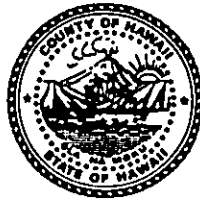


Stephen K. Yamashiro
Mayor



Virginia Goldstein
Director

RECEIVED

Norman Olesen
Deputy Director

County of Hawaii

95 JUN 13 P3:15

PLANNING DEPARTMENT (OFC. OF ENVIRONMENTAL
25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252 QUALITY CONTROL
(808) 961-8288 • Fax (808) 961-9615

June 6, 1995

Gary Gill, Director
Office of Environmental Quality Control
220 South King Street, 4th Floor
Honolulu, HI 96813

Dear Mr. Gill:

Final Environmental Assessment-Negative Declaration for the Development of a Master-Planned Residential Community to Consist of Approximately 246 Single Family Residential Units, 730 Multiple Family Residential Units and Its Related Improvements (Keauhou Development Parcel 53)

Applicant: Kamehameha Investment Corporation

Tax Map Key: 7-8-10: Portion of 2, Kahalu'u, North Kona, Hawaii

The County of Hawaii Planning Department has reviewed the Final Environmental Assessment for the subject project as well as comments received by this office during the 30-day public comment period on the draft environmental assessment-notice of determination which began on March 23, 1995. The Planning Department has determined that this project will not have significant environmental effect and has issued a negative declaration. Please publish notice of this determination in the June 23, 1995, OEQC Bulletin.

We have enclosed a completed OEQC Bulletin Publication Form and four copies of the final environmental assessment as required. Please contact Daryn Arai or Connie Kiriu of this office should you have any questions.

Sincerely,

Constance R. Kiriu

for VIRGINIA GOLDSTEIN
Planning Director

DSAsyw
LKameh06.DSA
Enclosures (OEQC Publication Form & 4 Copies of FEA)
cc: West Hawaii Office

1995-06-23-HI-PEA-Keauhou Resort Parcel 53 JUN 23 1995

KEAUHOU RESORT PARCEL 53
Final Environmental Assessment
County of Hawaii

Tax Map Keys:
7-8-10: Portion of 2

June 1995

OEQC BULLETIN PUBLICATION FORM

TITLE OF PROJECT: Keauhou Resort Parcel 53

LOCATION: ISLAND Island of Hawaii DISTRICT North Kona

TAX MAP KEY: 7-8-10: 2 portion

PLEASE CHECK THE FOLLOWING CATEGORIES:

Type of Action: Agency _____ Applicant xx

Applicable State of Federal Statute:

Chapter 343, HRS Chapter 205A, HRS NEPA (Federal Actions Only)

Type of Document:

<input type="checkbox"/> Draft Environmental Assessment (Negative Declaration anticipated)	<input type="checkbox"/> Draft EIS	<input type="checkbox"/> NEPA NOP
<input checked="" type="checkbox"/> Final Environmental Assessment Negative Declaration	<input type="checkbox"/> Final EIS	<input type="checkbox"/> NEPA Draft EIS
<input type="checkbox"/> Final Environmental Assessment (EIS Preparation Notice)	<input type="checkbox"/> NEPA FONSI	<input type="checkbox"/> NEPA Final EIS

Type of Revision (if applicable):

Revised Supplemental Addendum Other (please explain)

Prior to general distribution, please submit to OEQC: 4 copies of the Draft EA, Final EA (Negative Declaration or EIS Preparation Notice), 4 copies of the Draft EIS or Final EIS (For Draft and Final EIS's an additional copy is mailed to OEQC).

PROPOSING AGENCY OR APPLICANT SHOULD SUBMIT COPIES OF THE DOCUMENTS TO THE APPROVING AGENCY OR ACCEPTING AUTHORITY PRIOR TO SUBMITTING COPIES TO OEQC.

APPROVING AGENCY OR ACCEPTING AUTHORITY: County of Hawaii Planning Department

ADDRESS: 25 Aupuni Street, Suite 109

Hilo, Hawaii 96720

CONTACT: Virginia H. Goldstein, Director PHONE: 961-8288

PROPOSING AGENCY OR APPLICANT: Kamehameha Investment Corporation

ADDRESS: 78-6831 Alii Drive, Suite 234

Kailua-Kona, Hawaii 96740

CONTACT: Denise Hill, Manager, Special Projects PHONE: 322-0088

CONSULTANT: PBR HAWAII

ADDRESS: 101 Aupuni Street, Suite 310

Hilo, Hawaii 96720

CONTACT: James Leonard, Managing Director PHONE: 961-3333

COMMENT PERIOD END DATE:

— CONDITIONS WHICH TRIGGERED THE EIS LAW: PLEASE CHECK ALL THAT APPLY TO THE PROPOSED ACTION.

- | | |
|---|---|
| <input type="checkbox"/> Use of State or County lands or funds
HRS 353-5(a)(1) | <input type="checkbox"/> Use of lands in the Waikiki Special District
HRS 343-5(a)(5) |
| <input type="checkbox"/> Use of Conservation District Lands
HRS 343-5(a)(2) | <input type="checkbox"/> Amendment to a County General Plan
HRS 343-5(a)(6) |
| <input type="checkbox"/> Use of Shoreline Setback Area
HRS 343-5(a)(3) | <input type="checkbox"/> Reclassification of Conservation Lands
HRS 343-5(a)(7) |
| <input checked="" type="checkbox"/> Use of Historic Site or District
HRS 343-5(a)(4) | <input type="checkbox"/> Construction or modification of helicopter facilities
HRS 343-5(a)(8) |

— OTHER CONDITIONS:

Use of Special Management Area (City & County of Honolulu)

Other* _____

* If the project does not trigger HRS 343, please explain why document is being submitted to OEQC.

— SUMMARY of the proposed action or project to be published in OEQC Bulletin. Please submit it as a summary ready for publication. The description should be brief (300 words or less), yet provide sufficient detail to convey the full impact of the proposed action.

— Site Size/Location: The approximately 281-acre parcel site is located in the resort destination area of Keauhou, about 5 miles south of Kailua-Kona. The site is bounded by Kuakini Highway along the mauka side, Kamehameha III Road along the southern edge, and the proposed Alii Highway extension along the makai side. The approximately 20-acre 'Ohi'a Cave Preserve area abuts the southwestern boundary between the project site and the Keauhou Shopping Village.

— Proposed Action: The proposed project would consist of a master-planned residential community with a total of approximately 246 single family units and 730 multi-family units. The project has been master-planned in a manner that is responsive to the natural and cultural sensitivities of the site. Consistent with other developments within the Keauhou Resort area, residential densities would range from 2 to 3 units per acre within the single family neighborhoods and 8 to 15 units per acre within the multi-family neighborhood development areas. Overall, the project would have a density of approximately 3.5 units per acre.

— A concentration of archaeological sites are found primarily within the makai portion of the site, and an archaeological preserve area of approximately 25 acres is planned to provide an appropriate level of protection and separation from adjacent uses. Additional open space areas and buffers are planned along the major roadways and in areas of steeper slopes. In total, approximately 25 percent of the 281-acre site would be retained as open space. The open space areas and archaeological resources would be linked by an internal trail system in conjunction with an archaeological interpretation program. All utilities would be underground and uniform design guidelines would be implemented to maintain visual cohesion within the project and with the surrounding area.

— Environmental Impacts: No rare, threatened, or endangered species or unique species habitats were found as a result of flora and fauna surveys of the property. The soils that are present are generally thin and rocky, with relatively low agricultural value. The property has been used intermittently for cattle grazing. The property has no natural drainageways, and being situated inland from the shore, it is not subject to threat of flooding or tsunami inundation. The project site contains lands within the Kahalu'u Historic District, thereby, requiring compliance with the provisions of Chapter 343, HRS.

— NOTE: Since the deadline for EIS submittal is so close to the publication date for the OEQC Bulletin, please assist us by bringing the Document for Publication Form and a computer disk with the project description (size 3 1/2" or 5 1/4" disks are acceptable; preferably WordPerfect 5.1 or ASCII text format) to the Office of Environmental Quality Control as early as possible. Thank you.

KEAUHOU RESORT PARCEL 53
Final Environmental Assessment
County of Hawaii

Tax Map Keys:
7-8-10: Portion of 2

Prepared for:
Kamehameha Investment Corporation

Prepared by:
PBR HAWAII

June 1995

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1.0 Introduction

1.0 INTRODUCTION

1.1 PURPOSE AND CONTENT OF THIS DOCUMENT

This EA has been prepared in accordance with the provisions of the Hawaii Revised Statutes (HRS), Chapter 343, and Title 11, Department of Health (DOH), Chapter 200, Environmental Impact Rules, Sections 11-200-6 through 11-200-13. Section 11-200-6(b) establishes certain classes of action which subject the applicant to compliance with Chapter 343, HRS. These classes include:

- Use of State or County lands;
- Use of lands classified within the Conservation district;
- Use of the shoreline area;
- Use of any historic site, as designated within National or Hawaii Registers;
- Use within the Waikiki/Diamond Head area on Oahu;
- Any amendment to existing County General Plans that would result in designations other than Agriculture, Conservation, or Preservation;
- Use of State or County funds; and
- Construction of new, or expansion or modification of helicopter facilities.

The property is also located within the Kahalu'u Historic District, which is listed on the National Register of Historic Places (NRHP). The proposed use within the Kahalu'u Historic District, requires compliance with the provisions of Chapter 343, HRS. Therefore, this document serves as an EA for the proposed action at Keauhou. A description of the affected environment, the alternatives considered to date, proposed mitigation measures, preliminary impact determinations based on the information contained herein, and the reasons supporting those determinations are provided. The information contained within this EA has been developed from site visits, consultant reports, and available information regarding the environmental characteristics of the project site and surrounding area.

This Environmental Assessment (EA) has been prepared in support of the Special Management Area (SMA) Use Permit and Change of Zone applications to allow for a proposed residential development within the Keauhou Resort area on the Island of Hawaii. The proposed project site, encompassing approximately 281 acres, is located in Keauhou, North Kona, about five miles south of Kailua-Kona (Figures 1 and 2). The site lies between Kuakini Highway and the proposed Alii Highway extension, with an eastern boundary along Kamehameha III Road. The property is about 1,000 feet mauka of the shoreline of Kahaluu Bay, at elevations ranging between 100 and 600 feet above mean sea level (msl), and includes parcel 7-8-10: portion of 2 (Figure 3).

The applicant and property owner is Kamehameha Investment Corporation (KIC), which is owned by Pauahi Holdings Corp., a wholly owned subsidiary of Kamehameha Schools/Bernice Pauahi Bishop Estate (KSBE). Parcels 7-8-10: 28 and 57, encompassing approximately .75 acres, are located within the project area and owned by the State and County of Hawaii, respectively. These lands are used for water storage purposes. The lands on which the proposed development would be established are within the State Land Use Urban District and are designated for Urban Expansion and Low Density Urban use within the County General Plan Land Use Pattern Allocation Guide (LUPAG) map. The parcel is entirely within the County SMA and is currently zoned "Unplanned" (U).

1.2 REGIONAL SETTING

The close proximity of the project to the urban areas of Keauhou and Kailua-Kona would provide residents of the community with easy access to job opportunities, health care services, shopping, recreation, and leisure activities. Presently, the subject property is vacant and overgrown with scrub vegetation, as is the adjacent property directly to the north. Nearby land uses consist of both single and multi-family residential units, the Keauhou Shopping Village, a golf course, and other resort-oriented urban developments. The 'Ohi'a Cave Preserve, consisting of approximately 20 acres, abuts the southern boundary and is situated between the project site and the Keauhou Shopping Village at the intersection of Kamehameha III Road and Alii Drive.

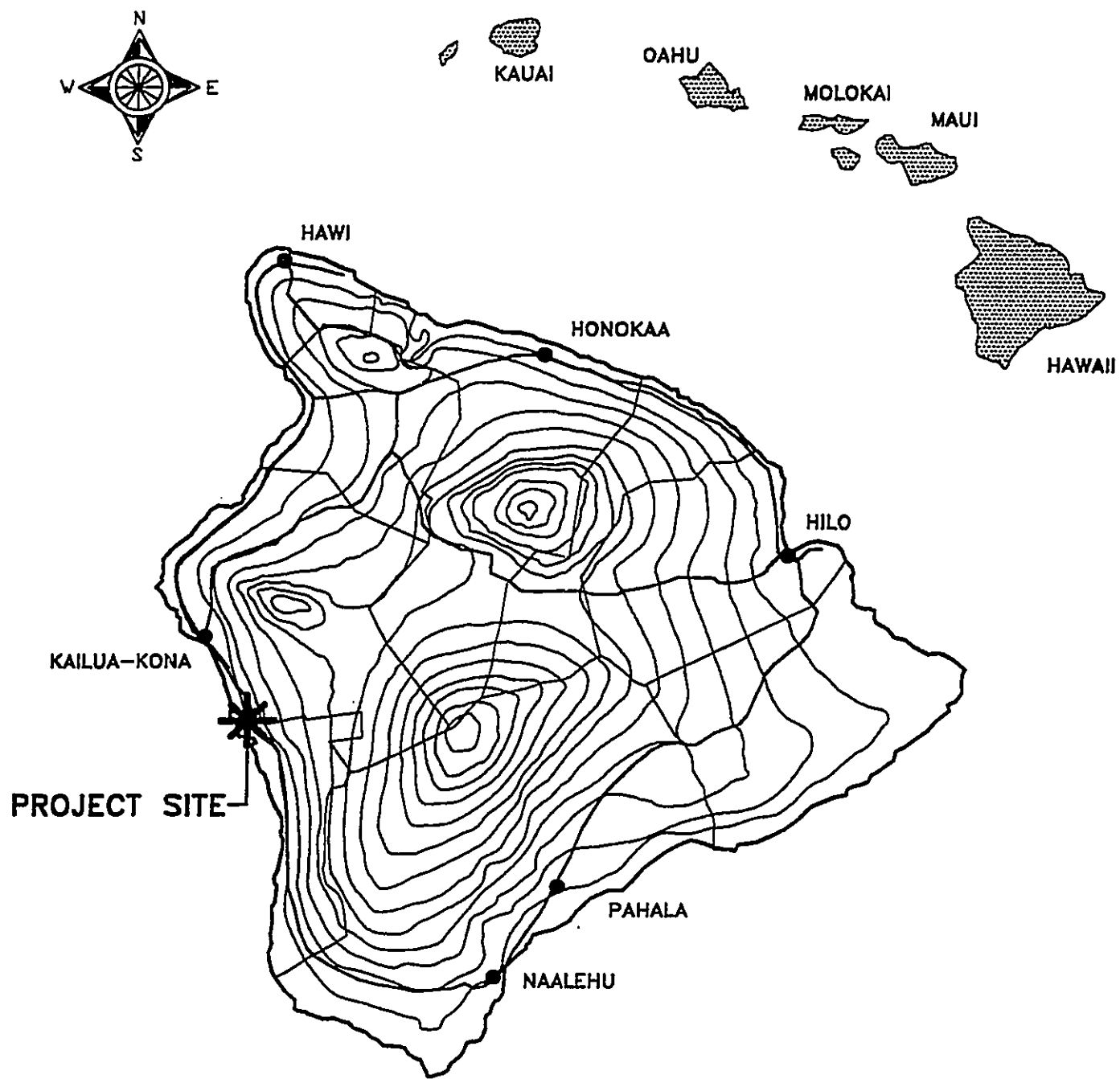


Figure 1
 ISLAND LOCATION MAP
 KEAUHOU PARCEL 53



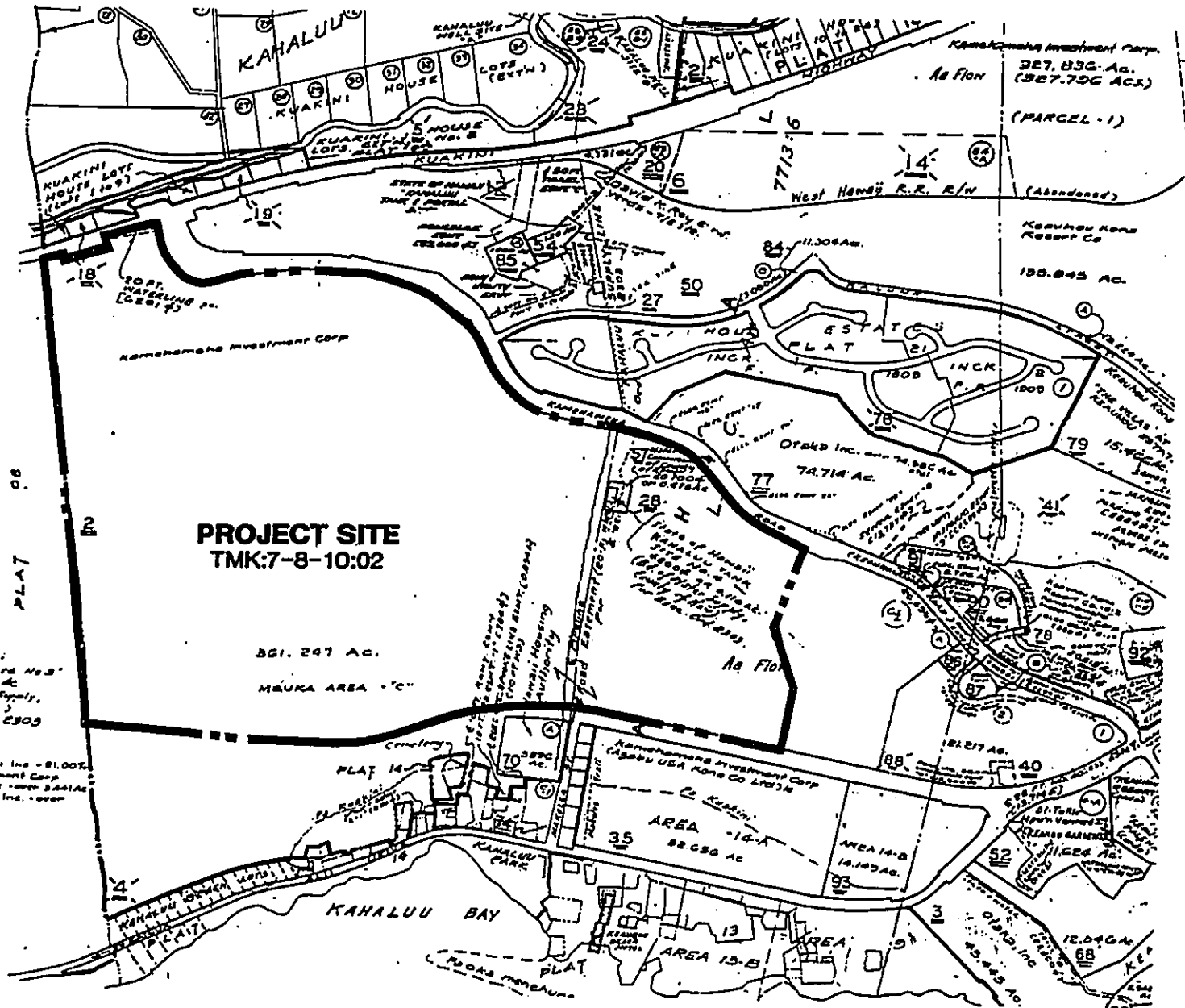


Figure 3
 TAX MAP KEY
 KEAUHOU PARCEL 53



1.3 REQUESTED GOVERNMENTAL ACTION

Regulatory approvals required for the proposed development include those for an SMA Use Permit, Change of Zone, and Subdivision.

1.4 DESCRIPTION AND PURPOSE OF THE PROPOSED ACTION

1.4.1 Description of the Proposed Action

The subject property is bordered by Kuakini Highway along the mauka side, by Kamehameha III Road along the southern edge, and by the proposed AIII Highway extension along the makai side. Located at the intersection of the three major access roadways leading into Keauhou Resort, the subject property will establish the resort character as the "gateway" into the Keauhou community.

The proposed project consists of a master-planned residential community within the resort destination area of Keauhou, and is comprised of a variety of single and multi-family units (Figure 4). A steep slope running in a north/south direction midway through the property provides a natural division into mauka and makai development areas. As proposed, both the makai and mauka development areas would have primary and secondary access through an internal loop road designed to work with the natural terrain.

The mauka portion of the project will consist primarily of single family detached homes. Larger lots will be located in areas of steep slope to avoid excessive grading or other site alterations. Multi-family development will occur makai of the main entry to take advantage of the relatively gentle slopes and views. The bases of the steeper slopes in the makai area are primarily planned for multi-family development with some attached and single family homes.

A total of approximately 246 single family and 730 multi-family residential units are planned in neighborhoods that range in density from 2 to 3 units per acre in the single family neighborhoods, and approximately 8 to 15 units per acre in the multi-family development areas. The project would be developed in three phases; the timing and distribution of which would be dependant upon market conditions. Preliminary plans for

LEGEND

		Approximate Acres
MF	Multi-Family (680 - 730 units)	± 72
SF	Single Family (220 - 246 units)	± 120
OS	Open Space/Roads	± 64
AR	Archaeological Resource	± 35

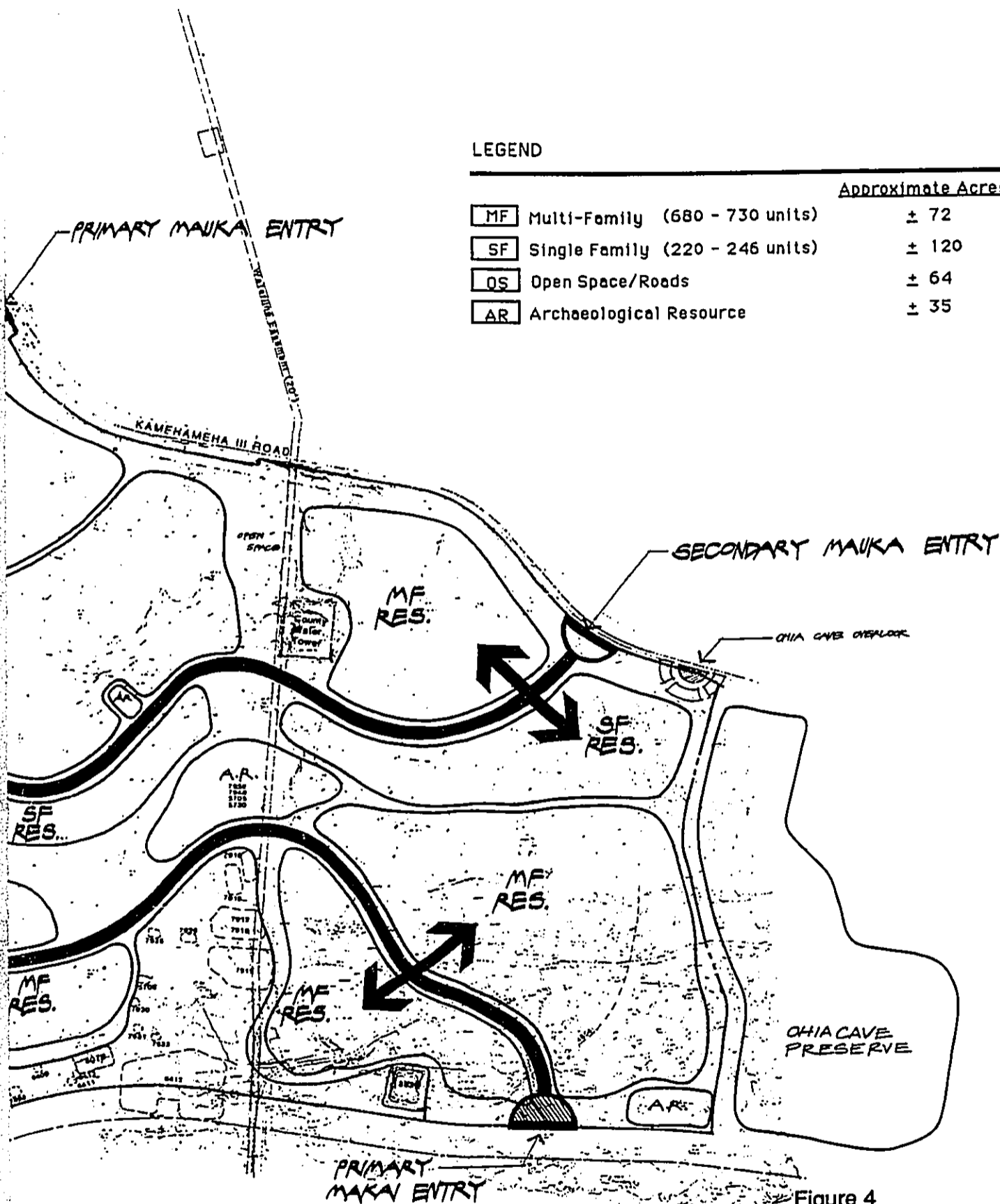


Figure 4
PRELIMINARY DEVELOPMENT
PLAN
KEAUHOU PARCEL 53



Phase I call for development of the mauka area, consisting of both single and multi-family units. Phase II would consist primarily of multi-family development near the proposed primary makai entry road, and Phase III would complete the project with development near the entry of the northern access roadway connecting onto the planned AIII Highway Extension.

The proposed development has been master planned to respond to the topographical characteristics of the site and environmental considerations of the area, including the integration and protection of important archaeological sites and site complexes. Those portions of the site not planned for residential development consist of steep slopes, archaeological reserves, and open space buffers located between residential areas and major roadways, such as Kamehameha III Road and AIII Highway. These open space resources, consisting of approximately 25 percent of the project site, would be connected by an internal pedestrian trail system, and uniform landscape design guidelines would be enforced through restrictive covenants. Archaeological resources would be protected by the use of these open space buffers, and archaeological interpretive signage is planned in conjunction with the more significant archaeological sites to convey the cultural and historic significance of the project area to residents and visitors.

1.4.2 Purpose of the Proposed Action

The purpose of the proposed project is to provide a broad mix of residential opportunities in the North Kona area in response to existing and projected market demands. A market study (Appendix A), conducted for the proposed project, indicates a steadily increasing demand for retirement, second-homes, vacation rental units, and some upper and primary/local housing units. The proposed project is located in close proximity to the amenities of Keauhou Resort to satisfy a portion of the projected market demand for primary and secondary homes in the North Kona area.

2.0 General Description of the Proposed
Action's Technical, Social, Economical
and Environmental Characteristics

2.0 GENERAL DESCRIPTION OF THE PROPOSED ACTION'S TECHNICAL, SOCIAL, ECONOMIC AND ENVIRONMENTAL CHARACTERISTICS

2.1 DESCRIPTION OF THE SOCIAL AND ECONOMIC CHARACTERISTICS OF THE PROPOSED ACTION

2.1.1 Existing Conditions

2.1.1.1 Land Use

The subject property is currently within the State Land Use Commission (SLUC) Urban district (Figure 5). The SLUC Urban district is generally defined as lands in urban use with sufficient reserve to accommodate foreseeable growth. Land uses within the Urban districts are administered exclusively by the Counties in which they are located.

The County LUPAG map designation is Urban Expansion and Low Density Urban (Figure 6). The LUPAG, an essential part of the Hawaii County General Plan, was envisioned to provide a general and long range guide related to land use within the County. The category of Urban Expansion Area is defined as those areas that allow for a mix of high density, medium density, low density, industrial 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. The Low Density Urban category characterizes single family residential areas, ancillary community and public uses, and convenience-type commercial uses, (Hawaii County Planning Department, 1989 General Plan, p. 78).

The County Zoning Code is the legal instrument that regulates the use of land and implements the General Plan. As an integrated portion of County Land Use Policy, the Zoning Code deals particularly with existing conditions and short-range needs. The County zoning designation classifies the entire project site as Unplanned (U). Single and Multi-Family Residential (RS and RM), Open (O), and Unplanned (U) zoning districts are located to the east and north, and Village Commercial (CV) and Multi-Family Residential (RM) to the south and west.

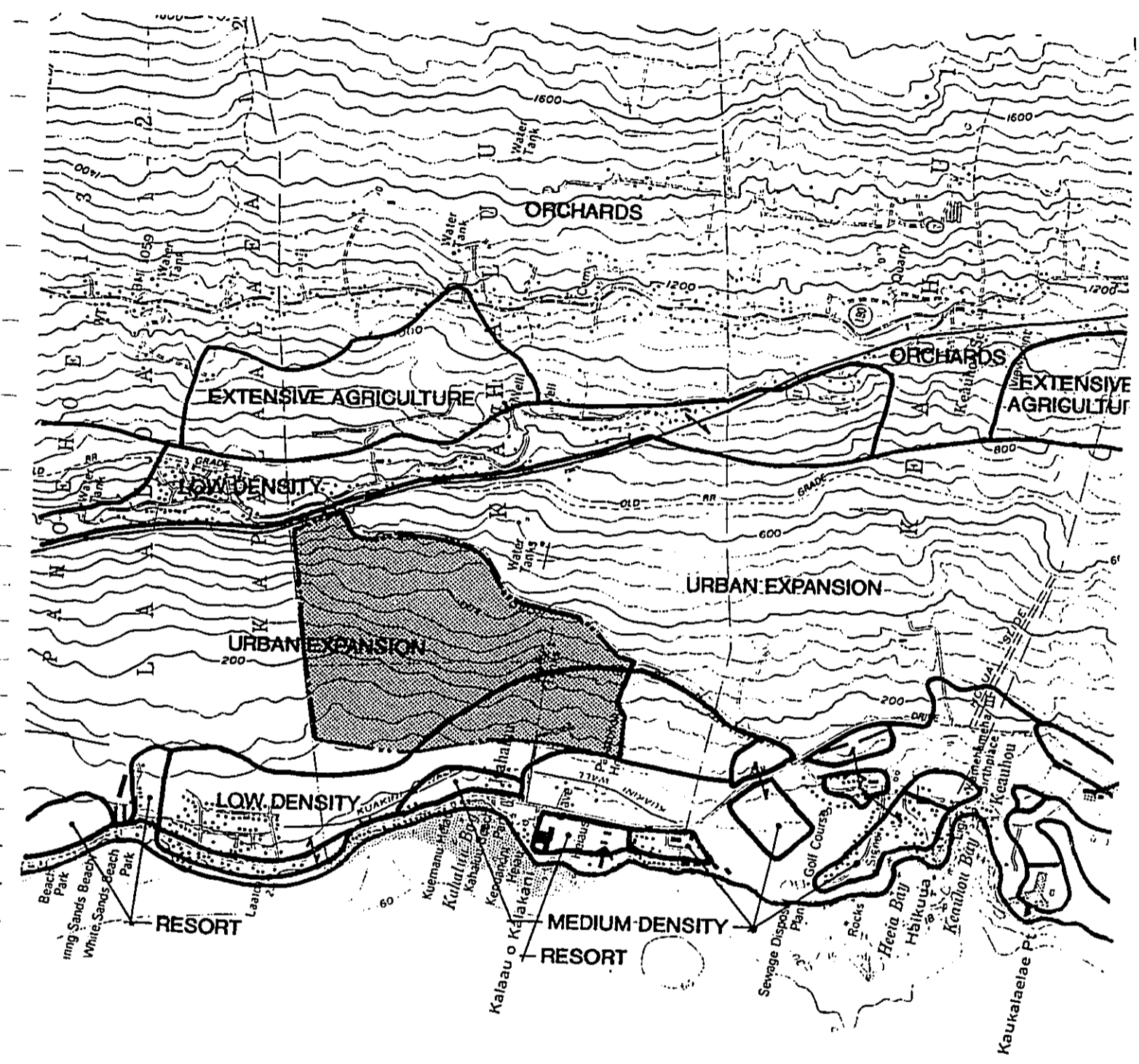
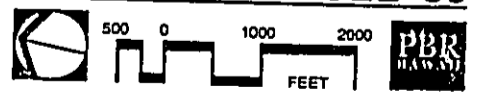


Figure 6
 COUNTY GENERAL PLAN
 KEAUHOU PARCEL 53



SOURCE: THE GENERAL PLAN-HAWAII COUNTY, ORDINANCE NO. 89-142 NOVEMBER 1989

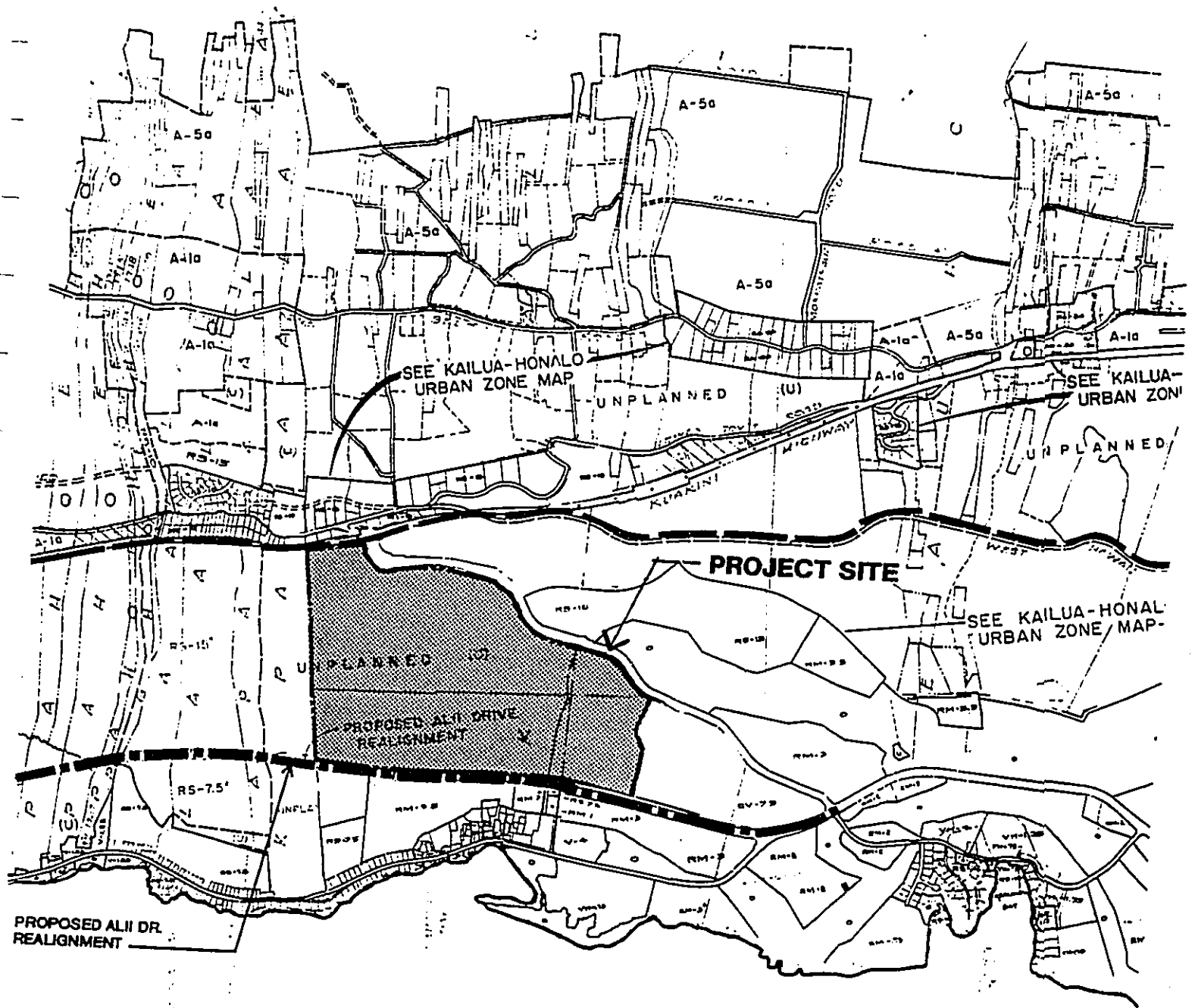
The project site is located within the County-designated SMA, which extends from the coastline to Kuakini Highway (Figure 7). Guidelines to manage and protect the resources in the SMA were set forth by the Shoreline Protection Act of 1975, which adopts many of the features of the Federal Coastal Zone Management (CZM) Act of 1972. An SMA Use Permit is required for the proposed action.

2.1.1.2 Population and Housing

Census figures reported in the 1991 Department of Business and Economic Development (DBED) Data Book indicate that the population of North Kona has increased from 13,748 persons in 1980 to 22,284 in 1990. This represents an average annual population increase of 6.2 percent during those ten years. From 1970 to 1980, the growth rate was 18.5 percent per year.

Based on past trends, preliminary population projections by the County of Hawaii Planning Department indicate that population in the North Kona district will increase by approximately 30,336 persons by the year 2010 to a total of over 56,620 persons, more than double the current population. Of the 22,284-person population in North Kona, 21,696 are in households. As indicated in the 1991 Hawaii County Data Book, the total number of households in the North Kona district is 7,898, which accounts for approximately 2.75 persons per household.

The projected population and persons per household provide an indication of how much housing will be necessary to meet future market demand. A recent study prepared for KIC, based on demonstrated resort housing market conditions for the past 20 years, projected that demand for new resort residential units in Hawaii will average 400 units per year from 1991 to 1999 and increase to 530 units per year from 2000 to 2010. The residential development at Keauhou is anticipated to meet demands for retirement, second-home, and vacation rental units, as well as some upper-end primary/local housing units. The proposed project is expected to capture approximately 15 to 20 percent of the market, absorbing an average of 80 units per year (Lesser, 1991:18).

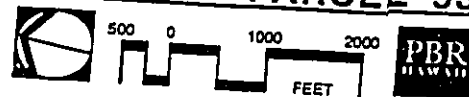


LEGEND

- | | |
|--|--|
| A-5a AGRICULTURE, 5 ACRE MIN. LOT | RS-7.5 AGRICULTURE, 7,500 SQ.FT. MIN. LOT |
| A-1a AGRICULTURE, 1 ACRE MIN. LOT | U UNPLANNED |
| RS-15 AGRICULTURE, 15,000 SQ.FT. MIN. LOT | — SMA BOUNDARY |

SOURCE: NORTH-KONA ZONING MAP, COUNTY OF HAWAII, PLANNING COMMISSION
ORDINANCE NO. 74, FEB. 17, 1967

Figure 7
COUNTY ZONING/SMA
KEAUHOU PARCEL 53



2.1.1.3 Employment

In 1990, the civilian labor force of North Kona amounted to 11,037 persons, of which 10,732 were employed. The unemployment rate averaged 2.9 percent, according to 1991 data from the State Department of Labor & Industrial Relations. The more recent downturn of the economy has, however, resulted in a significant reduction of construction, tourism, and agricultural activities. According to the State Department of Labor & Industrial Relations, the unemployment rate for the Island of Hawaii in 1993 was estimated at 7.3 percent, as compared to an islandwide average of 3.8 percent in 1990.

The employment potential related to construction of the proposed residential community may generally be classified as being direct, indirect, or induced. Direct effects refer to employment supported directly by construction activity and include onsite laborers, operatives, and craftsmen, as well as the professional, managerial, sales, and clerical workers whose usual place of employment may be elsewhere on the Island or in the State. Direct construction employment may be sustained over the estimated 20-year project buildout period. Based on the economic impacts of projects of a similar nature, it is estimated that the number of full-time direct employees generated during the construction of the proposed community will average 73 employees per year.

Indirect and induced effects result from the additional employment stimulated from the direct employment of construction workers. Based on data from DBED, it is estimated that 1.79 other full-time jobs are created for every full-time job in the construction industry. Using 1.79 as a multiplier, 131 indirect and induced jobs are anticipated to be supported by the construction activity associated with the proposed action.

Agriculture, including cattle ranching, fruit growing, and the coffee industry, has historically provided the economic base for the region. However, the importance of these industries has recently diminished, primarily due to employment opportunities created by the rapidly expanding visitor industry.

2.1.2 Social and Economic Characteristics of the Proposed Action

In spite of recent downturns in tourism and the economy, the long-term trend for increased housing needs remains strong. The market study conducted for the resort shows that demand will continue well into the future; and the proposed project, as a component of the Keauhou Resort Community, would fill a niche in the market by satisfying the demand for an amenity-oriented residential resort project at a price level below competing luxury and super luxury resorts on Hawaii. The primary social characteristics of the proposed master-planned residential development would be to provide additional housing and employment opportunities for present and future residents of the region. As such, the social characteristics of the proposed action are expected to be positive. Similarly, the economic characteristics of the proposed action are expected to be positive in that establishment of the planned residential development would provide construction-related jobs. Most construction employment is expected to be filled by the resident population commuting from North and South Kona.

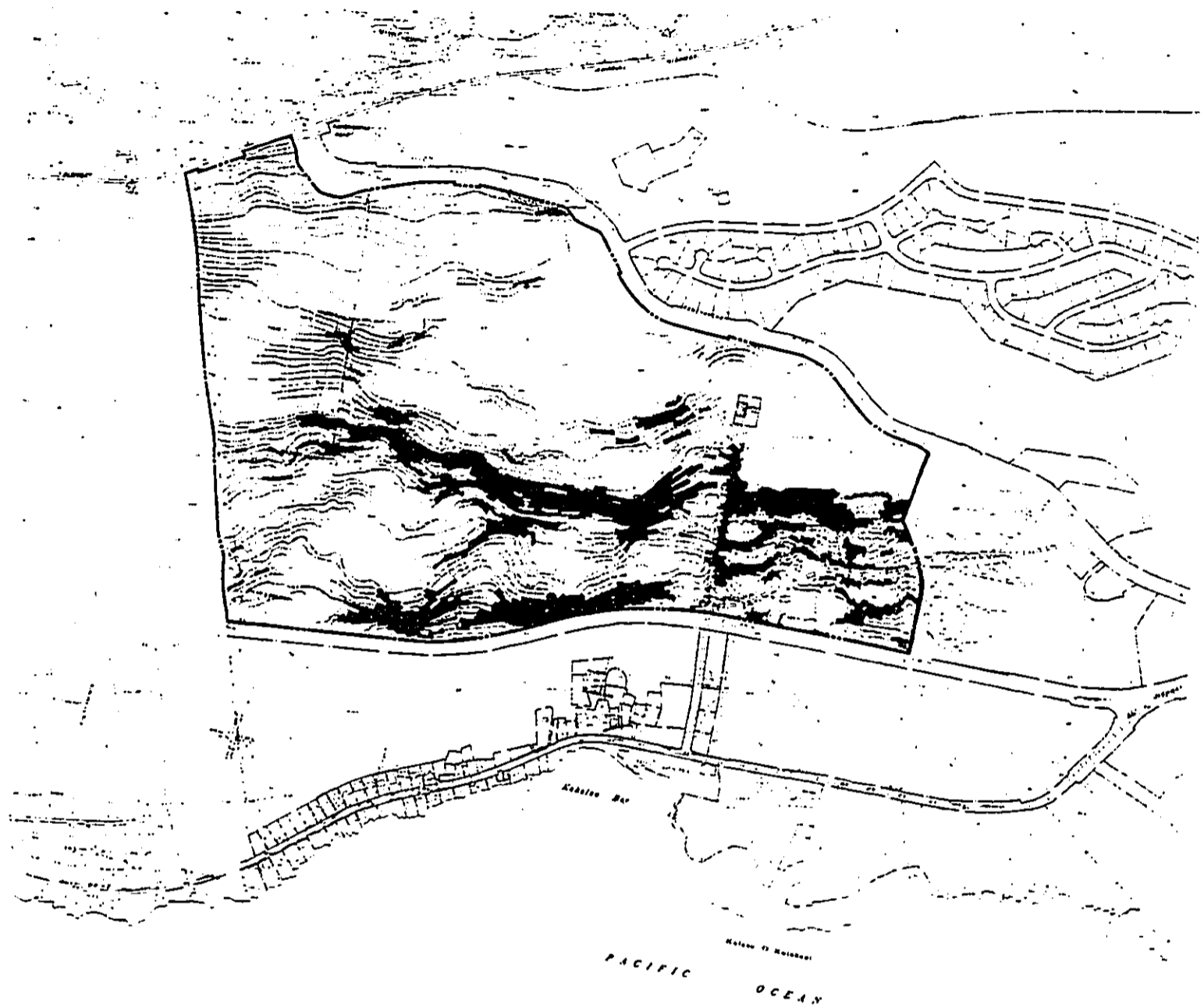
2.2 DESCRIPTION OF THE ENVIRONMENTAL CHARACTERISTICS OF THE PROPOSED ACTION

2.2.1 Existing Conditions

2.2.1.1 Geology, Physiography and Climate

The site is presently vacant and rises from the 110 foot elevation at the future All Highway alignment to the approximately 600 foot elevation at the intersection of Kuakini Highway and Kamehameha III Road. Located on remnants of lava flows from Hualalai, the property is geographically similar to other sites within the Keauhou Resort. These areas are characterized primarily by exposed a'a lava rockland and scattered pahoehoe exposures. The little soil present consists almost entirely of shallow, small pockets of slowly decaying organic matter. The general slope of the property is approximately 15 percent, with some steeper areas exceeding 20 percent within limited portions of the site (Figure 8).

Winds in this region are often light and variable due to the wind shadow effect caused by Hualalai and Mauna Loa, though, storms from the south during winter months can bring very strong winds for brief periods.



LEGEND

	LESS THAN 5% SLOPE
	5 TO 10%
	10 TO 20%
	GREATER THAN 20% SLOPE

Figure 8
SLOPE MAP
KEAUHOU PARCEL 53



CORRECTION

THE PRECEDING DOCUMENT(S) HAS
BEEN REPHOTOGRAPHED TO ASSURE
LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

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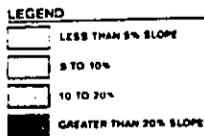
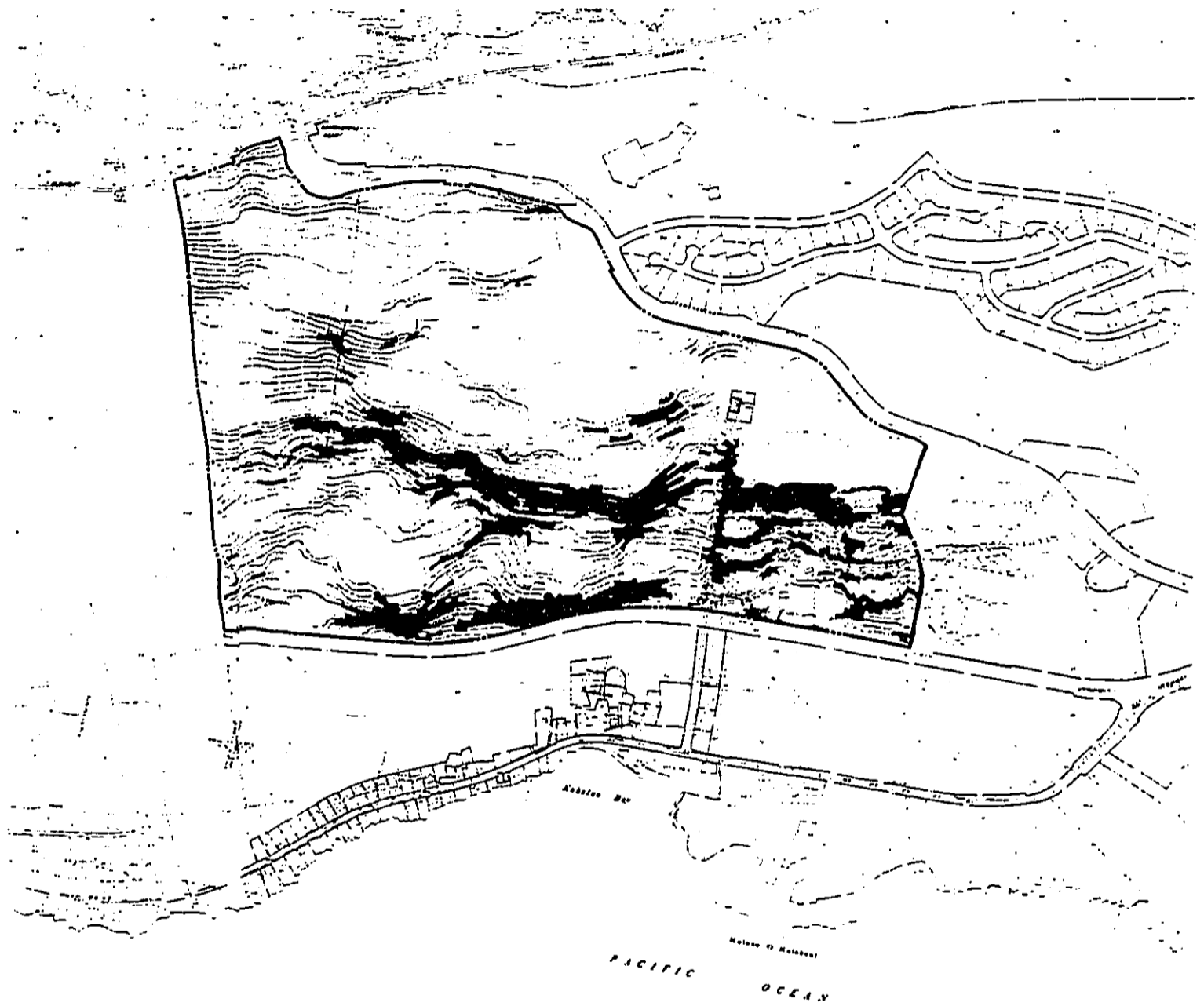


Figure 8
SLOPE MAP
KEAUHOU PARCEL 53



Temperatures range from the low 60 degrees Fahrenheit to a maximum in the high 80 to lower 90 degrees Fahrenheit. Average annual rainfall is approximately 30 inches, the majority occurring during the summer months--a characteristic unique to the Kona coast. All other parts of the Hawaiian Islands receive the highest average rainfall during the winter.

2.2.1.2 Soils and Agricultural Potential

As noted, the project site and surrounding areas have relatively little soil cover, generally following patterns of lava flows and drainageways. According to the United States Department of Agriculture Soil Survey, shown in Figure 9, the soils found on the subject property consist of Punalu'u extremely rocky peat (rPYD), Pahoehoe lava flows (rLV), and Kaimu extremely stony peat (rKED). None of these soil types are particularly agriculturally significant. The rPYD is a well-drained, thin organic soil that varies from 3 to 8 inches in thickness. Water permeates rapidly and runoff is slow, with virtually no erosion hazard. Nearly 85 percent of the subject property is covered by this soil. The rLV soil is essentially a'a lava. This type of lava is generally consists of rough, broken masses of clinkered lava with practically no soil covering. Surface water percolates readily through the rough and broken lava. The rKED is dark brown, extremely stony peat, approximately 0 to 3 inches deep. Permeability is rapid, runoff slow, and erosion hazard slight. None of the soils identified by the soils report are suitable for soil-based agriculture.

The Land Study Bureau Detailed Land Classification Report for the Island of Hawaii has designated approximately one-third of the subject lands as Class E, the lowest rating for productivity (Figure 10). The remaining two-thirds are rated "D", which is also generally unsuitable for soil-based agriculture.

The Department of Agriculture, Agricultural Lands of Importance to the State of Hawaii (ALISH) system of land classification identifies a small portion of the southeastern end of the property, comprising less than 5 percent of the total project area as "Other" agricultural land (Figure 11).

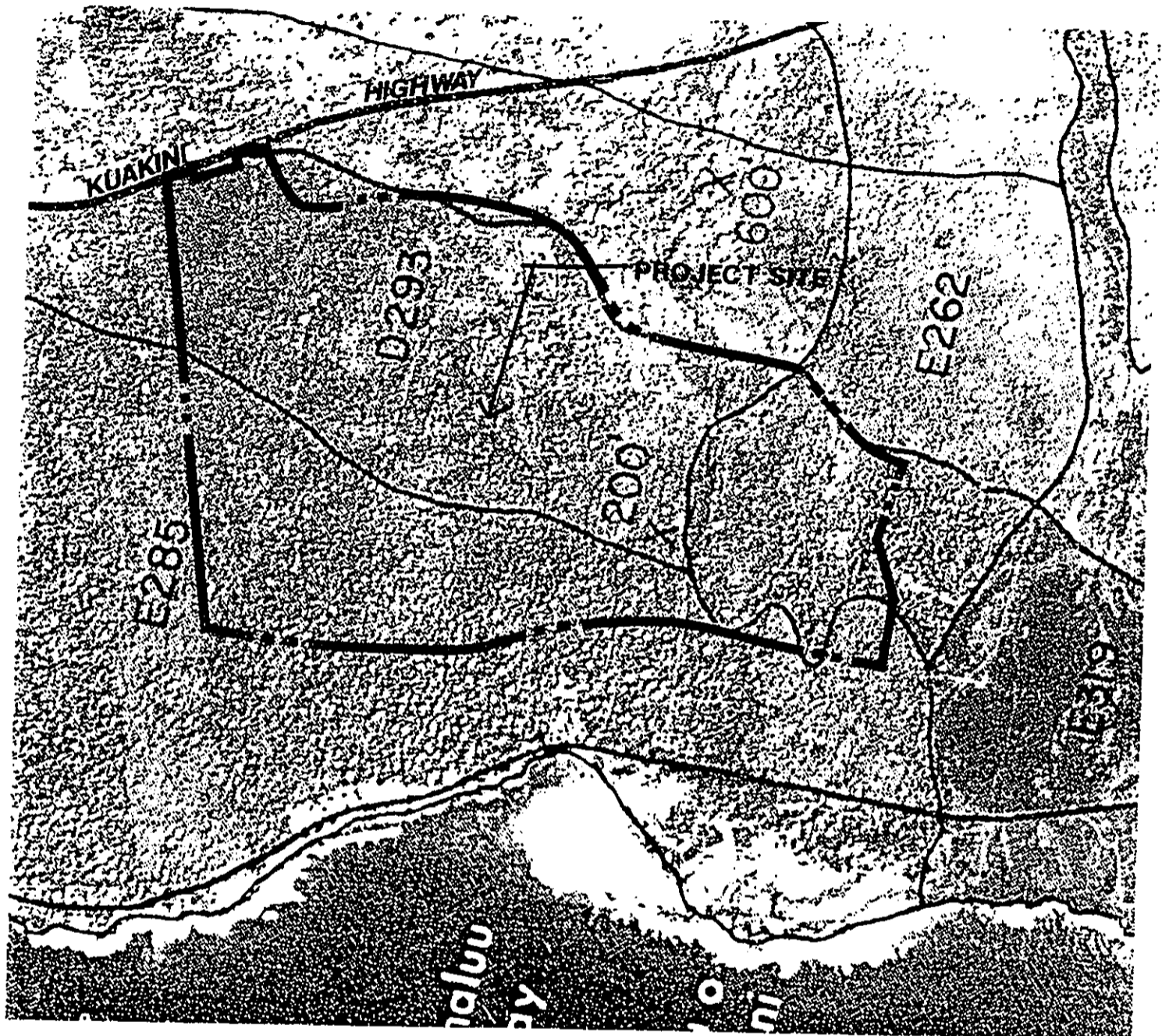
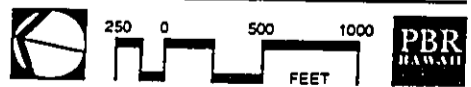


Figure 10
DETAILED LAND
CLASSIFICATION
KEAUHOU PARCEL 53



2.2.1.3 Surface Water and Drainage

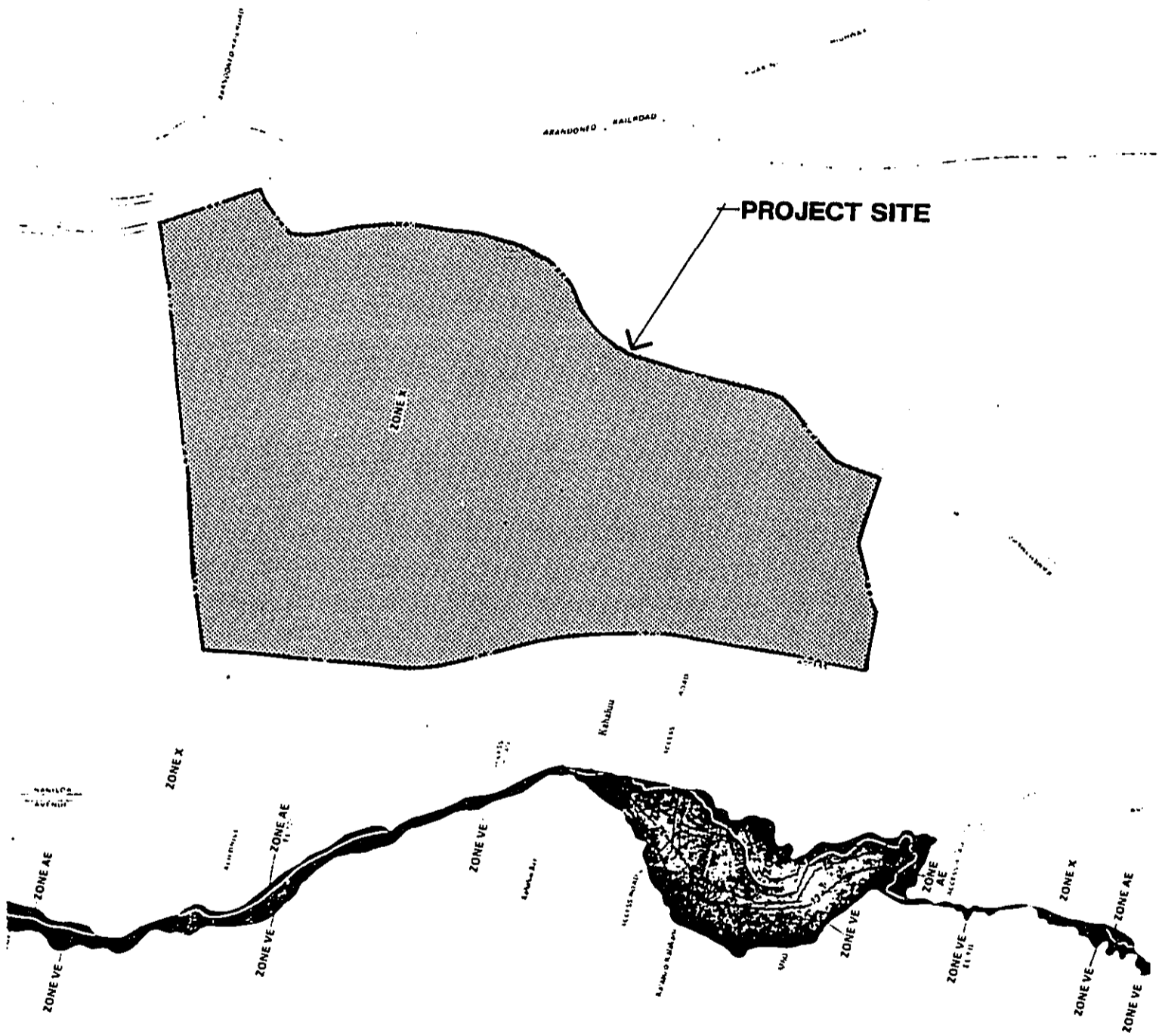
The project lands are situated within an area of relatively low rainfall amounts (20 to 30 inches annually) and intensities. The land is comprised of porous and unweathered lavas and has sparse soil cover. Consequently, no naturally occurring or well-defined drainageways or drainage outlets are found onsite, and surface water runoff occurs only at rare times of intense rainfall. The Flood Insurance Rate map (FIRM) shows that no areas of the project site are subject to flooding (Figure 12).

2.2.1.4 Groundwater and Hydrology

The domestic water supply along the Kona coast is derived primarily from the basal groundwater lens. At the project site, rainfall is normally adequate to furnish a limited catchment supply; however, the only reliable source is from groundwater. The site contains no perennial streams.

Several wells developed recently in the area indicate a substantial potable water resource capable of meeting the projected demands for future development in the Keauhou vicinity. In 1990, the applicant developed a well above Keauhou at the 1,620 foot elevation. This well was tested and showed a capacity of approximately two million gallons per day. In 1992 and 1993, two additional wells were developed south and north of the first well, and were shown to have similar potential capacity as the first. Water levels at the three wells range from the 228 to 386 foot elevation, indicating a substantial high-level potable water source in this area. Although all three wells indicate good potential potable water sources for the area, they are not expected to be in operation for several years.

In Keeli, to the south of Keauhou, the applicant, through its parent company, KSBE, contributed land to the County as a well site. In exchange, the County Department of Water Supply has provided the applicant with water commitments to meet its other development requirements. The County has since developed a well at the Keeli site and placed it into production to supplement the water system for South Kona, which is tied with the North Kona system serving the Keauhou area.



LEGEND

- VE** 100 YEAR FLOODS, COASTAL FLOOD WITH VELOCITY HAZARD(WAVE ACTION); BASE FLOOD ELEVATIONS DETERMINED
- AE** 100 YEAR FLOODS: BASE FLOOD ELEVATIONS DETERMINED
- X** AREAS DETERMINED TO BE OUTSIDE 500 YEAR FLOOD PLAIN

SOURCE: FLOOD INSURANCE RATING MAP, NATIONAL FLOOD INSURANCE PROGRAM, HAWAII COUNTY, HAWAII, PANEL NO. 155166-0926C TO 0929C SEPTEMBER 16, 1988

Figure 12
FLOOD INSURANCE RATE MAP
KEAUHOU PARCEL 53



2.2.1.5 Air and Noise Quality

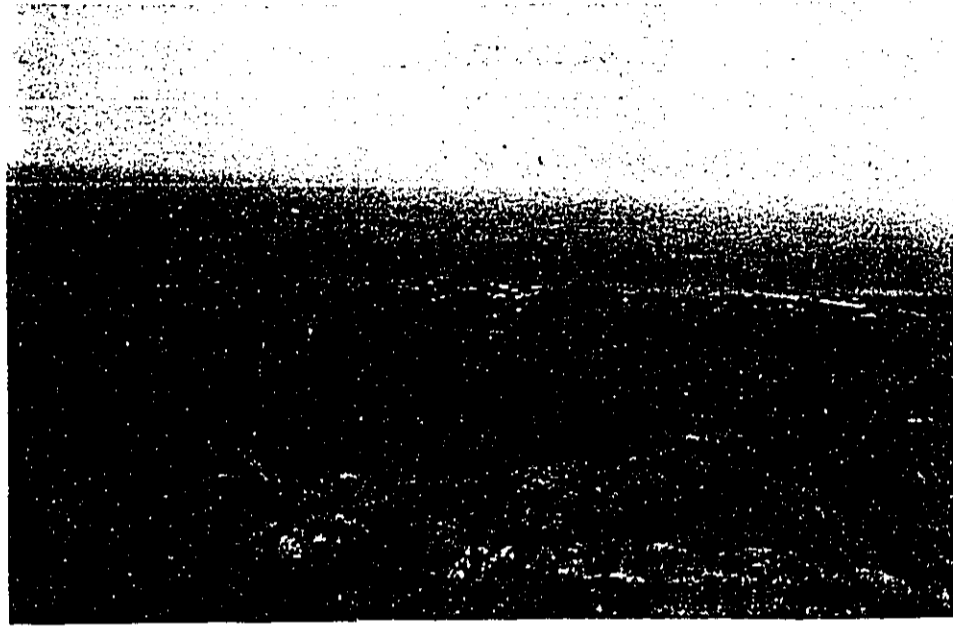
Generally, air quality is affected by regional and local climate together with the amount and type of human activity in a given location. Both Federal and State standards, which regulate six parameters, have been established to maintain ambient air quality. These parameters include: particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and lead. There are no State or County air quality monitoring stations in the vicinity of the project site, however, a monitoring station is planned to be located in the South Kona district near the intersection of Haleki'i Street and Mamalahoa Highway. Little air-quality monitoring data is currently available for the area, but it appears likely that both State and Federal ambient air quality standards are currently being met despite the persistent volcanic haze (vog).

Kilauea Volcano, over 50 miles away, has been the dominant contributing factor to air pollution for the past several years. No large stationary sources of air pollutants and no major industries are located within the Keauhou area to contribute, so the air quality in the vicinity of the project is affected primarily by such natural emissions, and by agricultural and/or vehicular sources. Other natural sources of air pollution that may affect the air quality of the site include the ocean, plants, and windblown dust.

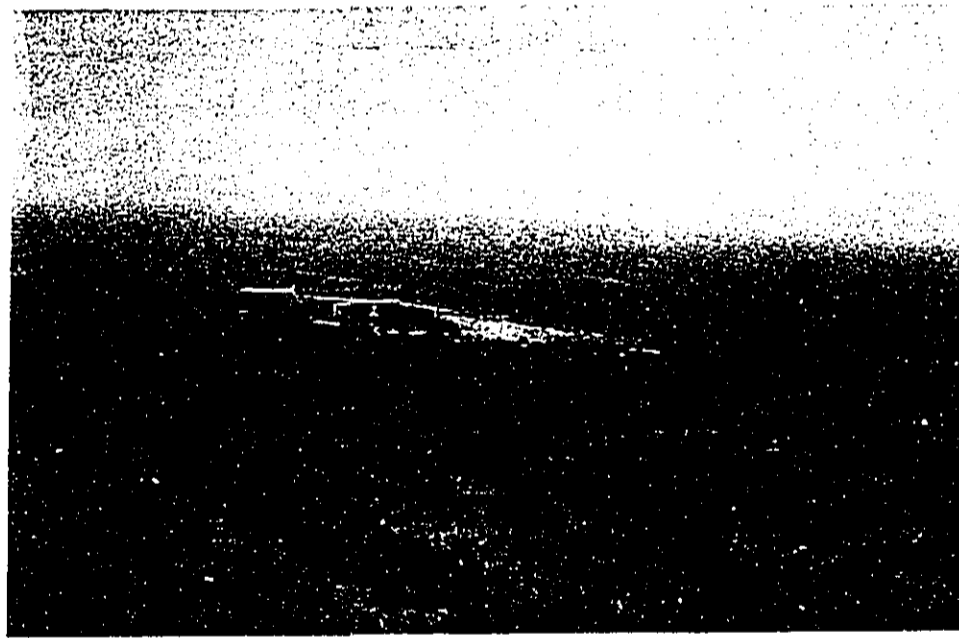
Data generated by previous noise studies in the project area indicates that the existing noise quality of the subject property site is dominated by motor vehicle traffic movement along King Kamehameha III Road and Alii Highway; and to a limited degree, noise generated by the shopping center activities; and natural factors, including wind moving through vegetation. The project site is currently exposed to low noise levels, less than 55 dBA, typical of rural or low density urbanized areas.

2.2.1.6 Visual Attributes

The lands on which the project would be developed range from an elevation of approximately 110 feet at Alii Drive to approximately 600 feet at the intersection of Kuakini Highway and Kamehameha III Road at the mauka property boundary. The visual characteristics of the project site are shown in Figures 13 through 16. As shown, the project site is characterized by dense scrub ground cover and widely scattered emergent trees.



A-1: View West From Kuakini Highway



A-2: View Southwest From Kuakini Highway

Figure 14
SITE PHOTO A & B
KEAUHOU PARCEL 53





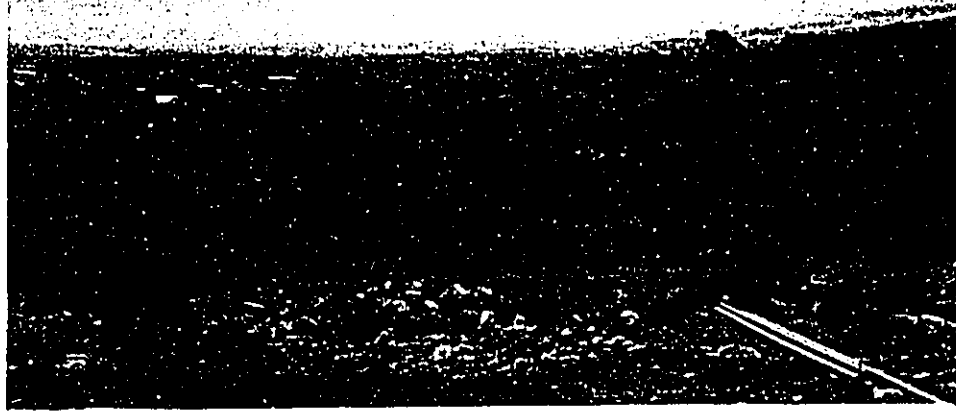
B-1: View West From Kamehameha III Road Toward the Keauhou Beach Hotel



B-2: View Southwest From Kamehameha III Road Toward the Kona Lagoon Hotel

Figure 15
SITE PHOTO C & D
KEAUHOU PARCEL 53





C-1: View North From The Keauhou Shopping Village, Phase II,
Toward Kailua-Kona



C-2: View East From Keauhou Shopping Village, Phase II,
Toward Kamehameha III Road and Keauhou Estates

Figure 16
SITE PHOTO E & F
KEAUHOU PARCEL 53



2.2.1.7 Flora and Fauna

A botanical survey of the project site was conducted by Char & Associates (Appendix B). The flora of the project site consists of varied scrubs, including dense koa haole (*Leucaena leucocephala*) and widely scattered emergent trees, the majority of which are klawe (*Prosopis pallida*), woman's tongue (*Albizia lebeck*), and 'opiuma (*Pithecellobium dulce*). No rare or endangered species are found onsite. Trees are a more prominent component of the vegetation in the upper portion of the site, and include the Chinese banyan (*Ficus microcarpa*), tamarind (*Tamarindus indica*), and jacaranda (*Jacaranda acutifolia*). Trees seen at lower elevations include monkey pod (*Samanea saman*), African tulip (*Spathodea campunulata*), Chinaberry (*Melia azedarach*), kukui (*Aleurites moluccana*), mulberry (*Morus* sp.), and papaya (*Carica papaya*). At one location along Kamehameha III Road, the pink orchid tree is forming a large colony.

Beneath the koa haole, the ground is covered with a dense growth consisting almost entirely of tallnum (*Tallnum triangulare*), air plant (*Kalanchoe pinnata*), Chinese violet (*Asystasia gangetica*), and Guinea grass (*Panicum maximum*). On rocky outcrops, there is a thinner and more diverse cover, including sida (*Sida spinosa*), malvastrum (*Malvastrum coromandelianum*), beggar's ticks (*Blidens cynapiifolia*), boerhavia (*Boerhavia coccinea*), popolo (*Solanum americanum*), spurge (*Chamaesyce hirta*), 'uhaloa (*Waltheria indica* var. *americana*), Madagascar periwinkle (*Catharanthus roseus*), Stachytarpheta (*Stachytarpheta jamaicensis*), 'ille'e (*Plumbago zeylanica*), sour grass (*Digitaria insularis*), and rouge plant (*Rivina humilis*).

The fauna of the proposed development site is common to Hawaii and includes migratory shorebirds and several species of exotic (introduced) birds. The most abundant of these are the Japanese White-eye (*Zosterops japonicus*), Zebra Dove (*Geopelia striata*), House Finch (*Carpodacus mexicanus*), and Yellow-billed Cardinal (*Paroaria capitata*).

The only feral mammals observed onsite were the Small Indian Mongoose and cats, however, it is likely that rats and mice inhabit the site in numbers typical of similar habitats along this coastline. Although the endemic and endangered Hawaiian Hoary

Bat (*Lasiurus cinereus semotus*) has been reported to frequent the Kona coast, none were observed onsite during the two night field survey. A copy of the Survey of Avifaunal and Feral Mammals, conducted by Phillip L. Bruner, is included as Appendix C.

2.2.1.8 Historical and Archaeological Resources

In 1988, an Archaeological Inventory Survey of the subject parcel, conducted by Paul H. Rosendahl, Inc. (PHRI), detailed findings with general significance assessments and recommended general treatments for all cultural remains. These findings were organized into a final report for the present project in 1993 (Appendix D). The four overall objectives of the present project inventory survey were to: 1) identify and locate all sites and features of potential archaeological significance that are present within the specified project area; 2) evaluate the potential general significance of all identified archaeological remains; 3) determine the possible impacts of the proposed development on the identified remains; and 4) define the general scope of any subsequent data collection and/or mitigation work that might be necessary or appropriate.

The study found that the project area was located entirely within the historic Kona Field System, and nearly the entire project area is situated within the boundaries of the Kahaluu Historic District. The Kahaluu Historic District (Site 4150) has been placed on the NRHP. The district was nominated to the register for several reasons, including the following: a) the district contains numerous heiaus within a relatively small area; b) the unique architecture of several of the heiaus; c) the value of the petroglyphs within the area; d) the district's association with important traditional political and religious activities; and e) the region's high scientific research value. The Kona Field System (Site 6601), which has also been declared eligible for inclusion on the NRHP, is a complex of aboriginal Hawaiian dry land cultivation and habitation remains. This area of approximately 3 by 18 miles, extends from Kailua south to Ho'okena.

One of the primary objectives of the survey was to determine the possible extent of functions and periods of use for project area sites and features. A total of 251 separate sites, comprising 36 functional types, were identified within the project area. These sites were discovered to contain a wide range of formal feature types, which were reduced to 14 general functional categories. These general functional interpretations include

habitation, possible burial, agriculture, indeterminate, boundary, ceremonial, habitation-possible burial, marker, transportation, habitation-ceremonial, habitation-refuge, ceremonial-possible burial, storage, and quarry. The archaeological landscape of the project area is characterized by the integration of a high density and wide range of site and feature types. These findings were fully expected on the basis of prior studies within Kahaluu.

Project dating results conform generally with previous findings for the region. Specific findings from the present inventory survey suggest more or less continuous occupation between about AD 1000 and the present. Although dating samples recovered during the current work were limited to those from surface contexts, these results compare closely with findings from other Keauhou-Kona resort sites. Tomonari-Tuggles' (1985) summary of radiocarbon and hydration ring dates from a range of feature types at Kailua-Kona resort sites (including lava tube caves, terraces, boulder platforms, enclosures, midden deposits, pavements, and firepits), as well as radiocarbon age determination results from various nearby projects, document limited occupation of coastal sites by AD 1000 to 1100, with much more intensive use occurring by AD 1450. Intensive and extensive use of the major habitats continued through the latter part of the 18th Century, and then began to decline. However, additional absolute dates are needed in order to further evaluate variation in the intensity of use of the area during the most intensive period of occupation; i.e., between about AD 1400 and AD 1800. One of the proposed goals of subsequent data collection and data recovery work will be to supplement the existing project's dating results with a much larger sample of absolute dates from a wider range of feature types.

2.2.1.9 Access

Regional access to Keauhou Resort is provided by Kuakini Highway, Aili Drive, and Kamehameha III Road. Kuakini Highway is a State roadway between Kailua-Kona and Honaunau, and Kamehameha III Road is a County roadway and mauka-makai arterial between Kuakini Highway and Aili Drive. Aili Drive provides access to the Keauhou Resort from Kailua-Kona along the coast.

The only access to the project site is currently provided by two driveways. One driveway, at the end of Makolea Street, provides access to the offices of Keauhou Kona

Resort Company, Wai'ell, and KIC Landscape Nursery. The other driveway exits Kamehameha III Road and proceeds 450 feet makai to the County of Hawaii water reservoir. Kuakini Highway and Kamehameha III Road abut the mauka boundary of the proposed project, while the future Aili Highway fronts the makai boundary. Aili Highway is a proposed north-south County feeder highway, designed to relieve traffic from Aili Drive and accommodate local collector traffic at a mid-level elevation (200 to 400 feet) between Kailua-Kona and Keauhou.

2.2.1.10 Potable Water

According to a preliminary engineering report prepared for the proposed project (Appendix F), extensive water improvements currently exist around and within the proposed project site. Within Kamehameha III Road, a 24-inch water main is located above Kealii Street, and an 8-inch water line extends below Kealii Street to Aili Highway. The Aili Highway corridor contains a 12-inch water line between Keauhou Shopping Village and Makolea Street. At the intersection of Makolea and the future Aili Highway, a pair of water lines (8- and 12-inch) run mauka to two water reservoirs located within the project site. These reservoirs are situated 500 feet makai of Kamehameha III Road. The Department of Water Supply refers to the existing 300,000 gallon reservoir as Keauhou Tank No. 4, and the 100,000 gallon reservoir as Kahaluu Tank No. 4. A 12-inch and a 6-inch water line connects these reservoirs to the previously mentioned 8-inch water line in Kamehameha III Road. Water service is also provided to the offices of Wai'ell and Keauhou Kona Resort Company and to KIC Landscape Nursery, which is situated on the project site.

The proposed project is estimated to require a maximum of 570,000 gallons of water per day at bulldout. With the County's current well sources and the applicant's future sources, there appears to be more than sufficient capacity to meet the demands of this and future development in the Keauhou area.

2.2.1.11 Wastewater Disposal

The only sanitary sewer systems existing within the proposed project are two cesspools providing service to the offices of Keauhou Kona Resort Company, Wai'ell, and KIC Landscape Nursery. The nearest sanitary sewer line is within Makolea Street,

approximately 250 feet from the makai boundary of the proposed development. The existing sanitary sewer system in Keauhou Resort consists of gravity lines, pumping stations, and force mains leading to the Waste Water Treatment Plant at Heeia Bay. The Heeia Waste Water Treatment Plant (HWWTP) was recently expanded to process an average flow of 1.8 million gallons per day (mgd), with a peak flow of 3.6 mgd. This new facility went on line in January 1994 and is operating at an average flow of approximately 0.5 mgd. Future plans call for the HWWTP to accommodate an average flow of 3.6 mgd as Keauhou Resort continues to grow.

According to the preliminary engineering report, projected average daily wastewater flow generated by the proposed project is .38 mgd with a peak flow of .9 mgd. Given the remaining capacity of approximately 1.2 mgd, the proposed project can be adequately served by the existing HWWTP without expansion improvements at this time. Capacity of all required existing transmission lines also appears adequate at this time.

2.2.1.12 Solid Waste Disposal

Solid wastes are not presently generated onsite. Solid waste collection and disposal for the proposed development would be handled by private contractors. The County recently opened a new landfill at Pu'uanahulu in North Kona to replace the existing Kealakehe landfill, which was reaching a critical capacity. The Pu'uanahulu landfill services the South Point area from Naalehu and Waiohinu up the west coast to Kohala. There are 21 transfer stations on the island and two landfills. Preliminary estimates of landfill capacity based on West Hawaii usage indicate that the Pu'uanahulu landfill will reach capacity between 70 and 150 years.

2.2.1.13 Electrical Power and Communications Systems

Electrical and telephone service in the area is provided by Hawaii Electric Light Company (HELCO) and Hawaiian Telephone Company (HTCO). Both HTCO and HELCO anticipate that normal power and communication services to the project site from existing and planned facilities can be provided.

By the year 2011, HELCO plans to reach a total generating capacity of 277.3 megawatts (MW) and anticipates an island-wide demand of 224 MW, providing a 24 percent

surplus in generating capacity over peak demand. Recent information provided by HELCO shows the current generating capacity at 197.6 MW and a present peak demand of 161 MW. By 1999, HELCO plans to have two 20 MW combustion turbines at the Keahole generating station at full capacity, in addition to an 18 MW steam turbine using reclaimed steam from the combustion turbines. Even accounting for the retiring of older, less efficient units, these additions to the proposed West Hawaii Power Facility in North Kona may bring its generating capacity incrementally to 105 MW. Through this facility, HELCO plans to address the Island's long-range demands for power and the development of generating capacity near the principal areas of demand.

2.2.1.14 Public Schools

Public schools that may be affected by the proposed development are considered part of the Konawaena Complex, including Konawaena High-Intermediate School, Kealakehe Elementary and Intermediate Schools, Kahakal Elementary, and Konawaena Elementary School. Due to classroom shortages, steady enrollment growth over the past decade and projected continued growth, three new schools (Konawaena Elementary, Kealakehe II Elementary, and Kealakehe High) are being planned to alleviate overcrowding.

2.2.1.15 Public Services

Project area police services are provided by facilities located in Kealakehe (main station) and Captain Cook (substation), the latter of which is less than 5 miles from the project area. At present, these facilities are understaffed, but adequately serve the area's needs. The main station is staffed by approximately 50 officers, including specialized units of detectives, a juvenile aid section, an intelligence unit, and vice officers. The specialized staff operate only during the day shift, with remaining personnel divided into three shifts to provide 24-hour coverage, with a minimum of 8 officers per 8-hour shift.

Fire protection facilities are located in Kailua-Kona and Captain Cook. The Kailua station, located at the intersection of Palani Road and Queen Ka'ahumanu Highway, is the "first-in" district station staffed by a total of 36 personnel divided into three 24 hour shifts of 12 personnel at any one time, providing 24-hour coverage. Each shift is staffed with personnel trained in scuba diving, mountain rescue, ocean search and recovery, and certified lifeguards. Equipment consists of a first line truck called a "Quint", indicating

that it is equipped with all five fire response mechanisms: a 1,500 gallons per minute (GPM) pumper, 1,000 gallons of water, a ladder, a hose, and personnel; one ladder truck, equipped similar to a Quint, along with a 65-foot aerial tower; and an ambulance. The Kailua-Kona station also provides rescue and conventional fire protection facilities. An additional facility is planned off Kuakini Highway approximately three miles south of the project site. Volunteer stations at Hualalai and Kona Village add private support services.

The nearest available health facility is the DOH Kona Hospital at Kealahou, which has 44 beds, 48 physicians, 119 RNs and LPNs, and 294 employees. Special services offered by Kona Hospital include medical, surgical, OB/GYN, ICU, emergency room, chemotherapy, and long-term care.

2.2.1.16 Recreational Resources

Existing recreational opportunities provided by the Keauhou Resort that are available to its guests, visitors, and Hawaii Island residents include: golf, tennis, boating, and beach activities. Additionally, beach and shoreline access to Heela Bay and Keauhou Bay are provided within the resort area from Manuka Road, Alii Drive, and at the Keauhou Bay Harbor.

County park facilities in the area include Pahoehoe Beach, White Sands, and Kahaui Beach Parks, all of which are located within a few miles of the project site. Kailua Park, located at the Old Kona Airport, consists of 14 acres and includes lighted play fields, tennis courts, meeting facilities, restrooms, park offices, and a bike track. State parks in the region include the Old Kona Airport Recreational Area, an 84.8-acre coastal park, and Kealahou Bay State Historical Park, which is approximately 8 miles to the north.

3.0 Summary Description of the Affected Environment

3.0 SUMMARY DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 EXISTING CONDITIONS

The existing environment of the project area is characterized as presently vacant with scrub vegetation, including a dense thicket of koa haole with scattered emergent trees (mostly klawe) over exposed a'ala lava rock land with scattered pahoehoe exposures and small, shallow pockets of soil. Fauna found on the site consists primarily of introduced bird species and feral mammals commonly found throughout the Island. The entire site is designated Urban by the SLUC and designated for Low Density Urban and Urban Expansion on the County General Plan LUPAG map.

As noted previously, the purpose of the proposed project is to provide residential property in the North Kona area. The project would also provide for generous open space along with cultural/historical interpretive areas and associated trails. A market study, conducted specifically for the Keauhou Resort (Appendix A), indicates that there is an existing demand for retirement, second home and vacation rental units, as well as upper-end primary/local housing units. Additionally, it is estimated that the overall demand for new resort residential units on the Island of Hawaii will increase in the future. Within the context of the specific purpose of the proposed project, the potential environmental impacts and mitigation measures designed to minimize potential adverse impacts are described below.

3.2 PROBABLE SOCIAL/ECONOMIC IMPACTS AND MITIGATION MEASURES

In general, the social and economic impacts associated with the overall development of the residential subdivision are expected to be positive. The socio-economic characteristics of the future residents of the planned development are expected to be similar to that of the surrounding resort area and, therefore, is not expected to have a significant impact on the characteristics of the existing community.

The proposed project is expected to generate significant positive fiscal benefits for the County and State of Hawaii. Potential increase expenditures to the County and the State

may occur as a result of increased demands for public services in the region (e.g., health, education, safety). These increased demands are generally a result of an increasing population which would occur regionally with or without the project. Increased County government revenues would be primarily in the form of increased real property taxes generated by improved property. Additional revenues to the State government consist of excise taxes, personal income taxes generated by new employees, and excise tax. Additionally, in that new project infrastructure requirements are typically implemented with the project development, no new direct infrastructure-related costs are anticipated to the State or County. By comparing tax revenues against operating expenditures that are normally borne by the State and County governments, it is anticipated that the net impact of the project will be positive.

Due to the expected positive social and economic benefits resulting from development of the proposed action and the lack of expected adverse impacts to the social and economic characteristics of the region, County or State mitigation measures to minimize potential adverse impacts are not warranted.

3.3 LAND USE

The Hawaii State Land Use Law, enacted in 1961, established the SLUC. The four land use districts created by the Commission are the Urban district, the Rural district, the Agricultural district, and the Conservation district. The current Urban designation for the subject property indicates that reclassification in this area is appropriate.

Because the existing land is vacant, the proposed development would alter the land use of the project area. However, implementation of the proposed development would be generally consistent with land use designations, and development would be undertaken in a manner consistent with the County General Plan. Since reclassification is consistent with the development patterns adopted in the General Plan, the proposed land uses are appropriate from a land planning perspective. The proposed development is also consistent with the land use goals of the General Plan, which emphasize:

- Land use allocations and designations in appropriate proportions and mix in keeping with the social, cultural, and physical environments of the County.

- Zoning of urban and rural types of uses in areas with ease of access to community services and employment centers, and with adequate public utilities and facilities.
- Rehabilitation and use of urban and rural areas which are serviced by basic community facilities and utilities.
- Allocation of appropriate requested zoning in accordance with the existing or projected needs of the neighborhood community region and the County (Hawaii County Planning Department, 1989 General Plan, p. 14).

The proposed project site would allow existing and/or new residents to relocate to an area specifically designed to accommodate an existing demand for planned residential and resort communities which provide scenic, recreational, cultural, and natural resource opportunities. The site is located in proximity to the urban areas of the North Kona district, including Kailua-Kona and Keauhou. These urban areas will provide prospective residents easy access to economic opportunities, health care and public services, shopping, recreation, and leisure activities.

As noted earlier, the change in zoning designations from Unplanned (U) to Single (RS) and Multi-Family (RM) Residential will require approval of a Change of Zone application. The new zoning classification would not permit land uses having "more than a moderate effect on the quality of the environment". Considering that the change of zone would occur within the Keauhou Resort area under single ownership and does not encompass a major area of the community, the change in zone will not create an adverse impact on surrounding land uses.

3.4 PROBABLE ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

3.4.1 Geology, Physiography, and Climate

Development of the proposed project is not expected to significantly impact or be impacted by the geology, physiography, or climate of the project area. As such, measures to minimize potential adverse impacts other than adherence to State and County building codes and standards, do not appear warranted.

3.4.2 Soils and Agricultural Potential

As previously noted, little soil is present on the site and those soils which are present generally do not provide a suitable base for agricultural production. As such, development of the proposed project is not expected to significantly impact the agricultural potential of the project site or area. The project will only involve the curtailment of the present limited use of the project lands for grazing purposes. However, given the extent of other more suitable grazing lands in the vicinity of the project site, this curtailment of use is not considered a significant adverse impact.

3.4.3 Surface Water and Drainage

As noted earlier, no natural surface water features or drainageways exist onsite. The porous and well-drained condition of the site's soils allow for most of the rainfall to percolate in the ground; thus, surface runoff is negligible. The project will increase surface runoff due to the impervious surfaces that accompany residential developments. The runoff from road pavements, sidewalks, driveways, and roofs will be controlled by storm drain lines and drywells as part of an onsite storm drainage system designed to avert runoff onto makai properties.

The storm water drainage system would be designed and constructed in accordance with applicable State and County standards, and would be included as part of the internal infrastructure serving the development. Approval of the drainage plans by the County Department of Public Works will be required prior to construction. Other measures to minimize potential adverse impacts are not warranted.

3.4.4 Groundwater and Hydrology

Adverse impacts to groundwater resources and hydrologic characteristics of the area as a result of the proposed action are not expected to occur, given the measures (within the project drainage and stormwater management plan) that will be taken to protect the groundwater resources below the project site. Other measures to minimize potential adverse impacts to the groundwater resource and hydrologic characteristics of the project site are not warranted. Considering the substantial potable water resources existing in the area, project-related potable water demands are not expected to have a significant impact on these resources.

3.4.5 Air and Noise Quality

Based on air quality assessments prepared for other projects in the general area, it is anticipated that the proposed project would not cause State or Federal air quality standards to be exceeded. The proposed project would be classified as an "indirect source" of air pollution, as defined by the Clean Air Act of 1977, because its primary association with air pollution would be due to increased motor vehicle activity. The proposed action may have offsite air quality effects due to increased demand for electrical energy, which must be met through the combustion of some type of fuel. However, the primary short term impact to air quality would most likely involve fugitive dust associated with project construction.

Potential long term air quality impacts may be caused primarily by the introduction of increased traffic levels in the area. However, given the relatively low levels of traffic that will be generated from the project and relatively low density land uses planned for the property, significant concentrations of air pollutants will not be generated. Similarly, emissions from construction equipment would be dispersed rapidly by the prevailing winds.

Projected noise levels during the short term grading and construction phases will also increase above present levels. However, construction noise would occur generally for short periods during daytime periods. Long term impacts to noise quality in the area may be generated from increased traffic, maintenance equipment, and the sounds of people talking. The noise from these sources, however, would be much less than the noise generated by construction activity. Because of the site's proximity to existing highways and shopping centers, the property is effectively removed from any nearby noise sensitive areas. The planned development includes a 100 foot buffer area along Kuakini Highway and Kamehameha III Road to mitigate potential impacts to planned residential areas generated by traffic along these corridors. An archaeological preserve (open space) area is located adjacent to the proposed A111 Highway extension.

During the short term grading and construction phases of the project, the potential for construction-generated fugitive dust can be mitigated through application of water on exposed areas and establishment of plantings and ground cover as soon as practical after grading. Construction equipment emissions would also be short term and generally

disbursed throughout the property. Because the proposed project is not expected to cause long term adverse impacts to the ambient air and noise quality, mitigation measures beyond those noted above do not appear warranted.

3.4.6 Visual Attributes

The site features and attributes of the property area would change from the present vacant condition to a landscaped residential community. The character of the land is generally sloping. As residents and guests approach the resort area, the makai views to the ocean that currently exist from Kamehameha III Road would be largely unimpeded due to the topographical characteristics of the property.

As planned, the project would establish extensive vegetative cover with new residential landscaping and generous open space areas where development is not appropriate. Approximately one quarter of the site would remain as open space, thus, maintaining an overall low density character of the area. In addition, the developer has proposed implementation of architectural design standards to enhance the visual image of the property relative to the surrounding area.

3.4.7 Flora and Fauna

Development of the proposed project would result in the loss of some of the vegetation on the site, however, there are no endangered or threatened plants or animals on the project site. The majority of the vegetation on the project site is found commonly throughout most of the islands in similar environmental conditions. A botanical survey report of the 281-acre project site is provided in Appendix B. The survey identifies composition of the vegetation cover and describes the vegetation types. A total of 105 species of vascular plants were found on the property. Of these, 95 (91 percent) are exotic weeds or deliberately introduced plants, and 10 (9 percent) are native or presumed native plants. There is no intact native plant community present on the site. None of the species found in the survey are officially listed as endangered or threatened, nor are any species proposed or candidates for such status. Fauna indicated onsite typically consist of introduced species and are transient in nature.

According to the Survey of Avifauna and Feral Mammals (Appendix C) at Keauhou by Phillip L. Bruner, no endemic species nor unique wildlife habitat was found on this property. Additionally, the limited number of migratory shorebirds recorded on the site was due to the lack of suitable habitat. Endemic birds such as the short-eared owl or Pueo and Hawaiian Hawk or I'o may forage in this region, however, none were found on or near the project site.

The project at bulldout will alter the existing habitat for some of the introduced animal species. However, the more formal landscape associated with residential land uses will contribute to increased habitat diversity. In some instances, the greater diversity in plant materials may increase the available habitat for several species, primarily the Golden Plover and Ruddy Turnstone. As such, it is expected that the overall project will result in negligible impacts, if any, on the flora and wildlife of the area, and specific mitigation measures are not warranted.

3.4.8 Archaeological and Historical Resources

Section 7 of Chapter 6E, HRS, established a State historic preservation program to preserve, restore, and maintain historic properties in Hawaii in a spirit of stewardship and trusteeship for future generations. The DLNR-SHPO keeps an inventory of known sites in the State of Hawaii, and is responsible for serving as the technical and administrative point of contact for all historic preservation issues within the State. The survey report covering the project site (Appendix D), has been submitted to the DLNR-SHPO for their review and approval. The DLNR-SHPO may request additional information to be added to the report, and may recommend future action by the developer regarding the treatment of potential historic resources.

The initial assessment proposes that the appropriate treatment for 243 significant sites is further data collection. Eight sites will require no further data collection, 20 sites will require preservation with some level of interpretive development, including appropriate related data recovery work, and 57 sites are recommended for preservation "as is", with no further work (and possible inclusion into landscaping) or minimal further data collection necessary. The preparation of acceptable detailed treatment (mitigation) plans must be submitted and approved by the DLNR-SHPO, and The Hawaii Island Burial Council must also approve proposed burial treatments. The proposed treatments will be

addressed in the preparation of a historic preservation plan, which includes buffers and both interim and long term protection measures.

Mitigation of significant historic sites generally takes one of two forms: preservation or data recovery. Preservation is accomplished either through site protection "as is," or through the development of an interpretation program. In data recovery, sites have a reasonable amount of their significant information recovered through documentation. Many of the indirect impacts to the significant sites to be preserved can be mitigated to a great degree by access control.

To mitigate potential impacts to the historical/archaeological resources of the project area, the recommendations of the consulting archaeologist, subject to the approval of the DLNR-SHPO, will be followed by the developer. With regard to the possible burials identified within the project area, if they are not preserved "as is", it is required that the procedures of Section 43 of the Chapter 6e (Historic Preservation, HRS) be followed. Buildings, roads, and infrastructure have been planned to avoid all sites noted for preservation, including appropriate buffer zones.

The specific treatment for features designated for preservation would be determined as part of the regulatory approval process, in conjunction with the recommendations of the DLNR-SHPO and The Hawaii Island Burial Council. The mitigation program for archaeological sites, including plans for site preservation, will require approval by the County Planning Department, in consultation with the DLNR-SHPO prior to issuance of a grading permit for any portion of the proposed development. It is the intent of the developer to incorporate those features noted for preservation as part of the archaeological preserve areas, which would be integrated as open space elements and linked through a pedestrian trail system as part of an overall interpretive program. It is considered that with implementation of measures detailed within the SHPO approved mitigation plan, the project would result in a "no adverse effect" to the significant historic sites.

3.4.9 Access

The project roadways will be designed according to County of Hawaii subdivision standards. The roadways will be laid out to facilitate grading, utility, and lot design.

Particular care will be exercised in the roadway layout to preserve significant archaeological and historical features, and minimize potential impacts to the natural topography.

Two entryways onto Kamehameha III Road are proposed. The primary mauka entry is planned at the Kamehameha III Road/Kealahi Street intersection. A secondary mauka entry off Kamehameha III Road is proposed approximately 450 feet mauka of the makai boundary. Likewise, two additional points of access onto the future Alii Highway will provide entry to the later phases of development. Construction of these intersection improvements will require associated traffic mitigation measures, as recommended by the traffic impact analysis conducted for the proposed project by The Traffic Management Consultant (Appendix E).

The proposed improvements to accommodate the project-generated traffic include exclusive left-turn storage lanes on the mauka and makai accesses on Kamehameha III Road and Alii Highway at the makai access roads I and II. Median shelter lanes would also be provided for left-turn movements from the makai access roads I and II to facilitate access onto Alii Highway.

Additionally, proposed improvements in the area to accommodate projected traffic without the project include: widening the northbound section of Alii Drive, which would provide an exclusive right-turn lane at Kamehameha III Road; and the widening of the southbound section of Kuakini Highway, to provide an exclusive right-turn lane to mauka-bound Kamehameha III Road.

Implementation of the proposed access improvements, as recommended by the traffic engineer, are expected to mitigate significant adverse traffic-related impacts resulting from the proposed development.

3.4.10 Potable Water

As noted previously, the water source capacity has been verified through development of several high-level wells in the region. The approximately 950 dwelling units, as proposed, would require about 570,000 gallons per day (gpd), assuming a maximum usage of 600 gallons per unit per day. It is expected that potable water for the project will be provided by the existing County of Hawaii North Kona Water System. Possible

water source development may include connecting the KIC wells to the Department of Water Supply's system and upsizing the transmission lines to the project area. Should additional water storage be required, these could be constructed adjacent to the Kahaluu shaft well or the reservoirs onsite (Kahaluu Tank No. 4).

3.4.11 Wastewater Collection, Treatment and Disposal

The proposed development is not expected to effect planned wastewater collection, treatment, or disposal systems. As noted, the proposed development will generate an average daily flow of approximately .38 mgd with a peak flow of 0.9 mgd, and sufficient capacity currently exists at the HWWTP to accommodate the expected flow. In order to transmit sewage from the project, approximately 21,000 lineal feet of onsite gravity sewer lines and about 17,300 feet of offsite gravity sewer lines would need to be installed. Additionally, the Kahaluu II sewage pump station near St. Peter's Catholic Church would be constructed to pump an average daily flow of 0.15 mgd. About 450 lineal feet of sanitary sewer force main would be installed to connect the Kahaluu sewage pump station to the inactive 8-inch force main in All Drive.

3.3.12 Solid Waste Disposal

The proposed development is expected to generate approximately 13,000 pounds of solid waste per day based on a residential waste production of five pounds per capita per day. In the single family residential areas, solid waste collection may be provided door to door by private collection trucks and crews. Approximately three refuse companies now provide this service in the Keauhou area. A transfer station is also available for solid waste disposal to residents of the Keauhou area. This transfer station is located three miles from the project site. In the multi-family residential areas and public areas, it is expected that containerized waste storage and collection would be provided. Solid waste from the future residents of this development would be ultimately taken to the Pu'uanahulu landfill, located in South Kohala, via a mix of refuse collection companies and transfer stations.

During the 1991 Legislative Session, the Integrated Solid Waste Management Act (Act 342) was enacted. The statute mandates that Counties submit an integrated solid waste management plan to the Solid Waste Branch of the DOH. An integrated solid waste management plan, meeting the approval of the DOH, has been proposed, but has yet to

be adopted by the County. The developer will prepare and submit to the Department of Public Works a solid waste management plan for the proposed development aimed at reducing the solid waste stream before disposal. The plan would comply with the requirements of the proposed County Integrated Solid Waste Management Plan, should this be adopted by the County of Hawaii. In that the proposed project would not cause a change in the manner of collection and disposal, and no hazardous wastes would be generated, the project is not expected to result in any adverse impacts relative to solid waste disposal.

3.4.13 Electrical Power and Communication Systems

HELCO provides electrical services to the area and telephone communications are furnished by HICO. A new electric substation will be required to extend electrical service to residences within the proposed project, and additional service trunking of the telephone cables may be required. Cable TV service is provided by Jones Spacelink. To mitigate the visual impact of overhead electric, telephone, and cable television lines, and to maximize system reliability, it is the applicant's intent to install these facilities underground. Based on the availability of present service capabilities and planned improvements to the electrical and telephone utilities, significant impacts are not expected to result from the proposed project.

3.4.14 Public Schools

Immediate impacts on educational facilities are not anticipated because individual lot sales and eventual buildout will occur over an extended period of time. According to the market study (Appendix A), most residents will be mid-level managers, retirees, and second homeowners. Consequently, most of these families will not have school-age children and the average household size is expected to be around 2.2 persons per unit. As such, the number of school-age children is expected to be relatively small, and the additional demand on educational services would be minimal. Plans for the proposed project should be reviewed by the State Department of Education before development to assess potential enrollment impacts on area schools. Schools that may be affected are Konawaena High School, Kealahou Intermediate School and Kahakal Elementary School.

3.4.15 Public Services

After project buildout, significant impacts to the level of police and fire protection services provided in the project area are not expected, as facilities should remain adequate to serve area requirements. In addition to the fire stations at Kailua-Kona and

Captain Cook, an additional facility, to be located off of Kuakini Highway approximately three miles from the project site, is under consideration.

The nearest available health facility is the DOH Kona Hospital at Kealahou, which would be adequate to service the projected project population. As such, the proposed project is not expected to place a significant additional burden on existing medical care facilities.

3.4.16 Recreational Resources

Given the socio-economic make-up of potential project residents, the proposed development is not expected to have a significant impact to the public recreational resources of the area, however, the conceptual plan prepared for the property provides approximately 73 acres as open space with a pedestrian trail system. These components of the plan will provide additional opportunities for passive recreational activities within the project site. Given the abundance of recreational resources within the Keauhou Resort and surrounding area, additional measures to minimize potential adverse impacts do not appear to be warranted.

4.0 Identification and Summary of Major
Impacts and Alternatives Considered

4.0 IDENTIFICATION AND SUMMARY OF MAJOR IMPACTS AND ALTERNATIVES CONSIDERED

4.1 MAJOR IMPACTS

Impact: Visual Impact of residential development from Kamehameha III Road.

Mitigation:

- The visual character of the area will change, but not in a negative manner. The existing scrub vegetation will be replaced with a residential landscape.
- Buildings will be low rise and will not significantly obstruct views from major roadways.
- The applicant proposes implementation of project design and construction guidelines aimed at achieving visual cohesion within the development, and visual compatibility with the surrounding environment.

Impact: The potential effects of sedimentation on coastal waters during construction.

Mitigation:

- The project site is located between 1,000 and 2,000 feet inland from the shoreline. However, during the construction phase, use of temporary settlement basins, filter berms, erosion control measures, and erosion barriers will minimize erosion potential and surface runoff. Approval of sedimentation and erosion control plans will be required prior to construction.

Impact: Project would contribute to the solid waste, impacting existing landfill capacities.

- Mitigation:**
- Preparation and Implementation of an integrated solid waste management plan, in concert with County and State programs, will be aimed at reducing the volume of solid waste to area landfills.

Impact: Project will increase traffic at buildout.

- Mitigation:**
- Participate in construction of intersection and access improvements within the resort area.
 - Implement the necessary roadway improvements in conjunction with development phasing to offset project-related impacts.
 - Provide a minimum of a 100 foot buffer between the planned residential uses and major roadways to minimize potential impacts from traffic generated noise.

Impact: Potential loss of historical, archaeological, and cultural sites.

- Mitigation:**
- The significance of archaeological sites on the property has been determined. Those sites of scientific, historical, or cultural value will be preserved in accordance with the recommendations of the archaeological report. A detailed preservation and mitigation plan will be prepared and implemented subject to approval by the DLNR-SHPO.

4.2 SUMMARY OF ALTERNATIVES CONSIDERED

4.2.1 No Action Alternative

The "no action" alternative would retain the property in its present use. This alternative would deny the community the potential public benefits associated with the development proposal. Some of these benefits include:

- Provision of housing to meet projected housing demands, planned in concert with long-range community plans.
- Efficient integration of existing infrastructure with the present system to more efficiently accommodate existing and future needs of the community.
- Documentation of archaeological features and development of appropriate historical and cultural interpretive programs providing public access to archaeological sites.
- Jobs for local residents in an area characterized by relatively high unemployment rates.

4.2.2 Scaled-Down Alternative

A lower density or "scaled-down alternative" would implement the proposed project based on the existing Unplanned zoning which permits five-acre lot sizes. This alternative would not require the regulatory processing requirements pertaining to a change of zone. The current Unplanned zoning would permit approximately 50 building sites. A project of such low densities, however, would not create a mechanism to provide the public benefits, as envisioned by the proposed alternative or the needed supporting infrastructure. Additionally, this low density use would not be consistent with the County nor the developer's long-range plans for the area, and would not represent an efficient use of existing infrastructure and services.

4.2.3 High Density Alternative

The high density alternative, including intensive resort use, would not allow for as sensitive a design in relation to the existing character of the site or provide for as sensitive a treatment of archaeological sites and preservation of views. Additionally, market support may not be presently sufficient to support a higher density project.

4.2.4 Alternative Use

The current zoning for the property is Unplanned. In accordance with this zoning designation, agriculture is a permitted use. Although the lack of suitable soils and rainfall limits the agricultural options for the site, the lands could be used for intermittent

grazing of cattle. The project site, however, has long been master planned for residential development, is designated for such uses with the County Plans, and is located within the Keauhou Resort so that it can be carefully integrated with other resort uses. Existing, as well as planned residential and commercial projects about the subject property.

As with the no action alternative, such alternative use would generate a minimum source of income, and the potential government revenues in the form of higher taxes would be significantly less. In addition, the provision for residential lots meeting the market demand in the area and the related public benefits generated from the proposed project would not be realized.

5.0 Determination, Findings and Supporting Reasons

5.0 DETERMINATION, FINDINGS AND SUPPORTING REASONS

In considering the significance of potential environmental effects, the sum of effects on the quality of the environment were considered and the overall and cumulative effects of the action were evaluated. Every phase of the proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short- and long-term effects of the action were considered.

As a result of these considerations, it is determined that the proposed action:

- 1) Will not involve a loss or destruction of any significant natural or cultural resources;
- 2) May increase the range of beneficial uses of the environment;
- 3) Is in concert with the State and County's long-term environmental policies, goals and guidelines;
- 4) Does not substantially affect the economic or social welfare of the community or State;
- 5) Does not substantially affect public health;
- 6) Does not involve substantial secondary impacts such as population changes;
- 7) Does not involve a substantial degradation of environmental quality;
- 8) Is individually limited and, cumulatively, will not have a considerable affect on the environment or involve a commitment for larger actions;
- 9) Does not substantially affect a rare, threatened, or endangered species or its habitat;

- 10) Is not detrimental to air quality or ambient noise levels;
- 11) Will not significantly affect water quality;
- 12) Does not substantially affect environmentally sensitive areas such as a flood plain, tsunami zone, erosion-prone areas, and geologically hazardous land; and
- 13) Will not significantly affect estuary, fresh water, or coastal waters.

Based on these findings, the proposed project will not result in significant environmental impacts and will not require preparation of an EIS in accordance with Chapter 343, HRS.

6.0 Consulting Agencies & Those Who Participated in the
Preparation of the Final EA

6.0 CONSULTING AGENCIES & THOSE WHO PARTICIPATED IN THE PREPARATION OF THE FINAL EA

6.1 AGENCIES CONSULTED IN THE PREPARATION OF THIS ENVIRONMENTAL ASSESSMENT

COUNTY

- Department of Planning
- Department of Public Works
- Department of Water Supply
- Fire Department

STATE

- Department of Education
- Department of Labor and Industrial Relations
- Department of Land & Natural Resources
- Department of Transportation

FEDERAL

- U.S. Department of Agriculture, Soil Conservation Service

6.2 AGENCIES TO BE CONSULTED IN THE REVIEW OF THIS ENVIRONMENTAL ASSESSMENT

STATE

- Department of Accounting and General Services
- Department of Agriculture
- Department of Business, Economic Development and Tourism
 - State Energy Office
- Department of Defense
- Department of Education
- Department of Hawaiian Homelands
- Department of Land and Natural Resources
 - State Historic Preservation Division

- Office of Environmental Quality Control
- Department of Health
 - Environmental Management Division
- Department of Transportation
- Office of State Planning
- Office of Hawaiian Affairs

UNIVERSITY OF HAWAII

- Water Resources Research Center
- Environmental Center

FEDERAL

- U.S. Department of Agriculture
 - Soil Conservation Service
- U.S. Army Corps of Engineers
 - Pacific Ocean Division
- U.S. Department of the Interior
 - Fish and Wildlife Services
 - National Park Service
- U.S. Department of Commerce
 - National Marine Fisheries Service
- U.S. Department of Transportation
 - Federal Aviation Administration

PRIVATE

- American Lung Association

CITIZENS

- Lois Tyler

COUNTY

- Planning Department
- Department of Public Works
- Department of Parks and Recreation
- Department of Research and Development
- Department of Water Supply

The Draft EA for this project was submitted to the Office of Environmental Quality Control (OEQC), and the notice of its availability appeared in the OEQC Bulletin on March 23, 1995 and April 8, 1995. The deadline for comments on the Draft EA was April 22, 1995. During the 30-day review period, two comment letters were received. Comments to the Draft EA were also received from the the County Planning Department. Copies of the comment letters and responses are included at the end of this section.

DOCUMENT CAPTURED AS RECEIVED

P. O. Box 1001, Captain Cook, HI 96704
April 8, 1995

County of Hawaii Planning Department, 25 Aupuni St., Suite 109
Hilo, Hawaii 96720

Attention: Daryn Arai or Connie Kiriu (961-8288)

Subject: ANTICIPATED NEGATIVE DECLARATION ON KEAUKOU RESORT PARCEL 53

COPY

Please give serious consideration to this request that you require a full EIS on Kamehameha Investment Corporation's Keauhou Resort Parcel 53 project so that all aspects of this project can be openly studied by all--experts, residents, and especially by native Hawaiians.

The sensitive location of this project (in Keauhou) with "A concentration of archaeological sites" (per OEQC Bulletin, April 8, 1995, page 3), the large size of the project (976 residential units, which translates to over 1,952 residents at 2 persons per household, a very conservative figure, and the increase in traffic congestion are only three factors that should be fully disclosed and discussed in an EIS.

The following questions should be addressed in an EIS:

1. What is the cultural significance of this area? Discussion should include but not be limited to information of the Kahalu'u Historic District, the 'Ohi'a Cave Preserve, the extent of archaeological studies and the results.

2. A related question is: What will be the cultural impact of this project on native Hawaiians? The growing involvement of native Hawaiians in the sovereignty movement and land use issues points to the need for such a study to be included.

3. Who are the buyers anticipated? Where will the homes/lots be marketed? Will the residents be people from out of State? If so, see #8 below.

4. What is the traffic volume anticipated? Discussion should include the traffic patterns, the proposed Ali'i Highway extension with all the alternative routes shown, the additional traffic on Kuakini Highway and Kamehameha III Road. Also, the cumulative effects of other projects planned in this area must be disclosed and discussed.

5. What are the water needs of this project? Information is needed from both the State and County on water sources, availability, and commitments.

6. How will solid and sewage waste be handled?

7. What will be the cumulative effects of this and other projects on the water quality at the shoreline and offshore, considering the existence of lava tubes and the use of chemicals by residents on their lawns and gardens?

8. What is the financial impact of this project on the County? on the State? Cost-benefit studies should be required and summaries presented in a manner readily understandable as was done by the State DPED on the Boise Cascade project (now this includes the 3 hotels and Waikoloa Village). The summary is attached hereto.

It should be noted that a crucial factor in the study was how many of the residents will be new in-migrants (coming into the State, whether from California, Canada, or Japan). If the Keauhou lots/homes will be marketed to non-residents, we should keep in mind the conclusion drawn by the State on the Waikoloa Village portion of the Boise project: "The greater the proportion of new in-migrants, the greater the costs to the State of providing increased levels of service. Even if only 15 percent of the permanent population comes from outside the State, (Waikoloa Village) will cost the State more than it will generate in revenues. If two-fifths of the population are new State residents, the costs of the Waikoloa Village portion of the project would be nearly four times the revenues generated." (P.54)

Sincerely,

Lois M. Tyler
Lois M. Tyler

Encl: 1 (10 pages)

P.S. Why is this project called Keauhou Resort Parcel 53?

CC: Applicant, (Consultant), OEQC



LAND AND ARCHITECTURE
PLANNING
ENVIRONMENTAL SERVICES

May 8, 1995

Ms. Lois M. Tyler
P.O.Box 1001
Captain Cook, Hawaii 96704

**SUBJECT: RESPONSE TO LETTER
DRAFT ENVIRONMENTAL ASSESSMENT
KEAUHOU RESORT PARCEL 53**

Dear Ms. Tyler:

Thank you for your letter of April 8, 1995 commenting on the subject Environmental Assessment (EA). The following is in response to the questions and comments raised within your letter.

Your letter suggests that an Environmental Impact Statement (EIS) should be required for this project "so that all aspects of the development can be openly studied." Your letter also included a list of questions that should be addressed within the EIS. These issues are, in fact, already addressed within the Draft EA that was prepared for the project, as noted below. It appears from your comments that your questions are based on the statement within the Office of Environmental Quality Control (OEQC) bulletin rather than on the Draft EA itself. Copies of the Draft EA are available through both the OEQC and the County Planning Department.

The EA for this project was prepared with the benefit of several consultant studies related to market, flora, fauna, archaeology, traffic and engineering. The process for notification, distribution and review of the Draft EA provides an opportunity for public and agency review and comment. The Final EA, which then serves as a resource document for decision makers, must include agency and public comments to the Draft EA, and their responses.

An EA with a declaration of no significant impact was prepared based on the significance criteria contained in Title 11, Chapter 200, Section 12 of the Department of Health's Environmental Impact Rules. According to this criteria, the project is deemed not to have a significant effect on the environment.

An EA, in adherence with Chapter 343, Hawaii Revised Statutes, was required for Keauhou Resort, Parcel 53 because the project includes a portion of the Kahalu'u Historic District. This is evidenced by the concentration of archaeological sites found in the makai portion of the project site. The archaeology that is present is fully described within the Archaeological Inventory Survey that was prepared for the project and included within the Draft EA. As noted within the Draft EA, an archaeological preservation and mitigation plan will be prepared for the project. This plan must be

W. Frank Brandt • Thomas S. Witten • R. Stan Duncan • Russell Y. J. Chang

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makai portion of the project site. The archaeology that is present is fully described within the Archaeological Inventory Survey that was prepared for the project and included within the Draft EA. As noted within the Draft EA, an archaeological preservation and mitigation plan will be prepared for the project. This plan must be approved by the Department of Land and Natural Resources Historic Site Preservation Office and the County of Hawaii Planning Department prior to development. It is assumed that with implementation of approved mitigation measures, the proposed development will not have an adverse impact on the historic or culturally significant features within the project site. In fact, the proposed development has been planned in a manner that respects and protects the archaeology in the area by providing substantial open area as an archaeological preserve. A trail system linking significant archaeological sites as part of an archaeological interpretation program, is also planned.

The following addresses the specific numbered questions in your letter in the order that they appear. Where applicable, those issues addressed within the Draft EA are noted.

- 1) "What is the cultural significance of the area. Discussion should include but not be limited to information of the Kahalu'u Historic District, the 'Ohi'a Cave Preserve, the extent of the archaeological studies and the results."

Response: Your question is addressed within Sections 2.2.1.8 and 3.4.8 in the Draft EA. The full text of the Archaeological Inventory Survey for the project site is included within Appendix D of the Draft EA.

- 2) "What will be the cultural impact of this project on native Hawaiians? The growing involvement of native Hawaiians in the sovereignty movement and land use issues points to the need for such a study to be included."

Response: The specific impact of the project to native Hawaiians was not addressed within the EA, as this would be outside the scope of Chapter 343 requirements. The applicant, Kamehameha Investment Corporation (KIC), has consulted with their cultural advisory group regarding the proposed development. Their advisory group is comprised of individuals of Hawaiian ancestry who are knowledgeable of the area, and representatives of Hawaiian groups. A list of the advisory group members is attached for your reference.

- 3) "Who are the buyers anticipated? Where will the homes/lots be marketed? Will the residents be people from out of State? If so, see #8 below."

Response: It is anticipated that the future residents of this project would be of similar social and economic mix as the rest of the Keauhou Resort, and would include individuals moving to Hawaii from out of state. It is assumed, however, that these buyers would be looking for a residence in Hawaii regardless of whether the proposed project is built. The proposed project will, however, provide a cost-effective alternative for home ownership within a prime resort setting near Kailua-Kona.

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4) "What is the traffic volume anticipated. . . ?"

Response: The potential traffic impacts from the proposed project are included within Sections 2.2.1.9 and 3.4.9 in the Draft EA. The complete Traffic Impact Analysis Report, which contains the projected traffic volumes, is included within Appendix E of the Draft EA. The Traffic Impact Analysis Report includes projected traffic levels based on the proposed development in the Keauhou area and the cumulative effects of these projects.

5. "What are the water needs of this project. . . ?"

Response: The project is expected to require a maximum of 570,000 gallons of potable water per day at buildout. To meet this demand, KIC expects to utilize one or more of their three potable wells located above Keauhou at the approximately 1,600 foot elevation. These wells have been tested and showed a capacity (and sustainable yield) of approximately 2 million gallons per day each. The water needs of the project are addressed within Sections 2.2.1.4 and 3.4.10 of the Draft EA. These sections include discussion on water sources, availability and project demands.

6) "How will solid and sewage waste be handled?"

It is anticipated that solid waste would generally be handled by private collectors and disposed at a County approved landfill. Wastewater would be transmitted to the Heela Wastewater Treatment Plant in Keauhou for processing and disposal. Solid waste disposal is addressed within Sections 2.2.1.12 and 3.4.12 in the Draft EA. A discussion on solid waste disposal is also included in the Preliminary Engineering Report, submitted as Appendix D of the Draft EA.

7) "What will be the cumulative effects of this and other projects on water quality at the shoreline and offshore, considering the existence of lava tubes and the use of chemicals by residents in their lawns and gardens."

Response: In that the project is an inland project, located over 1,000 feet from the shoreline, no impacts to the shoreline or marine waters are anticipated. There is also no indication from long term studies of other resorts with similar geological conditions (Mauna Kea, Mauna Lani, and Waikoloa Resort) of any presence of chemicals used for residential lawns within the marine waters fronting these developments.

8) "What is the financial impact on the County? On the State . . . ?"

Response: The Boise Cascade study cited in your letter was prepared over twenty years ago for the Waikoloa Village and Resort development. It is difficult to comment on excerpts from a study without the benefit of the full analysis. It would also be misleading to apply the findings of a study prepared over 20 years ago to a project today as the economic assumptions, including the tax structure, impact fees, and other exactions required of new developments, have changed dramatically since the time of the Boise Cascade Cost Benefit Study Analysis (1971).

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The proposed development of Parcel 53, by implementing an important segment of the master planned Keauhou Resort is expected to have a positive cost benefit to both the State and County, as indicated by more recent economic/fiscal studies of other proposed West Hawaii resort projects, such as Manini'owali, Kuki'o, Kaupulehu, and Mahukona.

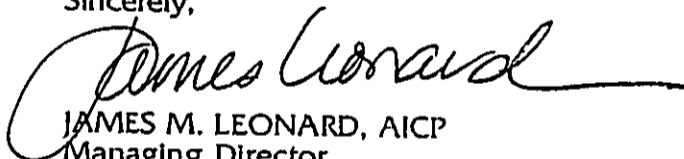
From a planning perspective, Keauhou Resort has the advantage of being located close to the urban setting of Kailua-Kona, allowing for more efficient use of the existing infrastructure and services in the immediate area. Also, within the resort area itself exists the necessary infrastructure system with regard to water supply, wastewater treatment, drainage and roads, and recreational facilities to support the proposed development, thereby minimizing potential impacts to the State and County to provide these.

Post Script: "Why is this project called Keauhou Resort Parcel 53?"

Response: The project is referred to as Keauhou Resort Parcel 53 because it is situated within the Keauhou Resort area and, for planning purposes, has been identified on KIC's Master Plan as Parcel 53.

Thank you for your comments to the Draft EA. Your letter in this response will be included within the Final EA.

Sincerely,



JAMES M. LEONARD, AICP
Managing Director
PBR HAWAII - Hilo Office

xc: V. Goldstein, Planning Department
G. Gill, OEQC
W. Tirrell, KIC
D. Hill, KIC
T. Witten, PBR

Attachment

KIC Cultural Advisory Committee

The Cultural Advisory Committee is advisory to KIC on matters dealing with historic and cultural preservation within the Keauhou Resort area. Members of the Advisory Committee include:

Mary Green
Samuel Haanlo
Lily Kong
Josephine Kamoku
Joseph Kamoku
David Roy, Jr.*
Faunie Au Hoy*
Peahi Spencer
Perry Kealoha

* Individuals not present at presentation regarding Parcel 53.

BENJAMIN J. CAYETANO
GOVERNOR



GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-2452

April 19, 1995

Ms. Virginia H. Goldstein, Director
County of Hawaii Planning Department
25 Aupuni Street, Suite 109
Hilo, Hawaii 96720

Dear Ms. Goldstein:

Subject: Draft Environmental Assessment for the Keauhou Resort
Parcel 53

Thank you for the opportunity to review the environmental assessment for the above project. We have the following comment.

The proposed project is estimated to require a maximum of 570,000 gallons of water per day at buildout. Please indicate in detail how this water demand will be met, what part will be supplied by the public water system and what part will be supplied by a private system. Also, please include in detail, the sustainable yield of the ground water aquifers that will be tapped to supply water to this development and note the secondary and cumulative impacts of dedicating this water solely to your project.

If you have any questions, please call Jeyan Thirugnanam at 586-4185. Thank you.

Sincerely,

A handwritten signature in cursive script, appearing to read "Gary Gill".

Gary Gill
Director

c: Kamehameha Investment Corporation
PBR Hawaii



LANDSCAPE ARCHITECTURE
PLANNING
ENVIRONMENTAL SERVICES

May 8, 1995

Mr. Gary Gill, Director
Office of Environmental Quality Control
200 South King Street, 4th Floor
Honolulu, HI 96813

**SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
KEAUHOU RESORT, PARCEL 53**

Dear Mr. Gill:

Thank you for your comments of April 19, 1995 to the Draft Environmental Assessment (EA) for the Keauhou Resort, Parcel 53 project. This letter is in response to your question regarding the water system for the project.

As you noted from the Draft EA, the project is estimated to require a maximum of 570,000 gallons per day (gpd) at buildout. To meet this demand, the developer, Kamehameha Investment Corporation (KIC), expects to utilize one or more of their three portable wells located above Keauhou at the approximately 1,600 foot elevation. Each well has been tested and showed a capacity (and sustainable yield) of approximately 2 million gpd. The water levels at the three wells range from 228 to 386 feet above mean sea level (msl), indicating a substantial high level portable water source for this area. ✓

KIC has had initial discussions with the County Department of Water Supply (DWS) regarding the connection of these well sources to the existing County of Hawaii North Kona water system and upsizing the transmission lines to the project area. If needed, KIC also has commitments from the County DWS for 1,400 units, which can be applied to new developments within the Keauhou Resort area, including the subject project.

You asked in your letter about the sustainable yield of the groundwater aquifer and the cumulative impact of dedicating approximately 0.57 million gpd to this project. According to the State Water Resource Protection Plan, the 167 square mile Keauhou Aquifer Sector (State No. 80901) has a sustainable yield of 38 mgd. Presently, pumping within this sector is approximately 10 mgd, or just over 25 percent of the aquifer's sustainable yield. Based on this figure, the 0.57 mgd needed for the Parcel 53 project, which represents approximately 1.5 percent of the total sustainable yield, will not have a significant impact on the aquifer.

W. Frank Brandt • Thomas S. Witten • R. Stan Duncan • Russell Y. J. Chung

PACIFIC TOWER, SUITE 550, 1001 BISHOP STREET, HONOLULU, HAWAII 96813 TELEPHONE: 808 521-0531 FAX: 808 521-1102
BRANCH OFFICE - HILO LAGOON CENTER, 66 ALPINE STREET, SUITE 100, HILO, HAWAII 96720 TELEPHONE: 808 961-0333 FAX: 808 961-0989

Mr. Gary Gill, OEQC Director
May 8, 1995
Page 2

Again, thank you for your comments to the Draft EA. Your letter in this response will be included within the Final EA.

Sincerely,



JAMES M. LEONARD, AICP
Managing Director
PBR HAWAII - Hilo Office

- c: V. Goldstein, County Planning Department
D. Hill, Kanehameha Investment Corp.
T. Nance, T. N. Water Resources Engineering
T. Witten, PBR Hawaii

Stephen K. Yamashiro
Mayor



Virginia Goldstein
Director
Norman Olesen
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-9615

June 6, 1995

Wallace K. Tirrell, President
Kamehameha Investment Corporation
78-6831 Alii Drive, Suite 234
Kailua-Kona, HI 96740

Dear Mr. Tirrell:

Draft Environmental Assessment-Negative Declaration for the Development of a
Master-Planned Residential Community to Consist of Approximately 246 Single Family
Residential Units, 730 Multiple Family Residential Units and Its Related Improvements
(Keauhou Development Parcel 53)

Applicant: Kamehameha Investment Corporation

Tax Map Key: 7-8-10: Portion of 2, Kahalu'u, North Kona, Hawaii

We have completed our review of the above-described draft environmental assessment and provide for your consideration the following comments:

1. According to the County of Hawaii General Plan Land Use Pattern Allocation Guide (LUPAG) map and correctly represented within the draft environmental assessment, the southwestern corner of the project site adjoining the Ohia Cave preserve is designated Low Density Urban, which would allow for uses which are single family residential in character, ancillary and public uses, and convenience-type commercial uses. The remainder of the project site is designated Urban Expansion, which would allow for a mix of high density, medium density, low density, industrial, and/or open space designations in areas where new settlements may be desirable, but where specific settlement patterns and mix of uses have not yet been determined.
2. According to the preliminary development plan contained within the draft environmental assessment, a portion of the project site proposed for multiple family residential uses is designated as Low Density Urban by the LUPAG map. All uses proposed within the project site shall be consistent with uses allowed under their respective LUPAG map designations.

Wallace K. Tirrell, President
Kamehameha Investment Corporation
Page 2
June 6, 1995

Please contact Daryn Arai or Susan Gagorik of this office should you have any questions.

Sincerely,


VIRGINIA GOLDSTEIN
Planning Director

DSA:syw
LKameh07.DSA

cc: OEQC
West Hawaii Office



LANDSCAPE ARCHITECTURE
PLANNING
ENVIRONMENTAL STUDIES

June 08, 1995

Ms. Virginia Goldstein
County Planning Department
25 Aupuni Street
Hilo, HI 96720

**SUBJECT: DRAFT ENVIRONMENT ASSESSMENT
KEAUHOU RESORT, PARCEL 53**

Dear Ms. Goldstein:

Thank you for your letter of June 6, 1995 commenting on the Draft Environmental Assessment (EA) for the Keauhou Resort, Parcel 53 project. This letter is in response to your comment regarding the County General Plan Land Use Map Allocation Guide designations for the project area.

As noted in your letter, a portion of the project site is proposed for multi-family residential use in the area designated as Low Density Urban by the County Land Use Pattern Allocation Guide (LUPAG) map. We understand that the LUPAG map provides a general guide for development rather than indicating a strict land use boundary within a given project site.

The County General Plan standards for land use states that "the designated land uses will be delineated on the LUPAG map. The broad brush boundaries indicate a graphic expression of the General Plan policies, particularly those related to land uses." Further, the land use policies of the General Plan state that "the County shall encourage the development and maintenance of communities meeting the needs of its residents in balance with the physical and social environment." The proposed development, as described within the EA, is planned in a manner that is responsive to the physical and cultural environment within Parcel 53. Multi-family uses are indicated in the makai portion because this use will allow for greater flexibility to respond to the site conditions and protection of archaeological resources in the area.

We believe that the County General Plan provides for such flexibility in order to respond to such specific site conditions that are not considered in the preparation of the General Plan LUPAG map. This is, in fact, evident in other portions of Keauhou Resort where existing uses are not consistent with the General Plan designation for those areas, but are consistent with the land use mix indicated on the County LUPAG map.

W. Frank Braedt • Thomas S. Witten • R. Stan Duncan • Russell V. J. Chung

PACIFIC TOWER, SUITE 550, 1094 BISHOP STREET, HONOLULU, HAWAII 96813 TELEPHONE: 808-521-5641 FAX: 808-521-4109
BRANCH OFFICE: HILO LAGOON CENTER, 60 AUPUNI STREET, SUITE 500, HILO, HAWAII 96720 TELEPHONE: 808-961-1133 FAX: 808-961-1999

Virginia Goldstein
June 08, 1995
Page 2

We look forward to discussing this issue with you to ensure consistency with the intent of the County General Plan in the further refinement of project plans. We thank you for your comments to the Draft EA. Your letter in this response will be included in the Final EA.

Sincerely,



JAMES M. LEONARD, AICP
Managing Director
PBR - Hilo Office

xc: D. Hill
W. Tirrell
T. Witten

Appendix A: Strategic Planning for Residential Land Uses



ROBERT CHARLES LESSER & CO.
REAL ESTATE ADVISORS

**STRATEGIC PLANNING FOR RESIDENTIAL
LAND USES AT PARCEL 53, KEAUFHOU
RESORT IN KAILUA-KONA, HAWAII**

**Prepared for:
KAMEHAMEHA INVESTMENT
CORPORATION**

November 10, 1993



ROBERT CHARLES LESSER & CO.
REAL ESTATE ADVISORS

EXECUTIVE MEMORANDUM

To: Wallace Tirrell and Denise Hill
KAMEHAMEHA INVESTMENT CORPORATION

From: Gadi Kaufmann and Margaret Waite
ROBERT CHARLES LESSER & CO.

Re: Strategic Planning for Residential Land Uses at Parcel 53, Keauhou
Resort in Kailua-Kona, Hawaii

Date: November 10, 1993

In accordance with our agreement, we have completed our analysis of the residential development potential for Parcel 53 at Keauhou. Our role in this assignment was to evaluate residential development opportunities at Parcel 53 based on current and projected supply/demand trends, target market segments and buyer profiles and preferences, and to prepare residential product recommendations for Parcel 53 in light of anticipated market opportunities.

This executive memorandum focuses on key conclusions and recommendations resulting from our analysis and is intended for use as an internal executive management document. The attached technical appendix provides additional support documentation with regard to regional economic trends and growth indicators, the competitive housing environment, and future residential demand. Research and forecasting methodologies employed in our analysis have been addressed in the technical appendix and are not emphasized in this report.

I. DEVELOPMENT STRATEGY RECOMMENDATIONS

The development of the Parcel 53 property comes at a strategic point in the evolution of the Keauhou Resort. Residential product at Parcel 53 should aim to provide the necessary "re-seeding" of Keauhou, bringing new visitors and buyers to the community and providing the foundation for future resort activity in the mid/late 1990s and beyond.

Over the past ten years, the hotel inventory at Keauhou has declined in quality and occupancy. Keauhou's stock of rental condominium product has been relied upon to supplement the declining hotels and to bring repeat visitors, those who are hoped to ultimately become second home purchaser prospects, to Keauhou.

However, the majority of the condominium product in Keauhou is over 15 years old and is less attractive to vacation renters than newer competitive projects in other Hawaii resort locations. In addition, the general Hawaii market has softened. Declining values and decreased sales activity have limited the ability of existing Keauhou residents to "trade-up" -- a key factor to the success of luxury projects such as The Estates and Villas during the late 1980s.

ROBERT CHARLES LESSER & CO.

KAMEHAMEHA INVESTMENT CORPORATION
November 10, 1993

01-3613.02

What is required now at Keauhou is a new generation of resort residential product which will reposition Keauhou as a viable destination resort for the remainder of the 1990s and into the 21st Century. This requires that Parcel 53 include a broad range of residential product types which will target the first time buyer and investor market early-on and ultimately provide product for those seeking to trade-up from earlier purchases.

<u>Location/Product</u>	<u>Density</u>	<u>Unit Size</u>	<u>Unit Price</u>	<u>Annual Absorption</u>
Lower Parcel 53				
Stacked Flats	10 - 15	900 - 1,600	\$175,000 - \$295,00	50 to 60
View Homes	2.5 to 3.5	1,700 - 2,400	\$450,000 - \$550,000	15 to 20
Custom Lots	0.3 - 0.5	--	\$400,000 to \$600,00	5 to 10
Upper Parcel 53				
Stacked Flats	15	1,200 - 1,500	\$275,00 - \$325,000	45 to 50
Hillside Flats	6 - 8	1,500 to 2,300	\$375,000 - \$485,000	35 to 40
View Duplexes	3 - 5	2,200 - 2,800	\$575,000 - \$650,000	20 to 35
Detached Villas	2.5 - 3.0	2,200 - 3,400	\$630,000 - \$980,000	10 to 15
Custom Lots	1.5 - 3.0	--	\$150,000 - \$500,000	25 to 30

Key market findings in support of the above development strategy are provided below.

II. RESIDENTIAL MARKET OPPORTUNITY ANALYSIS

A. Market Overview

Within the Hawaiian Islands, the residential market peaked in August of 1990 and subsequently entered a downturn resulting from the national economic recession's impact on buyer liquidity and lack of consumer confidence among domestic and foreign primary, second and speculator/investor home buyers. Statistical sales data drawn from our database of over 50 resort/residential product along the Kona/Kohala Coast indicate a 70% to 80% drop in sales activity from the 1990 market peak to the 1992/1993 market trough

Cycles among residential properties occur in reaction to shifts in market conditions (namely the cumulative impact of fundamental changes in the national and international economy), the resulting impact on net wealth among target markets, changes in interest rates, the availability of product, changes in prices, and the impact on consumer confidence.

In Hawaii, however, another significant factor during market upswings is demand from speculators, which fuels price escalations and contributes to the frenzy often associated with "hot market" periods. Rather than reflecting fundamental demand for units, speculators, with an eye towards quick value appreciation, buy and sell residential products like commodities. Consequently, during the downturn, the speculators vanish from the market, leaving a great void in overall demand from peak to trough market periods.

The greatest mistake made by the real estate community is assuming that either the peak or trough market trends are indicative of sustained market depth. The desirability of Hawaii as a destination vacation location and the resultant growth in tourism remain the fundamental drivers for demand for new resort housing in the islands. Furthermore, it is tourism which fuels the Big Island economy and creates demand for new primary residential units.

While the current national economic recession has had an adverse impact on the expressed demand for real estate, it has not radically altered the flow of tourists to the Hawaii Islands. Once the nation emerges from recession, we expect renewed consumer confidence and increases in tourism to create demand for resort and non-resort residential units once again.

However, even once the general market begins to experience recovery, market supply and demand indicators point to an increasingly competitive residential market place in the Hawaiian Islands, particularly within the resort housing market. While the number of visitors to the state is expected to increase at a rate of 3% per year between 1992 and 2000 (an average of 232,000 new visitors per year), the number of new resort residential units added in the market place each year is expected to more than double (increasing from 450 to over 1,000 new resort units per year). The vast majority of these new units (70% to 80%) is expected to be in the luxury to super luxury price category (\$350,000 and above).

The above general market overview suggests an opportunity for Parcel 53 at Keauhou as an "affordable" resort/residential location (condominium product priced below \$350,000 and single family product in the \$400,000 to \$600,000 range). Within this price range, product at Keauhou can and should appeal to a number of "first time" resort buyers who wish to rent out units at least part of the year. Ultimately, these first time buyers will become future move-up buyers, creating an internal market at Keauhou for future luxury resort product (i.e., similar to Keauhou Estates).

B. Target Market Segments

Given the subject property's location within the amenitized Keauhou Resort, we expect that the principal target market for residential product at Parcel 53 will be second home buyers and investors. To a lesser degree, residential product at Parcel 53 could also attract some primary (Big Island) residents who seek the amenities and "planned environment" offered by a resort.

The above defined target market buyer segments in turn service three distinct fundamental (end-user) sources of demand for new resort residential units: vacation rentals, second homes and permanent residences, as will be discussed in greater detail in the demand analysis section of this report.

Based upon extensive interviews with local real estate professionals and buyer profile information gathered through our surveys of competitive resort condominium projects, we have identified the following mix of buyers for residential units within destination resorts in the Hawaiian Islands. We anticipate a similar mix for Parcel 53 at Keauhou, assuming a wide array of residential products is provided.

Second Home Buyers	60 - 65%
Investors	20 - 25%
Retirees	5 - 10%
Primary Residents	5 - 10%

In general, other than retirees, less than 5% of the buyers in our survey purchase units as primary residences. However, in more populated resort regions proximate to centers of employment such as Keauhou, there has been an increasing presence of primary residents as long-term renters among some resort residential products. We expect primary (non-retiree) home buyers to have the greatest impact on demand for higher density non-ocean front condominium, townhome and single family residential units at Keauhou.

A detailed summary of key characteristics among target market segments has been provided in EXHIBIT 16. Those characteristics considered most relevant to opportunities at Keauhou are summarized below:

- As many as 60% to 65% of the buyers will rent out their units. Consequently, they seek product which is close to resort services and offers specific in-unit features such as an owners locked closet and a 3/4 to full second bathroom on one-bedroom units. Products at Keauhou which are likely to have the greatest market appeal to these segments include condominium of 900 to 1,500 square feet.
- Approximately 35% to 40% of all resort residential units are owned by primary or second home buyers who hold the unit for their "exclusive use" and do not place the unit in a rental pool. While these buyers enjoy the amenities offered by the resort, they tend to be highly discriminating and look for isolation from the more transient short-term vacationers. Products which have successfully targeted these market segments (The Ironwoods and Wailea Pointe) feature larger units (1,500 to 2,500 square feet) within a low-density, gated enclave. Products at Keauhou likely to have the greatest market appeal to these segments include duplex/fourplex condominiums of 1,500 to 2,800 square feet, single family and custom lot product.

- Both second home and investor buyers tend to purchase units in resorts which they have frequented as vacationers. Consequently, every element of the Keauhou Resort, hotel, recreation, residential, and retail, must work cooperatively to establish a base of repeat vacationing clientele.
- Purchase decisions among target market segments for resort-oriented residential product are highly discretionary. Members of this target market will only make a purchase if the product and service package are attractive to them; since they do not need to move, they will not be inclined to settle for anything short of what they want. Future marketing efforts must emphasize the desirability of the Keauhou Resort, and development efforts must ensure that product satisfies market demands.

D. Demand Estimates

Statistical Demand

According to our surveys of competitive resort projects, vacation renters -- and the second home buyers and investors who supply this market -- are the largest generators of demand for resort residential units, accounting for some 60% of the market. Vacation rentals include both short-term stay renters (five to seven nights) and mid-term stay renters (one to three months) who seek more spacious accommodations than are available in a standard hotel room and prefer private kitchen facilities over room service.

Throughout the 1970s and 1980s, residential rentals within resort environments have gained increasing market acceptance among vacation travelers as an alternative to hotel stay. According to statistics gathered by the Hawaii Visitors Bureau, approximately 25% of tourists visiting the Big Island of Hawaii in 1992 stayed in a condominium rental unit during some portion of their trip. In 1970, approximately 1% of the tourist stayed in condominium rental units.

Tourism to the island of Hawaii is projected to grow by an average of 5.8% from 1990 to 2010 based upon estimates prepared by The Department of Business and Economic Development (DBED) and published in their 1988 M-K projections. We estimate that if tourism to the island of Hawaii increases at these levels, there will be an average net demand for 330 additional vacation condominium rental units per year from 1993 to 2010 (See EXHIBIT 7).

However, in light of the recent national economic recession and prolonged downturn in the California economy, recent increases in tourism have fallen short of DBED estimates. In fact, the most recent year end tourism figures for the Big Island (1992) were 2.4% lower than 1990 levels. In all likelihood, continued recession (1993) and slow economic recovery (1994 to 1995) will result in net tourism increases to Hawaii at far lower rates than projected by DBED.

As a conservative alternative to the DBED tourism projections, RCLCo adjusted DBED's estimates downward to more closely reflect the tourism growth patterns experienced during and after the 1981/1982 recession (See EXHIBIT 10). Consequently, we applied

modest tourism growth rate of 1% for the period of 1992 to 1994. Tourism growth expectations were then increased to 8.8% for the period of 1995 to 2000 in anticipation of economic rebound and growth in the mid-1990s. This estimated growth rate represents a blend of modest growth (3.2%) with rapid growth rates (14.5 %) experienced from 1987 to 1990.

The RCLCo tourism growth figures yield an estimated net annual demand of 270 additional vacation condominium rental units per year from 1993 to 2010 on the Island as a whole. (See EXHIBIT 11). It is relevant to note that the RCLCo scenario may not represent the "worst case" as it still assumes that the island of Hawaii will continue to gain more than its proportional share of the incremental increases to tourism among the Hawaiian Islands.

In addition to demand generated by vacation rentals, there are three other sources of end-user demand for resort residential units -- demand for second homes which are held vacant for occasional use (owner-occupied); demand for investors who never occupy units; and demand for permanent residences occupied by already relocated retirees and local executives (counted in the existing population base). Per our survey of residential projects in destination resorts, these three additional demand sources account for approximately 40% of the resort residential buyers.

In total, under the RCLCo tourism growth scenarios, market demand for resort residential units on the island of Hawaii is expected to average some 450 units per year from 1993 to 2010. Under more aggressive assumptions, demand for resort residential units could be 550 units per year during the same 18 year period.

These estimates represent average annual demand for the 1993 to 2010 period and do not take into account the variations in expressed demand which occur in accordance with general real estate cycles as discussed below.

Real Estate Cycle Estimates

Our study of trends from the previous two decades suggest that the annual expression of demand for real estate is cyclical, and that a single cycle can span a six to ten year period from peak to peak. Depending upon the depth of the economic downturn which occurs in conjunction with the downturn in real estate, the trough, or low point of the cycle, can last two to three years (i.e, 1991 to 1993) before beginning an upswing (initially indicated by a noticeable increase in absorption and followed by new construction and real price increases). The two to five years of general market upswing finally leads to the market peak which can last one to two years and is typically marked by the greatest gains in values.

To the extent that this historical trend is an indication of future basic real estate cycles in Hawaii, we can expect the market to recover from the current downturn some time in

ROBERT CHARLES LESSER & CO.

KAMEHAMEHA INVESTMENT CORPORATION
November 10, 1993

01-3613.02

1994, and to experience a market upswing during the 1995 to 1997 period¹ with a peak occurring in 1998 to 1999 (See EXHIBIT 9 AND 13). Hawaii will undergo at least two additional market cycles over the estimated 10 to 15 year build-out of Parcel 53. Market peaks (such as 1989/1990) could occur in 1998/1999 and 2006/2007; market troughs could be experienced in 2000/2001, 2008/2009, in addition to the current trough of 1991/1993.

The general fluctuations in the estimated annual demand for resort residential units during market peaks and market troughs is summarized below.

TABLE 1
Impact of Real Estate Cycles on Annual Demand
for Resort Residential Units
Island of Hawaii
1993 to 2010

	Estimated Annual Demand	
	Scenario 1 DBED	Scenario 2 RCLCo
<u>1990 to 1999 Cycle</u>		
Average	525 units	375 units
Peak	800	600
Trough	200	150
<u>2000 to 2010 Cycle</u>		
Average	550	500
Peak	875	700
Trough	200	200

Note: Figures are derived from the statistical demand analysis summarized in EXHIBITS 7 through 9 and 11 through 13. Annual figures have been rounded to the nearest 25 units, and slight adjustments have been made to "smooth" out projection curves.

¹ Please recognize that these "cycle" estimates are discussed only for illustrative purposes based upon trends observed in Hawaii and other housing markets compared to general economic cycles. Housing markets are highly volatile and are influenced by a number of factors such as consumer confidence, which are difficult to predict without more extensive research (well beyond the scope of this engagement). Specific decisions which rely on predicting housing cycles should only be undertaken after a more thorough analysis can be conducted and should be subject to periodic (quarterly or semi-annual) updates.

As indicated by the above chart, reading the cycle and responding appropriately is one of the most critical efforts in determining development opportunities.

Keauhou Market Capture

Based upon our database of Kona/Kohala vacation home properties and information provided by TMK and Locations, Inc., we estimate that resorts capture some 50% of all of the vacation home sales within the Kona/Kohala Coast (based upon data from 1988 to 1993). Going forward, given the available land inventory among Kona/Kohala resorts and the expected broadening of the product and prices for resort residential product offered, we expect that capture could increase to as much as 70% by the year 2000. As such, Kona/Kohala Coast resorts could absorb an average of 300 to 360 new residential units per year from 1993 to 2010.

In the future, Keauhou will compete with three existing resorts and some four additional proposed resorts for a share of the above defined resort residential housing demand in the Kona/Kohala area: Mauna Lani, Mauna Kea, and Waikoloa, Kaupulehu, South Kohala, Kohanaiki and Kukio, and new development at Kohala Ranch. Mauna Kea, which releases only a few residential units per year is expected to represent only limited competition to the rest of the resorts. Similarly, the Kohanaiki, Kukio and subsequent phases at Kohala Ranch are still in the planning phases, and the timing for market entry and level of competition is still uncertain. The South Kohala and Kaupulehu resorts are expected to start competing with Keauhou in late 1995 to 1996.

Therefore, we expect that Keauhou will continue to compete with two resorts (Mauna Lani, and Waikoloa) during the 1993 to 1995 period; four resorts (including Kapalehu and South Kohala) during the 1996 to 1998 period; and potentially up to six resorts (Kohanaiki and Kukio) after 1999.

If demand were distributed equally among each of the existing and proposed resorts, Keauhou could absorb some 20 to 75 units per year over the next 18 years (See EXHIBIT 12 RCLCo adjusted scenario), based upon a conservative estimate of growth in tourism. Under the DBED tourism growth scenario, absorption levels range from 25 to 95 units per year per resort.

Assuming Keauhou could enhance its fair market share capture to up to 1.5 times fair share based upon its competitive price positioning, the resort could absorb some 30 to 45 units per year during market troughs (assuming one to two residential product types are offered), 75 to 90 units per year during stabilized growth periods (assuming three product types are offered) and up to 100 to 140 units during market peaks (assuming four to five product types are offered).

III. RESIDENTIAL PRODUCT PROGRAM RECOMMENDATIONS

General Market Positioning and General Pricing Strategy

In the near-term (i.e., the next five to seven years), residential product at Keauhou should be price positioned within the middle of the vacation/second home housing market, and at the lower end of the Hawaiian resort housing market. As such, Keauhou will be competitively priced as a more affordable alternative to luxury resorts with similar quality construction and amenities (i.e., Waikoloa, Kaanapali, Kapalua, and Mauna Lani). The near term market positioning was chosen with the following critical factors in mind:

1. A middle market position takes advantage of a niche in the market place to provide a high-quality, amenity oriented resort experience within a price level that is largely unavailable in other competitive resorts, particularly for product proximate to or with views of the ocean (versus mauka land).
2. A middle market position is within a price band that places product within the reach of a larger percentage of the visitor market, as well as the investor, primary and second home buyer market segments.
3. The middle market position is consistent with Keauhou's current image. Given the performance history of the existing hotel properties, the challenges associated with improving the resort's national and international image as a destination resort, and the expected increase in competition in the luxury resort market over the next ten years, attempting to move into the luxury market is considered to be a risk venture.

As such, residential product at Parcel 53 should generally be priced some 30% to 60% below similar new product at luxury and ultra luxury resorts including Kapalua, Waikoloa and Wailea, but 40% to 100% above product outside of master planned resort community settings.

Furthermore, an array of residential product types should be offered at Parcel 53 including "entry level" condominiums in non-view or limited view locations, as well as move-up products such as duplexes, villas or custom lots with superior ocean views in a low density setting.

Finally, in arriving at specific pricing recommendations by product type (as discussed in the following section), we took into consideration sales prices from both the 1989/1990 period and 1992/1993. Our survey of over 50 resort, vacation, and second home residential products on the Big Island provided inconclusive in terms of establishing today values for residential product. While recorded sales prices among resort products are indeed down some 20% to 30% from their market peak 1989/1990 prices, there has not been a sufficient volume of sale to determine to what degree the underlying resort residential values have also fallen.

Today's sale activity (new and resale) is approximately 20% of the level of activity which occurred during the market peak. Much of that activity has been occurring under "desperate sale" conditions.

As the market begins to recover and more sales occur, we anticipate some downward adjustment in values given the tremendous speculation and increase in prices toward the end of the last cycle, the length and depth of the economic downturn in two key target markets -- Japan and California, and the large standing inventory of resort residential condominium products throughout the Hawaiian Islands. However, to what degree values drop will only be determined once sales volumes increase.

Therefore, conservatively, we have assumed that today's prices establish the floor from which future values of resort residential product in the Island will start increasing in due time.

Residential Product Types

Early-on and periodically throughout the course of development at Parcel 53, residential product offered should target the first time resort residential purchasers and investors. This "entry level" resort housing product will consist principally of stacked flat condominiums ranging from 900 to 1,500 square feet and generally priced from approximately \$200,000 to \$325,000 (\$180 to \$220 per square foot). These condominiums are likely to be used as vacation rentals much of the time.

Entry level product will supplement the declining visitor inventory in Keauhou, and provide affordable new resort product opportunities. As such, it should be innovative in terms of design, responding to the changing needs of the Hawaii visitor market, not simply reproducing past product types.

Residential product at Parcel 53 should also offer trade-up product for the existing Keauhou (or Kona Coast) home owner. Trade up product types could include duplex and four-plex villas of 1,500 to 2,800 square feet, priced from \$375,000 to \$650,000; single family homes of 1,700 to 3,400 square feet on lots of 8,000 to 15,000 square feet priced from \$450,000 to just under \$1,000,000; and custom lots of 8,000 to 24,000 square feet priced from \$150,000 to \$500,000, depending upon view orientation. The bulk of the market support for trade up product is likely to occur during market upswings and market peaks, when there is greater liquidity for existing home owners.

A more detailed description of recommended entry level and trade-up resort residential product types suitable for Parcel 53 have been provided in the attached Exhibits.

Land Planning Issues

Finally, in addition to strong project layout, effective marketing and reasonable pricing, there are three principal factors that will greatly contribute to the success of Parcel 53.

1. Ocean view orientation.
2. An emphasis on open space.

3. Access to recreational amenities including golf and ocean activities.

Amenity orientation (ocean, golf course or open space) is critical in today's resort housing market. The market has been expressing interest in only amenity oriented resort product, with ocean frontage/ocean view currently representing the most desirable orientation. Amenity orientation can be as important to the entry level market as it is to the higher end markets, particularly during the soft market periods.

Parcel 53 offers both opportunities and challenges in terms of creating an amenity-oriented community. The views from various areas of the property range from none (on the lower portion of the property) to spectacular bay and ocean views (on the upper portion).

Every effort must be made to try to offer at least some view from each product on the property. Areas not currently offering views should be planned to offer lower priced product, and provide open space and green belts to make up for the lack of ocean views. Product which would be considered suitable for such limited view locations include:

Product A1- Stacked flats at 15 units to the acre (similar in concept to Grand Champion at Wailea).

Product A3 - Condo combos including stacked flats and townhomes at 10 units per acre (similar to Keauhou Gardens).

Product B1- Executive lots of 8,000 to 12,000 square feet (similar to Kona Vista and Iolani).

Product C3 - Ranch lots of 1 to 1.5 acres on topographically difficult areas.

By virtue of topography, it is likely that the lower portion of the property will contain most if not all of the limited view product. As such, the price positioning for product on the lower property is expected to be some 25% to 30% below comparable product found on the upper portion of the property.

View product could include:

Product A2- Stacked flats at 15 units to the acre (similar in concept to The Shores at Waikoloa).

Product A4 - Hillside flats (four-plexes) at 6 units to the acre (similar in building configuration to the Ironwoods at Kapalua).

Product A5 - Hillside villas (duplexes) at 3 to 5 units to the acre (similar to the Villas at Keauhou and Hale Kehau).

Product B2- Detached villas of 2,200 to 3,400 square feet on 10,000 to 15,000 square foot lots.

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KAMEHAMEHA INVESTMENT CORPORATION
November 10, 1993

01-3613.02

Product C1/2 -View lots of 8,000 to 24,0000 square feet.

The engagement was conducted by Gadi Kaufmann, Managing Partner, Margaret Waite, Senior Consultant, and Bruce Owen, Associate. Should you have further questions, please contact us. As always, it is a pleasure working with you, and we look forward to our continued association with Kamehameha Investment Corporation.

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EXHIBIT A
 PRELIMINARY RESIDENTIAL PRODUCT PROGRAM OPPORTUNITY MATRIX
 KEAHOHU RESORT, PARCEL 53
 JULY, 1993

PRODUCT TYPE	NET DENSITY NET LOT SIZE (SFS)	APPROX UNIT SIZE RANGE(SF)	APPROX PRICE RANGE / (1993 dollars)	AVERAGE VALUE/RATIO (G/SF)	ANNUAL ABSORPTION ESTIMATES			ORIENTATION COMPETITIVE POSITION	PRODUCT EXAMPLE	PRODUCT DESCRIPTION	SITE LOCATION
					SLOW	STABLE	RAPID				
MULTIFAMILY											
A1 Resort Flats (limited view)	15 (units per acre)	900 - 1,300	\$175,000 - \$225,000 Average - \$200,000	\$173 - \$194	30	60	90	Occasional use investment rental limited view Priced 30% below the Shores	Golf Villas at Kapalua The Shores	Three story stacked flat, second floor at grade, single loaded, 5 to 9 units per building	Lower
A2 View Flats	15 (units per acre)	1,200 - 1,500	\$275,000 - \$325,000 Average - \$300,000	\$217 - \$229	30	48	72	Occasional use, investment rental Priced equivalent to Keahou Peninsula peak prices, comparable to Vista Waialua	Vista Waialua Keahou Peninsula Kaula	Three story stacked flat, second floor at grade, single loaded to 9 units per building	Upper
A3 Resort Condo Condo (limited view)	10 (units per acre)	1,200 - 1,600	\$245,000 - \$295,000 Average - \$270,000	\$184 - \$204	24	48	72	Longer Stay/retirement	Keahou Garden	Two story stacked flats and townhomes, 4 to 6 units per building	Lower
A4 Hillside Flats (duplex)	6 (units per acre)	1,500 - 2,200	\$375,000 - \$445,000 Average - \$410,000	\$220 - \$250	18	36	54	Longer Stay/retirement Comparable to base prices at Villas The Islands 10% above Kaula to reflect lower density	Hale Kaha The Shores The Islands Ironwoods	Two story stacked flats case at grade on upper floor	Upper
A5 Hillside View Villas (duplex)	3 - 5 (units per acre)	2,200 - 2,800	\$375,000 - \$650,000 Average - \$612,500	\$232 - \$261	12	24	36	Longer Stay/retirement/second home Villas Priced comparable to Hale Kaha non-golf 60% below islands pricing	Hale Kaha Villas Islands Hale Kaha	One and two story, some ground floor mauiers	Upper
SINGLE FAMILY HOMES											
B1 Executive View Homes (limited view)	3/ 8,000 - 12,000	1,700 - 2,400	\$450,000 - \$550,000 Average - \$500,000	\$229 - \$265	9	18	27	Primary and second home/retirement/priced comparable to Kea Vista on smaller lots	Kea Vista Island	Small custom homes	Lower
B2 Hillside View Detached Villas (limited view)	2.5/ 10,000 - 15,000	2,200 - 3,400	\$630,000 - \$980,000 Average - \$805,000	\$286 - \$288	6	12	18	Business, second homes 30% below the island prices for larger single family	Pineapple Hill	Keahou custom homes alternative, gated enclaves of no more than 12 units	Upper
CUSTOM LOTS											
C1 Small Hillside View Lots	2.5/ 8,000 - 12,000	-	\$150,000 - \$200,000 Average - \$175,000	\$17 - \$19	9	18	27	Primary/Retiree Priced comparable to above surrounding subdivisions with larger lots	View	Minimum pad area of 6,000 square feet, 90 foot view frontage	Upper
C2 Larger Hillside View Lots	1.4 16,000 - 24,000	-	\$240,000 - \$300,000 Average - \$270,000	\$15 - \$21	6	12	18	Retiree/Second home Comparable to view lots at Keahou Estates	Keahou Estates	Minimum pad of 10,000 square feet, 120 to 160 foot frontage	Upper
C3 Hillside Ranch Lots (limited view)	0.5/ 43,560 - 65,340	-	\$400,000 - \$600,000 Average - \$500,000	\$8 - \$9	5	9	14	Second Home: Priced 60% below Mauna Kea lowland lots, 100% above Vista Sandwood and Kealahou Bay Estates	Kahaia Ranch Limited view	Building pads should minimize views of other homes	Lower

1/ including premiums
 SOURCE: Robert Charles Lesser & Co.

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TECHNICAL APPENDIX

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EXHIBIT 1
GROWTH IN TOURISM TO THE STATE OF HAWAII
1979 TO 2010

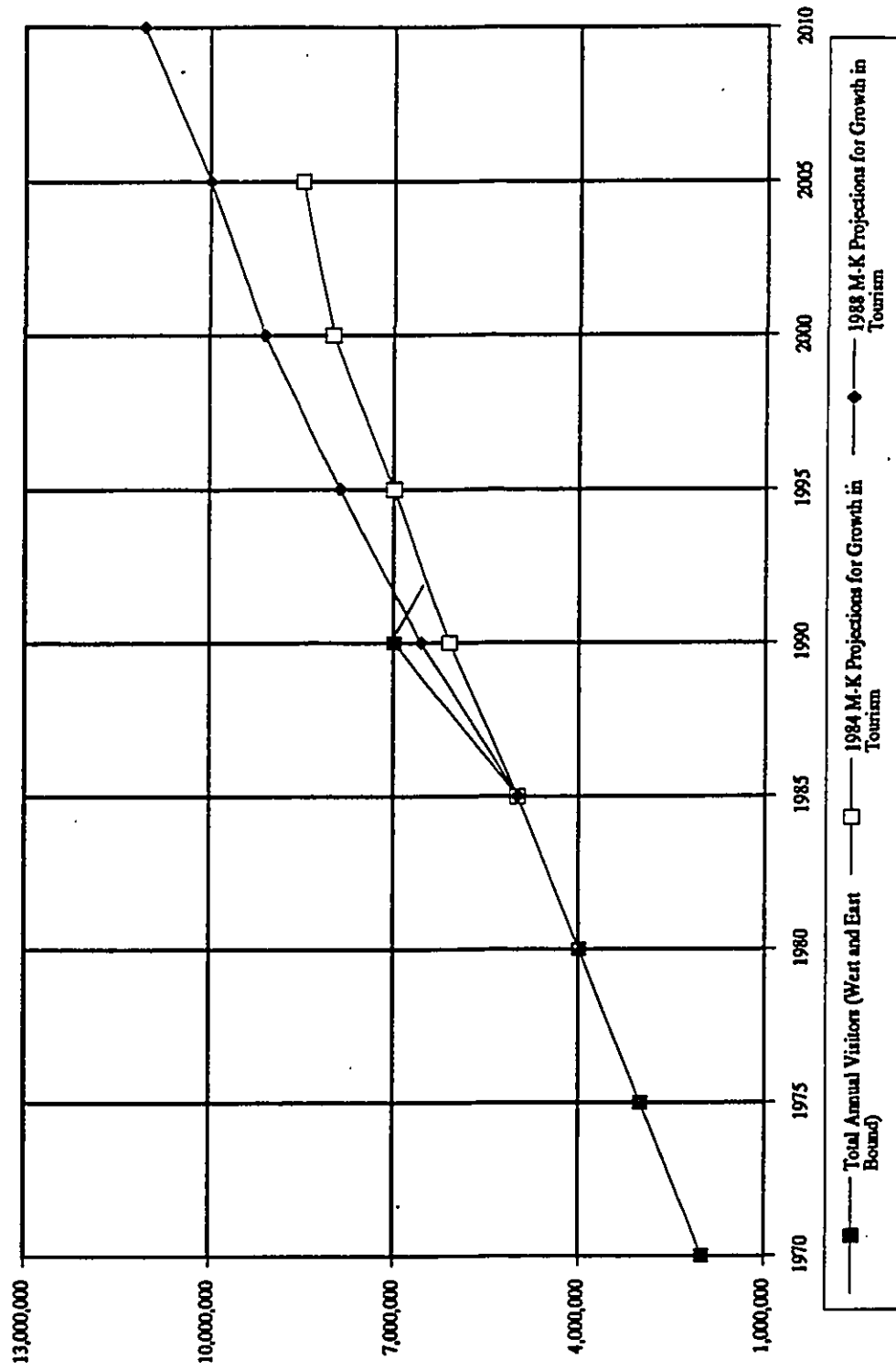
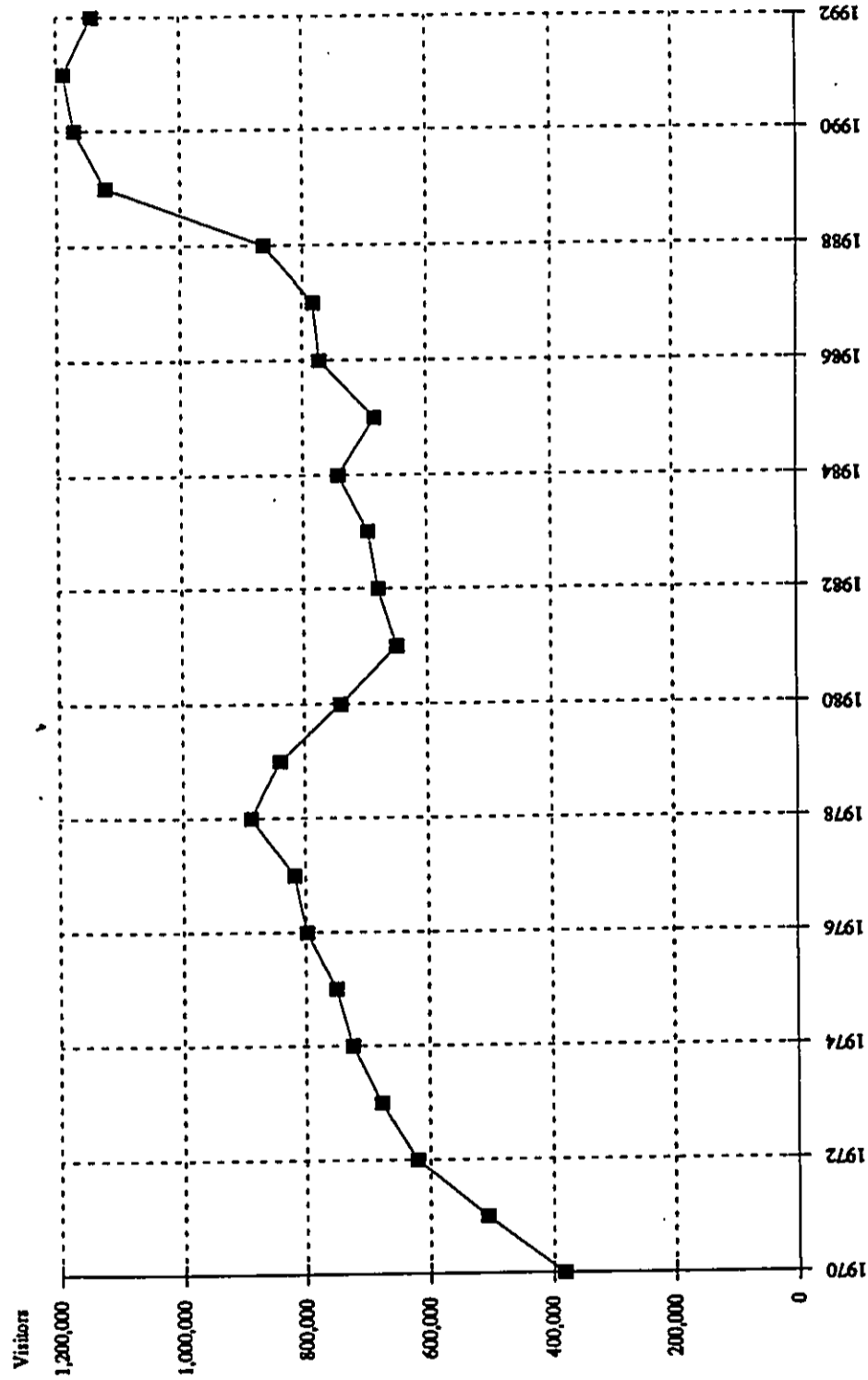


EXHIBIT 2
TRENDS IN TOURISM
ISLAND OF HAWAII
1970 TO 1992
01-3613.02

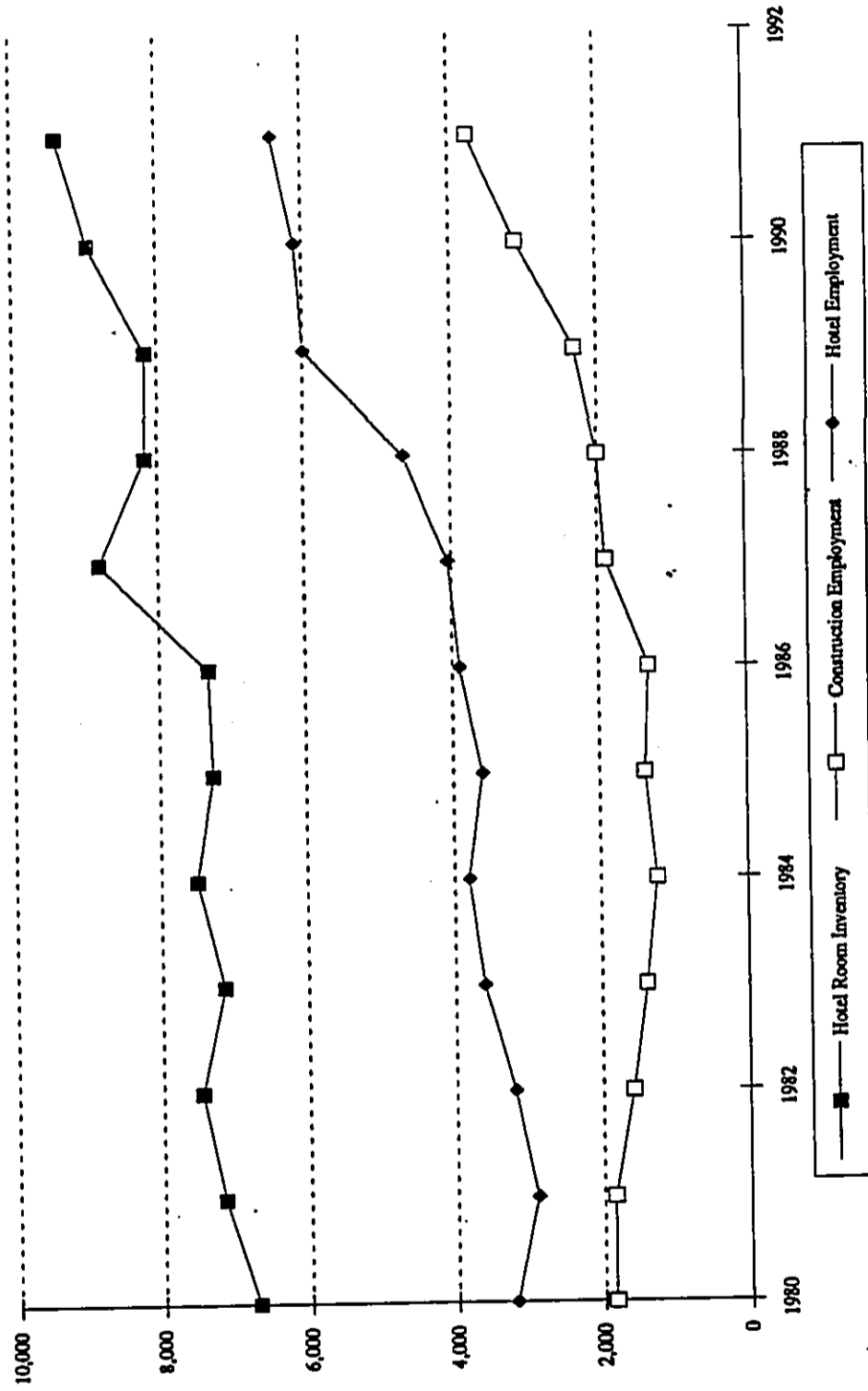


SOURCE: Department of Business and Economic Development; and Robert Charles Lesser & Co.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

EXHIBIT 3
THE RELATIONSHIP BETWEEN
HOTEL RELATED EMPLOYMENT AND HOTEL INVENTORY
ISLAND OF HAWAII
1980 TO 1991

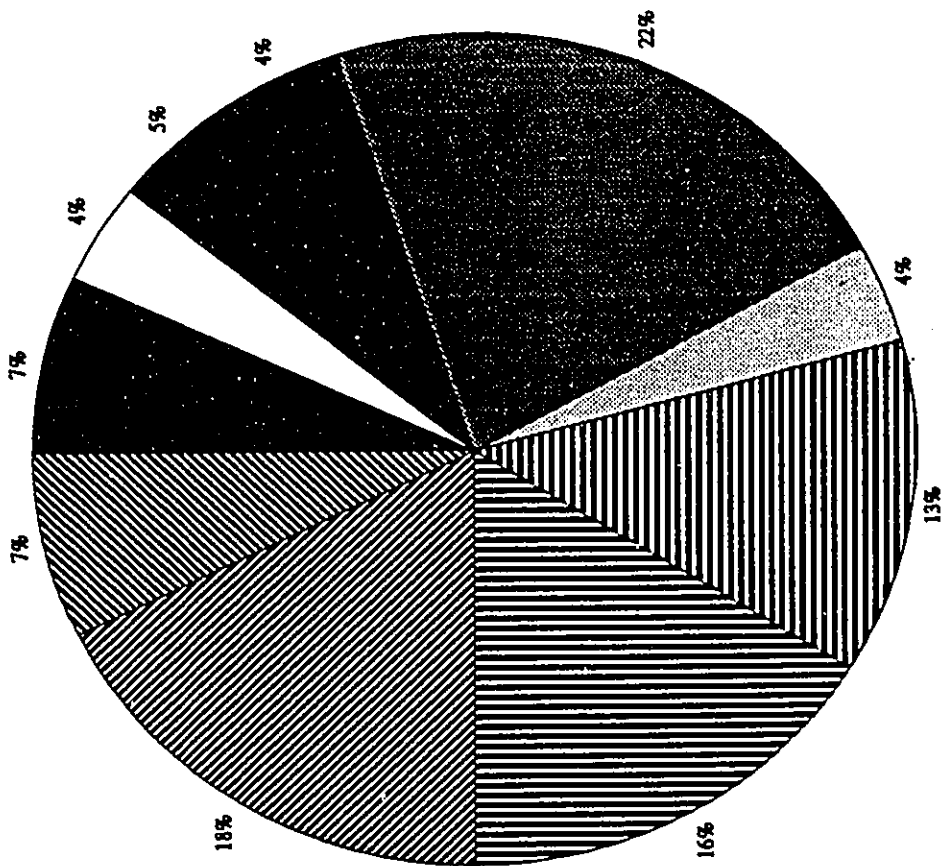
01-3613.02



SOURCE: Department of Business and Economic Development; and Robert Charles Lesser & Co.

01-3613.02

EXHIBIT 4
RELATIONSHIP BETWEEN TOURISM-RELATED
INDUSTRIES AND THE BIG ISLAND ECONOMY
1991

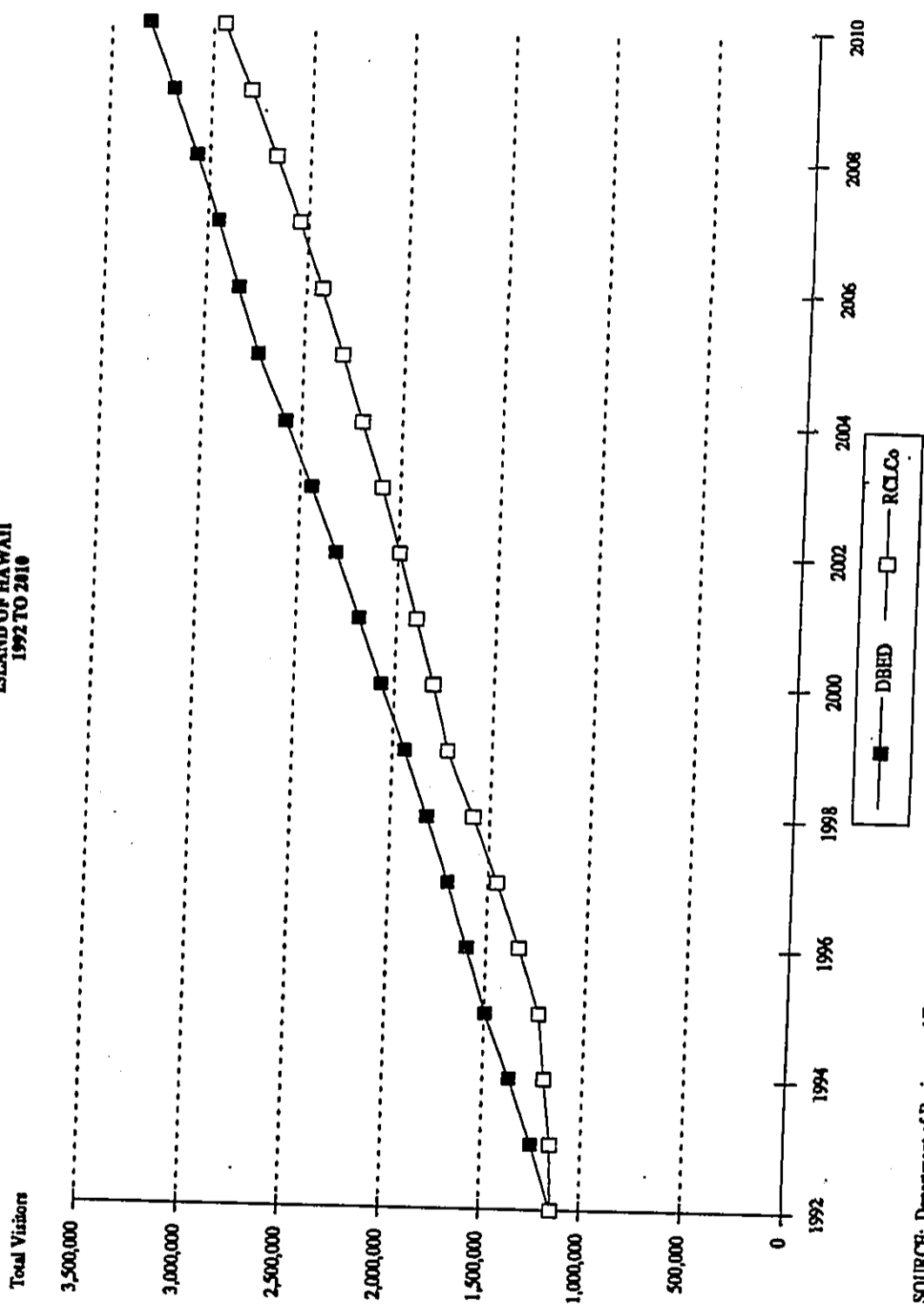


- Contract Construction
- Manufacturing
- Transportation
- Wholesale Trade
- Retail Trade
- FIRE
- Hotel Services
- Other Services
- Government
- Agriculture

SOURCE: Department of Business and Economic Development; and Robert Charles Lesser & Co. Total Employment: 63,500



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EXHIBIT 5
PROJECTED GROWTH IN TOURISM
ISLAND OF HAWAII
1992 TO 2010



SOURCE: Department of Business and Economic Development; and Robert Charles Lesser & Co.

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EXHIBIT 6
ISLAND OF HAWAII ECONOMIC INDICATORS
1970-2010
DBED SCENARIO
JUNE 1993

YEAR	POPULATION 1/ RESIDENT DEFACTO		HOUSE HOLDS 2/ POP/HH 2/		HOUSING UNITS 3/ TOTAL RESIDENT			ANNUAL VISITORS 4/ HAWAII VISITORS		KONA SIDE VISITORS		HOTEL ROOM INVENTORY 5/	NEW HOUSING PERMITS & EMPLOYMENT 7/
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980		
HISTORICAL													
1970	63,500	66,600	17,772	3.61	18,972	18,872	100	382,790	N/A	1,746,970	3,435	1,179	27,050
1971	67,000	70,600	18,831	3.56	20,061	19,951	110	506,843	N/A	1,818,944	4,241	1,873	28,150
1972	70,000	74,500	19,966	3.51	21,648	21,523	125	620,741	N/A	2,244,377	4,796	2,006	28,500
1973	73,900	78,700	21,395	3.45	23,578	23,428	150	678,538	N/A	2,630,952	5,234	1,622	29,300
1974	74,000	79,500	21,752	3.40	25,282	25,082	200	725,407	N/A	2,786,489	5,348	1,833	29,900
1975	77,400	83,300	23,104	3.35	26,694	26,444	250	751,920	N/A	2,829,105	6,045	1,333	31,150
1976	80,700	86,800	24,469	3.30	28,131	27,831	300	798,773	N/A	3,220,151	5,929	950	32,900
1977	82,800	89,300	25,508	3.25	29,453	29,123	330	817,460	N/A	3,443,667	6,002	1,203	34,350
1978	85,900	93,400	26,894	3.19	30,579	30,008	371	847,949	N/A	3,670,309	6,093	1,716	33,950
1979	89,400	96,700	28,453	3.14	32,283	31,548	421	880,532	N/A	3,960,531	5,889	2,163	34,350
1980	92,053	98,700	29,791	3.09	34,215	33,594	471	914,581	N/A	3,934,304	6,705	1,931	40,850
1981	96,100	101,700	31,120	3.09	36,041	34,782	521	948,516	N/A	3,934,623	7,167	1,318	42,150
1982	98,800	104,300	32,016	3.09	37,453	35,969	571	982,522	N/A	4,242,925	7,469	1,054	42,700
1983	100,800	108,300	32,685	3.08	38,264	36,495	621	1,016,532	N/A	4,367,880	7,149	976	44,050
1984	103,300	109,600	33,582	3.08	39,164	37,262	671	1,050,542	N/A	4,455,580	7,511	1,091	44,900
1985	105,900	112,300	34,383	3.08	40,054	37,775	721	1,084,552	N/A	4,544,110	7,280	1,172	46,150
1986	108,400	116,600	35,218	3.08	41,006	38,954	771	1,118,562	N/A	4,632,640	7,328	1,257	47,900
1987	111,700	120,400	36,313	3.08	42,022	39,920	821	1,152,572	N/A	4,721,170	8,823	1,755	50,900
1988	113,400	122,200	36,890	3.07	43,397	41,043	871	1,186,582	751,390	6,142,420	8,171	2,189	52,200
1989	116,600	132,300	37,956	3.07	45,520	43,502	921	1,220,592	999,140	6,641,820	8,161	2,904	54,700
1990	120,317	135,100	39,191	3.07	48,253	46,138	971	1,254,602	1,030,900	6,971,180	8,952	2,633	58,800
1991	126,400	143,200	41,199	3.07	50,579	48,178	1,021	1,288,612	1,020,390	6,873,890	9,384	2,918	63,300
1992	130,300	147,300	42,564	3.07	53,421	51,087	1,071	1,322,622	972,720	6,513,880	9,170	-	63,000
PROJECTIONS													
1993	134,051	152,259	43,750	3.06	55,040	52,214	1,121	1,356,632	1,062,684	6,742,057	9,674	-	65,319
1994	137,699	157,385	44,970	3.06	56,737	53,373	1,171	1,390,642	1,163,037	6,978,227	10,206	-	67,724
1995	141,445	162,684	46,224	3.06	58,517	54,564	1,221	1,424,652	1,272,868	7,222,669	10,768	-	70,217
1996	144,833	167,407	47,362	3.06	60,052	55,645	1,271	1,458,662	1,357,538	7,439,227	11,245	-	72,423
1997	148,301	172,268	48,528	3.06	61,644	56,753	1,321	1,492,672	1,447,841	7,662,278	11,744	-	74,699
1998	151,853	177,269	49,723	3.05	63,296	57,888	1,371	1,526,682	1,544,150	7,892,017	12,265	-	77,047
1999	155,489	182,416	50,947	3.05	65,010	59,051	1,421	1,560,692	1,646,866	8,128,644	12,810	-	79,468
2000	159,213	187,712	52,201	3.05	66,789	60,242	1,471	1,594,702	1,756,415	8,372,566	13,378	-	81,965
2001	163,071	193,134	53,501	3.05	68,563	61,478	1,521	1,628,712	1,856,655	8,581,690	13,996	-	84,290
2002	167,023	198,713	54,833	3.05	70,396	62,743	1,571	1,662,722	1,962,616	8,796,247	14,633	-	86,681
2003	171,070	204,452	56,199	3.04	72,295	64,041	1,621	1,696,732	2,074,825	9,016,168	15,250	-	89,139
2004	175,216	210,358	57,599	3.04	74,260	65,371	1,671	1,730,742	2,193,025	9,241,588	16,490	-	91,667
2005	179,482	216,433	59,034	3.04	76,295	66,733	1,721	1,764,752	2,318,183	9,472,644	17,304	-	94,267
2006	184,225	222,633	60,640	3.04	78,313	68,260	1,771	1,798,762	2,410,146	9,709,464	18,157	-	96,907
2007	189,114	229,010	62,291	3.04	80,394	69,828	1,821	1,832,772	2,505,756	9,952,204	19,053	-	99,621
2008	194,133	235,569	63,986	3.03	82,537	71,438	1,871	1,866,782	2,605,160	10,201,014	19,994	-	102,411
2009	199,286	242,317	65,727	3.03	84,746	73,093	1,921	1,900,792	2,708,506	10,456,044	20,980	-	105,279
2010	204,575	249,257	67,516	3.03	87,021	74,792	1,971	1,934,802	2,815,953	10,717,449	22,015	-	108,227

NOTE: See footnotes on page 3

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EXHIBIT 6

01-3613.02

ISLAND OF HAWAII ECONOMIC INDICATORS
1970-2010
DBED SCENARIO
JUNE 1993

YEAR	POPULATION 1/ RESIDENT DEFACTO		HOUSE HOLDS 2/ POPMH 2/	HOUSING UNITS 3/ TOTAL			ANNUAL VISITORS 4/ HAWAII KONA SIDE STATE			HOTEL ROOM INVENTORY 5/	NEW HOUSING PERMITS 6/	EMPLOYMENT 7/
				UNITS	RESIDENT	NON-RESIDENT	VISITORS	VISITORS	TOTAL			
HISTORICAL												
1970	-	-	-	-	-	-	-	-	-	-	-	-
1971	3,500	4,000	1,059	1,089	1,079	10	124,053	-	71,974	806	1,179	-
1972	3,000	3,900	1,135	1,587	1,572	15	113,898	-	425,433	555	1,873	1,100
1973	3,900	4,200	1,430	1,930	1,905	25	57,797	-	386,575	438	2,006	350
1974	100	800	356	1,704	1,654	50	46,869	-	155,537	114	1,833	400
1975	3,400	3,800	1,353	1,412	1,362	50	26,513	-	42,616	697	1,333	1,250
1976	3,300	3,300	1,365	1,437	1,387	50	18,687	-	391,046	(116)	950	1,750
1977	2,100	2,300	1,039	1,322	1,292	30	70,489	-	223,516	73	1,203	1,450
1978	3,100	4,100	1,386	1,126	885	241	47,417	-	226,642	91	1,716	400
1979	3,500	3,300	1,559	1,704	1,540	164	(98,951)	-	290,222	(204)	2,163	400
1980	2,653	2,000	1,337	1,932	2,046	(114)	(93,065)	-	119	816	1,991	6,500
1981	4,047	3,000	1,330	1,826	1,188	638	30,406	-	308,302	302	1,054	1,300
1982	2,700	2,600	895	1,412	1,187	225	16,678	-	124,955	(320)	976	550
1983	2,000	4,200	669	811	526	285	47,920	-	487,700	362	1,091	850
1984	2,700	1,100	897	900	767	133	59,260	-	28,530	(231)	1,172	1,250
1985	2,400	2,900	801	890	513	377	88,850	-	722,870	48	1,257	1,350
1986	2,300	4,100	835	952	1,179	(227)	9,440	-	192,850	1,495	1,755	3,450
1987	3,300	3,800	1,096	1,016	966	50	81,330	-	342,590	(632)	2,189	1,250
1988	1,700	1,800	577	1,123	1,123	232	256,950	247,750	499,400	(10)	2,504	2,500
1989	3,200	10,100	1,066	2,733	2,636	(336)	50,000	31,760	329,360	791	-	4,100
1990	3,717	2,800	1,235	2,326	2,040	286	17,800	(10,510)	(97,290)	-	-	4,700
1991	6,083	8,100	2,008	2,842	2,909	(67)	(46,290)	(47,670)	(360,010)	-	-	-500
1992	4,100	4,100	1,364	-	-	-	-	-	-	-	-	-
PROJECTIONS												
1993	3,551	4,959	1,187	1,619	1,127	492	107,876	89,964	228,177	-	-	2,319
1994	3,648	5,126	1,220	1,697	1,159	538	118,063	100,354	236,170	-	-	2,404
1995	3,747	5,299	1,254	1,780	1,191	589	129,212	109,830	244,443	-	-	2,493
1996	3,847	4,723	1,138	1,535	1,081	454	99,612	84,670	216,558	-	-	2,207
1997	3,468	4,860	1,166	1,592	1,108	484	106,238	90,303	223,051	-	-	2,276
1998	3,552	5,002	1,195	1,632	1,135	517	113,305	96,310	229,739	-	-	2,348
1999	3,637	5,147	1,224	1,714	1,163	551	120,842	102,716	236,627	-	-	2,421
2000	3,724	5,296	1,254	1,773	1,235	588	128,881	109,549	243,722	-	-	2,497
2001	3,858	5,422	1,300	1,834	1,266	635	117,930	100,240	209,324	-	-	2,325
2002	3,952	5,578	1,332	1,898	1,297	601	131,775	112,008	219,921	-	-	2,391
2003	4,047	5,740	1,366	1,965	1,330	671	139,295	118,401	225,420	-	-	2,458
2004	4,146	5,905	1,400	2,034	1,363	744	147,245	125,158	231,056	-	-	2,528
2005	4,246	6,076	1,435	2,019	1,526	493	108,191	91,982	236,820	-	-	2,600
2006	4,763	6,199	1,607	2,081	1,568	513	112,483	95,611	242,741	-	-	2,640
2007	4,889	6,377	1,650	2,144	1,611	533	116,945	99,403	248,809	-	-	2,714
2008	5,019	6,560	1,695	2,208	1,654	554	121,584	103,347	255,030	-	-	2,790
2009	5,152	6,747	1,742	2,276	1,700	576	126,408	107,446	261,406	-	-	2,868
2010	5,289	6,941	1,789	-	-	-	-	-	-	-	-	2,948
HISTORICAL 5-YEAR AVERAGE ANNUAL GROWTH PER CATEGORY												
1970-19	2,780	3,340	1,066	1,544	1,514	30	73,826	-	216,427	322	1,641	820
1975-19	2,931	3,080	1,337	1,504	1,430	74	-2,068	-	221,080	132	1,549	1,940
1980-19	2,769	2,760	919	1,168	836	332	-11,464	-	189,921	115	1,257	1,060
1985-19	2,883	4,320	962	1,640	1,673	-33	97,314	-	417,414	334	1,835	2,530
PROJECTED 5-YEAR AVERAGE ANNUAL GROWTH PER CATEGORY												
1990-19	4,226	5,517	1,407	2,053	1,685	-	65,332	48,394	50,298	363	-	2,283
1995-20	3,554	5,016	1,195	1,654	1,136	-	113,776	96,709	229,939	322	-	2,350
2000-20	4,050	5,744	1,367	1,901	1,298	-	132,181	112,354	220,056	785	-	2,460
2005-20	5,023	6,565	1,697	2,146	1,612	-	117,122	99,354	248,961	942	-	2,792

NOTE: See footnotes on Page 3.

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EXHIBIT 6

ISLAND OF HAWAII ECONOMIC INDICATORS
1970-2010
DBED SCENARIO
JUNE 1993

YEAR	POPULATION 1/ RESIDENT	HOUSE DEFACTO 2/ HOLDS	HOUSING UNITS 3/ TOTAL		ANNUAL VISITORS 4/ HAWAII KONA SIDE STATE			HOTEL ROOM INVENTORY 5/	NEW HOUSING PERMITS 6/ EMPLOYMENT 7/
			RESIDENT	NON- RESIDENT	VISITORS	VISITORS	TOTAL		

FOOTNOTES

- 1/ Historical population figures were provided by DBED, Tables 6 and 7 of the 1992 DBED Data Base. Projected population figures were derived by taking the 1990 Census figures and applying the 1990-2010 growth rates as provided by the November 1, 1988 DBED M-K Series projections as shown on pgs 36, Table 18 of the 1990 DBED Data Book.
- 2/ 1970, 1980 and 1985 historical households figures were provided by the US Census Bureau which were derived by estimated household size for those years. All historical years in between were derived by taking the straight line decline in households between each period. 1985 to 1990 and projected household figures were derived by applying the projected persons per household figure to projected population. Projected persons per household was an RCLCo estimate based on historical trends between 1980 and 1985 of statewide decline of household size and general trends in the state of Hawaii.
- 3/ Historical housing units were provided by DBED, table 615, of the 1992 Data Base. Non-Resident households for years 1970 through 1976 are estimates based on a straight line decline using data from years 1977 through 1989. Projected resident household units are expected to be new households formed and incorporating a 5% vacancy factor each year. Projected non resident units are based on future visitor travel to Hawaii.
- 4/ Historical visitor travelers were provided by Hawaii Visitors Bureau, Annual Research Report, various years, 1970 to 1992. Travelers that visited the Kona side of the island have only been tracked since 1988. Projected visitors are based on DBED projections, Table 9-"Visitor Industry Projections: 1985 to 2010" and are based on the growth of average visitor census to the island. For the purpose of this analysis, the 1992 estimate of visitors was grown by the percentage growth rate for each five year period as shown in Table 9.
- 5/ Historical hotel inventory was provided by the Bank of Hawaii "Annual Economic Report, 1992", pg. 30. Projected hotel units are based on DBED projections, Table 9-"Visitor Industry Projections: 1985 to 2010." For the purpose of this analysis, the 1992 estimate of units was grown by the percentage growth rate for each five year period as shown in Table 9. These figures include condominium units used for hotel use.
- 6/ Historical permits were provided by the DBED 1992 Data Base and the 1990 Bank of Hawaii "Annual Economic Report", pg. 31, and represent only residential permits, not all permit activity.
- 7/ Employment figures were provided by the 1992 Bank of Hawaii "Annual Economic Report", pg. 30.

SOURCE: Bank of Hawaii, DBED, US Census Bureau, Department of Labor and Industrial Relations, and Robert Charles Lesser & Co.

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EXHIBIT 7

PROJECTED RESIDENT AND NON-RESIDENT HOUSING UNIT DEMAND ON THE ISLAND OF HAWAII DBED SCENARIO 1991-2010 JUNE 1993

CATEGORY	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
PROJECTED NET ANNUAL NON-RESIDENT DEMAND										
Projected Annual Visitors to Hawaii 1/	1,250,216	1,368,279	1,497,491	1,597,104	1,703,342	1,816,647	1,937,490	2,066,371	2,184,300	2,308,960
Average Persons Per Party 2/	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Total Visitor Households	625,108	684,140	748,746	798,552	851,671	908,324	968,745	1,033,186	1,092,150	1,154,480
x Average Length of Stay (Days) 2/	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Total Visitor Nights (Days)	3,625,626	3,968,009	4,342,724	4,631,602	4,939,692	5,268,276	5,618,721	5,992,476	6,334,470	6,695,984
x % of Visitors Staying in a Non-Resident Unit 3/	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%
Total Occupied Non-Resident Nights	924,535	1,011,842	1,107,395	1,181,058	1,259,621	1,343,410	1,432,774	1,528,081	1,615,290	1,707,476
Vacancy Allowance (Occupancy @ 65%)	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
Adjusted Non-Resident Unit Nights (Demand Divided By 365 Nights Per Year)	1,248,122	1,365,987	1,494,983	1,594,429	1,700,489	1,813,604	1,934,245	2,062,910	2,180,641	2,305,092
Total Non-Residential Unit Demand	3,420	3,742	4,096	4,368	4,659	4,969	5,299	5,652	5,974	6,315
Net Annual Increase in Non-Resident Units 4/	295	323	353	272	291	310	331	353	323	341
Additional Demand from Second Home Market 5/	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Total Potential Non-Resident Unit Demand	492	538	589	454	484	517	551	588	538	568
Cumulative Increase in Non-Resident Units	492	1,030	1,619	2,073	2,557	3,074	3,625	4,212	4,750	5,318
PROJECTED NET ANNUAL RESIDENT DEMAND										
Total Households 1/	43,750	44,970	46,224	47,362	48,528	49,723	50,947	52,201	53,501	54,883
Net Annual Growth in New Resident Units 4/	1,186	1,220	1,254	1,138	1,166	1,195	1,224	1,254	1,300	1,382
Cumulative Growth in Resident Households	2,631	3,851	5,105	6,243	7,409	8,604	9,828	11,082	12,382	13,764
TOTAL PROJECTED ANNUAL HOUSING DEMAND										
Annual Growth in All Units (Resident and Non-Resident)	1,678	1,758	1,843	1,592	1,650	1,712	1,775	1,842	1,838	1,950
Cumulative Growth in All Units (Resident and Non-Resident)	1,678	3,436	5,279	6,871	8,521	10,233	12,008	13,849	15,687	17,637

NOTE: See Footnotes on Page 3

EXHIBIT 7
PROJECTED RESIDENT AND NON-RESIDENT
HOUSING UNIT DEMAND ON THE ISLAND OF HAWAII
DBED SCENARIO
1991-2010
JUNE 1993

CATEGORY	2003	2004	2005	2006	2007	2008	2009	2010
PROJECTED NET ANNUAL NON-RESIDENT DEMAND								
Projected Annual Visitors to Hawaii 1/	2,440,735	2,580,030	2,727,275	2,835,466	2,947,949	3,064,894	3,186,478	3,312,886
Average Persons Per Party 2/	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Total Visitor Households	1,220,368	1,290,015	1,363,638	1,417,733	1,473,975	1,532,447	1,593,239	1,656,443
x Average Length of Stay (Days) 1/	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Total Visitor Nights (Days)	7,078,132	7,482,087	7,909,098	8,222,851	8,549,052	8,888,193	9,240,786	9,607,369
x % of Visitors Staying in a Non-Residential Units 3/	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%
Total Occupied Non-Residential Nights	1,804,924	1,907,932	2,016,820	2,096,827	2,180,008	2,266,489	2,356,400	2,449,879
Vacancy Allowance (Occupancy @ 65%)	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
Adjusted Non-Resident Unit Nights (Demand)	2,436,647	2,575,708	2,722,707	2,830,717	2,943,011	3,059,760	3,181,141	3,307,337
Divided By 365 Nights Per Year	365	365	365	365	365	365	365	365
Total Non-Residential Unit Demand	6,676	7,057	7,459	7,755	8,063	8,383	8,715	9,061
Net Annual Increase in Non-Resident Units 4/	360	381	403	296	308	320	333	346
Additional Demand from Second Home Markets 5/	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Total Potential Non-Residential Unit Demand	601	635	671	493	513	533	554	576
Cumulative Increase in Non-Resident Units	5,919	6,554	7,225	7,718	8,231	8,764	9,318	9,895
PROJECTED NET ANNUAL RESIDENT DEMAND								
Total Households 1/	56,199	57,599	59,034	60,640	62,291	63,986	65,727	67,516
Net Annual Growth in New Households 4/	1,316	1,400	1,435	1,606	1,651	1,695	1,741	1,789
Cumulative Growth in Resident Households	15,080	16,480	17,915	19,521	21,172	22,867	24,608	26,397
TOTAL PROJECTED ANNUAL HOUSING DEMAND								
Annual Growth in All Units (Resident and Non-Resident)	1,917	2,035	2,106	2,099	2,164	2,228	2,295	2,365
Cumulative Growth in All Units (Resident and Non-Resident)	19,554	21,589	23,695	25,794	27,958	30,186	32,481	34,847

NOTE: See Footnotes on Page 3

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EXHIBIT 7

PROJECTED RESIDENT AND NON-RESIDENT
HOUSING UNIT DEMAND ON THE ISLAND OF HAWAII
DBED SCENARIO
1991-2010
JUNE 1993

FOOTNOTES

- 1/ From Exhibit 6.
- 2/ From the Hawaii Visitors Bureau, Annual Research Report, 1992. Figure was kept constant for the purpose of this analysis.
- 3/ Based on survey results published by the Hawaii Visitors Bureau, 1991 Annual Research Report. In the absence of empirical data or consumer research indicating an alternative trend, we have assumed that non-resident units will continue to capture 25% of total visitors with 60% to 70% of visitors staying in full service resorts/hotels and the remaining 5% to 15% staying with relatives, friends, campgrounds, etc.
- 4/ Net increase is the amount of incremental demand generated. 1993 increase is derived from the 1992 estimate.
- 5/ Based upon buyer profiles indicating that 29% of the buyers use units for occasional use/second home; 5% are strictly investment and are never occupied, and 7.5% are occupied by retirees; totaling 41.5% rounded to 40%.

SOURCE: Hawaii Visitor Bureau, Annual Research Reports, annual, DBED; and Robert Charles Lesser & Co.

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EXHIBIT 8

ESTIMATED CAPTURE OF ANNUAL NON-RESIDENT UNITS
BY ISLAND OF HAWAII RESORTS FAIR SHARE CAPTURE ANALYSIS
ISLAND OF HAWAII
DBED SCENARIO
JUNE 1993

DEMAND SOURCE	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Adjusted Forecasted Cyclical Annual New Non-Resident Units 1/ Percentage Allocated to Kona/Kohala Resorts 2/	207 50.0%	259 50.0%	388 60.0%	492 60.0%	647 60.0%	803 60.0%	829 60.0%	456 70.0%	228 70.0%	342 70.0%
= Total Annual Non-Resident Resort Housing Demand Total Number of Resorts-Fair Share Capture 3/	104 3.00	129 3.00	233 3.00	295 5.00	388 5.00	482 5.00	497 7.00	319 7.00	160 7.00	239 7.00
= Total Annual Non-Resident Resort Housing Demand Per Resort	35	43	78	59	78	96	71	46	23	34
Cumulative Demand Per Resort: 1991-2010	35	78	155	214	292	388	459	505	528	562

1/ Annual demand shown is based on average annual demand of non-resident units in EXHIBIT 7. The annual demand of units was determined by applying the percentage above or below the average annual demand for the forecasted cyclical demand. The percentage in a given year was assumed to be ranged from within 60% above or below the average demand for each cycle.

2/ Based on total capture of vacation home sales between 1988 and 1993 per Locations and MLS data.

3/ It is assumed that there are a total of 4 active existing and 5 proposed resorts on the island that will most likely offer resort product. We are assuming that each resort would capture a 1.00 fair share of the demand. The existing resorts are: Mauna Lani, Mauna Kea, Waikoloa, and Keahou. We are assuming for this analysis that Mauna Lani and Mauna Kea would capture a combined 1.00 fair share due to the extreme high-end nature of their product. Waikoloa and Keahou capture a 1.00 fair share each. Thus, there are a total of 3.00 active projects sharing potential resort demand. This analysis also assumes that the 5 planned and proposed resort projects would capture a 4.00 fair share combined. The planned projects include: Kaupulehu Resort; South Kohala Resort; Kohala Resort; Kohala Resort; Kohala Ranch. For this analysis, there are a total of 7.00 resorts capturing potential non-resident demand over the next 20 years. We are assuming that all projects would be active by 1996.

SOURCE: Urban Decisions Systems; DBED; US Census Bureau; and Robert Charles Lesser & Co.

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EXHIBIT 8

ESTIMATED CAPTURE OF ANNUAL NON-RESIDENT UNITS
BY ISLAND OF HAWAII RESORTS FAIR SHARE CAPTURE ANALYSIS
ISLAND OF HAWAII
DBED SCENARIO
JUNE 1993

DEMAND SOURCE	2003	2004	2005	2006	2007	2008	2009	2010
Adjusted Annual New Non-Resident Units 1/ Percentage Allocated to Kona/Kohala Resorts 2/	428 70.0%	570 70.0%	684 70.0%	855 70.0%	912 70.0%	798 70.0%	570 70.0%	428 70.0%
= Total Annual Non-Resident Resort Housing Demand Total Number of Resorts-Fair Share Capture 3/	299 7.00	399 7.00	479 7.00	599 7.00	638 7.00	559 7.00	399 7.00	299 7.00
= Total Annual Non-Resident Resort Housing Demand Per Resort	43	57	68	86	91	80	57	43
Cummulative Demand Per Resort: 1991-2010	605	662	730	816	907	987	1,044	1,086

1/ Annual demand shown is based on average annual demand of non-resident units in EXHIBIT 7. The annual demand of units was determined by applying the percentage above or below the average annual demand for the forecasted cyclical demand. The percentage in a given year was assumed to be ranged from within 60% above or below the average demand for each cycle.

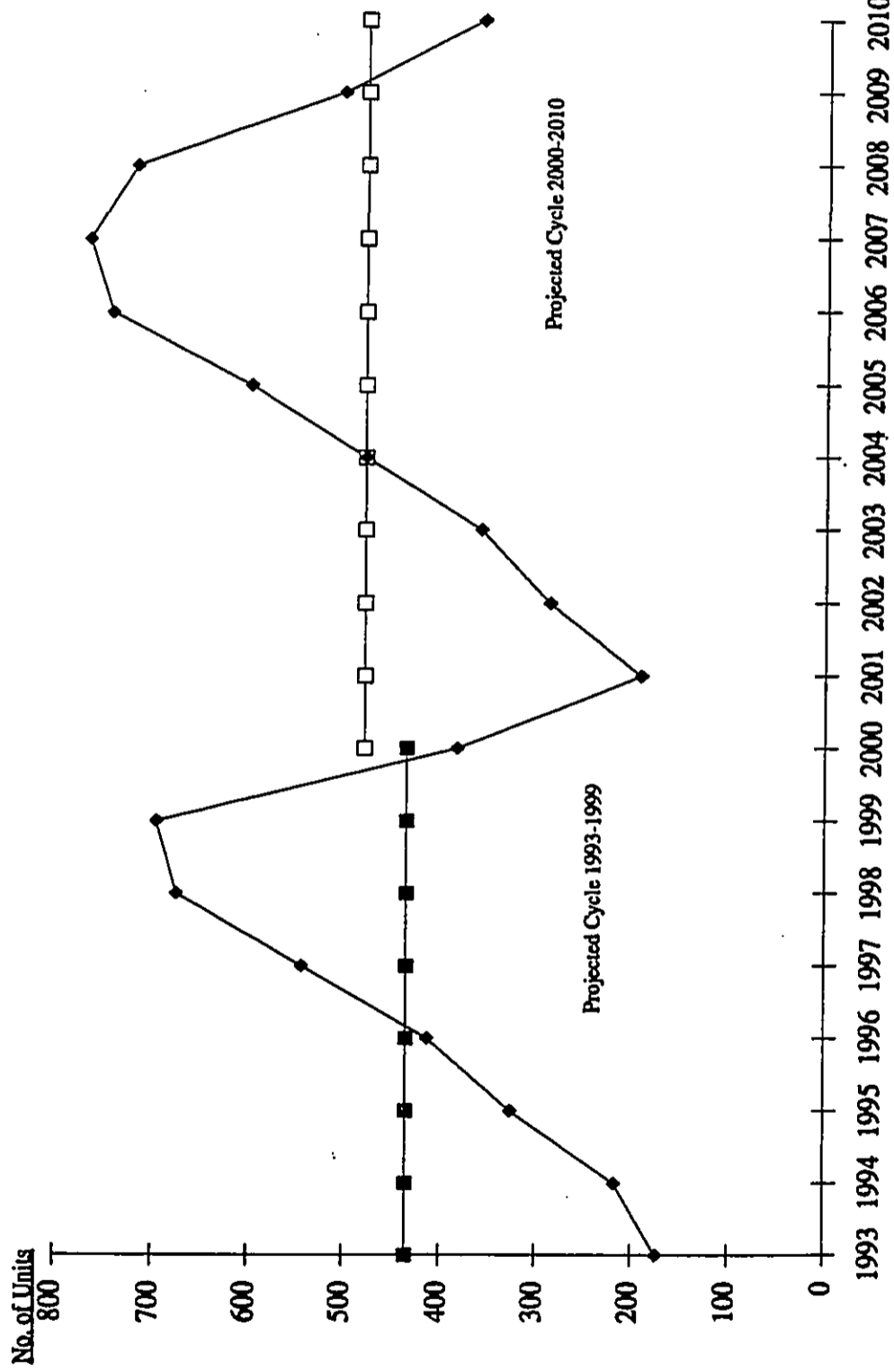
2/ Based on total capture of vacation home sales between 1988 and 1993 per Locations and MLS data.

3/ It is assumed that there are a total of 4 active existing and 5 proposed resorts on the island that will most likely offer resort product. We are assuming that each resort would capture a 1.00 fair share of the demand. The existing resorts are: Mauna Lani, Mauna Kea, Waikoloa, and Keauhou. We are assuming for this analysis that Mauna Lani and Mauna Kea would capture a combined 1.00 fair share due to the extreme high-end nature of their product. Waikoloa and Keauhou capture a 1.00 fair share each. Thus, there are a total of 3.00 active projects sharing potential resort demand. This analysis also assumes that the 5 planned and proposed resort projects would capture a 4.00 fair share combined. The planned projects include: Kaupulehu Resort; Kohala Resort; South Kohala Resort; Kohala Resort; Kihuna Resort and future development at Kohala Ranch. For this analysis, there are a total of 7.00 resorts capturing potential non-resident demand over the next 20 years. We are assuming that all projects would be active by 1996.

SOURCE: Urban Decisions Systems; DBED; US Census Bureau; and Robert Charles Lesser & Co.

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EXHIBIT 9
PROJECTED CYCLES OF NONRESIDENT UNITS
COUNTY OF HAWAII
DBED SCENARIO



SOURCE: Robert Charles Lesser & Co.

1/Projected change based on national cycle every 10 years.



ROBERT CHARLES LESSER & CO.

EXHIBIT 10
ISLAND OF HAWAII ECONOMIC INDICATORS
1970-2010
RCLCO SCENARIO
JUNE 1993

YEAR	POPULATION 1/		HOUSE HOLDS 2/	POP/HH 2	HOUSING UNITS 3/			ANNUAL VISITORS 4/			HOTEL ROOM INVENTORY 5/	NEW HOUSING PERMITS 6/	EMPLOYMENT 7/
	RESIDENT	DEFACTO			TOTAL UNITS	NON- RESIDENT	HAWAII VISITORS	KONA SIDE VISITORS	STATE TOTAL				
HISTORICAL													
1970	63,500	66,600	17,772	3.61	18,972	18,872	100	382,790	N/A	1,746,970	3,435	1,179	27,030
1971	67,000	70,600	18,831	3.56	20,061	19,951	110	506,843	N/A	1,818,944	4,241	1,873	28,130
1972	70,000	74,500	19,966	3.51	21,648	21,523	125	620,741	N/A	2,244,377	4,796	2,006	28,500
1973	73,900	78,700	21,395	3.45	23,578	23,428	150	678,538	N/A	2,630,932	5,234	1,622	29,500
1974	74,000	79,500	21,732	3.40	25,282	25,082	200	725,407	N/A	2,786,489	5,348	1,833	29,900
1975	77,400	83,300	23,104	3.35	26,694	26,444	250	751,920	N/A	2,829,105	6,045	1,333	31,130
1976	80,700	86,800	24,469	3.30	28,131	27,831	300	798,773	N/A	3,220,151	5,929	950	32,900
1977	82,800	89,300	25,508	3.25	29,453	29,123	330	817,460	N/A	3,443,667	6,002	1,203	34,330
1978	85,900	93,400	26,894	3.19	30,579	30,008	571	887,542	N/A	3,670,309	6,093	1,716	33,930
1979	89,400	96,700	28,433	3.14	32,283	31,548	735	840,939	N/A	3,960,531	5,889	2,163	34,330
1980	92,053	98,700	29,791	3.09	34,215	33,594	621	741,581	N/A	3,934,504	6,705	1,931	40,830
1981	96,100	101,700	31,120	3.09	36,041	34,782	1,259	648,516	N/A	3,934,623	7,167	1,318	42,130
1982	98,800	104,300	32,016	3.09	37,453	35,969	1,484	678,922	N/A	4,242,925	7,469	1,054	42,700
1983	100,800	108,500	32,685	3.08	38,264	36,495	1,769	695,600	N/A	4,367,880	7,149	976	44,000
1984	103,500	109,600	33,582	3.08	39,164	37,262	1,902	743,520	N/A	4,855,580	7,511	1,091	44,900
1985	105,900	112,500	34,383	3.08	40,054	37,775	2,279	684,260	N/A	4,884,110	7,280	1,172	46,130
1986	108,400	116,600	35,218	3.08	41,006	38,954	2,052	773,110	N/A	5,606,980	7,328	1,257	47,500
1987	111,700	120,400	36,313	3.08	42,022	39,920	2,102	782,550	N/A	5,799,830	8,823	1,755	50,900
1988	113,400	122,200	36,890	3.07	43,397	41,043	2,354	863,880	751,390	6,142,420	8,171	2,189	52,200
1989	116,600	132,300	37,956	3.07	45,520	43,502	2,018	1,120,830	999,140	6,641,820	8,161	2,904	54,700
1990	120,317	135,100	39,191	3.07	48,253	46,138	2,115	1,170,830	1,030,900	6,971,180	9,932	2,653	58,800
1991	126,400	143,200	41,199	3.07	50,579	48,178	2,401	1,188,630	1,020,390	6,873,890	9,384	2,918	63,500
1992	130,500	147,300	42,564	3.07	53,421	51,087	2,334	1,142,340	972,720	6,513,880	9,170	-	63,000
PROJECTIONS													
1993	134,051	152,259	43,730	3.06	54,599	52,214	2,385	1,153,763	980,699	6,742,057	9,674	-	65,319
1994	137,699	157,385	44,970	3.06	55,923	53,373	2,550	1,190,684	1,012,081	6,978,227	10,206	-	67,724
1995	141,445	162,684	46,224	3.06	57,284	54,564	2,720	1,228,786	1,044,468	7,222,669	10,768	-	70,217
1996	144,833	167,407	47,362	3.06	58,848	55,645	3,203	1,336,919	1,136,381	7,439,227	11,245	-	72,423
1997	148,301	172,268	48,528	3.06	60,482	56,753	3,729	1,454,568	1,236,383	7,662,278	11,744	-	74,699
1998	151,853	177,269	49,723	3.05	62,189	57,888	4,301	1,582,570	1,345,184	7,892,017	12,265	-	77,047
1999	155,489	182,416	50,947	3.05	63,974	59,051	4,923	1,721,836	1,463,560	8,128,644	12,810	-	79,468
2000	159,213	187,712	52,201	3.05	65,530	60,242	5,308	1,807,928	1,536,738	8,372,366	13,378	-	81,965
2001	163,071	193,134	53,501	3.05	67,190	61,478	5,712	1,898,324	1,613,575	8,581,690	14,096	-	84,290
2002	167,023	198,713	54,833	3.05	68,879	62,743	6,136	1,993,240	1,694,254	8,796,247	14,853	-	86,681
2003	171,070	204,432	56,199	3.04	70,622	64,041	6,581	2,092,902	1,778,967	9,016,168	15,650	-	89,139
2004	175,216	210,358	57,599	3.04	72,420	65,371	7,049	2,197,547	1,867,915	9,241,588	16,490	-	91,667
2005	179,462	216,433	59,034	3.04	74,273	66,733	7,540	2,307,425	1,961,311	9,472,644	17,304	-	94,267
2006	184,225	222,633	60,640	3.04	76,316	68,260	8,056	2,422,796	2,059,377	9,709,464	18,157	-	96,907
2007	189,114	229,010	62,291	3.04	78,425	69,828	8,597	2,543,936	2,162,345	9,952,204	19,053	-	99,621
2008	194,133	235,569	63,986	3.03	80,605	71,438	9,165	2,671,132	2,270,463	10,201,014	19,994	-	102,411
2009	199,286	242,317	65,727	3.03	82,855	73,093	9,762	2,804,689	2,383,986	10,456,044	20,980	-	105,279
2010	204,575	249,257	67,516	3.03	85,181	74,792	10,389	2,944,924	2,503,185	10,717,449	22,015	-	108,227

RCLCo adjusted projections simulate possible adverse impacts of the national recession on tourism and housing demand. DBED projects tourism will grow by 9.4% from 1991 to 1995, 6.7% from 1996 to 2000, 5.7% from 2001 to 2005, and 4% from 2006 to 2010. To illustrate the possible drop in tourism growth as the country slowly emerges from recession, we have adjusted the 1992-1993 growth rate downward to 1%. Further, we adjusted the 1994-1995 growth rate downward to 3.2% which is equivalent to tourism growth that occurred in Hawaii from 1981 to 1987. We used an 8.8% growth rate for the period between 1996 to 2000 which combines modest growth expectations (3.2%) with at least one period of rapid growth (14.4%) as experienced during the period of 1987 to 1990 on the island of Hawaii.

NOTE: See Footnotes on Page 3

ROBERT CHARLES LESSER & CO.

EXHIBIT 10

ISLAND OF HAWAII ECONOMIC INDICATORS
1970-2010
RCLCO SCENARIO
JUNE 1993

YEAR	POPULATION 1/		HOUSE HOLDS 2/	HOUSING UNITS 3/			ANNUAL VISITORS 4/			HOTEL ROOM INVENTORY 5/	NEW HOUSING PERMITS 6/EMPLOYMENT 7/		
	RESIDENT	DEFACTO		TOTAL	NON- RESIDENT	HAWAII	KONA SIDE	STATE	TOTAL				
HISTORICAL													
ANNUAL CHANGE PER EACH CATEGORY													
1970	-	-	-	-	-	-	-	-	-	-	1,179		
1971	3,500	4,000	1,059	-	1,089	1,079	10	124,053	-	71,974	806	1,873	1,100
1972	3,000	3,900	1,135	-	1,587	1,572	15	113,898	-	425,433	555	2,006	350
1973	3,900	4,200	1,430	-	1,930	1,905	25	57,797	-	386,575	438	1,622	1,000
1974	100	800	356	-	1,704	1,654	50	46,869	-	155,537	114	1,833	400
1975	3,400	3,800	1,353	-	1,412	1,362	50	26,513	-	42,616	697	1,333	1,250
1976	3,300	3,500	1,365	-	1,437	1,387	50	46,853	-	391,046	(116)	950	1,750
1977	2,100	2,500	1,059	-	1,322	1,292	30	18,687	-	223,516	73	1,203	1,450
1978	3,100	4,100	1,386	-	1,126	885	241	70,489	-	226,642	91	1,716	400
1979	3,500	3,300	1,559	-	1,704	1,540	164	(47,417)	-	290,222	(204)	2,163	400
1980	2,653	2,000	1,337	-	1,932	2,046	(114)	(98,951)	-	(26,027)	816	1,931	6,500
1981	4,047	3,000	1,330	-	1,826	1,188	638	(93,065)	-	119	462	1,318	1,300
1982	2,700	2,600	895	-	1,412	1,187	225	30,406	-	308,302	302	1,054	550
1983	2,000	4,200	669	-	811	526	285	16,678	-	124,955	(320)	976	1,350
1984	2,700	1,100	897	-	900	767	133	47,920	-	487,700	362	1,091	850
1985	2,400	2,900	801	-	890	513	377	(59,240)	-	28,530	(231)	1,172	1,250
1986	2,500	4,100	835	-	952	1,179	(227)	88,850	-	722,870	48	1,257	1,350
1987	3,300	3,800	1,096	-	1,016	966	50	9,440	-	192,850	1,495	1,755	3,450
1988	1,700	1,800	577	-	1,375	1,123	252	81,330	-	342,590	(632)	2,189	1,250
1989	3,200	10,100	1,066	-	2,123	2,459	(336)	256,950	247,750	499,400	(10)	2,904	2,500
1990	3,717	2,800	1,235	-	2,733	2,636	97	50,000	31,760	329,360	791	-	4,100
1991	6,083	8,100	2,008	-	2,326	2,040	286	17,800	(10,510)	(97,290)	-	-	4,700
1992	4,100	4,100	1,364	-	2,842	2,909	(67)	(46,290)	(47,670)	(360,010)	-	-	-500
PROJECTIONS													
1993	3,551	4,959	1,187	-	1,178	1,127	51	11,423	7,979	228,177	-	-	2,319
1994	3,648	5,126	1,220	-	1,324	1,159	165	36,920	31,382	236,170	-	-	2,404
1995	3,747	5,299	1,254	-	1,361	1,191	170	38,102	32,387	244,443	-	-	2,493
1996	3,847	4,723	1,138	-	1,564	1,081	483	108,133	91,913	216,558	-	-	2,207
1997	3,468	4,860	1,166	-	1,634	1,108	526	117,649	100,002	223,051	-	-	2,276
1998	3,532	5,002	1,195	-	1,707	1,135	572	128,002	108,802	229,739	-	-	2,348
1999	3,637	5,147	1,224	-	1,785	1,163	622	139,266	118,376	236,627	-	-	2,421
2000	3,724	5,296	1,254	-	1,577	1,192	385	86,092	73,178	243,722	-	-	2,497
2001	3,858	5,422	1,300	-	1,639	1,235	404	90,396	76,837	209,324	-	-	2,325
2002	3,932	5,578	1,332	-	1,690	1,266	424	94,916	80,679	214,557	-	-	2,391
2003	4,047	5,740	1,366	-	1,742	1,297	445	99,682	84,713	219,921	-	-	2,458
2004	4,146	5,905	1,400	-	1,798	1,330	468	104,645	88,948	225,420	-	-	2,528
2005	4,246	6,076	1,435	-	1,854	1,363	491	109,877	93,396	231,056	-	-	2,600
2006	4,763	6,199	1,507	-	2,042	1,526	516	115,371	98,066	236,820	-	-	2,640
2007	4,889	6,377	1,650	-	2,109	1,568	541	121,140	102,969	242,741	-	-	2,714
2008	5,019	6,560	1,695	-	2,179	1,611	568	127,197	108,117	248,809	-	-	2,790
2009	5,132	6,747	1,742	-	2,251	1,654	597	133,557	113,523	255,030	-	-	2,868
2010	5,289	6,941	1,789	-	2,327	1,700	627	140,234	119,199	261,406	-	-	2,948

HISTORICAL 5-YEAR AVERAGE ANNUAL GROWTH PER CATEGORY

1970-15	2,780	3,340	1,066	-	1,544	1,514	30	73,826	-	216,427	322	1,641	820
1975-15	2,931	3,080	1,337	-	1,504	1,430	74	-2,068	-	221,080	132	1,549	1,940
1980-15	2,769	2,760	919	-	1,168	836	332	-11,464	-	189,921	115	1,257	1,060
1985-15	2,883	4,520	982	-	1,640	1,673	-33	97,314	-	417,414	334	1,855	2,530

PROJECTED 5-YEAR AVERAGE ANNUAL GROWTH PER CATEGORY

1990-15	4,226	5,517	1,407	-	1,806	1,685	-	11,591	2,714	50,298	363	-	2,283
1995-20	3,554	5,006	1,195	-	1,633	1,136	-	115,828	98,454	229,939	322	-	2,330
2000-20	4,030	5,744	1,367	-	1,745	1,298	-	99,899	84,915	220,056	783	-	2,460
2005-20	5,023	6,565	1,697	-	2,182	1,612	-	127,500	108,375	248,961	942	-	2,792

NOTE: See footnotes on Page 3.

ROBERT CHARLES LESSER & CO.

EXHIBIT 10
 ISLAND OF HAWAII ECONOMIC INDICATORS
 1978-2010
 RCLCO SCENARIO
 JUNE 1993

YEAR	POPULATION 1/		HOUSE		HOUSING UNITS 3/		ANNUAL VISITORS 4/			HOTEL ROOM INVENTORY 5/	NEW HOUSING PERMITS 6/ EMPLOYMENT 7/
	RESIDENT	DEFACTO	HOLDS 2/	POP/HH 2	TOTAL UNITS	NON-RESIDENT	HAWAII VISITORS	KONA SIDE VISITORS	STATE TOTAL		

FOOTNOTES

- 1/ Historical population figures were provided by DBED, pgs 16-18, Tables 6 and 7 of the 1992 DBED Data Base. Projected population figures were derived by taking the 1990 Census figures and applying the 1990-2010 growth rates as provided by the November 1, 1988 DBED M-K Series projections as shown on pgs 34, Table 18 of the 1990 DBED Data Book.
- 2/ 1970, 1980 and 1985 historical households figures were provided by the US Census Bureau which were derived by estimated household size for those years. All historical years in between were derived by taking the straight line decline in households between each period. 1985 to 1990 and projected household figures were derived by applying the projected persons per household figure to projected population. Projected persons per household was an RCLCo estimate based on historical trends between 1980 and 1985 of statewide decline of household size and general trends in the state of Hawaii.
- 3/ Historical housing units were provided by DBED, table 615, of the 1992 Data Base. Non-Resident households for years 1970 through 1976 are estimates based on a straight line decline using data from years 1977 through 1989. Projected resident household units are expected to be new households formed and incorporating a 5% vacancy factor each year. Projected non resident units are based on future visitor travel to Hawaii.
- 4/ Historical visitor travelers were provided by Hawaii Visitors Bureau, Annual Research Report, various years, 1970 to 1992. Travelers that visited the Kona side of the island have only been tracked since 1988. Projected visitors are based on DBED projections, Table 9-"Visitor Industry Projections: 1985 to 2010" and are based on the growth of average visitor census to the island. For the purpose of this analysis, the 1992 estimate of visitors was grown by the percentage growth rate for each five year period as shown in Table 9.
- 5/ Historical hotel inventory was provided by the Bank of Hawaii "Annual Economic Report, 1992", pg. 30. Projected hotel units are based on DBED projections, Table 9-"Visitor Industry Projections: 1985 to 2010." For the purpose of this analysis, the 1992 estimate of units was grown by the percentage growth rate for each five year period as shown in Table 9. These figures include condominium units used for hotel use.
- 6/ Historical permits were provided by the DBED 1992 Data Base and the 1990 Bank of Hawaii "Annual Economic Report", pg. 31, and represent only residential permits, not all permit activity.
- 7/ Employment figures were provided by the 1992 Bank of Hawaii "Annual Economic Report", pg. 30.

SOURCE: Bank of Hawaii, DBED, US Census Bureau, Department of Labor and Industrial Relations, and Robert Charles

**PROJECTED RESIDENT AND NON-RESIDENT
HOUSING UNIT DEMAND ON THE ISLAND OF HAWAII
RCLCO SCENARIO
1993-2010
JUNE 1993**

CATEGORY	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
PROJECTED NET ANNUAL NON-RESIDENT DEMAND										
Projected Annual Visitors to Hawaii 1/ Average Persons Per Party 2/	1,153,763 2.00	1,190,684 2.00	1,228,786 2.00	1,336,919 2.00	1,454,568 2.00	1,582,570 2.00	1,721,836 2.00	1,807,928 2.00	1,898,324 2.00	1,993,240 2.00
Total Visitor Households x Average Length of Stay (Days) 2/	576,882 5.8	595,342 5.8	614,393 5.8	668,460 5.8	727,284 5.8	791,285 5.8	860,918 5.8	903,964 5.8	949,162 5.8	996,620 5.8
Total Visitor Nights (Days) x % of Visitors Staying in a Non-Resident Units 3/	3,345,913 25.0%	3,452,984 25.0%	3,563,479 25.0%	3,877,065 25.0%	4,218,247 25.0%	4,589,453 25.0%	4,993,324 25.0%	5,242,991 25.0%	5,505,140 25.0%	5,780,396 25.0%
Total Occupied Non-Resident Nights Vacancy Allowance (Occupancy @ 65%)	836,478 65.0%	863,246 65.0%	890,870 65.0%	969,266 65.0%	1,054,562 65.0%	1,147,363 65.0%	1,248,331 65.0%	1,310,748 65.0%	1,376,285 65.0%	1,445,099 65.0%
Adjusted Non-Resident Unit Nights (Demand) Divided By 365 Nights Per Year	1,129,246 365	1,165,382 365	1,202,674 365	1,308,509 365	1,423,658 365	1,548,940 365	1,685,247 365	1,769,510 365	1,857,985 365	1,950,884 365
Total Non-Residential Unit Demand	3,094	3,193	3,295	3,585	3,900	4,244	4,617	4,848	5,090	5,345
Net Annual Increase in Non-Resident Units 4/ Additional Demand from Second Home Market 5/	31 40.0%	99 40.0%	102 40.0%	290 40.0%	315 40.0%	343 40.0%	373 40.0%	231 40.0%	242 40.0%	255 40.0%
Total Potential Non-Resident Unit Demand Cumulative Increase in Non-Resident Units	51 51	165 216	170 386	483 870	526 1,395	572 1,967	622 2,590	385 2,975	404 3,379	424 3,803
PROJECTED NET ANNUAL RESIDENT DEMAND										
Total Households 1/	43,750	44,970	46,224	47,362	48,528	49,723	50,947	52,201	53,501	54,883
Net Annual Growth in New Residents Units 4/	1,186	1,220	1,254	1,138	1,166	1,195	1,224	1,254	1,300	1,382
Cumulative Growth in Resident Households	2,631	3,851	5,105	6,243	7,409	8,604	9,828	11,082	12,382	13,764
TOTAL PROJECTED ANNUAL HOUSING DEMAND										
Annual Growth in All Units (Resident and Non-Resident)	1,237	1,385	1,424	1,621	1,692	1,767	1,846	1,639	1,704	1,806
Cumulative Growth in All Units (Resident and Non-Resident)	1,237	2,622	4,046	5,668	7,359	9,126	10,973	12,612	14,316	16,122

NOTE: See Footnotes on Page 3

EXHIBIT II

PROJECTED RESIDENT AND NON-RESIDENT
HOUSING UNIT DEMAND ON THE ISLAND OF HAWAII
RCLCO SCENARIO
1993-2010
JUNE 1993

CATEGORY	2003	2004	2005	2006	2007	2008	2009	2010
PROJECTED NET ANNUAL NON-RESIDENT DEMAND								
Projected Annual Visitors to Hawaii 1/	2,092,902	2,197,547	2,307,425	2,422,796	2,543,936	2,671,132	2,804,689	2,944,924
Average Persons Per Party 2/	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Total Visitor Households	1,046,451	1,098,774	1,153,713	1,211,398	1,271,968	1,335,566	1,402,345	1,472,462
x Average Length of Stay (Days) 1/	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Total Visitor Nights (Days)	6,069,416	6,372,886	6,691,533	7,026,108	7,377,414	7,746,283	8,133,598	8,540,280
x % of Visitors Staying in a Non-Residential Units 3/	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Total Occupied Non-Residential Nights	1,517,354	1,593,222	1,672,883	1,756,527	1,844,354	1,936,571	2,033,400	2,135,070
Vacancy Allowance (Occupancy @ 65%)	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
Adjusted Non-Resident Unit Nights (Demand) Divided By 365 Nights Per Year	2,048,428	2,150,849	2,238,392	2,371,312	2,489,877	2,614,370	2,745,089	2,882,344
Total Non-Residential Unit Demand	365	365	365	365	365	365	365	365
	5,612	5,893	6,187	6,497	6,822	7,163	7,521	7,897
Net Annual Increase in Non-Resident Units 4/	267	281	295	309	325	341	358	376
Additional Demand from Second Home Market 5/	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Total Potential Non-Residential Unit Demand	445	468	491	516	541	568	597	627
Cumulative Increase in Non-Resident Units	4,248	4,716	5,207	5,723	6,264	6,832	7,429	8,056
PROJECTED NET ANNUAL RESIDENT DEMAND								
Total Households 1/	56,199	57,599	59,034	60,640	62,291	63,986	65,727	67,516
Net Annual Growth in New Households 4/	1,316	1,400	1,435	1,606	1,651	1,695	1,741	1,789
Cumulative Growth in Resident Households	15,080	16,480	17,915	19,521	21,172	22,867	24,608	26,397
TOTAL PROJECTED ANNUAL HOUSING DEMAND								
Annual Growth in All Units	1,761	1,868	1,926	2,122	2,192	2,263	2,338	2,416
(Resident and Non-Resident)								
Cumulative Growth in All Units	17,883	19,751	21,677	23,799	25,991	28,254	30,592	33,008
(Resident and Non-Resident)								

NOTE: See Footnotes on Page 3

EXHIBIT 11

PROJECTED RESIDENT AND NON-RESIDENT
HOUSING UNIT DEMAND ON THE ISLAND OF HAWAII
RCLCO SCENARIO
1993-2010
JUNE 1993

ROBERT CHARLES LESSER & CO.

FOOTNOTES

- 1/ From Exhibit 10.
- 2/ From the Hawaii Visitors Bureau, Annual Research Report, 1992. Figure was kept constant for the purpose of this analysis.
- 3/ Based on survey results published by the Hawaii Visitors Bureau, 1991 Annual Research Report. In the absence of empirical data or consumer research indicating an alternative trend, we have assumed that non-resident units will continue to capture 25% of total visitors with 60% to 70% of visitors staying in full service resort/hotels and the remaining 5% to 15% staying with relatives, friends, campgrounds, etc.
- 4/ Net increase in the amount of incremental demand generated. 1993 increase is derived for the 1992 estimate.
- 5/ Based upon buyer profiles indicating that 29% of the buyers are units for occasional use/second home; 5% are strictly investment and are never occupied, and 7.5% are occupied by retirees; totaling 41.5% rounded to 40%.

SOURCE: Hawaii Visitor Bureau, Annual Research Reports, annual, DBED; and Robert Charles Lesser & Co.

01-3613.02

EXHIBIT 12

ESTIMATED CAPTURE OF ANNUAL NON-RESIDENT UNITS
BY ISLAND OF HAWAII RESORTS FAIR SHARE CAPTURE ANALYSIS
ISLAND OF HAWAII
RCLCO SCENARIO
JUNE 1993

DEMAND SOURCE	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Adjusted Forecasted Cyclical Annual New Non-Resident Units 1/	148	185	259	388	499	592	518	398	199	248
Percentage Allocated to Kona/Kohala Resorts 2/	50.0%	50.0%	60.0%	60.0%	60.0%	60.0%	60.0%	70.0%	70.0%	70.0%
= Total Annual Non-Resident Resort Housing Demand	74	92	155	233	300	355	311	278	139	174
Total Number of Resorts-Fair Share Capture 3/	3.00	3.00	3.00	5.00	5.00	5.00	7.00	7.00	7.00	7.00
= Total Annual Non-Resident Resort Housing Demand Per Resort	25	31	52	47	60	71	44	40	20	25
Cumulative Demand Per Resort: 1993-2010	25	55	107	154	214	285	329	369	389	414

1/ Annual demand shown is based on average annual demand of non-resident units in EXHIBIT 11. The annual demand of units was determined by applying the percentage above or below the average annual demand for the forecasted cyclical demand. The percentage in a given year was assumed to be ranged from within 60% above or below the average demand for each cycle.

2/ Based on total capture of vacation home sales between 1988 and 1993 per Locations and MLS data.

3/ It is assumed that there are a total of 4 active existing and 5 proposed resorts on the island that will most likely offer resort product. We are assuming that each resort would capture a 1.00 fair share of the demand. The existing resorts are: Mauna Lani, Mauna Kea, Waikoloa, and Keaunohu. We are assuming for this analysis that Mauna Lani and Mauna Kea would capture a combined 1.00 fair share due to the extreme high-end nature of their product. Waikoloa and Keaunohu capture a 1.00 fair share each. Thus, there are a total of 3.00 active projects sharing potential resort demand. This analysis also assumes that the 5 planned and proposed resort projects would capture a 4.00 fair share combined. The planned projects include: Kaupulehu Resort; South Kohala Resort; Kohala Resort; Kohala Ranch; and future development at Kohala Ranch. For this analysis, there are a total of 7.00 resorts capturing potential non-resident demand over the next 20 years. We are assuming that all projects would be active by 1996.

SOURCE: Urban Decisions Systems; DBED; US Census Bureau; and Robert Charles Lesser & Co.

01-3613.02

EXHIBIT 12

ESTIMATED CAPTURE OF ANNUAL NON-RESIDENT UNITS
BY ISLAND OF HAWAII RESORTS FAIR SHARE CAPTURE ANALYSIS
ISLAND OF HAWAII
RCLCO SCENARIO
JUNE 1993

DEMAND SOURCE	2003	2004	2005	2006	2007	2008	2009	2010
Adjusted Annual New Non-Resident Units 1/ Percentage Allocated to Kona/Kohala Resorts 2/	373 70.0%	497 70.0%	596 70.0%	671 70.0%	745 70.0%	696 70.0%	596 70.0%	447 70.0%
= Total Annual Non-Resident Resort Housing Demand Total Number of Resorts-Fair Share Capture 3/	261 7.00	348 7.00	417 7.00	470 7.00	522 7.00	487 7.00	417 7.00	313 7.00
= Total Annual Non-Resident Resort Housing Demand Per Resort	37	50	60	67	75	70	60	45
Cumulative Demand Per Resort: 1991-2010	451	501	560	627	702	771	831	876

1/ Annual demand shown is based on average annual demand of non-resident units in EXHIBIT 11. The annual demand of units was determined by applying the percentage above or below the average annual demand for the forecasted cyclical demand. The percentage in a given year was assumed to be ranged from within 60% above or below the average demand for each cycle.

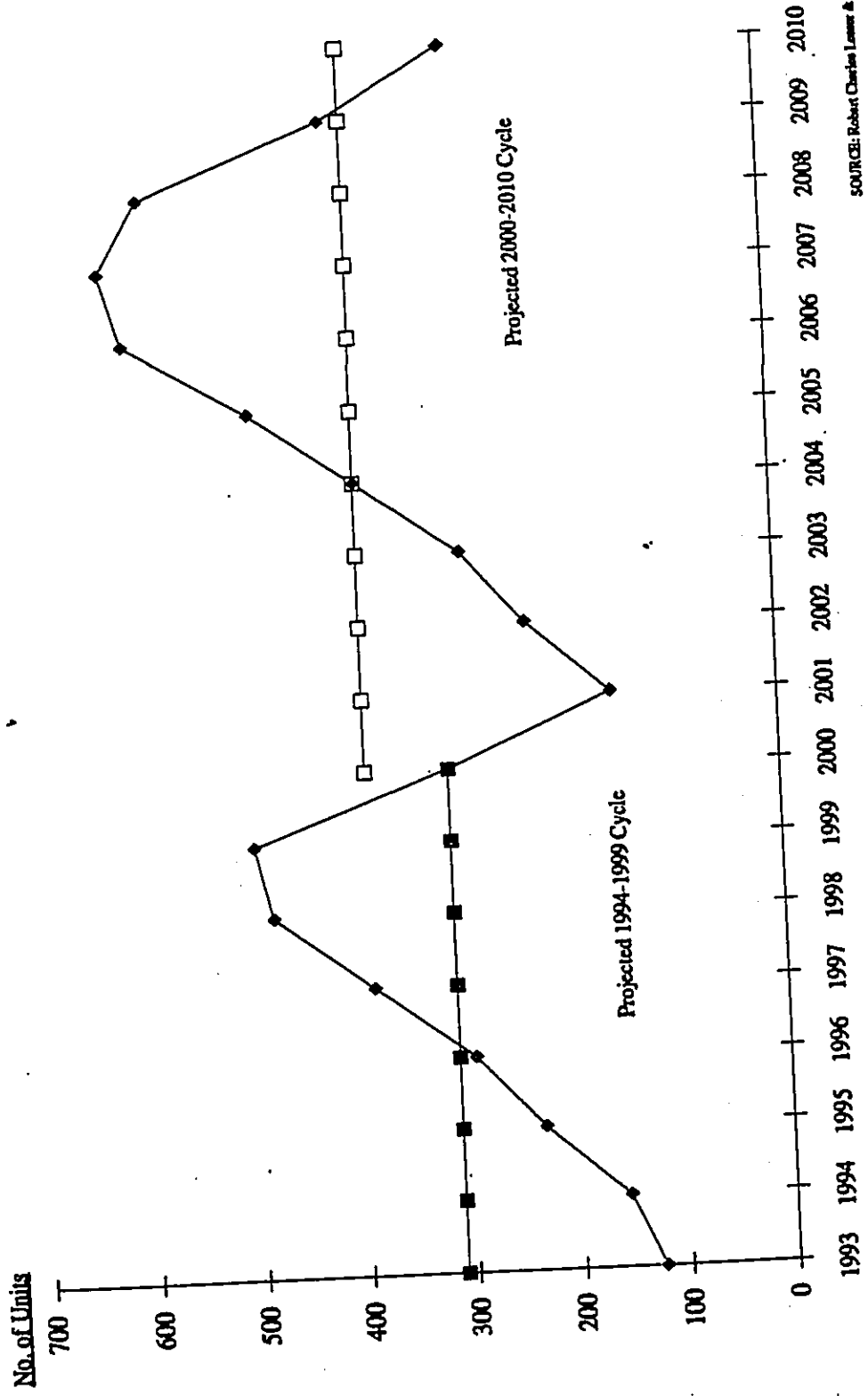
2/ Based on total capture of vacation home sales between 1988 and 1993 per Location and MLS data.

3/ It is assumed that there are a total of 4 active existing and 5 proposed resorts on the island that will most likely offer resort product. We are assuming that each resort would capture a 1.00 fair share of the demand. The existing resorts are: Mauna Lani, Mauna Kea, Waikoloa, and Keaunohu. We are assuming for this analysis that Mauna Lani and Mauna Kea would capture a combined 1.00 fair share due to the extreme high-end nature of their product. Waikoloa and Keaunohu capture a 1.00 fair share each. Thus, there are a total of 3.00 active projects sharing potential resort demand. This analysis also assumes that the 5 planned and proposed resort projects would capture a 4.00 fair share combined. The planned projects include: Kaupulehu Resort; South Kohala Resort; Kohala Resort; Kona Resort; and future development at Kohala Ranch. For this analysis, there are a total of 7.00 resorts capturing potential non-resident demand over the next 20 years. We are assuming that all projects would be active by 1996.

SOURCE: Urban Decisions Systems; DBED; US Census Bureau; and Robert Charles Lesser & Co.

01-3613.02

EXHIBIT 13
PROJECTED CYCLES OF NON RESIDENT UNITS
COUNTY OF HAWAII
RCLCO SCENARIO
1993-2000



1/ Cycle projected based on national cycles every 10 years

SOURCE: Robert Charles Lesser & Co.

01-3613.02

EXHIBIT 14

HISTORICAL AND PROJECTED RESIDENTIAL UNIT PRODUCTION
 SELECTED RESORTS
 STATE OF HAWAII
 1970 TO 2010

RESORT	ESTIMATED UNIT CONSTRUCTION PER FIVE-YEAR PERIOD 1/										Remaining
	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2010			
SUPER-LUXURY (\$1 Million Plus) 2/											
Mauna Kea/ Kohala Coast, Hawaii	--	33	40	32	25	--	--	--	--	0	
Mauna Lani/ Kohala Coast, Hawaii	--	--	80	135	95	600	600	600	600	1,200	
Menele Bay/ Lanai, Maui County	--	--	--	--	--	80	150	200	200	0	
Lodge at Koele/ Lanai, Maui County	--	--	--	--	50	150	150	--	--	0	
Subtotal	0	33	120	167	170	830	900	800	1,200		
LUXURY (\$300,000-\$1 Million Plus)											
Ko'Olima/ Leeward, Oahu	--	--	--	--	--	1,300	1,300	1,300	1,300	4,800	
Princeville Phase II/ North Shore, Kauai	--	--	--	--	75	250	350	325	325	0	
Wailea/ Maui	--	426	362	490	200	622	621	621	621	650	

01-3612.02

EXHIBIT 14
 HISTORICAL AND PROJECTED RESIDENTIAL UNIT PRODUCTION
 SELECTED RESORTS
 STATE OF HAWAII
 1970 TO 2010

RESORT	ESTIMATED UNIT CONSTRUCTION PER FIVE-YEAR PERIOD 1/										Remaining
	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2010			
LUXURY (Cont.)											
(\$350,000-\$1 Million Plus)											
Waikoloa/ Kohala Coast, Hawaii	--	--	--	120	300	1,024	1,024	897	0		
Kapaha Bay/ Maui	--	367	161	143	75	400	400	300	0		
Kaanapali/ Maui	--	360	369	166	50	500	500	500	0		
Princeville Phase I/ North Shore, Kauai	600	600	600	600	117	288	288	288	0		
Regent Beach-Kukio/ Kona, Hawaii	--	--	--	--	--	--	672	672	672		
Kaupulehu (Four Season)/ Kona, Hawaii	--	--	--	--	--	240	240	120	0		
Kohenaiki/ Kona, Hawaii	--	--	--	--	--	200	300	400	0		
South Kohala Kona, Hawaii	--	--	--	--	--	200	300	200	710		
Subtotal	600	1,753	1,492	1,519	817	5,024	5,995	5,423	6,832		

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EXHIBIT 14

HISTORICAL AND PROJECTED RESIDENTIAL UNIT PRODUCTION
SELECTED RESORTS
STATE OF HAWAII
1970 TO 2010

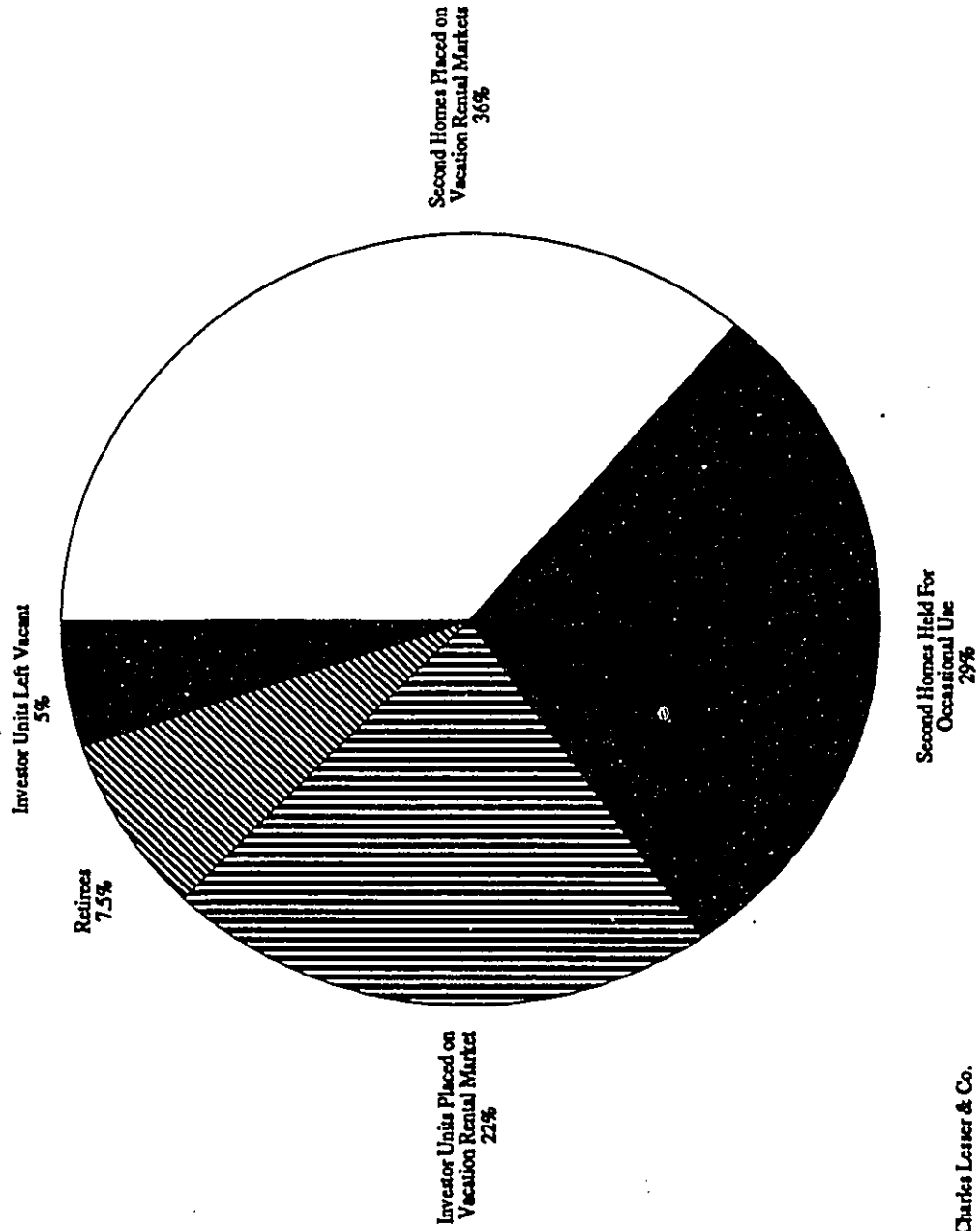
RESORT	ESTIMATED UNIT CONSTRUCTION PER FIVE-YEAR PERIOD 1/										Remaining
	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2010			
OTHER											
Hawaiian Riviera/ South Kona, Hawaii	--	--	--	--	--	--	400	400	1,000		
Kiahuna Resort/ Poipu, Kauai	--	423	--	70	--	350	150	--	0		
Kuilima/ North Shore, Oahu	378	--	--	--	--	250	250	250	250		
Kukuiula/ Poipu, Kauai	--	--	--	--	--	--	500	500	1,000		
Keauhou/ Kailua-Kona, Hawaii	165	429	232	200	240	300	550	336	0		
Subtotal	543	852	232	270	240	900	1,850	1,486	2,250		
Grand Total	1,143	2,638	1,844	1,956	1,227	6,754	8,745	7,709	10,282		

1/ Timing Projections are based upon discussions with planning officials, resort representatives and developers.
2/ Comparable 1991 prices.

SOURCE: Robert Charles Lesser & Co.

01-3613.02

EXHIBIT 15
BUYER PROFILE FOR RESORT UNITS
MATURE DESTINATION RESORT
STATE OF HAWAII
1990 THROUGH 1993



SOURCE: Robert Charles Lesser & Co.

EXHIBIT 16
RESORT RESIDENTIAL TARGET MARKET SEGMENTS
BUYER PROFILES
1988 to 1993

Second Home Buyers

The profile of the second home buyer market is individuals aged 45 to 60 with net worths of \$1,000,000 to \$5,000,000. Geographic origins include Southern California, Japan, Hawaii, Northern California and the Pacific Northwest; the remaining coming from other parts of the US and other nations. Second home buyers often purchase a residential unit within a resort which they have repeatedly visited as vacationers. Most second home buyers will have visited the resort at least three or four times before becoming potential buyers.

Overall, approximately 60% of the second home buyers will place their unit on the rental market for at least a portion of the year. Among this sector of the second home market, purchase decisions are influenced by the suitability of the unit for: 1) short-term owner visits (usually requiring accommodations for family and friends, and an in-unit locked storage closet); 2) short-term rentals (accommodations for two or more couples, or one family); and 3) investment purposes (value appreciation).

Condominium projects which successfully target this market include the Golf Villas at Kapalua and the Shores at Waikoloa where the majority of units offered range from 825 to 1,300 square feet within three-story buildings accommodating 11 to 12 units each. First-time second home purchasers will often begin with a smaller, frequently rented unit, eventually upgrading to a larger condominium or single family home.

The remaining 40% of the second home buyers will hold the units for their occasional use. In other words, the number of second home condominium buyers within Hawaiian destination resorts who maintain exclusive use of their units (including use by family, friends, and business associates) is almost equal to the number who will rent theirs out.

This sector of the second home market tends to be highly discriminating. A number of the "exclusive use" second home buyers are senior executives; or business owners, and are able to make extended stay visits (more than one month). While they enjoy the recreational amenities found within a resort environment, they seek isolation for the more transient short-term vacationers who have a greater tendency to load up rental units with a number of guests, overuse the condominium project amenities, (i.e. pool areas, parking), and increase noise levels within the project. Consequently, a number of the resorts offer condominium projects specifically targeted towards longer term stay second home owners and renters. Examples include the Ironwoods at Kapalua and Wailea Point which offer larger unit condominiums (1,500 to 2,500 square feet) within low-density gate-guarded enclaves with building clusters of up to four units.

EXHIBIT 16

RESORT RESIDENTIAL TARGET MARKET SEGMENTS
BUYER PROFILES
1988 to 1993

Investors

The investor buyer market segment is largely comprised of individual investors and to a much lesser degree, syndicators (One such example is August Financial which owns some 40 units at the Kanaloa project in Keauhou.) While rental income is used to off-set some of mortgage and operating expenses of vacation rental units, it is usually insufficient to cover all carrying costs.

Most investors are motivated by the anticipated appreciation in the underlying real estate value of the unit, realized once the unit is sold. In fact, brokers indicate that during the 1988/1989 market peak, as many as 5% of the units sold among surveyed condominium projects were never occupied by the owners, or made available for rent. Rather these units were viewed strictly as investments, similar to commodities, and are left vacant until resold. This trend is indicative of the heavy speculation which occurred within the Hawaiian resort market during the late 1980s. A number of these units are currently on the market as resales.

Similar to the profile for second home buyers, individual investors often purchase units in resorts which they frequently have rented as vacationers, usually after becoming "attached" to a specific vacation location ("we like it so much here, everyone must"). In addition, these investors have witnessed years of price appreciation among the resort's residential real estate. Consequently, higher net worth individuals often purchase investor units in super luxury resorts such as Mauna Lani (The Terraces and the Point), and Kapalua (The Ironwoods) which cater to the highest income frequent independent travelers (FITs). In other words, even investment purchase decisions are influenced by subjective elements such as is this an "in" vacation destination.

Mid-market to luxury resorts, which target a broader range of FIT and group travelers are likely to generate investor/purchaser interest from individuals within a broader income range, as well as syndicators. While both the reputation and the amenities associated with the resort are important to these buyers, value is also an important issue.

Retirees

Among the smallest market segment for resort condominiums is the retiree market, which is largely comprised of relocations from western mainland states. Among the luxury destination resort residential market, retirees are typically aged 55 to 65, and may actually be semi-retired or working on a "second/third career", after achieving professional success and raising their family. They have moved to Hawaii for lifestyle reasons principally related to weather and recreation.

Retirees are usually attracted to resort residential product because of the level of services and recreational amenities offered within the resort community. The principal barrier for retiree buyers within resorts is price. Consequently, the largest representation of retirees is typically found within the lower-priced resort condominium projects (i.e., Grand Champion and The Shores). An additional deterrent to retiree purchases is the limited availability of relatively affordable units in complexes which are not largely marketed towards vacation renters. As previously mentioned, most condominium projects which target the longer stay residents are typically larger units (and consequently higher priced). And similar to the preferences of semi-permanent residents, retirees avoid purchasing within a high concentration of short-term rental units.

Appendix B: Botanical Survey

BOTANICAL SURVEY
KEAUHOU RESORT PROPERTY
275-ACRE SITE
DISTRICT OF NORTH KONA
HAWAI'I

by

George K. Linney
Winona P. Char

CHAR & ASSOCIATES
Botanical/Environmental Consultants
Honolulu, Hawaii

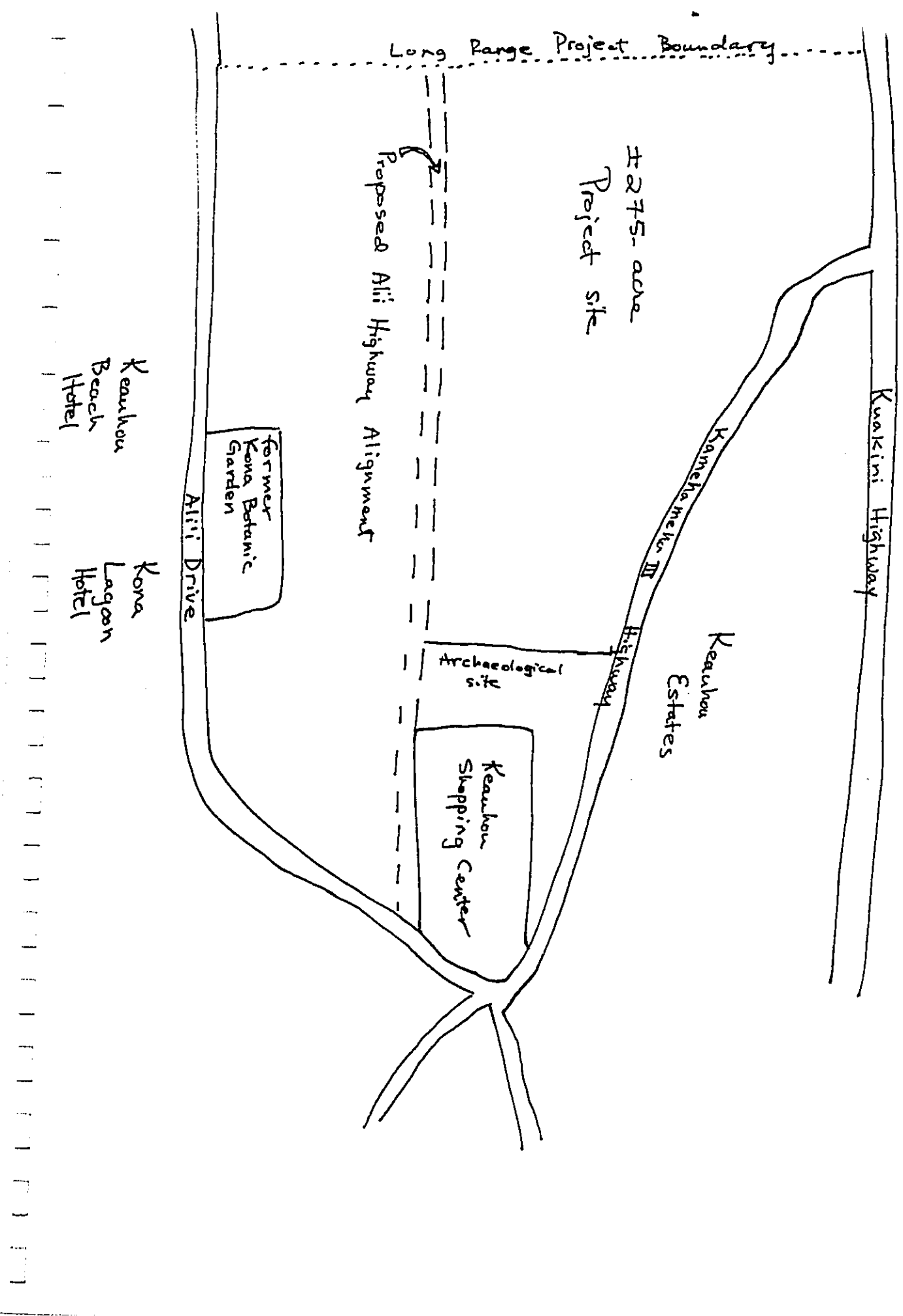
Prepared for: BELT COLLINS & ASSOCIATES

June 1988

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Not to scale -- sketch of ±275-acre project site at Keauhou



SUMMARY

On 23-24 May 1988, a botanical survey was carried out on the site of the proposed residential development. The site is approximately 275 acres in extent, located between the present Alii Drive and the Hawai'i Belt Road. There are two vegetation types present on the site: open, scrub-covered a'ala lava field; and closed scrub- or forest-covered pahoehoe. A total of 105 species of vascular plants are found on the site. Of these, 95 (91%) are exotic weeds or deliberately introduced plants, and 10 (9%) native, or presumed-native plants. There is no intact native plant community present on the site. None of the species found in the course of the survey are officially listed as endangered or threatened; nor are any species proposed or candidate for such status.

INTRODUCTION

The study site consists of approximately 275 acres in Keauhou, bounded on the west by the right-of-way for a proposed realignment of Alii Drive, on the east by Kamehameha III Road and Kuakini Highway. The northern boundary is marked by a stone wall and utility line running from Kuakini Highway to the present Alii Drive. The utility line right-of-way is cut periodically. The southern boundary is not well marked, consisting of a line perpendicular to Alii Drive and extending from Kamehameha III Road to the Kona Lagoon Hotel. The upper (eastern) boundary is at about 600 feet in elevation along Kuakini Highway, while the lower is at about 100-125 feet in elevation.

Because the high mountains of the Island of Hawai'i deflect the normal trade winds, weather does not follow patterns typical for the state on this portion of the Kona Coast. Mornings usually begin relatively clear, with clouds building continuously throughout the day. Rains may fall near the coast in the afternoon. During the evening, cloud cover decreases again. Summer months tend to be wetter than the rest of the year, just the reverse of the typical weather pattern for the state. Average annual rainfall is 35 inches. Relative humidity is relatively high (85%-90% maximum, 55%-65% mini-

mum). Annual maximum temperatures average 88°F, while minima average 65°F, a range only slightly exceeding the daily variation of 20°F (Leishmann 1986).

From the northern boundary and covering more than half of the site, soil is of the Punaluu Series, pahoehoe lava overlain with about four inches of acidic peat. Permeability is slow. Slope is from 6-20% and rock outcroppings cover 40-50% of the area. In the east, there are small patches of soils of the Kaimu series, neutral peat overlying a'a lava. Permeability is rapid. In the southern part of the site, the a'a is not overlain by any soil (Sato *et al.* 1973). Observation of the local weather patterns suggested that there may be a significant rainfall gradient from east to west across the site.

LITERATURE REVIEW

At least four previous botanical surveys have been done in the vicinity of the present study site (Park 1979; Char 1985, 1986, and 1988). All have found essentially the same assemblage of plants, though names reported are different. Most differences in plant names reflect changes of taxonomic opinion or source, some may reflect misidentifications, and some are actual differences in component species among the sites. None of the previous studies reported any rare or endangered species.

SURVEY METHODS

A walk-through method was used for this survey, with plants identified on sight. Plants that could not be positively identified were collected for later determination by comparison with known specimens in the herbarium and reference to standard taxonomic literature. Taxonomy and nomenclature of the ferns and fern allies is based on Wagner and Wagner (1987), while that for flowering plants follows Wagner *et al.* (in press). Access into the site was from along Kamehameha III Road and the Alii Drive realignment right-of-way. Access across the site was made possible by the utility-line right-of-way in the north, extensive cow trails, and some old, abandoned roads.

Species recorded from the site in this survey reflect both the season of study and the over-all environmental conditions. Surveys taken at different seasons of the year would probably yield slightly different species compositions, especially among the weedy annuals.

DESCRIPTION OF THE VEGETATION

Closed Scrub.

This is an extremely variable assemblage covering most of the site. In the lower, western portion it is characterized by a dense thicket of koa-haole (Leucaena leucocephala) with widely scattered emergent trees, mostly kiawe (Prosopis pallida), woman's tongue (Albizia lebeck) and 'opiuma (Pithecellobium dulce). Trees rarely encountered are Chinese banyan (Ficus microcarpa), tamarind (Tamarindus indica), and Jacaranda acutifolia. Beneath the koa-haole, the ground is covered with a dense growth consisting almost entirely of talinum (Talinum cf. triangulare), air plant (Kalanchoe pinnata), Chinese violet (Asystasia gangetica), or Guinea grass (Panicum maximum) to the exclusion of all else. On rocky outcrops, there is a thinner and more diverse cover, including Sida spinosa, Malvastrum coromandelianum, Bidens cynapifolia, Boerhavia coccinea, popolo (Solanum americanum), Chamaesyce hirta, 'uhaloa (Waltheria indica var. americana), Desmanthus virgatus, Eragrostis tenella, fountain grass (Pennisetum setaceum), Madagascar periwinkel (Catharanthus roseus), Stachytarpheta jamaicensis, 'ilie'e (Plumbago zeylanica), sour grass (Digitaria insularis), and rouge plant (Rivina humilis).

Small shrubs are not common, perhaps being excluded by the dense koa-haole thicket and ground covers. The few shrubby species present include ma'o (Abutilon grandifolium), cassia (Senna occidentalis), and indigo (Indigofera suffruticosa). Several species of vines climb trees and shrubs: bindweed (Ipomoea obscura), bittermelon (Momordica charantia), Coccinea grandis, and wild cucumber (Cucumis dipsaceus). Pelican flower (Aristolochia littoralis) is established in the northwestern corner the site.

In the upper portion of the site, trees are a more prominent component of the vegetation and also more diverse. In addition to those seen at lower elevation, there are monkey pod (Samanea saman), African tulip tree (Spathodea campanulata), Chinaberry (Melia azedarach), kukui (Aleurites moluccana), mulberry (Morus sp.), and papaya (Carica papaya). At one location along Kamehameha III Road, pink orchid tree (Bauhinia monandra) has escaped and is forming a large colony.

Cattle are far more common in the upper portion, and are probably responsible, at least in part, for differences observed in the shrub and herb vegetation. Shrubs include Pluchea symphytifolia, Lantana camara, klu (Acacia farnesiana), Christmasberry (Schinus terebinthifolius), castorbean (Ricinus communis), Buddleia asiatica, and sodom apple (Solanum linneanum). Common herb components here are Bermuda grass, (Cynodon dactylon), spiny pigweed (Amaranthus spinosus), four-o'clock (Mirabilis jalapa), beggar's ticks (Desmodium tortuosum), Cleome gynandra, Sacramento bur (Triumfetta semitriloba), Natal redtop (Rhynchelytrum repens), goose grass (Eleusine indica), heliotrope (Heliotropium amplexicaule), sowthistle (Sonchus oleraceus), Sida cordifolia and rhombifolia, rattlepod (Crotalaria incana and pallida), partridge pea (Chamaecrista nictitans), Chenopodium murale and carinatum, Phyllanthus debilis and tenellus, finger grass (Chloris barbata), Emilia coccinea, crab grass (Digitaria ciliaris), and sand bur (Cenchrus echinatus).

At the upper elevation bindweed, coccinea, and koali awahi'a (Ipomoea indica) form the vine component, of which the last is by far the most predominant. Coccinea seems to have spread to this area from below only in the last year or two. It prefers dry coastal areas, and may be near its upper limit at Kuakini Highway.

Open Lava

This substrate is limited to the southernmost portion of the site. It is largely bare lava, little weathered, apparently not of great age, with broken patches of dense scrub 4-9 feet tall. To the west, this portion of the site

is contiguous with a separate 40-acre parcel also surveyed at about the same time.

The scrub is composed primarily of koa-haole, klu, and Christmasberry. Less common, but highly characteristic of this vegetation type, are noni (Morinda citrifolia) and maiapilo (Capparis sandwichiana). Tree species are stunted and scarcely taller than the scrub. They include autograph tree (Clusia rosea), octopus tree (Schefflera actinophylla), kukui, woman's tongue, monkey pod, and kiawe. Total plant cover is between 10% and 30%, denser at the interface with the closed scrub. Common vines are koali awahi'a, love-in-a-mist (Passiflora foetida), and huehue (Cocculus trilobus). The herb component is composed of beggar's ticks, cleome, Natal redtop, finger grass, Madagascar periwinkle, sowthistle, spurge, sida, malvastrum, and purslane (Portulaca oleracea). Sword fern (Nephrolepis multiflora) occurs sporadically in lava cracks. Adjacent to the nursery, there is a single clump of native prickly poppy (Argemone glauca).

A number of plants are established along Kamehameha III Road, but not farther into the site. These are a'ali'i (Dodonaea viscosa), Hedyotis corymbosa, Portulaca pilosa and Cyperus compressus.

THREATENED AND ENDANGERED SPECIES

No listed, proposed, or candidate threatened and endangered species, as designated by the Federal and/or State governments (U.S. Fish and Wildlife Service 1985; Herbst 1987) are found on the site. There are no remnant native plant communities. Only 9 native or presumed-native species are found on the site, and many of these are weedy, able to compete in the face of disturbance or invasion by other weeds.

RECOMMENDATIONS

There is little of botanical interest on the project site, and it is of no great significance. Noni and kukui are possibly remnants of cultivation by the Hawaiians, though they both may have spread to the site from elsewhere without the help of man. These, as well as the native species, are found in similar environmental conditions throughout the islands. It is not likely that development of the site will result in serious damage to the state-wide status of any of the species involved.

Where feasible, it may be desirable to landscape with native plants. Plants are readily available, or can be propagated as needed, from local nurseries specializing in native plants. Many are adapted to such environmental conditions as are found on the site, are of cultural significance, and/or possess considerable ornamental value.

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SPECIES LIST

A list of all the vascular plants found on the site follows. Plants are organized in three groups -- ferns and fern allies, monocots, and dicots. Within each group, they are further arranged in alphabetical order by family and genus. For each species, an accepted common name is given; the Hawaiian name is given if commonly used. Biogeographic status is indicated by a letter code. Finally, the presence (+) or absence (-) of each species within each vegetation type is provided. An explanation of abbreviations used (other than author citations) is given below.

SCIENTIFIC NAME

- cf. - correct species name not known with certainty, but plant resembles the species listed
- sp. - correct species name not determined

STATUS

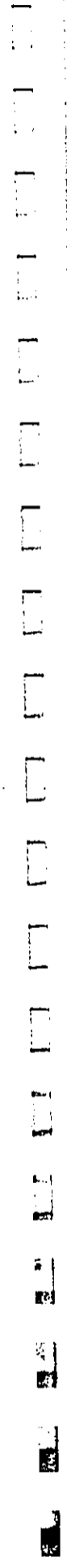
- E - endemic, native only to the Hawaiian Islands
- I - indigenous, native to the Hawaiian Islands, but also native elsewhere.
- P - Polynesian, not considered native, but thought to have been introduced by the Polynesians prior to 1778
- X - exotic, not native, introduced after 1778

VEGETATION TYPE

- cs - closed scrub
- ol - open lava

SPECIES LIST

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>BIOGEOGRAPHIC VEGETATION</u>	
		<u>STATUS</u>	<u>TYPE</u>
			<u>CS</u> <u>01</u>
FERNS			
Aspleniaceae			
<u>Nephrolepis multiflora</u> (Roxb.) Jarret ex Morton	sword fern	X	- +
Polypodiaceae			
<u>Phymatosorus scolopendria</u> (Burm.) Ching	lau'ae	X	+ +
MONOCOTS			
Commelinaceae			
<u>Commelina benghalensis</u> L.	day flower	X	+ -
Cyperaceae			
<u>Cyperus compressus</u> L.	cyperus	X	- +
Gramineae			
<u>Cenchrus echinatus</u> L.	sandbur	X	+ -
<u>Chloris barbata</u> (L.) Sw.	finger grass	X	+ +
<u>Cynodon dactylon</u> (L.) Pers.	Bermuda grass	X	+ -
<u>Digitaria ciliaris</u> (Retz.) Koeler	crab grass	X	+ +
<u>Digitaria insularis</u> (L.) Mez ex Ekman	sour grass	X	+ -
<u>Eleusine indica</u> (L.) Gaertn.	goose grass	X	+ -
<u>Eragrostis tenella</u> (L.) Beauv. ex R. & S.	Japanese love-grass	X	+ +



SCIENTIFIC NAME	COMMON NAME	STATUS	cs	ol
<u>Heteropogon contortus</u> (L.) Beauv. ex R. & S.	pili	P?	+	-
<u>Melinis minutiflora</u> Beauv.	molasses grass	X	+	+
<u>Panicum maximum</u> Jacq.	Guinea grass	X	+	+
<u>Panicum maximum</u> Jacq. var. <u>trichoglume</u> Eyles ex Robyns	green panic grass	X	+	-
<u>Pennisetum setaceum</u> (Forsk.) Chiov.	fountain grass	X	+	+
<u>Rhynchoelytrum repens</u> (Willd.) C. E. Hubb.	Natal reedtop	X	+	+
<u>Setaria verticillata</u> (L.) Beauv.	bristly foxtail	X	+	-
DICOTS				
Acanthaceae				
<u>Asystasia gangetica</u> (L.) T. Anderson	Chinese violet	X	+	+
Amaranthaceae				
<u>Amaranthus spinosus</u> L.	spiny pigweed	X	+	-
<u>Amaranthus viridis</u> L.	slender amaranth	X	+	-
Anacardiaceae				
<u>Schinus terebinthifolius</u> Raddi	Christmasberry	X	+	+
Apocynaceae				
<u>Catharanthus roseus</u> (L.) G. Don	Madagascar periwinkle	X	+	+
Araliaceae				
<u>Schefflera actinophylla</u> (Endl.) Harms	octopus tree	X	-	+

SCIENTIFIC NAME	COMMON NAME	STATUS	cs	ol
Aristolochiaceae				
<u>Aristolochia littoralis</u> Parodi	pelican flower	X	+	-
Bignoniaceae				
<u>Jacaranda acutifolia</u> Humb. & Bonpl.	jacaranda	X	+	-
<u>Spathodea campanulata</u> Beauv.	African tulip tree	X	+	+
Boraginaceae				
<u>Heliotropium amplexicaule</u> Vahl	heliotrope	X	+	+
Buddlejaceae				
<u>Buddleia asiatica</u> Lour.	buddleia	X	+	+
Cactaceae				
<u>Opuntia ficus-indica</u> (L.) Mill.	panini	X	+	+
Capparaceae				
<u>Capparis sandwichiana</u> DC.	maiapilo, puapilo	E	-	+
<u>Cleome gynandra</u> L.	spider plant	X	+	+
Caricaceae				
<u>Carica papaya</u> L.	papaya	X	+	+
Chenopodiaceae				
<u>Chenopodium carinatum</u> R. Br.	chenopodium	X	+	+
<u>Chenopodium murale</u> L.	chenopodium	X	+	+

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SCIENTIFIC NAME	COMMON NAME	STATUS	cs	01
Compositae				
<u>Ageratum conyzoides</u> L.	ageratum	X	+	+
<u>Bidens cynapiifolia</u> HBK.	beggar's ticks	X	+	+
<u>Emilia coccinea</u> (Sims) G. Don	emilia	X	+	+
<u>Parthenium hysterophorus</u> L.	false ragweed	X	+	-
<u>Pluchea symphytifolia</u> (Miller) Gillis	pluchea	X	+	+
<u>Sonchus oleraceus</u> L.	common sowthistle	X	+	+
<u>Tridax procumbens</u> L.	coat buttons	X	-	+
Convolvulaceae				
<u>Ipomoea indica</u> (J. Burm.) Merr.	koali awahi'a	I	+	+
<u>Ipomoea obscura</u> (L.) Ker-Gawl.	yellow bindweed	X	+	-
Crassulaceae				
<u>Kalanchoe pinnata</u> (Lam.) Pers.	bryophyllum, air plant	X	+	+
Cucurbitaceae				
<u>Coccinea grandis</u> (L.) Voigt	coccinea	X	+	+
<u>Cucumis dipsaceus</u> Ehrenb. ex Spach	wild cucumber	X	+	+
<u>Momordica charantia</u> L.	bittermelon	X	+	-
Euphorbiaceae				
<u>Aleurites moluccana</u> (L.) Willd.	kukui	P	+	+
<u>Chamaesyce hirta</u> (L.) Millsp.	spurge	X	+	+
<u>Chamaesyce hypericifolia</u> (L.) Millsp.	spurge	X	+	+
<u>Chamaesyce prostrata</u> (Ait.) Small	spurge	X	+	+

SCIENTIFIC NAME	COMMON NAME	STATUS	CS	01
<u>Phyllanthus debilis</u> Klein ex Willd.	phyllanthus	X	+	-
<u>Phyllanthus tenellus</u> Roxb.	phyllanthus	X	+	-
<u>Ricinus communis</u> L.	castorbean	X	+	+
Guttiferae				
<u>Clusea rosea</u> Jacq.	autograph tree	X	+	+
Labiatae				
<u>Leonotis nepetifolia</u> (L.) R. Br.	lion's ear	X	+	+
Leguminosae				
<u>Acacia farnesiana</u> (L.) Willd.	klu	X	+	+
<u>Albizia lebeck</u> (L.) Benth.	woman's tongue	X	+	+
<u>Bauhinia monandra</u> Kurz	pink bauhinia	X	+	+
<u>Chamaecrista nictitans</u> (L.) Moench	partridge pea	X	+	+
<u>Crotalaria incana</u> L.	rattlepod	X	+	-
<u>Crotalaria pallida</u> Aiton	rattlepod	X	+	-
<u>Desmanthus virgatus</u> (L.) Willd.	virgate mimosa	X	+	-
<u>Desmodium tortuosum</u> (Sw.) DC.	beggarweed	X	+	+
<u>Indigofera suffruticosa</u> Mill.	indigo	X	+	+
<u>Leucaena leucocephala</u> (Lam.) deWit	koa-haole	X	+	+
<u>Pithecellobium dulce</u> (Roxb.) Benth.	'opiuma	X	+	+
<u>Prosopis pallida</u> (Humb. & Bonpl. ex Willd.) H.B.K.	kiawe	X	+	+
<u>Samanea saman</u> (Jacq.) Merr.	monkey pod	X	+	+
<u>Senna occidentalis</u> (L.) Link	coffee senna	X	+	-
<u>Senna pendula</u> (Humb. & Bonpl. ex Willd.) Irwin & Barneby	cassia	X	+	-

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

SCIENTIFIC NAME	COMMON NAME	STATUS	cs	ol
<u>Tamarindus indica</u> L.	tamarind	X	+	-
Malvaceae				
<u>Abutilon grandifolium</u> (Willd.) Sweet	ma'o	X	+	+
<u>Malvastrum coromandelianum</u> (L.) Garcke	malvastrum	X	+	+
<u>Sida acuta</u> Burm.	sida	X	+	-
<u>Sida cordifolia</u> L.	sida	X	+	-
<u>Sida fallax</u> Walp.	'ilima	I	+	+
<u>Sida rhombifolia</u> L.	sida	X	+	+
<u>Sida spinosa</u> L.	sida	X	+	+
Meliaceae				
<u>Melia azedarach</u> L.	Chinaberry	X	+	-
Menispermaceae				
<u>Cocculus trilobus</u> (Thunb.) DC.	huehue	I	+	+
Moraceae				
<u>Ficus microcarpa</u> L. f.	Chinese banyan	X	+	+
<u>Morus</u> sp.	mulberry	X	+	-
Myrtaceae				
<u>Psidium guajava</u> L.	guava	X	+	+

SCIENTIFIC NAME	COMMON NAME	STATUS	CS	01
Nyctaginaceae				
<u>Boerhavia coccinea</u> Mill.	boerhavia	X	+	+
<u>Mirabilis jalapa</u> L.	four-o'clock	X	+	-
Papaveraceae				
<u>Argemone glauca</u> Pope	pua-kala, pokalakala	E	-	+
Passifloraceae				
<u>Passiflora foetida</u> L.	love-in-a-mist	X	+	+
Phytolaccaceae				
<u>Rivina humilis</u> L.	rouge plant	X	+	-
Piperaceae				
<u>Peperomia leptostachya</u> H. & A.	'ala'ala-wai-nui	I	-	+
Plumbaginaceae				
<u>Plumbago zeylanica</u> L.	'ilie'e	I	+	+
Portulacaceae				
<u>Portulaca oleracea</u> L.	common purslane	X	+	+
<u>Portulaca pilosa</u> L.	portulaca	X	-	+
<u>Talinum cf. triangulare</u> (Jacq.) Willd.	talinum	X	+	+



SCIENTIFIC NAME

SCIENTIFIC NAME	COMMON NAME	STATUS	cs	ol
Rubiaceae				
<u>Hedyotis corymbosa</u> (L.) Lam.	hedyotis	X	-	+
<u>Morinda citrifolia</u> L.	noni	P	+	+
Sapindaceae				
<u>Dodonaea viscosa</u> Jacq.	a'ali'i	I	+	-
Solanaceae				
<u>Solanum americanum</u> Mill.	popolo	I?	+	-
<u>Solanum linneanum</u> Hepper & Jaeger	Sodom apple	X	+	-
Sterculiaceae				
<u>Waltheria indica</u> L. var. <u>americana</u> (L.) R. Br. ex Hosaka	'uhaloa, hi'aloa	I?	+	+
Tiliaceae				
<u>Triumfetta semitriloba</u> Jacq.	Sacramento bur	X	+	-
Verbenaceae				
<u>Lantana camara</u> L.	lantana	X	+	+
<u>Stachytarpheta jamaicensis</u> (L.) Vahl	stachytarpheta	X	+	+
Zygophyllaceae				
<u>Tribulus terrestris</u> L.	puncture vine	X	-	+

Appendix C: Survey of the Avifauna and Feral Mammals

SURVEY OF THE AVIFAUNA AND FERAL MAMMALS AT
KEAUHOU RESORT PROJECT PROPERTY, KONA, HAWAII

Prepared for
Belt Collins & Associates

By

Phillip L. Bruner
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Laie, Hawaii 96762

4 August 1988

SURVEY OF THE AVIFAUNA AND FERAL MAMMALS AT
KEAUHOU RESORT PROJECT PROPERTY, KONA, HAWAII

INTRODUCTION

The purpose of this report is to summarize the findings of a three day (29-31 July 1988) bird and mammal field survey at Keauhou, Kona, Hawaii, for a proposed resort project (see Fig.1). Also included are references to pertinent literature as well as unpublished reports.

The objectives of the field survey were to:

- 1- Document what bird and mammal species occur on the property or may likely occur given the range of habitats available.
- 2- Provide some baseline data on the relative density of each species and where possible, within the constraints of the available time, determine the general habitat preferences of each species found on the property.
- 3- Determine the presence or likely occurrence of any native fauna particularly any that are considered "endangered" or "threatened". If such occur or are

likely to occur on the property identify what features of the habitat may be essential for these species and suggest how those resources may be protected.

GENERAL SITE DESCRIPTION

The project property is located on the Kona coast of the island of Hawaii (see Fig.1). Total acreage of the property surveyed was approximately 315 acres divided into two separate sites (Fig.1). This region of Hawaii normally receives light precipitation but may experience occasional heavy rain showers and flooding. The coastal sections of the site are more arid. Elevation in the mauka portions of the property is approximately 500 feet. Vegetation on the property consists of mostly exotic (introduced) trees with an understory of exotic weeds and grasses. Kiawe (Prosopis pallida) and Koa Haole (Leucaena glauca) are abundant. Cattle have grazed the understory making it possible to walk through the site despite its relatively steep terrain and brushy appearance.

Weather during the field survey varied from clear to light overcast. Winds were non-existent or very light from the SW.

STUDY METHODS

Field observations were made with the aid of binoculars and by listening for vocalizations. These observations were concentrated during the peak bird activity periods of early morning and late afternoon. Attention was also paid to the presence of tracks and scats as indicators of bird and mammal activity.

At various locations (see Fig.1) eight minute counts were made of all birds seen or heard. Between these count stations walking tallys of birds seen or heard were also kept. These counts provide the basis for the population estimates given in this report. Data on habitat preferences come from these observations plus information provided in Berger (1972), Hawaii Audubon Society (1984) and Pratt et al. (1987). Unpublished reports of birds known from this coast and in this type of habitat on the island of Hawaii were also consulted in order to acquire a more complete picture of possible avifauna activity (Bruner 1984a, 1984b, 1984c, 1985, 1986). Observations of feral mammals were limited to visual sightings and evidence in the form of scats and tracks. No attempts were made to trap mammals in order to obtain data on their

relative density and distribution. Two nights were devoted to searching for the presence of owls and the Hawaiian Hoary Bat (Lasiurus cinereus semotus).

Scientific names used herein follow those given in the most recent American Ornithologist's Union Checklist (A.O.U. 1983), Hawaii's Birds (Hawaii Audubon Society 1984) Birds of Hawaii and the Tropical Pacific (Pratt et al. 1987) and Mammal species of the World (Honacki et al. 1982).

RESULTS AND DISCUSSION

Resident Endemic (Native) Land Birds:

No endemic land birds were recorded during the course of the field survey. Given the nature of the habitat none would be expected. The Short-eared Owl or Pueo (Asio flammeus sandwichensis) prefers more open grassland habitat and hence would not likely occur on this brushy site (Berger 1972, Pratt et al. 1987). This endemic subspecies is listed as endangered on Oahu by the State of Hawaii Department of Land and Natural Resources Division of Forestry and Wildlife but not elsewhere in Hawaii.

Migratory Indigenous (Native) Birds:

Migratory shorebirds winter in Hawaii between the months of August and May. Some juveniles will stay through the summer months (Johnson et al. 1981, in press). No migratory shorebirds were observed during the survey and due to the brushy conditions of the present habitat none would be expected to make extensive use of this area. The more open sections of Site 2 (see Fig.1) might occasionally serve as a roosting or loafing area during the winter months but foraging opportunities appear limited. Of all the shorebird species which winter in Hawaii the Pacific Golden Plover (Pluvialis fulva) is most likely to utilize what little suitable shorebird habitat exists on the present property. Plovers prefer open areas such as mud flats and lawns. They arrive in Hawaii in early August and depart to their arctic breeding grounds during the last week of April (Johnson et al. 1981). Johnson et al. (1981) and Bruner (1983) have also shown plovers are extremely site-faithful on their wintering grounds and many establish foraging territories which they defend vigorously. Such behavior makes it possible to acquire a fairly good estimate of the abundance of plover in any one area. These populations likewise remain relatively stable over many years.

Resident Indigenous (Native) Land Birds:

No resident indigenous species were observed. None would be expected in the present habitat.

Resident Indigenous (Native) Seabirds:

None were observed on the property and due to the number of potential predators none would be expected.

Resident Endemic and Indigenous (Native) Water Bird:

No wetlands occur on the property and thus the fact that no waterbirds were observed or expected.

Exotic (Introduced) Birds:

A total of only ten species of exotic birds were recorded during the field survey. Table One shows the relative abundance and typical habitat preferences of these species. The most abundant species during the three day survey were Japanese White-eye (Zosterops japonicus) Zebra Dove (Geopelia striata) House Finch (Carpodacus mexicanus) and Yellow-billed Cardinal (Paroaria capitata). Exotic species not recorded on the actual survey but which potentially could be found in this sector of the island and at this elevation and habitat include: Common Barn Owl (Tyto alba), Warbling Silverbill (Lonchura malabarica), Northern Mockingbird (Mimus polyglottos), Melodious Laughing-Thrush

(Garrulax canorus), Gray Francolin (Francolinus francolinus) and Ring-necked Pheasant (Phasianus colchicus) (Bruner personal field notes, Pratt et al. 1987).

Feral Mammals:

The only feral mammals observed during the survey were the Small Indian Mongoose (Herpestes auropunctatus) and cats. No rats or mice were recorded but it would be highly unusual if these ubiquitous mammals did not occur on the property. Without a trapping program it is difficult to conclude anything about the relative abundance of rats, mice, mongooses and cats. However, it is likely that their numbers are typical of what one would find elsewhere in similar habitat on this coast of Hawaii.

Records of the endemic and endangered Hawaiian Hoary Bat (Lasiurus cinereus semotus) are sketchy but the species has been reported from the Kona coast (Tomich 1986). None were observed on this field survey despite two nights of intense searching. However, bats have been observed in similar dry coastal habitat elsewhere in Hawaii (Bruner 1984c). This species roosts solitarily in trees. So it is not unreasonable to assume that it might occasionally occur on the property. Much remains to be known about the natural history of this species and its requirements here in Hawaii.

CONCLUSION

A brief field survey can at best provide a limited perspective of the wildlife present in any given area. Not all species will necessarily be observed and information on their use of the site must be sketched together from brief observations and the available literature. The number of species and the relative density of each species may vary throughout the year due to available resources and reproductive success. Species which are migratory will quite obviously be a part of the ecological picture only at certain times during the year. Exotic species sometimes prosper for a time only to later disappear or become a less significant part of the ecosystem (Williams 1987). Thus only long term studies can provide the insights necessary to acquire both a broad view as well as a more definitive perspective of the bird and mammal populations in a particular area. However, when brief field studies are coupled with data gathered from other similar habitats the value of the conclusions drawn are significantly increased.

The following are broad conclusions related to bird and mammal activity on the property:

- 1- The present environment provides a moderate range of habitats which are utilized by the typical array of exotic species of birds one would expect at this

elevation and in this type of environment on the Kona coast of Hawaii. No native land birds or seabirds were recorded. No wetlands occur on the property and thus the absence of any wetland birds.

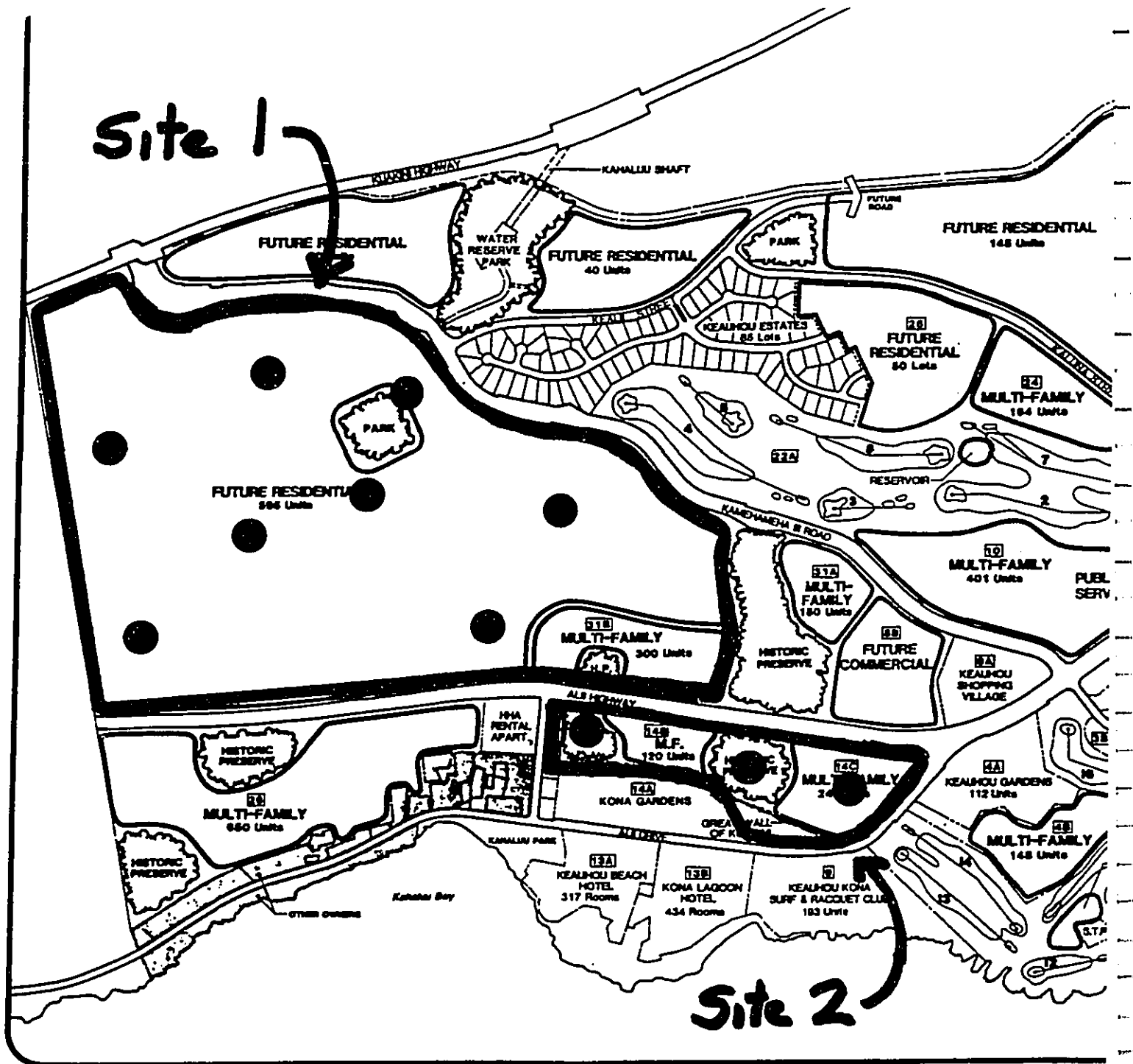
- 2- The dense nature of the vegetation on this property likely accounts for the relatively large number of individuals recorded on the eight minute counts for many of the species.
- 3- The proposed development would create considerably more open habitat than presently exist and would likely result in the following changes in the avifauna and feral mammals on this property:
 - a- Some species would probably experience a decline in numbers of individuals per unit area. Species in this situation would be: Japanese White-eye, Zebra Dove and Yellow-billed Cardinal.
 - b- Species whose population on the property will likely increase due to the proposed development include: Common Myna (Acridotheres tristis), House Sparrow (Passer domesticus) and Pacific Golden Plover.
 - c- Mongoose may become less abundant while the number of cats and also dogs could increase due to residential development.
- 4- The fact that no game birds such as Gray Francolin and Ring-necked Pheasant were noted on the property

was unexpected and may be due to a number of reasons
ie. predator pressure or hunting pressure. These
species are often detected by voice rather than by
sight particularly in areas of dense vegetation.

- 5- The most unexpected discovery was the occurrence of
the introduced Lavender Waxbill (Estrilda caerulescens)
known presently in Hawaii only from the Puu Waa area
(Hawaii Audubon Society 1984, Pratt et al. 1987).
This species is obviously spreading in the Kona area.
- 6- In order to obtain more data on mammals, a trapping
program would be required. The brief observations
of this survey did not reveal any unusual mammal
activity. No endangered species were observed.

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4 August 1988



LAND USE MASTER PLAN

 KEAUHOU RESORT

Fig. 1. Project property with both sites indicated and eight minute count stations marked by a ●

TABLE 1

Relative abundance and general habitat preferences of exotic birds on Keauhou Resort Property, Kona, Hawaii.

COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE*	HABITAT*
Spotted Dove	<u>Streptopelia chinensis</u>	U = 2.2	E, D
Zebra Dove	<u>Geopelia striata</u>	A = 12.4	E, D
Common Myna	<u>Acridotheres tristis</u>	U = 2.3	D, E
Northern Cardinal	<u>Cardinalis cardinalis</u>	C = 5.3	T, E
Yellow-billed Cardinal	<u>Paroaria capitata</u>	A = 11.5	T, E, D
Japanese white-eye	<u>Zosterops japonicus</u>	A = 17	T, E
House Sparrow	<u>Passer domesticus</u>	R = 6	D
House Finch	<u>Carpodacus mexicanus</u>	A = 12.1	E, G
Nutmeg Mannikin	<u>Lonchura punctulata</u>	R = 15	G
Lavender Waxbill	<u>Estrilda caerulea</u>	R = 5	E, D

* (See page 13 for key to symbols)

KEY TO TABLE 1

Relative Abundance = Average number of individuals observed during walking survey or average frequency on eight minute counts in appropriate habitat.

A = Abundant (ave. 10+) on 8 min. counts or noted between count stations

C = Common (ave. 5-10) on 8 min. counts or noted between count stations

U = Uncommon (ave. less than 5) on 8 min. counts or noted between count stations

R = Rare (number which follows is total recorded for all days of the survey)

Habitat Preference = Habitat type most likely to occur in on this property

T = Thickets of dense vegetation (trees/brush)

E = Ecotone (boundary of wooded areas and open patches)

D = Areas of human and cattle disturbance such as cattle pens

G = Patches of grassland (very limited on the present property)

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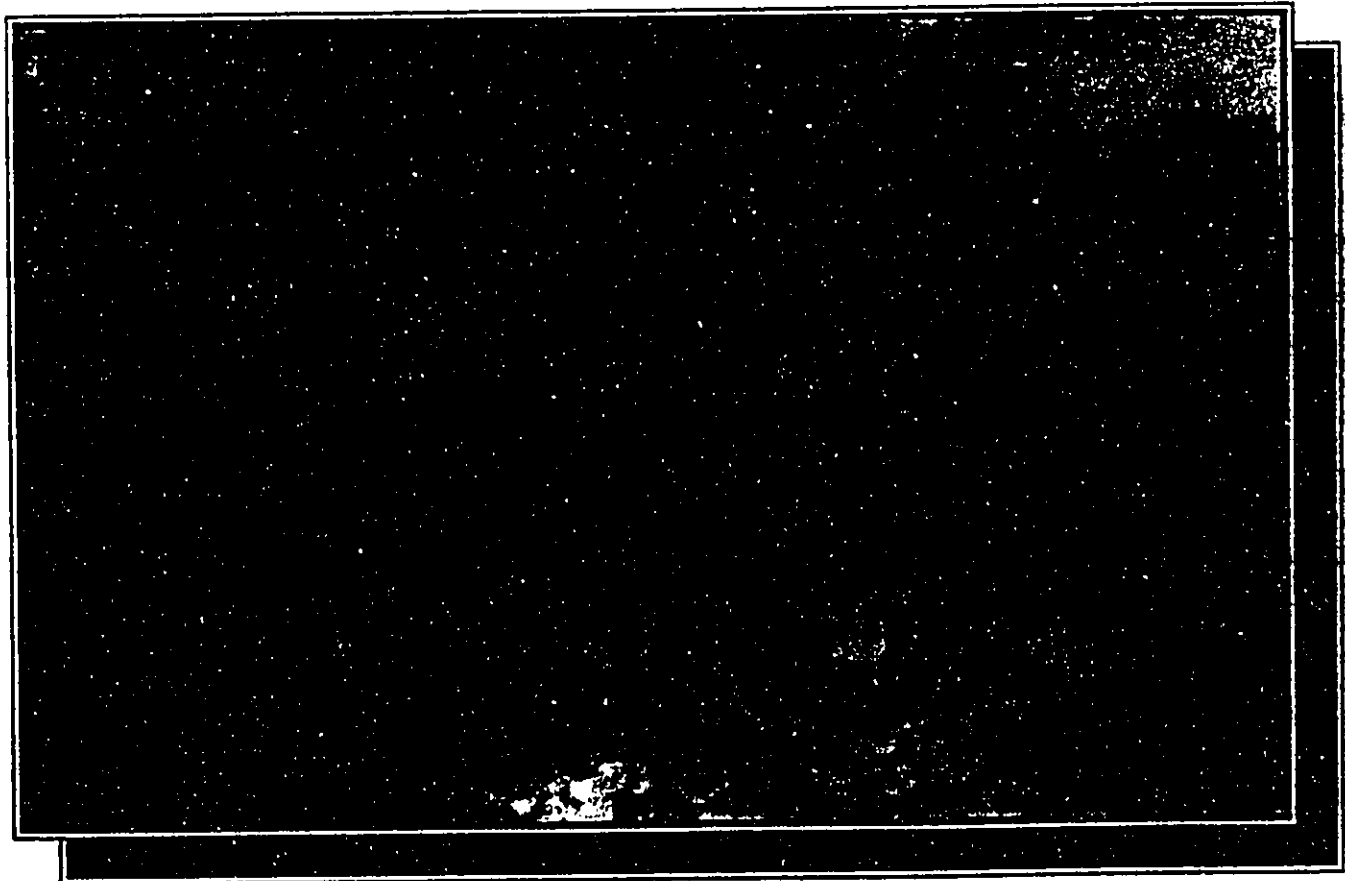
Appendix D: Archaeological Inventory Survey

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Report 451-012093

**Archaeological Inventory Survey
Azabu Keauhou Resort
Mauka Parcel Project Area**

**Land of Kahalu'u
North Kona District, Island of Hawai'i**



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**Archaeological Inventory Survey
Azabu Keauhou Resort
Mauka Parcel Project Area**

**Land of Kahalu'u
North Kona District, Island of Hawai'i
(TMK:3-7-8-10:2, Por.4)**

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SUMMARY

At the request of Mr. Glen Koyama, of Belt, Collins & Associates, Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted an archaeological inventory survey of the Azabu Keauhou Resort Mauka Parcel project area. The project area consisted of c. 275 acres, located within the Land of Kahalu'u, North Kona District, Island of Hawai'i (TMK:3-7-8-10:2, Por.4). The basic purpose of the survey was to provide information appropriate to and sufficient for the preparation of an Environmental Impact Statement (EIS) being prepared in conjunction with development permit applications submitted to the County of Hawai'i. The survey field work was conducted October 3 through November 23, 1988 and required approximately 1,388 labor-hours.

During the survey 251 sites comprising 532 component features were identified. Of these, 121 had been previously recorded, while 130 were newly identified. The sites comprised 36 functional types. These sites were discovered to contain a wide range of formal feature types; 43 separate formal types were recognized among the 532 features recorded. Based on an evaluation of feature morphology, physical setting, associated portable remains, associated additional features, combined with extrapolations from the findings from other nearby areas, the 43 formal feature types were reduced to 14 general functional categories. The functional interpretations include habitation, possible burial, agriculture, indeterminate, boundary, ceremonial, habitation-possible burial, marker, transportation, habitation-ceremonial, habitation-refuge, ceremonial-possible burial, storage, and quarry.

Of the 251 identified sites, 166 have been assessed as significant solely for information content (65%). Of these 166, 158 are recommended for further data recovery. For the eight remaining sites (3%) in this group, no further work has been recommended. Forty-nine sites (19%) are assessed as significant for information content and as tentatively significant for cultural value, pending further data collection. Data collection work, consisting of further testing for the presence or absence of human skeletal remains, has been proposed for all 49 of these sites. At present, these 49 sites are also recommended for preservation "as is," pending the results of the proposed testing. Nineteen sites are assessed as significant for information content, as excellent examples of site types, and for cultural significance (8%). These 19 sites are recommended for further data collection, to be followed by preservation with some level of interpretive development.

Of the remaining 17 project area sites, seven (3%) are assessed as significant for information and cultural values, with a recommendation of further data collection. Five sites (2%) are assessed as significant for information content and as excellent examples of site types. In addition, these five sites are preliminarily assessed as significant for cultural value, pending further data collection. These five sites are recommended for further data collection, and are tentatively recommended for preservation "as is." Site 4654 (0.4% of total) is assessed as significant for information and cultural content, and is recommended for further data collection and preservation "as is". Site 6400 (0.4%) is assessed as significant for information content, cultural value and as an excellent example of a site type. This site is recommended for further data collection and preservation "as is." Site 11182 (0.4%) is assessed as significant for information content, as an excellent example of a site type, and is preliminarily assessed as significant for cultural value, pending further data collection. This site is recommended for further data collection and preservation with interpretive development. A tentative recommendation of preservation "as is" is also offered. Site 11186 (0.4%) is assessed as significant for information content, cultural value, and as an excellent example of a site type. Further data collection is recommended. Site 11215 (0.4%) is assessed as significant for information content and as an excellent example of a site type. It is recommended for further data recovery.

Cover: Site 2077, Halela'au Refuge-Habitation Cave Entrance, View to East (PHRI Neg. 963-19a)

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INTRODUCTION

BACKGROUND

At the request of Mr. Glen Koyama, of Belt, Collins & Associates, Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted a surface archaeological inventory survey (100% coverage) of the approximately 275-acre Azabu Keauhou Resort Mauka Parcel project area. The project area is situated in the Land of Kahalu'u, North Kona District, Island of Hawai'i (TMK:3-7-8-10:2, Por.4) (Figure 1). As defined by Mr. Koyama, the project area (previously referred to as Study Area 1) is situated between Ali'i Drive and Kamehameha III Road, and consists of Keauhou Resort Development Parcels (DP) -27, -28, -29, and portions of DP-31 and -32. The basic objective of the inventory survey was to provide information appropriate to and sufficient for the preparation of an Environmental Impact Statement (EIS) to be prepared in conjunction with development permit applications to be made to the County of Hawai'i.

Survey field work was conducted October 3 through November 23, 1988, under the overall direction of PHRI Principal Archaeologist Dr. Paul H. Rosendahl and under the on-site supervision of PHRI Supervisory Archaeologist Alan T. Walker, B.A.. Approximately 1,388 labor-hours were required for the field work.

This report is the final report for the present project and includes a discussion of project goals and objectives, a detailed scope of work, relevant background information, and detailed findings. The background information includes the results of previous archaeological work conducted in the area and on adjacent lands, a summary of historical documentary research, a settlement pattern model for the *ahupua'a*, and a discussion of field methods and procedures. The report concludes with general significance assessments and recommended general treatments for all cultural remains located within the project area.

SCOPE OF WORK

The basic purpose of an inventory survey is to identify—to discover and locate on available maps—all sites and features of potential archaeological significance that are present within a specified project area. An inventory survey is the initial level of archaeological investigation. It is extensive rather than intensive in scope, and is conducted with the primary purpose of determining the presence or absence of archaeological resources within a specified project area. A survey of this type indicates both the general nature and

variety of archaeological remains present, and the general distribution and density of such remains. It permits a general significance assessment of the archaeological resources, and facilitates formulation of realistic recommendations and estimates for any subsequent mitigation work that might be necessary or appropriate. Such work could include intensive data collection involving detailed recording of sites and features, and selected test excavations. It might also include subsequent data recovery research excavations, construction monitoring, interpretive planning and development, and/or preservation of sites and features with significant scientific research, interpretive, and/or cultural values.

The basic objectives of the present inventory survey were four-fold: (a) to identify (find and locate) all sites and site complexes present within the parcel; (b) to evaluate the potential general significance of all identified archaeological remains; (c) to determine the possible impacts of proposed development upon the identified remains; and (d) to define the general scope of any subsequent data collection and/or mitigation work that might be necessary or appropriate.

Based on a review of available background literature, extensive familiarity with both the project area and current requirements of pertinent review authorities, and based on discussions with Ms. Virginia Goldstein and Mr. Tim Lui-Kwan—staff planner/historic sites specialist and deputy director, respectively, Hawai'i County Planning Department (HCPD), and with Dr. Ross Cordy, chief archaeologist with the Department of Land and Natural Resources—State Historic Preservation Division (DLNR-SHPD), the following specific tasks were determined to constitute an adequate and appropriate scope of work for the inventory survey:

1. Review available background archaeological and historical literature relevant to the immediate project area;
2. Conduct 100% coverage high-intensity surface survey of the entire project area, with emphasis upon (a) relocation and evaluation of all previously recorded sites, and (b) identification, recording, and evaluation of all previously unidentified sites;
3. Limited subsurface testing at selected sites to recover suitable charcoal and/or volcanic glass samples for radiocarbon and hydration dating analyses; and
4. Analyze background and field data, and prepare appropriate reports.

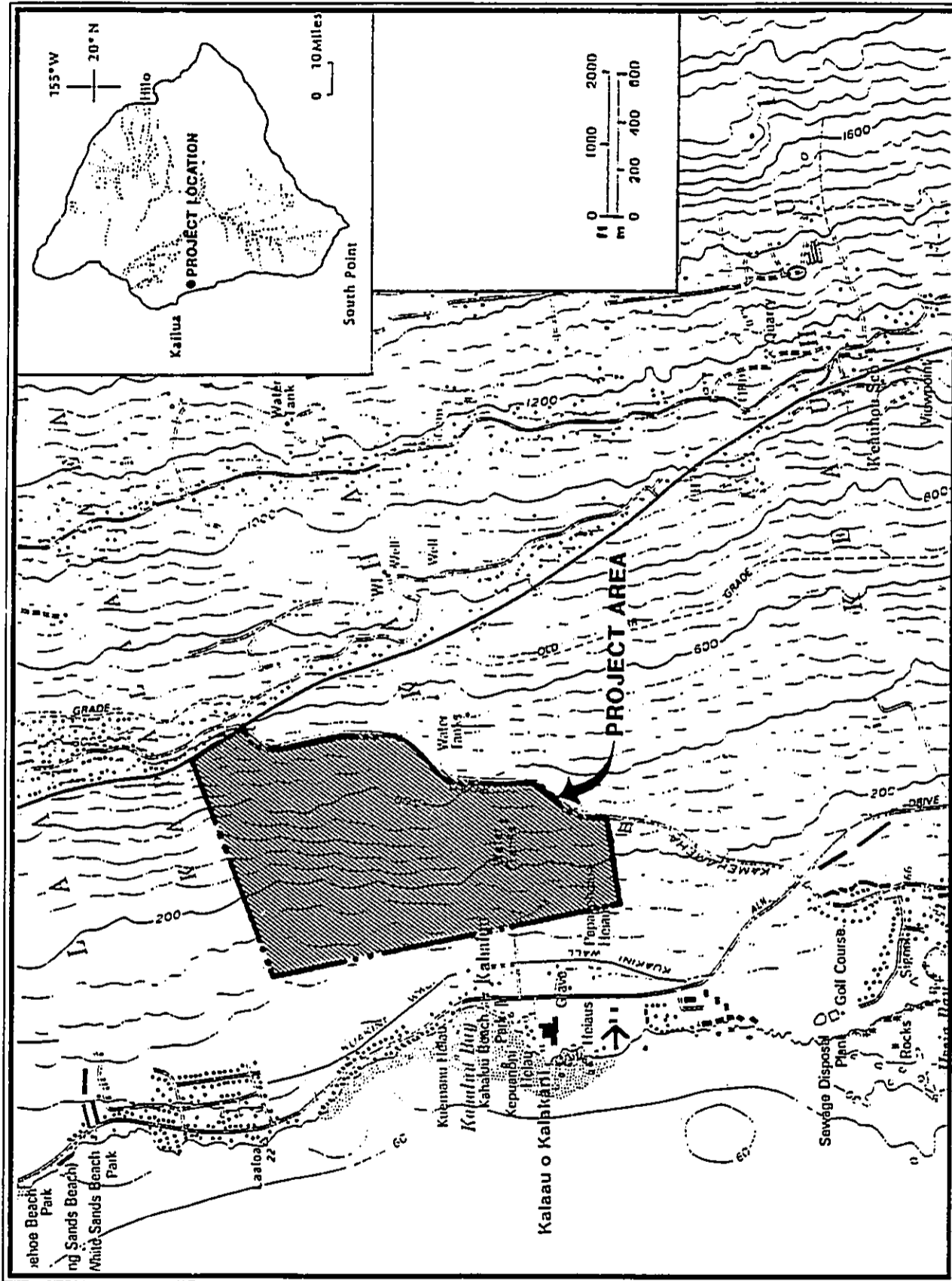


Figure 1. Project Area Location

The inventory survey was conducted in accordance with the standards for inventory-level survey recommended by DLNR-SHPD at the time of fieldwork. The significance of all archaeological remains identified within the project area was assessed in terms of (a) the National Register criteria contained in the Code of Federal Regulations (36 CFR Part 60), and (b) the criteria for evaluation of traditional cultural values prepared by the National Advisory Council on Historic Preservation (ACHP Draft Report, August 1985). DLNR-SHPD uses these criteria to evaluate eligibility for the Hawai'i State and National Registers of Historic Places. To assist the client with decisions regarding the treatment of archaeological resources, archaeological remains were also assessed in terms of PHRI value modes, which are based on the above federal criteria (see Appendix A for site-specific assessments).

PROJECT AREA DESCRIPTION

The Azabu Keauhou Resort Mauka Parcel project area consists of approximately 275 acres, situated in the Land of Kahalu'u, North Kona District, Island of Hawai'i (TMK:3-7-8-10:2, Por.4). The project area is bounded on the north by a stone wall and the Land of Kapala'alaea, on the east by Kamehameha III Road and Kuakini Highway, on the south by 'Ohi'a Cave Historic Preservation Area, and on the west by the centerline of Alignment A, which is the most seaward of the Proposed Ali'i Drive Realignment corridors.

The terrain of the project area is varied (Figure 2), and includes rolling lands accented by several ridge crests; these are interspersed with terrain that is somewhat level, and which contains substantial soil pockets. The ridge crests provide an excellent view of the coastline, in contrast to the level areas. Soil within the northern and central portions of the project area consists primarily of Punalu'u extremely rocky peat, (6-20% slopes) representing the Punalu'u series of well-drained, thin organic soils that have developed over pahoehoe lava bedrock (Sato et al. 1973). According to Sato et al. "[t]his soil is low on the leeward side of Mauna Loa. Rock outcrops occupy 40-50 percent of the surface. In a representative profile the surface layer is black peat about 4 inches thick. It is underlain by pahoehoe lava bedrock...[t]his soil is used for pasture" (1973:48). In a small area along Kamehameha III Road (east boundary) and in the southeast portion of the project area the soil is comprised of Kaimu extremely stony peat (6-20% slopes), representing the Kaimu series of well-drained, thin organic soils over 'a'a lava (Sato et al. 1973). According to Sato et al. "[t]his soil is at low elevations on Mauna Loa. In a representative profile the surface layer is very dark brown extremely stony peat about 3 inches thick. It

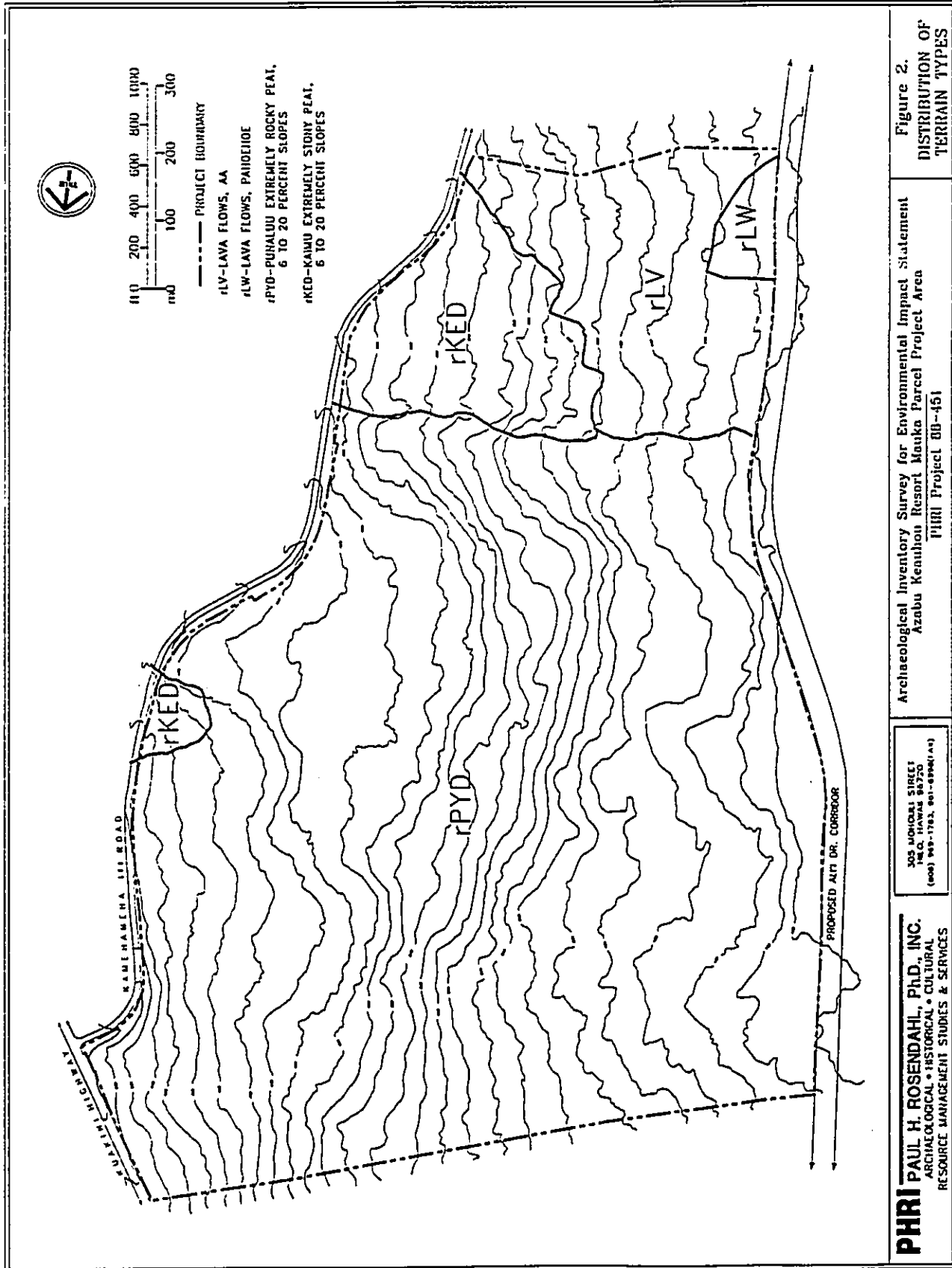
is underlain by fragmental A'a lava...[t]his soil is not suitable for cultivation" (1973:22). The southernmost end of the project area contains very little or no soil and is classified as 'a'a and/or pahoehoe lava flows (Sato et al. 1973).

Over the years, the terrain in portions of the project area has been altered. The alterations have accompanied construction of a water tank, the Keauhou-Kona Resort plant nursery, and a cattle corral. With the exception of the plant nursery and water tank areas, the present project area is currently used for cattle pasture.

Vegetation in the project area ranges from moderate to dense and consists primarily of an overstory of *koa-haole* (*Leucaena leucocephala* [Lam.] de Wit) and *kiawe* (*Prosopis pallida* [Humb. and Bonpl. ex Willd.] HBK), with scattered specimens of *opiuma* (*Pithecellobium dulce* [Roxb.] Benth.), monkeypod (*Samanea saman* [Jacq.] Merr.), Christmas-berry (*Schinus terebinthifolius* Raddi), and *kukui* (*Aleurites Moluccana* [L.] Willd.). The understory and ground cover consist primarily of *kolu* (*Acacia farnesiana* [L.] Willd.), *noni* (*Morinda citrifolia* L.), *lantana* (*Lantana camara* L.), *Portulaca* sp., air plant (*Bryophyllum pinnetum* [Lam.] Kurz), *'uhaloa* (*Waltheria americana* L.), and various grasses. Scattered specimens of *pua-pilo* (*Capparis sandwichiana* DC.) are also present on the 'a'a and pahoehoe lava in the southernmost portion of the project area.

Elevation in the project area ranges from approximately 80 ft AMSL (above mean sea level) at its seaward end to approximately 600 ft AMSL at its most inland point. Rainfall in the general vicinity of the project area ranges from about 30-40 inches per year, and the mean annual temperature is approximately 75 degrees F (Armstrong 1983:63,64).

The project area is entirely within the historic Kona Field System, and nearly the entire project area is situated within the boundaries of the Kahalu'u Historic District. The Kahalu'u Historic District (Site 4150) has been placed on the National Register of Historic Places (NRHP). The district was nominated to the register for several reasons, including the following: (a) the area contains numerous *heiau* within a relatively small area, (b) the unique architecture of several of the *heiau*, (c) the value of the petroglyphs within the area, (d) the areas association with important traditional political and religious activities, and (e) the region's high scientific research value. The Kona Field System (Site 6601), which has also been declared eligible for inclusion on the NRHP, is a complex of aboriginal Hawaiian dryland cultivation and habitation remains that covers an area approximately three by 18 miles, extending from the Kailua area south to Ho'okena.



PREVIOUS ARCHAEOLOGICAL WORK

Previous archaeological work conducted specifically within the present project area includes studies by Thrum (1908a,b [see also Thrum 1938]), Ching et al. (1973), Hammatt and Folk (1980), Hammatt et al. (1981), Hommon and Rosendahl (1983), and Tomonari-Tuggle (1985). These and other relevant studies are summarized in Table 1; see Figure 3 for locations.

In 1908 T.G. Thrum compiled a list of *heiau* within Kahalu'u (Thrum 1908a,b), which included the following 12 *heiau*: Lahae, Ku'emanu, Hale-o-kane, Halela'au, Kapuanoni, Hanakalawai, Hapaiali'i, Kamaike'eku (or simply Ke'eku), Paoumi, Makole'a, Ka'io'ena, and 'Ohi'amukumuku. Of these, only six appear to be located within or close to the present survey area: Hale-o-kane, Halela'au, Paoumi, Makole'a, Ka'io'ena, and 'Ohi'amukumuku. Another *heiau* (Mokuahi'ole), not mentioned by Thrum (1908a,b), is listed by Stokes (1991:70-71) in Kahalu'u, but is found south of the bay, on the beach.

In 1973, the initial inventory survey for the proposed realignment of Ali'i Drive was undertaken by Archaeological Research Center Hawai'i (Ching et al. 1973). During the pedestrian survey, along the western (*makai*) portion of the present project area, a number of features were noted, including *ahu* and mound complexes, terrace retaining walls, monument/platforms, *heiau*, petroglyph, walls, C-, U-, and L-Shape shelters, cave shelters, and house compounds and platforms. Ching et al. reported five previously known sites and thirty-two newly identified sites on the proposed Ali'i Drive re-alignment, where it passes west of the present study area.

Hammatt and Folk (1980) surveyed the present project area as part of a larger, c. 750 acre reconnaissance survey conducted in conjunction with test excavations and the preparation of an archaeological salvage research plan (Hammatt et al. 1981). The general objectives of this work were to locate, map, describe, and inventory all archaeological resources within their project area; to evaluate these resources in terms of scientific and cultural values; and to suggest appropriate treatment options. The purpose of the test excavations was to develop meaningful future archaeological work standards and to evaluate the cultural resources present (Hammatt et al. 1981:1). The purpose of the salvage research plan was to develop an overall program regarding future archaeological work (testing, analysis, and reporting) for sites within the Keauhou-Kona Resort area that were to be excluded from archaeological preserves.

In 1983, Hommon and Rosendahl inspected and further evaluated some of the sites within the Ali'i Drive Realignment Corridor. The primary goal of this work was to provide archaeological data for updating an EIS being prepared at that time by Belt, Collins & Associates for the County of Hawai'i (Hommon and Rosendahl 1983). The specific objectives of the survey were (a) to determine the presence or absence and general nature of archaeological resources in the survey area, (b) to evaluate identified resources, (c) to determine the scope of any possible future archaeological work, and (d) to sufficiently record data at sites which would require no further work. Fourteen previously unidentified archaeological sites and twenty-three previously-known sites were located during the project. The newly identified sites comprised a range of features including lava-tube caves, terraces, a C-shape structure, enclosures, platform, walls, and grave monuments.

A 1985 study by Tomonari-Tuggle involved preparation of a cultural resource management plan (CRMP) for Kamehameha Investment Corporation and Keauhou Resort (Tomonari-Tuggle 1985). The CRMP is an extensive document which outlines long-term interpretive development (preservation) and data recovery programs for the Keauhou Resort. The general objectives of the CRMP are: (a) to identify the nature and extent of cultural resources in the Keauhou Resort area; (b) to set the criteria for and assess the significance of cultural resources and specific sites in Keauhou Resort; (c) to discuss alternatives available for management of the cultural resources; and (d) to identify specific actions which must be taken to effectively implement CRMP alternatives. Included within the CRMP are (a) a discussion of the environment and history of Keauhou and Kahalu'u, (b) a discussion of the nature and significance of cultural resources in Keauhou and Kahalu'u, (c) a conservation program for cultural resources, (d) an interpretive program for sites and features to be preserved, (e) a data recovery program, (f) a summary of recommendations and overall cultural resource management considerations, (g) historical documentary research on Keauhou and Kahalu'u, and (h) several appendices, including (1) Hawai'i County Ordinance No. 820, Sections M through S; (2) archaeological and historical documentary sources for Keauhou and Kahalu'u; (3) development parcel profiles (summary); (4) interpretive themes and research problems in Hawai'i Island archaeology; and (5) a botanical list for Keauhou Resort CRMP.

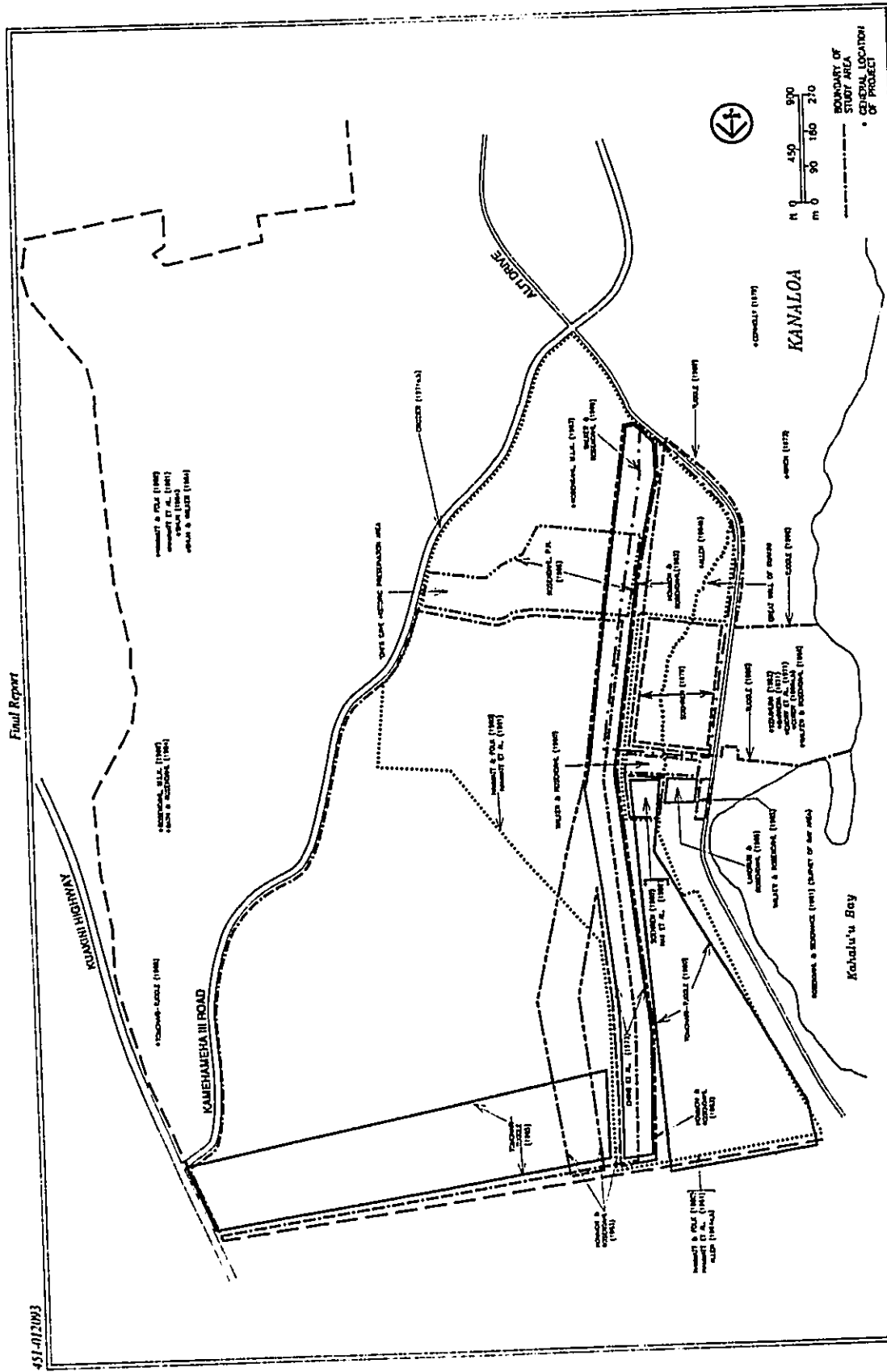
In the documentary research section of the Tomonari-Tuggle CRMP, a detailed model of the cultural history of the Keauhou-Kahalu'u area is presented (1985:14-34). The model comprises the following periods: (a) the beginnings of settlement, pre-AD 1000 to the 1300s; (b) settlement expansion, the

Table 1.

SUMMARY OF PREVIOUS ARCHAEOLOGICAL WORK

Date	Researcher	Type of Work	Location
n.d.	Reinecke	Reconnaissance	Kahalu'u & Keauhou
1908*	Thrum, T.G.	Reconnaissance	General
1938	Thrum, T.G.	Survey of heiau	General
1970	Emory, K.P.	Literature search	General
1971a,b	Emory, K.P. (IN Barrera 1971)	Reconnaissance & excavation	Keauhou
1971	Emory, et al.	Reconnaissance & historical research	Keauhou
1971	Crozier, S.N.	Reconnaissance & excavation	Kulu'ulu
1973*	Ching, et al.	Reconnaissance	General
1979	Soehren, L.J.	Reconnaissance	Kahalu'u
1980*	Hammatt & Folk	Reconnaissance	Kahalu'u & Keauhou
1981*	Hammatt et al.	Research design	Keauhou & Kaula'u
1983*	Homon & Rosendahl	Reconnaissance	General
1984	Allen, M.S.	Reconnaissance	Kahalu'u
1984	Rosendahl, P.H.	Field inspection	Kahalu'u & Keauhou
1985	Rosendahl, P.H.	Field inspection	Kahalu'u & Keauhou
1985	Walker & Rosendahl	Inventory	Kahalu'u
1985*	Tomonari-Tuggle, M.J.	Cultural resource management plan	Kahalu'u & Keauhou
1986a-c	Rosendahl, P.H.	Reconnaissance	Kahalu'u & Keauhou
1986	Hay, et al.	Data recovery	Kahalu'u
1988	Walker & Rosendahl	Reconnaissance	Kahalu'u

* = Located partially within current survey area



Fault Report

451-012093

Figure 3.

PREVIOUS ARCHAEOLOGICAL WORK LOCATIONS

Archaeological Inventory Survey for Environmental Impact Statement
Asabu Keshibu Resort Mauka Parcel Project Area
PHRI Project 88-451

303 KUHONUI STREET
HONOOLULU, HAWAII 96813
(808) 949-1762, 941-8888 (FAX)

PHRI PAUL H. ROSENDAHL, Ph.D., INC.
ARCHAEOLOGICAL • HISTORICAL • CULTURAL
RESOURCE MANAGEMENT STUDIES & SERVICES

early traditional period; (c) 'Umi and Lono, the late traditional period; (d) Kalaniopu'u and Kamehameha, last of the ruling chiefs; (e) the early 1800s, merchants and missionaries; (f) the mid-century, government land records; (g) the late 19th century; and (h) the 20th century, quiescence and revival.

Archaeological studies conducted immediately adjacent to the present project area include surveys and other studies by Crozier (1971a,b), Soehren (1979, 1980), Allen (1984a,b,c), Rosendahl (1985), Hay et al (1986), Walker and Rosendahl (1988), Tuggle (1990), and Tomonari-Tuggle (1990).

The studies by Crozier were undertaken in conjunction with the Kamehameha III road project. The road defines the southeastern limits of the proposed survey area. During the initial survey of the proposed corridor, Crozier (1971a) located "hundreds of features...in this archaeologically valuable area" (1971a:33). Crozier goes on to observe (ibid.):

There is a noticeable change in feature occurrence above the 152.5-meter (500-ft) elevation — most of the small shelters and house enclosures are located below that level. Therefore, the farming area was probably situated above 152.5 meters, where the terracing and small rock piles are much more frequent.

Re-alignment of the road corridor preserved several important features, including the entrance to 'Ohi'a Cave, a well-known refuge cave. Site complex D4-27 could not be saved and was recommended for salvage excavation, which took place during Phase II of the research program. Phase II (1971b) involved examination of the D4-27 site complex (50-HA-D4-27), located at the northern end of the road corridor in the Kaluulu subzone (170 meters or approximately 560 ft above mean sea level). The site consisted of three features (Features A-C), all of which were tested. Feature A consisted of "...a quasi-circular enclosure abutted by a low wall running makai" (ibid.:4); Feature B was a stepped platform composed of three distinct levels; and Feature C was composed of two, small possible features, the first being a C-shaped structure, with the second possibly representing a step leading to the upper platform of Feature B. Several artifacts, including a complete basalt adze and a portion of a larger adze, were recovered, along with shell midden, bone, and miscellaneous items. A volcanic glass hydration-rind date of A.D. 1130±20 was recovered from Feature B, and a date of 1696±15 was obtained from the upper portion of Feature A. Crozier writes that Feature A was probably a temporary or semi-permanent dwelling enclosure, while Feature B may represent at least three separate stages of construction (ibid:27-29). Hypotheses were advanced suggesting that the feature may have served a religious function or perhaps was used as an obser-

vation platform. Feature C, on the other hand, was considered to have resulted from essentially contemporary land clearing activities.

The 1979 Soehren study was a reconnaissance survey conducted in mid-1979. During the survey, Soehren identified or re-located 42 sites, including the Great Wall of Kuakini (Site 6302), Papakoholua Heiau (Site 1619), two smaller (possibly unnamed) *heiau*, numerous possible burial structures, habitation features, petroglyphs, and many other miscellaneous features. The 1980 Soehren study was an intensive survey of c. four acres in Development Parcel 4 and resulted in the location of three sites (7701, 7702 and 7703). Two of the sites were remnant features; the third (7702) was a collapsed lava tube cave.

In March of 1984, Allen conducted a reconnaissance survey for Mr. A.J. McDanold in Development Parcels 14B and 14C (Allen 1984a). The objectives of the project were to: (a) relocate sites previously identified by Hammatt and Folk (1980); (b) evaluate coverage of the previous ARCH survey; (c) determine the next level of work appropriate for sites in the area; and (d) evaluate the significance and coherence of sites comprising the two designated historic preserves. During the survey, 37 previously identified, and ten newly identified, sites were recorded. The previously identified features (from Hammatt and Folk 1980) included habitation, indeterminate, and religious structures. The 1984 Allen survey added agricultural features to the list of functional types represented.

Later in 1984, and under contract to Bishop Estate, Allen conducted an inspection and evaluation of previously identified sites in Development Parcel 26, located a short distance *makai* of the present project area (Allen 1984b). As with the relocation of sites in Parcels 14B and 14C, efforts were made to relocate and evaluate previous archaeological sites. Thirty-five sites had been previously identified in the area by Hammatt and Folk (1980), and all but one was relocated by Allen. In addition, thirteen new sites were encountered and recorded, including features suggesting habitation, religious activity, burial, and agriculture.

In 1985, Rosendahl (1985) prepared a cultural resource management plan for the lower section of 'Ohi'a Cave, at Kahalu'u. As part of this project, a minimal reconnaissance survey was undertaken, involving both the subsurface interior area of the cave and the surface atop the cave. Thirty-five designated sites and site complexes (comprising 60+ component features) were discovered on the surface of the project area. The cave complex also contained abundant structural and portable archaeological remains throughout (1985:7-13).

Moreover, the 35 designated sites and site complexes did not include the nearly continuous scatter of modified outcrops and other minor features observed in the immediate vicinity. Most of the features were found to be below about 170 ft elevation.

In 1986, Hay et al. (1986) undertook data recovery excavations at Site 50-10-37-7702, a coastal habitation cave located *makai* of the current project area, near Kahalu'u Bay. Excavation of c. 50 square meters of surface area within the cave disclosed three to eight distinct cultural layers, 27 horizontal features (firepits and ash lenses), and abundant artifacts and ecofactual remains. Radiocarbon and hydration rind measurements suggest almost continuous habitation between early AD 1400 to late AD 1700 (1986:ii-iii). One radiocarbon sample dated to as early as AD 670-1180. Recovered materials indicate that exploitation of a broad range of terrestrial and marine resources and raw-material procurement activities had taken place by a family-based group of commoners (ibid:5-4).

In 1988, Walker and Rosendahl (1988) undertook survey work on lands located *makai* of the present project area. This work resulted in the location of 110 sites (containing 211+ component features), of which 87 had been previously identified and 23 were newly identified; the sites included both single-component and multiple-component examples. Formal feature types present include petroglyphs, terraces, trails, C-shaped and L-shaped walls, boulder- and cobbled-filled areas, enclosures, free-standing walls, platforms, mounds, roads, caves/tubes, and various miscellaneous types. Functional types tentatively identified included habitation, ceremonial (possible burials, *heiau*, shrines, etc.), habitation/ceremonial, transportation, boundary, recreation, rock art, and miscellaneous.

In July and August of 1989, M.J. Tomonari-Tuggle of International Archaeological Research Institute, Inc. undertook an archaeological inventory of the 48-acre Development Parcel 26, at the Keauhou Resort, in the *ahupua'a* of Kahalu'u, North Kona, Hawai'i. This work included 100-percent transect-coverage of the project area. A total of 58 sites were identified, nine of which are within mandated County of Hawai'i historic preserves, while 49 are within the areas that may be developed. None of the 49 sites that are outside of the historic preserves, were recommended for preservation. Thirty-one sites were recommended for data recovery, and 14 sites were recommended for "special treatment" to determine the presence or absence of human remains. Eight sites, at which there was weaker surface evidence for burials, were recommended for subsurface testing. It was determined that sufficient

information had been collected from the remaining four sites, and no further work was recommended for those sites (Tomonari-Tuggle 1990:vii-viii).

Site interpretations include boundary walls, agricultural mounds and swales etc., burial mounds and platforms, habitation platforms and/or enclosures, ceremonial sites, trails and cart roads, enclosures, terraces, modified outcrops, and U- and C- shaped structures (ibid. 23-34). Tomonari-Tuggle also cites Hawaiian settlement, habitation, and land use in Keauhou—Kahalu'u from c. A.D. 1000 to the early 1800s, with continued, though changing land use through the mid 1900's. After the introduction of cattle and rise of ranching, Hawaiian habitation underwent dramatic changes and by the 1930s, Hawaiian sites were all but abandoned (ibid. 6-10).

In 1989, International Archaeological Research Institute, Inc., conducted archaeological field investigations in a 34-acre parcel of the Azabu Kona Resort, Kahalu'u, North Kona, under the supervision of Dr. H. David Tuggle (Tuggle 1990). The work was conducted as a part of the historic preservation mitigation process associated with Azabu Kona Resort proposed development improvements, which would have an impact on significant archaeological remains. The interim summary report is presented in four sections which include:

The field work for the initial data recovery and preservation phases was conducted between August 20 to October 1, 1989. Prior to field work, 31 sites had been identified as requiring some form of field recording in the project area. Seventeen of the sites had been recommended for data recovery, seven sites had been identified as possible burials and were provisionally recommended for conservation; and the remaining seven sites had been placed in the category of preservation with interpretation (Tuggle 1990:8).

Upon completion of field work, the following reclassifications were made; 16 of the 17 data recovery sites were relocated and mapped in detail (one site could not be relocated and is probably underneath a recent landscaping terrace). Nine of the sites were classified as "not significant" and the remaining seven sites will need additional data recovery if they are to be affected by development (ibid.:9)

Two of the seven sites identified as possible burials were confirmed as containing human remains and were classified as "Conservation" sites. Of the remaining five sites, two were recommended for reclassification as "not significant," and the other three sites were recommended for data recovery; two of these three sites are outside the development area, and may not require further work (ibid.:10).

The seven sites recommended for preservation and interpretation include five *heiau* (temples), one pond, and a petroglyph site. All of the sites were recorded in detail (ibid.:11).

Other previous archaeological work conducted in the immediate vicinity of the present project area includes but is not limited to reconnaissance surveys of the Kahalu'u-Keauhou shore areas (Kekahuna 1952); surveys involving Bishop Estate land within Kahalu'u and Keauhou (Emory et al. 1971) and the southern portion of Kahalu'u Bay (Rosendahl and Severance 1981); intensive survey and test excavations in Kahalu'u and Keauhou (Connolly 1979, Rosendahl 1983, Shun and Walker 1984, Bath and Rosendahl 1984); excavations at Kahalu'u (Barrera 1971, Kirch 1973, Walker and Rosendahl 1985, Kaschko 1985); data recovery excavations at Keauhou-Kona Resort (Shun 1984); survey of Kahalu'u Development Parcels (Walker and Rosendahl 1990); and of lands located inland of Kahalu'u Bay (Landrum and Rosendahl 1985); and archaeological fieldchecks and historical overviews of *heiau* (Cordy 1986a,b).

Radiocarbon samples recovered from subsurface excavations for several of these projects provide useful data for placing sites in the present project area within a general chronological setting. Radiocarbon samples recovered from habitation sites (17 samples, representative ranges listed here) have yielded age determinations of AD 1245-1395, AD 1457-1649, AD 1672-1766, and AD 1650-1950 (Shun 1984*), AD 1070-1390, AD 1270-1410, and AD 1630-1950 (Landrum and Rosendahl 1985), and AD 1260-1440 and AD 1660-1955 (Walker and Rosendahl 1990). Radiocarbon samples recovered from agricultural sites (8 samples, representative ranges listed here) have yielded age determinations of AD 1525-1955, AD 1690-1950, and AD 1790-1950 (Shun 1984), AD 1400-1800 (Bath and Rosendahl 1984), and AD 1420-1660 (Shun and Walker 1984). Radiocarbon samples recovered from habitation-refuge or habitation-ceremonial sites (15 samples, representative ranges listed here) have yielded age determinations of AD 1282-1408, AD 1661-1895, AD 1570-1950, AD 1800-1950 (Shun 1984).

A study of particular relevance to the current project is Newman's work on the Kona Field System (Newman 1970). Newman used aerial photographs and historical descriptions to define an area of intensive agriculture that extended three miles by 18 miles along the Kona coast, including both coastal and upland environments. Within this area Newman determined that four subzones appeared to be represented, each based on differential effects of elevation and rainfall. The portion of Kahalu'u under consideration in the current report incorporates a portion of the *kula* zone, in which sweet potatoes, gourds, and *wauke*

(paper mulberry) are likely to have been grown; the lowest reaches of the *kaluulu* zone may also be represented in the uppermost portions of the project area. This was a zone which was utilized for breadfruit, sweet potatoes, *wauke*, mountain apple, and some dryland taro.

Although not involving the present project area directly, the survey and salvage excavations along the nearby Kuakini Realignment Corridor (Schilt 1984) provide some cultural historical information relevant to the project area. Schilt's (1984) discussion of leeward Hawai'i expansion and settlement patterns is especially relevant, providing a chronological sequence for the Kona area generally, as well as specific information for portions of the project area. According to Schilt (1984:270-304), initial occupation of the area began circa AD 1000. Between AD 1000 to about AD 1400, occupation and settlement were centered in the pristine uplands and along the coastal fringe. Agriculture in the upland zone led to soil erosion, and the eroded material was deposited on lower, agriculturally marginal slopes. Then, between about AD 1400 to 1600, the erosional deposition continued so that the lower slopes gradually became more fertile, enabling a population increase based on agricultural production within this area. The population continued to increase after AD 1600, which in turn may have led to increased social conflict and warfare, as evidenced by increased use of refuge caves. The intensification of conflict is further documented by Hawaiian oral tradition and by historic accounts. Contact with the west after the arrival of Captain Cook in AD 1778 revolutionized traditional Hawaiian warfare, and by AD 1795, Kamehameha had emerged as the dominant chief, with a power base in Kailua, Kona. The period between about AD 1799 and 1850 was a period of general decline in the indigenous Hawaiian population, and also witnessed a significant decrease in native Hawaiian agricultural activity.

SUMMARY OF HISTORICAL DOCUMENTARY RESEARCH

This section provides a summary of historical documentary and archival research conducted by Kepa Maly (additional detail is contained in Appendix C). Much of the information was initially compiled by Walker and Rosendahl (1988) in conjunction with an interpretation of the histories of the Kahalu'u-Keauhou area of North Kona, Hawaii. Cited within Walker's report are several earlier historical studies, including the work of D. Barrere (1971), M.J. Tomonari-Tuggle (1985), and C. Silva (1985), all of whom relied heavily upon the work of S.M. Kamakau and A. Fornander, for legendary and early historical references.

* Dating results from project area are not presented in the Shun 1984 report, but are on file in the PHRI Laboratory

Because early information on Kahalu'u is limited, Walker's study simultaneously considered the Lands of Keauhou and Kahalu'u, as the two are situated adjacent to one another and are often mentioned together in historical references. Both legendary and early historical references indicate that while Keauhou and Kahalu'u were not unimportant, both were secondary villages located between the Kailua (Kamakahonu-Kaiakeakua) area and Ka'awaloa-Kealakekua. As a consequence, western ships with early historians aboard, had little reason to stop at these areas, and the historians did not record them in their journals.

Nevertheless, considerable information is available for the region, as documented by Maly in Appendix C. Historical documentary and archival data suggest that initial settlement was characterized by use of the small protected bays and shoreline, a pattern which ensured easy access to marine resources and coastal springs. Early agricultural planting would have occurred in and around these coastal springs. As the population grew and the political and religious systems became more formalized and complex, the communities themselves expanded and requisitioned larger units of land. The *ko kula kai—ko kula uka* (coastal and upland plains) were eventually extensively planted with important staple- and supplemental-crops that were less water-dependent than the *kalo wai* (wet taro) which was the staple of the *ko'olau* (windward) side of the island with its well-watered valleys. *Pu'epu'e* (planting in built up mounds), *makalua* and *'umoki* (planting in dug-out, mulched holes) are three planting techniques recorded as having been extensively used in this part of Kona at the time of Western Contact.

Crops such as sweet potatoes, sugar cane, bananas, breadfruit, gourds, and coconuts etc., provided the "bread" of the Hawaiian diet. On the upper slopes, agricultural practices would have included propagation and harvesting of *olona* (*Touchardia latifolia*) for cordage, and *'awa* (*Piper methysticum*) for ceremonial and domestic use, and the collecting various woods and resources from the upland forests; these woods were used for spears, paddles, canoes, among other things. Fishing in this area was some of the best on Hawai'i, and it is clear that a great deal of energy went into the various practices associated with the harvesting of ocean resources. Though a farmer probably gathered some ocean resources, and a fisherman probably kept some food plants near his home, it is generally accepted that many of the various tasks necessary to sustain the community were the responsibility of specialists. Thus the fishermen provided fish and other ocean resources to the planters, who in turn supplied the main agricultural products to the fishermen, at least during the latter phases of the prehistoric period.

Following unification of the islands under the rule of Kamehameha I, the lands of Kahalu'u and Keauhou were given to *ali'i* who had supported the chief and remained loyal to his descendants. Following the *Mahele* of 1848, the lands were further divided among Kamehameha's descendants, with the result being that much of the land is controlled by Bishop Estate. Additionally, however, small parcels of land were given to native residents who had lived upon and worked the land during preceding decades.

During this period, the Hawaiian population was in decline and by the mid-1800's, foreign land use—upland ranching, cultivation of coffee and other crops—was being developed along with other Western business interests. By the late 1800s and through the early 1900s, immigrant populations were on the rise and often the immigrants outnumbered the native Hawaiians. There is little historical documentation concerning interrelationships between whites and Native Hawaiians in Kahalu'u during this time period.

By 1928 there were only a few buildings documented at Kahalu'u, although the Kona coast remained a popular retreat for some of the "old-time" families of Hawai'i. This enjoyment of Kona eventually led to the development of hotel and resort facilities along the Kahalu'u-Keauhou coast, and much of Kona as well. With resort development came an increased demand for housing for both resident-workers and part-time residents, with the result that the local natural and cultural landscapes have been extensively modified and heavily impacted. Nevertheless, evidence of all periods of prehistory, history and land use have been at least partially preserved in the oral histories and written accounts available for the Kona area. When supplemented with information available in the archaeological record, it is possible to reconstruct many of the descriptive details of settlement and land use in this area during the nearly 1000 years of occupation by native Hawaiian populations.

IMPLICATIONS OF PREVIOUS RESEARCH; SETTLEMENT MODEL AND GENERAL RESEARCH ORIENTATION

As indicated in the above discussion of previous archaeological and historical documentary research, inventory-level information is available for a portion of Kahalu'u Ahupua'a, and one important goal of additional survey was to further refine existing models of prehistoric and early historical patterns of settlement, land use, and exploitative strategies within the area, and to attempt to further document evolution

in these patterns through time. For example, during the latter phases of prehistoric occupation in this area, important new social, political, and religious forms were apparently being developed in response to various requirements and conditions both imposed and made possible by an expanding agricultural base. What support for this hypothesis exists in data available from prehistoric sites within the present Kahalu'u project area? Moreover, since dating of several previously identified sites was based in part on analysis of volcanic glass, what level of refinement in the temporal sequence might be obtained by securing a larger sample of absolute dates (i.e., C-14 assays)?

It is the contention of DLNR-SHPD that an important goal of inventory survey work should be to further evaluate the ahupua'a-wide patterns of settlement and land use. Based on existing information, the following settlement model was developed to help guide the collection and analysis of data from the present project area.

As noted in previous discussions, the project area is situated between about 80 and 600 feet above sea level and incorporates a portion of the Kahalu'u Historic District (Site 4150), which in turn is situated within the historic Kona Field System (Site 6601). Although information available at the time of the present inventory survey suggested that not all of the structural remains present in the area conformed with the classic "patterned network" initially described by Newman for certain areas within the System, a wide variety of agricultural features, including rubble wall alignments, stone mounds, cleared areas, modified bedrock outcrops, and small crude terraces, were already recorded within the vicinity and known to be widely distributed throughout the project area and on adjacent lands.

According to Schilt (1984), the development of the Kona Field System was an evolutionary process which took place over a period of 300 to 400 years and which was intimately linked with changes in the pattern of settlement and land use in this area of western Hawaii. Based on existing information, pioneering (i.e., pre-System) settlements within leeward Hawaii (circa. AD 1050-1400) occurred along the coast with very limited, and only sporadic use of lowland slopes and caves above the Kailua Bay area. Development of one or more of the *mauka* subzones of what was eventually to become the integrated Kona Field System occurred during the latter part of this same period (i.e., beginning about AD 1400). Over time, use of *mauka* areas resulted in increased erosion, with concomitant deposition of silts and other useful deposits within the lower elevation (*Kula* and *kaluulu*) subzones. Modified through siltation, and following an increase in population and increasing socio-political demands for agricultural commodities in the late AD 1600s, the marginally

exploitable lower agricultural zone - the *kula* (coastal area) zone, from sea level to c. 500 ft (150 m) elevation - became more intensively utilized and occupied (Schilt 1984:270-276). Crops cultivated within the *kula* zone during the late prehistoric period (prior to AD 1778) included sweet potatoes (*'uala*, gourd (*ipu*), and paper mulberry (*wauke*). By the early AD 1800s, the impact of western culture had substantially altered the traditional cultural use of the area (Schilt 1984:276-285), and crops being cultivated included cabbage, melons, onions, oranges, tobacco, beans, coffee, corn, cotton, pineapple, Irish potatoes, and pumpkins.

The *kaluulu* (seaward slope) zone abuts the *kula* on its mauka side and includes the area from c. 500 to 1,000 ft (150 to 300 m) elevation and receives c. 40-55 inches (1.0-1.35 m) of rainfall annually. Crops grown with the *kaluulu* zone during the late prehistoric period include breadfruit (*'ulu*), mountain apple (*'ohi'a-'ai*), and taro (*kalo*), in addition to sweet potato and paper mulberry. The other two cultivation zones of the Kona Field System are (a) the *'apa'a* (upland slope) zone and (b) the *'ama'u* (upland jungle) zone. Unusual cultural features in these upland areas of the Kona Field System are spillways, constructed stone tunnels, diversion walls used for water control, and possibly irrigated pondfields (Allen 1984c:21).

Prehistoric habitation in the *kula* subzone was probably almost always temporary, although this pattern appears to have changed during the Proto-historic through early historic periods, during which permanent habitation sites appeared in greater frequency in this area, with residential features primarily situated *makai* of the Great Kuakini Wall. Within Kahalu'u, the immediate coastal zone was probably the primary focus of permanent habitation and associated religious and political activities, as evidenced by the presence within these areas not only of numerous residential sites, but of burial sites as well as a named *heiau*.

Chronological phases for this sequence within North Kona have been presented in Schilt (1984:276-284). Based on a series of radiocarbon and volcanic glass dates, initial occupation of the general Kailua area and southward to the approximate limits of the present project area is hypothesized to have occurred sometime during the period AD 1050-1400 (Phase I). However, two other radiocarbon dates (Delimont et al. 1985) indicate that initial occupation in the seaward portion of Puapua'a (and probably the general Kailua area) may have occurred as early as AD 600-890. Dryland agricultural development apparently had become established by AD 1400-1600/1650 (Phase II). The earliest samples that Schilt recovered from Puapua'a Ahupua'a date to Phase II (Schilt 1984:277), while most of the

radiocarbon and volcanic glass dates recovered from the seaward portion of Puapua'a date to AD 1335-1795 (Delimont et al. 1985) and generally agree with Schilt's dates. Dates from the Kahalu'u area indicate that cultivation and exploitation of this portion of the Kona Field System were occurring by AD 1420-1660 (Shun and Walker 1984). By AD 1600/1650-1779 (Phase III), the many areas of the Kona Field System were extensively developed and were intensively cultivated until use of the fields eventually began to decline, during the historic period, AD 1779-1850 (Phase IV).

The date ranges of volcanic glass samples recovered during a 1988 survey project at the Pualani Residential Development Project Area suggest occupation between about AD 1653-1729 (Walker and Rosendahl 1988:26, 29-30), and thus generally correspond with the intensive Phase III exploitation and habitation period documented elsewhere within the Kona Field System. Dates secured on deposits located within Kahakai suggest two phases of settlement and exploitation: an early, initial occupation between about AD 600-900, and a late prehistoric-early historic occupation between about AD 1400 and 1600. Finally, one of Schilt's radiocarbon samples dated to AD 635-905.

Tomonari-Tuggle (1985) constructed a prehistoric cultural sequence for the Kahalu'u-Keauhou area that was based primarily on the work of Kamakau and Formander, but which also utilized some of the archaeological findings discussed above. The Tomonari-Tuggle sequence extends from approximately AD 1000 to AD 1778, and is divided into three periods, as follows:

Pre-AD 1000 to the 1300s - Kahalu'u-Keauhou was initially settled sometime after about AD 1000. Initial settlements were marine-resource-oriented, with habitation probably focused around Kahalu'u and Keauhou Bays. Kin-based social and economic ties linked the coastal areas in the vicinities of the two bays. By AD 1300, upland areas at least 4,000 feet inland were being cultivated, with subsequent cultivation of areas located further inland.

Early Traditional Period - Generally, this period extended from the 14th to the 16th centuries. The social organization observed by early western explorers began to develop during this period. During the 14th century, the Kona Field System was established, while during the 15th century the first permanent occupation of dry uplands may have occurred. There was also an increased separation of the chiefly class from commoners, and

during the 16th century the population is stabilized and the *ahupua'a* become the established socio-economic unit around the island.

Late Traditional Period — This period comprised the 16th through 18th centuries. The first references to Kahalu'u-Keauhou in traditional oral literature date to this time.

Utilizing the cultural-historical sequence proposed by Kirch (Kirch 1985), the development of the Kona Field System (and thus by extrapolation much of the development affecting Kahalu'u) can be linked with development in the rest of the Hawaiian archipelago. Kirch's sequence consists of four major periods: Colonization (AD 300-600), Developmental (AD 600-1100), Expansion (AD 1100-1650), and Proto-historic (AD 1650-1795). The initial occupation and establishment of the Kona Field System appears to have begun during the Developmental period, with cultivation intensifying during the Expansion period and the initial stages of the Proto-historic period. It was during the Expansion and Proto-historic periods that important new social, political, and religious forms were developed in response to various requirements and conditions both imposed and made possible by an expanding agricultural base.

A number of primary research topics relevant to the present inventory survey work were developed based on what was already known about regional and *ahupua'a* prehistory, including the range and density of site and feature types that had been documented in the vicinity. Thus, one of the objectives of additional inventory survey within the project area was to develop a more refined model of land use variability. In part, the goal was to link elevational gradient data with archaeological feature type designations. The site distribution data available from previous surveys provided baseline data for developing a more formalized typology of agricultural features and complexes. The goal was to augment existing information with additional information concerning site and feature density along the elevational gradient.

In addition, existing dating results suggested that a high percentage of the inland habitation and agricultural features would likely post-date AD 1300-1400. In order to test this hypothesis, and to better determine the culture history of the project area, it was considered important to collect datable charcoal samples and to identify any variance in formal or functional types that may reflect temporal change. Additional evaluation of unpublished dating results on other nearby parcels would also augment dating of the sites and features located within the present project area.

In consideration of the above, it was clear that a number of important research topics could be addressed utilizing inventory-level data that was to be collected from project area sites:

1. Further evaluating the age, duration, and intensity of occupation within Kahalu'u;
2. Further evaluating and characterizing previously identified sites and features for portable artifact content and assemblages;
3. Further evaluating and characterizing individual sites and features for ecofactual content;
4. Refining existing assessments, thus far based on previous inventory-level survey findings, of the variety of cultural activities conducted at various locations within the *ahupua'a*; and,
5. Utilizing the above information to refine existing information concerning the *ahupua'a* settlement model. In this regard, research was to be focused upon the distribution of and interrelationships among temporal, artifactual, ecofactual and architectural variables as these are manifest at individual sites and features.

FIELD METHODS AND PROCEDURES

Field work was conducted from October 3 through November 23, 1988 by PHRI Supervisory Archaeologists Alan T. Walker, B.A. and Victoria K. Kai. Principal Archaeologist Dr. Paul H. Rosendahl provided overall guidance for the project. The surface reconnaissance survey (100% coverage) was accomplished using a series of systematic pedestrian

transects which were oriented approximately SW-NE. Intervals between sweeping crew members were maintained between 25 and 30 meters, depending on vegetation and terrain type.

As sites were identified, they were flagged with blue and pink flagging tape and were assigned sequential PHRI temporary numbers prefixed by "451-" beginning with "451-1." Sites were subsequently assigned permanent SIHP numbers. All sites in the study area were plotted on a blue-line topographic map (1"=200' scale, 2-ft contours) supplied by R.M. Towill Corporation (1988). Site plotting was aided by (a) blue-line topographic maps (1"=40', 2-ft contours), (b) a 1"=200' scale black-and-white aerial photo (R.M. Towill Corp. 1988:85-1-11), and (c) a series of photogrammetric aerial mapping points which were placed in the field by R.M. Towill Corporation and included on R.M. Towill topographic maps.

Newly identified sites were plotted using a metric tape and compass; they were recorded on standard PHRI site record forms and were sketch-mapped. Previously identified sites were field-checked and were compared with existing site descriptions. When appropriate, additional information on previously identified sites was recorded. A complete 35 mm black-and-white photographic record of field work was kept (PHRI Roll Nos. 917-921, 923-930, 956-963, and Lab Roll No. 1021, for artifacts). Sites were tagged with an aluminum strip bearing the site number, PHRI project number (88-451), and the date. The same information as on the aluminum strip was written on pieces of flagging tape, which were then wrapped around stones and placed in protected places on each site. If present, volcanic glass flakes were collected from the surface for possible age determination. Some sites—sites containing firepits or caves with surface charcoal/ash deposits or firepits—were subjected to surface collection for radiocarbon dating samples. No subsurface excavation was undertaken.

FINDINGS

ARCHAEOLOGICAL SURVEY

During the present survey, 251 sites containing 532 component features were identified. Of the 251 sites, 121 had been previously identified and recorded, with the remaining 130 sites being newly identified during the current survey. Among the identified sites, 144 were single structural features, such as alignments, retaining walls, mounds, isolated possible burials, caves, platforms, terraces, etc. The remaining 107 sites were complexes consisting of two or more features; collectively they contained 388 separate features, or slightly more than 3.5 features per recorded site. Formal feature types identified were boulder level area, cairn, cart road, cave, clearing area, cupboard, C-shape, C-shaped wall, enclosure, depression, double C-shape, double terrace, filled depression, lava blister, lava tube, lava tube/cave, L-shape, L-shaped wall, modified outcrop, mound, mound complex, mound-filled crack, pahoehoe excavation, paved area, pavement, pit, platform, platform remnant, platform remnant/wall, retaining wall, stepping stone trail, terrace, terrace complex, trail, triple terrace, U-shape, U-shaped pit, U-shaped wall, wall, wall complex, walled platform, walled terrace, and walled terrace complex. Tentative functional designations for the identified formal types include agriculture, boundary, possible burial, ceremonial, habitation, marker, refuge, storage, transportation, quarry and indeterminate.

Site locations for all identified and relocated sites are provided in Figure 4 (at end). Appendix A, Summary of identified Sites and Features summarizes the sites in terms of component features, formal and functional types represented, PHRI Cultural Resource Management (CRM) value mode assessments, and recommended field work tasks. Table 2 is a correlation of site numbers, including the PHRI temporary numbers, originally assigned in the field, and SIHP site numbers. Detailed descriptions of all sites within the project area are presented in Appendix B. Two sites previously identified by Hammatt and Folk (1980), Sites 4657 and 4658, were not relocated. Both of these sites (or at least major portions of each) were apparently destroyed after the original recording by Hammatt and Folk. Detailed descriptive information for Site 4657 was available, and the area around its original plotted location did not appear to have been heavily impacted. For this reason, Site 4657 has been listed in Appendix B and is included in the count of extant project area sites. Site 4658, on the other hand, had clearly been destroyed, and it is not included among the project area sites listed in the Appendix B.

The Appendix B information for each identified site includes:

1. **Site number** - State (SIHP) numbers, B.P. Bishop Museum (BPBM) site numbers where appropriate, PHRI temporary site numbers, and any other numbers assigned. State site numbers are four- and five-digit numbers prefixed by 50-10-37 (50=State of Hawai'i; 10=Island of Hawai'i; 37=USGS 7.5' series quad map ["Kealakekua, Hawai'i"]). BPBM site numbers are one- and two-digit site numbers prefixed by 50-HA-D4 (50=State of Hawai'i, HA=Island of Hawai'i, D=North Kona District, 4=Land of Kahu'u). PHRI temporary numbers are one- and two-digit numbers prefixed by "451-";
2. **A site type designation** - This entry provides formal feature type for sites consisting of a single feature, or designates the site as a complex if the site is comprised of more than one feature. This entry also lists the total number of features present;
3. **A description of site topography** - A brief description of the terrain in the immediate vicinity of the site;
4. **A list of site vegetation** - Lists principal components of the vegetation within the site boundaries and in the vicinity of the site;
5. **A statement of site condition** - Overall state of preservation of the site (designated as poor, fair, good, or excellent);
6. **An assessment of site integrity** - The degree of post-abandonment modification by human action (designated as unaltered, partially altered, and completely altered) and the nature of modifications, if any;
7. **A probable age** - Indicates the probable or possible age of the site (i.e., historic or prehistoric), based on feature construction, morphology, and/or associated artifacts or other portable cultural materials;
8. **A functional interpretation** - Probable or possible functions for each site; if function cannot be determined, the designation "indeterminate" has been assigned. For sites with multiple possible functions, functions are separated by "/";

Table 2.

CORRELATION OF SITE NUMBERS

SIHP Site Number	PHRI Temporary Site Number	SIHP Site Number	PHRI Temporary Site Number
2077*	451-161	5721	451-223
2078#	451-148	5722	451-224
2079	—	5723	451-225
3822*	451-157	5724	451-226
3823+	—	5725	451-227
4649	451-47	5726	451-228
4650	451-212	5727	451-229
4651	—	5728	451-230
4652	451-213	5729	451-231
4653	—	5730	451-232
4654	451-210/214	5731	451-233
4655	451-221	6341	451-164
4656	451-220	6368	451-8
4657	—	6385	—
4659	—	6386	451-112
4660	451-221	6388	451-116/117
4661	451-219	6390	—
4665	451-217	6391	451-118
4666	—	6391-B/9866	451-110
4667	—	6392	—
5700	451-120	6393	451-170/171/172
5701	451-124	6394	—
5702	451-125	6395	451-176
5703	451-127	6396	451-174
5704	451-129	6397	451-173
5705	451-136	6398	—
5706	451-147	6399	—
5707	451-153	6400	451-168
5708	451-165	6401	451-169
5709	451-166	6402	451-167
5710	451-201	6403	451-163
5711	451-202	6404	451-162
5712	451-204	6405	451-161
5713	451-205	6406	—
5714	451-206	6407	451-152
5715	451-208	6408	451-155
5716	451-209	6408-D/9876	451-155
5717	451-215	6409	—
5718	451-216	6410	—
5719	451-218	6411	—
5720	451-222	6412	—

Reinecke (n.d.) sites: + = Site F, # = Site H, * = Site J, □ = Site K
 □ = Ching et al. 1973, □ = Hammatt and Folk 1980/Hammatt et al. 1981, □ = Ching et al. 1971, ■ = newly identified, ■ = Hammatt et al. 1981

Table 2. (cont.)

SIHP Site Number	PHRI Temporary Site Number	SIHP Site Number	PHRI Temporary Site Number
6413	—	7948	451-99
6414	451-158	7949	451-99
6415	451-49	7950	451-100
7663	451-207	7951	451-101
7664	451-200	7952	451-138
7665	451-203	7953	—
7666	451-211	7955	451-131
7818/9825	—	7956	451-130
7883	451-194	7957	451-132
7888	451-195	9820	451-197
7890/6403	451-163	9821	—
7891	451-198	9822	—
7893 α	451-156	9823	—
7914	—	9824	—
7915	451-141/142	9825/7818	—
7916	451-140	9862	451-73
7917	451-135/139	9863	451-75
7918	—	9864	451-111
7919	—	9865	451-109
7920	451-137	9866/6391-B	451-110
7921	451-134	9867	451-108
7922	—	9868	451-106
7923	—	9869	451-121
7924	—	9870	451-105
7925	451-133	9871	451-122
7926	—	9872	451-104/123
7927	—	9873	451-126
7928	—	9874	—
7929	451-143	9875	—
7930	451-145	9876/6408-D	451-155
7931	451-146	11116	451-1
7932	451-144	11117	451-2
7933	451-143	11118	451-3
7934	451-150	11119	451-4
7935	451-149	11120	451-5
7936	451-151	11121	451-6
7937	451-128	11122	451-7
7938	—	11123	451-9
7939	—	11124	451-10
7940	—	11125	451-11
7941	—	11126	451-12
7942	451-154	11127	451-13
7943	—	11128	451-14
7944	—	11129	451-15
7945	—	11130	451-16
7946	—	11131	451-17
7947	—	11132	451-18

Reinecke (n.d.) sites: α = Site 1
 \square = Hommon and Rosendahl 1983

Table 2. (cont.)

SIHP Site Number	PHRI Temporary Site Number	SIHP Site Number	PHRI Temporary Site Number
11133	451-19	11174	451-62
11134	451-20	11175	451-63
11135	451-21	11176	451-64
11136	451-22	11177	451-65
11137	451-23	11178	451-66
11138	451-24	11179	451-67
11139	451-25	11180	451-68
11140	451-26	11181	451-69
11141	451-27	11182	451-70
11142	451-28	11183	451-71
11143	451-29	11184	451-72
11144	451-30	11186	451-74
11145	451-31	11188	451-76
11146	451-32	11189	451-77
11147	451-33	11190	451-78
11148	451-34	11191	451-79
11149	451-35	11192	451-80
11150	451-36	11193	451-81
11151	451-37	11194	451-82
11152	451-38	11195	451-83
11153	451-39	11196	451-84
11154	451-40	11197 [□]	451-85
11155	451-41	11198	451-86
11156	451-42	11199	451-87
11157	451-43	11200	451-88
11158	451-44	11201	451-89
11159	451-45	11202	451-90
11160	451-46	11203	451-91
11161	451-48	11204	451-92
11162	451-50	11205	451-93
11163	451-51	11206	451-94
11164	451-52	11207	451-95
11165	451-53	11208	451-96
11166	451-54	11209	451-97
11167	451-55	11210	451-101
11168	451-56	11211	451-102
11169	451-57	11212	451-103
11170	451-58	11213	451-107
11171	451-59	11214	451-113
11172	451-60	11215	451-119
11173	451-61		

Reinecke (n.d.) sites: □=Site K

9. **A site description** - A brief overall description of the site, listing types of constituent features, portable remains present, if any, and other site data; and
10. **Feature dimensions** - Maximum length, width, and height or depth. Dimensions are immediately followed by a description of feature construction methods, techniques, and materials, associated portable remains, and other relevant descriptive information.

Habitation Features

A habitation function was assigned to 260 project area features. This functional assignment was based on the presence or absence of a number of attributes, including (a) accumulated cultural deposits (consisting of food remains (midden), surface artifacts, or both), and (b) an evaluation of the structural complexity of the feature and construction details. Due to the preliminary nature of the present evidence, however, no attempt was made to distinguish temporary habitation sites from semi-permanent or permanent habitation sites, a problem area to be further evaluated in conjunction with the additional data collection and data recovery work that has been proposed for selected project area sites. In cases in which it appeared that habitation occurred in association with additional activity sets, features were assigned a dual function. These evaluations were based on the presence of multiple diagnostic attributes, as, for example, where structural type and associated midden or artifacts suggested not only habitation but perhaps burial, quarrying, or agricultural activity concurrently.

Habitation was the most common functional assignment made within the project area comprising approximately 49% of the total number of features identified. Site 7948 (Figure 5), originally recorded by Hammatt and Folk in 1980 (Hammatt and Folk 1980:132-133), typifies the prehistoric habitation complexes in the project area. This site is located at c. 200 ft AMSL, on a slope near a prominent ridge crest that commands a good view of the coast and Kahalu'u Bay. This site consists of Features A, B, and D (lava tube cave, enclosure, mound), which are thought to have served a habitation function, with the remaining feature (Feature C, platform) provisionally identified as a burial. Features A, B, and C were noted during the earlier survey by Hammatt and Folk, while Feature D was added to the complex during the current survey.

Site 7935 (Figure 6) is typical the multi-functional feature complexes dominated by a habitation function. Originally recorded by Hammatt and Folk in 1980, the site was located along Alignment B of the proposed Ali'i Drive Highway Corridor (Hammatt and Folk 1980:132). The site consisted of two primary feature areas. Feature A consisted of

two contiguous platforms, with a large upright slab on the surface of the north platform. Feature B included "several contiguous platforms", one of which had a depressed surface and several water-worn cobbles on the surface. Feature B was tested in 1981 (Hammatt et al. 1981:79-80), resulting in the identification of a small crypt-like alignment within the platform, which in turn contained three strata or layers. The upper layer within the crypt area yielded a few basalt and coral pebbles. Encountered within the middle layer were small, slab-boulder inclusions, coral, shell, charcoal, and basaltic glass. The lower layer yielded a variety of marine shells, fish bone, dog bone, charcoal, and basaltic glass. Recovered materials suggest use of this platform for habitation, although a burial function is also considered a possibility, pending the results of proposed data recovery work at this site.

Ceremonial Features

Eighteen probable ceremonial features (3.4% of the total number of features) were encountered in the project area. One example is Site 3822 (Figure 7), a large platform or *heiau* (Halela'au, site 50-Ha-D4-15). Stokes (1991:67-68) earlier described the feature as follows:

...Located 1100 feet from the sea at an elevation of 140 feet. An agricultural *heiau*, Halela'au is built on the high ground overlooking the village. The main platform is from 2 to 7 feet above the ground, depending on the contour of the land. At the middle of the western side is a bench 1.5 feet lower than the main platform, with steps leading up to it. A passage 3 feet wide leads to the south from the bench at the same elevation. It almost separates a portion of the main platform from the rest...

Transportation

Seven transportation features (1.30% of the total) were recorded during the current project. Site 7666 (Figure 8) is a historic transportation feature previously recorded by Hammatt and Folk (Hammatt and Folk 1980:153). This historic cart trail has a level pavement of cobbles with well-defined curbing. Despite the fact that the feature has been extensively disturbed by a bulldozed road, the construction details that remain suggest either a Type "B" or Type "C" trail, in Apple's typology (Apple 1965:65). Typically, these trails of this formal type were constructed during the middle part of the 19th century, as "labor taxes" required of "able subjects of His Majesty, born of native aboriginal mothers." The law of 1859 extended the labor requirement to "every male inhabitant of the kingdom between the ages of seventeen and fifty years, whether a Hawaiian subject, or an alien..." (ibid.:46-47). According to

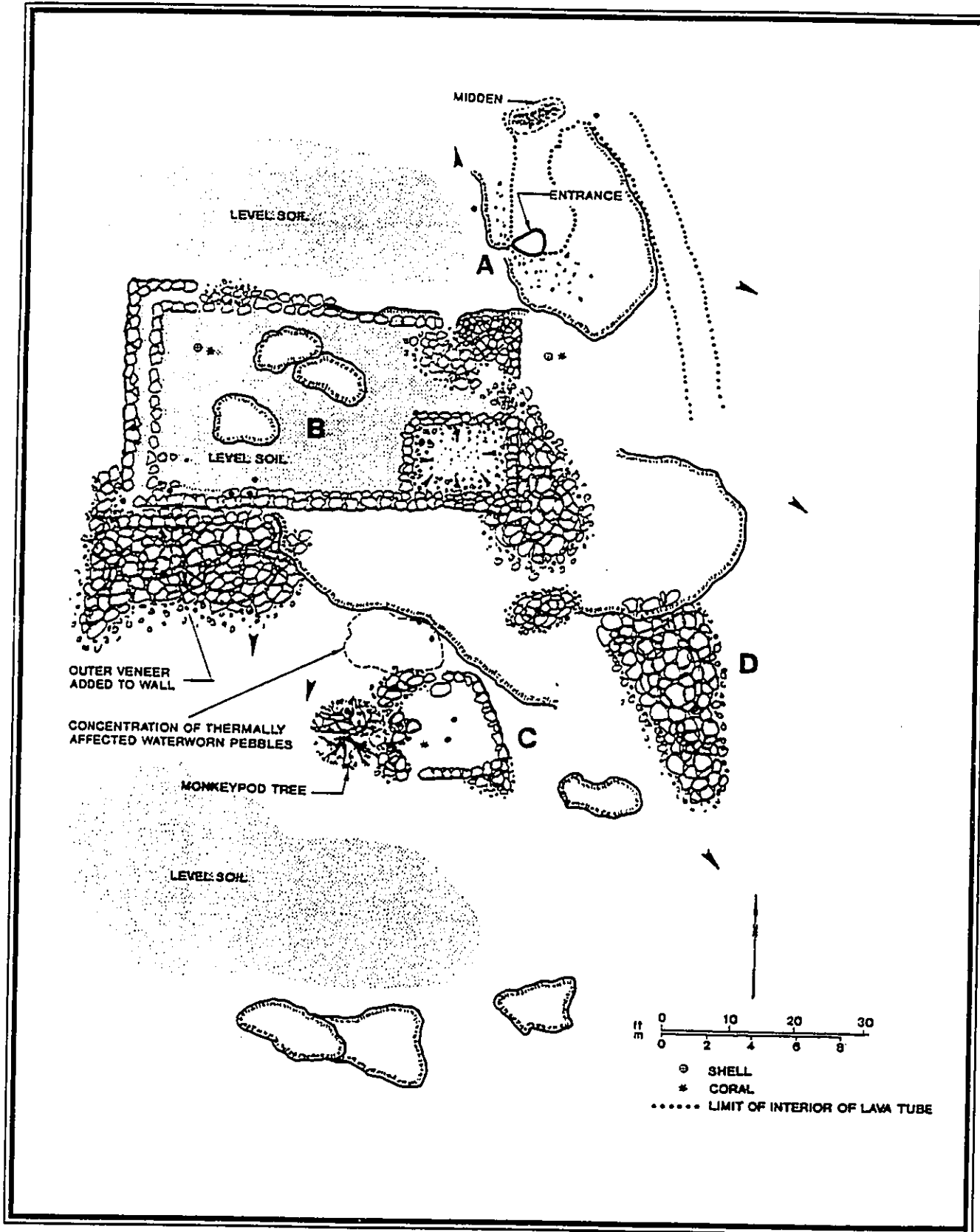


Figure 5. Site 7948

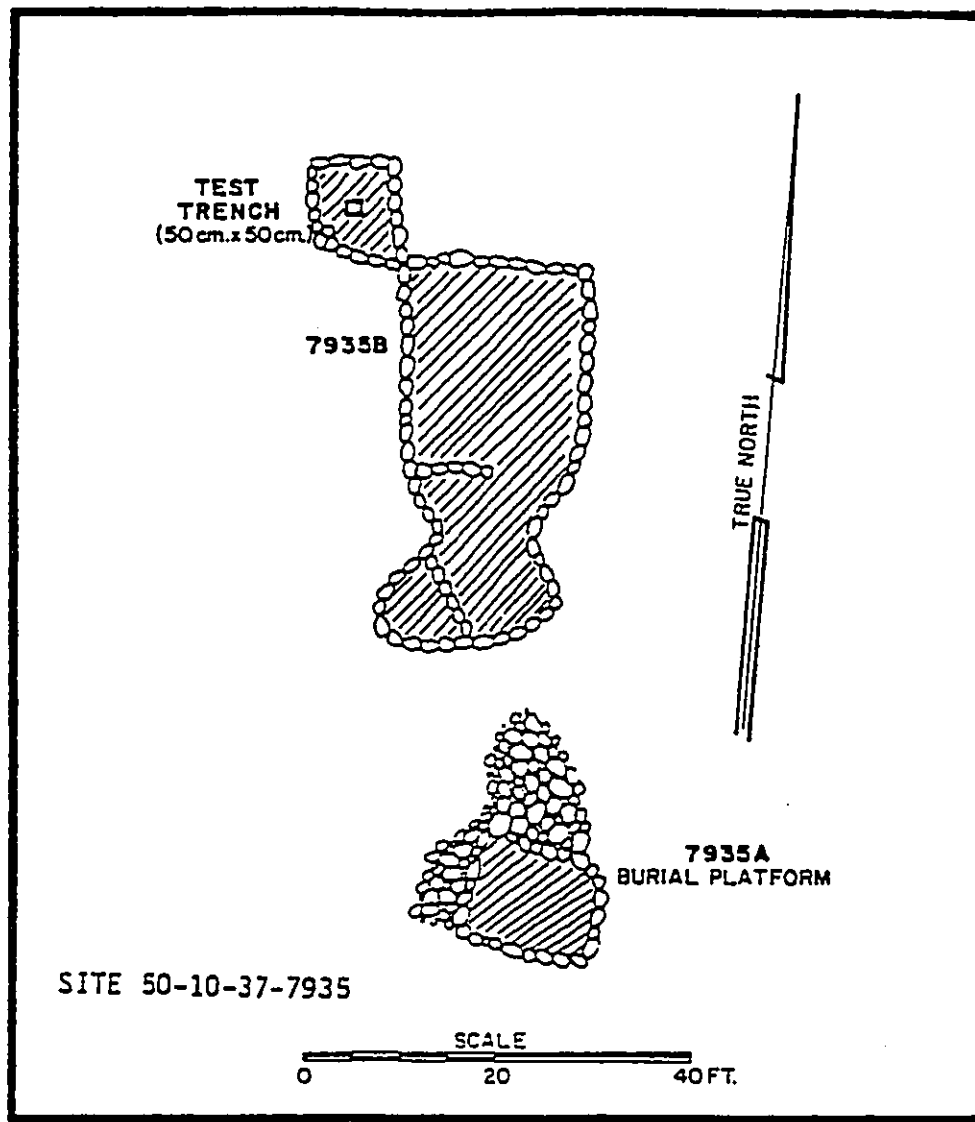


Figure 6. Site 7935, (From Hammatt et al. 1981)

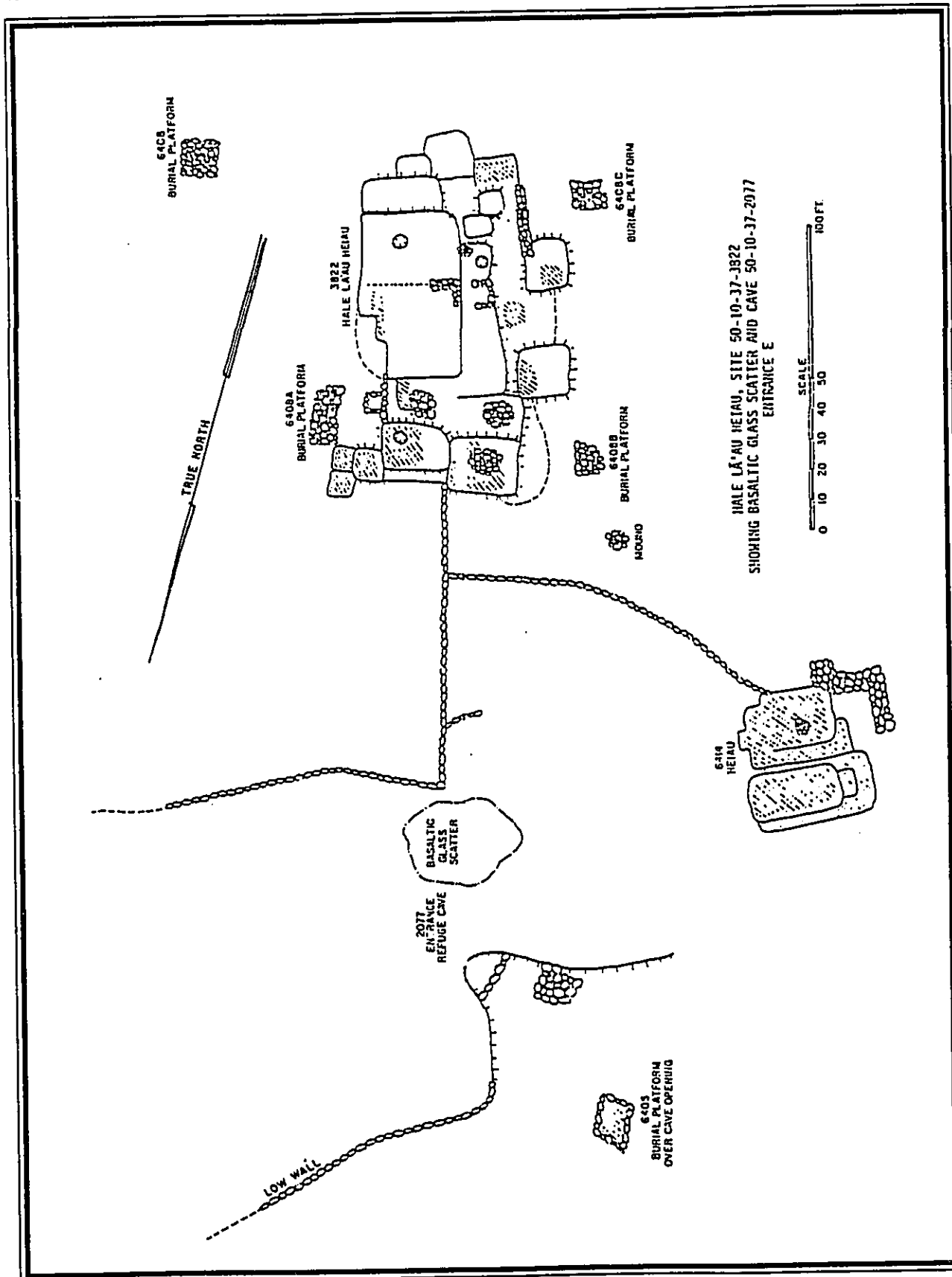


Figure 7. Site 3822 (From Hammatt et al. 1981)



Figure 8. Site 7666, Cart Road; View to SW (Neg.961-27a)

Hommon and Rosendahl (1983:110), Site 7666 may be a remnant of a 19th or early 20th century road called Makole'a Road.

Boundary

Site 7939 (4.65% of total) (Figure 9) is typical of the boundary sites in the project area. It consists of a probable prehistoric wall located a short distance north of another possible boundary wall that was recorded in 1980, by Hammatt and Folk (Site 7942) (Hammatt and Folk 1980:148). The wall is faced with boulders and is filled with both boulders and cobbles. The feature originates just north of another possible boundary wall — Site 7942 (Hammatt and Folk 1980:148).

Agricultural Features

Agriculture features are common in the project area, represented by 81 separate features (or roughly 15.2% of the total). One agricultural complex is located at Site 11117 (Figure 10). This particular complex is composed of a wall (Feature A), two terraces (Features B and C), and a mound (Feature D). This feature complex may be a part of the Kona Field System which, as discussed in previous sections, has already been documented within the area. As Tomonari-Tuggle previously observed (Tomonari-Tuggle 1985:37):

...Agricultural features are ubiquitous across most of the inland landscape. Terrace walls, field clearance mounds, and modified outcrops occur in the broad area above the 500 foot elevation and in swales and gullies below that topographic contour...

Along the nearby Kamehameha III Highway Corridor, Crozier (1971a,b) also described, mapped, and excavated features thought to be components of the Kona Field System. Hydration-rind dates from several of these features indicate probable use by c. A.D. 1350.

Habitation-Refuge

Site 11143 (Figure 11) is a complex of features that are believed to represent the remains of both habitation and refuge activity. The site, which is located on a pahoehoe outcrop bench, on a moderate slope with a good view of the coast, incorporates three terraces, a lava tube, and a double C-shape structure. Feature C, the lava tube cave, is entered through an entrance in Feature B terrace via a narrow, restricted crawlway lined with well-stacked and faced boulders. The interior of the cave contained charcoal, bone, ecofacts, wood, coral, water-worn basalt and numerous additional artifacts. Several additional features indicative of habitation (such as, C-shape shelter-walls, small enclosures, linear walls, and firepits) were also observed at the site.

Indeterminate

Site 11116 is an example of a feature of indeterminate function, represented by 33 individual features (or approximately 6.2% of the total). The feature at this site is an enclosure associated with several Kona Field System features such as *kuaiwi* walls, terraces, clearing/planting mounds, and modified outcrops. It may have functioned as a habitation feature or an animal enclosure.

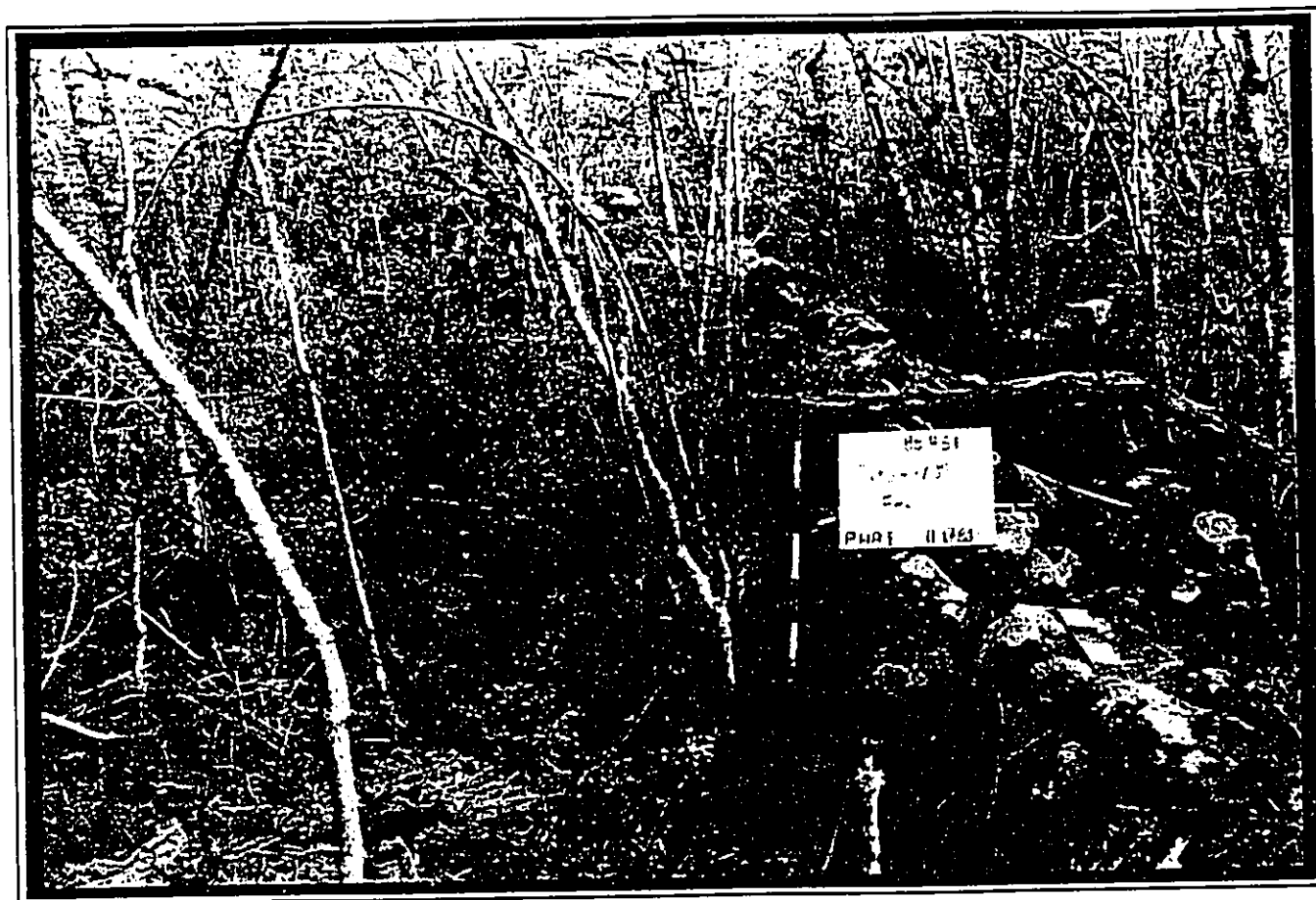


Figure 9. Site 7939, Boundary Wall; view to North (Neg.961-4a)

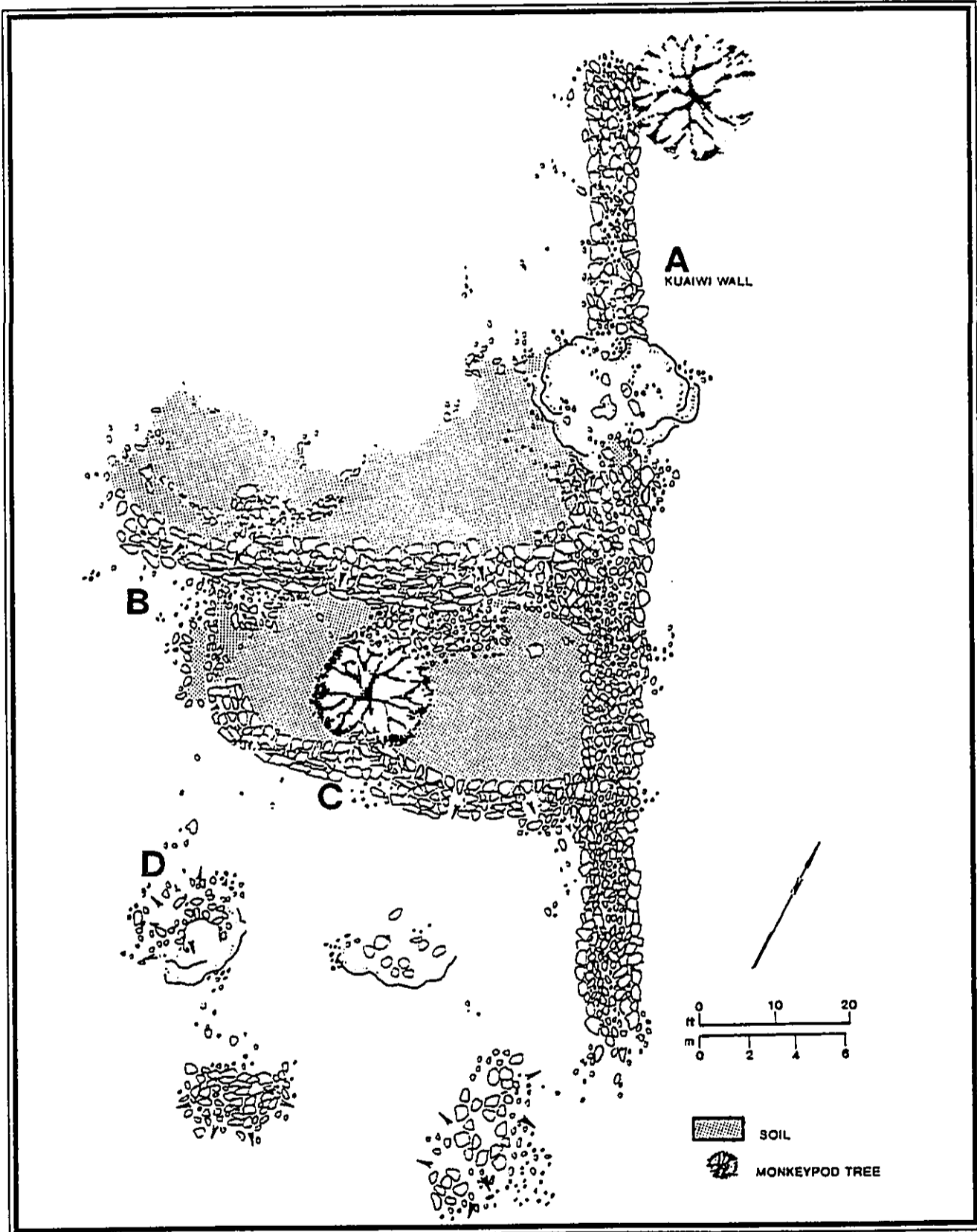
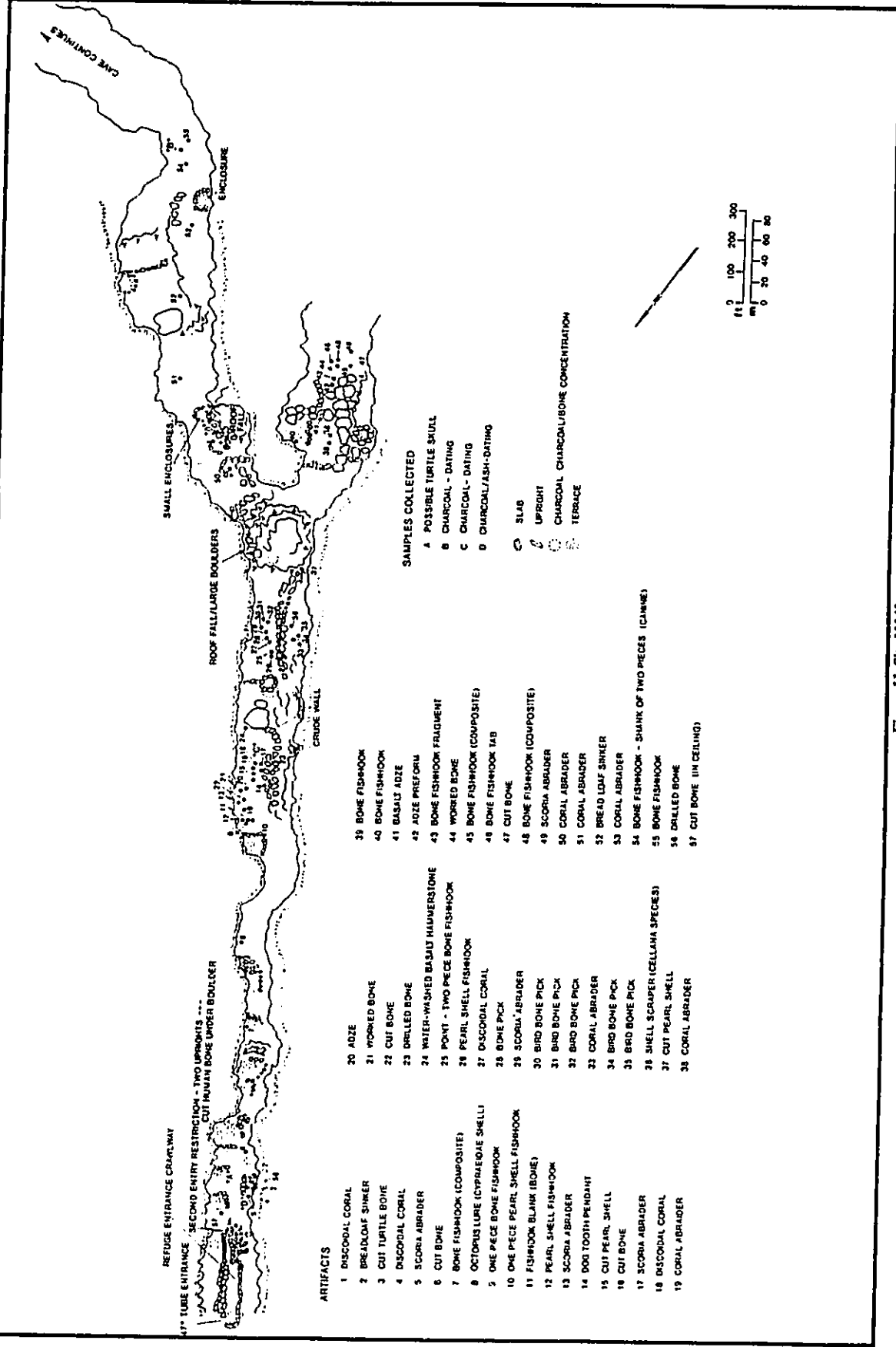


Figure 10. Site 11117



ARTIFACTS

- 1 DISCORDAL CORAL
- 2 BREADLOAF SHINER
- 3 CUT TURTLE BONE
- 4 DISCORDAL CORAL
- 5 SCORIA ABRADER
- 6 CUT BONE
- 7 BONE FISHHOOK (COMPOSITE)
- 8 OCTOPUS LURE (CYPRID/EGG SHELL)
- 9 ONE PEECE BONE FISHHOOK
- 10 ONE PEECE PEARL SHELL FISHHOOK
- 11 FISHHOOK BLANK (BONE)
- 12 PEARL SHELL FISHHOOK
- 13 SCORIA ABRADER
- 14 DOG TOOTH PENDANT
- 15 CUT PEARL SHELL
- 16 CUT BONE
- 17 SCORIA ABRADER
- 18 DISCORDAL CORAL
- 19 CORAL ABRADER

- 20 ADZE
- 21 WORKED BONE
- 22 CUT BONE
- 23 DRILLED BONE
- 24 WATER-WASHED BASALT HAMMERSTONE
- 25 POINT - TWO PEECE BONE FISHHOOK
- 26 PEARL SHELL FISHHOOK
- 27 DISCORDAL CORAL
- 28 BONE PICK
- 29 SCORIA ABRADER
- 30 BIRD BONE PICK
- 31 BIRD BONE PICK
- 32 BIRD BONE PICK
- 33 CORAL ABRADER
- 34 BIRD BONE PICK
- 35 BIRD BONE PICK
- 36 SHELL SCRAPER (CELLANA SPECIES)
- 37 CUT PEARL SHELL
- 38 CORAL ABRADER

- 39 BONE FISHHOOK
- 40 BONE FISHHOOK
- 41 BASALT ADZE
- 42 ADZE PREFORM
- 43 BONE FISHHOOK FRAGMENT
- 44 WORKED BONE
- 45 BONE FISHHOOK (COMPOSITE)
- 46 BONE FISHHOOK TAB
- 47 CUT BONE
- 48 BONE FISHHOOK (COMPOSITE)
- 49 SCORIA ABRADER
- 50 CORAL ABRADER
- 51 CORAL ABRADER
- 52 BREAD LOAF SHINER
- 53 CORAL ABRADER
- 54 BONE FISHHOOK - SHUNK OF TWO PEECES (CANKNE)
- 55 BONE FISHHOOK
- 56 DRILLED BONE
- 57 CUT BONE (IN CEILING)

SAMPLES COLLECTED

- A POSSIBLE TURTLE SKULL
- B CHARCOAL - DATING
- C CHARCOAL - DATING
- D CHARCOAL/ASH-DATING
- SLAB
- UPRIGHT
- CHARCOAL CHARCOAL/BONE CONCENTRATION
- TERRACE

Figure 11. Site 11143

DATA ANALYSES

AGE DETERMINATIONS

Objectives and Methods

The purpose of age determination analysis is to provide initial chronological data to aid in assessing the relative significance of sites in a project area. Six samples of charcoal were chosen from surface charcoal deposits within Sites 2077, 4659, 11143 and 11194 for age determination using radiocarbon analysis. Samples were selected based on the amount and nature of datable material present, stratigraphic context, and overall distribution within the project area. The samples were submitted for radiocarbon analysis to Beta Analytic Inc. of Miami, Florida.

Using standard procedures, the samples were pretreated with an acid, alkali, acid series of soakings to remove carbonates and humic acids. After pretreatment, samples were combusted to form carbon dioxide gas, combined with lithium to separate the carbon, and hydrolized for conversion to liquid form. The liquid was then catalyzed to form benzene and placed in a liquid scintillation counter to determine the amounts of carbon-13 and carbon-12. The isotope values obtained during the counting process were then used to calculate the carbon-13/ carbon-12 ratio for each sample, with the final result being determined relative to international standards in order to reduce errors produced by carbon isotope fractionation. Processing of the six samples proceeded normally.

In addition to the six samples submitted for radiocarbon analysis, 20 pieces of volcanic glass obtained from the surface of Sites 2077, 11144, 11170, 11174 and 11184, and from general surface collections, were submitted for hydration-rind dating to MOHLAB, State College, PA. Analytical procedures for hydration-rind dating are summarized in Michels (1986).

Results

The results of the radiocarbon age determination are summarized in Table 3. The age for each sample is reported as a range corresponding to the calendric age \pm two standard deviations. Ages were calibrated using the tables provided in Stuiver and Pearson (1986), which correct for variations in atmospheric carbon over time. Results for the hydration-rind age determinations are presented in Table 4.

As shown in Table 3, three of the samples: RC-426, RC-427, and RC-431, yield definitive age ranges after calibration,

while two produced multiple age ranges. Sample RC-431 yielded a modern result. Multiple ranges are caused by "flat" regions in the calibration curve, which correspond to periods when atmospheric carbon decreased at a rate greater than 1.2 ppm/ 10 years, resulting in more than one possible fit of a sample to the calibration curve. While multiple age ranges are more difficult to interpret archaeologically, detailed examination of the statistical curves, combined with evidence from artifactual material and feature stratigraphy, generally provides a means of selecting one age range as more probable than the others. Based on these criteria, the most likely age ranges for the samples are as follows: 1640-1900 AD for RC-428, 1633-1820 AD for RC-429, and 1800-1940 AD for RC-430. The three samples are derived from different surface areas at Site 11143, and correlate well with the ages of surface deposits across the site.

Results for the hydration-rind method were more equivocal (Table 4). Although rind measurements were made for all of the samples except No. 927, lack of definitive association of samples with specific source areas made determination of calendric ages for the samples impossible. The results are included in this report in the hopes that these sources may be identified by future research, but are not intended to add information to the current study.

Discussion

The results of the age determination analysis span a 950-year period extending from AD 1000 to the present (present = AD 1950). Within this period, the results from specific samples can be grouped into three clusters. The first cluster comprises samples with prehistoric age ranges (1000-1660 AD), and consists of samples RC-426, from Site 2077, and RC-427, from Site 4659. Sample RC-446 is associated with four volcanic glass flakes, while RC-427 was not associated with artifacts or ecofactual remains.

The second cluster consists of samples RC-428 and RC-429, from Site 11143, both of which yielded age ranges spanning the late prehistoric to early historic period (AD 1633-1900). Artifacts collected from the surface of Site 11143 include a variety of indigenous fishing gear, tools, domestic items and artifacts of uncertain function, suggesting either that the deposits date to the early part of this age range, or that there has been post-depositional disturbance of the site.

The third cluster consists of those samples with historic age ranges (post-1790) and includes samples RC-430, from

Table 3.

SUMMARY OF RADIOCARBON AGE DETERMINATIONS

PHRI Lab. No. RC-	Lab. No. BETA-	Provenience	C-14 Age Yrs. BP (one sigma)	C-13/ C-12 Ratio	C-13 Adjusted C-14 Age Yrs. BP	*Calendric Range Yrs. BP
Site 2077 426	29032	Surface	390+80	-25.3	380+80	1410-1660
Site 4659 427	29033	Surface	860±90	-25.1	860±90	1000-1280
Site 11143 428	29034	Area B, surface	200±50	-26.5	180±50	1640-1900 1900-1955 [#]
429	29035	Area C, surface	240±50	-26.8	210±50	1528-1555 1633-1704 1720-1820 1830-1879 1916-1955 [#]
430	29036	Area D, surface	90±50	-25.4	80±50	1672-1757 1800-1940 1955 [#]
Site 11194 431	29037	Surface	100.4±0.7% Modern	-25.5	100.5±0.7% Modern	

* Calibrated according to Stuiver and Pearson (1986). Range at two sigmas.
 # Denotes influence of bomb C-14

Table 4.

SUMMARY OF HYDRATION-RIND AGE DETERMINATIONS

PHRI Lab No. VG-	MOHLAB Lab No. 89-	Source*	Provenience	Hydration Rind Thickness (microns)
918	19	P	General surface collection	5.40/4.96 ± 0.08
919	20	P	General surface collection	4.28 ± 0.11
920	21	P	General surface collection	5.08 ± 0.08
921	22	P	General surface collection	3.72 ± 0.06
922	23	O	General surface collection	R 3.90 ± 0.60
923	24	P	Site 2077, surface	10.95/1.43 ± 0.08
924	25	P	Site 2077, surface	4.02 ± 0.08
925	26	P	Site 2077, surface	4.00/4.62 ± 0.13
926	27	P	Site 2077, surface	3.75 ± 0.08
927	28	P	Site 11144, surface	—
928	29	P	Site 11170, surface	4.23 ± 0.07
929	30	P	Site 11170, surface	5.00/2.88 ± 0.10
				R 3.20 ± 0.50
930	31	P	Site 11170, surface	3.35 ± 0.07
931	32	P	Site 11170, surface	1.75 ± 0.12
932	33	P	Site 11170, surface	5.08/1.96 ± 0.08
933	34	P	Site 11170, surface	3.02 ± 0.12
934	35	O	Site 11170, surface	3.89 ± 0.08
935	36	O	Site 11174, surface	4.46 ± 0.10
936	37	P	Site 11184, surface	4.21 ± 0.08
937	38	P	Site 11184, surface	5.57

* P = Puu'waa'waa; O = Oahu

Site 11143 and RC-431, from Site 11194. As noted above, samples from the surface of Site 11143 were associated with a range of indigenous items, suggesting either an occupation dating to the early portion of the historic period, or historic-period disturbance of earlier deposits. Sample RC-431 was not associated with artifacts or ecofactual remains.

Based on the results of the age determination analysis, initial occupation of the project area occurred during the prehistoric period, possibly beginning as early as AD 1000, at Site 4659. Site 2077 also appears to have been occupied during the prehistoric period, but given the lack of overlap between the age ranges for samples RC-426 and RC-427, was most likely not contemporaneous with use of Site 4659. Given the early dates derived from the surface of these sites and the general scarcity of remains, it is likely that these sites represent short-term camps rather than a longer-term or more permanent settlement. Verification of site function and identification of remains associated with initial use of each site must await excavation, however. Occupation of Site 11143 occurred during the late prehistoric to early historic period, and based on the variety of indigenous artifacts collected from the surface, was settled by native Hawaiians rather than *haoles*. Whether this occupation represents initial use of the site cannot be determined without evidence from excavation. Finally, remains on the surface of Site 11194 have been dated as modern, and provide little indication of earlier historic or prehistoric use of the site.

PORTABLE ARTIFACTS

A total of 81 artifacts was recovered from the project area, all of which are classified as indigenous artifacts (Appendix D). Indigenous artifacts are those fabricated using traditional Hawaiian manufacturing techniques and local raw materials (materials deriving from the Hawaiian Archipelago) and range in type from tools and fishing gear to various decorative or religious items. The inventory of indigenous artifacts from the current project area is fairly broad in content, and consists of fishing gear, tools, flaked stone artifacts, domestic implements, and a number of artifacts of uncertain function. A detailed tabulation of artifacts by deposit area is presented in Table 5. The results of the artifactual analysis are discussed below.

Fishing Gear

Twenty-four specimens of indigenous fishing gear were recovered from the project area during the current investigation. Most of the assemblage derives from Site 11143 and consists of 13 complete and fragmentary fishhooks, four

roughed-out fishhook tabs, one octopus lure, and two sinkers. Three octopus lures derive from Site 4653, and one octopus lure derives from Site 11161.

Fishhooks - The 13 fishhooks include four fishhook fragments and nine complete fishhooks. They range in type from one-piece jabbing and rotating hooks, and point or shank portions of two-piece hooks, to composite fishhooks. One-piece and two-piece fishhooks are classified according to the revised Coding System for Hawaiian Fishhooks devised by Sinoto (IN Kirch 1979:231-233). Composite fishhooks are classified according to a system developed by PHRI, based on Sinoto (1975). Classification codes for the fishhooks recovered during the current investigation are listed in Table 6, and are described below using terminology from Emory, Bonk, and Sinoto (1959:8-9).

Four of the complete fishhooks and all of the fragments are classified as one-piece fishhooks. One-piece fishhooks were fashioned as either jabbing or rotating hooks depending on the fisherman's intended catch strategy (Johannes 1981:113). Jabbing hooks are those in which the point is straight or slightly outcurved or incurved, so that if extended, the point would intersect the shank between the head and upper third portion of the shank. Rotating hooks are hooks in which the point is incurved so that its extension would intersect the shank somewhere in its lower two-thirds. Of the nine one-piece fishhook specimens, two of the complete fishhooks and one fishhook fragment are rotating hooks, while the remaining complete fishhooks and fishhook fragments are jabbing hooks.

All of the rotating hooks are manufactured from animal bone. The two complete rotating hooks have incurved points, while the fragment has a circular shank and point. One of the complete rotating hooks and the hook fragment have diagnostic circular bends, whereas the other complete hook has a U-shaped bend. All three specimens lack barbs.

One complete jabbing hook and two of the fragments are manufactured from pearl shell. The complete pearl shell hook has a tipped-out point, no barb, and a diagnostic U-shaped bend. The shank head is flat on top, with definite notches on the upper surface and outer edge that produce a distinct knob. Of the pearl shell fragments, one consists of the shank and bend portion only, while the other has a U-shaped bend and no barb. Neither fragment retains the shank head.

The two remaining complete jabbing hooks and fishhook fragment are composed of animal bone. One of the complete bone hooks has an inner point barb, a U-shaped

Table 5.

SUMMARY OF PORTABLE ARTIFACTS

Category	2077 Surf.	4653 Surf.	11143 Surf.	11144 Surf.	11161 Surf.	11170 Surf.	11174 Surf.	11184 Surf.	Surf.	Grand Total
Indigenous										
Fishing Gear										
Bone										
Fishhook	-	-	10	-	-	-	-	-	-	10
Roughed-out tab	-	-	4	-	-	-	-	-	-	4
Shell										
Fishhook	-	-	3	-	-	-	-	-	-	3
Octopus lure	-	3	1	-	1	-	-	-	-	5
Sinker (basalt)	-	-	2	-	-	-	-	-	-	2
Subtotal Fishing Gear	0	3	20	0	1	0	0	0	0	24
Tools										
Abrader										
Coral	-	-	6	-	-	-	-	-	-	6
Scoria	-	-	5	-	-	-	-	-	-	5
Adze (basalt)	-	-	3	-	-	-	-	-	-	3
Hammerstone (basalt)	-	-	1	-	1	-	-	-	-	2
Subtotal Tools	0	0	15	0	1	0	0	0	0	16
Flaked Stone										
Volcanic glass										
Core	1	-	-	-	-	1	-	1	-	3
Flakes	3	-	-	1	-	6	1	1	5	17
Subtotal Flaked Stone	4	0	0	1	0	7	1	2	5	20
Domestic Implements										
Pick (bone)	-	-	6	-	-	-	-	-	-	6
Scraper (shell)	-	-	1	-	-	-	-	-	-	1
Subtotal Domestic Implements	0	0	7	0	0	0	0	0	0	7
Uncertain Function										
Bone										
Cut	-	-	3	-	-	-	-	-	-	3
Drilled	-	-	2	-	-	-	-	-	-	2
Modified	-	-	3	-	-	-	-	-	-	3
Shell										
Cut	-	-	1	-	-	-	-	-	-	1
Modified	-	-	1	-	-	-	-	-	-	1
Coral										
Modified	-	-	4	-	-	-	-	-	-	4
Subtotal Uncertain Function	0	0	14	0	0	0	0	0	0	14
Total	4	3	56	1	1	7	1	2	5	81

Table 6.

CLASSIFICATION OF FISHHOOKS FROM SITE 11143

Condition Code*	Classification Type	Head (mm)	Material (mm)	Shank Length (mm)	Point Length	Width
Complete	IA1U(2)a	HT4b	bone	24.16	15.24	14.44
Complete	IA2U(1)b	HT4b	pearl shell	26.02	11.60	20.90
Complete	IA3V(1)a	HT4b	bone	20.44	13.37	10.32
Complete	IB2Q(1)a	HT4b	bone	12.26	6.37	7.66
Complete	IB2U(1)a	HT4b	bone	35.28	22.52	19.76
Fragment	S-IA(a,b,c)a	HT4b	bone	17.18	-	-
Fragment	S-IA(b,c)b	-	pearl shell	-	-	-
Fragment	S-IAU(1)(b,c)b	-	pearl shell	-	-	-
Fragment	S-IB4(1)(b,c,d)a	-	bone	-	11.32	9.52
Point	IIB2E1b1(1)a	-	bone	-	35.48	16.45
Shank	IIB4E1b1(1)a	HT1d	bone	43.94	-	17.04
Shank	IIB4E1b1(1)i	HT1d	dog tooth?	38.14	-	12.04
Point	IIB1E3(1)a	-	bone	-	47.82	31.80

*Coding Systems for Hawaiian Fishhooks, by Y.H. Sinoto, IN Kirch, P.V. 1979:231-233

bend, with the point parallel to the shank. The second complete bone fishhook has a V-shaped bend, no barb, and a slightly incurved point. The bone jabbing-hook fragment consists of the head, shank, and part of the bend. All three bone jabbing-hooks have shank heads that are flat on top, with definite notches on the upper surface and outer edge, producing a distinct knob.

Three two-piece fishhooks were also recovered from Site 11143. Two-piece fishhooks are hooks in which the point and shank are manufactured as two separate pieces, usually of the same raw material, which are then lashed together at their bases. It has been conjectured that two-piece fishhooks were created to reduce the problem of breakage caused by stress in the bend portion of one-piece fishhooks. Various head types and base types were created to facilitate lashing, and barbs were sometimes added to the inner or outer point, or to the shank. All three of the two-piece fishhooks in the current assemblage are of the separate point and shank type; no crescent points were found. Two of the specimens are shanks, one of which is manufactured from dogtooth (*Canis familiaris*); the other is made from animal bone. Both are massive and straight, with a pronounced knob on the outer edge of the base, a flat inner edge, and no barb. The head portions of both specimens are sloped markedly upward, from outer to inner

edge, with an outside notch that produces a projection resembling a knob. The third specimen is a point made from animal bone. The point is incurved and massive, with a pronounced knob on the outer base, a flat inner edge, and no barb.

The composite fishhook from Site 11143 is the point of an octopus lure point. The specimen is composed of animal bone, has an outer base knob with a triangular base end, and no barb. Octopus lure hooks are composites that consist of a point and shank, generally manufactured from wood, which are lashed together at the base and attached to a hackle. A perforated cowry shell (*Cypraeidae*), or octopus lure, is tied to one side of the toggle assembly, while a basalt sinker is attached to the opposing side of the toggle.

Fishhook Tabs - Four roughed-out fishhook tabs were also encountered on the surface of Site 11143. Fishhook tabs are categorized according to their manufacturing stage following terminology outlined by Sinoto (1975). Roughed-out tabs represent the first stage of manufacture, and were prepared by filing or sawing larger pieces of bone or pearl shell into sizes and shapes appropriate for the desired fishhook. They are usually triangular or rectangular, with rather rough edges and angular corners. All four of the roughed-out tabs in the fishing gear assemblage are rectangular tabs

manufactured from mammal bone; they range in size from 20-48 mm long by 12-22 mm wide.

Octopus Lures - One octopus lure was encountered in the deposit at Site 11143 and may be part of the same composite hook assembly as the octopus lure hook-point described above. The specimen is a complete cowry shell measuring 55 mm long, with two small perforations on opposing sides of the dorsal surface. Four other octopus lures are included in the assemblage, three from Site 4653, and one from Site 11161. The specimens from Site 4653 are all partial cowry shells, each measuring 65-70 mm long, with notches indicating the area of perforation on the dorsal surfaces. The octopus lure from Site 11161 is a complete cowry shell that has been bleached by exposure to the sun. It measures 70 mm long and has two opposing perforations on its dorsal surface. As described above, octopus lures were lashed to the shank and toggle of octopus lure hooks.

Sinkers - The final specimens of fishing gear are two breadloaf sinkers from the surface of Site 11143. The term "breadloaf" describes the shape of the sinker in plan-view, in contrast to the "coffee bean" shape also manufactured with octopus lure assemblies. Both sinkers are manufactured from vesicular basalt. The first measures 75 mm by 45 mm by 35 mm, while the second measures 70 mm by 50 mm by 45 mm. Both breadloaf and coffee bean sinkers were lashed to the shank of octopus lure hooks and provided a surface for the attachment of the cowry shell lures.

Tools

Sixteen tools were encountered in the project area during the current investigation. The entire tool assemblage, with the exception of one hammerstone from Site 11161, derives from the surface of Site 11143, and consists of 11 abraders, three adzes and two hammerstones.

Abraders - Coral and scoria abraders are evaluated according to their overall shape in plan view, following the classification system and nomenclature set forth by Suggs (1961) to describe coral abraders found at Nuku Hiva in the Marquesas Islands, French Polynesia. In this system, abraders are either informal, meaning that the shape of the raw material is dominant; or formal, indicating that the characteristics of the raw material have been extensively modified by use. Cross-sections are generally taken perpendicular to a line between the tip and butt of the abrader, while the number of abrasion faces is indicative of preferential abrasion on a given surface.

Six of the abraders are manufactured from coral, and include one fragment and five complete specimens. The first

specimen (Acc. 26) measures 51 mm by 25 mm by 10 mm, and is the tip and midsection of a formal abrader. It is lenticular in cross section, with an irregular shape, and has three abrasion faces. The second specimen (Acc. 40) measures 95 mm by 45 mm by 15 mm, and is a complete, formal abrader. It has a long-triangular shape in plan view, three abrasion faces, and is lenticular in cross section. The third specimen (Acc. 45) measures 90 mm by 35 mm by 20 mm, and is also a complete, formal abrader. It has a blunt shape in plan-view, three abrasion faces, and is obtuse-triangular in cross section. The fourth coral specimen (Acc. 57) measures 80 mm by 70 mm by 30 mm, and is a complete formal abrader. It has a short-triangular shape in plan-view, four abrasion faces, and is convex-lateral in cross section. The fifth coral specimen (Acc. 58) measures 40 mm by 30 mm by 1.4 mm, and is a complete, formal abrader. It is blunt in plan-view, with two abrasion faces, and is lenticular-oval in cross section. The sixth coral abrader (Acc. 60) measures 28 mm by 18 mm by 12 mm, and is a fragment of an informal abrader. It has an indeterminate shape in plan-view, five abrasion faces, and is plani-lateral in cross section.

The remaining abraders are manufactured from scoria (highly vesicular basalt) and consist of two fragments and three complete abraders, all of which are formal. The first specimen (Acc. 12) measures 67 mm by 55 mm by 15 mm, and has numerous phenocrysts of mafic minerals filling the vesicles (amygdoidal texture). It has a short-triangular shape in plan-view, four abrasion faces, and is lenticular in cross section. The second specimen (Acc. 20) is a butt fragment measuring 45 mm by 55 mm by 15 mm; this specimen also has numerous mafic phenocrysts filling many of the vesicles. It has a short-triangular shape in plan-view, six abrasion faces, and is plano-convex in cross section. The third specimen (Acc. 24) is a tip-fragment measuring 90 mm by 55 mm by 20 mm, and is marked by numerous phenocrysts of olivine in the groundmass. It has a long-triangular shape in plan-view, four abrasion faces, and is rectangular in cross section. The fourth specimen (Acc. 36) measures 120 mm by 65 mm by 18 mm, and is a complete abrader. It has a blunt shape in plan-view, six abrasion faces, and is lateral in cross section. The fifth and final scoria abrader (Acc. 56) measures 83 mm by 50 mm by 15 mm, and is marked by numerous phenocrysts of olivine in the groundmass. It has a blunt shape in plan-view, six to eight abrasion faces, and is elliptical in cross section.

Prehistorically, coral was used to manufacture several sorts of tools, ranging from "rubbers" used to finish canoes and wooden bowls (Buck 1964), to saws or files used in the manufacture of bone and shell fishhooks (Emory, Bonk, and Sinoto 1968; Suggs 1961). The variety of shapes, edges, and worn surfaces represented by the abraders in the assemblage

suggests that the abraders served as multipurpose tools. Use of a particular surface over a period of time might generate a sawing or filing edge, which in turn would wear down during use to a new shape that could serve a new purpose. Scoria abraders may have been used in the same manner as coral abraders, but given their greater resistance and coarser texture, they would most likely have been used during the early stages of a task, or to shape materials that were themselves resistant to abrasion.

Adzes - The tool assemblage at Site 11143 also included three basalt adzes. Adzes are described according to a system developed by PHRI, based on work done by Craib (1977), which records attributes such as cross sectional shape, shape in plan view, poll shape, cutting edge morphology, number and placement of ground surfaces, bevels type and angle, nature of side surfaces, and presence or absence of tangs. Terminology follows Buck, Emory, Skinner, and Stokes (1930), except that "face" and "base" are substituted for "front" and "back."

The first specimen (Acc. 27) is a formal adze composed of aphanitic basalt, and measures 50 mm by 23 mm by 10 mm. It is ground on all five surfaces. The adze is rectangular in cross section, with flat sides and a square poll, and is tanged. The cutting edge is straight in both plan-view and cross section and is beveled on the lower face at a 30-degree angle. The second adze specimen (Acc. 48) is a formal adze composed of black, aphanitic basalt, and measures 80 mm by 32 mm by 12 mm. It is ground on all six surfaces. The adze is rectangular in cross section, with flat sides and a square poll, and is tanged. The cutting edge is straight, in both plan view and profile, and is beveled at an angle of 25 degrees on the lower face. The third adze specimen (Acc. 49) is an adze preform composed of aphanitic basalt, and measures 90 mm by 45 mm by 35 mm. It has six surfaces, none of which are ground. The preform is rectangular in cross section, with square sides, but it lacks a developed poll, cutting edge, and tangs.

Hammerstones - Two hammerstones were found in the project area, one on the surface of Site 11143 and one on the surface of Site 11161. The hammerstone from Site 11143 is a waterworn cobble of aphanitic basalt and measures 80 mm by 75 mm by 4 mm. It has two areas of concentrated peck marks as well as scattered peck marks on all faces; it is oval in both cross section and plan view. The hammerstone from Site 11161 is a cobble of porphyritic vesicular basalt and measures 100 mm by 70 mm by 55 mm. It has peck marks on the tip and butt portions, is irregular-to-oblong in plan view, and is irregular in cross section. Basalt hammerstones were probably used for a variety of tasks such as pounding and flaking in the manufacture of stone or coral implements, the

manufacture and rejuvenation of adzes, and in the manufacture of volcanic glass tools.

Flaked Stone

Twenty of the indigenous artifacts recovered from the project area are flaked stone artifacts. All of the flaked stone artifacts are composed of volcanic glass. By provenience, the flaked stone artifacts derive from Site 2077 (20%), Site 11144 (5%), Site 11170 (35%), Site 11174 (5%), Site 11184 (10%), and from a surface scatter encountered between Sites 3822, 2077, and 6406 (25%).

All flaked stone material is evaluated with respect to flake/core type. According to established criteria for evaluating flaked stone material, diagnostic flakes are defined as those flakes having a complete or partial striking platform and a bulb of percussion. Non-diagnostic flakes are fragments that lack the platform and/or bulb. Cores tend toward multifaceted polyhedral shapes dominated by one or more platforms, and typically show little evidence of subsequent use as tools. Primary cores exhibit only flake scars, while secondary cores are actually flakes with a bulb from which other flakes have been removed. Based on the above criteria, the 20 specimens of volcanic glass material can be classified as follows: one primary flake core, two secondary flake cores, 15 diagnostic flakes, and two non-diagnostic flakes.

Cores - The primary core derives from Site 11170 and measures 25 mm by 16 mm by 8.6 mm. The core is rectangular and multi-facial, with four discernible flake scars and three single striking-platforms. Edge damage and platform damage are absent. One of the secondary cores comes from Site 2077, and measures 12.6 mm by 10 mm by 2.5 mm. The core is polyhedral and multi-facial, with three discernible flake scars that are oriented bi-directionally. It has two single platforms, both of which have been damaged by crushing. Edge wear and cortex coverage are absent. The second of the two secondary cores derives from Site 11184 and measures 15 mm by 15 mm by 3 mm. The core is keeled and multi-facial, with five discernible scars oriented unidirectionally. It has one joint platform that exhibits damage from crushing. Edge wear and cortex coverage are absent.

Flakes - The diagnostic flakes range from 10-25 mm long and are triangular (5), trapezoidal (2), rectangular (2), plano-convex (1), and irregular (5) in cross section. Bulbs of percussion are diffuse (10) or sheared (5), while striking platforms are crushed (8) or unmodified (7). Four of the flakes exhibit evidence of use-wear and 13 flakes have edge damage. The non-diagnostic flakes both derive from the surface scatter between Sites 3822, 2077, and 6406. The first is 14.3 mm

long, rectangular in cross section, and has a diffuse bulb of percussion. The second flake is 11.3 mm long, irregular in cross section, and has a sheared bulb of percussion. Both non-diagnostic flakes have three flake scars, dorsal ridges, and ventral fissures. Edge damage is present on one flake, but neither shows evidence of use-wear.

Uses for volcanic glass artifacts have been suggested both by Barrera (1971) and Kirch (1973), who observed:

The possible functions ... are many and varied. Basaltic glass holds a fine, sharp edge and the tools make excellent cutting and scraping implements. They may have been used in food preparation, for cutting and scraping plant materials, or for delicate woodworking ... [t]hese artifacts are extremely common, being found in virtually every type of [Hawaiian] site. The suggestion, then, is that the ubiquitous basaltic glass flakes functioned as a prehistoric "pocketknife", to use a modern analogy... (1973: 185-6).

Domestic Implements

Seven domestic implements were found in the project area during the current investigation. The assemblage derived entirely from the surface of Site 11143 and consisted of six bone picks and one scraper.

Pick - Five of the picks are manufactured from bird bone, and range from 45 to 67 mm long. Articulated ends are present in three of these specimens. The sixth bone pick measures 100 mm long and is manufactured from mammal bone. The articular end is present. All of the pick specimens are formal and in good condition. Picks were commonly used to extract the meat from various shellfish.

Scraper - The scraper is manufactured from *Cellana* shell and measures 58 mm by 50 mm by 20 mm. It is informal and is abraded on approximately 10% of the perimeter surface. Titcomb (1978) notes that *Cellana* shells, without prior modification, were used as scrapers. The edge or perimeter surface was used for a variety of general scooping, scraping, and peeling tasks, often in food preparation.

Uncertain Function

Fourteen artifacts of uncertain function were encountered in the project area during the current investigation. The assemblage, which derives entirely from Site 11143, consists of eight bone artifacts (which have been modified by cutting, filing or drilling), two shell artifacts, and four specimens of modified coral.

Modified Bone - Eight modified bone artifacts manufactured from mammal bone were encountered in the project area. Acc. 23 is basically triangular, with one cut edge and one edge that has been filed and polished. It measures 26 mm by 23 mm by 8 mm, and may be a large roughed-out tab that was discarded before completion. Acc. 54 is a rectangle measuring 42 mm by 14 mm by 14 mm that has striations in several areas. Acc. 76 is the articular end of a large mammal bone that has been cut perpendicular to the long axis of the bone. The specimen has been hollowed out and scraped on the interior surface. Two pairs of holes have been drilled into opposing sides of the bone, halfway between the cut surface and the articular end, perhaps in preparation for fishhook manufacture.

Acc. 10 is a large convex segment of turtle shell/bone which has been cut on four sides to form an elongated rectangle. The artifact is polished on both the upper and lower faces, and measures 115 mm by 70 mm by 5 mm. One end has been beveled to form a cutting edge, while the opposing end is blunt, and straight in plan-view. Given its overall morphology, the specimen was most likely used as a specialized cutting tool. Acc. 21 is an extremely fragmented dog tooth, measuring 15 mm on its longest surface. The specimen is cut/broken in several places, possibly in preparation for pick manufacture or use as an ornament. Acc. 28 is a portion of the pelvis from a small to medium mammal and measures 75 mm by 4 mm by 7 mm. It has been ground and polished on all surfaces, possibly during use as a scraping tool, or as a raw material for the manufacture of another tool type.

The two remaining modified bone artifacts are fragments of mammal bone that have been drilled. They are virtually identical except for overall size, each consisting of a bone that has been perforated directly below the articular end. The larger of the two specimens measures 77 mm by 20 mm by 18 mm, while the smaller is 75 mm by 23 mm by 14 mm. The presence of the perforations directly below the articular end suggests that they were used to string the artifacts and that they were not drilled in preparation for the manufacture of other implements.

Modified Shell - The two shell artifacts are both manufactured from specimens of the taxon *Isognomonidae californicum*. Acc. 22 measures 62 mm by 48 mm by 7 mm, and has been cut or filed on the outer perimeter. The dorsal surface is charred, possibly indicating use as food prior to modification for tool use. The second specimen (Acc. 44) is extremely fragmented, but appears to derive from a shell of approximately the same size as the first specimen. Most of the fragments show natural breaks, but there are a few cut edges that may indicate preparation of the specimen for fishhook tabs.

Modified Coral - The modified coral artifacts include three specimens that have been shaped into spheres and one specimen that resembles a flattened sphere. One sphere that measures 55-60 mm in diameter, appears to have been used as a hammerstone and exhibits peck marks on all surfaces. The second sphere measures 45 mm in diameter, and has been drilled at the extreme upper surface, possibly for stringing and use as a sinker. The third sphere measures 50-55 mm in diameter and has been drilled in four places. The holes penetrate the sphere fairly deeply, but do not intersect the opposite face, and thus may have been made by small, burrowing animals rather than by human modification. The flattened sphere measures 43 mm in diameter by 23 mm thick, and is abraded on all surfaces. There are no peck marks or holes, such as those found on the other coral artifacts, suggesting that this artifact may have been used for a different purpose.

Discussion

In general, the artifact assemblage encountered during the current investigation suggests that prehistoric activities in the project area included manufacture of bone or shell artifacts, particularly the production of fishing gear. Stone tool manufacture and use is suggested both by the volcanic glass material and the hammerstones, and may have been accompanied by food processing and craft production that relied on the use of flaked stone tools. Domestic activity is also suggested by the variety of scrapers and multipurpose tools in the assemblage. The adzes, as well as some of the coral abraders, may indicate wood-working, such as canoe manufacture or the modification of gourds for drinking vessels. Finally, the picks indicate exploitation of shellfish, which was used both as a food source and as a raw material for fishhook manufacture.

ECOFACTUAL REMAINS

Objectives and Methods

Ecofactual remains are archaeologically significant because the variety and content of food remains contained within a given deposit provide useful information concerning prehistoric diet and resource utilization patterns. The analysis of ecofactual remains for inventory survey projects has two primary objectives:

1. To determine the variety and distribution of the remains for each cultural deposit within the project area; and
2. To provide an indication of dietary and resource exploitation patterns for each site, and for the project area as a whole.

All ecofactual remains recovered are analyzed in detail in the laboratory. Detailed analysis involves splitting the sample into two size classes by passing each sample through 1/4-in and 1/8-in mesh screens. One-hundred percent of the material retained in the 1/4-in screen is completely sorted at the lowest taxonomic level possible, while the material retained in the 1/8-in screen is inspected both for artifactual material and for taxa not encountered in the larger portion of the sample. Marine-shell identifications are verified and augmented using Kay (1979).

The sampling design outlined above is adapted from Kirch (1979), based on a series of experiments measuring the relative distribution of molluscan remains and bone retained on each screen. Kirch concluded that use of the screening process increased the speed of the sorting without affecting the accuracy or statistical validity of the overall analysis. The taxonomic distribution and weight of material retained on the 1/4 in screen should thus be considered as representative of the variety and relative percentages of each taxon present in the entire sample.

Results

Ecofactual remains were encountered on the surface of Sites 4653 and 11143 only, and consisted of 6.2 grams of *A. moluccana* (*kukui*) from Site 4653 and one turtle bone from the surface of Site 11143. While the presence of *A. moluccana* at Site 4653 may indicate that collection of terrestrial resources was part of prehistoric subsistence activities at that site, there are several uses of *A. moluccana* documented in the ethnological records of the Bernice P. Bishop Museum, ranging from the manufacture of *kukui* nut candles and torches to its use as a raw material in tapa manufacture. The turtle bone may indicate marine resource exploitation at Site 11143, but is more likely the result of natural deposition at the site.

CONCLUSION

SUMMARY OF FINDINGS

One of the primary objectives of the present project was to determine to the extent possible the functions and periods of use for project area sites and features. A total of 251 separate sites, comprising 36 functional types, were identified within the project area. These sites were discovered to contain a wide range of formal feature types; 43 separate formal types were recognized among the 532 features recorded (see Table 7, *Frequencies of Formal Feature Types*). Based on an evaluation of feature morphology, physical setting, associated portable remains, associated additional features, combined with extrapolations from the findings from other nearby areas, the 43 formal feature types were reduced to 14 general functional categories. These general functional interpretations include habitation, possible burial, agriculture, indeterminate, boundary, ceremonial, habitation-possible burial, marker, transportation, habitation-ceremonial, habitation-refuge, ceremonial-possible burial, storage, and quarry. Table 8 summarizes the frequencies and percentages of occurrence of the 36 functional site types within the project area. Examples of particular feature types have already been described in preceding sections, and complete details concerning all recorded sites and features are summarized in various tables and Appendix B.

Clearly, the archaeological landscape of the present project area is characterized by the integration of a high density and wide range of site and features types. These findings were fully expected on the basis of prior studies within Kahalu'u.

Project dating results conform generally with previous findings from the region. Specific findings from the present inventory survey work suggest more or less continuous occupation between about AD 1000 and the present. Although dating samples recovered during the current work were limited to those from surface contexts, the present results compare closely with findings from other Keauhou-Kona resort sites. Tomonari-Tuggle's (1985) summary of radiocarbon and hydration rind dates from a range of feature types at Kailua-Kona resort sites (including lava tube caves, terraces, boulder platforms, enclosures, midden deposits, pavements, and firepits), as well as radiocarbon age determination results from various nearby projects, document limited occupation of coastal sites by AD 1000 to 1100, with much more intensive use occurring by AD 1450. Intensive and extensive use of the major habitats continued through the latter part of the 18th Century, and then began to decline. However, additional absolute dates are needed in order to further evaluate varia-

tion in the intensity of use of the area during the most intensive period of occupation; i.e., between about AD 1400 and AD 1800. Thus, one of the proposed goals of additional data collection and data recovery work is to supplement the existing project's dating results with a much larger sample of absolute dates from a wider range of feature types.

DISCUSSION

Examination of the distribution of sites and features suggests a significant degree of patterning with respect to both cultural variables and non-cultural variables, such as elevation, geomorphology. In order to further assess the distribution of sites and features in relation to these variables, four functional feature types were selected for evaluation — habitation, agricultural, possible burial, and ceremonial features. The distribution of each functional category was first plotted onto the site location base map (Figure 4), and then the number of occurrences of each of the four feature types were calculated by elevation "zone." In the present case, elevation zones were arbitrary designations representing 60-foot increments, beginning at the lowest point within the project area, adjacent to Ali'i Drive (c. 80-feet above sea level) and proceeding east, to the upper limits of the project area, along Kamehameha III Highway and Kuakini Highway (c. 600 AMSL). Four separate distribution maps were then prepared (Figures 12 through 15, for agricultural, habitation, ceremonial, and possible burial feature types, respectively). Finally, 16 is a graphic plot of these results.

AGRICULTURAL FEATURES

Soils in the northern portion of the project area consist primarily of Punalu'u extremely rocky peat, a thin, organic soil which has developed over pahoehoe lava bedrock (Sato et al. 1973). While this soil occurs only in isolated pockets, it would have provided a suitable medium for planting. By contrast, the southern portion of the study area is composed of an "a'a lava flow emanating from Hualalai Volcano. The flow is less than 1000 years old (Moore et al. 1987:574) and therefore is not extensively weathered. In view of these differences in soil type and accumulation, it was considered somewhat more likely that agricultural features might be more heavily concentrated in the northern portion of the project area, and perhaps within the upper elevation zone,

Table 7.

FREQUENCIES OF FORMAL FEATURE TYPES

Formal Type	Number	%
Terrace	126	23.7
Platform	98	18.4
Mound	68	12.8
Modified outcrop	52	9.8
Enclosure	31	5.8
Wall	31	5.8
C-shape	18	3.4
Cairn	15	2.8
Cave	11	2.1
U-shape	11	2.1
Lava tube	8	1.5
Paved area	6	1.1
Double terrace	6	1.1
Pit	5	0.9
L-shaped wall	3	0.6
Lava blister	3	0.6
Platform remnant	3	0.6
Trail	3	0.6
Wall complex	3	0.6
C-shaped wall	2	0.4
Cart road	2	0.4
Depression	2	0.4
Lava tube cave	2	0.4
Platform remnant/mound	2	0.4
U-shaped wall	2	0.4
Walled platform	2	0.4
Boulder level area	1	0.2
Clearing area	1	0.2
Cupboard	1	0.2
Double C-shape	1	0.2
Filled depression	1	0.2
L-shape	1	0.2
Mound complex	1	0.2
Mound-filled crack	1	0.2
Pahoehoe excavation	1	0.2
Pavement	1	0.2
Retaining wall	1	0.2
Stepping stone trail	1	0.2
Terrace complex	1	0.2
Triple terrace	1	0.2
U-shaped pit	1	0.2
Walled terrace	1	0.2
Walled terrace complex	1	0.2
TOTAL	532	100.5

Table 8.

FREQUENCIES OF FUNCTIONAL SITE TYPES

Function Type	Number	%
Habitation	105	42.0
Possible Burial	30	12.0
Agriculture	21	8.4
Agriculture-Habitation	12	4.8
Boundary	11	4.0
Indeterminate	9	3.6
Habitation/Possible Burial	7	2.8
Ceremonial	6	2.4
Habitation-Possible Burial	5	2.0
Habitation-Indeterminate	4	1.6
Transportation	4	1.6
Agriculture/Possible Burial/Habitation	3	1.2
Marker	3	1.2
Habitation-Refuge	3	1.2
Possible Burial-Agriculture	3	1.2
Ceremonial/Possible Burial/Habitation	2	0.8
Agriculture/Indeterminate	2	0.8
Ceremonial-Possible Burial	2	0.8
Possible Burial/Indeterminate	2	0.8
Habitation-Agriculture-Indeterminate	1	0.4
Habitation-Agriculture-Indeterminate-Marker	1	0.4
Boundary-Possible Burial	1	0.4
Boundary-Transportation	1	0.4
Possible Burial/Habitation/Boundary	1	0.4
Possible Burial/Habitation/Boundary/Indet.	1	0.4
Possible Burial/Habitation/Marker	1	0.4
Habitation/Boundary	1	0.4
Habitation/Boundary/Transportation	1	0.4
Habitation/Possible Burial/Indeterminate	1	0.4
Habitation/Ceremonial	1	0.4
Habitation/Quarry	1	0.4
Marker/Boundary	1	0.4
Storage	1	0.4
Habitation/Ag./Possible Burial/Boundary	1	0.4
Habitation-Ceremonial/Habitation-Possible Burial	1	0.4
Habitation/Agriculture/Boundary	1	0.4
TOTAL	251	100.0

where rainfall might be somewhat higher. In fact, however, Figure 12 indicates that while agricultural features are found throughout the project area, they are most concentrated in three widely separated areas, only one of which—the extreme northeastern corner of the project area—was predicted by the initial hypothesis. In this area the number of agricultural features increases between about 500 and 560 ft elevation, this probably relates to an increase in available moisture at and above this elevation. The area of greatest concentration of agricultural features, however, is along the margins of a gulch that descends east-west through the southern one-third of the project area. Finally, the third "cluster" of agricultural features occurs near the extreme southwestern corner of the project area, in apparent association with a relatively high density of habitation features in this area.

HABITATION FEATURES

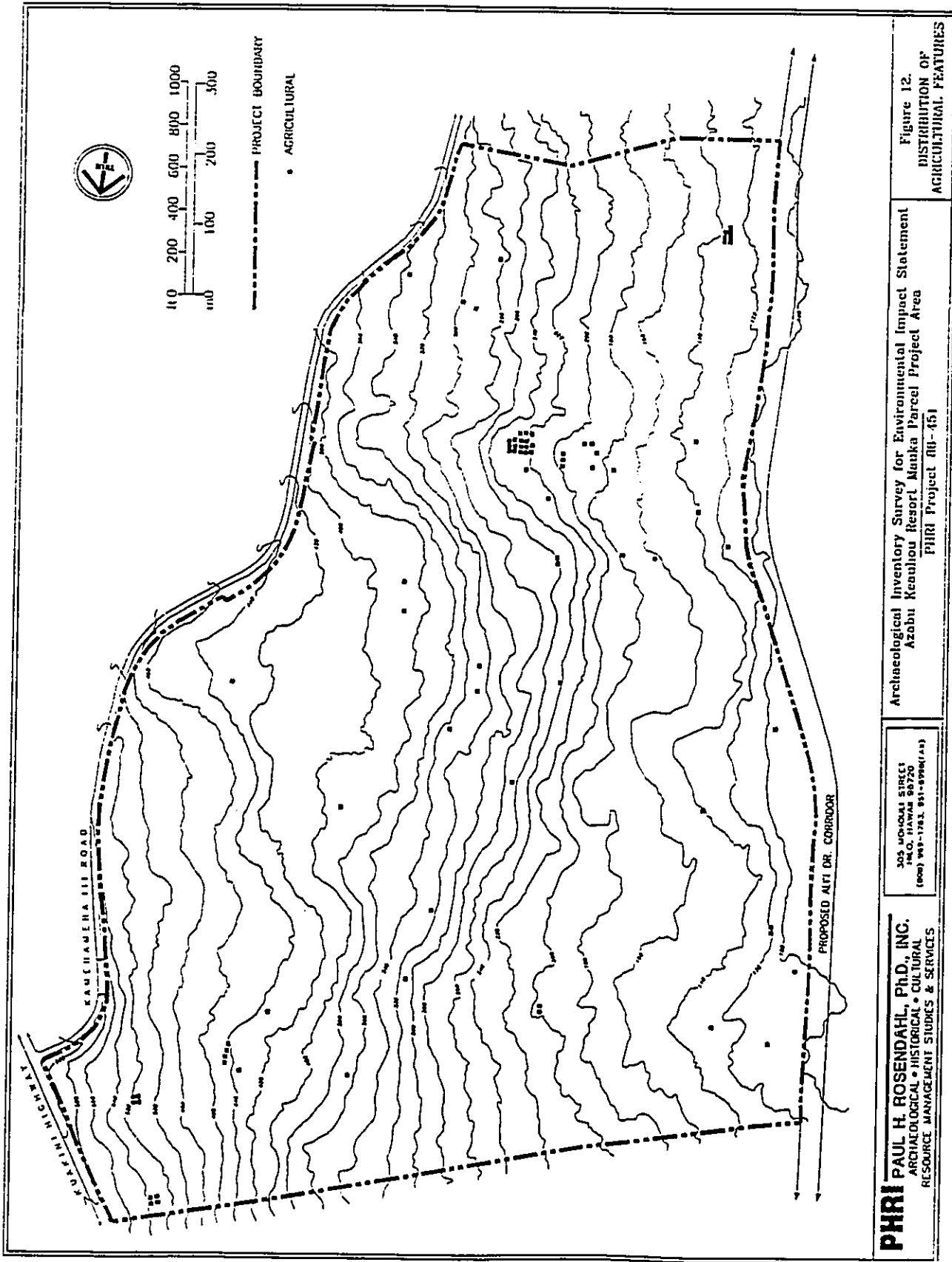
The property includes several ridge crests which offer an excellent view of the coast. These ridges are separated by more level areas within portions of which substantial soil has accumulated. It was considered likely that site density along the well-defined ridges would tend to be higher than site density within intervening lands, particularly as regards habitation and ceremonial features. In fact, the prediction is at least partially supported by the survey findings. Figure 13 documents an interesting, if somewhat predictable pattern of habitation feature distribution across the project area. There appear to be three primary areas of concentration. The highest density of habitation features occurs as a band paralleling Ali'i Drive and located within the westernmost portion of the project area (lowest elevation zone). Secondly, there is a particularly dense cluster of habitation features within the extreme southwestern corner of the property. These features clearly represent an inland extension of the dense habitation features that have already been documented seaward of Ali'i Drive (cf. Tomonari-Tuggle 1990). A second band of habitation features occurs between about 300-400 feet elevation. This band defines the approximate top of a well-defined series of ridge crests that are aligned roughly north-south across the project area. Finally, there is another cluster of habitation features between the lower and upper elevation bands, along both sides of the gulch system that passes east-west through the southern one-third of the project area. As noted above, this same gulch area was apparently the focus of intensive agricultural activity, as numerous agriculture-related features have been documented in the immediate vicinity of the gulch.

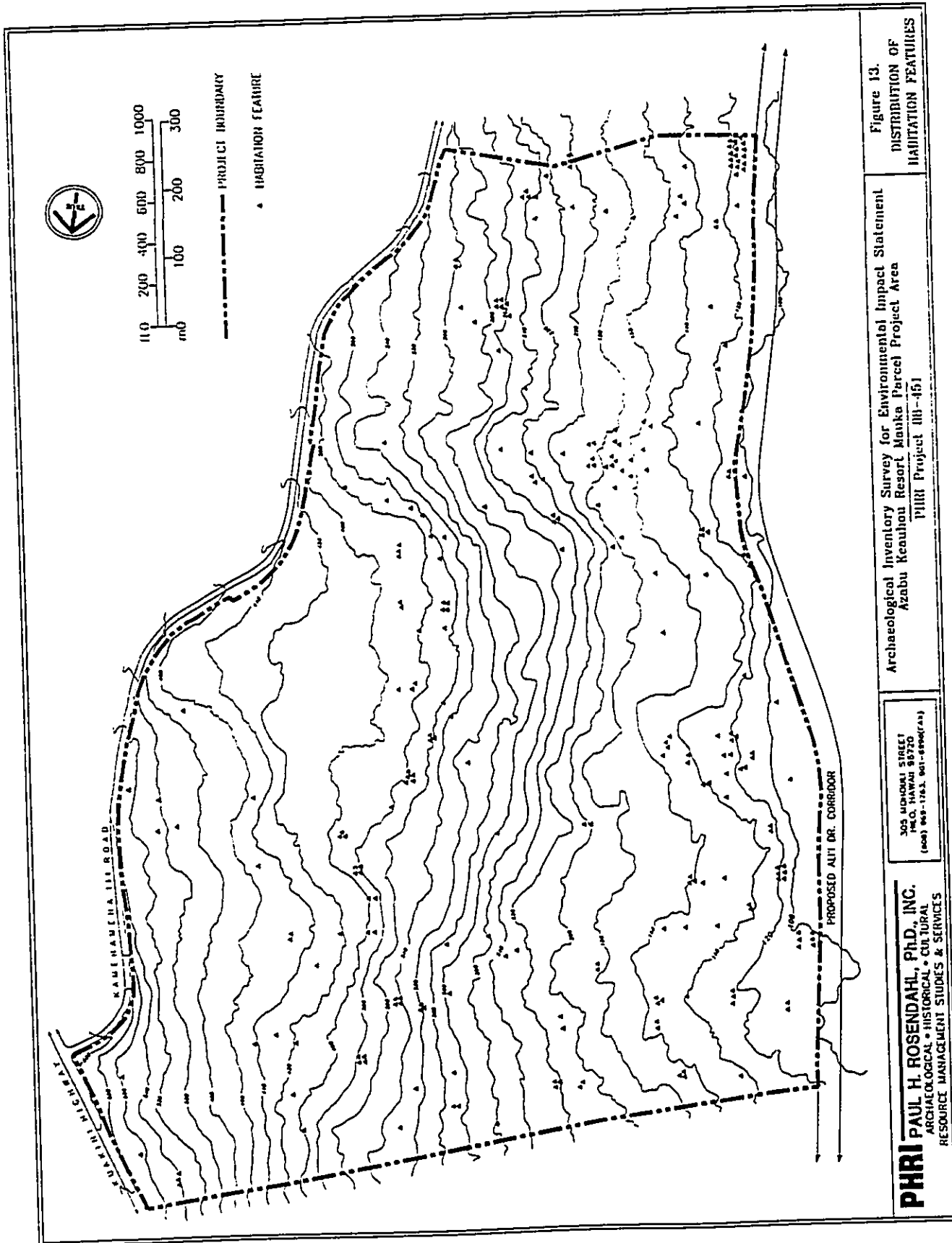
CEREMONIAL AND POSSIBLE BURIAL FEATURES

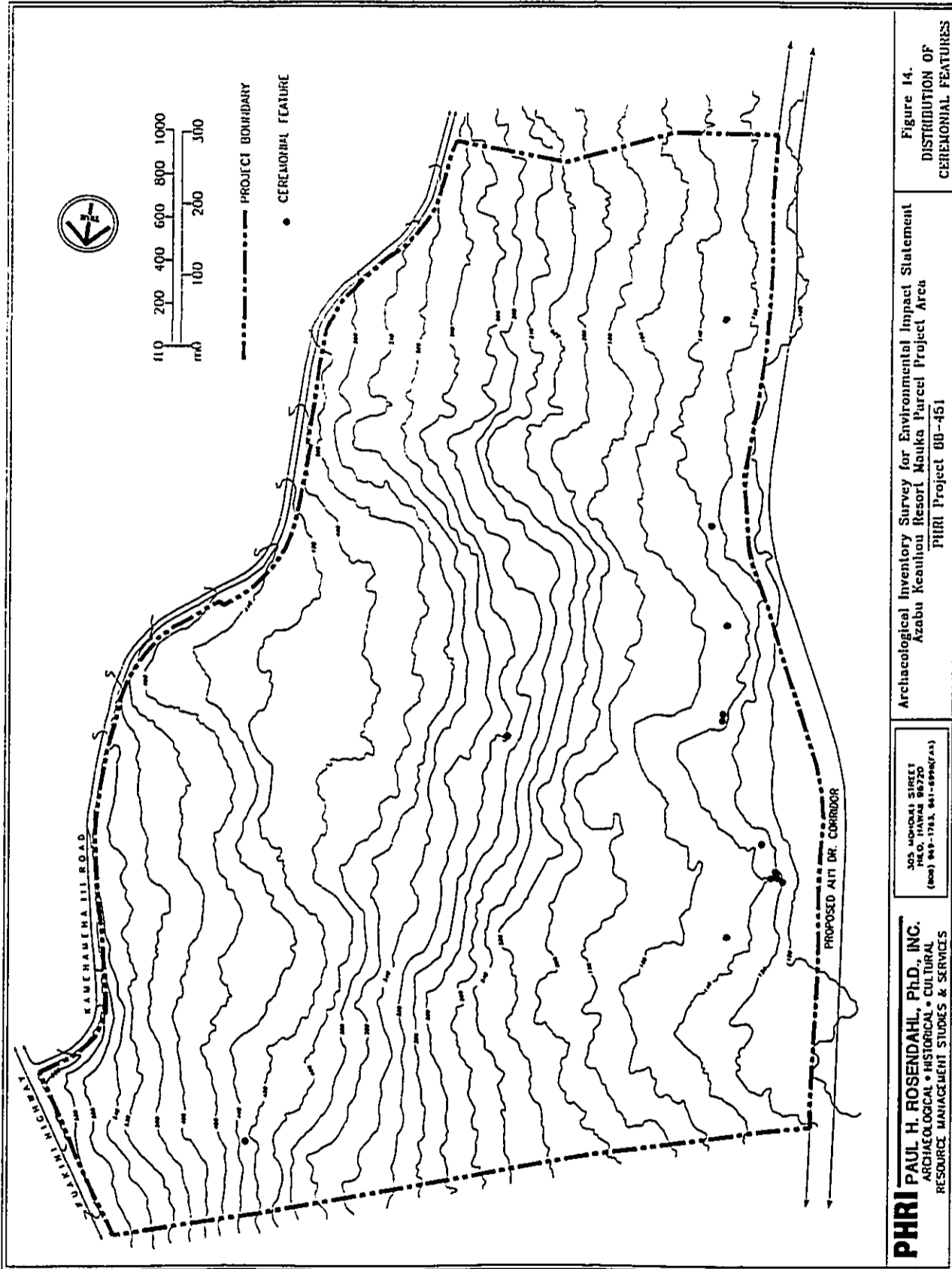
Ceremonial features occur most frequently at lower elevations of the project area, in apparent association, or at least in proximity to, the numerous habitation features within this area (Figure 14). The distribution of possible burial features is slightly different. They clearly co-occur with the numerous habitation features comprising the lower band of habitation locales, as well as in association with the habitation features located on the north side of the gulch system in the southern one-third of the property (see Figure 15). However, the possible burials co-occur much less frequently in association with the habitation features that compose the upper elevation band of habitation locales. This finding may indicate that the higher elevation areas may contain significantly fewer permanently occupied sites, and/or that they were much less intensively utilized.

The overall higher density among all categories of functional feature types within the lower, as opposed to upper, elevations of the current project area can be seen by examining the left side of Figure 16 graph, which clearly shows that the majority of all features occur below about 250 feet elevation and that the trend suggests a continuing increase in density as one proceeds toward the coastline. The increase in habitation features between 260 and 440 feet elevation is clearly visible in the graph, and is explained by the occurrence of the well-defined ridge system which dominates this zone.

Overall, site and feature types within the project area are distributed as would be expected based on ethnohistoric and other relevant information. Small, formal platforms and other habitation sites occur throughout the project area, but primarily along the ridges between swales (which were themselves utilized for agriculture) and in groups that were clearly coastal-oriented. Lava-tube caves that could have served a habitation function are scattered throughout the project area, and several of these were intensively utilized. Larger platforms and enclosure complexes (which suggest high status habitation compounds) tend to be concentrated within the lower elevation zones. Collectively, the findings suggest a densely populated settlement area that was oriented around Hakalu'u Bay, but which was clearly linked with supportive agricultural activities occurring inland, particularly along gulches and at higher elevations, where there was significantly more rainfall (i.e., above about 600 feet elevation). Lastly, while a large number of habitation features was found to co-occur with the upland agricultural features, the smaller number of possible burials and ceremonial features in direct







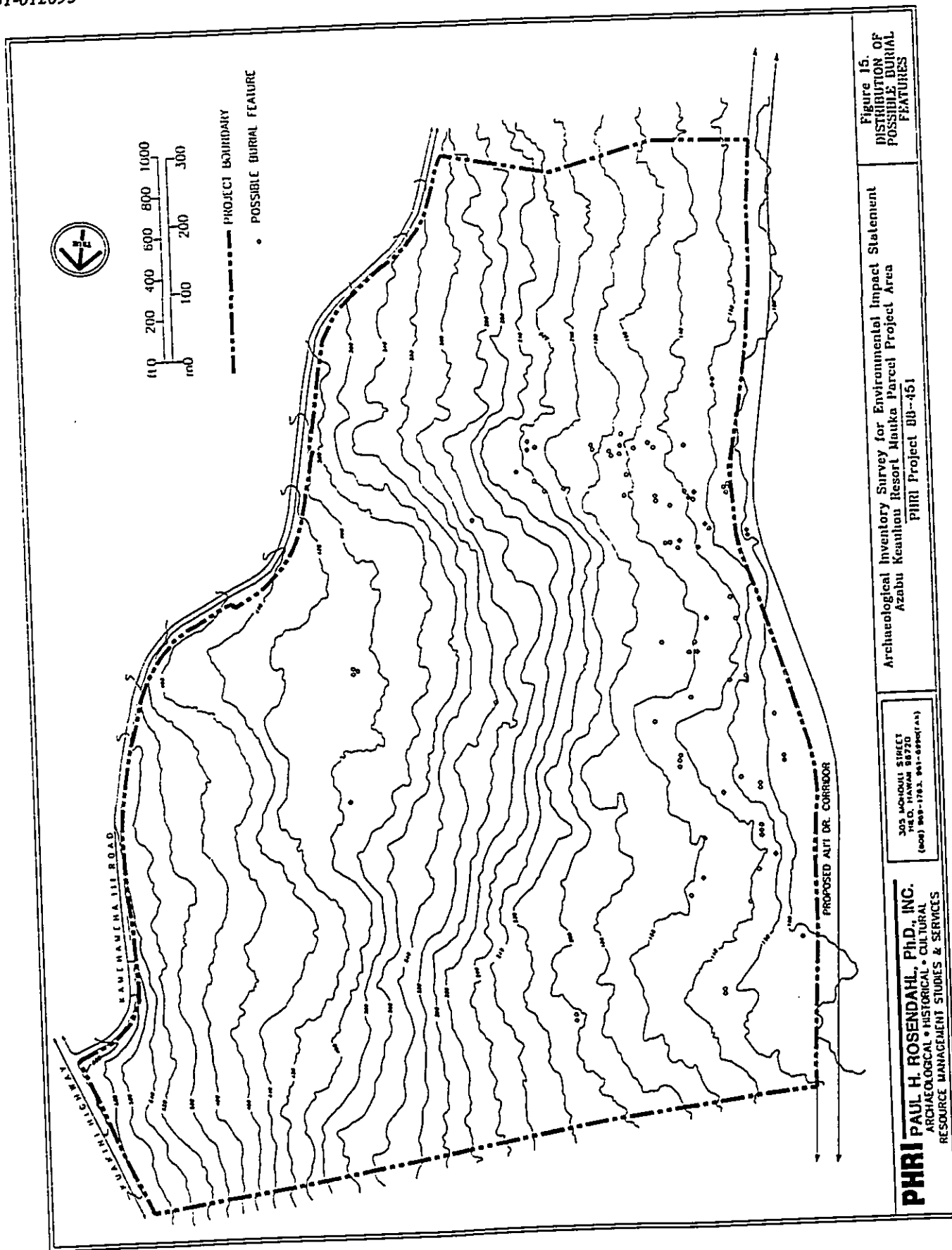


Figure 15.
DISTRIBUTION OF
POSSIBLE BURIAL
FEATURES

Archaeological Inventory Survey for Environmental Impact Statement
Azabu Keauhau Resort Mauka Parcel Project Area
PHRI Project 08-451

305 MOLOKAI STREET
SUVA, FIJI
(800) 848-1703, 841-0990 (FAX)

PHRI PAUL H. ROSENDAL, Ph.D., INC.
ARCHAEOLOGICAL • HISTORICAL • CULTURAL
RESOURCE MANAGEMENT STUDIES & SERVICES

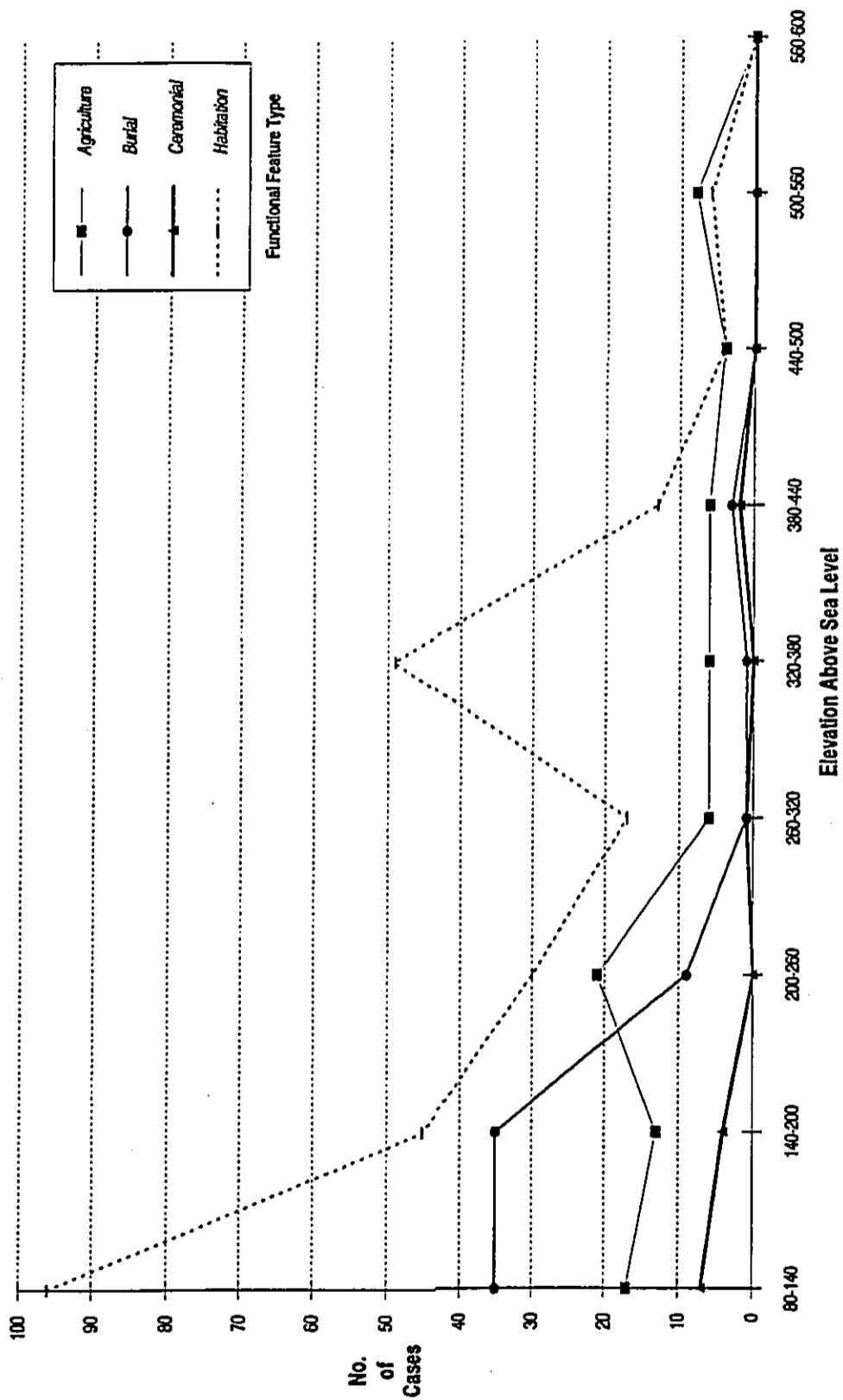


Figure 16. Summary of Distribution of Selected Feature Types by Elevation

association with inland habitation suggests less intensive use and performance of a narrower range of activities than characterized lower elevation habitation.

One final point should be made concerning the distribution of *heiau* sites in Kahalu'u. Reinecke's (n.d.) earlier description of the *heiau* of Kahalu'u suggests concentration of these features within five primary zones: along the beach front, just inland of the coast, at the approximate 300-400 foot contour, along the main road, and above the present Kuakini Highway. The present project area contains two of these, the land area located just inland of the coast and the ridge formations that dominate the project area between about 300-400 feet AMSL. Probable *heiau* features identified within these two areas include Sites 2077, 2078, 3822, 3823, 6341, 6391, 6395, 6396, 6414, and 7893 within the lowermost (seaward) portion of the project area adjacent to the east side of Ali'i Drive, and Sites 11130 and 11197, located further inland, on the approximate 300-400-foot contour, in association with a number of habitation and other feature types.

GENERAL SIGNIFICANCE ASSESSMENTS AND RECOMMENDED GENERAL TREATMENTS

Discussion

In order to facilitate DLNR-SHPD review and cultural resource management planning, general significance assessments and recommended general treatments for identified sites are summarized in Table 9. Significance categories used in the site evaluation process are based on the National Register criteria for evaluation, outlined in the Code of Federal Regulations (36 CFR Part 60). Sites determined to be potentially significant for information content fall under Criterion D, which defines significant resources as ones which "...have yielded, or may be likely to yield, information important in prehistory or history." Sites potentially significant as representative examples of site types are evaluated under Criterion C, which defines significant resources as those that "...embody the distinctive characteristics of a type, period, or method of construction...or that represent a significant and distinguishable entity whose components may lack individual distinction."

Sites with potential cultural significance are evaluated under guidelines prepared by the Advisory Council on Historic Preservation (ACHP) entitled "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review" (Draft Report, August 1985). The guidelines define cultural value as "...the contribution made by an historic

property to an ongoing society or cultural system. A traditional cultural value is a cultural value that has historical depth." The guidelines further specify that "[a] property need not have been in consistent use since antiquity by a cultural system in order to have traditional cultural value."

The information, interpretive, and cultural values of project area sites were assessed by comparing and contrasting project area site and feature attributes and distribution patterns with information available from adjacent lands. This procedure made it possible to determine shortcomings in the existing information base for the *ahupua'a* as well as potential deficiencies in DLNR-SHPD's inventory of preserved site types and feature complexes.

At the most general level, there is no question about the cultural and political significance of Kahalu'u. Early historic accounts depict Kahalu'u as the birthplace of and gathering place for certain members of Hawaii's chiefly class. Kahalu'u's religious significance is clearly attested by the numerous *heiau* that have already been recorded in the area (Thrum 1908a,b; NRHP n.d.). Further, the socio-economic significance of the region is documented by the eight LCA claims within the project area, the numerous LCA claims elsewhere within Kahalu'u, and the fact that Victoria Kamamalu, sister to Kamehameha IV and V and half-sister to Ruth Ke'elikolani, was deeded the entire *ahupua'a* of Kahalu'u.

In recognition of the importance of the Kahalu'u area, and based on contributing information from archaeological research, the Kahalu'u Historic District, the Kona Field System, and the Great Wall of Kuakini have all been included on the National Register of Historic Places. The Kahalu'u Historic District includes numerous *heiau*, some of which exhibit unique architectural attributes, while others contain associated petroglyphs (at Ke'eku Heiau, for example, the petroglyphs are thought to represent Kamalalawalu, King of Maui, an adversary of Lonoikamakahiki [Stokes n.d.]). The Kona Field System (Site 6601) represents a unique configuration and extensive distribution of aboriginal Hawaiian dryland cultivation and habitation sites and features. The complex of features comprising the field system dates to c. AD 1050-1400 (Schilt 1984) and has been divided into a number of zones (*kula*, *kaluulu*, *'apa'a*, and *'ama'u*, as summarized in Schilt [1984:6]). The present project area lies within the *kula* (coastal area) zone, which includes the area from sea level to approximately 500 ft (150 m) AMSL. Finally, the Great Wall of Kuakini (Site 6302 [also listed as 7276]) is highly significant in terms of both interpretive and cultural values. Named after Kuakini, governor of Hawai'i from 1820-1844, the wall was probably constructed in the early 19th century (Tomonari-Tuggle 1985:152-153) to keep domestic

Table 9.

**SUMMARY OF GENERAL SIGNIFICANCE ASSESSMENTS
AND RECOMMENDED GENERAL TREATMENTS**

Site No.	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
4649	+	-	-	-	+	-	-	-
4650	+	-	-	-	+	-	-	-
4651	+	-	-	-	+	-	-	-
4652	+	-	-	-	+	-	-	-
4656	+	-	-	-	+	-	-	-
4657	+	-	-	-	+	-	-	-
4659	+	-	-	-	+	-	-	-
4660	+	-	-	-	+	-	-	-
4666	+	-	-	-	+	-	-	-
5701	+	-	-	-	+	-	-	-
5702	+	-	-	-	+	-	-	-
5704	+	-	-	-	+	-	-	-
5707	+	-	-	-	+	-	-	-
5708	+	-	-	-	+	-	-	-
5709	+	-	-	-	+	-	-	-
5710	+	-	-	-	+	-	-	-
5711	+	-	-	-	+	-	-	-
5712	+	-	-	-	+	-	-	-
5713	+	-	-	-	+	-	-	-
5714	+	-	-	-	+	-	-	-
5715	+	-	-	-	+	-	-	-
5716	+	-	-	-	+	-	-	-
5717	+	-	-	-	+	-	-	-
5718	+	-	-	-	+	-	-	-
5719	+	-	-	-	+	-	-	-
5720	+	-	-	-	+	-	-	-
5722	+	-	-	-	+	-	-	-
5723	+	-	-	-	+	-	-	-
5724	+	-	-	-	+	-	-	-
5725	+	-	-	-	+	-	-	-
5726	+	-	-	-	+	-	-	-
5727	+	-	-	-	+	-	-	-
5731	+	-	-	-	+	-	-	-
6385	+	-	-	-	+	-	-	-
7664	+	-	-	-	+	-	-	-
7665	+	-	-	-	+	-	-	-
7666	+	-	-	-	+	-	-	-
6390	+	-	-	-	+	-	-	-
6392	+	-	-	-	+	-	-	-
6399	+	-	-	-	+	-	-	-

Deleted Site Numbers: 9866 = Site 6391, 9876 = Site 6408, 9825 = Site 7818

General Significance Categories:

- A=Important for information content, further data collection necessary (CRM value mode assessment = scientific research value)
 X=Important for information content, no further data collection necessary (CRM value mode assessment = scientific research value)
 B=Excellent example of site type at local, regional, island, state, or national level (CRM value mode assessment = interpretive value)
 C=Culturally significant (CRM value mode assessment = cultural value)

Recommended General Treatments:

- FDC=Further data collection necessary (further survey and testing, and possibly subsequent data recovery/mitigation excavations)
 NFW=No further work of any kind necessary; sufficient data collected, archaeological clearance recommended; no preservation potential (possible inclusion into landscaping suggested for consideration)
 PID=Preservation with some level of interpretive development recommended (including appropriate related data recovery work) and
 PAI=Preservation "as is," with no further work (and possible inclusion into landscaping), or minimal further data collection necessary

Table 9. (cont.)

Site No.	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
6401	+	-	-	-	+	-	-	-
6402	+	-	-	-	+	-	-	-
6407	+	-	-	-	+	-	-	-
6410	+	-	-	-	+	-	-	-
7663	+	-	-	-	+	-	-	-
7883	+	-	-	-	+	-	-	-
7914	+	-	-	-	+	-	-	-
7920	+	-	-	-	+	-	-	-
7921	+	-	-	-	+	-	-	-
7922	+	-	-	-	+	-	-	-
7923	+	-	-	-	+	-	-	-
7924	+	-	-	-	+	-	-	-
7927	+	-	-	-	+	-	-	-
7928	+	-	-	-	+	-	-	-
7929	+	-	-	-	+	-	-	-
7937	+	-	-	-	+	-	-	-
7939	+	-	-	-	+	-	-	-
7942	+	-	-	-	+	-	-	-
7943	+	-	-	-	+	-	-	-
7944	+	-	-	-	+	-	-	-
7945	+	-	-	-	+	-	-	-
7950	+	-	-	-	+	-	-	-
7951	+	-	-	-	+	-	-	-
7953	+	-	-	-	+	-	-	-
7955	+	-	-	-	+	-	-	-
7956	+	-	-	-	+	-	-	-
7957	+	-	-	-	+	-	-	-
9820	+	-	-	-	+	-	-	-
9821	+	-	-	-	+	-	-	-
9822	+	-	-	-	+	-	-	-
9862	+	-	-	-	+	-	-	-
9864	+	-	-	-	+	-	-	-
9865	+	-	-	-	+	-	-	-
9868	+	-	-	-	+	-	-	-
9871	+	-	-	-	+	-	-	-
9875	+	-	-	-	+	-	-	-
11116	+	-	-	-	+	-	-	-
11117	+	-	-	-	+	-	-	-
11118	+	-	-	-	+	-	-	-
11119	+	-	-	-	+	-	-	-
11120	+	-	-	-	+	-	-	-
11121	+	-	-	-	+	-	-	-
11124	+	-	-	-	+	-	-	-
11125	+	-	-	-	+	-	-	-
11126	+	-	-	-	+	-	-	-
11127	+	-	-	-	+	-	-	-
11128	+	-	-	-	+	-	-	-
11129	+	-	-	-	+	-	-	-
11131	+	-	-	-	+	-	-	-
11132	+	-	-	-	+	-	-	-
11133	+	-	-	-	+	-	-	-
11134	+	-	-	-	+	-	-	-
11135	+	-	-	-	+	-	-	-
11136	+	-	-	-	+	-	-	-

Table 9. (cont.)

Site No.	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
11137	+	-	-	-	+	-	-	-
11138	+	-	-	-	+	-	-	-
11139	+	-	-	-	+	-	-	-
11140	+	-	-	-	+	-	-	-
11142	+	-	-	-	+	-	-	-
11144	+	-	-	-	+	-	-	-
11145	+	-	-	-	+	-	-	-
11146	+	-	-	-	+	-	-	-
11147	+	-	-	-	+	-	-	-
11148	+	-	-	-	+	-	-	-
11149	+	-	-	-	+	-	-	-
11150	+	-	-	-	+	-	-	-
11151	+	-	-	-	+	-	-	-
11152	+	-	-	-	+	-	-	-
11153	+	-	-	-	+	-	-	-
11154	+	-	-	-	+	-	-	-
11155	+	-	-	-	+	-	-	-
11156	+	-	-	-	+	-	-	-
11157	+	-	-	-	+	-	-	-
11158	+	-	-	-	+	-	-	-
11159	+	-	-	-	+	-	-	-
11161	+	-	-	-	+	-	-	-
11162	+	-	-	-	+	-	-	-
11163	+	-	-	-	+	-	-	-
11164	+	-	-	-	+	-	-	-
11165	+	-	-	-	+	-	-	-
11166	+	-	-	-	+	-	-	-
11167	+	-	-	-	+	-	-	-
11168	+	-	-	-	+	-	-	-
11170	+	-	-	-	+	-	-	-
11171	+	-	-	-	+	-	-	-
11172	+	-	-	-	+	-	-	-
11173	+	-	-	-	+	-	-	-
11174	+	-	-	-	+	-	-	-
11175	+	-	-	-	+	-	-	-
11176	+	-	-	-	+	-	-	-
11177	+	-	-	-	+	-	-	-
11178	+	-	-	-	+	-	-	-
11179	+	-	-	-	+	-	-	-
11180	+	-	-	-	+	-	-	-
11181	+	-	-	-	+	-	-	-
11183	+	-	-	-	+	-	-	-
11184	+	-	-	-	+	-	-	-
11188	+	-	-	-	+	-	-	-
11190	+	-	-	-	+	-	-	-
11191	+	-	-	-	+	-	-	-
11192	+	-	-	-	+	-	-	-
11193	+	-	-	-	+	-	-	-
11194	+	-	-	-	+	-	-	-
11195	+	-	-	-	+	-	-	-
11196	+	-	-	-	+	-	-	-
11200	+	-	-	-	+	-	-	-
11201	+	-	-	-	+	-	-	-
11202	+	-	-	-	+	-	-	-

Table 9. (cont.)

Site No.	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
11203	+	-	-	-	+	-	-	-
11204	+	-	-	-	+	-	-	-
11206	+	-	-	-	+	-	-	-
11207	+	-	-	-	+	-	-	-
11208	+	-	-	-	+	-	-	-
11209	+	-	-	-	+	-	-	-
11210	+	-	-	-	+	-	-	-
11211	+	-	-	-	+	-	-	-
11214	+	-	-	-	+	-	-	-
Subtotal	158	0	0	0	158	0	0	0
5700	+	-	-	*	+	-	-	*
5703	+	-	-	*	+	-	-	*
5706	+	-	-	*	+	-	-	*
6386	+	-	-	*	+	-	-	*
6388	+	-	-	*	+	-	-	*
6394	+	-	-	*	+	-	-	*
6398	+	-	-	*	+	-	-	*
6404	+	-	-	*	+	-	-	*
6405	+	-	-	*	+	-	-	*
6406	+	-	-	*	+	-	-	*
6409	+	-	-	*	+	-	-	*
6411	+	-	-	*	+	-	-	*
6412	+	-	-	*	+	-	-	*
7888	+	-	-	*	+	-	-	*
7891	+	-	-	*	+	-	-	*
7915	+	-	-	*	+	-	-	*
7917	+	-	-	*	+	-	-	*
7918	+	-	-	*	+	-	-	*
7919	+	-	-	*	+	-	-	*
7925	+	-	-	*	+	-	-	*
7926	+	-	-	*	+	-	-	*
7930	+	-	-	*	+	-	-	*
7931	+	-	-	*	+	-	-	*
7932	+	-	-	*	+	-	-	*
9872	+	-	-	*	+	-	-	*
9873	+	-	-	*	+	-	-	*
9874	+	-	-	*	+	-	-	*
11141	+	-	-	*	+	-	-	*
11189	+	-	-	*	+	-	-	*
11199	+	-	-	*	+	-	-	*
11205	+	-	-	*	+	-	-	*
11212	+	-	-	*	+	-	-	*
11213	+	-	-	*	+	-	-	*
Subtotal	49	0	0	49	49	0	0	49

Table 9. (cont.)

Site No.	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
2077	+	-	+	+	+	-	+	-
2078	+	-	+	+	+	-	+	-
3822	+	-	+	+	+	-	+	-
3823	+	-	+	+	+	-	+	-
4665	+	-	+	+	+	-	+	-
5730	+	-	+	+	+	-	+	-
6341	+	-	+	+	+	-	+	-
6391	+	-	+	+	+	-	+	-
6393	+	-	+	+	+	-	+	-
6395	+	-	+	+	+	-	+	-
6396	+	-	+	+	+	-	+	-
6397	+	-	+	+	+	-	+	-
6403	+	-	+	+	+	-	+	-
6408	+	-	+	+	+	-	+	-
6414	+	-	+	+	+	-	+	-
7893	+	-	+	+	+	-	+	-
11130	+	-	+	+	+	-	+	-
11143	+	-	+	+	+	-	+	-
11197	+	-	+	+	+	-	+	-
Subtotal	19	0	19	19	19	0	19	0
4653	-	+	-	-	-	+	-	-
4667	-	+	-	-	-	+	-	-
5721	-	+	-	-	-	+	-	-
6368	-	+	-	-	-	+	-	-
6415	-	+	-	-	-	+	-	-
11122	-	+	-	-	-	+	-	-
11123	-	+	-	-	-	+	-	-
11169	-	+	-	-	-	+	-	-
Subtotal	0	8	0	0	0	8	0	0
2079	+	-	-	+	+	-	-	-
4655	+	-	-	+	+	-	-	-
4661	+	-	-	+	+	-	-	-
5728	+	-	-	+	+	-	-	-
7818	+	-	-	+	+	-	-	-
9863	+	-	-	+	+	-	-	-
11198	+	-	-	+	+	-	-	-
Subtotal	7	0	0	7	7	0	0	0
5705	+	-	+	*	+	-	-	*
7916	+	-	+	*	+	-	-	*
7948	+	-	+	*	+	-	-	*
7952	+	-	+	*	+	-	-	*
11160	+	-	+	*	+	-	-	*
Subtotal	5	0	5	5	5	0	0	5
4654	+	-	-	+	+	-	-	+
Subtotal	1	0	0	1	1	0	0	1
6400	+	-	+	+	+	-	-	+
Subtotal	1	0	1	1	1	0	0	1

Table 9. (cont.)

Site No.	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
11182	+	-	+	*	+	-	+	*
Subtotal	1	0	1	1	1	0	1	1
11186	+	-	+	+	+	-	-	-
Subtotal	1	0	1	1	1	0	0	0
11215	+	-	+	-	+	-	-	-
Subtotal	1	0	1	0	1	0	0	0
Total	243	8	28	84	243	8	20	57

animals out of the cultivated agricultural uplands (Baker 1915), or to prevent herbivores from straying into the coastal villages (Emory et al. 1971; Soehren 1979).

Data specific to assessing the information and research value of the project area derives from what is now known about the range of sites and feature types which are present. The archaeological reconnaissance surveys that have been completed to date have documented the presence of numerous archaeological sites and features relating to both prehistoric and historic-period occupation and exploitation activities. Terraces, platforms, and mounds together comprise nearly 60% of the formal feature types in the project area. Some of these represent habitation, some ceremonial activities, and others burial, agricultural, and a variety of other behavioral sets. Also present are *heiau*, as well as temporary and semi-permanent habitation features (terraces, C- and L-shape walls, enclosures, modified outcrops), miscellaneous additional features, transportation features, and sites or features of indeterminate function. The overall physical condition and integrity of the archaeological remains within the project area varies from poor to good, although a significant proportion of the features appear largely undisturbed and intact.

Substantial accumulated habitation debris, including specialized dating samples, were encountered at several project area sites, even though only limited surface samples were recovered during the present project.

Eighty-one features were tentatively identified as agricultural in function during the inventory survey work; these included mounds, terraces, enclosures, modified outcrops, and other formal feature types. Although agricultural sites are located throughout the project area, they are less dense than the garden complexes described by Schilt for higher elevations within nearby Kahakai Ahupua'a. This finding undoubt-

edly relates to the fact that portions of the present project area are only marginally suitable for agriculture. As previously noted, the project area is located within the lower extremes of the Kona Field System, in what is termed the *kula* zone, or the sweet potato/*wauke* sub-zone. Although the structural remains in the inland portion of the project area conform to the classic "patterned network" initially described by Newman for certain areas above Kealakekua, the patterned network is not as continuous as that observed by Newman, because the features are not as well preserved. Minor agricultural features, including rubble wall alignments, stone mounds, cleared areas, modified bedrock outcrops, and terraces, are widely distributed throughout the project area and on adjacent lands.

According to Schilt (1984), the emergence of the Kona Field System was an evolutionary process which unfolded over a period of 300-400 years. Pioneering (i.e., pre-System) settlements within leeward Hawaii (circa. AD 1000-1400) occurred along the coast, with limited, and apparently only sporadic use of lowland slopes and caves above the Kailua Bay area. Development of one or more of the *mauka* subzones of what was eventually to become the integrated Kona Field System occurred during the latter part of this same period (beginning about AD 1400). Over time, use of *mauka* areas resulted in increased erosion and deposition of silts and other useful deposits within the lower elevation (*kula* and *kaluulu*) subzones. Modified through siltation, and following an increase in population and concomitant greater demands for agricultural commodities in the late AD 1600s, the marginally exploitable lower agricultural zone—the *kula* (coastal area) zone, from sea level to c. 500 ft (150 m) elevation—became more intensively utilized and occupied (Schilt 1984:270-276). Crops cultivated within the *kula* zone during the late prehistoric period (prior to AD 1778) include sweet potatoes (*'uala*), gourd (*ipu*), and paper mulberry (*wauke*). By the early AD 1800s, the impact of western culture had substantially

altered traditional cultural use of the area (Schilt 1984:276-285), and crops being cultivated included cabbage, melons, onions, oranges, tobacco, beans, coffee, corn, cotton, pineapple, Irish potatoes, and pumpkins.

The *kaluulu* (seaward slope) zone abuts the *kula* on its *mauka* side and includes the area from c. 500-1,000 ft (150-300 m) AMSL. Crops grown with the *kaluulu* zone during the late prehistoric period include breadfruit ('ulu), mountain apple ('ohi'a-ai), and taro (*kalo*), in addition to some sweet potato and paper mulberry. It is possible that the uppermost portions of the present project area include the lowermost portions of the *kaluulu* zone.

The earliest prehistoric use of the *kula* subzone may rarely have resulted in permanent habitation, although this pattern appears to have changed during the proto-historic through early historic periods (although such residential features appear to have been located primarily *makai* of the Great Kuakini Wall). Within Kahalu'u, the immediate coastal zone was probably the primary focus of permanent habitation and associated religious and political activities, as evidenced by the presence within these areas not only of numerous residential sites, but of burial platforms as well as numerous named *heiau*.

The other two cultivation zones of the Kona Field System are the 'apa'a (upland slope) zone and the 'ama'u (upland jungle) zone. Within these upland areas of the Kona Field System are spillways, constructed stone tunnels, diversion walls used for water control, and possibly irrigated pondfields (Allen 1984c:21).

Chronological phases for this area of North Kona and the Kona Field System generally have been presented in Schilt (1984:276-284). Based on a series of radiocarbon and volcanic glass dates, initial occupation of the general Kailua area is hypothesized to have occurred sometime during the period AD 1000-1400 (Phase I), with dryland agricultural development becoming established by AD 1400-1600/1650 (Phase II). By AD 1600/1650-1779 (Phase III), the Kona Field System had undergone extensive development and was under intensive use until cultivation of fields eventually began declining during the historic period AD 1779-1850 (Phase IV).

The date ranges for both volcanic glass and radiocarbon samples recovered during the present survey correspond quite closely to the Schilt sequence, summarized above, except that not all of the c. 700-year-long sequence is represented in the current inventory of dated samples. It is expected that a more comprehensive dating program involving additional dating samples from a wider range of site and feature types would

yield the entire sequence and could provide additional insight into such questions as (a) initial use of upper elevation sites and features, (b) periods of intensification, and (c) the onset of declining intensification and eventual abandonment of major site complexes within this area.

The data categories that have now been documented as present within the project area acquire special significance when considered in relation to the importance of the Kona Field System in regional prehistory. In this regard, one of the most fruitful avenues of further research would involve refining the existing model of land use variability. In part, such an endeavor would require linking elevational-gradient data with archaeological feature-type designations. The existing inventory survey results provide baseline data for eventually developing a more formalized typology of agricultural features and complexes that will permit comparison of feature occurrence and density along the elevational gradient (see esp. Figure 16). Ideally, specific functions (i.e., likely cultigens grown at particular locales) and possible temporal patterns could eventually be suggested for the various feature types within the project area. However, such interpretations must be based on more systematic data collection and analysis than currently exists.

On the basis of prior analyses of archaeological data and age determinations, it is reasonable to expect that most of the habitation and agricultural features within the project area post-date AD 1300-1400. In order to test this preliminary finding, and to better determine the culture history of the project area, it is important to collect additional charcoal samples and to identify any variance in formal or functional types that may reflect temporal change. One of the goals of the present inventory was to locate deposits that had potential for containing carbonized material for dating, and to collect some dating samples. Such deposits have been identified, and additional data collection should be designed to recover additional samples.

In consideration of the above issues, it is clear that a number of important research topics could be addressed utilizing data available at numerous Kahalu'u sites. Additional proposed research at 243 of the total of 251 project area sites should focus on, but not necessarily be limited to, the following:

1. Further evaluating the age, duration, and intensity of occupation at individual sites and features;
2. Further evaluating and characterizing individual sites and features for portable artifact content and assemblages;

3. Further evaluating and characterizing individual sites and features for ecofactual content, particularly the relative percentage of marine versus terrestrial resource remains;
4. Refining existing assessments, thus far based on inventory-level survey data, of the variety of cultural activities conducted at various sites at different prehistoric time periods;
5. Further evaluating existing interpretations of specific architectural features and presumed associated activities;
6. Utilizing the above information to further refine the *ahupua'a* settlement model by focusing upon the distribution of and interrelationships among temporal, artifactual, ecofactual and architectural variables as these are manifest at individual sites and features. Subcomponents of such a settlement model would entail:
 - a. Further characterization of the *kula* zone of the Kona Field System dryland agricultural component in terms of crops, cultivation techniques, and temporal sequencing;
 - b. Further definition of the nature of occupation within the project area; i.e., the extent to which specific sites and features reflect temporary, semi-permanent, and/or permanent occupation, and single or recurrent episodes of use, or both;
 - c. In combination with available data from higher elevation zones (e.g., the *'apa'a* (upland slope) zone adjacent to the east side of the project area, further investigate the *ahupua'a*-wide settlement pattern in order to determine whether permanent occupation was exclusively coastal or if it included both coastal and inland components, and when permanent occupation may have appeared within the *Kula* zone of the present project area.

In addition to the research orientation outlined above, future archaeological research within the project area should also be guided by the Cultural Resource Management Plan prepared by Tomonari-Tuggle (1985) for Kahalu'u generally. General research topics contained within the Tomonari-Tuggle data recovery program and research design (Tomonari-Tuggle 1985:66-81) include:

1. Defining settlement pattern dimensions through duration, continuity (nature), and intensity of occupation;
2. Defining the archaeological manifestation of the *ahupua'a* as the postulated socio-economic local community group;
3. Examination of nucleation and dispersal of settlements, in terms of their growth and correlation with the development of the *ahupua'a* as socio-economic units;
4. Evaluation of the development of agricultural systems and the relationship of such development with such independent variables as population pressure, ecological constraints, and political demands on food production;
5. Evolution of complex chiefdoms and the archaeological expression of status differentiation;
6. Examination and analyses of archaeological data with traditional and historic references; and
7. Development and formation of historic archaeological studies focusing upon acculturation during the contact period (especially the 19th and 20th centuries).

SPECIFIC ASSESSMENTS AND RECOMMENDED TREATMENTS FOR SITES

Based on the above considerations, the following conclusions were reached concerning site significance and recommendations made for general site treatments. These conclusions and recommendations are summarized below in Table 9.

As summarized in Table 9, 166 of the 251 identified sites have been assessed as significant solely for information content (65%). Of these 166, 158 are recommended for further data recovery. The eight remaining sites (3%) in this group have been recommended for no further work (Sites 4653, 4667, 5721, 6368, 6415, 11122, 11123, and 11169).

Forty-nine sites (19%) are assessed as significant for information content and tentatively assessed as significant for cultural value, pending further data collection. Data collection work has been proposed for all forty-nine of

Table 11.

**INVENTORY OF SITES RECOMMENDED FOR
PRESERVATION AND INTERPRETIVE DEVELOPMENT**

Site Number	Functional Interpretation	Additional Comments
2077	Habitation-refuge	Halelaau Refuge Cave; also <i>heiau</i>
2078	Ceremonial	Probable <i>heiau</i> ; platform structure
3822	Ceremonial	<i>Heiau</i> ; Halelaau Heiau
3823	Ceremonial	<i>Heiau</i> ; Pa-o-Umi Heiau
4665	Habitation	—
5730	Habitation	—
6341	Ceremonial	Possible <i>heiau</i> or possible high-status residence site
6391	Ceremonial	Probable <i>heiau</i> or burial monument; possible habitation foundation, but no associated midden or artifacts noted
6393	Habitation-poss. burial	Associated with Sites 6396 & 6397
6395	Ceremonial-poss. burial	Possible <i>heiau</i> or possible high-status residence site
6396	Ceremonial-poss. burial	Possible <i>heiau</i> or possible high-status residence site
6397	Poss. burial	Associated with Sites 6393 and 6396
6403	Habitation-poss. burial	Associated with Site 6341; previously designated as Site 7890
6408	Burial-indeterminate	Features A and B probably associated with <i>heiau</i> (Site 3822); possible burial monuments
6414	Ceremonial-habitation	Possible <i>heiau</i> or possible high-residence site
6601	Multiple	Kona Field System; extensive complex of dryland agricultural features & associated features such as habitations and ceremonial features; only selected portions must be preserved
7893	Habitation-cer.-poss.bur.	—
11130	Ceremonial	—
11143	Habitation-refuge	—
11197	Ceremonial	Probable <i>heiau</i> ; platform structure; newly identified site

these sites; the work should consist of further testing for the presence or absence of human skeletal remains. At present, these 49 sites are also recommended for preservation "as is," pending the results of the proposed testing. Nineteen sites are assessed as significant for information content, as excellent examples of site types, and for cultural significance (8%). These 19 sites are recommended for further data collection, to be followed by preservation with some level of interpretive development.

Table 10 summarizes all sites recommended for preservation and interpretive development.

Of the remaining 17 project area sites, seven (3%) are assessed as significant for information and cultural values, with a recommendation of further data collection (Sites 2079, 4655, 4661, 5728, 7818, 9863, and 11198).

Five sites (2%) are assessed as significant for information value and as excellent examples of site types (Sites 5705, 7916, 7948, 7952, and 1160). In addition, these five sites are preliminarily assessed as significant for cultural value, pending further data collection. These five sites are recommended for further data collection, and are tentatively recommended for preservation "as is".

Site 4654 (0.4% of total) is assessed as significant for information and cultural values, and is recommended for further data collection and preservation "as is."

Site 6400 (0.4%) is assessed as significant for information content, cultural value and as an excellent example of a

site type. This site is recommended for further data collection and for preservation "as is."

Site 11182 (0.4%) is assessed as significant for information content, as an excellent example of a site type, and preliminarily assessed as significant for cultural value pending further collection. This site is recommended for further data collection and preservation with interpretive development. A tentative recommendation of preservation "as is" is also offered.

Site 11186 (0.4%) is assessed as significant for information content, cultural value, and as an excellent example of a site type. Further data collection is recommended.

Site 11215 (0.4%) is assessed as significant for information content and as an excellent example of a site type, and is recommended for further data recovery.

Prior to implementing the recommended additional data collection and data recovery work, a data recovery plan should be prepared in consultation with DLNR-SHPD.

Finally, it should be noted that the evaluations and recommendations presented within this survey report are based on a surface reconnaissance survey only and on data from previous archaeological research within the project area. There is always the possibility, however remote, that potentially significant, unidentified subsurface cultural remains will be encountered or during subsequent development. In such situations, archaeological consultation should be sought immediately.

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*Dating results from project area are not presented in the Shun 1984 report, but are on file in the PHRI Laboratory.

APPENDIX A

Table A-1.

SUMMARY OF IDENTIFIED SITES AND FEATURES

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
2077	Cave	Habitation-refuge	H	M	H	+	+	+
2078	Platform	Ceremonial	M/H	M	H	+	+	+
2079	Cave	Habitation	M/H	L	H	+	+	+
3822	Platform	Ceremonial	H	H	H	+	+	+
3823	Complex (2**)	Ceremonial	H	H	H	+	+	+
A	Walled platform							
B	Cave							
4649	Complex (4)	Habitation	M/H	L/M	L/M	+	+	+
A	Terrace							
B	Terrace							
C	Boulder level area							
D	Terrace							
4650	Walled terrace	Habitation	M	L	L	+	+	+
4651	Complex (2)	Markers	M	L	L	+	+	+
A	Cairn							
B	Cairn							
4652	Double terrace	Habitation	M	L	L	+	-	+
4653	Complex (2)	Habitation/indeterminate	L	L	L	-	-	-
A	Wall							
B	Lava tube cave							
4654	Steppingstone	Transportation/trail	M	L	H	+	-	+
4655	Complex (11)	Hab/ag./indeterm./marker	M	L	L	+	-	+
A	Wall							
B	Cairn							
C	Walled platform							
D	U-shaped pit							
E	Pit							
F	Enclosure							
G	Mound							
H	Pit							
I	Pit							
J	Pit							
K	Pit							
4656	Cave	Habitation	M/H	L	L	+	+	+
4657	Wall	Boundary	L	L	L	+	-	+
4659	Lava tube	Habitation	M/H	L	L	+	-	+
4660	C-shape wall	Habitation	L/M	L	L	+	+	+
4661	Cave	Habitation	M/H	M	M	+	+	+

State Inventory of Historic Places (SIHP) numbers. SIHP numbers are four- and five-digit numbers prefixed by 50-10-37 (50=State of Hawaii; 10=Island of Hawaii; 37=USGS 7.5' series quad map ["Kealahou, Hawaii"]).

#Cultural Resource Management Value Mode Assessment
 —Nature: R = scientific research, I = interpretive, C = cultural;
 —Degree: H = high, M = moderate, L = low.

*Field Work Tasks: DR = detailed recording (scaled drawings, photo graphs, and written descriptions), SC = surface collections, EX = test excavations.

**Number of component features.

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
4665	Complex (17)	Hab/ag./boundary	M/H	M	M	+	+	+
A	Paved area							
B	Terrace							
C	Terrace							
D	Terrace							
E	Clearing area							
F	Paved area							
G	Paved area							
H	Paved area							
I	Paved area							
J	Wall							
K	Platform							
L	Platform							
M	Platform							
N	Lava tube							
O	Paved area							
P	Enclosure							
Q	Paved area							
4666	Complex (2)	Marker/boundary	L/M	L	L	+	-	+
A	Cairn							
B	Wall							
4667	Wall	Boundary	L	L	L	-	-	-
5700	Complex (2)	Possible burial/habitation	M	L	L/H	+	-	+
A	Mound							
B	Enclosure							
5701	Complex (2)	Habitation	M	L	L	+	+	+
A	Platform							
B	Modified outcrop							
5702	Modified outcrop	Habitation	M	L	L	+	+	+
5703	Complex (3)	Indeterminate	M/H	L	L/H	+	-	+
A	Modified outcrop							
B	Modified outcrop							
C	Platform remnant/mound							
5704	C-shape	Habitation	M	L	L	+	-	+
5705	Complex (2)	Burial/indeterminate	M	M	L/H	+	-	+
A	Platform							
B	Mound							
5706	Complex (2)	Possible burial	M/H	L	L/H	+	+	+
A	Platform remnant							
B	Mound							
5707	C-shape	Habitation	M	L	L	+	+	+
5708	Complex (3)	Habitation	M	L	L	+	+	+
A	Terrace							
B	Terrace							
C	L-shape wall							
5709	C-shape	Habitation	M	L	L	+	+	+
5710	Cairn	Agriculture	L/M	L	L	+	-	+
5711	Complex (2)	Habitation	M	M	L/M	+	-	+
A	Terrace							
B	Terrace							
5712	Cairn	Marker	L/M	L	L	+	-	+
5713	Enclosure	Habitation	M	L	L	+	-	+
5714	Modified outcrop	Habitation	M	L	L	+	-	+
5715	Modified outcrop	Agriculture	L/M	L	L	+	+	+
5716	Lava tube	Habitation	M	L	L	+	+	+

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
5717	Cairn	Marker	M	L	L	+	-	+
5718	Terrace	Habitation	M	L	L	+	-	+
5719	Complex (2)	Boundary/trans.	M	L	L	+	+	+
A	Wall							
B	Trail							
5720	Terrace	Habitation	M	L	L	+	-	+
5721	Wall	Boundary	L	L	L	-	-	-
5722	Modified outcrop	Habitation	M/H	L	L	+	-	+
5723	Walled terrace complex	Habitation	M	L	L	+	-	+
5724	Complex (3)	Habitation	M	L	L	+	+	+
A	Platform							
B	Terrace							
C	Terrace							
5725	L-shape wall	Habitation	M	L	L	+	-	+
5726	C-shape	Habitation	M	L	L	+	+	+
5727	Terrace	Habitation	M	L	L	+	+	+
5728	Mound filled crack	Possible burial	L/M	L	L/H	+	+	+
5729	Complex (2)	Habitation/indeterminate	M	L	L	+	-	+
A	Terrace							
B	Cairn							
5730	Platform	Habitation	M	M	M	+	-	+
5731	Complex (2)	Habitation/quarry	M	L	L	+	+	+
A	Terrace							
B	Pahoehoe excavation							
6341	Complex (4)	Ceremonial	M	M/H	H	+	+	+
A	Double terrace							
B	Cairn							
C	Cairn							
D	Platform							
6368	Wall	Boundary	L	L	L	-	-	-
6385	Complex (3)	Habitation/agriculture	M	L	L	+	-	+
A	U-shape							
B	Enclosure							
C	Mound Complex							
6386	Complex (6)	Habitation/ag./poss. burial	M	L	L/H	+	+	+
G	Platform							
H	Modified outcrop							
I	C-shape							
J	Mound							
K	Mound							
L	C-shape							
6388	Complex (9)	Hab./ag./poss. bur./boundary	M	L	L/H	+	+	+
A	L-shape							
B	U-shape							
C	U-shape							
D	U-shape							
E	U-shape							
F	C-shape							
G	Platform							
H	Walls							
I	Mound							
6390	Complex (2)	Agriculture	L	L	L	+	-	+
A	Modified outcrop							
B	Wall							

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
6391	Complex (4)	Hab./poss. bur./ceremonial	M	M	M/H	+	+	+
A	Terrace							
B	Platform							
C	Enclosure							
D	Platform							
6392	Complex (6)	Habitation	M	L	L	+	-	+
A	U-shape							
B	Platform							
C	Platform							
D	Platform							
E	Terrace							
F	Terraces							
6393	Complex (3)	Habitation/burial	M	M	L/H	+	-	+
A	Platform							
B	Terrace							
C	Platform							
6394	Platform	Possible burial	M	L	L/H	+	-	+
6395	Complex (5)	Cerem./poss. bur.	M	M	H	+	-	+
A	Platform							
B	Platform							
C	Cairn							
D	Cairn							
E	Terrace							
6396	Complex (6)	Ceremonial/poss. bur./hab.	M	M/H	H	+	+	+
A	U-shape							
B	U-shape							
C	Platform							
D	Platform							
E	Platform							
F	Platform							
6397	Complex (2)	Possible burial	M	M	M/H	+	-	+
A	Platform							
B	Platform							
6398	Complex (2)	Poss. burial/habitation	M	L	L/H	+	-	+
A	Platform							
B	U-shape							
6399	Mound	Habitation	M	L	L	+	-	+
6400	Cart road	Transportation	M	M	M	+	-	+
6401	Complex (2)	Habitation	M	L	L	+	-	+
A	Platform							
B	Platform							
6402	Complex (2)	Habitation	M	L	L	+	+	+
A	Platform							
B	Cave							
6403	Complex (3)	Habitation-poss. burial	M	M	M/H	+	+	+
A	Terrace							
B	Terrace							
C	Terrace complex							
6404	Complex (3)	Habitation/poss. burial	M	L	L/H	+	-	+
A	Platform							
B	U-shape							
C	Terrace							
6405	Platform	Possible burial	M	L	L/H	+	-	+
6406	Platform	Possible burial	M/H	L	L/H	+	+	+

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
6407	Complex (3)	Habitation	M	L	L	+	-	+
A	Terrace							
B	Terrace							
C	Terrace							
6408	Complex (4)	Possible burial	M	M	L/H	+	+	+
A	Platform							
B	Platform							
C	Platform							
D	Platform							
6409	Mound	Possible burial	M	L	L/H	+	-	+
6410	Modified outcrop	Agriculture	L	L	L	+	-	+
6411	Mound	Burial	M	L	L/H	+	-	+
6412	Terrace	Burial	M	L	L/H	+	-	+
6413	Complex (11)	Poss. bur./hab./bound./indet.	M/H	L	L/H	+	+	+
A	Platform							
B	Platform							
C	Terrace							
D	Mound							
E	Terrace							
F	Wall							
G	Terrace							
H	Terrace							
I	Mound							
J	Platform							
K	Platform							
6414	Platform	Habitation/ceremonial	H	H	H	+	+	+
6415	Wall	Boundary	L	L	L	-	-	-
7663	Complex (5)	Habitation	M	L	L	+	+	+
A	Platform							
B	Terrace							
C	C-shape							
D	Double terrace							
E	Triple terrace							
7664	Wall	Agriculture	M	L	L	+	+	+
	Complex							
7665	Complex (3)	Habitation/agriculture	M	L	L	+	-	+
A	Terrace							
B	Modified outcrop							
C	Terrace							
7666	Cart road	Transportation	M	L	L	+	-	+
7818	Trail	Transportation	M	L	M	+	-	-
7883	Terrace	Habitation	M	L	L	+	-	+
7888	Complex (2)	Possible burial	M	L	L/H	+	+	+
A	Terrace							
B	Terrace							
7891	Complex (4)	Habitation-poss. burial	M	H	M/H	+	+	+
A	Terrace							
B	Terrace							
C	Platform							
D	Terrace							
7893	Complex (6)	Hab.-cerem./hab.-poss. burial	M	M	L/H	+	+	+
A	Platform							
B	Platform							
C	Terrace							
D	Platforms							
E	Terrace							
F	Platform							

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
7914	Complex (2)	Habitation/agriculture	M	L	L	+	+	+
A	Modified outcrop							
B	Modified outcrop							
7915	Complex (7)	Poss. burial/habitation/marker	M/H	L	H/L	+	+	+
A	Platform							
B	Cairn							
C	Terrace							
D	Modified outcrop							
E	Platform							
F	Terrace							
G	Mound							
7916	Platform	Possible burial	M	M	L/H	+	-	+
7917	Complex (8)	Hab./poss. burial/indet.	M	L	L/H	+	+	+
A	Platform							
B	Platform remnant							
C	Modified outcrop							
D	Terrace							
E	Mound							
F	Modified outcrop							
G	Terrace							
H	Modified outcrop							
7918	Complex (5)	Hab./ag./poss. burial	M/H	L	L/H	+	-	+
A	Modified outcrop							
B	Mound							
C	Terrace							
D	Terrace							
E	Mound							
7919	Complex (4)	Agriculture/indet.	M	L	L/H	+	-	+
A	Mound							
B	Modified outcrop							
C	Terrace							
D	Terrace							
7920	Complex (4)	Habitation/agriculture	M	L	L	+	+	+
A	Modified outcrop							
B	Terrace							
C	Mound							
D	Mound							
7921	Complex (4)	Habitation/agriculture	M	L	L	+	+	+
A	Terrace							
B	Platform							
C	Platform							
D	Modified outcrop							
7922	Complex (5)	Habitation/agriculture	M	L	L	+	+	+
A	Mound							
B	Modified outcrop							
C	Terrace							
D	Modified outcrop							
E	Mound							
7923	Modified outcrop	Habitation	M	L	L	+	+	+
7924	Terrace	Habitation	M	L	L	+	-	+
7925	Platform	Possible burial	M/H	L	L/H	+	-	+
7926	Complex (2)	Habitation/poss. burial	M	L	L/H	+	-	+
A	Terrace							
B	Mound							
7927	Terrace	Habitation	M	L	L	+	-	+
7928	Modified outcrop	Habitation	M	L	L	+	-	+
7929	Mound	Indeterminate	M	L	L	+	-	+

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
7930	Complex (2)	Possible burial	M	L	L/H	+	+	+
A	Platform							
B	Platform							
7931	Complex (3)	Possible burial	M	L	L/H	+	-	+
A	Terrace							
B	Terrace							
C	Terrace							
7932	Terrace	Possible burial	M	L	L/H	+	-	+
7933	Platform	Possible burial	M	L	L/H	+	+	+
7934	Mound	Possible burial	M	L	L/H	+	+	+
7935	Complex (2)	Possible burial						
A	Platform							
B	Platform							
7936	Platform	Possible burial	M	L	L/H	+	+	+
7937	Cupboard	Storage	M	L	L	+	+	+
7938	Lava tube	Possible burial	M	L	L/H	+	-	+
7939	Wall	Boundary	M	L	L	+	+	+
7940	Platform	Possible burial	M	L	L/H	+	+	+
7941	Platform	Possible burial	M	L	L	+	+	-
7942	Wall	Boundary	M	L	L	+	-	+
7943	Modified outcrop	Indeterminate	M	L	L	+	-	+
7944	Modified outcrop	Agriculture	M	L	L	+	-	+
7945	Complex (3)	Agriculture	M	L	L	+	-	+
A	Mound							
B	Mound							
C	Mound							
7946	Complex (17)	Ag./possible burial/hab.	M	L	L/H	+	-	+
A	Modified outcrop							
B	Mound							
C	Mound							
D	Mound							
E	Mound							
F	Mound							
G	Mound							
H	Platform							
I	Mound							
J	Mound							
K	Mound							
L	Mound							
M	Mound							
N	Mound							
O	Mound							
P	Mound							
Q	Mound							
7947	Complex (2)	Possible burial/agriculture	M	L	L/H	+	-	+
A	Modified outcrop							
B	Terrace							
7948	Complex (4)	Habitation/possible burial	M	M	L/H	+	+	+
A	Lava tube cave							
B	Enclosure							
C	Platform							
D	Mound							
7949	Complex (2)	Possible burial/agriculture	M	L	L/H	+	-	+
A	Platform							
B	Terrace							

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
7950	Complex (3)	Habitation	M	L	L	+	+	+
A	Terrace							
B	Terrace							
C	Platform							
7951	Wall complex	Boundary	M	L	L	+	-	-
7952	Terrace	Possible burial	M	M	L/H	+	-	+
7953	Lava blstr	Habitation	M	L	L	+	+	+
7955	Complex (2)	Habitation/agriculture	M	L	L	+	+	+
A	Platform							
B	Enclosure							
7956	Terrace	Habitation	M	L	L	+	-	+
7957	Terrace	Habitation	M	L	L	+	-	+
9820	Complex (3)	Agriculture	M	L	L	+	+	+
A	Mound							
B	Mound							
C	Modified outcrop							
9821	Wall	Agriculture	L	L	L	+	+	+
9822	Complex (2)	Habitation	M	L	L	+	+	+
A	Terrace							
B	Terrace							
9823	Complex (2)	Possible burial	M	L	L/H	+	+	+
A	Mound							
B	Mound							
9824	Complex (4)	Habitation/possible burial	M	L	L/H	+	+	+
A	Modified outcrop							
B	Enclosure							
C	Platform							
D	Platform							
9825	Deleted—same site as 7818							
9862	Complex (3)	Habitation	M	L	L	+	-	+
A	Enclosure							
B	C-shape							
C	C-shape							
9863	Complex (7)	Hab./boundary/trans.	M	L	M	+	-	+
A	Wall							
B	Wall							
C	Wall							
D	C-shape							
E	Trail							
F	Wall							
G	Wall							
9864	Complex (2)	Habitation-possible burial	M	L	L	+	+	+
A	Lava tube							
B	Pavement							
9865	Modified Outcrop	Habitation	M	L	L	+	-	+
9866	Deleted — Part of site 6391-B.							
9867	Cave	Habitation-possible burial	M	L	L/H	+	+	+
9868	Complex (3)	Habitation	M/H	L	L	+	+	+
A	C-shape							
B	Lava blister							
C	Lava blister							
9869	Complex (2)	Possible burial/indeterminate	M	L	L/H	+	-	+
A	Platform							
B	Wall							
9870	Enclosure	Ceremonial-possible burial	M	L	L/H	+	+	+

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
9871	Complex (3)	Habitation/agriculture	M	L	L	+	+	+
A	U-shape wall							
B	Terrace							
C	U-shape wall							
9872	Complex (6)	Possible burial/hab./boundary	M	L	L/H	+	-	+
A	Platform							
B	Terrace							
C	C-shape Wall							
D	Wall							
E	Platform							
F	Terrace							
9873	Mound	Possible burial	M	L	L/H	+	-	+
9874	Complex (2)	Boundary/possible burial	M	L	L/H	+	-	+
A	Wall							
B	Modified outcrop							
9875	Terrace	Habitation	M	L	L	+	-	+
9876	Deleted—Part of site 6408-D.							
11116	Enclosure	Indeterminate	M	L	L	+	-	+
11117	Complex (4)	Agriculture	M	L	L	+	-	+
A	Wall							
B	Terrace							
C	Terrace							
D	Mound							
11118	Complex (3)	Habitation	M	L	L	+	+	+
A	Terrace							
B	Terrace							
C	Terrace							
11119	Plat. remnant mound	Habitation	L/M	L	L	+	-	+
11120	Complex (4)	Agriculture	M	L	L	+	-	+
A	Mound							
B	Mound							
C	Mound							
D	Mound							
11121	Enclosure	Habitation	M	L	L	+	-	+
11122	Wall	Boundary	L	L	L	-	-	-
11123	Wall	Boundary	L	L	L	-	-	-
11124	Enclosure	Habitation	M	L	L	+	-	+
11125	Enclosure	Habitation	M	L	L	+	-	+
11126	Terrace	Habitation	L/M	L	L	+	-	+
11127	Mound	Habitation	M	L	L	+	-	+
11128	Complex (5)	Agriculture/habitation	M	L	L	+	-	+
A	Mound							
B	Mound							
C	Platform							
D	Platform							
E	Mound							
11129	Retaining wall	Agriculture	L	L	L	-	-	-
11130	Platform	Ceremonial	M	M	M/H	+	+	+
11131	Double terrace	Habitation	M	L	L	+	+	+
11132	Enclosure	Habitation	L/M	L	L	+	-	+
11133	Enclosure	Habitation	M	L	L	+	-	+
11134	C-shape	Habitation	M	L	L	+	-	+
11135	Enclosure	Habitation	L/M	L	L	+	-	+
11136	Platform	Agriculture	L/M	L	L	+	+	+
11137	Modified outcrop	Habitation	L/M	L	L	+	-	+
11138	Complex (2)	Habitation	M	L	L	+	-	+
A	Mound							
B	Terrace							

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
11138	Modified outcrop	Habitation	M	L	L	+	-	+
11139	Enclosure	Habitation	L/M	L	L	+	-	+
11140	Enclosure	Agriculture	L	L	L	+	-	-
11141	Complex (2)	Possible burial/agriculture	M	L	L/H	+	-	+
A	Mound							
B	Wall							
11142	Complex (3)	Habitation	M/H	L	L	+	+	+
A	Modified outcrop							
B	Lava tube							
C	Lava tube							
11143	Complex (5)	Habitation-refuge	H	M	H	+	+	+
A	Terrace							
B	Terrace							
C	Lava tube							
D	Terrace							
E	Double C-shape							
11144	Complex (2)	Habitation	L/M	L	L	+	+	+
A	Terrace							
B	Modified outcrop							
11145	Complex (2)	Habitation	M	L	L	+	+	+
A	Terrace							
B	Mound							
11146	Terrace	Habitation	M	L	L	+	-	+
11147	Terrace	Agriculture	L	L	L	+	-	+
11148	Complex (4)	Habitation	M	L/M	L/M	+	+	+
A	Enclosure							
B	Terrace							
C	Terrace							
D	C-shape wall							
11149	Platform	Habitation	M	L	L	+	-	+
11150	Complex (5)	Habitation/agriculture	M/H	L	L/M	+	+	+
A	Modified outcrop							
B	Terrace							
C	Terrace							
D	Terrace							
E	Terrace							
11151	Complex (3)	Habitation/indeterminate	M	L	L	+	+	+
A	Enclosure							
B	Modified outcrop							
C	Modified outcrop							
11152	C-shape	Habitation	M	L	L	+	-	+
11153	Terrace	Habitation	M	L	L/M	+	+	+
11154	Complex (2)	Habitation	M	L	L	+	-	+
A	Terrace							
B	Mound							
11155	C-shape	Habitation	M	L	L	+	-	+
11156	Terrace	Habitation	M	L	L	+	+	+
11157	Wall	Agriculture complex	M	L	L	+	-	+
11158	Mound	Habitation	M	L	L	+	-	+
11159	Complex (6)	Habitation/boundary	M	L	L	+	-	+
A	Platform							
B	Platform							
C	Modified outcrop							
D	Modified outcrop							
E	Terrace							
F	Wall							

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
11160	Complex (3)	Possible burial	M	M	L/H	+	-	+
A	Platform							
B	Platform							
C	Platform							
11161	Complex (5)	Habitation/indet.	M	L	L	+	+	+
A	Terrace							
B	Depression							
C	Depression							
D	Terrace							
E	Terrace							
11162	Terrace	Habitation	M	L	L	+	-	+
11163	Enclosure	Indeterminate	M	L	L	+	+	+
11164	Terrace	Habitation	M	L	L	+	-	+
11165	Platform	Habitation	M	L	L	+	+	+
11166	Complex (3)	Habitation	M	L	L	+	+	+
A	Cave							
B	Modified outcrop							
C	Modified outcrop							
11167	Enclosure	Agriculture	M	L	L	+	-	+
11168	Complex (4)	Habitation/ag./indet.	M	L	L	+	-	+
A	Mound							
B	Mound							
C	Wall							
D	Terrace							
11169	Wall	Boundary	L	L	L	-	-	-
11170	Complex (4)	Habitation	M/H	L	L	+	+	+
A	Enclosure							
B	Terrace							
C	Enclosure							
D	Terrace							
11171	Terrace	Habitation	M	L	L	+	-	+
11172	U-shape	Habitation	M	L	L	+	-	+
11173	Complex (2)	Habitation	M	L	L	+	+	+
A	Enclosure							
B	Enclosure							
11174	Modified outcrop	Habitation	M	L	L	+	+	+
11175	Terrace	Habitation	M	L	L	+	-	+
11176	Complex (2)	Agriculture/habitation	M	L	L	+	-	+
A	Enclosure							
B	C-shape							
11177	Complex (3)	Habitation	M	L	L	+	+	+
A	Modified outcrop							
B	Terrace							
C	Terrace							
11178	Double terrace	Habitation	L/M	L	L	+	-	+
11179	Double terrace	Habitation	L/M	L	L	+	+	+
11180	Complex (2)	Agriculture	M	L	L	+	-	+
A	Mound							
B	Mound							
11181	Terrace	Habitation	M	L	L	+	-	+
11182	Complex (2)	Possible burial	M	L	L/H	+	+	+
A	Platform							
B	Terrace							
11183	Complex (2)	Habitation	M	L	L	+	+	+
A	Platform							
B	Modified outcrop							

Table A-2. (cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess.			Field Work Tasks		
			R	I	C	DR	SC	EX
11184	Complex (3)	Habitation	M/H	L	L	+	+	+
A	Terrace							
B	Terrace							
C	Enclosure							
11186	Complex (2)	Habitation	M	L	L	+	+	+
A	Cave							
B	Terrace							
11188	Complex (3)	Habitation	M	L	L	+	-	+
A	Platform							
B	Modified outcrop							
C	Modified outcrop							
11189	Platform	Indeterminate	M	L	L/H	+	-	+
11190	Complex (2)	Habitation	M	L	L	+	-	+
A	Platform							
B	Terrace							
11191	Cave	Habitation	M/H	L	L	+	+	+
11192	Filled depression	Indeterminate	L	L	L	+	-	+
11193	Platform	Indeterminate	M	L	L	+	-	+
11194	Cave	Habitation-refuge	M/H	L	L	+	+	+
11195	Complex (2)	Habitation	M	L	L	+	+	+
A	Modified outcrop							
B	Terrace							
11196	Terrace	Agriculture	L/M	L	L	+	-	+
11197	Platform	Ceremonial	M	M	M	+	-	+
11198	Modified outcrop	Possible burial	M/H	L	L/H	+	+	+
11199	Platform	Habitation-possible burial	M/H	L	L/H	+	-	+
11200	Platform remnant	Agriculture	L/M	L	L	+	-	+
11201	Modified outcrop	Agriculture	L/M	L	L	+	-	+
11202	Platform	Habitation	M	L	L	+	-	+
11203	Terrace	Habitation	M	L	L	+	+	+
11204	Terrace	Habitation	M	L	L	+	+	+
11205	Terrace	Possible burial	M	L	L/H	+	+	+
11206	Terrace	Habitation	M	L	L	+	-	+
11207	Platform	Habitation	M	L	L	+	+	+
11208	Complex (2)	Indeterminate	M	L/M	L	+	-	+
A	Cairn							
B	Cairn							
11209	Terrace	Habitation	M	L	L	+	+	+
11210	Complex (3)	Agriculture/habitation	M	L	L	+	+	+
A	Terrace							
B	Mound							
C	Mound							
11211	Complex (2)	Agriculture/indeterminate	M	L	L	+	-	+
A	Terrace							
B	L-shape wall							
11212	Platform	Habitation	M	L	L	+	-	+
11213	Platform	Possible burial	M	L	L/H	+	+	+
11214	C-shape	Habitation	M	L	L	+	-	+
11215	Enclosure	Habitation	M	L	L	+	-	+

APPENDIX B

SITE DESCRIPTIONS

SITE NO.: State: 2077 (Figure B-1)

PHRI: 451-161

SITE TYPE: Cave

TOPOGRAPHY: Undulating pahoehoe bedrock terrain with a soil mantle cover. Site is in a low spot.

VEGETATION: *Koa-haole* (*Leucaena glauca*), purslane (*Portulaca oleracea*), and *opiuma* (*Pithecellobium dulce*) tree.

CONDITION: Fair-good

INTEGRITY: May be partially altered by pot hunters

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-refuge

DIMENSIONS: 72.00 m by 10.00 m by 3.00 m (approx.)

DESCRIPTION: Site 2077 and 3822 is Reinecke's (n.d.) Site J, based on dimensions and location. "Much midden, including *kukui* nut, *opihi*, *Conus* sp., cowrie, *pipipi*, vana (pencil), coral, coconut, and charcoal, artifacts include *poi* pounder, coral abrader, and bread loaf sinker, [also scoria abrader], impressive stone wall blocking cave passage, access is through small crawl way, a second entry is closed off with stones, good research potential, good potential for restoration and development" (Ching et al. 1973).

The entrance is 3.4 m wide and open to the west. A wall is constructed at the entrance of the cave. It measures 3.4 m long by 0.9 m wide by 0.6-1.10 m high. This was one of the archaeological sites that was tested by Hammatt et al. The following is from his report (1981:39): "Sediments in the cave were tested by a 50 cm sq trench reduced to 25 cm sq during excavation. Three stratified cultural A horizons are present. Basaltic glass was recovered from all levels of the test trench. This assemblage is comprised of large and small flakes indicating on site flaking. Quantities of midden are present in all layers including mammal bone (dog and pig) and *Neritina cariosa*. The lava tube extends *mauka* from the rear of the cave and its entrance is closed off with a unique uncamouflaged stacked stone structure [eleven-thirteen courses high] with a low, constricted tunnel incorporated into it giving access to the tube. Sediments in the *makai* end of this entrance were swept up and one piece of basaltic glass was recovered. The tube floor is predominantly bedrock and is relatively free of refuge type deposits, i.e., only three small cultural deposits of minor scale. A deposit of charcoal on the tube floor was collected for dating. It is apparent from inside the tube that two entrance tunnels are present in the structure that seals the tube. The second entrance is not visible from the outside of the tube because it probably was used as an escape exit and as such, the entrance was disguised."

SITE NO.: State: 2078

PHRI: 451-148

SITE TYPE: Platform

TOPOGRAPHY: Undulating pahoehoe bedrock terrain with a soil mantle. Site is near the base of a bluff.

VEGETATION: *Koa-haole*, purslane, grasses.

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Ceremonial

DIMENSIONS: 13.00 m by 11.00 m by 2.00 m (approx.)

DESCRIPTION: This platform is possibly Reinecke's (n.d.) Site H, Alainamona Heiau, based on dimensions and location.

According to Hommon and Rosendahl (1983:212), "The surface of the platform is divided into two approximately equal parts. The eastern half is higher than the western (Ching et al. 1973:Map 103, p.214)."

According to Ching et al. (1973:246), "A small platform with two levels, a small pit on top, may not be a *heiau*. Dimensions; of upper platform 12.00 m by 5.00 m by 0.50 m, of lower level 12.00 m by 5.00 m by 1.50 m."

According to Allen Field Records 1983, several waterworn cobbles and pebbles were visible on the surface, along with a possible fallen upright near the back of the second terrace.

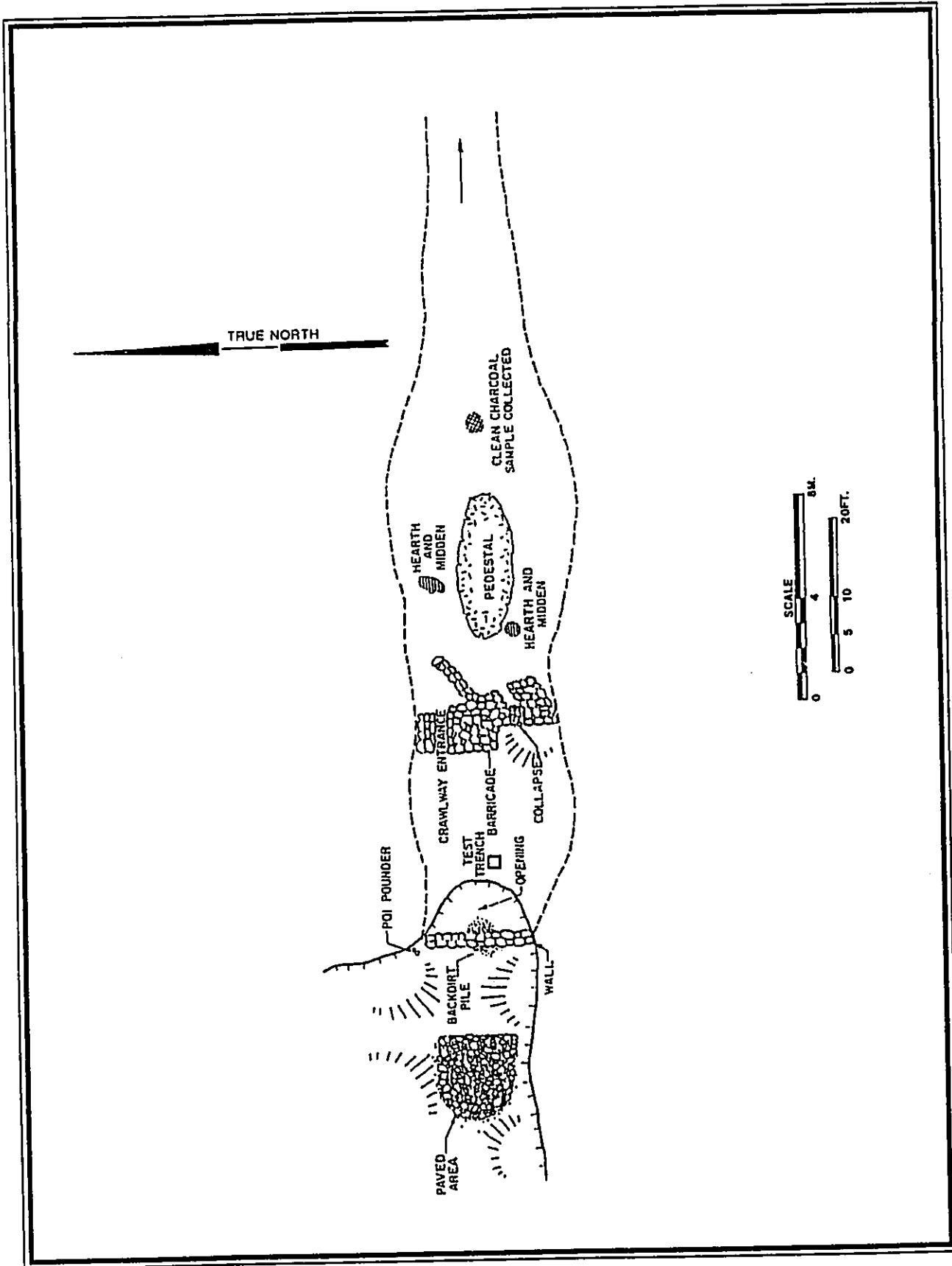


Figure B-1. Site 2077 (from Hammatt et al.)

SITE NO.: State: 2079

SITE TYPE: Cave

TOPOGRAPHY: Undulating pahoehoe bedrock terrain.

VEGETATION: *Koa-haole* and scattered *opiuma*.

CONDITION: Good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 18.00 m by 10.00 m by 1.90 m (approx.)

DESCRIPTION: "The site form for site 37-2079 (in the HRHP file for the Kahalu'u Historic District, Site 37-4150) notes that in 1970, a small tube off the larger of the two chambers included human skeletal remains and fragments of a gourd shell...At the entrance of the larger chamber is a triangular bodied human figure petroglyph" (Hommon and Rosendahl 1983:220).

"Lava tube shelter with two entrances, 5.00 meters apart. Entrance 1[A], measuring 2.00 by 0.70 meters, leads to a chamber measuring 4.60 by 2.00 by 0.90 meters floor to ceiling height" (Hommon and Rosendahl 1983:220). A small terrace c. 0.40 m high is located across this entrance.

"Entrance 2[B], measuring 2.50 by 1.30 meters leads to a chamber measuring 6.50 by 5.00 by 1.90 meters floor to ceiling height. Both chambers contain cultural deposits and surface portable items including fragments of mollusc shell and bone and coconut shell and a small whetstone" (Hommon and Rosendahl 1983:220). Also noted were three coral abraders and waterworn basalt and coral.

PHRI: 451-157

SITE NO.: State: 3822

SITE TYPE: Platform

TOPOGRAPHY: Situated on a pahoehoe bedrock rise

VEGETATION: *Koa-haole*, *kiawe* (*Prosopis pallida*) and purslane.

CONDITION: Good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Ceremonial

DIMENSIONS: 36.00 m by 24.00 m by 1.90 m (approx.)

DESCRIPTION: Site 2077 and 3822 is Reinecke's (n.d.) Site J, based on dimensions and location. "Large platform, measuring at least 36.00 by 24.00 meters including at least 15 rectangular terraces and platforms at various levels, as well as mounds, low walls, and depressions. Smaller platforms [Site 6408] near and adjacent to the *heiau*, including one set of structures attached to the northeast corner are probably grave monuments, and the *heiau* itself may contain graves as well" (Hommon and Rosendahl 1983:203).

Site 3822 is a well-constructed platform of blocky basalt boulders and cobbles stacked two to seven courses high. According to Hommon and Rosendahl Field Notes 1983, "scattered midden and ecofactual materials suggest several areas off the *heiau* which would be good for excavation...adjacent areas should be tested, as increased accessibility will adversely impact sites". To the northwest is a scatter of volcanic glass, waterworn basalt pebbles, cowrie, *Conus* sp., and a basalt flake.

"According to John Reinecke (1930) quoted in the HRHP Kahalu'u Historic District Site File, Halela'au Heiau 'was the residence of a king', a very unusual function for a *heiau*, since such structures usually served only ritual purposes. He goes on to note that the structure here referred to as Site 37-6414, was 'the residence of the *kahuna* attached to Halela'au Heiau'. Halela'au Heiau is clearly of high significance in terms of research and interpretive value, as an example of a major class of religious structure whose traditional name had been preserved until the early 20th century. Such structures also are of intrinsic value to members of the Hawaiian community" (Hommon and Rosendahl 1983:203).

"This *heiau* is an element of the Kahalu'u Historic District, a site on the National Register of Historic Places, and is undoubtedly of sufficient significance for inclusion on the Hawaii Register of Historic Places as well. This *heiau* and its associated features should be preserved intact, and protected from secondary impacts of construction and eventual use of Ali'i Drive. Secondary impact would include, but not be limited to physical damage to the *heiau* structure by construction related activities and structural deterioration resulting from increased pedestrian activity made possible by easier access to the *heiau* from a realigned Ali'i Drive." (Hommon and Rosendahl 1983:203.) During the present survey (1988), the *papamu* board was not relocated.

SITE NO.: State: 3823 (Figure B-2)

SITE TYPE: Complex(2 Features)

TOPOGRAPHY: On a low bluff overlooking the ocean. Areas outside the terrace are gently sloping to undulating.

VEGETATION: *Koa-haole*, *opiuma*, *kiawe*, grasses and air plants (*Bryophyllum pinnatum*).

CONDITION: Fair-good

INTEGRITY: Unaltered-partially disturbed by nursery construction

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Ceremonial

DESCRIPTION: Site 3823 is Reinecke's (n.d.) Site F, Pa O Umi Heiau, based on dimensions and location. During the 1983 survey, it was noted that the areas surrounding the *heiau* had been highly disturbed one degree or another. To the west, the area has been bulldozed for a roadway as well as for laying down a waterline. To the east and south, the area has been disturbed by the construction of the nursery.

FEATURE A: Walled platform

FUNCTION: Ceremonial

DIMENSIONS: 40.00 m by 30.00 m by 2.30 m (approx.)

DESCRIPTION: According to Hommon and Rosendahl (1983), this feature was built "...with walls up to 2.50 meters wide and 2.30 meters high, constructed of fragments of pahoehoe and aa. The interior of the structure is paved with aa cobbles and pebbles, and, in the northeast corner, with aa boulders. At the northwest corner of the structure are several mounds of stone. Abutting the exterior of the west wall of the enclosure is a terrace, 15.00 by 7.00 by up to 0.5 meters high. Steps lead from the terrace to the enclosure. At the foot of the terrace is a 0.50 by 0.50 meter excavation [probably Hammatt et al. 1981]...In the bulldozer cut west of the site were marine mollusc shells, and basalt, coral waterworn cobbles and pebbles."

"Pa O 'Umi Heiau is clearly of great significance in terms of research and interpretive value both as an example of a major class of religious structure whose traditional name had evidently been preserved until the early 20th century (when it was recorded by Stokes) and more specifically as a *heiau* of specific traditional function that is related to one of the best known ancient Hawaiian chiefs. Such structures are also of intrinsic value to members of the Hawaiian community." (Hommon and Rosendahl 1983:108).

"This *heiau* and its directly associated features should be preserved intact and protected from secondary impacts of the construction and eventual use of Ali'i Drive. Secondary impacts would include but not be limited to physical damage to the *heiau* structure by construction activities and structural deterioration as a result of increased pedestrian activity made possible by easier access to the *heiau* allowed by the presence of Ali'i Drive." (Hommon and Rosendahl 1983:109).

FEATURE B: Cave

FUNCTION: Habitation

DIMENSIONS: 9.00 m by 5.00 m by 1.65 m (approx.)

DESCRIPTION "About 15.00 meters north of the corner of the enclosure is an oval, 7.00 by 3.00 meter enclosure formed by a 0.50 meter high wall and a bedrock outcrop. A hole in the bedrock leads to a lava bubble. Water-worn cobbles and pebbles and a water-worn coral pebble were found on and around the enclosure" (Hommon and Rosendahl 1983:108).

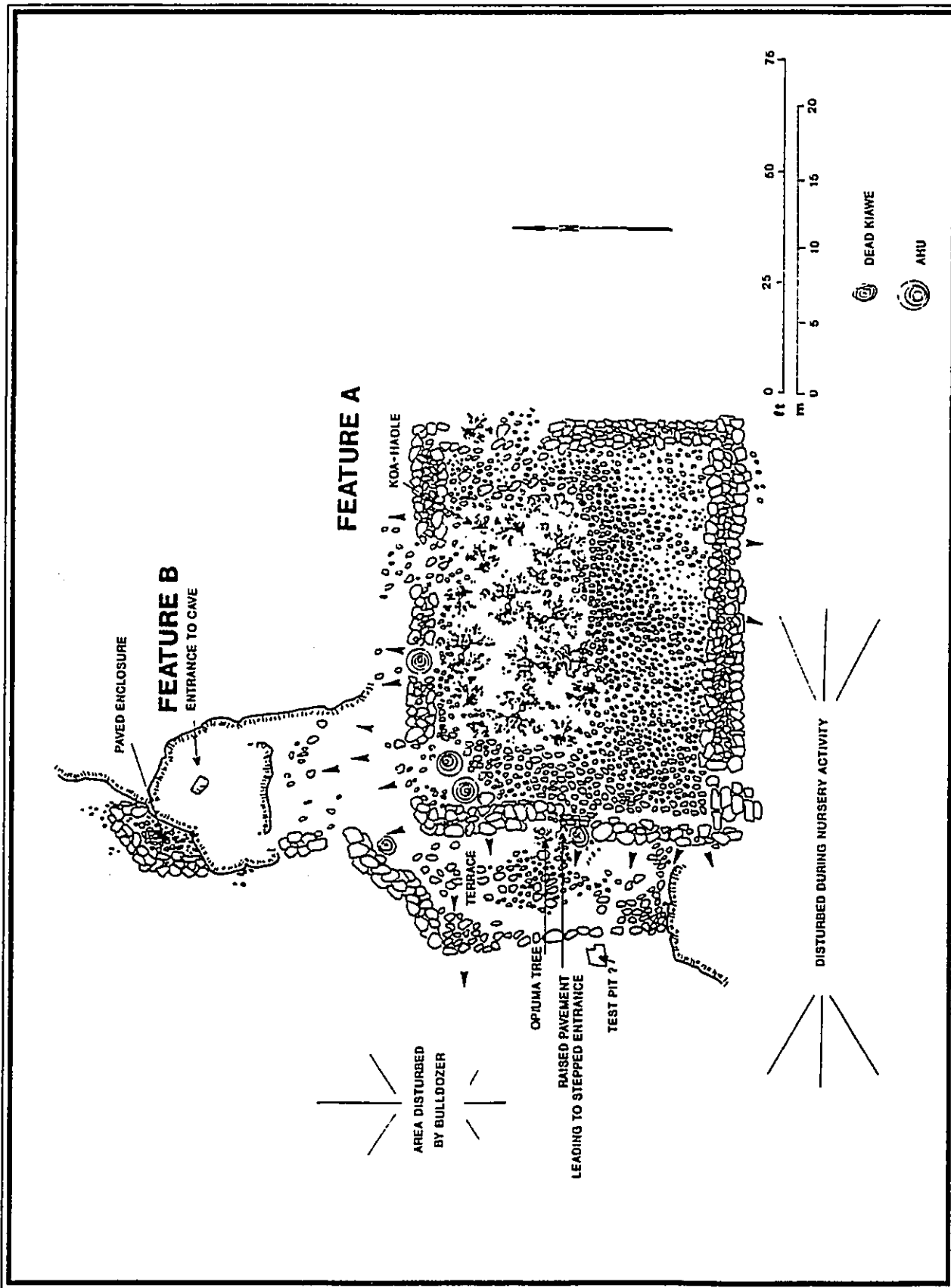


Figure B-2. Site 3823

The cave entrance opens northwest. It is 1.90 m long by 0.90 m wide by 0.90 m deep. An alignment of boulders is present on the west half of the cave surface. It is oriented east-west, with a width of 0.45 m. The ceiling heights range from 0.75 m to 1.65 m. This small cave "was tested with a 0.50 meter by 1.00 meter trench located 2.00 meters from the blister entrance. One piece of basaltic glass and three to four pieces of *kukui* nut shell fragments were collected from the sifting screen." (Hammatt et al. 1981:41).

SITE NO.: State: 4649

PHRI: 451-47

SITE TYPE: Complex(4 Features)

TOPOGRAPHY: Undulating aa flows with older pahoehoe flow to the north. Site is on a raised bedrock outcrop.

VEGETATION: *Koa-haole*, purslane, *koju* (*Acacia farnesiana*), and Christmas-berry (*Schinus terebinthifolius*).

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 19 m (east-west) by 13 m (north-south).

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 5.00 m by 0.70 m (approx.)

DESCRIPTION: The terrace is irregularly shaped. It is west of Feature B, and may have abutted it at one time. The retaining wall extends west c. 2.60 m and curves south c. 1.60 m. Large to medium aa boulders are stacked and faced three to four courses along portions of the exterior face. The wall is c. 0.60 m wide, slightly raised, but sloping in profile along the interior (north) side for one course. The terrace interior is uneven, with outcropping and boulders and cobbles. A rubble mound is on the surface at the northwest corner. Its dimensions are 1.10 m by 0.80 m by 0.60 m high. The mound is of piled aa boulder and cobble construction. It is irregularly shaped in plan view, centrally raised, with sloping sides. Feature A lies at the seaward end (base) of the raised outcrop.

FEATURE B: Terrace

FUNCTION: Habitation

DIMENSIONS: 8.00 m by 7.00 m by 1.10 m (approx.)

DESCRIPTION: It is constructed along the south perimeter of a bedrock outcrop. Feature A is immediately west of Feature B and may have abutted Feature B in the past. The feature is roughly rectangular in plan. It is raised on portions of the east, west and south sides. It is collapsing on the remaining portions, especially the southeast corner, the southwest corner and along the west side. It is raised from two courses on the east side, three to five courses on the south side, and three courses on the west. It is constructed with aa boulders along the perimeter and with aa cobbles and boulders as terrace fill. The surface is roughly level with bedrock outcrop and fill. The terrace abuts the seaward edge of Feature D. Feature B contains a slab-lined firepit on the terrace surface. The dimensions of the firepit are 0.70 m (east-west) by 0.60 m (north-south).

FEATURE C: Boulder level area

FUNCTION: Habitation

DIMENSIONS: 3.00 m by 1.80 m by 0.35 m (approx.)

DESCRIPTION: Immediately south and abutting the base of Feature B is a level area constructed with blocky aa boulders. It is raised on portions of the west side with single boulder facings. It is c. 1.10 m below the surface of Feature B. This may have been a terraced area.

FEATURE D: Terrace

FUNCTION: Habitation

DIMENSIONS: 8.00 m by 5.00 m by 0.80 m (approx.)

DESCRIPTION: Feature D terrace abuts Feature B to the east. It is raised and stacked three to five courses on the south and portions of the west side. There is a large boulder at the southwest corner. The surface is roughly level, with boulders and cobbles and bedrock outcropping. A rubble mound, roughly square in plan, is located at the northwest corner of the terrace surface. It is 1.20 m (east-west) by 1.10 m (north-south) and is constructed of piled aa boulders to a height of 0.65 m.

SITE NO.: State: 4650 (Figure B-3)
SITE TYPE: Walled terrace
TOPOGRAPHY: Undulating and sloping aa flows
VEGETATION: *Koa-haole*, air plants, and *kolu*.
CONDITION: Poor-fair
INTEGRITY: Unaltered to partially altered by Site 7666, Cart Road
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DIMENSIONS: 26.00 m by 9.00 m by 1.50 m (approx.)
DESCRIPTION: Site 7666, Cart Road, appears to bisect the site. Site 7666 is present at the bedrock outcropping seaward of Site 4650. The north and south alignments continue intermittently inland into Site 4650, bisect it into a north and south half and continue east as rubble alignments, for at least 10.00 m more. The terrace surface is fairly level with boulders and cobbles. A possible cupboard is present in the NE corner. There are low retaining walls along the interior pavement on the east side roughly C-shape in plan view. Blocky pahoehoe boulder stacked walls are constructed on the north, west and south sides above the terrace surface.

PHRI: 451-212

Within the north half, the walls are stacked three courses and 0.50-1.20 m high and 0.80-1.00 m wide. The south half has higher walls than the north half. They are constructed with aa boulders, stacked six to seven courses and 0.80-1.80 m high. The south wall is c. 1.10 m wide and is stacked and faced on both the interior and exterior sides. Portions of the SW corner are collapsing. The west wall of the south half is of similar construction. Blocky pahoehoe and aa boulders are stacked four courses high. The terrace surface in the south half is cobble and boulder filled, and partially paved. Abutting this paved area NW is a raised C-shape that is open to the northwest. Natural depressions in the aa flows might have been used as planting areas.

SITE NO.: State: 4651
SITE TYPE: Complex(2 Features)
TOPOGRAPHY: Aa flow, sloping west (seaward). The site is on an outcrop area with little vegetation
VEGETATION: Moderate to dense *koa-haole*, scattered *opiuma*, *pua-pilo* (*Capparis sandwichiana*), and Christmas-berry
CONDITION: Poor-fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Markers
DESCRIPTION: Overall complex area measures c. 15.00 m by 10.00 m with one waterworn boulder near Feature A.

FEATURE A: Cairn
FUNCTION: Marker

DIMENSIONS: 3.20 m by 2.60 m by 0.80 m (approx.)
DESCRIPTION: This cairn is roughly oval shape in plan. It is constructed of stacked aa boulders and cobbles. The cairn is raised and resembles a small platform. The cairn is formally faced on the northeast and southwest sides, but rounded or sloping in profile on the northwest and southeast sides.

A small mound is built upon the cairn's surface. The mound is raised on the SW side, but is not formally faced. This mound measures c. 1.00 m by 0.80 m by 0.50 m in height.

FEATURE B: Cairn
FUNCTION: Marker

DIMENSIONS: 1.30 m by 0.90 m by 0.21 m (approx.)
DESCRIPTION: This low cairn is roughly oval in plan. It is constructed of piled aa boulders and cobbles. The cairn is centrally raised, but its sides are not formally faced. At present, it resembles a rubble pile. The cairn is built on a roughly level aa cobble surface. This aa cobble surface appears to be raised at the southeast corner and resembles a terrace. The level aa cobble surface measures c. 3.60 m (east-west) by 5.60 m (north-south) by 0.40 m in height.

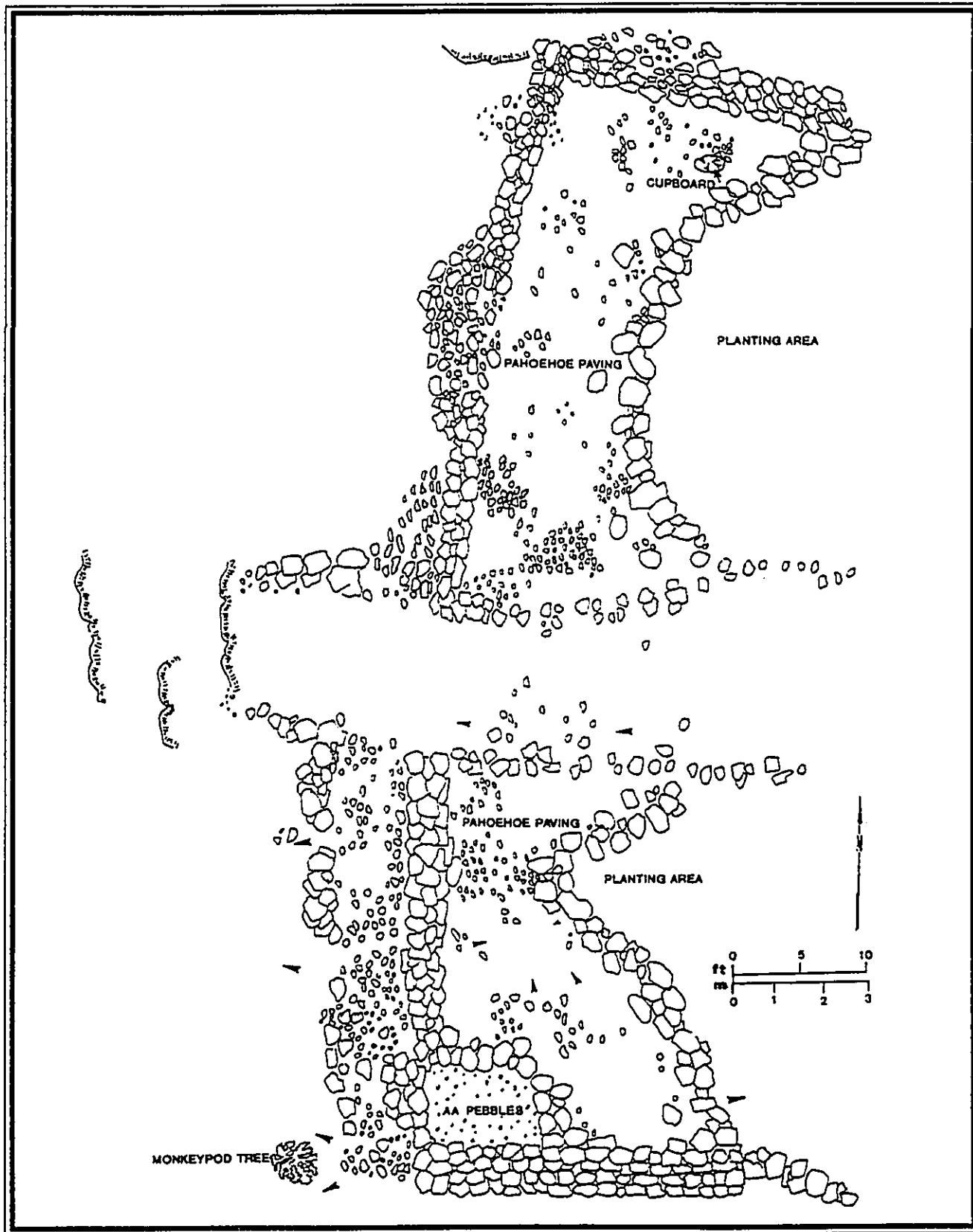


Figure B-3. Site 4650

SITE NO.: State: 4652 (Figure B-4)

PHRI: 451-213

SITE TYPE: Double terrace

TOPOGRAPHY: Undulating pahoehoe and aa flows

VEGETATION: *Koa-haole*, purslane, indigo (*Indigofera suffruticosa*) and grass

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 7.50 m by 4.00 m by 1.20 m (approx.)

DESCRIPTION: This double terrace has an upper level constructed of blocky pahoehoe boulders, with an upright located at the base of the SW corner. It is stacked and faced two to five courses on the south and portions of the west side. It is collapsed along the north and east sides. The dimensions of this upper terrace are c. 4.60 m (east-west) by 4.00 m (north-south) by 0.20-1.20 m high. The surface is slightly level with boulder and cobble fill.

Abutting the west side and c. 0.50 m below the upper terrace is a lower terrace measuring c. 4.00 m (north-south) by 3.00 m (east-west) by 0.30-0.40 m high. It is not formally faced or stacked. There is a lava tube section that is not modified, c. 3.00 m and 203° from the southwest corner of the lower terrace.

SITE NO.: State: 4653

SITE TYPE: Complex(2 Features)

TOPOGRAPHY: Situated on a slightly undulating aa flow that has a cover of vegetation. Feature A is on a slightly elevated and leveled aa area.

VEGETATION: Predominantly *koa-haole* and air plants, with purslane, *kolu*, and vines

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-indeterminate

DESCRIPTION: Overall complex area measures c. 20.00 m (north-south) by 18.00 m (east-west).

FEATURE A: Wall

FUNCTION: Indeterminate

DIMENSIONS: 5.00 m by 0.60 m by 0.60 m (approx.)

DESCRIPTION: The wall is oriented east-west. It is a short section constructed with blocky pahoehoe and aa boulders piled on top each other. A single large boulder lies on top the smaller boulder-cobble piled base. The wall is not formally faced, and is constructed on top of an aa flow with bedrock outcrop.

A cobble area is immediately west of the wall. The surface is slightly level with aa cobbles, pebbles and small boulders. Not formally constructed, the area measures c. 4.00 m (east-west) by 3.50 m (north-south).

FEATURE B: Lava tube cave

FUNCTION: Habitation

DIMENSIONS: 15.00 m by 1.40 m by 0.60 m (approx.)

DESCRIPTION: This lava tube cave does not appear to contain any structural modifications. It is entered through a horizontal opening in a small lava blister. The entrance measures c. 3.05 m (east-west) by 0.45-0.80 m in height. This entrance opens west. The tube contains a smooth pahoehoe bedrock floor and terminates c. 15.00 m inland from the entrance. Three fragments of two cowrie shells (*Cypraea* sp.) octopus lures were present. One fragment was c. 8.00 m in from the entrance, another c. 10.0 m in and the other c. 12.0 m. in from the entrance. The fragments from the areas 8.00 m and 12.00 m in from the entrance fit together. Also present was one whole *kukui* nut shell.

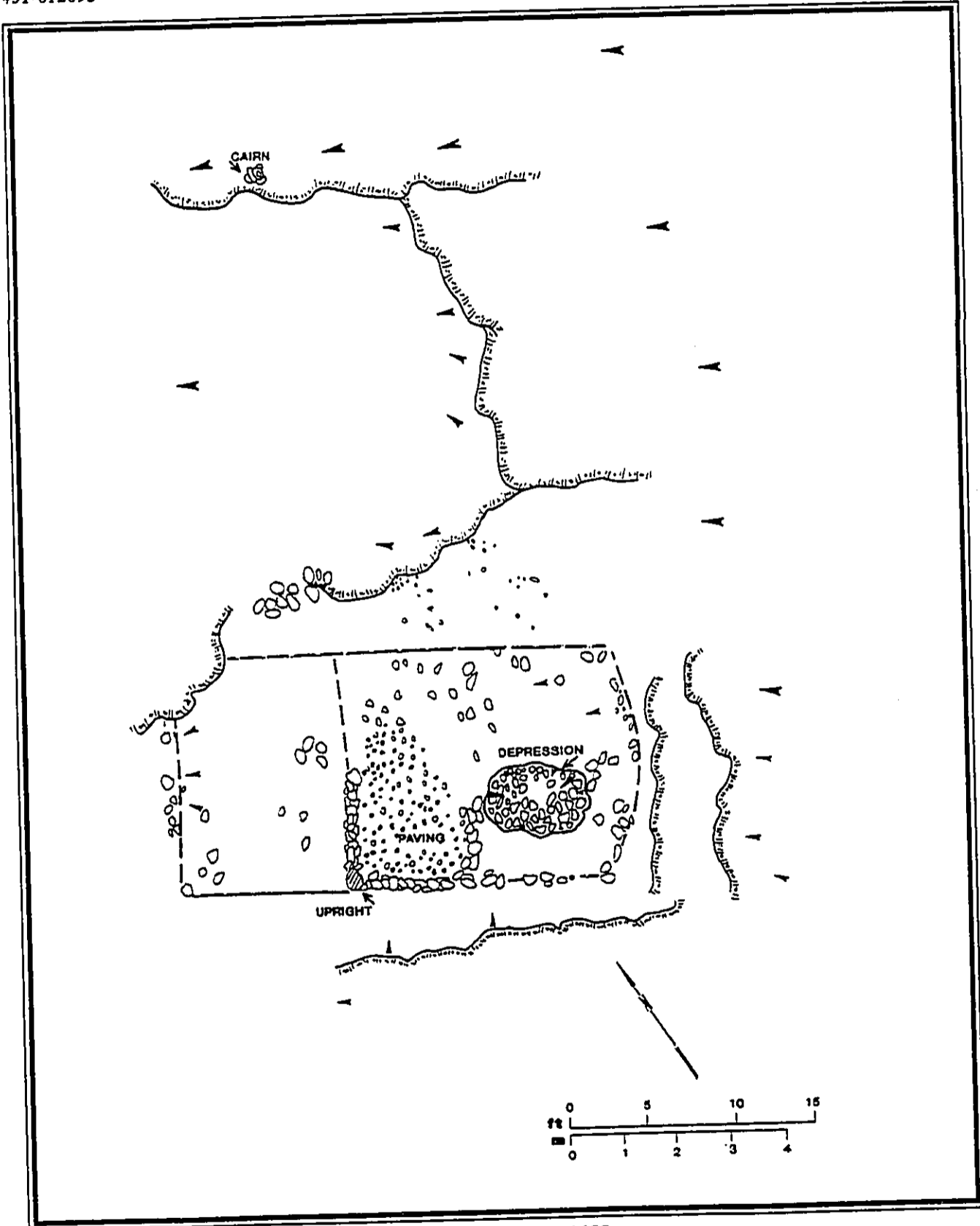


Figure B-4. Site 4652

SITE NO.: State: 4654
 SITE TYPE: Stepping stone trail
 TOPOGRAPHY: Gently undulating aa flow.
 VEGETATION: Dense *koa-haole* with a ground cover of grasses, purslane, '*uhaloa* (*Waltheria americana*).
 CONDITION: Fair
 INTEGRITY: Unaltered
 PROBABLE AGE: Prehistoric
 FUNCTIONAL INTERPRETATION: Transportation
 DIMENSIONS: 120.00 m by 0.70 m by 0.00 m (approx.)
 DESCRIPTION: This site is intermittent over a c. 90.00-120.00 m area. It is constructed with flat pahoehoe slabs set into the surface of the aa flow. There is an inland continuation of this site that was given a temporary number 451-210 during the present survey.

PHRI: 451-210/214

SITE NO.: State: 4655
 SITE TYPE: Complex(11 Features)
 TOPOGRAPHY: Gentle sloping aa flow.
 VEGETATION: *Koa-haole*, Christmas-berry, grasses, *kiawe*, *opiuma*.
 CONDITION: Poor-fair
 INTEGRITY: Unaltered to partially disturbed
 PROBABLE AGE: Prehistoric
 FUNCTIONAL INTERPRETATION: Habitation-agriculture-indeterminate
 DESCRIPTION: Western sections were noted to be bulldozed during the 1983 survey. Site complex is vague and indistinct. The following site and feature descriptions are as described by Hammatt and Folk (1980:100,101). "This site complex is situated on a clear aa flow of cobbles and boulders and is presumed to be a small habitation and agricultural area. Site features include a walled platform, an *ahu*, six planting depressions, a walled depression, two partial enclosures, a modified bedrock bluff, and a 30-foot wall."

PHRI: 451-221

FEATURE A: Wall
 FUNCTION: Habitation
 DIMENSIONS: 9.20 m by 1.50 m by 0.75 m (approx.)
 DESCRIPTION: "Feature 1 [A] is a wall. The wall is of stacked construction except on the east end where it is single [aa] boulder construction. The wall partly encloses an area of 19 by 27 feet; its southeast border is an aa bluff with a low (1.5 feet in height) lava blister which may have been used as a cupboard" (Hammatt and Folk 1980:100).

FEATURE B: Cairn
 FUNCTION: Indeterminate
 DIMENSIONS: 1.40 m by 1.40 m by 0.75 m (approx.)
 DESCRIPTION: "Feature 2 [B] is an *ahu* [cairn]. Its circular base measures 4.5 feet in diameter, 2.5 feet maximum height. It is situated 18 feet northeast of Feature 3 [C]" (Hammatt and Folk 1980:100).

FEATURE C: Walled platform
 FUNCTION: Habitation
 DIMENSIONS: 7.00 m by 2.90 m by 0.45 m (approx.)
 DESCRIPTION: "Feature 3 [C] is a walled platform, roughly rectangular in shape...and is constructed with aa cobbles. The northern half is slightly lower (.5 feet) than the southern half. The platform is situated 11 feet north of Feature 1 [A]" (Hammatt and Folk 1980:100). This feature is vague, crude, and indistinct.

FEATURE D: U-shaped pit
 FUNCTION: Agriculture
 DIMENSIONS: 1.80 m by 1.20 m by 0.60 m (approx.)

DESCRIPTION: "Feature 4 [D] is an U-shaped depression [pit], 4 by 6 feet. The walls have a height of 2 feet above the floor of the depression and are constructed with aa cobbles. It is situated 2 feet from the northeast corner of Feature 3 [C]" (Hammatt and Folk 1980:100).

FEATURE E: Pit

FUNCTION: Agriculture

DIMENSIONS: 2.00 m by 2.00 m by 0.60 m (approx.)

DESCRIPTION: "Feature 5 [E] is a probable planting area. It is a depression [pit] in the aa, circular in shape, with a diameter of 7 feet and depth of 2 feet. The surface consists of aa cobbles. An unmodified waterworn cobble is present in the depression" (Hammatt and Folk 1980:100).

FEATURE F: Enclosure

FUNCTION: Indeterminate

DIMENSIONS: 3.40 m by 3.00 m by 0.60 m (approx.)

DESCRIPTION: "Feature 6 [F] is a partial enclosure situated about 3.5 feet east of the north end of Feature 1 [A] wall. The enclosure measures 10 by 11 feet, with walls 2 feet high and 2 feet wide. The walls are constructed of large aa cobbles" (Hammatt and Folk 1980:100-101). This feature is vague, crude and indistinct.

FEATURE G: Mound

FUNCTION: Agriculture

DIMENSIONS: 2.40 m by 1.20 m by 0.60 m (approx.)

DESCRIPTION: "Feature 7 [G] is a possible clearance mound, measuring 4 by 8 feet, and 2 feet high. The mound consists of aa cobbles stacked on a bedrock bluff" (Hammatt and Folk 1980:101).

FEATURE H: Pit

FUNCTION: Agriculture

DIMENSIONS: 2.40 m by 1.50 m by 0.45 m (approx.)

DESCRIPTION: "Feature 8-11 [H-K] are probable planting depressions [pit], oval and circular in shape, ranging from 4 by 5 feet to 6 by 8 feet in size, and average 1.5 feet in depth. Only Feature 10 [J] contains soil deposits. An upright aa boulder is situated 6 feet south of Feature 1 [A]. Although no midden or artifacts were found, several dense basalt manuports (two boulders and several cobbles) were found in the site area" (Hammatt and Folk 1980:101).

FEATURE I: Pit

FUNCTION: Agriculture

DIMENSIONS: 2.40 m by 1.50 m by 0.45 m (approx.)

DESCRIPTION: "Feature 8-11 [H-K] are probable planting depressions [pit], oval and circular in shape, ranging from 4 by 5 feet to 6 by 8 feet in size, and average 1.5 feet in depth. Only Feature 10 [J] contains soil deposits. An upright aa boulder is situated 6 feet south of Feature 1 [A]. Although no midden or artifacts were found, several dense basalt manuports (two boulders and several cobbles) were found in the site area" (Hammatt and Folk 1980:101).

FEATURE J: Pit

FUNCTION: Agriculture

DIMENSIONS: 2.40 m by 1.50 m by 0.45 m (approx.)

DESCRIPTION: "Feature 8-11 [H-K] are probable planting depressions [pit], oval and circular in shape, ranging from 4 by 5 feet to 6 by 8 feet in size, and average 1.5 feet in depth. Only Feature 10 [J] contains soil deposits. An upright aa boulder is situated 6 feet south of Feature 1 [A]. Although no midden or artifacts were found, several dense basalt manuports (two boulders and several cobbles) were found in the site area" (Hammatt and Folk 1980:101).

FEATURE K: Pit

FUNCTION: Agriculture

DIMENSIONS: 2.40 m by 1.50 m by 0.45 m (approx.)

DESCRIPTION: "Feature 8-11 [H-K] are probable planting depressions [pit], oval and circular in shape, ranging from 4 by 5 feet to 6 by 8 feet in size, and average 1.5 feet in depth. Only Feature 10 [J] contains soil deposits. An upright aa boulder is situated 6 feet south of Feature 1 [A]. Although no midden or artifacts were found, several dense basalt manuports (two boulders and several cobbles) were found in the site area" (Hammatt and Folk 1980:101).

SITE NO.: State: 4656 (Figure B-5)

PHRI: 451-220

SITE TYPE: Cave

TOPOGRAPHY: Gently sloping pahoehoe lava flow.

VEGETATION: *Koa-haole*, monkeypod (*Samanea saman*), *opiuma*.

CONDITION: Fair

INTEGRITY: Unaltered to partially disturbed

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 7.00 m by 6.00 m by 1.40 m (approx.)

DESCRIPTION: A natural lava bubble cave is at the west end of a bedrock depression. There are two openings to the cave, one of which opens north but is blocked off, and the main entrance, which opens east. This entrance is 2.50 m (north-south) by 1.20 m (east-west) and 1.50 m deep.

"The soil deposit in the bubble [the main chamber] is quite shallow, probably no more than 20 centimeters in depth. Portable items on the surface include shells of *Cellana* sp., *Cypraea* sp., mammal bones, and shells of *kukui* nuts, as well as water-worn boulders and a scraper made from a shell of *Cellana* sp. In the vicinity of the bubble are mounds and pavements" (Hommon and Rosendahl 1983:113).

There are two smaller tubes, one leading east and the other leading southwest from the main chamber. The southwest tube leads to a seaward chamber with no soil deposit on the pahoehoe floor. There are waterworn basalt and coral cobbles, *kukui*, coconut shell, and mammal teeth. The tube continues south, becoming narrow and constricted. It was not explored further.

SITE NO.: State: 4657

SITE TYPE: Wall

TOPOGRAPHY: Gently sloping aa terrain with patches of soil.

VEGETATION: *Koa-haole* and *kiawe*.

CONDITION: Poor (not relocated)

INTEGRITY: Altered (not relocated)

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 6.70 m by 1.06 m by 0.30 m (approx.)

DESCRIPTION: This site was not relocated during the present survey. It may possibly have been destroyed by the nursery, which occupies the area to the north. However, another attempt should be made to relocate it in the future. This site was probably associated with a destroyed site, Site 4658 Enclosure.

Site 4657 "is a low, crudely constructed wall of aa cobbles and basalt, beginning about 3 feet from the northeast corner of the enclosure. The wall is 22 feet long, 3.5 feet wide and averages 1 foot high. The east end of the wall is constructed over a section of a pahoehoe slab stepping stone trail (Site 4654)" (Hammatt and Folk 1980:154).

SITE NO.: State: 4659

SITE TYPE: Lava tube

TOPOGRAPHY: Gently sloping pahoehoe flow.

VEGETATION: *Koa-haole*, *kolu*, *opiuma*, air plant, grasses.

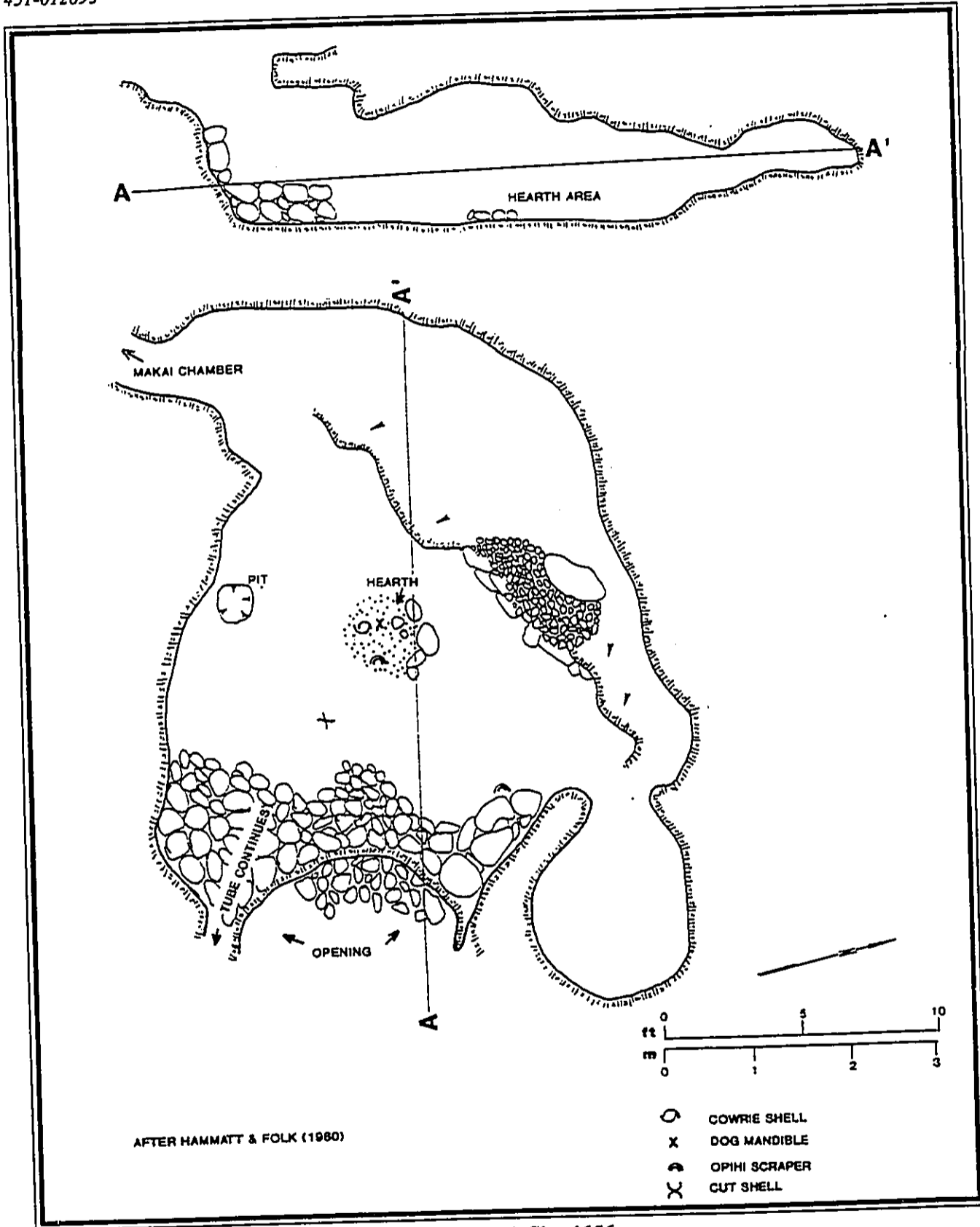


Figure B-5. Site 4656

CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DIMENSIONS: 22.50 m by 5.00 m by 1.50 m (approx.)
DESCRIPTION: "This lava tube has an entrance facing north and measures 10 feet long and 3 feet high. The entrance is collapsed and opens to a narrow tube which is blocked off on the west end. The east end continues for 50 feet before turning northeast and opens into a chamber 40 by 50 feet. The only cultural material found in the chamber is one *kukui* nut and a charcoal concentration 1.5 feet in diameter. No midden deposits or artifacts are present at the tube entrance" (Hammatt and Folk 1980:139).

This is a natural tube with no modifications. The entrance is 18.50 m at 255° from Site 5717, Cairn. The entrance opens east and measures 3.0 m (north-south) by 1.00 m (east-west). The tube passes under a point 2.00 m north of the cairn. Light-admitting cracks in the roof c. 4.00 m beyond the charcoal concentration seem to be at or near the paved trail, ENE of the cairn. There is roof collapse under the paved area in the tube. Voices from the tube can be heard on the surface near the cairn. A portion of *kukui* nut was found on the tube surface.

SITE NO.: State: 4660 PHRI: 451-221
SITE TYPE: C-shaped wall
TOPOGRAPHY: Undulating to sloping aa terrain.
VEGETATION: *Koa-haole* and monkeypod.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DIMENSIONS: 5.00 m by 1.50 m by 0.90 m (approx.)
DESCRIPTION: The C-shape is open to the west. It is constructed with aa boulders and cobbles stacked three courses high. It is crudely faced on the interior side. The floor is roughly level aa cobbles. The wall continues SSE as a low rubble/boulder alignment.

SITE NO.: State: 4661 (Figure B-6) PHRI: 451-219
SITE TYPE: Cave
TOPOGRAPHY: Gently sloping pahoehoe terrain with soil pockets.
VEGETATION: *Koa-haole*, *opiuma*, *kiawe*, *kolu*, and monkeypod.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DIMENSIONS: 6.50 m by 3.00 m by 1.10 m (approx.)
DESCRIPTION: "Lava tube, 5.00 m by 3.00 m by up to 1.10 m in floor to ceiling height. The entrance measures 1.00 m by 0.8 m by up to 1.10 m. Two other entrances were evidently sealed with stones.

Cultural deposit is present and surface portable items include shells of *Cellana* sp., *Nerita* sp., *Cypraea* sp., and *Conus* sp., sea urchin remains, mammal bones and *kukui* nut shells, as well as water worn stones, coral abraders and worked mollusc shells" (Hommon and Rosendahl 1983:119).

"A medium-size lava blister cave, measuring 15 by 29.5 feet, with a ceiling height of 3 feet 2 inches. The floor consists of a bedrock area in the south section. Pahoehoe pebble paving covers much of the floor on the east side and north end. A soil surface is present adjacent to the opening, situated on the west side of the cave. At the southeast end of the cave a low wall divides the interior area with the cave. Present on the surface of the floor area a variety of midden

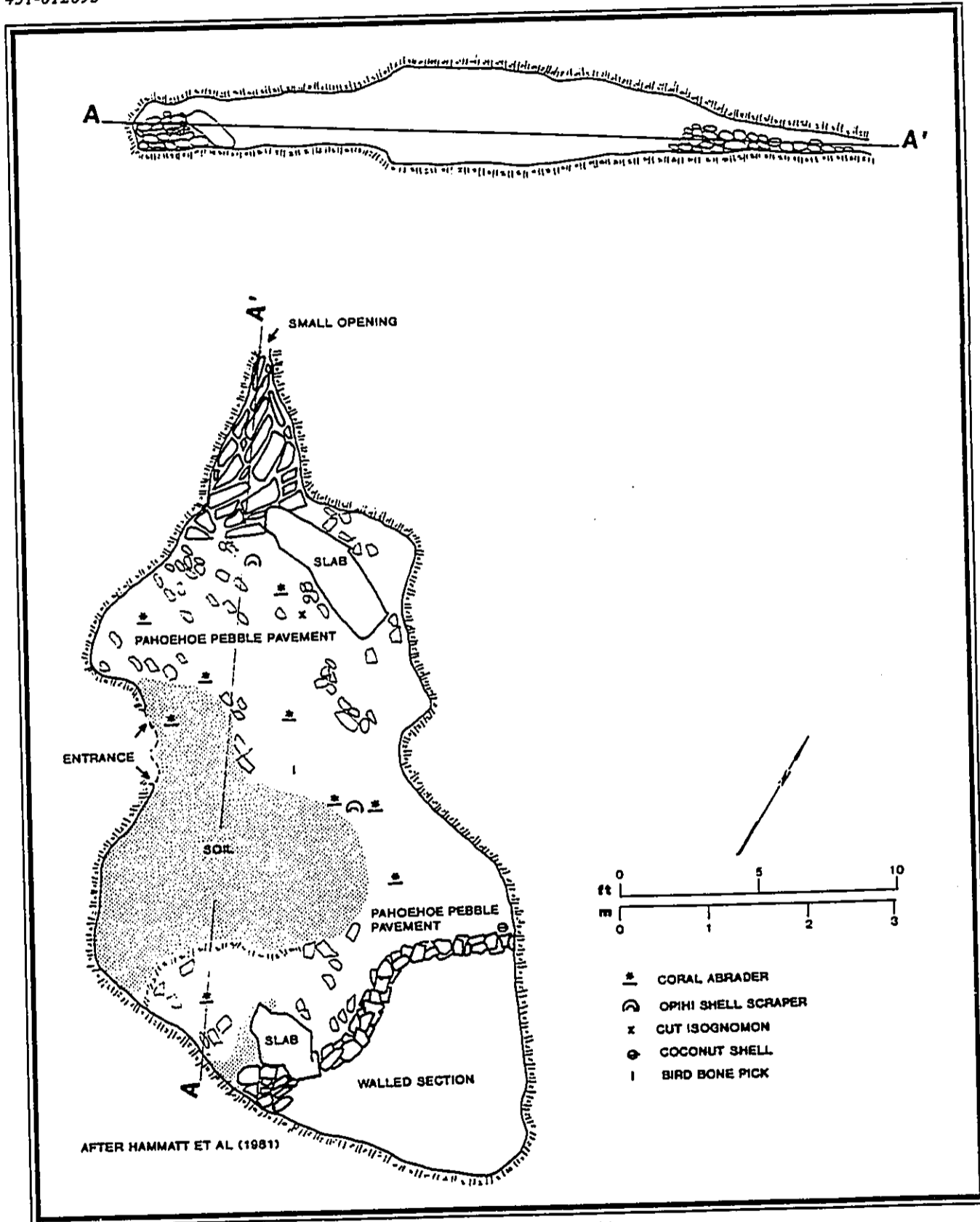


Figure B-6. Site 4661

including sea urchin, *opihi*, *pipipi*, cowrie, cone shells, mammal bone, coconut shell, and scattered *kukui* nut fragments. Artifacts present on the surface include nine coral abraders, two *opihi* shell scrapers, one (bird bone) pick, and one piece of cut *Isognomon* shell" (Hammatt and Folk 1980:139,140).

A three-stone pile (0.30 m high) is on the cave floor near the entrance. There is a possible hearth SE of the cave interior. A possible filled-in lava tube is exterior of the site to the northeast. During the 1983 survey, a wall section, possibly the southern boundary for site complex 4665 was noted in the nearby vicinity. It is c. 1.00 m wide and 0.50 m high and is constructed of aa boulders and cobbles with sections totally destroyed by bulldozing. The length was not determined at that time.

SITE NO.: State: 4665

PHRI: 451-217

SITE TYPE: Complex(17 Features)

TOPOGRAPHY: Gently sloping to undulating pahoehoe flow.

VEGETATION: Dense *koa-haole* with a scatter of *kiawe* and monkeypod

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures 75.00 m (north-south) by 50.00 m (east-west). "This site consists of 17 tightly-clustered features, many of which are contiguous with one another...A description and sketch map of thirteen (13) of these features were prepared during an earlier survey (Hammatt and Folk 1980:Figure 17, p. 43; pp. 101-103)...Four additional features were described during the present survey. In keeping with the previous designation system, they were assigned numbers 14 through 17." (Hommon and Rosendahl 1983:117).

The present 1988 survey relocated most of the previously identified features in Site 4665. However, for consistency, all numeric designated features were re-assigned alphabetically from A through Q.

FEATURE A: Paved area

FUNCTION: Habitation

DIMENSIONS: 3.00 m by 2.00 m by 0.00 m (approx.)

DESCRIPTION: "Feature 1 [A] is a level paving [10 by 7 ft] of pahoehoe cobbles with a few waterworn cobbles and pahoehoe boulders scattered atop the surface. Paving extends into the southeast corner of platform (Feature 3) [C]" (Hammatt and Folk 1980:101). The paved area is east of Feature C with a low, indistinct wall separating Features A and C.

FEATURE B: Terrace

FUNCTION: Habitation

DIMENSIONS: 6.00 m by 4.00 m by 1.00 m (approx.)

DESCRIPTION: Feature B is probably not a clearance mound as described by Hammatt and Folk 1980. This possible terrace is constructed northwest to Feature A. A cupboard in the west wall face with a coral abrader and marine shell inside. Also noted during the present survey (1988) were waterworn rocks on the surface. During the 1983 survey it was noted that behind the boulder bluff is a partially level area 3.50 by 2.30 m with waterworn cobbles, pebbles and few shell pieces and aa paving.

FEATURE C: Terrace

FUNCTION: Habitation

DIMENSIONS: 3.00 m by 3.00 m by 0.60 m (approx.)

DESCRIPTION: The uneven surface of the boulder terrace consists of cobble and pebble fill with a depression in the center. "A pahoehoe cobble fill is located next to the platform's north edge. Possible planting areas are adjacent to this platform in the northwest and northeast corners. A boulder alignment defines the planting area adjacent to the northeast corner. This platform may be a second level to Feature 13 [M] (platform). An extension of this platform consists of pahoehoe boulders and cobbles, creating an uneven surface. An alignment of pahoehoe boulders extends 5.00 feet from the southwest corner" (Hammatt and Folk 1980:101).

FEATURE D: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 6.00 m by 3.00 m by 0.80 m (approx.)**DESCRIPTION:** "Feature 4 [D] is a bedrock [terrace] bluff measuring 10 by 20 feet by 2.5 feet high, with a level surface paving of pahoehoe cobble. A pahoehoe cobble pavement extends 12 by 15 feet north of this bluff [terrace]" (Hammatt and Folk 1980:101).**FEATURE E: Planting area****FUNCTION:** Habitation**DIMENSIONS:** 6.00 m by 4.00 m by 0.76 m (approx.)**DESCRIPTION:** "Feature 5 [E] is a possible planting area measuring 13 by 20 feet, bordered by bedrock and pahoehoe boulders. A few waterworn cobbles and coral cobbles were found on the dirt surface. Surface midden consisted of cowrie shell fragments" (Hammatt and Folk 1980:102). The wall along the west side consists of jumbled boulders.**FEATURE F: Paved area****FUNCTION:** Habitation**DIMENSIONS:** 6.00 m by 4.30 m by 0.45 m (approx.)**DESCRIPTION:** "Feature 6 [F] is an enclosure [paved area] 14 by 20 feet in size, 1.5 feet high, constructed of pahoehoe boulders and paved with pahoehoe cobbles and boulders. In the northeast corner of the enclosure [paved area], pahoehoe cobbles are scattered upon a soil surface, while pahoehoe boulders are mainly in the southwest corner of the enclosure [paved area]. Adjacent (west) to the enclosure [paved area] is a bedrock/soil area measuring 10 by 11 feet" (Hammatt and Folk 1980:102).**FEATURE G: Enclosure****FUNCTION:** Habitation**DIMENSIONS:** 12.20 m by 7.60 m by 1.20 m (approx.)**DESCRIPTION:** "Feature 7 [G] is a platform [enclosure] measuring 25 by 40 feet, 1.5 to 4 feet high, paved with pahoehoe cobbles. In the southwest corner of the platform is a pit [vault] 4 feet in diameter, 2.5 feet deep, paved with pahoehoe boulders and cobbles. Pahoehoe slabs outline/define the pit on the surface. An upright slab in the pit (west side) is a part of the wall face. Extending 18 to 20 feet west from the southwest corner of the platform is a level paving of pahoehoe cobble. Pahoehoe boulders are scattered over this surface. A single coral cobble is located 1.0 feet northwest of datum 4664" (Hammatt and Folk 1980:102). The wall at the north end has large slab uprights.**FEATURE H: Paved area****FUNCTION:** Habitation**DIMENSIONS:** 2.00 m by 2.00 m by 0.00 m (approx.)**DESCRIPTION:** "Feature 8 [H] is a paving of pahoehoe cobbles and boulders which extends into the east corner of Feature 12 [L] (platform). A cowrie shell fragment was found on the surface cobble in the southwest corner" (Hammatt and Folk 1980:102). During the 1983 survey, waterworn pebbles and coral were present on the feature. A possible entrance path was also present to the south.**FEATURE I: Paved area****FUNCTION:** Habitation**DIMENSIONS:** 7.60 m by 1.50 m by 0.00 m (approx.)**DESCRIPTION:** "Feature 9 [I] is a pavement of pahoehoe cobbles 5 by 25 feet in size, with pahoehoe boulders scattered over the surface. A low wall (Feature 10) of pahoehoe boulders is constructed 4.5 feet in the southwest corner of the pavement. The pavement has a well-defined edge on the south side" (Hammatt and Folk 1980:102).**FEATURE J: Wall****FUNCTION:** Indeterminate**DIMENSIONS:** 12.00 m by 1.20 m by 1.00 m (approx.)

DESCRIPTION: "Feature 10 [J] is a low wall of loosely stacked pahoehoe boulders 3-4 feet wide and 40 feet long. The wall is situated 2.5 feet below a paving level (Feature 9 [I]). A small lava blister is located on the north facing, about 20 feet *makai* of datum 4665 (Feature 3 [C]). It may have been utilized as a cupboard. The blister has a level paving of pahoehoe boulders and cobbles" (Hammatt and Folk 1980:102).

FEATURE K: Platform

FUNCTION: Habitation

DIMENSIONS: 4.40 m by 3.40 m by 1.20 m (approx.)

DESCRIPTION: "Feature 11 [K] is a platform, rectangular in shape, measuring 11 by 14.5 feet. The *mauka* section is fairly level; the *makai* section is [faced but somewhat deteriorated] gently sloping to the edge. The exterior edges of the platform are defined by pahoehoe boulders while the surface consists of pahoehoe cobble pavement. Found on the surface are two basalt flakes and one cowrie shell. A waterworm cobble is present adjacent to west (*makai*) edge. The terrain surrounding the platform is very rocky with some soil areas. Also present is exposed pahoehoe bedrock. This is a probable occupation site based on midden and basalt flakes" (Hammatt and folk 1980:103). [A wall alignment near the *makai* edge is c. 2 m long, running basically north-south.

FEATURE L: Platform

FUNCTION: Habitation

DIMENSIONS: 4.60 m by 4.40 m by 0.60 m (approx.)

DESCRIPTION: "Feature 12 [L] is a rectangular platform measuring 14.5 by 15 feet and is constructed with pahoehoe boulders and cobbles. The *mauka* section of the platform surface consists primarily of pahoehoe boulders, creating an uneven surface. The central area to the west (*makai*) edge is paved with pahoehoe cobbles and a few boulders and is fairly level. A short wall 2 by 5 feet by 2 feet high is situated about 4.5 feet from the west edge of the platform surface. It is constructed with pahoehoe boulders and cobbles, loosely stacked, and no facing. The west edge of the platform is deteriorated at the southwest corner. The terrain [sic] surrounding this platform is moderately sloping" (Hammatt and Folk 1980:103).

FEATURE M: Platform

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 3.50 m by 0.80 m (approx.)

DESCRIPTION: "Feature 13 [M] is a roughly rectangular platform 11.5 by 16.5 feet and approximately 1.5 to 2.5 feet high. The surface consists primarily of pahoehoe boulders which create an uneven surface. A small area of small cobble pavement is situated in the center and in the southwest corner. While the platform edges are fairly clear, the facing is deteriorated. The platform surface slopes slightly to the *makai* edge" (Hammatt and Folk 1980:103).

FEATURE N: Lava tube

FUNCTION: Habitation

DESCRIPTION: Lava tube shelter containing midden and one bird bone awl in a niche near the entrance. Also visible is a shallow cultural deposit.

FEATURE O: Paved area

FUNCTION: Habitation

DIMENSIONS: 8.00 m by 7.00 m by 0.00 m (approx.)

DESCRIPTION: "A flat level area, paved with basalt cobbles and pebbles. The north and west sides are bordered by a large single boulder alignment. A few water worm cobbles noted on the paving. Exposed pahoehoe at the SW and SE corners. Feature 16 [P] is c. 4 m to the south" (Hommon and Rosendahl Field Notes 1983).

FEATURE P: Enclosure

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 4.00 m by 1.00 m (approx.)

DESCRIPTION: According to Hommon and Rosendahl Field Notes 1983 "an enclosure with well-built bifaced core filled walls of c. 0.80-1.00 m in ht. by 0.90 m wide. The interior dimensions are c. 3.00 m by 2.00 m. Interior a bit jumbled, the exterior well faced. There are *koa-haole* trees growing in the center. One waterworn cobble noted."

FEATURE Q: Paved area

FUNCTION: Habitation

DIMENSIONS: 14.00 m by 11.00 m by 0.00 m (approx.)

DESCRIPTION: "Pavement, 14 by 11 meters, consisting mainly of pebbles and surrounded on three sides by a rubble wall. A wall, 1.00 m wide by up to 0.50 m high extends south from the south side of this site, then across the width of the realignment corridor...Surface portable items include waterworn basalt cobbles and pebbles, coral cobbles, shells of *Cypraea* sp. and basalt flakes" (Hommon and Rosendahl 1983:117).

SITE NO.: State: 4666

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Situated to the north and at the base of an aa flow.

VEGETATION: *Koa-haole*, purslane, *opiuma*, *kolu*, *pua-pilo*, *ha'uowi* (*Verbena litoralis*)

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Marker-boundary

DESCRIPTION: "Site 4666 is situated on the north edge [and at the base] of a clear aa flow" (Hammatt and Folk 1980:150).

FEATURE A: Cairn

FUNCTION: Marker

DIMENSIONS: 1.20 m by 1.20 m by 1.10 m (approx.)

DESCRIPTION: The cairn is roughly circular in plan and is raised and stacked along most portions. It is constructed with aa boulders and cobbles stacked six courses high. It is collapsing along the north side.

FEATURE B: Wall

FUNCTION: Boundary

DIMENSIONS: 4.00 m by 1.10 m by 1.00 m (approx.)

DESCRIPTION: It is constructed of aa boulders and cobbles stacked five courses high along the seaward edge. The inland side is rubble and collapsing in appearance. The southern end abuts the flow edge.

SITE NO.: State: 4667

SITE TYPE: Wall

TOPOGRAPHY: Undulating aa flow. Site is situated in open area on flow.

VEGETATION: Dense *koa-haole*, scattered monkeypod, *kiawe*, *opiuma*.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Boundary

DIMENSIONS: 7.50 m by 0.50 m by 0.50 m (approx.)

DESCRIPTION: The wall is constructed of crudely stacked aa boulders and cobbles. It is raised slightly, but not formally faced. The wall is also collapsed in places.

SITE NO.: State: 5700

PHRI: 451-120

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Fairly level terrain consisting of pahoehoe bedrock underlying a soil mantle.

VEGETATION: *Koa-haole*, purslane, *kiawe*, and grasses.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial-habitation

DESCRIPTION: Overall complex area measures c. 20.00 m (east-west) by 10.00 m (north-south).

FEATURE A: Mound

FUNCTION: Possible burial

DIMENSIONS: 4.80 m by 3.50 m by 0.70 m (approx.)

DESCRIPTION: Amorphous shape in plan. It is constructed with piled boulders and cobbles. It is partially faced at the NW corner. The remaining sides of the mound are not faced, but are sloping in profile. The mound is partially ringed by a naturally curved pahoehoe bedrock outcrop on the east, south, and west sides. This outcrop makes a soil pocket on which the mound is built.

FEATURE B: Enclosure

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 5.00 m by 0.70 m (approx.)

DESCRIPTION: A low, circular enclosure. The interior dimensions are c. 2.00 m in diameter. There are two possible entrances, one located at the northeast side and the other at the west side. The enclosure is built with piled pahoehoe boulders and cobbles. The west side is terrace-like in appearance. Several other small mounds are located within 25.00 m south and southwest of Feature B.

SITE NO.: State: 5701

PHRI: 451-124

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock outcrop underlying soil mantle.

VEGETATION: Moderate *koa-haole*, purslane, indigo, 'uhaloa, two monkeypod and *opiuma* trees.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 15.00 m (north-south) by 9.00 m (east-west). Additional associated Kona Field System (6601) features consisting of mounds and a possible *kuaiwi* wall are in the area.

FEATURE A: Platform

FUNCTION: Habitation

DIMENSIONS: 4.50 m by 3.50 m by 0.60 m (approx.)

DESCRIPTION: Generally square shape in plan. Raised on four sides, but collapsing and rubble-like in appearance. The west side is still partially faced, and stacked three courses high. The platform is constructed on a bedrock outcrop. The platform surface is roughly level, with boulder and cobble fill. Abutting and at the base of the southwest corner is a 1.70 m (north-south) by 1.20 m (east-west) raised cobble and boulder fill area. It is 0.65 m above the ground surface and also 0.60 m below the platform surface.

FEATURE B: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 9.00 m by 7.00 m by 0.60 m (approx.)

DESCRIPTION: Modified outcrop with a terrace. The outcrop is modified with piled boulders and cobbles atop its surface, creating a low raised wall with no formally faced sides. The wall is centrally raised, with each end curving slightly to the SW. Abutting the outcrop wall to the SW is a terraced soil area with a retaining wall. The retaining wall is raised on the SW side. The wall face is sloping in profile and not formally faced. It is constructed of piled cobbles and boulders. The retaining wall is c. 2.74 m wide. The interior surface is level with soil and loose rocks.

SITE NO.: State: 5702

PHRI: 451-125

SITE TYPE: Modified outcrop

TOPOGRAPHY: Gently undulating terrain of pahoehoe bedrock outcrops and brownish soil mantle.

VEGETATION: Dense *koa-haole*, air plants, and purslane, scattered *kiawe*, *opiuma*, and monkeypod

CONDITION: Very poor

INTEGRITY: Appears unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 7.00 m by 5.00 m by 0.70 m (approx.)

DESCRIPTION: Additional Kona Field System (6601) features consisting of mounds, modified outcrops, and walls are within the area. The pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles piled against its side. On the south side of the pahoehoe bedrock, the piled boulders and cobbles form a vague C-shape or enclosure feature. The enclosure is roughly rectangular shape in plan. The walls are extremely collapsed, 1.60-2.00 m wide, and resemble surface boulder rubble. A small entrance or opening is present in the west wall. The east wall is raised in profile, and one short section appears to be crudely faced. The interior surface consists of pahoehoe bedrock with shallow soil pockets. A small boulder-lined pit or depression is also visible on the modified outcrop, possibly a planting area.

No definite cultural deposit visible, but possibly present subsurface. The site appears unaltered, but rocks may have been moved for the agriculture (*kuaiwi*) wall.

SITE NO.: State: 5703

PHRI: 451-127

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Slightly undulating terrain consisting of pahoehoe bedrock underlying a moderate soil mantle.

VEGETATION: Moderate *koa-haole* and purslane.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Indeterminate

DESCRIPTION: Overall complex area measures c. 11.60 m (NE-SW) by 9.00 m (NW-SE). Proximity to Site 7893 could give this complex a possible burial function.

FEATURE A: Modified outcrop

FUNCTION: Indeterminate

DIMENSIONS: 8.50 m by 6.00 m by 0.85 m (approx.)

DESCRIPTION: Irregular shape in plan. A bedrock outcrop is visible to the north, south and center of the feature. Medium to large boulders and cobbles are piled atop and against the outcrop. There is no formal construction or faced sides. This modified outcrop resembles a low platform/mound.

FEATURE B: Modified outcrop

FUNCTION: Indeterminate

DIMENSIONS: 4.00 m by 3.00 m by 0.80 m (approx.)

DESCRIPTION: A bedrock outcrop located along the SW edge of the feature. Blocky pahoehoe boulders and some cobbles are piled atop and against the outcrop. Somewhat oval shape in plan, it contains raised sides that are not formally faced. The surface interior is roughly level, with boulders and cobbles.

FEATURE C: Platform remnant/mound

FUNCTION: Indeterminate

DIMENSIONS: 4.00 m by 3.60 m by 0.60 m (approx.)

DESCRIPTION: Irregularly shaped in plan, the feature is constructed with uprights along the west end, and boulders and cobbles piled atop. It has a standing face c. 0.75 m in height. The remaining faces are collapsed and rubble. At present, they are one to two boulders high. The surface interior is somewhat level with boulders and some cobbles.

South and west of the feature is a low wall. It is of rubble construction with one to two upright pahoehoe boulders. It is c. 0.70-0.90 m wide, 0.80 m in height and c. 26.00 m in length. A boulder terrace measuring c. 3.00 m (east-west) by 1.50 m (north-south) is situated c. 10.00 m west of Feature C.

SITE NO.: State: 5704

PHRI: 451-129

SITE TYPE: C-shape

TOPOGRAPHY: Gentle slope to even terrain with pahoehoe bedrock outcrop; underlying, a fair amount of soil. Site is inland of *kiawe* grove.

VEGETATION: *Koa-haole* and purslane.

CONDITION: Good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 7.00 m by 6.50 m by 0.70 m (approx.)

DESCRIPTION: Associated Kona Field System (6601) features consisting of mounds and walls are in the area. A bi-faced, core-filled wall is c. 12.00 m and 70° of Site 5704. It is c. 1.00 m wide and is oriented north-south. The C-shape is open to the southwest. The interior side is faced with two to three courses of large, blocky pahoehoe boulders. The exterior side is built against a bedrock outcrop and is even with the ground slope. The C-shape may have been altered by growers, since planters were found atop the structure.

SITE NO.: State: 5705

PHRI: 451-136

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Site is at the base of a ridge slope. The terrain consists of pahoehoe bedrock outcrop with a soil mantle.

VEGETATION: Dense *koa-haole* and purslane, with scattered *opiuma*, *kiawe* and monkeypod.

CONDITION: Poor-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial -indeterminate

DESCRIPTION: Overall complex area measures c. 20.0 m (NW-SE) by 10.00 m (NE-SW). A low rubble wall (east-west) is adjacent to Feature A to the south between Features A and B.

FEATURE A: Platform

FUNCTION: Possible burial

DIMENSIONS: 4.00 m by 4.00 m by 1.00 m (approx.)

DESCRIPTION: The platform is generally square-shaped in plan. It is constructed of stacked, blocky basalt boulders and cobbles. The platform is raised on all four sides, and is formally faced on the NW and NE sides. The SW and SE sides appear crudely faced, with some collapsed portions. The platform contains a larger boulder perimeter with a smaller cobble fill. The platform surface is roughly level. No cultural deposit is visible, but is possibly present subsurface or in the fill.

FEATURE B: Mound

FUNCTION: Indeterminate

DIMENSIONS: 2.80 m by 2.40 m by 0.70 m (approx.)

DESCRIPTION: This mound is generally oval-shaped in plan. It is constructed of crudely stacked, blocky basalt boulders and cobbles. The mound is centrally raised and possibly crudely faced on part of the south side. The remaining sides, especially the northwest side, are rounded or sloping in profile and appear collapsed.

SITE NO.: State: 5706

SITE TYPE: Complex (2 Features)

PHRI: 451-147

TOPOGRAPHY: Seaward edge of a flat soil area.

VEGETATION: *Koa-haole*, purslane, and vines.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DESCRIPTION: Overall complex area measures c. 15.00 m (NW-SE) by 7.00 m (NE-SW). The site is located at the seaward end of a soil area. This soil area is flat and may contain a fair subsurface deposit.

FEATURE A: Platform remnant (Figure B-7)

FUNCTION: Possible burial

DIMENSIONS: 7.00 m by 5.00 m by 1.00 m (approx.)

DESCRIPTION: The feature is irregular to rectangular-shaped in plan. It is raised on all sides and built of blocky pahoehoe boulders and cobbles. A low, rubble, raised linear section bisects the feature into a north and south half. It is collapsing and is c. 0.35 m above the platform surface. The north half of the platform is collapsing and rubble. The south half is stacked along the east, south and west faces, three to four courses high. Uprights are present along the perimeter. Cobbles and smaller boulders are used as fill.

FEATURE B: Mound

FUNCTION: Possible burial

DIMENSIONS: 3.50 m by 3.00 m by 0.35 m (approx.)

DESCRIPTION: Rectangular in plan, the feature may represent a platform remnant. A boulder alignment consisting of three large boulders is present at the north corner. Other large, loose boulders are visible along the perimeter. This mound may have been boulder-lined. At present, it is of piled construction with boulders and cobbles as fill. A low spot/depression is present in the center of the mound.

SITE NO.: State: 5707

SITE TYPE: C-shape

PHRI: 451-153

TOPOGRAPHY: Seaward of a flat soil area and at the top of a sloping to undulating terrain consisting of pahoehoe bedrock outcrop and soil.

VEGETATION: Moderate to dense air plants, some *koa-haole*, purslane and indigo.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 8.00 m by 6.00 m by 0.80 m (approx.)

DESCRIPTION: Open to the south. The interior of the C-shape is constructed of piled, medium sized, blocky pahoehoe boulders. Portions of the wall are collapsing. The exterior is mostly even with the ground slope. The NW exterior is slightly raised. It is c. 1.50 m wider, higher and longer than the southeast wall. The southeast wall consists of a few piled boulders. The interior is level with soil and loose rocks.

SITE NO.: State: 5708

SITE TYPE: Complex (3 Features)

PHRI: 451-165

TOPOGRAPHY: Gentle undulating slope consisting of pahoehoe bedrock underlying a soil mantle.

VEGETATION: *Koa-haole*, air plants, *kiawe*, and purslane.

CONDITION: Poor-fair



Figure B-7. Site 5706, Feature A. (Neg. 957-11a)

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 25.00 m by 25.00 m. No definite cultural deposit is visible, but may be present subsurface.

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 6.50 m by 3.00 m by 0.70 m (approx.)

DESCRIPTION: The terrace is constructed of crudely stacked, blocky basalt boulders and cobbles. The terrace is raised on the north and west sides, but it is not formally faced.

The sides are generally collapsed rubble and are rounded or sloping in profile. Although the terrace sides are collapsed, several upright boulders are visible in the original face. The terrace surface is slightly uneven and consists primarily of basalt cobbles underlying basalt boulder rubble.

A crude, L-shaped rubble wall (measuring c. 4.00 m [east-west] by 4.00 m [north-south] long and 1.25-2.00 m wide by 0.20-0.50 m in height) is built downslope (west) and abuts the terrace to the west. The L-shaped rubble wall is constructed of piled blocky basalt boulders and cobbles. The sides are raised slightly, but are collapsed and rounded or sloping in profile. Several boulders on the westernmost side of the rubble wall appear to be set upright and are probably the original foundation stones. This westernmost side of the rubble wall is vaguely terrace-like in appearance. This rubble wall delineates a level soil area on the downslope (west) side of the terrace.

FEATURE B: Terrace

FUNCTION: Habitation

DIMENSIONS: 9.00 m by 6.00 m by 0.70 m (approx.)

DESCRIPTION: Several large uprights of tabular pahoehoe are aligned across the slope, with piled terrace construction on the upslope and downslope sides. The uprights are exposed c. 0.40-0.70 m above the ground surface. The area between the uprights and the lower terrace component of Feature A may indicate a habitation area.

FEATURE C: L-shaped wall

FUNCTION: Habitation

DIMENSIONS: 22.00 m by 5.60 m by 0.80 m (approx.)

DESCRIPTION: The wall is constructed of crudely stacked, blocky basalt boulders and cobbles. The wall is raised, but not formally faced. The sides are generally collapsed in appearance and rounded or sloping in profile. Several upright boulders are present in the long (east-west) axis of the wall. The L-shaped wall is situated on the south side of, and partially encloses Features A and B.

SITE NO.: State: 5709

SITE TYPE: C-shape

TOPOGRAPHY: Undulating pahoehoe bedrock outcrop underlying a thin soil mantle

VEGETATION: Dense air plants, *koa-haole*, purslane, and *kiawe* trees

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 8.00 m by 6.60 m by 0.70 m (approx.)

DESCRIPTION: The C-shape is open to the SW. The C-shape wall is constructed of crudely stacked blocky basalt boulders and cobbles. The wall is raised, but its sides are not formally faced.

The sides are collapsed and rounded or sloping in profile. Several possible uprights are visible. Several waterworn basalt boulders are present in the wall. Also present are coral/sandstone, and waterworn basalt set in coral. A pahoehoe bedrock outcrop delineates the west side of the C-shape.

PHRI: 451-166

PHRI: 451-201

SITE NO.: State: 5710

SITE TYPE: Cairn

TOPOGRAPHY: Steeply sloping and undulating aa flows. Site is atop an aa front. Some soil present, but very little.

VEGETATION: Predominantly *koa-haole* and air plants, with some *opiuma*, monkeypod, vines

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 2.30 m by 2.20 m by 0.60 m (approx.)

DESCRIPTION: The cairn is oval-shaped in plan. It is constructed with piled aa boulders and cobbles. Centrally raised, the center area still has some stacking visible, c. 2-3 cobbles high. It is wider at the base. This may be an agriculture mound. Some terracing is downslope of the site. However, this may be natural, since the front of aa flows create raised terrace-like areas. An agricultural mound is present c. 1.00-2.00 m SE of site.

PHRI: 451-202

SITE NO.: State: 5711

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock with very little soil.

VEGETATION: *Koa-haole*, air plants, monkeypod and vines.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 11.00 m (east-west) by 7.00 m (north-south). Additional Kona Field System (6601) features consisting of mounds are in the area.

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 6.00 m by 4.00 m by 1.50 m (approx.)

DESCRIPTION: Generally rectangular-shaped in plan, this feature is a crude boulder terrace, raised on the seaward edge. The retaining wall is c. 1.50 m wide. The east side is one boulder high. The area between Features A and B is slightly level with bedrock outcrop.

FEATURE B: Terrace

FUNCTION: Habitation

DIMENSIONS: 3.00 m by 2.50 m by 0.45 m (approx.)

DESCRIPTION: It is roughly rectangular-shaped in plan. The terrace feature is a bedrock outcrop in the center with aa boulders and cobbles piled atop. It is raised on the south and west sides, one to two courses high. It is even with the ground surface on the north and east sides. Boulders are on the exterior, with cobbles as fill. Generally, the surface interior is level.

PHRI: 451-204

SITE NO.: State: 5712

SITE TYPE: Cairn

TOPOGRAPHY: Undulating to steeply sloping pahoehoe bedrock terrain underlying soil.

VEGETATION: *Koa-haole*, monkeypod, and *opiuma* trees, grasses.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric-historic

FUNCTIONAL INTERPRETATION: Marker

DIMENSIONS: 1.00 m by 1.00 m by 0.75 m (approx.)

DESCRIPTION: The site is north of a steep incline. Circular in plan, it is constructed of blocky aa boulders, and stacked three courses high. The base is wider than the top. It is centrally raised, with a conical profile. A bi-faced core-filled wall is c. 10.00-15.00 m south of the site.

SITE NO.: State: 5713

PHRI: 451-205

SITE TYPE: Enclosure

TOPOGRAPHY: Gently sloping terrain consisting of rough aa substrate. Good view of the coast and Kahalu'u Bay.

VEGETATION: Dense *koa-haole*, grasses, and air plants, with scattered *opiuma*, monkeypod, and *kiawe*.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 5.00 m by 3.50 m by 1.20 m (approx.)

DESCRIPTION: The enclosure is roughly rectangular in plan. It is built against aa bedrock rubble to the east and south. The north and west walls of the enclosure are crudely constructed of crudely stacked aa boulders and cobbles. The walls are raised, and the north wall is crudely faced on the interior and exterior sides. The west wall is vaguely faced in places, but generally appears collapsed. The enclosure is also crudely faced along the interior side of the aa outcrop which forms the east wall. The interior side of the south wall is collapsed. The walls are c. 0.70-0.80 m wide. A possible entrance or opening is visible in the west wall. The interior surface is roughly level aa cobbles and humus material.

SITE NO.: State: 5714

PHRI: 451-206

SITE TYPE: Modified outcrop

TOPOGRAPHY: Sloping terrain consisting of aa substrate.

VEGETATION: Dense *koa-haole*, air plants, and grasses, with scattered *kiawe* and *opiuma* trees.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 2.40 m by 1.70 m by 0.70 m (approx.)

DESCRIPTION: The bedrock outcrop contains a small blister, which is modified with aa boulders, slabs and cobbles stacked atop and along its south and west sides. The boulder modifications create a "dome-like" shelter with an opening in the ceiling. The modified outcrop contains a level, interior soil surface. No definite cultural deposit is visible, but may be present subsurface.

SITE NO.: State: 5715

PHRI: 451-208

SITE TYPE: Modified outcrop

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock with very little soil.

VEGETATION: *Koa-haole*, purslane, monkeypod and vines.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 1.20 m by 1.20 m by 0.25 m (approx.)

DESCRIPTION: Blocky pahoehoe boulders and cobbles are crudely piled on the inland edge of a collapsed blister. It is irregularly-shaped in plan, and collapsing. The blister has no modifications or any cultural activity. About 5.00 m south is a cobble and rubble filled area. It measures c. 2.00 m (NE-SW) by 1.30 m (NW-SE) by 0.50 m in height. Terrace-like in appearance, it is probably natural.

SITE NO.: State: 5716 PHRI: 451-209
SITE TYPE: Lava tube
TOPOGRAPHY: Generally an undulating aa flow with some pahoehoe.
VEGETATION: *Koa-haole*, air plants, *kolu*, a rubber tree and a Christmas-berry.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DIMENSIONS: 13.00 m by 3.00 m by 0.70 m (approx.)
DESCRIPTION: The lava tube cave contains a vertical opening measuring c. 2.10 m (NE-SW) by 0.50 m (NW-SE) by 0.87 m high. The floor surface slopes seaward, and consists of a level, brownish loam with loose cobbles.

The SW tube continues seaward and is too shallow to investigate. A boulder/cobble rubble pile is partially built across the NE tube. The NE tube continues upslope for c. 4.00 m and ends with a crack or two visible in the ceiling overhead. Both tubes lack modifications, but contains a level soil area with cobbles. The main chamber is c. 3.50 m (NE-SW) by 3.00 m (NW-SE). A crude boulder alignment, c. 0.30 m in height, is piled along the seaward wall of the cave.

SITE NO.: State: 5717 PHRI: 451-215
SITE TYPE: Cairn
TOPOGRAPHY: A gentle slope of pahoehoe flow.
VEGETATION: *Koa-haole*, *opiuma*, and monkeypod.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Marker
DIMENSIONS: 2.40 m by 2.00 m by 1.20 m (approx.)
DESCRIPTION: It is constructed with stacked boulder facings on the east and south sides with cobble boulder fill. The north and west sides are collapsed faces. A possible foot trail constructed of pahoehoe slabs is northeast of the cairn. A low boulder/cobble rubble wall is c. 2.50 m NW of the cairn.

SITE NO.: State: 5718 PHRI: 451-216
SITE TYPE: Terrace
TOPOGRAPHY: Undulating aa flow with pahoehoe outcrops. A good view of the coastline.
VEGETATION: Dense *koa-haole*, scattered monkeypod, *opiuma*, and *kiawe* with ground cover of scrub *koa-haole*.
CONDITION: Fair
INTEGRITY: Unaltered-partially altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DIMENSIONS: 7.20 m by 5.50 m by 1.00 m (approx.)
DESCRIPTION: The terrace is roughly rectangular in plan. It is constructed of stacked blocky basalt boulders and cobbles. The terrace contains a larger boulder perimeter with a level interior surface. The surface is paved with smaller boulders, cobbles and pebbles. The terrace is raised on the north, south, and west sides. The raised sides are formally faced, but sections on the west side have collapsed.

The east side of the terrace is built against the bedrock slope. Boulder alignments are present on the east and south sides of the terrace surface. These boulder alignments may possibly be wall or interior terrace foundations. The original terrace may have contained walls or terraces on its east and south sides.

PHRI: 451-218

SITE NO.: State: 5719

SITE TYPE: Complex(2 Features)

TOPOGRAPHY: Undulating aa and pahoehoe flows with very little to no soil.

VEGETATION: Predominantly *koa-haole* and purslane with *ha'uowi*, monkeypod, indigo, *kolu*, *opiuma*, one papaya (*Carica papaya*) tree and one *noni* (*Morinda citrifolia*).

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Boundary-transportation

DESCRIPTION: Overall complex area measures c. 30.00 m (north-south) by 10.00 m (east-west).

FEATURE A: Wall

FUNCTION: Boundary

DIMENSIONS: 40.00 m by 1.50 m by 0.75 m (approx.)

DESCRIPTION: The wall is oriented roughly north-south. It continues north and south for c. 15.00-20.00 m each way and then curves westward (seaward). The wall is collapsing and rubbed in appearance. Mostly piled in construction, it is stacked in some sections. These sections have uprights or blocky basalt boulders that are stacked two to three courses high. Some denser, fine grained basalt is visible along the north end of the wall.

FEATURE B: Trail

FUNCTION: Transportation

DIMENSIONS: 3.00 m by 0.60 m by 0.25 m (approx.)

DESCRIPTION: This steppingstone trail comprises five pahoehoe boulder slabs. These boulder slabs are placed in a low spot between two bedrock outcrops. Within this low area is a slightly even boulder and cobble surface. This area may be a possible terrace. The bedrock outcrops abut the trail to the east and west. The outcrops are smooth and lead to Site 5718 (terrace) east and Site 5719 Feature A (wall) west.

PHRI: 451-222

SITE NO.: State: 5720

SITE TYPE: Terrace

TOPOGRAPHY: Situated on a bench atop an undulating terrain.

VEGETATION: Air plants, *koa-haole* and *kiawe* trees.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 9.50 m by 7.00 m by 1.30 m (approx.)

DESCRIPTION: It is constructed of crudely stacked blocky basalt boulders and cobbles. The terrace is raised on the west and south sides. Several upright boulders are present along the inland edge of the west wall. The terrace surface consists of thin soil atop bedrock exposures. A boulder/cobble concentration is present at the SE corner of the terrace.

PHRI: 451-223

SITE NO.: State: 5721

SITE TYPE: Wall

TOPOGRAPHY: Gently undulating soil mantle with pahoehoe bedrock outcrop.

VEGETATION: Moderate *koa-haole*, indigo, *opiuma*, monkeypod, *kolu*.

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Early historic-historic

FUNCTIONAL INTERPRETATION: Boundary

DIMENSIONS: 25.00 m by 1.00 m by 0.60 m (approx.)

DESCRIPTION: This linear wall is oriented at c. 70° azimuth. The wall is constructed of well-stacked blocky basalt boulders and cobbles. The wall is raised and faced on both sides, but some portions are collapsed. This could possibly be an old, drift wall for animals and was probably associated with the ranching period.

SITE NO.: State: 5722

PHRI: 451-224

SITE TYPE: Modified outcrop

TOPOGRAPHY: Located on a bedrock knoll. The terrain slopes downward to the NW and offers a coastline view.

VEGETATION: Moderate *koa-haole* and air plants with purslane, vines, amaranth (*Amaranthus spinosus*), *honohono* (*Commelina diffusa*), *kiawe*.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 9.00 m by 7.00 m by 1.25 m (approx.)

DESCRIPTION: Associated Kona Field System (6601) features consisting of modified outcrops and mounds are in the area. The modified outcrop, generally rectangular in plan, is built up to resemble a platform. It is stacked and faced four courses high on the south, and portions of the west and east sides. It is constructed with large, blocky pahoehoe boulders and smaller boulders on top. Portions of the west and east side are also collapsing and rubble-like in appearance. The north side is mostly bedrock outcropping. The interior is roughly even with bedrock outcropping and boulder fill.

SITE NO.: State: 5723

PHRI: 451-225

SITE TYPE: Walled terrace complex

TOPOGRAPHY: Site is on a sloping bedrock hill. The terraces are across the slope. 3.00 m north of the site is a large, flat soil area.

VEGETATION: *Koa-haole*, unidentified vines and bushes.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric/possibly historic

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 10.00 m by 4.00 m by 1.40 m (approx.)

DESCRIPTION: Numerous (7+) other stacked and faced retaining walls with cobble fill and level surfaces are in the area.

A wall is c. 18.00 m north. The retaining/standing wall is constructed of stacked and faced boulders five courses high along the exterior, and stacked three courses high along the interior. The retaining/standing wall is mostly bi-faced and cobble filled. The walled area measures c. 6.00 m (NE-SW) by 4.00 m (NW-SE). This area is a level soil area.

To the NE is a boulder terrace. It is constructed of pahoehoe boulders, stacked four courses high, to a height of 1.15 m, along the north exterior face. The interior edge of the retaining wall is even with the level soil surface. About 6.00 m SE is another stacked and faced boulder retaining wall, four courses high, with boulder and cobble fill. It is collapsing along the WNW face.

SITE NO.: State: 5724

PHRI: 451-226

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Complex is on the west side of a ridge crest and contains an excellent view of the coastline and Kahalu'u Bay.

VEGETATION: Dense *koa-haole* with scattered monkeypod and *kiawe*, ground cover of purslane and grasses

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 25.00 m (east-west) by 15.00 m (north-south). Associated Kona Field System (6601) features are present around the site.

FEATURE A: Platform

FUNCTION: Habitation

DIMENSIONS: 3.30 m by 3.30 m by 0.90 m (approx.)

DESCRIPTION: The platform is roughly square in plan and is low in profile. It is constructed of crudely stacked blocky basalt boulders and cobbles. The platform is raised on all four sides, but is crudely faced on only the south and east sides. The north and west sides generally appear collapsed and are rounded or sloping in profile. The platform contains a roughly level surface consisting of boulder-cobble fill. An upright boulder is visible on the platform surface, near its east side. No definite cultural deposit is visible, but is possibly present within the platform fill.

FEATURE B: Terrace

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 4.60 m by 0.80 m (approx.)

DESCRIPTION: The terrace is immediately north of Feature A, Platform. The terrace is constructed of piled to crudely stacked blocky basalt boulders and cobbles.

The terrace utilizes a natural pahoehoe bedrock outcrop and is raised on the north and west sides, but is even with the surrounding surface on the east and south sides. The terrace sides are generally collapsed in appearance and rounded or sloping in profile. A section near the north side, however, appears very crudely faced. The terrace surface is generally level and consists of a thin soil mantle with exposed pahoehoe bedrock. The west side of the terrace slopes several meters (c. 5.00 m) downslope. No definite cultural deposit is visible, but may be present subsurface.

FEATURE C: Terrace

FUNCTION: Habitation

DIMENSIONS: 4.00 m by 3.80 m by 1.00 m (approx.)

DESCRIPTION: The terrace is constructed of crudely stacked, blocky basalt boulders and cobbles. The terrace is raised and crudely faced on the north, south, and west sides. The east side is even with the surrounding ground surface. The upper (east) portion of the terrace surface is roughly level and is constructed of basalt boulder and cobble fill. No definite cultural deposit is visible, but may be present within the terrace fill.

SITE NO.: State: 5725

SITE TYPE: L-shaped wall

PHRI: 451-227

TOPOGRAPHY: Site is near the base of a ridge slope.

VEGETATION: Dense *koa-haole*, scattered *opiuma* and *kiawe* with ground cover of purslane and grasses.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 6.70 m by 6.40 m by 0.95 m (approx.)

DESCRIPTION: Additional Kona Field System (6601) features consisting of mounds and modified outcrops are in the area. The L-shaped shelter contains walls on the south and east sides, but is open north and west with a level interior soil surface.

The walls are constructed of stacked, blocky basalt boulders and cobbles c. 0.70 m wide. Both walls are raised and formally faced on the interior sides. The exterior side of the south wall is formally faced, but on the east wall, it is collapsed and rounded or sloping in appearance. The north and west sides of the L-shaped shelter are collapsed downslope and resemble rubble terraces. The north and west sides are raised, but not formally faced. No definite cultural deposit is visible, but may be present subsurface.

SITE NO.: State: 5726

PHRI: 451-228

SITE TYPE: C-shape

TOPOGRAPHY: Site is on a small knoll with a moderate view of the coastline.

VEGETATION: Dense *koa-haole*, scattered *opiuma*, *kiawe*, monkeypod, indigo, '*uhaloa*', ground cover of purslane and grasses.

CONDITION: Poor

INTEGRITY: Partially altered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 5.00 m by 4.50 m by 0.90 m (approx.)

DESCRIPTION: Additional Kona Field System (6601) features consisting of mounds and modified outcrops are in the area.

The C-shape wall shelter is open to the southwest. The walls are c. 0.40-1.50 m wide and are constructed of crudely stacked, blocky basalt cobbles and boulders. The interior side of the east wall contains a very short, crudely faced section and an upright boulder. Overall, the wall remnants are extremely collapsed and rubble-like in appearance. Boulders may have been removed to build other structures. The interior surface of the C-shape wall shelter is composed of pahoehoe bedrock. Thin soil deposits in small pockets of bedrock may possibly contain cultural material.

SITE NO.: State: 5727

PHRI: 451-229

SITE TYPE: Terrace

TOPOGRAPHY: Gently undulating terrain consisting of pahoehoe bedrock outcrop with thin soil mantle.

VEGETATION: Dense *koa-haole*, scattered *kiawe* and *opiuma* with dense ground cover of purslane.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 5.00 m by 3.50 m by 0.50 m (approx.)

DESCRIPTION: The terrace is roughly square in plan. It is constructed of crudely stacked basalt boulders, cobbles and

pebbles, but at present, it appears collapsed. The terrace is raised, with larger boulders on the north and west sides.

The boulders form a crudely faced alignment, one boulder high, on the north side. The west side is generally collapsed and rounded or sloping in profile. The terrace abuts a pahoehoe outcrop to the south side and at the SE corner. The east side is even with the surrounding ground surface. The surface is roughly level and contains a smaller boulder, cobble, and pebble fill. No definite cultural deposit is visible, but is probably present in the fill.

SITE NO.: State: 5728

PHRI: 451-230

SITE TYPE: Mound-Filled crack

TOPOGRAPHY: Fairly level terrain consisting of pahoehoe bedrock outcrop with soil on top.

VEGETATION: *Koa-haole*, purslane, grasses and vines.

CONDITION: Poor

INTEGRITY: Altered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 5.50 m by 4.50 m by 0.30 m (approx.)

DESCRIPTION: A low mound, amorphous shape in plan. It is constructed of piled smaller boulders and cobbles on top of

bedrock outcropping. Slightly raised centrally, it is constructed over a bedrock crack. The bedrock crack is c. 4.00 m long, 2.00-3.00 m wide, and 0.70 m deep, creating a chamber-like structure. The low ceiling is less than 0.50 m high. It is c. 1.30 m from the surface of the mound to the floor of the chamber, with the mound consisting of c. 0.50-0.75 m of cobble and small boulder fill. One waterworn coral cobble was found inside the blister along with subangular basalt cobble fill.

This site was recently excavated by pothunters. The excavated mound material is visible on the ground surface and seaward of the bedrock crack.

PHRI: 451-231

SITE NO.: State: 5729

SITE TYPE: Complex(2 Features)

TOPOGRAPHY: Gently sloping terrain consisting of pahoehoe bedrock outcrop underlying a thin soil mantle.

VEGETATION: Dense *koa-haole*, scattered *kiawe* and *opiuma* with ground cover of weeds, purslane, and air plants.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-indeterminate

DESCRIPTION: Overall complex area measures c. 10.0 m (north-south) by 5.0 m (east-west).

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 7.00 m by 3.50 m by 0.55 m (approx.)

DESCRIPTION: The terrace is roughly L-shaped in plan. It is constructed of crudely stacked, blocky basalt boulders and cobbles. The terrace is raised on the west and south sides, but not formally faced. The south end is composed partly of pahoehoe bedrock outcropping. The terrace surface is roughly level and crudely paved with smaller cobble fill. The terrace is even with the surrounding surface north and east. No definite cultural deposit is visible, but may be present in the fill.

FEATURE B: Cairn

FUNCTION: Indeterminate

DIMENSIONS: 0.90 m by 0.60 m by 1.00 m (approx.)

DESCRIPTION: The cairn is generally oval shape in plan. It is constructed of stacked, blocky basalt boulders. The cairn is centrally raised, but it is not formally faced. The cairn is c. 2.00 m west of Feature A, Terrace. It is built adjacent to the wire fence.

PHRI: 451-232

SITE NO.: State: 5730

SITE TYPE: Platform

TOPOGRAPHY: Situated along the north edge of an aa flow.

VEGETATION: Dense air plants, moderate to dense *koa-haole*, and one to two *kiawe* and *opiuma* trees.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 20.00 m by 10.00 m by 2.00 m (approx.)

DESCRIPTION: Roughly square in plan, the platform is constructed of large blocky aa boulders, stacked one to three courses high, with smaller boulders on top. It is stacked along the north, east and south faces. It appears to have been partially walled. An interior face is visible along the east and south walls, with a maximum height of c. 0.45 m. The east and south walls measure c. 0.80 m wide. The surface interior of the platform is level with medium sized aa boulders. It is collapsing along the west face.

The platform appears to be situated on a terrace. This terrace is seaward (west) of the platform. It is raised on the north and south side. The south side abuts the platform's SW corner. It is constructed of aa boulders and cobbles and is mostly rubble-like in construction. The north side is partially stacked and faced, c. five courses high. It is also constructed with blocky aa boulders and is built directly atop and along the aa flow edge. It appears to continue slightly east and beyond the platform. The heights of the north face range from 0.90-2.00 m. The terrace is in fair condition, with some collapse. The terrace surface is level soil. A fenceline is along the west end of the terrace and delineates the eastern boundary of the nursery. A bi-faced core-filled wall is c. 10.00 m SSE of the platform.

SITE NO.: State: 5731

PHRI: 451-233

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Aa flow with small pockets of pahoehoe. The terrain slopes seaward (west).

VEGETATION: Surrounding area consists of moderate to dense *koa-haole*, scattered *opiuma*, *pua-pilo*, indigo, autograph tree (*Ficus* sp.) with ground cover of purslane.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-quarry

DESCRIPTION: Overall complex area measures c. 30.00 m (east-west) by 15.00 m (north-south).

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 5.00 m by 0.70 m (approx.)

DESCRIPTION: The terrace is roughly square shape in plan. It is constructed of crudely stacked aa boulders and cobbles. The terrace is raised on the north and west sides, but not formally faced. The north and west sides are rounded or sloping in profile and appear collapsed. The east and south sides are even with the surrounding ground surface.

The terrace contains a level interior surface crudely paved with smaller aa cobbles and pebbles. A vague rubble wall extends off the west side of the terrace. Waterworn basalt cobbles, fire-cracked basalt, coral and *Cypraea* sp. comprise the visible portable remains. No definite cultural deposit is visible, but may be present subsurface.

FEATURE B: Pahoehoe excavation

FUNCTION: Quarry

DIMENSIONS: 1.50 m by 1.20 m by 1.10 m (approx.)

DESCRIPTION: Feature B is a small pahoehoe lava blister which has been excavated. The large excavated boulders have been placed along the blister perimeter. No portable remains are visible. The feature is surrounded by aa flow material. This feature could possibly be a prospecting quarry for scoria or volcanic glass material.

SITE NO.: State: 6341

PHRI: 451-164

SITE TYPE: Complex (4 Features)

TOPOGRAPHY: Undulating terrain with pahoehoe bedrock outcrops and soil pockets.

VEGETATION: *Koa-haole*, purslane, *kiawe*, grasses.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Ceremonial

DESCRIPTION: Overall complex area measures 18.00 m (north-south) by 10.00 m (east-west).

FEATURE A: Double terrace

FUNCTION: Ceremonial

DIMENSIONS: 17.00 m by 10.50 m by 3.00 m (approx.)

DESCRIPTION: "Two small platforms [terraces], mostly collapsed, one above the other, the highest platform [terrace] has two *ahu* [Features B and C] on top. Dimensions; of upper platform 6.00 m by 6.00 m by 1.20 m, of lower platform 4.00 m by 3.00 m by 1.00 m" (Ching et al. 1973:102). The remainder of the structure is presently boulder/cobble rubble that is collapsed in appearance.

FEATURE B: Cairn

FUNCTION: Marker

DIMENSIONS: 1.00 m by 1.00 m by 0.90 m (approx.)

DESCRIPTION: On the surface of Feature A, Double terrace, this feature is roughly circular in plan. It is constructed of stacked and piled boulders and cobbles.

FEATURE C: Cairn

FUNCTION: Marker

DIMENSIONS: 1.00 m by 1.00 m by 0.90 m (approx.)

DESCRIPTION: Situated on the surface of Feature A, Double terrace, this feature is roughly circular in plan. It is constructed of stacked and piled boulders and cobbles.

FEATURE D: Platform

FUNCTION: Ceremonial

DIMENSIONS: 8.00 m by 6.00 m by 1.10 m (approx.)

DESCRIPTION: This feature is generally rectangular in plan. It is well-faced along portions of the platform. The surface interior is level with cobble paving.

SITE NO.: State: 6368

PHRI: 451- 8

SITE TYPE: Wall

TOPOGRAPHY: Sloping and undulating pahoehoe bedrock underlying a thin mantle of brown soil.

VEGETATION: *Koa-haole*, *kiawe*, purslane, grasses.

CONDITION: Good

INTEGRITY: Unaltered

PROBABLE AGE: Historic

FUNCTIONAL INTERPRETATION: Boundary

DIMENSIONS: 960.00 m by 1.00 m by 1.10 m (approx.)

DESCRIPTION: The feature is constructed of well-stacked, blocky basalt boulders and cobbles, and is well-faced on both the interior and exterior sides. It resembles a bi-faced, core-filled wall. The wall is oriented at c. 60° azimuth. The wall is built from Kuakini Highway to Alii Drive.

SITE NO.: State: 6385

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Surrounding terrain mostly flat; slight undulations of soil and bedrock outcrops.

VEGETATION: *Koa-haole*, *kiawe*, purslane, grasses.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-agriculture

DESCRIPTION: Overall complex area measures c. 168.00 m by 91.00 m. This large area contains numerous amorphous mounds of piled pahoehoe.

FEATURE A: U-shape

FUNCTION: Habitation

DIMENSIONS: 9.50 m by 4.00 m by 0.55 m (approx.)

DESCRIPTION: It is constructed of piled pahoehoe boulders and cobbles, collapsing in appearance. The interior surface is soil with loose cobbles and boulders. The south wall is mostly a retaining wall.

FEATURE B: Enclosure

FUNCTION: Habitation

DIMENSIONS: 4.20 m by 4.00 m by 0.65 m (approx.)

DESCRIPTION: It is roughly rectangular in plan. Feature B is constructed of piled blocky pahoehoe boulders, that appear collapsed. The wall ranges from 1.00-1.50 m wide. The exterior sides are sloping in profile. The interior surface consists of soil atop bedrock, with loose cobbles and boulders.

FEATURE C: Mound complex

FUNCTION: Agriculture

DIMENSIONS: 168.00 m by 91.00 m by 0.65 m (approx.)

DESCRIPTION: Feature C is a large area containing 20 + amorphous mounds of piled pahoehoe boulders and cobbles. This feature encompasses Features A and B.

PHRI: 451-112

SITE NO.: State: 6386

SITE TYPE: Complex (6 Features)

TOPOGRAPHY: Flat areas, to gentle slopes, to undulating bedrock terrain with a soil mantle cover. Transitional between coastal and upland zones.

VEGETATION: *Kiawe*, *opiuna*, purslane, indigo, 'uhaloa.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-agriculture-possible burial

DESCRIPTION: Overall complex area measures 75.00 m (east-west) by 35.00 m (north-south). Site 6386 Features A through F are nonexistent. Features G through L were relocated and recorded. There are numerous amorphous mounds and terraces noted immediately south of site complex.

FEATURE G: Platform

FUNCTION: Possible burial

DIMENSIONS: 6.00 m by 5.20 m by 1.50 m (approx.)

DESCRIPTION: Roughly rectangular in plan. It is built of medium to large pahoehoe boulders, stacked four courses high. The SE wall is collapsing, and the remaining walls are sloping in profile. The surface interior is uneven, but roughly level.

FEATURE H: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 18.00 m by 12.00 m by 2.20 m (approx.)

DESCRIPTION: Feature H is a modified outcrop built into a platform-like area. Irregularly shaped, it is highest on the north end, where the slope is higher and where it has been built up more. The east wall on the north end of the feature contains numerous uprights and stacked pieces of pahoehoe lava. These pieces of pahoehoe measure 0.50 m by 0.75 m to 0.50 m by 1.00 m and are used as formal facings here and along the SW and SE sides. There is a small collapsed feature, approximately 1.00 m by 2.00 m, located in the north section.

FEATURE I: C-shape

FUNCTION: Habitation

DIMENSIONS: 7.00 m by 5.60 m by 1.20 m (approx.)

DESCRIPTION: The feature is open to the east. It is constructed with medium to small blocky pahoehoe boulders and cobbles. The exterior walls are piled and sloping in profile. The interior walls are also piled, and collapsing. One waterworn rock is on the west corner of the C-shape. The wall ranges from 1.80-2.00 m wide and 0.30-1.20 m high. The interior surface is soil and loose boulders on bedrock.

FEATURE J: Mound

FUNCTION: Possible burial

DIMENSIONS: 2.50 m by 2.30 m by 0.50 m (approx.)

DESCRIPTION: Amorphous in plan, the low mound is centrally raised, with sloping sides. It is constructed of piled blocky pahoehoe boulders and cobbles. One branch coral present on the mound surface. There are additional mounds in the area, including a linear mound c. 2.00 m east of Feature J. Feature J measures c. 7.00 m (NE-SW) by 1.00 m (NW-SE).

FEATURE K: Mound

FUNCTION: Agriculture

DIMENSIONS: 4.00 m by 2.30 m by 1.00 m (approx.)

DESCRIPTION: Amorphous in plan, this feature is a stacked mound of pahoehoe boulders and cobbles, three to four courses high. The SW side has a stacked wall, and the NE side is collapsed. The surface interior is rounded and rocky, with boulders and cobbles and one waterworn boulder. There are approximately 8+ mounds, in an area of c. 10.00-15.00 m, NE of Feature K. Some are collapsed, and a few are piled, almost stacked, and circular in plan. Feature K is c. 28.00 m and 33" from Site 6386, Feature J.

FEATURE L: C-shape

FUNCTION: Habitation

DIMENSIONS: 7.20 m by 6.00 m by 0.75 m (approx.)

DESCRIPTION: The C-shape is open to the west. Its walls are constructed of crudely stacked, blocky basalt boulders and cobbles. The walls are raised, and with the exception of the east wall (exterior side), are not formally faced. The exterior side of the east wall is crudely faced. The interior surface consists of level, brownish soil. The southwest end of the C-shape wall is extremely collapsed and rubble-like in appearance. No definite cultural deposit is visible, but may be present subsurface.

PHRI: 451-116/117

SITE NO.: State: 6388

SITE TYPE: Complex (9 Features)

TOPOGRAPHY: Fairly level to gently sloping bedrock terrain with soil mantle cover.

VEGETATION: *Koa-haole*, *kiawe*, purslane, grasses.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-agriculture-boundary-possible burial

DESCRIPTION: Overall complex area measures approximately 81.00 m (east-west) by 47.00 m (north-south). Ching et al. (1973:75) combine Site 6388 and Site 6389 and describe it as a house compound. "Small habitation complex, empty chamber built into wall, dwelling cave nearby, good research potential."

FEATURE A: L-shape

FUNCTION: Habitation

DIMENSIONS: 12.00 m by 6.50 m by 0.20 m (approx.)

DESCRIPTION: "Stacked pahoehoe, around entrance to dwelling cave" (Ching et al. 1973:69).

FEATURE B: U-shape

FUNCTION: Habitation

DIMENSIONS: 4.20 m by 4.00 m by 0.20 m (approx.)

DESCRIPTION: "Built of collapsed pahoehoe at one end of large flat area" (Ching et al. 1973:65).

FEATURE C: U-shape

FUNCTION: Habitation

DIMENSIONS: 4.00 m by 3.00 m by 0.20 m (approx.)

DESCRIPTION: "Built of collapsed pahoehoe" (Ching et al. 1973:65).

FEATURE D: U-shape
FUNCTION: Habitation
DIMENSIONS: 4.00 m by 4.00 m by 0.20 m (approx.)
DESCRIPTION: "Collapsed pahoehoe, next to dwelling cave" (Ching et al. 1973:65).

FEATURE E: U-shape
FUNCTION: Habitation
DIMENSIONS: 4.00 m by 4.00 m by 0.20 m (approx.)
DESCRIPTION: "Collapsed pahoehoe, next to dwelling cave" (Ching et al. 1973:65).

FEATURE F: C-shape
FUNCTION: Habitation
DIMENSIONS: 4.00 m by 3.00 m by 0.20 m (approx.)
DESCRIPTION: "Low walls of collapsed pahoehoe" (Ching et al. 1973:61).

FEATURE G: Platform
FUNCTION: Possible burial
DIMENSIONS: 5.50 m by 4.00 m by 1.10 m (approx.)
DESCRIPTION: "Built of stacked pahoehoe, connected to stone walls" (Ching et al. 1973:89). *Papamu* was noted during the present survey.

FEATURE H: Walls
FUNCTION: Boundary
DIMENSIONS: 54.00 m by 0.80 m by 0.80 m (approx.)
DESCRIPTION: "Curved wall bordering a house compound. Made of stacked pahoehoe. The wall curves around to a large burial platform, right where the wall joins the platform, there is a hollow chamber in the wall" (Ching et al. 1973:113).

FEATURE I: Mound
FUNCTION: Agriculture
DIMENSIONS: 4.50 m by 3.00 m by 1.00 m (approx.)
DESCRIPTION: Oval in plan. It is constructed with piled boulders and cobbles. A possible terrace is associated with this mound feature. The terrace is crude and vague, however, it contains several upright boulders in its northwest face.

SITE NO.: State: 6390
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Undulating pahoehoe flow with a soil mantle cover.
VEGETATION: *Koa-haole*, *kiawe*, purslane, grasses.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric-historic
FUNCTIONAL INTERPRETATION: Agriculture
DESCRIPTION: Previously identified in 1973 as independent walls (probably cattle fence) and a monument/platform. During the present survey, no monument/platform was found, only modified outcrops.

FEATURE A: Modified outcrop
FUNCTION: Agriculture
DIMENSIONS: 4.00 m by 3.50 m by 0.50 m (approx.)
DESCRIPTION: No previous flagging found. This feature does not fit the description of Ching et al. 1973. At present, it appears as a modified outcrop constructed with piled, blocky basalt boulders and cobbles. It is not formally constructed. Three additional modified outcrops are present in the immediate area. They also do not appear to function as burials.

FEATURE B: Wall**FUNCTION:** Agriculture**DIMENSIONS:** 60.00 m by 1.00 m by 0.50 m (approx.)**DESCRIPTION:** "Wall of stacked [and piled] pahoehoe, probably a cattle fence, mostly collapsed" (Ching et al. 1973:113). The wall is oriented east-west at c. 60/240° azimuth. Portions of the wall are built on bedrock outcrops.**SITE NO.:** State: 6391 Other: 9866

PHRI: 451-110/118

SITE TYPE: Complex (4 Features)**TOPOGRAPHY:** Site is on a low bedrock knoll with soil pockets.**VEGETATION:** Moderate to dense *koa-haole*, and scattered *kiawe* and *opiuma*.**CONDITION:** Fair-good**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation-possible burial -ceremonial**DESCRIPTION:** The overall complex area measures c. 40.00 m (east-west) by 32.00 m (north-south). Additional modified outcrops (one of which has a waterworn basalt cobble present on the surface) are in the area.**FEATURE A: Terrace****FUNCTION:** Habitation**DIMENSIONS:** 6.60 m by 5.00 m by 0.70 m (approx.)**DESCRIPTION:** "Collapsed pahoehoe built on bedrock, small cave hole [blister] at one end" (Ching et al. 1973:65). A low wall is on the north, west and east sides. The wall is constructed with piled boulders. It is collapsed in appearance. The surface interior is c. 20 cm below the wall surface.**FEATURE B: Platform (Figure B-8)****FUNCTION:** Ceremonial**DIMENSIONS:** 13.00 m by 12.00 m by 1.30 m (approx.)**DESCRIPTION:** According to Ching et al. (1973), the feature is "Built of stacked pahoehoe, divided into four small rooms by inner walls." These walls were collapsing during the present survey. Feature B was subsequently assigned SIHP Site Number 9866 by Hommon and Rosendahl (1983). According to Hommon and Rosendahl (1983:190), "The structure is built around bedrock outcrops and the southwest half of the platform is about 1 meter lower than the northeast half. The surface of the platform includes four soil surface depressions measuring 1.50 m by 1.00 m by 0.30 meters deep, 3.00 m in diameter by 0.30 m deep, 3.50 m by 2.30 m by 0.6 m deep and 6.00 m by 4.00 m by 0.7 m deep, respectively. The soil in these depressions varies from 0.10-0.30 m in depth. Portable items observed [sic] were a coral cobble and a waterworn basalt pebble."**FEATURE C: Enclosure****FUNCTION:** Habitation**DIMENSIONS:** 4.00 m by 4.00 m by 0.55 m (approx.)**DESCRIPTION:** It is constructed with piled pahoehoe boulders and cobbles. The walls are not formally faced, but are sloping in profile. A modified outcrop/possible terrace is c. 4.00 m SW of Feature C.**FEATURE D: Platform****FUNCTION:** Possible burial**DIMENSIONS:** 5.00 m by 4.50 m by 1.00 m (approx.)**DESCRIPTION:** The feature is roughly square in plan. It is constructed with blocky basalt boulders and cobbles. It is stacked and formally faced on the north, west, and east sides. Abutting the platform to the south are irregularly shaped collapsed walls. A survey marker/cairn, supporting an upright stick, is present on the central area of the platform surface. According to Ching et al. (1973:91), this platform may have "Evidence of more than one period of construction, good research potential."

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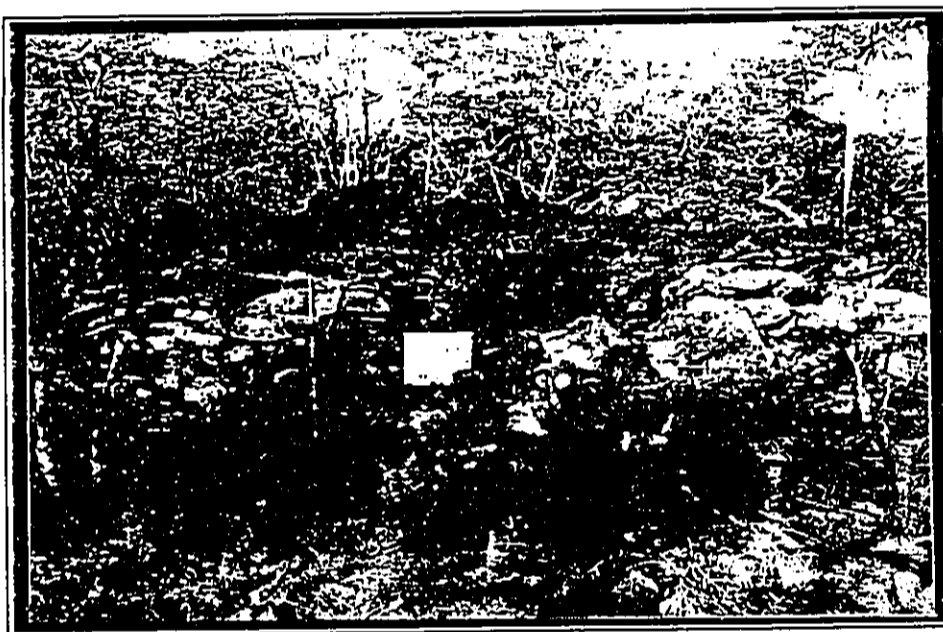


Figure B-8. Site 6391, Feature B (Neg. 919-1a)

SITE NO.: State: 6392
SITE TYPE: Complex (6 Features)
TOPOGRAPHY: Undulating to steeply sloping bedrock terrain with soil pockets.
VEGETATION: *Koa-haole*, purslane, grasses.
CONDITION: Poor-fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DESCRIPTION: The overall complex area measures c. 48.00 m (north-south) by 32.00 m (east-west).

FEATURE A: U-shape
FUNCTION: Habitation
DIMENSIONS: 4.00 m by 3.00 m by 0.20 m (approx.)
DESCRIPTION: "Collapsed pahoehoe, adjacent to terrace and house platform" (Ching et al. 1973:65).

FEATURE B: Platform
FUNCTION: Habitation
DIMENSIONS: 4.00 m by 4.00 m by 0.20 m (approx.)
DESCRIPTION: "Stacked pahoehoe constructions, extends out from terrace retaining wall at foot of steep slope" (Ching et al. 1973:59).

FEATURE C: Platform
FUNCTION: Habitation
DIMENSIONS: 5.40 m by 5.00 m by 1.00 m (approx.)
DESCRIPTION: "Two small terraces paved with chunks of lava, totally collapsed" (Ching et al. 1973:59).

FEATURE D: Platform
FUNCTION: Habitation
DIMENSIONS: 6.50 m by 4.00 m by 0.80 m (approx.)
DESCRIPTION: "Small L-shaped platform paved with chunks of lava" (Ching et al. 1973:59).

FEATURE E: Terrace
FUNCTION: Habitation
DIMENSIONS: 8.00 m by 3.50 m by 1.25 m (approx.)
DESCRIPTION: Roughly level surface paved with basalt cobbles. Terrace is constructed with crudely stacked, blocky basalt boulders and cobbles. The sides are not formally faced, but are collapsed in appearance.

FEATURE F: Terraces
FUNCTION: Habitation
DIMENSIONS: 25.00 m by 1.50 m by 2.00 m (approx.)
DESCRIPTION: Feature F consists of at least three terrace retaining walls. They cover an overall area of c. 25.00 m (north-south) by 20.00 m (east-west). "Terrace retaining walls built of stacked lava on steeply sloping hillside" (Ching et al. 1973:83). According to Ching (1973), their dimensions are: 26.00 m by 1.50 m by 1.50 m, 18.50 m by 1.00 m by 1.00 m, and 17.20 m by 0.70 m by 2.00 m.

SITE NO.: State: 6393
SITE TYPE: Complex (3 Features)
TOPOGRAPHY: Sloping bedrock terrain.
VEGETATION: *Koa-haole*, purslane, *kiawe*, grasses.
CONDITION: Fair
INTEGRITY: Unaltered

PHRI: 451-170/171/172

Appendix B

451-012093

PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation-possible burial
DESCRIPTION: This site complex is associated with Site 6396, *heiau*.

FEATURE A: Platform
FUNCTION: Possible burial
DIMENSIONS: 15.00 m by 10.00 m by 0.80 m (approx.)
DESCRIPTION: "Irregular shape, collapsed platform of stacked pahoehoe" (Ching et al. 1973:91).

FEATURE B: Terrace
FUNCTION: Habitation
DIMENSIONS: 5.00 m by 4.00 m by 0.20 m (approx.)
DESCRIPTION: "Collapsed pahoehoe, outside large enclosure" (Ching et al. 1973:71). Situated approximately 15.00-20.00 m downslope of Feature C. It is covered with air plants. A possible wall is located north of terrace.

FEATURE C: Platform
FUNCTION: Habitation
DIMENSIONS: 16.00 m by 10.00 m by 0.50 m (approx.)
DESCRIPTION: This feature resembles a platform. It appears stepped on the SW side. "Small, single family unit, part of an intensely populated complex" (Ching et al. 1973:75).

SITE NO.: State: 6394
SITE TYPE: Platform
TOPOGRAPHY: Undulating bedrock terrain.
VEGETATION: *Koa-haole*, purslane, grasses.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DIMENSIONS: 4.00 m by 4.00 m by 1.00 m (approx.)
DESCRIPTION: The platform is roughly square in plan. It is faced along the north and east sides with blocky basalt boulders and cobbles. The southwest portion is sloping in profile and collapsing in appearance.

PHRI: 451-176

SITE NO.: State: 6395
SITE TYPE: Complex (5 Features)
TOPOGRAPHY: Sloping bedrock terrain with soil.
VEGETATION: *Koa-haole*, purslane, grasses.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Ceremonial-possible burial
DESCRIPTION: Site 6395 complex is linked with Site 6396 complex by a wall and/or terrace.

FEATURE A: Platform
FUNCTION: Ceremonial
DIMENSIONS: 9.20 m by 7.00 m by 2.00 m (approx.)
DESCRIPTION: "Small but interesting, consists of a small area paved with lava surrounded by a low rock wall, has two small *ahu* on top, there is also a small burial platform [Feature B] with a partially collapsed chamber inside, good research and development potential" (Ching et al. 1973:103).

FEATURE B: Platform**FUNCTION:** Possible burial**DIMENSIONS:** 5.00 m by 5.00 m by 0.80 m (approx.)**DESCRIPTION:** "Associated with small *heiau* [Feature A], depression on top part of a collapsed chamber, good research potential for restoration and interpretation" (Ching et al. 1973:91).**FEATURE C: Cairn****FUNCTION:** Ceremonial**DIMENSIONS:** 1.20 m by 1.20 m by 1.40 m (approx.)**DESCRIPTION:** "Located on terrace wall [Feature E] below *heiau* #6395" (Ching et al. 1973:99).**FEATURE D: Cairn****FUNCTION:** Ceremonial**DIMENSIONS:** 1.20 m by 1.20 m by 1.30 m (approx.)**DESCRIPTION:** "Located on terrace wall [Feature E] below *heiau* #6395" (Ching et al. 1973:99).**FEATURE E: Terrace****FUNCTION:** Ceremonial**DIMENSIONS:** 16.00 m by 0.90 m by 1.00 m (approx.)**DESCRIPTION:** "Built of stacked *pahoehoe* on sloped area. Two *ahu* [Feature C and D, Cairns] found on wall" (Ching et al. 1973:83).**SITE NO.:** State: 6396 (Figure B-9)

PHRI: 451-174

SITE TYPE: Complex (6 Features)**TOPOGRAPHY:** The site complex is situated on a level area at the top of a steep ridgeline.**VEGETATION:** *Koa-haole*, purslane, grasses.**CONDITION:** Fair**INTEGRITY:** Appears unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Ceremonial-possible burial -habitation**DESCRIPTION:** Overall complex area measures c. 20.00 m by 20.00 m.**FEATURE A: U-shape****FUNCTION:** Habitation**DIMENSIONS:** 5.00 m by 5.00 m by 0.55 m (approx.)**DESCRIPTION:** "Collapsed *pahoehoe*, near burial platform" (Ching et al. 1973:67). It is open to the NW and is constructed with blocky basalt boulders and cobbles.**FEATURE B: U-shape****FUNCTION:** Habitation**DIMENSIONS:** 4.00 m by 4.10 m by 0.60 m (approx.)**DESCRIPTION:** "Collapsed *pahoehoe*, near burial platform" (Ching et al. 1973:67). It is open to the SW and is constructed with blocky basalt boulders and cobbles. East of Feature B are c. three mounds, collapsed, and platform-like in appearance. These were not recorded during the present survey, and should be included within this site complex. At present, they probably serve a burial function.**FEATURE C: Platform****FUNCTION:** Possible burial**DIMENSIONS:** 5.00 m by 5.00 m by 1.75 m (approx.)**DESCRIPTION:** The platform is roughly square in plan. Stacked and faced five courses high, it is constructed with blocky basalt boulders and cobbles. It is collapsing along the SW corner.

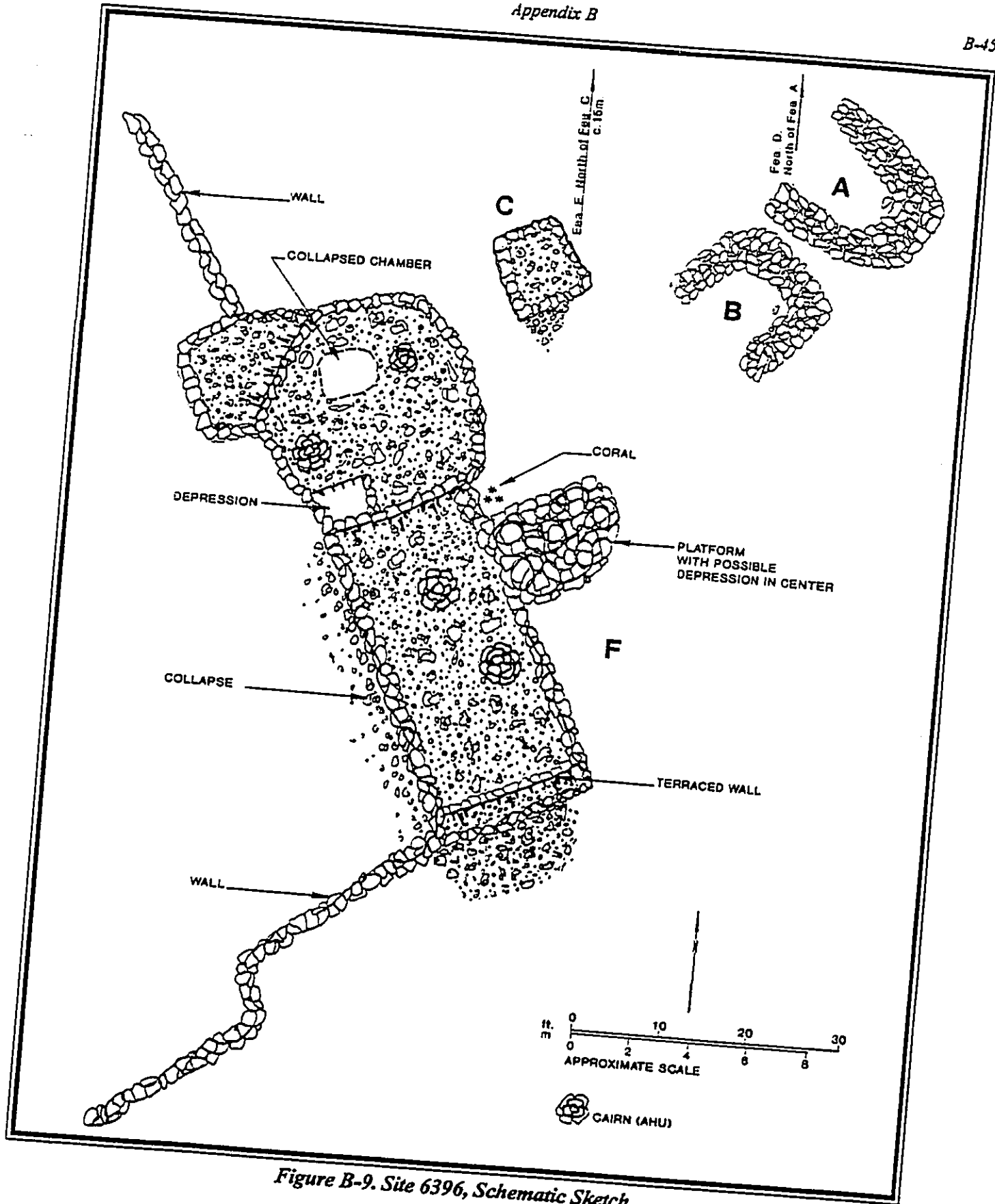


Figure B-9. Site 6396, Schematic Sketch

FEATURE D: Platform
FUNCTION: Possible burial
DIMENSIONS: 3.00 m by 3.00 m by 0.75 m (approx.)
DESCRIPTION: Roughly square in plan, it is constructed with blocky basalt boulders and cobbles.

FEATURE E: Platform
FUNCTION: Possible burial
DIMENSIONS: 3.00 m by 2.00 m by 0.80 m (approx.)
DESCRIPTION: Stacked and faced, it is constructed with blocky basalt boulders and cobbles. Approximately 4.00 m south of Feature E is a modified outcrop, probably agricultural in function.

FEATURE F: Platform
FUNCTION: Ceremonial
DIMENSIONS: 21.10 m by 6.50 m by 2.00 m (approx.)
DESCRIPTION: "Contiguous with a long wall running north-south through the area, has an irregular shape resulting from numerous alterations and additions, and some collapse, has four *ahu* on top, good research and development potential" (Ching et al. 1973:103). Coral cobbles and fragments are present nearby. Additional terraces are downslope of Feature F.

PHRI: 451-173

SITE NO.: State: 6397
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Sloping and undulating bedrock terrain.
VEGETATION: *Koa-haole*, purslane, grasses, *kiawe*.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DESCRIPTION: Built of stacked pahoehoe.

FEATURE A: Platform
FUNCTION: Possible burial
DIMENSIONS: 16.00 m by 9.00 m by 0.90 m (approx.)
DESCRIPTION: "Several small platforms of stacked pahoehoe joined to form one long, irregular platform, possible burial site" (Ching et al. 1973:59).

FEATURE B: Platform
FUNCTION: Possible burial
DIMENSIONS: 3.00 m by 3.00 m by 0.90 m (approx.)
DESCRIPTION: Roughly square in plan, it is constructed of stacked, blocky basalt boulders and cobbles. It is on the west side of, and partially enclosed by, Feature A.

SITE NO.: State: 6398
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Sloping and undulating bedrock terrain with soil.
VEGETATION: *Koa-haole*, purslane, grasses.
CONDITION: Poor-fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial -habitation
DESCRIPTION: Overall complex area measures c. 16.00 m (north-south) by 8.00 m (east-west).

FEATURE A: Platform**FUNCTION:** Possible burial**DIMENSIONS:** 3.00 m by 3.00 m by 0.90 m (approx.)**DESCRIPTION:** Roughly square in plan, it is constructed with stacked, blocky basalt boulders and cobbles.**FEATURE B: U-shape****FUNCTION:** Habitation**DIMENSIONS:** 5.00 m by 4.00 m by 0.20 m (approx.)**DESCRIPTION:** Open to the south, it is constructed with piled blocky basalt boulders and cobbles. It is generally collapsed in appearance.**SITE NO.:** State: 6399**SITE TYPE:** Mound**TOPOGRAPHY:** Gently sloping and undulating terrain.**VEGETATION:** *Koa-haole*, purslane, grasses.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DIMENSIONS:** 8.00 m by 5.20 m by 0.20 m (approx.)**DESCRIPTION:** Irregularly shaped in plan, it is constructed of piled blocky basalt boulders and cobbles. It is generally collapsed in appearance.**SITE NO.:** State: 6400**PHRI:** 451-168**SITE TYPE:** Cart road**TOPOGRAPHY:** Undulating pahoehoe bedrock terrain with a soil mantle cover.**VEGETATION:** *Koa-haole*, purslane, grasses, *kiawe*.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Transportation**DIMENSIONS:** 50.00 m by 5.10 m by 0.40 m (approx.)**DESCRIPTION:** A parallel alignment of blocky boulders c. 5.00 m apart, the road is roughly oriented NE-SW. It passes through a number of site complexes and continues both inland/upslope (east) and seaward/downslope (west). "A dirt trail lined on both sides with pahoehoe" (Ching et al. 1973:94).**SITE NO.:** State: 6401**PHRI:** 451-169**SITE TYPE:** Complex (2 Features)**TOPOGRAPHY:** Gently sloping and undulating bedrock terrain with soil mantle.**VEGETATION:** *Koa-haole*, purslane, grasses, *kiawe*.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DESCRIPTION:** Terrace noted c. 8.00 m upslope between Sites 6400 and 6401.**FEATURE A: Platform****FUNCTION:** Habitation**DIMENSIONS:** 4.00 m by 3.00 m by 0.20 m (approx.)**DESCRIPTION:** "Roughly rectangular, paved with pahoehoe chunks" (Ching et al. 1973:59). It is east of Feature B, Platform.

FEATURE B: Platform
FUNCTION: Habitation
DIMENSIONS: 6.10 m by 3.00 m by 0.20 m (approx.)
DESCRIPTION: "An irregular shaped, paved with pahoehoe chunks" (Ching et al. 1973:59). It is situated west of Feature A, Platform.

PHRI: 451-167

SITE NO.: State: 6402
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Gently sloping and undulating pahoehoe bedrock terrain with a soil mantle.
VEGETATION: Air plant, *koa-haole*, purslane, grasses.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DESCRIPTION: Overall complex area measures c. 80.00 m by 80.00 m.

FEATURE A: Platform
FUNCTION: Habitation
DIMENSIONS: 7.00 m by 4.00 m by 0.60 m (approx.)
DESCRIPTION: Generally rectangular shape in plan, the feature is constructed with blocky basalt boulders and cobbles. A low wall abuts the east side of the platform, and partially encircles it along its south end.

FEATURE B: Cave
FUNCTION: Habitation
DIMENSIONS: 3.00 m by 1.50 m by 0.00 m (approx.)
DESCRIPTION: "Some midden material of shell and bones; main passage unexplored" (Ching et al. 1973:53).

PHRI: 451-163

SITE NO.: State: 6403 Other: 7890
SITE TYPE: Complex (3 Features)
TOPOGRAPHY: Gentle sloping terrain consisting of pahoehoe bedrock with a soil mantle. Site is downslope of a small rise.
VEGETATION: *Koa-haole*.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation-possible burial
DESCRIPTION: The overall complex area measures 35.0 m (north-south) by 28.0 m (east-west). Several terraces are noted north and downslope of Site Complex 6403. This site was previously listed as 7890 on ARCH area A map, but the Hammatt and Folk (1980) report says it was not used. Site 7890 is also listed on a blue-line Archaeological Site Map (1"=300' scale) of the proposed development for Keauhou Resort, prepared by Belt, Collins & Associates (1980) for Kamehameha Investment Corporation.

FEATURE A: Terrace
FUNCTION: Habitation-possible burial
DIMENSIONS: 14.00 m by 6.00 m by 0.70 m (approx.)
DESCRIPTION: "The terrace is divided into three roughly equal portions with an alignment of boulders between the north and central sections and a jog in the retaining wall defining the south section. An oval terrace (2.50 m by 2.00 m by 0.50 m high) is adjacent to the north end of the feature" (Hommon and Rosendahl 1983:93).

FEATURE B: Terrace**FUNCTION:** Habitation-possible burial**DIMENSIONS:** 8.00 m by 3.00 m by 1.10 m (approx.)**DESCRIPTION:** "A portion of the retaining wall is formed by large boulders. At the back of the terrace (the east side) is a small lava bubble that may have served as a storage 'cupboard'. A portion of the bedrock outcrop east of the terrace has been modified with a retaining wall forming a corner of about 90°" (Hommon and Rosendahl 1983:93).**FEATURE C: Terrace complex****FUNCTION:** Habitation-possible burial**DIMENSIONS:** 11.00 m by 10.00 m by 0.50 m (approx.)**DESCRIPTION:** "A cluster of terraces measuring 11 by 10 meters overall built on and around a bedrock outcrop and a pile of rubble. The four terraces range in size from about 2.00 m by 2.00 m to 2.50 m by 3.00 m and are all about 0.50 meters high. At the uphill (east) side of this feature is an upright boulder. A retaining wall corner faces a portion of the rubble" (Hommon and Rosendahl 1983:93).

PHRI: 451-162

SITE NO.: State: 6404**SITE TYPE:** Complex (3 Features)**TOPOGRAPHY:** Undulating pahoehoe bedrock terrain with a soil mantle cover.**VEGETATION:** *Koa-haole*, purslane, *opiuma*.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation-possible burial**DESCRIPTION:** Overall complex area measures c. 35.00 m by 35.00 m.**FEATURE A: Platform****FUNCTION:** Possible burial**DIMENSIONS:** 4.20 m by 3.00 m by 0.90 m (approx.)**DESCRIPTION:** Somewhat irregular in plan, the platform is constructed with stacked blocky basalt boulders and cobbles.**FEATURE B: U-shape****FUNCTION:** Habitation**DIMENSIONS:** 4.00 m by 3.00 m by 0.20 m (approx.)**DESCRIPTION:** Open to the west, the feature is constructed of piled basalt boulders and cobbles. Not formally faced, it is collapsed in appearance. It may be part of the east corner of a large enclosure.**FEATURE C: Terrace****FUNCTION:** Possible burial**DIMENSIONS:** 3.00 m by 3.00 m by 0.40 m (approx.)**DESCRIPTION:** Generally square in plan, the feature is constructed with stacked blocky basalt boulders and cobbles.

PHRI: 451-161

SITE NO.: State: 6405**SITE TYPE:** Platform**TOPOGRAPHY:** Undulating pahoehoe bedrock terrain with a soil mantle cover.**VEGETATION:** *Koa-haole*, purslane, grasses.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Possible burial

DIMENSIONS: 4.50 m by 4.50 m by 1.00 m (approx.)

DESCRIPTION: "An interesting platform, built over a natural bedrock outcropping with a small cave opening in the center, possibly a secret hiding place disguised as a possible burial mound" (Ching et al. 1973:93). During the present survey, the blister was investigated. Soil was present, but no burial was visible. However, this may still have functioned as a possible burial.

SITE NO.: State: 6406

SITE TYPE: Platform

TOPOGRAPHY: Located on a pahoehoe bedrock rise with a commanding view of the coastline and Kahalu'u Bay.

VEGETATION: *Koa-haole*, purslane, and *kiawe*.

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 5.50 m by 4.00 m by 1.30 m (approx.)

DESCRIPTION: The feature is generally square in plan. It is constructed with blocky basalt boulders and cobbles. It is stacked and faced four to five courses high along most portions. There was some collapse along the NW side. The roughly level surface consists of boulders and cobble fill. A low, circular mound, c. 1.00 m in diameter and 0.50 m in height, is present on the platform surface. Portable remains consist of waterworn pebbles and a coral fragment.

NW of Site 6406 at c. 3.00 m is a modified outcrop/blister. It is modified with piled basalt cobbles. "About 20.00 meters south of Site 6406 is an alignment which starts...as a single boulder alignment and turns into a terrace..." (Allen Field Records 1983). Within the seaward vicinity of this alignment/terrace is a c. 10.00 m diameter area containing volcanic glass, waterworn pebbles, cowrie, *Conus* sp., and basalt flake.

SITE NO.: State: 6407

PHRI: 451-152

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Sloping and undulating pahoehoe bedrock terrain consisting of a soil mantle cover.

VEGETATION: *Koa-haole*, purslane.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 32 m (north-south) by 24 m (east-west). According to Hommon and Rosendahl (1983:206) "The site bearing the marker '6407' left by the ARCH archaeological crew is a terrace, probably of agricultural function, rather than a 'burial platform' as noted in the ARCH report (Ching et al. 1973: Map 102, p. 213)." At present, the functional interpretation is probably habitational.

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 4.00 m by 1.20 m (approx.)

DESCRIPTION: Built on a bedrock outcrop, the terrace is crudely constructed with blocky basalt boulders and cobbles. The surface interior is uneven, with numerous boulders.

FEATURE B: Terrace

FUNCTION: Habitation

DIMENSIONS: 3.50 m by 3.00 m by 1.10 m (approx.)

DESCRIPTION: The terrace is constructed with crudely stacked boulders and cobbles. It is not formally faced, and all sides are collapsed. Several waterworn pebbles were noted.

FEATURE C: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 3.50 m by 2.50 m by 1.25 m (approx.)**DESCRIPTION:** Similar to Feature B in construction, this terrace is crudely stacked with boulders and cobbles. It is not formally faced, and all sides are collapsed. An additional modified outcrop is located c. 12 m NW of Feature C. It measures c. 3.20 m (north-south) by 2.10 m (east-west) by 0.95 m high. It is centrally raised and constructed with blocky basalt boulders and cobbles piled on top bedrock outcrop. It is located in the approximate area of Site 6410.**SITE NO.:** State: 6408 Other: 9876

PHRI: 451-155

SITE TYPE: Complex (4 Features)**TOPOGRAPHY:** Situated on a pahoehoe bedrock rise. Flat soil area to the east.**VEGETATION:** *Koa-haole*, *kiawe*, purslane.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Possible burial-indeterminate**DESCRIPTION:** Site 6408, Possible burial Complex is situated along the perimeter of Site 3822.**FEATURE A: Platform****FUNCTION:** Possible burial**DIMENSIONS:** 7.00 m by 2.00 m by 1.00 m (approx.)**DESCRIPTION:** The feature is built of blocky basalt boulders faced and stacked four courses high. The NW and NE corners are rounded. The surface perimeter-facing of the platform is one boulder higher than the surface interior.**FEATURE B: Platform****FUNCTION:** Possible burial**DIMENSIONS:** 3.00 m by 3.00 m by 0.33 m (approx.)**DESCRIPTION:** The feature is faced and stacked one to two courses on the north and east sides. The surface interior is slightly flat, with cobbles. Waterworn cobbles are also visible.**FEATURE C: Platform****FUNCTION:** Indeterminate**DIMENSIONS:** 9.00 m by 3.00 m by 0.75 m (approx.)**DESCRIPTION:** A ramp-like structure, the feature is probably associated with Site 3822. It is constructed on bedrock with blocky basalt boulders three courses high. It has a boulder surface, and slopes south. Waterworn cobbles are also visible.**FEATURE D: Platform****FUNCTION:** Possible burial**DIMENSIONS:** 2.40 m by 2.20 m by 0.55 m (approx.)**DESCRIPTION:** Feature D is also Site 9876. Generally square in plan, it has a boulder perimeter and a level, cobble fill surface. Stacked two-three courses high, it is collapsed in appearance. Waterworn basalt cobbles are present.**SITE NO.:** State: 6409**SITE TYPE:** Mound**TOPOGRAPHY:** Sloping terrain (to south) consisting of pahoehoe bedrock outcrops and a thin soil mantle.**VEGETATION:** Dense *koa-haole*, scattered *kiawe*, monkeypod, ground cover of purslane.**CONDITION:** Poor**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 4.20 m by 2.00 m by 1.15 m (approx.)

DESCRIPTION: This structure resembles a mound rather than a platform, as suggested by Ching et al. (1973). This mound is roughly oval in plan. It is constructed of crudely stacked, blocky basalt boulders and cobbles. The mound is raised on the east, west, and south sides, but is not formally faced. The east, west, and south sides are rounded or sloping in profile, and appear collapsed. The north side of the mound is built against a pahoehoe bedrock outcrop. A second small boulder/rubble mound (measuring 3.00 m by 1.70 m by 0.5 m high) is immediately south of Site 6409, Mound. Two small monkeypod trees are growing between the mounds. Additional small mounds are in the area.

SITE NO.: State: 6410

SITE TYPE: Modified outcrop

TOPOGRAPHY: Flat to undulating pahoehoe bedrock outcrop with soil. Site on a pahoehoe finger that is sloping south.

VEGETATION: *Koa-haole*, purslane, grasses.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 3.00 m by 3.00 m by 0.90 m (approx.)

DESCRIPTION: Site 6410 was not positively identified during the present survey. However, there are additional (3+) mounds within the approximate area. One of these, a modified outcrop, was located.

There was weathered flagging tape on a nearby tree, but no site number. This was designated as Site 6410. Boulders and cobbles fill a depression within a raised bedrock outcrop. The fill area is fairly level. The bedrock outcrop and the filled area resemble a terrace, with the pahoehoe bedrock outcropping to the north and south. The east and west sides also consist of bedrock outcropping with cobble rubble.

SITE NO.: State: 6411

SITE TYPE: Mound

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock outcrops and a soil mantle cover.

VEGETATION: *Koa-haole*, purslane, grasses.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 4.00 m by 4.00 m by 1.00 m (approx.)

DESCRIPTION: Roughly square in plan, it is constructed with large aa boulders, and smaller boulders and cobbles as fill. The east side of Site 6411 is a sloping area, with terracing and modified outcrops.

SITE NO.: State: 6412

SITE TYPE: Terrace

TOPOGRAPHY: Flat to undulating terrain consisting of pahoehoe bedrock outcrops and a soil mantle cover. Site is on the down side of a slope area.

VEGETATION: *Koa-haole*, purslane, grasses.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 7.50 m by 4.00 m by 0.25 m (approx.)

DESCRIPTION: Roughly rectangular in plan. It is constructed with blocky basalt boulders and cobbles.

SITE NO.: State: 6413
SITE TYPE: Complex (11 Features)
TOPOGRAPHY: Flat to undulating pahoehoe bedrock terrain with a soil mantle.
VEGETATION: *Koa-haole*, purslane, opiuma tree.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial-habitation-boundary-indeterminate
DESCRIPTION: Overall complex area measures c. 88.00 m (north-south) by 60.00 m (east-west).

FEATURE A: Platform
FUNCTION: Possible burial
DIMENSIONS: 2.00 m by 1.00 m by 0.50 m (approx.)
DESCRIPTION: The feature is roughly rectangular in plan. It is constructed with blocky basalt boulders and cobbles. It is also boulder-lined and cobble-filled. A coral fragment is in the vicinity. During the 1983 survey, a 0.09-0.10 m long quadrangular adze, with polish, was found.

FEATURE B: Platform
FUNCTION: Possible burial
DIMENSIONS: 3.50 m by 3.00 m by 0.30 m (approx.)
DESCRIPTION: Rectangular shape in plan, the platform is bordered with boulders, and filled with cobbles.

FEATURE C: Terrace
FUNCTION: Indeterminate
DIMENSIONS: 6.00 m by 3.00 m by 1.10 m (approx.)
DESCRIPTION: It is constructed with blocky basalt boulders and cobbles.

FEATURE D: Mound
FUNCTION: Indeterminate
DIMENSIONS: 4.00 m by 4.00 m by 1.00 m (approx.)
DESCRIPTION: "Circular mound, 4.00 m in diameter by 1.00 m high" (Hommon and Rosendahl 1983:218).

FEATURE E: Terrace
FUNCTION: Indeterminate
DIMENSIONS: 5.00 m by 2.00 m by 0.20 m (approx.)
DESCRIPTION: According to Allen Field Records 1983, two parallel terraces were found, but no C-shape that was located during the survey of 1973 (Ching et al.) could be relocated.

FEATURE F: Wall
FUNCTION: Boundary
DIMENSIONS: 36.00 m by 0.80 m by 0.80 m (approx.)
DESCRIPTION: Bi-faced, core-filled wall constructed with blocky basalt boulders and cobbles. "Wall running east-west among several burial platforms made of stacked pahoehoe" (Ching et al. 1973:113).

FEATURE G: Terrace
FUNCTION: Habitation
DIMENSIONS: 9.00 m by 6.00 m by 1.30 m (approx.)
DESCRIPTION: This feature is outside the entrance to Site 2079, Cave. It is constructed with blocky basalt boulders and cobbles, stacked and faced along the south and west sides. A possible mound is on the terrace surface. Several waterworn basalt and coral cobbles are also present.

FEATURE H: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 8.00 m by 3.00 m by 1.00 m (approx.)**DESCRIPTION:** "Back (east) of the terrace is a relatively flat, earth surfaced area on which are a few water-worn cobbles, coral fragments and fragments [sic] of marine mollusc shell. A rubble wall (16.00 m by 0.90 m by up to 0.50 m high) extends along the northwest side of the flat area and adjacent to it is a pavement measuring 4.00 m by 2.50 m. Feature H appears to be the only habitation feature in the complex" (Hommon and Rosendahl 1983:218).**FEATURE I: Mound****FUNCTION:** Indeterminate**DIMENSIONS:** 1.20 m by 1.20 m by 0.90 m (approx.)**DESCRIPTION:** "Built of piled lava, hole in center, probably for a post" (Ching et al. 1973:99).**FEATURE J: Platform****FUNCTION:** Possible burial**DIMENSIONS:** 3.00 m by 2.50 m by 0.40 m (approx.)**DESCRIPTION:** According to Allen's Field Records (1983), Feature J is a platform with a pahoehoe outcrop on its south side. It is built of boulder and cobble fill, with some boulders along its edges. One coral fragment is on the terrace surface.**FEATURE K: Platform****FUNCTION:** Possible burial**DIMENSIONS:** 4.00 m by 4.00 m by 1.00 m (approx.)**DESCRIPTION:** "Built of stacked pahoehoe, depression in center" (Ching et al. 1973:93). Generally square in plan, it is constructed with blocky basalt boulders and cobbles.**SITE NO.:** State: 6414 (Figure B-10)

PHRI: 451-158

SITE TYPE: Platform**TOPOGRAPHY:** Situated atop a small rise.**VEGETATION:** Predominately *koa-haole*.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Ceremonial-habitation**DIMENSIONS:** 26.00 m by 18.00 m by 2.00 m (approx.)**DESCRIPTION:** The overall complex structure measures c. 28.00 m (north-south) by 18.00 m (east-west). "...and consisting of at least nine boulder and cobble-paved terraces, ranging in size from about 3.50 m by 3.00 m to 8.00 m by 6.00 m and up to 1.00 m high.

The terraces form two clusters, one on the north with five component terraces and one on the south with four. The two clusters are separated by a mass of rubble about 4.00 meters wide" (Hommon and Rosendahl 1983:99). Waterworn basalt cobbles and coral are visible.

SITE NO.: State: 6415

PHRI: 451-49

SITE TYPE: Wall**TOPOGRAPHY:** Sloping and undulating bedrock terrain consisting of pahoehoe and aa flows with a soil mantle.**VEGETATION:** *Koa-haole*, purslane, grasses, *kiawe*, *opiuma* and monkeypod trees.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Possibly historic**FUNCTIONAL INTERPRETATION:** Boundary

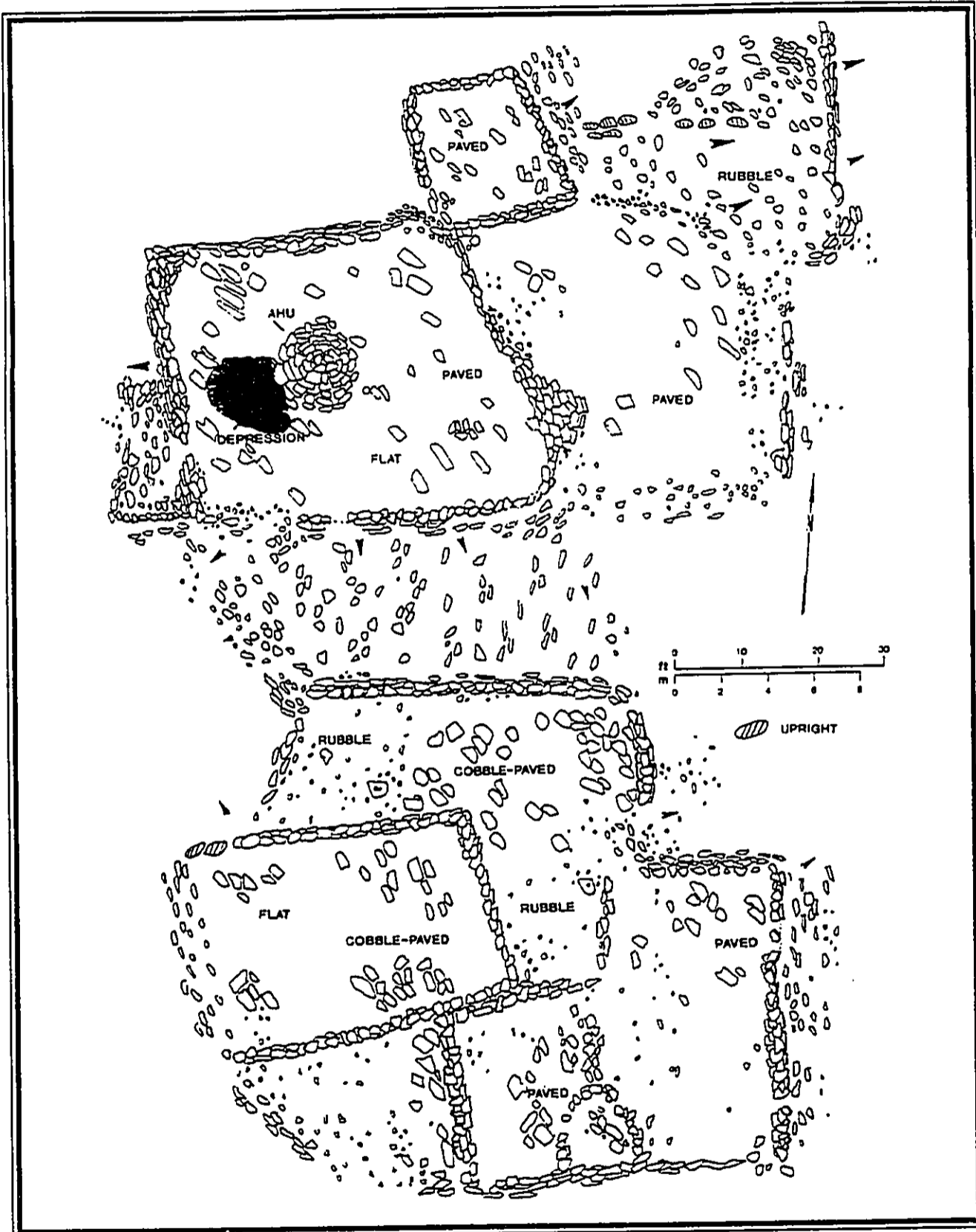


Figure B-10. Site 6414

DIMENSIONS: 580.00 m by 0.80 m by 1.20 m (approx.)

DESCRIPTION: This is a bi-faced and core-filled wall, constructed with blocky basalt boulders and cobbles, stacked five courses high. It is wider at the base than at the top of the wall. This wall is oriented east-west and extends across the width of the project area.

PHRI: 451-207

SITE NO.: State: 7663

SITE TYPE: Complex (5 Features)

TOPOGRAPHY: Undulating pahoehoe bedrock on a sloping terrain with soil in pockets.

VEGETATION: *Koa-haole*, purslane, castor bean (*Ricinus communis*), *opiuma*, indigo, and papaya tree.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 100.00 m (east-west) by 60.00 m (north-south).

FEATURE A: Platform (Figure B-11)

FUNCTION: Habitation

DIMENSIONS: 4.50 m by 4.25 m by 1.30 m (approx.)

DESCRIPTION: This rectangular platform is defined by well-stacked aa boulder faces on the north, south and west sides. The east side is defined by an aa boulder wall. The interior is boulder and cobble fill. There is a depression c. 1.00 m by 0.50 m by 0.50 m in depth near the south edge.

FEATURE B: Terrace (Figure B-11)

FUNCTION: Habitation

DIMENSIONS: 3.00 m by 2.00 m by 1.00 m (approx.)

DESCRIPTION: A level cobble boulder area accompanied by a crudely stacked retaining wall on the downslope side. Side walls extend upslope for c. 1.0 m, where the terrace converges with the slope.

FEATURE C: C-shape (Figure B-11)

FUNCTION: Habitation

DIMENSIONS: 3.70 m by 3.50 m by 0.90 m (approx.)

DESCRIPTION: The C-shape opens to the west. It is constructed with stacked boulders and cobbles and in part is built on top of or utilizes bedrock, especially along the south half. The interior surface is level soil, with a few stray boulders on the surface. The exterior surface of the C-shape is fairly even with the ground surface. This feature is well-defined in appearance.

FEATURE D: Double terrace

FUNCTION: Habitation

DIMENSIONS: 16.00 m by 8.00 m by 1.10 m (approx.)

DESCRIPTION: This feature consists of two retaining walls c. 2.00-4.00 m apart. They are oriented east-west, and are c. 1.50 m wide, with an area of c. 16.00 m (east-west) by 6.00 m (north-south) in between the retaining walls. This area is somewhat level, with cobbles and small boulders on c. 0.15 of soil. Portions of the north retaining wall are constructed on bedrock. Other portions are constructed with blocky aa boulders that are stacked five courses in one section, and are collapsing along the other sections. The south retaining wall has approximately five boulder slabs as uprights, with cobbles and smaller boulders as fill. Bedrock outcropping, and 3+ agricultural mounds on a level soil area are north of Feature D. Also north and west of Feature D are one to two boulder terraces.

FEATURE E: Triple terrace

FUNCTION: Habitation

DIMENSIONS: 6.50 m by 6.00 m by 1.20 m (approx.)

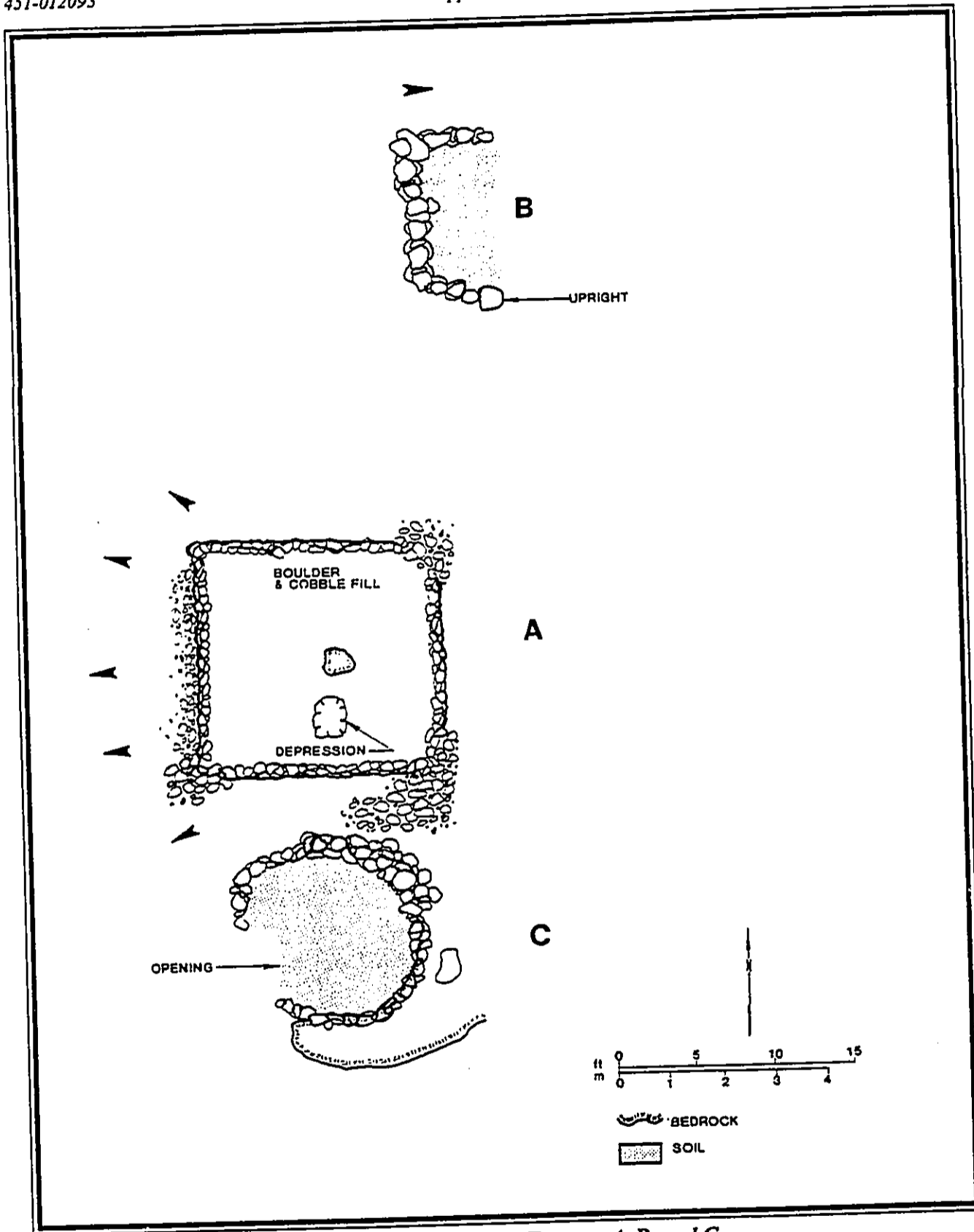


Figure B-11. Site 7663, Features A, B, and C

DESCRIPTION: The terrace consists of upper (inland), middle, and lower (seaward) terraces. The upper terrace is constructed of two to six courses of blocky pahoehoe boulders. Stacked and faced on the north side, the west side is one to two courses high, with some bedrock outcropping. There is bedrock outcropping south and east. The surface is c. 6.00 m by 4.00 m and is roughly level, with cobbles and boulders as fill. A possible cupboard (0.80 m by 0.60 m by 0.40 m deep) is in the upper half.

About 0.40 m lower is the middle terrace. It measures c. 6.00 m by 2.50 m. There are at least six large boulder slabs used as paving on this terrace. The lower (seaward) terrace measures c. 3.50 m (north-south) by 2.00 m (east-west) and is c. 1.40 m high. It abuts bedrock north and south. The west side is also bedrock outcropping with some boulders piled on top. The surface interior is roughly level bedrock with the boulders in between. The terrace abuts Feature D west and northwest. Approximately 5.00-6.00 m SSE of Feature E is a standing, bi-faced boulder and cobble-filled wall. This wall continues east (inland) and west (seaward) and is located on the topography map.

PHRI: 451-200

SITE NO.: State: 7664

SITE TYPE: Wall complex

TOPOGRAPHY: Undulating pahoehoe and aa terrain.

VEGETATION: Moderate to dense *koa-haole*, purslane, castor bean, *opiuma*, indigo.

CONDITION: Poor-good

INTEGRITY: Altered in places

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 270.00 m by 2.00 m by 1.00 m (approx.)

DESCRIPTION: Site 7664 walls cover an overall area of c. 270.00 m (east-west) by 120.00 m (north-south). They are well faced along most of the exterior and interior sides. Constructed of stacked pahoehoe and aa boulders and cobbles, they average 0.8-2.0 m wide. The lateral (east-west) walls are usually not as well constructed. Mounds, terraces, platforms and modified outcrops are present within the wall complex. Many cleared and leveled areas are visible. No midden material is seen but waterworn pebbles, and flaked and battered basalt cobbles are present.

PHRI: 451-203

SITE NO.: State: 7665

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Rocky aa substrate with numerous outcrops. Terrain slopes west (seaward).

VEGETATION: Dense *koa-haole*, scattered monkeypod, *opiuma*, and thick grass cover.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-agriculture

DESCRIPTION: Overall complex area measures c. 40.00 m (NW-SE) by 20.00 m (NE-SW). There is a moderate view of the coastline.

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 15.00 m by 7.00 m by 1.00 m (approx.)

DESCRIPTION: This terrace is built on a natural aa outcrop immediately north of Site 7664, Wall complex. The terrace appears vague, and is possibly natural. A crude wall is built on the north side of this terrace area. The wall is constructed of crudely stacked, blocky basalt and aa boulders and cobbles. The wall is raised on both the interior and exterior sides and is crudely faced. The terrace surface is not level, but slopes inward, forming a sunken area.

FEATURE B: Modified outcrop

FUNCTION: Agriculture

DIMENSIONS: 7.00 m by 4.50 m by 0.80 m (approx.)

DESCRIPTION: This modified outcrop is amorphous in plan. It is modified with aa boulders, cobbles and pebbles piled upon its surface. Portions of the modified surface appear roughly level. The modified outcrop is raised, but its sides are not formally faced. The sides generally consist of aa bedrock.

FEATURE C: Terrace

FUNCTION: Habitation

DIMENSIONS: 3.60 m by 2.40 m by 0.60 m (approx.)

DESCRIPTION: This terrace is constructed of crudely stacked aa boulders and cobbles. The terrace is raised and crudely faced on the west side. The north, south and east sides are generally even with the surrounding ground surface. The terrace contains a roughly level aa cobble, boulder and soil surface. A rubble wall and bedrock outcrop are present on the east side of the terrace. The wall and outcrop possibly functioned as a windbreak.

SITE NO.: State: 7666

PHRI: 451-211

SITE TYPE: Cart road

TOPOGRAPHY: Gently sloping pahoehoe and aa flows.

VEGETATION: *Koa-haole*, *kiawe*, air plants, vines, monkeypod.

CONDITION: Poor-fair

INTEGRITY: Unaltered except for bulldozing.

PROBABLE AGE: Historic

FUNCTIONAL INTERPRETATION: Transportation

DIMENSIONS: 50.00 m by 5.00 m by 1.30 m (approx.)

DESCRIPTION: It is faced 2-6 courses, on the north and south sides, of medium to large blocky pahoehoe boulders. This is especially visible in the low depression areas. Some sections have the north and south faces one boulder above the surface interior. It ranges from c. 30.00-50.00 m long, 3.00-5.00 m wide, and 0.20-1.30 m high. Oriented 243/63°, the inland end terminates on bedrock. The seaward end rubbles out near the bulldozed road, becomes a single alignment, and is destroyed.

The inland end of Site 7666 appears to bisect Site 4650, Walled terrace. The Cart road (Site 7666) appears to end at the bedrock just seaward of Site 4650. However, the north and south alignments continue intermittently up and into Site 4650. It appears to bisect and continue inland of Site 4650, for an undetermined distance as rubble alignments. This immediate vicinity is heavily vegetated with air plants. The cart road may extend seaward of the bulldozed road and inland of Site 4650, but it was vague and indistinct.

SITE NO.: State: 7818 Other: 9825

SITE TYPE: Trail

TOPOGRAPHY: Gently sloping pahoehoe bedrock terrain.

VEGETATION: *Koa-haole*, *kiawe*, *opiuma*, and grasses

CONDITION: Poor

INTEGRITY: Partially disturbed

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Transportation

DIMENSIONS: 30.00 m by 2.50 m by 0.80 m (approx.)

DESCRIPTION: Oriented approximately 185/05°. This site was subsequently assigned SIHP Site Number 9825 by Hommon and Rosendahl (1983).

"It is 1.50 to 2.50 m wide and is marked by two discontinuous rubble mounds up to [1.00-] 1.50 m wide and [0.45-] 0.80 m high" (Hommon and Rosendahl 1983:115). Overall, it is generally vague and indistinct. Further south c. 15.00 m, the trail becomes somewhat steppingstone-like in construction. This section is oriented c. 215/35°.

According to Hammatt and Folk (1980:153) "This site features a foot trail that leads up to a 3 feet high modified pahoehoe bluff. A large inclined pahoehoe slab set against a 4 feet high wall serves as a step to mount the wall to the top of the paved bluff."

SITE NO.: State: 7883

SITE TYPE: Terrace

PHRI: 451-194

TOPOGRAPHY: Sloping bedrock terrain consisting of pahoehoe and soil pockets.

VEGETATION: Predominately *koa-haole*, grasses and *kiawe* trees.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 10.00 m by 5.00 m by 0.60 m (approx.)

DESCRIPTION: "The retaining wall is L-shaped and includes upright stones at each end. To the southeast [and also upslope] are several small mounds and small terraces, probably of agricultural function. [One of these terraces measures 1.80 m (NW-SE) by 1.10 m (NE-SW) by 0.50 m in height.] About 3.00 m to the south of the terrace is a flat-topped boulder measuring about 1.00 m long, which appears to have been propped in a horizontal position with three cobbles" (Hommon and Rosendahl 1983:90).

"Available evidence suggests that the terrace may be related to agricultural activity in the area. Hammatt and Folk (1980:95) suggest that the propped-up boulder may be a salt pan" (Hommon and Rosendahl 1983:90).

SITE NO.: State: 7888 (Figure B-12)

SITE TYPE: Complex (2 Features)

PHRI: 451-195

TOPOGRAPHY: Flat to gently sloping pahoehoe bedrock terrain with soil pockets.

VEGETATION: Predominantly *koa-haole*, air plant and grasses.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DESCRIPTION: Overall complex area measures c. 18.00 m (north-south) by 12.00 m (east-west).

FEATURE A: Terrace

FUNCTION: Possible burial

DIMENSIONS: 7.00 m by 5.00 m by 0.50 m (approx.)

DESCRIPTION: A low terrace constructed of basalt boulders and cobbles. The surface interior is level and flat, with an internal alignment of boulders dividing the platform into two portions, 5.00 m by 4.00 m and 4.00 m by 3.00 m respectively. Waterworn cobbles and pebbles are present on the surface. About 10.00 m north is Feature B.

FEATURE B: Terrace

FUNCTION: Possible burial

DIMENSIONS: 4.00 m by 1.00 m by 0.60 m (approx.)

DESCRIPTION: Mound-like in appearance, this rubble terrace is stacked two courses along the NW side, and with bedrock along the SE side. The surface is of cobbles and boulders, with a mounded surface interior.

SITE NO.: State: 7891 (Figure B-13)

SITE TYPE: Complex (4 Features)

PHRI: 451-198

TOPOGRAPHY: Gently sloping pahoehoe bedrock terrain with soil pockets. The site is downslope of a small rise.

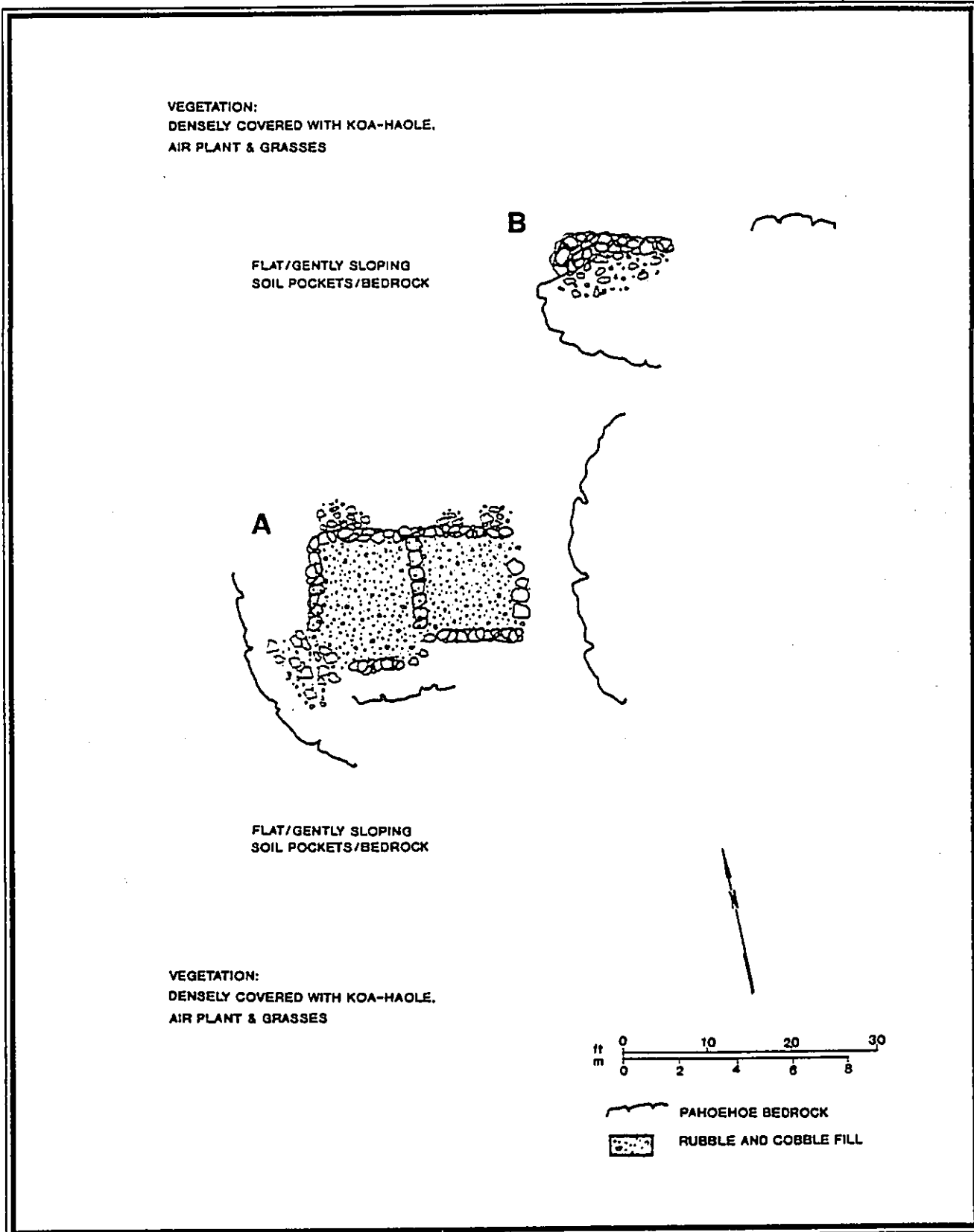


Figure B-12. Site 7888

VEGETATION: Predominantly *koa-haole*.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-possible burial

DESCRIPTION: Overall complex area measures c. 26.00 m by 22.00 m. An additional terrace (3.00 m by 3.00 m by 0.80 m high) is between Features A, B, and C.

FEATURE A: Terrace

FUNCTION: Habitation-possible burial

DIMENSIONS: 4.00 m by 4.00 m by 1.00 m (approx.)

DESCRIPTION: Generally square in plan, it is constructed with basalt boulders and cobbles. It is faced along the west and south sides, with bedrock outcropping north. The terrace surface is flat and level, and is adjacent to a concentration of cobble-sized rubble northeast.

FEATURE B: Terrace

FUNCTION: Habitation-possible burial

DIMENSIONS: 7.00 m by 3.00 m by 0.50 m (approx.)

DESCRIPTION: "Roughly oval terrace constructed against the south side of a bedrock outcrop [forming a flat/level soil area]. The feature is in very poor condition, with only small sections of retaining wall intact" (Hommon and Rosendahl 1983:95). This flat terraced area is shared with Feature D to the north. Features B and D should be combined to form a single feature terrace.

FEATURE C: Platform

FUNCTION: Habitation-possible burial

DIMENSIONS: 6.50 m by 5.00 m by 1.00 m (approx.)

DESCRIPTION: "An alignment of boulders divides the surface of the structure into a wide section (6.50 by 3.50 m) and a narrow section (6.50 by 1.50 m). Near the north corner of the wide section is an oval depression, 0.60 by 0.50 by 0.60 m deep. Rubble adjacent to the northwest side of the structure may be the remnant of an attached terrace" (Hommon and Rosendahl 1983:95).

FEATURE D: Terrace

FUNCTION: Habitation-possible burial

DIMENSIONS: 6.00 m by 3.50 m by 1.00 m (approx.)

DESCRIPTION: "The northwest retaining wall includes three upright boulders. This terrace is attached to the northwest side of the same outcrop to which Feature B is attached. Both features extend the flat surface of the outcrop. A 0.50 m high retaining wall extends northwest from Feature D about 4 meters" (Hommon and Rosendahl 1983:95). Features B and D should be combined to form a single feature terrace.

SITE NO.: State: 7893 (Figure B-14)

PHRI: 451-156

SITE TYPE: Complex (6 Features)

TOPOGRAPHY: Site is on a sloping bedrock terrain with soil.

VEGETATION: Predominantly *koa-haole*, purslane, grasses.

CONDITION: Fair-good

INTEGRITY: Unaltered-partially altered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-ceremonial-possible burial

DESCRIPTION: Overall complex area measures c. 55.00 m by 40.00 m. All features are constructed of angular basalt boulders, cobbles, and pebbles, utilizing larger boulders as facing, cobbles as fill or as structural components, and pebbles in paved areas.

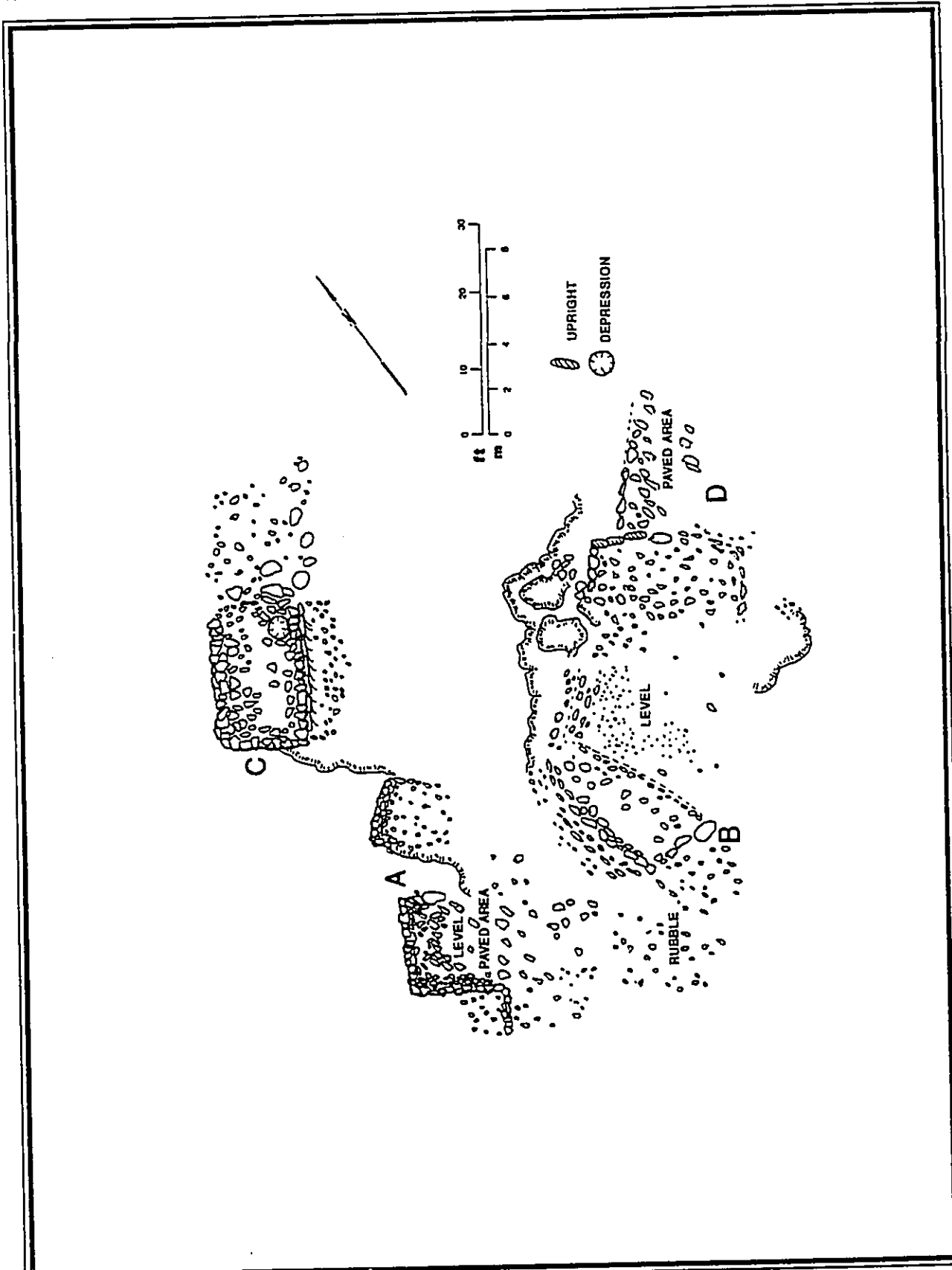


Figure B-13. Site 7891

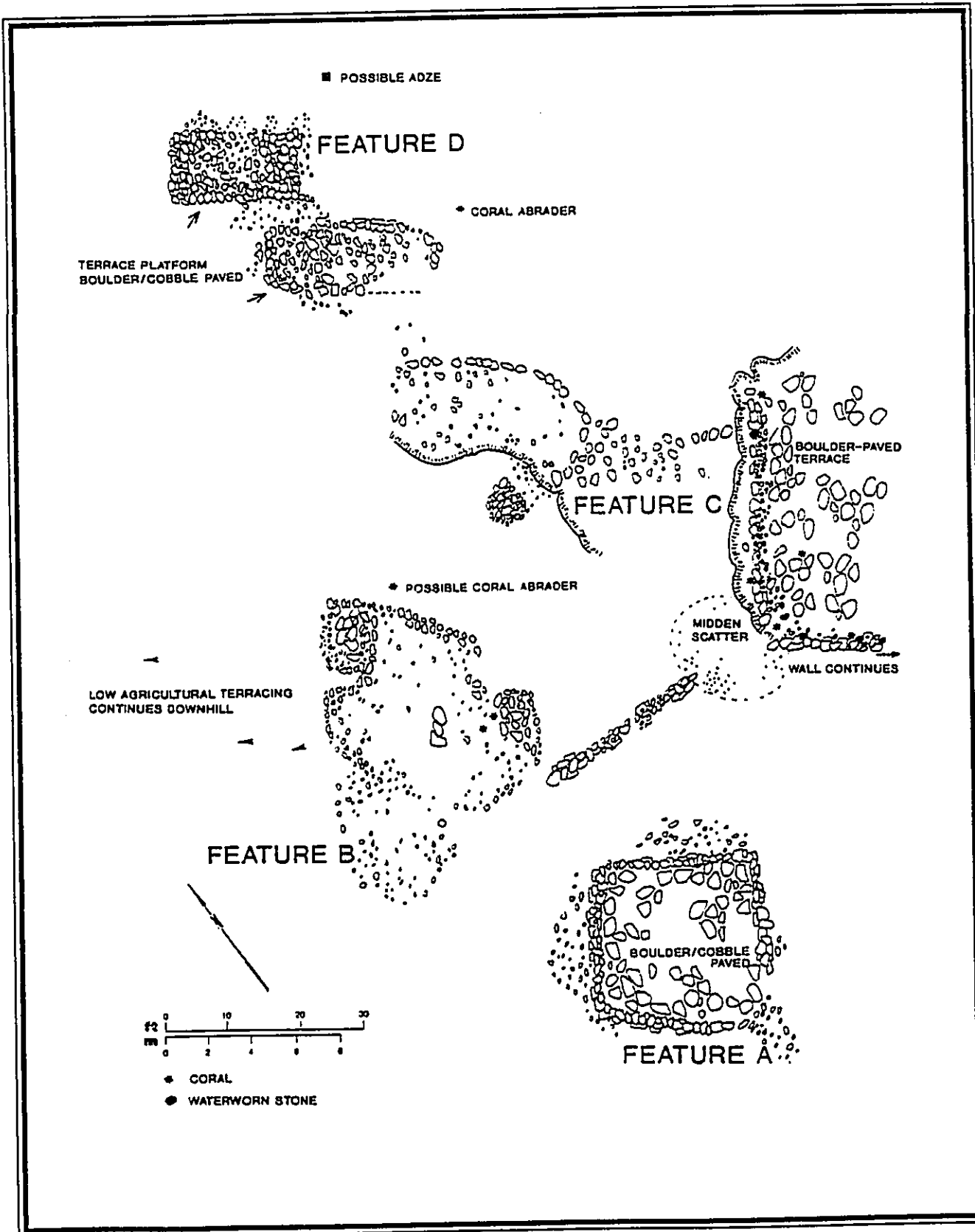


Figure B-14a. Site 7893, Features A-D

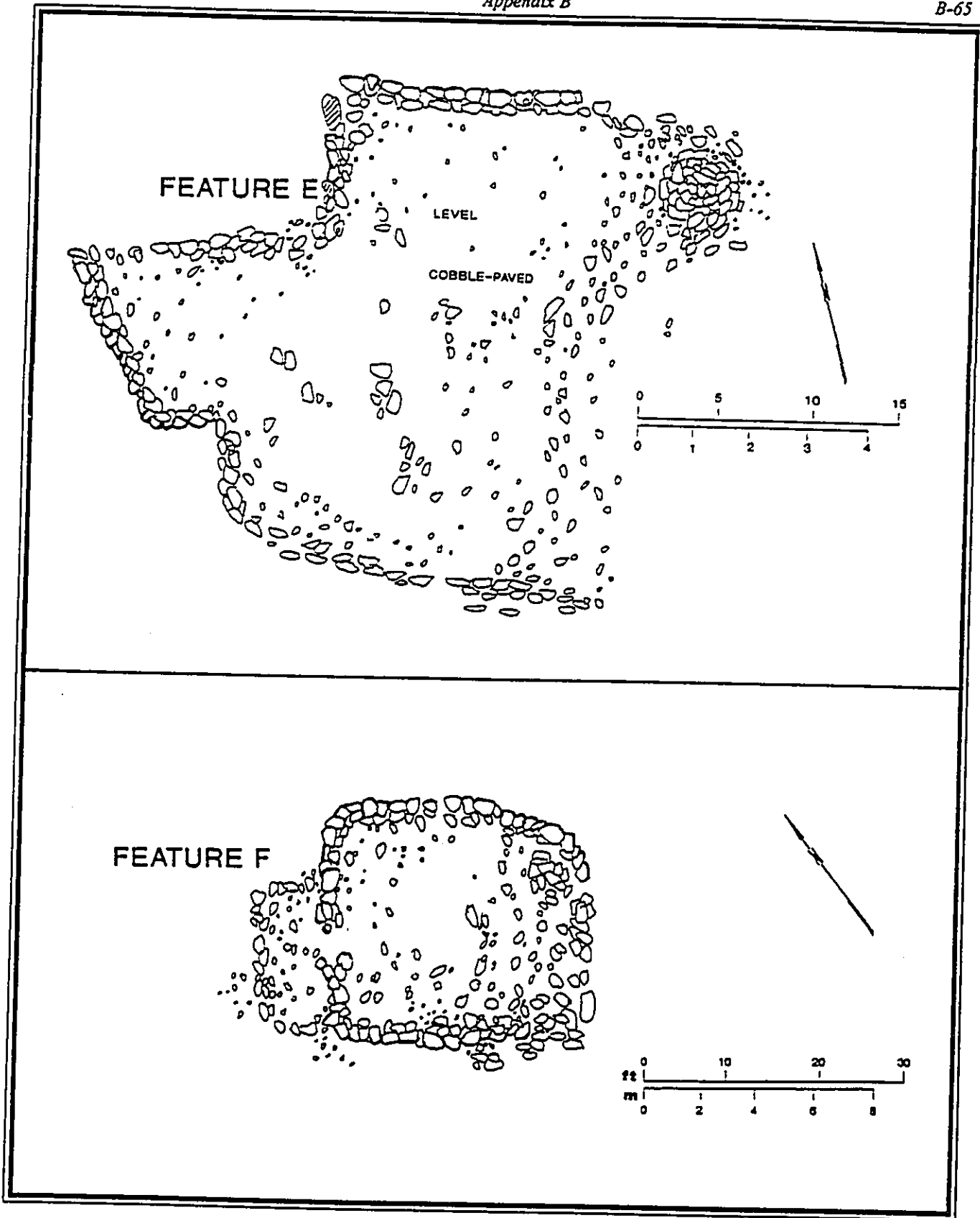


Figure B-14b. Site 7893, Features E-F

"Mollusc shells were concentrated in an area about 7 meters north of Feature A and more sparsely scattered elsewhere in the complex. Coral fragments were relatively abundant throughout the complex. Waterworn cobbles and pebbles were widely scattered both on the structures and around them" (Hommon and Rosendahl 1983:100).

FEATURE A: Platform**FUNCTION:** Habitation-ceremonial**DIMENSIONS:** 8.00 m by 8.00 m by 1.20 m (approx.)**DESCRIPTION:** This platform is Reinecke's (n.d.) Site I based on dimensions and location. "On the surface of this roughly square structure are three piles of cobbles and boulders, each about 0.50 m in diameter and from 0.20-0.30 m high" (Hommon and Rosendahl 1983:100).

"Feature A platform is built on a high bluff...The maximum height above the surrounding ground level is 6 feet on the *makai* side and 4 feet on the *mauka* side. The platform surface is rough cobbles and boulder pavement. On the platform surface pavement are three *ahu* (each with a maximum height of 1.5 feet; 1.50 diameter). The *ahu* appears to be a later addition to the platform" (Hammatt and Folk 1980:126). A cultural deposit is probably present subsurface.

FEATURE B: Platform**FUNCTION:** Habitation-ceremonial**DIMENSIONS:** 10.00 m by 10.00 m by 0.90 m (approx.)**DESCRIPTION:** "Irregularly-shaped platform...The presence of two sections of cobble pavement and the stepped form of the surface suggest that various portions of this structure were built at different times" (Hommon and Rosendahl 1983:100).

"Feature B is a rough boulder-paved terraced platform. The upper level measures 25.00 by 30.00 feet and is faced on the *makai* side. The second level is a well-constructed pebble and cobble-paved rectangular [sic] addition. It features a 3-foot *makai* facing" (Hammatt and Folk 1980:127). A cultural deposit is probably present subsurface.

FEATURE C: Terrace**FUNCTION:** Habitation-ceremonial**DIMENSIONS:** 9.00 m by 5.00 m by 0.90 m**DESCRIPTION:** "Terrace...built against a bedrock outcrop. In plan, this structure forms a shallow, irregular arc. Boulder alignments are visible in the surface of the structure. A crude pavement, possibly including a short length of stepping stone trail, leads northeast to a modified outcrop consisting of a wall about 12.00 meters long and up to about 0.75 meters high with an adjacent rough pavement. About 1 meter south of the platform is a 2.00 m by 2.00 m cobble pavement with a border of boulders" (Hommon and Rosendahl 1983:100). A cultural deposit is probably present subsurface.**FEATURE D: Platforms****FUNCTION:** Habitation-ceremonial**DIMENSIONS:** 13.00 m by 8.00 m by 1.10 m (approx.)**DESCRIPTION:** "A pair of platforms measuring 7.50 by 5.50 by up to 0.70 m high and 6.00 m by 3.50 by up to 1.10 m high, respectively. They are about 1 meter apart" (Hommon and Rosendahl 1983:100).

"Feature D consists of two adjoining platforms. The first platform measures 15 by 20 feet and is cobble paved, with boulder facings on the *makai* edge. This platform is built on a bedrock bluff. The southeast corner of the second platform adjoins the northwest corner of the first platform. The second platform is of the same construction and measures 12 by 20 feet, with facing on all sides, 1.5 to 3.5 feet high. *Mauka* of Site 7893D and north of Site 7893C are several faced terraces in poor condition" (Hammatt and Folk 1980:127). A cultural deposit is probably present subsurface.

FEATURE E: Terrace**FUNCTION:** Habitation-possible burial**DIMENSIONS:** 10.00 m by 9.00 m by 0.50 m (approx.)

DESCRIPTION: "Feature E platform...is roughly T-shaped, with a cobble/boulder paving. The facing is deteriorated on the *makai* side, 1.0 to 1.5 feet high" (Hammatt and Folk 1980:127).

FEATURE F: Platform

FUNCTION: Habitation-possible burial

DIMENSIONS: 4.50 m by 4.50 m by 0.30 m (approx.)

DESCRIPTION: "On the surface of the north corner is a small mound of stones and a rough pavement, 3.00 m by 1.20 m, is adjacent to the southwest side of the platform" (Hommon and Rosendahl 1983:100).

"Feature F platform...faced north, south, and west sides 1-3 feet high. The platform is roughly paved with boulders and cobbles. There is a rough mound (ahu) 1.5 feet high on the northeast corner of the platform" (Hammatt and Folk 1980:127). A cultural deposit is probably present subsurface.

SITE NO.: State: 7914 (Figure B-15)

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Level soil area with a raised bedrock outcropping.

VEGETATION: *Koa-haole*, grasses, *kiawe*.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-agriculture

DESCRIPTION: Overall complex area measures c. 28.00 m (east-west) by 20.00 m (north-south).

FEATURE A: Modified outcrop

FUNCTION: Agriculture

DIMENSIONS: 3.00 m by 3.00 m by 0.60 m (approx.)

DESCRIPTION: Feature A is constructed with blocky boulders and cobbles piled atop a bedrock outcropping. The surface is roughly level. The interior of the mound appears to be hollow.

FEATURE B: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 4.00 m by 0.90 m (approx.)

DESCRIPTION: A rough boulder wall partially encloses a fissure within a raised pahoehoe outcrop along its seaward side. The exterior height of the wall is 0.90 m, and the interior height is 0.20-0.35 m. The floor surface of the outcrop is roughly level, with loose rocks and limited soil. Waterworn basalt pebbles and 1-3 coral pebbles are visible along the base of the outcrop on its seaward side. A wall/terrace extends out from the bluff at 110° towards a lava blister c. 10.00-12.00 m upslope. This wall is c. 3.60 m long by 0.50-0.80 m wide by 0.45 m high. It is a single boulder high, with loose cobbles on top. The wall has been destroyed, but finally continues as an encircling 1.00-2.00 m wide terrace around the inland side of the lava blister.

SITE NO.: State: 7915

PHRI: 451-141/142

SITE TYPE: Complex (7 Features)

TOPOGRAPHY: Gentle sloping terrain with pahoehoe bedrock outcrop and soil mantle on top.

VEGETATION: *Koa-haole*, purslane, air plants, weeds, *opiuma* and grasses.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial-habitation-marker

DESCRIPTION: The overall complex area measures c. 45.00 m (north-south) by 30.00 m (east-west). A fair amount of soil is in areas between Features A, E, and F. A trail noted on ARCH Area B Map is indefinite. Since it is overgrown with

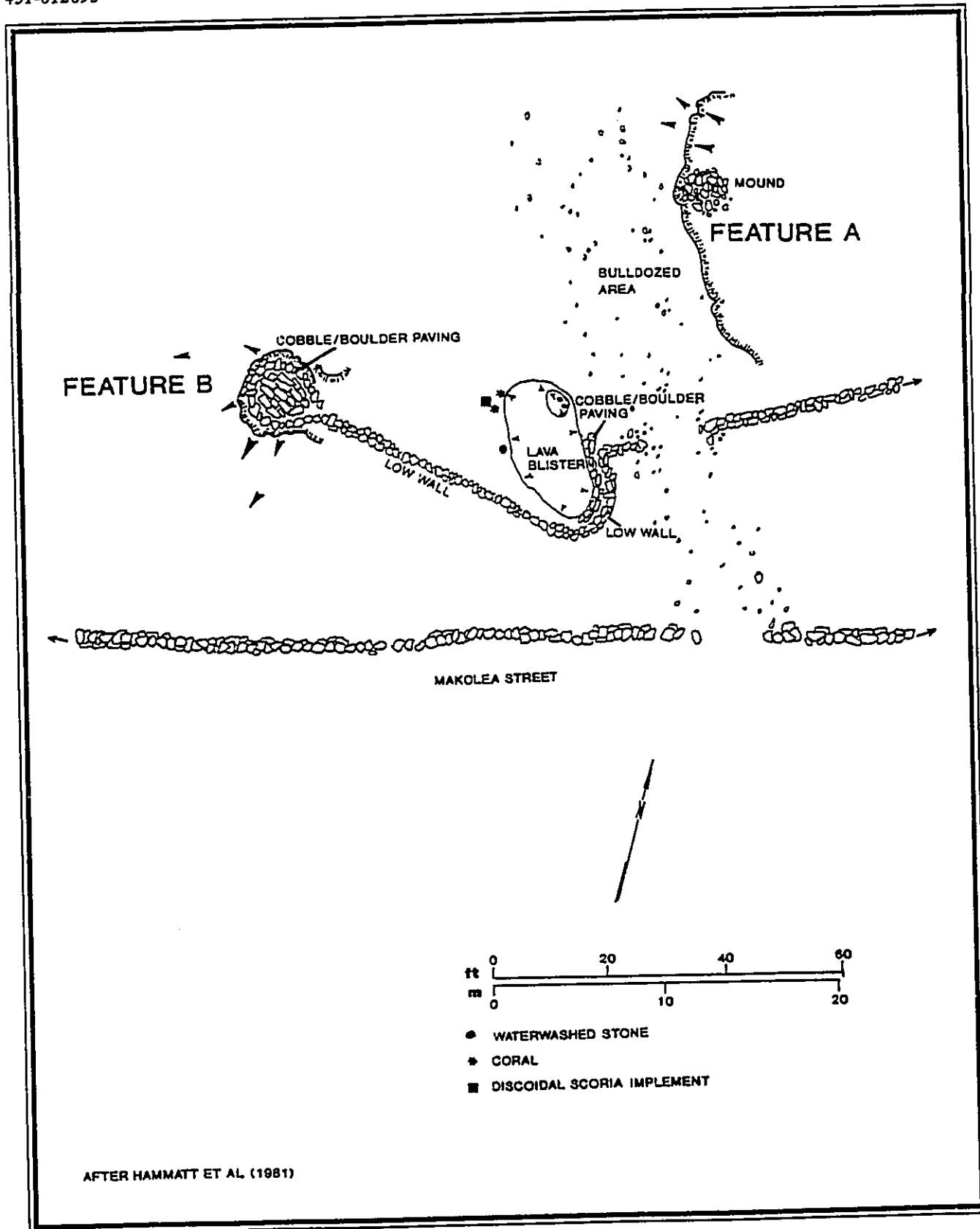


Figure B-15. Site 7914

vegetation, it cannot be determined if it is a trail. Additional investigation may be necessary. A mound/rock pile also noted on ARCH Area B Map was also checked. It is in poor condition and could have been utilized as a possible agricultural mound. Additional investigation may be necessary.

FEATURE A: Platform**FUNCTION:** Possible burial**DIMENSIONS:** 6.50 m by 5.50 m by 1.20 m (approx.)**DESCRIPTION:** Generally square in plan, the platform is raised on all sides. It is stacked and faced three to five courses high on portions of the north, west and east faces. It is collapsing on the SW corner, and portions of the south face. The SE corner is bedrock outcropping. The platform is constructed with blocky, medium pahoehoe boulders. The east side has large boulders, one to two courses high, with some uprights. The surface interior is level with boulders and cobbles. A few large pahoehoe slabs are used as paving. Waterworn basalt cobbles are also present on the surface.**FEATURE B: Cairn****FUNCTION:** Marker**DIMENSIONS:** 2.00 m by 1.80 m by 1.00 m (approx.)**DESCRIPTION:** Roughly circular in plan, the feature is constructed of blocky, medium-sized pahoehoe boulders, piled on top of a bedrock outcrop. Centrally raised, it is not formally faced at present.**FEATURE C: Terrace****FUNCTION:** Habitation**DIMENSIONS:** 7.00 m by 3.00 m by 0.95 m (approx.)**DESCRIPTION:** The feature is generally rectangular in plan, and raised on the south side. The retaining wall is c. 2.00 m wide, and is constructed of piled medium to small pahoehoe boulders. The retaining wall is not formally faced. The surface is slightly level with boulder and cobble fill. The feature abuts bedrock outcropping to the north.**FEATURE D: Modified outcrop****FUNCTION:** Habitation**DIMENSIONS:** 3.40 m by 3.00 m by 0.75 m (approx.)**DESCRIPTION:** The pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles crudely stacked against its west side. The crudely stacked boulders resemble a crude terrace.

The modified boulder area is raised, but not formally faced, on the north, south, and west sides. The modified boulder surface is slightly uneven and slopes slightly to the west.

FEATURE E: Platform**FUNCTION:** Possible burial**DIMENSIONS:** 2.40 m by 2.40 m by 1.20 m (approx.)**DESCRIPTION:** Square in plan, the feature is faced on four sides with a boulder perimeter. It is constructed of large and medium blocky pahoehoe boulders stacked to six courses high. The interior is small boulders and cobble fill, sloping or collapsing to the west. One waterworn basalt cobble is on the platform, and small waterworn basalt pebbles are in the soil area ENE of the platform.**FEATURE F: Terrace****FUNCTION:** Habitation**DIMENSIONS:** 17.00 m by 2.50 m by 0.75 m (approx.)**DESCRIPTION:** The major axis of the terrace is oriented roughly north-south. On its south end, the terrace curves slightly west. The terrace is constructed of crudely stacked, blocky basalt boulders and cobbles. The terrace is raised on its west side and is crudely faced in places. The curved, southernmost section of the terrace is generally collapsed in appearance. The terrace retains a level soil area to the east.**FEATURE G: Mound****FUNCTION:** Possible burial

DIMENSIONS: 4.80 m by 3.40 m by 0.30 m (approx.)

DESCRIPTION: Amorphous in plan, the feature is constructed of boulders and cobbles piled on top of portions of a bedrock outcrop. A few medium-sized pahoehoe boulders are centrally placed. The mound is also centrally raised.

SITE NO.: State: 7916

PHRI: 451-140

SITE TYPE: Platform

TOPOGRAPHY: Undulating pahoehoe bedrock outcrop terrain with a soil mantle cover.

VEGETATION: Predominantly *koa-haole*, with purslane, *opiuma*, *kiawe*, and monkeypod.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 9.50 m by 6.60 m by 1.60 m (approx.)

DESCRIPTION: The platform is rectangular in plan. Four to five courses of pahoehoe boulders are stacked and faced on most portions of the platform. There is some collapse along the west and north faces. The NE and SE corners are also collapsing. The surface interior is fairly level, with cobbles and some boulder slab paving.

SITE NO.: State: 7917

PHRI: 451-135/139

SITE TYPE: Complex (8 Features)

TOPOGRAPHY: Gently sloping terrain consisting of pahoehoe bedrock outcropping and brownish soil pockets.

VEGETATION: Dense *koa-haole*, scattered *kiawe*, *opiuma*, monkeypod, dense purslane, some grasses.

CONDITION: Poor-fair

INTEGRITY: Appears unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-possible burial-indeterminate

DESCRIPTION: Overall complex area measures c. 45.00 m (north-south) by 30.00 m (east-west).

FEATURE A: Platform

FUNCTION: Possible burial

DIMENSIONS: 4.40 m by 4.00 m by 1.10 m (approx.)

DESCRIPTION: The platform is roughly oval to square in plan. It is constructed of stacked, blocky basalt boulders and cobbles. The platform is raised and crudely faced on portions of the south, southeast, and north sides. The west side is visibly collapsed and rounded or sloping in profile. Because the west side is collapsed, the terrace surface is not level, but slopes west. The platform contains a larger boulder perimeter with a fill of smaller cobbles. No definite cultural deposit is visible, but may be present within the fill.

FEATURE B: Platform remnant

FUNCTION: Possible burial

DIMENSIONS: 3.00 m by 2.80 m by 1.00 m (approx.)

DESCRIPTION: This irregularly shaped platform remnant is collapsing on all sides except for the NE side, which is stacked and faced four to five courses high. The surface interior is cobble and boulder fill and is mostly collapsing to the west. One waterworn coral cobble is on the exterior ground surface.

FEATURE C: Modified outcrop

FUNCTION: Indeterminate

DIMENSIONS: 3.60 m by 2.80 m by 0.95 m (approx.)

DESCRIPTION: The pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles piled against its west side. The modified area is rounded and sloping in profile to the west. It is not formally faced. The east side of the

modified outcrop is roughly even with the surrounding ground surface and resembles a terrace. Portions of the north side are possibly crudely faced.

A linear shaped boulder and cobble rubble area is present c. 10.00 m NW of Feature C. Several boulders appear set into rubble and resemble steppingstones. This may be a short trail segment.

FEATURE D: Terrace

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 3.00 m by 1.40 m (approx.)

DESCRIPTION: The feature is raised on the west side and stacked four to five courses high. It is constructed with blocky, medium-sized pahoehoe boulders. The terrace is collapsed along portions of the west face. The retaining wall is c. 2.50 m wide, and is slightly leveled. The east side is raised 0.20-0.40 m in height, approximately one boulder high. Bedrock outcropping is visible to the east and northeast.

FEATURE E: Mound

FUNCTION: Possible burial

DIMENSIONS: 2.50 m by 2.20 m by 1.10 m (approx.)

DESCRIPTION: The mound is roughly oval in plan. It is constructed of blocky basalt boulders and cobbles crudely stacked on pahoehoe bedrock. The mound is roughly faced and crudely faced on the northwest side. The remaining sides are collapsed and rounded or sloping in profile. The mound surface is also crudely leveled with basalt cobbles and a few boulders. The mound may possibly conceal a lava blister in the pahoehoe bedrock. There are two additional mounds c. 10.00 m NE, however, the mounds are small and resemble agricultural features.

FEATURE F: Modified outcrop

FUNCTION: Possible burial

DIMENSIONS: 8.20 m by 4.00 m by 0.80 m (approx.)

DESCRIPTION: The pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles piled on its surface. The modified outcrop is not formally faced, but appears collapsed, and is rounded or sloping in profile. No definite cultural deposit is visible, but may possibly be present subsurface.

FEATURE G: Terrace

FUNCTION: Habitation

DIMENSIONS: 4.00 m by 3.10 m by 1.10 m (approx.)

DESCRIPTION: Feature G, Terrace, is faced on portions of the west side. The west side is stacked, four courses high, with blocky pahoehoe boulders. It is collapsing at the north and south ends. The retaining wall surface is slightly level. Constructed on the terrace surface, at the north end, is a low, amorphous cairn. The cairn is slightly faced on the north side, and sloping along the remaining sides. It is constructed with piled and stacked pahoehoe boulders. It measures c. 1.00 m (east-west) by 0.70 m (north-south) and 0.50-0.70 m high. It is centrally raised. East of the terrace is bedrock outcropping with one pahoehoe slab and some cobbles piled on top.

FEATURE H: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 4.00 m by 2.75 m by 1.40 m (approx.)

DESCRIPTION: Feature H is an outcrop with a modified blister in the center, and a terrace along the south edge. A natural collapsed blister c. 1.40 m deep, it has an interior measurement of 3.00 m (north-south) by 0.90-1.20 m (east-west).

The blister has a horizontal opening (to the SE), that is blocked with two boulder slabs, creating a vertical opening into the blister. The interior floor is level with soil deposit. Southwest of the blister is a terrace. It is roughly L-shaped and raised on the SW and SE side to a maximum height of 1.00 m. It is crudely stacked with two to three courses of pahoehoe boulders on top of bedrock outcrop. The retaining wall surface is somewhat uneven. At present, the terrace is collapsing. There is bedrock outcropping visible to the northwest.

A possible terrace area was noted by ARCH northeast of the blister. It appears vague and collapsed at present. Most of it appears to be decomposing bedrock outcrops.

A small cairn is built on the modified outcrop surface. The cairn is constructed of crudely stacked blocky basalt boulders. It measures c. 2.40 m (north-south) by 1.60 m (east-west) and 0.60 m in height. The cairn is raised, but not formally faced.

SITE NO.: State: 7918

SITE TYPE: Complex (5 Features)

TOPOGRAPHY: Undulating pahoehoe bedrock with a mantle of soil on top. Flat soil area south of Feature A.

VEGETATION: *Koa-haole*, purslane, vines, grasses, *opiuma*, monkeypod, *ha'uowi* (*verbena litoralis*), and periwinkle family (Apocynaceae)

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-agriculture-possible burial

DESCRIPTION: The overall complex area measures c. 30.00 m (east-west) by 13.00 m (north-south). There is a flat soil area south of the features with a fair amount of soil. It appears excellent for agriculture and possibly deep enough for burials.

FEATURE A: Modified outcrop (Figure B-16)

FUNCTION: Possible burial

DIMENSIONS: 4.50 m by 4.50 m by 0.85 m (approx.)

DESCRIPTION: This modified outcrop resembles a platform. It is roughly oval in plan, and is constructed of medium to large boulders piled on top of a raised bedrock outcrop. The west and north sides are in better shape than the remaining sides, which are collapsing. The surface interior of the modified outcrop is level with boulders and cobbles. A possible cupboard is present on the SW side. It measures c. 1.10 m (north-south) by 0.75 m (east-west) by 0.70 m deep. Also on the SW side, immediately south of and below the cupboard, is a level cobble area 2.00 m by 2.00 m and 0.50 m in height.

FEATURE B: Mound

FUNCTION: Possible burial

DIMENSIONS: 3.00 m by 2.60 m by 0.90 m (approx.)

DESCRIPTION: The mound is oval in plan, with medium pahoehoe boulders, some uprights, present along portions of its perimeter. The other portions are collapsed. The mound is centrally raised to a maximum height of 0.90 m from the base to the top. The surface is sloping, with cobbles and small boulders. Three to four medium pahoehoe boulders are placed on the top and center of the mound.

FEATURE C: Terrace

FUNCTION: Habitation

DIMENSIONS: 8.00 m by 4.00 m by 0.55 m (approx.)

DESCRIPTION: The feature is a roughly V-shaped outcrop, with the surface consisting of undulating and smooth pahoehoe bedrock with a thin soil cover. It is constructed with loosely piled cobbles and boulders built along the seaward exterior, forming a terrace that could function as a habitation feature. Some boulders and cobbles are also piled along the north and south ends. A low boulder pile, 0.50 m in height, is on the terrace surface.

FEATURE D: Terrace

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 4.00 m by 0.45 m (approx.)

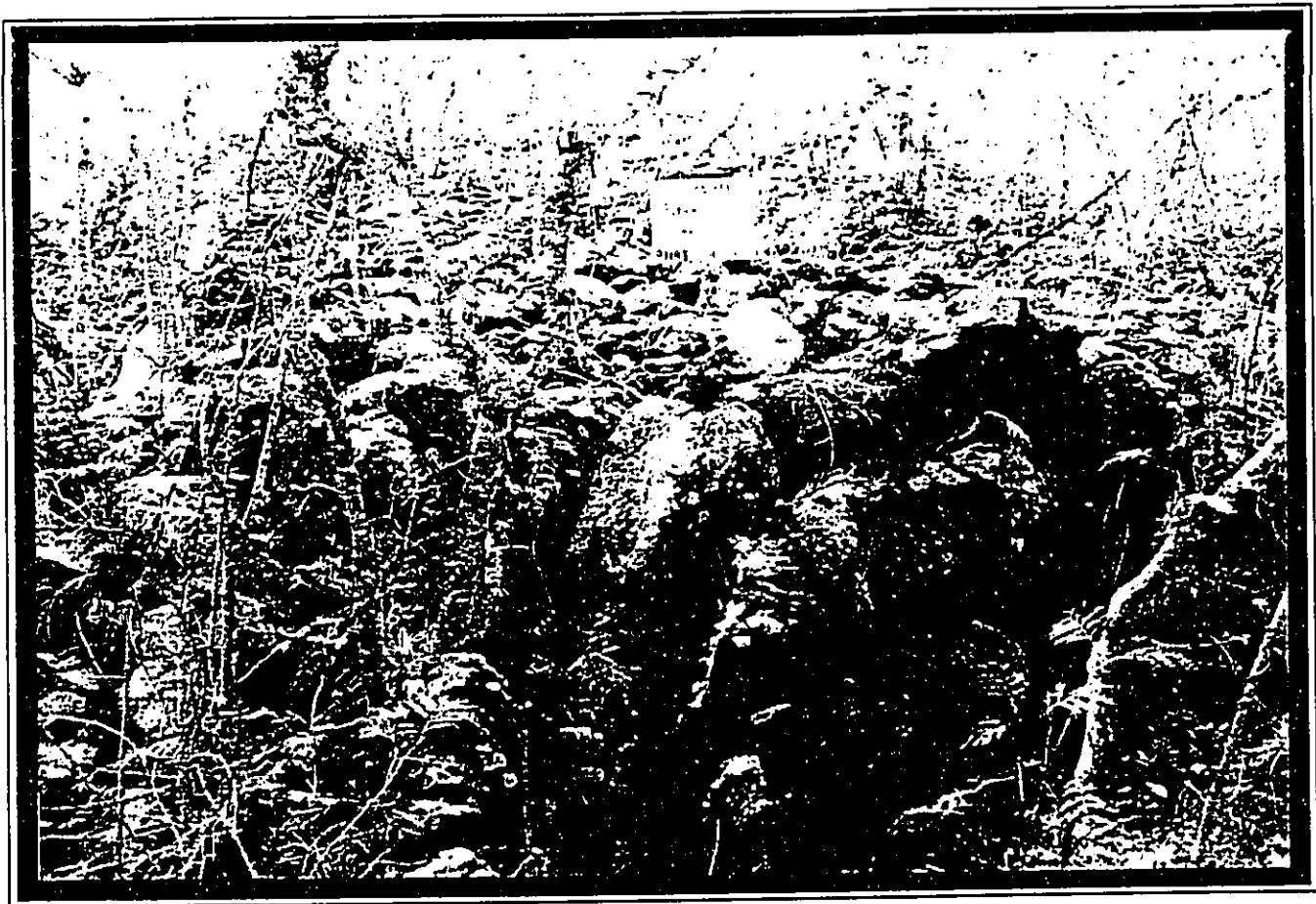


Figure B-16. Site 7918, Feature A (Neg. 958-34a)

DESCRIPTION: This is a roughly U-shaped raised outcrop, with a level surface interior of pahoehoe bedrock. It is constructed with loosely piled boulders and cobbles built along the seaward exterior, forming a terrace that could function as a habitational feature.

FEATURE E: Mound

FUNCTION: Agriculture

DIMENSIONS: 7.00 m by 4.00 m by 0.55 m (approx.)

DESCRIPTION: The feature is partially stacked on the SW side with blocky pahoehoe boulders, two courses high. The remainder of the feature is mostly a raised length of pahoehoe bedrock that is decomposing. A few pahoehoe boulders and cobbles are piled on top of the exterior length of the feature. It is fairly vague and indistinct.

SITE NO.: State: 7919

SITE TYPE: Complex (4 Features)

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock with soil mantle cover. Site is on a raised bedrock outcrop.

VEGETATION: Predominantly *koa-haole*, purslane, grasses, and vines.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture-indeterminate

DESCRIPTION: The overall complex area measures 25.00 m (north-south) by 20.00 m (east-west). Additional mounds of similar construction are in the area. A boulder rubble terrace is also present.

FEATURE A: Mound

FUNCTION: Indeterminate

DIMENSIONS: 3.00 m by 2.50 m by 0.50 m (approx.)

DESCRIPTION: The mound is irregular in plan. It is slightly faced and stacked, two courses, on the west side. The remaining sides are mostly rubble with loose rock. Construction is of piled pahoehoe boulders and cobbles. The interior is slightly level boulder cobble fill.

FEATURE B: Modified outcrop

FUNCTION: Indeterminate

DIMENSIONS: 3.20 m by 2.90 m by 0.45 m (approx.)

DESCRIPTION: Irregular in plan, the feature is constructed with piled boulders and cobbles on top of a bedrock outcrop. The surface is uneven and collapsing. No formal construction is visible.

FEATURE C: Terrace

FUNCTION: Agriculture

DIMENSIONS: 9.00 m by 4.50 m by 1.00 m (approx.)

DESCRIPTION: The terrace is constructed across a slope. The retaining wall is constructed of large, piled, blocky pahoehoe boulders and cobbles. It is raised on the seaward (SW) side, but not formally faced. The retaining wall is collapsing and is level with the ground surface NE.

FEATURE D: Terrace

FUNCTION: Agriculture

DIMENSIONS: 3.50 m by 2.00 m by 0.70 m (approx.)

DESCRIPTION: Feature D is constructed with piled boulders and cobbles. The retaining wall has sloping and collapsed sides, and is not formally faced. The terrace surface is uneven, with boulders and cobbles. Bedrock outcropping is north and northwest. A boulder pile is present c. 2.00 m northwest.

PHRI: 451-137

SITE NO.: State: 7920**SITE TYPE:** Complex (4 Features)**TOPOGRAPHY:** Gently sloping terrain near base of ridge. Terrain is pahoehoe bedrock outcrop and a thin soil mantle.**VEGETATION:** Dense *koa-haole*, scattered *kiawe*, *opiuma*, monkeypod, ground cover of purslane .**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation-agriculture**DESCRIPTION:** Overall complex area measures c. 40.00 m (north-south) by 25.00 m (east-west).**FEATURE A:** Modified outcrop**FUNCTION:** Habitation**DIMENSIONS:** 20.00 m by 15.00 m by 2.00 m (approx.)**DESCRIPTION:** This large pahoehoe bedrock outcrop is modified with blocky basalt boulders crudely stacked on its west side. The crudely stacked boulders form a small level area, which resembles a terrace between two raised outcrops. This area measures c. 4.00 m (north-south) by 3.00 m (east-west) by 1.30 m high and contains soil and a smaller cobble fill. Feature A also contains basalt boulders scattered atop the surface of its large pahoehoe bedrock outcrop. One waterworn basalt cobble is present.

A second small, vague terrace area is present on the bedrock outcrop at the NW end. This second terrace area consists of a level, cobble-filled area between natural bedrock boulders and outcrop. It measures c. 2.00 m (north-south) by 1.00 m (east-west) by 0.60 m high.

A third small and vague possible terrace is located off the NW end of the large bedrock outcrop. This third possible terrace contains a level soil surface, and the sides resemble collapsed boulder/cobble rubble. It measures c. 7.00 m (east-west) by 4.00 m (north-south) by 0.50-0.60 m high.

FEATURE B: Terrace**FUNCTION:** Agriculture**DIMENSIONS:** 9.00 m by 2.00 m by 0.30 m (approx.)**DESCRIPTION:** The terrace is linear in plan and oriented roughly north-south. The terrace is constructed of crudely stacked, blocky basalt boulders and cobbles. It is raised on the west side, but is not formally faced. The terrace sides are rounded or sloping in profile, and appear collapsed. The terrace retains a level soil surface on its upslope (east) side. Several possible uprights are present in the terrace wall.**FEATURE C:** Mound**FUNCTION:** Agriculture**DIMENSIONS:** 5.00 m by 4.00 m by 1.30 m (approx.)**DESCRIPTION:** The mound is generally oval in plan and is constructed of crudely stacked blocky basalt boulders and cobbles. It is generally raised and crudely faced on the west side. The remaining sides are rounded or sloping in profile, and appear collapsed. Feature C is built atop a bedrock outcrop.**FEATURE D:** Mound**FUNCTION:** Agriculture**DIMENSIONS:** 5.00 m by 4.50 m by 1.10 m (approx.)**DESCRIPTION:** This mound is generally oval in plan. It is constructed of piled blocky basalt boulders and cobbles and is centrally raised. The sides are rounded or sloping in profile, and appear collapsed. They are not formally faced. The mound may be a platform remnant.

PHRI: 451-134

SITE NO.: State: 7921**SITE TYPE:** Complex (4 Features)

TOPOGRAPHY: Gently sloping terrain to the west. Terrain is pahoehoe bedrock outcrop and a thin soil mantle.
VEGETATION: Dense *koa-haole*, scattered *opiuma*, monkeypod, *kiawe*, and dense purslane.
CONDITION: Poor-fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation-agriculture
DESCRIPTION: Overall complex area measures c. 30.00 m (NW-SE) by 20.00 m (NE-SW).

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 6.50 m by 3.00 m by 1.56 m (approx.)

DESCRIPTION: The terrace is built against the NW side of a bedrock outcrop. It is constructed of blocky basalt boulders and cobbles. The terrace is raised on the NW side, and even with the outcrop surface southeast. On the northernmost end, the terrace side is formally faced. The remaining portions are collapsed in appearance and rounded or sloping in profile. One possible upright (0.65 m high) is present on the terrace surface.

A small modified outcrop is also present on the terrace. The pahoehoe bedrock outcrop is modified with boulders and cobbles piled against its NW side. The modified outcrop is not formally faced, and resembles a rubble terrace. The modified area is c. 4.00 m (east-west) by 2.00 m (north-south) by 0.80 m high. Waterworn basalt cobbles and one piece of coral are present off of the Feature A structure. No definite cultural deposit is visible, but is possibly present within the fill.

FEATURE B: Platform

FUNCTION: Habitation

DIMENSIONS: 4.20 m by 3.20 m by 1.40 m (approx.)

DESCRIPTION: The platform contains one corner, and originally may possibly have been roughly square in plan. It is constructed of stacked, blocky basalt boulders, cobbles, and pebbles. The platform is raised and formally faced on the northwest and part of the east sides. The remaining sides are collapsed, and rounded or sloping in profile. The platform contains a perimeter of larger boulders and a smaller cobble/pebble fill, creating a level surface. No definite cultural deposit is visible, but is possibly present subsurface.

FEATURE C: Platform

FUNCTION: Habitation

DIMENSIONS: 6.20 m by 4.50 m by 1.00 m (approx.)

DESCRIPTION: The platform is generally oval in plan. It is constructed of stacked, blocky basalt boulders, cobbles and pebbles. The platform sides are generally raised on all sides, but collapsed in places. It is formally faced on portions of the north side. The remaining sides (south, east, and west) are collapsed and rounded or sloping in profile. The upper surface of the platform is level and paved with smaller cobbles and pebbles. One possible upright boulder is noted off the SE side of the platform. Two waterworn cobbles and fire-cracked basalt cobbles are present. No definite cultural deposit is visible, but is possibly present in fill.

FEATURE D: Modified outcrop

FUNCTION: Agriculture

DIMENSIONS: 8.00 m by 4.00 m by 0.50 m (approx.)

DESCRIPTION: The pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles piled upon its surface. The modified outcrop is amorphous in plan. It contains no formally faced sides. The sides are generally collapsed and rounded or sloping in profile. The modified outcrop contains a rough, uneven surface, with exposed bedrock.

SITE NO.: State: 7922

SITE TYPE: Complex (5 Features)

TOPOGRAPHY: Gently sloping terrain to the west consisting of pahoehoe bedrock outcrops and a thin soil mantle.

VEGETATION: Dense *koa-haole*, scattered *kiawe*, *opiuma*, *Ficus* sp., dense purslane, grasses.
CONDITION: Poor-fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation-agriculture
DESCRIPTION: Overall complex area measures c. 45.00 (east-west) by 30.00 m (north-south).

FEATURE A: Mound**FUNCTION:** Habitation**DIMENSIONS:** 10.00 m by 7.00 m by 0.60 m (approx.)

DESCRIPTION: The mound is linear in plan and resembles Feature E, Mound. The major axis of the mound is oriented c. east-west. The mound is constructed of crudely stacked, blocky basalt boulders, cobbles and pebbles. The east end of the mound is built against a pahoehoe bedrock outcrop. The mound is raised, but its sides are not formally faced. The sides are collapsed and rounded or sloping in profile. The mound contains a vague perimeter of larger boulders with a smaller cobble/pebble interior fill. The mound surface slopes west. On the east end of the mound, a boulder/cobble rubble concentration abuts its north side. One piece of coral is present. No definite cultural deposit is visible, but is possibly present subsurface.

FEATURE B: Modified outcrop**FUNCTION:** Agriculture**DIMENSIONS:** 7.00 m by 4.20 m by 0.95 m (approx.)

DESCRIPTION: Generally amorphous shape in plan. The pahoehoe bedrock outcrop is modified with blocky basalt boulders, cobbles, and pebbles, crudely stacked upon its surface. It is raised on all sides and crudely faced on the east end. The remaining sides consist of collapsed boulder/cobble rubble and/or bedrock outcrop. Portions of the bedrock outcrop interior surface are also modified with boulder, cobble, and pebble fill. Bedrock outcropping is also present on the interior surface.

FEATURE C: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 3.00 m by 1.00 m by 1.10 m (approx.)

DESCRIPTION: The terrace is built against the south side of a pahoehoe bedrock outcrop. It is constructed of stacked, blocky basalt boulders, cobbles and pebbles, and is raised and formally faced on its south side. The northwest end of the terrace is collapsed and sloping in profile. The terrace surface is slightly uneven. No definite cultural deposit is visible, but is possibly present within the terrace fill.

FEATURE D: Modified outcrop**FUNCTION:** Habitation**DIMENSIONS:** 8.00 m by 5.00 m by 1.20 m (approx.)

DESCRIPTION: The pahoehoe bedrock outcrop is modified with blocky basalt boulders, cobbles and pebbles crudely stacked upon its surface. This crude stacking of boulders and cobbles creates a faced side, on the west end of the outcrop, to a height of 0.70 m. The east (*mauka*) end of the outcrop is not faced, as noted by Hammatt and Folk (1980), but consists of raised bedrock. The remaining sides consist of collapsed boulder rubble and/or bedrock outcrop. Portions on the bedrock outcrop's interior surface are also modified with boulder, cobble and pebble fill. Bedrock outcrops are also present on the interior surface. No definite cultural deposit is visible, but is possibly present subsurface.

FEATURE E: Mound**FUNCTION:** Habitation**DIMENSIONS:** 10.00 m by 3.00 m by 0.70 m (approx.)

DESCRIPTION: The mound is linear in plan, with its major axis oriented east-west. It is constructed of crudely stacked, blocky basalt boulders, and cobbles and pebbles. The mound is raised, and contains a crudely faced section near its northeast corner. The remaining sides are collapsed, and rounded or sloping in profile. The mound contains a perimeter of larger boulders and a smaller cobble and pebble fill. The mound surface slopes to the west. No definite cultural deposit is visible, but is possibly present in mound fill.

SITE NO.: State: 7923

SITE TYPE: Modified outcrop

TOPOGRAPHY: Just south of a flat soil area. The site is on undulating bedrock terrain with soil in pockets.

VEGETATION: Predominantly *koa-haole*, purslane, one to two *kiawe* and *opiuma* trees.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 9.00 m by 6.50 m by 0.50 m (approx.)

DESCRIPTION: Boulders and cobbles are piled on the west and south sides of a raised bedrock area. Roughly rectangular in plan, it resembles a platform or a terrace. The sides are not faced, but are collapsing and rubble-like in appearance. The north and east sides are mostly bedrock outcrop with some loose rock. The interior surface area is mostly smooth pahoehoe bedrock. An irregularly shaped cairn is located on the pahoehoe surface. It is constructed with 1 upright and medium-sized blocky pahoehoe boulders, stacked on each other one to two courses high. The cairn has an even, flat surface. It measures 1.30 m (north-south) by 1.10 m (east-west) by 0.55 m in height.

SITE NO.: State: 7924

SITE TYPE: Terrace

TOPOGRAPHY: Flat to very slightly undulating terrain consisting of pahoehoe bedrock outcrops and soil. Site is south of a large flat soil area.

VEGETATION: Predominantly *koa-haole* and purslane.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 8.00 m by 7.00 m by 0.90 m (approx.)

DESCRIPTION: The terrace is stacked and faced on portions of the west side, two to three courses high, and is collapsing along the remaining sections. There is bedrock outcropping on the inland side. The terrace surface is sloping seaward with the general ground surface. Large boulders and cobbles make up the terrace interior.

To the north are large blocky boulders and some cobbles piled on top of a roughly crescent shaped bedrock outcrop. The surface here is uneven, with boulders. Between this modified outcrop and the terrace is a smooth bedrock surface interior. This area measures c. 3.00 m (east-west) by 2.25 m (north-south). There is a soil area to the north between Sites 7923, Modified outcrop and Site 7925, Platform. It is very flat and even, a good area for agriculture. Also, possible structures functioning as possible burial features are present in this soil area.

SITE NO.: State: 7925

PHRI: 451-133

SITE TYPE: Platform

TOPOGRAPHY: On a fairly level to gently sloping terrain consisting of some bedrock outcropping with a fairly good deposit of soil immediately southwest.

VEGETATION: *Koa-haole*, purslane, and a *kiawe* tree.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 7.60 m by 5.25 m by 0.80 m (approx.)

DESCRIPTION: The platform is generally oval in plan. Raised on all sides, it is stacked and faced four courses high with blocky pahoehoe boulders, along the south and east side. The north and west sides are sloping profiles, and not formally faced. On the east side is a short wall section c. 2.00 m in length. It is bifaced and cobble filled to c. 0.70 m in height above the platform surface. This wall section may be the remnant of a wall that was built along the perimeter of the platform surface. It is presently collapsed. The surface of the platform is level boulder and cobble fill.

A depression was noted on the SE end c. 0.70 m in diameter and deep. The north section of the platform appears to step down onto a level cobble paved area. A possible boulder lined depression is visible. Bedrock outcropping is present along the northeast side of the feature.

SITE NO.: State: 7926

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Gently undulating terrain consisting of pahoehoe bedrock outcropping and a brownish soil mantle.

VEGETATION: Dense *koa-haole*, scattered monkeypod, *opiuna*, *kiawe* and dense purslane.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-possible burial

DESCRIPTION: Overall complex area measures c. 20.00 m by 20.00 m. No definite cultural deposit visible, but possibly present subsurface. A roughly east-west wall is present north of Site 7926.

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 6.25 m by 2.50 m by 0.80 m (approx.)

DESCRIPTION: The terrace is constructed against the southwest side of a pahoehoe bedrock outcrop. It is constructed of crudely stacked blocky basalt boulders and cobbles.

The terrace is raised on the southwest, southeast, and part of the northwest sides. The terrace sides are not formally faced, but appear collapsed and rounded or sloping in profile. The surface interior of the terrace is roughly level. A crude boulder alignment (possibly a collapsed wall remnant?) extends west, off the south corner of the terrace.

FEATURE B: Mound

FUNCTION: Possible burial

DIMENSIONS: 2.60 m by 2.30 m by 0.35 m (approx.)

DESCRIPTION: Feature B is an amorphous shaped low mound. It is constructed of piled basalt cobbles and small boulders. One large blocky pahoehoe boulder is placed at the NE end. The surface interior is slightly level. Feature B is situated in a flat soil area with a fair amount of soil deposit.

SITE NO.: State: 7927

SITE TYPE: Terrace

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock outcrop and soil mantle cover.

VEGETATION: Predominantly *koa-haole* and purslane.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 11.00 m by 6.00 m by 1.10 m (approx.)

DESCRIPTION: A terrace retaining wall raised along the southwest. The face is collapsing and sloping in profile. It is not formally faced, but may have been at one time. It is constructed of large blocky and smaller pahoehoe boulders. The surface is level, with cobbles and small boulders along the southeast half of the terrace. The northwest half of the terrace is uneven with bedrock outcrop and medium to large pahoehoe blocky boulders. The northeast edge is raised one boulder high. Approximately 0.15 m of soil is visible in the area.

A wall segment is present c. 3.00 m northwest of terrace. It measures c. 5.00 m (NE-SW) by 0.40-0.60 m (NW-SE) and 0.60 m in height. The wall is constructed of piled large to small blocky pahoehoe boulders and cobbles. It is oriented inland/seaward and is collapsing, especially along the inland half. The wall segment has an indeterminate function. A single old horse shoe was present but not collected.

SITE NO.: State: 7928

SITE TYPE: Modified outcrop

TOPOGRAPHY: Gently undulating terrain consisting of pahoehoe bedrock outcrop and thin soil mantle.

VEGETATION: Dense *koa-haole*, scattered *kiawe*, *opiuma*, and monkeypod.

CONDITION: Poor

INTEGRITY: Appears unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 9.00 m by 3.00 m by 0.70 m (approx.)

DESCRIPTION: The pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles piled against its northwest and west sides. The modified area appears to create a vague terrace and enlarge the level pahoehoe bedrock surface. The piled boulders and cobbles are raised on the northwest and west sides, but not formally faced. The modified surface is very roughly level. Several upright boulders are present within the piled boulders. Rubble boulder walls are situated to the south and east.

SITE NO.: State: 7929

SITE TYPE: Mound

TOPOGRAPHY: Generally sloping pahoehoe bedrock terrain with isolated soil pockets.

VEGETATION: Dense *koa-haole*, scattered *kiawe*, *opiuma*, dense purslane and grasses.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Indeterminate

DIMENSIONS: 7.25 m by 7.00 m by 1.00 m (approx.)

DESCRIPTION: The mound is amorphous in plan and is constructed of piled or very crudely stacked, blocky basalt cobbles and boulders. The mound is centrally raised, but its sides are not formally faced. The sides are rounded or sloping in profile and appear collapsed. This site is immediately south of Site Complex 7930.

PHRI: 451-143

SITE NO.: State: 7930

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Generally sloping pahoehoe bedrock terrain with isolated soil pockets. Site is on a bluff.

VEGETATION: Sparse to moderately dense cover of *koa-haole* and *kiawe*.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DESCRIPTION: "Between this site and 37-7931 are a few scattered fragments of *Cypraea* shell and volcanic glass fragments" (Hommon and Rosendahl 1983:214).

PHRI: 451-145

FEATURE A: Platform**FUNCTION:** Possible burial**DIMENSIONS:** 6.00 m by 4.00 m by 1.00 m (approx.)**DESCRIPTION:** "Platform, 6.00 m by 4.00 m by up to 1.00 m high, the surface of which is in two steps, one higher than the other." (Hommon and Rosendahl 1983:214). According to Allen's Field Records (1983), the step on the seaward side is 2.00 m wide. The surface interior is fairly level. The inland end is somewhat deteriorated. A natural pahoehoe path leads to this feature. A coral fragment is present on the surface.**FEATURE B: Platform****FUNCTION:** Possible burial**DIMENSIONS:** 2.00 m by 2.00 m by 0.80 m (approx.)**DESCRIPTION:** "Platform, 2.00 m by 2.00 m by up to 0.80 m high. A portion of the top of the platform is paved with two pahoehoe slabs. A stone alignment adjacent to the north face of the feature extends east and west" (Hommon and Rosendahl 1983:214). It is faced on four sides, with a cobble-filled interior.**SITE NO.:** State: 7931

PHRI: 451-146

SITE TYPE: Complex (3 Features)**TOPOGRAPHY:** Generally sloping pahoehoe bedrock terrain with isolated soil pockets.**VEGETATION:** Moderately dense cover of *koa-haole*, *kiawe*, purslane, and grasses.**CONDITION:** Fair-good**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Possible burial-agriculture**DESCRIPTION:****FEATURE A: Terrace****FUNCTION:** Possible burial**DIMENSIONS:** 3.50 m by 2.50 m by 1.20 m (approx.)**DESCRIPTION:** The terrace is faced with large boulders, with level cobble/pebble paving. Immediately north and abutting is a 4.50 m by 4.50 m platform. Faced at the northeast and northwest corners, the front is rubble and the surface interior is fairly flat cobble paving.**FEATURE B: Terrace****FUNCTION:** Possible burial**DIMENSIONS:** 5.50 m by 3.50 m by 2.50 m (approx.)**DESCRIPTION:** A crude, three-stepped terrace with large boulders demarcating the feature edges. Its surface widths are 2.00 m, 1.00 m, and 2.50 m. It is a somewhat deteriorated feature.**FEATURE C: Terrace****FUNCTION:** Agriculture**DIMENSIONS:** 5.00 m by 2.00 m by 1.00 m (approx.)**DESCRIPTION:** A rubbly terrace with sloping rubbled surface.**SITE NO.:** State: 7932**SITE TYPE:** Terrace**TOPOGRAPHY:** Generally sloping pahoehoe bedrock terrain with isolated soil pockets.**VEGETATION:** Moderately dense cover of *koa-haole*, *kiawe*, purslane, and grasses.**CONDITION:** Poor**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial
DIMENSIONS: 4.50 m by 4.50 m by 1.00 m (approx.)
DESCRIPTION: "This terrace wall is roughly T-shaped, with the lower portion being the cross of the "T". It measures 15 ft by 15 feet" (Hammatt and Folk 1980:148). A rubble wall is north of Site 7932. Approximately 10.00 m southwest of site is an additional terrace.

SITE NO.: State: 7933
SITE TYPE: Platform
TOPOGRAPHY: Generally sloping pahoehoe bedrock terrain with isolated soil pockets.
VEGETATION: Moderately dense cover of *koa-haole*, *kiawe*, purslane, and grasses.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DIMENSIONS: 3.00 m by 2.00 m by 1.50 m (approx.)
DESCRIPTION: The platform is irregular in plan. It is boulder-faced on three sides and constructed on pahoehoe outcrop. The surface interior is level cobble/pebble fill. Several waterworn basalt pebbles are visible on the surface.

PHRI: 451-150

SITE NO.: State: 7934
SITE TYPE: Mound
TOPOGRAPHY: Located on pahoehoe bedrock rise.
VEGETATION: Moderately dense cover of *koa-haole* and *kiawe*.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DIMENSIONS: 4.50 m by 3.50 m by 1.20 m (approx.)
DESCRIPTION: "A possible burial platform 7 by 8 feet that is faced on the east side. The other sides may have been faced at one time but are now fallen" (Hammatt and Folk 1980:86). According to Allen Field Records 1983, the feature is a rough, jumbled mound that is faced on the south and east sides. A waterworn pebble is visible on the surface.

PHRI: 451-149

SITE NO.: State: 7935
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Located on pahoehoe bedrock rise.
VEGETATION: Moderately dense cover of *koa-haole* and *kiawe*
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DESCRIPTION: Overall complex area measures c. 27.00 m (north-south) by 10.00 m (east-west).

FEATURE A: Platform
FUNCTION: Possible burial
DIMENSIONS: 6.00 m by 4.00 m by 0.70 m (approx.)
DESCRIPTION: "Two contiguous platforms. The south platform[sic] measures 4.00 m by 3.00 m by 0.70 m high. The central portion of its surface is depressed. The north platform measures 3.00 m by 2.50 m. A large upright slab is situated on the surface of the north platform [sic]" (Hommon and Rosendahl 1983:210).

According to Allen Field Records 1983, the northernmost platform is constructed from large boulders, and the interior appears collapsed and jumbled. The southernmost platform is outlined by boulders, but filled with cobbles. A single waterworn pebble is present on its surface. A large upright slab marks the boundary between the two features.

FEATURE B: Platform**FUNCTION:** Possible burial**DIMENSIONS:** 10.50 m by 10.00 m by 0.70 m (approx.)**DESCRIPTION:** "A multicomponent feature consisting of several contiguous platforms with roughly faced edges. Heights range from 0.30-0.70 m. Several waterworn cobbles on surface. Northernmost platform utilizes large boulders for facing, is 3.00 m by 3.00 m and collapsed in the center" (Allen: Field Records 1983).

According to Hammatt et al. "A small, roughly rectangular, raised (50 centimeters) platform abutting the northwest corner of Site 7935, Feature B was tested for burial. The 0.25 m two (2) test pits revealed the corner of a small scale crypt-like alignment within the platform from the sediment surface to 0.26 m above that surface. Three (3) strata are present...Although the assemblage of refuse suggests an occupational function for this platform the construction technique and the loose characteristic of the deeper stratum suggest that a pit has been backfilled beneath the platform. Thus a burial function or a refuse pit function are also indicated" (Hammatt et al. 1981:79).

SITE NO.: State: 7936

PHRI: 451-151

SITE TYPE: Platform**TOPOGRAPHY:** Located on pahoehoe bedrock rise.**VEGETATION:** Moderately dense cover of *koa-haole* and *kiawe*.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Possible burial**DIMENSIONS:** 7.00 m by 4.00 m by 1.00 m (approx.)**DESCRIPTION:** "A few water-worn cobbles are on the surface. To the west are a few small terraces and scattered midden materials" (Hommon and Rosendahl 1983:211).

"This is a possible habitation platform measuring 19 feet by 21 feet. It is cobble/pebble paved with facing on the west side" (Hammatt and Folk 1980:98).

SITE NO.: State: 7937

PHRI: 451-128

SITE TYPE: Cupboard**TOPOGRAPHY:** Gentle slope to undulating pahoehoe bedrock terrain.**VEGETATION:** Moderate to dense *koa-haole* and a *kiawe* tree.**CONDITION:** Good**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Storage**DIMENSIONS:** 0.80 m by 0.80 m by 0.70 m (approx.)**DESCRIPTION:** "Roughly circular cairn, 0.8 meters in diameter by 0.70 m high. Its hollow center measures about 0.50 by 0.50 m and contains coral cobbles" (Hommon and Rosendahl 1983:202).**SITE NO.:** State: 7938**SITE TYPE:** Lava tube**TOPOGRAPHY:** Gentle slope to undulating pahoehoe bedrock terrain**VEGETATION:** *Koa-haole*, purslane, and grasses with some *kiawe*.

CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DIMENSIONS: 5.00 m by 4.00 m by 0.90 m (approx.)
DESCRIPTION: The entrances are c. 0.90 m high, with openings to the west and the east. The cave interior is somewhat shallow and probably too small to utilize. Its interior dimensions are c. 5.00 m (east-west) by 4.00 m (north-south). A boulder alignment is present on the exterior surface just southwest of the entrance. About 6.00-7.00 m ESE of the entrance is a filled-in pahoehoe bedrock crack. This could be a possible second entrance to the cave.

SITE NO.: State: 7939
SITE TYPE: Wall
TOPOGRAPHY: Undulating terrain with slightly level pahoehoe bedrock outcrops. Soil in area.
VEGETATION: *Koa-haole* and grasses.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric]
FUNCTIONAL INTERPRETATION: Boundary
DIMENSIONS: 55.00 m by 1.50 m by 1.50 m (approx.)
DESCRIPTION: Site 7939 is oriented c. 350° azimuth and begins c. 5.0 m north of site 7942, Wall. Both walls are similar in construction. Site 7939 is c. 50.00-55.00 m in length and is in close proximity to other sites in the area. It is boulder faced with cobbles and boulders also used as fill. It is standing on the west side, and collapsing on the east, almost terrace-like along sections.

About 20.00 m north from its break with Site 7942, Wall is another wall that extends westward. This wall is constructed with an upright basalt slab and is cobble filled. Oriented c. 255° azimuth, it is 0.90 m wide and 0.30-0.75 m in height.

About 25.00-35.00 m north of this extension, Site 7939 rubbles out within c. 8.00 m east of Site 7941, Platform. The last 10.00 m of the wall curves east on a bedrock outcrop and forms a half circle that is open towards 7941.

SITE NO.: State: 7940
SITE TYPE: Platform
TOPOGRAPHY: Slightly undulating pahoehoe bedrock terrain with soil pockets.
VEGETATION: *Koa-haole* and purslane.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DIMENSIONS: 3.50 m by 2.50 m by 0.60 m (approx.)
DESCRIPTION: Rectangular in plan, the platform is adjacent to a pahoehoe outcrop on its south side. The north and west edges are partially faced, one to two courses high, with blocky basalt boulders, and cobble and pebble-filled. The east edge is raised and not faced. The surface interior is level, with two waterworn cobbles present.

SITE NO.: State: 7941
SITE TYPE: Platform
TOPOGRAPHY: Gentle to undulating pahoehoe bedrock terrain.
VEGETATION: *Koa-haole* and *kiawe*.

CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DIMENSIONS: 2.50 m by 2.50 m by 0.80 m (approx.)
DESCRIPTION: Square shape in plan. It is raised on four sides. The south and east sides are faced with boulders. The north and west sides are collapsing. The surface interior is roughly level boulder, cobble, and pebble filled.

SITE NO.: State: 7942
SITE TYPE: Wall
TOPOGRAPHY: Undulating terrain with slightly level pahoehoe bedrock outcrop. Soil in area.
VEGETATION: *Koa-haole* and grasses.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Boundary
DIMENSIONS: 82.00 m by 1.50 m by 1.25 m (approx.)
DESCRIPTION: Site 7942 is in close proximity to other sites in the area. It is L-shaped in plan and is oriented at c. 235° for c. 78.00 m and 350° for c. 82.00 m. It is similar in construction to Site 7939, Wall. The east-west portion is constructed mostly of single boulders and uprights, standing along some portions with heights of 0.80-1.25 m, and widths of 0.60 m. It continues westward for an undetermined length, passing at least four sites. About 38.00 m west is a 5.00 m north-south wall section situated south of Site 7942.

The north-south portion is mostly terrace-like, c. 1.50 m wide, with heights along the west side at c. 0.70 m, and even with the ground surface along the east side. About 70.00 m north, is a 7.00 m east-west wall section located west of Site 7942. The total northern length is c. 82.00 m, before it breaks and becomes Site 7939, Wall. Waterworn basalt cobbles are present along Site 7942.

SITE NO.: State: 7943
SITE TYPE: Modified outcrop
TOPOGRAPHY: Gently undulating pahoehoe bedrock outcrop with a thin soil mantle.
VEGETATION: Dense *koa-haole*, scattered *kiawe*, *opiuma*, monkeypod, dense purslane.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Indeterminate
DIMENSIONS: 18.00 m by 5.00 m by 0.90 m (approx.)
DESCRIPTION: This pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles piled against its sides and upon its surface.

The piled boulders do not create any faced sides. A boulder rubble alignment creates a crude wall off the northwest end of the bedrock outcrop. The wall is raised c. 0.50 m high, but is not formally faced.

The pahoehoe bedrock outcrop contains several small lava blisters which may possibly have been utilized as cupboards. A crude rubble wall (kuaiwi wall) is present on the inland side of the modified outcrop.

SITE NO.: State: 7944
SITE TYPE: Modified outcrop
TOPOGRAPHY: Undulating pahoehoe bedrock outcrops with a thin soil mantle.
VEGETATION: Dense *koa-haole*, scattered *kiawe*, *opiuma*, dense purslane.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 15.00 m by 11.00 m by 1.10 m (approx.)

DESCRIPTION: This site is an outcrop modified with a terrace, two depressions, a C-shape wall shelter and a stacked boulder pile. The terrace feature is on the northwest end of the outcrop. The terrace measures c. 3.50 m (north-south) by 2.50 m (east-west) by 1.00 m in height. It is raised and crudely faced on the west side. The surface is roughly level.

The first depression is on the west side of the outcrop and immediately adjacent (south) the terrace. The first depression measures 1.00 m in diameter by 0.50 m deep. The depression is not formally faced, and is open on the west side.

The second depression is c. 1.5 m south of the first. The second depression measures c. 3.50 m by 2.50 m by 0.30-0.50 m deep. This depression is somewhat indistinct and its sides are not formally faced.

The C-shape shelter is on the east side of the outcrop, and is open to the west. It measures c. 2.50 m by 2.00 m with walls c. 1.00 m in height. The C-shape walls are built with crudely stacked boulders. The walls are raised, but not formally faced.

The stacked boulder pile is immediately adjacent (south) of the C-shape. The stacked boulder pile measures c. 1.00 m in diameter by 0.60 m in height. The pile is raised and crudely faced on the west side.

SITE NO.: State: 7945

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Sloping pahoehoe bedrock terrain with soil and loose rock.

VEGETATION: *Koa-haole*, purslane, *opiuma*, vines, and grasses.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DESCRIPTION: Overall complex area measures 17.00 m (east-west) by 15.00 m (north-south). It is located c. 5.00 m north of Site 6415, Wall.

FEATURE A: Mound

FUNCTION: Agriculture

DIMENSIONS: 9.40 m by 1.70 m by 0.70 m (approx.)

DESCRIPTION: This linear mound is oriented inland/seaward. This mound abuts a bedrock outcrop to the east. It is constructed of very large to small, loosely piled boulders. With no formally faced sides, the mound is collapsing and rubble-like in appearance. It may have been a wall at one time, but at present it resembles a low, linear mound.

FEATURE B: Mound

FUNCTION: Agriculture

DIMENSIONS: 5.40 m by 3.60 m by 0.70 m (approx.)

DESCRIPTION: Elongated in plan, Feature B is wider than Features A or C. It is constructed mostly of cobbles and small to medium pahoehoe boulders. The sides are sloping in profile and not formally faced. It has a slightly level surface that is centrally raised. A bedrock outcrop with boulders and cobbles is located c. 6.00 m inland of Feature B.

FEATURE C: Mound

FUNCTION: Agriculture

DIMENSIONS: 9.00 m by 1.20 m by 0.45 m (approx.)

DESCRIPTION: A low linear mound is oriented inland/seaward. It is constructed with medium to large blocky pahoehoe boulders with some sections only 1-2 boulders wide. Portions of the mound are constructed over bedrock outcrop. With no formally faced sides, the mound is collapsing and rubble-like in appearance. As with Feature A, it may have been wall-like at one time, but at present it resembles a low linear mound. It also abuts bedrock to the east.

At the seaward end of the mound, it abuts a roughly circular to square raised terrace area. It measures c. 2.80 m (east-west) by 2.60 m (north-south). Raised on the north, west, and south sides, at present it is not formally faced. Larger boulders appear to be along the perimeter, and the north and west side may have been partially faced at one time. The surface is fairly level, with cobbles and smaller boulder fill.

SITE NO.: State: 7946 (Figure B-17)

SITE TYPE: Complex (17 Features)

TOPOGRAPHY: Majority of features situated on a rocky slope overlooking soil pocket to the south.

VEGETATION: Dense *koa-haole*, scattered *opiuma*, monkeypod, dense purslane and grasses.

CONDITION: Poor-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture-possible burial-habitation

DESCRIPTION: Overall complex area measures c. 50.00 m (NE-SW) by 25.00 m (NW-SE).

FEATURE A: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 6.40 m by 4.20 m by 1.80 m (approx.)

DESCRIPTION: The pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles piled against its west side to resemble a terrace. The west side is raised, but not formally faced. It is rounded or sloping in profile and appears collapsed. The north, south and east sides consist of a sloping pahoehoe bedrock outcrop. The terrace surface is uneven and consists of blocky boulders on pahoehoe bedrock.

FEATURE B: Mound

FUNCTION: Agriculture

DIMENSIONS: 3.10 m by 2.20 m by 0.70 m (approx.)

DESCRIPTION: This mound is amorphous in plan. It is constructed of piled blocky basalt boulders and cobbles. The mound is centrally raised, but its sides are not formally faced. The sides are rounded or sloping in profile and appear collapsed.

FEATURE C: Mound

FUNCTION: Agriculture

DIMENSIONS: 3.00 m by 2.40 m by 1.25 m (approx.)

DESCRIPTION: This mound is generally oval in plan. It is constructed of crudely stacked blocky basalt boulders and cobbles. The mound is centrally raised and very crudely faced on the west side. The remaining sides are rounded or sloping in profile and appear collapsed. Two large boulders are present on the mound surface.

FEATURE D: Mound

FUNCTION: Agriculture

DIMENSIONS: 5.40 m by 4.10 m by 1.40 m (approx.)

DESCRIPTION: This mound is roughly oval in plan. It is constructed of stacked blocky basalt boulders and cobbles. The mound is raised and faced on all sides, but is collapsed in places, especially portions of the north and south sides. One additional mound is c. 5.00 m north of Feature D.

FEATURE E: Mound

FUNCTION: Agriculture

DIMENSIONS: 8.00 m by 2.00 m by 0.80 m (approx.)

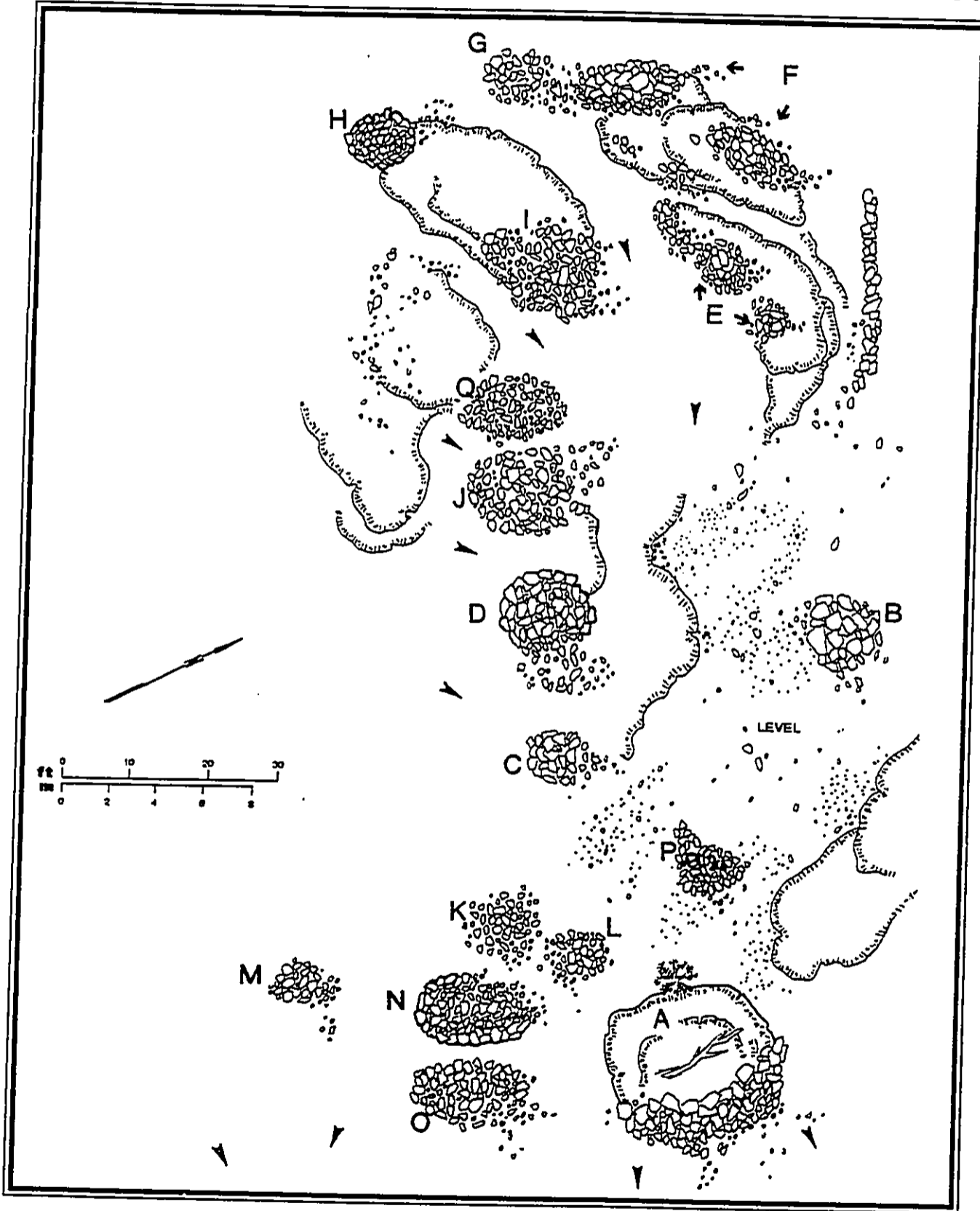


Figure B-17. Site 7946

DESCRIPTION: This mound is low and amorphous in plan. It is constructed of blocky basalt boulders and cobbles. The mound is centrally raised, but its sides are not formally faced. The sides are rounded or sloping in profile and appear collapsed. The mound is built on the north side of a pahoehoe bedrock. A large boulder slab is present on the east side of the mound.

FEATURE F: Mound

FUNCTION: Agriculture

DIMENSIONS: 9.00 m by 3.00 m by 1.00 m (approx.)

DESCRIPTION: This mound is amorphous in plan. It is constructed of crudely stacked blocky basalt boulders and cobbles. The mound is raised and crudely faced on portions of its north, east, and west sides.

The south side is rounded or sloping in profile and appears collapsed. Between Features F and G are cobbles piled on a bedrock outcrop.

FEATURE G: Mound

FUNCTION: Agriculture

DIMENSIONS: 2.40 m by 2.00 m by 1.30 m (approx.)

DESCRIPTION: This mound is generally oval in plan. It is constructed of crudely stacked blocky basalt boulders and cobbles. The mound is raised and crudely faced on the north, south and part of the east side. The west and part of the east side is collapsed. The north side of the mound is built on pahoehoe bedrock.

FEATURE H: Platform

FUNCTION: Possible burial

DIMENSIONS: 3.00 m by 2.50 m by 1.50 m (approx.)

DESCRIPTION: A burial function was initially assigned by Hammatt and Folk (1980). This platform is roughly rectangular in plan. It is constructed of blocky basalt boulders and cobbles. The platform is raised and faced on the NW, SW, and SE sides. The NE side is collapsed and built against pahoehoe bedrock. The platform surface is roughly level and contains several flat boulders.

FEATURE I: Mound

FUNCTION: Agriculture

DIMENSIONS: 4.40 m by 3.90 m by 1.05 m (approx.)

DESCRIPTION: This mound is amorphous in plan. It is constructed of piled blocky basalt boulders and cobbles. The mound is centrally raised, but its sides are not formally faced. The sides are rounded or sloping in profile and appear collapsed. It is built against pahoehoe bedrock and resembles a modified outcrop.

FEATURE J: Mound

FUNCTION: Agriculture

DIMENSIONS: 4.60 m by 2.20 m by 1.20 m (approx.)

DESCRIPTION: This mound is generally oval in plan. It is constructed of crudely stacked blocky basalt boulders and cobbles. The mound is raised and crudely faced on all sides, but collapsed on part of the south side.

FEATURE K: Mound

FUNCTION: Agriculture

DIMENSIONS: 3.20 m by 1.50 m by 1.45 m (approx.)

DESCRIPTION: This mound is generally oval in plan. It is constructed of crudely stacked blocky basalt boulders and cobbles. The mound is centrally raised and crudely faced on all sides.

FEATURE L: Mound

FUNCTION: Agriculture

DIMENSIONS: 2.30 m by 2.00 m by 1.10 m (approx.)

DESCRIPTION: This mound is generally oval in plan. It is constructed of crudely stacked blocky basalt boulders and cobbles. The mound is raised on the west, south, and part of the east sides. Part of the east side is collapsed, and the north side is built against a pahoehoe bedrock outcrop.

FEATURE M: Mound

FUNCTION: Agriculture

DIMENSIONS: 2.80 m by 2.10 m by 1.80 m (approx.)

DESCRIPTION: This large mound is generally oval in plan. It is constructed of crudely stacked, blocky basalt boulders and cobbles. The mound is centrally raised and crudely faced on the north, east, and west sides. The south side is rounded or sloping in profile and appears collapsed. Due to the slope, the mound is raised substantially higher on the west side in comparison to the east.

FEATURE N: Mound

FUNCTION: Agriculture

DIMENSIONS: 6.00 m by 4.00 m by 1.40 m (approx.)

DESCRIPTION: This mound is roughly oval in plan. It is constructed of crudely stacked blocky basalt boulders and cobbles. The mound is centrally raised and very crudely faced on the west side. The north and northwest sides are built on pahoehoe bedrock. The east and south sides are rounded or sloping in profile and appear collapsed. Several large boulders are present on the mound surface.

FEATURE O: Mound

FUNCTION: Agriculture

DIMENSIONS: 4.30 m by 2.10 m by 1.40 m (approx.)

DESCRIPTION: This mound is amorphous in plan. It is constructed of crudely stacked blocky basalt boulders and cobbles. The mound is centrally raised and is crudely faced on parts of the north, south and east sides. The west side is generally rounded or sloping in profile and collapsed in appearance.

FEATURE P: Mound

FUNCTION: Possible burial

DIMENSIONS: 6.00 m by 4.00 m by 0.80 m (approx.)

DESCRIPTION: A burial function was initially assigned by Hammatt and Folk (1980). This mound is generally amorphous in plan. It is constructed of piled blocky basalt boulders and cobbles. The mound is centrally raised, but its sides are not formally faced. The sides are rounded or sloping in profile and appear collapsed.

FEATURE Q: Mound

FUNCTION: Agriculture

DIMENSIONS: 5.00 m by 3.20 m by 0.90 m (approx.)

DESCRIPTION: This mound is generally oval in plan. It is constructed of very crudely stacked blocky basalt boulders and cobbles. The mound is raised slightly and the SE corner is crudely faced. The remaining sides are sloping or rounded in profile and appear collapsed.

SITE NO.: State: 7947 (Figure B-18)

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Situated on a flat area near the top of a ridge. Undulating pahoehoe bedrock outcrop terrain with soil pocket.

VEGETATION: Predominantly *koa-haole*, purslane, some indigo, *kolu*, and vines.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial-agriculture

DESCRIPTION: Overall complex area measures c. 14.00 m (north-south) by 10.00 m (east-west).

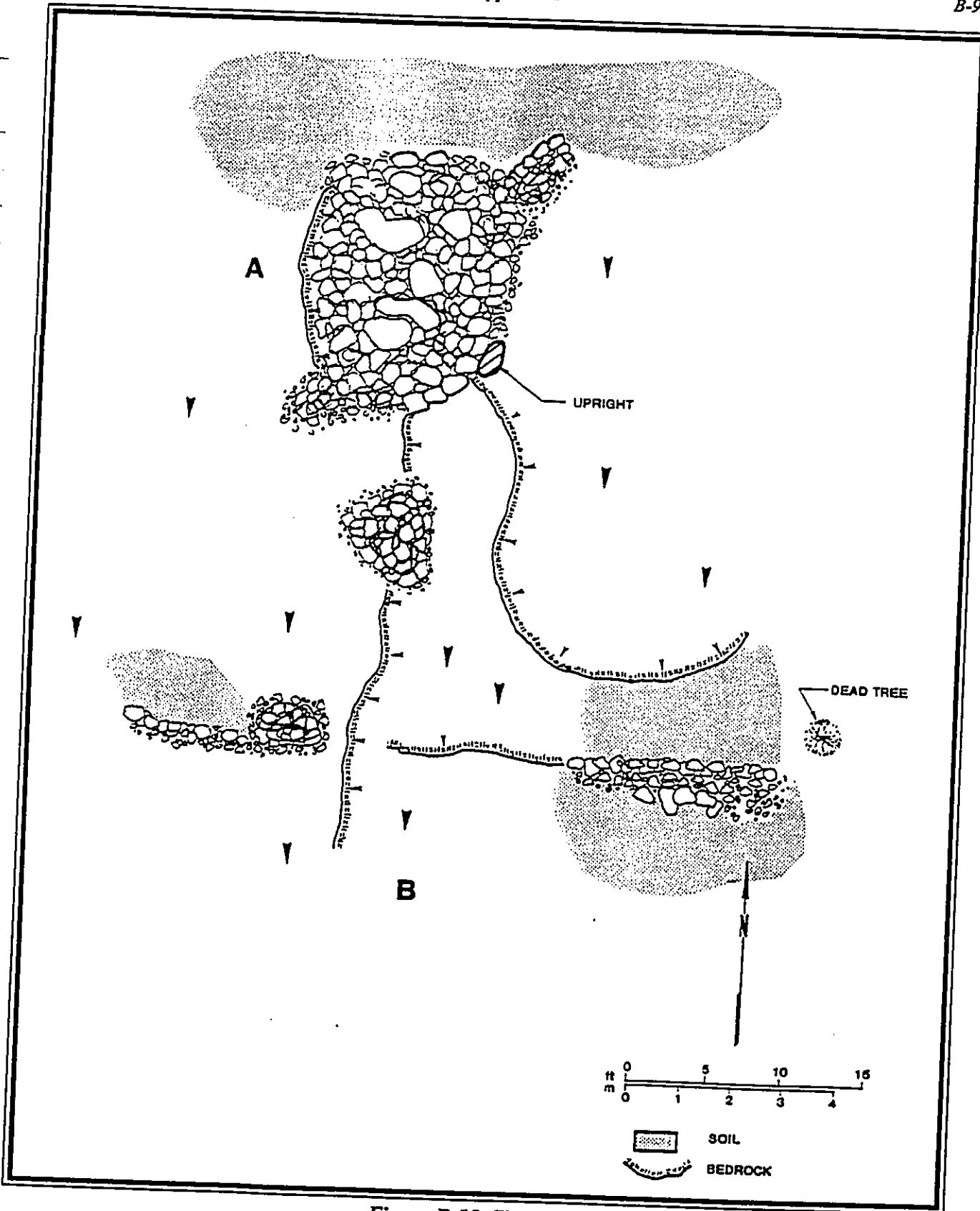


Figure B-18. Site 7947

FEATURE A: Modified outcrop**FUNCTION:** Possible burial**DIMENSIONS:** 5.40 m by 4.00 m by 0.80 m (approx.)

DESCRIPTION: Roughly rectangular in plan, this modified outcrop resembles a platform. Feature A is a bedrock outcrop with medium to large boulders piled on and around its surface. It is raised, especially on the east, south, and west sides, with the north (inland) side raised but collapsing. The southeast corner has a possible upright. The sides are not formally faced at present. The surface is slightly even, consisting of bedrock outcropping and cobble fill.

A soil area is north, in a flat area at the base of another steep slope. There is possible excavation potential for burials, and/or agriculture. Also, a low rubble wall is constructed at the northeast corner, delineating the seaward edge of the soil area.

FEATURE B: Terrace**FUNCTION:** Agriculture**DIMENSIONS:** 13.00 m by 2.50 m by 1.00 m (approx.)

DESCRIPTION: It is constructed across slope with pahoehoe bedrock exposures. Boulders and cobbles are piled on top of a sloping bedrock outcrop. The retaining wall is not formally faced, but collapsing and rubbled. Along the central portion of the retaining wall is c. 3.00 m of exposed bedrock with no boulders or cobbles. The southern section has crude boulder pile construction and cobble fill. One or two possible uprights are present along the seaward edge, retaining the boulder and cobble pile construction. The surface is sloping and rubbled in profile. The area northeast of the terrace retaining wall consists of undulating pahoehoe bedrock with loose rocks and thin soil.

SITE NO.: State: 7948

PHRI: 451-99

SITE TYPE: Complex (4 Features)**TOPOGRAPHY:** Site on slope near ridge crest. Good view of the coastline and Kahalu'u Bay.**VEGETATION:** Dense *koa-haole*, scattered *kiawe*, monkeypod, *opiuma*, dense purslane.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation-possible burial

DESCRIPTION: Overall complex area measures c. 35.00 m (NE-SW) by 35.00 m (NW-SE). No definite cultural deposit is visible, but is possibly present subsurface.

FEATURE A: Lava tube cave**FUNCTION:** Habitation**DIMENSIONS:** 12.00 m by 2.00 m by 1.00 m (approx.)

DESCRIPTION: This lava tube cave is entered through a small lava blister on the inland (east) side of Feature B, Enclosure. The lava blister entrance does not contain any structural modifications. There is sparse marine shell midden present in the cave. The tube ends at collapsed rubble, which blocks the passageway. No definite cultural deposit is visible, but brownish soil present in the blister may possibly contain a subsurface deposit.

FEATURE B: Enclosure**FUNCTION:** Habitation**DIMENSIONS:** 17.00 m by 11.50 m by 1.50 m (approx.)

DESCRIPTION: The enclosure is generally rectangular in plan. The walls are constructed of stacked, blocky basalt boulders and cobbles. The walls are raised and formally faced on both the interior and exterior sides, but portions are collapsed. At the northwest corner of the enclosure, a boulder-faced veneer is built against the exterior side. The west wall of the enclosure is raised on the interior side only, near the southwest corner. The west side of the enclosure is generally raised only on the exterior side, and resembles a terrace retaining wall.

With the exception of the southwest corner, the enclosure interior consists of a level pahoehoe bedrock and soil surface. The southwest corner of the enclosure contains a boulder-cobble rubble concentration. The boulder-cobble rubble is raised, but not formally faced on the west and north sides. The east side is even with the surrounding ground surface and the structure resembles a terrace or collapsed platform.

FEATURE C: Platform**FUNCTION:** Possible burial**DIMENSIONS:** 5.80 m by 4.50 m by 1.15 m (approx.)**DESCRIPTION:** The platform is roughly square in plan. It is constructed of stacked, blocky basalt boulders and cobbles. The platform is raised on all four sides, but is formally faced only on the south side and part of the west side. Several upright boulders are present in the faced sides. The north, east, and part of the west sides are rounded or sloping in profile and appear collapsed.

The platform is built with a perimeter of larger boulders and a smaller cobble/pebble fill. The platform surface also contains several scattered boulders atop its roughly level surface.

FEATURE D: Mound**FUNCTION:** Habitation**DIMENSIONS:** 9.00 m by 5.00 m by 0.80 m (approx.)**DESCRIPTION:** This rubble mound is generally linear in plan. The major axis is oriented upslope-downslope (roughly east-west). The mound is constructed of piled, blocky basalt boulders and cobbles. It is raised, but its sides are not formally faced. The sides are rounded or sloping in profile and appear collapsed.**SITE NO.:** State: 7949**SITE TYPE:** Complex (2 Features)**TOPOGRAPHY:** Site on a rocky and steep slope with 5-10 cm of soil in areas.**VEGETATION:** Predominantly *koa-haole*, purslane, indigo, and vines.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Possible burial-agriculture**DESCRIPTION:** Overall complex area measures c. 6.50 m (NW-SE) by 5.00 m (NE-SW).**FEATURE A: Platform****FUNCTION:** Possible burial**DIMENSIONS:** 2.60 m by 1.70 m by 1.10 m (approx.)**DESCRIPTION:** The feature is oval in plan. It is constructed with large pahoehoe boulders and one to two boulder uprights stacked along the perimeter of the platform. It is somewhat collapsed and rubble-like, especially along the seaward side. The interior is cobble and smaller boulder fill, slightly even, but also sloping seaward.**FEATURE B: Terrace****FUNCTION:** Agriculture**DIMENSIONS:** 5.00 m by 2.80 m by 0.90 m (approx.)**DESCRIPTION:** Feature B is a boulder and cobble rubble terrace. It is constructed of mostly piled boulders and cobbles. Raised on the seaward side, it is sloping in profile, and not formally faced. The surface is slightly even, with boulders and cobbles. Constructed across slope, it possibly continues north for c. 4.00 m where it is even with the ground slope.**SITE NO.:** State: 7950**SITE TYPE:** Complex (3 Features)**TOPOGRAPHY:** Site is on a ridge crest with an excellent view of the coast and Kahalu'u Bay.

VEGETATION: Dense *koa-haole*, scattered *kiawe*, *opiuma*, dense purslane.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DESCRIPTION: Overall complex area measures c. 20.00 m (north-south) by 20.00 m (east-west).

FEATURE A: Terrace
FUNCTION: Habitation
DIMENSIONS: 7.00 m by 6.00 m by 1.50 m (approx.)
DESCRIPTION: This terrace is constructed of crudely stacked blocky basalt boulders and cobbles. The terrace is raised on the west side, but is not formally faced. The west face is rounded or sloping in profile and collapsed in appearance. The east side of the terrace abuts Feature B, Terrace. The south side of Feature A abuts Feature C, Platform. The north side of Feature A is delineated by a crude boulder/rubble alignment. A collapsed rubble wall is present c. 5.00 m north of Feature A. This terrace contains a level soil surface.

FEATURE B: Terrace
FUNCTION: Habitation
DIMENSIONS: 8.00 m by 6.00 m by 0.90 m (approx.)
DESCRIPTION: This terrace is situated immediately east (upslope) of Feature A. Feature B is constructed of crudely stacked, blocky basalt boulders and cobbles. The terrace is raised and crudely faced on portions of the west side. Other portions of the west side are also collapsed. The north side of the terrace is generally even with the surrounding ground surface. The east side is delineated by pahoehoe bedrock outcrop. The south side consists of sloping boulder/cobble rubble. The terrace surface is roughly level and consists of crude boulder/cobble/pebble paving. Soil is also present on the inland (east) portion of the terrace.

FEATURE C: Platform
FUNCTION: Habitation
DIMENSIONS: 3.50 m by 3.00 m by 0.90 m (approx.)
DESCRIPTION: This platform is located immediately south of Feature A, Terrace. The platform is generally square in plan. It is constructed of crudely stacked, blocky basalt boulders and cobbles. The platform is raised on the north, south, east, and west sides, but the northeast corner is built against a bedrock outcrop. Part of the east and south sides are formally faced. The west and north sides are rounded or sloping in profile and collapsed in appearance. The platform contains a larger boulder perimeter with a smaller cobble-pebble fill. The surface is roughly level and appears crudely paved. Several upright boulders are present within the sides.

SITE NO.: State: 7951
SITE TYPE: Wall complex
TOPOGRAPHY: Very undulating to steep slopes of pahoehoe bedrock terrain with thin soil mantle cover.
VEGETATION: Predominantly *koa-haole*, purslane, monkeypod, *kiawe*, *opiuma*.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric-historic
FUNCTIONAL INTERPRETATION: Boundary
DIMENSIONS: 244.00 m by 0.90 m by 1.00 m (approx.)
DESCRIPTION: The overall wall complex area measures c. 244 m (east-west) by 153 m (north-south). It is constructed with blocky pahoehoe boulders stacked three to four courses high. The wall is either double stacked, or bifaced core and boulder fill construction. The walls are mostly collapsed and in rubble condition. They form a gridwork of walls within the area, which extend north-south and east-west for a fair length. The next wall north is oriented east-west and continues inland to Site 11170, Complex.

SITE NO.: State: 7952 (Figure B-19)

SITE TYPE: Terrace

TOPOGRAPHY: Site at base of slope and on a possibly deep soil pocket.

VEGETATION: Dense *koa-haole*, scattered *kiawe* and *opiuma*, dense purslane, grasses.

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 8.50 m by 7.00 m by 1.00 m (approx.)

DESCRIPTION: The terrace is rectangular in plan. It is constructed of well-stacked, blocky basalt boulders and cobbles. The terrace is raised and formally faced on the east, west, and south sides. The middle of the south side is collapsed. The north side is built against the ridge slope. The terrace sides contain several large upright boulders. The surface is level and contains a boulder/cobble fill.

SITE NO.: State: 7953

SITE TYPE: Lava blister

TOPOGRAPHY: Gently sloping terrain consisting of pahoehoe bedrock outcrop and thin soil mantle.

VEGETATION: Dense *koa-haole*, with scattered *opiuma*, *kiawe*, monkey pod, and dense purslane.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 3.70 m by 2.70 m by 1.20 m (approx.)

DESCRIPTION: This site consists of a pahoehoe bedrock outcrop which contains a natural lava blister.

The blister opening is on the north side of the bedrock outcrop. The lava blister does not contain any visible modifications. A low, rubble wall abuts the southeast end of the bedrock outcrop. It is constructed of piled, blocky basalt boulders and cobbles. The wall is raised slightly, but its sides are not formally faced. It measures c. 5.00 m by 0.90 m by 0.30 m in height and is oriented roughly east-west. No definite cultural deposit is visible, but is possibly present on blister floor.

SITE NO.: State: 7955 (Figure B-20)

PHRI: 451-131

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Gentle slope to undulating terrain consisting of pahoehoe boulders with soil on top.

VEGETATION: *Koa-haole* and purslane.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-agriculture

DESCRIPTION: Additional associated Kona Field System (6601) features in the area consisting of agricultural mounds and modified outcrops. There are very large, level soil areas with agricultural features located downslope of Sites 7955, 7956, and 7957.

FEATURE A: Platform

FUNCTION: Habitation

DIMENSIONS: 6.00 m by 5.00 m by 0.70 m (approx.)

DESCRIPTION: An irregularly shaped platform. Crude facings on the west side consist of large pahoehoe boulders. The north side has a small short section faced one to two courses. The remaining facings are raised, but collapsing, especially the south side. The interior surface is crudely level with medium boulders and cobbles. Northeast of the platform is bedrock outcrop.

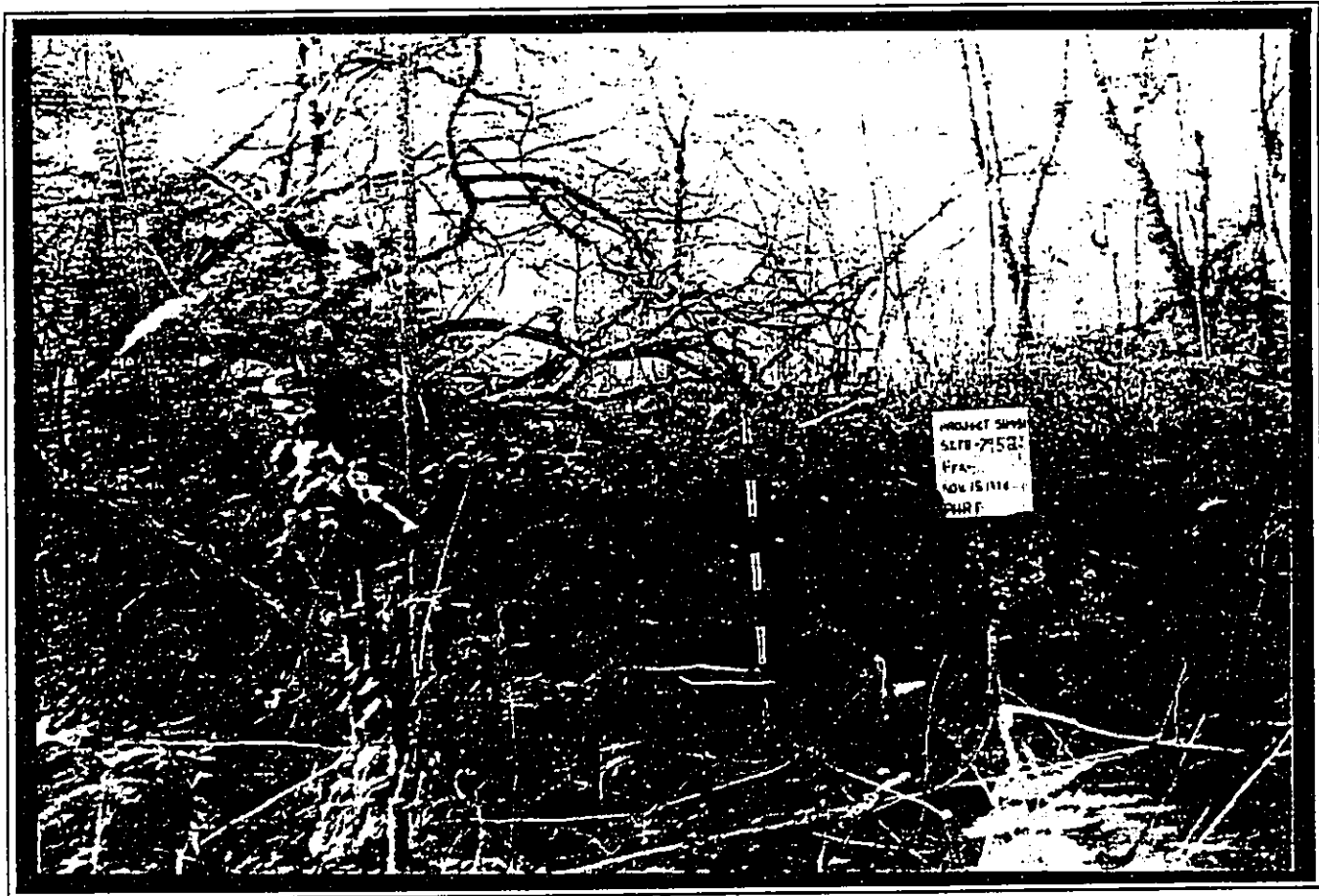


Figure B-19. Site 7952 (Neg. 960-5a)

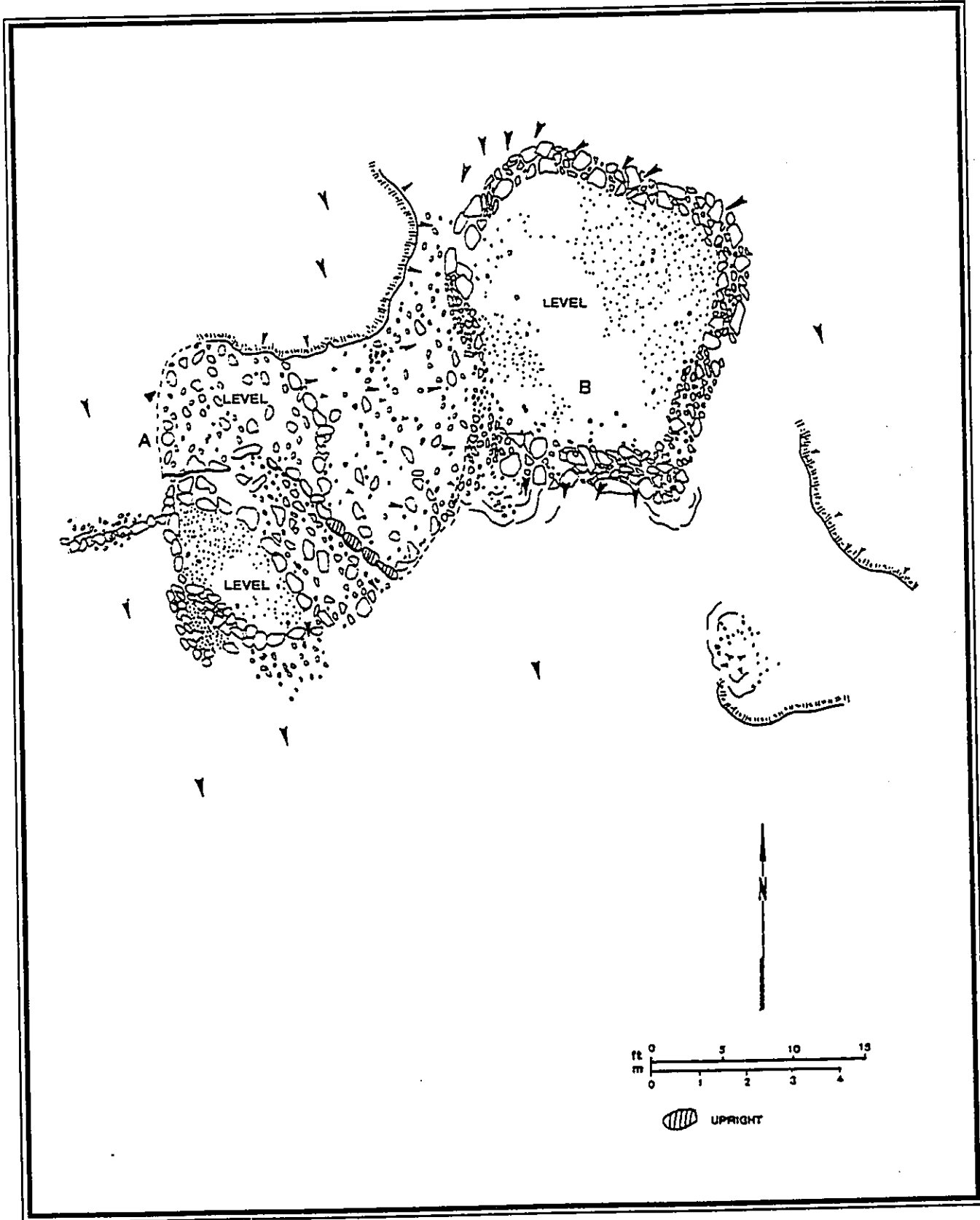


Figure B-20. Site 7955

FEATURE B: Enclosure**FUNCTION:** Agriculture**DIMENSIONS:** 8.00 m by 6.00 m by 1.00 m (approx.)**DESCRIPTION:** This feature abuts Feature A, Platform to the southeast. The walls are c. 0.60-1.00 m wide. These walls are bifaced with cobble fill along the southeast end and terrace-like along the inland and seaward sides. The surface interior is level with soil deposit and loose rocks.**SITE NO.:** State: 7956

PHRI: 451-130

SITE TYPE: Terrace**TOPOGRAPHY:** Gentle to steep sloping terrain. It is located near the base of a ridgeline.**VEGETATION:** Moderate *koa-haole* and purslane.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DIMENSIONS:** 6.00 m by 3.70 m by 0.70 m (approx.)**DESCRIPTION:** The terrace resembles a crude platform. It is raised on the south and east sides, and portions of the west side. The south side is also crudely faced. It is constructed with large pahoehoe boulders and cobbles and smaller boulders as fill. Built against bedrock outcrop to the north, the surface interior is roughly level. A boulder/cobble mound is located c. 4.00 m south of the terrace.**SITE NO.:** State: 7957

PHRI: 451-132

SITE TYPE: Terrace**TOPOGRAPHY:** Situated near the base of a moderate slope.**VEGETATION:** *Koa-haole*, purslane, sparse *kiawe* and *opiuma*.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DIMENSIONS:** 4.00 m by 3.00 m by 0.60 m (approx.)**DESCRIPTION:** A rubble wall is adjacent to Site 7957. It is oriented c. 235-240°/55-60°. About 2.5 m southwest of the terrace, this rubble wall forms a corner and continues NW. This wall is possibly part of Site 7951, Wall Complex. The terrace is raised on the southwest and southeast sides. The sides are slightly sloping in profile. It is constructed of piled boulders and cobbles. The terrace may have been faced at one time, but it is presently collapsing. The surface interior is fairly level with small boulders and cobbles. Additional Kona Field System (6601) features, consisting of modified outcrops, mounds and rubble terraces, are in the area.**SITE NO.:** State: 9820

PHRI: 451-197

SITE TYPE: Complex (3 Features)**TOPOGRAPHY:** Slightly sloping to a level soil area with loose boulders and cobbles.**VEGETATION:** *Koa-haole*, scattered *kiawe* and various grasses.**CONDITION:** Poor**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Agriculture-possible burial-habitation**DESCRIPTION:** Overall complex area measures c. 14.00 m (east-west) by 12.00 m (north-south).**FEATURE A:** Mound**FUNCTION:** Agriculture

DIMENSIONS: 2.50 m by 2.00 m by 0.30 m (approx.)

DESCRIPTION: Piled basalt boulders and cobbles on bedrock. A rubble alignment extends 3.50 m from its southwest side.

FEATURE B: Mound

FUNCTION: Possible burial

DIMENSIONS: 2.50 m by 2.00 m by 0.30 m (approx.)

DESCRIPTION: Large boulders form the perimeter of the mound. The interior is cobble filled.

FEATURE C: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 4.00 m by 0.50 m (approx.)

DESCRIPTION: This modified outcrop resembles a terrace. It is constructed of piled basalt boulders on top of bedrock outcropping. It is raised on the north, west and south sides. The east side is even with the ground surface.

SITE NO.: State: 9821

SITE TYPE: Wall

TOPOGRAPHY: Gently sloping terrain consisting of pahoehoe bedrock with soil pockets in between the outcrops.

VEGETATION: Predominantly *koa-haole* and scattered grasses.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 25.00 m by 1.90 m by 0.40 m (approx.)

DESCRIPTION: A low, rubble wall constructed of angular basalt boulders and cobbles. The north side has a possible boulder alignment. The south side is rubble, and cobble filled. It is oriented seaward-inland (SW-NE). Waterworn basalt cobbles are present in the wall.

SITE NO.: State: 9822

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Gently sloping terrain consisting of pahoehoe bedrock.

VEGETATION: Predominantly *koa-haole*, some grasses, purslane, 1 *kiawe* tree.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 11.00 m (east-west) by 8.00 m (north-south).

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 4.00 m by 3.00 m by 0.50 m (approx.)

DESCRIPTION: Crudely faced on the north, west and south sides, the terrace perimeter is constructed of large basalt boulders. The interior surface is paved with flat bedrock slabs, and cobble fill is used in between. A few waterworn pebbles are also present.

FEATURE B: Terrace

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 2.00 m by 0.50 m (approx.)

DESCRIPTION: A crudely constructed terrace of angular basalt boulders and cobbles. It is crudely faced along a portion of the south side, and raised along the remaining sections.

SITE NO.: State: 9823
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Relatively flat area with soil deposit in the surrounding area.
VEGETATION: *Koa-haole*, *kiawe*, and grass.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DESCRIPTION: Overall complex area measures c. 8.00 m (north-south) by 2.50 m (east-west).

FEATURE A: Mound
FUNCTION: Possible burial
DIMENSIONS: 3.00 m by 2.00 m by 0.50 m (approx.)
DESCRIPTION: "This roughly rectangular structure is faced on two sides [the NW and SE sides]. The perimeter consists mainly of boulders and a fill of cobbles" (Hommon and Rosendahl 1983:104). The surface interior is roughly level cobble fill.

FEATURE B: Mound
FUNCTION: Possible burial
DIMENSIONS: 3.00 m by 2.00 m by 0.40 m (approx.)
DESCRIPTION: Amorphous in plan. It is not faced, but constructed with piled boulders and cobbles. The surface interior is uneven cobble fill. At the NW corner is a 2.00 m extension consisting of boulder alignments and some cobble fill.

SITE NO.: State: 9824
SITE TYPE: Complex (4 Features)
TOPOGRAPHY: Slightly sloping to undulating terrain consisting of pahoehoe bedrock with scattered soil pockets.
VEGETATION: Predominantly *koa-haole*, air plants, and scattered *kiawe*.
CONDITION: Poor-fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation-possible burial-boundary
DESCRIPTION: The overall complex area measures c. 35.00 m (north-south) by 30.00 m (east-west). Waterworn pebbles and cobbles are present throughout the complex. According to Allen Field Records 1983, the "eastern, western, and northern edges of this site complex have been possibly disturbed by bulldozing and the construction of the road to KIC nursery".

FEATURE A: Modified outcrop
FUNCTION: Habitation
DIMENSIONS: 6.00 m by 4.00 m by 1.10 m (approx.)
DESCRIPTION: Amorphous in plan. Boulders and cobbles are piled on top of bedrock outcropping. A waterworn basalt pebble is present. According to Allen's field records (1983), Feature A has been damaged by earth-moving equipment.

FEATURE B: Enclosure
FUNCTION: Boundary
DIMENSIONS: 25.00 m by 15.00 m by 0.50 m (approx.)
DESCRIPTION: Low, walled enclosure constructed with stacked basalt boulders, partially surrounding Feature C. The wall contains uprights.

FEATURE C: Platform
FUNCTION: Possible burial
DIMENSIONS: 7.00 m by 4.00 m by 0.70 m (approx.)
DESCRIPTION: Irregular in plan, the platform is constructed with stacked basalt boulders, and is cobble-filled.

FEATURE D: Platform**FUNCTION:** Possible burial**DIMENSIONS:** 6.00 m by 4.00 m by 0.70 m (approx.)**DESCRIPTION:** Roughly square in plan, the platform is constructed with stacked basalt boulders and is cobble-filled. According to Allen Field Records 1983, Feature D was also disturbed by bulldozing.**SITE NO.:** State: 9825 Other: 7818**SITE TYPE:** Trail**TOPOGRAPHY:** Gently sloping pahoehoe bedrock terrain.**VEGETATION:** *Koa-haole*, *kiawe*, *opiuma*, and grasses.**CONDITION:** Poor**INTEGRITY:** Partially disturbed**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Transportation**DIMENSIONS:** 30.00 m by 2.50 m by 0.80 m (approx.)**DESCRIPTION:** Site 9825 is also Site 7818. See Site 7818 for feature description.**SITE NO.:** State: 9862**PHRI:** 451- 73**SITE TYPE:** Complex (3 Features)**TOPOGRAPHY:** Sloping and undulating bedrock terrain.**VEGETATION:** *Koa-haole*, purslane, grasses**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DESCRIPTION:****FEATURE A: Enclosure****FUNCTION:** Habitation**DIMENSIONS:** 12.00 m by 7.00 m by 0.70 m (approx.)**DESCRIPTION:** "Enclosure, 12.00 m by 7.00 m (interior), consisting of rubble and multiple stacked walls up to 2.00 m wide and up to 0.70 m high" (Hommon and Rosendahl 1983:185). It is somewhat deteriorated at the northwest side. About 3.00 m east of Feature A is a possible modified natural terrace at the toe of a bedrock outcrop. Two C-shapes are built off this modified outcrop, Features B and C.**FEATURE B: C-shape****FUNCTION:** Habitation**DIMENSIONS:** 2.50 m by 1.00 m by 0.40 m (approx.)**DESCRIPTION:** Feature B is situated at the east end of the outcrop. It is open to the west with crude walls c. 1.50 m wide. There is at least 0.15 m of soil within the C-shape.**FEATURE C: C-shape****FUNCTION:** Habitation**DIMENSIONS:** 3.00 m by 2.00 m by 0.70 m (approx.)**DESCRIPTION:** This C-shape is boxy and at the west end of the modified outcrop. The south wall is c. 1.00 m across. The interior surface has c. 0.10 m of soil.**SITE NO.:** State: 9863**PHRI:** 451- 75**SITE TYPE:** Complex (7 Features)

TOPOGRAPHY: Gentle slope to undulating pahoehoe bedrock terrain.

VEGETATION: *Koa-haole*, *kiawe*, indigo, grasses, and purslane.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-boundary-transportation

DESCRIPTION: The overall complex area measures c. 122.00-185.00 m (north-south) by 46.00-90.00 m (east-west). "This complex includes an unusually dense cluster of features (such as earth surfaced terraces and stone mounds) suggesting long-term and/or relatively intensive agricultural activity. The east-west walls may mark property boundaries... Numerous terraces, mounds and modified outcrops are situated in the spaces between the major east-west walls (Features A, B, F, and G)" (Hommon and Rosendahl 1983:186).

FEATURE A: Wall

FUNCTION: Boundary

DIMENSIONS: 22.00 m by 1.50 m by 0.70 m (approx.)

DESCRIPTION: Oriented east-west at c. 51° azimuth, this is a bifaced, core-filled wall with heights ranging from 0.30-0.70 m. In relatively poor condition, it is broken in several places.

FEATURE B: Wall

FUNCTION: Boundary

DIMENSIONS: 87.00 m by 1.50 m by 1.00 m (approx.)

DESCRIPTION: The wall is oriented east-west at c. 63° azimuth. It is bifaced, core-filled and broken in places.

FEATURE C: Wall

FUNCTION: Boundary

DIMENSIONS: 90.00 m by 1.50 m by 0.50 m (approx.)

DESCRIPTION: The wall is oriented roughly east-west. It is very low in places, almost becoming a terrace. The eastern end is bifaced and core-filled. The remaining wall is rubbly. Several large mounds are located between Features B and C.

FEATURE D: C-shape

FUNCTION: Habitation

DIMENSIONS: 5.50 m by 2.50 m by 1.00 m (approx.)

DESCRIPTION: The C-shape is boxy in plan and opens to the south. The walls are c. 1.20 m wide and up to 1.00 m high. The east wall is level with the exterior ground surface and the NNW wall is collapsing. The surface interior is a soil deposit c. 0.15-0.20 m deep. A monkeypod tree is situated c. 2.00 m to the NW. Feature E, Trail, is immediately inland of Feature D and may possibly lead into Feature D.

FEATURE E: Trail

FUNCTION: Transportation

DIMENSIONS: 90.00 m by 1.00 m by 0.60 m (approx.)

DESCRIPTION: This trail is oriented c. 20-30° azimuth. It is paved with large basalt slabs and raised in places up to 0.60 m in height and 1.00 m wide. This trail roughly parallels Feature C, Wall, continues downslope, and then cross cuts Feature C. Feature E is immediately inland of Feature D, C-shape, and may possibly lead into Feature D.

FEATURE F: Wall

FUNCTION: Boundary

DIMENSIONS: 100.00 m by 1.50 m by 0.40 m (approx.)

DESCRIPTION: A rubbled and collapsing wall, extremely broken near its center. The wall is up to 1.50 m wide.

FEATURE G: Wall

FUNCTION: Boundary

DIMENSIONS: 100.00 m by 1.00 m by 0.50 m (approx.)

DESCRIPTION: The wall is oriented c. 55° azimuth. "Rubble wall, up to 1.00 m wide and up to 0.50 m high. This wall is paralleled by a barbed wire fence, immediately to the south. The wall may be a continuation of site 37-6390 (see Ching et al. 1973:112-113; Map 83, P. 194)" (Hommon and Rosendahl 1983:186).

SITE NO.: State: 9864

PHRI: 451-111

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Gentle sloping pahoehoe bedrock terrain.

VEGETATION: *Koa-haole*, *kiawe*, indigo, and purslane.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-possible burial

DESCRIPTION:

FEATURE A: Lava tube

FUNCTION: Habitation-possible burial

DIMENSIONS: 3.00 m by 2.00 m by 1.00 m (approx.)

DESCRIPTION: "Lava tube, 3.00 m by 2.00 m by 1.00 m floor-to-ceiling height with a 1.40 m by 0.80 m entrance. Adjacent to the [tube] entrance hole is a terrace measuring 9.00 m by 5.00 m by up to 0.40 m high. The soil on the tube floor is up to 0.25 m deep. Surface portable items include *Cypraea* sp. shell, bird bone, *kukui* nut shell and a human maxillary bone. One waterworn cobble was found in the tube and another on the terrace" (Hommon and Rosendahl 1983:188). There are two short tube sections, one to the NNW and the other to the SE.

FEATURE B: Pavement

FUNCTION: Habitation

DIMENSIONS: 6.00 m by 5.00 m by 0.35 m (approx.)

DESCRIPTION: Paved area built around a pahoehoe flat. It is constructed with large boulders along the perimeter and consisting of basalt pebble and cobble pavement.

SITE NO.: State: 9865

PHRI: 451-109

SITE TYPE: Modified outcrop

TOPOGRAPHY: Fairly level pahoehoe terrain with soil mantle cover.

VEGETATION: *Koa-haole*, *kiawe*, and grasses.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 10.00 m by 8.00 m by 0.70 m (approx.)

DESCRIPTION: This was initially recorded as a C-shape during the 1983 survey. Presently, it is a modified outcrop resembling a very crude C-shape. It is constructed of basalt boulders and cobbles piled on top of pahoehoe bedrock. The northeast and southwest portion of the outcrop are raised rubble cobble piles, 0.65-0.70 m in height, that extend seaward creating a crude C-shape in plan. The open end of this crude C-shape is a rubble pile resembling a terrace 8.00 m by 4.00 m by 0.60 m high.

SITE NO.: State: 9866 Other: 6391-B

PHRI: 451-110

SITE TYPE: Platform

TOPOGRAPHY: Site is situated on a low bedrock knoll with soil pockets.

VEGETATION: Moderate to dense *koa-haole*, and scattered *kiawe* and *opiuma*.

CONDITION: Fair-good

INTEGRITY: Unaltered
 PROBABLE AGE: Prehistoric
 FUNCTIONAL INTERPRETATION: Possible burial/Ceremonial/Habitation
 DIMENSIONS: 13.00 m by 12.00 m by 1.30 m (approx.)
 DESCRIPTION: Site 9866 is also Site 6391 Feature B. See Site 6391 Feature B description.

SITE NO.: State: 9867

PHRI: 451-108

SITE TYPE: Cave

TOPOGRAPHY: Fairly level pahoehoe terrain with soil mantle cover.

VEGETATION: Dense cover of *koa-haole*, scattered *kiawe* and *opiuma*.

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-possible burial

DIMENSIONS: 13.00 m by 5.00 m by 1.70 m (approx.)

DESCRIPTION: "Lava tube extending northwest and southeast of a sink hole. The opening of the sink hole measures 2.80 m by 1.40 m by 1.90 m deep. The floor to ceiling height of the tube is up to 1.70 m. Internal structures include a terrace about 1.50 m long and up to 0.4 meters high and a rough pavement including a large slab and numerous fragments of coral, both in the northwest tube and minor structures in the southeast tube. A small terrace is situated on the surface near the southwest side of the entrance. Portable items include *Cypraea* sp. and *Cellana* sp. shells, sea urchin remains, a bone of a mammal (possibly a pig), fragments of charcoal and coral, and waterworn stones. The cultural deposit appears to be up to 0.25 m deep" (Hommon and Rosendahl 1983:191).

SITE NO.: State: 9868

PHRI: 451-106

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Gentle sloping pahoehoe bedrock terrain with soil mantle cover.

VEGETATION: *Koa-haole* and infrequent *kiawe*.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 14.00 m (NW-SE) by 10.00 m (NE-SW).

FEATURE A: C-shape

FUNCTION: Habitation

DIMENSIONS: 7.00 m by 5.50 m by 1.50 m (approx.)

DESCRIPTION: "...consisting of walls up to 2.00 m wide and up to 1.50 m high. This structure sits on a bedrock outcrop. Adjoining the open (southwest) side of the C-shape is an earth surfaced terrace measuring about 7.00 m by 1.50 m by up to 0.70 m, with smaller terraces to the southwest" (Hommon and Rosendahl 1983:192).

FEATURE B: Lava blister

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 5.00 m (approx.)

DESCRIPTION: A lava blister located in a prominent pahoehoe rise, "...with adjacent patches of rough pavement. A few fragments of mollusc shell were seen in the lava blisters" (Hommon and Rosendahl 1983:192). A rubble pile is adjacent to the southwest side of Feature B and extends c. 3.00 m.

FEATURE C: Lava blister

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 4.00 m by 0.00 m (approx.)

DESCRIPTION: A lava blister located in a prominent pahoehoe rise, "...with adjacent patches of rough pavement. A few fragments of mollusc shell were seen in the lava blisters" (Hommon and Rosendahl 1983:192).

SITE NO.: State: 9869

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Fairly level pahoehoe terrain with soil mantle cover.

VEGETATION: *Koa-haole*, infrequent *kiawe*, some grasses and purslane.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial-indeterminate

DESCRIPTION: Overall complex area measures c. 22.00 m (east-west) by 16.00 m (north-south).

FEATURE A: Platform

FUNCTION: Possible burial

DIMENSIONS: 5.00 m by 5.00 m by 1.00 m (approx.)

DESCRIPTION: Roughly circular in plan. "The upper surface, which is depressed in the middle, is outlined with boulders and filled with cobbles and boulders" (Hommon and Rosendahl 1983:193). It is in fair to good condition, although some faces are partially fallen. This platform is partially built on pahoehoe outcrop.

FEATURE B: Wall

FUNCTION: Indeterminate

DIMENSIONS: 17.00 m by 0.60 m by 0.40 m (approx.)

DESCRIPTION: "Rubble wall, 0.60 m wide by up to 0.40 m high, extending across the width of the corridor [Ali'i Drive Realignment Corridors]" (Hommon and Rosendahl 1983:193).

SITE NO.: State: 9870

PHRI: 451-105

SITE TYPE: Enclosure

TOPOGRAPHY: Gently sloping pahoehoe bedrock terrain with soil mantle cover.

VEGETATION: *Koa-haole*, scattered *kiawe*, and purslane.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Ceremonial-possible burial

DIMENSIONS: 2.50 m by 2.00 m by 1.00 m (approx.)

DESCRIPTION: The overall site measures c. 10.00 m (NE-SW) by 5.00 m (NW-SE). "Oval enclosure, 2.50 by 2.00 m (interior), whose wall, which incorporates several large boulders, is up to 1.00 m high. The wall continues as a terrace along a 7.00 m by 5.00 m by 1.50 m high bedrock outcrop. On the enclosure wall is a waterworn boulder that may have once been set upright" (Hommon and Rosendahl 1983:194).

The pahoehoe bedrock outcrop is modified with piled basalt boulders and cobbles. The surface of the outcrop has some flat slabs, possibly used as paving. This outcrop is c. 7.00 m long by 4.00-5.00 m wide and 0.50-1.50 m high.

SITE NO.: State: 9871

PHRI: 451-122

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Gently sloping pahoehoe bedrock terrain.

VEGETATION: *Koa-haole* and occasional *kiawe* trees.

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric-historic

FUNCTIONAL INTERPRETATION: Habitation-agriculture

DESCRIPTION: Overall complex area measures c. 50.00 m (east-west) by 30.00 m (north-south).

FEATURE A: U-shaped wall

FUNCTION: Habitation

DIMENSIONS: 12.00 m by 10.00 m by 1.00 m (approx.)

DESCRIPTION: A small circular enclosure is located at the northwest end, with soil 0.25 m deep. Feature A may have joined Feature C at one time. At present, there is a 3.00-4.00 m break along the easternmost wall that may have connected the two features. The walls are partially bifaced along some sections, and rubbly in the remaining sections. Constructed with basalt boulders and cobbles, the wall widths are c. 1.75 m and the heights range from 0.40-1.00 m.

FEATURE B: Terrace

FUNCTION: Agriculture

DIMENSIONS: 40.00 m by 20.00 m by 1.00 m (approx.)

DESCRIPTION: This is a continuous terrace occupying a fairly massive area in comparison to other agricultural terraces seen in the project area. Constructed of stacked and piled faces, the height varies from 0.60-1.00 m. The soil on the terrace interior is c. 0.50 m deep, and c. 0.10 m deep on the seaward side.

FEATURE C: U-shaped wall

FUNCTION: Habitation

DIMENSIONS: 20.00 m by 9.00 m by 0.70 m (approx.)

DESCRIPTION: U-shape in plan, the walls are generally rubbly in construction. The walls are built with basalt boulders and cobbles. They also form terraces. Feature C may have joined Feature A at one time. At present, there is a 3.00-4.00 m break along the easternmost wall that may have connected the two features.

SITE NO.: State: 9872

PHRI: 451-123

SITE TYPE: Complex (6 Features)

TOPOGRAPHY: Moderately steep sloping pahoehoe bedrock terrain.

VEGETATION: *Koa-haole*, air plants, *kolu*, indigo, and a monkeypod tree.

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial-habitation-boundary

DESCRIPTION: Overall complex area measures c. 55.00 m (east-west) by 50.00 m (north-south).

FEATURE A: Platform

FUNCTION: Possible burial

DIMENSIONS: 4.50 m by 4.00 m by 1.50 m (approx.)

DESCRIPTION: Generally square in plan. It is faced on four sides, and especially well faced on the south side. The interior is fairly level, with boulder and cobble fill. A sunken area is visible near the northeast side of the platform.

FEATURE B: Terrace

FUNCTION: Possible burial

DIMENSIONS: 8.00 m by 4.50 m by 1.00 m (approx.)

DESCRIPTION: Built adjacent to outcrops and faced up to 1.00 m high on the seaward side.

FEATURE C: C-shape

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 3.30 m by 0.70 m (approx.)

DESCRIPTION: Open to the southwest. Square in plan, it is constructed with walls up to 1.50 m wide and well-faced. The interior floor surface is c. 0.50 m higher than the exterior ground surface. A possible cupboard is located in the northeast corner.

FEATURE D: Wall

FUNCTION: Boundary

DIMENSIONS: 56.00 m by 1.50 m by 0.70 m (approx.)

DESCRIPTION: Built of basalt boulders and cobbles with some upright slabs on the northwest side. Construction varies from bifaced, unifaced, and rubble forms. The wall is adjacent to the north and west sides of Feature E.

FEATURE E: Platform

FUNCTION: Possible burial

DIMENSIONS: 5.40 m by 4.80 m by 1.20 m (approx.)

DESCRIPTION: Roughly oval in plan. It is faced on the east and rubbly along portions of the southwest side. The surface interior is level cobble and boulder fill.

FEATURE F: Terrace

FUNCTION: Habitation

DIMENSIONS: 32.00 m by 1.50 m by 0.50 m (approx.)

DESCRIPTION: A soil-surfaced terrace which joins to Feature D, Wall. Portions are well faced along the seaward side. The terrace continues south after a break of c. 4.00 m for another 22.00 m where it meets with a NE-SW wall.

SITE NO.: State: 9873

PHRI: 451-126

SITE TYPE: Mound

TOPOGRAPHY: Site is at the base of a slope. The surrounding area is flat with a soil mantle cover.

VEGETATION: Occasional *koa-haole* and *kiawe*.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 7.00 m by 5.00 m by 0.45 m (approx.)

DESCRIPTION: Irregular in plan, it strongly resembles a platform. Constructed with boulders one to two courses high, the feature is fairly level, with boulders and cobbles as fill.

A wall remnant, four to five courses high, is situated at the NE corner. The wall measures c. 3.00 m (north-south) and up to 0.90 m high. About 20.00 m southwest is a terrace/wall, c. 10.00 m long. It is oriented inland/seaward, partially bounding a soil area. Additional terrace features are present in the area.

SITE NO.: State: 9874

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Undulating pahoehoe bedrock terrain with a soil mantle cover. Site is on a slightly elevated knoll.

VEGETATION: Moderate *koa-haole*, purslane, and vines. One monkeypod tree west of site

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Boundary-possible burial

DESCRIPTION: Overall complex area is c. 45.00 m by 45.00 m.

FEATURE A: Wall

FUNCTION: Boundary

DIMENSIONS: 45.00 m by 0.80 m by 1.00 m (approx.)

DESCRIPTION: "The wall varies in construction from veneer along bedrock outcrops to multiple stacked to core-filled" (Hommon and Rosendahl 1983:197). It is a bifaced and core-filled wall constructed with boulders and cobbles and with large uprights used as facing. Some portions are unifaced and almost terrace-like in form.

FEATURE B: Modified outcrop

FUNCTION: Possible burial

DIMENSIONS: 5.50 m by 4.00 m by 0.60 m (approx.)

DESCRIPTION: A modified outcrop that resembles a terrace. Raised on the north, west and east sides. Bedrock outcropping is present on the north side. Pahoehoe boulders and cobbles are piled on the outcrop, with the south half c. one to two boulders high maximum. The surface interior of the terrace is smooth pahoehoe bedrock and small boulder and cobble fill.

At the SW corner is a rubble wall, almost terrace-like in construction. It extends west and north, wrapping around a soil area that contains one to two waterworn basalt cobbles. This soil area may possibly contain burials.

From the NW corner is a 4.00 m (east-west) by 2.00 m (north-south) extension. Abutting this extension area is a wall that extends north. This wall joins other walls, some of them probably *kuaiwi*, that enclose soil areas and connects to Site Complex 5703. Additional agricultural terraces and mounds are in the immediate area.

SITE NO.: State: 9875

SITE TYPE: Terrace

TOPOGRAPHY: Relatively level terrain with soil mantle cover.

VEGETATION: At the edge of a *kiawe* grove.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 5.50 m by 4.50 m by 0.60 m (approx.)

DESCRIPTION: Roughly square in shape, it is stacked along the north and east sides. "...bordered by large boulders and paved in part with slabs. A barely discernible alignment divides the surface into two parts" (Hommon and Rosendahl 1983:204). The surface interior is level with boulders, cobbles and pebbles as fill. A large, level soil area (c. 25.00 m by 25.00 m) is north of the site. Also noted were two to three low boulder/cobble mounds within this soil area. These mounds could represent possible burials.

SITE NO.: State: 9876 Other: 6408-D

PHRI: 451-155

SITE TYPE: Mound

TOPOGRAPHY: In a slight depression next to an outcrop.

VEGETATION: *Koa-haole*, and *kiawe*.

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 2.40 m by 2.20 m by 0.55 m (approx.)

DESCRIPTION: Site 9876 is also Site 6408 Feature D. See Site 6408 Feature D for description.

SITE NO.: State: 11116 (Figure B-21)

PHRI: 451- 1

SITE TYPE: Enclosure

TOPOGRAPHY: Gently sloping ground surface containing pahoehoe bedrock exposures with a thin mantle of brownish loamy soil.

VEGETATION: *Koa-haole*, grasses, air plants, monkeypod, *Peperomia* sp., and indigo.

CONDITION: Poor-fair

INTEGRITY: Appears slightly altered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Indeterminate

DIMENSIONS: 11.00 m by 10.00 m by 1.60 m (approx.)

DESCRIPTION: The enclosure is generally square-shaped. The walls are constructed with crudely to well-stacked, blocky basalt boulders and cobbles, 1.00-1.60 m wide and 0.40-1.60 m high. The walls are raised and formally well-faced in places, but collapsed in other portions. The well-built sections appear to be bifaced, core-filled type construction. The poorly preserved sections may have also been bifaced/core-filled, but at present, they appear to consist of crudely stacked cobbles and boulders. Boulders and cobbles have been pushed/piled against the southwest side of the enclosure, possibly the result of chain dragging. No definite entrance or opening is visible in the enclosure wall. The site may possibly have functioned as a habitation feature. However, due to the absence of an entrance or opening, the enclosure may have an agricultural function (animal pen).

SITE NO.: State: 11117

PHRI: 451-2

SITE TYPE: Complex (4 Features)

TOPOGRAPHY: Sloping pahoehoe bedrock and thin soil mantle terrain.

VEGETATION: Moderate grasses, monkeypod, *koa-haole*, air plants.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DESCRIPTION: Overall complex area measures c. 50.00 m (NE-SW) by 20.00 m (NW-SE).

FEATURE A: Wall

FUNCTION: Agriculture

DIMENSIONS: 50.00 m by 2.00 m by 0.65 m (approx.)

DESCRIPTION: The wall is oriented c. 50/230° (upslope/downslope). It is constructed of crudely stacked/piled blocky basalt boulders and cobbles. The wall is raised, but its sides are generally rounded or sloping in profile and collapsed in appearance. The wall width is 1.50-2.00 m and the height is 0.40-0.65 m. One short wall section (c. 1.50 m) appears formally faced. The upslope (NE) end of the wall abuts Site-11118. The downslope (SW) end of the wall continues seaward. The wall is probably a *kuaiwi* wall and is part of the Kona Field System (6601). The wall is not present over an area of flat pahoehoe bedrock. Present on this flat pahoehoe bedrock area is an entrance (0.4 m in diameter) to a small lava blister.

FEATURE B: Terrace

FUNCTION: Agriculture

DIMENSIONS: 17.00 m by 2.90 m by 1.00 m (approx.)

DESCRIPTION: The terrace is oriented c. 320-330° and is roughly perpendicular to Feature A, Wall (*kuaiwi* wall). The terrace is constructed of crudely stacked/piled blocky basalt boulders and cobbles. The terrace is raised on the downslope side, but is not formally faced. It is rubble-like in appearance and sloping in profile. A small boulder mound is present on the terrace. The northernmost end of the terrace curves slightly upslope (to the north). The height of the terrace ranges from 0.20-1.00 m.

FEATURE C: Terrace

FUNCTION: Agriculture

DIMENSIONS: 14.00 m by 2.00 m by 0.60 m (approx.)

DESCRIPTION: The terrace is oriented c. 330-340° and is roughly perpendicular to Feature A, Wall (*kuaiwi* wall). The terrace is constructed of crudely piled, blocky basalt boulders and cobbles. The terrace is raised on the downslope side, but

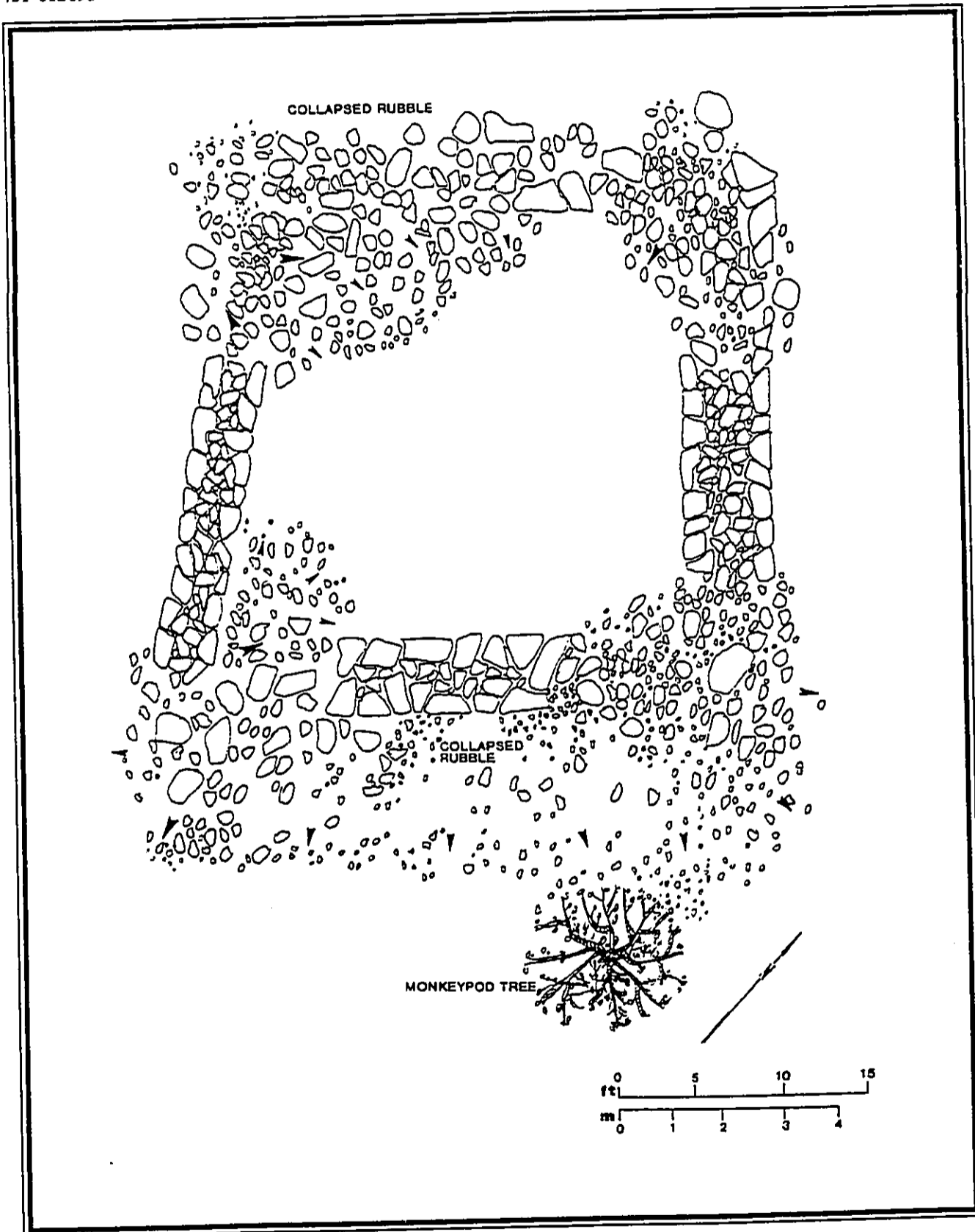


Figure B-21. Site 11116

is not formally faced. The terrace is rubble-like in appearance and sloping in profile. A monkeypod tree is immediately upslope. The terrace retains a level soil area on its upslope side.

FEATURE D: Mound**FUNCTION:** Agriculture**DIMENSIONS:** 3.00 m by 2.50 m by 0.60 m (approx.)

DESCRIPTION: The mound is generally oval/round in plan. It is constructed of piled basalt boulders and cobbles. The mound is raised, but its surface is fairly level. Its sides are not formally faced and appear rounded or sloping in profile. A portion of the mound is built on pahoehoe bedrock. A large basalt boulder (or decomposing bedrock) is also present on the mound. Additional mounds and modified outcrops are also present in the area.

SITE NO.: State: 11118

PHRI: 451-3

SITE TYPE: Complex (3 Features)**TOPOGRAPHY:** Undulating to fairly steep sloping pahoehoe bedrock.**VEGETATION:** *Koa-haole*, grasses, and air plants.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation

DESCRIPTION: The overall complex area measures c. 20.00 m (north-south) by 15.00 m (east-west). A *kuaiwi* wall (*maukamakai* orientation) abuts Feature A to the SW. It is of rubble construction, c. 1.00-2.00 m wide and continues westward.

FEATURE A: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 16.80 m by 3.40 m by 0.70 m (approx.)

DESCRIPTION: The terrace is situated across slope, with a level soil area immediately inland (east) of the terrace face. It is constructed of piled, small to medium boulders and cobbles. The sides are rubble and collapsed in appearance, sloping in profile, and not formally faced. Approximately four to five boulder uprights are present along the SW edge of the terrace. Also, 3-4 boulder slabs are present on the terrace surface and probably served as paving.

One piece of coral and *Cypraea* sp. shell was noted. No definite cultural deposit is visible, but is probably present subsurface. Feature A to Feature B is 15.00 m at 29°; Feature A to Feature C is 7.60 m at 135°.

FEATURE B: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 5.00 m by 4.40 m by 0.70 m (approx.)

DESCRIPTION: The terrace is roughly L-shape. It is raised on the south (interior) side and even with the ground surface along the remaining sides. Situated across slope, it delineates the inland edge of the flat soil (probable living) area. It is constructed of raised and piled pahoehoe cobbles and small boulders. The south side is not formally faced, but sloping in profile. The surface is also sloping and uneven cobble and boulder fill. One waterworn basalt cobble was noted on the terrace surface.

FEATURE C: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 3.50 m by 1.90 m by 0.90 m (approx.)

DESCRIPTION: The terrace is roughly rectangular in plan. It is raised on the south side, with piled pahoehoe boulders and cobbles. It is collapsed along the southeast corner. It is even with the ground surface along the north, west, and east sides. The surface is roughly level boulders and cobbles. One piece of *Cypraea* sp. shell was noted in the boulder cobble fill. No definite cultural deposit is visible, but is probably present subsurface.

SITE NO.: State: 11119

PHRI: 451-4

SITE TYPE: Platform remnant/mound

TOPOGRAPHY: Undulating terrain generally sloping to the southwest.

VEGETATION: *Koa-haole*, grasses, air plants, two to three monkeypods.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 8.40 m by 6.00 m by 0.90 m (approx.)

DESCRIPTION: Roughly rectangular in plan, the raised platform or mound is constructed of piled, small to large boulders. Not formally faced, the sides are sloping in profile. The surface is centrally raised, and roughly uneven, with boulders and cobbles. As the ground slopes southwest, the platform/mound begins to collapse. The southwest edge of the feature is on top of a c. 6.00 m by 3.00 m rubble/cobble raised area. It may have been a part of the platform/mound. Possible additional Kona Field System (6601) features consisting of agricultural mounds and several *kuaiwi* walls were noted in the area. A possible second large terrace area is to the east.

SITE NO.: State: 11120 (Figure B-22)

PHRI: 451-5

SITE TYPE: Complex (4 Features)

TOPOGRAPHY: Undulating pahoehoe bedrock terrain with moderate cover of soil. Site is situated across the slope.

VEGETATION: *Koa-haole*, grasses, air plants, and vines.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DESCRIPTION: Additional Kona Field System (6601) features consisting of mounds and a *kuaiwi* wall c. 5.00 m N of Feature C.

FEATURE A: Mound

FUNCTION: Agriculture

DIMENSIONS: 4.00 m by 3.00 m by 1.60 m (approx.)

DESCRIPTION: The mound is amorphous in plan. It is stacked and faced 5 courses high, of medium-sized pahoehoe boulders on the west side. The east side is even with the ground slope. The north and south sides are slightly raised, but not formally faced. The surface interior is uneven boulder and cobble fill. Feature A to Feature B is c. 7.00 m at 103°; Feature A to Feature C is 10.30 m at 327°; Feature A to Feature D is 29.00 m at 229°.

FEATURE B: Mound

FUNCTION: Agriculture

DIMENSIONS: 4.40 m by 1.70 m by 1.40 m (approx.)

DESCRIPTION: Amorphous in plan, the mound is stacked and faced 5 courses high, of medium-sized pahoehoe boulders on the west side only. The remaining sides are even with the ground slope. The surface interior is level, except for the northwest corner, which is rubble and collapsed.

FEATURE C: Mound

FUNCTION: Agriculture

DIMENSIONS: 4.30 m by 3.00 m by 1.10 m (approx.)

DESCRIPTION: Amorphous in plan, the mound is a boulder/rubble pile, not formally faced or stacked. It is constructed of cobbles and medium to large pahoehoe boulders. It is raised, not faced, in the northwest corner to a height of 1.10 m. The surface is uneven and slopes with the terrain.

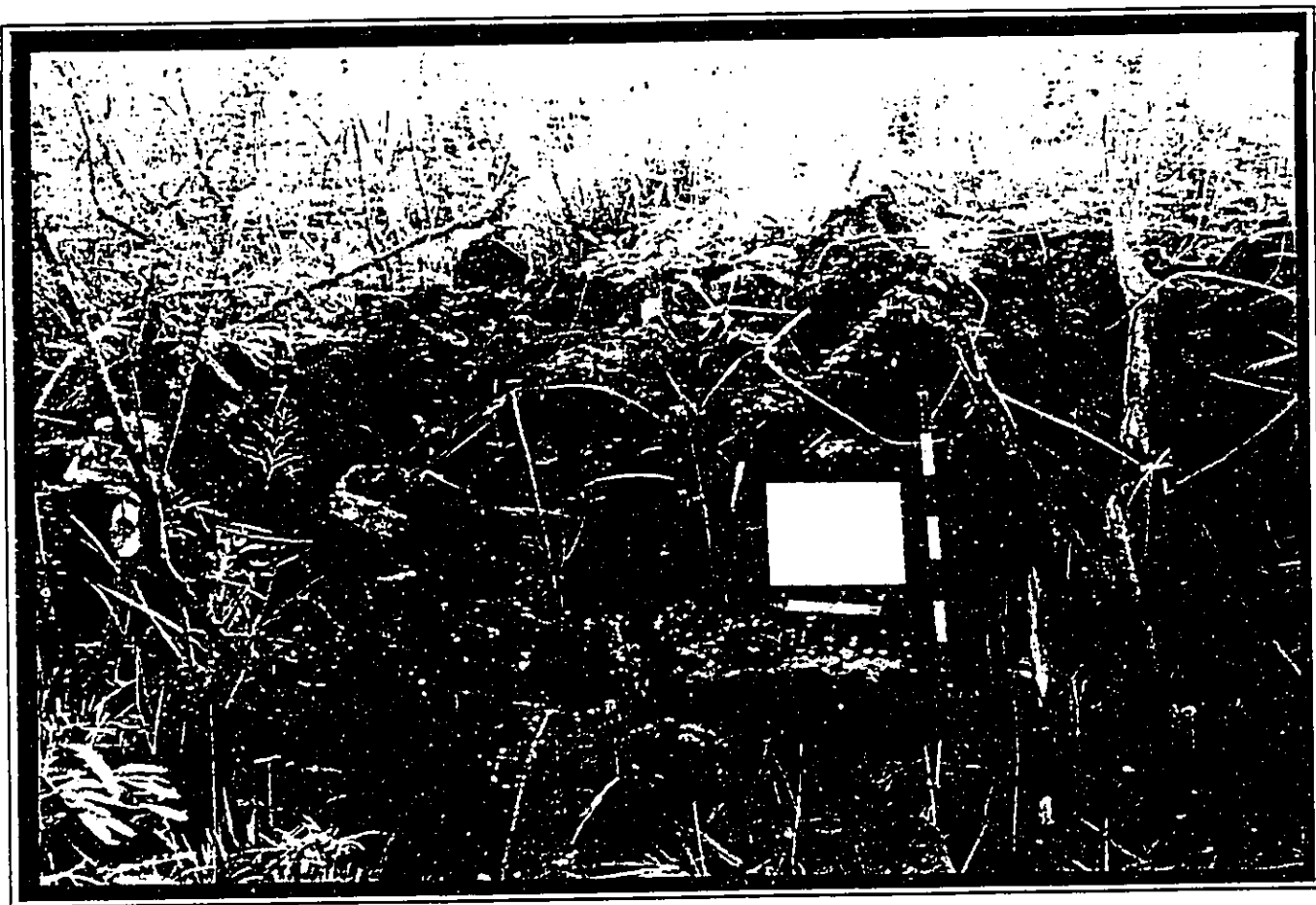


Figure B-22. Site 11120 (Neg. 917-3a)

FEATURE D: Mound**FUNCTION:** Agriculture**DIMENSIONS:** 7.40 m by 1.90 m by 1.00 m (approx.)**DESCRIPTION:** Elongated in plan, the mound is a raised pile of medium to large pahoehoe boulders. It is rubbed to the east and southeast, and raised and not formally faced to the north, south and west. The surface is roughly even, with cobbles and boulders.**SITE NO.: State:** 11121**PHRI:** 451- 6**SITE TYPE:** Enclosure**TOPOGRAPHY:** Gently undulating pahoehoe bedrock with a thin mantle of brownish soil.**VEGETATION:** Site overgrown with *koa-haole*, air plants, grasses, *noni*, lantana, several trees (possibly shower trees).**CONDITION:** Poor**INTEGRITY:** Appears slightly altered by chain-dragging**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DIMENSIONS:** 11.50 m by 11.20 m by 1.30 m (approx.)**DESCRIPTION:** Associated Kona Field System (6601) features consisting of *kuaiwi* walls, mounds, terraces and modified outcrop. The enclosure is generally square shaped. The walls are constructed of crudely stacked and piled blocky basalt boulders. The walls are raised, but not formally faced. The width ranges from 1.50-2.50 m. The height ranges from 0.60-1.30 m. The sides are collapsed, sloping in profile, and rubble-like in appearance. The SW and SE walls of the enclosure appear to be better preserved than the NW and NE walls.

A *kuaiwi* wall extends downslope (SW) from the enclosure. The *kuaiwi* wall measures c. 17.00 m long by 2.00 m wide by 0.80-1.00 m in height. The wall is constructed of piled basalt boulders, and its sides are not formally faced.

A lava tube cave is present SW of the enclosure. The tube measures c. 8.00 m by 5.00 m by 1.00 m (height) and is entered through a vertical opening measuring c. 1.20 m in diameter.

SITE NO.: State: 11122**PHRI:** 451- 7**SITE TYPE:** Wall**TOPOGRAPHY:** Sloping terrain exposed pahoehoe bedrock outcrop with a thin soil mantle.**VEGETATION:** Dense *koa-haole* and grasses, scattered monkeypod, *opiuma*.**CONDITION:** Good**INTEGRITY:** Unaltered**PROBABLE AGE:** Historic**FUNCTIONAL INTERPRETATION:** Boundary**DIMENSIONS:** 270.00 m by 0.80 m by 1.40 m (approx.)**DESCRIPTION:** Constructed of well-stacked blocky basalt boulders, the wall is raised and faced on both sides. This is a recently constructed cattle wall situated on the inland (east) boundary of the project area adjacent to Kuakini Highway.**SITE NO.: State:** 11123**PHRI:** 451- 9**SITE TYPE:** Wall**TOPOGRAPHY:** Undulating sloping terrain with some soil.**VEGETATION:** *Kukui*, grasses, and *koa-haole*.**CONDITION:** Good**INTEGRITY:** Unaltered**PROBABLE AGE:** Historic**FUNCTIONAL INTERPRETATION:** Boundary**DIMENSIONS:** 180.00 m by 0.70 m by 1.40 m (approx.)

DESCRIPTION: This wall is of bifaced and cobble-filled construction. It is built with angular, blocky basalt boulders and cobbles. The size and sorting of the boulder/cobble building material is well-mixed in cross section and along the length of the wall. The wall appears to be older than Sites 11122 and 6368. It was possibly used for the early historic roadway.

PHRI: 451- 10

SITE NO.: State: 11124

SITE TYPE: Enclosure

TOPOGRAPHY: Undulating pahoehoe bedrock terrain.

VEGETATION: *Kukui*, *koa-haole*, grasses, *opiuma*.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 6.00 m by 3.50 m by 0.85 m (approx.)

DESCRIPTION: The enclosure is oval to rectangular in plan. It is constructed of blocky basalt boulders and cobbles one to two courses high. The sides are collapsed and rubble-like in appearance. They are sloping in profile and are not formally faced. Some of the stones may have been removed from this site for use in building the nearby historic wall, Site 11123.

PHRI: 451- 11

SITE NO.: State: 11125

SITE TYPE: Enclosure

TOPOGRAPHY: Gently sloping pahoehoe bedrock terrain with a thin soil mantle.

VEGETATION: *Koa-haole*, grasses, monkeypod, *opiuma*, air plants, and vines.

CONDITION: Poor

INTEGRITY: Appears unaltered.

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 11.00 m by 9.50 m by 0.80 m (approx.)

DESCRIPTION: Sparse scattering of agricultural Kona Field System (6601) features consisting of mounds, rubble walls and modified outcrop. The enclosure is vaguely rectangular/square in plan. Its walls are extremely collapsed and rubble-like in appearance. The enclosure walls are constructed of piled blocky basalt boulders and cobbles. They are slightly raised, but rounded or sloping in profile and not formally faced.

The northeast (upslope) and southwest (downslope) "walls" resemble terraces in form. The downslope sides of these walls are raised slightly. In contrast, the upslope sides are generally even with the surrounding ground surface. The terrace interior consists of a fairly level soil surface with a scatter of loose boulders. Rocks could have been removed for the construction of Site 11123, Wall. A large monkeypod tree is growing within the east corner of the enclosure.

PHRI: 451- 12

SITE NO.: State: 11126

SITE TYPE: Terrace

TOPOGRAPHY: Situated at the base of a gradual slope and at the beginning of a low bluff.

VEGETATION: *Koa-haole*, air plants, amaranth, grasses, four monkeypod, and vines.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 13.00 m by 4.00 m by 2.20 m (approx.)

DESCRIPTION: Crudely stacked pahoehoe boulders on the downslope side of a low bluff, creating a terraced area of bedrock, loose rock and soil. The terrace surface located east of the terrace face has a gentle, sloping surface.

Situated southeast of the terrace is a mound, faced and stacked three courses high on the south and west edges. It measures 2.50 m (north-south) by 2.00 m (east-west) with heights of 1.25 m on the south side and 0.90 m on the west side. The surface interior is an uneven surface of boulder and cobble fill. This mound probably delineates the south boundary of the terrace.

SITE NO.: State: 11127

PHRI: 451- 13

SITE TYPE: Mound

TOPOGRAPHY: Gently sloping pahoehoe bedrock underlying a thin soil mantle.

VEGETATION: *Koa-haole*, air plants, *opiuma*, grasses

CONDITION: Poor

INTEGRITY: Altered by chain dragging

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 10.00 m by 8.00 m by 0.80 m (approx.)

DESCRIPTION: Sparse scattering of agricultural Kona Field System (6601) features consisting of mounds, modified outcrops, and rubble walls. The mound appears vaguely rectangular to oval in plan. It is constructed of crudely stacked, blocky basalt boulders and cobbles. The mound is raised on the southeast, southwest and northwest sides. The sides are not formally faced, but appear collapsed and rounded or sloping in profile. The northeast side is generally even or raised only slightly above the surrounding terrain. The mound surface is roughly level and consists of boulders and cobbles. A possible cupboard is located on the mound feature. A flat slab is placed over the cupboard and functions like a capstone. This large mound may have originally been a terrace or platform which has been possibly altered by chain-dragging.

SITE NO.: State: 11128 (Figure B-23)

PHRI: 451- 14

SITE TYPE: Complex (5 Features)

TOPOGRAPHY: Gently sloping pahoehoe bedrock underlying a thin soil mantle

VEGETATION: Moderate to dense *koa-haole*, air plants, and grasses.

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture-habitation

DESCRIPTION: Overall complex area measures c. 40.00 m (north-south) by 25.00 m (east-west).

FEATURE A: Mound

FUNCTION: Agriculture

DIMENSIONS: 3.20 m by 2.40 m by 1.50 m (approx.)

DESCRIPTION: This mound feature resembles a large, raised cairn. The mound is generally oval in plan. It is constructed of stacked, blocky basalt boulders and cobbles. The mound is raised and crudely faced on all sides. The sides contain predominately larger boulders. The mound surface consists of rough and uneven blocky basalt boulders.

FEATURE B: Mound

FUNCTION: Agriculture

DIMENSIONS: 3.50 m by 2.20 m by 0.70 m (approx.)

DESCRIPTION: A low mound generally oval in shape. It is constructed of piled pahoehoe boulders and cobbles. The sides are raised and not formally faced. A single upright stone is present on the surface. This upright appears to be a later addition.

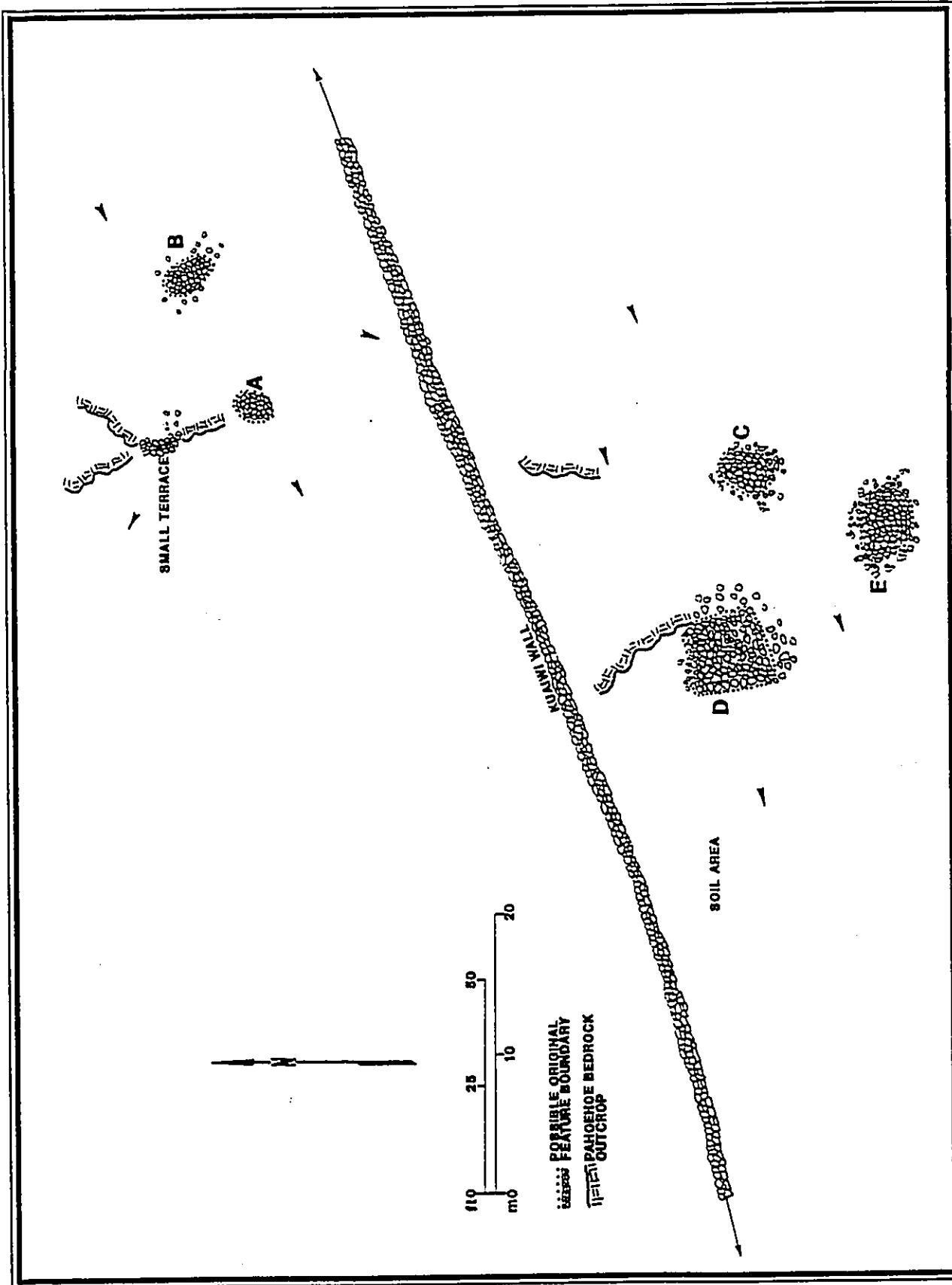


Figure B-23. Site 11128

FEATURE C: Platform**FUNCTION:** Agriculture**DIMENSIONS:** 3.00 m by 3.00 m by 1.80 m (approx.)**DESCRIPTION:** The platform is generally oval in plan and resembles a large raised cairn. It is constructed of stacked, blocky, basalt boulders and cobbles. The sides are raised and formally faced. The southwest side appears to be well preserved. Portions of the northwest and southeast sides are collapsed.

The platform surface is roughly level, and contains a basalt cobble fill. The feature is situated near a low/swale area. It is c. 175° and 31.00 m from Feature A to Feature C.

FEATURE D: Platform**FUNCTION:** Habitation**DIMENSIONS:** 5.00 m by 5.00 m by 1.90 m (approx.)**DESCRIPTION:** Generally square, it is constructed with well-stacked pahoehoe boulders and cobbles. The west wall is nicely faced and intact. The north and the south walls are slightly deteriorated and slumped. Damage to the north and south mid-walls is due to cattle. Small cobbles of pahoehoe are numerous on the surface interior, for a smoother and level surface. The north and east sides abut an outcrop of pahoehoe, so the walls are not as high in the northeast corner. The wall heights range from 0.30-1.90 m.**FEATURE E: Mound****FUNCTION:** Agriculture**DIMENSIONS:** 5.50 m by 3.50 m by 1.75 m (approx.)**DESCRIPTION:** The mound is generally oblong in plan and is constructed of piled, blocky, basalt boulders and cobbles. It is centrally raised, but contains no formally faced sides, and the sides are generally rounded or sloping in profile. A portion on the east side of the mound is raised, but not formally faced.**SITE NO.:** State: 11129 (Figure B-24)

PHRI: 451- 15

SITE TYPE: Retaining wall**TOPOGRAPHY:** Undulating terrain on a medium to steep slope. Site is situated at the top of a gully.**VEGETATION:** Moderate *koa-haole* and air plants, grasses, amaranth, and vines.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Agriculture**DIMENSIONS:** 6.00 m by 4.40 m by 1.68 m (approx.)**DESCRIPTION:** The retaining wall is c. 2.00 m wide and is situated across the top of a gully. It is stacked and faced on the west side, five to seven courses high with blocky pahoehoe boulders. The east side is even with the ground surface. This retaining wall was probably used for erosional control.**SITE NO.:** State: 11130 (Figure B-25)

PHRI: 451- 16

SITE TYPE: Platform**TOPOGRAPHY:** Bench on slope**VEGETATION:** *Koa-haole* and grasses.**CONDITION:** Fair-good**INTEGRITY:** Unaltered-partially altered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Ceremonial**DIMENSIONS:** 7.00 m by 6.50 m by 1.60 m

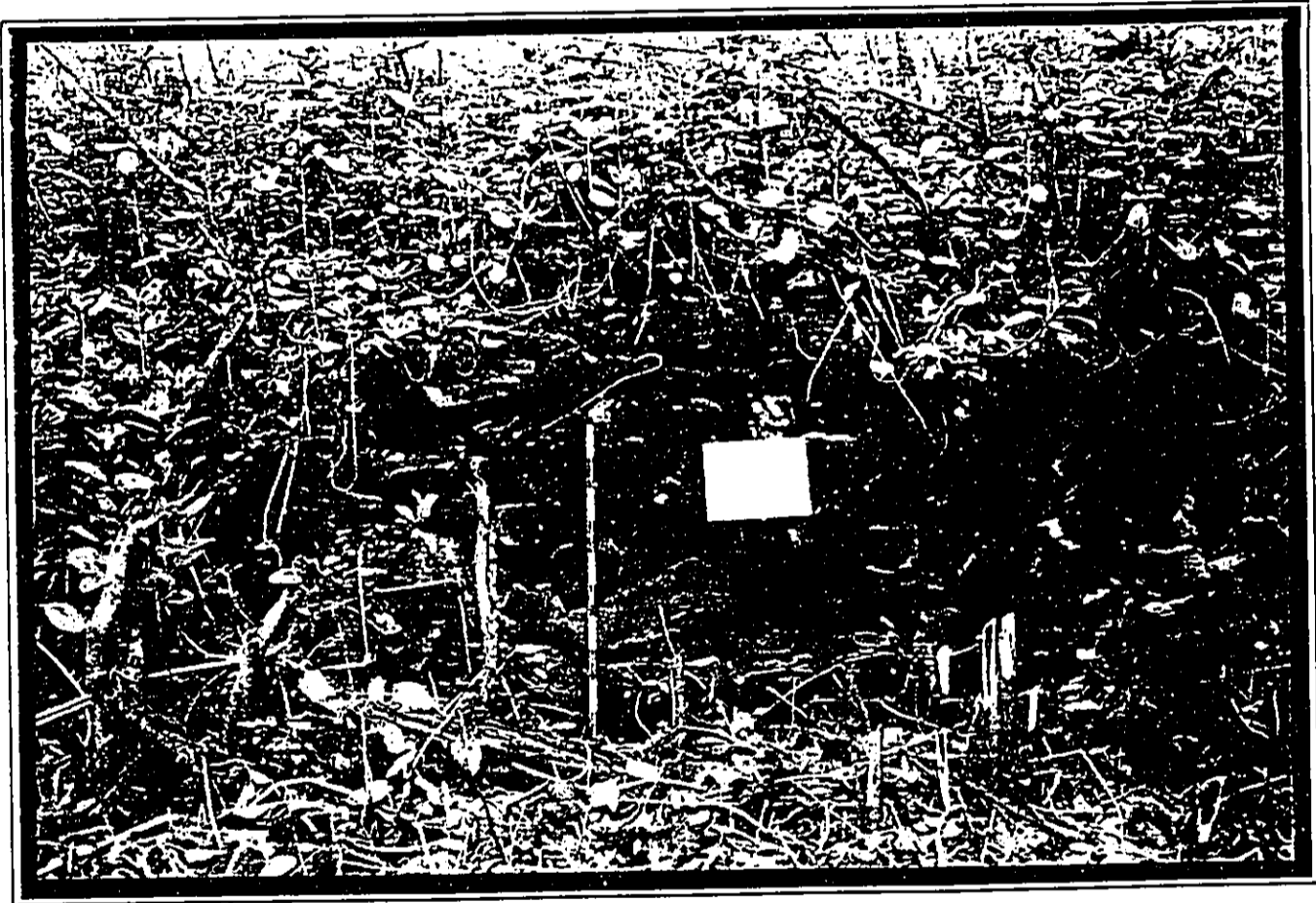


Figure B-24. Site 11129 (Neg. 917-15a)

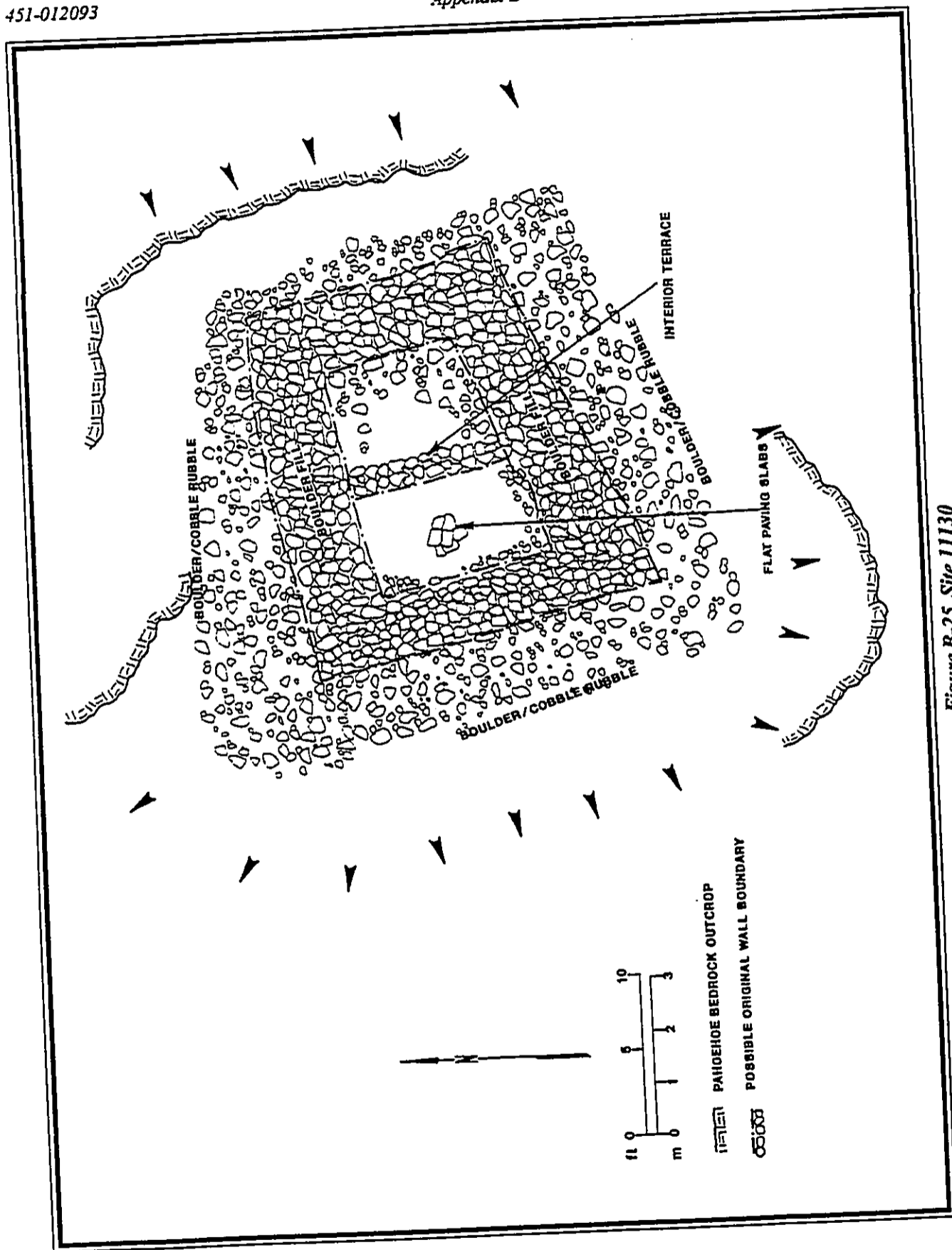


Figure B-25. Site 11130

DESCRIPTION: A possible walled platform. It is roughly trapezoidal in plan and is constructed of basalt boulders and cobble filled. Raised on all four sides, it was probably stacked and faced at one time. Portions of the floor are crudely paved with no obvious entrance. The top of the platform is elliptically walled. It is possible that the walled area on the top was added on after initial construction. The platform contains an internal terrace.

PHRI: 451- 17

SITE NO.: State: 11131

SITE TYPE: Double terrace

TOPOGRAPHY: Undulating pahoehoe bedrock terrain.

VEGETATION: *Koa-haole* and grasses.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 19.00 m by 8.00 m by 1.50 m (approx.)

DESCRIPTION: A *kuaiwi* wall is on the NW side of the double terrace. It is oriented NE-SW. A rubble piled linear mound is southeast of the site. The two terraces are constructed with piled basalt boulders and cobbles.

The upper terrace measures c. 5.00 m by 5.00 m. It is raised on the northwest, southeast, and southwest sides. The exterior edge is sloping in profile and not formally faced. It is crudely faced along the interior edge. The surface interior of the terrace is fairly level, with small cobble fill and brownish soil. A waterworn basalt cobble also present.

A raised L-shaped boulder pile, c. 0.45 m high, is at the east corner of the terrace interior. The southeast retaining wall continues northeast and southwest into the lower terrace. The lower terrace is downslope of the upper terrace. It measures c. 8.00 by 8.00 m. The lower terrace is raised along the downslope side and crudely faced along the exterior edge from 0.70-0.90 m in height. The surface interior is fairly level, with small cobble fill, bedrock outcropping and brownish soil.

PHRI: 451- 18

SITE NO.: State: 11132

SITE TYPE: Enclosure

TOPOGRAPHY: On a medium sloping terrain consisting of pahoehoe bedrock with soil mantle cover.

VEGETATION: 3 *opiuna* trees, moderate *koa-haole*, grasses, air plants, purslane, indigo.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 18.00 m by 12.50 m by 0.90 m (approx.)

DESCRIPTION: Roughly rectangular in plan, the enclosure is constructed of cobbles and small to large boulders. The SW interior corner of the south wall is raised and crudely stacked three to four courses high. The exterior portion is collapsed and rubble. The west wall is sloping in profile and rubble terrace-like in appearance. The interior edge is raised one cobble/boulder high. The north wall is a collapsing rubble wall. The east wall is also terrace-like, with the west (interior) edge raised one to two boulders high, and the east (exterior) edge level with the ground surface. The middle portion of both the north and south walls are destroyed, probably due to cattle.

PHRI: 451- 19

SITE NO.: State: 11133

SITE TYPE: C-shape

TOPOGRAPHY: Gently sloping terrain of soil and loose rock.

VEGETATION: *Koa-haole*, one monkeypod, air plants, and grasses.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 19.00 m by 7.20 m by 1.00 m (approx.)

DESCRIPTION: Open to the WSW, it is faced with blocky pahoehoe boulders and cobbles, stacked three to five courses high, along portions of the interior and exterior sides. Cobble and boulder filled, it is sloping and collapsed along the northeast corner exterior, the east wall, and portions of the south wall. The surface interior is soil, with loose rock and *koa-haole* trees. It appears that it may have been enclosed by another wall along its west (open) side. The interior edge of this possible wall is raised c. 0.20 m. The exterior edge contains one upright and two possible fallen uprights. It is presently collapsed and in poor condition. At the base of this possible wall (along the west edge), and also along the north edge of the C-shape are four to seven boulders that are used as paving. This paving creates an L-shaped terrace that wraps around the northwest corner of the C-shape. It is stacked three to four courses high, c. 1.20 m wide, and c. 0.75 m high along its northern edge. The west edge is rubble, and c. 0.80 m wide and high.

At the northwest corner of the terrace is a low rubble wall. It is c. 1.00-2.00 m wide and is stacked and faced three to four courses high along a portion of its north exterior edge. This wall is boulder and cobble filled and extends c. 6.20 m west. The immediate surrounding area is fairly level with soil, bedrock and loose boulders and cobbles.

SITE NO.: State: 11134

PHRI: 451- 20

SITE TYPE: Enclosure

TOPOGRAPHY: On a flat to gentle terrain consisting of pahoehoe bedrock, loose boulders and soil mantle cover.

VEGETATION: Moderate to dense air plants, moderate *koa-haole*, various vines and grasses.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 17.00 m by 14.00 m by 0.85 m (approx.)

DESCRIPTION: The enclosure is circular to oval in plan. In general, the walls are collapsed and rubble in appearance. They are sloping in profile, not formally faced, and constructed of piled blocky pahoehoe small to medium boulders and cobbles. The walls are wider at the base than at the surface.

Portions of the south wall and along the NW corner are deteriorated, probably from the cattle in the area. The NE corner has crude stacking still evident along the interior and exterior faces, but mostly it is collapsed. The east wall is centrally raised with sloping profiles. The surface interior of the enclosure is fairly level soil with loose boulders and cobbles on a gentle slope.

SITE NO.: State: 11135 (Figure B-26)

PHRI: 451- 21

SITE TYPE: Platform

TOPOGRAPHY: Level to gently sloping terrain consisting of pahoehoe bedrock outcropping with a soil mantle cover.

VEGETATION: *Koa-haole*, air plants and grasses.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Historic

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 3.80 m by 3.20 m by 1.70 m (approx.)

DESCRIPTION: Additional Kona Field System (6601) features are in the area; they consist of mounds and modified outcrops. Also present is a wall remnant c. 10.00 m in length, 1.50 m wide and 0.90-1.00 m in height. It is stacked four courses high, bifaced and core-filled. This wall is situated c. 8.00 m west of the platform. The platform is roughly square in plan and is constructed with blocky pahoehoe medium boulders, stacked six to seven courses high along its perimeter. The surface interior is roughly level and mostly cobble filled. It is faced on the north, east and south sides. The northwest side is collapsed and rubble. This platform is wider at the base than at its surface. The surface perimeter is built up one boulder higher than the interior surface, to a height of c. 0.30-0.40 m. This feature may have been constructed by the ranchers as a possible clearing mound.



Figure B-26. Site 11135 (Neg. 917-29a)

SITE NO.: State: 11136

PHRI: 451-22

SITE TYPE: Modified outcrop

TOPOGRAPHY: Site is situated on a bedrock knoll. The area east of the site is gentle sloping bedrock terrain with soil mantle cover.

VEGETATION: *Koa-haole*, air plants, grasses, monkeypod, and one large *kiawe* tree.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 14.50 m by 6.00 m by 0.70 m (approx.)

DESCRIPTION: A modified outcrop resembling a crude C-shape. Open to the west, the south wall consists of pahoehoe boulders and cobbles piled atop and adjacent to a raised bedrock outcrop.

The south wall is constructed with a sloping exterior face composed of cobble and boulder fill. The interior area of the C-shape is soil surface on bedrock. About 8.00 m downslope (westward) is a raised terrace-like area. It measures c. 4.00 m (east-west) by 3.50 m (north-south) and 0.20-0.60 m in height. Raised on the north, west, and south sides, it is constructed with boulders and cobbles, and with a cobble and pebble fill paving. The surface is even but sloping gently west. One *Cypraea* sp. fragment was noted downslope.

PHRI: 451-23

SITE NO.: State: 11137

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Gently undulating pahoehoe bedrock underlying a thin, brownish soil mantle.

VEGETATION: *Koa-haole*, air plants, *kiawe*, *opiuma*, indigo.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 15.00 m (east-west) by 10.00 m (north-south). Site is c. 20.00 m SE of a large *kiawe* tree.

FEATURE A: Mound

FUNCTION: Habitation

DIMENSIONS: 3.70 m by 3.70 m by 1.30 m (approx.)

DESCRIPTION: This mound feature resembles a platform that has deteriorated and collapsed. It is constructed with piled and stacked pahoehoe boulders and cobbles.

The mound has evidence of stacking and facing at the NW corner that is presently masked by rubble from the collapsed structure.

FEATURE B: Terrace (Figure B-27)

FUNCTION: Habitation

DIMENSIONS: 4.00 m by 3.00 m by 1.00 m (approx.)

DESCRIPTION: The terrace is vaguely L-shaped in plan. It is raised on the west and north sides. A short section (c. 1.00 m long) at the NW corner of the terrace is formally faced.

Remaining sections of the terrace wall generally appear collapsed and rounded or sloping in profile. The terrace surface is generally uneven, rough and composed of blocky basalt boulders. Areas near the faced section, however, are somewhat level and contain basalt cobbles.

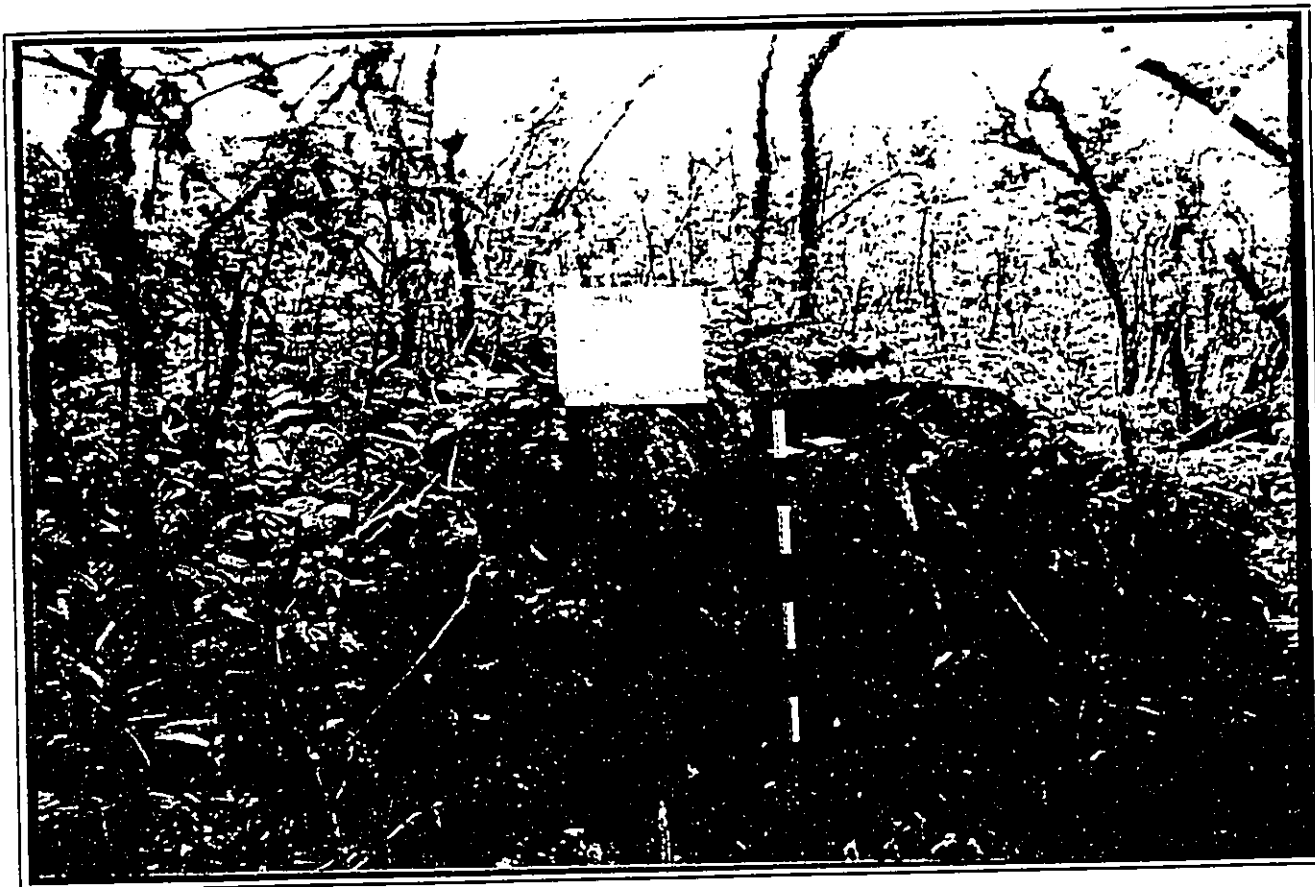


Figure B-27. Site 11137 Feature B (Neg. 917-33a)

PHRI: 451- 24

SITE NO.: State: 11138

SITE TYPE: Modified outcrop

TOPOGRAPHY: Site is on the downslope (west) side of a hill. Surrounding area consists of undulating ridges and a valley.

VEGETATION: Moderate *koa-haole*, air plants, vines, grasses, and occasional monkeypod trees.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 18.00 m by 12.00 m by 1.80 m (approx.)

DESCRIPTION: The site comprises terraces that are on the downslope side of a large hill of bedrock outcropping. The terraces are constructed across slope, utilizing pahoehoe bedrock and the slope of the hill to create level/flat areas of loose rock, soil, and pahoehoe. The terraces are built with stacked blocky pahoehoe boulders, stacked four to six courses high, and with cobble and boulder fill. Two main terraced areas are present with stacked faces along some sections and rubble collapsed along the remaining portions. A cupboard is located at the base of and into a terrace face. This cupboard measures 1.00 m (east-west) by 0.50 m (north-south) by 0.45 m in height.

PHRI: 451- 25

SITE NO.: State: 11139

SITE TYPE: Enclosure

TOPOGRAPHY: Undulating to medium slope of pahoehoe bedrock terrain underlying a thin soil mantle.

VEGETATION: Monkeypod, *opiuma*, *koa-haole*, grasses, air plants, indigo.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 20.00 m by 10.00 m by 1.00 m (approx.)

DESCRIPTION: Additional mounds and a *kuaiwi* wall are located in the area. Constructed of blocky pahoehoe boulders and cobbles, they are formally raised on all sides. They are situated across a steep slope. Rectangular in plan, the enclosure is constructed with blocky pahoehoe boulders, stacked three to five courses high, and with cobble fill. Both the interior and exterior faces of the enclosure has evidence of stacking. The other portions are collapsed and rubble. The wall widths range from 1.40-2.50 m. The interior dimensions are 16.00 m by 4.50 m. The surface interior is fairly level, with soil and loose rock.

A terraced area is abutting the NW corner of the enclosure. It measures c. 5.00 m (north-south) by 3.00 m (east-west) by 0.95 m in height. Stacked and faced three to four courses high with blocky basalt boulders and one upright on the west side. The surface interior of this terraced area is level soil on bedrock outcropping.

PHRI: 451- 26

SITE NO.: State: 11140

SITE TYPE: Enclosure

TOPOGRAPHY: Flat to gentle terrain consisting of pahoehoe bedrock underlying a soil mantle cover.

VEGETATION: Amaranth, *kiawe*, *opiuma*, monkeypod, grasses, air plants, *koa-haole*, lantana, indigo.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Historic

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 122.00 m by 76.00 m by 1.70 m (approx.)

DESCRIPTION: A large rectangular enclosure probably constructed for ranching purposes. It is of bifaced construction with blocky pahoehoe boulders stacked c. five to seven courses high. The base, at c. 1.00 m, is wider than the surface, which is 0.40-0.70 m. The enclosure walls are standing along some sections and collapsing along others.

SITE NO.: State: 11141 PHRI: 451-27
 SITE TYPE: Complex (2 Features)
 TOPOGRAPHY: Gently undulating pahoehoe bedrock with a thin mantle of overlying soil.
 VEGETATION: Moderate to dense *koa-haole*, *kiawe*, *opiuma*, air plant and monkeypod.
 CONDITION: Poor
 INTEGRITY: Unaltered
 PROBABLE AGE: Prehistoric
 FUNCTIONAL INTERPRETATION: Possible burial-agriculture
 DESCRIPTION: Overall complex area measures c. 25.00 m (east-west) by 15.00 m (north-south). The area may be slightly altered by chain dragging activities.

FEATURE A: Mound
 FUNCTION: Ceremonial
 DIMENSIONS: 4.50 m by 2.75 m by 0.45 m (approx.)
 DESCRIPTION: The mound is roughly oval in plan and resembles a small, collapsed platform. It is constructed of piled blocky basalt boulders on the perimeter, with a level cobble filled interior. The mound is raised slightly, but its sides are rubble-like in appearance and not formally faced. Several upright boulders are nearby, but possibly natural. A small lava blister is present c. 3.00 m north.

FEATURE B: Wall
 FUNCTION: Agriculture
 DIMENSIONS: 25.00 m by 3.00 m by 0.45 m (approx.)
 DESCRIPTION: The wall is rubble-like in appearance and constructed of piled, blocky basalt boulders and cobbles. The wall is raised, but its sides are rounded or sloping in profile and are not formally faced. It is oriented c. 270° azimuth (upslope/downslope). The east end of the wall curves slightly north. The wall may possibly be a remnant of a *kua'iwi* wall.

SITE NO.: State: 11142 PHRI: 451-28
 SITE TYPE: Complex (3 Features)
 TOPOGRAPHY: Gentle to moderately sloping terrain consisting of pahoehoe bedrock outcrop, with coastal view.
 VEGETATION: *Koa-haole*, *opiuma*, and air plant.
 CONDITION: Fair
 INTEGRITY: Unaltered
 PROBABLE AGE: Prehistoric
 FUNCTIONAL INTERPRETATION: Habitation
 DESCRIPTION: Overall complex area measures c. 18.00 m (east-west) by 15.00 m (north-south).

FEATURE A: Modified outcrop
 FUNCTION: Habitation
 DIMENSIONS: 7.00 m by 6.00 m by 0.80 m (approx.)
 DESCRIPTION: Pahoehoe outcrop modified with piled angular to subangular pahoehoe boulders and cobbles to give the outcrop the appearance of a terrace or a rough platform. Generally crude and collapsed in appearance. It is slightly raised on the north, west, and south sides. The outcrop is bounded on the south and west by two cave openings into separate lava tubes situated below the outcrop.

FEATURE B: Lava tube
 FUNCTION: Habitation
 DIMENSIONS: 50.00 m by 4.00 m by 1.80 m (approx.)
 DESCRIPTION: A natural lava tube with some cultural modifications constructed of stacked basalt boulders. The cave entrance is c. 0.50 m in diameter. The lava tube contains a large chamber c. 4.00 m wide in addition to several branches and or passageways.

FEATURE C: Lava tube**FUNCTION:** Habitation**DIMENSIONS:** 4.00 m by 2.50 m by 1.00 m (approx.)**DESCRIPTION:** A natural lava tube with cultural material remains. The lava tube has a large chamber with a relatively low ceiling. Cobbles and boulders are visible on the floor.

PHRI: 451-29

SITE NO.: State: 11143**SITE TYPE:** Complex (5 Features)**TOPOGRAPHY:** The general area is undulating sloping terrain of pahoehoe bedrock. The site is on a pahoehoe outcrop bench on a moderate slope, with a coastal view.**VEGETATION:** Moderate to dense *koa-haole*, air plants, *kiawe* and *opiuma*.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation-refuge**DESCRIPTION:** Overall surface area of complex measures c. 50.00 m (east-west) by 35.00 m (north-south).**FEATURE A: Terrace****FUNCTION:** Habitation**DIMENSIONS:** 8.00 m by 8.00 m by 1.20 m (approx.)**DESCRIPTION:** Generally square in plan, the terrace is constructed with piled pahoehoe boulders and cobbles. Raised on four sides, it is stacked along a central section of its southwest face. The terrace is roughly C-shape at the northern corner. It is constructed of crudely stacked boulder walls c. 0.45 m in height. The eastern corner of the terrace is roughly constructed as an oval shaped enclosure. It is built with basalt boulder rubble fill.**FEATURE B: Terrace****FUNCTION:** Habitation**DIMENSIONS:** 7.40 m by 5.00 m by 0.85 m (approx.)**DESCRIPTION:** The terrace is generally rectangular in plan. Mound-like in appearance, it also resembles a collapsed platform. Raised on all sides, it is constructed with boulders and cobbles. The surface is slightly sloping along the edges. It is largely collapsed except for a c. 1.0 m section 2.00 m south of the NW corner, which features an upright slab about 0.70-0.80 m in length. Feature C entrance is located in the eastern corner.**FEATURE C: Lava tube****FUNCTION:** Habitation-refuge**DIMENSIONS:** 150.00 m by 8.00 m by 2.50 m (approx.)**DESCRIPTION:** The lava tube is entered through a narrow, restricted, vertical type opening. The crawl way itself continues 5.00 m in a horizontal direction to the west. The entrance is constructed with well stacked boulders and the sides are well faced. The crawl way ceiling consists of set capstones. The tube itself measures c. 75.00 m long, 2.00-4.00 m wide and 1.50-2.50 m in ceiling height. This main tube contains C-shaped shelter walls, small enclosures, linear walls and charcoal concentrations.**FEATURE D: Terrace****FUNCTION:** Habitation**DIMENSIONS:** 30.00 m by 4.50 m by 1.10 m (approx.)**DESCRIPTION:** The terrace is raised on the west side and constructed of crudely stacked to piled blocky basalt boulders. The northwest end of the terrace is better preserved, and appears crudely faced. An upright boulder is present near the northwest end of the terrace. The southeast end of the terrace is less well preserved and is collapsed and rubble-like in appearance. The terrace surface is generally level and consists of soil and rock. No definite cultural deposit is visible, but is possibly present subsurface.

FEATURE E: Double C-shape**FUNCTION:** Habitation**DIMENSIONS:** 16.80 m by 14.80 m by 0.70 m (approx.)**DESCRIPTION:** Two C-shapes constructed of stacked and piled pahoehoe boulders and cobbles sharing a common wall. The overall shape roughly resembles a backwards E, the common wall being in the middle.

The wall is raised c. 0.75 m on the SW side and rubbled on the NE side. The closed end of the C-shapes is terrace-like and abuts the SW side of the wall. The C-shapes are open to the SW. The interiors of the C-shapes are generally flat areas of brown loam.

SITE NO.: State: 11144 (Figure B-28)**PHRI:** 451-30**SITE TYPE:** Complex (2 Features)**TOPOGRAPHY:** Two bench series on a steep slope of pahoehoe bedrock terrain.**VEGETATION:** Air plants, *kiawe*, small vines, and *opiuma*.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DESCRIPTION:** Overall complex area measures c. 35.00 m (NE-SW) by 25.00 m (NW-SE).**FEATURE A: Terrace****FUNCTION:** Habitation**DIMENSIONS:** 7.00 m by 5.00 m by 1.60 m (approx.)**DESCRIPTION:** One possibly two terraces abutting the SE side of a *kuaiwi* wall (oriented inland/seaward). The lower terrace consists of a well stacked, 1.60 m high boulder faced retaining wall with cobble fill. The retained surface area is generally level soil and rubble. Inland of this terrace is a boulder rubble and soil slope, possibly natural. It also retains a generally level soil and rubble area.**FEATURE B: Modified outcrop****FUNCTION:** Habitation**DIMENSIONS:** 8.00 m by 4.50 m by 0.80 m (approx.)**DESCRIPTION:** A pahoehoe bedrock outcrop modified to resemble a linear terrace that is oriented north-south. It is constructed with boulders and cobbles piled atop bedrock. The northern half is generally square in plan. It is crudely stacked along the north and east sides. The surface interior is level cobble fill. On the surface is a circular boulder pile, c. 1.50 m in diameter and raised 0.45 m high. The southern half is somewhat less regular. It is raised on the west and east sides of piled larger boulder/cobble rubble fill. A low wall remnant c. 0.80 m in height is situated on the south end of the modified outcrop.**SITE NO.:** State: 11145**PHRI:** 451-31**SITE TYPE:** Complex (2 Features)**TOPOGRAPHY:** Moderate slope on a ridge of pahoehoe bedrock outcropping.**VEGETATION:** *Koa-haole*, air plants, *opiuma*, monkeypod, indigo and grasses**CONDITION:** Poor**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DESCRIPTION:** Overall complex area measures c. 23.00 m (east-west) by 10.00 m (north-south).**FEATURE A: Terrace****FUNCTION:** Habitation



Figure B-28. Site 11144 (Neg. 924-10a)

DIMENSIONS: 6.00 m by 5.50 m by 1.80 m (approx.)

DESCRIPTION: The terrace is constructed of pahoehoe boulders and cobbles on bedrock outcrop. It features two upright boulders in addition to a boulder alignment surrounding the terrace surface. Generally square in plan, it is raised on the northwest, southwest, and southeast sides. The sides are sloping in profile and rubble-like in appearance. The terrace surface interior is fairly level with bedrock outcropping and boulders and cobbles. This outcrop is located at the southwest edge of a ridge with an excellent and clear view of the coast.

FEATURE B: Mound

FUNCTION: Habitation

DIMENSIONS: 4.60 m by 4.60 m by 1.05 m (approx.)

DESCRIPTION: Generally circular in plan, it is constructed with loosely piled pahoehoe boulders and cobbles. The sides are sloping in profile, with the exception of the southwest side, which is crudely faced to a height of c. 1.05 m.

Adjacent to and abutting the southwest side of the mound is a possible terrace. It measures c. 5.00 m by 4.50 m and is roughly square in plan. Constructed with basalt boulders and cobbles, it is raised on the northwest and crudely faced on the southwest side to a height of c. 1.60 m. The terrace surface is fairly level with boulder cobble fill and bedrock outcropping.

SITE NO.: State: 11146

PHRI: 451- 32

SITE TYPE: Terrace

TOPOGRAPHY: Site is situated on the seaward crest of a ridge. The site commands an excellent view of the coastline and Keauhou Bay.

VEGETATION: *Koa-haole*, air plants, and *opiuma*.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 11.00 m by 4.00 m by 1.80 m (approx.)

DESCRIPTION: The terrace is generally rectangular in plan. It is constructed of stacked, blocky basalt boulders and cobbles. The terrace is raised on the west, north and south sides, with sections of the south and west being formally faced.

The remaining sections of the north, south and west sides are collapsed in appearance and rounded or sloping in profile. The terrace surface is very roughly level and consists of basalt boulders and cobbles. The second possible terrace is situated c. 5.00 m (east) inland of the site. This second terrace is generally linear shaped (north-south) and is constructed of crudely stacked blocky basalt boulders. The terrace is not formally faced and is rubble-like in appearance.

SITE NO.: State: 11147

PHRI: 451- 33

SITE TYPE: Terrace

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock with a mantle of soil on top of it. Site is situated along the front edge of a bedrock hill.

VEGETATION: Moderate *koa-haole*, grasses, indigo, purslane, and one each of *opiuma* and monkeypod.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 8.20 m by 2.60 m by 1.00 m (approx.)

DESCRIPTION: Additional Kona Field System (6601) features in the area consist of agricultural mounds and modified outcrops. The terrace retaining wall is crudely stacked, not formally faced on the west side. Constructed of large boulders and with cobble fill on top of bedrock, it is collapsing at present. The terrace cobble fill is c. 1.30 m (east-west) wide. East of the retaining wall is a flat level area of soil on bedrock. It is c. 1.50-2.00 m (east-west) wide. This level soil area has one agriculture mound present. The soil area is situated at the base of a bedrock hill. Located on this bedrock hill are three to four additional agricultural mounds within a 5.00-7.00 m radius from the terrace.

SITE NO.: State: 11148

PHRI: 451-34

SITE TYPE: Complex

TOPOGRAPHY: Situated on the level area atop a ridge. Ground slopes steeply c. 20.00- 25.00 m west of site. The site commands an excellent view of the coastline.

VEGETATION: *Koa-haole*, air plants, *kiawe*, monkeypod, vines, purslane, amaranth, grasses, '*uhaloa*, apple of sodom (*Solanum sodomaeum*)

CONDITION: Poor-fair

INTEGRITY: Unaltered to partially altered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 28.30 m (N-S) by 26.30 m (E-W). Seaward of the site are about eight agricultural mounds. These mounds are mostly piled boulders and cobbles on bedrock.

FEATURE A: Enclosure

FUNCTION: Habitation

DIMENSIONS: 6.00 m by 4.40 m by 1.15 m (approx.)

DESCRIPTION: Rectangular in plan, the enclosure is constructed with stacked blocky pahoehoe boulders, four to six courses high. It is bifaced and core-filled. The wall widths range from 0.70-1.10 m. Collapsing along the exterior south corner, and the interior southeast and northwest corners, the remaining portions are standing faces.

FEATURE B: Terrace

FUNCTION: Habitation

DIMENSIONS: 11.00 m by 4.20 m by 1.35 m (approx.)

DESCRIPTION: Feature B abuts Feature A's west and northern sides. The west side of the terrace is stacked and faced with boulders to a height of 1.35 m. The surface interior (c. 6.00 m from the west edge) is level and smooth cobble fill.

The terrace continues around the north and western sides of Feature A c. 0.80 m below Feature A's northwest and southwest wall. It is mostly boulder and cobble rubble, with an uneven surface and sloping, collapsed sides. A low, crudely faced boulder wall is present at the SW corner of the terrace. It c. 2.50 m long, 0.80 m wide and stacked two courses high at 0.70 m. It rubbles out to the south and may have formally been a terrace.

FEATURE C: Terrace (Figure B-29)

FUNCTION: Habitation

DIMENSIONS: 6.50 m by 5.00 m by 0.70 m (approx.)

DESCRIPTION: It is roughly square shape in plan and is built on the southwest (seaward) edge of a bedrock outcrop. Large boulders are placed along this edge to create a face c. 0.85 m high. It defines the northeast boundary of the terrace. A low, bifaced, large boulder wall, c. 1.20 m wide, with smaller boulder and cobble fill, extends seaward from this bedrock outcrop. The terrace is constructed of medium to large blocky pahoehoe boulders, two large upright slabs, with cobbles and boulders as fill. The surface is mostly rough boulders, collapsing along the seaward end. Portions of the south and west sides are crudely stacked, about four courses high. A boulder alignment is visible along the southwest half.

Another terrace is located on the inland (eastern) side of the bedrock outcrop. It is raised, but not faced on the east and south sides with basalt boulders. The surface interior consists of cobble and boulder fill. Abutting the outcrop, it measures c. 2.50 m (north-south) by 1.90 m (east-west) by 0.50 m in height.

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Figure B-29. Site 11148, Feature C (Neg. 918-8)

FEATURE D: C-shaped wall**FUNCTION:** Habitation**DIMENSIONS:** 11.00 m by 6.00 m by 1.40 m (approx.)

DESCRIPTION: Generally rectangular and boxy in plan, the wall may formally have been an enclosure at one time. Open to the northwest, it is constructed of large and medium blocky pahoehoe boulders, slabs, smaller boulders and cobbles. The larger boulders and the slabs form the perimeter, with the remaining material forming the structural fill. It is stacked two to four boulders high along some sections, rubble and collapsed along others. The southwest wall utilizes two uprights in the south corner. The internal fill of the southwest wall appears to be decomposing bedrock with boulder slabs and cobbles piled on top. The interior floor of the C-shape wall is bedrock with loose boulders and thin soil. A depression measuring c. 0.90 m by 0.70 m by 0.50 m is situated within the southeast wall.

Northwest and across the opening of the C-shape, a wall remnant is present. It is c. 3.50 m long and 1.25 m wide. It has possible foundation stones utilizing two to three uprights. Presently, it appears as two alignments and lacks any fill except for six boulder rocks. The maximum height is c. 0.30 m.

SITE NO.: State: 11149

PHRI: 451-35

SITE TYPE: Platform**TOPOGRAPHY:** Site is situated on a lower slope or ridge. There is a view of the coastline and Kahalu'u Bay.**VEGETATION:** Dense *koa-haole* and scattered *kiawe*.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DIMENSIONS:** 4.80 m by 4.60 m by 1.40 m (approx.)

DESCRIPTION: A small mound is present c. 2.00 m northwest of the platform. The platform is generally square in plan. It is constructed of crudely stacked, blocky basalt boulders and cobbles. The platform is raised on all four sides. The north side of the platform is crudely faced, but the east, west and south sides are generally collapsed in appearance, and rounded or sloping in profile. The east side face may possibly be present under the boulder-cobble rubble. The platform surface is roughly level, and consists of boulder-cobble fill. A pit/depression or possibly a collapsed cupboard is present on the platform surface near the northwest corner. No cultural deposit is visible, but is possibly present within the platform fill.

SITE NO.: State: 11150

PHRI: 451-36

SITE TYPE: Complex (5 Features)**TOPOGRAPHY:** Undulating to sloping terrain consisting of pahoehoe bedrock outcrops.**VEGETATION:** Moderate *koa-haole*, grasses, purslane, vines and indigo.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered to partially altered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation-agriculture

DESCRIPTION: The overall complex area measures c. 50.00 m (east-west) by 26.00 m (north-south). Additional Kona Field System (6601) features are in the area consisting of mounds and modified outcrops.

FEATURE A: Modified outcrop**FUNCTION:** Habitation**DIMENSIONS:** 6.00 m by 6.00 m by 1.20 m (approx.)

DESCRIPTION: Feature A appears to be a large outcrop with boulders piled up around it giving it a terrace form. It is constructed mostly of piled large boulders. Raised on the north and west faces, they are not formally faced, but are collapsing into rubble.

A short c. 1.25 m section along the southwest face is stacked three courses high. To the south it is mostly bedrock outcropping. The surface interior has bedrock outcrops, with boulders and cobbles on top, creating a roughly even surface. The east end is comprised of mostly soil on bedrock.

FEATURE B: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 10.00 m by 8.00 m by 0.75 m (approx.)

DESCRIPTION: The terrace is generally rectangular in plan. It is raised on the north, west, and south sides and possibly on the east. It roughly resembles a platform. The terrace is constructed of medium to large pahoehoe boulders and cobbles. The north face presently appears to be a collapsing stacked face, c. three to four courses high. The west and south sides are sloping in profile, not formally faced.

About 2.00 m east of the northwest corner of the feature, is a stacked and faced constructed corner situated within the structure. This may indicate a previously constructed form, an internal feature, or a stepped terrace. At present, it is difficult to interpret without further investigation. The surface interior is of pahoehoe boulders and cobbles, sloping westward with the surrounding terrain. Two fragments of *Cypraea* sp. shell and coral fragments are present at the base of the feature. No definite cultural deposit is visible, but is possibly present subsurface. An area west of the feature contains a darker brown loam.

FEATURE C: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 12.00 m by 5.00 m by 0.80 m (approx.)

DESCRIPTION: The terrace is L-shaped in plan and open to the northwest. It is raised on the north, west and portions of the south side. The terrace is constructed of piled boulders and cobbles. The sides are sloping in profile and are not formally faced. The surface is roughly even with soil and loose rocks. A *Cypraea* sp. shell and coral fragment are present c. 1.00-2.00 m north of Feature C, on top of the soil surface. The soil in the surrounding area is a dark brown loam and may contain a subsurface deposit.

FEATURE D: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 7.00 m by 4.00 m by 1.00 m (approx.)

DESCRIPTION: It is situated c. 2.00 m downslope of Feature C, Terrace. Raised on the west side the retaining wall is c. 2.00 m wide. It is constructed with piled pahoehoe cobbles and medium to large boulders. The retaining wall is sloping in profile and not formally faced. The north half of the terrace is c. 3.00 m wide with a roughly even surface of cobbles and boulders. The area to the east is level soil and may possibly be cultural. Shell midden was present c. 1.00-2.00 m northeast of Feature D.

FEATURE E: Terrace**FUNCTION:** Agriculture**DIMENSIONS:** 5.00 m by 2.00 m by 1.20 m (approx.)

DESCRIPTION: Crudely stacked, four courses high, of pahoehoe boulders and cobbles. Raised on the westward side, the retaining wall is c. 1.30 m wide and composed of boulder and cobble fill. The north and south ends are collapsed. The terrace abuts a soil area to the east. Additional Kona Field System (6601) features are in the immediate area consisting of mounds and terraces.

PHRI: 451-37

SITE NO.: State: 11151**SITE TYPE:** Complex (3 Features)**TOPOGRAPHY:** Undulating terrain consisting of pahoehoe bedrock underlying a soil mantle.**VEGETATION:** Moderate *koa-haole* and purslane.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered

PROBABLE AGE: Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation-indeterminate

DESCRIPTION: The overall complex area measures c. 46.00 m (north-south) by 23.00 m (east-west). Additional Kona Field System (6601) features in the area consist of mounds and *kuaiwi* walls. The site complex contains no visible cultural deposit. However, the soil areas consist of a darkish brown loam and may contain subsurface deposit(s).

FEATURE A: Enclosure**FUNCTION:** Habitation

DIMENSIONS: 7.00 m by 6.00 m by 1.00 m (approx.)

DESCRIPTION: The collapsed enclosure is rectangular to oval in plan. It is constructed with piled boulders and cobbles, portions of which are piled atop bedrock. The walls are raised but not formally faced and are c. 1.20 m in width. The walls are raised along its interior and exterior faces. The interior surface of the enclosure is bedrock outcropping underlying soil. Additional Kona Field System (6601) features consisting of mounds are located within the immediate area of Feature A.

FEATURE B: Modified outcrop**FUNCTION:** Indeterminate

DIMENSIONS: 9.00 m by 7.00 m by 1.20 m (approx.)

DESCRIPTION: The modified outcrop roughly resembles a crude C-shape that is open to the northeast. Raised bedrock outcropping is west, north, and along the interior of the south wall. Pahoehoe boulders and cobbles are piled on top. The exterior sides are collapsed, rubble-like in appearance, and not formally faced. The southern wall is c. 3.00 m wide with an even surface. It is constructed with crudely stacked boulders, three to four courses high, on bedrock outcrop.

The eastern end of this wall contains a roughly circular compartment. It measures c. 2.00 m (east-west) by 1.70 m (north-south). The west side of the compartment is crudely stacked three to four courses high. Boulder alignments, cobble fill, and also bedrock complete the north and east sides. The surface interior of Feature B consists of pahoehoe bedrock outcropping underlying soil. A coral fragment was also present on the surface of Feature B.

FEATURE C: Modified outcrop**FUNCTION:** Indeterminate

DIMENSIONS: 8.00 m by 7.00 m by 1.00 m (approx.)

DESCRIPTION: Amorphous shape in plan, the feature is generally constructed with boulders and cobbles piled against and atop of bedrock outcropping. The modified outcrop is raised on the west, south, and east sides. A possible upright is along the north side with cobbles and boulders piled against and around it. The interior of Feature C is uneven bedrock outcropping with boulder and cobble fill. A 4.00 m long terrace is located c. 1.25 m northwest of feature. A waterworn coral is present on the surface of Feature C.

SITE NO.: State: 11152

PHRI: 451-38

SITE TYPE: C-shape

TOPOGRAPHY: Situated on lower slope of ridge. Site contains only moderate view of coastline and Kahalu'u Bay.

VEGETATION: Dense *koa-haole* and scattered *kiawe* and *opiuma*.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 6.00 m by 5.60 m by 0.90 m (approx.)

DESCRIPTION: The C-shape wall is open to the west. It is constructed of crudely stacked blocky basalt boulders and cobbles atop a small outcrop. The walls are raised on both the interior and exterior sides. They range from 1.00-3.00 m in width. The walls are only very crudely faced in places, but generally appear collapsed and sloping or rounded in profile. The interior surface of the C-shape contains a level soil floor. No definite cultural deposit is visible, but is possibly present subsurface. Additional boulder-cobble rubble is present upslope (east) and may possibly be a terrace remnant. A relatively level soil surface, with scattered boulders, extends c. 25.00 m to the west, and may possibly have been utilized.

PHRI: 451-39

SITE NO.: State: 11153

SITE TYPE: Terrace

TOPOGRAPHY: Immediate vicinity is fairly level to slightly undulating terrain consisting of pahoehoe bedrock with many soil pockets.

VEGETATION: Moderate *koa-haole*, purslane, and grasses.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 7.00 m by 5.00 m by 0.80 m (approx.)

DESCRIPTION: Associated Kona Field System (6601) features consisting of 5+ mounds, *kuaiwi* wall and a terrace. The terrace is raised on the north, west, and south sides. It is constructed of piled blocky pahoehoe boulders and cobbles. The sides are sloping in profile and not formally faced. The surface interior is crudely even, with boulders and cobbles as fill.

At the SW corner is a short wall extension. It is c. 1.75 m long and c. 0.70 m wide, and is a collapsed double stacked wall. This wall encloses a level soil area. No definite cultural deposit is visible, but may possibly be present subsurface based on the darker color soil surrounding the north half of the feature.

PHRI: 451-40

SITE NO.: State: 11154 (Figure B-30)

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Situated on a lower slope of a ridge with a moderate view of the coastline.

VEGETATION: Dense *koa-haole*, scattered *kiawe*, *opiuma*, groundcover of purslane, grasses.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 30.00 m (east-west) by 15.00 m (north-south). Additional Kona Field System (6601) features are in the area consisting of modified outcrops and mounds.

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 10.00 m by 6.60 m by 1.10 m (approx.)

DESCRIPTION: The terrace is somewhat vague in appearance and amorphous in plan. It is constructed of crudely stacked to stacked blocky basalt boulders and cobbles. The terrace is raised on the west (downslope) and north sides. The west side is formally faced and contains two large upright boulders. The north side is only raised slightly, collapsed in appearance, and rounded or sloping in profile.

The terrace surface consists of a roughly level boulder-cobble fill on its western part, but the eastern part consists of an oval soil pocket. The easternmost (upslope) part of the terrace is delineated by boulder-cobble rubble which possibly functions as a windbreak or retaining wall. The west (downslope) side of this boulder-cobble rubble, is rounded or sloping in profile and has collapsed onto the terrace surface. No definite cultural is deposit visible, but may be possibly present subsurface or in the terrace fill.



Figure B-30. Site 11154 (Neg. 928-11a)

FEATURE B: Mound**FUNCTION:** Habitation**DIMENSIONS:** 8.00 m by 5.50 m by 0.30 m (approx.)

DESCRIPTION: The mound is generally amorphous in plan. It is constructed of piled blocky basalt boulders and cobbles. The mound appears raised on all sides, but it is not formally faced. The sides generally appear collapsed and rounded or sloping in profile. The mound surface is also raised slightly and consists of boulder-cobble fill. A small rock-lined cupboard measuring c. 1.00 m (north-south) by 0.40 m (east-west) by 0.40 m deep is present on the mound surface. The mound may possibly be a collapsed terrace or a platform remnant.

SITE NO.: State: 11155

PHRI: 451-41

SITE TYPE: C-shape**TOPOGRAPHY:** Site is situated on the lower slope of a ridge with a moderate to poor view of the coastline.**VEGETATION:** Dense *koa-haole*, scattered *kiawe*, *opiuma*, ground cover of purslane and grasses.**CONDITION:** Poor**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DIMENSIONS:** 4.60 m by 4.40 m by 0.85 m (approx.)

DESCRIPTION: The site remnant consists of a C-shape wall (possibly a small enclosure remnant) with bulldozer-pushed boulder-cobble rubble covering its north half. The C-shape wall remnant is constructed of crudely stacked blocky basalt boulders and cobbles. The C-shape wall is raised and the interior side is crudely faced. One upright boulder is present along the interior face. The exterior side is collapsed and rounded or sloping in profile. The interior surface of the C-shape is roughly level and appears crudely paved with smaller basalt cobbles.

SITE NO.: State: 11156

PHRI: 451-42

SITE TYPE: Terrace**TOPOGRAPHY:** Situated near the upper portion of a ridge slope. Terrain consists of pahoehoe bedrock outcrop underlying a soil mantle cover.**VEGETATION:** *Koa-haole*, purslane, and various vines.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DIMENSIONS:** 4.00 m by 2.50 m by 1.25 m (approx.)

DESCRIPTION: The terrace is raised on the south and west sides. The south side is stacked and faced three to four courses high with blocky, medium-sized pahoehoe boulders. The west side is collapsed. The north and east sides are one boulder high. The surface interior of the terrace is roughly even with boulders and cobble fill. Immediately north of the feature is a bedrock outcrop. A *kuaiwi* wall is situated c. 6.00 m south of the site and is oriented roughly east-west.

SITE NO.: State: 11157

PHRI: 451-43

SITE TYPE: Wall complex**TOPOGRAPHY:** Site is situated on the seaward slope of a ridge crest with an excellent view of the coastline and Kahalu'u Bay.**VEGETATION:** Moderate to dense *koa-haole*, scattered *kiawe*, *opiuma*, *kolu*, indigo, purslane, grasses.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered-partially altered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Agriculture**DIMENSIONS:** 183.00 m by 1.50 m by 1.20 m (approx.)

DESCRIPTION: The overall complex area measures c. 183.00 m (east-west) by 100.00 m (north-south). The wall widths range from c. 0.56-1.50 m, and the heights range from 0.30-1.20 m. The walls are oriented both east-west (c. 235-240° azimuth) and north-south (335-342° azimuth), forming a vague gridwork or "checkerboard" pattern. The walls are constructed with crudely stacked to stacked, blocky basalt boulders and cobbles. The wall sections vary in appearance from raised with formally faced sides, to collapsed with sloping and rounded profiles. Portions appear to have been bulldozed, or rocks robbed during the historic period. The walls are probably *kuaiwi* wall remnants and are part of the Kona Field System (Site 6601). Additional Kona Field System (6601) dryland agricultural features, consisting of mounds and modified outcrops, are in the area.

SITE NO.: State: 11158

PHRI: 451- 44

SITE TYPE: Mound

TOPOGRAPHY: Site is near ridge crest to the west and contains a good view of the coast and Kahalu'u Bay.

VEGETATION: Moderate to dense *koa-haole*, air plants, monkeypod, *opiuma* and *kiawe*.

CONDITION: Poor

INTEGRITY: Possibly altered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 11.00 m by 9.50 m by 0.40 m (approx.)

DESCRIPTION: The mound is generally amorphous in plan and constructed of piled blocky basalt boulders and a few cobbles. The mound is generally raised on all sides, but is not formally faced. The sides are collapsed in appearance and rounded or sloping in profile. The mound is not centrally raised, and its uneven surface consists of blocky boulders. Visible on the mound surface are areas which contain upright basalt boulders, several of which appear aligned. Several of these upright boulders are set in the rubble-mound and are even/flush with the surrounding boulders. These aligned upright boulders are possibly the foundations of wall remnants. The original structure may have been damaged by chain dragging. The site could possibly be a rectangular/square shaped platform or terrace remnant which has been extensively altered by the chain dragging. A small cupboard feature is located in the sloping boulder rubble (possibly a collapsed terrace) c. 285° and 12.00 m from the mound. No definite cultural deposit is visible, but may be possibly present subsurface.

SITE NO.: State: 11159 (Figure B-31)

PHRI: 451- 45

SITE TYPE: Complex (6 Features)

TOPOGRAPHY: Located on and below a bench of pahoehoe outcrops interspersed with areas of brown loam. Moderate to gentle sloping terrain. An excellent view of the coastline.

VEGETATION: Stands of *koa-haole*, with one or more monkeypod, *opiuma*, and air plants.

CONDITION: Poor-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-boundary

DESCRIPTION: Overall complex area measures c. 50.00 m (east-west) by 36.00 m (north-south).

FEATURE A: Platform

FUNCTION: Habitation

DIMENSIONS: 7.20 m by 4.90 m by 1.80 m (approx.)

DESCRIPTION: Generally rectangular in plan, it is constructed with stacked pahoehoe boulders and cobbles. It is collapsing somewhat along the NW and SW corners, but largely intact standing faces are elsewhere. It is situated on a pahoehoe outcrop bench with an excellent view of the coastline. In the center of the platform is a 1.00 m square depression that is either a collapsed chamber or the result of vandalism.

FEATURE B: Platform

FUNCTION: Habitation

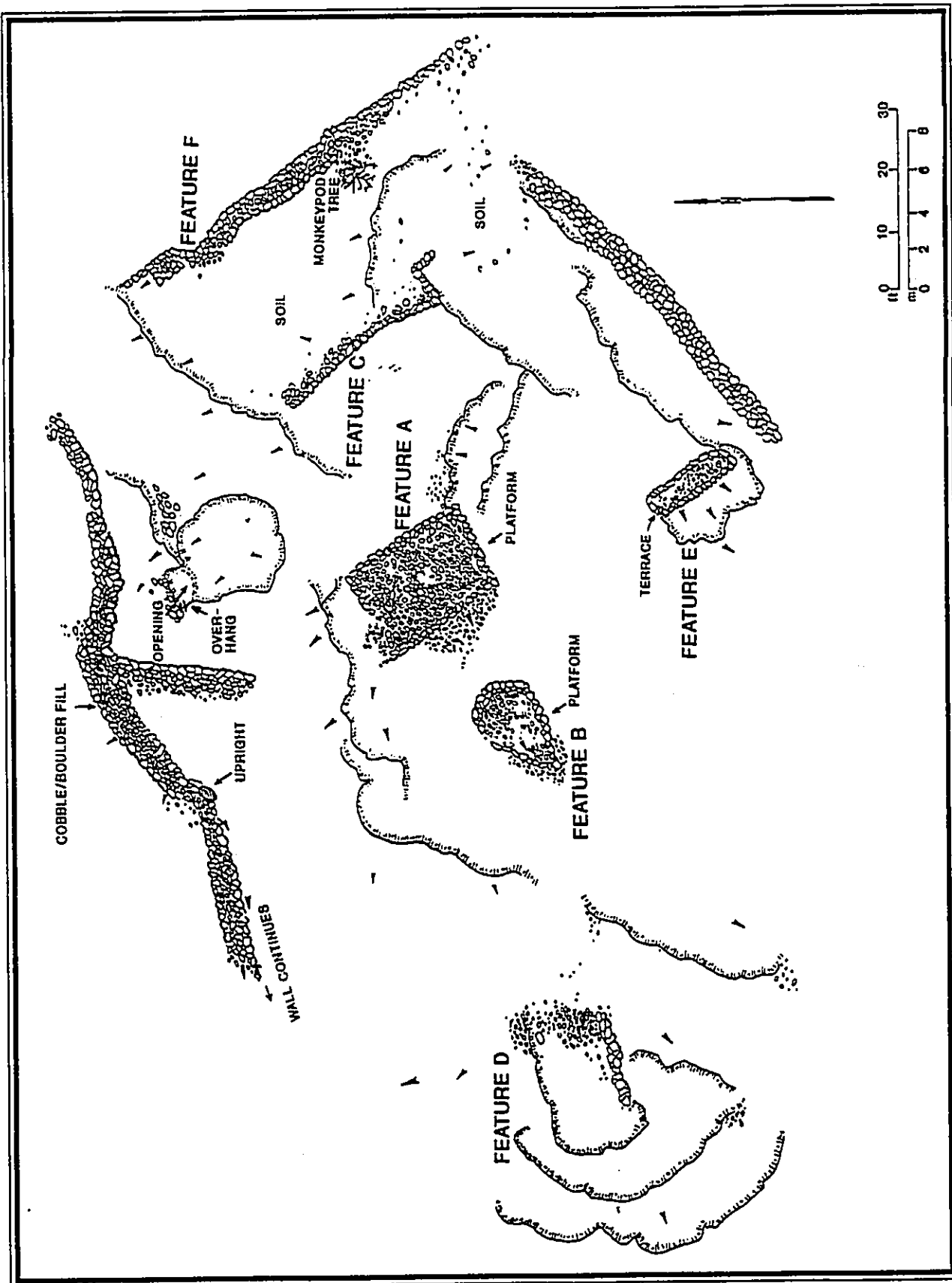


Figure B-31. Site 11159

DIMENSIONS: 3.50 m by 3.00 m by 1.10 m (approx.)

DESCRIPTION: Roughly square in plan, it is constructed of stacked pahoehoe boulders and cobbles. Intact, faced walls are visible on the north and east side. The remaining sections are collapsing and rubble. Generally larger boulders c. 0.30-0.50 m in size are used for facing along the outer walls. The surface interior is constructed with smaller boulders and cobbles as fill.

FEATURE C: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 4.00 m by 0.70 m (approx.)

DESCRIPTION: The modified outcrop of pahoehoe is joined by agricultural walls surrounding small fields of brown loam. There is a wall adjoining on the western and southern sides of the outcrop with a lower terrace to the south. The walls are built of boulders and cobbles of pahoehoe. The modified outcrop may possibly be an adjunct of the several agricultural walls connected to it or a possible habitation function. The walls associated with it define cleared fields.

FEATURE D: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 6.00 m by 3.00 m by 1.50 m (approx.)

DESCRIPTION: Generally a natural feature with a nominal amount of stacking and filling with pahoehoe boulders and cobbles to resemble a platform. There is a low wall on the south side of the outcrop. It is oriented east-west along a crest of outcrop. Some fill behind of the wall at the eastern end.

FEATURE E: Terrace

FUNCTION: Habitation

DIMENSIONS: 4.80 m by 1.20 m by 0.80 m (approx.)

DESCRIPTION: Constructed of stacked blocky basalt boulders and cobbles, the terrace is raised on the west, but not formally faced. The west side is sloping in profile. The east side is even with the surrounding ground surface. Parts of the north and south sides are also even with the surrounding ground surface. The terrace contains a level interior surface.

FEATURE F: Wall

FUNCTION: Boundary

DIMENSIONS: 60.00 m by 1.20 m by 1.30 m (approx.)

DESCRIPTION: The walls are constructed of stacked, blocky basalt boulders and cobbles. Sections of the wall are raised and well faced. Other sections are collapsed and rubble-like in appearance. The wall partially encloses the knoll area. Sections of the wall extend off the knoll area and continue downslope.

PHRI: 451-46

SITE NO.: State: 11160 (Figure B-32)

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Very gently sloping terrain consisting of pahoehoe bedrock outcrop underlying a brownish soil mantle.

VEGETATION: Moderate to dense *koa-haole*, *opiuma*, *kiawe*, monkeypod, *uhaloa* and lantana (*Lantana camara*)

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DESCRIPTION: Overall complex area measures c. 30.00 m (east-west) by 10.00 m (north-south). No portable remains are present on site, however, several sparse fragments of marine shell midden (*Cypraea* sp.) are visible on a bedrock area c. 25.00 m east of Feature C. There is also a soil deposit, somewhat dark brown.

FEATURE A: Platform

FUNCTION: Possible burial

DIMENSIONS: 5.10 m by 3.85 m by 1.15 m (approx.)

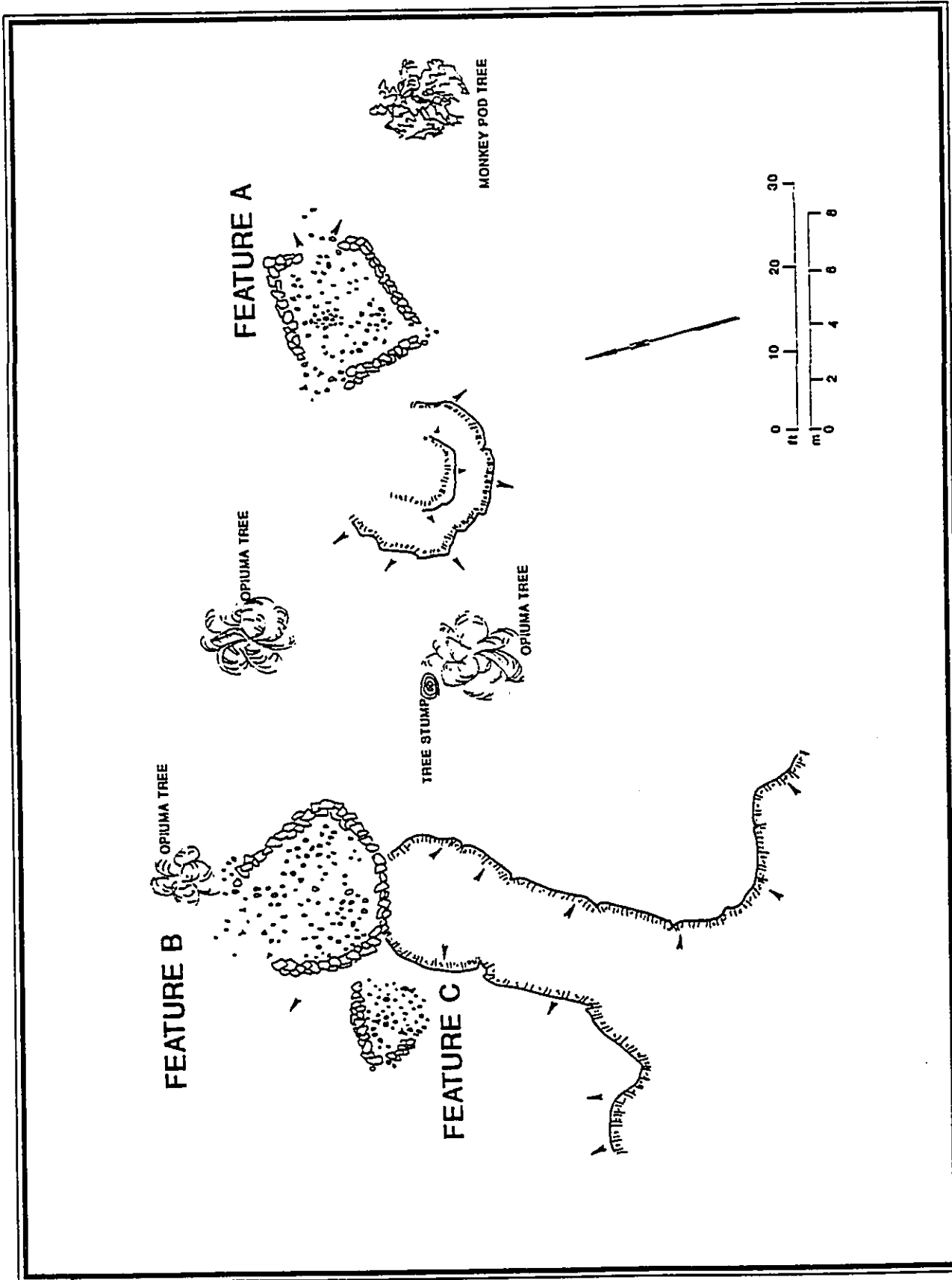


Figure B-32. Site 11160

DESCRIPTION: The platform is rectangular in plan. It is constructed of well stacked blocky basalt boulders and cobbles. The platform is raised and well faced on four sides, but collapsed in places. The well faced sides are constructed exclusively with blocky basalt boulders. The platform is collapsed on the north corner, east corner, and the middle of the southwest side. The platform surface is level and well paved with smaller cobbles.

FEATURE B: Platform**FUNCTION:** Possible burial**DIMENSIONS:** 5.00 m by 4.20 m by 0.90 m (approx.)

DESCRIPTION: The platform is very roughly square in plan. It is constructed with well stacked blocky basalt boulders and cobbles. The platform is raised on the east, west, and southeast part of the north side. The remaining portion of the north side is built against pahoehoe bedrock outcrop. The south and east sides are well faced with boulders. The west and part of the north side are collapsed and the "corners" are rounded in plan. The platform surface is level and well paved with smaller basalt cobbles.

FEATURE C: Platform**FUNCTION:** Possible burial**DIMENSIONS:** 3.50 m by 3.00 m by 1.10 m (approx.)

DESCRIPTION: The platform is roughly oval in plan. It is constructed with well stacked, blocky basalt boulders and cobbles. The platform is raised and formally faced on the west and part of the south side. The north and east sides are collapsed and rounded or sloping in profile. The platform surface is not flat, but is centrally raised to a maximum height of 1.70 m, and appears rounded (pyramid-like) in profile.

SITE NO.: State: 11161

PHRI: 451-48

SITE TYPE: Complex (5 Features)**TOPOGRAPHY:** A gently sloping westward aa flow.**VEGETATION:** Moderate to dense *koa-haole*, scattered monkeypod, *opiuma*, and Christmas-berry.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation-indeterminate

DESCRIPTION: Overall complex area measures c. 30.00 m (north-south) by 20.00 m (east-west). The site is situated along the project area's southern boundary. Features A and B are probably within the Ohia Cave Preservation Area and out of the project area. The remaining features are probably within the project area. No definite cultural deposit is visible, but may be present subsurface.

FEATURE A: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 4.50 m by 3.00 m by 0.80 m (approx.)

DESCRIPTION: This terrace is constructed of stacked aa boulders and cobbles. The terrace is raised and formally faced with larger aa boulders on the southwest side. The terrace is even with the surrounding aa terrain on the northwest, northeast and southeast sides. The terrace surface is level aa cobbles and pebbles.

FEATURE B: Depression**FUNCTION:** Indeterminate**DIMENSIONS:** 3.40 m by 3.00 m by 0.70 m (approx.)

DESCRIPTION: The depression or pit is generally oval in plan. The center is sunken with the sides sloping inward. The sides are not formally faced. The depression appears to have been created by removing the aa boulders and cobbles until the desired form was achieved. A *Comus* sp. shell was present nearby.

FEATURE C: Depression**FUNCTION:** Indeterminate

DIMENSIONS: 2.90 m by 2.00 m by 0.70 m (approx.)

DESCRIPTION: This depression or pit is roughly oval in plan. The center is sunken and the sides are collapsed inward. The sides are not formally faced. Several (two to three) upright boulders are set on the west edge of the depression. The depression appears to have been created by removing the aa boulders and cobbles until the desired form was achieved.

FEATURE D: Terrace

FUNCTION: Habitation

DIMENSIONS: 3.00 m by 2.00 m by 0.70 m (approx.)

DESCRIPTION: This terrace is constructed of crudely stacked aa boulders and cobbles. The terrace is raised and crudely faced with larger aa boulders on the west side. The north, south, and east sides are even with the surrounding aa slope. The terrace contains a rough boulder cobble surface. A waterworn basalt cobble is visible nearby.

FEATURE E: Terrace

FUNCTION: Habitation

DIMENSIONS: 9.00 m by 8.00 m by 0.90 m (approx.)

DESCRIPTION: This terrace is roughly square in plan and built atop a small rise. It is raised and crudely faced on the west side. The north and south sides of the terrace are rounded or sloping in profile and appear natural. The east side is even with the surrounding terrain. The terrace contains a roughly level surface consisting of a thin soil mantle with exposed bedrock. Coral and waterworn basalt cobbles are present.

SITE NO.: State: 11162

PHRI: 451- 50

SITE TYPE: Terrace

TOPOGRAPHY: Sloping terrain consisting of pahoehoe bedrock outcropping underlying a thin soil mantle.

VEGETATION: Moderate to dense *koa-haole*, monkeypod, air plants, grasses, *opiuma*, *kolu*, and lantana.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 8.40 m by 4.80 m by 1.20 m (approx.)

DESCRIPTION: The terrace is amorphous in plan, but contains a distinct west corner. The terrace is constructed of crudely stacked, blocky basalt boulders and cobbles. It is raised and crudely faced on the southwest and northwest sides, but is collapsed in places. The northeast and southeast sides are either very roughly even with the surrounding ground surface, or the sloping rubble is raised one boulder high.

The terrace surface is roughly level at the west corner, but the remaining portion consists of generally uneven boulders. The terrace also contains a shallow depression on its surface c. 0.35 m deep. A boulder/bedrock outcrop is immediately upslope c. 3.00 m from the terrace. It appears to be crudely modified with basalt cobbles to create a roughly level surface. No definite cultural deposit is visible, but may be possibly present subsurface.

SITE NO.: State: 11163

PHRI: 451- 51

SITE TYPE: Enclosure

TOPOGRAPHY: Generally sloping terrain consisting of pahoehoe bedrock outcropping underlying a soil mantle.

VEGETATION: Moderate *koa-haole*, monkeypod, *opiuma*, and grasses.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Indeterminate

DIMENSIONS: 13.00 m by 9.40 m by 0.80 m (approx.)

DESCRIPTION: The enclosure is roughly rectangular in plan. It consists of walls on the northwest, northeast, and southeast sides, which form a U-shape structure, and a vague terrace or retaining wall-like structure on part of the southwest side. The walls are c. 1.60 m wide and constructed of very crudely stacked blocky basalt boulders and cobbles. The walls are raised, but do not contain formally faced sides. The sides are collapsed in appearance and rounded or sloping in profile. The terrace wall is raised on the southwest (downslope) side and retains a level soil area on the northeast (upslope) side. The enclosure interior contains pockets of soil with pahoehoe bedrock outcrops and loose boulder rubble. The westernmost corner of the enclosure is generally collapsed and/or open. No definite cultural deposit is visible, but may be possibly present subsurface.

SITE NO.: State: 11164

PHRI: 451- 52

SITE TYPE: Terrace

TOPOGRAPHY: Site is situated immediately upslope of a ridge crest.

VEGETATION: Moderate *koa-haole*, *opiuma*, *kiawe*, indigo, *kolu* and grasses.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 3.50 m by 2.90 m by 0.90 m (approx.)

DESCRIPTION: The terrace is roughly square in plan. It is constructed of stacked, blocky basalt boulders and cobbles. The terrace is raised and formally faced on the northwest, southwest and southeast sides. Part of the southeast side is collapsed. The northeast side is built against a pahoehoe bedrock outcrop.

The terrace is built with a perimeter of larger boulders, with a level fill of smaller cobbles and a few boulders. An upright boulder is visible in the southeast side. An area of boulder/cobble rubble extends to the northeast. No definite cultural deposit is visible, but may be possibly present subsurface.

SITE NO.: State: 11165

PHRI: 451- 53

SITE TYPE: Platform

TOPOGRAPHY: Site is situated on a ridge crest with an excellent view of the coast and Kahalu'u Bay.

VEGETATION: Moderate to dense *koa-haole*, monkeypod, grasses, *kiawe*, and *opiuma*.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 5.80 m by 5.60 m by 1.80 m (approx.)

DESCRIPTION: The platform is roughly square in plan. It is constructed of stacked blocky basalt boulders and cobbles. The platform is raised and formally faced on all four sides, but portions are collapsed and rubble-like in appearance. The platform surface is roughly level boulder and cobble fill. A crude cairn is built on the platform surface near the south corner to c. 0.80 m in height. A pit or depression is also present on the platform surface near the northwest side at c. 0.70 m in depth.

A crude terrace abuts the northwest side of the platform. It measures c. 4.00 m (north-south) by 3.00 m (east-west) by 0.25-0.70 m in height. The terrace is oriented NW-SE and is built of crudely stacked blocky basalt boulders and cobbles. It is raised and crudely faced on the southwest (downslope) side. The terrace contains a roughly level boulder-cobble fill and retains a level soil area to the northeast. One waterworn basalt cobble is present. No definite cultural deposit is visible, but may be possibly present within the fill.

SITE NO.: State: 11166

PHRI: 451- 54

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Site is situated on a ridge crest. It contains a good view of the coast and Kahalu'u Bay.

VEGETATION: Moderate *koa-haole*, monkeypod, *opiuma*, *kiawe*, and indigo.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 30.00 m (NE-SW) by 15.00 m (NW-SE).

FEATURE A: Cave

FUNCTION: Habitation

DIMENSIONS: 4.20 m by 4.00 m by 0.80 m (approx.)

DESCRIPTION: Feature A is a small, natural lava blister situated on Feature B, a small, modified pahoehoe bedrock outcrop.

The lava blister cave is entered through a small horizontal opening facing west. The entrance measures c. 1.00 m (north-south) and 1.00 m in height. No obvious modifications are visible within the lava blister. The blister cave contains a level interior soil surface. This soil surface is a brownish soil estimated to be c. 0.20-0.30 m thick, and may conceal a subsurface cultural deposit. Several pieces of marine shell such as *Nerita picea* were present within the lava blister cave.

FEATURE B: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 8.80 m by 5.80 m by 0.70 m (approx.)

DESCRIPTION: A small pahoehoe bedrock outcrop is modified with blocky basalt boulders piled against its west side to create a terrace-like structure. The piled boulder structure is raised on the west and part of the north and south sides, but is generally not formally faced. Portions of the west side may possibly be very crudely faced. The sides are generally collapsed in appearance and rounded or sloping in profile. A waterworn basalt cobble is present along the west side of Feature B at the base of the collapse. The modified area is roughly level at Feature A, Blister Cave entrance. But overall, it is somewhat uneven.

A low, boulder-rubble wall extends south from the modified outcrop. The wall curves slightly southwest and is constructed of blocky basalt boulders and cobbles. The wall is raised slightly, but not formally faced. A small boulder rubble mound is present c. 2.50 m west of the wall.

FEATURE C: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 7.00 m by 6.00 m by 0.95 m (approx.)

DESCRIPTION: The modified outcrop is roughly square/rectangular in plan and resembles a platform. The pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles crudely stacked around the outcrop perimeter. The sides are raised on all four sides, but are not formally faced. The sides are collapsed in appearance and rounded or sloping in profile. A level pahoehoe bedrock area is present on the outcrop surface, but the boulder surface appears somewhat uneven.

SITE NO.: State: 11167

PHRI: 451- 55

SITE TYPE: Enclosure

TOPOGRAPHY: Gently sloping terrain consisting of pahoehoe bedrock outcrop underlying a soil mantle.

VEGETATION: Moderate *koa-haole*, monkeypod, *opiuma*, and *kiawe*.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 18.00 m by 11.00 m by 1.15 m (approx.)

DESCRIPTION: The enclosure is roughly hourglass shaped in plan. The walls are generally collapsed in appearance and rounded or sloping in profile. Some sections of the walls are constructed of crudely stacked blocky basalt boulders and cobbles. Other sections are raised, and portions of the interior side are crudely faced. The wall width ranges from 0.80-2.60 m. The enclosure contains an interior surface of brownish soil, but no opening is present. No definite cultural deposit is visible, but may be possibly present subsurface.

SITE NO.: State: 11168

PHRI: 451- 56

SITE TYPE: Complex (4 Features)

TOPOGRAPHY: Gently sloping (westward) terrain consisting of pahoehoe bedrock underlying a brownish soil mantle.

VEGETATION: Moderate *koa-haole*, *opiuma*, *kiawe*, monkeypod, *kolu* and *'uhaloa*.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-agricultural-indeterminate

DESCRIPTION: Overall complex area measures c. 30.00 m (east-west) by 15.00 m (north-south).

FEATURE A: Mound

FUNCTION: Habitation

DIMENSIONS: 8.80 m by 7.00 m by 0.65 m (approx.)

DESCRIPTION: Generally oval in plan, it is constructed of piled, blocky basalt boulders and cobbles. The mound is raised on all sides, but it is not formally faced. The mound does not appear centrally raised, but does contain an uneven surface.

FEATURE B: Mound

FUNCTION: Indeterminate

DIMENSIONS: 3.80 m by 2.30 m by 1.07 m (approx.)

DESCRIPTION: The mound is roughly oval in plan. It is constructed of piled, blocky basalt boulders and cobbles. The mound is raised on all sides, but it is not formally faced. Larger boulders are situated on the perimeter of the mound and the cobbles appear scattered on its surface. The mound is built on the east edge of a pahoehoe bedrock outcrop.

FEATURE C: Wall

FUNCTION: Agriculture

DIMENSIONS: 30.00 m by 0.70 m by 0.40 m (approx.)

DESCRIPTION: Generally a linear shaped wall oriented c. 70° azimuth. The wall is constructed of piled blocky basalt boulders and cobbles and is collapsed or rubble-like in appearance. The wall does not contain any formally faced sides. The wall abuts Feature D on the east side and is incorporated into the north side of Feature A. This site may have been altered by the removal of rocks to construct Site 11169, Wall. This wall is probably a remnant of a *kuaiwi* wall.

FEATURE D: Terrace

FUNCTION: Habitation

DIMENSIONS: 9.00 m by 2.30 m by 1.30 m (approx.)

DESCRIPTION: The terrace is amorphous in plan. It is constructed of stacked, blocky basalt boulders and cobbles. The terrace is raised on the north and west sides, and is crudely faced on the NW corner. The NW corner of the terrace surface contains a crude boulder wall which is raised slightly on the interior side. The remaining sides of the terrace are collapsed and rounded or sloping in profile. The terrace surface is generally uneven, but portions appear roughly level.

SITE NO.: State: 11169

PHRI: 451- 57

SITE TYPE: Wall

TOPOGRAPHY: Gently sloping terrain consisting of pahoehoe bedrock outcropping underlying a brownish soil mantle.

VEGETATION: Moderate *koa-haole*, *opiuma*, *kiawe*, monkeypod.

CONDITION: Good

INTEGRITY: Unaltered
PROBABLE AGE: Early historic/Historic
FUNCTIONAL INTERPRETATION: Boundary
DIMENSIONS: 20.30 m by 1.15 m by 0.75 m (approx.)
DESCRIPTION: The wall is oriented c. 68° azimuth. It is constructed of well stacked blocky basalt boulders and cobbles. The wall is raised and well faced along the interior and exterior sides. The wall surface appears crudely core-filled with cobbles.

SITE NO.: State: 11170 (Figure B-33) **PHRI:** 451- 58
SITE TYPE: Complex (4 Features)
TOPOGRAPHY: Site complex is situated on a ridge crest with an excellent view of the coast and Kahalu'u Bay.
VEGETATION: Moderate *koa-haole*, *kiawe*, monkeypod, *opiuma*, indigo, and *'uhaloa*.
CONDITION: Poor-fair
INTEGRITY: Unaltered-partially altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DESCRIPTION: Overall complex area measures c. 38.00 m (north-south) by 36.00 m (east-west).

FEATURE A: Enclosure
FUNCTION: Habitation
DIMENSIONS: 38.00 m by 36.00 m by 0.80 m (approx.)
DESCRIPTION: The enclosure is vaguely rectangular in plan. The enclosure contains walls on the east, west, and south sides, but is open to the north and southwest. The enclosure walls are constructed of stacked blocky basalt boulders and cobbles. The northwest section of the wall is raised, formally faced on both the interior and exterior sides, and in good condition. The remaining sections are generally raised in profile, are not formally faced, and appear collapsed or rubble-like. The west wall also contains an opening. Feature A wall partly encloses Features C and D. This enclosure wall was probably altered by the robbing of rocks to upkeep other features.

FEATURE B: Terrace
FUNCTION: Habitation
DIMENSIONS: 7.00 m by 5.00 m by 0.90 m (approx.)
DESCRIPTION: The terrace is generally amorphous in plan and built on the SE corner of Feature A. The terrace is constructed of crudely stacked blocky basalt boulders and cobbles. The terrace is raised and very crudely faced on the west side, which incorporates Feature A, Enclosure Wall. The remaining sides of the terrace are collapsed in appearance and rounded or sloping in profile.

The terrace contains a roughly level boulder/cobble surface. No portable remains present on Feature B, however, sparse marine shell and volcanic glass are noted 4.00-8.00 m downslope. No definite cultural deposit is visible, but may be possibly present in fill.

FEATURE C: Enclosure
FUNCTION: Habitation
DIMENSIONS: 9.00 m by 8.00 m by 0.70 m (approx.)
DESCRIPTION: The enclosure is generally rectangular in plan and incorporates the south wall of Feature A. The enclosure walls are constructed of crudely stacked, blocky basalt boulders and cobbles. The west and north walls of Feature C are raised on both the interior and exterior sides, but are not formally faced. They are rubble-like in appearance. The east wall is raised on the interior (downslope) side, but even with the surrounding terrain on the exterior (upslope) side, which gives it the appearance of a terrace. The interior of Feature C consists of level soil.

FEATURE D: Terrace
FUNCTION: Habitation

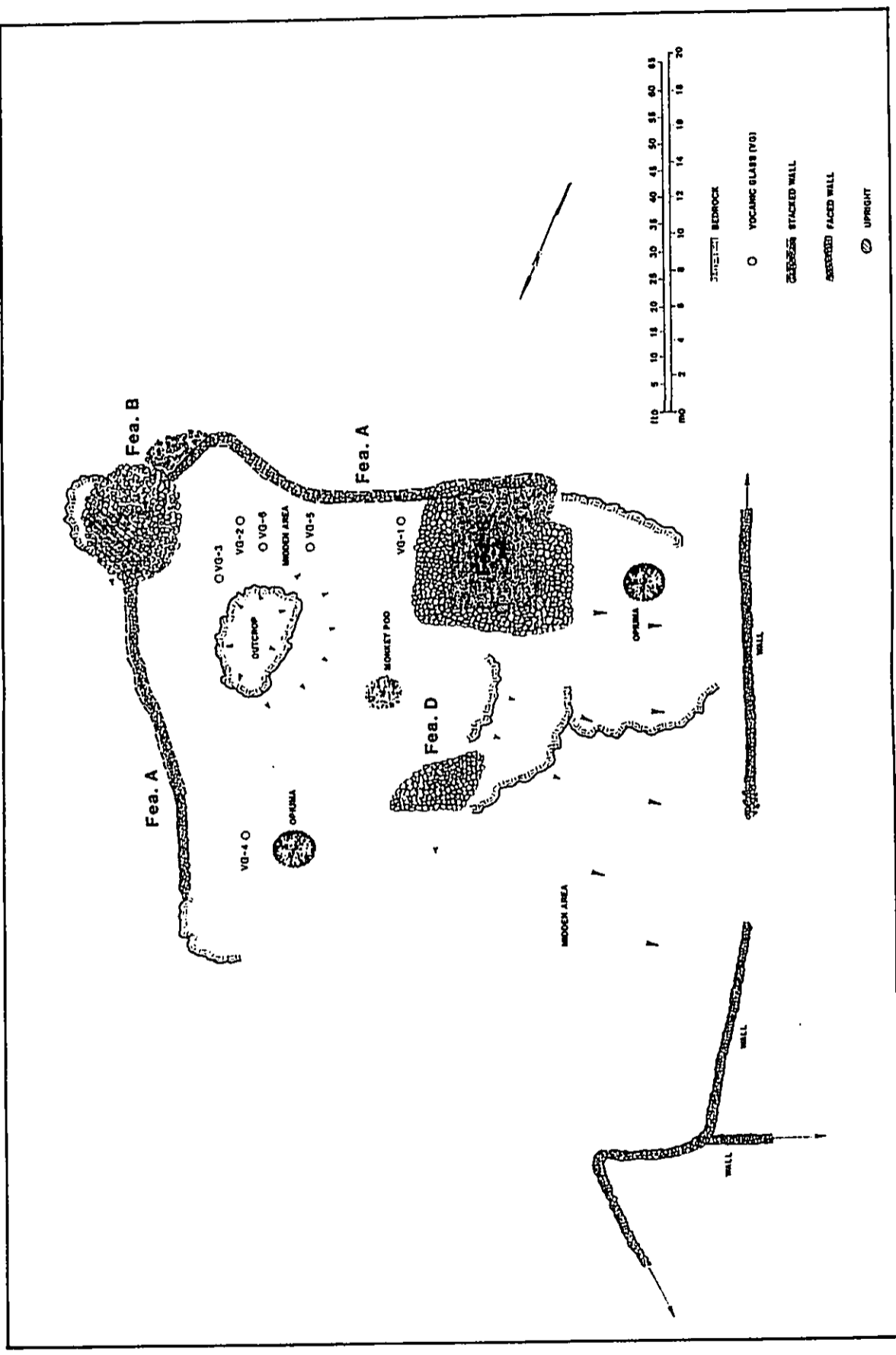


Figure B-33, Site 11170

DIMENSIONS: 5.00 m by 3.00 m by 0.90 m (approx.)

DESCRIPTION: The terrace is roughly L-shaped in plan. It is constructed with crudely stacked, blocky basalt boulders and cobbles. The terrace is raised, but not formally faced on the north and west sides. The sides are rubble-like in appearance and are rounded or sloping in profile. The terrace contains a slightly raised, boulder-rubble surface which gives it the appearance of a mound.

No portable remains are present on Feature D, however, waterworn basalt, coral, marine shell midden, and volcanic glass are noted c. 8.00 m from the feature. No definite cultural deposit is visible on the structure, but is probably present within the fill and in the surrounding area.

SITE NO.: State: 11171

PHRI: 451- 59

SITE TYPE: Terrace

TOPOGRAPHY: Sloping terrain consisting of pahoehoe bedrock with soil.

VEGETATION: *Koa-haole*, monkeypod and *opiuma*.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 9.40 m by 5.40 m by 0.80 m (approx.)

DESCRIPTION: The terrace is built mostly of boulders and cobbles. It is raised and partly to crudely faced on the southwest and southeast sides. The northern half is mostly rubbled and collapsed, sloping in profile, and not formally faced. The terrace surface is level and crudely paved with smaller basalt cobbles. An internal alignment is visible within the terrace. About 2.80 m and NW of terrace is a rubbled mound constructed with boulders and cobble filled. It measures c. 3.00 m (north-south) by 2.60 m (east-west) and 0.85 m in height.

SITE NO.: State: 11172

PHRI: 451- 60

SITE TYPE: U-shape

TOPOGRAPHY: Sloping terrain consisting of pahoehoe bedrock with soil.

VEGETATION: *Koa-haole*, monkeypod and *opiuma*.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 10.00 m by 5.50 m by 0.70 m (approx.)

DESCRIPTION: The U-shape shelter is vague in appearance and open to the west. It is constructed with boulders and cobbles. A portion of the interior face indicates a crude facing. The remaining interior and portions of the exterior faces are generally raised and collapsing in appearance. The east side wall is even with the upslope (east) surface and is terrace-like in appearance.

SITE NO.: State: 11173

PHRI: 451- 61

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Pahoehoe outcrops on bench interspersed with pockets and small fields of brown loam. Gentle to moderate slope with a good coastal view.

VEGETATION: Stands of *koa-haole*, *opiuma*, and indigo.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 15.00 m (north-south) by 10.00 m (east-west).

FEATURE A: Enclosure**FUNCTION:** Habitation**DIMENSIONS:** 15.40 m by 8.80 m by 0.90 m (approx.)

DESCRIPTION: The enclosure is constructed of stacked boulders and cobbles delineating an interior basin of brown loam overlying a pahoehoe outcrop. The walls outline a generally D-shape interior. There is a monkeypod tree inside the west end of the enclosure. No intact faced walls are visible at present. Several pieces of branch coral are situated in the center of the northern wall.

FEATURE B: Enclosure**FUNCTION:** Habitation**DIMENSIONS:** 5.60 m by 4.80 m by 0.60 m (approx.)

DESCRIPTION: The enclosure resembles a C-shape because of the collapsed walls. It is constructed of stacked boulders and cobbles delineating a generally circular interior basin measuring c. 2.00 m in diameter. The walls have collapsed into the interior. Portions of the northern and southern walls contain some uprights and faced sections. The walls are generally collapsed and rubble-like in appearance.

SITE NO.: State: 11174

PHRI: 451- 62

SITE TYPE: Modified outcrop

TOPOGRAPHY: Bench of pahoehoe outcrops separated by pockets of brown loam to the north and southeast with good coastal view. There is a gentle slope on the seaward side, and a moderate slope on the inland side.

VEGETATION: Stands of *koa-haole*, *opiuma*, and *kiawe*.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DIMENSIONS:** 14.00 m by 5.00 m by 0.96 m (approx.)

DESCRIPTION: A modified outcrop that is terrace-like in appearance. The long axis of the outcrop is oriented at c. 290°. A section at the NE corner is stacked and faced to a height of c. 0.96 m. The remaining sides are generally rubble-like and collapsed in appearance. The surface interior of the terrace-like modified outcrop contains a level boulder/cobble surface. On the northeast end of the modified outcrop is a natural pahoehoe blister that is augmented with stacked pahoehoe boulders and cobbles.

This modified blister feature may have functioned as a cupboard. There are several mounds of stacked boulders and modified outcrops to the west and southwest of the site.

SITE NO.: State: 11175

PHRI: 451- 63

SITE TYPE: Terrace**TOPOGRAPHY:** Sloping terrain consisting of pahoehoe bedrock with soil.**VEGETATION:** *Koa-haole*, *opiuma*, and monkeypod.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DIMENSIONS:** 6.00 m by 3.80 m by 0.80 m (approx.)

DESCRIPTION: The terrace is constructed with boulders and with cobbles as fill. The south wall is well faced with stacked boulders three to four courses high. The remaining sides are collapsed and rounded or sloping in profile.

The surface interior of the terrace generally slopes to the southwest. An interior boulder alignment is visible on the terrace surface.

SITE NO.: State: 11176 **PHRI:** 451- 64
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Medium to steep sloping terrain consisting of pahoehoe bedrock underlying a soil mantle with loose boulders and cobbles.
VEGETATION: Just within a moderate *koa-haole* cover.
CONDITION: Poor-fair
INTEGRITY: Unaltered-partially altered
PROBABLE AGE: Prehistoric-historic
FUNCTIONAL INTERPRETATION: Agriculture-habitation
DESCRIPTION: Overall complex area measures c. 54.00 m (east-west) by 36.00 m (north-south). Feature A may be a possible cattle enclosure used by the ranchers.

Also associated with and included within the enclosure are numerous agricultural features consisting of five mounds and two boulder terraces. Numerous additional Kona Field System (6601) features consisting of *kuaiwi* walls, mounds and terraces are within the area of the overall complex.

FEATURE A: Enclosure
FUNCTION: Agriculture
DIMENSIONS: 44.00 m by 36.00 m by 1.15 m (approx.)
DESCRIPTION: The enclosure is rectangular in plan. Portions of the wall are standing, some sections are collapsing, and other sections are retaining in form. The east wall of the enclosure is bifaced in construction, with cobble fill. It is constructed with three courses of medium to large boulders, utilizing a few uprights. The wall has an average width of c. 0.90 m. Other sections of the east wall are collapsing, as is the south wall. Near the eastern half of the south wall, it resembles a retaining wall in form. It is raised along the interior edge and level with the ground surface along the exterior. The north wall is very much like the east wall in form and condition. About 1.00 m east of the NE corner are boulder alignments forming a wall. This wall continues c. 20.00 m ENE. The west wall is also similar to the north and east walls. It is of boulder and cobble construction, and stacked three courses high. Along the west wall, near the center, is an entrance. Two short wall sections are constructed north and south of this entrance. They both extend c. 1.50 m west. This may be a historic alteration that was done by the ranchers. The west wall continues south beyond the south wall. At the SW corner, it resembles a mound rather than a corner. The surface interior of the mound is undulating pahoehoe bedrock with soil. This feature may have been altered by the moving of rocks by the ranchers.

FEATURE B: C-shape
FUNCTION: Habitation
DIMENSIONS: 8.00 m by 2.50 m by 1.00 m (approx.)
DESCRIPTION: Open to the southwest, it is constructed of medium to large, blocky pahoehoe boulders with some cobble and smaller boulder fill. The interior is partially faced, three courses high and collapsing. The southeast and northwest exterior is also partially faced three courses and collapsing. The wall is c. 1.20 m wide. In the interior of the C-shape is bedrock floor with 0.01-0.02 m of soil on top. The exterior of the C-shape, along the northeast side, abuts bedrock outcrop. Continuing east from and built against the outcrop is a linear mound, possibly a *kuaiwi* wall. It measures c. 7.00 m (east-west) by 1.25 m (north-south) by 0.75 m in height. It is rubble piled, with sloping sides of medium to large boulders, cobbles and smaller boulder fill.

SITE NO.: State: 11177 **PHRI:** 451- 65
SITE TYPE: Complex (3 Features)
TOPOGRAPHY: Moderate slope of pahoehoe outcrops punctuated by pockets of brown loam.
VEGETATION: Stands of *koa-haole* with *opiuna* and monkeypod and air plants.
CONDITION: Poor-fair
INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 21.00 m (north-south) by 12.00 m (east-west). Associated Kona Field System (6601) features consisting of walls, terraces and mounds surround the site.

FEATURE A: Modified outcrop

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 4.70 m by 1.25 m (approx.)

DESCRIPTION: A natural pahoehoe outcrop augmented by the crude stacking and filling of pahoehoe boulders and cobbles primarily on the western and southern sections. A flat enclosed area is situated at the top measuring roughly 1.70 m (east-west) by 1.40 m (north-south). A rock alignment is also situated atop the outcrop.

FEATURE B: Terrace

FUNCTION: Habitation

DIMENSIONS: 7.00 m by 5.40 m by 0.65 m (approx.)

DESCRIPTION: Terrace of stacked boulders abutting slope on east side, with faced walls on the west and north side. The northwest section of the wall is collapsed. The terrace interior consists of slightly sloping boulder and cobble fill.

FEATURE C: Terrace

FUNCTION: Habitation

DIMENSIONS: 5.00 m by 3.50 m by 0.85 m (approx.)

DESCRIPTION: A terrace constructed of stacked pahoehoe boulders and cobbles running on a north-south axis. A short section along the west wall is faced to a height of c. 0.85 m. The northwest end is collapsed. The terrace is also built with boulders and cobbles as fill. A generally flat area of brown loam is inland of the terrace.

SITE NO.: State: 11178

SITE TYPE: Double Terrace

TOPOGRAPHY: Situated on the northwestern slope of a ridge line. Terrain is undulating to steep, sloping, pahoehoe bedrock with soil on top.

PHRI: 451- 66

VEGETATION: Moderate *koa-haole*, grasses and air plants.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 8.00 m by 6.00 m by 0.80 m (approx.)

DESCRIPTION: The double terrace is raised, but not formally faced, on the west sides. The upper (easternmost) terrace is also raised on the south side. The upper terrace measures c. 6.00 m (north-south) by 4.00 m (east-west).

The retaining wall is collapsed and rubble-like, with sloping profiles. It is built with small to medium boulders and cobbles and constructed to c. 1.5 m in width. A small soil area measuring c. 2.00 m (north-south) by 1.00 m (east-west) is immediately east of the retaining wall. Loose, large to medium boulders surround this soil area. Abutting this terrace to the west is a lower terrace. It measures c. 5.00 m (north-south) by 4.00 m (east-west).

The retaining wall is collapsed and rubble-like in appearance, with a sloping profile. Also c. 1.50 m wide, it is constructed of blocky pahoehoe boulders and cobbles. The interior soil surface it retains is c. 2.00 m by 2.00 m and level with loose boulders.

A boulder rubble retaining wall (oriented east-west) delineates the northern edge of the double terrace. It is c. 1.50 m wide, constructed with loosely piled boulders, and is raised but not formally faced. This retaining-type wall joins and abuts both terraces.

SITE NO.: State: 11179

PHRI: 451-67

SITE TYPE: Double terrace

TOPOGRAPHY: Irregular and undulating moderate sloping terrain consisting of pahoehoe bedrock outcrop and soil.

VEGETATION: *Koa-haole*, purslane, and vines.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 10.00 m by 8.00 m by 1.80 m (approx.)

DESCRIPTION: The site is built onto an abutting pahoehoe outcrop. It is constructed with piled, large pahoehoe boulders and with cobbles as fill. The terrace faces southwest. It is raised along the southwest sides to a height of c. 1.30-1.80 m, but it is not formally faced. The upper terrace has a configuration of rocks on the flat surface approaching a "C" shape in plan, with a waterworn basalt pebble. This small structure is c. 1.50-1.75 m across, c. 0.70 m high and opens to the southwest. There is a small mound of pahoehoe boulders c. 1.50 m to the northwest.

SITE NO.: State: 11180

PHRI: 451-68

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Near the base of a ridge line with the terrain becoming level consisting of pahoehoe bedrock outcropping and soil.

VEGETATION: *Koa-haole*, purslane, grasses, 'uhaloa, vines, indigo and an *opiuma* tree.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DESCRIPTION: Overall complex area measures c. 13.0 m (east-west) by 7.0 m (north-south). Associated Kona Field System (6601) features consisting of mounds, terraces and *kuaiwi* walls are in the surrounding area. At least three rubble mounds are within the immediate area between Features A and B.

FEATURE A: Mound

FUNCTION: Agriculture

DIMENSIONS: 2.30 m by 2.20 m by 1.20 m (approx.)

DESCRIPTION: Generally square in shape, the mound is stacked and faced on most of the four sides, and resembles a cairn. It utilizes large boulders of pahoehoe at the base and is stacked with smaller boulders three to four courses high. It is collapsing along the SW corner. The surface interior is of smaller boulders and cobble fill with the surface collapsing to the southwest.

FEATURE B: Mound

FUNCTION: Agriculture

DIMENSIONS: 5.50 m by 3.50 m by 1.00 m (approx.)

DESCRIPTION: Amorphous in plan, the mound is raised on all sides. The north side is stacked and faced three to four courses high of medium to large pahoehoe boulders. The remaining sides are mostly collapsing and sloping in profile. The surface interior is of boulder and cobble fill, with large boulders along the perimeter. It is collapsing at the southwest end.

SITE NO.: State: 11181

PHRI: 451-69

SITE TYPE: Terrace

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock with soil mantle cover.

VEGETATION: Moderate *koa-haole*, purslane, grasses, vines, indigo, one *opiuma* and a monkeypod tree.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation**DIMENSIONS:** 8.00 m by 7.00 m by 0.85 m (approx.)

DESCRIPTION: Associated Kona Field System (6601) features, consisting of mounds and terraces, are in the area. The terrace is raised on the south, west and east sides. The south side is partially faced with two upright pahoehoe boulder slabs at the base and small boulders and cobbles piled two courses high. The west and east sides are raised, sloping profiles, not formally faced. The north end abuts ground and bedrock surface. The terrace interior surface is cobble boulder fill with a 1.50 m diameter depression in the center. A low rubble mound is situated on the terrace surface near the NE corner.

PHRI: 451- 70

SITE NO.: State: 11182**SITE TYPE:** Complex (2 Features)**TOPOGRAPHY:** Undulating terrain consisting of pahoehoe bedrock outcrop with a soil mantle.**VEGETATION:** *Koa-haole*, purslane, grasses, *'uhaloa*, indigo, and *ha'uowi*.**CONDITION:** Poor**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Possible burial**DESCRIPTION:****FEATURE A:** Platform**FUNCTION:** Possible burial**DIMENSIONS:** 7.00 m by 6.50 m by 2.20 m (approx.)

DESCRIPTION: The platform is stacked and faced on the east side and along portions of the north side. The east side has large boulders and bedrock at the base, with smaller boulders on top. Portions of the north side are stacked five courses high with medium pahoehoe boulder slabs. The remaining faces are raised, but mostly collapsed and rubble. On the SE corner is a pile-constructed cairn, centrally raised. This cairn is amorphous shape in plan. A broken bottle c. 1930s was present on the platform surface. A waterworn coral fragment was also present c. 1.00 m north of the platform.

FEATURE B: Terrace**FUNCTION:** Possible burial**DIMENSIONS:** 6.00 m by 5.00 m by 1.00 m (approx.)

DESCRIPTION: The terrace is raised on the north, west and south sides. It is constructed of piled small to large pahoehoe boulders. The faces are sloping in profile and not formally faced. The west side is the highest above ground surface. The east side is one boulder high at the most. The terrace surface is crudely even, with boulder and cobble fill and is c. 2.50 m wide. Adjoining and west of Feature B is a terraced soil area. It is c. 5.50 m (north-south) by 3.00 m (east-west). A rubble retaining wall is situated west and north of this soil area. There is at least 0.15 m of soil deposit in this terrace. About 5.00 m west are additional agricultural mounds.

PHRI: 451- 71

SITE NO.: State: 11183**SITE TYPE:** Complex (2 Features)**TOPOGRAPHY:** Gently undulating pahoehoe bedrock outcrop with a thin mantle of brown soil.**VEGETATION:** Dense *koa-haole*, purslane, and grasses with scattered *kiawe*, *opiuma*, and indigo.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DESCRIPTION:** Overall complex area measures c. 25.00 m (north-south) by 25.00 m (east-west).

FEATURE A: Platform (Figure B-34)**FUNCTION:** Habitation**DIMENSIONS:** 5.80 m by 5.00 m by 0.95 m (approx.)

DESCRIPTION: The platform is roughly oval in plan. It is constructed of crudely stacked blocky basalt boulders and cobbles. The platform is raised on all four sides and is crudely faced in places, with the remaining portions collapsed in appearance. The platform contains a roughly level surface with a boulder-cobble fill. No definite cultural deposit is visible, but may be possibly present within the fill.

FEATURE B: Modified outcrop**FUNCTION:** Habitation**DIMENSIONS:** 9.80 m by 6.00 m by 0.75 m (approx.)

DESCRIPTION: The pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles crudely stacked against its south and east sides to create terraces. The terraced sides are raised and crudely faced. Boulder-cobble rubble is also piled on these terrace surfaces to create crude rubble walls on the south and east edges of the outcrop. The rubble walls are raised, not formally faced, but appear collapsed and are rounded or sloping in profile. A rubble wall (similar to the south and east walls) is also built on the west side of the bedrock outcrop. These three rubble walls vaguely resemble a U-shape enclosure. The bedrock outcrop contains a level soil surface c. 0.50 m deep. No definite cultural deposit visible, but possibly present subsurface.

SITE NO.: State: 11184

PHRI: 451-72

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Situated on the lower slope of the ridge, but on a slightly elevated area. Moderate view of coastline and Kahalu'u Bay.

VEGETATION: Dense *koa-haole*, sparse *kiawe*, *opiuna* and groundcover of purslane and grasses.

CONDITION: Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation

DESCRIPTION: Overall complex area measures c. 25.00 m (north-south) by 20.00 m (east-west). Associated Kona Field System (6601) features consisting of terraces and mounds are in the area.

FEATURE A: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 7.00 m by 6.60 m by 0.75 m (approx.)

DESCRIPTION: The terrace is roughly square in plan. It is constructed of crudely stacked, blocky basalt boulders and cobbles. The terrace is raised, and contains retaining walls on the north, south, and west sides. The retaining walls are crudely faced. The terrace is even with the surrounding ground surface on the east side. The terrace contains a roughly level, interior soil surface. No definite cultural deposit is visible, but is probably present subsurface.

FEATURE B: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 7.00 m by 3.80 m by 1.00 m (approx.)

DESCRIPTION: The terrace is raised on the south and west sides. It is constructed of piled to crudely stacked medium to large blocky pahoehoe boulders and cobbles. The retaining wall is generally sloping in profile. Large pahoehoe slabs are present on the west side of the retaining wall and may have possibly served as paving. The interior surface is bedrock outcropping with soil on top. The retaining wall is c. 3.50 m wide, creating a fair-sized boulder-cobble raised area. No definite cultural deposit is visible, but is possibly present on the interior of the terrace. The soil deposit is a dark brown color.

FEATURE C: Enclosure**FUNCTION:** Habitation

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Appendix B

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Figure B-34. Site 11183, Feature A (Neg. 929-1a)

DIMENSIONS: 5.80 m by 4.00 m by 1.00 m (approx.)

DESCRIPTION: The enclosure is a pahoehoe bedrock blister modified with a crude boulder wall built on its perimeter to create a small enclosed area. This wall is constructed of crudely, stacked blocky basalt boulders and cobbles. It is raised and crudely faced on portions of the interior side. The wall is generally collapsed and rounded or sloping in profile on the exterior side. There is an opening (possible entrance) along the north side. The lava blister/enclosure contains a level, interior soil surface. No definite cultural deposit is visible, but is possibly present subsurface.

SITE NO.: State: 11186

PHRI: 451- 74

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Gently sloping terrain consisting of undulating pahoehoe bedrock.

VEGETATION: *Koa-haole*, *kiawe*, and purslane.

CONDITION: Good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 25.00 m by 25.00 m.

FEATURE A: Cave

FUNCTION: Habitation

DIMENSIONS: 3.50 m by 2.25 m by 0.65 m (approx.)

DESCRIPTION: A blister cave with modifications. A figure eight-shaped site formed from the area where the roof collapsed on a lava blister. The upper portion of the "8" is the cave entrance, with an overhang on the east side. About 2.50 m north of the cave entrance is the shared wall. It is very poorly faced, and constructed of large angular pahoehoe boulders. The lower loop in the "8" is filled with pahoehoe boulders and cobbles. This appears to be intentional, and completely blocks and fills the remaining portion of the blister cave. Large pahoehoe boulders have also been faced and set on the west side of the entrance.

FEATURE B: Terrace

FUNCTION: Habitation

DIMENSIONS: 14.00 m by 6.70 m by 1.00 m (approx.)

DESCRIPTION: The terrace is constructed of stacked basalt boulders and cobbles. It is raised on the west side and is generally collapsed in appearance, but several sections are crudely faced. Several large upright boulders are present in the terrace face. The terrace surface is roughly level, and very crudely paved with blocky basalt boulders and cobbles. The terrace is built on the downslope (west) side of Feature A, Cave and extends south. No definite cultural deposit is visible, but may be possibly present subsurface.

SITE NO.: State: 11188

PHRI: 451- 76

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: Gently undulating terrain of pahoehoe bedrock outcropping with a thin soil mantle.

VEGETATION: Moderate to dense *koa-haole*, *opiuma*, purslane, and *kiawe*.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DESCRIPTION: Overall complex area measures c. 25.00 m (NW-SE) by 20.00 m (NE-SW). No definite cultural deposit is visible, but may be possibly present subsurface or in the fill.

FEATURE A: Platform

FUNCTION: Habitation

DIMENSIONS: 6.00 m by 4.00 m by 1.40 m (approx.)

DESCRIPTION: Generally oval in plan, the platform is constructed of stacked, blocky basalt boulders and cobbles. It is generally raised in profile and formally faced on the north, east, and part of the west side. The remaining sides are generally collapsed in appearance. The platform surface is very roughly level boulders and cobbles. It is built on a pahoehoe bedrock outcrop. Pahoehoe bedrock is also visible off the northwest side of the platform.

FEATURE B: Modified outcrop**FUNCTION:** Habitation**DIMENSIONS:** 5.80 m by 5.00 m by 0.80 m (approx.)

DESCRIPTION: Feature B is a pahoehoe bedrock outcrop modified with blocky basalt boulders and cobbles piled against and on its surface. The sides of the structure are collapsed in appearance and rounded or sloping in profile. A short section of the southwest side appears very crudely faced. A depression or sunken area is present in the surface of the modified outcrop. A crude boulder alignment is visible, on the north side of this depression.

FEATURE C: Modified outcrop**FUNCTION:** Habitation**DIMENSIONS:** 7.00 m by 6.00 m by 0.90 m (approx.)

DESCRIPTION: The pahoehoe bedrock outcrop is modified with blocky basalt boulders and cobbles crudely stacked against its sides. The crudely stacked rubble creates a crude face on the south side of the bedrock outcrop, and a crude terrace on the west side. This terrace contains a level soil and rock surface. The interior portion of the modified outcrop consists of pahoehoe bedrock. Two small blister openings are present on this interior surface.

SITE NO.: State: 11189 (Figure B-35)

PHRI: 451-77

SITE TYPE: Platform

TOPOGRAPHY: Site is situated on a pahoehoe bedrock bench. The terrain consists of a moderately steep slope on the southwest side.

VEGETATION: *Koa-haole* and *kiawe*.**CONDITION:** Good**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Indeterminate**DIMENSIONS:** 2.50 m by 2.00 m by 1.40 m (approx.)

DESCRIPTION: Generally square in plan. It is constructed with stacked and piled boulders and cobbles, with an internal fill of smaller boulders and cobbles. The southwest and northwest sides are stacked and faced. The south corner is collapsed. The northeast side is constructed with piled boulders, and internally filled with smaller cobbles and rubble. There is a ridge of pahoehoe running NE-SW, c. 1.50-1.75 m higher than the surrounding flat areas of the pahoehoe outcrop. This ridge extends from the northeast wall of the platform upslope for 9.00 m where it meets a perpendicular ridge running c. north-south. The ridge is c. 4.50 m wide. On the ridge are several possible modified outcrops. They may function as habitation sites even though there are no signs of portable remains.

PHRI: 451-78

SITE NO.: State: 11190**SITE TYPE:** Complex (2 Features)

TOPOGRAPHY: Gently sloping terrain consisting of pahoehoe bedrock outcrop and a thin soil mantle.

VEGETATION: Dense *koa-haole*, scattered *kiawe*, *opiuma*, ground cover of purslane, grasses.

CONDITION: Poor**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation

DESCRIPTION: Overall complex area measures c. 25.00 m (north-south) by 20.00 m (east-west).

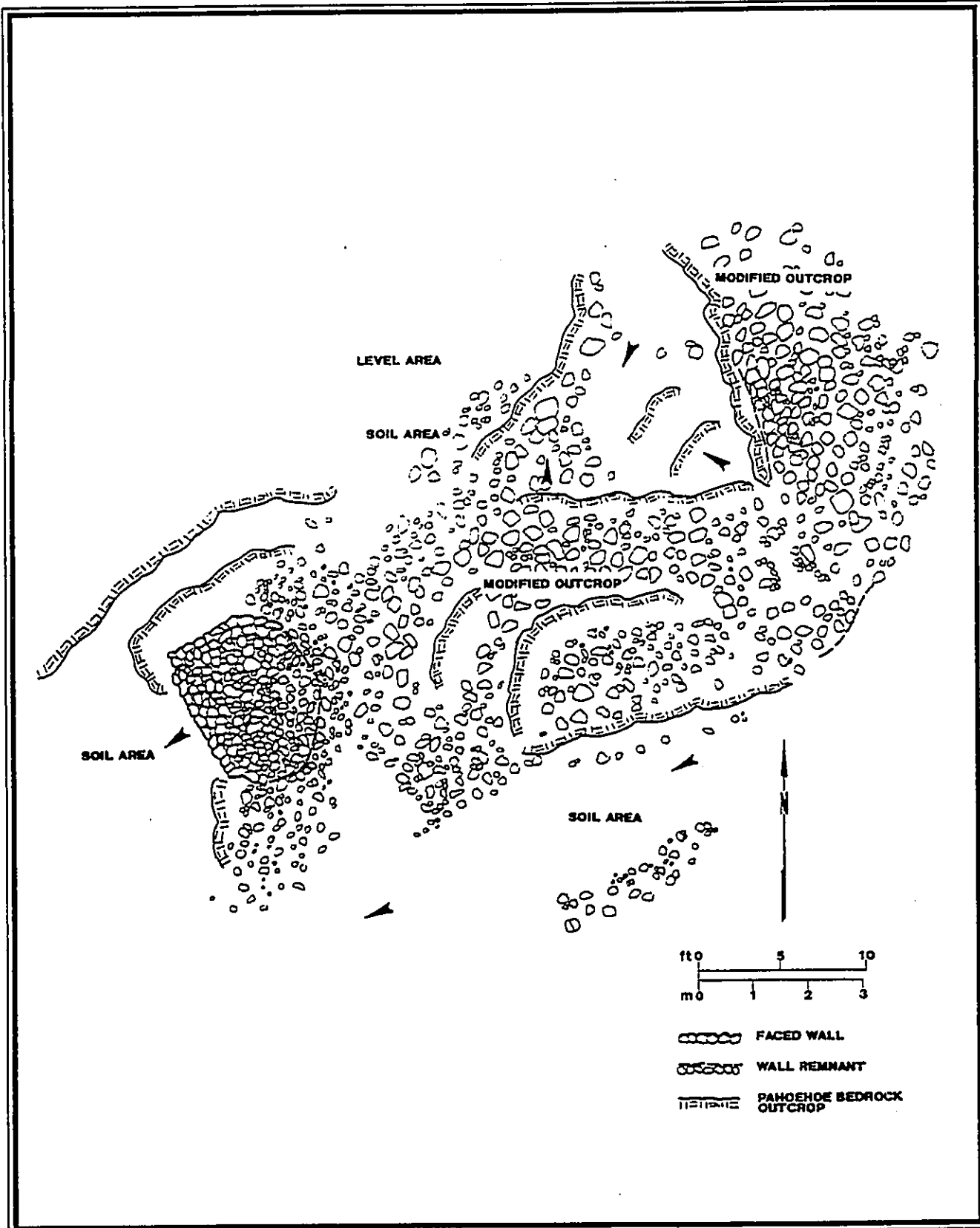


Figure B-35. Site 11189

FEATURE A: Platform**FUNCTION:** Habitation**DIMENSIONS:** 8.50 m by 6.00 m by 0.70 m (approx.)

DESCRIPTION: The platform is very roughly rectangular in plan and has an enclosure abutting its south side. It is constructed of crudely stacked, blocky basalt boulders and cobbles. The platform sides are raised, and with the exception of its south side, the sides are not formally faced. The north, east and west sides of the platform are collapsed in appearance and rounded or sloping in profile. The south side of the platform is raised and formally faced with several upright basalt boulders. The enclosure is roughly oval in plan and its walls abut the platform's south side. The enclosure walls are raised, but not formally faced. The walls are generally collapsed in appearance and rounded or sloping in profile. The enclosure contains a level, interior soil surface.

FEATURE B: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 7.50 m by 6.70 m by 0.90 m (approx.)

DESCRIPTION: The terrace structure is vague and amorphous in plan. It is constructed of crudely stacked blocky basalt cobbles and boulders. The terrace is raised on the west (downslope) side. The north and south sides appear slightly raised, but the east side is generally with the surrounding ground surface. The west side of the terrace is rough and very crudely faced. The other sides are collapsed in appearance and rounded or sloping in profile. The terrace surface consists of rough and somewhat uneven basalt boulders and cobbles. A pit or depression is present on the south end of the terrace, near the west side. A boulder-rubble concentration extends west off the south end of the terrace. A boulder-rubble alignment is parallel to the main terrace and may possibly represent the remnants of a smaller terrace.

SITE NO.: State: 11191 (Figure B-36)

PHRI: 451- 79

SITE TYPE: Cave**TOPOGRAPHY:** Gently undulating pahoehoe bedrock with a thin mantle of brownish soil.**VEGETATION:** Moderate to dense *koa-haole*, *kiawe*, and *opiuma*.**CONDITION:** Fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Habitation**DIMENSIONS:** 5.40 m by 3.60 m by 1.25 m (approx.)

DESCRIPTION: The cave shelter is formed by a collapsed blister atop a pahoehoe bedrock outcrop. Blocky basalt boulder-cobble rubble slopes down from the pahoehoe bedrock outcrop and toward the cave entrance. Near the entrance, three surface boulders form a vague box-shaped alignment which possibly functioned as a fireplace. One portion atop the bedrock outcrop appears crudely leveled with basalt cobbles. A single waterworn basalt cobble fragment is noted near this level area. The cave shelter does not appear to contain any modifications at its entrance. The entrance is open to the west. The small cave contains a horizontal entrance that measures c. 2.20 m wide with a ceiling height of c. 1.25 m.

No definite cultural deposit is visible, however, the cave interior contains a level, brownish colored soil surface estimated at c. 0.25 m thick. *Kukui* is present within the cave.

SITE NO.: State: 11192

PHRI: 451- 80

SITE TYPE: Filled depression**TOPOGRAPHY:** Flat to undulating pahoehoe bedrock outcrop with a soil mantle.**VEGETATION:** *Koa-haole*, grasses, purslane, and vines.**CONDITION:** Poor**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Indeterminate



Figure B-36. Site 11191 (Neg. 920-20a)

DIMENSIONS: 6.00 m by 5.00 m by 1.00 m (approx.)

DESCRIPTION: A boulder-cobble filled depression measuring c. 5.00-6.00 m in diameter. The filled-in area is fairly level. Three large boulders are in a crude alignment along the south side of the filled in area. Located in the center of this leveled area is a depression measuring c. 2.00 m in diameter to a depth of 1.00 m. Three to four smaller boulders appear to line the north side of this depression.

SITE NO.: State: 11193

PHRI: 451- 81

SITE TYPE: Platform

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock outcrop underlying a mantle of soil.

VEGETATION: *Koa-haole*, purslane, vines, and one to two *kiawe* and *opiuma* trees.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Indeterminate

DIMENSIONS: 3.60 m by 3.40 m by 0.55 m (approx.)

DESCRIPTION: Generally square in plan, it is raised on all four sides. The platform is faced and stacked two to three courses high along the north and south sides. Portions of the east and west sides are also stacked and faced. The remaining portions are collapsed and rubble. The surface interior is fairly level with boulders and cobbles. A cow bell (possibly iron) was present c. 1.00 m east of the platform.

SITE NO.: State: 11194 (Figure B-37)

PHRI: 451- 82

SITE TYPE: Cave

TOPOGRAPHY: Gently undulating pahoehoe bedrock outcrop with thin soil mantle.

VEGETATION: Dense *koa-haole*, scattered *kiawe*, *opiuma*, ground cover of purslane and grasses.

CONDITION: Fair

INTEGRITY: Partially altered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-refuge

DIMENSIONS: 25.0 m by 11.0 m by 1.17 m (approx.)

DESCRIPTION: The cave contains a horizontal entrance which is open to the west.

The area outside the cave opening is faced with retaining walls on the north and south side, which somewhat restricts entry. The main chamber immediately inside the cave entrance contains a level soil floor with sparse amounts of midden and portable remains. A tube on the north side of the main chamber has been partially blocked by a rock wall. No portable remains were observed within this side tube.

A second, partially walled side tube is present on the south side of the main chamber. This second side tube runs east-west. The east portion contains several boulders set upright to partially block the tube. The west portion also contains several upright boulders to restrict entry (refuge-like). This western tube contains several side tubes. It eventually circles back toward the main cave opening and also contains a built-up refuge type entrance. This refuge entrance, however, has been concealed. Immediately inside this sealed entrance are a possible terrace, two walled shelters, a charcoal concentration (that was collected for a possible dating sample), and sparse portable remains.

SITE NO.: State: 11195

PHRI: 451- 83

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Situated atop of a knoll and slightly downslope. The seaward area tapers off to a lesser sloping terrain underlying soil. A slightly higher knoll is just southeast of the site.

VEGETATION: Moderate to dense air plants and *koa-haole*, also vines and two young *opiuma* trees.

CONDITION: Poor-fair

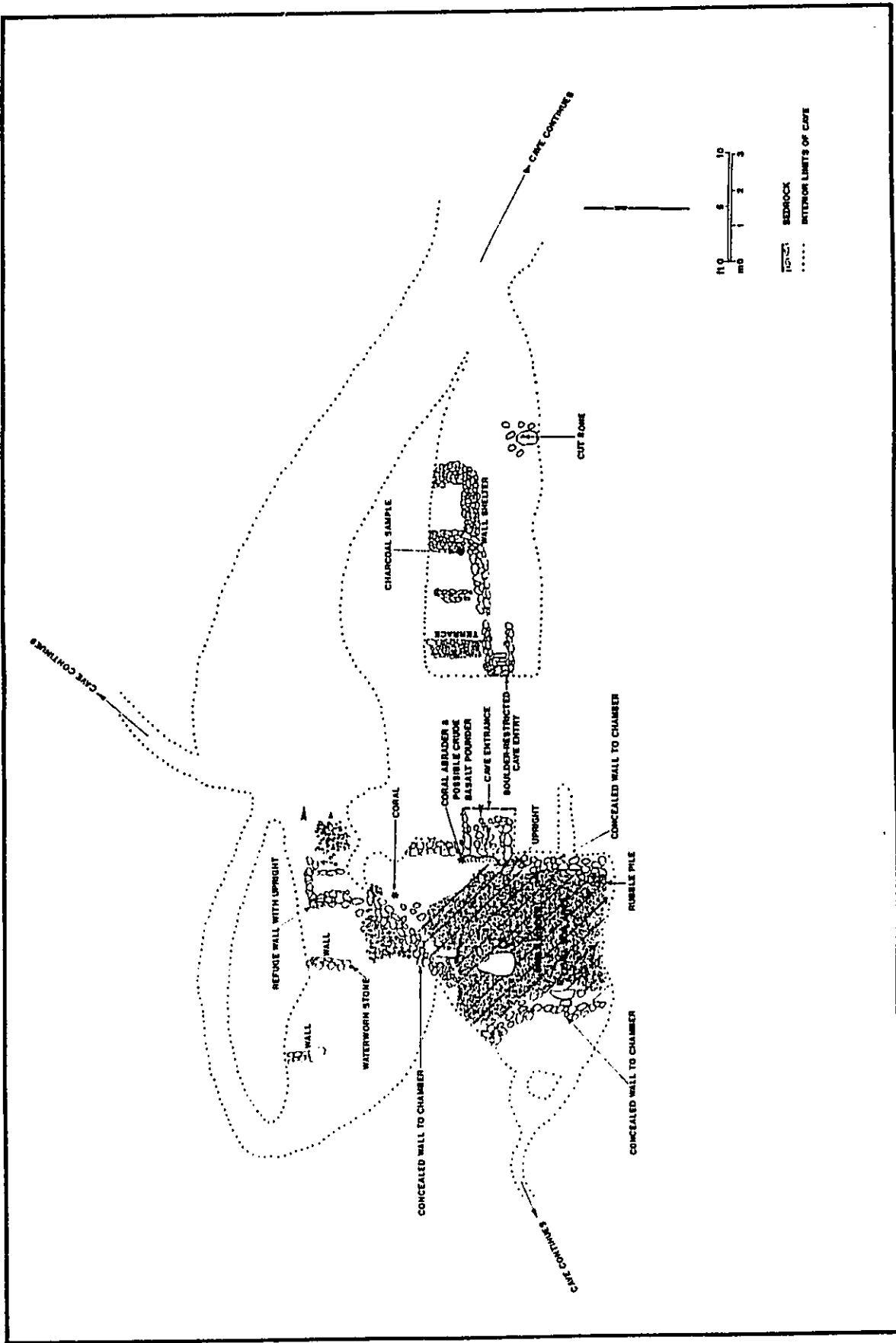


Figure B-37. Site 11194

INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DESCRIPTION: Overall complex area measures c. 19.00 m (NE-SW) by 12.00 m (NW-SE).

FEATURE A: Modified outcrop**FUNCTION:** Habitation**DIMENSIONS:** 10.00 m by 9.00 m by 1.30 m (approx.)

DESCRIPTION: A large bedrock outcrop with constructed and faced sides to the east and northwest. They are stacked three to five courses high, with blocky pahoehoe boulders. The remaining sides are partially collapsed and rubble-like in appearance. The south side is even with the ground slope. The faced and raised sides around the outcrop perimeter increase the surface area. The surface interior is uneven, with boulders and cobbles.

Two cairns are located c. 2.50 m apart atop either end of the northern side of the outcrop. The cairns are circular in plan, conical in profile and centrally raised. They are constructed of piled small to medium pahoehoe boulders.

In the center of the outcrop is a collapsed blister-like area. Open to the west, it creates a wind break or protected area measuring c. 2.00 m in diameter. The interior has c. 0.15 m of soil and a loose rock or two. Piled cobbles and boulders are on top of the collapsed blister wall for added height and protection.

FEATURE B: Terrace**FUNCTION:** Habitation**DIMENSIONS:** 5.00 m by 3.50 m by 1.00 m (approx.)

DESCRIPTION: The terrace is faced on the west and portions of the north side. It is stacked three to five courses high with medium to small pahoehoe boulders. Portions of the north face are collapsing and rubble-like in appearance. The terrace surface is roughly level, with boulder and cobble fill.

A collapsed/depressed area is present on the surface interior. A few larger pahoehoe boulders are located on the east end of the terrace surface. A waterworn coral cobble is present on the terrace surface.

SITE NO.: State: 11196**PHRI:** 451- 84**SITE TYPE:** Terrace

TOPOGRAPHY: Site is situated on the west side of a cliff face, c. 2.0 m above the base of the cliff and the cut roadway. The ground surface at the base of the cliff is level for c. 5.00 m west and then another cliff face forms.

VEGETATION: Moderate *koa-haole*, air plants and vines.**CONDITION:** Poor-fair**INTEGRITY:** Unaltered**PROBABLE AGE:** Prehistoric**FUNCTIONAL INTERPRETATION:** Agriculture**DIMENSIONS:** 4.00 m by 2.60 m by 1.10 m (approx.)

DESCRIPTION: The terrace is faced on the north and west sides. It is constructed of blocky, medium to large pahoehoe boulders, stacked three to four courses high. Cobble and boulder filled, the surface interior is uneven and is sloping with the general topography. Boulder and cobble rubble is at the base of the terrace and also along the cliff face. About 20.00-35.00 m north of Site 11196 is another terrace and a wall. Probable Kona Field System (6601) features consisting of mounds and terraces are in the area.

SITE NO.: State: 11197**PHRI:** 451- 85**SITE TYPE:** Platform

TOPOGRAPHY: Undulating with steep slopes and level soil areas consisting of pahoehoe bedrock with a mantle of brownish loamy soil.

VEGETATION: Moderate cover of *koa-haole* and *kolu*.

CONDITION: Fair

INTEGRITY: Unaltered to partially altered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Ceremonial

DIMENSIONS: 11.50 m by 9.00 m by 1.70 m (approx.)

DESCRIPTION: This platform is Reinecke's (n.d.) Site K, Nohoanapa'ena Heiau and cave, based on its dimensions and location. However, no cave was found during the present 1988 survey (cave supposedly sealed). The platform is rectangular in plan. It is constructed of blocky pahoehoe boulders, stacked four to five courses high. It is formally faced on all four sides, with collapse occurring along the seaward face and most of the platform's corners. The surface is uneven, but level, with small to large boulders and some cobble fill. At least three depressions are visible on the platform surface. Also present on the surface are three rock piles along the seaward edge of the platform.

Adjacent to the platform along its east side is a wall extension, mostly rubble in construction. It is constructed of piled medium-sized blocky boulders, c. 0.90 m wide. The wall has sloping sides and is centrally raised. At present it extends out of the SE corner c. 2.00 m and curves north almost parallel to the platform wall. It may have enclosed a small soil and bedrock area along the inland side of the platform.

Two cairns, both constructed of piled medium pahoehoe boulders, are situated seaward of the site. Centrally raised, circular in plan, one cairn is located immediately adjacent of the SW corner; the other cairn is situated c. 3.00 m west of the platform.

At the SW corner and going west is a bifaced wall. It extends at least 30.00 m seaward, becoming stepped and splitting into a sort of enclosure.

Additional terraces and walls are present between Sites 11197, 11199 and 11211. They are excellent examples of agriculture, habitation and possible ceremonial functions.

SITE NO.: State: 11198

PHRI: 451- 86

SITE TYPE: Modified outcrop

TOPOGRAPHY: On a slightly higher rise than the surrounding area. The terrain is mostly undulating pahoehoe bedrock outcrop with soil mantle.

VEGETATION: *Koa-haole*, one *opiuma* tree and unidentified bushes.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 12.00 m by 9.00 m by 1.00 m (approx.)

DESCRIPTION: The overall site area measures 20.00 m (east-west) by 15.00 m (north-south). It is a modified outcrop consisting of two terraces, and one raised area with a cairn. A boulder cobble terrace measuring c. 9.00 m (north-south) by 2.00 m (east-west) and 0.95 m in height is c. 7.00-10.00 m seaward of Site 11198. Additional Kona Field System (6601) features are in the area.

The site is generally rectangular. It is stacked and faced with blocky pahoehoe boulders, three to four courses high, along the east end. The west end and portions of the north and south end have bedrock outcropping. The west half is terrace-like in appearance. It is built with boulders and cobbles piled on top of the outcrops, creating a raised retaining wall. The sides of the retaining wall are sloping and not formally faced. To the east of the retaining wall is a level soil area with bedrock outcropping. This area is c. 2.00 m by 2.00 m in diameter. At the SE corner of the site is a raised boulder and cobble paved area. Raised c. 0.30 m higher than the west half, it is partially faced along the south wall. It is constructed with boulders and cobbles stacked one to two courses high.

The interior surface is cobble paved and fairly level. It measures c. 4.90 m (north-south) by 3.00 m (east-west). Another raised area is in the NE corner. Large boulders from the south wall are collapsing onto the previous (SE corner) paved area. This raised boulder area has a collapsing north wall. It abuts a terrace to its west. This raised area measures c. 6.00 m (east-west) by 4.00 m (north-south), and is constructed with medium boulders and smaller cobbles, three to five courses high. The surface is roughly level boulder and cobble fill. A cairn measuring c. 2.00 m (north-south) by 1.50 m (east-west) and 0.95 m high is situated near the middle of the raised area. The cairn is roughly circular, centrally raised and stacked along the east side, four courses high. The remaining sides are piled construction and collapsing.

PHRI: 451- 87

SITE NO.: State: 11199 (Figure B-38)

SITE TYPE: Platform

TOPOGRAPHY: Site is situated in the middle of a slope. Generally the terrain is undulating pahoehoe bedrock sloping steeply at times.

VEGETATION: Four *opiuma*, and two *kiawe* trees surround the site. Moderate amounts of *koa-haole* and purslane are present.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation-possible burial

DIMENSIONS: 9.00 m by 6.20 m by 1.24 m (approx.)

DESCRIPTION: Generally rectangular in plan, it is raised on all four sides. The west wall is raised the highest because of the ground slope. The northwest section of the platform is intact, stacked and faced five to seven courses high, of medium pahoehoe boulders and cobbles. The remaining section of the west wall is collapsing. The north wall is collapsing, with a boulder alignment visible along its midsection. The north half of the east wall is collapsing, with the southern end still fairly intact. This southern end (the SE corner of the platform) is stacked two courses high, with one upright. The remaining portion of the south wall is beginning to collapse. The surface interior of the platform is even with boulders and cobble fill over most of the platform and a soil area near the northern end. A depression is also visible on the platform surface.

The area north of Site 11199 and below Site 11197 contains numerous Kona Field System (6601) features consisting of terraces and mounds. They appear to be in fair to good condition and unaltered.

PHRI: 451- 88

SITE NO.: State: 11200

SITE TYPE: Platform remnant

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock with a mantle of brown loamy soil. Site is situated at the seaward base of a bedrock hill.

VEGETATION: *Koa-haole*, vines, amaranth and four *opiuma* trees.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture

DIMENSIONS: 5.70 m by 5.00 m by 0.80 m (approx.)

DESCRIPTION: Associated Kona Field System (6601) features consisting of modified outcrops, terraces and mounds are in the area. At c. 20.0 m south, between Sites 11200 and 11201, are one to two additional platforms/mounds. Generally square in plan, the platform remnant is raised, not faced, on the north, south, and west sides. It is collapsed and rubble-like in appearance. The east side is faced and stacked two to three courses high, but collapsing near the NE corner.

The platform remnant is constructed of medium to large blocky pahoehoe boulders and cobbles. The surface interior is uneven, with boulders and cobbles, sloping along the north, south, and west sides.

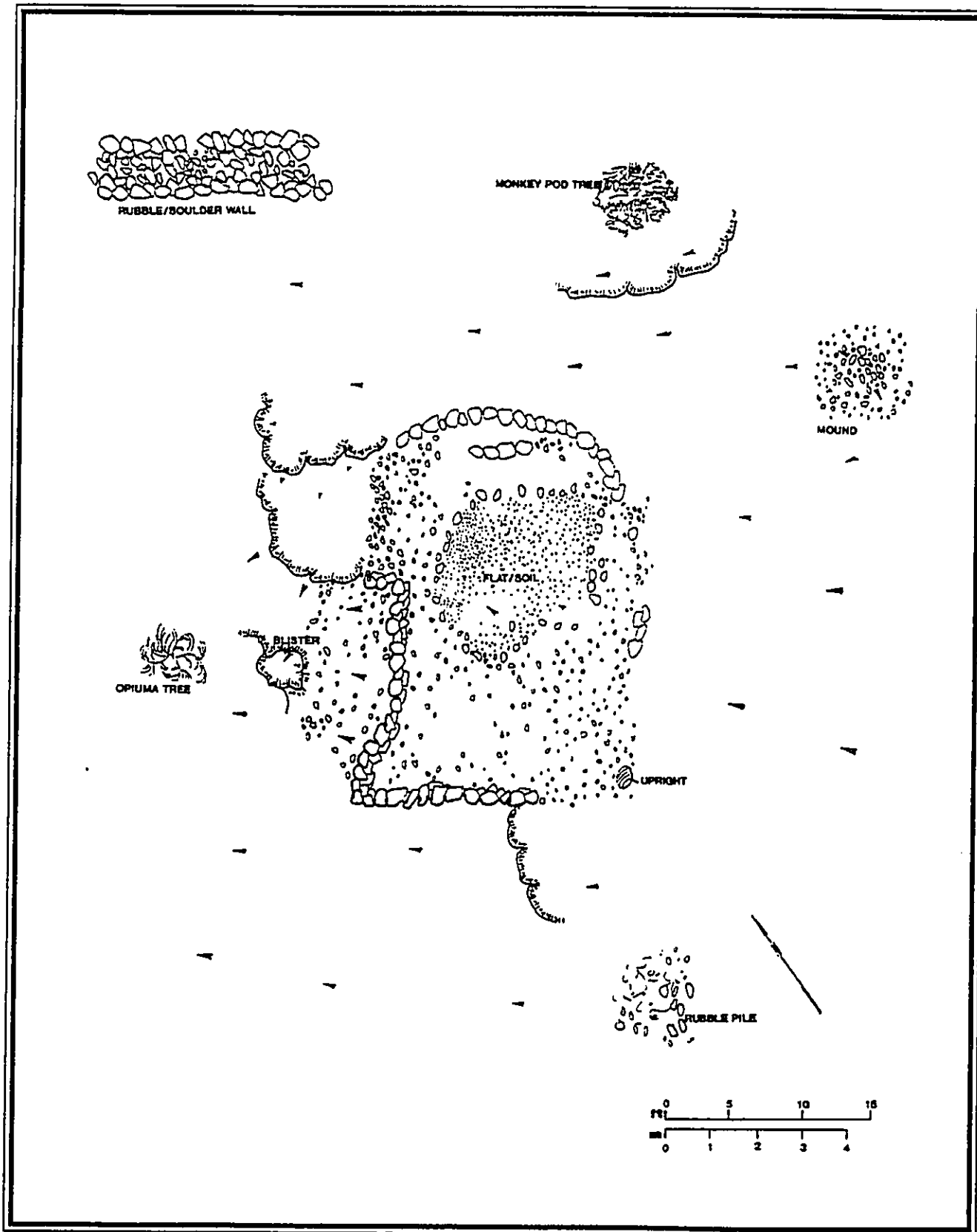


Figure B-38. Site 11199

SITE NO.: State: 11201 **PHRI:** 451- 89
SITE TYPE: Modified outcrop
TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock outcrops and a mantle of brownish loamy soil.
VEGETATION: *Koa-haole*, grasses, vines, indigo, purslane, and one monkeypod tree.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture
DIMENSIONS: 6.60 m by 5.00 m by 1.10 m (approx.)
DESCRIPTION: Associated Kona Field System (6601) features consisting of modified outcrops, mounds and boulder terraces are in the area. Rectangular in plan, the modified outcrop resembles a terrace. Bedrock outcropping is present along the west, south and portions of the north edge. Large to medium pahoehoe boulders and cobbles are piled atop. The north and south edges are raised, not formally faced, with boulders and cobbles. The east edge is even with the ground surface. The interior surface is roughly level with boulders and cobbles and boulder outcropping.

SITE NO.: State: 11202 **PHRI:** 451- 90
SITE TYPE: Platform
TOPOGRAPHY: The platform is on a ridge crest with an excellent view of the coastline and Kahalu'u Bay.
VEGETATION: Moderate *koa-haole*, *opiuma*, monkeypod, indigo.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DIMENSIONS: 4.40 m by 4.00 m by 0.85 m (approx.)
DESCRIPTION: The platform is generally rectangular in plan. It is constructed of stacked blocky basalt boulders along the perimeter, with a fill of smaller basalt cobbles and pebbles. The platform is raised and well faced on the north and part of the east side. The west, south and part of the east side are crudely faced in places and collapsed in others. The platform surface is leveled cobbles except for a depression in the NW corner that is partly filled with boulders.

SITE NO.: State: 11203 (Figure B-39) **PHRI:** 451- 91
SITE TYPE: Terrace
TOPOGRAPHY: Site is situated on a ridge crest with an excellent view of the coast and Kahalu'u Bay.
VEGETATION: Moderate *koa-haole*, *opiuma*, monkeypod, indigo, *kiawe*, and grasses.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation
DIMENSIONS: 11.00 m by 4.00 m by 1.10 m (approx.)
DESCRIPTION: The terrace is generally amorphous in plan. It is constructed of crudely stacked blocky basalt boulders and cobbles. The terrace is raised on the west (downslope) side and retains a level soil and rock area to the east. With the exception of its north end, the terrace is generally collapsed or sloping in profile and appears very crudely faced in places. The north end is raised and formally faced. The terrace surface consists of roughly level boulders, with a small area crudely paved with cobbles near the south end. Several boulders are piled on this crudely paved surface and resemble a crude cairn. One of these boulders contains a human figure petroglyph. It is a pecked-out rectangular body with stick arms and legs. A *kukui* nut shell was noted on the downslope side of the terrace.

A low, bedrock and boulder/cobble rubble alignment on the north end of the terrace extends east and abuts a small mound built of basalt boulder and cobble rubble.

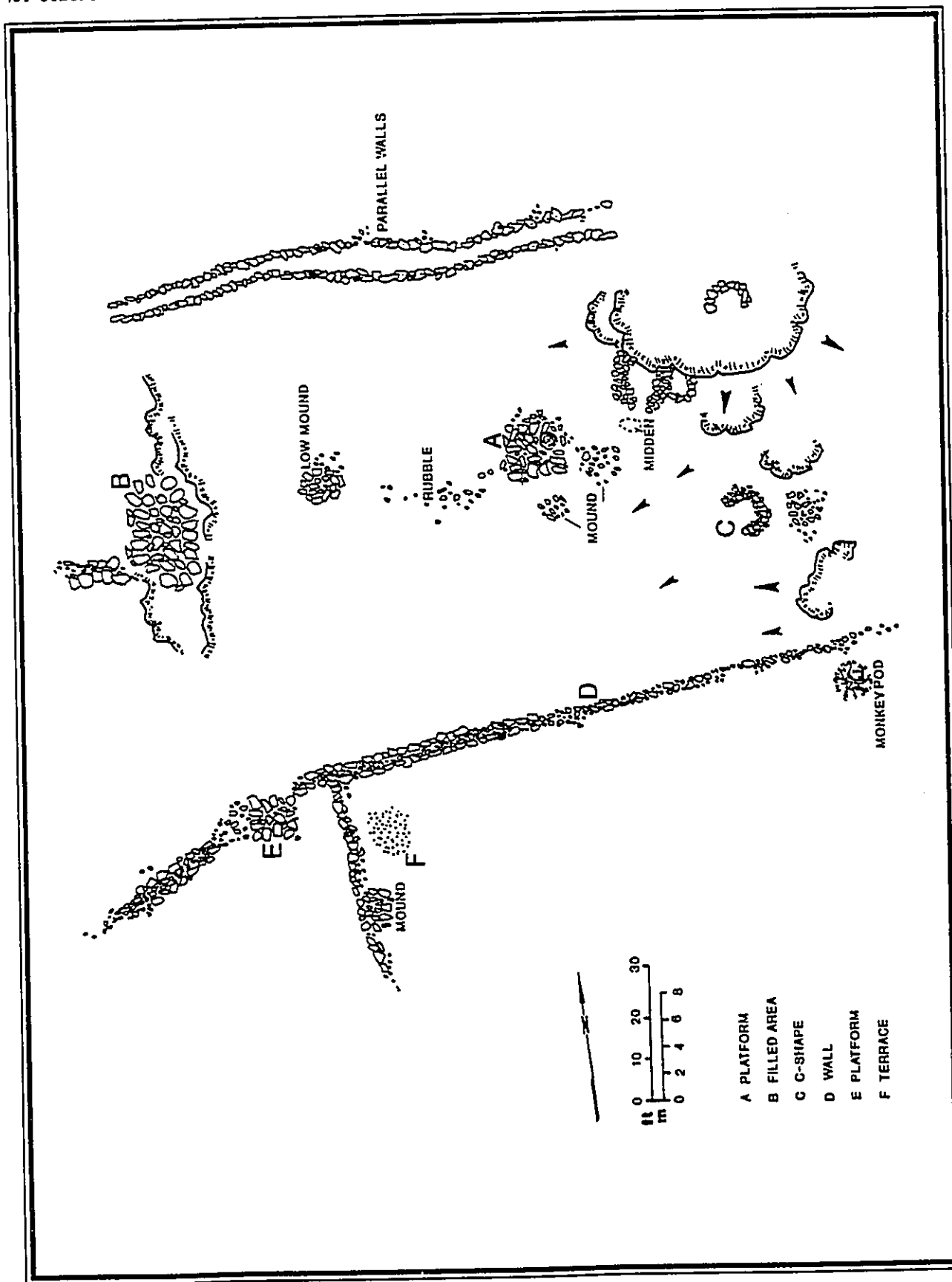


Figure B-39. Site 11203



SITE NO.: State: 11204

PHRI: 451- 92

SITE TYPE: Terrace

TOPOGRAPHY: On the very edge of a ridge crest with an excellent view of the coast and Kahalu'u Bay

VEGETATION: Moderate *koa-haole*, *opiuma*, monkeypod, grasses, and indigo.

CONDITION: Poor

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 7.00 m by 5.00 m by 0.80 m (approx.)

DESCRIPTION: The terrace is generally amorphous in plan and resembles a very low platform. It is constructed of crudely stacked blocky basalt boulders and cobbles.

The terrace is raised on the south and part of the west sides. The south side appears very crudely faced, and several upright boulders are present. The west and south sides, however, are generally collapsed in appearance and rounded or sloping in profile. The north and east sides are roughly even with the surrounding ground surface, or very slightly raised (at most), one boulder high. The terrace surface consists of roughly level blocky basalt boulders and cobbles. No definite cultural deposit is visible, but may be possibly present subsurface or in the fill. A level soil and pahoehoe bedrock area is present north of the terrace and probably was also utilized.

SITE NO.: State: 11205

PHRI: 451- 93

SITE TYPE: Terrace

TOPOGRAPHY: Site is situated across slope of a ridge line. The terrain is steep and undulating pahoehoe bedrock with thin soil mantle. A good view of the southwest coast is available.

VEGETATION: *Koa-haole*, purslane, one monkeypod, and two *opiuma* trees.

CONDITION: Fair-good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Possible burial

DIMENSIONS: 8.00 m by 7.00 m by 1.40 m (approx.)

DESCRIPTION: Generally rectangular in plan, it is faced on the southeast, southwest, and northwest sides. The terrace is constructed of upright boulders and medium to large boulders, three to five courses high. The south corner is collapsed. The southwest wall has the highest face. The surface interior is flat and consists of cobbles and small boulder fill. A square, collapsed mound, c. 0.55 m in height, is located on the terrace surface in the northern corner. A retaining wall segment is also located in this northern corner.

SITE NO.: State: 11206

PHRI: 451- 94

SITE TYPE: Terrace

TOPOGRAPHY: Undulating pahoehoe bedrock terrain with soil mantle. Site is situated across slope with a view of the nursery.

VEGETATION: *Koa-haole*, *opiuma*, and purslane.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 13.00 m by 7.10 m by 1.15 m (approx.)

DESCRIPTION: Associated Kona Field System (6601) features consisting of mounds and boulder cobble terraces are in the area. The retaining wall is collapsed and rubble-like in construction. The sides are sloping in profile, and not formally faced. It is constructed with small to medium sized pahoehoe boulders and cobbles. The retaining wall is also boulder and cobble-filled and c. 2.00 m wide.

A flat soil area is immediately east of the retaining wall. North of the retaining wall is a boulder and cobble-filled raised area. Raised on all four sides, this area is wider (east-west) than the retaining wall. It measures c. 5.70 m (east-west) by 4.00 m (north-south). Also constructed with boulders and cobbles, the surface is roughly even with loose boulders. It has no formally faced sides, but is collapsed and rubble-like in appearance. This raised area may have been a platform at one time.

SITE NO.: State: 11207

PHRI: 451-95

SITE TYPE: Platform

TOPOGRAPHY: Site is situated on the west side of a ridge crest and has an excellent view of the coast and Kahalu'u Bay.

VEGETATION: Moderate to dense *koa-haole*, with monkeypod trees and various grasses.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 7.00 m by 6.00 m by 1.00 m (approx.)

DESCRIPTION: The platform is generally square in plan and resembles a terrace because it is raised only slightly (one boulder high) on portions of the northeast side. The northwest, southwest, and southeast sides are raised substantially. The southwest and part of the southeast sides appear formally faced. But the northwest side is collapsed and rounded or sloping in profile. One large upright boulder is present in the southwest side. The southeast side also contains an upright boulder. Several large, blocky basalt boulders (about four) are set against the platform's northeast side. One is set crudely upright. The platform contains a roughly level boulder filled surface. However, the surface area along the northeast side contains a greater amount of basalt cobbles and appears crudely paved. No definite cultural deposit is visible, but is possibly present within the fill.

SITE NO.: State: 11208

PHRI: 451-96

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Medium slope to undulating terrain consisting of pahoehoe bedrock and a soil mantle.

VEGETATION: *Koa-haole* with one to two *opiuma* trees.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Indeterminate

DESCRIPTION: Overall complex area measures c. 27.00 m (east-west) by 5.00 m (north-south). A possible *kuaiwi* wall is c. 7.00 m south of Feature A. Additional Kona Field System (6601) features consisting of mounds and *kuaiwi* walls are in the area.

FEATURE A: Cairn

FUNCTION: Indeterminate

DIMENSIONS: 4.20 m by 3.00 m by 1.60 m (approx.)

DESCRIPTION: The cairn is generally rectangular in plan. It is stacked and faced on the south and west sides. The south and west sides are faced nine courses high with blocky pahoehoe boulders, medium to large in size. These are also the highest faces. The cairn is collapsing on the north and east sides. The surface interior is of boulders and cobbles, with the surface sloping toward the ground surface along the north and east sides. The base is slightly wider than the surface perimeter. There is a corner visible along the entire length of the SW corner.

FEATURE B: Cairn

FUNCTION: Indeterminate

DIMENSIONS: 3.60 m by 3.00 m by 0.95 m (approx.)

DESCRIPTION: The cairn is generally square in plan. Faced on four sides, it is constructed of medium to large pahoehoe boulders, four courses high. The surface interior is flat cobble and small boulder fill. At least three low agricultural mounds are in the immediate areas surrounding the feature.

SITE NO.: State: 11209

PHRI: 451-97

SITE TYPE: Terrace

TOPOGRAPHY: Pahoehoe bedrock and outcrop underlying a thin soil mantle, sloping to the southwest.

VEGETATION: Moderate *koa-haole*, monkeypod, air plants, *kolu*, grasses and *opiuma*.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 9.00 m by 5.80 m by 1.20 m (approx.)

DESCRIPTION: The terrace is roughly rectangular in plan. It is raised and crudely faced on the southwest side. The northwest and southeast sides are also raised, but are collapsed in appearance and sloping or rounded in profile. The west corner of the terrace is collapsed and rubble-like in appearance. The northeast side is built against a pahoehoe bedrock outcrop. The bedrock outcrop contains a small lava blister (0.60 m ceiling height) which may possibly have functioned as a cupboard. The terrace surface appears slightly raised on the northeast side and slopes gently to the southwest. This raised area on the northeast side may possibly have originally been a stepped upper terrace.

SITE NO.: State: 11210

PHRI: 451-101

SITE TYPE: Complex (3 Features)

TOPOGRAPHY: On a steep slope of pahoehoe bedrock terrain underlying a thin soil mantle.

VEGETATION: Predominantly *koa-haole*, purslane, and few *pa-nini* (*Opuntia megacantha*).

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture-habitation

DESCRIPTION: Additional possible Kona Field System (6601) features (mounds) are in the area.

FEATURE A: Terrace

FUNCTION: Habitation

DIMENSIONS: 8.50 m by 7.50 m by 1.26 m (approx.)

DESCRIPTION: A boulder cobble terrace constructed on the seaward side of a bedrock outcrop. The retaining wall is on the north, west, and south sides. It is constructed of boulders and cobbles piled atop each other. The retaining wall is at least 1.50 m wide, with sloping profiles, and not formally faced. The terrace interior is level with pahoehoe bedrock outcrop rising to the east. A possible and smaller terrace abuts Feature A to the seaward side, c. 2.50 m (north-south) by 1.70 m (east-west). This terrace has an internal boulder alignment that is roughly bifaced and core-filled in appearance.

FEATURE B: Mound

FUNCTION: Agriculture

DIMENSIONS: 4.50 m by 3.60 m by 1.30 m (approx.)

DESCRIPTION: Irregularly shaped in plan, it is terrace-like in appearance. It is constructed with piled, blocky pahoehoe boulders and cobbles. Raised on all sides, the sides are sloping and rubble-like in appearance. The surface interior slopes seaward and consists of uneven boulder and cobble fill. It abuts a cobble terrace to the northwest. Additional mounds are in the area.

FEATURE C: Mound

FUNCTION: Agriculture

DIMENSIONS: 7.20 m by 6.60 m by 1.10 m (approx.)

DESCRIPTION: Roughly rectangular in plan. It is constructed with piled blocky pahoehoe boulders and cobbles. Raised on all sides, the sides are sloping and rubble-like in appearance. The surface interior slopes gently seaward and consists of slightly even boulder and cobble fill. Additional mounds are in the area.

PHRI: 451-102

SITE NO.: State: 11211

SITE TYPE: Complex (2 Features)

TOPOGRAPHY: Site is situated on a slope. Generally the terrain is undulating but sloping steeply at times. It consists of pahoehoe bedrock underlying a soil mantle.

VEGETATION: *Opiuma* tree to the east, moderate *koa-haole* and purslane.

CONDITION: Poor-fair

INTEGRITY: Unaltered-partially altered.

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Agriculture-indeterminate

DESCRIPTION: Overall complex area measures c. 30.00 m (NE-SW) by 20.00 m (NW-SE). The two features may have been connected at one time. Many additional and associated Kona Field System (6601) features consisting of mounds, terraces and *kuaiwi* walls are in the area. They are in fair to good condition.

FEATURE A: Terrace

FUNCTION: Agriculture

DIMENSIONS: 18.00 m by 6.00 m by 1.10 m (approx.)

DESCRIPTION: Stacked and faced along the west side. It is constructed of large pahoehoe boulders, stacked five to six courses high, and boulder and cobble-filled. The retaining wall is c. 1.50 m wide and even with the ground slope to the east. The middle section is collapsed and virtually gone. Two additional terraces are visible within 8.00 m east of Feature A.

FEATURE B: L-shaped wall

FUNCTION: Indeterminate

DIMENSIONS: 8.00 m by 4.80 m by 1.00 m (approx.)

DESCRIPTION: A north and west wall, open to the southeast. Faced and stacked along the exterior, it is constructed of blocky pahoehoe boulders stacked four to five courses high. The cobble-filled wall is c. 0.60-1.20 m wide. The interior is partially faced and collapsing. A mound is situated immediately east of the wall, and may have been connected at one time. This mound is elongated in plan, centrally raised and pile-constructed. The surface interior is smooth and of boulder and cobble fill. The sides are sloping in profile.

PHRI: 451-103

SITE NO.: State: 11212

SITE TYPE: Platform

TOPOGRAPHY: Undulating terrain consisting of pahoehoe bedrock outcropping with a mantle of soil on top.

VEGETATION: Moderate *koa-haole* and air plants, with some vines.

CONDITION: Poor-fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 5.00 m by 3.00 m by 1.30 m (approx.)

DESCRIPTION: Generally rectangular in plan. Raised on four sides, it is stacked and faced three to four courses high on portions of the north, south, and east side. The platform is constructed with pahoehoe boulders. The west side, which is also the highest face, is collapsed and rubble. The surface interior is level with boulders and cobbles. A few boulder slabs on the surface may have been used as paving. A rubble wall is c. 2.00 m northwest of the platform. The wall is c. 0.60 m wide, and double stacked with cobble fill now and then. Generally collapsing in appearance, it is oriented NE-SW and continues seaward to Site 9872.

PHRI: 451-107

SITE NO.: State: 11213

SITE TYPE: Platform

TOPOGRAPHY: Platform is situated in a low soil pocket delineated by several pahoehoe bedrock outcrops.

VEGETATION: Moderate to dense *koa-haole*, grasses, with *opiuma*, *kiawe*, and purslane.

CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DIMENSIONS: 4.20 m by 3.80 m by 0.75 m (approx.)
DESCRIPTION: The platform is generally oval in plan. It is constructed of well stacked blocky basalt boulders and cobbles. The platform contains formally faced sides, but is collapsed in several places on the south side. The platform contains a perimeter of larger boulders and a fill of smaller basalt cobbles. The surface interior of the platform is generally level.

SITE NO.: State: 11214

PHRI: 451-113

SITE TYPE: C-shape

TOPOGRAPHY: Gentle undulating slope consisting of pahoehoe bedrock outcrops and soil. The site is situated on a small knoll crest.

VEGETATION: Purslane, *kiawe* and *koa-haole*.

CONDITION: Good

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 5.00 m by 4.50 m by 1.10 m (approx.)

DESCRIPTION: The opening of the C-shape is to the southwest. The C-shape is 5.00 m in diameter (exterior dimensions) with internal dimensions of 3.00 m (NE-SW) and 2.00 m (NW-SE). The wall height varies from 0.60 m on the south to 1.10 m on the northeast. The interior section of the C-shape is faced and the exterior sections are piled in construction. A bedrock outcrop surrounds the site to the north and northwest. It is slightly modified with pahoehoe boulders and cobbles piled atop the bedrock outcrop to heights of c. 1.30-1.40 m. There are interstices between the piled boulders large enough for use as cupboards and storage areas.

SITE NO.: State: 11215

PHRI: 451-119

SITE TYPE: Enclosure

TOPOGRAPHY: Gently undulating pahoehoe bedrock outcrop underlying a thin soil mantle.

VEGETATION: Moderate to dense *koa-haole*, and *kiawe* with a groundcover of purslane and grasses.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Prehistoric

FUNCTIONAL INTERPRETATION: Habitation

DIMENSIONS: 11.00 m by 10.80 m by 0.85 m (approx.)

DESCRIPTION: The enclosure is generally rectangular in plan, with several interior "compartments". The walls are constructed c. 1.00-2.50 m wide, of crudely stacked, blocky basalt boulders and cobbles. The walls are raised on both the interior and exterior sides, with formally faced sections on parts of the interior sides. The walls, however, are generally collapsed in appearance and rounded or sloping in profile. The enclosure contains a level, interior soil surface. It appears that a small terrace is constructed within the main enclosure and abutting the interior side of the east wall. A crude L-shaped rubble wall is built against the south side of the main enclosure. The L-shaped rubble wall vaguely delineates a second "compartment" with a level, interior soil surface. The northeast interior area of this L-shaped rubble wall contains a roughly level boulder concentration that vaguely resembles a terrace. A depression or sunken area is present east of the L-shaped compartment. No definite cultural deposit is visible, but one may be present subsurface.

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APPENDIX C

HISTORICAL DOCUMENTARY RESEARCH by Kepā Maly

Background

The following is a summary of the historical documentary research (HDR) compiled by Walker and Rosendahl (1989), for the Kahalu'u-Keauhou area of North Kona, Hawai'i. Cited within Walker's HDR are earlier historical studies by D. Barrere (1971), M.J. Tomonari-Tuggle (1985), and C. Silva (1985), all of whom relied heavily upon the work of S.M. Kamakau and A. Fornander for legendary and early-historic references.

Because there is little information on the early history of Kahalu'u, Walker's study, like most of the earlier studies, considered the Lands of Keauhou and Kahalu'u together, as they are adjacent and are often mentioned together in historic references. Both legendary and early historical references indicate that though Keauhou and Kahalu'u were not unimportant, they were secondary villages between the Kailua (Kamakahonu-Kaiakeakua) area and Ka'awaloa-Kealakekua; hence, Western ships had little reason to stop at them and they went undescribed in the journals of the early historians who sailed past.

Included in this HDR are references from a recently available PHRI Index of legendary accounts published in Hawaiian language newspapers. In particular, two previously untranslated accounts, *Ka'ao Ho'oniu Pu'uwai no Ka-Miki...* (The Heart Stirring Story of Ka-Miki) and *He Mo'olelo Ka'ao No Kepaka'ili'ula...* (The Story of Kepaka'ili'ula...*) provide us with new material with which to interpret the lands and setting of Kahalu'u, and the relationship of its early inhabitants to those people dwelling in surrounding *ahupua'a* (land divisions). Because these legendary references describe the relationships among traditional *ahupua'a* communities, a few of the sites mentioned here are beyond the boundaries of Kahalu'u. They are included because they appear important in the political and social setting of Kahalu'u, and this region of Kona.

About the Legends of Ka-Miki and Kepaka'ili'ula

The legend of Ka-Miki is set in the time of Pili-a-Ka'aiea (Pili), who was sovereign chief of all Kona c. the 13th century.

The tale concerns two supernatural brothers who travel around the island of Hawaii, vanquishing evil *'olohe* (skilled fighters) and priests whose conduct offended the gods. Contained in the story are descriptions of traditional life in ancient Hawai'i, as seen by native informants. Their story provides commentary on place name origins; site and community histories; local and regional practices; ceremonial sites, and *mele* (chant) texts.

Like Ka-Miki, *He Mo'olelo Ka'ao No Kepaka'ili'ula...* is about a youth who was born in an *'e'epa* (premature - mysterious) form and was given up for dead by his parents (both of whom were descended from Kuahailo and Hina the *akua - ali'i* [god-chiefs] who came from Kahiki, the distant, ancestral homelands of Hawai'i's people, and established the highest chiefly bloodlines of Hawai'i. At the time of Kepaka'ili'ula's birth, his parents, Makaokū and Hina lived near Moku-ola and ruled the district of Hilo.

Kepaka'ili'ula's birth was accompanied by numerous displays of natural phenomena: fragmented rainbows rested upon the ocean, rains poured down on the land, and the rivers flowed powerfully. His maternal uncles Ki'inoho and Ki'ihele took these signs as omens of Kepaka'ili'ula's nature. Unknown to the boy's parents, Ki'inoho and Ki'ihele rescued Kepaka'ili'ula and raised him, instructing him in all manner of fighting techniques and in the uses of his supernatural powers. When Kepaka'ili'ula came of age, his uncles went in search of a suitably beautiful and highly ranked chiefess to whom Kepaka'ili'ula could be married. The journey took them around Hawai'i, where they met with the chief Keolonāhihi and his wife Kahalu'u, parents of the sacred chiefess Mākole'a. A wedding was arranged, but Keolonāhihi broke the betrothal, setting in motion the events contained in the narratives referenced in this HDR.

The events contained in the cited portions of the Kepaka'ili'ula texts are centered in Kona District, in the lands extending from Ke'ei to Kailua, and on to the region of Kekaha. The lands of this region and associated sites are named for various *ali'i*, all of whom are related. Through known individuals identified in the legend, it can be determined that it is set in the late 16th century, immediately before the time of Lono-i-ka-Makahiki.

* This version of the account of Kepaka'ili'ula differs substantially from the version published in *The Fornander Collection of Hawaiian Antiquities and Folk-lore* (1917, 1918, and 1919). The earliest written accounts of Kepaka'ili'ula date back to c. 1863, and this version of the legend is attributed to David Malo (*Ka Hōkū o Hawai'i*, 3/13, and 3/20, 1919).

The Legendary Setting

In the Hawaiian language, "kona" may be translated as meaning "leeward". It is also used to describe a geographical location on each Hawaiian Island. Kona, Hawai'i is particularly associated with lore of Lono, a Hawaiian god of agriculture, who is also associated with the billowing horizon clouds and rain-laden clouds that are a manifestation of the seasonal Kona storms. Kona, Hawai'i also has rich legendary and historic period histories. The Hawaiian monarchy became established along Kona's shores, and chiefs were made and unmade. The people left their mark, and yet they lived within the wealth and limitations of their environment. It was in Kona, Captain James Cook was greeted as a god, and then met his death.

Kona is one of six major districts of the island of Hawai'i. A description of the boundaries of Kona, and its various inner divisions is documented in the legendary account of Ka-Miki (1992), as translated from the Hawaiian language newspaper *Ka Hōkū o Hawai'i*:

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!

[Kona] extends from Keahualono on the rocky expanse of Kanikū, to Kaulanamauna, next to the crawling (tangled growth of) 'ūlei bushes at Manukā, where it [Kona] clings to Ka'ū. (9/13/1917)

Traditionally, the district of Kona was divided into two geographical regions, Kona-'akau (North Kona) and Kona-hema (South Kona). The traditional boundary between these two Kona was marked by the coastal hill of Pu'u-o-hau, which lies between Hōkūkano and Haleki'i. These regions were further divided into the smaller *ahupua'a*, or sub-districts, which were under the jurisdiction of appointed *konohiki*, or landlords. The individual *konohiki* were in turn responsible to an *ali'i-'ai-ahupua'a* or *ali'i 'ai moku* (higher chiefs), who claimed the abundance the sub-districts or entire region as his personal wealth, for tribute to the gods, and for distribution to his attendants. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning.

The district of Kona extends from sea level to the upper reaches of Mauna Loa, which rises to an elevation of more than 13,670 feet. Kona hema was noted for its steep slopes, extensive agricultural plantations, and good fishing grounds. Kona 'akau, the larger of the two Kona divisions includes the entire volcanic mountain of Hualalai and was known for its

fishponds and ocean resources, and for its upland agricultural plantations and rich mountain forests.

It is in this setting that we find the project area, which is within the *ahupua'a* of Kaha-lu'u ([the] diving shore) which is on the western slope of Hualalai volcano, in the northern portion of Kona district. The legend of Ka-Miki provides us with one account of the naming of Kahalu'u, and early descriptions pertaining to some of the important individuals and/or features of the period.

The Political Setting (from the account of Ka-Miki)

The lands of Kahalu'u were named for the chief Kahalu'u-kai-ākea (Kahalu'u of the expansive or open sea), he was the father of the beautiful glowing skinned chiefess Mākole'ā, and this chief's lead counselor was Hale-kumu-ka-lani (Hale-o-Kāne) (4/9/1914). Kahalu'u was a contemporary of the chief Pōhaku-nui-o-Kāne, who controlled the lands from Keauhou towards Mā'ihī, and both Kahalu'u and Pōhaku-nui-o-Kāne were subordinate to "Pili-a-Ka'aiea, chief to whom all Kona paid tribute" (7/26/1917).

Kahalu'u Place Name Narratives (from the account of Ka-Miki)

Hale-kumu-ka-lani (Interpretive translation: House with its foundation in heaven; also identified as Hale-o-Kāne [Stokes 1991:67])

Halekumukalani was the name of a chief war advisor and games official of the chief Kahalu'u-kai-ākea, and the temple Halekumukalani in Kahalu'u was named for this individual. When Ka-Miki mā* arrived at Hōlualoa, Halekumukalani was serving as the official of contests being held at the *kahua* of Kāulaokalani. Competitors on the contest arena that day included Pālau'eka (a champion of Kahalu'u) and Ka-Miki (6/25/1914).

Hale-'ōpele (Kapu or sacred house; see also Halelā'au; project area Site No. 3822 [Stokes and Dye 1991:67])

Following the 'awa ceremony, which Ka-uluhe offered upon completion of part of the brother's 'ōlohe training, Ka-Miki and Maka-'iole ventured from Kalama'ula to visit some of the lands of Kona. Upon returning to Kalama'ula, Ka-uluhe, described the nature of the lands which Ka-Miki mā had visited:

At Kahalu'u, Hale'ōpele was an *āhua* (hillock-agricultural feature) covered with coconut trees (4/9/1914).

He-lani (A royal person or place)

Helani is a spring site and favorite retreat of chiefs at Kahalu'u. An *'ōlelo no 'enu* (poetic saying) for Kahalu'u praises the district and its spring, Helani:

Kahalu'u ua 'āina ala i ka wai puka iki o Helani

Kahalu'u, land of the small issuing waters of Helani (6/25/1914). [See also Waiku'iwai]

Kaha-lu'u (Diving shore)

Following the *'awa* ceremony that Ka-uluhe offered upon completion of part of the brother's *'ōlohe* training, Ka-Miki and Maka-'iole ventured from Kalama'ula to visit some of the lands of Kona. Returning to Kalama'ula, Ka-uluhe described the lands, features and people which they had seen:

The village with the walled pond and grove of *hau* and coconut trees was Kahalu'u, and Kahalu'u was the chief who controlled the *ahupua'a* which bears his name. The chief's full name was Kahalu'u-kai-ākea, and he was father of the beautiful glowing-skinned chiefess Mākole'ā... (4/9/1914)

Ke-ahi-olo (interpretive translation: The flickering flame)

Keahiolo was a priest who protected the land and and *'ōlohe* who served under the chief Pōhakunuiokāne [who governed the lands between Keauhou and Mā'ihī] (7/2/14). Keahiolo served as the contest official at 'Iwa'awa'a (Kohana-iki) during Ka-Miki's first appearance as a competitor on a *kahua le'ale'a* [contest field; 5/7/1914]. This exhibition at 'Iwa'awa'a occurred as a part of the dedication ceremonies and events held for the *hālau ali'i* (royal compound) of Ka'aipua'a, Kohana-iki.

Having started their journey around Hawai'i, Ka-Miki mā departed from the *kahua* of Kāulaokalani at Hōlualoa, and arrived at the residence of Keahiolo between Kahalu'u and Keauhou. This powerful priest was jealous of the abilities of Ka-Miki and Maka-'iole, and he sought to kill them. Keahiolo

called the brothers to share *'awa* with him, at the same time he picked up his *pīkoi* (tripping club), which he had hidden in a mat, and prepared to attack them (6/25/1914).

Ka-Miki knew the nature of Keahiolo, and Ka-Miki used the *'olohū* (an *'ulumai* tripping stone) Ka'aku-a-Mā'ihī to strike at the feet of Keahiolo, and thus defeated the *'ōlohe* priest. Keahiolo apologized for his deception, but Ka-Miki told him there was no value in his repentance, as it was made in fear of his death. Ka-Miki then told Keahiolo, "Your god has departed from you and taken our side. And so you have seen that Uli (goddess of sorcery) is a twofold deity, looking for that which is right and that which is wrong; as it is spoken in the prayer – *mele pule*:

<i>O Uli i uka,</i>	Hail Uli in the uplands,
<i>O Uli i kai,</i>	Uli in the lowlands,
<i>O Uli nānā pono,</i>	O Uli who looks for that which is correct, and
<i>O Uli nānā hewa...</i>	Uli who looks for that which is in error...

Because you leapt first, you erred against your god, and your god has left you. You have set aside the unwavering laws of the powerful gods and *'aumakua* which came down from ancient times, from the antiquity of Waiolōi and Waiolōlā. And so Nana-i-ke-kīhi-o-ka-malama and Kahuelo-i-ke-kīhi-o-Kā'elo, the descendants of Ka-uluhe-nui-hihikolo-i-uka and Lani-nui-ku'i-a-maomao-loa have come before you." Maka-'iole took compassion and chanted to Ka-Miki asking him to spare the priest. Ka-Miki agreed, Keahiolo repented and prepared *'awa* and a feast for Ka-Miki mā. The *heiau* near the Kahalu'u-Keauhou boundary was named for the priest, Keahiolo (7/2/1914).

Keahiolo then took Ka-Miki (also called Nana-i-ke-kīhi-o-ka-Malama) and Maka-'iole (also called Kahuelo-ku-i-ke-kīhi-o-Kā'elo) to the *kahua* of Kahō'e'e (Keauhou) where contests were to occur. Keahiolo presented Ka-Miki and Maka-'iole to the officials, stating they were his *mo'opuna* (grandsons); so they were allowed to enter the competition.

The champions, Haumanomano and 'Ōhi'amukumuku, were both defeated by Ka-Miki.

* mā - a Hawaiian word meaning: "and associates" or "and companions."

Because of their anger at being humiliated, Haumanomano and 'Ōhi'amukumuku chose to compete again, intent on killing Ka-Miki, Maka-'iole, and Keahiolo. After Ka-Miki defeated 'Ōhi'amukumuku and Haumanomano again, the chiefs of Keaouhou attempted to meet Ka-Miki mā and question them about their intentions. Ka-Miki, Maka-'iole and Keahiolo disappeared, going to the *hālau ali'i* (royal compound) of the chief Honalo (father of Kāināliu, the chiefess whom Ka-Miki had returned to life). Honalo mā prepared a feast, and 'awa was obtained from the uplands of Keaouhou to host the guests (7/2-16, 1914).

Kuhia (a site at Pu'uloa, Keaouhou) and 'Ōulu, expert runners and 'olohū fighters of Keaouhou chiefs, were sent to find Ka-Miki mā and bring them back dead or alive. The runners arrived at the compound of Keahiolo, and found no one there. Kuhia called out in chant - *Ea aku ua hala i Makakalo...* (Having arrived, and finding that one has passed to Makakalo... [could not be located]), lamenting his inability to locate Ka-Miki mā. Kuhia and 'Ōulu then went to Honalo, where they encountered Ka-Miki mā and met with their deaths (7/23/1914).

Before departing from Honalo, Ka-Miki mā sent Keahiolo to Apo'ula (Kohana-iki), where he would be cared for by their uncle, the chief Kapukalua. Kapukalua was a great fisherman-priest, and he lived with his guardians by the sea of Apo'ula. Ka-Miki instructed Keahiolo in using a chant with which he was to greet Kapukalua, and thus be acknowledged as a companion of Ka-Miki mā. Keahiolo fulfilled the instructions of Ka-Miki and was warmly greeted by Kapukalua and his court at Kohana-iki, where he remained. (8/13/14)

Ke'e-kū (Adze stone of Kū)

Having completed the contests in North Kona, Ka-Miki and Maka-'iole journeyed on to Ke'ei, where they met with, and were challenged by Nā-'ulu-o-Weli. Nā'uluoweli called upon his sister 'Ālanapō and the priest Ke'ekū to assist him and observe the contests. Ke'ekū, the high priest of these 'ōkana (combined land divisions) declined to participate (9/17/1914).

Ku'e-manu (Interpretive translation: To push like a bird; perhaps descriptive of 'ōlohe competition, with the symbolism of a cock fight)

The temple Ku'emanu was named for Ku'emanu a warrior champion who served the chief Kahalu'u-kai-ākea. Ku'emanu and Pālau'eka the champion of Kaumalumu, competed on the *kahua* of Kāulaokalani at Hōlualoa. During this contest, Halekumukalani (also a Kahalu'u champion and *heiau*) a general counselor for Kahalu'u served as the *ilāmuku* (contest overseer). Pālau'eka defeated Ku'emanu, and it was agreed that Ka-Miki would be the next contestant to compete against Pālau'eka (6/25/1914).

Mākole'ā (Glowing - red eye)

Following the 'awa ceremony which Ka-uluhe offered upon completion of part of the brother's 'ōlohe training, Ka-Miki and Maka-'iole ventured from Kalama'ula to visit some of the lands of Kona. Returning to Kalama'ula, Ka-uluhe described the lands, features and people which they had seen:

The village with the walled pond and grove of *hau* and coconut trees was Kahalu'u. Kahalu'u was the chief who controlled the *ahupua'a* which bears his name. Mākole'ā was the beautiful glowing-skinned daughter of Kahalu'u, and the *heiau* which bears her name was named for the chiefess (4/9/1914).

'Ōhi'a-mukumuku (Maimed or broken 'ōhi'a [*Metrosideros polymorpha*] tree)

'Ōhi'amukumuku was a master 'ōlohe and champion land securer for the chief Pōhakuuiokāne who controlled the *ahupua'a* from Keaouhou to Mā'ihī. The *heiau* of 'Ōhi'amukumuku (Kahalu'u) was named for this famous warrior.

While competing at Kahō'e'e (the contest field of Keaouhou), Ka-Miki defeated Haumanomano and won the coveted *lei-o-manō* (shark tooth knife). 'Ōhi'amukumuku was greatly angered, and tried to return the *lei-o-manō* to the local competitors. A contest between 'Ōhi'amukumuku and Ka-Miki was arranged, and the chiefs offered the *pikoi* (tripping club) Lawalawa-ku'i-a-ho'i, as a prize to the victor. This particular club had crosswise cuts across the wood (serrated edge) and a perforation through which it was bound with cordage. Indeed, through one of the extraordinary weapons of those people skilled in warfare of past times, and was highly coveted.

The contest between Ka-Miki and 'Ōhi'amukumuku took the forms of *kula'i* (shoving contests) and *auamo* (lifting one's opponent and throwing him from the arena). 'Ōhi'amukumuku was thrown from the *kahua* five times, thus the victory and prize went to Ka-Miki. All those gathered were amazed at 'Ōhi'amukumuku's defeat. 'Ōhi'amukumuku and Haumanomano were angered at being so humiliated, and made an agreement to kill Ka-Miki, Maka-'iole, and Keahiolo, who had sponsored Ka-Miki mā in this series of contests (7/9/1914).

Haumanomano returned to the *kahua* with his war club (see Haumanomano) and was defeated. 'Ōhi'amukumuku then challenged Ka-Miki to a *kākā lā'au* (spear fighting) contest. When the contest began, 'Ōhi'amukumuku thrust at Ka-Miki, aiming for his midsection, but Ka-Miki dodged the attacks, and his skills and agility were compared to those of the great, sacred hawk that circles in the heavens.

Ka-Miki praised 'Ōhi'amukumuku's skills but told him that he could not win. 'Ōhi'amukumuku responded that Ka-Miki could not avoid being killed by 'Ōhi-kapili-a-lo'ulo'u, his spear, cherished by 'Ōhi'amukumuku's *aumakua*. 'Ōhi'amukumuku struck at Ka-Miki but was thwarted, and Ka-Miki scored against him, striking his thigh and throwing him from the *kahua*. The officials called for a break in contest and the crowd surged forward to see this young champion. Ka-Miki mā took this opportunity to depart for Honalo (7/16/1914).

The chiefs of Keauhou greatly desired to meet with Ka-Miki, Maka-'iole, and Keahiolo, and a rumor arose that Ka-Miki mā were plotting to overthrow Pōhakunuiokāne and the regional chiefs. Thus the chiefs sent their runners, Kuhia and 'Ōulu to find Ka-Miki mā and bring them back dead or alive. Kuhia (also a site at Pu'uloa in Keauhou) and 'Ōulu arrived at Keahiolo's compound, but could not find Ka-Miki mā, so they then went to Honalo, where they encountered Ka-Miki mā and met their deaths (7/23/1914).

Kahalu'u and the Immediate Region: Accounts from the Legends of Kepaka'ili'ula and Ka-Miki

The following is a synopsis of *He Mo'olelo Ka'ao no Kepaka'ili'ula* with emphasis upon the important events and individuals associated with the Kahalu'u region)

The lands of Kahalu'u were named for the chiefess Kahalu'u, the wife of Keolonāhihi and mother of Mākole'ā. Following his journey through Hilo, Puna, Ka'ū, and into Kona, Ki'ihele found Mākole'ā to be the most beautiful, and best choice for marriage to his ward, Kepaka'ili'ula. Kahalu'u and Keolonāhihi agreed the Kepaka'ili'ula and Mākole'ā should marry, and Ki'ihele went to call Ki'inoho and Kepaka'ili'ula mā to Kahalu'u, Kona (3/20 - 6/5, 1919).

Ki'ihele, Ki'inoho and Kepaka'ili'ula traveled from Hilo to Kona. The narrative of their journey describes the many sites they visited along the way. Once in Kona, Kepaka'ili'ula waited in the uplands of Kahalu'u, at the great banana plantation of the chief Kaho'oali'i, which extended from the Kaumalumalu-Kāpala'alaea area to Ke'ei, while preparations were made for his meeting with Mākole'ā. When things were ready, Kepaka'ili'ula and his guardians came down to the shore of Kahalu'u, where they stood not far from the royal house of Mākole'ā. Standing before them was the priest of Kahalu'u who was called Hāli'ikolomea. Through the priest's divining skills he had seen the true dual nature of Kepaka'ili'ula, and understood that he was descended from the *ali'i-akua* of antiquity. Hāli'ikolomea presented offerings to Kepaka'ili'ula, and the observances were completed. Kepaka'ili'ula responded with a *mele kānaenae* (chant offering) to Mākole'ā and those gathered with her:

*Kau iluna ka wai a ka Nāulu
'Alohi 'ula i ka pali o
Lehulehu i ka luna o Koa'ekea a
Pa'a pono mai Kona i ka ehū
a ke kai a
Kipū lua i ke one o Kaiakeakua*

* *Kaumalumalu* - Legendary narration on regional agriculture. The legend of Kepaka'ili'ula describes the banana plantation of Kaumalumalu as extending across the uplands from Kāpala'alaea to Ke'ei. The legend of Ka-Miki identifies several plantations including the taro plantations of *La'a-hiwa-mai-Kahiki* (from Keauhou to Mā'ihī), and *Kuapehu* (from Keōpuka to Kanaeue). The narratives describing *Kuahewa*, the plantation worked by Kamehameha I, depict a cultivated area that extended from Kailua through Kahalu'u and Keauhou. The plantations described in these three narratives probably represent major components of what has come to be called The Kona Field System, and the legends provide a picture of agriculture in upland Kahalu'u.

*He akua ka hoa he 'ike 'ole mai e
'Auwe ka mea aloha 'oia la e ho'i a!*

The Nāulu showers
that are placed above
Appear to glow red in the Koholālele light on the
cliff of Koholālele.
Indeed, the multitudes are gathered at the
heights of Koa'ekea,
but Kona is firmly embraced by the sea-mists,
And there is a twofold calm upon the
shores of Kaiakeakua
A god-chief is the companion that is not seen,
But here is one that can indeed be cherished!

Hāli'ikolomea then called Kepaka'ili'ula into the
compound, telling him that he was indeed welcome
to know the famous waters of Kahalu'u. Because
Mākole'ā wanted to be near Kepaka'ili'ula, she
beckoned him to join her on her sacred platform
(*nu'u kapu*), calling to him with a chant of affection.

All things having been fulfilled, the chiefess Kahalu'u
could not deny the value of this relationship; thus,
Kahalu'u i ka 'āina kaulana i ka wai puka iki o Helani
(Kahalu'u chiefess of the land famous for the small
flowing spring of Helani) gave her blessings to
Mākole'ā and Kepaka'ili'ula (6/19-6/26, 1919).

Unknown to Kahalu'u and Mākole'ā mā, Keolonāhihi
had broken his agreement allowing Mākole'ā to
marry Kepaka'ili'ula, and had instead promised to
take the young chiefess to Maui nui a Kama (Maui
great island of the chief Kama) where she would wed
the high chief Kaikipa'ananea (Kaiki). Having pre-
pared the canoes, Keolonāhihi forced Kahalu'u and
Mākole'ā to travel to Maui.

This turn of events greatly angered Kepaka'ili'ula,
and he challenged Keolonāhihi to a fight. Fright-
ened, Keolonāhihi also fled to Maui; thus,
Keolonāhihi left behind those he loved and his
favorite places. Among the favorite places of the
Kona chiefs was the spring site of Wai-ku'i-wai, at
Kahalu'u, where the *ali'i* gathered to relax and play
the game of *konane* (7/3-7/17, 1919).

Because many of the *ali'i* of Kona were related to
Kahalu'u, Keolonāhihi, and Mākole'ā, they rallied
to challenge Kepaka'ili'ula in battle. These chiefs
included Kaho'oali'i, who controlled the upland
plantation called Kaumalumalu, which extended

from Kaumalumalu-Kāpala'alaea to Ka'awaloa and
Kealakekua, Kuapehu, Kāināliu, Hōlualoa, Onouli-
ākea, Hōkūkano, and Kailua. All of the chiefs were
associated with the lands that now bear their names.

Calling upon his god Kā'ili, Kepaka'ili'ula defeated
each of the chiefs in battle, and came to control all
of Kona from Kekaha wai 'ole to Ke'ei. At this time
the land was greatly populated, and because
Kepaka'ili'ula was found to be a just chief, the
people of the land were satisfied with his benevo-
lence, and they accepted him as the *ali'i 'ai moku*
(chief who consumes, or controls, the district).
Following the people's acceptance of Kepaka'ili'ula
as their chief, tribute from all Kona was presented to
Kepaka'ili'ula. All of the offerings of the wealth of
the land were gathered at one site and presented to
Kepaka'ili'ula. The mound of offerings was so great
that it looked as if a hill had been formed. To this day,
the sight where the offerings were gathered is called
Pu'u, which is above the place named for Keolonāhihi
[near the Kaumalumalu border of Hōlualoa].

Kepaka'ili'ula divided the wealth, offering the first
portion to his god. He then provided a portion to the
families of his trusted supporters and returned the
rest to the people of the land. To Kepaka'ili'ula is
attributed the saying:

*O ke ali'i mālama kānaka a ho'omana'o mau i ka
mōhai i nā akua, 'oia ana no ke ali'i e kā i ka moku*

The chief who cares for his people and remembers
to pay tribute to his gods, is the chief who will stand
upon [be supported by] the island (7/24-11/13, 1919).

Seeing that there was peace in Kona, Kepaka'ili'ula
then departed from the lands of the Kahalu'u area
(11/20/1919). The legend then describes how
Kepaka'ili'ula secured the aid of Mākole'ā's uncle
Kukuipahu of Kohala in mounting an attack on
Maui. Kukuipahu went to the compound of
Kaikipa'ananea at Olowalu, Maui and told Mākole'ā
about the events that had occurred on Hawai'i, and
informed her of her father's treachery, and told her
that Kepaka'ili'ula still desired her as his wife.

Upon hearing these things from her uncle Kukuipahu,
Makole'ā chanted to him asking that he would give her
message to Kepaka'ili'ula. In the chant she spoke of
the beauty of Helani at Kahalu'u and the pleasant
time which she had spent with Kepaka'ili'ula:

Ku'u hoa o ka malu niu o Helani
My companion, sheltered there by the coconut palms of Helani.

E hea pua'i nei ia'u e ho'i aku wau
My call flows forth to you. I will return.

Ku'u hoa i ka pe'a huli luna e Kona e
You are my companion of the upper reaches of Kona.

He 'Eka ka makani o kawa e 'olu ai...
Where the 'Eka breezes refresh us two...

While Kukuipahu was on Maui, Ki'ihele journeyed to Hilo and revealed Kepaka'ili'ula's identity to his parents Makaokū and Hina, who joined him, along with over 30,000 warriors of Hawai'i, in the quest of reclaiming Mākole'ā (11/27/1919–2/26/1920).

When the battle preparations were completed, the canoe fleet set sail, and it stretched from Kohala, Hawai'i to Kahikinui, Maui. Landing at Pu'umoa, final battle preparations were made, and the people of Lāna'i and Moloka'i joined together in supporting Kepaka'ili'ula against Kaikipa'ananea, as well (3/4/1920). The battle took place upon the *kahua* (battle field) of Waine'e, a short distance above the Waine'e Church. It was there that Kaikipa'ananea was killed by Kepaka'ili'ula, and Keolonāhihi was killed by Makaokū. So it was in this way that Mākole'ā the beautiful chiefess of Kahalu'u came to marry Kepaka'ili'ula (3/11 - 4/1, 1920).

Kepaka'ili'ula mā lived in Lāhaina for one year, and then Kepaka'ili'ula desired to visit O'ahu, Kaua'i, Ni'ihau, and journey on to Kahiki, the land of his ancestors. Following numerous events, Kepaka'ili'ula returned to Hawai'i and with Mākole'ā, he settled in his compound which was a short distance from the *heiau* of Pāka'alana at Waipi'o. Thus they lived out the rest of their lives in peace (4/8 - 12/9, 1920).

Kau-malumalu (Shaded or protected place); from the narratives of Ka-Miki)

Following the 'awa ceremony that Ka-uluhe offered upon completion of part of the brothers' 'ōlohe training, Ka-Miki and Maka-'iole ventured from Kalama'ula to visit some of the lands of Kona. Upon returning to Kalama'ula, Ka-uluhe explained to the brothers the nature of the lands, features, and people that they had seen:

Kaumalumalu was named for the chief Kaumalumalu; he was the *ali'i ai ahupua'a, me nā paukā 'āina a me nā 'ōkana 'āina o Pāhoehoe, La'aloa, a me Kāpala'alaea*—the chief to whom the sub-districts and land parcels of Pāhoehoe, La'aloa and Kāpala'alaea answered.

Kaumalumalu was described with the saying: *'ōlelo no 'eau:*

Kaumalumalu i ka hekuawa.
Kaumalumalu is the sheltered valley.

(Said in praise of the calm and beauty of this area)

When Ka-Miki and Maka-'iole set out on their journey around Hawai'i, they started in the lands of Kona. Upon arriving at the *kahua* of Kāulaokalani in Hōlualoa, contests were being held when Ka-Miki and Maka-'iole approached. Pālau'eka, land-securing champion of Kaumalumalu and Ku'emanu, the champion of Kahalu'u, were competing. Pālau'eka defeated Ku'emanu, but was in turn defeated and killed during his contest with Ka-Miki. Because Pālau'eka died at Hōlualoa, the land upon which the *heiau* of Keolonāhihi sits was named for Pālau'eka. (6/25/1914)

Haumanomano (Interpretive translation: Bountiful dew); from the narratives of Ka-Miki, as related to an account of 'Ōhi'amukumuku)

Haumanomano lived in the lands which now bear his name, the *'ili 'āina lele muku* (detached land parcels) between Keauhou (2) and Honalo. Haumanomano was a champion warrior and instructor of *lua, kākā lā'au*, and many other skills for the chiefs of Honalo.

Keahiolo led Ka-Miki and Maka-'iole to the *kahua* of Kahō'e'e in the parcel of Ka'awale, Keauhou. Presented as the grandsons of Keahiolo, Ka-Miki mā were allowed to enter the contests, and Haumanomano was selected to compete against Ka-Miki.

The chiefs of Keauhou offered a *lei-o-manō* (shark-tooth knife) as the victor's trophy. The *lei-o-manō* was made by lashing sharks teeth to the wooden handle with *olonā* (*Touchardia latifolia*) cordage, and was one of the foremost and most highly coveted weapons of ancient times.

Haumanomano thought he would win easily, and leapt onto the *kahua*, grabbing Ka-Miki (who was

competing under the name Nana-i-ke-kihi-o-ka-malama). Ka-Miki promptly threw Haumanomano out of the *kahua*. This occurred ten times, and all the local competitors were angry that Haumanomano had been so easily defeated by this stranger who Keahiolo called his grandson.

The officials called Kuhia, the chiefs' runner to take the *lei-o-manō* to Ka-Miki, as his prize for victory over Haumanomano, and 'Ōhi'amukumuku was called as the next contestant. Ka-Miki defeated 'Ōhi'amukumuku as well. Haumanomano and 'Ōhi'amukumuku then joined together in a pact to kill Ka-Miki, Maka-'iole, and Keahiolo (the priest because he sponsored Ka-Miki mā).

When the next round of contests began, Haumanomano entered the *kahua* and challenged Ka-Miki to fighting with *hauna lā'au* (war clubs). Haumanomano's club was named 'Io; it was more than three fathoms long and more than three feet in diameter; it glistened with the oils of coconuts and *kukui*. Haumanomano then called to Ka-Miki, telling him that he would indeed need great wisdom to escaped from death dealt by his powerful *hauna lā'au* (7/9/1914).

The contest official asked Ka-Miki, where his club was, and Ka-Miki explained that it was with his teacher (Ka-uluhe). Ka-Miki chanted to Maka-'iole, calling his name attributes, and requesting that he go to Kalama'ula and fetch the club 'Ōlapa-kahuila-o-ka-lani - mele:

E Kahuelo-i-ke-kihi-o-ka-malama,
Say Kahuelo at the point of light

O Kā'elo, 'elo ka malama,
O Kā'elo [star] of the moist season,

O Kā'elo, 'elo ka lā...
O Kā'elo [star] of the moist days...

Like a swift wind that scatters the leaves, Maka-'iole departed and fetched the war club. In no time, Maka-'iole returned with the club, and when those gathered at the *kahua* saw how quickly he had returned, and how great the club he bore was, they knew that these 'ōlohe were true experts. Ka-Miki asked Haumanomano how victory would be gained, and Haumanomano said only by the death of the opponent.

When the contest began, Haumanomano leapt to attack, but Ka-Miki knew Haumanomano's techniques, and dodged the attack. Ka-Miki struck at Haumanomano throwing him from the *kahua*, and the assembled crowd cried out at this great show of skill (7/16/1914). 'Ōhi'amukumuku then leapt to the *kahua*, challenging Ka-Miki to a spear-fighting contest. Having defeated both Haumanomano and 'Ōhi'amukumuku, Ka-Miki mā departed from Keauhou for Honalo.

Additional References To Prehistoric and Historic Kahalu'u

Additional pre-contact history of Kahalu'u was recorded in Kamakau (1961) and Fornander (1969), both of whom recorded Hawaiian legends, genealogies, and traditions in the 19th century. M.J. Tomonari-Tuggle (1985) constructed a prehistoric cultural sequence for the Kahalu'u-Keauhou area based, primarily on the work of Kamakau and Fornander, and on archaeological work conducted in the area during the 20th century. Tomonari-Tuggle notes that the sequence is only approximate, because the dating is based on available genealogical data, which is open to dispute, and on a small number of hydration-rind age determinations.

The Tomonari-Tuggle prehistoric sequence extends from c. AD 1000 to AD 1778 and is divided into three periods. Summaries of her descriptions of the three periods, presented below, provide an overview of the Kahalu'u-Keauhou area prior to 1778, when Captain James Cook arrived in the islands:

Pre-AD 1000 to the 1300s - Kahalu'u-Keauhou is initially settled sometime after AD 1000. Settlement is marine-resource-oriented with habitation probably focused around Kahalu'u and Keauhou Bays. Kin-based social and economic ties link the coastal areas in the vicinities of the bays. By AD 1300, upland areas at least 4,000 feet inland are cultivated. Subsequently, areas further inland are cultivated.

Early Traditional Period - Generally covers 14th-16th centuries. Initial development of social organization recorded by early western explorers. During 14th century, Kona Field System established. During 15th century, occupation of dry uplands probably permanent. Increasing separation of chiefly class from commoners. In 16th century population stabilized and ahupua'a established as socio-economic unit.

Late Traditional Period - Generally covers 16th-18th centuries. First references to Kahalu'u-Keauhou in traditional literature (Tomonari-Tuggle IN Walker and Rosendahl 1989:8).

It was about fifteen years after Cook's arrival that the first written reference to Keauhou, which is situated next to Kahalu'u, appears. It was written by Menzies, a surgeon with the Vancouver expedition. Menzies described Keauhou in 1794 as "a small cove surrounded by a scattered village belonging to Ke'eaumoku" (1920:149). Thirty years later, in 1823, the missionary, William Ellis, toured of the island. Traveling from Kailua towards Ka'u, Ellis stopped at villages along the way to talk with, and preach to, the natives.

Upon departing from the canoe-making sheds of Pāhoehoe, his party traveled towards the shore of Kahalu'u:

...where a smart shower of rain obliged us to take shelter in a house by the road side...the people of the house...listened attentively, and continued the conversation till the rain abated, when we pursued our journey. We passed another large heiau, and traveled about a mile across a rugged bed of lava, which had evidently been ejected from a volcano more recently than the vast tracts of the same substance by which it was surrounded...There was a kind of path formed across the most level part of it, by large smooth round stones, brought from the sea-shore, and placed about three or four feet apart. By stepping from one to another of these, we passed over the roughest piece of lava we had yet seen; and soon after five p.m. we arrived at Keauhou, a pleasant village, containing one hundred and thirty-five houses...we had not been long in the village when about one hundred and fifty people collected round the house in which we stopped (Ellis 1963:75-76).

On July 18, 1823, Ellis and his missionary companions spent the night at Keauhou. That day Ellis had counted 610 houses and 19 *heiau* on the eight-mile stretch of land between Kailua and Keauhou and estimated that the uplands contained another 100 houses. Allowing five persons to a house, Ellis and his companions estimated that there were 3,550 persons in the area (ibid).

Sometime later, Keauhou was described by S.D. Mackintosh, editor of *The Sandwich Island Gazette and Journal of Commerce*, as "a picturesque retreat...said to have been a favorite residence of the Queens of olden days, at the periods when in the maturity of events, they were inclined to confer upon the nation new heirs to royalty" (Mackintosh 1838:L2).

Early missionary accounts which contain references to Kahalu'u and Keauhou include those by A. Bishop (1892), S.E. Bishop (1916), and J.D. Paris (n.d.). Unpublished documents containing references to the two areas include mission station reports and missionary letters. The mission station reports provide information on births, deaths, and marriages, but the information is by district, not by specific *alupua*'a.

Several Hawaiian scholars who wrote about early Hawaii were trained by missionaries, and it is primarily from the works of these scholars that Hawaiian genealogies and chronologies of events in early Hawaii have been formulated. The writings of Samuel Mānaiakalani Kamakau, in his chronicle of the *Ruling Chiefs of Hawai'i* (1961), provides some of the most noteworthy information on Kahalu'u.

While relating the account of 'Umi-a-Līloa ('Umi son of Līloa) and his unification of the island of Hawai'i under his rule, Kamakau states that 'Umi lived in, Kona, where the climate was warm. The chiefs lived in Kailua (1961:19). 'Umi is also credited with promoting extensive cultivation of the land and fishing of the sea. In the lands of Kahalu'u, Pā-o-'Umi ('Umi's enclosure) is said to be a *heiau ho'oūluulu 'ai* (a temple for promoting the increase of agricultural product). Stokes identifies 'Umi-a-Līloa as the builder of Pā-o-'Umi (1991:80-81). This *heiau* is within the project area lands and is identified as Site 3823.

It is from the writings of Kamakau and other early Hawaiian historians that led Barrere (1971), to the conclusion that it is from the time of 'Umi that Kona became the preferred residence of the Hawai'i Island ruling chief. During the time of 'Umi, the Kona coastal region between Kailua and Keauhou grew in political and religious significance. As a result, the population also grew, and the increasing demands of a growing community required intensified development of the agricultural systems for which the area around Kahalu'u is well known.

Additionally, Kamakau comments on people, events, and features associated with Kahalu'u, these references include:

1. At Hōlualoa and Kahalu'u were extensive coconut groves (ibid:56);
2. Kalani'ōpu'u dwelt at Keauhou so he could enjoy the surf of Kahalu'u and Hōlualoa (ibid:105);
3. Following the death of Kalani'ōpu'u the lands of Kahalu'u and the two Keauhou were among those divided between the chiefs (ibid:120);

4. Upon departing from O'ahu [c. 1812], Kamehameha I returned to dwell on Hawai'i. The time of his return was close to that of the Makahiki Celebration, and the heiau of Hikiau at Kealakekua and 'Ōhi'amukumuku at Kahalu'u were made kapu by Kamehameha I, in observance of the Makahiki (ibid:200);
5. The chief Ka-lua-i-Konahale Kuakini, brother of Ka'ahumanu, was born at Kahalu'u in 1791 (ibid:388); and
6. ...the high chiefess Ke-ka-ulu-ohi, granddaughter of Nāmahana and Ke'e-au-moku was brought up at Kahalu'u and Keauhou, where she was fondled as if she were a feather lei [made] from the precious mamō bird (ibid:394).

One of the early traditional chiefs who is specifically linked with Kahalu'u-Keauhou is Lono-i-ka-Makahiki, grandson of 'Umi (Barrere 1971). The story of Lonoikamakahiki (Lono; not to be confused with the god, Lono) is presented in Kamakau (1961:47-61) and in Fornander (1916-1917, 4:256-358; 1918-1919, 5:436-445) and the stories in each are somewhat different. One story is that Lono was an *ali'i nui* who directly controlled the districts of Ka'ū and Puna. During Lono's reign, chiefs of other Hawai'i Island districts rebelled against him. Lono, with the help of a Puna chief, put down the rebellion and restored order. It was during Lono's time that the Maui chief, Kamalālāwala invaded Hawai'i. Lono defeated Kamalālāwala and it is said that Kamalālāwala was sacrificed on a Kahalu'u heiau, either 'Ōhi'amukumuku or Ke'ekū (Barrere 1971:4). According to Fornander, following Lono's island-wide travels and success in his battles, he lived in Kahalu'u (1916-1917, 4:356). Various heiau in Kahalu'u are attributed to Lono, including 'Ōhi'amukumuku, Ke'ekū, Mākole'ā, and Keahiolo.

Oral tradition has it that following the time of Lono, the island remained unified, with a brief upheaval leading to Alapa'inui's gaining power. Another story indicates it was not until the first half of the 18th century that Hawai'i was once again ruled as a single political unit. Alapa'inui, a member of a Kohala family of chiefs, ruled the island. In 1752, Alapa'inui was challenged by Kalani'ōpu'u, chief of Ka'ū and Puna. Kalani'ōpu'u declared himself independent of Alapa'inui, and when Alapa'inui later died, Kalani'ōpu'u defeated his successor and became the *ali'i nui* (Fornander 1969:145).

It was during Kalani'ōpu'u's rule that James Cook arrived in Hawai'i. During his rule Kalani'ōpu'u visited Keauhou and Kahalu'u intermittently. Sometime after the death of

Captain Cook, it is said that Kalani'ōpu'u spent time in Kahalu'u and Keauhou, diverting himself with Hula performances (Fornander 1969:200). According to Kamakau (1961:105), Kalani'ōpu'u moved to Keauhou, where he could surf in the waves of Kahalu'u and Hōlualoa. When Kalani'ōpu'u died, Kamehameha I rose to power on Hawai'i Island. Helping him rise was Ke'eaumoku. As a reward, Ke'eaumoku was apparently awarded Keauhou and Kahalu'u.

The numerous heiau and the large residential features in the Kahalu'u area attest to the religious significance of Kahalu'u. Aside from the heiau attributed to Lono-i-ka-Makahiki, Lahai, Hale-o-Kāne (Hale-kumu-ka-lani), Hale-lā'au (Hale-'ōpele), Ku'emanu, Moku-ahi-'ole (also called Po'o Hawai'i), Ka-pua-noni, Hana-ka-lau-'ai, Hāpai-ali'i, Pā-o-'Umi, and another Ke'ekū (also called Kamike'ekū) are among the known heiau and/or residential sites of Kahalu'u.

Aside from Pā-o-'Umi (Site 3823) mentioned earlier in the report, Hale-lā'au (Site 3822) is the only other heiau identified within the project area. Hale-lā'au (wooden or agriculture/healing house) is described by Stokes as, "An agricultural heiau... built on the high ground overlooking the village" (1991:67) The general term applied to the agricultural class of temples is *ho'ōhūulu'ai*; these were temples or shrines designed to promote rainfall and agricultural abundance, and they were places at which to pray for healing rains during drought. This class of temple is usually associated with the gods Lono and Kāne, who brought life to the land with their rain, wild growth, and light forms.

The identification of Hale-lā'au as an agricultural heiau, built on high ground, is consistent with the earlier reference from the Ka-Mūki legend that identifies Hale-'ōpele (Sacred house [site of a temple]) as an *āhūa* (hillock-agricultural feature) covered with coconut trees, in the Kahalu'u area above the village (4/9/1914). That extensive plots of land were given to agricultural pursuits, and that rituals associated with agriculture were integral to life in Kahalu'u and the lands of Kona is well documented. In *Native Planters*, Handy (1972) describes several aspects of native life that are important in interpreting agriculture and rituals in Kona.

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, and 'Ulupalakua, on Maui. At both of these places 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 (1972:14).

Handy states that Lono, god of agriculture, fertility, and the rituals for inducing rain fall is plainly identified as being centered in Kona. It is there that Lono is said to have introduced taro, sweet potatoes, yams, sugarcane, bananas, and 'awa. Citing William Ellis, Handy also points out that the northern part of Kona, including Kailua, Kealakekua, and Honaunau, was densely populated, and that the mountainsides were cultivated to a considerable extent (ibid:523).

One additional reference from Handy describes the plantation that belonged to Kamehameha I: "In the uplands above Kahalu'u, Keauhou, and Kailua, was the vast plantation named Kuahewa (Huge). To protect these lands, which were cultivated for his people... Kamehameha established the law that anyone who took one taro or one stalk of sugarcane must plant one cutting of the same in its place" (ibid:524).

Government Land Records

Government land records in the Indices of Awards (1929) provide a little information on Kahalu'u-Keauhou. Records indicate that during the Māhele, of 1848 Victoria Kamāmalu received Kahalu'u (LCA 7713:6; Royal Patent 6856) and half of Keauhou (Keauhou 1); her brother, Lot Kamehameha, received the other half of Keauhou (Keauhou 2). Kamāmalu and Lot Kamehameha were great-grandchildren of Ke'eumoku and Nāmahana. In addition, 126 Land Commission Awards (LCAs) were granted in Keauhou and Kahalu'u. Fifty-six of the LCAs were awarded in Kahalu'u, the lots ranged from 0.07-4.40 acres. In Kahalu'u, 28 of the LCAs are clustered along the north edge of Kahalu'u Bay; the other 15 are scattered south of the bay. Based on LCA records, early crops grown in the LCAs include sweet potato, pumpkin, yam, coffee, taro, breadfruit, oranges, gourds, and melons.

In addition showing to whom land was distributed, the land records, indicate the general population of, and the distribution of, the population in Kahalu'u-Keauhou. It is well-documented that under the reigns of Ke'eumoku and Kamehameha, Kahalu'u-Keauhou was a focus of political and religious activity, and sustained a village population that extended at least 1,200-1,500 feet inland of the coast. However, land records indicate that by the mid-1800s, the population was declining, as it was all along the Kona coast. By 1885, according to an early map, Keauhou consisted of only about 16 structures, including a store and a school house. Little is known about Kahalu'u during this period; the only records for Kahalu'u for this period indicate the taxable

population declined from 57 to 40. Meanwhile, in upland Kona areas, where there was ranching and commercial coffee production, the population was growing rapidly. This growth was not only in terms of the traditional ethnic population, but in terms of a new population of Chinese immigrants, which government records show to have been living in Keauhou and Kahalu'u since 1870.

During early 1900s, the pattern of population movement from the coastal areas to the uplands continued. During this period Keauhou was described as "the end of the road" and Kahalu'u was merely a cluster of houses on the way to the end of the road. A visitor during this period described Keauhou Bay as "miles off the beaten path...a place where people used to live in numbers and now live no more." (Schenck 1931:80). On a 1928 USGS map, only 15 structures are shown around He'eia and Keauhou Bays and 12 structures are shown around Kahalu'u.

In Summary

Initial Hawaiian occupation occurred in small, protected bays and shorelines, where there was easy access to marine resources and coastal springs. These coastal communities and immediate vicinities were the sites of the first agriculture in Hawai'i. As the population grew and the communities expanded, the political and religious systems became more formalized. The *ko kula kai* and *ko kula uka* (coastal and upland plains) were extensively planted with important staple and supplemental crops that were less water-dependent than the *kalo wai* (wet taro) that was the staple of the *ko'olau* (windward) side of the island, with its watered valleys. Pu'epu'e (planting in built up mounds), *mākālua* and 'umoki (planting in dugout-mulched holes) are three methods of planting techniques which are recorded as having been extensively used in this region of Kona.

Crops such as sweet potatoes, sugarcane, bananas, breadfruit, gourds, and coconuts etc., provided the carbohydrate of the Hawaiian diet. On the upper slopes, agriculture would have included propagation and harvesting of *olonā* (*Touchardia latifolia*) for cordage, and 'awa (*Piper methysticum*) for ceremonial and domestic use, and various woods and other resources were collected from the upland forests, and these were used for spears, paddles, canoes, and tools.

Fishing in this region was considered some of the best on Hawai'i, and it is likely that a great deal of energy went into harvesting ocean resources. Though farmers probably gathered some ocean resources, and fishermen probably kept some food plants near their homes, it is generally accepted that many of the tasks related to the well-being of the

community as a whole were entrusted to specialists. It is therefore reasonable to assume that the fishermen provided fish and other ocean resources to the planters, who in turn supplied the products of the land to the fishermen.

Following unification of the islands under the rule of Kamehameha I, the lands of Kahalu'u and Keauhou were given to *ali'i* who had supported the chief and remained loyal to his descendants. Following the *māhele* of 1848, the lands were further divided between Kamehameha's descendants; thus, much of the land is now controlled by Bishop Estate. Additionally, small parcels of land were also given to natives who had lived upon, and worked the land.

During this period, the Hawaiian population was in decline and by the mid-1800s, foreign land use, such as upland

ranching and the cultivation of coffee and other crops was being developed along with other Western business interests. From the late 1800s through the early 1900s, immigrant populations rose, and often the immigrants outnumbered the native Hawaiians. There is little documentation regarding events in Kahalu'u during this time.

By 1928 there were only a few buildings at Kahalu'u, although the Kona coast remained a popular retreat for some of the old families of Hawai'i. Subsequently the Kahalu'u-Keauhou coast, and much of Kona as well, saw the development of hotels and other resort facilities. Along with resort development came the increased demand for housing for both resident-workers and part-time residents. Development has greatly modified both the natural and cultural landscapes of this area, often destroying all traces of the past.

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APPENDIX D

ARTIFACT PHOTOGRAPHS

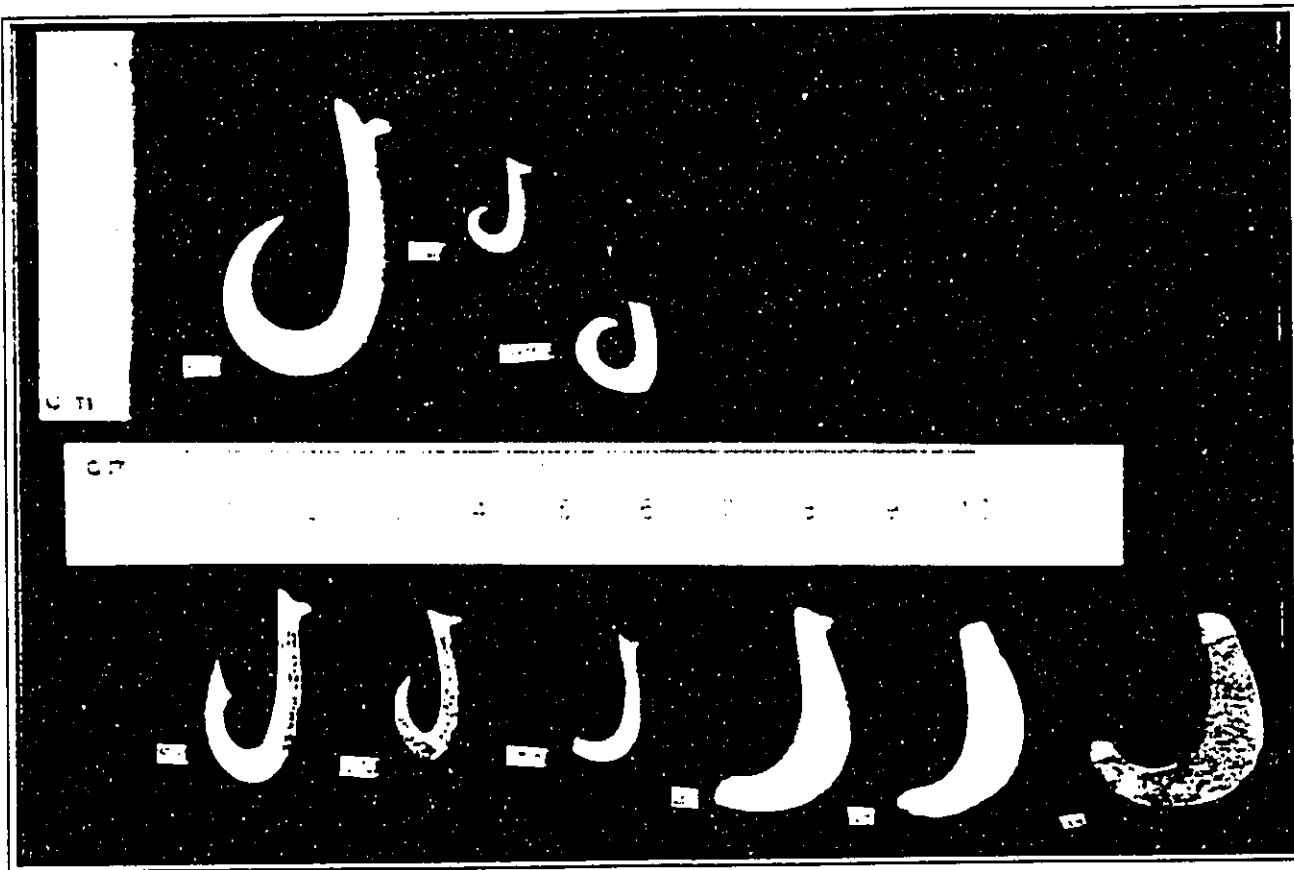


Figure D-1. One-piece Hooks (PHRI Neg. 4455-2)

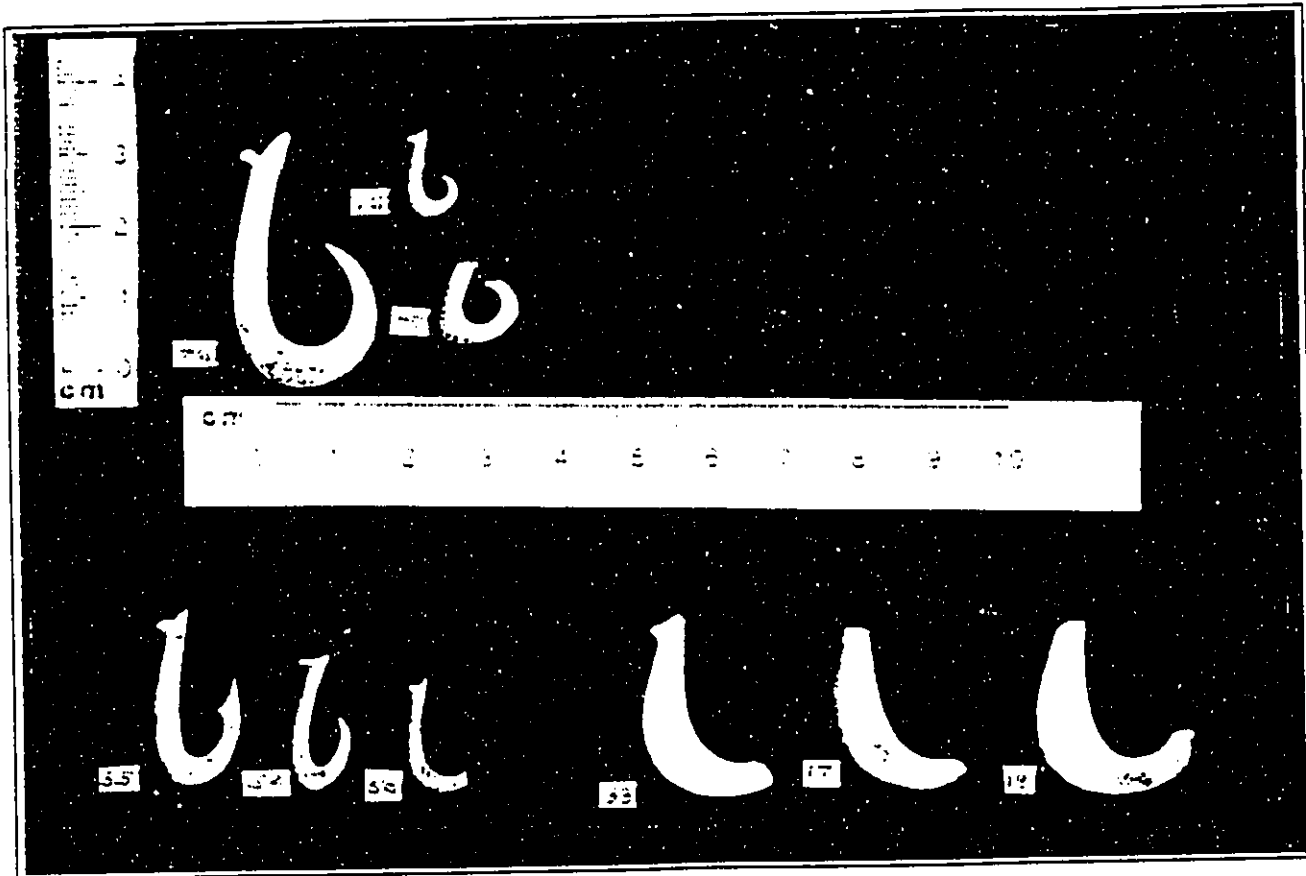


Figure D-2. One-piece Hooks (PHRI Neg. 4450-1a)

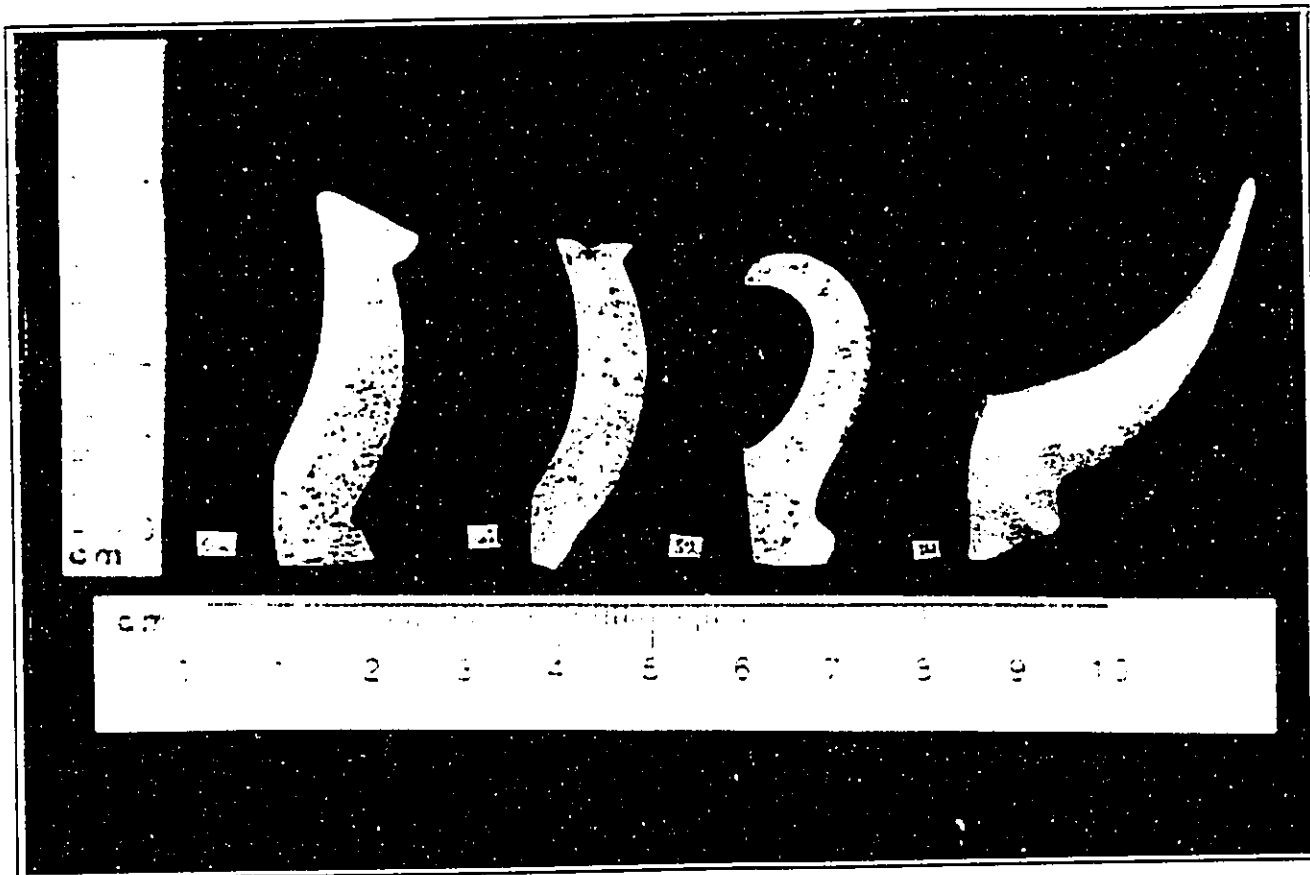


Figure D-3. Two-piece Hooks (PHRI Neg. 4455-4)

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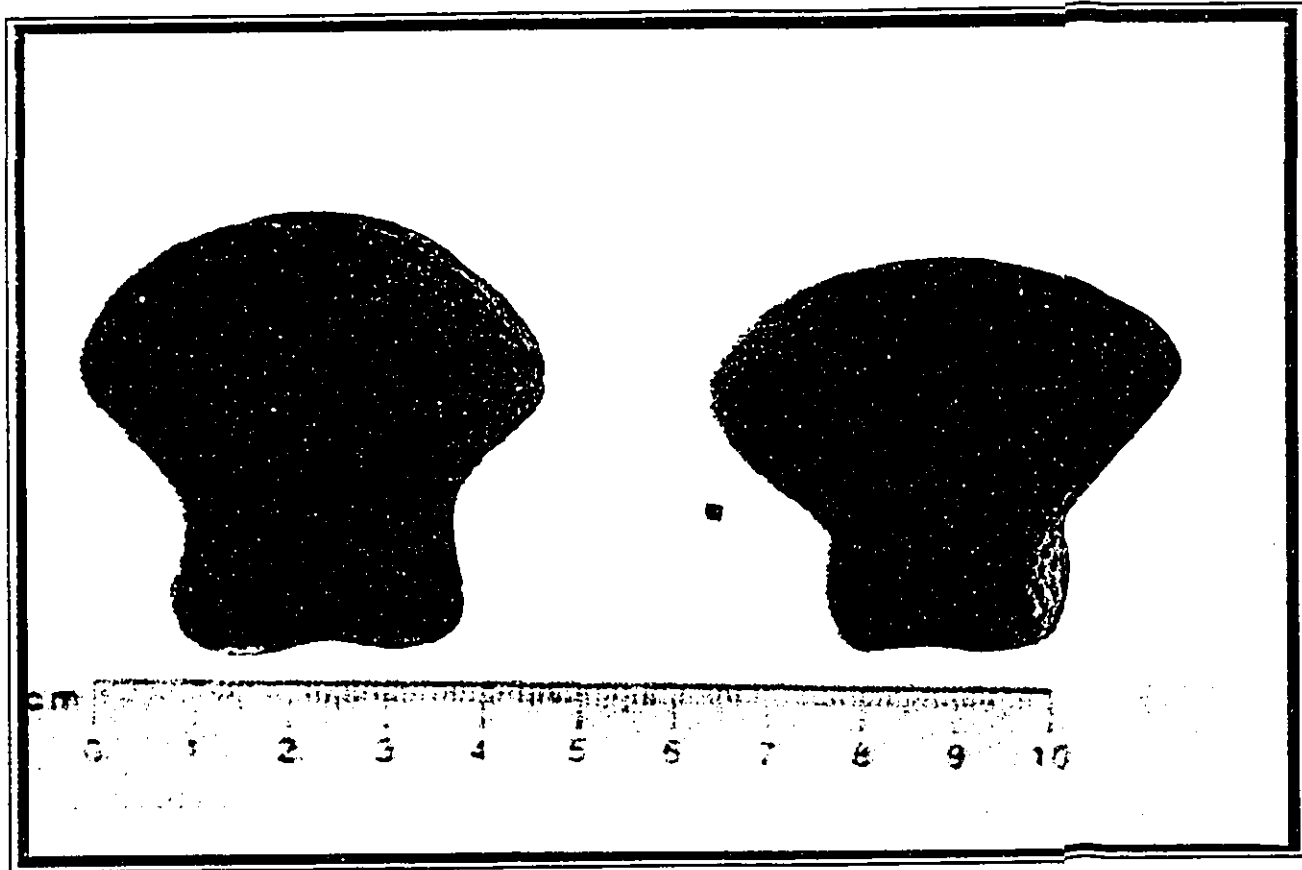


Figure D-4. Breadloaf Sinkers (PHRI Neg. 4455-10)

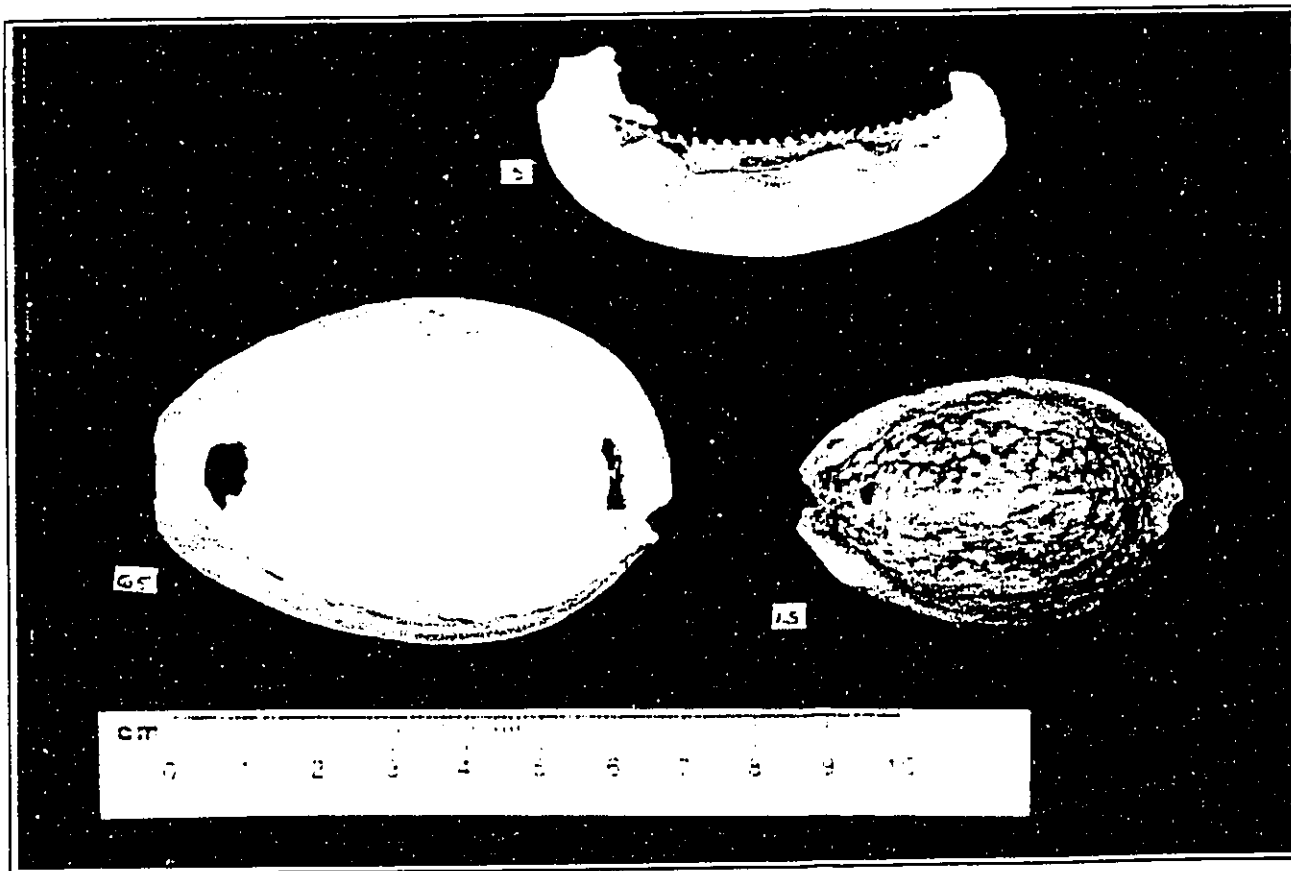


Figure D-5. Octopus Lures (PHRI Neg. 4450-7a)

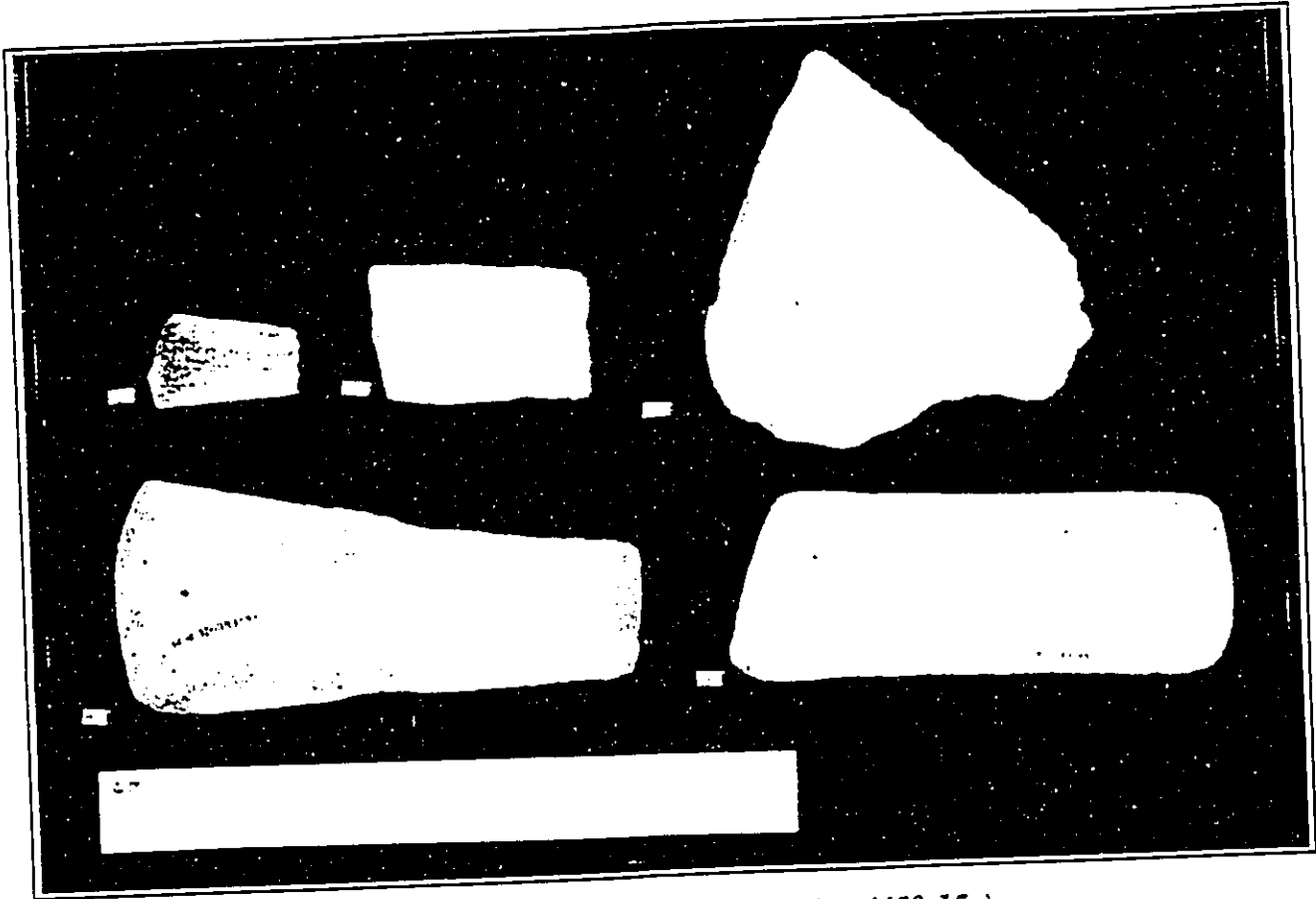


Figure D-6. Coral Abraders (PHRI Neg. 4450-15a)

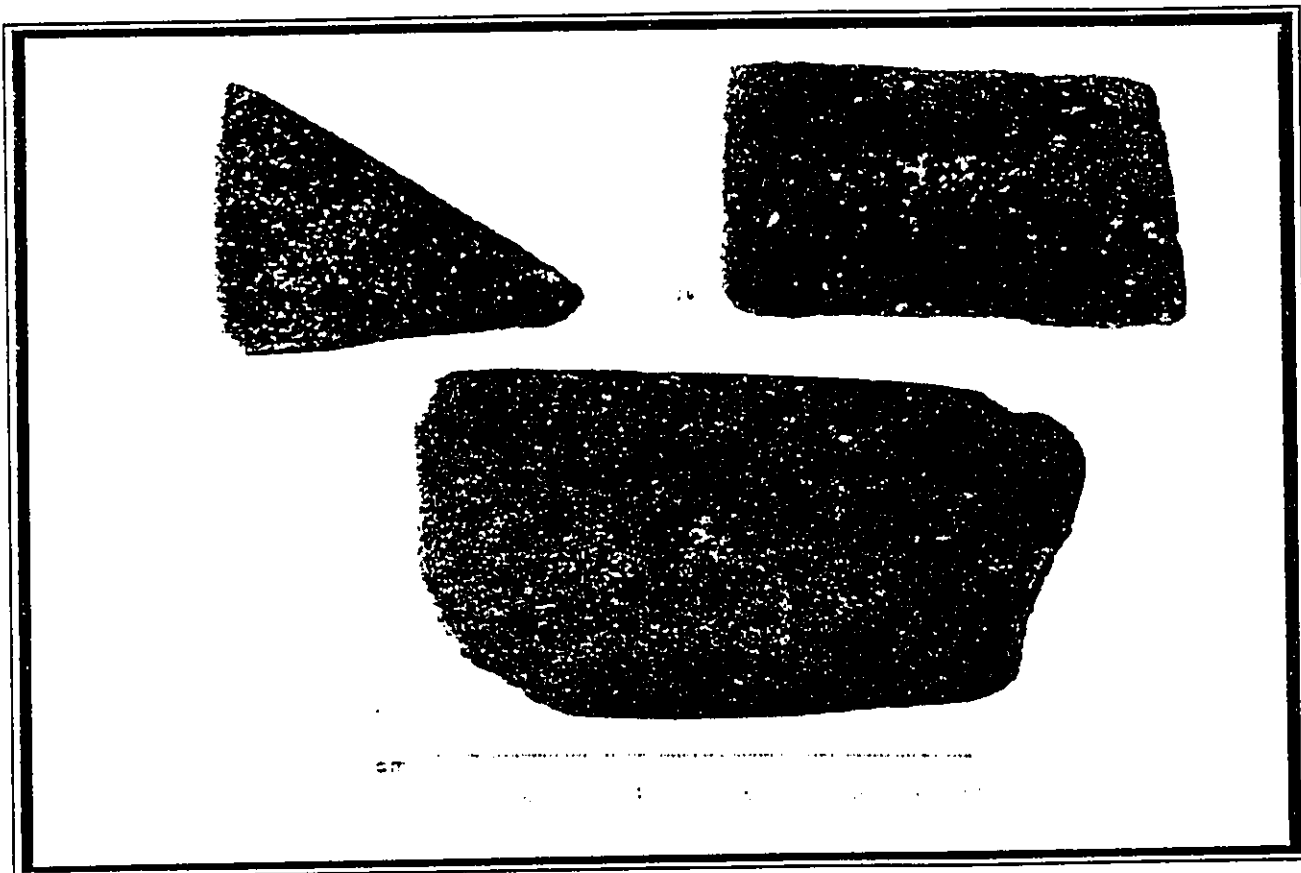


Figure D-7. Scoria Abraders (PHRI Neg. 4450-17a)

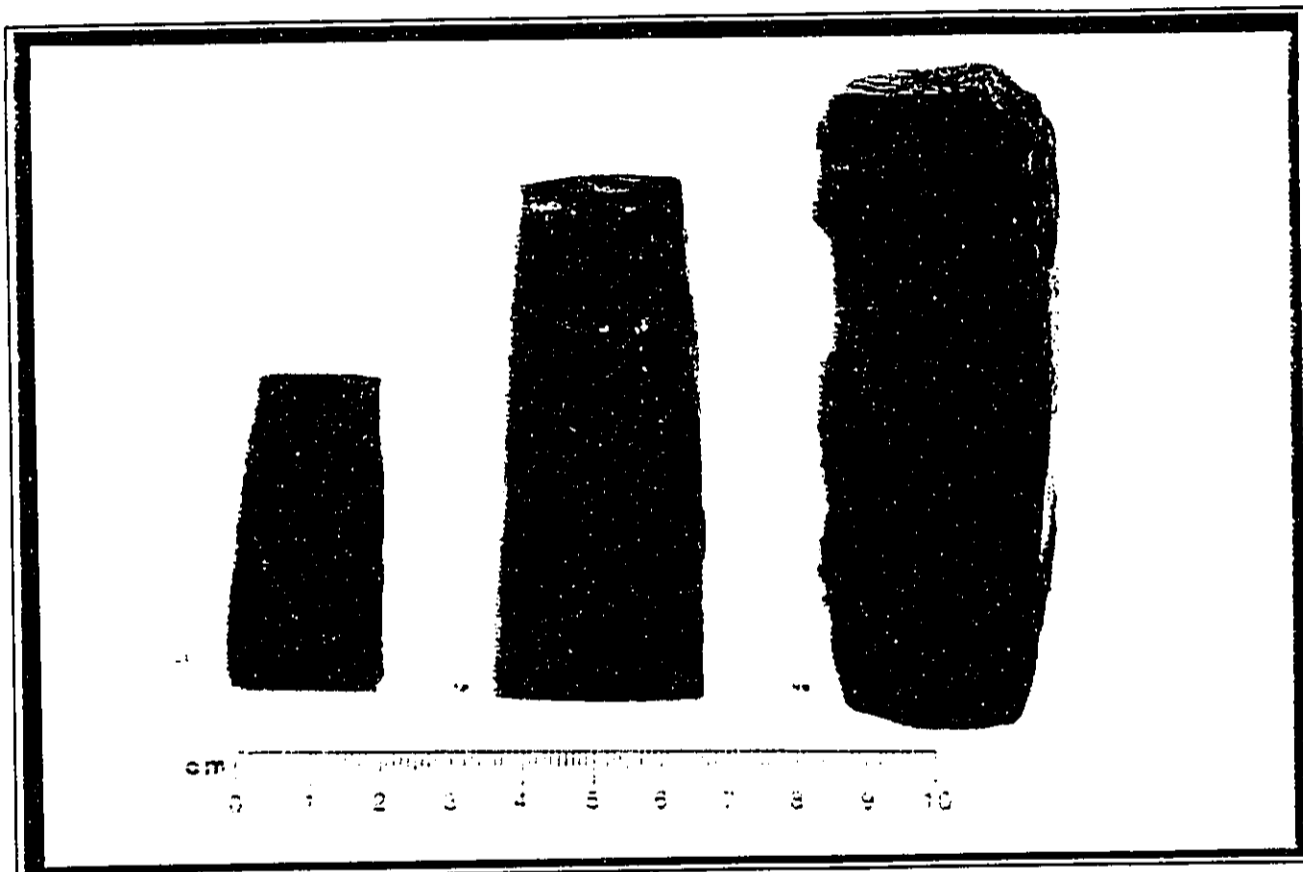


Figure D-8. Adzes (PHRI Neg. 4455-11)

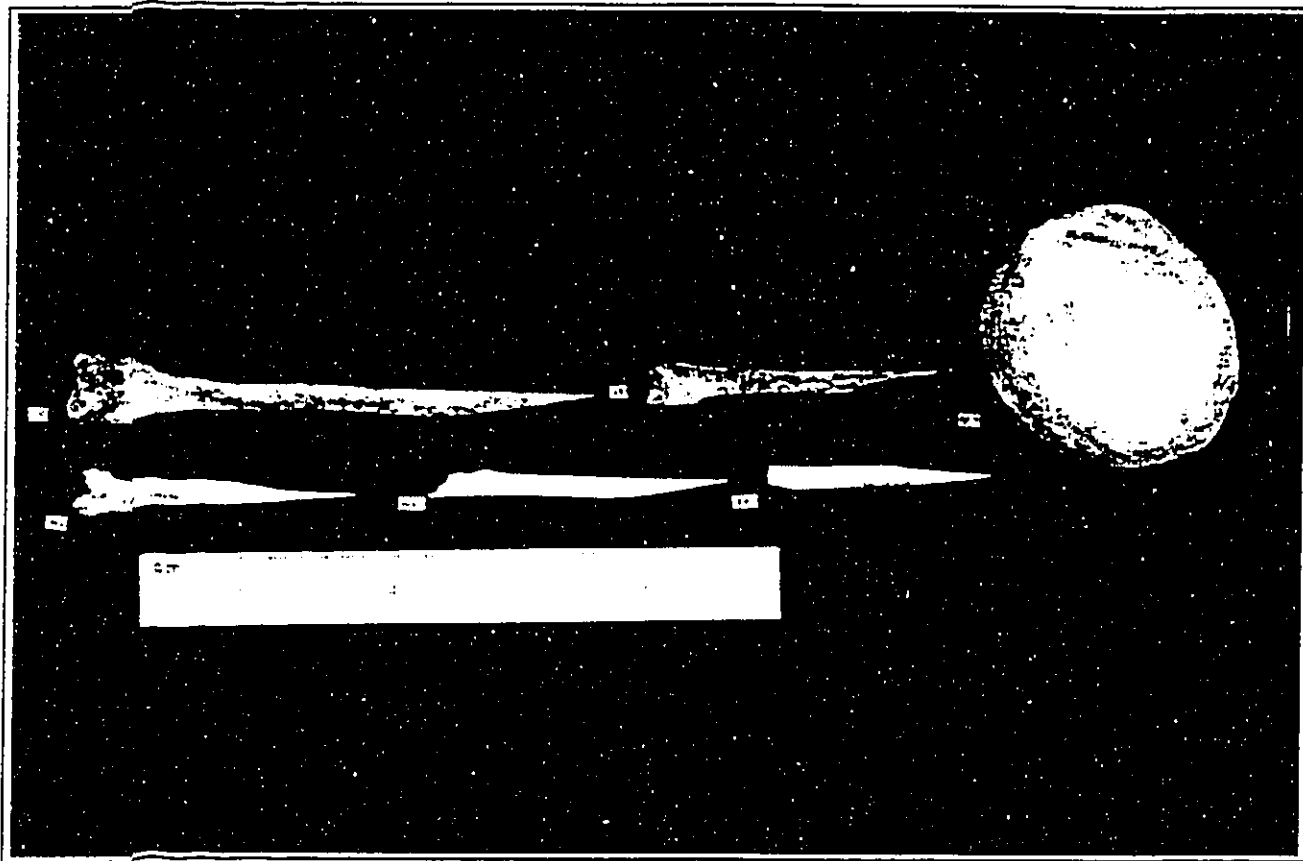


Figure D-9. Bone Picks and Cellana Scraper (PHRI Neg. 4450-27a)

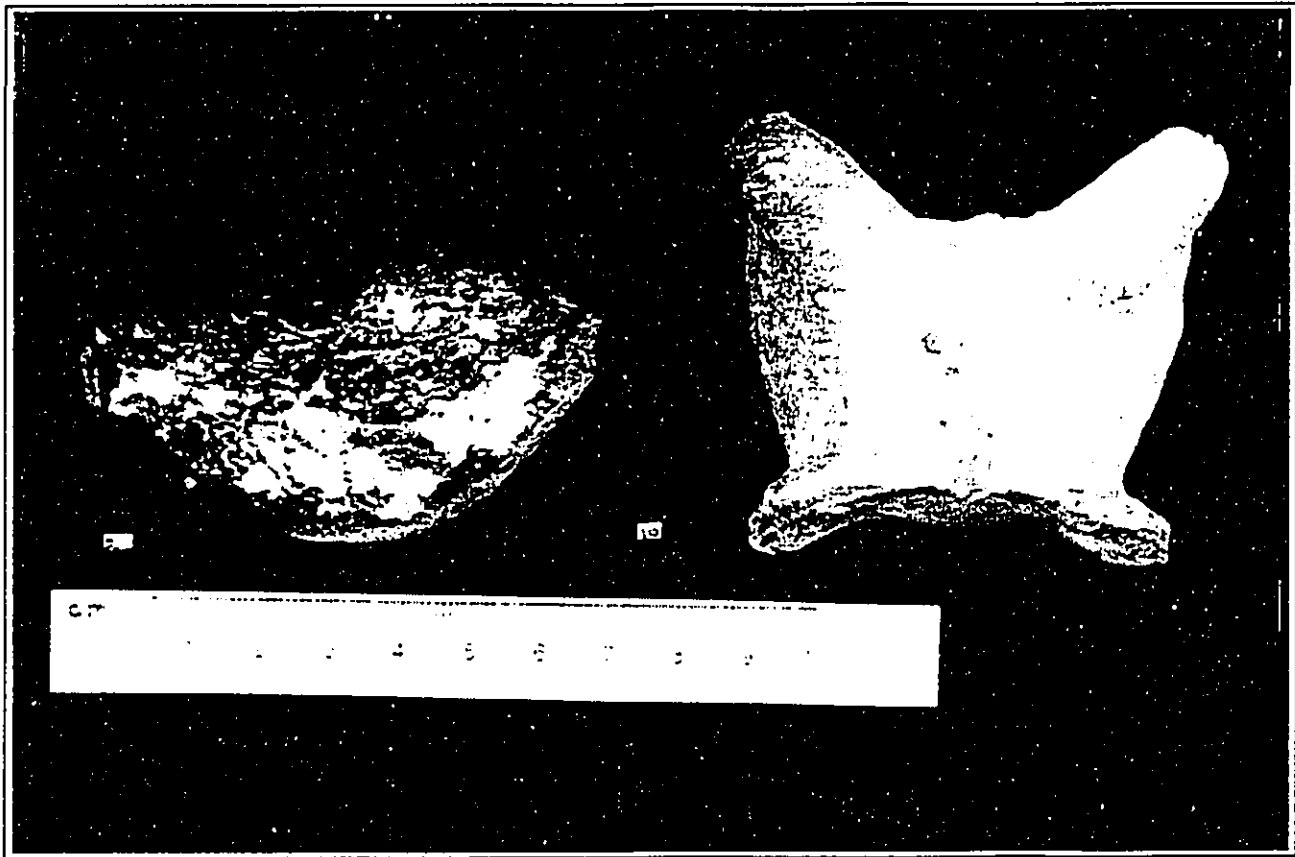


Figure D-10. Modified Bone Artifacts (PHRI Neg. 4455-17)

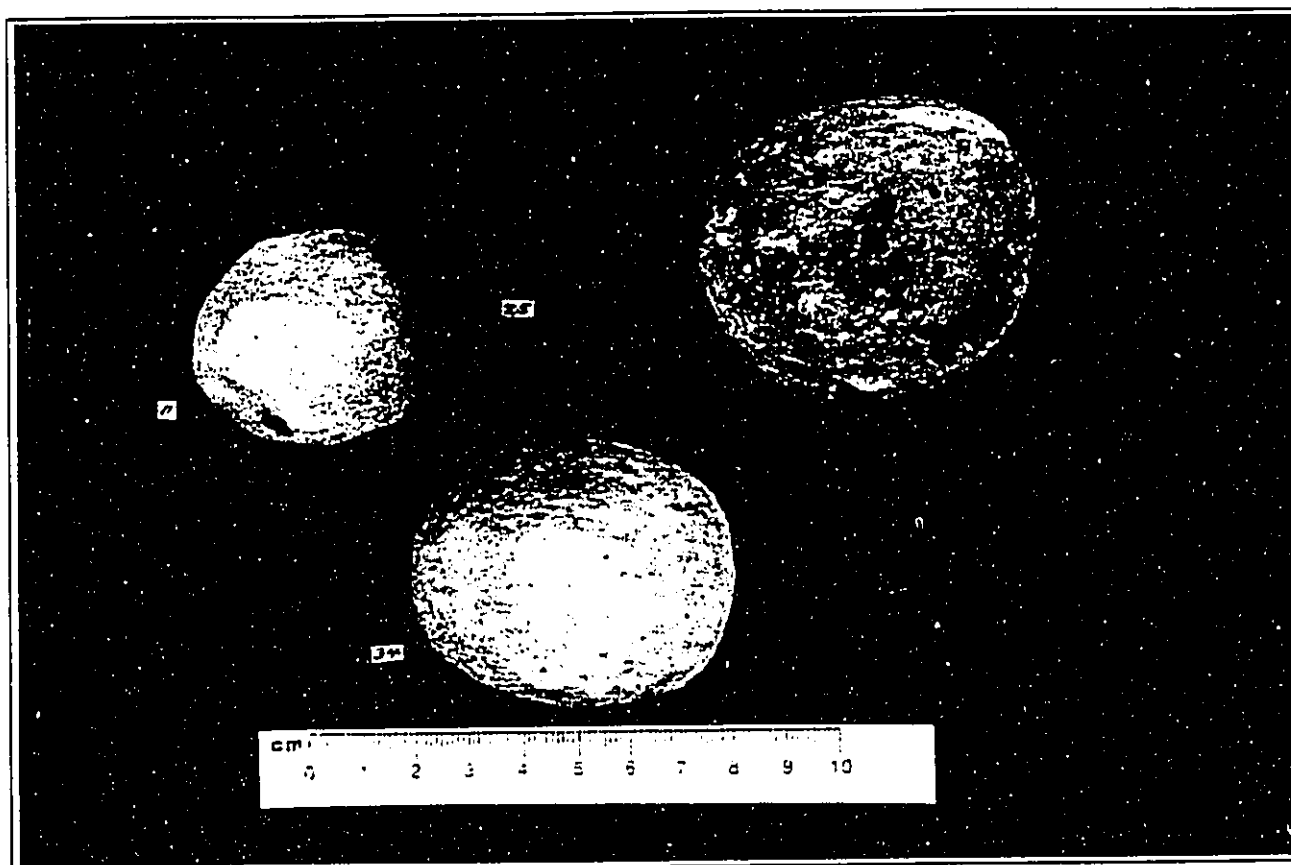


Figure D-11. Modified Coral Artifacts (PHRI Neg. 4450-31a)

Appendix E: Traffic Impact Analysis Report

TRAFFIC IMPACT ANALYSIS REPORT

KEAUHOU PARCEL 53

PREPARED FOR

KAMEHAMEHA INVESTMENT CORPORATION

July 27, 1994

PREPARED BY

THE TRAFFIC MANAGEMENT CONSULTANT

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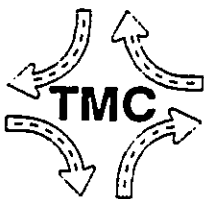


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TRAFFIC IMPACT ANALYSIS REPORT

KEAUHOU PARCEL 53

I. Introduction

A. Purpose of Study

The purpose of this study is to analyze the traffic impacts resulting from the development of the proposed Keauhou Parcel 53 in Keauhou, Kona, Hawaii. This study also recommends alternative improvements that would mitigate the traffic impacts identified in this study. This report presents the findings and recommendations of the study.

B. Scope of the Study

1. Description of the proposed project.
2. Description of existing and planned land uses in the project vicinity.
3. Evaluation of existing roadway and traffic conditions.
4. Estimation of future traffic demands without the project.
5. Development of trip generation characteristics for the proposed project.
6. The identification and analysis of traffic impacts resulting from the proposed project.
7. Description of proposed roadway improvements planned within the study area.
8. Recommendation of improvements that would mitigate the traffic impacts identified in this study.

C. Study Area

In addition to the project access intersections, the study area includes the following intersections:

1. Kuakini Highway and Kamehameha III Road/Walua Road
2. Kamehameha III Road and Kealii Street
3. Alii Drive and Kamehameha III Road
4. Alii Drive and the Keauhou Shopping Village Driveway

II. Project Description

A. General I

Keauhou Parcel 53 is a 281 acre property, identified as Tax Map Key 7-8-10: portion of 02, 28, and 57. The project site is bounded by Keauhou Shopping Village to the south, Kamehameha III Road to the east, the proposed Alii Highway to the west, and undeveloped land to the north. The Keauhou Parcel 53 project would consist of single family residential lots and multi-family residential dwelling units. The Keauhou Parcel 53 is proposed to be developed in three phases. However for the purpose of this traffic impact analysis, the combined Phases I and II (Mauka Phase) and Phase III (Makai Phase) are analyzed in two phases.

The Mauka Phase would cover about 121 net acres. The Mauka Phase is expected to begin occupancy in the Year 1996 and is expected to be fully built-out and occupied by the Year 2005. The Makai Phase consists of about 71 net acres. The remaining 88 acres make up roadways, open space and an archaeological reserve. The Makai Phase is expected to be fully built-out and occupied by the Year 2010. Figure 1 shows project location and vicinity map.

B. Land Use Intensity

The Mauka Phase consists of approximately 451 dwelling units: 196 single family dwelling units and 255 multi-family dwelling units. About 40% or 78 single family dwelling units and 25% or 64 multi-family dwelling units are expected to be primary residences. Sixty-four (64) multi-family dwelling units are expected to be occupied by retired persons. The remaining 245 single family and multi-family dwelling units in the Mauka Phase are expected to be purchased by "second home" buyers.

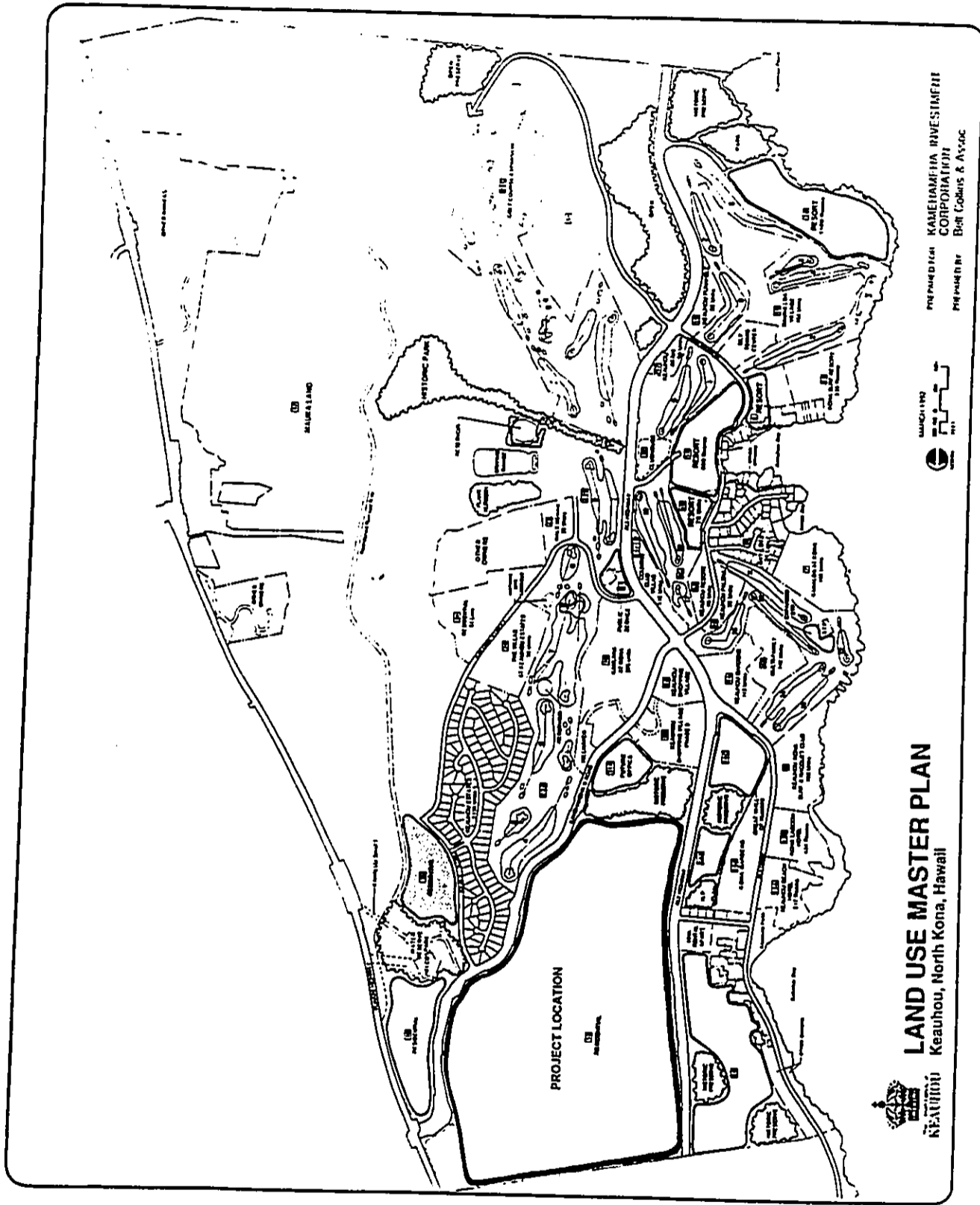


FIGURE 1 - PROJECT LOCATION AND VICINITY MAP

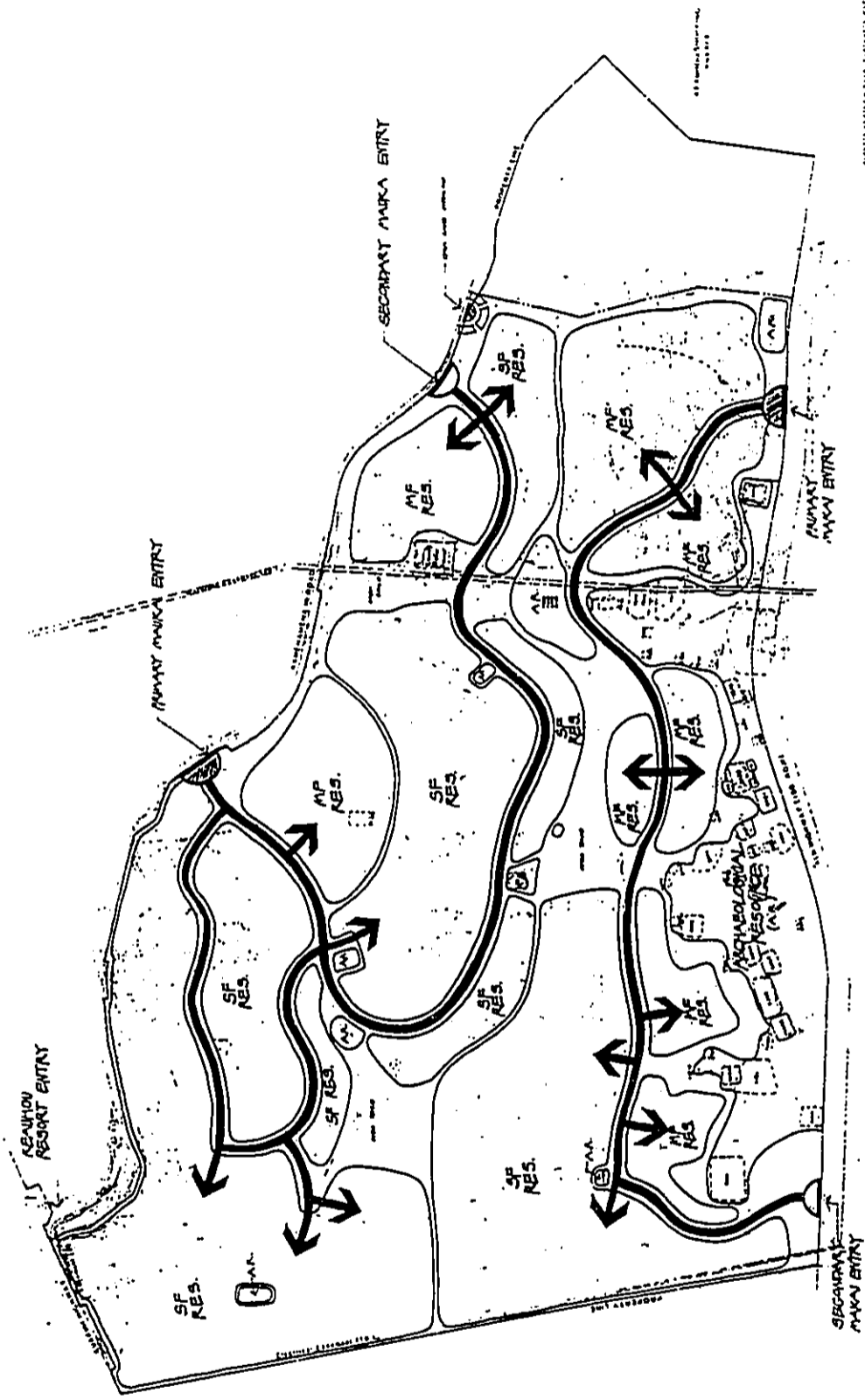
The Makai Phase would contain a total of 525 dwelling units: 68 single-family dwelling units, and 457 multi-family dwelling units. Fifty (50) single family dwelling units are expected to be primary residences. Of the 457 multi-family dwelling units, about 153 units are assumed to be primary residences, and about 152 units are assumed to be occupied by retired persons. The remaining 152 single family and multi-family dwelling units are assumed to be second homes. Table 1 shows the residential types and allocation. Figure 2 shows the proposed development plan.

Table 1. Residential Allocation				
Phase	Type	Single Family DU	Multi-Family DU	Totals
Mauka Phase	Primary	78	64	142
	Retiree	0	64	64
	Second Home	118	127	245
Makai Phase	Primary	50	153	203
	Retiree	0	152	152
	Second Home	18	152	170
Totals		264	712	976

C. Access

Access to the Mauka Phase would be provided by a loop roadway system intersecting Kamehameha III Road opposite the existing Kealii Street intersection and at a new Tee-intersection about 3,200 feet makai of the Kealii Street intersection.

The County-proposed Alii Highway is expected to be constructed before the development of the Makai Phase. Makai Phase access would be located on the proposed Alii Highway, currently in the planning phase by the County of Hawaii. A loop road system would intersect the proposed Alii Highway at two Tee-intersections.



PRELIMINARY DEVELOPMENT
 PLAN
 KEAHOHU PAIR(F) 51

FIGURE 2 - PROPOSED DEVELOPMENT PLAN

D. Existing and Anticipated Future Development

1. Keauhou Shopping Village

The Keauhou Shopping Village is located to the south of the project site. Phase II of the Keauhou Shopping Village is under construction at this writing. The shopping center expansion would include retail activities covering 127,300 gross square feet of floor area (GSF) and 42,400 GSF office space. The Keauhou Shopping Village expansion includes the traffic signalization and channelization of the following intersections:

- a. Alii Drive and Kamehameha III Road
- b. Alii Drive and the Keauhou Shopping Village Driveway/Future Alii Highway
- c. Kamehameha III Road and the Keauhou Shopping Village Driveway

2. Resort-Residential Projects

Several resort-residential developments are in various phases of development in Keauhou. These include Keauhou Estates, Bayview Estates, The Villas at Keauhou Estates, Kaulana at Kona, and Hale Kehau.

3. Alii Highway

Alii Highway is being planned by County of Hawaii as a four-lane divided arterial highway, which would begin at Queen Kaahumanu Highway, south of its intersection with Hualalai Road; cross Kuakini Highway before turning south, roughly parallel with the existing Alii Drive. Alii Highway would rejoin the existing Alii Drive alignment at the Keauhou Shopping Village intersection. Alii Highway would continue to the south of Keauhou and connect to the Hawaii Belt Highway realignment, planned by the State Department of Transportation (DOT). For the purpose of this study, it is assumed that the first phase of the Alii Highway project would consist of the construction of a two-lane roadway along its planned route.

III. Existing Conditions

A. Area Roadway System

Kuakini Highway is the primary arterial highway in the Keauhou area. Kuakini Highway is primarily a two-lane highway. In the vicinity of the project, Kuakini Highway provides an additional truck climbing lane in the southbound direction, for a total of two through lanes. Kuakini Highway is signalized at Kamehameha III Road/Walua Road intersection. Exclusive left turn lanes on Kuakini Highway are provided at this intersection.

Alii Drive is a secondary arterial roadway between Kailua Village and Keauhou. Alii Drive is a two lane roadway, which generally follows the coastline.

Kamehameha III Road is the only mauka-makai connecting roadway between Kuakini Highway and Alii Drive in Keauhou. Kamehameha III Road is stop-controlled at Alii Drive. Construction is currently underway to signalize this intersection. Traffic signals are also being installed at the Keauhou Shopping Village driveway on Kamehameha II Road.

B. Existing Traffic Volumes and Operating Conditions

1. General

a. Field Investigation

A manual traffic count survey was conducted in the project vicinity in April, 1994, between the hours of 6:00 AM to 9:00 AM, and 3:00 PM to 6:00 PM. Additional traffic count data were obtained from the State DOT and other studies conducted in the vicinity. Although Alii Drive and Kamehameha III Road were under construction during the month of April, all roadwork activities ceased during the field investigation period.

b. Capacity Analysis Methodology

The highway capacity analysis, performed in this study, is based upon procedures presented in the "Highway Capacity Manual" (HCM), Special Report 209, Transportation Research Board, 1985 as amended, and the "Highway Capacity Software", Federal Highways Administration.

Level of Service (LOS) is defined as "a qualitative measure describing operational conditions within a traffic stream". Several factors are included in determining LOS such as: speed, delay, vehicle density, freedom to maneuver, traffic interruptions, driver comfort, and safety. LOS "A", "B", and "C" are considered satisfactory levels of service. LOS "D" is generally considered a "desirable minimum" operating level of service. LOS "E" is an undesirable condition and LOS "F" is an unacceptable condition.

The capacity analysis for signalized intersections, relating traffic volumes to intersection capacity, is presented in the HCM as the "planning analysis" method. Three categories are used to evaluate traffic operations: "under capacity", "near capacity", and "over capacity". Under capacity conditions indicate that critical traffic volumes would virtually always be below the intersection's capacity. Over capacity conditions indicate that the intersection capacity will be exceeded in most cases and the intersection would require geometric improvements. Near capacity conditions requires engineering judgment as to whether or not intersection improvements would be required, especially when critical traffic volumes approach over capacity conditions. The purpose of this analysis is to determine the adequacy of intersection geometrics, i.e., number of through and turning lanes required, under given traffic demands. The planning method is a broad measure of traffic operations at an intersection, where the details of the traffic signal design and operation, intersection geometrics, and vehicle type distribution of traffic are not available.

2. Existing Peak Hour Traffic Analysis

The AM peak hour of traffic in the vicinity of the project occurs between 7:00 AM and 8:00 AM. The PM peak hour of traffic occurs between 4:30 PM and 5:30 PM. Traffic operations operate at satisfactorily during the peak hours of weekday traffic. Figures 3 and 4 shows the existing peak hour traffic and results of the capacity analysis.

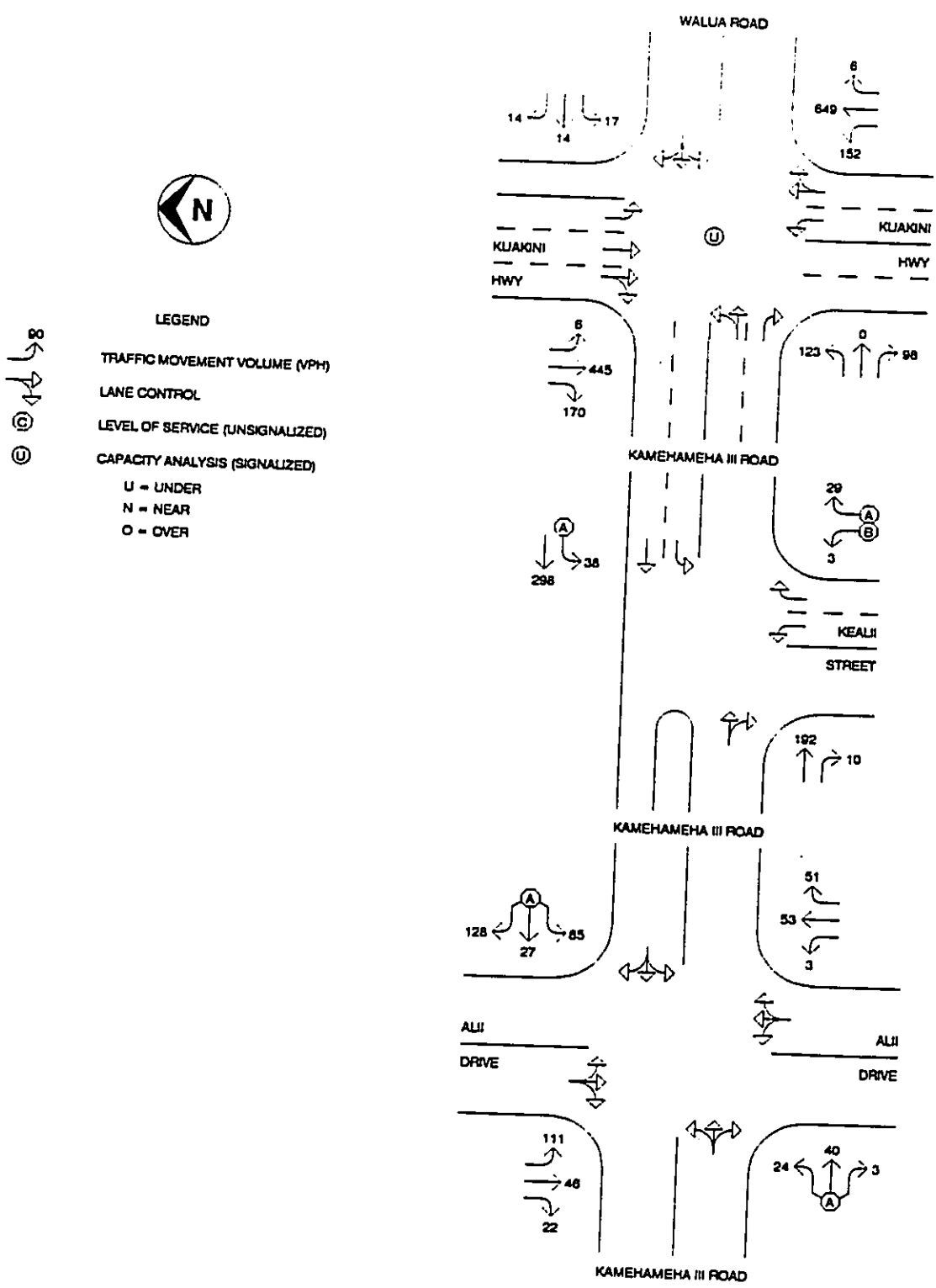


FIGURE 3 - EXISTING AM PEAK HOUR TRAFFIC

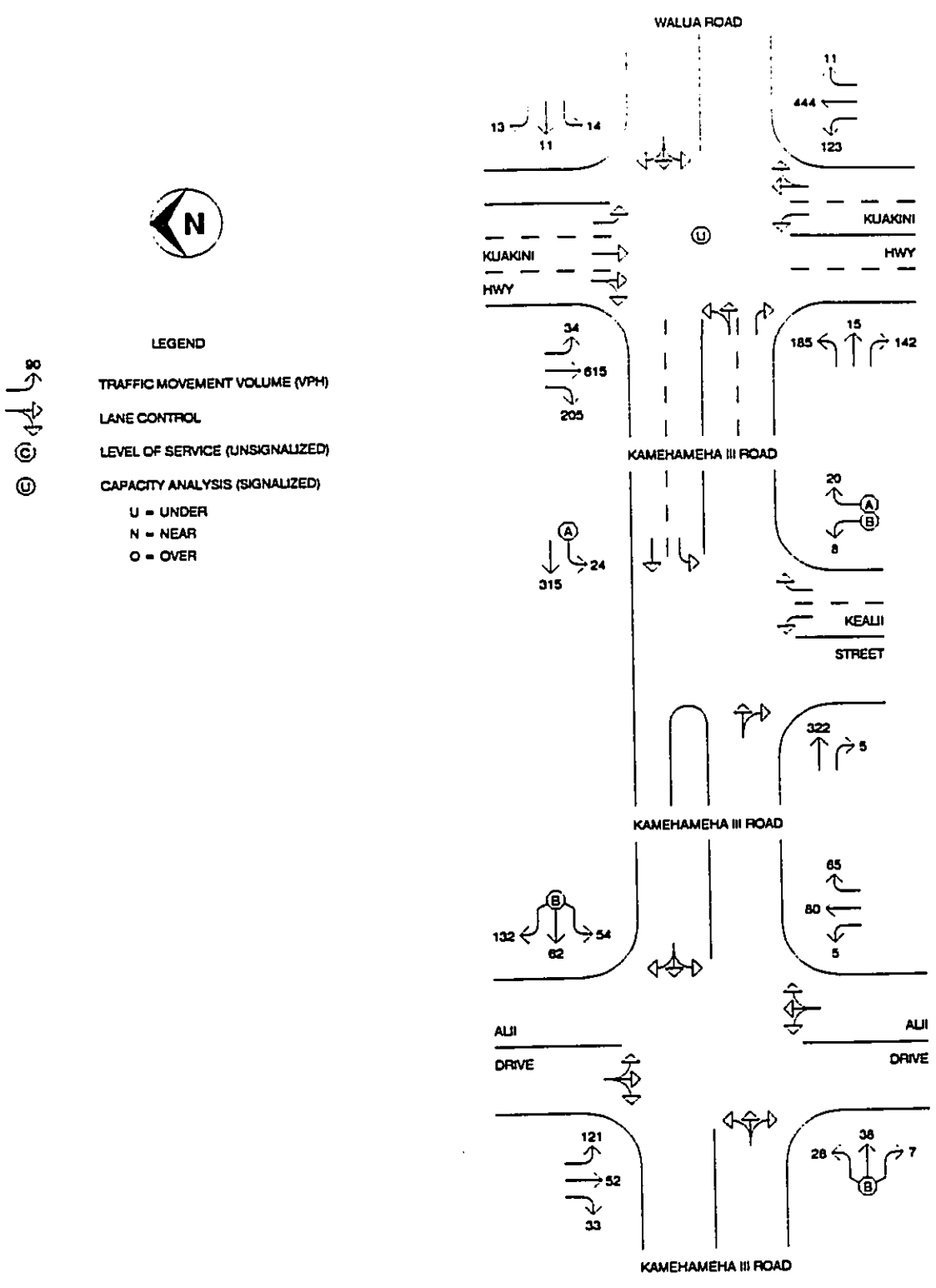


FIGURE 4 - EXISTING PM PEAK HOUR TRAFFIC

IV. Projected Traffic

A. Site Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation", 5th Edition, 1991. The ITE trip rates for light industrial and commercial uses are developed by correlating the vehicle trip generation data with various land use characteristics, such as vehicle trips per dwelling unit. The trip generation characteristics for Keauhou Parcel 53 are based upon the land use intensity described in Section II.

2. Trip Generation Characteristics

The Mauka Phase is expected to generate a total of 151 vehicles per hour (vph) during the AM peak hour of traffic, 54 vph entering the site and 97 vph exiting the site. During the PM peak hour of traffic, the Mauka Phase is expected to generate a total of 217 vph, 124 vph entering the site and 93 vph exiting the site.

The Makai Phase of Keauhou Parcel 53 is expected to generate a total of 167 vph during the AM peak hour of traffic, 52 vph entering the site and 115 vph exiting the site. During the PM peak hour of traffic, the Makai Phase is expected to generate a total of 231 vph, 138 vph entering the site and 93 vph exiting the site. Table 2 shows a summary of the trip generation characteristics.

Table 2. Trip Generation Summary						
Phase	AM Peak Hour Traffic (vph)			PM Peak Hour Traffic (vph)		
	Enter	Exit	Total	Enter	Exit	Totals
Mauka	54	97	151	124	93	217
Makai	52	115	167	138	93	231
Totals	106	212	318	262	186	448

B. External Traffic

1. General

The purpose of analysis of projected traffic condition without the proposed project is to establish the base line conditions from which to analyze the traffic impacts directly attributable to the proposed project. The Years 2005 and 2010 are selected as the planning horizons corresponding to the development of the Mauka and Makai Phases, respectively.

2. Through Traffic

The State Department of Transportation and the County Departments of Planning and Public Works have completed the "Island of Hawaii Long Range Highway Plan" (HLRHP) in 1991. Based upon the highway planning study, traffic in the vicinity is projected to increase at an annual rate of approximately 5.5%, using 1994 as the base year. The annual growth rate in traffic is used to estimate projected Years 2005 and 2010 peak hour traffic conditions.

State DOT is in the process of updating its transportation plan for the island of Hawaii. The updated plan is expected to be completed by the end of 1994. This long-range plan update would address the transportation needs for Hawaii through the Year 2020.

3. Future Off-Site Traffic In Study Area

The Keauhou Shopping Village expansion is currently under construction. "Areas 8B and 31A Traffic Study", prepared by Wilbur Smith Associates, May 1990, analyzed the traffic impacts resulting from the expansion of the Keauhou Shopping Village. The trip generation and traffic assignments, developed in that study, are adopted for use in this analysis. Several resort residential developments, located in Keauhou, are also included in this analysis. The traffic generated by developments in the Keauhou area are added to the background growth in traffic projected by the HLRHP.

C. Peak Hour Traffic Analysis Without Project

1. General

The Year 2005 peak hour traffic analysis without project is performed, assuming an exclusive right turn lane on southbound Kuakini Highway at Kamehameha III Road is constructed to mitigate over capacity conditions expected at that intersection. The traffic improvements on Alii Drive and Kamehameha III Road, under construction at this writing, are also taken into account.

The Year 2010 peak hour traffic analysis without project is performed, assuming the two-lane Alii Highway is constructed and extended south of Keauhou, connecting to the Hawaii Belt Highway. It is also assumed that an exclusive right turn lane is constructed on northbound Alii Highway at Kamehameha III Road to mitigate over capacity conditions expected at that intersection.

2. Year 2005 Peak Hour Traffic Analysis Without Project

During the Year 2005 AM peak hour of traffic without project, the intersection of Kuakini Highway and Kamehameha III Road would operate at near capacity conditions. The left turn movement from Kealii Drive to makai bound Kamehameha III Road is expected to operate at LOS "D". The other intersections in the study area are expected to operate at under capacity conditions during the Year 2005 AM peak hour without project. Figure 5 shows the Year 2005 AM peak hour traffic without project and results of the capacity analysis.

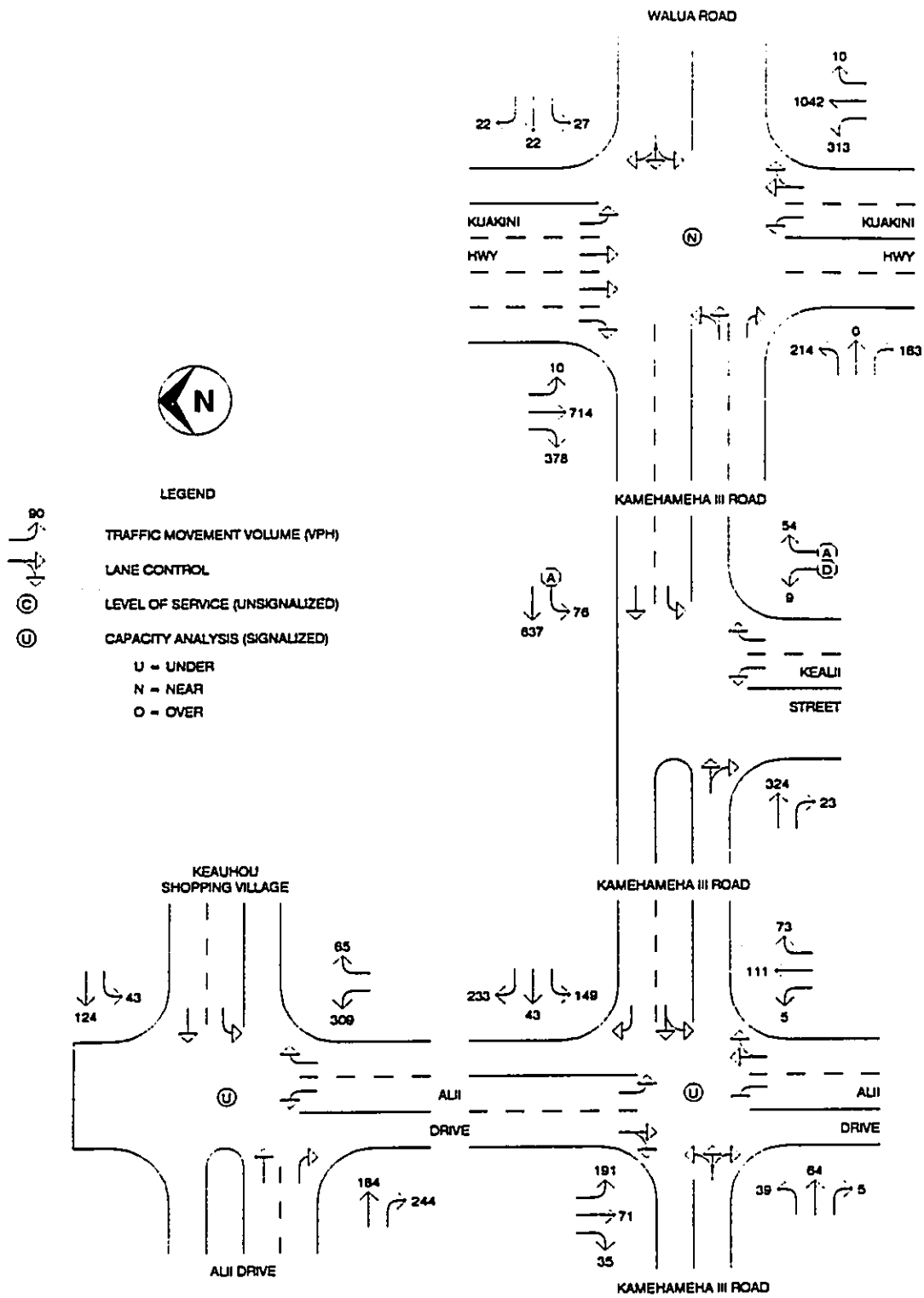


FIGURE 5 - YEAR 2005 AM PEAK HOUR TRAFFIC WITHOUT PROJECT

Kuakini Highway and Kamehameha III Road intersection would continue to operate at near capacity conditions, during the Year 2005 PM peak hour of traffic without project. The left turn movement from Kealii Street to makai bound Kamehameha III Road would operate at LOS "E". The remaining intersections in the study area are expected to operate at under capacity conditions during the Year 2005 PM peak hour without project. Figure 6 shows the Year 2005 PM peak hour traffic without project and results of the capacity analysis.

3. Year 2010 Peak Hour Traffic Analysis Without Project

During the Year 2010 AM peak hour of traffic without project, the intersection of Alii Highway and Kamehameha III Road is expected to operate at near capacity conditions. Other intersections in the study area operate at under capacity and at acceptable Levels of Service. Figure 7 shows the Year 2010 AM peak hour traffic without project and results of the capacity analysis.

The intersection of Alii Highway and Kamehameha III Road is expected to operate at near capacity conditions, during the Year 2010 PM peak hour of traffic. The left turn movement from Kealii Street to makai bound Kamehameha III Road is expected to operate at LOS "E". The other intersections in the study area operate at under capacity and at acceptable Levels of Service. Figure 8 shows the Year 2010 PM peak hour traffic without project and results of the capacity analysis.

D. Peak Hour Traffic Analysis With the Proposed Project

The traffic impacts are analyzed for the Mauka and Makai Phases of Keauhou Parcel 53. Mauka Phase traffic is superimposed over the Year 2005 peak hour conditions without project. Traffic, generated by both Mauka and Makai Phases, is superimposed over the Year 2010 peak hour conditions without project. The traffic impact analysis is discussed in the next section.

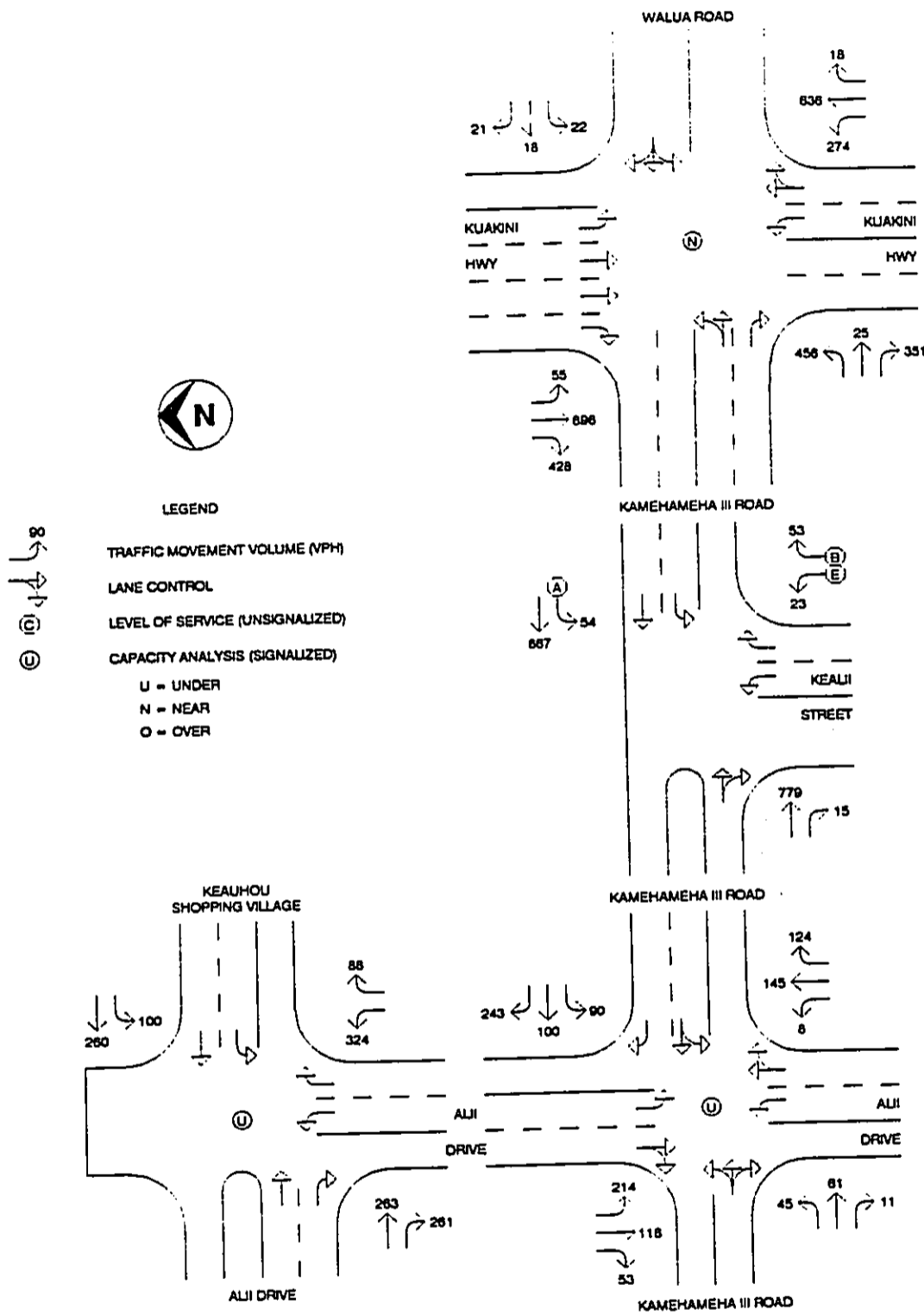


FIGURE 6 - YEAR 2005 PM PEAK HOUR TRAFFIC WITHOUT PROJECT

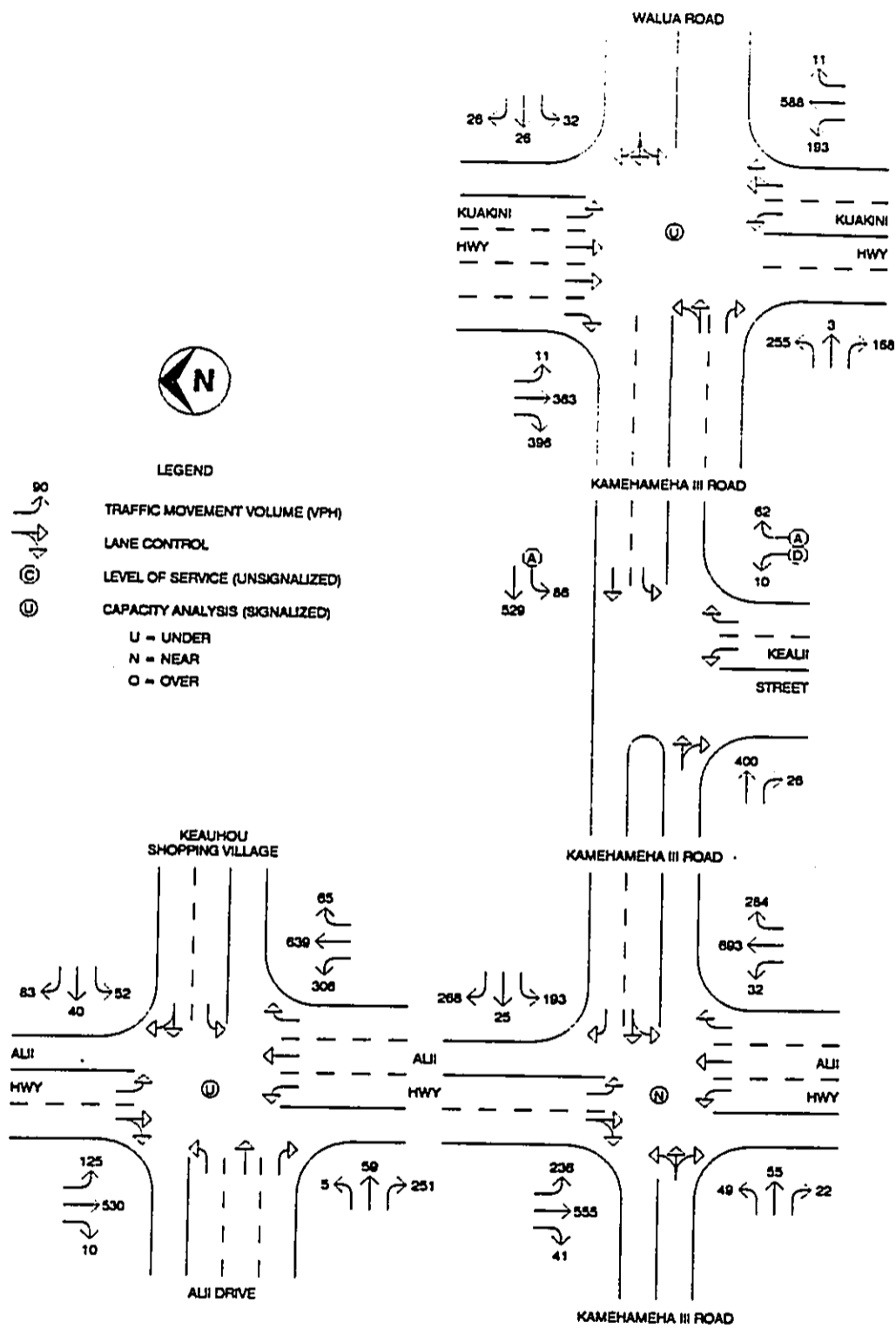


FIGURE 7 - YEAR 2010 AM PEAK HOUR TRAFFIC WITHOUT PROJECT

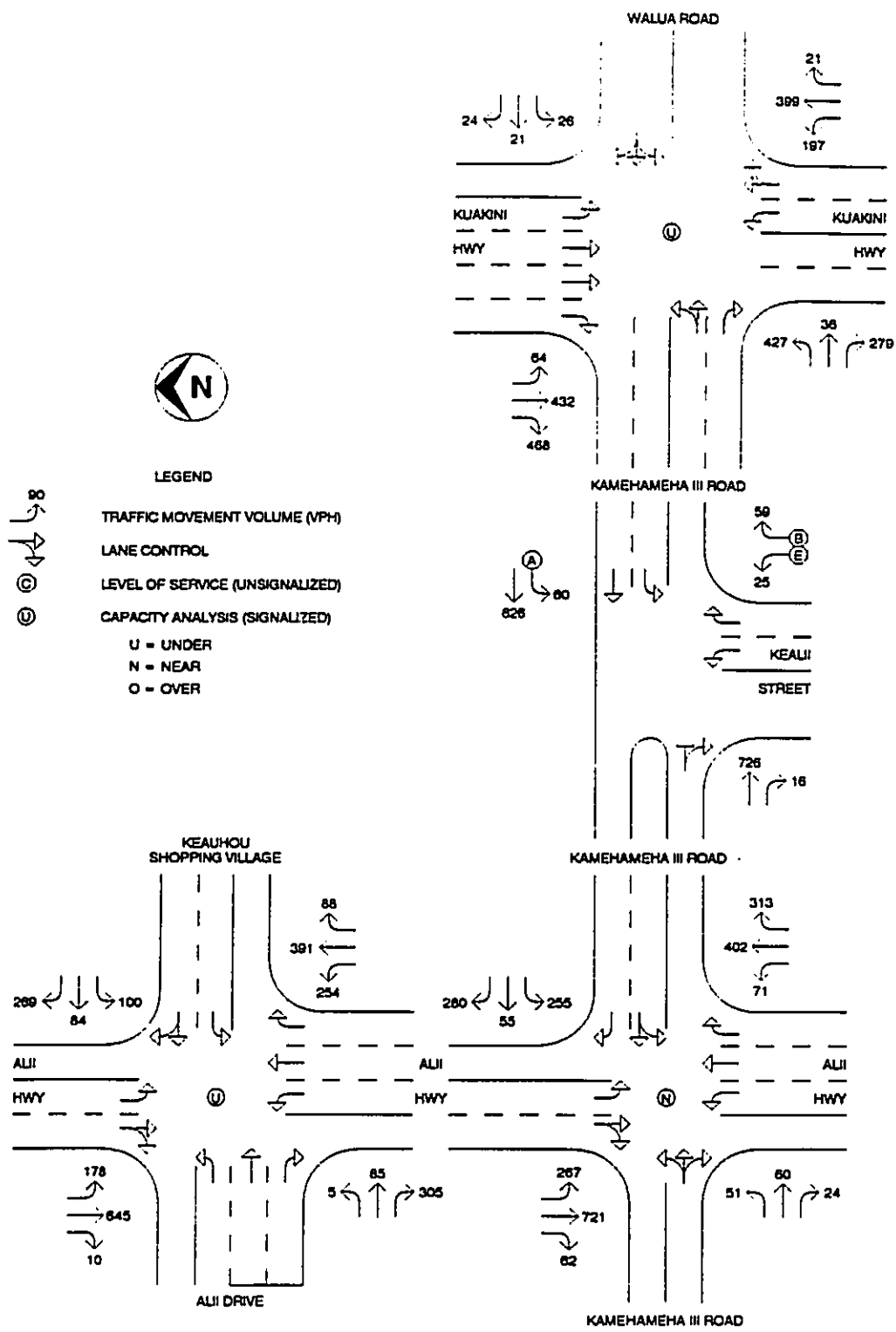


FIGURE 8 - YEAR 2010 PM PEAK HOUR TRAFFIC WITHOUT PROJECT

V. Traffic Impact Analysis

A. Mauka Phase Peak Hour Traffic

Figure 9 shows the AM peak hour traffic with the development Mauka Phase. During AM peak hour with project, the intersection of Kuakini Highway and Kamehameha III Road is expected to operate at near capacity conditions. Both left turn movements from Mauka Phase Access I and Kealii Street are expected to operate at LOS "E" during the AM peak hour with project. The left turn movement from Mauka Phase Access II is expected to operate at LOS "D". The other intersections in the study area are expected to operate at under capacity conditions during the AM peak hour with project.

During PM peak hour with project, the intersection of Kuakini Highway and Kamehameha III Road is expected to operate at near capacity conditions. Both left turn movements from Mauka Phase Access I and Kealii Street continue to operate at LOS "E". The left turn movement from Mauka Phase Access II is expected to operate at LOS "E". The Alii Drive intersections in the study area are expected to operate at under capacity conditions during the PM peak hour with project. Figure 10 shows the PM peak hour traffic with the development Mauka Phase.

B. Makai Phase Peak Hour Traffic

Figure 11 shows the AM peak hour traffic with the full build-out and occupancy of the Keauhou Parcel 53 project. During the AM peak hour with project, the intersection of Alii Drive and Kamehameha III Road is expected to operate at near capacity conditions. Left turn movements from both Makai Access I and II are expected to operate at LOS "E". The left turn movements from both Mauka Access I and II to mauka bound Kamehameha III Road are expected to operate at LOS "E". The remaining intersections in the study area operate at acceptable LOS and under capacity conditions.

Figure 12 shows the PM peak hour traffic with project. The intersections of Kuakini Highway at Kamehameha III Road and Alii Drive at Kamehameha III Road are expected to operate at near capacity conditions, during the PM peak hour with project. The left turn movements from both Makai Access I and II continue to operate at LOS "E". The left turn movements from Kealii Street and Mauka Access I are expected to operate at LOS "E". The left turn movement

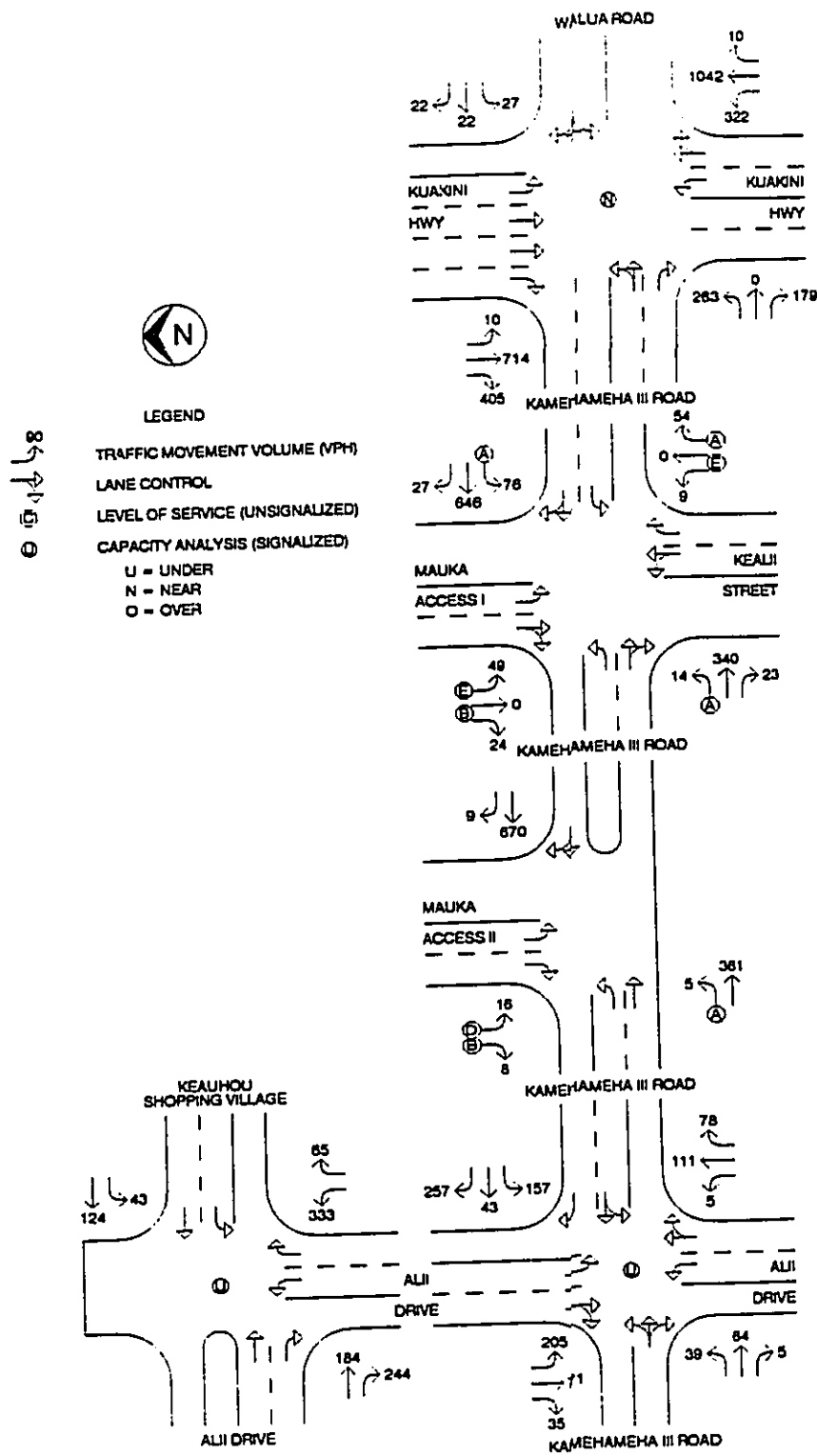


FIGURE 9 - YEAR 2005 AM PEAK HR TRAFFIC WITH MAUKA PHASE

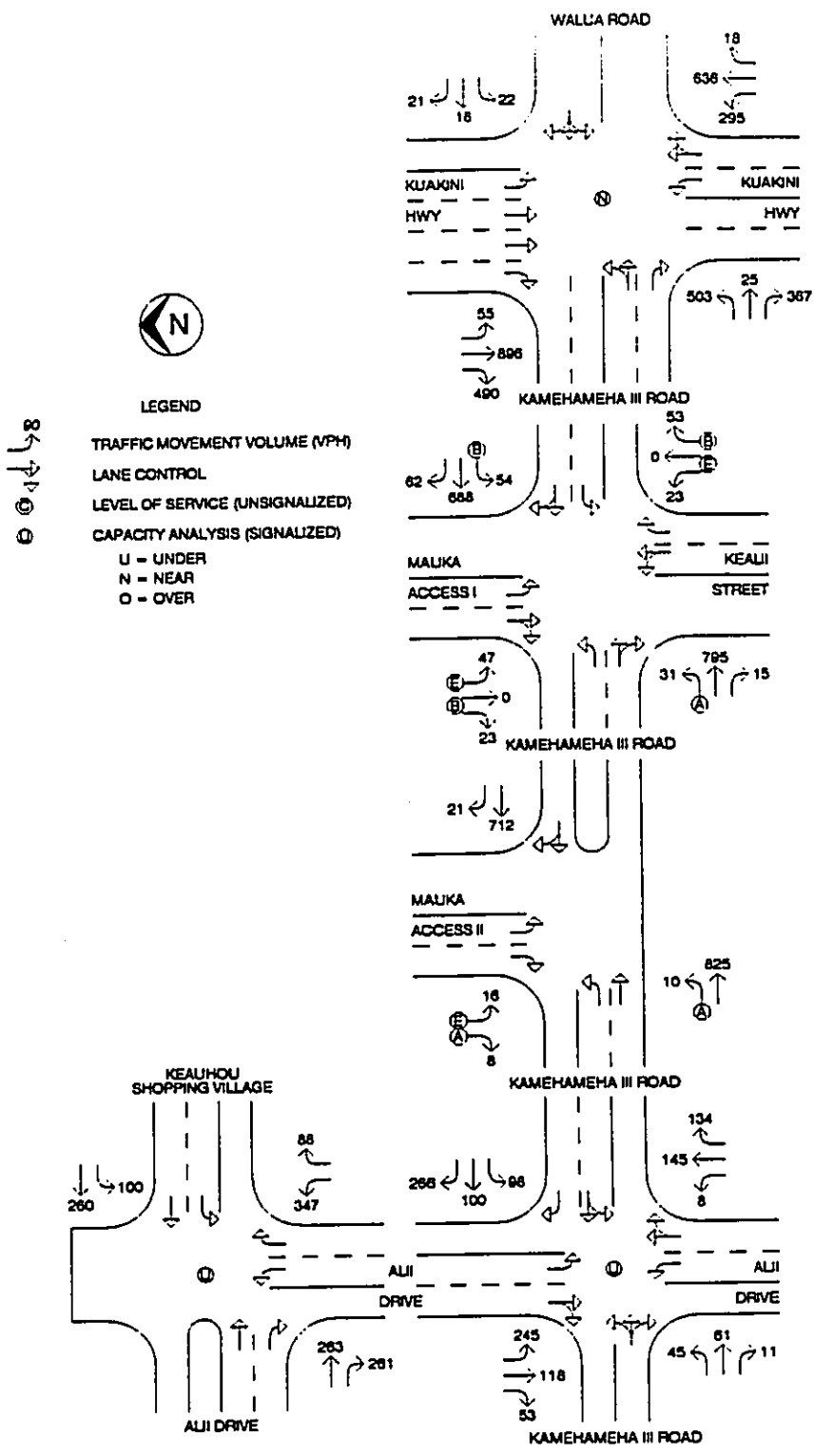


FIGURE 10 - YEAR 2005 PM PEAK HR TRAFFIC WITH MAUKA PHASE

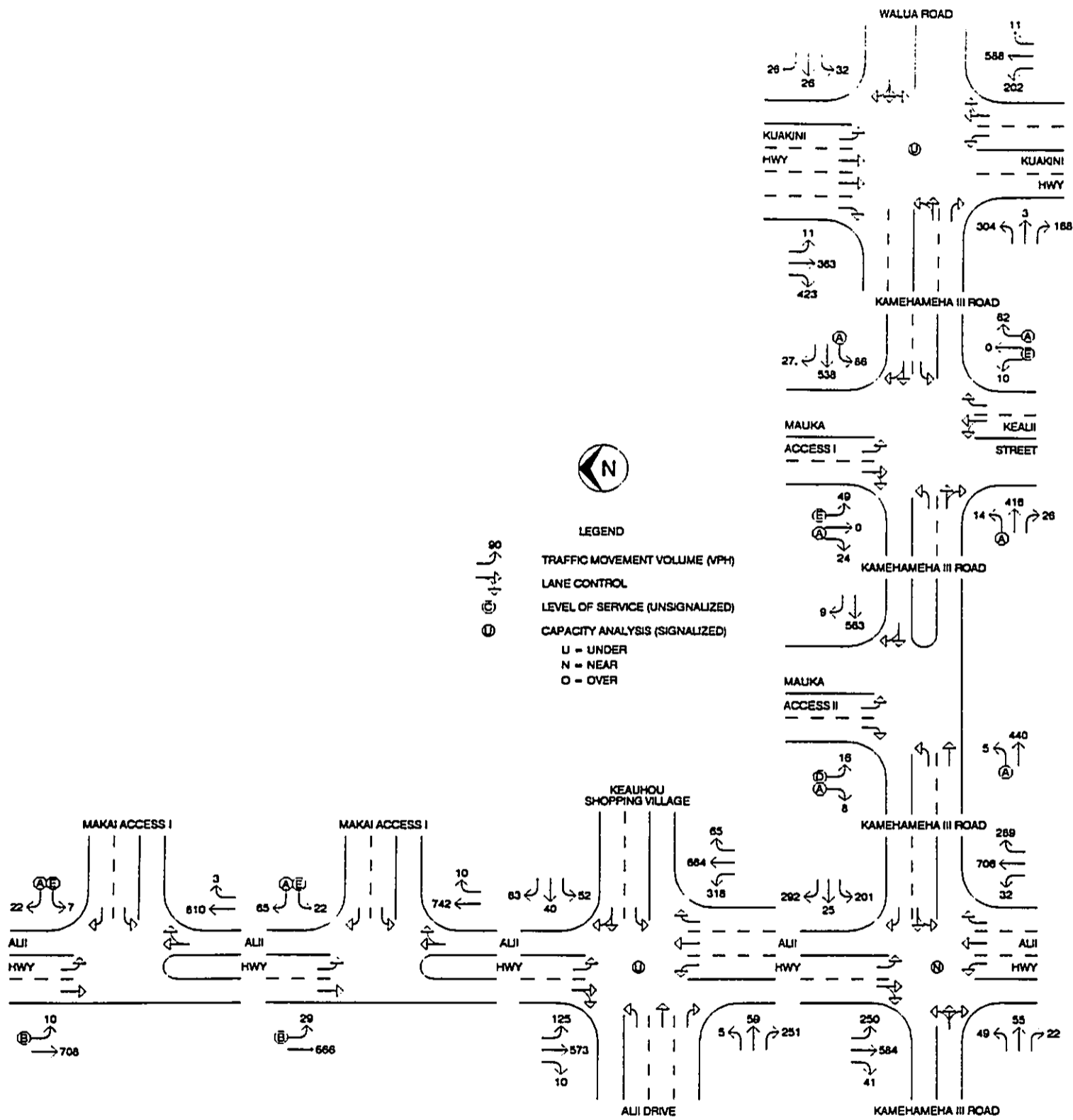


FIGURE 11 - YEAR 2010 AM PEAK HR TRAFFIC WITH MAKAI PHASE

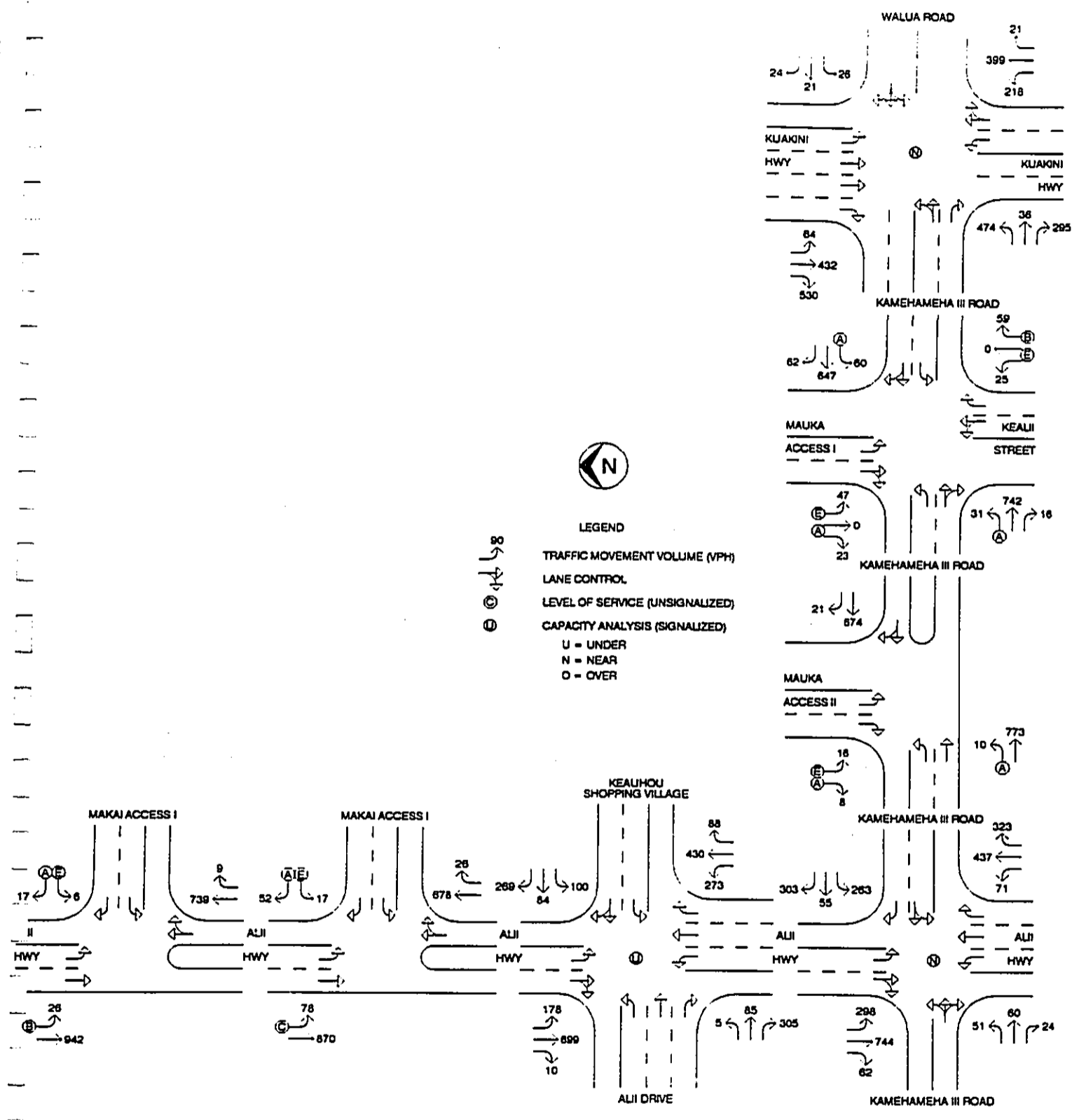


FIGURE 12 - YEAR 2010 PM PEAK HR TRAFFIC WITH MAKAI PHASE

from Mauka Access II is also expected to operate at LOS "E". The intersection of Alii Highway and Alii Drive is expected to operate at under capacity conditions during the PM peak hour with project.

VI. Recommended Road Improvements

A. Regional Highway Improvements Planned by the County of Hawaii

Alii Highway should be constructed between Kailua-Kona and points south of Keauhou.

B. Proposed Improvements to Accommodate Projected Traffic Without Project

1. Southbound Kuakini Highway should be widened to provide an exclusive right turn lane to makai bound Kamehameha III Road to mitigate over capacity conditions during the Year 2005 PM peak hour conditions without project.
2. Northbound Alii Drive should be widened to provide an exclusive right turn lane at Kamehameha III Road to mitigate over capacity conditions during the Year 2010 AM and PM peak hours of traffic without project.

C. Proposed Improvements to Accommodate Site Traffic

1. Exclusive left turn lanes should be provided on Kamehameha III Road at Mauka Access I and II Roads.
2. Exclusive left turn lanes should be provided on Alii Highway at Makai Access I and II Roads. Median shelter lanes should also be provided on Alii Highway to mitigate LOS "E" condition for left turn movements from the Makai Access I and II Roads.

VII. Conclusions

Alii Highway provides additional corridor highway capacity to accommodate the projected through traffic. Extending Alii Highway, south of Keauhou, further reduces traffic demands on Kamehameha III Road and provides improved overall access to the Keauhou Resort.

The timely implementation of highway improvements, discussed in this report, are expected to mitigate the traffic impacts resulting from the proposed Keauhou Parcel 53.

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Appendix F: Engineering Report

KEAUHOU RESORT PARCEL 53
Preliminary Engineering Report
County of Hawaii

Prepared for:
Kamehameha Investment Corporation

Prepared by:
Keauhou Kona Resort Company
Engineering Division

May 1994

I. SITE CHARACTERISTICS

Location

The project site is situated in the North Kona district of the Island of Hawaii. It is located approximately 4 miles south of Kailua-Kona and mauka of the future Alii Highway. This project is within the Keauhou Resort. Kuakini Highway and Kamehameha III Road provide its mauka boundary. The proposed Alii Highway extension will be its makai boundary.

Topography

The proposed project is located on the lower slope of Hualalai Mountain, approximately 1,100 feet from the shoreline. The project lies between the 90 and 600 foot elevations, with an average slope of 15 percent. The proposed site will need grading in order to provide terraced lots for residential dwellings. It is recommended that the overall grading be designed to follow the general terrain of the site.

Soils

According to the U.S. Soil Conservation Service, the proposed project consists of Punalu'u extremely rocky peat, A'a lava, Kaimu extremely stony peat, and Pahoehoe lava. The following table indicates the percentage of coverage:

<u>Soil Type</u>	<u>Area</u>	<u>Percent of the Proposed Site</u>
Punalu'u Extremely Rocky Peat	202	72
A'a Lava	64	23
Kaimu Extremely Stony Peat	10	3
Pahoehoe Lava	5	2
Total:	281 acres	100%

The Soil Conservation Service's description of these soil types follow:

Punalu'u Extremely Rocky Peat, (rPYD) with 6 to 20 percent slopes. This very shallow, well-drained organic soil overlies pahoehoe lava bedrock. It occurs on gently sloping to moderately steep uplands. Rock outcrops occupy about 30 percent of the surface area. This soil is medium acid. Although the organic soil is rapidly permeable, the underlying pahoehoe lava is very slowly permeable, except where water moves rapidly through cracks. Runoff is slow, and the erosion hazard is slight.

Lava Flow, A'a, (rLV). This land type consists of A'a lava with little or no soil material. The lava is rough and broken. It is a mass of clinkery, hard, glassy, sharp pieces of lava on a rough undulating to steep topography. The land is bare of vegetation, except for mosses, lichens, and few shrubs and trees.

Kaimu Extremely Stony Peat, (rKED) with 7 to 25 percent slopes. This is a well-drained, extremely stony organic soil that is shallow to fragmental a'a lava, but deep to underlying bedrock. It occurs on moderately sloping to moderately steep uplands. The soil is neutral in reaction. Permeability is rapid, runoff is slow, and the erosion hazard is slight.

Lava Flows, Pahoehoe (rLW). This land type consists of pahoehoe lava with little or no soil material. The lava has a billowy, glassy surface that is rough and broken, and there are hummocks and pressure domes. The land is typically bare of vegetation, except for mosses and lichens. In higher rainfall areas, shrubs have gained a foothold in cracks and crevices.

These four soil types have a capability classification of VIIs or VIIIs, non-irrigated. This classification system has a range from Level I (i.e., few limitations to cultivation) to Level VIII (i.e., very severe limitations for cultivation).

According to the Soil Conservation Service, "Class VII soils have very severe limitations that make them unsuited to cultivate and that restrict their use largely to pasture or range, woodland, or wildlife. Class VIII soils and landform have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, or water supply, or to aesthetic purposes."

Additionally, "the small letter "s" that follows the class numeral, shows that the soil's capacity to support agriculture is limited mainly because it is shallow, draughty or stony. The Agricultural Lands of Importance to the State of Hawaii (ALISH) maps indicate the proposed project contains approximately nine acres of land that are classified as "Other Important Agricultural Land". This represents 3.3 percent of the project site. This "Other Important Agricultural Land" is located along Kamehameha III Road. The remaining acreage (i.e., 96.7 percent) is not classified. It should be noted there are no lands within the project site with classifications of "Unique Agricultural Land" or "Prime Agricultural Land".

Climate

The average daily temperature in Keauhou varies between 71 and 79 degrees Fahrenheit. Summers raise the temperature to the mid 80's and winters cool off to the mid 60's. The average

annual rainfall in the Keauhou area is 30 inches. Yearly rainfall maximums tend to occur in April through October, while daily rainfall maximums occur in the late afternoons and evenings. Trade winds serve to keep the temperature and humidity down. When the trades stop blowing, the southerly Kona winds often take over. These "Kona winds" bring hot, sticky air. Kona winds are most common from October to April; however, they appear about half the time.

II. PROJECT DESCRIPTION

The proposed project consists of 281 acres, portions of which are to be developed into residential housing. A total of 900 to 975 dwelling units are proposed to be built in three phases over a 15 to 20 year period. Twenty-five percent of the total acreage will be open space or dedicated to historic preserve in order maintain the archaeological sites.

A steeply sloped bank exists in the middle of the project site. This topographic relief traverses north and south to provide a natural break between the mauka and makai areas of the proposed project. Phases I and II are within the mauka portion, while Phase III makes up the makai area. A mix of Single Family and Multi-Family zoning is proposed for the project site.

III. ROADWAY SYSTEM

No roadways presently exist within the project site. One driveway, at the end of Makolea Street, provides access to the offices of Keauhou Kona Resort Company, Wai'eli and Kamehameha Investment Corporation (KIC) Landscape Nursery. Another driveway exits Kamehameha III Road and proceeds 450 feet makai to County of Hawaii's water reservoir.

Kuakini Highway and Kamehameha III Road abut the mauka boundary of the proposed project; the future Alii Highway fronts the makai boundary. Alii Highway is a proposed north-south County feeder highway designed to relieve traffic from Alii Drive and to allow for local collector traffic at a mid-level elevation (200-400 feet) between Kailua-Kona and Keauhou. Regional access to Keauhou Resort is provided by Kuakini Highway, Alii Drive, and Kamehameha III Road. Kuakini Highway is a State of Hawaii right-of-way between Kailua-Kona and Honaunau. Kamehameha III Road and Alii Highway are County right-of-ways with widths of 110 feet and 132 feet, respectively. Kamehameha III Road is the mauka-makai arterial between Kuakini Highway and Alii Highway. Alii Drive provides access to Keauhou Resort from Kailua-Kona along the coast.

The Kuakini Highway/Kamehameha III Road intersection is serviced by a traffic light. Currently, the intersections of Kamehameha III Road/Alii Highway and Alii Highway/Alii Drive

are under construction to be widened and equipped with traffic signals. It should be noted that the intersection of Kamehameha III Road/Keauhou Shopping Village mauka entrance (i.e., at Circus Shop-U's) is also undergoing construction for similar improvements.

For this project, two points of entry onto Kamehameha III Road are proposed to provide roadway access to Phases I and II. The primary mauka entry will occur at the Kamehameha III Road/Kealii Street intersection, and it is anticipated that a traffic signal will be installed here. The secondary mauka entry is proposed at 450 feet mauka of the southern boundary.

Likewise, two additional points of access onto the future Alii Highway will provide entry to Phase III. The primary makai entry is expected to be 500 feet north of the project site's southern boundary. The secondary makai entry is proposed to be 300 feet south of the northern boundary. Construction of intersection improvements meeting with the approval of the County Department of Public Works and State Department of Transportation will be required for the proposed development, in accordance to the recommendations of the traffic engineer. Roadway improvements to Kamehameha III Road are also addressed in the Traffic Impact Analysis Report for the project.

The mauka portions of the proposed project (Phases I and II) will require construction of approximately 14,000 lineal feet of onsite roadways and approximately 9,000 lineal feet of onsite roadways will be necessary for the makai portion of the project site. Refer to EXHIBIT "A" for a map of the proposed roadways. All roadways will be designed and built to County of Hawaii Standards.

IV. POTABLE WATER SYSTEM

Extensive water improvements currently exist within and around the proposed development. Within Kamehameha III Road, a 24" water main exists above Kealii Street and an 8" water line exists below Kealii Street to Alii Highway. The Alii Highway corridor contains a 12" water line between Keauhou Shopping Village and Makolea Street. At the intersection of Makolea Street and the future Alii Highway, a pair of water lines (8" and 12") runs mauka to two water reservoirs existing in the proposed Phase II area. These reservoirs exist 500 feet makai of Kamehameha III Road. The Department of Water Supply (DWS) refers to the existing 300,000 gallon reservoir as Keauhou Tank No. 4 and the 100,000 gallon reservoir as Kahaluu Tank No. 4. A 12" and a 6" water line connect these reservoirs to the previously mentioned 8" water line in Kamehameha III Road. See EXHIBIT "B" for the location of the existing water mains. Water service exists to the offices of Wai'eli and Keauhou Kona Resort Company and to KIC's landscape nursery.

A maximum of 975 dwelling units in the proposed residential development will require approximately 585,000 gallons of water per day. This assumes a maximum usage of 600 gallons per day per dwelling unit. Currently, there are no water commitments dedicated to the project site. However, preliminary negotiations between DWS and the applicant are in progress.

Offsite water infrastructure will need to be constructed. Possible water source development may include connecting one of KIC's wells to the DWS's existing system and up sizing of transmission mains. Pump test on KIC's wells in the Keauhou area average 1,400 gallons per minute per well. If water storage is required, it is recommended that reservoirs be constructed adjacent to reservoirs existing at the Kahaluu Shaft and/or the onsite reservoirs at the Kahaluu Tank No. 4 site. Two water main crossings at Kamehameha III Road are expected in order to provide service to the mauka portion of the proposed development. Onsite water improvements for Phases I and II will require installation of approximately 13,900 lineal feet of water mains. Onsite improvements for Phase III will include about 8,800 feet of water lines. The proposed onsite water infrastructure is shown in EXHIBIT "C".

V. WASTE WATER SYSTEM

The only sanitary sewer systems existing within the proposed project are two cesspools providing service to the offices of Keauhou Kona Resort Company, Wai'eli, and KIC's Landscape Nursery. The nearest existing sanitary sewer line is within Makolea Street, approximately 250 feet from the makai boundary of the proposed development. This 8" PVC gravity sewer line terminates at the Kahaluu Park Sewer Pump Station. A 4" force main exits this facility en route to the Heeia Waste Water Treatment Plant (HWWTP) at Heeia Bay.

An inactive 8" sanitary sewer force main exists in Alii Drive for the purpose of providing service to this proposed project and the undeveloped lands makai of the project site (i.e., between Alii Highway and Alii Drive). This 8" ductile iron force main begins near the St. Peter's Catholic Church on Kahaluu Bay and terminates at a sewer manhole at the northern makai boundary of Keauhou Gardens. Refer to EXHIBIT "D" for the existing sanitary sewer facilities.

The existing sanitary sewer system in Keauhou Resort consists of gravity lines, pumping stations, and force mains leading to HWWTP. HWWTP was recently expanded to process an average flow of 1.8 mgd, with a peak flow of 3.6 mgd. This new facility went on line in January 1994 and is operating at an average flow of approximately 0.5 mgd. Future plans call for expanding the HWWTP to accommodate an average flow of 3.6 mgd as Keauhou Resort continues to grow.

The proposed development will generate an average daily flow of approximately 0.38 mgd with a peak flow of 0.9 mgd. Sufficient capacity currently exists at HWWTP to accommodate the expected flow from the project site. In order to transmit the sewage from the project, approximately 21,000 lineal feet of onsite gravity sewer lines and about 17,300 feet of offsite gravity sewer lines will need to be installed. Additionally, the Kahaluu II Sewage Pump Station near St. Peter's Catholic Church will need to be constructed to pump an average daily flow of 0.15 mgd. About 450 lineal feet of sanitary sewer force main will be installed to connect the Kahaluu II Sewage Pump Station to the inactive 8" force main in Alii Drive. See EXHIBITS "E" and "F" for maps of proposed sanitary sewer facilities.

VI. SOLID WASTE

The majority of the site does not currently generate solid waste; however, three commercial enterprises exist at the end of Makolea Street. The offices of Keauhou Kona Resort Company and Wai'eli currently dispose their solid waste in a nearby dumpster. KIC's Landscape Nursery also disposes its solid waste in a dumpster. Both dumpsters are serviced by refuse companies on a regular basis.

The proposed development is expected to generate approximately 13,000 pounds of solid waste per day. This is based on a residential waste production of five pounds per capita per day. In the single family residential areas, solid waste collection may be provided door to door by private collection trucks and crews. Currently there are approximately three refuse companies providing this service in the Keauhou area. There is also a transfer station available for solid waste disposal to residents of the Keauhou area. This transfer station is located three miles from the project site. In the multi-family residential and public areas, it is expected that containerized waste storage and collection will be provided. It is expected that solid waste from the future residents of this development will be ultimately taken to the Pu'uuanahulu landfill located in South Kohala. This method of transfer to Pu'uuanahulu will be via a mix of refuse collection companies and the County of Hawaii's transfer station.

VII. STORM DRAINAGE SYSTEM

No natural surface water features or drainageways exist on the proposed development. According to the Federal Emergency Management Agency's flood maps, this property is in ZONE X (eg: "other areas"). FEMA's designation for these ZONE X lands are "areas determined to be outside 500 year flood plain". The porous and well-drained condition of the site's soils allow for most of the rainfall to percolate in the ground. Thus, surface runoff is negligible.

The proposed project will increase surface runoff due to the impervious surfaces that accompany residential developments. The runoff from road pavements, sidewalks, driveways and roofs will be controlled by storm drain lines, drywells, and retention areas. It is recommended that an onsite storm drainage system be designed to avert runoff onto makai properties. Before construction begins, approval of the drainage plan will be obtained from the County's Public Works Department.

VIII. ELECTRIC POWER AND COMMUNICATION SYSTEMS

Hawaii Electric Light Company (HELCO) is responsible for providing electricity service to the project site. Onsite electric service exists to the businesses of KIC's Landscape Nursery, Wai'eli, and Keauhou Kona Resort Company. Electric service is also provided to the County's Kahaluu Water Reservoir No. 4 site.

In order to provide electric service to the proposed development, HELCO will need to increase the capacity of the Kahaluu Switch & Substation, install underground lines in Kamehameha III Road from Hillhaven Health Care Center to the Kahaluu Switch & Substation, and install underground lines in Alii Highway from Alii Drive to the northern boundary when Phase II or the highway is constructed. Within the proposed project, onsite underground electric lines will be constructed such that "looped" systems exist in all three phases of development.

Hawaiian Telephone Company and Sun Cablevision of Hawaii provide telephone and cable television service, respectively, to Keauhou Resort. Phone service within the project site is limited to the present facilities at KIC's Landscape Nursery, Wai'eli, and Keauhou Kona Resort Company. Hawaiian Telephone's and Sun Cablevision's offsite lines exist underground in Kamehameha III Road and stub-outs to the Alii Highway corridor are being constructed in the Alii Drive/Alii Highway intersection.

The proposed project's telephone needs will require a remote switching unit to be constructed at the intersection of Alii Drive and Kaluna Street. Phone cables will exit this new building and be pulled through the existing ducts in Kamehameha III Road. Underground telephone and cable television lines will be "looped" through Phase I and II. In order to provide telephone and cable television to Phase III of the proposed development, underground lines will be installed in Alii Highway and in the onsite streets of Phase III. KIC will work with and contribute monies to the utility companies, as needed, to upgrade offsite facilities. It is also the applicant's intent to mitigate the visual impact of overhead electrical, telephone and cable television lines by installing these facilities underground.



The Crown Lands of
KEAUHOU
PRELIMINARY
SUBDIVISION PLAN

JUNE 2, 1979

SECONDARY MAUKA ENTRY

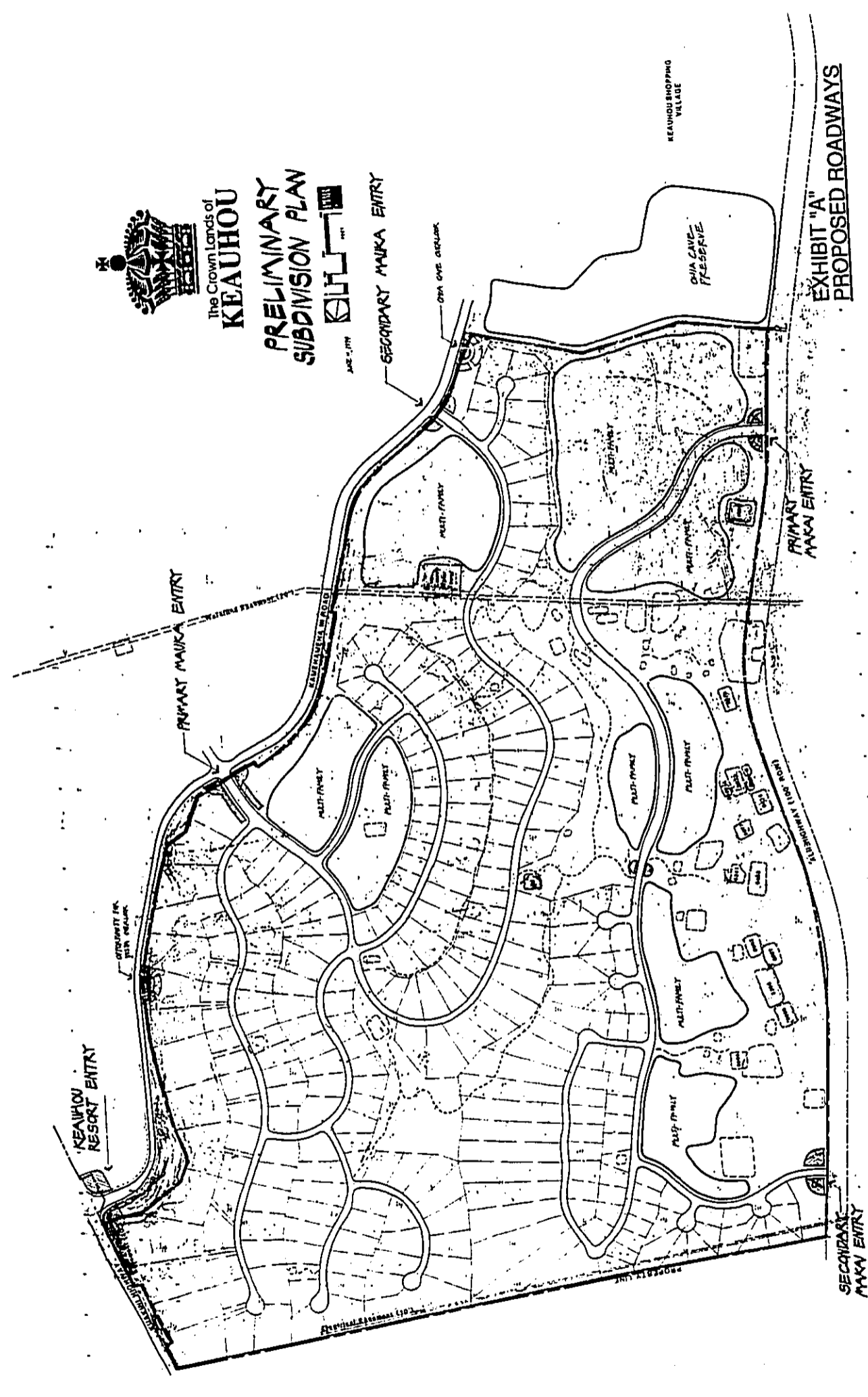


EXHIBIT "A"
PROPOSED ROADWAYS

DOCUMENT CAPTURED AS RECEIVED

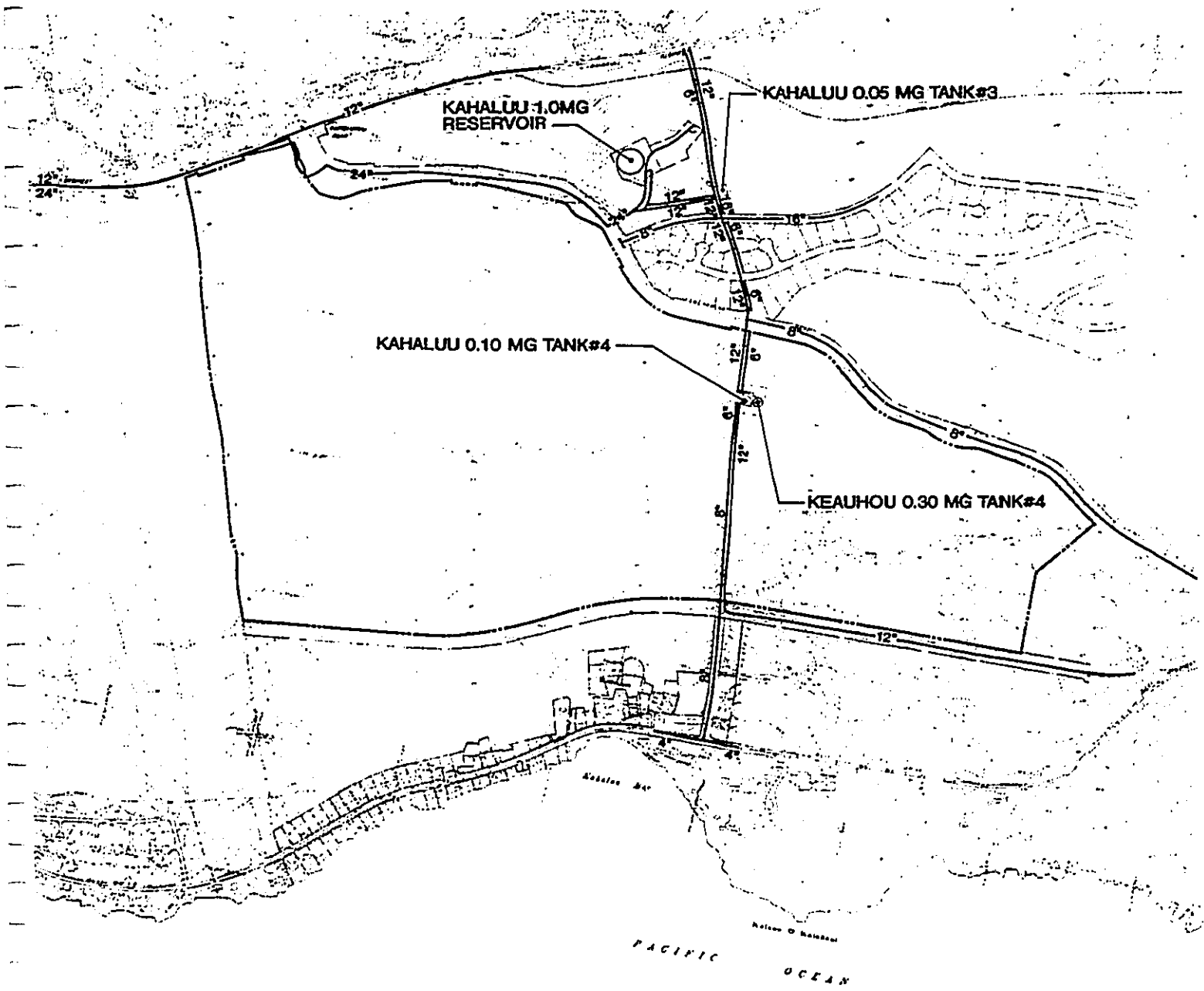
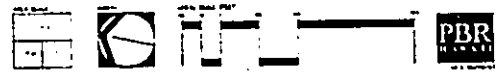


EXHIBIT "B"
EXISTING WATER SYSTEM

KEAUHOU
LANDOWNERS DEVELOPMENT CORPORATION

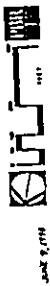
STATE OF HAWAII



PBR



The Crown Lands of
KEAUHOU
PRELIMINARY
SUBDIVISION PLAN



JUNE 8, 1978
 SECONDARY MAUIKA ENTRY

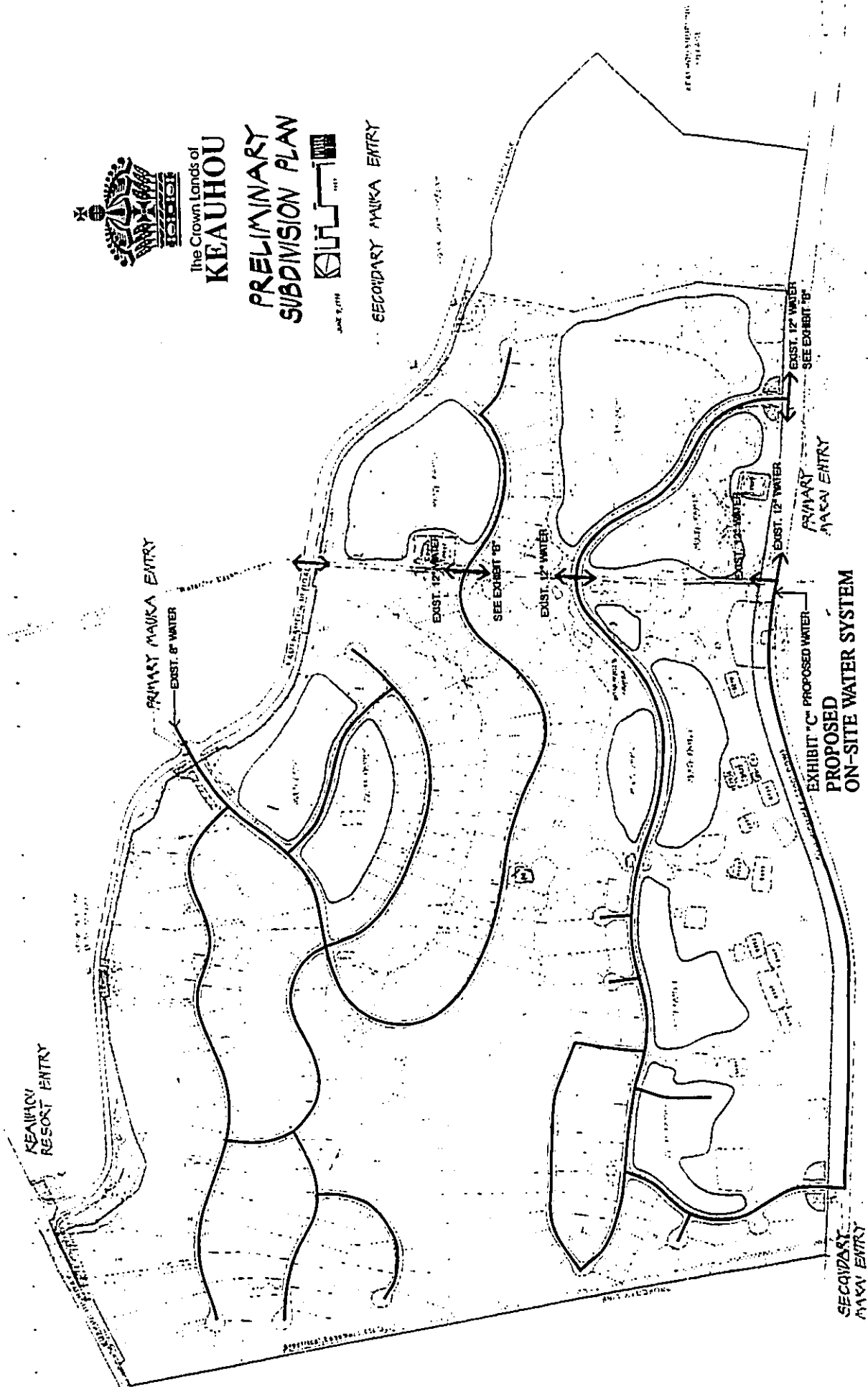


EXHIBIT "C" PROPOSED WATER
PROPOSED
ON-SITE WATER SYSTEM

SECONDARY
 MAUIKA ENTRY

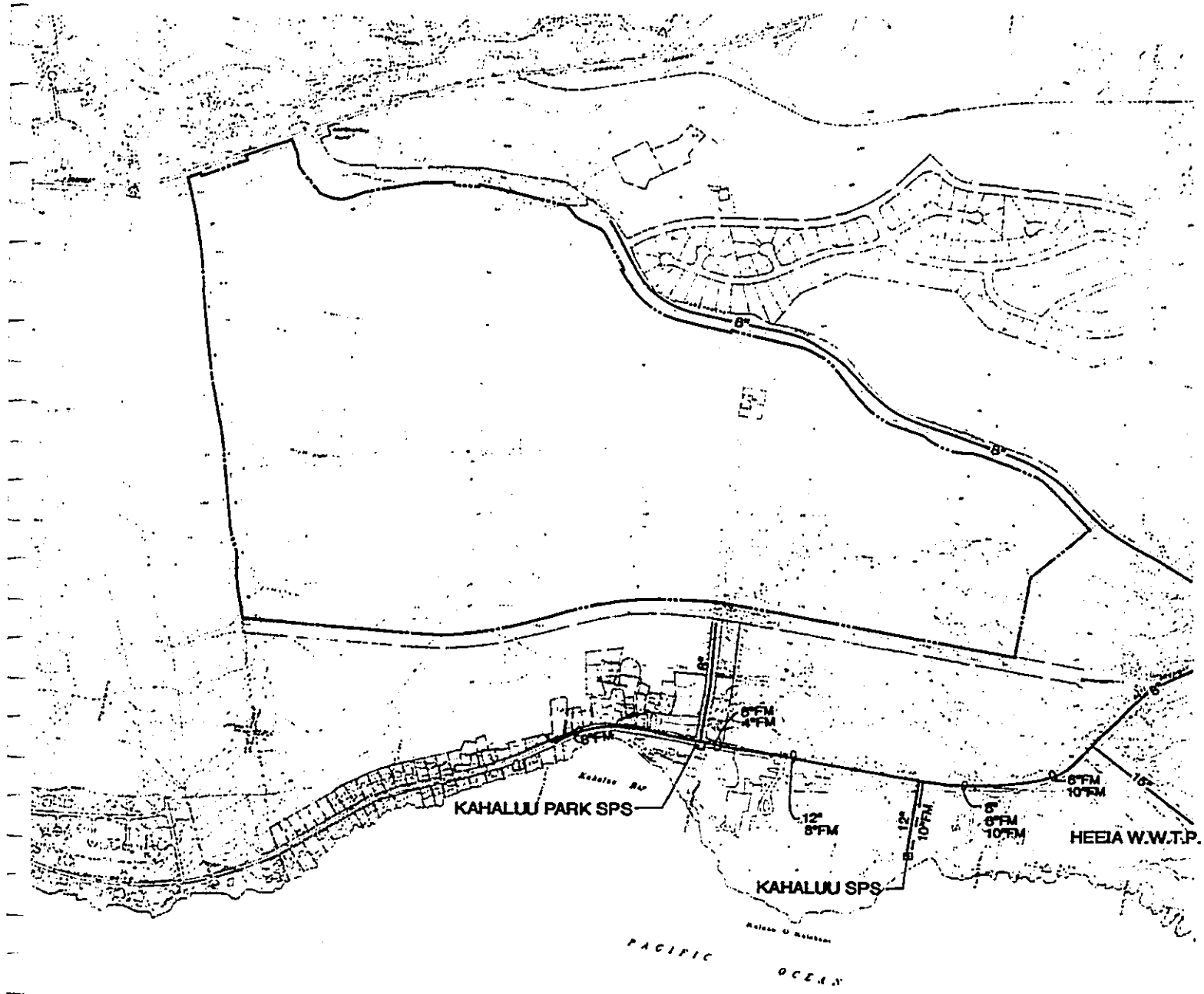
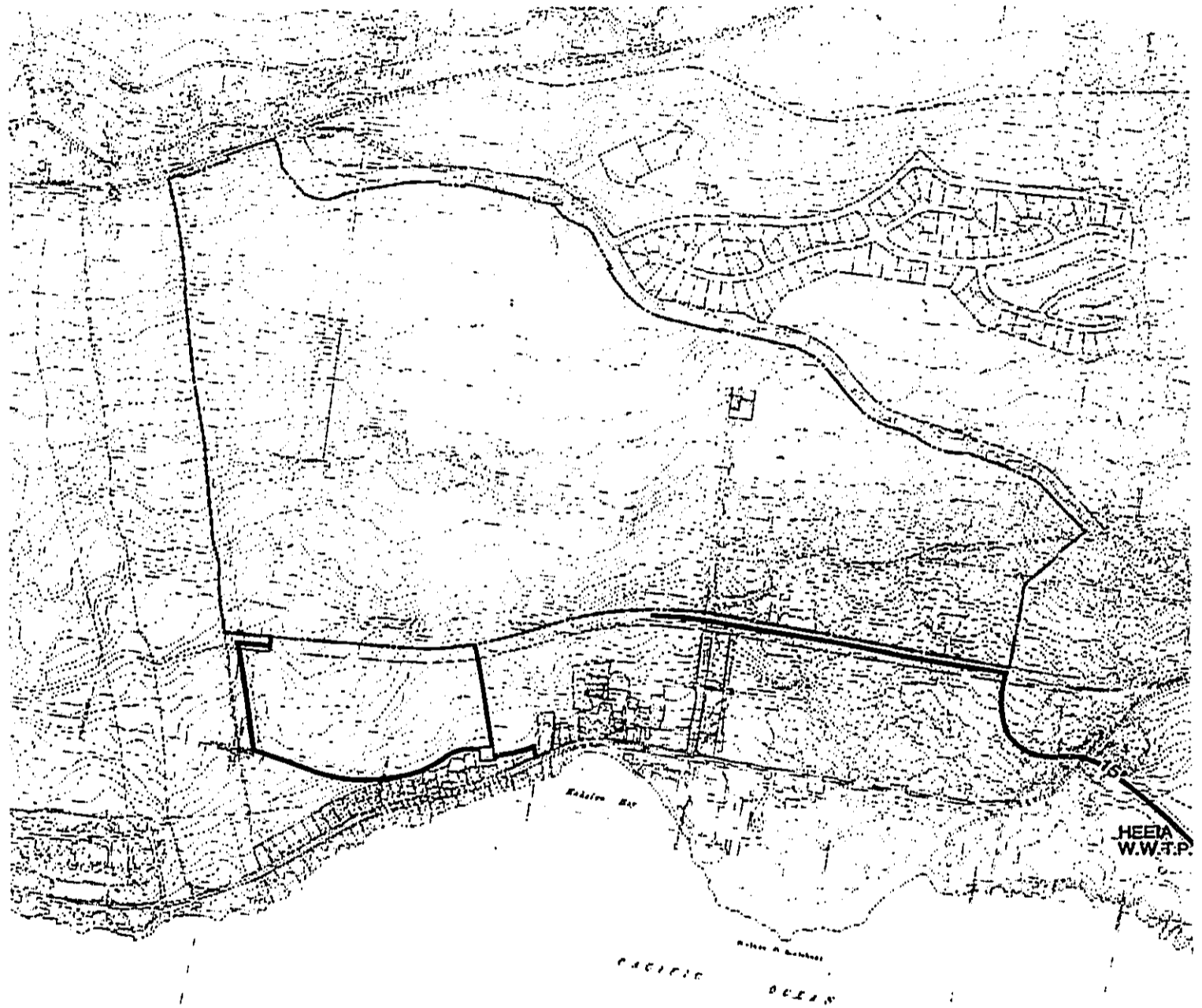


EXHIBIT "D"
EXISTING SANITARY SEWER SYSTEM

KEAUHOU

LANDOWNERS ASSOCIATION CORPORATION ISLAND OF HAWAII



**EXHIBIT "E" OFF-SITE
PROPOSED SANITARY SEWER SYSTEM**

KEAUHOU

PLANNING DEPARTMENT CONSULTANTS

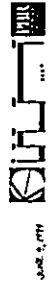
STATE OF HAWAII

PBR



The Crown Lands of
KEAUHOU

PRELIMINARY SUBDIVISION PLAN



SECURITY PLANNING PARTNERS

