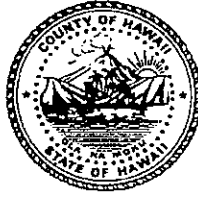


FILE COPY

MAR 08 2012

William P. Kenoi
Mayor



BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

West Hawai'i Office
74-5044 Ane Keohokalole Hwy
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County of Hawai'i
PLANNING DEPARTMENT

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

RECEIVED
12 FEB 27 4:53
OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

February 24, 2012

Mr. Gary Hooser, Director
Office of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, HI 96813

**SUBJECT: FINDING OF NO SIGNIFICANT IMPACT FOR QUEEN KA'AHUMANU
FRONTAGE ROAD: HULIKOA DRIVE TO KOHANIKI WAY- KOHANAIKI,
NORTH KONA, HAWAII, TMK: (3) 7-3-009:016 (portion), & 018 (portion)**

Dear Director Hooser:

The County of Hawai'i Planning Department has reviewed the Final Environmental Assessment and comments received on the Draft Environmental Assessment during the 30-day public comment period which ended on January 6, 2012. The Department has determined that this project will not have significant environmental impacts and has issued a Finding of No Significant Impact. Please publish notice in the next available OEQC Environmental Notice.

A completed OEQC Publication Form, one (1) copy of the FEA document in pdf format, and one (1) hardcopy of the Final EA will be delivered to your office shortly via separate cover. Please call Daryn Arai of the Hawai'i County Planning Department at 961-8288 or Tom Schnell at PBR HAWAII at 521-5631 if you have any questions.

Sincerely,


BJ LEITHEAD TODD
Planning Director

Project Name: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD: HULIKOA DRIVE TO KOHANIKI WAY

**Publication Form
The Environmental Notice
Office of Environmental Quality Control**

Instructions: Please submit one hardcopy of the document along with a determination letter from the agency. On a compact disk, put an electronic copy of this publication form in MS Word and a PDF of the EA or EIS. Please make sure that your PDF documents are ADA compliant. Mahalo.

Applicable Law:	HRS 343-5(a)(2) (proposed use within Conservation District)
Type of Document:	Final EA
Island:	Hawai`i
District:	North Kona
TMK:	(3) 7-3-009:016 (portion), & 018 (portion)
Permits Required:	SMA Use Permit Conservation District Use Permit Subdivision Approval National Pollutant Discharge Elimination System Permit Grading Permit Underground Injection Control
Applicant or Proposing Agency:	Kohanaiki Shores, LLC & Kohanaiki Business Park Association
Address	Kohanaiki Shores, LLC Attn: Mr. Joe Root P.O. Box 9015 Kailua-Kona, Hawai`i 96745
Contact & Phone	808-329-6200 (Joe Root)
Approving Agency/ Accepting Authority:	Hawai`i County Planning Department
Address	Aupuni Center, 101 Pauahi Street, Suite 3, Hilo, HI 96720
Contact & Phone	Bobby Jean Leithead-Todd, Director, 808-961-8288
Consultant:	PBR HAWAII
Address	1001 Bishop Street, ASB Tower, Suite 650, Honolulu, Hawai`i 96813
Contact & Phone	Tom Schnell, AICP, (808) 521-5631

Project Summary: Summary of the direct, indirect, secondary, and cumulative impacts of the proposed action (less than 200 words). Please keep the summary brief and on this one page.

This EA covers the first portion of the frontage road envisioned in the Kona Community Development Plan (CDP), extending from Hulikoa Drive to Kohanaiki Way. The Kona CDP calls for a frontage road to “enable the consolidation of Queen Ka’ahumanu Highway vehicular access points for the developments makai of Queen Ka’ahumanu Highway”.

No threatened or endangered plant or animal species were found on the Site. Two historic sites were found, but neither of these sites is located within the proposed roadway alignments. A cultural impact assessment concluded that: 1) no known cultural resources will be directly affected; and 2) no customary native Hawaiian rights are currently conducted in the study area. Since the Project will be at a lower elevation than Queen Ka’ahumanu Highway, the line of sight from Queen Ka’ahumanu Highway toward the ocean should not be affected.

The Project will improve the social welfare and quality of life for area residents by 1) improving safety and traffic flow on Queen Ka’ahumanu Highway through the consolidation of access points; and 2) improving public access to properties makai and mauka of Queen Ka’ahumanu Highway, and in particular improving public access to Kohanaiki Public Beach Park and the shoreline.

QUEEN KA‘AHUMANU HIGHWAY
FRONTAGE ROAD
HULIKOA DRIVE TO KOHANAIKI WAY

FINAL ENVIRONMENTAL ASSESSMENT

Prepared for:

KOHANAIKI SHORES, LLC &
KOHANAIKI BUSINESS PARK ASSOCIATION

Accepting Authority:

COUNTY OF HAWAII
PLANNING DEPARTMENT

Prepared by:



February 2012

QUEEN KA‘AHUMANU HIGHWAY
FRONTAGE ROAD
HULIKOA DRIVE TO KOHANAIFI WAY

FINAL ENVIRONMENTAL ASSESSMENT

Prepared for:

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Accepting Authority:

COUNTY OF HAWAII
PLANNING DEPARTMENT

Prepared by:



February 2012

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

PREFACE

The Kona Community Development Plan (CDP) calls for a frontage road makai (west) of, and parallel to, Queen Ka‘ahumanu Highway from the Kona International Airport at Keāhole to Honokōhau Harbor (Kona CDP Policy TRAN-1.5). The Kona CDP envisions this frontage road to serve as a secondary transit route to “enable the consolidation of Queen Ka‘ahumanu Highway vehicular access points for the developments makai of Queen Ka‘ahumanu Highway” (Kona CDP Policy TRAN-1.5). As a secondary transit route, eventually the frontage road will also include bus transit stations along its path to facilitate the expansion of Kona’s bus transportation system.

This EA covers the first portion of the frontage road envisioned in the Kona CDP (see Figure 1). This first portion extends from Hulikoa Drive to Kohanaiki Way and includes three elements (collectively called “the Project” for the purpose of this EA):

1. Extending Hulikoa Drive makai (west) of Queen Ka‘ahumanu Highway from the makai highway right-of-way to a new intersection with the new frontage road;
2. Creating a new intersection makai of Queen Ka‘ahumanu Highway connecting the makai portion of Hulikoa Drive to the frontage road; and
3. Constructing the frontage road from the new intersection to the existing Kohanaiki Way to the north.

With Hulikoa Drive extended makai of Queen Ka‘ahumanu Highway, the current “T” Queen Ka‘ahumanu Highway/Hulikoa Drive intersection will be reconfigured into a four-way signalized intersection. The State Department of Transportation (DOT) will design and construct the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection improvements as part of widening Queen Ka‘ahumanu Highway from two to four lanes. The intersection lane configurations and signal phasing are proposed to include protected left-turn phasing in all four directions. Upon completion of the Project and the improvements to the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection: 1) the existing connection of Kohanaiki Way to Queen Ka‘ahumanu Highway will be closed; 2) the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection will become the access point to makai properties and the shoreline; and 3) the Project will be dedicated to the County of Hawai‘i.

The Project, the improvements to the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection, and the closure of the existing connection of Kohanaiki Way to Queen Ka‘ahumanu Highway are part of a multi-party memorandum of agreement (MOA) among the DOT, an entity representing Kohanaiki Business Park, the owner of the land underlying the Project, and Kohanaiki Shores. Under this MOA, Kohanaiki Shores committed to construct the Project and the DOT agreed to design and construct the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection improvements within the Queen Ka‘ahumanu right-of-way as part of the Queen Ka‘ahumanu Highway Phase II widening project, which extends from the Airport to Kealakehe Parkway.

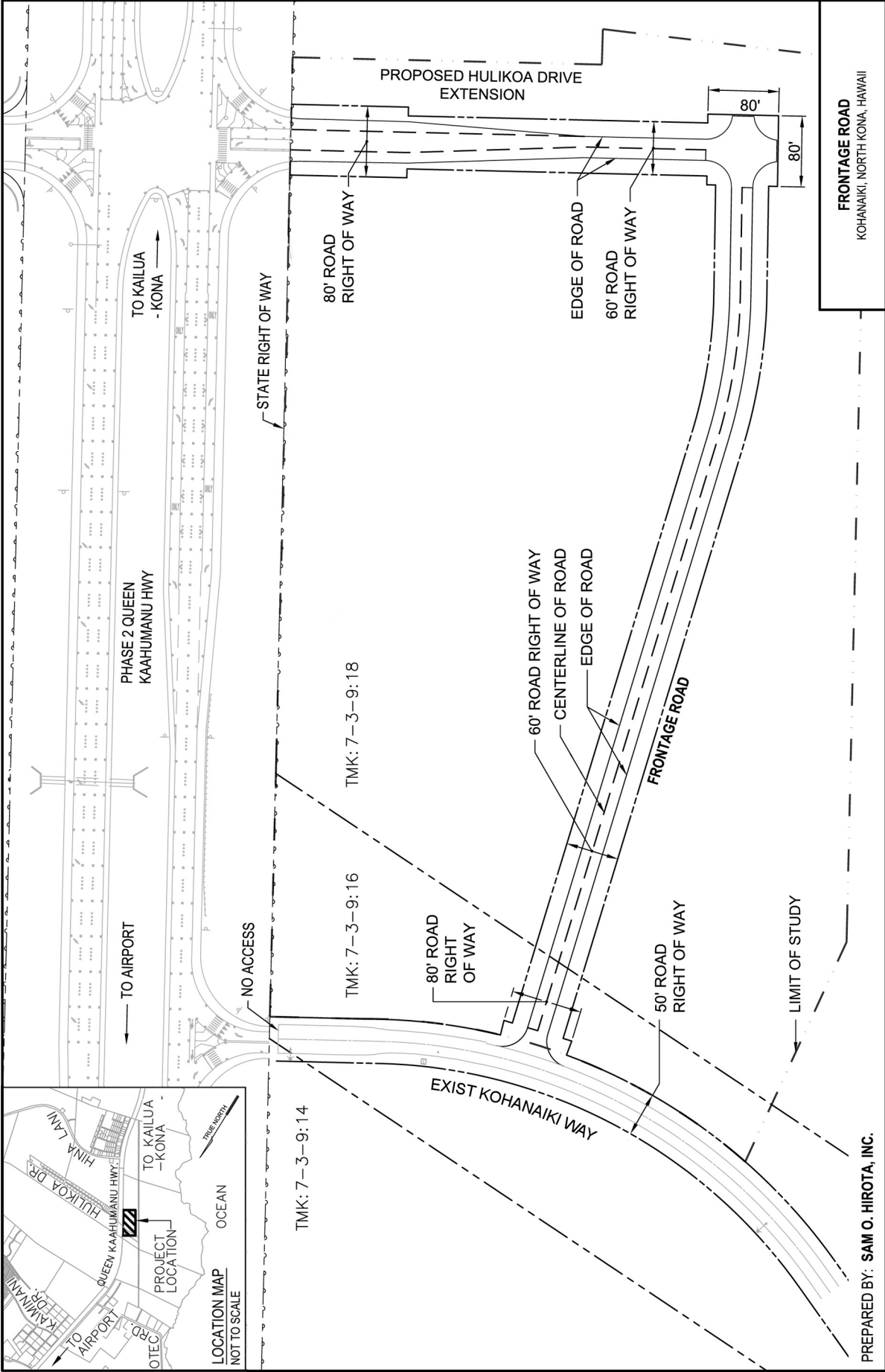


FIGURE 1:
 Frontage Road Hulikoa Drive to Kohanaiki Way
Queen Ka'ahumanu Highway Frontage Road
 Kohanaiki Shores, LLC
 Island of Hawaii
 PBR HAWAII & ASSOCIATES, INC.

Source: Prepared by Sam O. Hirota, Inc.
 Disclaimer: This Graphic has been prepared for general Planning purposes only and should not be used for boundary interpretations or other spatial analysis beyond the limitations of the data.

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

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D	Cultural Impact Assessment
E	Traffic Engineering Study & Technical Addendum
F	Hydrology Report

LIST OF ACRONYMS AND ABBREVIATIONS

ALISH	Agricultural Lands of Importance to the State of Hawai‘i
CDP	Community Development Plan
CDUP	Conservation District Use Permit
CWRM	Commission on Water Resource Management
CZM	Coastal Zone Management
DLNR	Department of Land and Natural Resources
DOH	Department of Health
DOT	Department of Transportation
DWS	Department of Water Supply
EA	Environmental Assessment
EIS	Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
HAR	Hawai‘i Administrative Rules
HELCO	Hawai‘i Electric Light Company
HRS	Hawai‘i Revised Statutes
LOS	Level of Service
LSB	Land Study Bureau
MGD	Million Gallons per Day
MOA	Memorandum of Agreement
NELHA	Natural Energy Laboratory of Hawai‘i Authority
NPDES	National Pollutant Discharge Elimination Systems
NRCS	Natural Resources Conservation Services
SMA	Special Management Area
TMK	Tax Map Key
USFWS	U.S. Fish and Wildlife Service
WWTP	Wastewater Treatment Plan

1.0 INTRODUCTION

This Final Environmental Assessment (EA) has been prepared in accordance with Chapter 343, HRS.

1.1 PROFILE

Name: Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way (the Project)

Location: Kohanaiki, North Kona, Island of Hawai‘i

Judicial District: North Kona

Applicant: Kohanaiki Shores, LLC & Kohanaiki Business Park Association

Tax Map Keys: (3) 7-3-009: 016 (portion) and 018 (portion)

Recorded Fee Owner: Rutter/KW Kohanaiki LLC

Land Area: The study area of this EA (the Site) includes approximately 16 acres (on portions of TMK 7-3-009: 016 & 018) to accommodate alternative roadway alignments.

Existing Use: Undeveloped vacant land.

Proposed Action: Construction of the first portion of a frontage road makai (west) of, and parallel to, Queen Ka‘ahumanu Highway envisioned in the Kona CDP. The proposed action subject to this EA (the Project) includes three elements:

1. Extending Hulikoa Drive makai (west) of Queen Ka‘ahumanu Highway from the makai highway right-of-way to a new intersection with the new frontage road;
2. Creating a new intersection makai of Queen Ka‘ahumanu Highway connecting the makai portion of Hulikoa Drive to the frontage road; and
3. Constructing the frontage road from the new intersection to the existing Kohanaiki Way to the north.

Land Use Designations (both parcels):

State Land Use District: Conservation and Urban
General Plan: Urban Expansion and Open
County of Hawai‘i Zoning: Open
Kona Community Development Plan: Kona Urban Area
Special Management Area (SMA): Within the SMA

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

Major Approvals

Anticipated: SMA Use Permit
Conservation District Use Permit
Subdivision Approval
National Pollutant Discharge Elimination System Permit
Grading Permit
Underground Injection Control

Accepting Authority: County of Hawai‘i, Planning Department

1.2 LAND OWNERSHIP

The Applicant, Kohanaiki Shores, LLC, owns tax map key (TMK) parcel 7-3-009:016. Rutter/KW Kohanaiki LLC owns TMK 7-3-009:018. Kohanaiki Shores, LLC has a license from Rutter/KW Kohanaiki LLC to build the portion of the Project within TMK (3) 7-3-009: 018 pursuant to multi-party memorandum of agreement (MOA) discussed in Section 2.3 of this EA. The Queen Ka‘ahumanu Highway right-of-way is owned by the State of Hawai‘i. The Project covered by this EA is outside the State’s Queen Ka‘ahumanu Highway right-of-way. The State Department of Transportation (DOT) has prepared an EA for the Queen Ka‘ahumanu Phase II widening project.

1.3 IDENTIFICATION OF THE APPLICANT

The applicant is Kohanaiki Shores, LLC. Contact information is as follows:

Kohanaiki Shores, LLC
Attn: Mr. Joe Root
P.O. Box 9015
Kailua-Kona, Hawai‘i 96745

1.4 IDENTIFICATION OF ENVIRONMENTAL CONSULTANT

Kohanaiki Shores LLC’s environmental planning consultant for the Project is PBR HAWAII.

Contact: Tom Schnell, AICP
Senior Associate
PBR HAWAII
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, Hawai‘i 96813
Telephone: (808) 521-5631
Fax: (808) 523-1402

1.5 IDENTIFICATION OF ACCEPTING AUTHORITY

In accordance with Chapter 343, HRS, privately initiated environmental documents must be accepted by the government agency empowered to issue a permit or approval for the project. In this instance, the County of Hawai‘i Planning Department is the accepting authority, since a SMA Use Permit is being sought.

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

Contact: County of Hawai‘i Planning Department
ATTN: Bobby Jean Leithead-Todd
Aupuni Center
101 Pauahi Street, Suite 3
Hilo, Hawai‘i 96720
Telephone: (808) 961-8288

1.6 COMPLIANCE WITH STATE OF HAWAI‘I ENVIRONMENTAL LAW

Preparation of this EA is being undertaken to address requirements of Chapter 343, HRS and Title 11, Department of Health (DOH), Chapter 200, Environmental Impact Rules, Hawai‘i Administrative Rules (HAR).

Section 343-5, HRS, establishes nine “triggers” that require compliance with the State’s EIS law. The triggers for the Project include, without limitation, the following:

- Construction of the Project in the State Land Use Conservation District; and,
- Connections to adjacent roads owned by the State of Hawai‘i or County of Hawai‘i.

While the Project will be built up to the Queen Ka‘ahumanu Highway right-of-way owned by the State of Hawai‘i, the Project does not include work within the highway right-of-way. The State DOT will design and construct the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection improvements to connect to the Project as part of the widening of Queen Ka‘ahumanu Highway from two to four lanes. The State DOT has prepared an EA for the Queen Ka‘ahumanu Phase II widening project. However the Project may involve or impact State and/or County lands or funds relating to infrastructure improvements for public facilities, roadways, water, sewer, utility, drainage, or other facilities. While the specific nature of each improvement is not known at this time, the EA is intended to address all current and future instances involving the use of State and/or County lands and funds relating to the Project.

1.7 STUDIES CONDUCTED AND INCLUDED IN THIS EA

The information contained in this EA has been developed from planning and design efforts, site visits, and technical studies of the Site and surrounding area. The following consultant studies referenced in this document are appended to this EA.

- Botanical Survey
- Fauna Survey
- Archaeological Inventory Survey
- Cultural Impact Assessment
- Traffic Engineering Study & Technical Addendum
- Hydrology Report

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

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2.0 PROJECT DESCRIPTION

This section includes background information and a general description of the Project.

2.1 LOCATION AND SITE DESCRIPTION

The Project will be located in Kohanaiki, North Kona on the island of Hawai‘i (Figure 2) in a portion of TMK (3) 7-3-009:016 and a portion of TMK (3) 7-3-009:018 (Figure 3). For the purpose of this EA a 16-acre Site was studied to accommodate alternative frontage road alignments; however the actual alignment of the Project will not encompass the entire Site. The Site is bound by Kohanaiki Way to the north, the Queen Ka‘ahumanu Highway right-of-way to the east, and undeveloped vacant lands to the south and west.

The Site is undeveloped and vacant. Pāhoehoe and ‘a‘ā lava flows cover the Site with sparse vegetation consisting primarily of fountain grass and scattered kiawe and koa haole trees.

The elevations of the Site range from approximately 50-feet to 70-feet above mean sea level. The slope of the Site is approximately 1.5 percent in a mauka-makai direction.

Current land use designations of the Site are:

- State Land Use District: Conservation and Urban (Figure 4)
- Conservation District: General Subzone (Figure 5)
- General Plan: Urban Expansion and Open Area (Figure 6)
- County of Hawai‘i Zoning: Open (Figure 7)
- Kona CDP: Kona Urban Area (Figure 8)
- Special Management Area: Within the SMA (Figure 9)

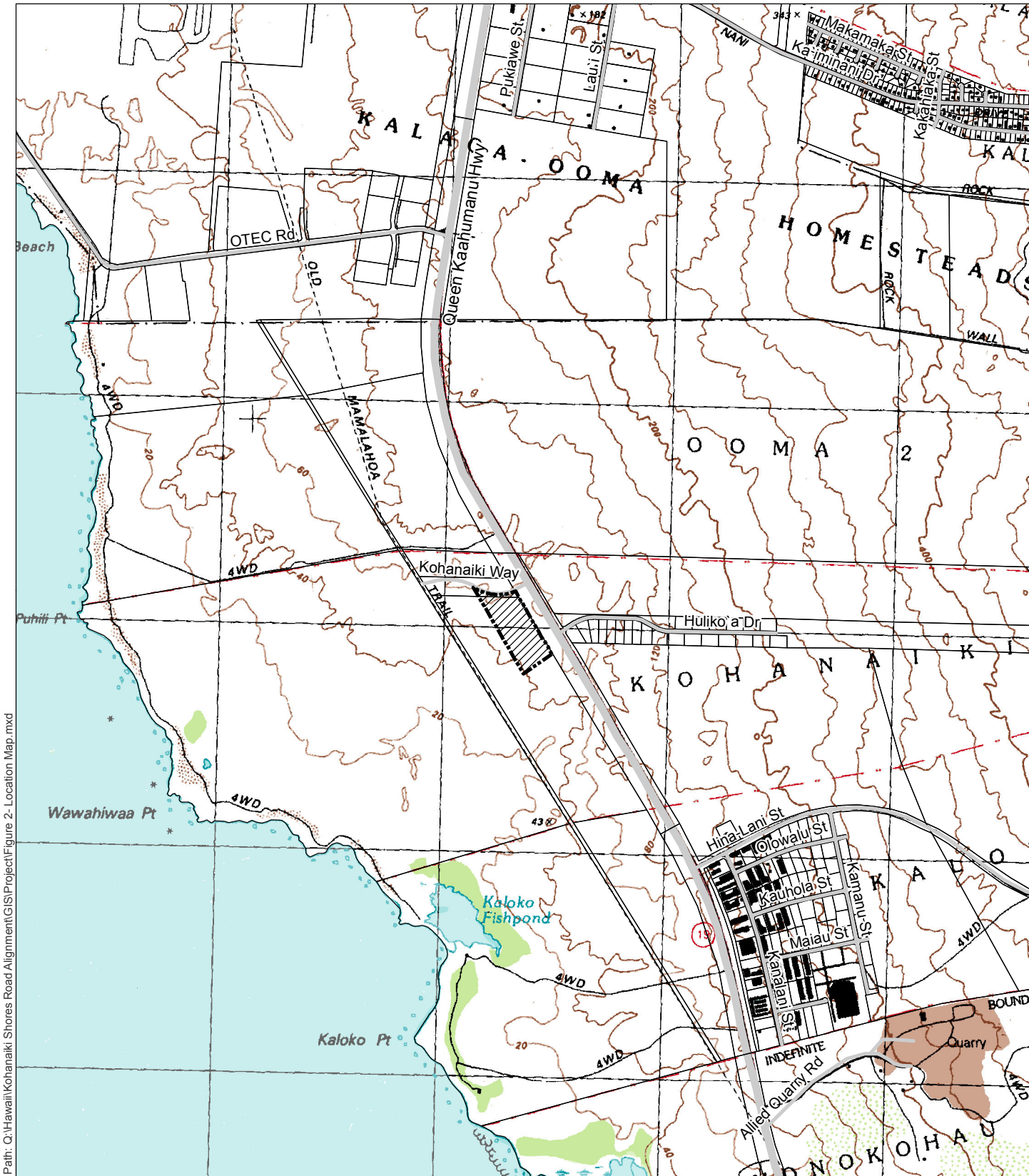
2.2 SURROUNDING USES

North: Kohanaiki Way, a two-lane roadway, is immediately north of the Site. The nearest developments north of the Site are the Natural Energy Laboratory of Hawai‘i Authority (NELHA) and Kona International Airport, about 1.0 and 1.5 miles distant, respectively.

East: Queen Ka‘ahumanu Highway, a major highway providing north-south access along the western side of Hawai‘i Island, is immediately east of the Site. The Highway, which presently has two lanes, is being widened to four lanes from Kailua-Kona to Kona International Airport. The Kohanaiki Business Park, a 26-lot light industrial development, is located across of the Highway from the Site.

South: Lands immediately south of the Site are undeveloped. The Kaloko-Honokōhau National Historical Park and Honokōhau Harbor are located about 1.5-miles and 2.0-miles south of the Site, respectively.

West: Lands immediate west of the Site within parcel 18 are undeveloped. The Shores at Kohanaiki, which includes a public shoreline park, home sites, and a golf course is about one-quarter mile south of the Site.



Path: Q:\Hawaii\Kohanaiki Shores Road Alignment\GIS\Project\Figure 2- Location Map.mxd


LEGEND

-  Study Area
-  Hawaii County TMK Parcels
-  Roads

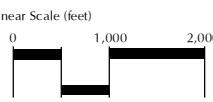



FIGURE 2:
Regional Location Map
Queen Ka'ahumanu Highway Frontage Road

Kohanaiki Shores, LLC North Island of Hawaii



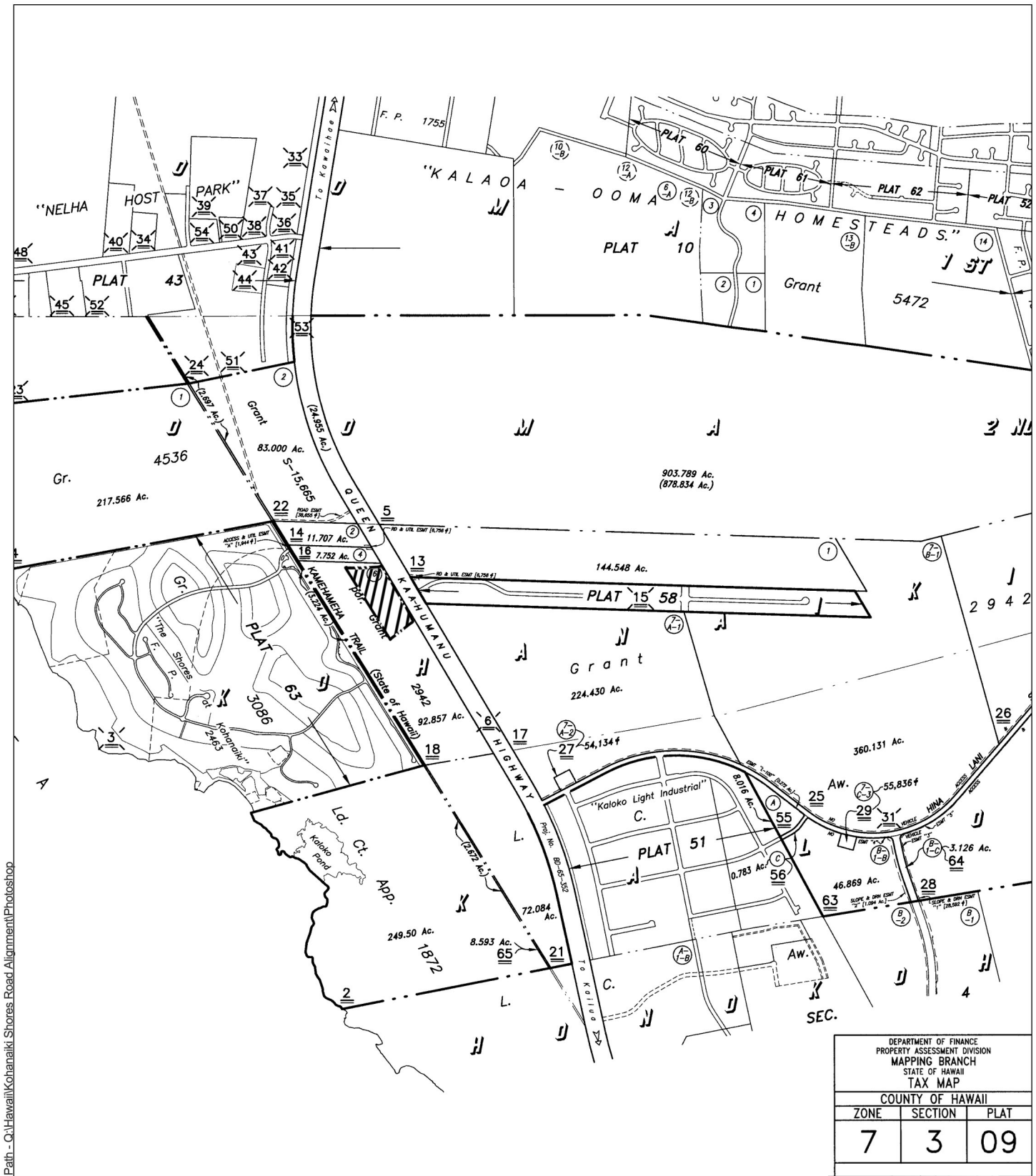
Linear Scale (feet)

PBR HAWAII & ASSOCIATES, INC.

Source: U.S. Geological Survey (2004)

Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary Interpretations or other spatial analysis.



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DEPARTMENT OF FINANCE PROPERTY ASSESSMENT DIVISION MAPPING BRANCH STATE OF HAWAII		
TAX MAP		
COUNTY OF HAWAII		
ZONE	SECTION	PLAT
7	3	09

LEGEND

Study Area

FIGURE 3 :
Tax Map Key

**Queen Ka'ahumanu Highway
Frontage Road**

Kohala Shores, LLC
North

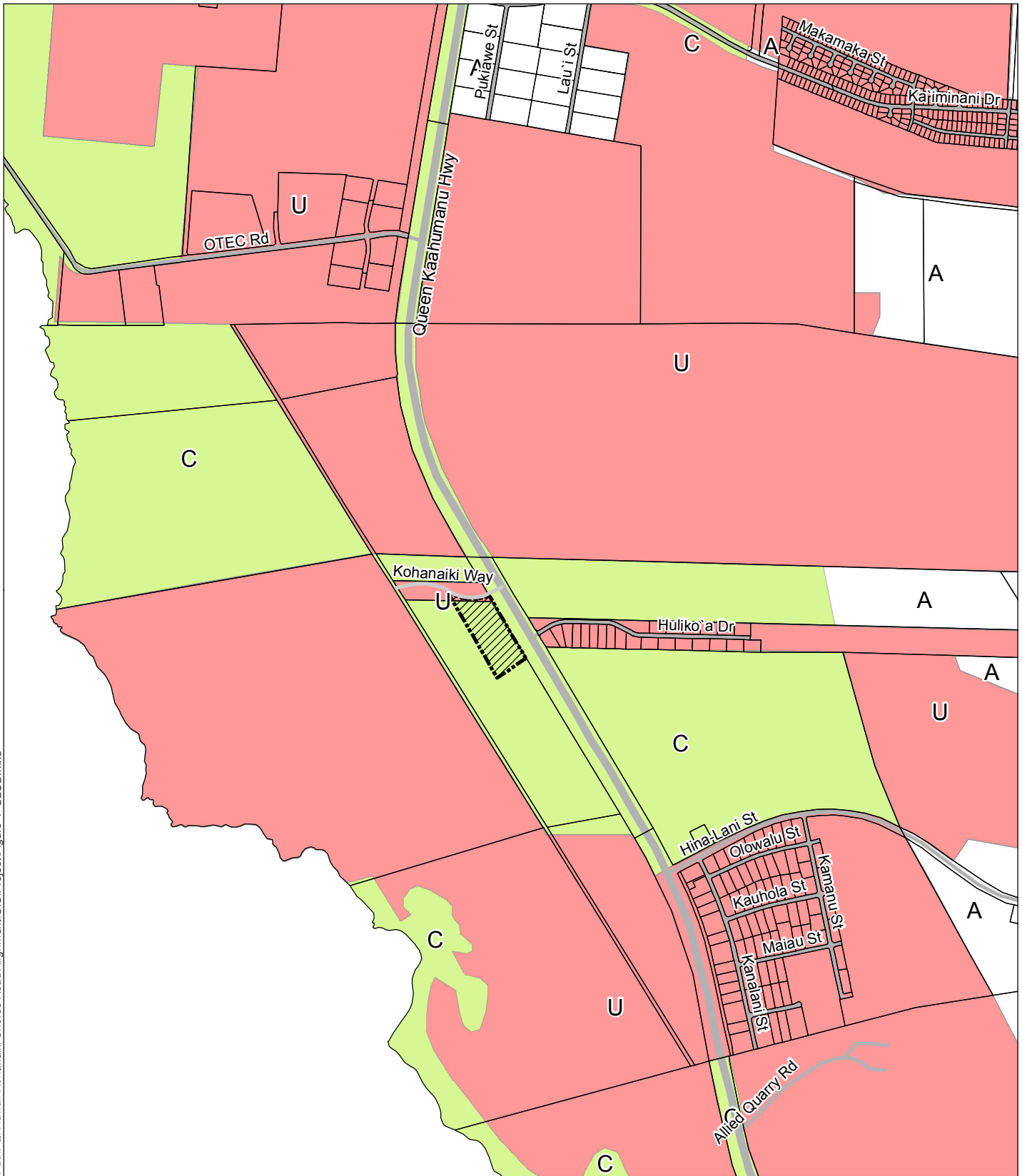
Island of Hawai'i










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LEGEND

-  Study Area
-  Hawaii County TMK Parcels
-  Roads
-  A- Agriculture
-  C- Conservation
-  R- Rural
-  U- Urban


Source: Hawai'i State Land Use Commission

Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary Interpretations or other spatial analysis.

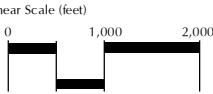

FIGURE 4:
State Land Use Districts

Queen Ka'ahumanu Highway Frontage Road

Kohanaiki Shores, LLC Island of Hawai'i
North



Linear Scale (feet)
0 1,000 2,000

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LEGEND








-  Study Area
-  Hawaii County TMK Parcels
-  Roads
-  G- General
-  P- Protected
-  R- Resource

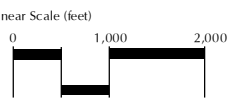
FIGURE 5:
 Conservation District Subzones
**Queen Ka'ahumanu Highway
 Frontage Road**

Kohanaiki Shores, LLC Island of Hawaii


North



Linear Scale (feet)



0 1,000 2,000

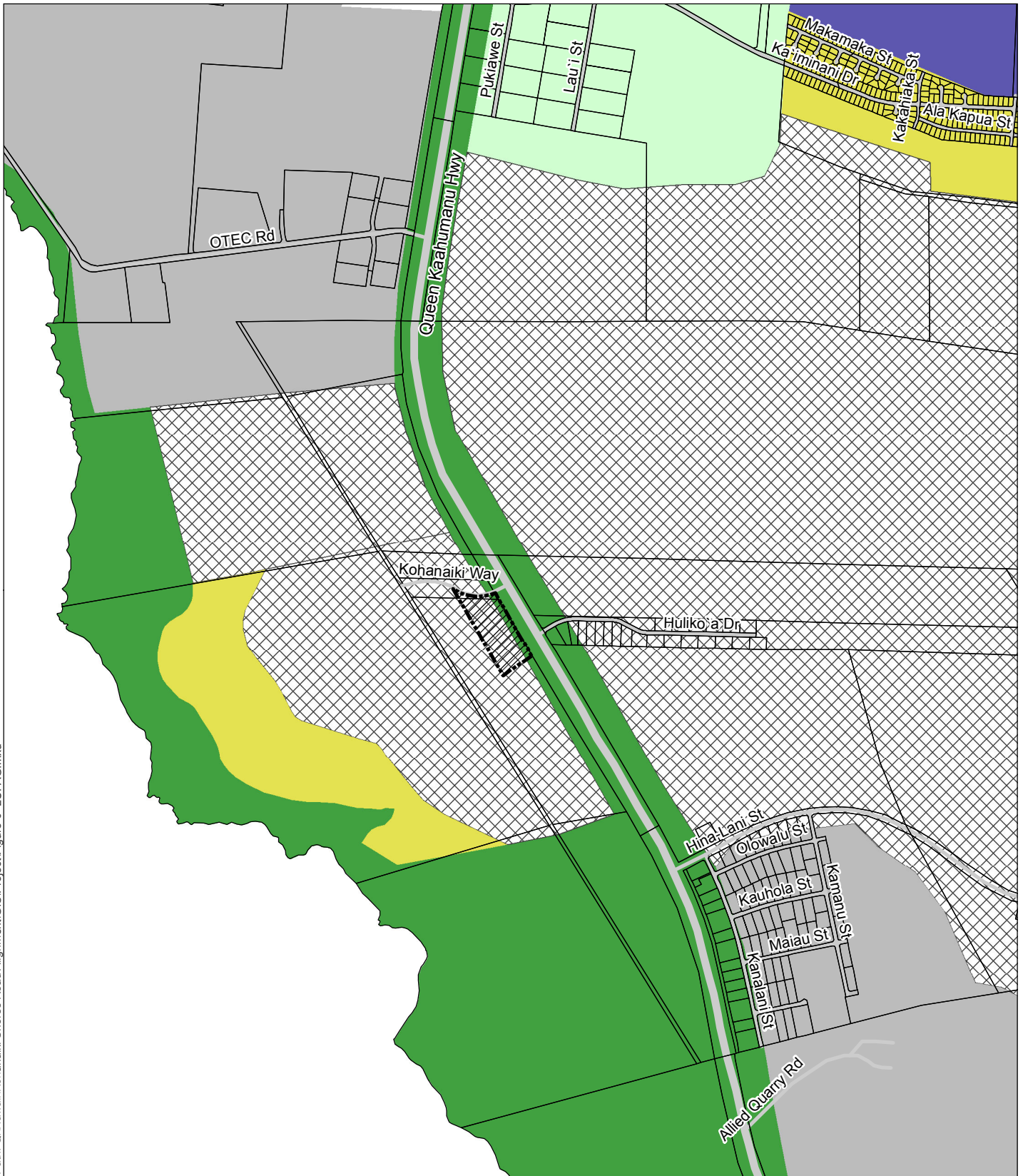


PBR HAWAII & ASSOCIATES, INC.

Source: Department of Land and Natural Resources

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Path: Q:\Hawaii\Kohanaiki Shores Road Alignment\GIS\Project\Figure 6- LUPAG.mxd



LEGEND









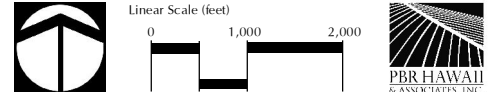
- | | | | |
|---|------------|---|---------------------|
|  | Study Area |  | Industrial |
|  | Roads |  | Low Density Urban |
| | |  | Open Area |
| | |  | Important Ag. Lands |
| | |  | Urban Expansion |
| | |  | University Use |

FIGURE 6:
 General Plan LUPAG
 Queen Ka'ahumanu Highway
 Frontage Road

Kohanaiki Shores, LLC
 North

Island of Hawaii

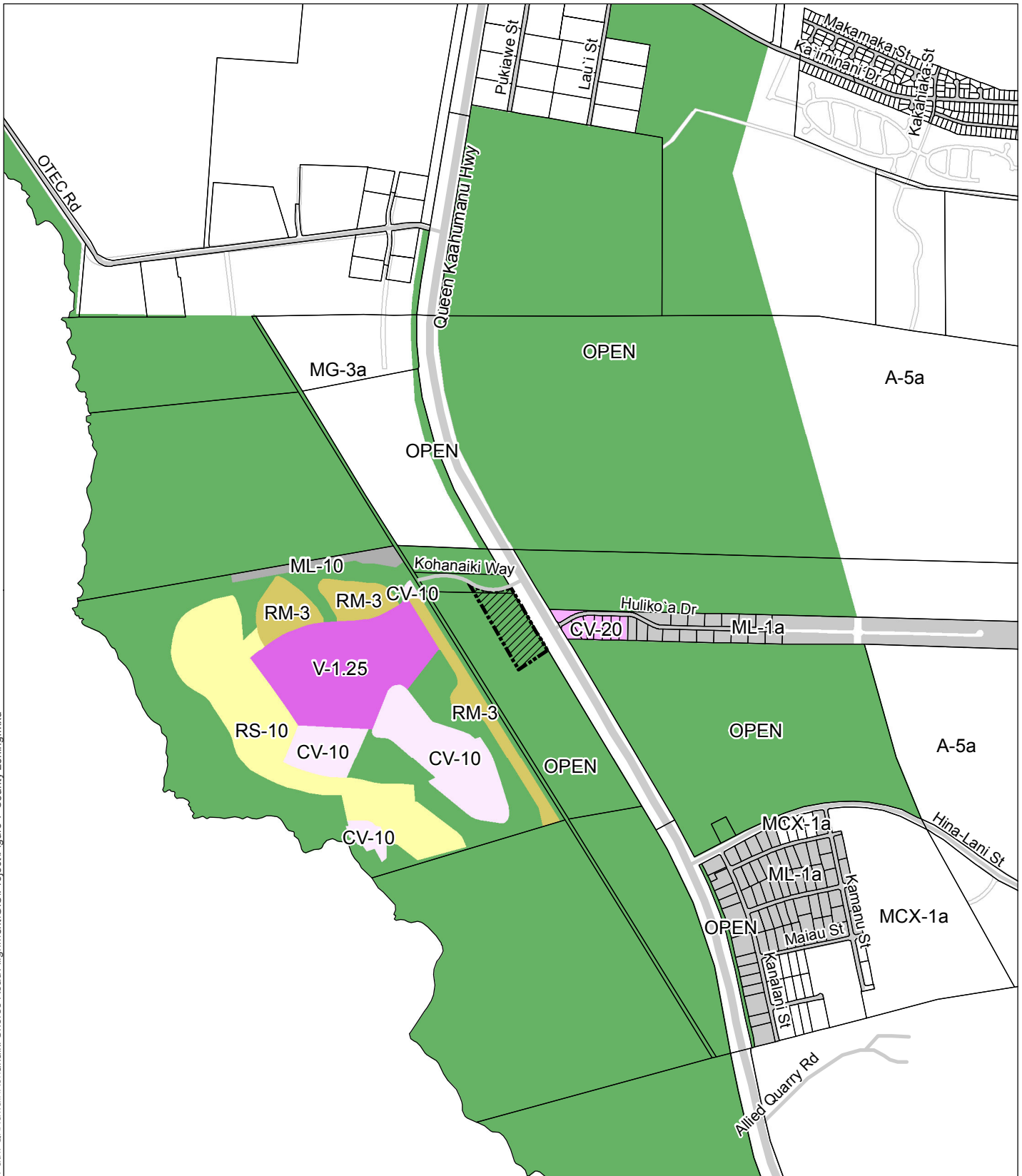
Linear Scale (feet)
 0 1,000 2,000



Source: Hawaii County General Plan (2011)

Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary Interpretations or other spatial analysis.

Path: Q:\Hawaii\Kohanaiki Shores Road Alignment\GIS\Project\Figure 7-County zoning.mxd



LEGEND















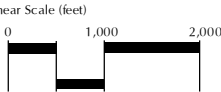

- | | |
|---|--|
|  Study Area |  ML-1a |
|  Hawaii County TMK Parcels |  OPEN |
|  Roads |  RM-3 |
|  Road |  RS-10 |
|  CV-10 |  V-1.25 |
|  CV-20 |  ML-10 |
|  MG-1a | |

FIGURE 7:
County of Hawai'i Zoning
**Queen Ka'ahumanu Highway
Frontage Road**

Kohanaiki Shores, LLC North Island of Hawai'i

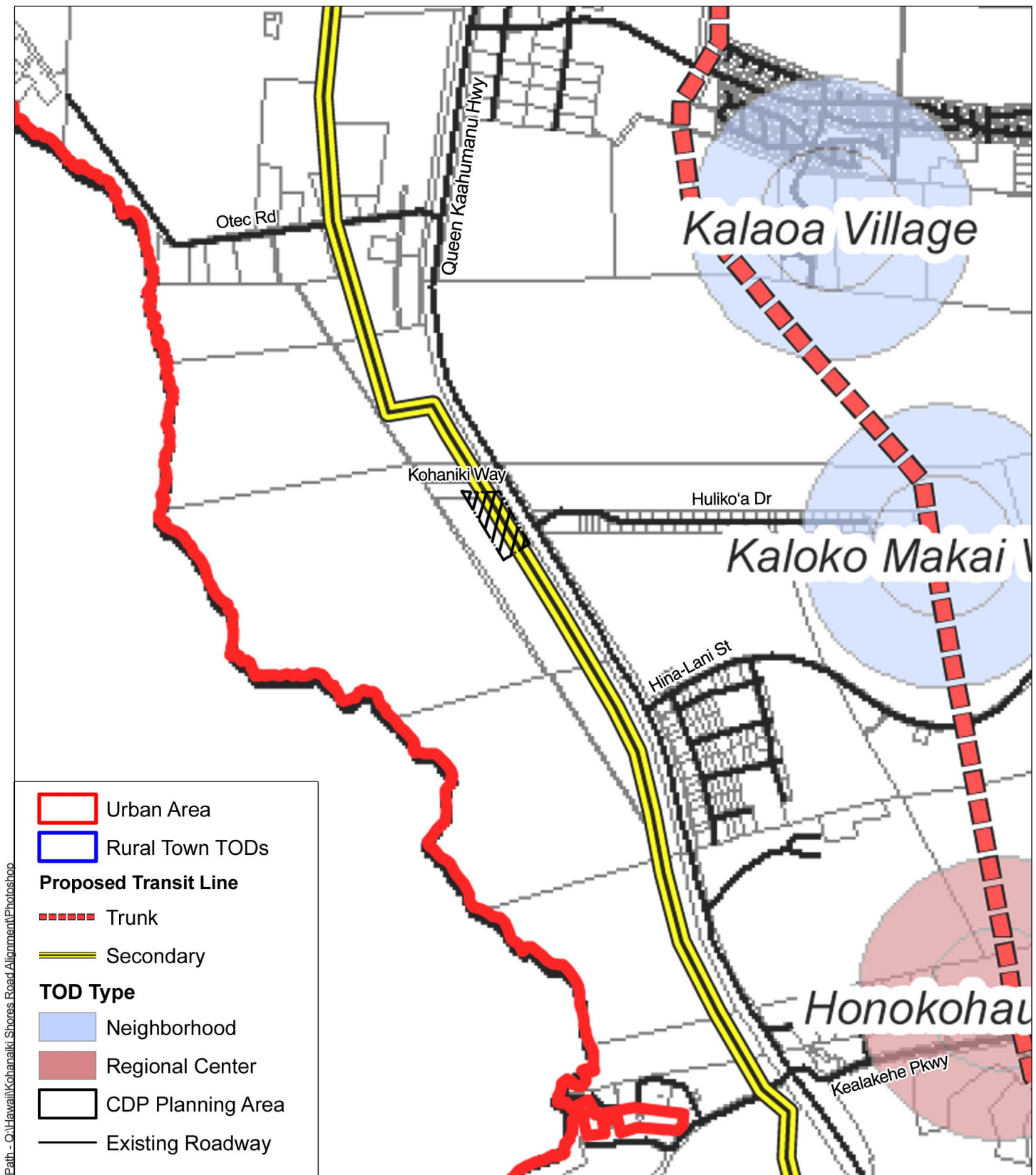


Linear Scale (feet)

Source: County of Hawaii, Planning Department (2010)

Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary Interpretations or other spatial analysis.



Path - Oahu Hawaii/Kohala/Kona Shores Road Alignment/Photoshop

FIGURE 8 :
 Kona CDP- Official Land Use Map
**Queen Ka'ahumanu Highway
 Frontage Road**



Path: Q:\Hawaii\Kohanaiki Shores Road Alignment\GIS\Project\Figure 9-SMA.mxd

LEGEND



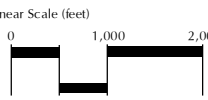

-  Study Area
-  Hawaii County TMK Parcels
-  Roads
-  Special Management Area

FIGURE 9:
Special Management Area
**Queen Ka'ahumanu Highway
Frontage Road**

Kohanaiki Shores, LLC Island of Hawaii

North 

Linear Scale (feet) 

 PBR HAWAII & ASSOCIATES, INC.

Source: Hawai'i County Department of Planning

Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary Interpretations or other spatial analysis.

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

2.3 PROJECT DESCRIPTION

The Kona CDP calls for a frontage road makai (west) of, and parallel to, Queen Ka‘ahumanu Highway from the Kona International Airport at Keāhole to Honokōhau Harbor (Kona CDP Policy TRAN-1.5). The Kona CDP envisions this frontage road to serve as a secondary transit route to “enable the consolidation of Queen Ka‘ahumanu Highway vehicular access points for the developments makai of Queen Ka‘ahumanu Highway” (Kona CDP Policy TRAN-1.5). As a secondary transit route, eventually the frontage road will also include bus transit stations along its path to facilitate the expansion of Kona’s bus transportation system.

This EA covers the first portion of the frontage road envisioned in the Kona CDP (see Figure 1). This first portion extends from Hulikoa Drive to Kohanaiki Way and includes three elements (collectively called “the Project” for the purpose of this EA):

1. Extending Hulikoa Drive makai (west) of Queen Ka‘ahumanu Highway from the makai highway right-of-way to a new intersection with the new frontage road;
2. Creating a new intersection makai of Queen Ka‘ahumanu Highway connecting the makai portion of Hulikoa Drive to the frontage road; and
3. Constructing the frontage road from the new intersection to the existing Kohanaiki Way to the north.

The Project may also include an entry feature, or features, for Kohanaiki Shores. The entry feature(s) would be located near the: 1) Queen Ka‘ahumanu/Hulikoa Drive intersection; and/or 2) Hulikoa Drive/Frontage Road intersection 3) Kohanaiki Way/Frontage Road intersection. The entry feature(s) may include a wall, sign, lighting, water feature, and landscaping in character and scale to the Hualalai Resort and Kaloko-Honokōhau National Historical Park entry features.

With Hulikoa Drive extended makai of Queen Ka‘ahumanu Highway, the current “T” Queen Ka‘ahumanu Highway/Hulikoa Drive intersection will be reconfigured into a four-way signalized intersection. The State DOT will design and construct the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection improvements as part of widening Queen Ka‘ahumanu Highway from two to four lanes. The intersection lane configurations and signal phasing are proposed to include protected left-turn phasing in all four directions. Upon completion of the Project and the improvements to the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection: 1) the existing connection of Kohanaiki Way to Queen Ka‘ahumanu Highway will be closed; 2) the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection will become the access point to makai properties and the shoreline; and 3) the Project will be dedicated to the County of Hawai‘i. After or concurrent with the dedication to the County, Kohanaiki Shores will execute a landscaping agreement with the County of Hawai‘i specifying that Kohanaiki Shores will maintain the Project landscaping.

The Project, the improvements to the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection, and the closure of the existing connection of Kohanaiki Way to Queen Ka‘ahumanu Highway are part of a multi-party MOA among the State DOT, an entity representing Kohanaiki Business Park, the owner of the land underlying the Project (Rutter/KW Kohanaiki LLC), and Kohanaiki Shores. Under this MOA, Kohanaiki Shores committed to construct the Project and the DOT agreed to design and construct the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection improvements within the Queen Ka‘ahumanu right-of-way as part of the Queen Ka‘ahumanu Phase II widening project, which extends from the Airport to Kealakehe Parkway.

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way

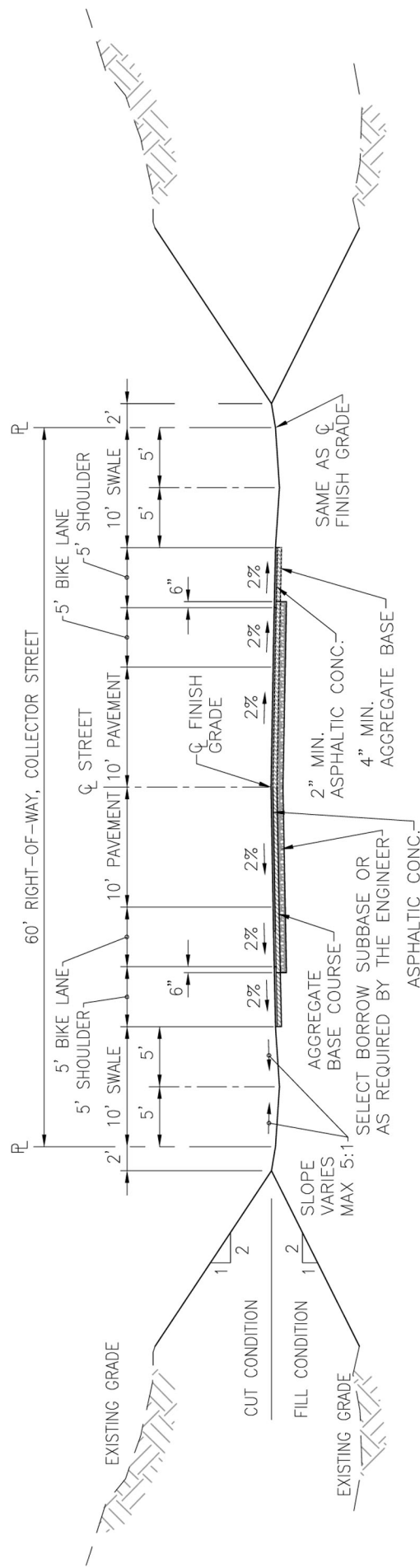
Final Environmental Assessment

The Hulikoa Drive extension and the frontage road will both be two-lane collector roads with 60 foot right-of-ways (with possible widening to 80 foot right-of-ways at intersections). The Hulikoa Drive extension will be approximately 511 feet from the makai Queen Ka‘ahumanu Highway right-of-way to the new intersection with the new frontage road. The frontage road will be approximately 1065 feet from the new intersection with the extended Hulikoa Drive to Kohanaiki Way. The proposed typical section consists of 10-foot wide travel lanes, five-foot bike lanes, five-foot shoulders, and 10-foot landscaped swales to accommodate drainage (Figure 10). Streetlights are proposed only at the intersections (Hulikoa Drive/Frontage Road and Frontage Road/Kohanaiki Way). Landscaping is proposed to include native species that either occur naturally on the Site or are suitable for the climate and soil conditions. The basis of the typical section design is to have a multi-modal corridor (i.e., bike lanes and shoulders/swales wide enough for pedestrians), narrower travel lanes that induce slower traffic but wide enough for buses and trucks (i.e., 10-foot lanes), a drainage system that allows for infiltration and filtering (i.e., landscaped swales) and aesthetic value while requiring minimal maintenance and irrigation (i.e., native plant landscaping), and a rural character in the stretches between urban settlements (i.e., swales instead of sidewalks, street lights only at intersections). Kohanaiki Shores is willing to assume maintenance responsibilities for the roadside landscaping subject to the terms of an agreement to be entered into between Kohanaiki Shores and the County.

Although the Kona CDP Official Transportation Network Map – Pedestrian and Bike Paths (Figure 11) designates pedestrian sidewalks to be constructed along the Frontage Road, the policy emphasized that the pedestrian facilities shown on the map were intended as a guide due to the need to evaluate a project within the context of its surroundings. Sidewalks make sense where there is high pedestrian traffic. Where the Frontage Road eventually traverses through development, sidewalks can be provided. The sidewalks can then transition to shoulder/swales for the relatively long segments between developed areas to provide a less formal or rural character and in recognition that the amount of pedestrian traffic would be considerably less outside the developed areas. The proposed portion of the Frontage Road covered by this EA is in an undeveloped area where urban development has not been proposed.

The Kona CDP serves as a policy guide for County decisions regarding land use, transportation systems, and other facilities. The Project recognizes the relationship between transportation and land use as the road is necessary to serve existing and planned developments makai of Queen Ka‘ahumanu Highway, while maintaining a high level of service for through traffic on Queen Ka‘ahumanu Highway. The planned four-way Queen Ka‘ahumanu Highway/Hulikoa Drive intersection is shown on the Kona CDP Official Transportation Network Map – Proposed Roads and Transit Facilities (See Figure 12).

As noted above, the Project will be the first portion of the long-term plan envisioned in the Kona CDP for a frontage road makai (west) of, and parallel to, Queen Ka‘ahumanu Highway connecting through to the Airport to the north (Kona CDP Policy TRAN-1.5). Notwithstanding the long-term plans, the Project provides an independent functional purpose in terms of providing safe access to the Kohanaiki Public Beach Park, access to Kohanaiki Shores, and one of the few planned intersections between the Airport and Kailua-Kona that will connect land uses mauka and makai of the Queen Ka‘ahumanu Highway (other than the existing temporary intersection at Kealakehe Parkway)



60' RIGHT-OF-WAY, COLLECTOR STREET, TYPICAL SECTION
NOT TO SCALE

FIGURE 10:
Typical Section

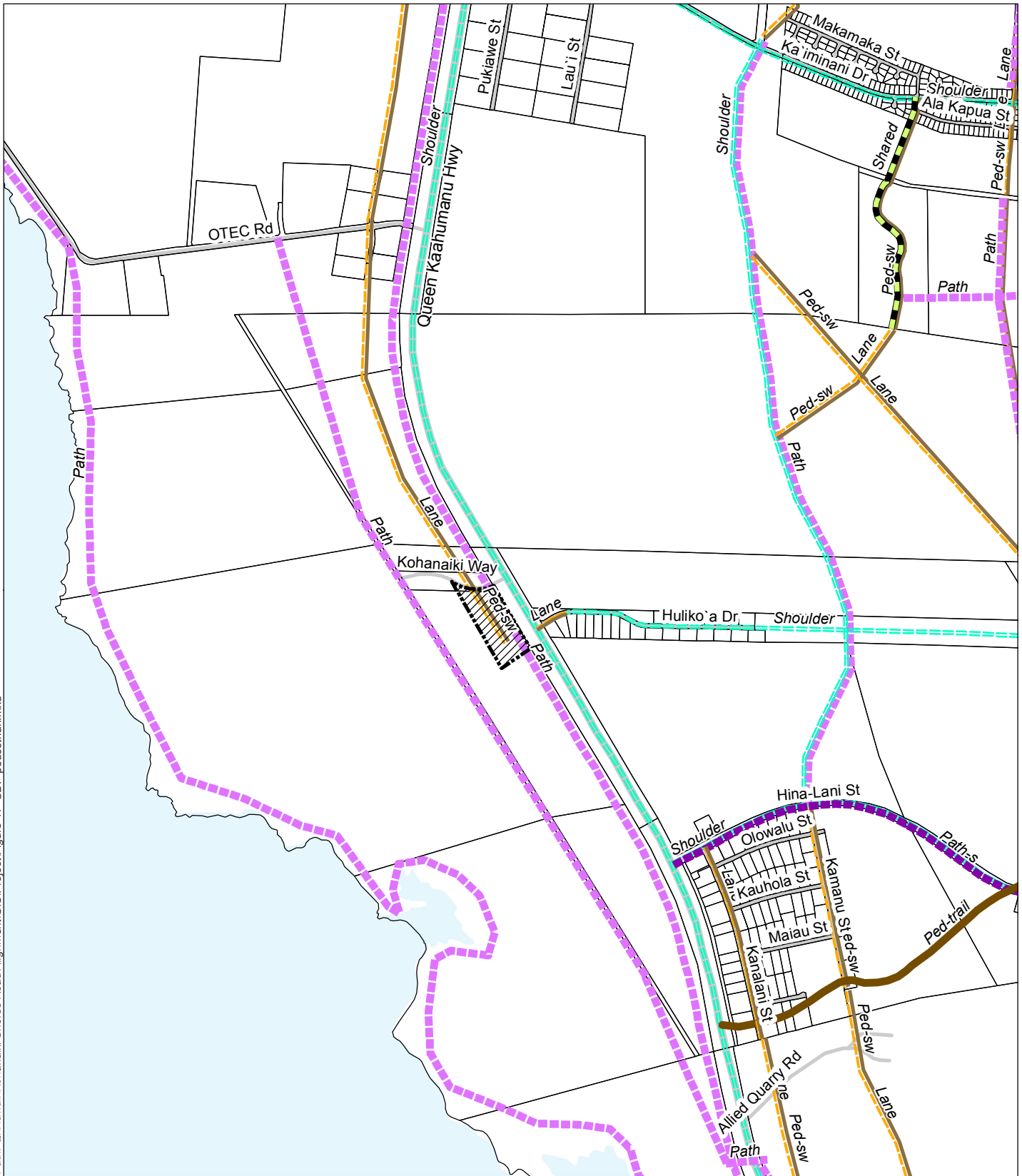
Queen Ka'ahumanu Highway
Frontage Road

Kohalaiki Shores, LLC
Island of Hawaii
PBR HAWAII & ASSOCIATES, INC.

Not To Scale

Source: Prepared by Sam O. Hirota, Inc.
Disclaimer: This Graphic has been prepared for general Planning purposes only and should not be used for boundary interpretations or other spatial analysis beyond the limitations of the data.

Path: Q:\Hawaii\Kohanaiki Shores Road Alignment\GIS\Project\Figure 11- CDP_ pedestrian.mxd



LEGEND











- | | | |
|---|--|--|
|  Study Area | Pedestrian and Bike Paths |  Ped-sidewalk |
|  Hawaii County TMK Parcels |  Lane |  Ped-trail |
|  Roads |  Path |  Shared |
| |  Path-s |  Shoulder |

FIGURE 11:
Kona CDP Official Transportation
Network Map:
Bike & Pedestrian Paths
**Queen Ka'ahumanu Highway
Frontage Road**

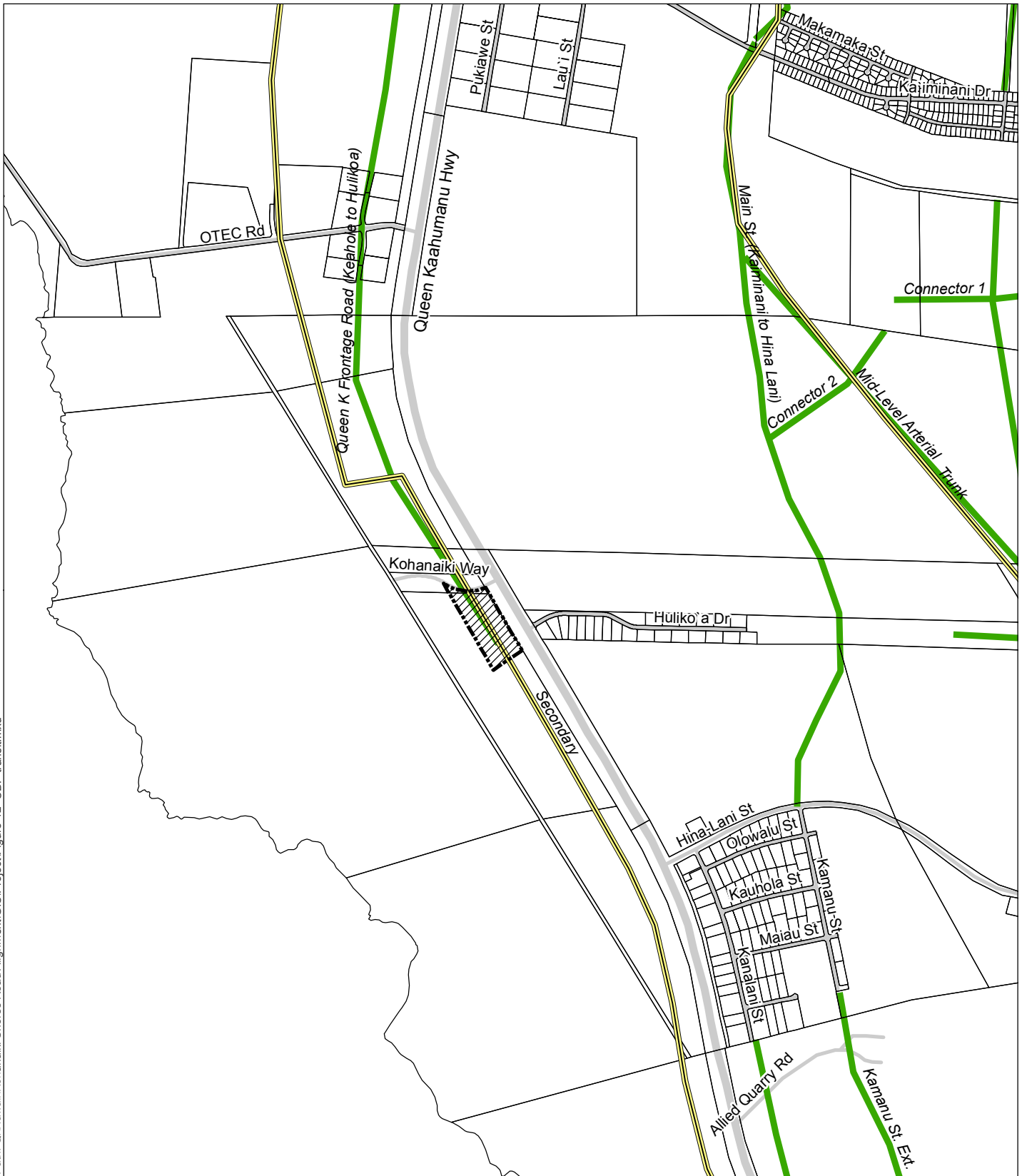
Kohanaiki Shores, LLC
North

Linear Scale (feet)
0 1,000 2,000

Island of Hawaii
PBR HAWAII & ASSOCIATES, INC.

Source: Hawai'i County Department of Planning

Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary Interpretations or other spatial analysis.



LEGEND







-  Study Area
-  Roads
-  Hawaii County TMK Parcels
-  Proposed Transit Line, Secondary
-  Proposed Roads, GP Collector, Major

FIGURE 12:
Kona CDP Official Transportation
Network Map: Proposed
Roads and Transit Facilities


**Queen Ka'ahumanu Highway
Frontage Road**

Kohanaiki Shores, LLC
North

Island of Hawai'i



Linear Scale (feet)
0 1,000 2,000



Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

2.4 PROJECT PURPOSE

The Project serves two public purposes. First, it is consistent with the Kona CDP policy (Kona CDP Policy TRAN-1.5) calling for a frontage road makai (west) of, and parallel to, Queen Ka‘ahumanu Highway to “enable the consolidation of Queen Ka‘ahumanu Highway vehicular access points for the developments makai of Queen Ka‘ahumanu Highway.” DOT is currently widening Queen Ka‘ahumanu Highway from two-lanes to four-lanes and wishes to minimize access points to reduce traffic disruptions. The Project, pursuant to the MOA (see Section 2.3), will serve to consolidate Highway access for properties makai of the Highway to a single point at the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection. By reducing the number of access points to the Highway, turning movements that may disrupt traffic flow will also be reduced. Thus the Project serves a public purpose of improving traffic flow on Queen Ka‘ahumanu Highway through the consolidation of access points.

Second, the Frontage Road improves access for properties makai and mauka of Queen Ka‘ahumanu Highway, such as the Kohanaiki Public Beach Park, Kohanaiki Shores, and the Kohanaiki Business Park. Presently, highway access for makai areas is limited to right-in, and right-out turning movements from and onto the Highway from Kohanaiki Way. Northbound vehicles wishing to access makai properties must drive past Kohanaiki Way and make a U-turn further down the highway. Similarly, vehicles exiting from Kohanaiki Way wishing to travel north must turn right (southbound) onto the Highway and make a U-turn further down the Highway. With the Project, and pursuant to the MOA (see Section 2.3 of this EA), DOT will design and construct a new four-way signalized intersection at the existing Queen Ka‘ahumanu Highway/Hulikoa Drive intersection enabling safe left-turn movements on and off of the highway. This new four-way signalized intersection will also facilitate improved ingress and egress to and from the Kohanaiki Business Park mauka of Queen Ka‘ahumanu Highway. Thus the Project serves a public purpose of improving public access to properties makai and mauka of Queen Ka‘ahumanu Highway, and in particular improving public access to Kohanaiki Public Beach Park and the shoreline.

2.5 DEVELOPMENT TIMETABLE AND PRELIMINARY COSTS

Construction of the Project will commence following the receipt of required approvals and permits, including a SMA Use Permit and CDUP. Construction will require about 12 months to complete. The estimated cost of the Frontage Road and related improvements is \$1,350,000. The Project is privately funded by Kohanaiki Shores and Rutter/KW Kohanaiki LLC (the owners of Parcel 018) per the MOA.

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

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

This section describes the existing conditions of the physical or natural environment, potential impacts of the Project, and mitigation measures to minimize any impacts.

3.1 CLIMATE

Existing Conditions

The climate in the vicinity of the Site is affected by its coastal location and nearby mountains, producing a semi-arid climate. Temperatures are generally very consistent and moderate with average daily temperatures ranging from about 65°F to 85°F. Average annual rainfall in the area amounts to about 25 inches with each month typically contributing about 2 inches.

North Kona is largely sheltered from the predominant tradewind system by the land masses of Hualālai, Mauna Kea, and Mauna Loa volcanoes. The prevailing wind is typically offshore in the early morning and onshore in the afternoon (Juvik and Juvik 1998). Winds average approximately eight miles per hour in the Kona region (NOAA 2007).

Potential Impacts and Mitigation Measures

The Project is not anticipated to have any effect on regional climate.

3.2 GEOLOGY AND TOPOGRAPHY

Existing Conditions

The Site is located on the western slope of Hualālai, the third oldest shield volcano on the Island of Hawai‘i. Hualālai, with its summit at 8,271 feet above mean sea level, comprises an area of approximately 290 square miles, accounting for 7.2 percent of the island (USGS 1996). Three rifts of Hualālai radiate to the north, south, and northwest. The volcano is characterized by a well-developed northwest rift zone, a moderately well-developed south-southeast rift zone and a poorly developed north rift zone (HCV 2004).

Hualālai grew above sea level more than 300,000 years ago (USGS 1996). The lava is no longer exposed on the subaerial surface, but has been dredged from submarine portions of the northwest rift zone (HCV 2004). Post-shield volcanism began 100,000 years ago and covered the entire surface of the volcano (OSU 2006). A large trachyte pumice cone of Pu‘uwa‘awa‘a occurs on the northern slope.

In the past 5,000 years, 80 percent of Hualālai’s surface has been covered by lava flows; however, earthquake activity beneath the volcano has been low (USGS 1996). Hualālai erupted last in 1800-1801 along its northwest rift zone, resulting in the Ka‘ūpūlehu and Hu‘ehu‘e flows, which are noted for their shiny black surface and abundant olivine basalt (HCV 2004). The Ka‘ūpūlehu flow is located between Kona Village Resort and Kīholo Bay; the Hu‘ehu‘e flow is beneath Kona International Airport.

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

Hualālai is still considered an active volcano, but there has been no recent magma-related seismicity or ground deformation, making it difficult to predict the next eruption. In 1929, there were a series of earthquakes occurring for about a month, which was attributed to magma intrusion near the surface. However, there was no surface eruption (HCV 2004).

Although Hualālai is still considered an active volcano, mapping and dating studies indicate that eruptions have been separated by centuries of inactivity. Since 1971, a seismic station has been maintained about three km east of the summit by the Hawaiian Volcano Observatory to monitor the volcano for signs of activity. Since its inception, there have been no micro earthquake swarms or harmonic tremors indicative of magma movement. Hualālai experiences earthquakes, registered to have a 4.0 magnitude, which stem from a deep source off the coast of the northwest rift zone and is not related to magma movement (HCV 2004).

The slope of the Site is approximately 1.5 percent in a mauka-makai direction.

Potential Impacts and Mitigation Measures

The Project will be constructed within the Site at elevations ranging from approximately 50-feet to 70-feet above mean sea level. Earthwork and grading will be necessary. Appropriate Best Management Practices will be implemented to minimize potential erosion of soils during construction. Significant adverse impacts to geology and landforms attributable to grading activity are not anticipated.

3.3 SOILS

Existing Conditions

There are three soil suitability studies prepared for lands in Hawai‘i whose principal focus has been to describe the physical attributes of land and the relative productivity of different land types for agricultural production; these are: 1) the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Soil Survey; 2) the University of Hawai‘i Land Study Bureau (LSB) Detailed Land Classification; and 3) the State Department of Agriculture’s Agricultural Lands of Importance to the State of Hawai‘i (ALISH).

3.3.1 NRCS Soil Survey

The *Soil Survey of the Island of Hawai‘i, State of Hawai‘i* (1973) shows that the Site contains soil from the lava flows association, which is characterized as gently sloping to excessively drained soils that are coarse-textured and medium-textured formed in volcanic ash, pumice, and cinders. The soil is found on nearly barren lava flows and upland areas at elevations ranging from near sea level to 13,000 feet. More specifically, most of the Site consists of pāhoehoe lava flow (rLW) and ‘a‘ā lava flow (rLV). See Figure 13. Descriptions of the soil classifications are as follows:

Path: Q:\Hawaii\Kohanaiki Shores Road Alignment\GIS\Project\Figure 13- Soil Survey.mxd



LEGEND









- | | |
|---|--|
|  Study Area |  BH, Not highly erodible land |
|  Hawaii County TMK Parcels |  rLV, Lava Flows, Pāhoehoe |
|  Roads |  rLW, Lava Flows, 'a'a |
| |  rPYD, Potentially highly erodible land |

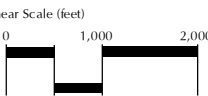
FIGURE 13:
NRCS Soil Survey


Queen Ka'ahumanu Highway Frontage Road

Kohanaiki Shores, LLC Island of Hawaii
North



Linear Scale (feet)





Source: Natural Resources Conservation Service

Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary Interpretations or other spatial analysis.

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

Lava Flows, pāhoehoe (rLW) -This soil has a billowy, glassy surface that is relatively smooth. In some areas, the surface is rough and broken and there are hummocks and pressure domes. The soil has no cover and is typically bare of vegetation, except for mosses and lichens. Some flat slabs are used as facings on buildings and fireplaces.

The SCS Land Capability Grouping, rates soil types according to eight levels, ranging from I, the highest classification level, to VIII, the lowest level. The SCS Land Capability classification is an indicator of suitability of soil for field crop cultivation. The Land Capability classification for the soil at the Property is VIII, non-irrigated, meaning the soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife or water supply or aesthetic purposes. The subclass is “s,” meaning the soil is limited because it is shallow, droughty, or stony.

Lava Flows, ‘a‘ā (rLV) – This soil is rough and broken, consisting of a mass of clinkery, hard, glassy, sharp pieces piled in tumbled heaps. There is practically no soil covering and it is typically bare of vegetation, except for mosses, lichens, ferns, and a few small ‘ōhi‘a trees. The capability classification is VIII, non-irrigated. Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife or water supply, or aesthetic purposes. The subclass is “s,” meaning the soil is limited because it is shallow, droughty, or stony.

3.3.2 Land Study Bureau Detailed Land Classification

The University of Hawai‘i LSB document titled *Detailed Land Classification, Island of Hawai‘i* classifies non-urban land by a five-class productivity rating system, using the letters A, B, C, D and E, where “A” represents the highest class of productivity and “E” the lowest. Soils at the Site are classified “E” (See Figure 14).

3.3.3 Agricultural Lands of Importance to the State of Hawai‘i

The State of Hawai‘i Department of Agriculture’s ALISH system rates agricultural land as “Prime,” “Unique” or “Other” lands. The remaining land is not classified.

The Site is not classified by the ALISH system and therefore is not considered important agricultural land by the ALISH system (See Figure 15).

Potential Impacts and Mitigation Measures

Impacts to the soils of the Site include the potential for soil erosion and the generation of dust during construction. However, since the majority of the site consists of ‘a‘ā and pāhoehoe lava flows with little or no soil covering, the erosion hazard is slight. Creation of the Project will require land-disturbance, including grading. All ground-altering activity will be conducted in accordance with the State DOH and County of Hawai‘i’s regulations relating to erosion and sedimentation control. As typically required for projects greater than one acre in size, a National Pollutant Discharge Elimination System (NPDES) Notice of General Permit Coverage for Storm Water Associated with Construction Activity will be necessary.

Path: Q:\Hawaii\Kohanaiki Shores Road Alignment\GIS\Project\Figure 14-LSB.mxd



LEGEND







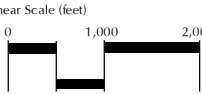

-  Study Area
-  Hawaii County TMK Parcels
-  Roads
- Land Study Bureau**
-  E
-  N- Not Classified

FIGURE 14:
Land Study Bureau Classification
**Queen Ka'ahumanu Highway
Frontage Road**

Kohanaiki Shores, LLC Island of Hawaii
North



Linear Scale (feet)
0 1,000 2,000

PBR HAWAII & ASSOCIATES, INC.

Source: State of Hawaii, Land Study Bureau

Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary Interpretations or other spatial analysis.

Path: Q:\Hawaii\Kohanaiki Shores Road Alignment\GIS\Project\Figure 15-ALISH.mxd



LEGEND







-  Study Area
-  Hawaii County TMK Parcels
-  Roads
- ALISH Definition**
-  Other
-  Unclassified

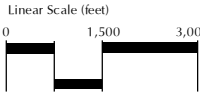

FIGURE 15:
 Agricultural Lands of Importance
 to the State of Hawaii (ALISH)
**Queen Ka'ahumanu Highway
 Frontage Road**

Kohanaiki Shores, LLC Island of Hawaii

North



Linear Scale (feet)

Source: State Department of Agriculture (State GIS, 2007)

Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary Interpretations or other spatial analysis.

3.4 WATER RESOURCES

Existing Conditions

3.4.1 Ground and Surface Water Resources

There are two aquifer coding systems in Hawai‘i used to characterize groundwater resources; the State Commission on Water Resource Management’s (CWRM) coding system which is administrative in nature and the State DOH system which is resource-oriented. Based on the CWRM’s coding system, the Site overlies the Keauhou Aquifer System of the Hualālai Aquifer Sector. The aquifer has a sustainable yield of 38 MGD and is not within a designated ground water management area.

The DOH coding system also classifies the underlying aquifer as the Keauhou Aquifer Sector of the Hualālai Aquifer Sector. The Hualālai Aquifer Sector is characterized as a basal unconfined aquifer within horizontally extensive lavas.

There are no streams or wetlands on the Site.

3.4.2 Nearshore Marine Environment

The Site is about 4,000 feet inland from the coast. Nearshore marine waters off of the coast are classified as “AA” by the State DOH. According to DOH Water Quality Standards, “It is the objective of class AA waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions” (HAR §11-54-03(c)(1)).

Potential Impacts and Mitigation Measures

Roadway surfaces of the Project will increase the amount of impermeable surface area of the Site. Direct discharges of stormwater runoff into marine waters during construction or following completion of the Project are not expected to occur, due to the Project’s distance to the coast and high permeability of lavas in the vicinity of the Site. As applicable, the Project will be in conformance with all State DOH Clean Water Branch Hawai‘i Administrative Rules including HAR Section 11-54-1.1; HAR Section 11-54-3; and HAR Sections 11-54-4 through 11-54-8. Prior to construction, an NPDES permit will be procured specifying measures to prevent stormwater discharges from affecting coastal water quality. This permit requires compliance with best management practices (BMPs) during construction to minimize soil erosion into adjacent waterways. The NPDES permit will also include requirements to maintain water quality after construction.

Stormwater runoff from the Project will be directed to swales located along both sides of the roads with excess flows directed to drywells. Due to the porous nature of the lavas underlying the Site, it is expected that the majority of runoff will infiltrate within the swales. All runoff due to the Project will be retained on-site in accordance with County standards.

3.5 NATURAL HAZARDS

The Hawaiian Islands are susceptible to potential natural hazards, such as flooding, tsunami inundation, hurricanes, and earthquakes. The Site’s vulnerability to such hazards is provided in the following section.

Existing Conditions

According to the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), National Flood Insurance Program, the Site is located outside of the 500-year flood plain, in an area of minimal flooding (Zone X).

Since the early 1800s, approximately 50 tsunamis were reported in Hawai‘i. Seven caused major damage and two were generated locally. The Project will be about 4,000-feet inland from the coast at a ground elevation of approximately 50-feet and is not within the tsunami evacuation zone designated by the State of Hawai‘i Department of Defense, Office of Civil Defense.

Since 1980, two hurricanes have had a devastating effect on Hawai‘i. They were Hurricane ‘Iwa in 1982 and Hurricane ‘Iniki in 1992. While it is difficult to predict such natural occurrences, it is reasonable to assume that future incidents are likely, given historical events.

In Hawai‘i, most earthquakes are linked to volcanic activity, unlike other areas where a shift in tectonic plates is the cause of an earthquake. Each year, thousands of earthquakes occur on the island of Hawai‘i, although the vast majority are so small they are detectable only with highly sensitive instruments.

The volcanic hazard zone map for Hawai‘i Island divides the island into zones ranked from one through nine (with one (1) being the area of greatest hazard and nine (9) being the area of least hazard) based on probability of coverage by lava flows. According to this map, the Site is within Zone 4, which includes the entire slope of Hualālai and Kailua-Kona, where about five percent has been covered with lava since 1800 and less than 15 percent has been covered by lava in the last 750 years. Hualālai flows typically cover large areas but the frequency of eruptions is lower than other volcanoes, such as Kīlauea and Mauna Loa (USGS 1997).

Potential Impacts and Mitigation Measures

Construction of the Project will not exacerbate any natural hazard conditions. The Site is not in a designated flood hazard or tsunami evacuation area. In the event of a hurricane or earthquake, the potential impact for damage to the roadway or structures such as lighting and utility poles will be mitigated through compliance with the appropriate design standards.

3.6 FLORA

Geometrician Associates, LLC conducted a botanical survey of the Site in August 2011. The objective of the survey was to describe existing vegetation and list all species encountered, including any threatened or endangered plant species. Findings of the survey work are summarized below. Appendix A contains the complete botanical survey report.

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Existing Conditions

The survey found that vegetation cover varies from scattered to sparse, and is dominated by dispersed bunch grasses with low shrubs and herbs. There are a few very widely scattered noni (*Morinda citrifolia*) bushes. The most common grass is fountain grass (*Pennisetum setaceum*), with Natal red-top grass (*Rhynchelytrum repens*) also abundant. The main herbs are the almost ubiquitous native ‘uhaloa (*Waltheria indica*) along with the non-native composite weed *Tridax procumbens*, which was very common. Less common but scattered throughout the property were the native *ilima*. The main shrubs are *koa haole* (*Leucaena leucocephala*), *klu* (*Acacia farnesiana*), *sourbush* (*Pluchea symphytifolia*), and the regionally somewhat rare native *maiapilo* of which dozens of individual shrubs are scattered throughout the pāhoehoe portion of the property. The alien swordfern *Nephrolepis multiflora* (and possibly its native counterpart, *N. exaltata subsp. Hawaiiensis*) are found in some lava cracks in pāhoehoe and widely scattered on the ‘a‘ā.

No listed or proposed threatened or endangered plant species were found. *Maiapilo* (*Capparis sandwichiana*), although common on the property, is considered a species of concern by the U.S. Fish and Wildlife Service (USFWS) and is often listed among rare plants in Hawai‘i. This plant is important in traditional Hawaiian medicine. Although this status does not provide official legal protection, USFWS and the State DLNR are keenly interested in its protection. In addition, one individual of the native tree *naio* (*Myoporum sandwicense*) was found in the southeast portion of the Site. *Naio* grows on all the main islands except Kaho‘olawe (Wagner et al 1990). Although not a rare plant per se, it is relatively uncommon in lowland dry-mesic forest and is considered to have community restoration value in lowland dry-mesic forests (Belfield et al 2011).

Potential Impact and Mitigation Measures

The botanical survey concludes that the Project will have a minimal effect on botanical resources. The Project will not result in the destruction of the single *naio* tree identified in the Site. Both the preferred and alternative roadway alignments avoid the tree and the location of the tree is at a sufficient distance from the alignments that construction activities will not impact the tree.

The botanical survey notes that the road will reduce the area of “wild” land containing the native shrub *maiapilo*, and that future developments may further reduce the habitat for this shrub. Thus the survey recommends that special consideration be given to planting *naio* and *maiapilo* as landscaping for the road. The survey also recommends that roadway landscaping should avoid invasive species and employ native species as practical.

In their comments on the Draft EA USFWS confirmed the findings of the botanical survey and species list and thus agreed that the Project would have no effect on any listed or proposed threatened or endangered plant species.

3.7 FAUNA

Rana Biological Consulting, Inc. conducted a survey of avian and terrestrial mammals of the Site in July 2011. Findings of the survey work are summarized below. Appendix B contains the complete survey report.

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Existing Conditions

No avian species currently protected or proposed for protection under either the Federal or State of Hawai‘i endangered species programs were detected during the course of the survey. A total of 42 individual birds of seven species, representing seven separate families, were recorded during the station counts. All of the avian species are considered to be alien to the Hawaiian Islands.

Although no seabirds were detected during the survey, it is probable that both the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened endemic sub species of the Newell’s Shearwater (*Puffinus auricularis newelli*), over-fly the Site in small numbers between April and December.

No terrestrial mammalian species were detected during the survey; therefore no terrestrial mammalian species currently protected or proposed for protection under either the Federal or State of Hawai‘i Endangered species programs were detected during the survey. While no terrestrial mammalian species were detected during the survey it is likely that the four established alien rodents, roof rat (*Rattus r. rattus*), Norway rat (*Rattus norvegicus*), European house mouse (*Mus musculus domesticus*) and possibly the Polynesian rat (*Rattus exulans hawaiiensis*) may be present at the Site on a seasonal basis. The endangered Hawaiian hoary bat was not sighted during the survey. The bat is widely distributed along the Kona coast and is present in most areas that have trees and dense shrubs; however, the Site and immediate vicinity do not provide suitable roosting habitat for the bat.

Potential Impacts and Mitigation Measures

The avian and terrestrial mammal survey report determined that the principal impact that the Project may have is to seabirds that may become disoriented by light from: 1) construction lighting if night work is necessary; or 2) streetlights, if provided, after construction. It is not anticipated that nighttime construction will be necessary; however if lighting is required for night construction, the report recommends that lights be placed on poles high enough to allow lights to be pointed directly at the ground. The report further recommends that if streetlights are provided after construction they should be shielded to prevent seabird disorientation. Streetlights are proposed only at the intersections (Hulikoa Drive/Frontage Road and Frontage Road/Kohanaiki Way). Consistent with the report recommendations all lighting (temporary construction lights and permanent streetlights) will be in compliance with Hawai‘i County law regarding lighting (Chapter 14 Article 9, HCC), which requires shielding of all outdoor lights, to ensure light pollution will not impact astronomical observatories on Mauna Kea.

In their comments on the Draft EA USFWS confirmed the findings of the avian and terrestrial mammal survey and species list and thus agreed that the Project would have no effect on any listed or proposed threatened or endangered species as long as there is no nighttime construction, as anticipated. If nighttime construction is anticipated the applicant will contact USFWS directly to discuss whether further regulatory action is necessary because seabirds (specifically the Hawaiian petrel and Newell’s shearwater) may be affected.

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

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

4.1 ARCHAEOLOGICAL AND HISTORIC RESOURCES

Existing Conditions

Haun & Associates conducted an archaeological inventory survey of the Site in June 2011. The entire 16-acre area of the Site was subjected to surface examination with surveyors spaced at 10-meter intervals. Findings of the survey work are summarized below. Appendix C contains the complete survey report.

The Site lies within an area of lava-covered land north of Kailua called Kekaha within the ahupua‘a of Kohanaiki which translates to “small barrenness,” reflecting the harsh environment of the area. Radiocarbon dating of features makai of the Site from a prior data recovery report indicate that lands in the vicinity may have been initially settled in the 1000s, followed by a marked increase during the 14th and 15th centuries.

Cordy *et al* (1991) used four environmental zones to characterize settlement patterns that are applicable to Kohanaiki. The four zones include: 1) the Coastal Zone extending from sea level to 15-foot elevation; 2) the Middle Zone from 15-foot elevation to 900-foot elevation; 3) the Lower Upland Zone from 900-foot to 1,500-foot elevation; and 4) the Upland Forest Zone from 1,500-foot to 6,000-foot elevation. Uses associated with the Coastal Zone include coastal trails, fishponds, and habitation, usually clustered around fishponds. Areas in the lower-middle zone, such as the location of the Site, may have been associated with mauka-makai trails and cairns that connected coastal settlements to inland agricultural areas.

The survey identified two sites with three features. Site 28999 is a complex consisting of a trail and an associated cairn and Site 29000 consists of an isolated cairn. A description of each Site is as follows:

- **Site 28999** consists of a trail and a cairn located in the in the southeastern portion of the Site. The trail feature originates at the interface between the ‘a‘ā and pāhoehoe lava flows, adjacent to the cairn feature. The trail, which varies in width from 0.85 to 1.2 meters, extends for about 60 meters toward the east-northeast where it terminates in a bulldozed area. The Site is interpreted as a probable prehistoric transportation route designed to traverse the uneven lava flow. The trail feature is a single file foot trail based on its mauka-makai orientation and width. The location of the cairn at the ‘a‘ā/pāhoehoe interface indicates that it served to mark the seaward end of the trail for travelers approaching from the ocean.
- **Site 29000** is an isolated cairn situated in relatively level pāhoehoe lava in the northwestern portion of the Site. The cairn is collapsed and is comprised of roughly oval shaped pile of pāhoehoe slabs stacked three to four courses in height. It measures 1.4 meters long, 0.8 meters wide, and 0.4 meters in height. No cultural remains are present at

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the site. The site is interpreted as a marker based on its formal type and appearance. It is possibly associated with Site 28999, potentially functioning to guide travelers across the pāhoehoe flow toward the trail leading inland.

Section 13-284-6, HAR, establishes criteria to evaluate the significance of historic sites. For resources to be significant, they must possess integrity of location, design, setting, materials, workmanship, feeling and association and meet one or more of the following criteria:

- A. Be associated with events that have made an important contribution to the broad patterns of our history;
- B. Be associated with the lives of persons important in our past;
- C. Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- D. Have yielded, or is likely to yield, information important for research on prehistory or history;
- E. Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the Property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity.

Based on the above criteria, Sites 28999 and 29000 are both assessed as significant under Criterion “D” as they have yielded information important for understanding late prehistoric to historic land use in the area.

Potential Impacts and Mitigation Measures

The Project will not impact Sites 28999 and 29000 as neither of these sites are located within the proposed roadway alignments. The archaeological sites will be left as is and will not be disturbed. The archaeological inventory survey determined that the mapping, written description, and photography of the sites adequately documents them and no further work or preservation is recommended.

4.2 CULTURAL RESOURCES

Existing Conditions

Haun & Associates prepared a cultural impact assessment to identify any culturally significant resources or traditional cultural practices associated with the Project (2011B). The cultural impact assessment includes archival research that focused on historical documents, previous archaeological studies, and previous oral history interviews of former Kohanaiki residents (Maly and Maly 2003). In addition, several individuals were consulted regarding traditional cultural practices (Haun & Associates 2011B). Findings of the cultural impact assessment and other relevant information are summarized below. Appendix D contains the complete cultural impact assessment.

The ahupua‘a of Kohanaiki is one of twenty-three ahupua‘a within the ‘okana (district) of Kekaha-wai-‘ole (Kekaha), part of the larger North Kona District. Initial settlement of Kohanaiki appears to have occurred between 900 and 1200 AD.

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There is little mention of Kohanaiki in Hawaiian legends and traditional history. Theresa Donham summarizes the limited references as follows:

Statements from native historian S.M. Kamakau describes the destruction of Kekaha undertaken by Kekaulike of Maui while fleeing Alapa'inui of Hawaii, and the setting apart of Kekaha for the priestly class, specifically the Kauahi and Nahulu lines of priesthood. Presence of the priestly class in Kohanaiki is indicated in the source of the name for Puhili Point, which is said to be named after a priest.

A mythological tale entitled "The Pool of Wawaloli" may have involved one of the anchialine pools of Kohanaiki. The tale involves a young woman who was traveling from the mountains to the coast and stopped at a pool for refreshment. There she met Wawaloli, who was eventually captured by the woman's father and exposed as a wicked wizard. A section of the shoreline in Kohanaiki bears the name of Wawaloli Beach.

In *Ka Hōkū o Hawai'i*, J.W.H.I. Kihe, a Hawaiian historian of the late 19th and early 20th centuries, and John Wise tell the story of Ka-Miki entitled "*Ka'ao Ho'oniua Pu'uwai no Ka-Miki*" (The Heart Stirring story of Ka-Miki). The story took place during the 1300s and follows two brothers, Ka-miki and Ma-Ka'iole, on their journey around the Island of Hawai'i. The two brothers received supernatural abilities from their ancestor Ka-uluhe-nui-hihi-kolo-i-uka, one of the many body forms of the goddess Haumea. The story describes their ties to Kohanaiki through Ka'uluhenuihikoloiuka and her family, who lived in Kohanaiki and for whom places were named in Kohanaiki.

The shores of Kekaha were once densely populated due to the abundance of reef fish in their coastal waters. However, by the late 1800s many families moved up to the higher elevations of Kekaha, while only a few families stayed at the coast. Mauka-makai trails were important transportation routes between the uplands and the shore. Families would travel to the coast during the summer months to fish. They also traded sweet potato and *poi* for dried *'ōpelu* (mackerel scad) with the families living along the coast. By the early 20th Century most of Kohanaiki's residents had moved upland to 900 ft elevation and higher, where agricultural land was more productive. The lowlands provided only marginal forage for cattle and goats.

During the Mahele, Kohanaiki became government land. Two Land Commission Award (LCA) claims for parcels in Kohanaiki were made but were not awarded. Hahe'eholua (LCA 10336) claimed a house lot that he received from his grandparents in 1819. Pa'awela (LCA 7987) claimed four parcels in Kohanaiki that included eight cultivated plots and a house lot, but no specific crops are mentioned.

According to Hawaiian Government Department of Interior correspondence and documents, Kohanaiki is divided into three grants: Grant 3086 to Kapena at the coast, Grant 2030 to Kaiakoili inland and Grant 2942, that contains the project area, to Hulikoa.

Residents interviewed as part of the cultural impact assessment live in the uplands and walk the trails to the shore. Access to marine resources has continued to be a primary concern of native Hawaiian families into the 21st Century.

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Potential Impacts and Mitigation Measures

Based on the archival research and interviews with knowledgeable individuals and organizations, the cultural impact assessment concludes that: 1) no known cultural resources, such as culturally significant sites, flora or fauna, or cultural practices or places will be directly affected as a result of the Project; and 2) no customary native Hawaiian rights are currently conducted in the study area.

Consultation with knowledgeable individuals and organizations did not result in the identification of any direct effects to any culturally significant resources or traditional cultural practices that would be affected as a result of the Project. However the cultural impact assessment notes that several perceived indirect effects to marine resources as a result of increased shore access were mentioned during the course of the interviews. The perception was that the Project may result in increased accessibility that is potentially detrimental to culturally important brine shrimp resources in anchialine ponds at the shore and fish availability to on-shore anglers. The cultural impact assessment notes that these indirect effects are characterized as “perceived” because: 1) no additional significant increase in shoreline use is anticipated as a result of the Project; and 2) mitigation efforts by Kohanaiki Shores, LLC over the past decade have been implemented to address shoreline and marine resources.

Consultation included meeting with the Kohanaiki ‘Ohana Committee, a government-sanctioned entity that is specifically responsible for management of the exercise of traditional and customary native Hawaiian rights on the Kohanaiki Shores property and is composed of lineal descendants of the ahupua‘a. In a letter dated September 19, 2011, the Kohanaiki ‘Ohana Committee stated that “...the committee unanimously supports the placement of the frontage road on parcel #07-03-09: 18 connecting the Hulikoa intersection to the Kohanaiki entry road.”

4.3 NOISE

Existing Conditions

Background noise from Queen Ka‘ahumanu Highway is the primary source of noise at the Site. Other sources of noise include aircraft flying to and from the Kona International Airport and natural sources such as wind and rain.

Potential Impacts and Mitigation Measures

Potential impacts to ambient noise levels due to the development of the Project are primarily limited to short-term construction activity and, in the long-term, vehicles on the new roadway. Noise from construction activities will be short-term and will comply with DOH noise regulations (HAR, Chapter 11-46, Community Noise Control). When construction noise exceeds, or is expected to exceed the DOH’s allowable limits, a permit must be obtained from the DOH. Specific permit restrictions for construction activities are:

- No permit shall allow any construction activities that emit noise in excess of the maximum permissible sound levels before 7:00 a.m. and after 6:00 p.m. of the same day, Monday through Friday.
- No permit shall allow any construction activities that emit noise in excess of the maximum permissible sound levels before 9:00 a.m. and after 6:00 p.m. on Saturday.

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- No permit shall allow any construction activities that would emit noise in excess of the maximum permissible sound levels on Sundays and holidays.
- The use of pile drivers, hoe rams, jack hammers 25 lbs. or larger, high-pressure sprayers, and chain saws may be restricted to 9:00 a.m. to 5:30 p.m., Monday through Friday.

Following construction, noise from vehicles traveling on the new roads is not expected to be significant as lands in the immediate vicinity are undeveloped and no noise-sensitive receptors are present. In addition traffic noise from Queen Ka‘ahumanu Highway will continue to be the dominate source of noise in the area.

4.4 AIR QUALITY

Existing Conditions

Regional and local climate together with the amount and type of human activity generally dictate the air quality of a given location. The climate in the vicinity of the Site is very much affected by its near coastal situation and by nearby mountains. Winds are predominantly light and variable, although Kona storms generate occasional strong winds from the south or southwest during winter. Temperatures are generally very consistent and moderate with average daily temperatures ranging from about 65°F to 85°F. Average annual rainfall in the area amounts to about 25 inches with each month typically contributing about 2 inches.

Hawai‘i Island is unique from its neighbor islands in terms of the natural volcanic air pollution emissions that occur. Volcanic emissions periodically plague the region. This is especially so since the latest eruption phase of Kīlauea Volcano began in 1983. Air pollution emissions from the volcano consist primarily of sulfur dioxide. Although emissions from Kīlauea are vented on the other side of the mountain barrier over 50 miles east of the Site, the prevailing wind patterns eventually carry some of the emissions into the Kona area. These emissions can be seen in the form of a volcanic haze (vog), which persistently hangs over the area.

The present air quality in the vicinity of the Site is believed to be relatively good except for periodic impacts from volcanic emissions (vog) and possibly occasional localized impacts from traffic congestion. Air quality data from DOH indicate that concentrations are well within State and Federal air quality standards (despite the vog). Other sources of potential air pollution in the area are traffic and the Keāhole Power Plant, mauka of the Airport.

Potential Impacts and Mitigation Measures

Development of the Project may result in short and long-term impacts on air quality either directly or indirectly as a consequence of construction and use. However, it is anticipated that the Project will not result in the exceeding of any Federal or State air quality standards.

Short-term Impacts – Short-term impacts from fugitive dust will likely occur during construction. Construction will include earthmoving activity, excavating, trenching, and filling. To a lesser extent, exhaust emissions from stationary and mobile construction equipment, from disruption of traffic, and from workers' vehicles may also affect air quality during the period of construction.

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A dust control plan will be implemented during all construction phases. All construction activities will comply with the provisions of Chapter 11-60.1-33, HAR on fugitive dust. Measures to control dust during may include:

- Planning phases of construction to minimize the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of least impact.
- Watering active work areas and any temporary unpaved work roads daily.
- Minimizing dust from shoulders and access roads.
- Providing adequate dust control measures during weekends, after hours and before daily start-up of construction activities.
- Controlling dust from debris being hauled away.
- Using wind screens and/or limiting the area of disturbance at any given time.
- Covering dirt-hauling trucks traveling on roadways.
- Preventing trucks from tracking dirt onto paved roadway by routine road cleaning and/or tire washing.
- Monitoring dust at the Property boundary during the construction period as a means to evaluate the effectiveness of the dust control program, and adjusting the program if necessary.

Long-term Impacts – After construction, motor vehicles traveling on the new roads will result in a long-term increase in emissions; however, it is expected that concentrations will remain well within State and Federal standards.

The impact of emissions from vehicles was previously assessed by an air quality impact analysis prepared for the ‘O‘oma Beachside Village final EIS (PBR Hawaii 2009). The analysis modeled air quality at the Hulikoa Drive intersection with the Frontage Road and factored in increases of vehicle traffic from development of the Kohanaiki Mauka and the Kohanaiki Shores projects. A computerized air quality modeling study was undertaken to estimate current ambient concentrations of carbon monoxide at roadway intersections in the vicinity and to predict future levels. The model indicated that current carbon monoxide concentrations are within the one-hour and eight-hour State and Federal air quality standards, and carbon monoxide concentrations would remain within current State and Federal thresholds through 2029, the duration of the study period.

4.5 VISUAL RESOURCES

Existing Conditions

The Site is currently vacant, sparsely vegetated, and slightly sloped from Queen Ka‘ahumanu Highway toward the coast. There are few distinguishing landmarks on the Site that can be detected over a distance of 100 yards or more, other than an occasional tree or shrub. Per the Hawai‘i County General Plan, there are no significant natural beauty sites in the vicinity. The dominant landscape feature is black-grey pāhoehoe lava sparsely covered with widely distributed yellow-brown fountain grass.

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Potential Impacts and Mitigation Measures

The Project is not anticipated to significantly alter the visual character of the Site or surrounding area. No significant landforms or landmarks will be affected by the Project. Since the Project will be at a lower elevation than Queen Ka‘ahumanu Highway, the line of sight from Queen Ka‘ahumanu Highway toward the ocean should not be affected. Streetlights are proposed only at the intersections (Hulikoa Drive/Frontage Road and Frontage Road/Kohanaiki Way) for safety purposes. Electrical lines for the streetlights will be underground.

Roadway landscaping, if provided, will be designed with native species that occur naturally on the Site, such as *naio* and *maiapilo*.

The Project may also include an entry feature, or features, for Kohanaiki Shores. The entry feature(s) would be located near the: 1) Queen Ka‘ahumanu/Hulikoa Drive intersection; and/or 2) Hulikoa Drive/Frontage Road intersection. The entry feature(s) may include a wall, sign, lighting, water feature, and landscaping in character and scale to the Hualalai Resort and Kaloko-Honokōhau National Historical Park entry features.

4.6 SOCIO-ECONOMIC CHARACTERISTICS

Existing Conditions

4.6.1 Community Character

Forty years ago, West Hawai‘i was a stable agrarian culture with scattered villages, a resident population of about 14,000, little tourism activity, and limited commercial and industrial development. All products were shipped from O‘ahu and there were few major retailers. West Hawai‘i had a relatively simple financial structure, and most of the County’s businesses were located in East Hawai‘i.

The construction of Queen Ka‘ahumanu Highway in the early 1970s led to the development of major destination resorts along the North Kona and South Kōhala coastlines, including the Mauna Kea Resort, Waikoloa Resort, and Hualālai Resort. Over the last several decades land uses in West Hawai‘i have undergone a gradual change as more in-fill urban uses were built on previously vacant properties, particularly makai of Queen Ka‘ahumanu Highway.

Today, the North Kona and South Kōhala districts contain the primary drivers of the region’s economy, which is anchored in the visitor, construction, and related service industries. Kailua-Kona is the regional hub and has attracted retailers, shopping centers, residential and vacation home development, and industrial uses.

4.6.2 Population and Housing

The 2010 Census reported that the resident population of Hawai‘i County was 185,079. This represents a 24 percent increase from the population reported by the 2000 Census of 148,677. The 2010 Census also reported that there were 82,324 housing units in Hawai‘i County, an increase of 31 percent from the 2000 Census. Of the total housing units, 54 percent were owner occupied, 28 percent were renter occupied, and 18 were vacant. See Table 1.

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In 2000, North Kona (19%) ranked second to South Hilo (37%) in terms of percent of Hawai‘i County’s population. However, the trend is that North Kona and Puna are increasing their share of population, while the South Hilo share is declining. The North Kona region has experienced rapid growth over the past several decades. According to the Kona CDP, the resident population of North Kona increased by 62% from 1980 to 1990, and then by 28% from 1990 to 2000.

Table 1: Demographic Characteristics of Hawai‘i County

	2000 Census		2010 Census	
	Number	Percent	Number	Percent
Total Population	148,677	100%	185,079	100%
Age				
Under 5 years	9,130	6.1%	11,845	6.4%
18 years and over	109,825	73.9%	142,799	77.2%
65 years and over	20,119	13.5%	26,834	14.5%
Median age	38.6	--	40.9	--
Household (By type)				
Total Households	53,045	100%	67,096	100%
Average household size	2.75	--	2.70	--
Average family size	3.24	--	3.22	--
Housing				
Total housing units	62,674	100%	82,324	100%
Owner occupied	34,175	54.5%	44,271	53.8%
Renter occupied	18,810	30.0%	22,825	27.7%
Vacant units	9,689	15.5%	15,228	18.5%

Source: U.S. Census Bureau

4.6.3 Economy

The growth of Hawai‘i County in terms of employment, population, income, and economic activity has been more closely tied to the visitor industry than any other sector of the economy. As tourism became the primary economic generator during the 1980s, a shift in employment from the non-service to the service industry sector was evident.

In 1980, the service industry accounted for approximately 60.6 percent of average employment, rising to 71.3 percent in 1990 and 78.5 percent in 1997. Between 1981 and 1997, the County experienced the largest growth in hotel job count statewide with an average annual growth rate of 5.2 percent. The principal visitor destination area of the County is the North Kona and South Kōhala regions (Hawai‘i County 2005).

The County of Hawai‘i has supported annual increases in the number of employed persons since 2000. In February 2007, there were an estimated 81,450 employed persons in the County (DLIR 2007).

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Potential Impacts and Mitigation Measures

The Project facilitates the development of planned projects in North Kona, such as the Shores at Kohanaiki. The Frontage Road is consistent with the community character and plans for the North Kona region and is a recommended transportation improvement in the Kona CDP. In the long-term as future portions of the Frontage Road are constructed, the road will also provide a secondary route for transit service.

Construction of the Project will create construction-related jobs and beneficial secondary economic impacts associated job creation.

4.7 INFRASTRUCTURE AND UTILITIES

4.7.1 Roadways and Traffic

Fehr & Peers prepared a traffic engineering study in October 2008 to assess the lane configuration requirements for the four-way Queen Ka‘ahumanu Highway/Hulikoa Drive intersection. Fehr & Peers also prepared a technical addendum to the traffic engineering study in June 2009. Findings of the traffic engineering study and technical addendum are summarized below. Appendix E contains the complete traffic engineering study and technical addendum.

Existing Conditions

Roadways in the vicinity of the Site include Queen Ka‘ahumanu Highway, Hulikoa Drive, Ka‘iminani Drive, Hina Lani Street, and Māmalahoa Highway. A brief description of these roads is as follows:

Queen Ka‘ahumanu Highway: Queen Ka‘ahumanu Highway is a major highway running north and south along the west side of the island of Hawai‘i. The Highway presently has four travel lanes (two in each direction) from Kailua-Kona to Kealakehe Parkway and two travel lanes (one in each direction) north of Kealakehe Parkway. Currently it is being widened to four travel lanes from Kealakehe Parkway to the airport

Hulikoa Drive: Hulikoa Drive is a local street providing access from Queen Ka‘ahumanu Highway to the Kohanaiki Business Park, located mauka of the Highway. Hulikoa Drive’s “T” intersection with the Highway is stop-controlled (on Hulikoa Drive) and allows north and southbound Highway access.

Kohanaiki Way: Kohanaiki Way is the existing access road from Queen Ka‘ahumanu Highway to the Kohanaiki Public Beach Park. Turning movements to/from Queen Ka‘ahumanu Highway onto /out of Kohanaiki Way are limited to right-in/right-out movements.

Kealakehe Parkway: Kealakehe Parkway is an east-west arterial between Queen Ka‘ahumanu Highway and Māmalahoa Highway. It intersects with Queen Ka‘ahumanu Highway approximately 2.3 miles south of Hulikoa Drive.

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Ka‘iminani Drive: Ka‘iminani Drive is an east-west arterial between Queen Ka‘ahumanu Highway and Māmalahoa Highway. It intersects with Queen Ka‘ahumanu Highway approximately one and a half miles north of Hulikoa Drive.

Hina Lani Street: Hina Lani Street is an east-west arterial between Queen Ka‘ahumanu Highway and Māmalahoa Highway. It intersects with Queen Ka‘ahumanu Highway approximately three-quarters of a mile south of Hulikoa Drive.

The traffic engineering study used the concept of Level of Service (LOS) to evaluate traffic conditions. LOS is a qualitative measure to describe the condition of traffic flow, ranging from excellent conditions at LOS A to overloaded conditions at LOS F. LOS D or higher is generally considered acceptable in most urbanized areas.

The study found that the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection currently operates at LOS F during the peak morning and afternoon hours of traffic. The poor LOS is primarily due to left-turn movements (eastbound) onto Hulikoa Drive from the Highway, and from Hulikoa Drive onto the Highway’s southbound lanes.

Potential Impacts and Mitigation Measures

Development of the Project will transform the current “T” configuration of the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection into a four-way signalized intersection, with Hulikoa Drive extending makai of Queen Ka‘ahumanu Highway to intersect with the Frontage Road. Proposed lane configurations and signal phasing would include protected left-turn phasing in all four directions. The June 2009 technical addendum to the traffic engineering study concludes that in 2015 the signalized Queen Ka‘ahumanu Highway/Hulikoa Drive intersection will operate at LOS C during the AM and PM peak hours of traffic.

To reach this conclusion the traffic engineering study and the June 2009 technical addendum to the traffic engineering study analyzed the impact that three existing or planned developments may have on the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection. The developments included the existing Kohanaiki Business Park, The Shores at Kohanaiki, and ‘O‘oma Beachside Village¹. A description of each development and assumptions relative to the engineering study are as follows:

- The Kohanaiki Business Park is a fifty-two parcel industrial park, of which forty-one parcels are occupied. Full project occupancy was assumed by the year 2015. At full occupancy, the project is expected to generate 690 vehicle trips during the AM peak hour and 450 trips during the PM peak hour.
- The Shores at Kohanaiki is a planned community with 500 residential units, a golf course, and public beach park with 120 parking spaces. The project was assumed to be

¹Since the traffic engineering study and technical addendum were completed, the State Land Use Commission denied the reclassification of the ‘O‘oma Beachside Village property to “Urban” effectively stalling the project as it was planned. It is uncertain if the ‘O‘oma Beachside Village property will be developed in the near future, or if developed, what any revised development plans would entail.

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fully occupied by 2015 at which time it would generate 583 vehicle trips in the AM peak hour and 719 trips during the PM peak hour of traffic.

- ‘O‘oma Beachside Village was a proposed mixed-use development with up to 1,190 residential units, 200,000 sq. ft. of commercial space, a school, and public beach access. Although the project was planned to have a right-in, right-out access to Queen Ka‘ahumanu Highway, the majority of the project’s external trips were projected to access Queen Ka‘ahumanu Highway via the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection. Build-out of ‘O‘oma Beachside Village’s was projected by 2029.

Ambient traffic growth on Queen Ka‘ahumanu Highway was estimated at five percent simple growth per year through 2029, the duration of the study period. The study also assumed that several planned road improvements in the area will be implemented, reducing overall highway volumes by 20 percent in the long-term.

Based on the four-way configuration of the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection, combined with the anticipated planned developments noted above and ambient traffic growth, the June 2009 technical addendum to the traffic engineering study recommended the following intersection design:

- Northbound: One left-turn lane, two through lanes, and one right-turn lane. To provide adequate storage, the left-turn lane should be 310 feet long and the right-turn lane should be 110 feet long.
- Southbound: One left-turn lane, two through lanes and one right-turn lane. To provide adequate storage, the left turn lane should be 250 feet long and the right-turn lane should be 90 feet long.
- Eastbound: One left-turn lane and one shared through/right-turn lane. The left-turn lane should be 220 feet long to provide adequate storage.
- Westbound: One left-turn lane and one shared through/right-turn lane. The left-turn lane should be 250 feet long to provide adequate storage.

With the improvements, in 2015 the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection is expected to operate at a LOS C during the AM and PM peak hours of traffic.

4.7.2 Water System

Existing Conditions

The County of Hawai‘i Department of Water Supply (DWS) is the major purveyor for potable water. Thirteen wells serve the North Kona System, running from the Airport south to Kealahou.

The DWS North Kona Water System provides the region’s potable water and is integrated with sources south of Hina Lani Street, down to the intersection of Māmalahoa Highway and Queen

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Ka‘ahumanu Highway. The system extends from the Airport in the north to Kealakekua to the south.

There are two existing 12-inch transmission mains within the Queen Ka‘ahumanu Highway in the vicinity of the Project. One main connects to the two storage tanks located above the Keahole Airport (Keahole Tank and Keahole No. 1 Tank) and terminates at NELHA. The other runs from the tanks and continues past the Project to the south. Along Kohanaiki Way there is a 12-inch water line that connects to the 12-inch water line along Queen Ka‘ahumanu Highway.

In their comment letter on the Draft EA the Department of Environmental Management Wastewater Division noted that an eight-inch service lateral for a reclaimed waterline to the Site is proposed in accordance with the widening of Queen Ka‘ahumanu Highway.

Potential Impacts and Mitigation Measures

The Project will not generate significant increased demand for water over existing conditions. If necessary, non-potable water will be used for dust control during construction. Minimal irrigation is anticipated for landscaping as landscaping is proposed to include native species that either occur naturally on the Site or are suitable for the climate and soil conditions.

In their comment letter on the Draft EA DWS stated: “Should individual service be required for landscape/irrigation of the frontage road, estimated maximum daily water usage calculations and service lateral installation plans, prepared by a professional engineer licensed in the State of Hawaii, must be submitted [to DWS] for review and approval. Additional facilities changes for the new service may also apply.”

4.7.3 Wastewater System

Existing Conditions

Wastewater treatment plants (WWTP) in the vicinity of the Site include: 1) a private system at the Crown Lands of Keauhou to the south; 2) the County’s Kealahou WWTP south of Kealahou Parkway; 3) the DOT-Airports Division WWTP at the Airport to the north; and 4) the Kaloko WWTP to the southwest on Hina Lani Street which was installed by the Office of Housing and Community Development to serve their housing complex on TMK 7-3-09:55).

Presently, there are no public or private wastewater transmission lines or treatment facilities on the Site.

Potential Impacts and Mitigation Measures

The Project will not increase demand for wastewater facilities over existing conditions. The Project does not require any wastewater facilities and there are no underground wastewater lines proposed within the roadway right-of-way.

4.7.4 Drainage System

Sam O. Hirota, Inc, Engineers and Surveyors prepared a hydrology report for the Project to: 1) analyze the hydrology of the watershed upstream from the Project; 2) estimate the peak

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stormwater runoff from the upstream watershed to adequately size the proposed culverts under the frontage road; and 3) addresses the disposal of roadway drainage. Findings of the hydrology report are summarized below. Appendix F contains the complete hydrology report.

Existing Conditions

The watershed upstream from the Project is fairly large: 1497 acres, 2.34 square miles. Currently, only a small portion of this area is developed, and the undeveloped areas are composed mainly of open grass-covered land and a small forested area. The open grass-covered portion consists of highly permeable lava rock (basalt).

Mauka of the Project there is an existing arch culvert under Queen Ka‘ahumanu Highway. Only a small portion of the watershed (14.87 acres or 0.75 percent) is downstream of this culvert (i.e., between Queen Ka‘ahumanu Highway and the proposed frontage road). The remainder of the watershed is upstream of Queen Ka‘ahumanu Highway, where the slope steadily increases from about seven percent just mauka of the highway, all the way up to about 20 percent at the top of the watershed.

Most of the developed area upstream of Queen Ka‘ahumanu Highway consists of one-acre residential lots and a few paved roadways. The terrain consists of many local depressions that have the effect of trapping runoff, which allows for percolation through the soils. This has the overall effect of reducing runoff at the bottom of the watershed. These depressions and an overall lack of a defined channel are mainly evident toward the bottom of the watershed in between Queen Ka‘ahumanu Highway and the proposed frontage road.

Potential Impacts and Mitigation Measures

Based on analysis of the upstream watershed and calculations of peak stormwater runoff, the hydrology report concludes that runoff from the upstream watershed could be accommodated with six 48-inch culverts under the new frontage road.

The new roadway surfaces of the Project will increase the amount of impermeable area of the Site. Rather than allowing runoff from the roadway surfaces to flow through the proposed culverts, drainage from the roadways will be diverted to swales along both sides of the roads, with excess flows directed to drywells. Due to the porous nature of the lavas underlying the Site, it is expected that the majority of runoff will infiltrate within the swales. Calculations using the County of Hawai‘i Storm Drainage Standards will determine the amount of runoff generated from the roadways. All runoff due to the Project will be retained on-site in accordance with County standards. An Underground Injection Control (UIC) permit will be required to construct the drywells. Once completed, the drywells will be tested and an UIC permit will be obtained from the DOH to operate the drywells.

Chapter 23, HAR provides for the regulation of underground injection wells, such as drywells. The purpose of these rules is:

... to protect the quality of the state's underground sources of drinking water (USDW) from pollution by subsurface disposal of fluids. Toward this end, conditions are specified to govern the location, construction and operation of injection wells so that injected fluids do not migrate and pollute USDW (§11-23-01, HAR).

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Among other regulations, the rules provide for:

- Siting and pre-construction requirements (§11-23-9, HAR);
- Operating conditions (§11-23-11, HAR);
- Application procedures for UIC permits (§ 11-23-12);
- Monitoring and reporting requirements (§11-23-18, HAR); and
- Penalties for violations (§11-23-22, HAR).

Section 11-23-11(C), HAR specifically provides that “All injection wells shall be operated in such a manner that they do not violate any of the department’s [i.e. DOH] administrative rules under title 11, Hawaii Administrative Rules, regulating various aspects of water quality and pollution [including Chapter 11-55, HAR “Water Pollution Control”], and chapters 342-B, 342-D, 342-F, 342-H, 342-J, 342-L, and 342-N, HRS [Hawaii Revised Statutes]”

Because of the comprehensive nature of rules regulating underground injection wells, such as drywells, compliance with these rules provides the appropriate mitigation measures to protect groundwater quality from water flowing from the drywells. In addition, the proposed road and right-of-way improvements of the Project will be dedicated to the County of Hawai‘i, so the improvements must also comply with the County’s standards for dedication.

4.7.5 Electrical and Communication Systems

Existing Conditions

Presently the Site has no electrical or communication systems. The nearest source of existing electrical power is Hawai‘i Electric Light Company, Inc.’s (HELCO) 69 KV transmission line mounted on poles mauka (east) of Queen Ka‘ahumanu Highway. The same poles also hold telephone and cable television lines.

Potential Impacts and Mitigation Measures

The Project will not significantly increase demand for electrical services over existing conditions. Streetlights are proposed only at the intersections (Hulikoa Drive/Frontage Road and Frontage Road/Kohanaiki Way) for safety purposes. Electrical lines for the streetlights will be underground. The roadway does not require any communication services.

4.8 PUBLIC SERVICES AND FACILITIES

4.8.1 Police Protection

Existing Conditions

The Kealahou Police Station is situated about three miles south of the Site and provides service to the North and South Kona Districts.

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Potential Impacts and Mitigation Measures

Construction of the Project is anticipated to have a beneficial effect on police protection services by improving traffic flow on Queen Ka‘ahumanu Highway and facilitating access to the shoreline and developments makai of Queen Ka‘ahumanu Highway. In their pre-consultation comments, the Police Department stated: “This proposed project does not impact any police-related project, plans, policies, or programs.” In their comments on the Draft EA Police Department stated: “...we have no comments or objections to offer at this time.”

4.8.2 Fire Protection

Existing Conditions

Fire prevention, suppression and protection services for the region are provided by the Kailua-Kona Fire Station, near the intersection of Palani Road and Queen Ka‘ahumanu Highway. Other fire stations are located in Keauhou, Waikōloa, Kona Palisades (volunteer station), Miloli‘i, and Captain Cook. The County of Hawai‘i is planning to construct another fire station at Makalei at the intersection of Māmalahoa Highway and Makalei Drive.

Potential Impacts and Mitigation Measures

Construction of the Project is anticipated to have a beneficial effect on fire protection services by improving traffic flow on Queen Ka‘ahumanu Highway and facilitating access to the shoreline and developments makai of Queen Ka‘ahumanu Highway. The Project roadways will be considered “fire apparatus access roads” and will be designed in accordance with all Uniform Fire Code requirements. In their comments on the Draft EA the Fire Department stated: “We have no comments to offer at this time...”

4.8.3 Medical Services

Existing Conditions

Kona Community Hospital is the primary health care facility serving West Hawai‘i. The hospital, located approximately 17 miles south of the Site, includes 94 acute-care beds, 34 Skilled Nursing/Long Term Care beds, and 11 Psychiatric care beds. Other health care facilities located in the Kona region include Kaiser Permanente Clinic, Hualālai Urgent Care Center, and Straub Clinic and Hospital.

Potential Impacts and Mitigation Measures

Development of the Project is not expected to impact the demand for health care services or facilities in the West Hawai‘i region. The Project will improve access for emergency responders by maintaining a high level of service on Queen Ka‘ahumanu Highway and facilitating access to the shoreline and developments makai of Queen Ka‘ahumanu Highway.

4.8.4 Recreational Facilities

Existing Conditions

A number of recreational parks and facilities are located in the vicinity of the Site. The Kohanaiki Public Beach Park is located on the shoreline makai of the Kohanaiki Shores. The public park, which is being developed in conjunction with Kohanaiki Shores will have 121 parking spaces.

The Kaloko-Honokōhau National Historical Park, a 1,160-acre national historical landmark, is located approximately one-half mile south of the Site. The park contains extensive natural and cultural resources, including archaeological sites, wetlands, and fishponds.

Other parks in the area include Wāwālohi Beach Park and Kekaha Kai State Park, approximately two and four miles north of the Site, respectively. The Honokōhau Small Boat Harbor and the Old Kona Airport State Recreation Area are situated about two and four miles south of the Site, respectively.

Potential Impacts and Mitigation Measures

Construction of the Project will improve access to the Kohanaiki Public Beach Park as access to the park is presently provided by Kohanaiki Way, which is limited to right-in and right-out turning movements from and to Queen Ka‘ahumanu Highway. The Project is not expected to significantly affect other recreational facilities in the area.

5.0 LAND USE CONFORMANCE

The processing of various permits and approvals are prerequisites to the creation of the project. Relevant State of Hawai‘i and County of Hawai‘i land use plans, policies, and ordinances are described below.

5.1 STATE OF HAWAI‘I

5.1.1 Chapter 343, Hawai‘i Revised Statutes

Compliance with Chapter 343, HRS is required as described in Section 1.6.

5.1.2 State Land Use Law, Chapter 205, Hawai‘i Revised Statutes

The State Land Use Law (Chapter 205, HRS), establishes the State Land Use Commission and authorizes this body to designate all lands in the State into one of four (4) Districts: “Urban,” “Rural,” “Agricultural,” or “Conservation.” The Site is within the State Land Use Conservation District, General subzone (See Figure 4 and Figure 5).

As stated in Chapter 205-2 (e), HRS, “Conservation districts shall include areas necessary for protecting watersheds and water sources; preserving scenic and historic areas; providing park lands, wilderness, and beach reserves; conserving indigenous or endemic plants, fish, and wildlife, including those which are threatened or endangered; preventing floods and soil erosion; forestry; open space areas whose existing openness, natural condition, or present state of use, if retained, would enhance the present or potential value of abutting or surrounding communities, or would maintain or enhance the conservation of natural or scenic resources; areas of value for recreational purposes; other related activities; and other permitted uses not detrimental to a multiple use conservation concept.”

The objective of the General subzone as stated in Chapter 13-5-14, HAR, “is to designate open space where specific conservation uses may not be defined, but where urban use would be premature”. Public purpose uses are an identified use within the General subzone pursuant to Section 13-5-22, P-6, Public Purpose Uses, HAR.

Discussion: The Project will serve two public purposes: 1) improving traffic flow on Queen Ka‘ahumanu Highway through the consolidation of access points; and 2) improving public access to properties makai and mauka of Queen Ka‘ahumanu Highway, and in particular improving public access to Kohanaiki Public Beach Park and the shoreline. Public purpose uses, such as public roads, are an identified use within the Conservation District General subzone provided that a CDUP is obtained. A CDUP will be procured prior to construction of the Project. Construction of the road will not have a significant adverse impact on Conservation district resources such as watersheds and water resources, scenic or historic areas, park, wilderness or beach reserves, or wildlife. The Site is not prone to flooding or soil erosion and the Project’s development is consistent with the character of the surrounding area, which is a developing urban area.

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5.1.3 State Conservation District Administrative Rules

The State Conservation District Administrative Rules (HAR, Title 13, DLNR, Subtitle 1 Administration, Chapter 5, Conservation District) provide for identified land uses within Conservation District subzones. As stated above, public purpose uses, such as public roads, are an identified use within General subzone, provided a permit is obtained from the DLNR. In evaluating the merits of a proposed land use, the DLNR applies the criteria listed under Section 13-5-30(c), HAR. Below each criterion is listed, along with a discussion of how the Project conforms to the specific criterion.

(1) *The proposed land use is consistent with the purpose of the conservation district;*

Discussion: According to HAR §13-5-1, the purpose of the Conservation District is to “regulate land use in the conservation district for the purpose of conserving, protecting, and preserving the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare.”

The Project will not have a significant adverse impact on Conservation district resources such as watersheds and water resources, scenic or historic areas, park, wilderness or beach reserves, or indigenous or endemic plants, fish, and wildlife. No threatened or endangered plant species listed, or proposed for listing, under either the Federal or State of Hawai‘i Endangered species programs were found on the Site during the course of a botanical survey. Likewise no avian species or terrestrial mammalian species currently protected or proposed for protection under either the Federal or State of Hawai‘i Endangered species programs were detected during the course of a survey of avian and terrestrial mammals of the Site. Regarding historic resources, while two historic sites were found during the course of an archaeological inventory survey, neither of these sites are located within the proposed roadway alignments and so will not be impacted by the Project. In addition, the archaeologist determined that the mapping, written description, and photography of the sites adequately documents them and no further work or preservation is recommended.

The Project will promote long-term sustainability and public health, safety, and welfare by providing increased and improved public access to the ocean.

(2) *The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur;*

Discussion: The objective of the General subzone is: “to designate open space where specific conservation uses may not be defined, but where urban use would be premature” (HAR §13-5-14). Public purpose uses, such as public roads, are an identified use within the Conservation District General subzone provided that a CDUP is obtained. The Project will serve a public purpose in that it will provide improved public access to the shoreline. In addition, the Project will not significantly detract from the existing open space characteristics of the Site. A CDUP will be procured prior to construction of the Project.

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(3) *The proposed land use complies with provisions and guidelines contained in chapter 205A, HRS, entitled “Coastal Zone Management”, where applicable;*

Discussion: The Project complies with the provisions and guidelines contained in Chapter 205A, HRS, entitled “Coastal Zone Management” as discussed in Section 5.1.4 of this EA.

(4) *The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region;*

Discussion: The Project will not cause adverse impact to existing natural resources within the surrounding area, community, or region. As discussed previously, no threatened or endangered plant species listed, or proposed for listing, under either the Federal or State of Hawai‘i Endangered species programs were found on the Site during the course of a botanical survey of the Site. Likewise no avian species or terrestrial mammalian species currently protected or proposed for protection under either the Federal or State of Hawai‘i Endangered species programs were detected during the course of a survey of avian and terrestrial mammals of the Site.

(5) *The proposed land use, including buildings, structures, and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.*

Discussion: The Project will be compatible with the surrounding areas and appropriate to the physical conditions and capabilities of the Site. The Project will serve a public purpose in that it will provide improved public access to the shoreline. In addition, the Project will not significantly detract from the existing open space characteristics of the Site.

(6) *The existing physical and environmental aspects of the land such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable;*

Discussion: The Project will not significantly detract from the existing open space characteristics of the Site, thus the existing physical and environmental aspects of the land such as natural beauty and open space characteristics will not be significantly impacted.

(7) *Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district; and*

Discussion: The Project will be dedicated to the County of Hawaii. Subdivision of a roadway right-of-way will be necessary to dedicate the Project to the County; however this subdivision of land to convey the Project to the County is not intended to increase the intensity of land uses in the Conservation district. Under Section 13-5-22, P-10 HAR, subdivision of property into two or more legal lots of record that serves a public purpose and is consistent with the objectives of the subzone is an identified use within the General subzone. The Project will serve two public purposes: 1) improving safety and traffic flow on Queen Ka‘ahumanu Highway through the consolidation of access points; and 2) improving public access to properties makai and mauka of Queen Ka‘ahumanu Highway, and in particular improving public access to Kohanaiki Public Beach Park and the shoreline.

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(8) *The proposed land use will not be materially detrimental to the public health, safety and welfare.*

Discussion: The Project will be beneficial to public health, safety, and welfare by 1) improving traffic flow on Queen Ka‘ahumanu Highway through the consolidation of access points; and 2) improving public access to properties makai and mauka of Queen Ka‘ahumanu Highway, and in particular improving public access to Kohanaiki Public Beach Park and the shoreline.

5.1.4 Hawai‘i Coastal Zone Management Program, Chapter 205A, Hawai‘i Revised Statutes

The National Coastal Zone Management (CZM) Program was created through passage of the Coastal Zone Management Act of 1972. Hawai‘i’s CZM Program, adopted as Chapter 205A, HRS, provides a basis for protecting, restoring, and responsibly developing coastal communities and resources. The objectives and policies of the CZM Program encompass broad concerns such as impact on recreational resources, historic and archaeological resources, coastal scenic resources and open space, coastal ecosystems, coastal hazards, and the management of development. Each of the Counties have adopted SMAs in which a development’s consistency with the objectives and policies of the CZM program are evaluated through the SMA permitting process. The Site is within Hawai‘i County’s designated SMA (See Figure 9). SMA permits are administered by the Hawai‘i County Planning Department and decided upon by the Hawai‘i County Planning Commission. The Project is consistent with the objectives and policies of the CZM program as discussed below.

(1) Recreational Resources

Objective: Provide coastal recreational opportunities accessible to the public.

Policies

- (A) *Improve coordination and funding of coastal recreational planning and management; and*
- (B) *Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:*
 - (i) *Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;*
 - (ii) *Requiring replacement of coastal resources having significant recreational value including, but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;*
 - (iii) *Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*
 - (iv) *Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
 - (v) *Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;*

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- (vi) *Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;*
- (vii) *Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and*
- (viii) *Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6;*

Discussion: The Project will improve vehicular access to coastal recreation opportunities in the area. Currently, left turns into and out of the existing unsignalized access at Queen Ka‘ahumanu Highway are prohibited.

To protect water resources for purposes including recreation, the State of Hawai‘i has adopted water quality standards. Generally, these standards will require the submittal and adherence to a National Pollution Discharge Elimination System (NPDES) permit. This permit requires compliance with BMPs during construction to minimize soil erosion into adjacent waterways. The NPDES permit will also include requirements to maintain water quality during operation. A NPDES permit will be required for the Project.

(2) *Historic Resources*

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

Policies

- (A) *Identify and analyze significant archaeological resources;*
- (B) *Maximize information retention through preservation of remains and artifacts or salvage operations; and*
- (C) *Support state goals for protection, restoration, interpretation, and display of historic resources;*

Discussion: The Project will not affect historic resources. While two historic sites were found during the course of an archaeological inventory survey, neither of these sites are located within the proposed roadway alignments and so will not be impacted by the Project. In addition, the archaeologist determined that the mapping, written description, and photography of the sites adequately documents them and no further work or preservation is recommended.

(3) *Scenic and Open Space Resources*

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

Policies

- (A) *Identify valued scenic resources in the coastal zone management area;*

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- (B) *Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*
- (C) *Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and*
- (D) *Encourage those developments that are not coastal dependent to locate in inland areas;*

Discussion: The Project will not affect scenic resources, nor will it alter the visual character of the Site or surrounding area. No significant landforms or landmarks will be affected by development of the Project. The road is visually compatible with surrounding uses as it is located in the midst of urban uses, including Queen Ka‘ahumanu Highway to the east and the Shores at Kohanaiki development to the west. Since the Project will be at a lower elevation than Queen Ka‘ahumanu Highway, the line of sight from Queen Ka‘ahumanu Highway toward the ocean should not be affected.

(4) Coastal Ecosystems

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

Policies

- (A) *Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*
- (B) *Improve the technical basis for natural resource management;*
- (C) *Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;*
- (D) *Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and*
- (E) *Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures;*

Discussion: The Frontage Road will not affect coastal ecosystems. Direct discharges of stormwater runoff into marine waters during construction or following completion of the Project are not expected to occur, due to the Site’s distance to the coast and high permeability of lavas in the vicinity of the Site. Prior to construction, an NPDES permit will be procured specifying measures to prevent stormwater discharges from affecting coastal water quality. Following construction, drainage from the roadways will be diverted to swales along both sides of the roads, with excess flows directed to drywells. Due to the porous nature of the lavas underlying the Site, it is expected that the majority of runoff will infiltrate within the swales. All runoff due to the Project will be retained on-site in accordance with County standards.

(5) Economic Uses

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

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Policies

- (A) *Concentrate coastal dependent development in appropriate areas;*
- (B) *Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and*
- (C) *Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:*
 - (i) *Use of presently designated locations is not feasible;*
 - (ii) *Adverse environmental effects are minimized; and*
 - (iii) *The development is important to the State's economy;*

Discussion: The Project is appropriately situated parallel to Queen Ka‘ahumanu Highway and adjacent to Urban lands. The Project is in accordance with the Kona CDP and will provide access to coastal uses that are in conformance with that plan.

(6) Coastal Hazards

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

Policies

- (A) *Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;*
- (B) *Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;*
- (C) *Ensure that developments comply with requirements of the Federal Flood Insurance Program; and*
- (D) *Prevent coastal flooding from inland projects;*

Discussion: The Site is not in a flood hazard or tsunami evacuation zone, nor is it particularly susceptible to other coastal hazards such as erosion, subsidence or pollution. Development of the Project will not exacerbate these hazards for adjacent properties.

(7) Managing Development

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

Policies

- (A) *Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*
- (B) *Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and*

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

Discussion: Potential short and long term impacts of the proposed Project will be reviewed by the public and agencies through this EA process. Further opportunities for agency and public review will be provided through the SMA Use Permit and CDUP processes.

(8) Public Participation

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

Policies

- (A) *Promote public involvement in coastal zone management processes;*
(B) *Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and*
(C) *Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts;*

Discussion: Agencies and the public are being given the opportunity to review and comment on plans for the Project through the environmental review process. Further opportunities for agency and public review will be provided through the SMA Use Permit and CDUP processes.

(9) Beach Protection

Objective: *Protect beaches for public use and recreation; locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion.*

Policies

- (A) *Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;*
(B) *Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities;*
(C) *Minimize the construction of public erosion-protection structures seaward of the shoreline;*
(D) *Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor; and*
(E) *Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor;*

Discussion: The Project is located inland and does not involve construction of improvements in the shoreline setback area or erosion-protection structures. Development of the Project will

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directly benefit coastal recreational opportunities by facilitating improved access to Kohanaiki Public Beach Park.

(10) Marine Resources

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

Policies

- (A) *Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;*
- (B) *Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;*
- (C) *Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;*
- (D) *Promote research, study, and understanding of ocean processes, marine life, and other ocean resources to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and*
- (E) *Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.*

Discussion: The Frontage Road will not have a significant adverse effect on Marine Resources. No direct discharges of stormwater from the road to coastal waters are likely to occur given the highly porous nature of lavas and the three-quarter mile distance of the coast from the road. As applicable, the Project will be in conformance with all State DOH Clean Water Branch Hawaii Administrative Rules including HAR Section 11-54-1.1; HAR Section 11-54-3; and HAR Sections 11-54-4 through 11-54-8. In addition, the proposed road and right-of-way improvements of the Project will be dedicated to the County of Hawai‘i so the improvements must also comply with the County’s standards for dedication. Prior to construction, an NPDES permit will be procured specifying measures to prevent storm water discharges from affecting coastal water quality. Following construction, drainage from the roadways will be diverted to swales along both sides of the roads, with excess flows directed to drywells. Due to the porous nature of the lavas underlying the Site, it is expected that the majority of runoff will infiltrate within the swales. All runoff due to the Project will be retained on-site in accordance with County standards.

5.1.5 Hawai‘i State Plan, Chapter 226, Hawai‘i Revised Statutes

The Hawai‘i State Plan (Chapter 226, HRS), establishes a set of goals, objectives and policies that serve as long-range guidelines for the growth and development of the State. Objectives and policies pertinent to the proposed project are as follows:

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

Objectives: Planning for the State’s physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:

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- (1) *Maintenance and pursuit of improved quality in Hawai‘i’s land, air, and water resources.*
- (2) *Greater public awareness and appreciation of Hawai‘i’s environmental resources.*

Policies:

- (2) *Promote the proper management of Hawai‘i’s land and water resources.*
- (3) *Promote effective measures to achieve desired quality in Hawai‘i’s surface, ground and coastal waters.*
- (6) *Encourage design and construction practices that enhance the physical qualities of Hawai‘i’s communities.*
- (7) *Encourage urban developments in close proximity to existing services and facilities.*

Discussion: The Project is not anticipated to have a significant adverse impact on land, air, or water resources, either during its construction or long-term operation. Appropriate measures will be implemented to prevent impacts to air quality, water quality, and environmental resources. The Project will serve existing urban developments and is recognized as a necessary improvement by the Kona CDP.

HRS § 226-14: Objectives and policies for facility systems – in general.

Objectives: Planning for the State’s facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.

Policies:

- (1) *Accommodate the needs of Hawai‘i’s people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.*
- (4) *Pursue alternative methods of financing programs and projects and cost-saving techniques in planning, construction, and maintenance of facility systems.*

Discussion: The Project is necessary to accommodate future transportation needs, while minimizing impacts to Queen Ka‘ahumanu Highway. Construction will be privately funded, thus there will be no financial burden or fiscal impact to the County and State.

HRS § 226-17: Objectives and policies for facility systems – transportation.

Objective: Planning for the State’s facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:

- (1) *An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.*
- (2) *A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.*

Policies:

- (1) *Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;*
- (6) *Encourage transportation systems that serve to accommodate present and future development needs of communities;*
- (9) *Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;*

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Discussion: The Project will be part of the multi-modal transportation system serving the West Hawai‘i Region. The Frontage Road is identified by the Kona CDP as a desirable improvement to serve area developments and to enhance traffic flow on Queen Ka‘ahumanu Highway. Maintenance of a high level of service on Queen Ka‘ahumanu Highway and other major roadways is essential for commerce and the economic well-being of West Hawai‘i.

5.1.6 State Environmental Policy, Chapter 344, Hawai‘i Revised Statutes

The State Environmental Policy, codified as Chapter 344, HRS, is intended to encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawai‘i. Applicable policies of the State Environmental Policy to the project include the following:

§344-3 Environmental policy. *It shall be the policy of the State, through its programs, authorities, and resources to:*

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

Discussion: As discussed in Chapters 3 and 4 of this EA, no significant adverse environmental effects are anticipated to occur either during construction of the Project or from its long-term operation. The Project will improve traffic flow on Queen Ka‘ahumanu Highway, having a favorable impact on air quality.

- (2) *Enhance the quality of life by:*
 - (B) *Creating opportunities for the residents of Hawai‘i to improve their quality of life through diverse economic activities which are stable and in balance with the physical and social environments;*
 - (C) *Establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian; and*

Discussion: The Project will improve traffic flow on Queen Ka‘ahumanu Highway and other area roads, increasing the efficiency of the transportation system and enhancing the quality of life for residents.

§344-4 Guidelines. *In pursuance of the state policy to conserve the natural resources and enhance the quality of life, all agencies, in the development of programs, shall, insofar as practicable, consider the following guidelines:*

- (2) *Land, water, mineral, visual, air, and other natural resources.*
 - (F) *Maintain an integrated system of state land use planning which coordinates the state and county general plans;*

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Discussion: The Project is consistent with objectives and policies of the County of Hawai‘i General Plan and Kona CDP.

(6) *Transportation.*

(A) *Encourage transportation systems in harmony with the lifestyle of the people and environment of the State;*

Discussion: The Project’s design is compatible with the character of the surrounding community.

10) *Citizen participation.*

(B) *Provide for expanding citizen participation in the decision making process so it continually embraces more citizens and more issues.*

Discussion: Citizens are being given the opportunity to participate in the decision making process through the environmental review process, and will be given additional opportunities through the CDUP and SMA Use Permit processes.

5.2 COUNTY OF HAWAI‘I

5.2.1 County of Hawai‘i General Plan

The *County of Hawai‘i General Plan* is the policy document for the long-range comprehensive development of the island of Hawai‘i. Among the purposes of the General Plan are to guide the pattern of development in Hawai‘i County and to provide the framework for regulatory decisions and capital improvement priorities. The General Plan undergoes a comprehensive review every ten years, with the last review being completed in 2005.

The Land Use Pattern Allocation Guide (LUPAG) map is intended to guide the direction and quality of future developments in a coordinated and rational manner. According to the *County of Hawai‘i General Plan* LUPAG, a portion of the Site is designated as “Urban Expansion” and a portion is “Open Area” (See Figure 6)

Relative to transportation, the General Plan describes requirements for air and water transport terminal facilities linking the County with the rest of the State and overseas areas, and the island’s network of streets, highways, and roads. General Plan goals and policies applicable to the Project include:

13.2 Roadways

13.2.2 Goals

(a) *Provide a system of roadways for the safe, efficient and comfortable movement of people and goods.*

(b) *Provide an integrated State and County transportation system so that new major routes will complement and encourage proposed land policies.*

13.2.3 Policies

(b) *Investigate various methods of funding road improvements, including private sector participation, to meet the growing transportation needs of the island.*

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(f) Consider the development of alternative means of transportation, such as mass transit, bicycle and pedestrian systems, as a means to increase arterial capacity.

(j) Transportation and drainage systems shall be integrated where feasible.

Discussion: The Project will improve the efficiency of Queen Ka‘ahumanu Highway in the vicinity of the Site, and improve access for properties served by the Frontage Road/Hulikoa Drive intersection. Construction will be privately funded, thus there will be no financial burden or fiscal impact to the County and State. In the long-term when completely built out the Project will provide a secondary route for transit service. As discussed in Section 4.7.4, drainage requirements for the road have been incorporated into its design.

5.2.2 Kona Community Development Plan

The Site is located within the area of the Kona CDP, which encompasses the North and South Kona judicial districts (See Figure 8). Adopted in 2008, the Kona CDP is intended to translate the broad goals and policies of the *County of Hawai‘i General Plan* into specific actions and priorities for the North and South Kona districts. Relative to transportation, the Kona CDP serves as a policy guide for County decisions regarding transportation systems. Goals, objectives, policies and actions in the Kona CDP that are applicable to the project include the following:

Transportation Goal: An efficient, safe, and attractive multi-modal transportation system integrated with land use planning that allows movement around and through Kona with minimal reliance on the automobile.

Objective TRAN-1: Transportation and Land Use. To organize growth on a regional level in Kona, growth should be compact and transit-supportive. Compact mixed-use villages along transit routes provide sufficient densities to support transit feasibility and enable people to meet a variety of daily needs within walking distance.

Policy TRAN-1.5: Frontage Road. A frontage road makai of the Queen Ka‘ahumanu Highway, or, if permitted by DOT, within the 300-foot wide Queen Ka‘ahumanu Highway right-of-way between the airport and Honokohau Harbor shall serve as a Secondary Transit Route. It will enable the consolidation of Queen Ka‘ahumanu Highway vehicular access points for the developments makai of Queen Ka‘ahumanu Highway.

Action TRAN-1.5a: Design and construct Frontage Road.

- 1) Phase 1 – Airport to Huliko‘a Drive*
 - a) Coordinate design and intersections with the DOT’s Queen Ka‘ahumanu Highway widening (PD, DOT, 1-2)*
 - b) Coordinate financing with public and private owners (PD, Fin., 1-2)*
 - c) Obtain permit approvals (PD, 2-3)*

Discussion: The Project implements Policy TRAN-1.5 and Action TRAN-1.5a of the Kona CDP. The Project’s creation recognizes the relationship between transportation and land use as the road is necessary to serve existing and planned developments, while maintaining a high level of service on Queen Ka‘ahumanu Highway.

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Objective TRAN-2 Street Network Connectivity. To develop a system of interconnected roads in Kona that will provide alternative transportation routes that will disperse automobile trips and reduce their length, while not compromising the functions of arterials and major collectors with excessive intersections.

Policy TRAN-2.2: Access Management. To preserve the through functions of arterials and major collectors, driveway access along new arterials and major collectors should be minimized to the greatest extent consistent with the need to provide access to adjoining property. Access to such adjoining properties shall be planned to occur from local streets, and not from the arterial or collector road, whenever possible. On existing arterials and major collectors, the number of access driveways currently permitted shall not be increased, and when development is proposed that would increase the usage of an existing driveway access, every effort should be made to eliminate the driveway access in favor of access at an existing or planned intersection. Four-way intersections with arterials and major collectors shall be permitted only as shown on the Official Transportation Network Map in order to preserve the through functions of arterials and major collectors.

Action TRAN-2.2a: Update the Official Transportation Network Maps with intersection locations as they are determined through preliminary engineering reports or other plans and/or studies (Figure 4-2a and 4-2b).

Discussion: The Project will preserve the through function of Queen Ka‘ahumanu, an arterial roadway, by consolidating and minimizing Highway access points for properties makai of the Highway. The planned four-way intersection with Hulikoa Drive is shown on the Kona CDP Official Transportation Network Map – Proposed Roads and Transit Facilities (See Figure 12).

Objective TRAN-3. Multi-Modal System. To develop a multi-modal transportation system to encourage walking, biking, transit, and other non-vehicular modes of travel. A multi-modal system needs to be attractive, safe, comfortable, convenient, accessible, environmentally friendly, and affordable. Such a system would reduce congestion, improve air quality, reduce fuel consumption, and increase healthy activity. Not only would the system enhance the mobility of the elderly and youth, who do not drive, it would also make it possible for residents to divert automobile ownership expenses to other daily needs, such as homeownership mortgage or insurance. The network could connect pathways within and outside of street rights-of-way. The system should provide convenient transfers between modes of transportation.

Policy TRAN-3.6: Multi-Modal Network. The Official Transportation Network Map (Figures 4-2a to 4-2d) shall designate a system of pedestrian and bicycle paths to use as a guide for street design, public improvements, and subdivision improvements. Recognizing that the appropriate type of facility may evolve, the Implementation Committee shall have the authority to change the designated type and maintain such changes on a database.

Action TRAN-3.6a: Designate multi-modal paths (pedestrian and bicycle).

Discussion: Although the Kona CDP Official Transportation Network Map – Pedestrian and Bike Paths (Figure 11) designates pedestrian sidewalks to be constructed along the Frontage Road, the policy emphasized that the pedestrian facilities shown on the map were intended as a guide due to the need to evaluate a project within the context of its surroundings. Sidewalks

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make sense where there is high pedestrian traffic. Where the Frontage Road eventually traverses through development, sidewalks can be provided. The sidewalks can then transition to shoulder/swales for the relatively long segments between developed areas to provide a less formal or urban character and in recognition that the amount of pedestrian traffic would be considerably less outside the developed areas. The proposed portion of the Frontage Road covered by this EA is in the Conservation District where urban development has not been proposed.

5.2.3 County of Hawai‘i Zoning

Similar to the State Land Use Districts, the Hawai‘i County Code regulates the type and location of development permitted on the island. The Hawai‘i Zoning Code, Chapter 25 of the Hawai‘i County Code, provides more specific permitted land uses. For example, for lands within the State Land Use Urban District, the zoning code provides specific permitted land uses and development standards for residential, resort, commercial, industrial, planned unit development, cluster developments and other uses.

The Site is within the “Open” zoning district (See Figure 7). The Open zone applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use that has been established, or is proposed. The objective of this district is to encourage development around it, such as golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands).

Public uses, such as the Project’s roads, are a permitted use in the Open zoning district.

5.3 APPROVALS AND PERMITS

A listing of anticipated permits and approvals required for the project is presented below:

Table 2: List of Anticipated Permits and Approvals

Permit/Approval	Responsible Agency
Conservation District Use Permit	State Department of Land & Natural Resources
Special Management Area Use Permit	Hawai‘i County Planning Commission
Subdivision Approval	County of Hawai‘i Planning Department
National Pollutant Discharge Elimination System Permit	State Department of Health
Grading Permit	County of Hawai‘i Department of Public Works
Underground Injection Control Permit	State Department of Health

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6.0 ALTERNATIVES TO THE PROPOSED ACTION

In compliance with HAR Title 11, DOH, Chapter 200, Environmental Impact Statement Rules, Section 11-200-10(F), the following is a summary of alternatives to the proposed action..

6.1 NO ACTION ALTERNATIVE

Under the No Action alternative the Project would not be built. The existing access road, Kohanaiki Way, would continue to provide access to the Shores at Kohanaiki and Kohanaiki Public Beach Park via the existing connection to Queen Ka‘ahumanu Highway, which is limited to right-in and right-out turns from/to Queen Ka‘ahumanu Highway. These limited turning movements hamper access for the Shores at Kohanaiki and Kohanaiki Public Beach Park users, particularly those arriving from the south, or those wishing to travel north on the Highway when departing, who need to make U-turns.

The Kohanaiki Business Park would continue to use Hulikoa Drive, whose intersection with Queen Ka‘ahumanu Highway would remain a stop-controlled “T” intersection. Traffic flow at the intersection, which presently operates at LOS F during the AM and PM peak periods of traffic, would not be improved. Traffic conditions at the Kohanaiki Business Park would likely worsen in the future as vacant lots are occupied.

In the long-term, as occupancy of the Kohanaiki Business Park and Shores at Kohanaiki progresses, traffic on Queen Ka‘ahumanu Highway would worsen as Highway access would occur from multiple intersections instead of a single consolidated intersection, increasing turning movements that may disrupt traffic flow.

The Site would remain in its current undeveloped state and no benefits or impacts associated the Project would occur; no funds would be expended for construction and no construction-related jobs, or positive secondary economic impacts associated with construction, would occur.

6.2 PREFERRED AND ALTERNATE ALIGNMENT

Two alignments for the Project were considered (see Figure 16). Each alternative alignment would provide the same function and contain the same three elements:

1. Extending Hulikoa Drive makai (west) of Queen Ka‘ahumanu Highway from the makai highway right-of-way to a new intersection with the new frontage road;
2. Creating a new intersection makai of Queen Ka‘ahumanu Highway connecting the makai portion of Hulikoa Drive to the frontage road; and
3. Constructing the frontage road from the new intersection to the existing Kohanaiki Way to the north.

The preferred alignment provides a more direct connection from the new Hulikoa Drive intersection to Kohanaiki Way, while the alternative alignment would be somewhat longer in length and would curve toward Queen Ka‘ahumanu Highway (east) to connect with Kohanaiki Way further east. Both alternatives essentially would have the same or similar impacts and mitigation measures as described in this EA.

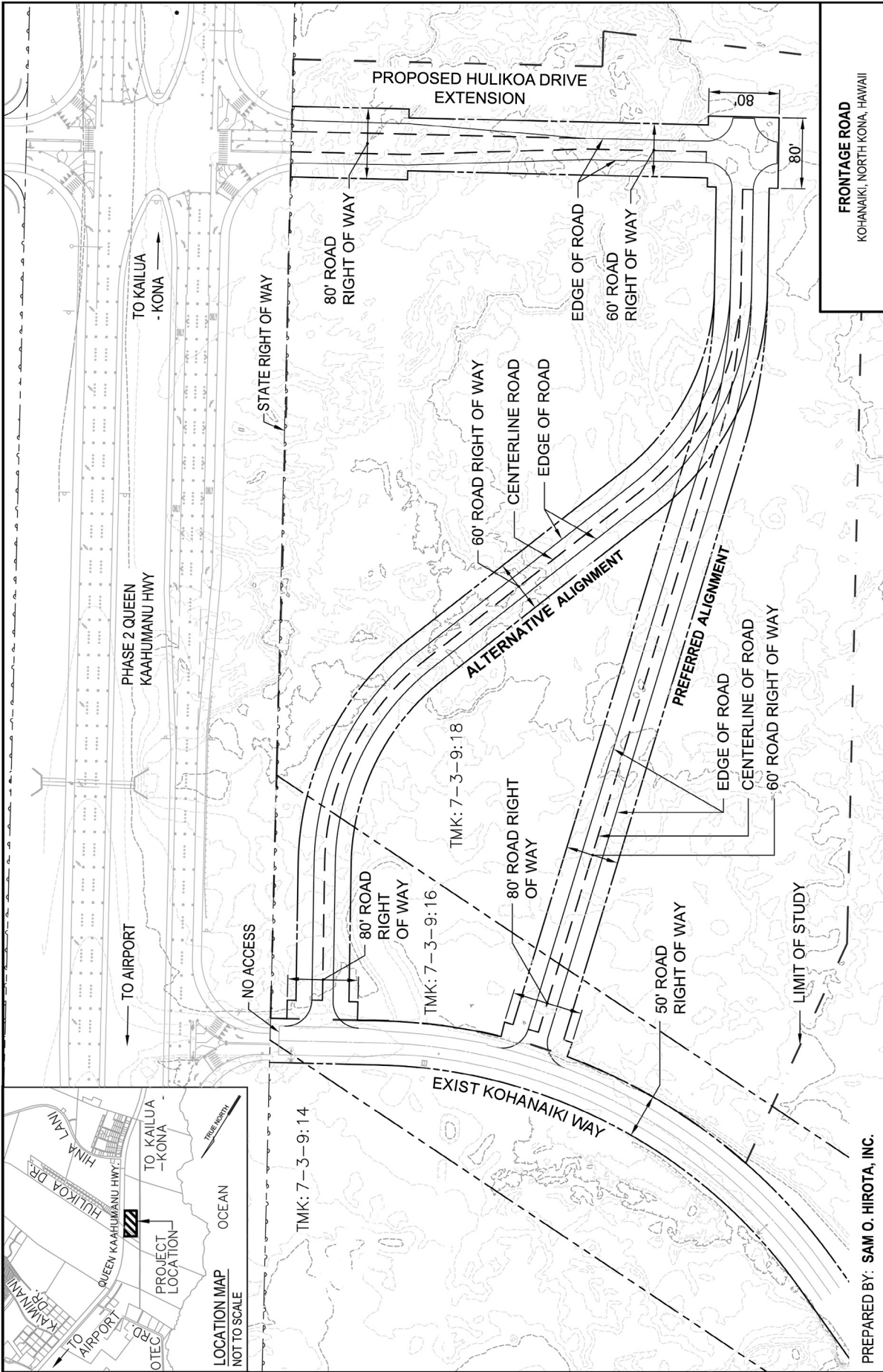


FIGURE 16:
Frontage Road Alternatives

Queen Ka'ahumanu Highway Frontage Road

Kohalaiki Shores, LLC
North

Island of Hawaii

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The preferred alignment was selected because of its multiple advantages over the alternative alignment.

The preferred alignment provides the shortest distance between the new Hulikoa Drive extension and Kohanaiki Way. A shorter alignment results in multiple benefits such as: less land disturbance, less earthwork (cut and fill), less pavement, less construction costs, less impact to drainage, and less maintenance. The preferred alignment would also have less vehicle light impact to on-coming traffic on Queen Ka‘ahumanu traffic at night.

The alternative alignment would involve greater land disturbances, greater earthwork (cut and fill), greater pavement, greater construction costs, greater impact to drainage, and greater maintenance.

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7.0 DETERMINATION

7.1 SIGNIFICANCE CRITERIA

The State DOH Administrative Rules, Chapter 200, Title 11, Section 12, establishes 13 criterion to evaluate the significance of potential environmental effects. Construction of the Project and its operation is not anticipated to have a significant impact based on the established criterion as discussed below.

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

The Project will not involve an irrevocable commitment to loss or destruction of any natural or cultural resource. No threatened or endangered plant species listed, or proposed for listing, under either the Federal or State of Hawai‘i Endangered species programs were found on the Site during the course of a botanical survey. Likewise no avian species or terrestrial mammalian species currently protected or proposed for protection under either the Federal or State of Hawai‘i Endangered species programs were detected during the course of a survey of avian and terrestrial mammals of the Site. Regarding historic and cultural resources, while two historic sites were found during the course of an archaeological inventory survey, neither of these sites are located within the proposed roadway alignments and so will not be impacted by the Project. In addition, the archaeologist determined that the mapping, written description, and photography of the sites adequately documents them and no further work or preservation is recommended.

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

The Project will not curtail the range of beneficial uses of the environment. The Project has been designed to minimize impacts to the environment and facilitates build-out of planned developments and access to Kohanaiki Public Beach Park. In context with the existing and proposed uses in the vicinity, the Project is a beneficial use of the environment.

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

The Project is consistent with the State’s long-term environmental policies, goals, and guidelines, as discussed in Section 5.1.5 of this EA.

- (4) *Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;*

The Project will have a positive economic impact by generating construction related jobs during development of the road, and a long-term positive economic effect by improving the efficiency of the transportation system.

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The Project will improve the social welfare and quality of life for area residents by providing 1) improving safety and traffic flow on Queen Ka‘ahumanu Highway through the consolidation of access points; and 2) improving public access to properties makai and mauka of Queen Ka‘ahumanu Highway, and in particular improving public access to Kohanaiki Public Beach Park and the shoreline.

A cultural impact assessment prepared for the Project concludes that: 1) no known cultural resources or cultural practices or places will be directly affected by the Project; and 2) no customary native Hawaiian rights are currently conducted in the study area.

(5) *Substantially affects public health;*

The Project will not create significant impacts that would affect public health, such as impacts to air quality or ambient noise levels.

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

The Frontage Road will have a beneficial secondary impact on traffic flow by improving flow on Queen Ka‘ahumanu Highway and local roads including Kohanaiki Way and Hulikoa Drive. In the long-term, the Frontage Road will also promote transit use by providing a secondary route for transit service.

(7) *Is not likely to involve a substantial degradation of environmental quality;*

As discussed in Chapters 3 and 4 of this EA, when completed, the Project improvements will be dedicated to the County of Hawaii. All applicable governmental requirements will be complied with, and thus construction of the Project and its long-term operation will not significantly affect environmental quality.

(8) *Is individually limited but cumulatively may have a considerable effect upon the environment or involves a commitment for larger actions;*

Construction of the Project is not associated with cumulative effects, nor does it involve a commitment for larger actions. While additional portions of the Frontage Road may be constructed in the future as adjacent lands are developed, construction of this portion of the road provides an independent functional purpose in terms of providing safe access to Kohanaiki Public Beach Park and access to Kohanaiki Shores. As such, the Project does not require a commitment for future development or actions.

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

No threatened or endangered plant species listed, or proposed for listing, under either the Federal or State of Hawai‘i Endangered species programs were found on the Site during the course of a botanical survey. Likewise no avian species or terrestrial mammalian species currently protected or proposed for protection under either the Federal or State of Hawai‘i Endangered species programs were detected during the course of a survey of avian and terrestrial mammals of the Site.

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- (10) *Detrimentially affects air or water quality or ambient noise levels;*

As discussed in Sections 3.4 (Water Resources), 4.3 (Noise), and 4.4 (Air Quality), the Project is not anticipated to have a significant impact on air or water quality or ambient noise levels.

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

The Project is not within an environmentally sensitive area.

- (12) *Will not significantly affect scenic vistas and viewplanes identified in county or state plans or studies; or*

The Project will not significantly affect scenic vistas or viewplanes. As discussed in section 4.5 the Project is not anticipated to significantly alter the visual character of the Site or surrounding area. No significant landforms or landmarks will be affected by the Project. Since the Project will be at a lower elevation than Queen Ka‘ahumanu Highway, the line of sight from Queen Ka‘ahumanu Highway toward the ocean should not be affected. Streetlights are proposed only at the intersections (Hulikoa Drive/Frontage Road and Frontage Road/Kohanaiki Way) for safety purposes. Electrical lines for the streetlights will be underground. Roadway landscaping, if provided, will be designed with native species that occur naturally on the site, such as *naio* and *maiapilo*.

- (13) *Will result in additional energy consumption.*

As discussed in section 4.7.5, the Project will not significantly increase demand for electrical services over existing conditions. Streetlights are proposed only at the intersections (Hulikoa Drive/Frontage Road and Frontage Road/Kohanaiki Way) for safety purposes. The road will have a favorable effect on energy consumption by improving traffic flow on Queen Ka‘ahumanu Highway and area roads, thereby reducing gasoline consumption by automobiles.

7.2 DETERMINATION

On the basis of impacts and mitigative measures examined in this document and analyzed under the above criteria, it has been determined that the Project will not have a significant effect on the local, County, or State-wide physical or human environments. Pursuant to Chapter 343, Hawai‘i Revised Statutes, the Approving Agency, which in this case is the County of Hawai‘i Planning Department, has issued a Finding of No Significant Impact (FONSI).

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

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8.0 CONSULTATION

8.1 PRE-ASSESSMENT CONSULTATION

In the course of planning for the Project, the following agencies or individuals were consulted and/or provided information and asked to comment. Comment letters and responses are attached at the end of this document.

Federal

- U.S. Fish and Wildlife Service

State of Hawai‘i

- Department of Business, Economic Development & Tourism (DBEDT)
- DBEDT, Office of Planning
- Department of Health
- DOH, Office of Environmental Quality Control
- Department of Land and Natural Resources
- DLNR, State Historic Preservation Division
- Department of Transportation
- Office of Hawaiian Affairs

County of Hawai‘i

- Department of Environmental Management
- Department of Public Works
- Department of Water Supply
- Fire Department
- Planning Department
- Police Department

Other

- Peoples Advocacy for Trails Hawaii (PATH)
- Natural Energy Laboratory of Hawaii Authority (NELHA)
- Kama‘aina Eight Properties LLC
- First Capital Realty One
- ‘O‘oma Beachside Village, LLC

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

8.2 EA CONSULTATION

The EA has been distributed to the following individuals and organizations. Comment letters received for the Draft EA are included in the Final EA.

Federal

- U.S. Fish and Wildlife Service
- National Park Service

State of Hawai‘i

-
- Department of Accounting and General Services
- Department of Business, Economic Development & Tourism
- DBEDT – Office of Planning
- Department of Hawaiian Home Lands
- Department of Health
- DOH, Office of Environmental Quality Control
- Department of Land and Natural Resources
- DLNR, State Historic Preservation Division
- Department of Transportation
- Office of Hawaiian Affairs

County of Hawai‘i

- Department of Environmental Management
- Department of Parks and Recreation
- Department of Public Works
- Department of Research and Development
- Department of Water Supply
- Fire Department
- Mass Transit Agency
- Office of Housing and Community Development
- Planning Department
- Police Department

Other

- Kailua Kona Public Library
- Peoples Advocacy for Trails Hawaii (PATH)
- Natural Energy Laboratory of Hawaii Authority (NELHA)
- Kama‘aina Eight Properties LLC
- First Capital Realty One
- ‘O‘oma Beachside Village, LLC

9.0 REFERENCES

- Baker, H.L. et al. 1965. *Detailed Land Classification, Island of Oahu*. L.S. Land Study Bureau, University of Hawai‘i.
- Fehr & Peers. 2008. *Traffic Engineering Study for the Intersection of Queen Ka‘ahumanu Highway & Hulikoa Road*. Prepared for Kohanaiki Business Park Association, Inc.
- Geometrician Associates, LLC. 2011. *Botanical Survey Kohanaiki, North Kona, Island of Hawai‘i*. Prepared for: Kohanaiki Shores, LLC.
- Haun & Associates. 2011A. *Draft Archaeological Inventory Survey TMK: (3) 7-3-09: Portion 16 and Portion 18 Land of Kohanaiki, North Kona District, Island of Hawai‘i*. Prepared for: Kohanaiki Shores, LLC.
- Haun & Associates. 2011B. *Cultural Impact Assessment Frontage Road Improvements Project (TMK: [3] 7-3-09: Portion 16 and Portion 18) Land of Kohanaiki, North Kona District, Island of Hawai‘i*. Prepared for Kohanaiki Shores, LLC and Kohanaiki Business Park.
- Hawai‘i State Department of Agriculture. 1977. *Agricultural Lands of Importance to the State of Hawai‘i*. Honolulu, Hawai‘i.
- Juvik, Sonia P. and James O. Juvik, eds. 1998. *Atlas of Hawai‘i*. 3rd Edition. Honolulu: University of Hawai‘i Press, Honolulu, Hawai‘i.
- Macdonald, Gordon A., Agatin Abbott. Frank L. Peterson. 1983. *Volcanoes Under the Sea: The Geology of Hawai‘i*. University of Hawai‘i Press, Honolulu, Hawai‘i.
- Maly, K. and O. Maly. 2003. *Kohanaiki Ma Kekaha Wai ‘Ole O Nā Kona (Kohanaiki on the Arid Shores of Kona), A Report on Archival and Historical Documentary Research, and Oral History Interviews for the Ahupua‘a of Kohanaiki, District of Kona, Island of Hawai‘i, Kumu Pono Associates*. Prepared for Paul H. Rosendahl, Ph.D., Inc.
- PBR HAWAII. 2009. *‘O‘oma Beachside Village Final Environmental Impact Statement, North Kona, Hawai‘i*. Prepared for ‘O‘oma Beachside Village, LLC and State of Hawai‘i Land Use Commission Docket No. A07-774.
- Rana Biological Consulting, Inc. *Avian and Terrestrial Mammalian Surveys Conducted for the Kohanaiki Shores Frontage Road Corridor, North Kona District, Island of Hawai‘i*. Prepared for: Kohanaiki Shores, LLC.
- Sam O. Hirota, Inc. 2011. *Queen Ka‘ahumanu Frontage Road Hydrology Report*. Prepared for Kohanaiki Shores, LLC.
- State of Hawai‘i, Department of Business, Economic Development and Tourism. 2009 *State of Hawai‘i Data Book*. Available online at <http://hawaii.gov/dbedt/info/economic/databook/>.

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

United States Department of Agriculture Soil Conservation Service. 1972. *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawai‘i.*

University of Hawai‘i Economic Research Organization. 2010. *UHERO State Forecast Update, October 1, 2010.* Available online at
<http://www.uhero.hawaii.edu/assets/UHEROStateForecastUpdate-2010Q3.pdf>

O:\Job27\2790.01\EA\FINAL EA\2012-02-27

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

**10.0 PRE-ASSESSMENT CONSULTATION COMMENT
LETTERS & RESPONSES**

AGENCY/INDIVIDUAL	PRE-ASSESSMENT SENT	COMMENT DATE
State		
Department of Business, Economic Development & Tourism	8-5-11	-
DBEDT Office of Planning	8-5-11	-
Department of Defense	8-5-11	-
Department of Health	8-5-11	-
DOH – Office of Environmental Quality Control	8-5-11	-
Department of Land and Natural Resources	8-5-11	8-31-11
DLNR – State Historic Preservation Division	-	-
Department of Transportation	8-5-11	9-26-11
Office of Hawaiian Affairs	8-5-11	9-1-11
Federal		
U.S. Fish and Wildlife	8-5-11	-
County		
Department of Environmental Management	8-5-11	-
Department of Public Works	8-5-11	-
Department of Water Supply	8-5-11	8-20-11
Fire Department	8-5-11	8-16-11
Planning Department	8-5-11	8-26-11
Police Department	8-5-11	8-22-11
Private Companies, Organizations, and Individuals		
Natural Energy Laboratory of Hawaii Authority (NELHA)	8-5-11	9-1-11
Peoples Advocacy for Trails Hawaii (PATH)	8-5-11	-
Kamaaina Eight Properties LLC	8-5-11	-
First Capital Realty One	8-5-11	-
Ooma Beachside Village, LLC	8-5-11	-

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 31, 2011

PBR Hawaii & Associates, Inc.
Attn: Dean Minakami, AICP
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484

via email: dminakami@pbrhawaii.com

Dear Mr. Minakami:

SUBJECT: Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road, North Kona, Hawaii; TMK: (3) 7-3-009:018 (portion)

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

At this time, enclosed are comments from (a) Engineering Division; (b) Office of Conservation & Coastal Lands; and (c) Land Division – Hawaii District on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at 587-0417. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Russell Y. Tsuji".

Russell Y. Tsuji
Land Administrator

Enclosures

No. of Pages: 6

RUSH

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT



**STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 24, 2011

MEMORANDUM

TO:

DLNR Agencies:

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

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

2011 AUG 30 A 10:51

MEMORANDUM
LAND DIVISION
ENGINEERING

FROM:

Russell Y. Tsuji, Land Administrator

SUBJECT:

Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road

LOCATION:

North Kona, Hawaii; TMK: (3) 7-3-009:018 (portion)

APPLICANT:

PBR Hawaii & Associates

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by **August 29, 2011**.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachment

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

Signed:

Date:

[Signature]

8/24/11

cc: Central Files

**DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION**

LD/DarleneNakamura

**RE:PreConsultQueenKaahumanuHwyFrontageRd
Hawaii.853**

COMMENTS

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

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

- () Mr. Robert Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.
 - () Mr. Carter Romero at (808) 961-8943 of the County of Hawaii, Department of Public Works.
 - () Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
 - () Ms. Wynne Ushigome at (808) 241-4890 of the County of Kauai, Department of Public Works.
-
- () The applicant should include water demands and infrastructure required to meet project needs. Please note that projects within State lands requiring water service from the Honolulu Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.
 - () The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.
 - () Additional Comments: _____

 - () Other: _____

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

Signed: 
CARTY S. CHANG, CHIEF ENGINEER

Date: 8/29/11

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

HA-12-41



RUSH

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT



DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS

STATE OF HAWAII 2011 AUG 25 P 4: 24
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

August 24, 2011

MEMORANDUM

TO:

DLNR Agencies:

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

RECEIVED
LAND DIVISION
2011 AUG 29 P 3: 12
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

FROM:

Russell Y. Tsuji, Land Administrator

SUBJECT:

Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road

LOCATION:

North Kona, Hawaii; TMK: (3) 7-3-009:018 (portion)

APPLICANT:

PBR Hawaii & Associates

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by August 29, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachment

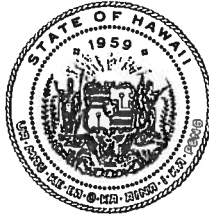
- We have no objections.
- We have no comments.
- Comments are attached.

Signed:

Date: 8.27.2011

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAIHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF:OCCL:TM

Correspondence: HA 12-41

MEMORANDUM

TO: Russell Y. Tsuji, Administrator
Land Division

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

SUBJECT: Pre-Consultation for Queen Kaahumanu Highway Frontage, North Kona, Hawaii,
TMK: (3) 7-3-009:018

AUG 29 2011

A handwritten signature in black ink, appearing to read "Samuel J. Lemmo", written over a date stamp.

The Office of Conservation and Coastal lands has reviewed the subject request and notes that the proposed area appears to lie within the State Land Use Conservation District, General subzone. The proposed PUBLIC PURPOSE land use is an identified land use within the General subzone pursuant to the Hawaii Administrative Rules (HAR) §13-5-22, P-6 Transportation systems, transmission facilities or pubic utilities, water systems, energy generation facilities...undertaken by non-governmental entities which benefit the public and are consistent with the purpose of the conservation district.

The proposal will require the filling of a Conservation District Use Application (CDUA) and all required attachments. To allow, modify or deny the use will be at the Board of Land and Natural Resources discretion. Therefore this proposal will require a Board permit. Should you have any questions regarding this memorandum, contact Tiger Mills of our Office at (808) 587-0382.



RUSH
WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 24, 2011

2011 AUG 26 P 1:38

RECEIVED
LAND DIVISION
HILO HAWAII
HILO, HAWAII

MEMORANDUM

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

RECEIVED
LAND DIVISION
2011 AUG 30 A 9:41
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road

LOCATION: North Kona, Hawaii; TMK: (3) 7-3-009:018 (portion)

APPLICANT: PBR Hawaii & Associates

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by August 29, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachment

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

Signed:

Date: 8.26.11



PBR HAWAII
& ASSOCIATES, INC.

November 4, 2011

PRINCIPALS

THOMAS S. WITTEN, ASLA
President

R. STAN DUNCAN, ASLA
Executive Vice-President

RUSSELL Y. J. CHUNG, FASLA, LEED® AP
Executive Vice-President

VINCENT SHIGEKUNI
Vice-President

GRANT T. MURAKAMI, AICP, LEED® AP
Principal

W. FRANK BRANDT, FASLA
Chairman Emeritus

ASSOCIATES

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Senior Associate

RAYMOND T. HIGA, ASLA
Senior Associate

KEVIN K. NISHIKAWA, ASLA
Associate

KIMI MIKAMI YUEN, LEED® AP
Associate

SCOTT ALIKA ABRIGO, LEED® AP
Associate

SCOTT MURAKAMI, ASLA, LEED® AP
Associate

DACHENG DONG, LEED® AP
Associate

Russell Y. Tsuji
State of Hawai'i
Department of Land & Natural Resources
Land Division
P.O. Box 621
Honolulu, Hawai'i 96809

SUBJECT: Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way, Tax Map Key (3) 7-3-009:018 (Por.) and 016 (Por.) North Kona, Island of Hawai'i

Dear Mr. Tsuji:

Thank you for letter dated August 31, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way (the Project). As the planning consultant for the applicant, Kohanaiki Shores, LLC and Kamaaina Eight Properties, LLC, we are responding to the comments received from each Department of Land and Natural Resources division.

Engineering Division

Thank you for confirming that the Project is located in Flood Insurance Rate Map Zone X. This information will be included in the Draft Environmental Assessment (EA).

Office of Conservation & Coastal Lands

We note that the Project is within the State Land Use Conservation District, General subzone. Public purpose land uses are an identified land use within the General subzone pursuant to Hawaii Administrative Rules Section 13-5-22, P-6, Transportation Systems. We acknowledge that the Project will require a Board permit. A Conservation District Use Application for the Board permit will be submitted.

Land Division

We acknowledge that the Land Division has no comments.

Thank you for participating in the pre-consultation process. Your letter will be included in the Draft EA. We will send you a copy of the Draft EA when it is available.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

HONOLULU OFFICE
1001 Bishop Street, Suite 650
Honolulu, Hawai'i 96813-3484
Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

KAPOLEI OFFICE
1001 Kamokila Boulevard
Kapolei Building, Suite 313
Kapolei, Hawai'i 96707-2005
Tel: (808) 521-5631
Fax: (808) 535-3163



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

IN REPLY REFER TO:

STP 8.0548

September 26, 2011

Mr. Dean Minakami, AICP
Planner
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Minakami:

Subject: Queen Kaahumanu Highway Frontage Road
Pre-Consultation for Draft Environmental Assessment (DEA)

Thank you for providing the pre-consultation notice on the subject project for the Department of Transportation's (DOT) review and comments.

DOT executed a Memorandum of Agreement (MOA) dated March 29, 2011, with Kamaaina Eight Properties LLC, Kohanaiki Shores LLC, and Rutter/KW Kohanaiki LLC. The provisions of said MOA include, besides other highway and intersection connections and improvements, a frontage road with preparation and processing (with necessary license by one of the MOA parties) of an environmental impact statement or environmental assessment for the frontage road portion and other such permits as are necessary for the construction of the road because the frontage road portion is situated in State land use conservation district and County special management areas. The preparation of a draft environmental assessment (DEA) is consistent with the MOA.

A traffic access analysis report is required as part of the draft environmental assessment to ensure proper design of the Queen Kaahumanu Highway and Hulikoa Drive intersection improvements and related road improvements. Also, continued advance consultations and project coordination with the DOT Highways Division, as well as County of Hawaii agencies and the other involved parties, will be needed.

When the DEA has been prepared, the DOT requests at least four printed copies and one CD of the DEA be provided for further review and comment.


DOT appreciates the early consultation and for the opportunity to provide initial comments on the subject project. If there are any questions or the need to meet with DOT Highways Division

Mr. Dean Minakami, AICP
Page 2
September 26, 2011

STP 8.0548

staff, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7976.

Very truly yours,

A handwritten signature in black ink, appearing to read "Glenn M. Okimoto", written in a cursive style.

GLENN M. OKIMOTO, Ph.D.
Director of Transportation



PBR HAWAII
& ASSOCIATES, INC.

November 4, 2011

PRINCIPALS

THOMAS S. WITTEN, ASLA
President

R. STAN DUNCAN, ASLA
Executive Vice-President

RUSSELL Y. J. CHUNG, FASLA, LEED® AP
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SCOTT ALIKA ABRIGO, LEED® AP
Associate

SCOTT MURAKAMI, ASLA, LEED® AP
Associate

DACHENG DONG, LEED® AP
Associate

HONOLULU OFFICE

1001 Bishop Street, Suite 650
Honolulu, Hawai'i 96813-3484
Tel: (808) 521-5631
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E-mail: sysadmin@pbrhawaii.com

KAPOLEI OFFICE

1001 Kamokila Boulevard
Kapolei Building, Suite 313
Kapolei, Hawai'i 96707-2005
Tel: (808) 521-5631
Fax: (808) 535-3163

Glenn M. Okimoto, Ph.D.
State of Hawai'i
Department of Transportation
869 Punchbowl Street
Honolulu, Hawai'i 96813-5097

SUBJECT: Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way, Tax Map Key (3) 7-3-009:018 (Por.) and 016 (Por.) North Kona, Island of Hawai'i

Dear Mr. Okimoto:

Thank you for your letter dated September 26, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way (the Project). As the planning consultant for the applicant Kohanaiki Shores, LLC and Kamaaina Eight Properties, LLC, we are responding to your comments.

Thank you for confirming that the Environmental Assessment (EA) and related permits being initiated with the EA (i.e., the Conservation District Use Application and Special Management Area Use Permit) are consistent with the Memorandum of Agreement referenced in your letter. A Traffic Engineering Study & Technical Addendum have been prepared and will be included in the Draft Environmental Assessment (EA) as an appendix.

We will continue to coordinate with the DOT Highways Division, as well as County of Hawai'i agencies and other involved parties regarding the Project.

Thank you for participating in the environmental review process. Your letter will be included in the Draft EA. We will send you four hard copies and one electronic version of the Draft EA when it is available.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

O:\Job27\2790.01\EA\Pre-Consultation\ Responses DOT

To: Dean Minakami
Subject: RE: Queen Kaahumanu Highway Frontage Road Draft Environmental Assessment

From: Keola Lindsey [mailto:keolal@oha.org]
Sent: Thursday, September 01, 2011 4:04 PM
To: Dean Minakami
Subject: Queen Kaahumanu Highway Frontage Road Draft Environmental Assessment

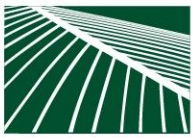
Aloha Dean:

Thank you for speaking with me this afternoon regarding your August 5, 2011 letter seeking comments ahead of an draft environmental assessment (DEA) which will be prepared to support the Queen Ka'ahumanu Highway Frontage Road.

OHA has no substantive comments ahead of the DEA at this time. It is our understanding the project area has been subject to an archaeological inventory survey. We look forward to seeing a discussion on the findings of the AIS in the DEA when it is prepared. As I mentioned to you, the National Park Service may have an interest in this DEA. Please send one electronic copy and one hardcopy of the DEA to OHA: attn Compliance Program. Should you have any questions, please feel free to contact me.

Thank you, Keola

Keola Lindsey
Office of Hawaiian Affairs
Compliance Monitoring Program
711 Kapiolani Boulevard
Honolulu, Hawaii 96813
keolal@oha.org (email)
(808) 594-0244 (office)



PBR HAWAII
& ASSOCIATES, INC.

November 4, 2011

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Keola Lindsey
State of Hawai'i
Office of Hawaiian Affairs
Compliance Monitoring Program
711 Kapi'olani Boulevard
Honolulu, Hawai'i 96813

SUBJECT: Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way, Tax Map Key (3) 7-3-009:018 (Por.) and 016 (Por.) North Kona, Island of Hawai'i

Dear Mr. Lindsey:

Thank you for e-mail dated September 1, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way (the Project). As the planning consultant for the applicant, Kohanaiki Shores, LLC and Kamaaina Eight Properties, LLC, we acknowledge that the Office of Hawaiian Affairs has no substantive comments at this time.

Thank you for participating in the environmental review process. Your letter will be included in the Draft Environmental Assessment (EA). We will send you a copy of the Draft EA when it is available.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

ASSOCIATES

TOM SCHNELL, AICP
Senior Associate

RAYMOND T. HIGA, ASLA
Senior Associate

KEVIN K. NISHIKAWA, ASLA
Associate

KIMI MIKAMI YUEN, LEED® AP
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SCOTT ALIKA ABRIGO, LEED® AP
Associate

SCOTT MURAKAMI, ASLA, LEED® AP
Associate

DACHENG DONG, LEED® AP
Associate

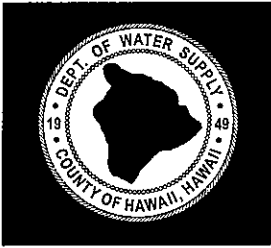
HONOLULU OFFICE

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Fax: (808) 535-3163



DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAII 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

September 20, 2011

Dean Minakami
PBR Hawaii
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, HI 96813-3484

**PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD
TAX MAP KEY 7-3-009:018 (PORTION)**

This is in response to your Pre-Environmental Assessment Consultation letter dated August 5, 2011.

Please be informed that there is an existing 12-inch waterline within the existing Kohanaiki Way which is connected to an existing 12-inch waterline within Queen Ka'ahumanu Highway.

We have no objection to the proposed project with the condition that the developer will be responsible for the cost of relocating or modifying any of the existing water system facilities within the project area, should it be necessary.

Should there be any questions, please contact Mr. Ryan Quitariano of our Water Resources and Planning Branch at 961-8070, extension 256.

Sincerely yours,

Milton D. Pavao, P.E.
Manager-Chief Engineer

RQ:dfg



PBR HAWAII
& ASSOCIATES, INC.

November 4, 2011

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Milton D. Pavao, P.E.
County of Hawai'i
Department of Water Supply
345 Kekūanaō'a Street, Suite 20
Hilo, Hawai'i 96720

SUBJECT: Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way, Tax Map Key (3) 7-3-009:018 (Por.) and 016 (Por.) North Kona, Island of Hawai'i

Dear Mr. Pavao:

Thank you for letter dated August 20, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way (the Project). As the planning consultant for the applicant, Kohanaiki Shores, LLC and Kamaaina Eight Properties, LLC, we are responding to your comments.

Thank you for the information regarding the 12-inch waterline along Kohanaiki Way that connects to a 12-inch waterline along Queen Ka'ahumanu Highway. The Draft Environmental Assessment (EA) will include this information.

We acknowledge that the Department of Water Supply has no objection to the Project provided that the applicant will be responsible for the cost of relocating or modifying any of the water system facilities within the Project area, should it be necessary.

Thank you for participating in the environmental review process. Your letter will be included in the Draft EA. We will send you a copy of the Draft EA when it is available.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

O:\Job27\2790.01\EA\Pre-Consultation\ Responses DWS

William P. Kenoi
Mayor



Darryl J. Oliveira
Fire Chief

Glen P. I. Honda
Deputy Fire Chief

County of Hawai'i
HAWAII FIRE DEPARTMENT
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

August 16, 2011

Mr. Dean Minakami
PBR Hawai'i & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

SUBJECT: PRE-CONSULTATION FOR QUEEN KA'AHUMANU HIGHWAY
FRONTAGE ROAD
TMK: (3) 7-3-009:018 (PORTION) NORTH KONA, ISLAND OF HAWAII

In regards to the above-mentioned pre-consultation environmental assessment, the following shall be in accordance:

Fire apparatus access roads shall be in accordance with UFC Section 10.207:

"Fire Apparatus Access Roads

"Sec. 10.207. (a) General. Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.

"(b) Where Required. Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access as measured by an unobstructed route around the exterior of the building.

"EXCEPTIONS: 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.

"2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).



"3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

"More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

"For high-piled combustible storage, see Section 81.109.

"(c) **Width.** The unobstructed width of a fire apparatus access road shall meet the requirements of the appropriate county jurisdiction.

"(d) **Vertical Clearance.** Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

"EXCEPTION: Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

"(e) **Permissible Modifications.** Vertical clearances or widths required by this section may be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

"(f) **Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities." (20 tons)

"(g) **Turning Radius.** The turning radius of a fire apparatus access road shall be as approved by the chief." (45 feet)

"(h) **Turnarounds.** All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

"(i) **Bridges.** When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

"(j) **Grade.** The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief." (15%)

Dean Minakami
August 15, 2011
Page 3

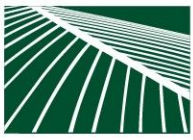
"(k) **Obstruction.** The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

"(l) **Signs.** When required by the fire chief, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both."



DARRYL OLIVEIRA
Fire Chief

RP:lpc



PBR HAWAII
& ASSOCIATES, INC.

November 4, 2011

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Chairman Emeritus

Darryl Oliveira
County of Hawai'i
Hawai'i Fire Department
25 Aupuni Street, Suite 2501
Hilo, Hawai'i 96720

SUBJECT: Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way, Tax Map Key (3) 7-3-009:018 (Por.) and 016 (Por.) North Kona, Island of Hawai'i

Dear Chief Oliveira:

Thank you for letter dated August 16, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way (the Project). As the planning consultant for the applicant, Kohanaiki Shores, LLC and Kamaaina Eight Properties, LLC, we are responding to your comments.

The Project roadways will be considered "fire apparatus access roads" and will be designed in accordance with all Uniform Fire Code requirements. The Project is anticipated to have a beneficial effect on fire protection services by improving traffic flow on Queen Ka'ahumanu Highway and facilitating access to the shoreline and developments makai of Queen Ka'ahumanu Highway.

Thank you for participating in the environmental review process. Your letter will be included in the Draft Environmental Assessment (EA). We will send you a copy of the Draft EA when it is available.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

HONOLULU OFFICE

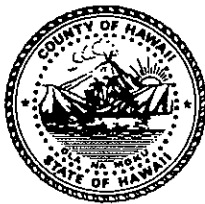
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O:\Job27\2790.01\EA\Pre-Consultation\Responses Fire

William P. Kenoi
Mayor



BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy Director

County of Hawai'i

PLANNING DEPARTMENT

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

August 26, 2011

Mr. Dean Minakami, AICP
PBR Hawai'i & Associates Inc.
1001 Bishop Street, Suite 650
Honolulu, HI 96813

Dear Mr. Minakami:

SUBJECT: Early Consultation for Draft Environmental Assessment
Project: Queen Ka'ahumanu Highway Frontage Road
TMK: (3) 7-3-009: Portion of Parcel 018; North Kona, Hawai'i

Thank you for your letter dated August 5, 2011, requesting comments from this office regarding the preparation of a Draft Environmental Assessment (DEA) for the construction of a frontage road makai of and parallel to Queen Ka'ahumanu Highway. The project will construct an approximately 1,000-foot long frontage road that will connect Kohanaiki Way with the highway at the existing Hulikoa Drive intersection. The existing connection of Kohanaiki Way to the highway will then be closed.

The subject property is zoned Open by the County of Hawai'i. The property is situated within the State Land Use Conservation district. In addition, according to the County of Hawai'i General Plan 2005 (amended December 2006), the subject properties are designated as Urban Expansion by the Land Use Pattern Allocation Guide.

In addition, the project site is also located entirely within the Special Management Area (SMA). According to Hawai'i Revised Statutes (HRS) Chapter 205A-22 and Planning Commission (PC) Rule 9-4(e) (1) (A) and (B), "development" includes *Placement or erection of any solid material or any gaseous, liquid, solid, or thermal waste and Grading, removing, dredging, mining, or extraction of any materials.* Therefore, the proposed project requires either a Special Management Area Minor Permit or a Special Management Area (Major) Use Permit.

Mr. Dean Minakami, AICP
PBR Hawai'i & Associates Inc.
April 26, 2011
Page 2

In addition, the Kona Community Development Plan (KCDP) was adopted by Ordinance No. 08-13, effective as of September 25, 2008. The KCDP identifies the need for a frontage road makai of the Queen Ka'ahumanu Highway between the Keahole Airport and Honokohau Harbor to serve as a Secondary Transit Route. The subject project would provide a small portion of the frontage road identified in the KCDP.

We have no further comments to offer, at this time. However, please keep us informed and provide our department with a copy of the Draft Environmental Assessment for our review.

If you have any questions or if you need further assistance, please feel free to contact Bethany Morrison of this office at 961-8138.

Sincerely,



BJ LEITHEAD TODD
Planning Director

BJM:cs
P:\wpwin60\Bethany\EA-EIS Review\preconsultdraft\ea Queen Kaahumanu Highway Frontage Road.doc



PBR HAWAII
& ASSOCIATES, INC.

November 4, 2011

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Bobby-Jean Leithead Todd
County of Hawai'i
Planning Department
Aupuni Center
101 Pauahu Street, Suite 3
Hilo, Hawai'i 96720

SUBJECT: Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way, Tax Map Key (3) 7-3-009:018 (Por.) and 016 (Por.) North Kona, Island of Hawai'i

Dear Ms. Leithead Todd:

Thank you for letter dated August 26, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way (the Project). As the planning consultant for the applicant, Kohanaiki Shores, LLC and Kamaaina Eight Properties, LLC, we are responding to your comments.

Thank you for confirming that the Project is zoned "Open" by the County of Hawai'i and situated within the State Land Use Conservation District. We acknowledge that the Project is located within the Special Management Area. Since the Project will exceed the threshold value for a Special Management Area Minor Permit, we anticipate filing for a Special Management Area Use Permit. We have also discussed with your staff the possibility of the Planning Department serving as the accepting authority for the Environmental Assessment (EA).

We note that the Project is consistent with the Kona Community Development Plan (Kona CDP) policy (Kona CDP Policy TRAN-1.5) calling for a frontage road makai (west) of, and parallel to, Queen Ka'ahumanu Highway to "enable the consolidation of Queen Ka'ahumanu Highway vehicular access points for the developments makai of Queen Ka'ahumanu Highway." The Draft EA will discuss the conformance of the Project with the various policies of the Kona CDP.

Thank you for participating in the environmental review process. Your letter will be included in the Draft EA. We will send you a copy of the Draft EA when it is available.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

HONOLULU OFFICE

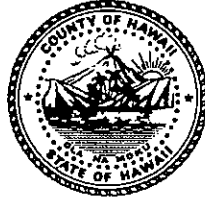
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O:\Job27\2790.01\EA\Pre-Consultation\Responses Planning Dept

William P. Kenoi
Mayor



Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai'i

POLICE DEPARTMENT

349 Kapi'olani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

August 22, 2011

Mr. Dean Minakami, AICP
Planner
PBR Hawaii & Associates Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Minakami:

SUBJECT: Pre-Consultation for Queen Kaahumanu Highway Frontage Road
Tax Map Key (3) 7-3-009:018 (Portion)
North Kona, Island of Hawaii

This responds to your request for comments on the above-referenced project.

This proposed project does not impact any police-related projects, plans, policies, services, or programs.

Should there be any questions, please contact Captain Samuel Kawamoto, Commander of the Kona District, at 326-4646, ext. 299.

Sincerely,

HARRY S. KUBOJIRI
POLICE CHIEF

RAUL H. KEALOHA JR.
ASSISTANT POLICE CHIEF
AREA II OPERATIONS

SK:dmv
RS110529



PBR HAWAII
& ASSOCIATES, INC.

November 4, 2011

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Harry S. Kubojiri
County of Hawai'i
Police Department
349 Kapi'olani Street
Hilo, Hawai'i 96720-3998

SUBJECT: Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way, Tax Map Key (3) 7-3-009:018 (Por.) and 016 (Por.) North Kona, Island of Hawai'i

Dear Chief Kubojiri:

Thank you for letter dated August 22, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way (the Project). As the planning consultant for the applicant, Kohanaiki Shores, LLC and Kamaaina Eight Properties, LLC, we are responding to your comments.

We acknowledge that the Project does not impact any police-related projects, plans, policies, services, or programs.

Thank you for participating in the environmental review process. Your letter will be included in the Draft Environmental Assessment (EA). We will send you a copy of the Draft EA when it is available.

Sincerely,

PBR HAWAII

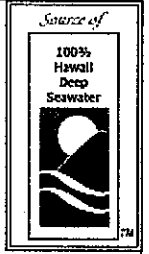
Tom Schnell, AICP
Senior Associate

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NATURAL ENERGY LABORATORY OF HAWAII AUTHORITY

An Authority of the State of Hawaii attached to the Department of Business, Economic Development & Tourism



September 1, 2011

Mr. Dean Minakami, Planner
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484

Subject: Pre-Consultation for Queen Kaahumanu Highway Frontage Road Tax Map Key (3) 7-3-009:018 (Portion) North Kona, Island of Hawaii

Dear Mr. Minakami:

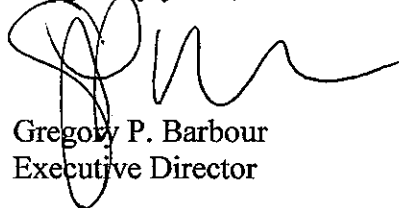
Thank you for notifying us of this proposed project which will involve the construction of a frontage road makai of and parallel to Queen Kaahumanu Highway within the Kohanaiki property located south of the Natural Energy Laboratory of Hawaii Authority (NELHA).

We do not have any comments regarding the possible impacts the proposed project may have on NELHA at this time, and will reserve our comments until after reviewing the draft Environmental Assessment prepared for the project.

Please include NELHA on the distribution list when the draft and final Environmental Assessments have been published.

If you have any questions or require additional information, please contact Jeff Nichols at 327-9585, ext. 237.

Very truly yours,



Gregory P. Barbour
Executive Director



PBR HAWAII
& ASSOCIATES, INC.

November 4, 2011

PRINCIPALS

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KIMI MIKAMI YUEN, LEED® AP
Associate

SCOTT ALIKA ABRIGO, LEED® AP
Associate

SCOTT MURAKAMI, ASLA, LEED® AP
Associate

DACHENG DONG, LEED® AP
Associate

Gregory P. Barbour
Natural Energy Laboratory of Hawai'i Authority
73-4460 Queen Ka'ahumanu Highway, #101
Kailua-Kona, Hawai'i 96740-2637

SUBJECT: Pre-Consultation for Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way, Tax Map Key (3) 7-3-009:018 (Por.) and 016 (Por.) North Kona, Island of Hawai'i

Dear Mr. Barbour:

Thank you for letter dated September 1, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way (the Project). As the planning consultant for the applicant, Kohanaiki Shores, LLC and Kamaaina Eight Properties, LLC, we acknowledge that the Natural Energy Laboratory of Hawai'i Authority has no comments at this time.

Thank you for participating in the environmental review process. Your letter will be included in the Draft Environmental Assessment (EA). We will send you a copy of the Draft EA when it is available.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

O:\Job27\2790.01\EA\Pre-Consultation\ Responses NELHA

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Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

11.0 DRAFT EA COMMENTS AND RESPONSES

AGENCY/INDIVIDUAL	DEA SENT	COMMENT DATE
State		
Department of Accounting and General Services	12-8-11	12-19-11
Department of Business, Economic Development & Tourism	12-8-11	
DBEDT - Office of Planning	12-8-11	
Department of Hawaiian Home Lands	12-8-11	
Department of Health	12-8-11	
DOH – Office of Environmental Quality Control	12-8-11	
Department of Transportation	12-8-11	1-13-12
Department of Land and Natural Resources	12-8-11	1-12-12
DLNR - Historic Preservation Division	12-8-11	
DOH Clean Air Branch	12-8-11	1-10-12
DOH Clean Water Branch	12-8-11	1-4-12
Office of Hawaiian Affairs	12-8-11	12-20-11
Federal		
U.S. Fish and Wildlife Service	12-8-11	1-3-12
U.S. National Park Service - Kaloko-Honokohau		1-5-12
U.S. National Park Service - Volcanoes National Park	12-8-11	
County		
Department of Environmental Management	12-8-11	12-14-11
Department of Parks and Recreation	12-8-11	
Department of Public Works	12-8-11	
Department of Research and Development	12-8-11	
Department of Water Supply	12-8-11	
Fire Department	12-8-11	12-27-11
Mass Transit Agency	12-8-11	
Office of Housing and Community Development	12-8-11	
Planning Department	12-8-11	
Police Department	12-8-11	12-14-11
Other		
Kailua Kona Public Library (Nearest State Library)	12-8-11	
First Capital Realty One	12-8-11	
Kamaaina Eight Properties LLC	12-8-11	
Natural Energy Laboratory of Hawaii Authority	12-8-11	
Ooma Beachside Village, LLC	12-8-11	
Peoples Advocacy for Trails Hawaii	12-8-11	

Queen Ka‘ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Final Environmental Assessment

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NEIL ABERCROMBIE
GOVERNOR



JAN S. GOUVEIA
ACTING COMPTROLLER
KERRY K. YONESHIGE
ACTING DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1347.1

DEC 19 2011

Mr. Tom Schnell
PBR Hawaii
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Schnell:

Subject: Draft Environmental Assessment
Queen Kaahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
North Kona, Island of Hawaii,
TMK: (3) 7-3-009:016 (por.) and 018 (por.)

This is in response to your letter regarding the subject project. The proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions, please call me at 586-0400 or have your staff call Mr. David DePonte of the Public Works Division at 586-0492.

Sincerely,


JAN S. GOUVEIA
Acting State Comptroller

c: Ms. Bobby Jean Leithead-Todd, County of Hawaii Planning Department
Mr. Jerry Watanabe, DAGS Hawaii District Office



PBR HAWAII
& ASSOCIATES, INC.

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SCOTT ALIKA ABRIGO, LEED® AP
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SCOTT MURAKAMI, ASLA, LEED® AP
Associate

DACHENG DONG, LEED® AP
Associate

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1001 Bishop Street, Suite 650
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KAPOLEI OFFICE
1001 Kamokila Boulevard
Kapolei Building, Suite 313
Kapolei, Hawai'i 96707-2005
Tel: (808) 521-5631
Fax: (808) 535-3163

February 27, 2012

Ms. Jan S Gouveia, Acting State Comptroller
State of Hawai'i
Department of Accounting & General Services
PO BOX 119
Honolulu, Hawai'i 96810-0119

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD
HULIKOA DRIVE TO KOHANAIKI WAY DRAFT
ENVIRONMENTAL ASSESSMENT**

Dear Ms. Gouveia:

Thank you for your letter dated December 19, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way Draft Environmental Assessment (EA).

As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we acknowledge that the proposed project does not impact any Department of Accounting and General Services' projects or existing facilities and you have no comments to offer at this time.

Thank you for reviewing the Draft EA. Your letter will be included in the Final EA.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC

O:\Job27\2790.01\EA\Draft EA\ Responses\DAGS

NEIL ABERCROMBIE
GOVERNOR



GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
JADE T. BUTAY
FORD N. FUCHIGAMI
RANDY GRUNE
JADINE URASAKI

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

IN REPLY REFER TO:
STP 8.0727

January 27, 2012

Mr. Tom Schnell, AICP
Senior Associate
PBR & Associates, Inc.
1001 Bishop Street
ABS Tower, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Schnell:

Subject: Queen Kaahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Draft Environmental Assessment (DEA)

The State Department of Transportation (DOT) previously commented on the DEA for the subject project in its letter STP 8.0705 dated January 13, 2012 (attached). DOT now offers the following supplemental comments provided by the DOT Highways Division.

The DOT Highways Division Planning Branch completed its review of the subject project including the Traffic Engineering Study (TES) for the intersection of Queen Kaahumanu Highway and Hulikoa Road dated October 2008 (Appendix E of DEA). Based on the information provided in the DEA, DOT has no further comments to add at this time.

If there are any questions or the need to meet with DOT Highways Division staff, please contact Mr. Elton Teshima of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7978.

Very truly yours,

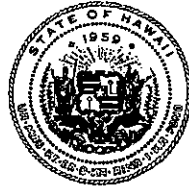
A handwritten signature in black ink, appearing to read "Glenn M. Okimoto".

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

Attachment: Ltr. STP 8.0705 dtd. 1/13/12

c: Bobby Jean Leithead-Todd, County of Hawaii, Planning Department

NEIL ABERCROMBIE
GOVERNOR



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

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
JADE T. BUTAY
FORD N. FUCHIGAMI
RANDY GRUNE
JADINE URASAKI

IN REPLY REFER TO:
DIR 1650
STP 8.0705

January 13, 2012

Mr. Tom Schnell
1001 Bishop Street
ABS Tower, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Schnell:

Subject: Queen Kaahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way
Draft Environmental Assessment (DEA)

The State Department of Transportation (DOT) previously commented during Pre-Consultation for Draft Environmental Assessment (PCDEA) on the subject project in its letter STP 8.0548 dated September 26, 2011 (see Section 10.0 of the DEA).

The DOT Highways Division Planning Branch is still reviewing the subject project including the Traffic Engineering Study (TES) for the intersection of Queen Kaahumanu Highway and Hulikoa Road dated October 2008 (Appendix E of DEA). However, until this review is completed, DOT's prior comments remain valid.

If there are any questions or the need to meet with DOT Highways Division staff, please contact Mr. Elton Teshima of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7978.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Glenn M. Okimoto".

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

Attachment: Ltr. STP 8.0548 dtd. 9/26/11

EKT:cc

c: Bobby Jean Leithead-Todd, County of Hawaii, Planning Department

bc: HWP-H, HWY-P, STP (ET)



PBR HAWAII

& ASSOCIATES, INC.

February 27, 2012

PRINCIPALS

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Executive Vice-President

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1001 Kamokila Boulevard
Kapolei Building, Suite 313
Kapolei, Hawai'i 96707-2005
Tel: (808) 521-5631
Fax: (808) 535-3163

Mr. Glenn Okimoto, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD HULIKOA
DRIVE TO KOHANAIKI WAY DRAFT ENVIRONMENTAL
ASSESSMENT**

Dear Mr. Okimoto:

Thank you for your letters dated January 13, 2012 (STP 8.0705) and January 27, 2012 (STP 8.0727) regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way Draft Environmental Assessment (EA). As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we are responding to your comments.

As per your January 27, 2012 letter we acknowledge that the State Department of Transportation (DOT) Highways Division Planning Branch has completed its review of the traffic engineering study included in the Draft EA and has no comments to add at this time.

We have also received DOT's pre-consultation comment letter dated September 26, 2011 (STP 8.0548). We responded to DOT's previous comments in our response letter dated November 4, 2011 and the Draft EA addresses each of DOT's previous review comments. Specifically:

- A Traffic Engineering Study & Technical Addendum have been prepared and included in the Draft EA as an appendix.
- We acknowledge that preparation the Draft EA is consistent with the Memorandum of Agreement referenced in your letter.

We will continue to coordinate with the DOT Highways Division, as well as County of Hawai'i agencies and other involved parties regarding the Project.

Thank you for reviewing the Draft EA. Your letter will be included in the Final EA.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC

O:\Job27\2790.01\EA\Draft EA\Responses\DOT

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 12, 2012

PBR Hawaii & Associates, Inc.
Attn: Dean Minakami, AICP
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484

via email: dminakami@pbrhawaii.com

County of Hawaii
Planning Department
Attention: Mr. Daryn Arai
101 Pauahi Street, Suite 3
Hilo, Hawaii 96720

via email: darai@co.hawaii.hi.us

Gentlemen:

SUBJECT: Draft Environmental Assessment for the Queen Ka'ahumanu Highway Frontage Road – Hulikoa Drive to Kohanaiki Way for Kohanaiki Shores, LLC & Kohanaiki Business Park Association - North Kona, Island of Hawaii; TMK: (3) 7-3-009:016 (por.) and 018 (por.)

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

At this time, enclosed are comments from (a) Engineering Division; (b) Division of Forestry & Wildlife; (c) Office of Conservation & Coastal Lands; and (d) Land Division – Hawaii District on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at 587-0417. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Russell Y. Tsuji".

Russell Y. Tsuji
Land Administrator

Enclosures



11 DEC 27 AM 10:52 ENGINEERING

WILLIAM J. AHLA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
LAND DIVISION



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

2012 JAN 10 A 8:19

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

December 22, 2011

MEMORANDUM

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

FROM: *Russell Y. Tsuji*, Land Administrator

SUBJECT: Draft Environmental Assessment for the Queen Ka'ahumanu Highway Frontage Road – Hulikoa Drove to Kohanaiki Way

LOCATION: North Kona, Island of Hawaii; TMK: (3) 7-3-009:016 (por.) and 018 (por.)

APPLICANT: PBR Hawaii & Associates, Inc., on behalf of Kohanaiki Shores, LLC & Kohanaiki Business Park Association

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by January 5, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

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

Signed: *[Signature]*
Date: 1/5/12

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji

REF: DEA for the Queen Kaahumanu Highway Frontage Road, Hulikoa Drive to Kohanaiki Way,
North Kona
Hawaii.012

COMMENTS

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

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

- () Mr. Mario Siu Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.
- () Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.
- () Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
- () Ms. Wynne Ushigome at (808) 241-4890 of the County of Kauai, Department of Public Works.

- () The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.
- () The applicant should provide to the Engineering Division upon its availability the water demands and calculations for the selected site, so it can be included in the State Water Projects Plan Update.

() Additional Comments: _____

() Other: _____

Should you have any questions, please call Mr. Dennis Imada of the Planning Branch at 587-0257.

Signed:  _____
CARY S. CHANG, CHIEF ENGINEER

Date: 1/5/12 _____



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 22, 2011

MEMORANDUM

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

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Draft Environmental Assessment for the Queen Ka'ahumanu Highway Frontage Road – Hulikoia Drove to Kohanaiki Way

LOCATION: North Kona, Island of Hawaii; TMK: (3) 7-3-009:016 (por.) and 018 (por.)

APPLICANT: PBR Hawaii & Associates, Inc., on behalf of Kohanaiki Shores, LLC & Kohanaiki Business Park Association

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by January 5, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

- () We have no objections.
(x) We have no comments.
() Comments are attached.

Signed: Randy Kuy
Date: 12/28/11

cc: Central Files

Circ: HA 12-156

TM

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS

2011 DEC 27 A 11: 25

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 22, 2011

MEMORANDUM

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

RECEIVED
LAND DIVISION
2012 JAN -4 A 9: 39
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

FROM: *R* Russell Y. Tsuji, Land Administrator

SUBJECT: Draft Environmental Assessment for the Queen Ka'ahumanu Highway Frontage Road – Hulikoa Drive to Kohanaiki Way

LOCATION: North Kona, Island of Hawaii; TMK: (3) 7-3-009:016 (por.) and 018 (por.)

APPLICANT: PBR Hawaii & Associates, Inc., on behalf of Kohanaiki Shores, LLC & Kohanaiki Business Park Association

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by January 5, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

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

Signed: *R. Tsuji*

Date: 1.3.2012

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF:OCCL:TM

Correspondence: HA 12-156

MEMORANDUM

JAN - 4 2012

TO: Russell Y. Tsuji, Administrator
Land Division

A handwritten signature in black ink, appearing to read "Samuel J. Lemmo".

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

SUBJECT: Draft Environmental Assessment (EA) for the Queen Kaahumanu Highway
Frontage Road-Hulikoa Drive to Kohanaiki Way, North Kona, Hawaii, TMK:
(3) 7-3-009:018

The Office of Conservation and Coastal Lands has reviewed the subject document and as noted the proposed area appears to lie within the State Land Use Conservation District, General subzone and will require the filing of a Conservation District Use Application (CDUA) and all required attachments for a Board permit.

The proposed PUBLIC PURPOSE and SUBDIVISION land use are identified land uses within the General subzone pursuant to the Hawaii Administrative Rules (HAR) §13-5-22, P-6 Transportation systems, transmission facilities or public utilities, water systems, energy generation facilities...undertaken by non-governmental entities which benefit the public and are consistent with the purpose of the conservation district; and P-10 Subdivision of property into two or more legal lots of record that serves a public purpose and is consistent with the objectives of the subzone.

In the draft EA, under Section 5.1.3 (1), please note that §13-5-1, HAR defines the purpose of the Conservation District.

The rules and regulations of the Conservation District known as Chapter 13-5, HAR has been recently amended (December 5, 2011). Chapter 13-5, HAR and our new CDUA may be found at our website at hawaii.gov/dlnr/occl. Should you have any questions regarding this memorandum, contact Tiger Mills of our Office at (808) 587-0382.



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

2011 DEC 29 1P 1:01

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

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LAND DIVISION
HILO, HAWAII

December 22, 2011

MEMORANDUM

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

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LAND DIVISION
2011 JAN -3 A 10:32
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

FROM: *Russell Y. Tsuji*, Land Administrator

SUBJECT: Draft Environmental Assessment for the Queen Ka'ahumanu Highway Frontage Road – Hulikoa Drive to Kohanaiki Way

LOCATION: North Kona, Island of Hawaii; TMK: (3) 7-3-009:016 (por.) and 018 (por.)

APPLICANT: PBR Hawaii & Associates, Inc., on behalf of Kohanaiki Shores, LLC & Kohanaiki Business Park Association

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by January 5, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

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

Signed: *[Signature]*
Date: 12.30.11

cc: Central Files



PRINCIPALS

THOMAS S. WITTEN, ASLA
President

R. STAN DUNCAN, ASLA
Executive Vice-President

RUSSELL Y. J. CHUNG, FASLA, LEED® AP
Executive Vice-President

VINCENT SHIGEKUNI
Vice-President

GRANT T. MURAKAMI, AICP, LEED® AP
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SCOTT ALIKA ABRIGO, LEED® AP
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SCOTT MURAKAMI, ASLA, LEED® AP
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DACHENG DONG, LEED® AP
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Kapolei, Hawai'i 96707-2005
Tel: (808) 521-5631
Fax: (808) 535-3163

February 27, 2012

Mr. Russell Y. Tsuji, Land Administrator
State of Hawaii
Department of Land and Natural Resources
P.O. BOX 621
Honolulu, Hawaii 96809

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD
HULIKOA DRIVE TO KOHANAIKI WAY DRAFT
ENVIRONMENTAL ASSESSMENT**

Dear Mr. Tsuji:

Thank you for your letter dated January 12, 2012 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way Draft Environmental Assessment (EA). As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we are responding to the comments received from each Department of Land and Natural Resources division.

Engineering Division

Thank you for confirming that according to the Flood Insurance Rate Map (FIRM) the project site is located in Zone X. We note that the Flood Insurance Program does not have any regulations for developments in Zone X.

Division of Forestry and Wildlife

We acknowledge that the Division of Forestry and Wildlife has no comments.

Office of Conservation & Coastal Lands

Thank you for confirming that the project is located within the State Conservation District, General Subzone.

In conformance with the revised Conservation District rules, in the Final EA section 5.1.3 will be revised to note that public purpose uses and subdivision of land in the Conservation District are identified uses under Section 13-5-22, P-6 (Public Purpose Uses) and Section 13-5-22, P-10 (subdivision).

Thank you for pointing out that Section 13-5-1, HAR defines the purpose of the Conservation District. In the Draft EIS it was mistakenly noted as Section 13-5-30, HAR. The Final EA will reflect this correction.

Mr. Russell Tsuji
SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD HULIKOA DRIVE TO
KOHANAIKI WAY DRAFT ENVIRONMENTAL ASSESSMENT
February 27, 2012
Page 2 of 2

Thank you also for pointing out that the Conservation District rules (Chapter 13-5, HAR) have been amended, effective December 5, 2011. The Final EIS will reference the amended rules, as appropriate. When the Conservation District Use Application for the project is submitted the new form will be used.

Land Division – Hawaii District

We acknowledge that the Land Division – Hawaii District has no comments.

Commission on Water Resource Management

We note that your request for comments on the Draft EA was routed to the Commission on Water Resource Management, but no comments were received.

Historic Preservation

We note that your request for comments on the Draft EA was routed to the Historic Preservation Division, but no comments were received.

Thank you for reviewing the Draft EA. Your letter will be included in the Final EA.

Sincerely,

PBR HAWAII



Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

12-027A CAB

January 10, 2012

Mr. Tom Schnell
PBR Hawaii & Associates, Inc.
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Schnell:

SUBJECT: Queen Kaahumanu Highway Frontage Road Draft Environmental Assessment
Hulikoa Drive to Kohanaiki Way
North Kona, Hawaii

All projects should address potential dust, emissions, and odor nuisance concerns. The activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust. In addition, for cases involving mixed land use, we strongly recommend that buffer zones be established, wherever possible, in order to alleviate potential dust nuisance problems.

We encourage the contractor to implement a dust control plan, which does not require approval by the Department of Health, to comply with the fugitive dust regulations. The plan may include measures identified in your report.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Nolan S. Hirai".

NOLAN S. HIRAI
Acting Manager, Clean Air Branch

BC:rg

c: Bobby Jean Leithead-Todd, County of Hawaii Planning Department



PBR HAWAII
& ASSOCIATES, INC.

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February 27, 2012

Mr. Nolan S. Hirai, Acting Manager
Clean Air Branch
State of Hawaii
Department of Health
P.O. BOX 3378
Honolulu, Hawaii 96801-3378

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD
HULIKOA DRIVE TO KOHANAIKI WAY DRAFT
ENVIRONMENTAL ASSESSMENT**

Dear Mr. Wong:

Thank you for your letter dated January 10, 2012 (12-027A CAB) regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way Draft Environmental Assessment (EA). As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we are responding to your comments.

As noted in Section 4.4 (Air Quality) of the Draft EA: 1) construction will include earthmoving activity, excavating, trenching, and filling; 2) exhaust emissions from stationary and mobile construction equipment may affect air quality during construction; 3) all construction activities will comply with the provisions of Chapter 11-60.1-33, HAR on fugitive dust; and 4) a dust control plan will be implemented during all construction phases. Section 4.4 (Air Quality) also lists several mitigation measures that may be implemented, as appropriate, to control dust during construction.

Thank you for reviewing the Draft EA. Your letter will be included in the Final EA.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC

O:\Job27\2790.01\EA\Draft EA\Responses\DOH clean air



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

In reply, please refer to:
EMD/CWB

01004PDCL.12

January 4, 2012

Mr. Tom Schnell
PBR HAWAII
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Schnell:

**SUBJECT: Comments on Draft Environmental Assessment (DEA) for the
Queen Kaahumanu Highway Frontage Road
Hulikoa Drive to Kohanaiki Way
Island of Hawaii, Hawaii**

The Department of Health, Clean Water Branch (CWB), has reviewed the subject document and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at:
<http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf>.

1. Any project and its potential impacts to State waters must meet the following criteria:
 - a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.
 - b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.
 - c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. You may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for an NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. This includes areas used for a construction base yard and the storage of any construction related equipment, material, and waste products. An NPDES permit is required before the start of the construction activities.

The NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at: <http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html>.

3. For other types of wastewater not listed in Item No. 2 above or wastewater discharging into Class 1 or Class AA waters, an NPDES individual permit will need to be obtained. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at <http://hawaii.gov/health/environmental/water/cleanwater/forms/environmental/water/cleanwater/forms/indiv-index.html>.
4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 Water Quality Certification are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of \$25,000 per day per violation.

If you have any questions, please visit our website at: <http://www.hawaii.gov/health/environmental/water/cleanwater/index.html>, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,



ALEC WONG, P.E., CHIEF
Clean Water Branch

DCL:ml

c: DOH-EPO #11-267 [via email only]
Ms. Bobby Jean Leithead-Todd, County of Hawaii Planning Department



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February 27, 2012

Mr. Alec Wong, P.E., Chief
Clean Water Branch
State of Hawaii
Department of Health
P.O. BOX 3378
Honolulu, Hawaii 96801-3378

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD
HULIKOA DRIVE TO KOHANAIKI WAY DRAFT
ENVIRONMENTAL ASSESSMENT**

Dear Mr. Wong:

Thank you for your letter dated January 4, 2012 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way Draft Environmental Assessment (EA). As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we are responding to your comments.

1. As stated in Section 3.4.1 (Ground and Surface Water Resources) of the Draft EA: "Direct discharges of stormwater runoff into marine waters during construction or following completion of the Project are not expected to occur, due to the Project's distance to the coast and high permeability of lavas in the vicinity of the Site." However the in the Final EA it will be noted that, as applicable, the Project be in conformance with all State Department of Health Clean Water Branch Hawaii Administrative Rules (HAR) including HAR Section 11-54-1.1; HAR Section 11-54-3; and HAR Sections 11-54-4 through 11-54-8.
2. As noted in Section 3.2 (Geology and Topography) of the Draft EA a National Pollutant Discharge Elimination System (NPDES) permit will be required for the Project. In the final EA it will also be noted in Section 3.4.1 (Ground and Surface Water Resources) that: 1) prior to construction, an NPDES permit will be procured specifying measures to prevent stormwater discharges from affecting coastal water quality; and 2) the NPDES permit will also include requirements to maintain water quality after construction.
3. As stated in Section 3.4.1 (Ground and Surface Water Resources) of the Draft EA: "Direct discharges of stormwater runoff into marine waters during construction or following completion of the Project are not expected to occur, due to the Project's distance to the coast and high permeability of lavas in the vicinity of the Site." However, if necessary an NPDES individual permit will be obtained.

Mr. Alec Wong, P.E.

SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD HULIKOA DRIVE TO
KOHANAIKI WAY DRAFT ENVIRONMENTAL ASSESSMENT

February 27, 2012

Page 2 of 2

4. The Project will comply with the State's Water Quality Standards contained in HAR Chapter 11-54 and permitting requirements specified in HAR Chapter 11-55.

Thank you for reviewing the Draft EA. Your letter will be included in the Final EA.

Sincerely,

PBR HAWAII



Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC



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

HRD11/5919B

December 20, 2011

Bobby Jean Leithead-Todd, Director
County of Hawai'i-Planning Department
Aupuni Center
101 Pauahhi Street, Suite 3
Hilo, Hawai'i 96720

Re: Draft Environmental Assessment
Queen Ka'ahumanu Highway Frontage Road Project
North Kona, island of Hawai'i

Aloha e Director Leithead-Todd,

The Office of Hawaiian Affairs (OHA) is in receipt of a December 8, 2011 request for comments on a draft environmental assessment (DEA) prepared to support the Queen Ka'ahumanu Highway Frontage Road (project) proposed by Kohanaiki Shores, LLC and the Kohanaiki Business Park Association in North Kona on the Island of Hawai'i.

Project activities will consist of: 1. Extending Hulikoa Drive west to cross the existing Queen Ka'ahumanu Highway (highway); 2. Creating a new intersection 511 feet west of the highway right-of way to connect the Hulikoa Drive extension with the Frontage Road; and 3. Constructing a Frontage Road (road) from an intersection with the Hulikoa Drive extension 1065 feet north to an intersection with the existing Kohanaiki Way. The Hulikoa Drive extension and road will be constructed as two-lane collector roads within a 60-foot right-of-way. A proposed typical section consists of a ten-foot landscaped swale, 5-foot shoulder, 5-foot bike lane and 10-foot travel lane.¹ A Special Management Area Use Permit and a Conservation District Use Permit will be required to facilitate this project which will be constructed on private lands owned by Kohanaiki Shores, LLC and Rutter/KW Kohanaiki, LLC (landowners) which are currently undeveloped and vacant.

This project is part of an agreement executed between the landowners, State of Hawai'i-Department of Transportation (SDOT) and the Kohanaiki Business Park Association. It is our understanding that pursuant to this agreement, Kohanaiki Shores, LLC agreed to design and construct this project, and dedicate it to the County of Hawai'i upon completion and the SDOT agreed to design and construct a four way signalized intersection at the Hulikoa Drive/highway intersection as an element of the Queen Ka'ahumanu Highway Widening Project- Phase II.

¹ DEA, Figure 10.

No project activities will occur within the SDOT highway right-of-way (ROW). Upon completion of the project, the current connection from Kohanaiki Way onto the highway will be closed.

The project is a segment of a larger element of the Kona Community Development Plan² which envisioned a "frontage road" (road) west of the highway extending from Honokohau Harbor north to Kona International Airport. Such a road is intended to serve as a "Secondary Transit Route"³ and consolidate access points from developments west of the highway, limiting traffic flow disruptions while ensuring safe turn movements onto and off of the highway. OHA recognizes that vehicular access to and from the Kohanaiki Public Beach Park and shoreline areas will be improved upon completion of the project.

Upon dedication of the project to the County of Hawai'i, Kohanaiki Shores, LLC has indicated a willingness to assume the responsibility for maintaining project landscaping. OHA appreciates this generous offer and it is our understanding native plant species common or adapted to the climate of the project area will be utilized. OHA notes that a botanical survey of the project area identified maiapilo, which is a traditional Hawaiian medicinal plant and considered a "species of concern" by the U.S. Fish and Wildlife Service.⁴ A single naio tree was also identified in the project area. If project activities will result in the destruction of this naio tree, OHA advocates that it's wood be appropriately utilized, if possible.

An archaeological inventory survey (AIS) of the project area⁵ was conducted and two historic properties, comprised of three component features (a trail and two cairns) were identified. OHA seeks confirmation that this AIS has been submitted to the Department of Land and Natural Resources-State Historic Preservation Division for review and approval. While the AIS recommends "no further work" for these identified historic properties, they will not be impacted by project activities.⁶ We also seek clarification whether archaeological monitoring will be employed during initial ground disturbing activities.

A cultural impact assessment (CIA) was prepared to support the project.⁷ OHA appreciates that the scope of the CIA was prepared with the analytical framework established by the Hawai'i Supreme Court to complete a proper analysis of the impacts of a given action on Native Hawaiian resources, beliefs and traditional and customary practices in mind.⁸ We recognize that certain members of the entity known as the Kohanaiki 'Ohana Committee (committee) participated in the consultation which developed the CIA. OHA is aware that the committee in comprised of certain lineal descendants to the project area. While the membership of the committee is unknown to OHA at this time and we recognize that there is a possibility that it might not be inclusive of, or represent the views of all lineal descendants to the project area, OHA does see the effort to consult with the members of the committee who are identified in the CIA as appropriate and we applaud this effort.

² The Kona Community Development Plan (CDP) was adopted as Ordinance 08 131 by the Council of the County of Hawai'i on September 25, 2008, making it the first community development plan enacted on Hawai'i Island.

³ Kona CDP, Page 4-8.

⁴ DEA, Appendix A.

⁵ DEA, Appendix C.

⁶ DEA, page 32.

⁷ DEA, Appendix D.

⁸ See *Ka Pa'akai O Ka 'Aina v. Land Use Commission*, 94 Haw. 1,7 P.3d 1068 (2000).

The DEA places an emphasis on no project activities occurring within the SDOT highway right-of-way (ROW) and that the design and construction of the four-way signalized intersection at the Hulikoa Drive extension intersection with the highway (which is within the SDOT highway ROW) is "covered" by a separate environmental assessment prepared for the Queen Ka'ahumanu Highway Widening Project.⁹

OHA notes that the SDOT's Queen Ka'ahumanu Highway Widening Project¹⁰ (highway widening project) is supported by federal funding through the U.S. Department of Transportation-Federal Highways Administration (FHWA). The federal nexus to this separate project has triggered the requirements of both the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA). While OHA recognizes from a procedural standpoint, this project and the highway widening project are being viewed separately, we see these projects as being directly related to each other in reality as the success of this project is entirely dependent on Phase 2 of the highway widening project moving forward and the SDOT designing and constructing the Hulikoa Drive extension/highway intersection.

The NEPA environmental assessment which was prepared to support the highway widening project lists specific intersections which will be subject to construction and/or improvements.¹¹ The Hulikoa Drive extension/highway intersection is not one of those listed. This is an issue which should be discussed with the FHWA and SDOT.

Pursuant to the provisions of the NHPA, a memorandum of agreement (MOA) was executed in 1999 to mitigate the adverse effects of the highway widening project on historic properties of religious and/or cultural significance to the Native Hawaiian people. NHPA consultation to develop an Amendment to the MOA (Amendment) is ongoing at this time. Development of this amendment is necessary due to the discovery of additional historic properties within the SDOT ROW circa 2010. OHA is aware that the mitigation measures proposed in recent drafts of the Amendment also address visual (street lighting) and auditory (traffic noise) impacts to the Honokohau Settlement National Historic Landmark and Kaloko-Honokohau National Historical Park. Potential indirect impacts of the highway widening project on groundwater and near shore marine water quality and resources are being addressed through the installation of drainage controls equipped with oil/water separators. OHA suggests that the visual, auditory and groundwater mitigation measures being considered by the FHWA and SDOT for the highway widening project be considered in the instant DEA.

As we specifically stated in our pre-DEA comments to you, the National Park Service (NPS) may have interest in this project and the DEA. The consulted agencies listed in development of the DEA¹² do not include the NPS. We respectfully suggest that this issue be considered and possibly remedied prior to a final environmental assessment for this project being accepted and/or approved by the County of Hawai'i-Planning Department.

⁹ See RM Towill Corporation 1996. *Final Environmental Assessment for Queen Kaahumanu Highway Widening*. Honolulu. Prepared for the U.S. Department of Transportation-Federal Highways Administration and the State of Hawai'i-Department of Transportation. (Queen Ka'ahumanu Highway Widening FEA).

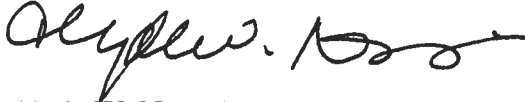
¹⁰ Phase 1 of this project extending from Henry Street north to the vicinity of Kealakehe Parkway has been completed. Initiation of construction activities for Phase 2 of this project extending approximately 5.2 miles from 1150 feet south of the Kealakehe Parkway to 1700 feet north of Keāhole Airport Road are pending.

¹¹ Queen Ka'ahumanu Highway Widening FEA, Table 1.

¹² DEA, page 75.

Thank you for the opportunity to provide comments. Should you have any questions or concerns, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

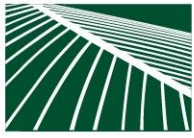
'O wau iho nō me ka 'oia'i'o,



Clyde W. Nāmu'o
Chief Executive Officer

CWN:kl

C: OHA, West Hawai'i Community Outreach Coordinator
Joe Root, Kohanaiki Shores, LLC
Tom Schnell, PBR Hawai'i & Associates, Inc.
Henry Kennedy, SDOT (via email)
John Nicholson, FHWA (via email)



February 27, 2012

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Mr. Kamana'opono Crabbe, Chief Executive Officer
State of Hawai'i
Office of Hawaiian Affairs
711 Kapi'olani Boulevard, Suite 500
Honolulu, Hawaii 96813

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD HULIKOA
DRIVE TO KOHANAIKI WAY DRAFT ENVIRONMENTAL
ASSESSMENT**

Dear Mr. Crabbe:

We received the Office of Hawaiian Affairs' (OHA) letter dated December 20, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way Draft Environmental Assessment (EA). As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we are responding to OHA's comments.

Project Need. We acknowledge OHA's concurrence that the Project will improve vehicular access to the Kohanaiki Public Beach Park and shoreline areas.

Botanical Resources. As noted in the Draft EA, roadway landscaping, if provided, will be designed with native species that occur naturally on the Site, such as *naio* and *maiapilo*. We confirm the willingness of the applicant to assume responsibility for the maintenance of any roadside landscaping provided, subject to the terms of an agreement to be entered into between Kohanaiki Shores, LLC and the County of Hawai'i. Project activities will not result in the destruction of the single *naio* tree identified on the site. Both the preferred and alternative roadway alignments avoid the tree, and the location of the tree is at a sufficient distance from the alignments that construction activities will not impact the tree. This will be noted in the Final EA.

Archaeological Inventory Survey (AIS). The Project archaeologist submitted the AIS to the State Historic Preservation Division (SHPD) for review and approval on February 1, 2012. We have not yet received SHPD's comments. Regarding archeological monitoring during initial ground construction, the archeologist notes that this is not usually standard in places like the Project area, which is away from shoreline, with no soil; however the applicant will comply with any recommendation from SHPD regarding archeological monitoring.

Cultural Impact Assessment (CIA). We acknowledge and appreciate OHA's concurrence that the CIA was adequate in scope and consultation.

Relationship to the Queen Ka'ahumanu Highway Widening NEPA EA. The scope of environmental surveys in the 1996 NEPA EA, such as the archaeological and flora/fauna surveys, included the full Queen Ka'ahumanu Highway right-of-way. Since the Hulikoa Street intersection will be located within this right-of-way, the previous surveys cover this intersection. Updated archaeological inventory surveys and traffic impact analyses have been done since the 1996 NEPA EA that cover the full right-of-way, including the Hulikoa Street intersection area. Since the 1996 NEPA EA and updated studies adequately cover the Hulikoa Street intersection within the Queen Ka'ahumanu Highway right-of-way, the present EA focuses on the improvements outside the Queen Ka'ahumanu Highway right-of-way.

Mr. Kamana‘opono Crabbe

SUBJECT:QUEEN KA‘AHUMANU HIGHWAY FRONTAGE ROAD HULIKOA DRIVE TO
KOHANAIKI WAY DRAFT ENVIRONMENTAL ASSESSMENT

February 27, 2012

Page 2 of 3

We note that the State Department of Transportation has been consulted regarding the present EA and is a party to the memorandum of agreement discussed in the EA whereby Kohanaiki Shores committed to construct the Project and the DOT agreed to design and construct the Queen Ka‘ahumanu Highway/Hulikoa Drive intersection improvements within the Queen Ka‘ahumanu right-of-way as part of the Queen Ka‘ahumanu Highway Phase II widening project.

Mitigation Measures Under Consideration in an Amendment to the 1999 NHPA MOA. We have reviewed the document titled: “Final Draft – Amendment –Draft Oct 6- 2011 to the Memorandum of Agreement among the Advisory Council on Historic Preservation, Federal Highway Administration, and the Hawaii State Historic Preservation Officer” (Amendment).

It is noted in OHA’s letter that recent drafts of this proposed Amendment address visual (street lighting) and auditory (traffic noise) impacts to the Honokōhau Settlement National Historic Landmark (Landmark) and Kaloko-Honokōhau National Historic Park (Park). OHA’s letter also notes that in the proposed Amendment potential impacts of the Queen Ka‘ahumanu Highway widening project on water quality are being addressed through the installation of drainage controls equipped with oil/water separators. OHA recommends that the visual, auditory, and groundwater mitigation measures being considered in the proposed Amendment be considered in the EA.

We note that the visual, auditory, and groundwater mitigation measures being considered in the proposed Amendment are specifically limited to the area of the Queen Ka‘ahumanu Highway widening project in the immediate vicinity of the Landmark and the Park. Specifically:

- Street lighting specifications in the proposed Amendment are limited to intersections and the immediate approaches to intersections fronting the Park;
- Analysis of noise impacts is limited to impacts on the Landmark and the Park, with noise impacts to be assessed from locations within the Park; and
- Installation of drainage controls (“drywells”) equipped with oil/water separators is limited to the area 1,000 feet north of Hina Lani Street to immediately south of the Kealakehe intersection.

As inferred in one of the “Whereas” clauses of the proposed Amendment, the intent of the proposed visual, auditory, and groundwater mitigation measures in the vicinity of the Landmark and the Park appears to be to protect the integrity, historical significance, character, serenity, and quiet of the Landmark and the Park. Significantly, the Amendment does not specify that these mitigation measures shall be implemented along the entire length of the Queen Ka‘ahumanu Highway widening project. Thus it seems reasonable to conclude that the areas specified for the mitigation measures in the proposed Amendment are adequate to protect the Landmark and the Park.

The area of the Project discussed in the Draft EA is north of the Landmark and the Park and north of the point 1,000 feet north of Hina Lani Street specified in the proposed Amendment as the northern most point where oil/water separators are to be installed. The integrity, character, serenity, and quiet of this area, while worthy of adequate protection, may not warrant the same level of mitigation as the area in the immediate vicinity of the Landmark and the Park. We note the area immediately makai of the proposed frontage road is already developed as a golf course and the area immediately mauka is already developed as an industrial park. Hence the mitigation measures already proposed in the Draft EA regarding visual, auditory, and groundwater impacts are appropriate for this area.

Consultation with the National Park Service (NPS). Although NPS was not sent a pre-consultation letter before the Draft EA was prepared, we did send them a copy of Draft EA during the public comment period and we received comments from them. We have responded to their comments, which included

Mr. Kamana'opono Crabbe
SUBJECT:QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD HULIKOA DRIVE TO
KOHANAIKI WAY DRAFT ENVIRONMENTAL ASSESSMENT
February 27, 2012
Page 3 of 3

revising the EA in response their concern related potential impacts to ground water quality. The Final EA will include both NPS' comment letter and our response.

Thank you for reviewing the Draft EA. Your letter will be included, and appropriate revisions incorporated, in the Final EA.

Sincerely,

PBR HAWAII



Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC

Tom Schnell

From: Tim_Langer@fws.gov
Sent: Tuesday, January 03, 2012 10:46 AM
To: Tom Schnell
Cc: bjltodd@co.hawaii.hi.us; rley@co.hawaii.hi.us
Subject: Queen Kaahumanu Highway Frontage Road Improvement Project from Hulikoa Drive to Kohanaiki Way, North Kona, Hawaii

Dear Mr. Schnell,

The U.S. Fish and Wildlife Service received the Draft Environmental Assessment (DEA) for this project on December 8, 2011. Our records confirmed your biological surveys and species list for the proposed action area. If there is no nighttime construction, as anticipated, we agree with the biological determination of no effect for this proposed action on species listed pursuant to the Endangered Species Act of 1973. If, however, the project description changes and there is construction at night requiring lighting, please contact me directly to discuss whether further regulatory action is necessary because seabirds (specifically, the Hawaiian petrel and Newell's shearwater) may be affected. We have additional Best Management Practices than those listed in the DEA to avoid and minimize possible impacts to seabirds.

Aloha and mahalo, Tim.

~~~~~  
Tim Langer, Ph.D.  
Branch Chief, Consultation and HCP Program  
United States Fish and Wildlife Service  
Pacific Islands Field Office  
300 Ala Moana Boulevard, Room 3-122, Box 50088  
Honolulu, Hawaii 96850

Direct line (808) 792-9462  
~~~~~



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& ASSOCIATES, INC.

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February 27, 2012

Mr. Tim Langer, Ph.D., Branch Chief
United States Fish and Wildlife Service
Pacific Islands Field Office
Consultation and HCP Program
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD HULIKOA
DRIVE TO KOHANAIKI WAY DRAFT ENVIRONMENTAL
ASSESSMENT**

Dear Mr. Langer:

Thank you for your e-mail sent January 3, 2012 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way Draft Environmental Assessment (EA). As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we are responding to your comments.

Thank you for confirming information in the biological surveys and species lists with records from United States Fish and Wildlife Service (USFWS). We acknowledge that you agree with the determination of no effect as long as there is no nighttime construction, as anticipated. If nighttime construction is anticipated the applicant will contact you directly to discuss whether further regulatory action is necessary because seabirds (specifically the Hawaiian petrel and Newell's shearwater) may be affected. The Final EA will include the above information.

Thank you for reviewing the Draft EA. Your letter will be included in the Final EA.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC

O:\Job27\2790.01\EA\Draft EA\Responses\USFWS



National Park Service
U.S. Department of the Interior

Kaloko-Honokohau
National Historical Park

73-4786 Kanalani Street # 14
Kailua-Kona, Hawai'i 96740

808 329-6881 Phone
808 329-2597 Fax

Kaloko-Honokohau

IN REPLY REFER TO:
L7621 (2012-1)

January 5, 2012

Mr. Tom Schnell
PBR Hawaii
1001 Bishop Street, ASB Tower, Suite 650
Honolulu, Hawaii 96813

Subject: Queen Kaahumanu Frontage Road Hulikoa Drive to Kohanaiki Draft
Environmental Assessment

Dear Mr. Schnell:

Thank you for providing the National Park Service (NPS) with the opportunity to review and comment on the Draft Environmental Assessment (EA) for the Queen Kaahumanu Frontage Road, Hulikoa Drive to Kohanaiki, North Kona, Hawaii. Kaloko-Honokohau National Historical Park was authorized in 1978 by Congress to preserve, interpret, and perpetuate traditional native Hawaiian activities and culture (Public Law 95-625). Water quality and quantity are vital to the integrity of this mission. The National Park contains two large (11- and 15-acre) ancient Hawaiian fishponds with large associated wetlands, more than 155 known anchialine pools, and 596 acres of marine waters. The pools and fishponds are significant cultural resources that define the Park and also provide habitat for nine species that are either federally listed or candidates for listing. The National Park water resources are fed by, and in the case of the anchialine pools and Aimakapa Fishpond, are solely dependent upon, ground water inputs to maintain the integrity of these ecosystems. The anchialine pools support three known candidate endangered species. Aimakapa Fishpond and wetland is a significant foraging and nesting habitat for two endangered waterbird species, the Hawaiian stilt and the Hawaiian coot, and is an important habitat for migratory waterfowl.

The National Park's aquatic resources are at risk from non-point source pollution associated with roadways (including stormwater runoff, spills, and accidents), which can introduce petroleum products, metals, pesticides, nutrients, and other pollutants very quickly to ground water through the highly permeable lava substrate. Rainfall in the vicinity of the National Park typically occurs in discrete, intense events with significant quantity rainfall in short periods of time. Pollutants accumulated over long dry periods are carried to ground water. The Draft EA did not consider impacts to groundwater quality from drywells. Clean groundwater is critically important for groundwater-fed resources and for the Hawaiian cultural practices associated with them. Nor did the Draft EA propose mitigation measures to protect groundwater quality from contaminated water flowing from dry wells. In order for the project to be consistent with the Finding of No

EXPERIENCE YOUR AMERICA

The National Park Service cares for special places saved by the American people so that all may experience our heritage.

Significant Impact, appropriate mitigation measures must be taken that will protect cultural and natural aquatic resources from roadway-associated nonpoint source pollution. Structural best management practices that are engineered to detain and filter pollutant-carrying first-flush stormwater or spills must be included in the design, examples include Stormceptor, Bio Clean, and Contech.

Figure 12 shows a frontage road passing through Kaloko-Honokohau National Historical Park. The National Park Service cannot legally allow a frontage road to be built on National Park Service lands. The final EA must include the information that a frontage road will not pass through the National Park or at the least, Figure 12 should be changed to show no frontage road in the National Park.

Page 32 of the Draft EA discusses the significance evaluation of archeological and historical resources (Sec 13-284-6 HAR). In our opinion, in addition to criterion "D", these sites (28999 and 29000) are significant under criterion "E" as well. These sites "have an important value to native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the Property or due to associations with traditional beliefs, events or oral accounts – these associations being important to the group's history or cultural identity." For their protection, both sites should be recommended for preservation as significant sites as identified in the Cultural Impact Assessment.

If you have any questions regarding this letter, please contact Dr. Jeff Zimpfer, at 808-329-6881 ext. 1500.

Sincerely,


Kathy Billings
Superintendent

cc:

Bobby Jean Leithead-Todd, Hawaii County Planning Department



February 27, 2012

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Ms. Kathy Billings, Superintendent
National Park Service
U.S. Department of the Interior
Kaloko-Honokohau National Historical Park
73-4786 Kanalani Street #14
Kailua-Kona, Hawaii 96740

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD HULIKOA DRIVE
TO KOHANAIKI WAY DRAFT ENVIRONMENTAL ASSESSMENT**

Dear Ms. Billings:

Thank you for your letter dated December 27, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way Draft Environmental Assessment (EA). As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we are responding to your comments

Groundwater Quality. We understand that you are concerned about potential impacts to the National Park's aquatic resources as a result of impacts to ground water quality from drywells. In Section 4.7 (Drainage System) of the Draft EA it is stated that: "drainage from the roadways will be diverted to swales along both sides of the roads, with excess flows directed to drywells." It is also stated that an Underground Injection Control permit will be required to construct the drywells and that once completed, the drywells will be tested and an Underground Injection Control permit will be obtained from the DOH to operate the drywells.

The State Department of Health (DOH) Administrative Rules (Chapter 23, Hawaii Administrative Rules (HAR)) provides for the regulation of underground injection wells, such as drywells. The purpose of these rules is:

...to protect the quality of the state's underground sources of drinking water (USDW) from pollution by subsurface disposal of fluids. Toward this end, conditions are specified to govern the location, construction and operation of injection wells so that injected fluids do not migrate and pollute USDW (§11-23-01, HAR).

Among other regulations, the rules provide for:

- Siting and pre-construction requirements (§11-23-9, HAR);
- Operating conditions (§11-23-11, HAR);
- Application procedures for UIC permits (§ 11-23-12);
- Monitoring and reporting requirements (§11-23-18, HAR); and
- Penalties for violations (§11-23-22, HAR).

Section 11-23-11(C), HAR specifically provides that "All injection wells shall be operated in such a manner that they do not violate any of the department's [i.e. DOH] administrative rules under title 11, Hawaii Administrative Rules, regulating various aspects of water quality and pollution [including Chapter 11-55, HAR "Water Pollution Control"], and chapters 342-B, 342-D, 342-F, 342-H, 342-J, 342-L, and 342-N, HRS [Hawaii Revised Statutes]".

Because of the comprehensive nature of the DOH Administrative Rules regulating underground injection wells, such as drywells, compliance with these rules provides the appropriate mitigation measures to protect groundwater quality from water flowing from the drywells. Section 4.7 (Drainage System) in the Final EA will be revised to reflect the information above.

Ms. Kathy Billings

SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD HULIKOA DRIVE TO
KOHANAIKI WAY DRAFT ENVIRONMENTAL ASSESSMENT

February 27, 2012

Page 2 of 2

Figure 12. Regarding your comment pertaining to Figure 12 of the Draft EA, which shows a frontage road passing through Kaloko-Honokōhau National Historic Park, please note that the source for this figure is the Kona Community Development Plan (CDP). Specifically the road network depicted in Figure 12 is from the Kona CDP Figure 4-2a, titled: "Official Transportation Network Map – Proposed Roads and Transit." As such, the County of Hawaii, and not the applicant, is proposing the frontage road passing through Kaloko-Honokōhau National Historic Park. Figure 12 in the EA accurately shows what is presented in the Kona CDP. However we note that frontage road alignment shown is conceptual in nature, with the intent to connect the Airport to Kailua-Kona.

Archaeological Significance Determination. The archaeologist who conducted the archaeological inventory survey (AIS) recommended that the two identified archaeological sites are significant solely under significance criterion "D." We acknowledge that, in your opinion, the sites are significant under criterion "E" as well. We note that since the proposed roadway alignment avoids both identified archaeological sites, a change in significance determination would not change any impact recommendations. In other words, the archaeological sites will be left as they are, and will not be disturbed regardless if they are significant under criterion "E" or criterion "D".

However, according to the archaeologist who conducted the AIS, cultural significance is typically assigned to sites that clearly have the potential to promote or enhance Hawaiian ethnic identity and values. Such sites include heiau, shrines, fishponds, main trails (mauka-makai and coastal), petroglyphs, burials, and sites that are either unique types within a given region (i.e., refuge caves, holua slides, etc.) or good examples of more mundane site types including habitation architecture, lava tube shelters, and a variety of resource procurement sites. While one could argue that all Hawaiian sites are culturally significant, such a broad application of criterion "E" essentially invalidates its value in determining site treatment. For example, if cultural significance (i.e. criterion "E") is assigned to both an isolated cairn and a heiau, the criterion loses its value in helping to determine appropriate treatment. When a site is assigned cultural significance there is an implicit assumption that such significance would be widely agreed to by Hawaiians, archaeologists, and the general public. In the opinion of the archaeologist who conducted the AIS, the application of criterion "E" to the two identified archaeological sites would not be widely accepted.

The AIS makes recommendations regarding significance assessments, but these are not final until the State Historic Preservation Division concurs, a process that has yet to be concluded. To maintain the integrity of the archaeological inventory, there should be a consistent application of significance criteria.

Thank you for reviewing the Draft EA. Your letter will be included in the Final EA.

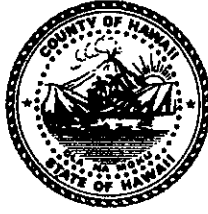
Sincerely,

PBR HAWAII



Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC



William P. Kenoi
Mayor

William T. Takaba
Managing Director

Dora Beck, P.E.
Acting Director

Hunter Bishop
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street • Hilo, Hawai'i 96720

(808) 961-8083 • Fax (808) 961-8086

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

December 14, 2011

Mr. Tom Schnell
PBR HAWAII & ASSOCIATES, INC.
1001 Bishop Street, ASB Tower, Suite 650
Honolulu, HI 96813

Bobby Jean Leithead Todd, Director
County of Hawai'i
Planning Department
101 Pauahi Street, Suite 3
Hilo, HI 96720

RE: Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohananaiki Way
TMK: 7-3-009:016 (portion) and 018 (portion)
North Kona, Island of Hawai'i

Dear Mr. Schnell and Ms. Leithead Todd,

See the enclosed comments from our Wastewater Division on the subject project.

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

Sincerely,

Dora Beck, P.E.
ACTING DIRECTOR

cc: WWD

enclosure




DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WASTEWATER DIVISION

COUNTY OF HAWAII – 108 RAILROAD AVENUE – HILO, HI 96720
HILO (808) 961-8338 FAX (808) 961-8644

MEMORANDUM

Date: December 14, 2011

To: DORA BECK, P.E., Acting Director

Via: LYLE HIROTA, P.E., Acting WWD Chief 

From: RIZ MANGAOANG, P.E., Acting Deputy WWD Chief

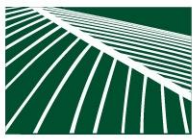
Subject: Draft Environmental Assessment for Queen Ka'ahumanu Frontage Road Hulikoa Drive to Kohanaiki Way

The County of Hawai'i Department of Environmental Management Wastewater Division has reviewed the Draft Environmental Assessment and provides the following comments:

- In addition to the existing wastewater treatment facilities headlined in *Section 4.7.3 Wastewater System - Existing Conditions*, the Office of Housing and Community Development (OHCD) has installed the Kaloko Wastewater Treatment Plant within the vicinity of the proposed development to the southwest on Hina Lani Street at TMK 7-3-009:055 to serve their housing complex.
- An 8-inch service lateral for a reclaimed waterline to TMK 7-3-009:018 is proposed in accordance with the "Queen Ka'ahumanu Highway Widening Phase 2" project.

Should you have any questions, please contact me at 808-961-8279 (rmangaoang@co.hawaii.hi.us) or Mr. Lyle Hirota at 808-961-8333 (lhirota@co.hawaii.hi.us).

cc: Lyle Hirota, P.E., Acting WWD Chief
Merton Ogata, West Hawai'i Superintendent
Toni Nakatani, EST III



PBR HAWAII
& ASSOCIATES, INC.

February 27, 2012

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Ms. Dora Beck, P.E., Acting Director
County of Hawai'i
Department of Environment Management
25 Aupuni Street
Hilo, Hawai'i 96720

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD HULIKOA
DRIVE TO KOHANAIKI WAY DRAFT ENVIRONMENTAL
ASSESSMENT**

Dear Ms. Beck:

Thank you for your letter dated December 14, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Huliko Drive to Kohanaiki Way Draft Environmental Assessment (EA). As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we are responding to comments received from your Wastewater Division.

Thank you for the information provided regarding: 1) the Kaloko Wastewater Treatment Plant to the southwest on Hina Lani Street which was installed by the Office of Housing and Community Development to serve their housing complex on TMK 7-3-09:55; and 2) that an eight-inch service lateral for a reclaimed waterline to the Site is proposed in accordance with the widening of Queen Ka'ahumanu Highway. This information will be included in the Final EA.

Thank you for reviewing the Draft EA. Your letter will be included in the Final EA.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC

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William P. Kenoi
Mayor



Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAII FIRE DEPARTMENT
25 Aupuni Street • Room 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

December 27, 2011

Mr. Tom Schnell
PBR Hawaii
1001 Bishop Street, Suite 650
Honolulu, Hawai'i 96813-3484

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
QUEEN KAAHUMANU HIGHWAY FRONTAGE ROAD,
HULIKOA DRIVE TO KAHANAIKI WAY
TMK: (3) 7-3-009:016 (PORTION) AND 018 (PORTION)

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

A handwritten signature in black ink, appearing to read "D.R.", written over a horizontal line.

DARREN J. ROSARIO
Fire Chief

TG:lpc





PBR HAWAII

& ASSOCIATES, INC.

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February 27, 2012

Chief Darren J. Rosario,
Hawaii Fire Department
County of Hawai'i
25 Aupuni Street, Room 2501
Hilo, Hawai'i 96720

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD
HULIKOA DRIVE TO KOHANAIKI WAY DRAFT
ENVIRONMENTAL ASSESSMENT**

Dear Chief Rosario:

Thank you for your letter dated December 27, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way Draft Environmental Assessment (EA).

As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we acknowledge that you have no comments to offer at this time.

Thank you for reviewing the Draft EA. Your letter will be included in the Final EA.

Sincerely,

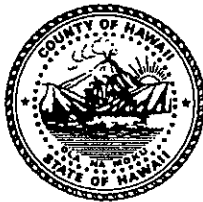
PBR HAWAII

Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC

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William P. Kenoi
Mayor



Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai'i

POLICE DEPARTMENT

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December 14, 2011

Mr. Tom Schnell
PBR Hawai'i & Associates Inc.
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, Hawai'i 96813

Dear Mr. Schnell:


**SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA)
QUEEN KAAHUMANU HIGHWAY FRONTAGE ROAD
HULIKOA DRIVE TO KOHANA'IKI WAY**

The above-referenced Draft Environmental Assessment has been reviewed, and we have no comments or objections to offer at this time.

Should you have any questions, please contact Major James O'Connor, Area II Operations, at (808)326-4646, ext. 270.

Sincerely,

HARRY S. KUBOJIRI
POLICE CHIEF



PAUL H. KEALOHA JR.
ASSISTANT CHIEF
AREA II OPERATIONS

JO
RS110529



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February 27, 2012

Mr. Harry S. Kubojiri, Police Chief
County of Hawai'i
Police Department
349 Kapi'olani Street
Hilo, Hawaii 96720-3998

**SUBJECT: QUEEN KA'AHUMANU HIGHWAY FRONTAGE ROAD
HULIKOA DRIVE TO KOHANAIKI WAY DRAFT
ENVIRONMENTAL ASSESSMENT**

Dear Chief Kubojiri:

Thank you for your letter dated December 14, 2011 regarding the Queen Ka'ahumanu Highway Frontage Road Hulikoa Drive to Kohanaiki Way Draft Environmental Assessment (EA).

As the planning consultant for the applicant, Kohanaiki Shores, LLC & Kohanaiki Business Park Association, we acknowledge that the Police Department has no comments or objections to offer at this time.

Thank you for reviewing the Draft EA. Your letter will be included in the Final EA.

Sincerely,

PBR HAWAII

Tom Schnell, AICP
Senior Associate

cc: Bobby Jean Leithead-Todd, Director, County of Hawai'i Planning Department
Joe Root, Kohanaiki Shores, LLC

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Botanical Survey

Botanical Survey Kohanaiki, North Kona, Island of Hawai‘i

**By Ron Terry, Ph.D., Geometrician Associates, LLC
Prepared for Kohanaiki Shores, LLC
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Introduction

This report describes the results of a botanical survey of an approximately 16-acre area (see map figure attached at end of report) that is currently within a portion TMK (3) 7-3-009:016 and a portion of TMK (3) 7-3-009:018. At least part of this 16-acre area is planned for use for a frontage road for Queen Ka‘ahumanu Highway.

Purpose and Methodology

The objectives of the botanical survey were to 1) describe the vegetation; 2) list all species encountered; and 3) identify threatened or endangered plant species. I surveyed the area on August 14, 2011. I first walked the entire staked perimeter, and then walked zigzag transects within the 16 acres with a spacing of about 50 feet. Because of the very open and evenly sparse vegetation, plant visibility was excellent over this range. In addition, I made excursions to rock outcrops, steep-sided depressions, cave openings, and large fissures, where less common plants might be found.

Species were identified in the field and, as necessary, collected and keyed out in the laboratory. Special attention was given to the possible presence of any federally (USFWS 2011) listed threatened or endangered plant species.

Limitations

No botanical survey of a large area can claim to have detected every species present. Some species are cryptic in juvenile or even mature stages of their life cycle. Dry conditions can render almost undetectable plants that extended rainfall may later invigorate and make obvious. Thick grass can obscure small individuals. The findings of this survey must therefore be interpreted with proper caution; in particular, there is no warranty as to the absence of any particular species.

Vegetational Influences

The geologic substrate in this area consists of lava flows from Hualalai volcano dating from 3,000 to 5,000 years before the present (Wolfe and Morris 1996). The surface is mainly pahoehoe (smooth or ropy lava) with a smaller area in the southeast of ‘a‘a (clinkery lava). Elevation varies from roughly 55 to 70 feet above sea level. Annual rainfall in this area of Kona is about 20 inches. Almost no weathering has occurred on this substrate and little soil is present. The surface has been termed “rough lava, ‘a‘a or pahoehoe” in soil classifications (U.S. Soil Conservation Service 1973).

Based on the evidence of current rainfall, geology, and vegetation, the area probably supported a Coastal Dry Shrubland and Forest (per Gagne and Cuddihy 1990) prior to human disturbance. It was likely dominated in different places by *ilima* (*Sida fallax*), pili grass (*Heteropogon contortus*), and *maiapilo*

(*Capparis sandwichiana*), among other plants. Certain low-elevation areas of Kona that have avoided disturbance (often because of a rough 'a'a substrate) maintain semi-intact native vegetation. For example, a survey of relatively undisturbed land several miles north at somewhat higher elevations than the maximum found on this property (Hart 2003), found a *lama*-dominated forest with three endangered species: *halepepe* (*Pleomele hawaiiensis*), *uhiuhi* (*Caesalpinia kawaiensis*), and 'aiea (*Nothocestrum breviflorum*), as well as several rare species: 'ohe makai (*Reynoldsia sandwicensis*) and maua (*Xylosma hawaiiense*). Although elevation, rainfall and geology are not optimum, some of these rare species may also have inhabited parts of the subject property and were thus especially sought during the survey.

Except for a few areas on and near the road margins, this area seems to have avoided severe disturbance such as grading, although it has likely been intensely grazed by goats. There is also a small amount of discarded materials.

Current Vegetation

Vegetation cover varies from scattered to sparse, and is dominated by scattered bunch grasses, with low shrubs and herbs subdominant (Figure 1a). There are a few very widely scattered noni (*Morinda citrifolia*) bushes. The most common grass by far is fountain grass (*Pennisetum setaceum*), with Natal red-top grass (*Rhynchelytrum repens*) also abundant. The main herbs are the almost ubiquitous native 'uhaloa (*Waltheria indica*) along with the non-native composite weed *Tridax procumbens*, which was very common. Less common but scattered throughout the property were the native *ilima*. The main shrubs are *koa haole* (*Leucaena leucocephala*), *klu* (*Acacia farnesiana*), *sourbush* (*Pluchea symphytifolia*), and, surprisingly, the regionally somewhat rare native *maiapilo* (Figure 1b); dozens of individual shrubs are scattered throughout the pahoehoe portion of the property. The alien swordfern *Nephrolepis multiflora* (and possibly its native counterpart, *N. exaltata* subsp. *Hawaiiensis*) are found in some lava cracks in pahoehoe and widely scattered on the 'a'a.

A full list of plant species found on the site is contained in Table 1, below. **No listed or proposed threatened or endangered plant species were found.** *Maiapilo* (*Capparis sandwichiana*), although common on the property, is considered a species of concern by the U.S. Fish and Wildlife Service (USFWS) and is often listed among rare plants in Hawai'i. This plant is important in traditional Hawaiian medicine. Although this status does not provide official legal protection, USFWS and the Hawai'i Department of Land and Natural Resources are keenly interested in its protection. In addition, one individual of the native tree *naio* (*Myoporum sandwicense*) appears to be within the 'a'a portion of the property at UTM 811396 mE 2180976 mN. *Naio* grows on all the main islands except Kaho'olawe (Wagner et al 1990). Although not a rare plant per se, it is relatively uncommon in lowland dry-mesic forest and is considered to have community restoration value in lowland dry-mesic forests (Belfield et al 2011).

Impacts and Mitigation Measures

Use of the subject area will have generally minimal botanical effects but will reduce the area of wild land containing the rare native shrub *maiapilo*. This reduction needs to be considered in the context of ongoing, planned or potential developments at NELHA, 'O'oma and elsewhere that will also reduce *maiapilo* habitat. Landscaping for the roadway should avoid invasive species and employ native species to the greatest degree practical. Reputable Kona nurseries will supply lists of, and sources for, suitable native species. I recommend that special consideration be given to planting *naio* as well as *maiapilo*.

Figure 1a Typical Vegetation on Pahoehoe and 'A'a Sections



Figure 1b Maiapilo (*Capparis sandwichiana*)



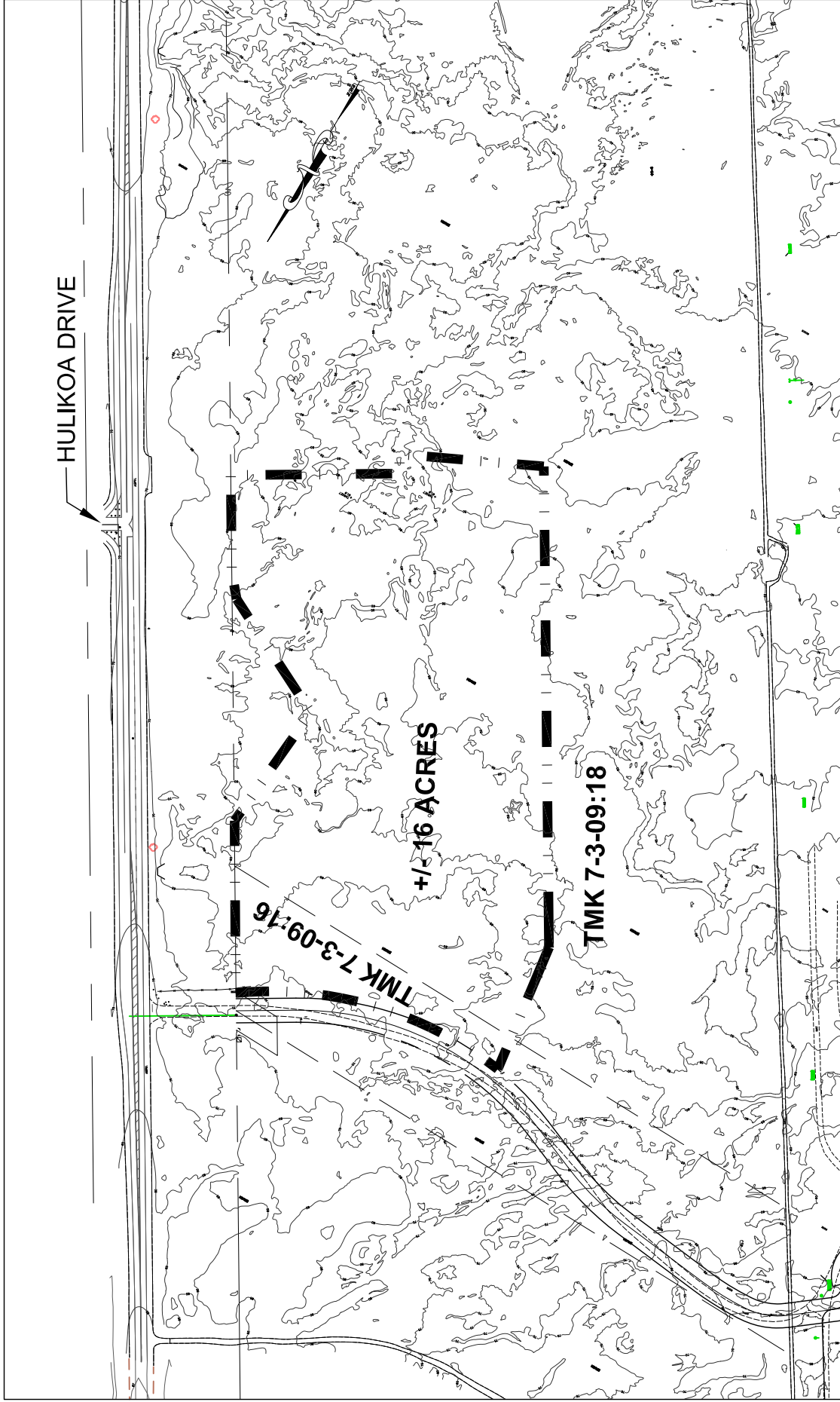
Table 1
Plants Observed on Property

Scientific Name	Family	Common Name	Life Form	Status*
<i>Acacia farnesiana</i>	Fabaceae	Klu	Shrub	A
<i>Capparis sandwichiana</i>	Capparaceae	Maiapilo	Shrub	E
<i>Chamaecrista nictitans</i>	Fabaceae	Partridge pea	Herb	A
<i>Indigofera suffruticosa</i>	Fabaceae	Indigo	Shrub	A
<i>Lantana camara</i>	Verbenaceae	Lantana	Shrub	A
<i>Leucaena leucocephala</i>	Fabaceae	Haole koa	Tree	A
<i>Morinda citrifolia</i>	Rubiaceae	Noni	Shrub	A
<i>Myoporum sandwicense</i>	Myoporaceae	Naio	Tree	I
<i>Nephrolepis multiflora</i> *	Nephrolepidaceae	Sword fern	Herb	A
<i>Pennisetum setaceum</i>	Poaceae	Fountain grass	Grass	A
<i>Pluchea symphytifolia</i>	Asteraceae	Sourbush	Shrub	A
<i>Portulaca pilosa</i>	Portulacaceae	Portulaca	Herb	A
<i>Prosopis pallida</i>	Fabaceae	Kiawe	Tree	A
<i>Rhynchelytrum repens</i>	Poaceae	Natal red-top	Grass	A
<i>Schinus terebinthifolius</i>	Anacardiaceae	Christmas berry	Shrub	A
<i>Sida fallax</i>	Malvaceae	'Ilima	Shrub	I
<i>Tridax procumbens</i>	Asteraceae	Coat buttons	Herb	A
<i>Waltheria indica</i>	Sterculiaceae	Uhaloa	Herb	I

A = alien, E = endemic, I = indigenous, End = Federal and State listed Endangered Species. *Some individuals of the endemic subspecies *Nephrolepis exaltata* subsp. *hawaiiensis* may also be present.

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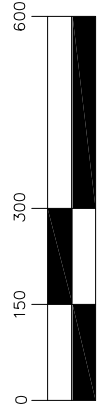


FRONTAGE ROAD ENVIRONMENTAL ASSESSMENT

STUDY CORRIDOR

TMK (3) 7-3-09:16 & 18

GRAPHIC SCALE



(IN FEET)
1 inch = 300 ft.

Fauna Survey

**Avian and Terrestrial Mammalian Surveys Conducted for
the Kohanaiki Shores Frontage Road Corridor,
North Kona District,
Island of Hawai'i**

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Introduction and Background

The Kohanaiki Shores LLC is proposing to build a frontage road *makai* of Queen Ka'ahumanu Highway. This report describes the methods used and the results of the avian and terrestrial mammalian surveys conducted as part of the environmental disclosure process associated with the proposed project. The study corridor encompasses a ± 16-acre portion of TMK: 7-3-09:16 and TMK: 7-3-09:18, North Kona District, Island of Hawai'i.

The primary purpose of the surveys was to determine if there are any avian or mammalian species currently listed, or proposed for listing under either federal or State of Hawai'i endangered species statutes within or adjacent to the frontage road.

The federal and State of Hawai'i listed species status follows species identified in the following referenced documents, (Department of Land and Natural Resources (DLNR) 1998; U. S. Fish & Wildlife Service (USFWS) 2005a, 2005b, 2011). Fieldwork was conducted on June 16 and 17, 2011.

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

General Project and Site Descriptions

The study site is approximately 16-acres of land that is bordered to the north by the Koahanaiki access road, to the east by Queen Ka'ahumanu Highway, to the south and west by undeveloped land. The bulk of the site is comprised of *pāhoehoe* flows disgorged by Mount Hualālai some 3,000 to 5,000 years ago (Figure 1). An older *'a'ā* flow also disgorged from Mount Hualālai deposited between 5,000 and 10,000 years ago can be seen along the eastern edge of the study site (Figure 2), [Wolfe and Morris 1996].

Vegetation on the site is best characterized as fountain grass/kiawe grassland. The vegetation is dominated by fountain grass (*Pennisetum setaceum*), with scattered *kiawe* (*Prosopis pallida*) and *koa haole* (*Leucaena leucocephala*). Two common native species *'uhaloa* (*Waltheria indica*) and *'ilima* (*Sida fallax*), were common on the site. One rare and localized species, *maiapilo* (*Capparis sandwichiana*), was scattered on the *pāhoehoe* flows.



Figure 1 – Kohanaiki Shores Frontage Road site, showing *pāhoehoe* flows and fountain grass



Figure – Kohanaiki Shores Frontage Road site, showing 'a'ā flow on eastern side of site

Methods

Plant names follow *Manual of the Flowering Plants of Hawai'i* (Wagner *et al.*, 1990, 1999) for native and naturalized flowering plants. Place names follow *Place Names of Hawaii* (Pukui *et al.*, 1974). The avian phylogenetic order and nomenclature used in this report follows the *AOU Check-List of North American Birds* (American Ornithologists' Union, 1998), and the 42nd through the 51st supplements to the Check-List (American Ornithologists' Union, 2000; Banks *et al.*, 2002, 2003, 2004, 2005, 2006, 2007, 2008; Chesser *et al.*, 2009, 2010). Mammal scientific names follow (Tomich, 1986).

Avian Survey Methods

The avian surveys were conducted on July 3, 2011. Five avian count stations were sited equidistant from each other within the study site. A single 6-minute avian point count was made at each of the five count stations. Field observations were made with the aid of Leica 10 X 42 binoculars and by listening for vocalizations. The counts and subsequent searches of the site, were conducted between 7:00 am and 10:00 am. Time not spent counting the point count stations was used to search the remainder of the site for species and habitats not detected during the point counts. Weather conditions were ideal, with no rain, unlimited visibility on the site, and winds of between 1 and 4 kilometers an hour.

Mammalian Survey Methods

With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or 'ōpe'ape'a as it is known locally, all terrestrial mammals currently found on the Island of Hawai'i are alien species, and most are ubiquitous. The survey of mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. A running tally was kept of all terrestrial vertebrate mammalian species detected within the study site. The mammalian survey was conducted concurrently with the avian surveys on July 3, 2011.

Results

Avian Surveys

A total of 42 individual birds of seven species, representing seven separate families, were recorded during the station counts. All of the seven avian species recorded during the course of this survey are considered to be alien to the Hawaiian Islands (Table 1).

No avian species currently protected or proposed for protection under either the federal or State of Hawai'i endangered species programs were detected during the course of this survey (DLNR, 1998; USFWS, 2005a, 2005b, 2011).

Avian diversity and densities were extremely low, though in keeping with the xeric habitat present on the site. One species, Common Myna (*Acridotheres tristis*) accounted for slightly more than 59.5 percent of all birds recorded during the station counts.

Table 2 – Avian Species Detected Within the Proposed Kohanaiki Frontage Road Corridor			
<i>Common Name</i>	<i>Scientific Name</i>	<i>ST</i>	<i>RA</i>
GALLIFORMES			
PHASIANIDAE - Pheasants & Partridges			
Phasianinae - Pheasants & Allies			
Grey Francolin	<i>Francolinus pondicerianus</i>	A	0.14
COLUMBIFORMES			
COLUMBIDAE - Pigeons & Doves			
Zebra Dove	<i>Geopelia striata</i>	A	0.07
PASSERIFORMES			
ZOSTEROPIDAE - White-eyes			
Japanese White-eye	<i>Zosterops japonicus</i>	A	0.07
STURNIDAE - Starlings			
Common Myna	<i>Acridotheres tristis</i>	A	1.79
FRINGILLIDAE - Fringilline and Carduleline Finches & Allies			
Carduelinae - Carduline Finches			
House Finch	<i>Carpodacus mexicanus</i>	A	0.07
PASSERIDAE - Old World Sparrows			
House Sparrow	<i>Passer domesticus</i>	A	0.79
ESTRILDIDAE - Estrildid Finches			
Common Waxbill	<i>Estrilda astrild</i>	A	0.07

Key to table 2

ST Status

A Alien - Introduced to the Hawaiian Islands by humans

RA Relative Abundance - Number of birds detected divided by the number of count stations (5)

Mammalian Survey

No terrestrial mammalian species were detected during the course of this survey. Ergo. No mammalian species currently protected or proposed for protection under either the federal or State of Hawai'i endangered species programs were detected during the course of this survey (DLNR, 1998; USFWS; 2005a, 2005b, 2011).

Discussion

Avian Resources

The findings of the avian survey are consistent with the location of the site, and the xeric nature of the habitat present on it. All seven of the avian species recorded during the course of this survey are alien to the Hawaiian Islands.

Although no seabirds were detected during this survey, it is probable that both the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened endemic subspecies of the Newell's Shearwater (*Puffinus auricularis newelli*), over-fly the project area in small numbers between April and the middle of December each year. Both species have been recorded flying to and from their nesting colonies over the greater Kona area (Day et al., 2003; David 2011). Both of these pelagic seabird species nest high in the mountains in burrows excavated under thick vegetation, especially *uluhe* (*Dicranopteris sp.*) fern. There is no suitable nesting habitat for either of these seabird species on, or close to the proposed frontage road corridor.

The primary cause of mortality in the two aforementioned seabird species is thought to be predation by alien mammalian species at the nesting colonies (USFWS 1983; Simons and Hodges 1998; Ainley *et al.*, 2001). Collision with man-made structures is considered to be the second most significant cause of mortality of these seabird species in Hawai'i. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds often collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Hadley 1961; Telfer 1979; Sincock 1981; Reed *et al.*, 1985; Telfer *et al.*, 1987; Cooper and Day, 1998; Podolsky *et al.* 1998; Ainley *et al.*, 2001; Hue *et al.*, 2001; Day *et al* 2003).

Additionally, no migratory shorebird species were recorded on the site, and this finding is not surprising as these Arctic breeders are present in Hawai'i between late July and the end of April each year. Thus the survey window fell outside the normal period when one would expect to find these species in the islands. It is guaranteed that at least one of these migratory shorebird species; Pacific-Golden Plover (*Pluvialis fulva*) use resources within the greater project area on a seasonal basis in small numbers.

Mammalian Resources

The findings of the mammalian survey are consistent with the location of the site, and the xeric nature of the habitat present on it. That no mammals were detected is not overly surprising, as the site is extremely dry and there is plentiful better habitat within the greater project area that is more attractive to most of the alien mammalian species present in the lowlands on the Island of Hawai'i.

Although no rodents were detected during the course of this survey, it is likely that the four established alien *muridae* fund on Hawai'i, roof rat (*Rattus r. rattus*), Norway rat (*Rattus norvegicus*), European house mouse (*Mus musculus domesticus*) and possibly Polynesian rats (*Rattus exulans hawaiiensis*) use various resources found within the site on a seasonal basis.

No Hawaiian hoary bats were detected during the course of this survey. Hawaiian hoary bats are widely distributed along the Kona coast and are present in most areas that still have tree and dense shrubs, (USFWS, 1998; Bonaccorso *et al.*, 2005, 2007; 2011; David, 2011). There is no suitable roosting habitat for this foliage roosting bat within or close to the on the Koahanaiki Shores Frontage Road corridor.

Potential Impacts to Protected Species

Seabirds

The principal potential impact that construction and operation of the proposed Koahanaiki Shores Frontage Road poses to protected seabirds is the increased threat that birds will be downed after becoming disoriented by lights associated with the project during the nesting season. The two main areas that outdoor lighting could pose a threat to these nocturnally flying seabirds is if, 1) during construction it is deemed expedient, or necessary to conduct nighttime construction activities, 2) following build-out, the potential operation of streetlights during the seabird nesting season.

Recommendations

If nighttime construction activity or equipment maintenance is proposed during the construction phases of the project, all associated lights should be shielded, and when large flood/work lights are used, they should be placed on poles that are high enough to allow the lights to be pointed directly at the ground.

Following build-out it is recommended that any streetlights that may be required for public safety reasons be shielded (Reed et al. 1985, Telfer et al. 1987). This minimization measure would serve the dual purpose of minimizing the threat of disorientation and downing of Hawaiian Petrels and Newell's Shearwaters, while at the same time complying with the Hawai'i County Code § 14 - 50 *et seq.* which requires the shielding of exterior lights so as to lower the ambient glare caused by unshielded lighting to the astronomical observatories located on Mauna Kea.

It is recommended that, where appropriate and practicable, native plant species be used in landscaping efforts. Not only is this ecologically prudent, but also if the appropriate plants are used, it will also likely save maintenance and water costs over the long term.

Critical Habitat

There is no federally delineated Critical Habitat present on or adjacent to the study site. Thus the development and operation of the proposed frontage road will not result in impacts to federally designated Critical Habitat. There is no equivalent statute under State law.

Glossary

'A 'āā – Clinker lava formed by slow moving lava flows

Alien – Introduced to Hawai'i by humans

Endangered – Listed and protected under the Endangered Species Act of 1973, as amended (ESA) as an endangered species

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

Makai – Down-slope, towards the ocean

Muridae – Rodents, including rats, mice and voles, one of the most diverse family of mammals

Naturalized – A plant or animal that has become established in an area that it is not indigenous to

Nocturnal – Night-time, after dark.

'Ōpe'ape'a – Endemic endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*)

Pāhoehoe - Sheet lava formed by relatively fast moving lava flows

Pelagic – An animal that spends its life at sea – in this case seabirds that only return to land to nest and rear their young

Sign – Biological term referring tracks, scat, rubbing, odor, marks, nests, and other signs created by animals by which their presence may be detected

Threatened – Listed and protected under the ESA as a threatened species

DLNR – Department of Land and Natural Resources

DOFAW – Division of Forestry and Wildlife

ESA – Endangered Species Act of 1973, as amended

TMK – Tax Map Key

USFWS – United State Fish & Wildlife Service

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Archaeological Inventory Survey

DRAFT

ARCHAEOLOGICAL INVENTORY SURVEY

TMK: (3) 7-3-09:PORTION 16 AND PORTION 18

LAND OF KOHANAIKI, NORTH KONA DISTRICT

ISLAND OF HAWAII

Haun & Associates

Archaeological, Cultural, and Historical Resource Management Services
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SUMMARY

At the request of Kohanaiki Shores, LLC, Haun & Associates conducted an archaeological inventory survey of a c. 16-acre parcel comprised of portions of TMK: (3) 7-3-09:16 and 18 located in the Land of Kohanaiki, North Kona District, Island of Hawaii. The objective of the survey was to satisfy historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-Historic Preservation Division (DLNR-HPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 6, State Historic Preservation Rules.

The survey identified two sites with three features. The sites consist of a complex comprised of a trail and a cairn (Site 28999) and a single feature cairn site (Site 29000). Functionally the features are comprised of transportation (n=1) and marker (n=2). The sites identified during the project conform to the site/feature types expected in the lower Middle Zone based on previous archaeological work and historic documentary research.

The two sites within the project area are assessed as solely significant for their information content. The sites have yielded information important for understanding late prehistoric to historic land use in project area. The mapping, written descriptions and photography at the sites adequately documents them no further work or preservation is recommended.

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INTRODUCTION

This report presents the results of an archaeological inventory survey of a c. 16-acre parcel comprised of portions of TMK: 7-3-09:16 and 18, located in the Land of Kohanaiki, North Kona District, Island of Hawaii (*Figures 1 and 2*). The objective of the survey was to satisfy current historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 6, State Historic Preservation Rules (DLNR 2003).

The survey fieldwork was conducted on June 27-28, 2011 by Haun & Associates Project Supervisors Juliana and Solomon Kailihiwa, under the direction of Dr. Alan Haun. Approximately 3 person days were required to complete the fieldwork portion of the project. Described in this final report are the project scope of work, field methods, background information, survey findings, and significance assessments of the sites with recommended further treatments.

Scope of Work

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

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

Project Area Description

The project area consists of a roughly rectangular-shaped c. 16-acre parcel located seaward of Queen Ka'ahumanu Highway easement between c. 40 to 65 ft elevation. The project area is bordered by the access road for The Shores at Kohanaiki development along the northwest side and by undeveloped land on the southwest and southeast sides. The area to the northeast has been impacted by construction work associated with highway improvement projects.

There is little soil present within the project area with the ground surface consisting of areas of a'a and pahoehoe lavas (*Figure 3*). The pahoehoe lava portion comprises c. 10.4-acres (65% of project area). According to Sato et al., pahoehoe lava is dominated by a smooth surface with scattered hummocks



Figure 1. Portion of USGS Keahole Point Quadrangle showing Project Area

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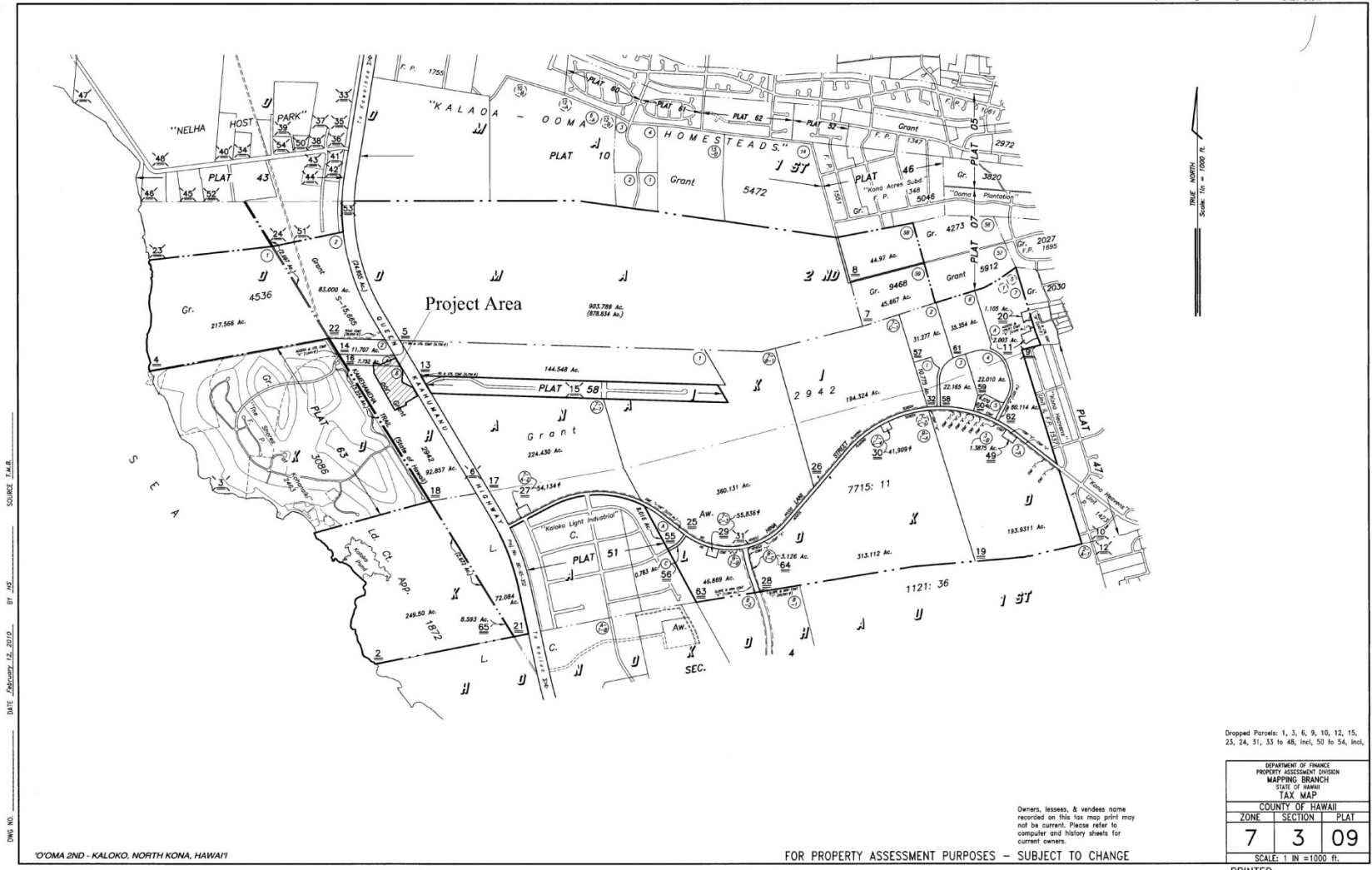


Figure 2. Tax Map Key 7-3-09 showing Project



Figure 3. Aerial View of Project Area (from Google Earth)



Figure 4. Pahoehoe Lava Portion of Project Area, view to southeast



Figure 5. A'a Lava Portion of Project Area, view to northwest

and pressure domes (1973:34). Wolfe and Morris indicate that this lava originated from Hualalai Volcano and was deposited 3,000 to 5,000 years ago (2001:12, Sheet 1). The pahoehoe lava portion of the project area is depicted in *Figure 4*.

The a'a lava portion of the project area comprises 5.4-acres or 35% of the total area. This lava is characterized as rough land comprised of "a mass of clinkery, hard, glassy, sharp pieces piled in tumbled heaps" (Sato et al. 1973:34). This a'a lava is also from Hualalai and was deposited 5,000 to 10,000 years ago (Wolfe and Morris 2001:12, Sheet 1). The a'a lava flow is illustrated in *Figure 5*.

No vegetation is present on the a'a lava portion of the project area. The remaining area contains fountain grass (*Pennisetum setaceum* [Forsk.]) with scattered *haole koa* (*Leucaena glauca*), Christmas berry (*Schinus terebinthifolius*), *maiapilo* (*Capparis sandwichiana*), *noni* (*Morinda citrifolia*) and *klu* (*Acacia farnesiana* L.).

Field Methods

The project area was subjected to a 100% surface examination with the surveyors spaced at 10 m intervals, oriented parallel to Queen Ka'ahumanu Highway. The ground surface visibility was excellent due to the low, scattered vegetation within the study area. The identified sites/features were flagged with pink and blue flagging tape and the site locations plotted on a scaled project area map with the aid of hand-held Garmin Global Positioning System (GPS) Model 60 devices using the World Geodetic Survey (WGS) 1984 datum (Zone 5). The accuracy of these GPS devices for a single point is +/- 3-5 m. This accuracy is increased to less than c. 2-3 meters by taking multiple points including property corners and overlying the plotted points on a scaled map using AutoCAD software.

The sites present within the project area were subjected to detailed recording, including the preparation of standardized site/feature forms and photographic documentation. A metal site tag was placed at each site and the tag's location was plotted on the site plan map. No subsurface testing was undertaken during the project due to the absence of soil. No subsistence remains or artifacts were recovered for analysis.

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Historical Documentary Research

Kohanaiki lies within an area of lava-covered land north of Kailua called Kekaha, which "describes a dry, sun-baked land" (Kelly 1971:2, *Figure 6*). Kohanaiki means "small barrenness" (Pukui et al. 1974:115), reflecting its harsh environment. There is little mention of Kohanaiki in Hawaiian legendary and traditional history. Donham summarizes the limited references located by Silva (Appendix A; Donham 1986:120-128) as follows:

Included in Silva's report are statements from native historian S.M. Kamakau describing the destruction of Kekaha undertaken by Kekaulike of Maui while fleeing Alapa'inui of Hawaii, and the setting apart of Kekaha for the priestly class, specifically the Kauahi and Nahulu lines of priesthood. Presence of the priestly class in Kohanaiki is indicated in the source of the name for Puhili Point, which is said to be named after a priest.

...she [Silva] does reference a mythological tale entitled "The Pool of Wawaloli" which may have involved one of the anchialine pools of Kohanaiki. The tale involves a young woman who was traveling from the mountains to the coast and stopped at a pool for refreshment. There she met Wawaloli, who was eventually captured by the woman's father and exposed as a wicked wizard. A section of the shoreline in Kohanaiki bears the name of Wawaloli Beach (1986:9-10).

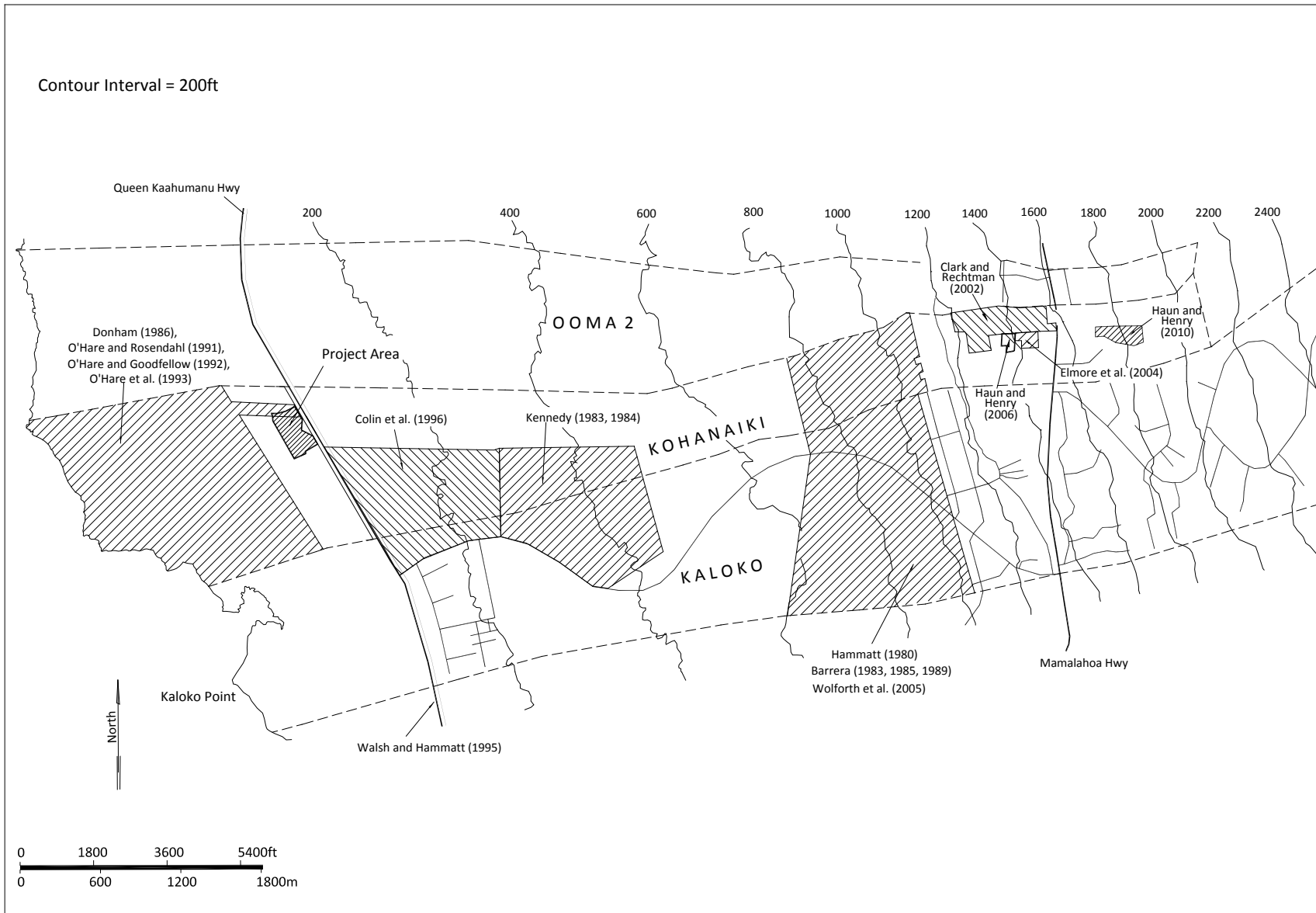


Figure 6. Ahupua'a Boundaries and Previous Archaeological Work

Ellis (1963) reported the observations of the Reverends Thurston and Bishop during a walk along the coast north from Kailua in 1823. They described houses along the coast built on lava and small gardens in the lava where sweet potatoes, watermelon, and tobacco were grown.

During the Great Mahele, Kohanaiki became government land (Indices 1929:9). The Waihona 'Aina (2000) Mahele Database; which is a compilation of data from the Indices of Awards (Indices 1929), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.); lists two Land Commission Award (LCA) claims for parcels in Kohanaiki that were not awarded.

Haheeholua (LCA 10336) claimed a house lot that he received from his grandparents in 1819 (NT n.d.: 654v8). The house lot measured 875 ft by 420 ft (NR n.d.:590v8). There is no indication of where the house lot was situated. Haheeholua also claimed two parcels in Kaloko (NR n.d.:590v8). One parcel in Kiikahala 'Ili had eight taro and potato plots. The other parcel, in Kealaehu 'Ili, had four plots of taro. The latter parcels were undoubtedly situated in the upland portion of Kaloko. Paawela (LCA 7987) claimed four parcels in Kohanaiki that included eight cultivated plots and a house lot, no specific crops are mentioned (NT n.d.:539v4). The parcels were situated in two 'ili: Paawela and Haleolono. He received the land from Hulikoa in 1845.

Silva (Appendix A; Donham 1986:120-128) researched Hawaiian Government Department of Interior correspondence and documents pertaining to Kohanaiki. In 1863, Kapena applied to purchase 154 acres in the seaward portion of the *ahupua'a* and was accepted receiving Grant 3086. The upland portion of the *ahupua'a* is comprised of Grant 2030, a 102 acre parcel that was sold to Kaiakoili in 1856 (Waihona 'Aina 2005 Land Grant Database). The intervening portion of Kohanaiki, that contains the present project area, consists of 930 acres was sold to Hulikoa in 1864 as Grant 2942 (see *Figure 2*).

Kelly (1971:12) cites missionary and later census data that document a decline in the population of Kekaha in the 1800s. The population declined from 12,432 in 1832 to 3,488 by 1860. The most dramatic decrease occurred between 1832 and 1835 when the population decreased by more than half. She cites tax records that indicate Kohanaiki had 8 taxpayers in 1857, thirteen in 1858, and 12 in 1859. Kohanaiki Church was completed in the inland portion of Kohanaiki in 1879 by a minister named Kaanoimaka (Kelly 1971). The Hawaiian Kingdom Directory for 1880-1881 lists a Chinese storekeeper named Akao and coffee planter named Kaiakoili in upland Kohanaiki along the government road (Kelly 1971:13). Kaiakoili owned 600 acres of land with ten acres in cultivation.

A map by J.S. Emerson from the 1880s (*Figure 7*) shows the area of Kohanaiki divided into three grants: Grant 3086 to Kapena at the coast, Grant 2030 to Kaiakoili inland and a large grant (2942) in the intervening area to Hulikoa. The map shows four roads or trails: one paralleling the shoreline, another follows the route of the Mamalahoa Highway, one extending south-southeast and inland from the latter road, and one extending from a coastal fishpond in Kaloko that joins the inland two roads in upland Kaloko. The map also shows Kohanaiki Church situated along the latter inland-seaward route at the southwest corner of Kaiakoili's grant. On Emerson's map the seaward portion of Kohanaiki (containing the present project area) is characterized as consisting of pahoehoe and a'a lava with vegetation. The map also shows the seaward edge of the upland forest just seaward of Kaiakoili's grant at approximately 1,100 ft elevation. This line was probably the seaward limit of the upland cultivated portion of the *ahupua'a*.

Kohanaiki Homestead lots were purchased in the area surrounding Kohanaiki Church between 1895 and 1898 (Cordy et al. 1991:418-419), but it is likely that a settlement was established there as early as the late 1870s when the church was constructed. Several caretakers of the Kaloko fishpond lived at the homesteads (Kelly 1971). The homestead settlement, which is situated seaward of the project area, is depicted in Cordy et al. (1991:420, *Figure 105*). The settlement consisted of at least nineteen house lots, most with stone wall enclosed yards. The settlement was situated at the intersection of four roads: (1) Kohanaiki Road that extended inland to the inland government road, today's Mamalahoa Highway, (2) A road to the fishpond at the coast in Kaloko, (3) A road that extended south-southeast from the settlement

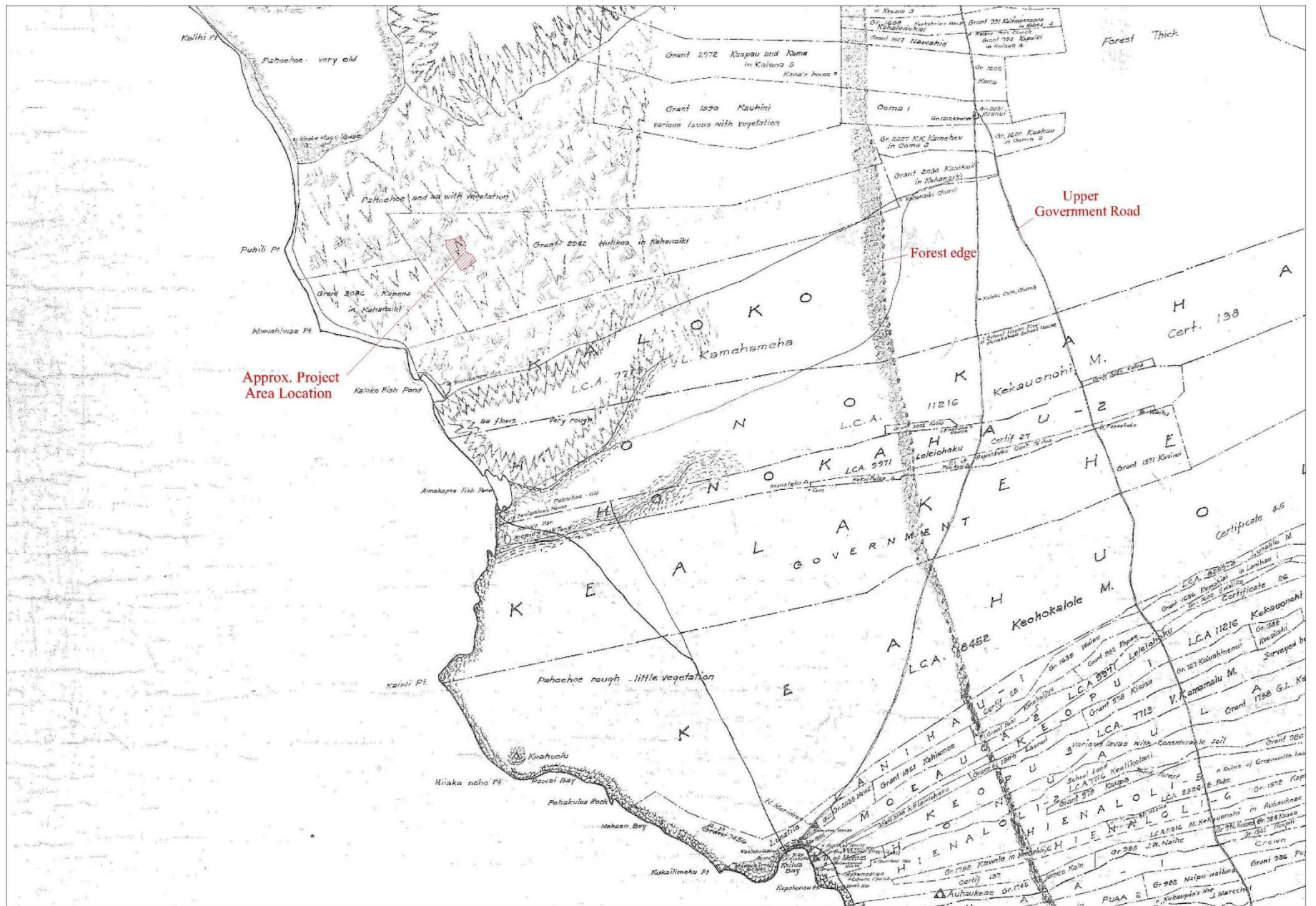


Figure 7. Portion of Emerson's 1880 Map of Kailua,

to a junction with a road that followed the general course of Mamalahoa Highway and Palani Road to Kailua, and (4) Alanui Kauwila, a road that extended north from the settlement.

The Kohanaiki Homesteads map shows the house of Kaiakaoli, the recipient of Grant 2030, situated in the northeast corner of the settlement. Other residents included Keo, Kiaha, Kaholi, Pahuole, Kaninau, Paiwa, Mokuaikai, Hoomana, Kuhia, Kaiha, Haau, Kaalawamaka, Kikaha, Kapa, Punihaole, Keakemao, Kaiakoili, Noa, and Hulimai. Wolforth et al. (2005) suggest that by 1957 only a single homestead was still occupied based on cartographic evidence.

Figure 8 is a portion of the 1924 USGS Kalaoa Quadrangle map. The map shows the location of Kohanaiki Homesteads as a cluster of structures at approximately 1,150 ft elevation. Three structures are depicted along an inland road that follows the route of today's Mamalahoa Highway. Another road extends from the inland road in Honokohau to the homesteads. A trail extends to the northwest from the homesteads. At the southeast corner of the homesteads the map shows a survey station labeled "Kaiha", the name of one of the homestead residents.

Previous Archaeological Research

At least fifteen archaeological survey and excavation projects have been conducted in Kohanaiki. Figure 6 shows the locations of the projects and Table 1 summarizes the projects. Not included in the figure is the West Hawaii survey by Reinecke (1930). Reinecke's coastal survey identified eight sites along the coast of Kohanaiki (Sites 58-62). The sites included a survey station, a cattle pen, a complex of walls with a burial platform, a complex of modern house platforms and a corral, a complex of two enclosures and a small platform, and a possible *heiau* at Wawahiwaa Point. These sites were subsequently documented by Donham (1986). The inland portion of the Donham (1986) survey area also extended through the current project area, though no sites were identified in this portion of her study area.

Table 1. Summary of Previous Archaeological Work

Study	Study Type*	Elevation (ft)	Area (ac)	Total sites	Sites per acre	Total fea	Feas. Per acre	Hab Feas	Hab Feas per acre	Perm Hab Feas	Temp Hab Feas	Ag Feas	Ag Feas per acre	Burial Feas	Ritual Feas	Trail	Ahu	Rock art	Historic Feas	Indet/ Misc. Feas
Donham (1986), O'Hare and Rosendahl (1991), O'Hare and Goodfellow (1992), O'Hare et al. (1993)	RN, IN, DR	0-80	362	112	0.31	256	0.71	139	0.38	57	82			19	19	1	40	8	3	27
Walsh and Hammatt (1995)	IN	40-140	15	3	0.20	6	0.40									3	3			
Colin et al. (1996)	IN	90-340	244	55	0.23	90	0.37	39	0.16		39	9	0.04	9		20	2			11
Kennedy (1983, 1984)	RN	250-500	200	39	0.20	80	0.40	63	0.32	18	45			1		2	9	2	4	
Hammatt (1980), Barrera (1983, 1985, 1988), Wolforth et al. (2005)	RN, IN, EX	790-1100	127	143	1.13	181	1.43	25	0.20		25	145	1.14	5	1				5	
Clark and Rechtman (2002)	IN	1200-1580	52	5	0.10	5	0.10	3	0.06		3								2	
Haun and Henry (2006)	IN	1340-1410	2.5	4	1.60	37	14.80	3	1.20	2	1	27	10.80						7	
Elmore et al. (2004)	IN	1410-1480	4	1	0.25	23	5.75	3	0.75			18	4.50							1
Haun and Henry (2010)	IN	1715-1915	9.945	9	0.90	274	27.55	1	0.10	1		261	26.24		1		1		10	
Total/Average			1016	371	0.55	746	5.72	276	0.40	78	195	460	8.54	34	21	26	55	10	31	39

* = AS = Assessment, EX = Excavation, IN = Inventory Survey, RN = Reconnaissance Survey

The projects in Table 1 cover more than 1,000 acres of Kohanaiki identifying 371 sites with 746 features. Sites and features identified in other *ahupua'a* by the studies are not included in the table. To aid in reconstructing settlement patterns, features were quantified by probable age and function, and the studies are ordered by elevation. Traditional Hawaiian features were categorized as habitation, agricultural, burial (including possible burials), ritual, trail, *ahu*, and rock art. Features not assignable to these categories were categorized as miscellaneous/indeterminate. Traditional sites in this category

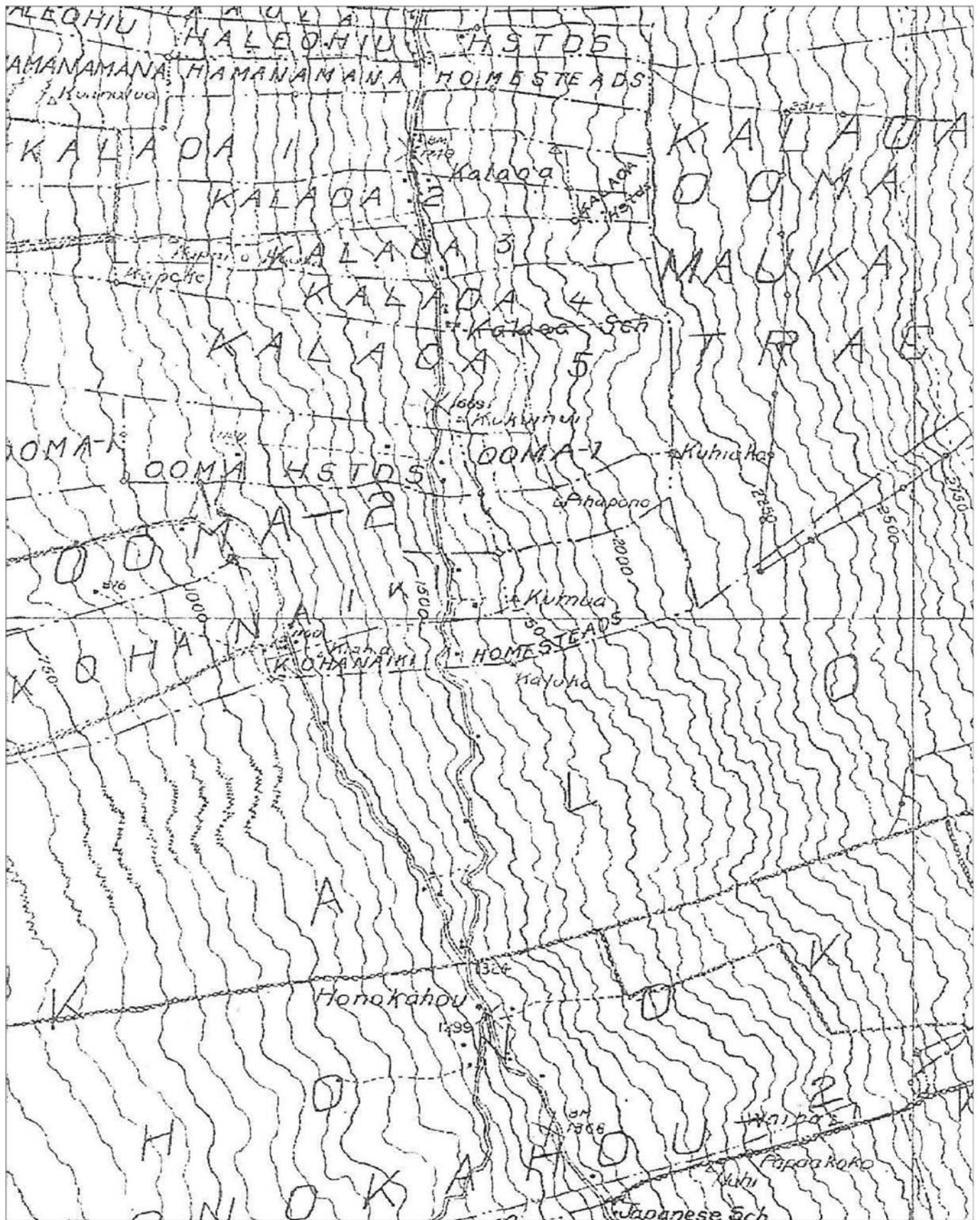


Figure 8. Portion of 1924 USGS Kailua Quadrangle

include storage features, an abrader quarry, and features with indeterminate functions. Habitation sites are further subdivided into temporary and permanent for studies making this distinction.

Density values are given for sites, features, and habitation and agricultural features. The studies have identified 276 habitation features, 460 agricultural features, thirty-four burials, twenty-one ritual features, twenty-six trails, fifty-five *ahu*, and ten features consisting of petroglyphs. Historic features were not segregated by function. The majority of the historic features are ranch walls. Overall feature density values range from 0.1 to 27.55 features per acre with an average of 5.72. Habitation feature density ranges from 0.06 to 0.75 features per acre with an average of 0.4. Agricultural feature density ranges from 0 to 26.24 features per acre with an average of 8.54.

Twenty-seven radiocarbon dates are reported in the data recovery report by O'Hare and Goodfellow (1992) that covered the coastal portion of Kohanaiki. Most of the age determination results produced multiple age ranges. When all potential age ranges are examined two span the A.D. 1000s, six include the 1100s, seven span the 1200s, sixteen span the 1300s, twenty span the 1400s, nineteen include the 1500s, twenty-three span the 1600s, fifteen include the 1700s and the rest (27) include the 1800s to mid-1900s. The results potentially indicate initial use of the area by the 1000s, followed by a marked increase during the 14th and 15th centuries. The largest number of age ranges spans the 1600s followed by a slight decrease during the 100s to 1800s.

Cordy, Tainter, Renger, and Hitchcock (1991) describe their *ahupua'a*-wide study of the adjacent *ahupua'a* of Kaloko conducted in the early 1970s and summarize the work of Reinecke (1930) and Emory and Soehren (1961) in the coastal portion of Kaloko. The study included a survey of the entire *ahupua'a* seaward of the Queen Kaahumanu Highway and sample areas inland of the highway. Excavations were conducted at 20 sites near the coast, 11 sites between 30 m and 244 m elevation, and five upland sites above 610 m elevation.

Cordy *et al.* (1991) utilized four environmental zones to characterize settlement patterns that are applicable to the adjacent lands of Kohanaiki: (a) the Coastal Zone from sea level to 15 ft elevation, (b) the Middle Zone from 15 ft to 800-900 ft elevation, (c) the Lower Upland Zone from 900 ft to 1500 ft elevation, and (d) the Upland-Forest Zone between 1,500 and 6,000 ft elevation. Their settlement pattern model has been largely confirmed by the subsequent studies described above.

Based on their data, the authors believe the *ahupua'a* was permanently settled between A.D. 900 and 1200. Most of the sites were presumed to have been occupied in late prehistory in the 1600s and 1700s and this period is used to generate the settlement pattern model. Many sites also had a historic component. A *heiau*, coastal trail, *ahupua'a* boundary shrine, and permanent habitation sites, including the residence of at least one chief and four men's houses, were clustered next to the shoreline and around the fishpond. Temporary habitation sites were also present in the coastal zone. Branch trails linked habitation sites with subsistence sites and water sources along the coast. Subsistence sites included the fishpond at the coast and animal enclosures and agricultural complexes in the lower portion of the middle zone. A series of *mauka-makai* trails extend from the coast inland. Burials were concentrated in a cemetery in the lower middle zone and individual burials were present at two coastal sites.

Inland of the lower Middle Zone adjacent to the Coastal Zone, sites were widely scattered and primarily consisted of trails leading to the uplands associated with markers (cairns) and temporary habitations, primarily in lava tubes. Settlement pattern data for the Upland Zone were derived from historic records. In the early to mid-1800s, the zone was used for agriculture and scattered habitations. This pattern is assumed to have prevailed in late prehistory as well. By the 1870s and 1880s, residential sites were more common and agricultural use continued as a small community developed near the upper road. This coincided with the near abandonment of the coastal habitations. In the late 1800s to early 1900s, the focus of land use shifted to large-scale ranching.

The Upland-Forest Zone was characterized by an extensive field system consisting of formal walled fields from 900 ft elevation up to approximately 2,300 ft, which was believed to be the lower limit of the late prehistoric forest edge. The major field boundary walls were perpendicular to the coast. Other agricultural features included terraces, depressions, mounds, and probable pigpens. Temporary habitation sites were scattered among the fields and at least one small shrine was present. Below 900 ft and above 2,300 ft elevation agricultural features were present, but were scattered and informal. By the mid-1800s, the forest edge was reported to be at the 1,700 ft elevation, leading the author's to conclude that much of the area was abandoned coincident with depopulation between European Contact and the 1850s.

PROJECT EXPECTATIONS

The project area is situated in the lower portion of the Middle Zone as defined by Cordy *et al.* (1991). Prehistoric use of the project area is potentially represented by *mauka-makai* trails and associated cairns that connected the coastal settlements to inland agricultural areas. Burials are also potentially present. Chronologically, sites may have been used as early as the 1400s, with the most extensive period of use occurring between the 1600s and early historic period.

FINDINGS

The survey identified two sites with three features. The sites consists of a complex (Site 28999) comprised of a trail (Feature A) with an associated cairn (Feature B) and an isolated cairn (Site 29000). Feature functions consist of transportation (n=1) and marker (n=2). The sites are described below and the site locations are presented in *Figure 9*. No subsurface testing was undertaken during the present project due to the absence of testable soil. No cultural remains were recovered for analysis.

Site 28999

Site 28999 consists of a trail (Feature A) and a cairn located in the a'a lava portion of the parcel in the southeastern portion of the project area. The Feature A trail originates at the interface between the a'a and pahoehoe lava flows, adjacent to the Feature B cairn, at c. 52 ft elevation (UTM = E 183328, N 2181118). It extends 41.8 m to the east-northeast where it exits the inland portion of the project area at c. 55 ft elevation. The trail continues in this direction outside the project area for 17.6 m where it terminates in a bulldozed area at E 182387, N 2181121.

The trail is comprised of a path that extends across the rugged, uneven surface of the a'a lava flow. The path was created by removing a'a boulders, slabs and large cobbles, leaving behind a crudely paved area of small cobbles and pebbles (*Figure 10*). The trail varies in width from 0.85 to 1.2 m with an average width of 1.0 m. No cultural remains were found in association with the trail. A weathered skeleton of a goat was observed inland of the project area boundary.

The Feature B cairn is situated at the western edge of the a'a flow, adjacent to the seaward end of the Feature A trail. The cairn is comprised of a crude stack of a'a slabs and cobbles (*Figure 11*). The pile of stones are perched on top of the raised seaward edge of the a'a flow. The cairn is 0.35 m long (north-south), 0.3 m wide and 0.4 m in height above the surface of the lava flow.

Apple (1965) developed a typology for trails at Honaunau. The trail types consist of Type A, A/B, C and D. These trail types are summarized in Haun *et al.* (1998) as follows:

Type A – single file foot trails constructed during pre-Contact and early Historic (prior to the abolishment of the *kapu* system) times. Generally *mauka/makai* trails not crossing *ahupua'a* boundaries (Prehistory to AD 1819).

Type A/B – modified Type A to accommodate the use of horses. Some widening and ramping of slopes, but it is the addition of curbing (kerbstones) to a Type A trail that primarily defines this type (AD 1820 to AD 1840).

Type C – newly constructed horse trails wide enough for two horse travel. A linear alignment and distinct kerbstones typify these trails (AD 1841 to AD 1918).

Type D – modified Type C to accommodate the use of wheeled vehicles (later nineteenth and early twentieth century (Haun *et al.* 1998:7.32).

Site 28999 is interpreted as a probable prehistoric transportation route designed to traverse the uneven lava flow. Based on Apple's (1965) typology, the Feature A trail is a Type A single file foot trail based on its inland/seaward orientation and width. The location of the Feature B cairn at the a'a/pahoehoe interface indicates it served to mark the seaward end of the trail for travelers approaching from the ocean. The inland end of the trail is altered although the site is in generally good condition. It is assessed as significant for its information content.

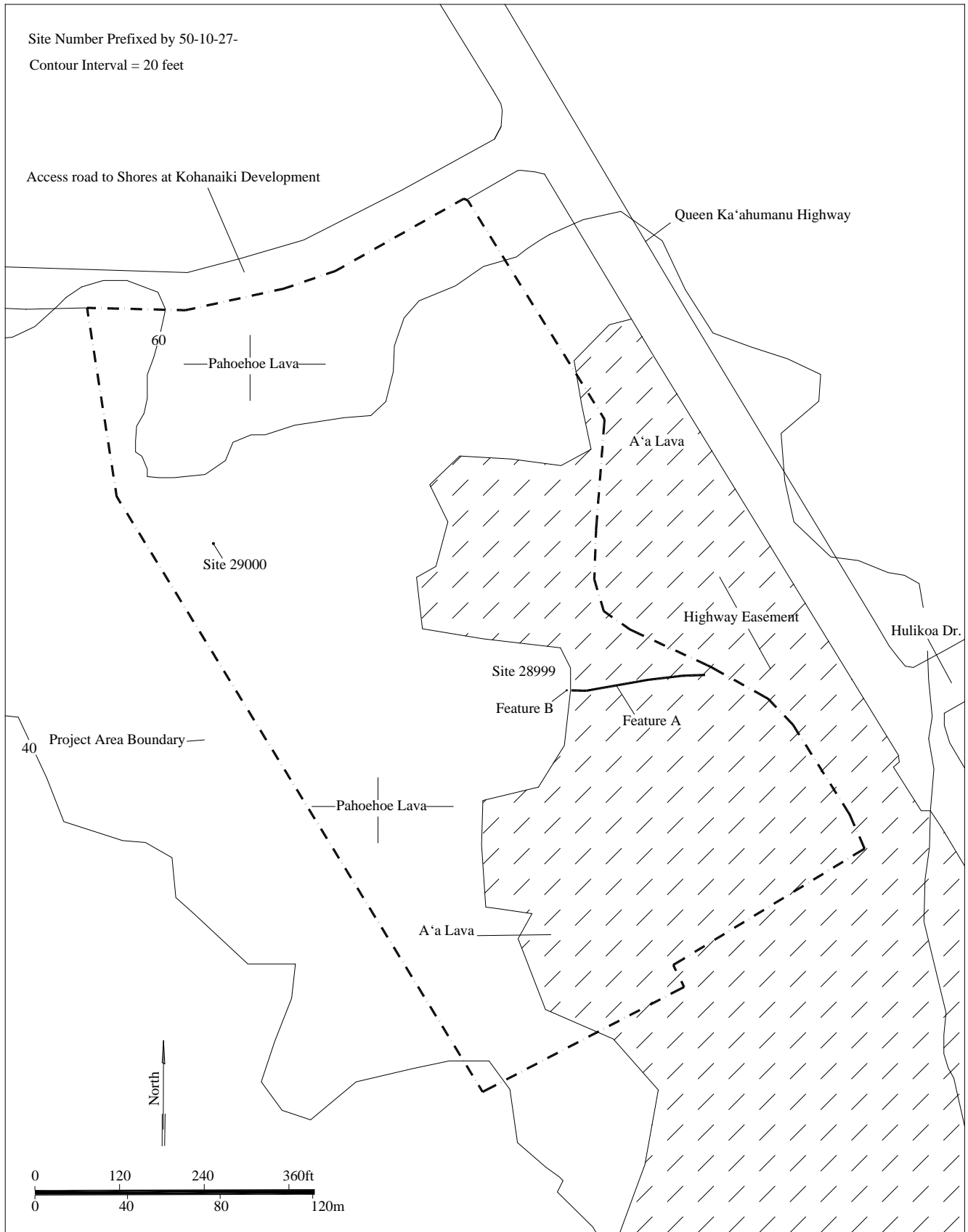


Figure 9. Site Location Map



Figure 10. Site 28999, Feature A Trail, view to southeast



Figure 11. Site 28999, Feature B Cairn, view to northwest

Site 29000

Site 29000 is an isolated cairn situated in an area of relatively level pahoehoe lava in the northwestern portion of the project area at c. 55 ft elevation (E 182179, N 2181190). The cairn is collapsed and is comprised of a roughly oval-shaped pile of pahoehoe slabs stacked three to four courses in height (*Figure 12*). It measures 1.4 m long (northwest by southeast), 0.8 m wide and 0.4 m in height. No cultural remains are present at the site.

The Site 29000 cairn is interpreted as a marker based on its formal type and appearance. It is possible that the site is associated with the Site 28999 trail and cairn, potentially functioning to guide the way across the pahoehoe flow towards the trail leading inland. The site is unaltered and in fair condition. It is assessed as significant for its information content.



Figure 12. Site 29000 Cairn, view to west-northwest

CONCLUSION

Discussion

The sites identified during the project conform to the site/feature types expected in the lower Middle Zone based on previous archaeological work and historic documentary research. Probable traditional Hawaiian features consist of a trail (Site 28999-A) and two cairns (Site 28999-B and 29000) that functioned as components of an inland/seaward transportation route. No prehistoric habitation, agricultural or historic features are present within the project area. The absence of these sites is not unexpected based on the harsh, arid conditions and absence of soil.

Donham (1986) conducted a survey of a large parcel in seaward Kohanaiki, a portion of which extended through the present project area. This study identified 112 sites and 256 features consisting of permanent and temporary habitations, burials, ritual features, cairns, petroglyphs, a trail and a number of miscellaneous feature types. The trail documented during Donham's survey does not appear to be a seaward continuation of the trail segment within the project area. This indicates that the Site 28999 trail likely is not a primary transportation route, but rather a short trail used to traverse the rugged a'a lava flow.

Significance Assessments

Pursuant to DLNR (2003) Chapter 275-6 (d), the initial significance assessments provided herein are not final until concurrence from the DLNR has been obtained. The sites identified during the survey are assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DLNR 2003). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:

1. Criterion "a". Be associated with events that have made an important contribution to the broad patterns of our history;
2. Criterion "b". Be associated with the lives of persons important in our past;
3. Criterion "c". Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
4. Criterion "d". Have yielded, or is likely to yield, information important for research on prehistory or history; and
5. Criterion "e". Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts--these associations being important to the group's history and cultural identity.

Based on the above criteria, Sites 28999 and 29000 are both assessed as solely significant under Criterion "d". The sites have yielded information important for understanding late prehistoric to historic land use in project area.

Recommended Treatments

The mapping, written descriptions and photography at the sites adequately documents them no further work or preservation is recommended.

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Cultural Impact Assessment

**CULTURAL IMPACT ASSESSMENT
FRONTAGE ROAD IMPROVEMENTS PROJECT
(TMK: [3] 7-3-09: PORTION 16 AND PORTION 18)**

**LAND OF KOHANAIKI, NORTH KONA DISTRICT
ISLAND OF HAWAII**

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INTRODUCTION

At the request of Kohanaiki Shores, LLC and Kohanaiki Business Park, Haun & Associates conducted a Cultural Impact Assessment (CIA) for a frontage road improvements project to be contained within a c. 16-acre property located in Kohanaiki Ahupua'a, North Kona District, Island of Hawai'i (TMK: [3] 7-3-09: por. 16 and por. 18 - *Figure 1*). The purpose of the CIA is to identify traditional cultural resources or practices that may be affected by the proposed frontage road. A frontage road corridor is required because plans to upgrade the Queen Ka'ahumanu Highway to 4-lane limited access highway between Honokōhau and the Keāhole Airport will consolidate signalized intersections. Access to the Kohanaiki Shores development and the county's beach park needs to be relocated c. 943 ft (287 m) south of the current access where a traffic signal will be installed at the intersection of the Queen Ka'ahumanu Highway and Hulikoa Drive.

Scope of Work

This assessment provides information to address the constitutional duty of agencies of the State of Hawai'i to protect the reasonable exercise of customarily and traditionally exercised rights of native Hawaiians, to the extent feasible. To this end, the Hawai'i Supreme Court, in September 2000, pronounced an analytical framework within which State and County agencies may fulfill this constitutional duty. In Act 50 of Ka Pa'akai O Ka 'Aina vs. Land Use Commission (Supreme Court, State of Hawai'i 2000), the court directed the LUC, in consideration of petitions, to make specific findings before reaching a decision on the petition concerning:

- The identity and scope of "valued cultural, historical and natural resources" in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;
- The extent to which those resources, as well as traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
- The feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights, if they are found to exist.

The specific tasks of this study to satisfy the Act 50 of the Ka Pa'akai O Ka 'Aina requirements are:

1. Conduct background review and research of existing ethnographic, historical, anthropological and sociological documentary literature relating to traditional cultural practices and resources in the study area and its immediate vicinity;
2. Identify and consult with individuals and organizations to identify knowledgeable individuals with expertise concerning the types of cultural resources, practices and beliefs found in the vicinity of the study area; and
3. Prepare and submit a CIA report including: (a) a discussion of all methods and procedures used for data collection; (b) identification of identified cultural resources, practices and beliefs within the vicinity of study area; (c) an assessment of the potential effects of the proposed project on any identified resources, practices and beliefs; and (d) recommendations for mitigating any potential adverse effects.



Figure 1. Portion of USGS Keahole Point Quadrangle showing Project Area

Study Area Description

The study area consists of a roughly rectangular-shaped c. 16-acre parcel located 50 to 95 m seaward of Queen Ka'ahumanu Highway and inland of the Shores at Kohanaiki development, from c. 39 to 65 ft elevation (*Figure 2*). The north side of the study area is located adjacent to the south side of the access road for The Shores at Kohanaiki development. The east side borders the Queen Ka'ahumanu Highway right-of-way and the south and west sides are bordered by undeveloped land. The frontage road will provide a signalized access to the development at the Queen Ka'ahumanu Highway and Hulikoa Drive intersection in the future.

There is little soil in the study area and the ground surface consists of a'a and pahoehoe lava flows. Pahoehoe covers c. 8.8-acres (62% of study area). According to Sato *et al.* (1973:34) pahoehoe lava is dominated by a smooth surface with scattered hummocks and pressure domes. Wolfe and Morris (2001:12, Sheet 1) indicate that the pahoehoe flow originated from Hualālai Volcano 3,000 to 5,000 years ago. Pahoehoe in the study area is depicted in *Figure 3*. The a'a lava flow covers 5.4-acres or 38% of the total area and is characterized as "a mass of clinkery, hard, glassy, sharp pieces piled in tumbled heaps" (Sato *et al.* 1973:34). The a'a flow is also derived from Hualālai and was deposited 5,000 to 10,000 years ago (Wolfe and Morris 2001:12, Sheet 1). The a'a flow in the study area is illustrated in *Figure 4*.

No vegetation is present on the a'a flow in the study area. The pahoehoe flows supports fountain grass (*Pennisetum setaceum* [Forsk.]), scattered *haole koa* (*Leucaena glauca*), Christmas berry (*Schinus terebinthifolius*), *maia pilo* (*Capparis sandwichiana*), *noni* (*Morinda citrifolia*) and *klu* (*Acacia farnesiana* [L.]).

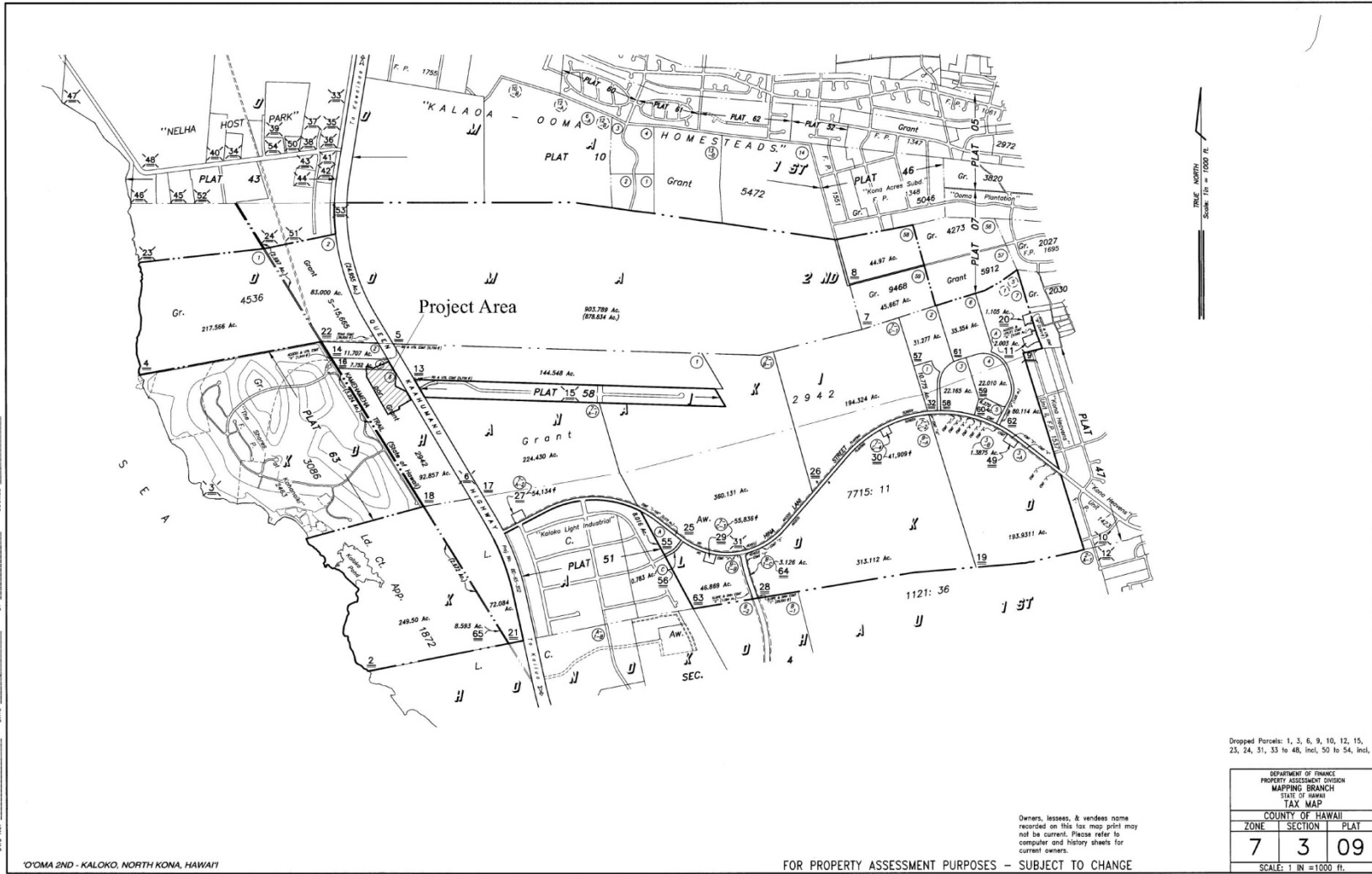
METHODS

Archival research was conducted at the Office of Environmental Quality Control Archives, Hawai'i State Historic Preservation Division Library in Kapolei, the Hawai'i State Survey Office and the Hawai'i State Archives using both recent archaeological reports as well as historical texts to build a cultural and historical background for the study area. The Kohanaiki 'Ohana Committee, composed of family members with ancestral ties to Kohanaiki, is currently working with Kohanaiki Shores, LLC to ensure that the development of the Kohanaiki Golf and Ocean Club is conducted in a culturally appropriate manner. The active members of this committee include Reggie and Elizabeth Lee, Herman and Nalei Kunewa, Mahealani Pai and Zachary Kanuha. The committee members were contacted via telephone and email in order to find individuals that would be willing to share their knowledge about traditional cultural places and practices that currently take place or that formerly took place in and around the study area. The email text follows:

Haun & Associates has been contracted by Discovery Land, Co. to conduct a cultural impact assessment for the Kohanaiki Frontage Road Corridor (TMK: 7-3-09: Por. 18), Kohanaiki Ahupua'a, North Kona District, Island of Hawai'i. The purpose of this assessment is to identify any traditional and customary native Hawaiian rights that are exercised in the area; the extent in which the proposed development will affect these rights; and feasible action to be taken to protect native Hawaiian rights if they exist.

1/26/11

7 - 3 - 9 3RD. DIST.



DWG NO. _____
 DATE: JANUARY 12, 2010 BY: JSE
 SOURCE: T.M.R.

Dropped Parcels: 1, 3, 6, 9, 10, 12, 15, 23, 24, 31, 33 to 48, incl, 50 to 54, incl.

Owners, lessees, & vendees name recorded on this tax map print may not be current. Please refer to computer and history sheets for current owners.

Figure 2. Tax Map Key 7-3-09 showing Project Area



Figure 3. Pahoehoe Lava Portion of Project Area, view to southeast



Figure 4. A'a Lava Portion of Project Area, view to northwest

The project area is a portion of land situated between the Shores at Kohanaiki development and Queen Ka'ahumanu Highway. The frontage road will provide the development access to the highway in the future.

We are searching for individuals that are knowledgeable in the traditional cultural practices that take place and the traditional cultural properties in the project area and its vicinity. Would you be willing to share your knowledge of the activities that take or took place here or would you be able to recommend someone that is willing to share their knowledge?

The people identified during this process were then interviewed in an informal “talk story” manner in which they were able to discuss the issues most important to them. The interviewees signed a form authorizing the use of their information within this study. When possible, the interviews were recorded on a digital voice recorder.

HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

Historical Documentary Research

Kohanaiki lies within an area of lava-covered land north of Kailua called Kekaha, which “describes a dry, sun-baked land” (Kelly 1971:2). Kohanaiki means “small barrenness” (Pukui *et al.* 1974:115), reflecting its harsh environment. There is little mention of Kohanaiki in Hawaiian legendary and traditional history. The cultural historical background of the Kekaha region has been documented by Maly (Rechtman and Maly 2007), who has spent more than a decade compiling interviews and translating Hawaiian newspaper articles.

The story of Ka-Miki was published in the weekly Hawaiian language news paper *Ka Hōkū o Hawai'i* in 1914 and 1917, written by John Whalley Hermosa Isaac Kihe and John Wise (*ibid.*; translated by Maly). The story, entitled “*Ka'ao Ho'oniua Pu'uwai no Ka-Miki*” (The Heart Stirring story of Ka-Miki), took place during the 1300s and follows two brothers, Ka-miki and Ma-Ka'iole, on their journey around the Island of Hawai'i. The two brothers received their supernatural abilities from their ancestor Ka-uluhe-nui-hihi-kolo-i-uka, one of the many body forms of the goddess Haumea (*ibid.*:16). The story describes their ties to Kohanaiki through Ka'uluhenuihikoloiuka and her family, who lived in Kohanaiki and for whom places were named in Kohanaiki:

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

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

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

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

Kauluhenuihikoloiuka trained the brothers in Kohanaiki. They also built their royal compound in the *ahupua'a*. During the dedication ceremony, the brothers discover that one of the priests of Kekaha has taken to killing people and has also conspired to kill Kamiki and Makai'ole. The priests of Kekaha gather to discuss the plot against the brothers and prepare to apologize and ask the forgiveness of Kamiki and Makai'ole. It is during this part of the tale that we learn the name of the high priest of 'O'oma and Kohanaiki (*ibid.*:17):

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

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

'Elepaio was the high priest of Honokōhau. The place where he dwelt bears the name 'Elepaio. It is in the great grove of 'ulu (*kaulu 'ulu*) on the boundary between Honokōhau-nui and Honokōhau-iki...

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

Silva (Appendix A in Donham 1986:122) conducted historical documentary research for the 1986 archaeological survey of coastal Kohanaiki. Her research based on Kamakau's (1961) history bears repeating verbatim:

Kamakau also stated that Kekaha lands had been set apart from the whole of Hawai'i island for the priestly class:

Waimea was given to the Pao kahuna class in perpetuity and was held by them up to the time of Kamehameha III when titles had to be obtained. But there was one land title held by the kahuna class of Pao for many years and that was Puuepa in Kohala. In the same way the

land of Kekaha was held by the kahuna class of Ka-uahi and Nahulu (Kamakau 1961:231).

These Kauahi and Nahulu lines of priesthood assumed active and influential roles well into the historic period. They served as counsel to kings and later even dared to strongly voice their disapproval over Liholiho's "free-eating" and his general disregard of traditional precepts.

The reserving of these Kekaha lands for the priesthood went unquestioned and was guaranteed by chiefs such as Kalaniopu'u in historic times. Kekaha consequently passed quietly to the progeny of these priestly lines. Individuals descending from the Nahulu priesthood included the twin chiefs Kame'eiamoku and Kamanawa.

Of particular note in relation to Kekaha, is Kame'eiamoku's son, Ulumaheiehi Hoapili, who was well-trained in all of the arts of this esteemed lineage. Kamakau recalled:

He [Hoapili] belonged to the priesthood of Nahulu and was an expert in priestly knowledge. He had been taught astronomy and all the ancient lore (Kamakau 1961:354).

Kamakau further enumerated upon some of the skills at which Hoapili excelled: debate, knowledge of the history and rule of the chiefly lines, ancient protocol, royal genealogies, and proficiency and literacy in the English language as well. So faithful and dependable was he that upon the demise of Kamehameha, Hoapili was given the guardianship for the "Conqueror's" sacred remains, which (it is believed) he carefully hid in Kekaha at Kaloko, which immediately adjoins Kohana-Iki to the south (Kamakau 1961: 215, 355).

Ellis (1963) reported the observations of the Reverends Thurston and Bishop during a walk along the coast north from Kailua in 1823. They described houses along the coast built on lava and small gardens in the lava where sweet potatoes, watermelon and tobacco were grown.

During the Great Mahele, Kohanaiki became government land (Indices 1929:9). The Waihona 'Aina (2000) Mahele Database, which is a compilation of data from the Indices of Awards (Indices 1929), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.), lists two Land Commission Award (LCA) claims for parcels in Kohanaiki that were not awarded.

Haheeholua (LCA 10336) claimed a house lot that he received from his grandparents in 1819 (NT n.d: 654v8). The house lot measured 875 ft by 420 ft (NR n.d: 590v8). There is no indication of the house lot location. Haheeholua also claimed two parcels in Kaloko (NR n.d: 590v8). One parcel in Kiikahala'ili had eight taro and potato plots. The other parcel, in Kealaehu'ili, had four plots of taro. The latter parcels were undoubtedly located in the upland portion of Kaloko. Paawela (LCA 7987) claimed four parcels in Kohanaiki that included eight cultivated plots and a house lot, but no specific crops are mentioned (NT n.d: 539v4). The parcels were located in two 'ili: Paawela and Haleolono. He received the land from Hulikoa in 1845.

Silva (1986:120-128) also researched Hawaiian Government Department of Interior correspondence and documents pertaining to Kohanaiki. In 1863, Kapena applied to purchase 154 acres in the seaward

portion of the *ahupuaʻa* and was accepted receiving Grant 3086. The upland portion of the *ahupuaʻa* consisted of Grant 2030, a 102-acre parcel that was sold to Kaiakoili in 1856 (Waihona ʻAina 2005 Land Grant Database). The intervening portion of Kohanaiki, that contains the present study area, consists of 930 acres sold to Hulikoa in 1864 as Grant 2942.

Kelly (1971:12) cites missionary and later census data that document a decline in the population of Kekaha in the 1800s. The population declined from 12,432 in 1832 to 3,488 by 1860. The most dramatic decrease occurred between 1832 and 1835 when the population decreased by more than half. She cites tax records that indicate Kohanaiki had 8 taxpayers in 1857, thirteen in 1858, and 12 in 1859. A minister named Kaanoimaka completed Kohanaiki Church in the inland portion of Kohanaiki in 1879 (Kelly 1971). The Hawaiian Kingdom Directory for 1880-1881 lists a Chinese storekeeper named Akao and coffee planter named Kaiakoili in upland Kohanaiki along the government road (Kelly 1971:13). Kaiakoili owned 600 acres of land with ten acres in cultivation.

In 1924, John Whalley Hermosa Isaac Kihe wrote about the changes that he had witnessed in Kekaha as a whole from c. 1860 to 1924. He notes the difference in the children as the Hawaiian language is phased out in the schools and replaced by English, and he notes the decline in population of a once populous region (translated by Maly in Rechtman and Maly 2007:22).

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

From the lands of Honokōhau, Kaloko, Kohanaiki, the lands of ʻOʻoma, Kalaoa, Haleʻohiʻu, Makaʻula, Kaʻū, Puʻukala-ʻOhiki, Awalua, the lands of Kaulana, Mahaiʻula, Makalawena, Awakeʻe, the lands of Kūkiʻo, Kaʻūpūlehu, Kīhōlo, Keawaiki, Kapalaoa, Puʻuanahulu, and Puʻuwaʻawaʻa. These many lands were filled with people in those days.

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

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

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

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

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

A map by J.S. Emerson in the 1880s (*Figure 5*) shows the area of Kohanaiki divided into three grants: Grant 3086 to Kapena at the coast, Grant 2030 to Kaiakoili inland and a large grant (2942) in the intervening area to Hulikoa. The map shows four roads or trails: one paralleling the shoreline, another follows the route of the Mamalahoa Highway, one extending south-southeast and inland from the latter road, and one extending from a coastal fishpond in Kaloko that joins the inland two roads in upland Kaloko. The map also shows Kohanaiki Church situated along the latter inland-seaward route at the southwest corner of Kaiakoili's grant. On Emerson's map the seaward portion of Kohanaiki (containing the present study area) is characterized as consisting of pahoehoe and a'a lava with vegetation. The map also shows the seaward edge of the upland forest just seaward of Kaiakoili's grant at approximately 1,100 ft elevation. This line was probably the seaward limit of the upland cultivated portion of the *ahupua'a*.

Kohanaiki Homestead lots were purchased in the area surrounding Kohanaiki Church between 1895 and 1898 (Cordy et al. 1991:418-419), but it is likely that a settlement was established there as early as the late 1870s when the church was constructed. Several caretakers of the Kaloko fishpond lived at the homesteads (Kelly 1971). The homestead settlement, which is situated seaward of the study area, is depicted in Cordy et al. (1991:420, Figure 105). The settlement consisted of at least nineteen house lots, most with stone wall enclosed yards. The settlement was situated at the intersection of four roads: (1) Kohanaiki Road that extended inland to the inland government road, today's Mamalahoa Highway, (2) A road to the fishpond at the coast in Kaloko, (3) A road that extended south-southeast from the settlement to a junction with a road that followed the general course of Mamalahoa Highway and Palani Road to Kailua, and (4) Alanui Kauwila, a road that extended north from the settlement.

The Kohana-iki Homesteads map shows the house of Kaiakoili, the recipient of Grant 2030, situated in the northeast corner of the settlement. Other residents included Keo, Kiaha, Kaholi, Pahuole, Kaninau, Paiwa, Mokuaikai, Hoomana, Kuhia, Kaiha, Haau, Kaalawamaka, Kikaha, Kapa, Punihaole, Keakemao, Kaiakoili, Noa, and Hulimai. Wolforth et al. (2005) suggest that by 1957 only a single homestead was still occupied based on cartographic evidence.

Figure 6 is a portion of the 1924 USGS Kalaoa Quadrangle map. The map shows the location of Kohanaiki Homesteads as a cluster of structures at approximately 1,150 ft elevation. Three structures are depicted along an inland road that follows the route of today's Mamalahoa Highway. Another road extends from the inland road in Honokōhau to the homesteads. A trail extends northwest from the homesteads. At the southeast corner of the homesteads the map shows a survey station labeled "Kaiha", the name of one of the homestead residents.

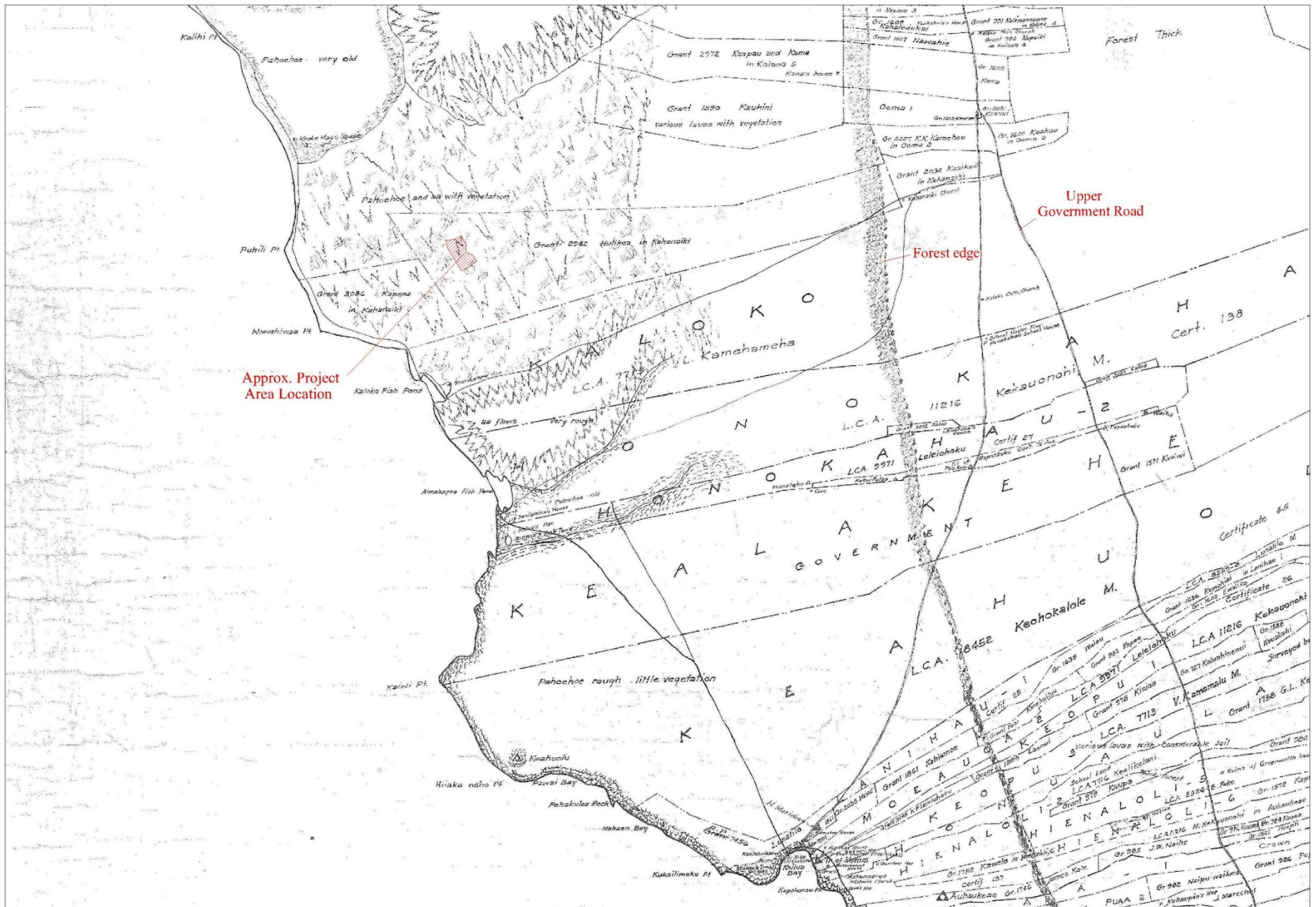


Figure 5. Portion of Emerson's 1880 Map of Kailua, Kona

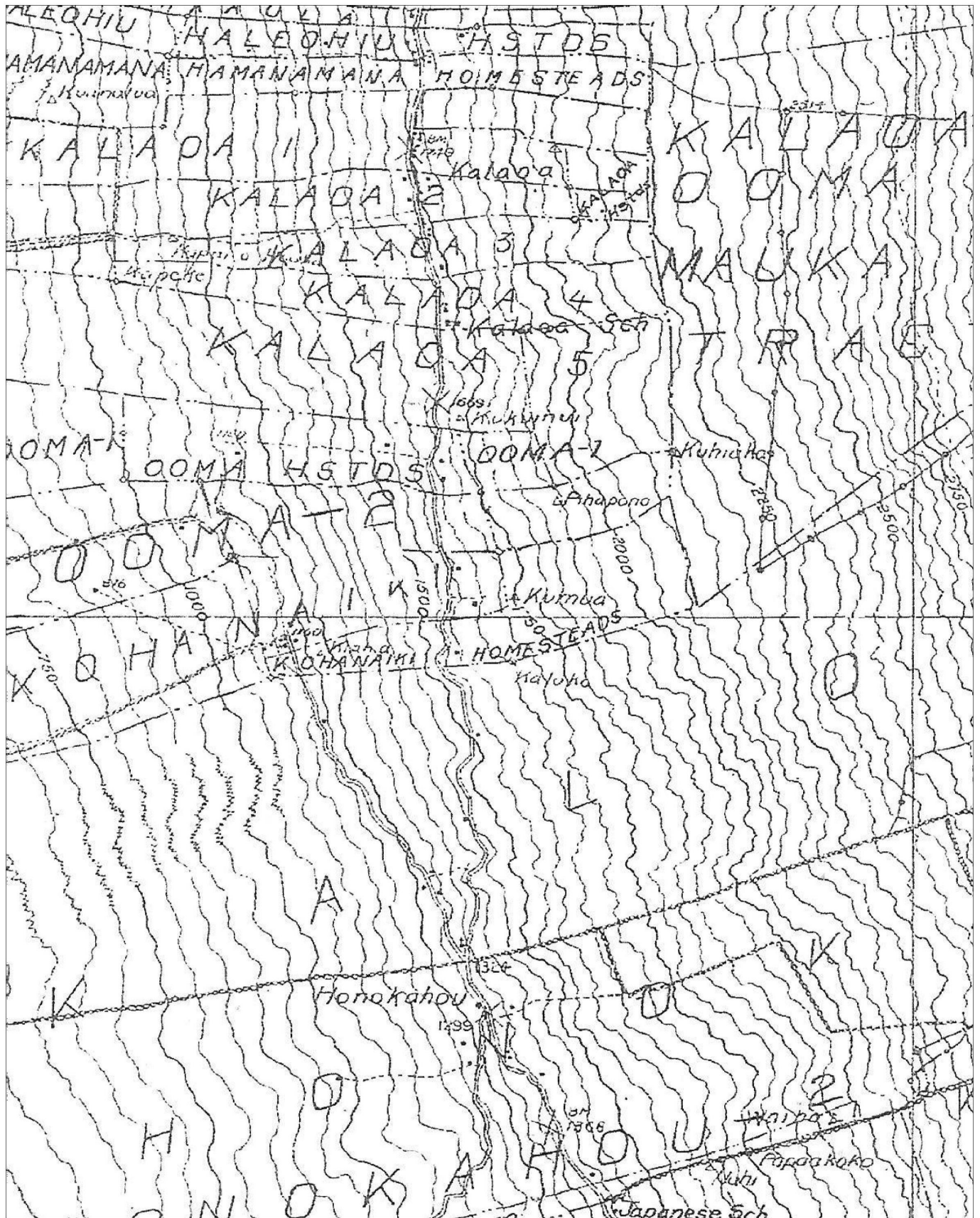


Figure 6. Portion of 1924 USGS Kailua Quadrangle

Previous Archaeological Research

At least 15 archaeological survey and excavation projects have been conducted in Kohanaiki (*Figure 7*). *Table 1* summarizes the project findings. The location of the West Hawai'i survey by Reinecke (1930) is not included on the *Figure 7* map. Reinecke's coastal survey identified eight sites along the coast of Kohanaiki (Sites 58-62). The sites included a survey station, a cattle pen, a complex of walls with a burial platform, a complex of modern house platforms and a corral, a complex of two enclosures and a small platform, and a possible *heiau* at Wāwahiwa'a Point. These sites were subsequently documented by Donham (1986). The inland portion of the Donham survey area also extended through the current study area, but no sites were identified in this portion of her study area.

Table 1. Summary of Previous Archaeological Work

Study	Study Type*	Elevation (ft)	Area (ac)	Total sites	Sites per acre	Total fea	Feas. Per acre	Hab Feas	Hab Feas per acre	Perm Hab Feas	Temp Hab Feas	Ag Feas	Ag Feas per acre	Burial Feas	Ritual Feas	Trail	Ahu	Rock art	Historic Feas	Indet/ Misc. Feas
Donham (1986), O'Hare and Rosendahl (1991), O'Hare and Goodfellow (1992), O'Hare et al. (1993)	RN, IN, DR	0-80	362	112	0.31	256	0.71	139	0.38	57	82			19	19	1	40	8	3	27
Walsh and Hammatt (1995)	IN	40-140	15	3	0.20	6	0.40									3	3			
Colin et al. (1996)	IN	90-340	244	55	0.23	90	0.37	39	0.16		39	9	0.04	9		20	2			11
Kennedy (1983, 1984)	RN	250-500	200	39	0.20	80	0.40	63	0.32	18	45			1		2	9	2	4	
Hammatt (1980), Barrera (1983, 1985, 1988), Wolforth et al. (2005)	RN, IN, EX	790-1100	127	143	1.13	181	1.43	25	0.20		25	145	1.14	5	1				5	
Clark and Rechtman (2002)	IN	1200-1580	52	5	0.10	5	0.10	3	0.06		3								2	
Haun and Henry (2006)	IN	1340-1410	2.5	4	1.60	37	14.80	3	1.20	2	1	27	10.80						7	
Elmore et al. (2004)	IN	1410-1480	4	1	0.25	23	5.75	3	0.75			18	4.50							1
Haun and Henry (2010)	IN	1715-1915	9.945	9	0.90	274	27.55	1	0.10	1		261	26.24		1		1		10	
Total/Average			1016	371	0.55	746	5.72	276	0.40	78	195	460	8.54	34	21	26	55	10	31	39

* = AS = Assessment, EX = Excavation, IN = Inventory Survey, RN = Reconnaissance Survey

The projects in *Table 1* cover more than 1,000 acres of Kohanaiki in which 371 sites with 746 features have been identified. Sites and features identified in other *ahupua'a* by the studies are not included in the table. To aid in reconstructing settlement patterns, features were quantified by probable age and function, and the studies are ordered by elevation. Traditional Hawaiian features were categorized as habitation, agricultural, burial (including possible burials), ritual, trail, *ahu* and rock art. Features not assignable to these categories were categorized as indeterminate or miscellaneous. Traditional sites in this category include storage features, an abrader quarry and features of indeterminate function. Habitation sites are further subdivided into temporary and permanent for studies in which this distinction was made.

Density values are given for sites, features, and habitation and agricultural features. The studies identified 276 habitation features, 460 agricultural features, 34 burials, 21 ritual features, 26 trails, 55 *ahu* and 10 petroglyphs. Historic features were not segregated by function; the majority are ranch walls. Overall feature density values vary from 0.1 to 27.55 features per acre with an average of 5.72. Habitation feature density varies from 0.06 to 0.75 features per acre with an average of 0.4. Agricultural feature density varies from 0 to 26.24 features per acre, with an average of 8.54 features per acre.

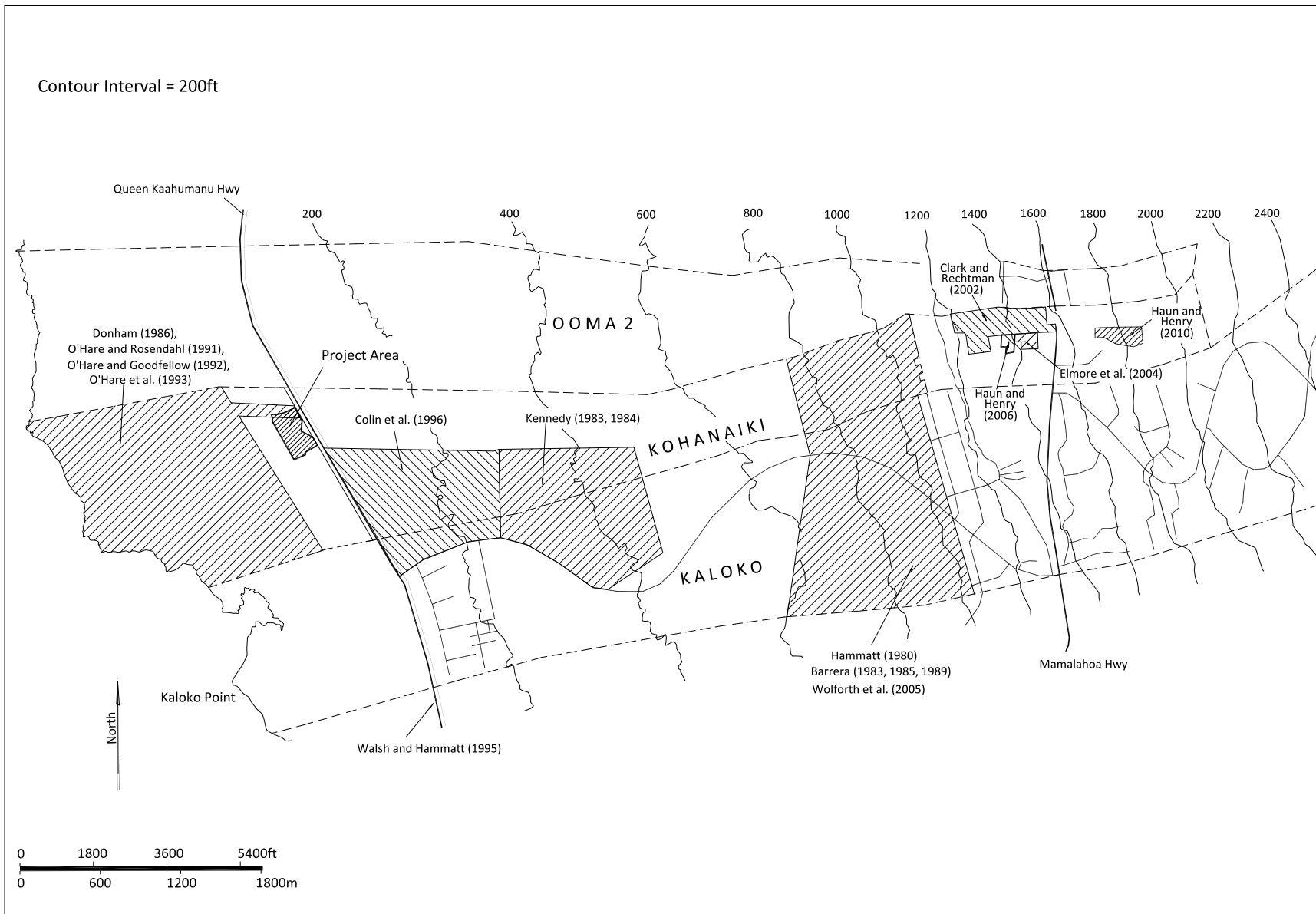


Figure 7. Ahupua'a Boundaries and Previous Archaeological Work

Twenty-seven radiocarbon dates are reported in the data recovery report by O'Hare and Goodfellow (1992) that covered the coastal portion of Kohanaiki. Most of the age determination results produced multiple age ranges. When all potential age ranges are examined, two span the A.D. 1000s, six include the 1100s, seven span the 1200s, sixteen span the 1300s, twenty span the 1400s, nineteen include the 1500s, twenty-three span the 1600s, fifteen include the 1700s and the rest (27) include the 1800s to mid-1900s. The results potentially indicate initial use of the area by the 9th century, followed by a marked increase during the 14th and 15th centuries. The largest number of age ranges spans the 1600s followed by a slight decrease during the 1700s to 1800s.

Cordy *et al.* (1991) describe their *ahupua'a*-wide study of the adjacent *ahupua'a* of Kaloko conducted in the early 1970s and summarize the work of Reinecke (1930) and Emory and Soehren (1961) in the coastal portion of Kaloko. The study included a survey of the entire *ahupua'a* seaward of the Queen Ka'ahumanu Highway and sample areas inland of the highway. Excavations were conducted at 20 sites near the coast, 11 sites between 30 m and 244 m elevation, and five upland sites above 610 m elevation. Their study used four environmental zones to characterize settlement patterns that are applicable to the adjacent lands of Kohanaiki: (a) the Coastal Zone from sea level to 15 ft elevation, (b) the Middle Zone from 15 ft to 800-900 ft elevation, (c) the Lower Upland Zone from 900 ft to 1500 ft elevation, and (d) the Upland-Forest Zone between 1,500 and 6,000 ft elevation. Their settlement pattern model has been largely confirmed by the subsequent studies described above.

Based on their data, Cordy *et al.* (1991) surmised the *ahupua'a* was permanently settled between A.D. 900 and 1200. Most of the sites were presumed to date to the 1600s and 1700s and many sites had a historic component. A *heiau*, coastal trail, *ahupua'a* boundary shrine, and permanent habitation sites, including the residence of at least one chief and four men's houses, were clustered next to the shoreline and around the fishpond. Temporary habitation sites were also present in the coastal zone. Branch trails linked habitation sites with subsistence sites and water sources along the coast. Subsistence sites included the fishpond at the coast, animal enclosures and agricultural features in the lower portion of the Middle Zone. A series of *mauka-makai* trails extend from the coast to the uplands. Burials were concentrated in a cemetery in the lower Middle Zone and individual burials were present at two coastal sites.

Inland of the lower Middle Zone adjacent to the Coastal Zone, sites were widely scattered and primarily consisted of trails leading to the uplands associated with markers (cairns) and temporary habitations, primarily in lava tubes. Settlement pattern data for the Upland Zone were derived from historic records. In the early to mid-1800s, the Upland Zone was used for agriculture and habitations were scattered. This pattern is assumed to have prevailed in late prehistory as well. By the 1870s and 1880s, residential sites were more common and agricultural use continued as a small community developed near the upper road. This coincided with the near abandonment of the coastal habitations. In the late 1800s to early 1900s, the focus of land use shifted to large-scale ranching.

The Upland-Forest Zone was characterized by an extensive field system consisting of formal walled fields from 900 ft elevation up to c. 2,300 ft, which was believed to be the lower limit of the late prehistoric forest edge. The major field boundary walls were perpendicular to the coast. Other agricultural features included terraces, depressions, mounds, and probable pigpens. Temporary habitation sites were scattered among the fields and at least one small shrine was present. Below 900 ft and above 2,300 ft elevation agricultural features were present, but were informal and scattered. By the mid-1800s, the forest edge was reported to be at the 1,700 ft elevation, leading the authors to conclude that much of the area was abandoned as a result of depopulation between European Contact and the 1850s.

ORAL HISTORIES

Previous Cultural Impact Assessments

Maly and Maly (2003) conducted a CIA for Kohanaiki Ahupua'a. In addition to compiling and translating Native Hawaiian accounts of the area, Maly interviewed 17 individuals knowledgeable about Kohanaiki and the surrounding Kekaha area. Some of these individuals were interviewed for another CIA (Retchman and Maly 2007) for O'oma Beachside Village development in neighboring 'O'oma 2nd Ahupua'a. The individuals interviewed included Valentine K. Ako, Josephine Ako-Freitas, Annie K. Coelho, George Kinoulu Kahananui Sr., Elizabeth Maluihi Ako Lee, Francis and Anna Keanaaina, Samuel and Claudia Keanaaina, Malaea Agnes Keanaaina-Tolentino, Cynthia Torres, Agnes Puakalehua Nihi-Harp, Isaac Harp, Violet Leimomi Nihi-Quiddaoen, Peter Keikuaana, Anna Kamaka-Park, Robert Kaiwa Punihaole, C. Hanohano Punihaole, Ruby Keanaaina McDonald, and Peter Keka.

The individuals interviewed by Maly related a similar story to Kihe's retrospection in *Ka Hōkū o Hawai'i* as he recalled the years from 1860 to 1924. By the late 1800s and early 1900s many of the families had left the lower elevations of Kekaha and moved to the uplands. Only a few fishermen lived at the coast in the early- to mid-20th Century. The *mauka* – *makai* trails were important to the upland residents for travel between the uplands and the coast to access the marine and near-shore resources such as fish, shellfish, *limu* (sea weed) and brackish water. The consensus of the individuals interviewed was that the trails, burial places, *heiau*, petroglyphs and other culturally important sites should be preserved in place, and that all sites should be protected whenever possible.

Knowledgeable Individuals

The Kohanaiki 'Ohana Committee is a government-sanctioned entity that is specifically responsible for management of the exercise of traditional and customary native Hawaiian rights on the property. The Committee is composed of lineal descendants of the *ahupua'a*. The Kohanaiki 'Ohana Committee identified Elizabeth Maluihi Ako Lee (Maluihi) and Mahealani Pai as individuals knowledgeable of the traditional cultural places and practices of the area. Kaleo Kualii, a traditional cultural practitioner, was also contacted about his knowledge of the study area.

Aunty Maluihi was born in 1929 in Holualoa, raised in Kohanaiki and moved to 'O'oma. Her family lived in the uplands of Kohanaiki and she would accompany her father to the coast and walk along the shore from Kaloko to 'O'oma as he gathered fish. She is a respected *lauhala* (*Pandanus*) weaver, and has a wealth of knowledge of Kohanaiki and the surrounding area. Her son, Uncle Reggie Lee, formerly of DOCARE and member of the Kohanaiki 'Ohana Committee, accompanied her during the interview and offered insights of his own as well.

Mahealani Pai was born in Kona and grew up on O'ahu. He spent the summer months of his youth with his grandmother, *Tūtū* Kaninau, in Honokōhau. He would accompany his father to Kohanaiki to gather '*ōpae'ula* (*Halocaridina rubra*). Mahealani is a chanter and a cultural practitioner, knowledgeable of Kohanaiki and the area.

Kaleo Kualii was born and raised in Kona. He is the grandnephew of Aunty Maluihi and would often accompany her brother, George Kinoulu Kahananui, along the trails that connected the *mauka* and *makai* portions of Kohanaiki, 'O'oma, and Kaloko. Kaleo was responsible for initially marking the buffers around the preservation sites before the mass grading of the Shores at Kohanaiki commenced and also monitored the initial vegetation cleanup along the anchialine ponds.

Statements Concerning Traditional Places

Aunty Maluihi stated that the place names of the area were used to describe that area, and to provide warnings when necessary. Wāwahiwa'a, a point located along the shore of Kohanaiki (*Figure 8*), is a place that people avoided when landing their canoes. It means that the water is very rough and it will destroy any canoe should it come too close. People did land their canoes near there but further south in Kohanaiki near the boundary of Kohanaiki and Kaloko.

Pūhili, a point along the shore of Kohanaiki south of Wāwahiwa'a, is not the name of that point. Its real name is Pūwili, a combination of *pū* (to blow) and *wili* (to twist), which describes a blowhole located at the point. When the surf is high and the waves are crashing you can hear the air blowing (*pū*) through as it is twisted (*wili*) by the waves through the blowhole.

Maluihi stated that the original name of the *ahupua'a* was not Kohanaiki; they called it Kohohaiki. Its name comes from the fact that it is a narrow strip of land that is cut off, it does not go all the way to the summit of the mountain. This is in relation to Kaloko, which in the case of the *ahupua'a*, means that it is a strip of land that is "deep in," the land does not reach the summit of the mountain. Kaloko also means the fishpond where people would go and gather fish. Maluihi stressed the context of the Hawaiian words is very important. Mahealani Pai also stated that his family did not refer to the *ahupua'a* as Kohanaiki, but rather Koheneke.

The *mauka-makai* trails were important to the families living in the uplands of Kohanaiki and the surrounding Kekaha areas. The trails provided access to the shoreline resources and for trade between the few people that lived on the shore and those that lived in the uplands. Kaleo Kualii learned the *mauka-makai* trails from his great-Uncle Kinoulu. He stated that there were the two main trails, one to the north in 'O'oma that came down to Wāwālolī, and the other to the south that came down to the boundary between Kohanaiki and Kaloko. He knew of two other trails that came down through Kohanaiki. The trails were marked by coral and by 'opihi (*Cellana*) shells.

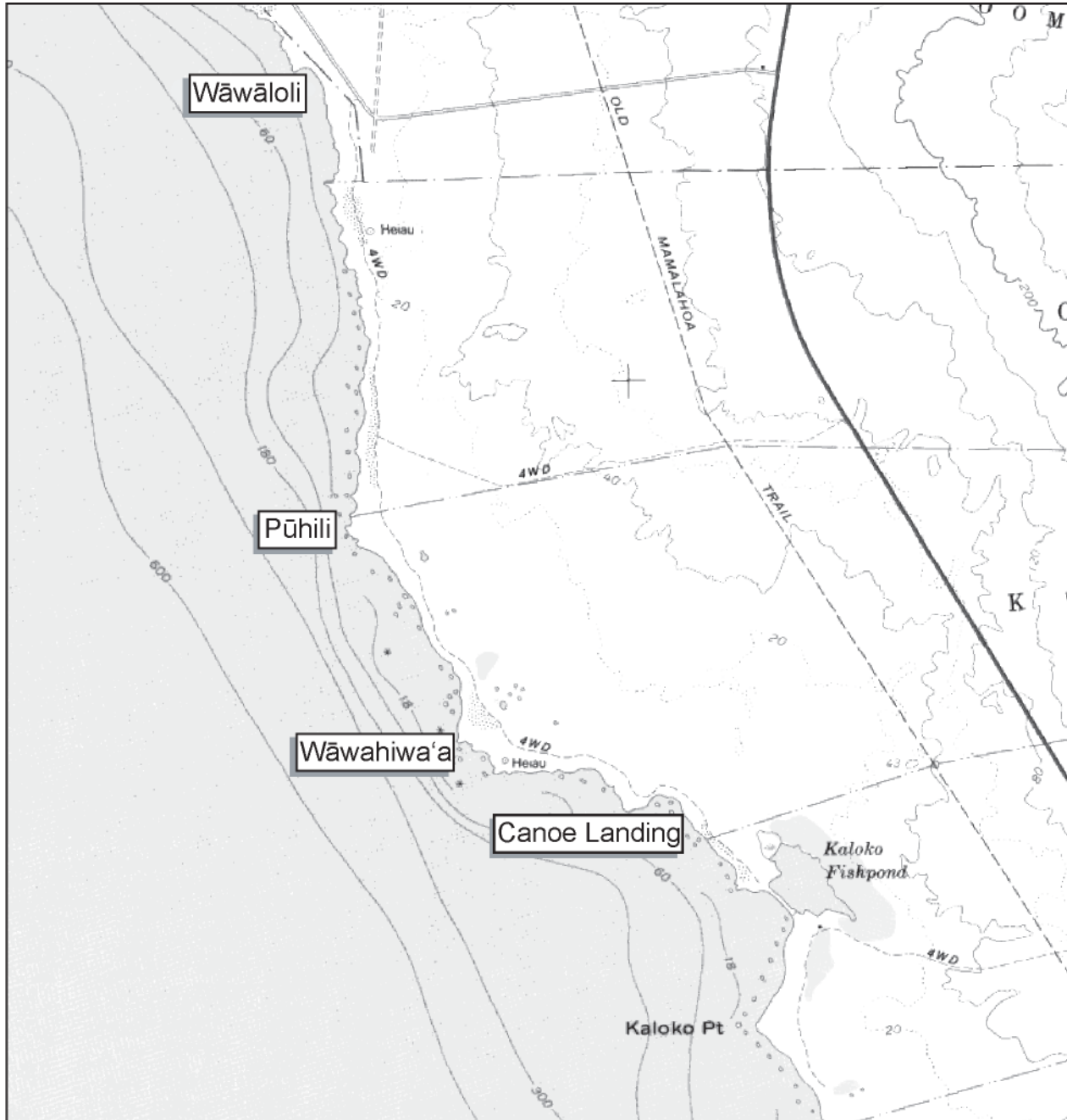
Herman Kunewa, a Kohanaiki 'Ohana Committee member, thought that the frontage road could provide increased access to a culturally significant and sensitive area. He stated (Kunewa 2011) that:

All [of the] 'āina of Keawe [Island of Hawai'i] is sacred and since the 'iwi kupuna of Kohanaiki have been identified we believe the development of the entrance is very much significant. It's like entering into a *hale* (house), the *mana'o* (mindset) you come with [must be] good intentions and aloha. Once the building begins and *malihini* (newcomers) take up residence they will enter and live with our *kupuna iwi*.

Statements Concerning Traditional Practices

Hu'ehu'e Ranch owned most of the lowlands of Kohanaiki. Joe Kolea, a man of Korean ancestry, leased a parcel of land from Hu'ehu'e Ranch on the coast of Kohanaiki near the boundary of Kohanaiki and Kaloko. Aunty Maluihi stated that Joe Kolea would catch 'ōpae'ula and use it as bait to catch 'ōpelu which he would dry and trade to her family for goods such as *poi* and sweet potato.

Mahealani Pai was taught by his father, who was taught by Mahealani's grandfather, the proper way in which to harvest the 'ōpae'ula to use as bait for 'ōpelu (Pai 2011). Pai's father and grandfather would travel from Honokōhau to Kohanaiki by canoe. They would land the canoe either near the border of



Source: USGS 7.5 Minute Series Keahole Point.

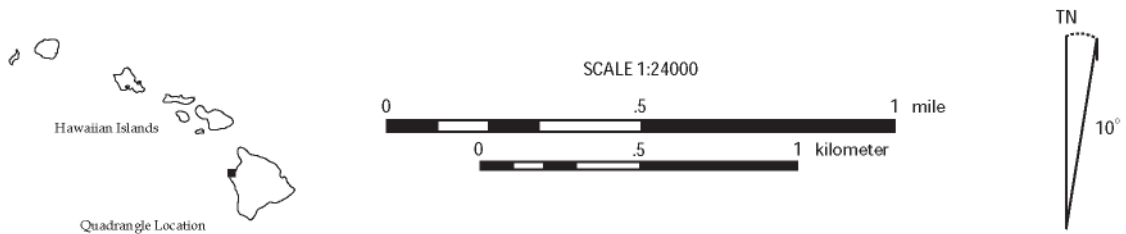


Figure 8. Noted places in Kohanaiki and vicinity.

Kaloko and Kohanaiki or near Wāwahiwa'a Point. The line of ahu denoted by SIHP site 50-10-27-14594, was used in conjunction with the lava flow (puhi-a-Pele) as a navigational aid so that one could tell where they were out on the ocean. They knew they were in Kohanaiki once they were able to see the lava flow.

Mahealani Pai walked along the golf course among the extant anchialine ponds with Solomon Kailihiwa. Mahealani's father showed and taught him about the anchialine ponds and the 'ōpae'ula that lived within the ponds. This knowledge had been passed down from Mahealani's grandfather. 'Ōpae'ula (brine shrimp) are used as a bait for catching 'ōpelu (*Decapcturus macarellus*). Mahealani's family would tend and care for the ponds and still gather 'ōpae'ula today.

Pai named one pond as "The King of the 'Ōpae'ula." This pond is very healthy, there are no mosquito fish, the grass and the *limu* (seaweed) are clean and green, and bubbles are coming to the surface through the vegetation mat, and the 'ōpae'ula are present in large numbers around the edge of the pond. Mahealani's father and grandfather used to come down to this pond to gather the 'ōpae'ula. Pai would come down in the past and care for this pond, cleaning it, and maintaining its health. Pai would come here and gather for his father and uncles as they grew older and lost the agility of their younger years, and carry the 'ōpae'ula out to the canoes for them so that they could fish for 'ōpelu. Pai's great-Aunty and *tūtū* (his father's sister) still come down to Kohanaiki to gather 'ōpae'ula.

Aunty Maluihi recalled how clean the ocean and the beach were when she was growing up and her family would spend the summer months along the shores of Kaloko, Kohanaiki and 'O'oma. She and her family would travel down the *mauka-makai* trails by horseback. They came down during the summertime to the shore because there was no school. The dryland taro was planted in the uplands and its critical growing season was during the summer. Her family did not want to disturb the taro during this time so they would cover the taro up with *hāpu'u* (*Cibotium*) fern for protection during the summer months and then they would bring down one or two bags of *poi* with them to the shore. They would put the bags of *poi* in the brackish water to keep them fresh when they were at the shore because they had no other means of refrigeration.

Aunty Maluihi recalled how plentiful the fish were when she was growing up. She would accompany her father as they walked along the shore from Kaloko to Wāwālohi. He would throw his net on the way back to Kaloko, keeping what they needed and throwing back the smaller fish. The fish they kept in those days were such as *manini* (*Acanthurus sandvicensis*), *moi* (*Polydactylus sexfilis*), *uouoa* (*Neomyxus chaptalii*), *kole* (*Ctenochaetus strigosus*), and *uhu* (parrotfish). They threw back the *pualu* (*Acanthurus xanthopterus*), because it had a bad smell much like *palani* (*Acanthurus dussumieri*). Today, the people will keep and eat *pualu* if they catch it because they are happy just to have fish. Aunty Maluihi described the method in which her father would catch *uhu*:

At certain time up here at nighttime it's high tide, and in the morning the tide goes out. The *uhu* is filled with the seaweed, had a lot of *limu* over here. Whenever they would eat at night and fall asleep in the reef and the tide go down, they cannot get out they get stuck up there. And that's when my father goes with the net and just throw or he have an iron, had no spear in those days, had an iron and make their own spear...and stab the *uhu* (Lee and Lee 2011).

Fish were often cleaned and rinsed off in the ocean, then dried directly on the pahoehoe. There were no flies like there are today, and there was no need for a screen box to dry the fish. Salt from the ocean was enough for the fish. There was very little salt in Kohanaiki and Kaloko. Salt was obtained by trading with people from Makalawena and Mahai'ula. Maluihi's family would also clean, salt, and dry the intestines and organs for consumption at a later time when they did not have any fish.

Maluihi recalled that on moonless nights, families would go to the shore and gather *kūpe'e* (*Nerita polita*) and cook them with salt and eat them. 'Opihi (limpets, *Cellana*), *ha'uke'uke* (helmet urchin, *Colobocentrotus atratus*), and *wana* (sea urchin) were also gathered along the rocky beach of Kohanaiki. 'Opihi picking practices have changed over the years. The largest 'opihi are no longer harvested, but left to reproduce and keep the population up. The large females, especially, are left alone. The females have yellow shells and the males have darker colored shells. Urchins (*wana*, and *ha'uke'uke*) were only gathered during the seasons when the yellow-colored flowers were blooming in the uplands. These flowers included 'ōhi'a *lehua* (*Metrosideros polymorpha*) and *alahe'e* (*Canthium odoratum*).

Various plants in the area were used either as food or medicine. Maluihi recalls that they would eat the fruit of the *pānini* (*Opuntia megacantha*) that grew in the area. One had to be careful when picking and preparing the fruit to eat because the *heu* (fine hairs) would irritate the skin upon contact. One always had to have their back to the wind so that the *heu* would be carried away from the body.

Mahealani mentioned the use of *pōhuehue* (*Ipomea pes-caprae*), growing in the vicinity of the anchialine ponds, to treat sprains. The vine would be mashed up and then applied to the injured limb. The vine was also tied around a person's abdomen when they were suffering from seasickness in order to alleviate the symptoms. Maluihi also mentioned that when they were at the shore, they used whatever they had on hand for medicine and first aid. She recalled that whenever her father or uncles would scrape and cut themselves, they would cleanse the wound with their own urine and then pound algae called *limu kala* (*Sargassum echinocarpum*) to make a paste to apply to the open wound.

Mahealani also spoke of the *pā'ū-o-hi'iaka* (*Jacquemontia ovalifolia*) present in the vicinity of the anchialine ponds. This plant is to remind one of the story of Pele and to not be stingy. When someone asks for a fish, you share. An old lady came down from the mountain and asked a fisherman for one of his fish. The fisherman refused her. She asked for the scales of the fish, the fisherman refused her the scales. She asked for the innards of the fish and he again refused her. The old woman went back up to the top of the mountain. By the time the family of the fisherman realized the identity of the old woman, it was too late: her lava destroyed the fishpond.

Results of Archaeological Inventory Survey for Study Area

Haun & Associates conducted an Archaeological Inventory Survey for the area of effect and identified two sites with three features (*Figure 9*; Haun and Henry 2011). The sites consist of a complex composed of a trail segment over the a'a flow and an adjacent cairn (Site 28999) and a site composed of a single cairn (Site 29000). The features were used for transportation (n=1) and as markers (n=2). The sites conformed to the site and feature types expected in the lower Middle Zone based on previous archaeological work and historic documentary research. The two sites within the area of effect were assessed significant solely for their information content. The trail segment was once part of a secondary or tertiary network of footpaths across portions of the a'a lava flow, while the cairns marked the route or other features on the landscape. No further work or preservation was recommended.

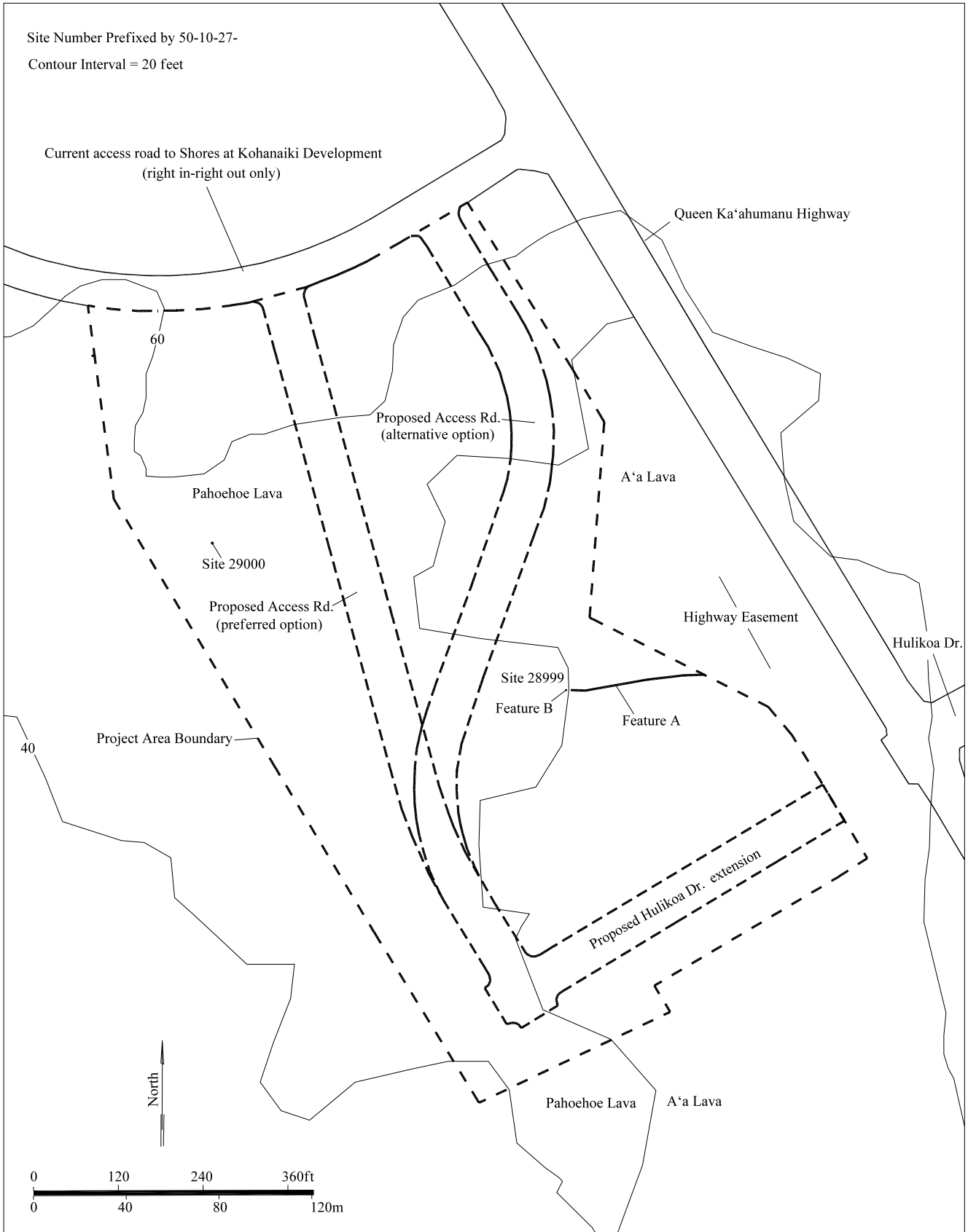


Figure 9. Archaeological sites located within the study area

Cultural Concerns

Consultation with knowledgeable individuals and organizations did not result in the identification of any direct effects to any culturally significant resources or traditional cultural practices that would be affected as a result of the proposed undertaking. Several perceived indirect effects to marine resources as a result of increased shore access, however, were mentioned during the course of the interviews. These indirect effects are characterized as “perceived” because no additional significant increase in shoreline use is anticipated as a result of access realignment and because mitigation efforts by Kohanaiki Shores, LLC over the past decade have been implemented to address shoreline and marine resources. The following cultural concerns are summarized from interviews with two individuals interviewed for this assessment.

Mahealani Pai voiced concern that the golf course had encroached so close to the ponds. He believes the area where he and his family gathered *‘ōpae ‘ula* for generations has diminished. The *‘ōpae ‘ula* population has been reduced over his lifetime due to the introduction of fish, either by people or naturally, to the anchialine ponds. Pai would like to be able to pass his knowledge of the ponds and the *‘ōpae ‘ula* to his children and grandchildren, but fears that he may not be able to do so in the future. He understands that if people see him gathering from the ponds, then they will seek to gather from the ponds and in the process destroy the ponds because they do not know the proper protocols; therefore, he would be responsible for the destruction. In his opinion, the development of the Shores at Kohanaiki has made access to the ponds much easier for the general public. Pai is concerned that when people start buying lots and building houses, easy access will result in adverse effects to the *‘ōpae ‘ula* population, but no negative consequences to those people for affecting the *‘ōpae ‘ula*. He is concerned that runoff water from irrigated landscaping in such close proximity to the anchialine ponds will leach into the ponds and affect the fragile ecosystem.

Reggie Lee is concerned about an increase in access to the beach from the proposed frontage road access. He has seen the fish population decline greatly over his lifetime and is worried about further stresses on the marine resources. He has seen men come down one right after the other to throw their fishnets from the same spot and noted that the fish have moved to the deeper water where the surfers wait for waves because the fish know that they are safe in the deeper waters. Lee has watched as people take their fishnets out on the paddleboards and throw their nets in the deeper water. He is concerned that if this continues, the fish will be pushed into deeper and deeper water until they are no longer accessible as viable near-shore food resources.

CONCLUSION

The objective of this assessment is to identify any culturally significant resources or traditional cultural practices that will be affected as a result of the proposed undertaking. Direct effects within the study area and indirect effects within the vicinity of the proposed undertaking were considered. The study relied upon archival research that focused on historical documents, previous archaeological studies, and previous oral history interviews of former Kohanaiki residents (Maly and Maly 2003). In addition, several individuals were consulted regarding traditional cultural practices; these interviews documented Hawaiian cultural practices in the second half of the 20th Century that were largely seasonal and shore-

based, predominantly concerned with obtaining marine resources. Residents interviewed in 2003 lived in the uplands and walked the trails to the shore, which was in part why the trails were considered so significant and why each family participated in their upkeep. Access to marine resources has continued to be a primary concern of native Hawaiian families into the 21st Century, as illustrated by the most recent interviews.

Historic documentary research identified very few traditional or legendary references to Kohanaiki. The ahupua'a name means "small barrenness", which refers in a poetical way to the lava flows that cover its lower slopes. The story of Kamiki and his brother Maka'iole describes the origins of some place names in Kohanaiki. These place names include: Kūmua in the uplands provides a sweeping view of the lowlands; Wailoa is a pond on the shores of Kohanaiki; Kapa'ihī is a hidden waterhole northwest and below Kūmua; Pipipi'apo'o is a lava tube and Pandanus grove near the coast; and Pūhili refers to the high priest's residence on the shore at the north boundary of Kohanaiki Ahupua'a. Along the coast, Wāwahiwa'a is a place known for rough waters and is dangerous to bring a canoe (*lit.* breaker of canoes), and Pūhili is properly called Pūwili, after the blowhole where the twisting waves blow the air through the hole. All of these place names refer to locations in Kohanaiki, but none refer to places in the actual study area. Previous archaeological studies have documented numerous traditional Hawaiian habitation, ritual and burial sites in Kohanaiki.

The priestly class of Ka-uahi and Nahulu formerly controlled the Lands of Kohanaiki. King Kamehameha I held one of their highly educated descendants, Ulumaheihei Hoapili, in especially high esteem (Kamakau 1961). During the Mahele the *ahupua'a* became government land and one LCA was awarded, but its exact location is unknown. Three land grants were sold to three individuals between 1856 and 1864. By 1857 Kohanaiki had only 8 taxpayers.

Kihe recalled that the shores of Kekaha were once densely populated and in the late 1800s many families moved up to the higher elevations of Kekaha, while only a few families stayed at the coast. The Hu'ehu'e Ranch owned most of lowland Kohanaiki. The Greenwell Ranch owned most of lowland Kaloko. *Mauka-makai* trails were important transportation routes between the uplands and the shore. Families would travel to the coast during the summer months to fish. They also traded sweet potato and *poi* for dried 'ōpelu (mackerel scad) with the families living along the coast. By the early 20th Century most of Kohanaiki's residents had moved upland to 900 ft elevation and higher, where agricultural land was more productive. The lowlands provided only marginal forage for cattle and goats, but the Hu'ehu'e and Greenwell ranches provided employment opportunities and fishing continued to be a reliable source of food.

Nearly all of the Hawaiians interviewed by Maly (Maly and Maly 2003; Retchman and Maly 2007) spoke of the bountiful marine resources that were the focus of traditional subsistence activity on the coast, as did the individuals interviewed for this study. The anchialine ponds are the sole source of 'ōpae'ula which was used as bait to catch the 'ōpelu. The families of the area still use this limited resource. The shores of Kaloko, Kohanaiki and 'O'oma once had an abundance of reef fish in their coastal waters, so people were able to be selective and particular. Their favorite fish included *moi* (thread fish), *manini* (convict tang), *uhu* (parrotfish), *kole* (yelloweye surgeonfish), and *uouoa* (false mullet). *Pualu* (yellowfin surgeonfish) was thrown back before fish in general became scarce, but now the *pualu* are harvested as well. In addition to fish, the families also collected 'opihī (limpet), *ha'uke'uke* (helmet sea urchin), *wana* (sea urchin), and *kūpe'e* (polished nerite). Coastal plants were collected for food and medicine, including *pānini*, *pōhuehue* and *limu kala*.

Archaeological studies of the of the Kohanaiki Shores development area, which is seaward of the planned frontage road project, have documented *heiau* and shrines, permanent and temporary habitation sites, burials, trails, boundary markers, animal pens, petroglyphs and modifications of the anchialine ponds. All culturally significant and sensitive sites have been identified and provisions in the Burial Treatment Plan (PHRI 2004b) and Site Preservation Plan (PHRI 2004a) guide their protection.

The recent archaeological inventory survey of the project parcel identified two sites containing three features (Haun and Henry 2011), consisting of an *ahu* (cairn) and a trail with an associated *ahu*. The individuals interviewed for the proposed access road realignment did not identify any direct adverse effects to traditional cultural practices or places within the study area. Their statements and concerns focused on the perceived indirect adverse effects of increased access to anchialine ponds and marine resources at the shore.

Direct effects to significant cultural resources within the proposed frontage road corridor have been mitigated through documentation (Haun and Henry 2011). No known cultural resources, such as culturally significant sites, flora or fauna, or cultural practices or places will be directly affected as a result of the proposed access redesign. No customary native Hawaiian rights are currently conducted in the study area. The Kohanaiki 'Ohana Committee is responsible for management of traditional and customary native Hawaiian rights on the property. The committee discussed the proposed placement of the frontage road to provide access at the Hulikoa intersection at their meeting on August 31, 2011 and agreed to unanimously support the proposal (Letter to Alan Haun from Reggie Lee dated September 19, 2011 provided as Appendix A).

Indirect effects of the c. 16-acre proposed frontage road corridor largely concern the perception that the frontage road will result in increased accessibility that is potentially detrimental to culturally important brine shrimp resources in the anchialine ponds at the shore and fish availability to on-shore anglers. In addition, one person was concerned about possible pollution of anchialine pond water quality from chemical fertilizers and herbicides used on nearby golf course landscaping.

The existing access is a paved two-lane road that provides right in and right out access only for the Kailua-bound lane of the Queen Ka'ahumanu Highway. The frontage road improvements will include a signal on the highway that also permits left-turn in and out. The planned frontage road will not provide an appreciable difference in the amount of visitors to the shoreline, but will improve intersection safety.

Kohanaiki Shores, LLC provides access to the state-controlled shoreline and comfort facilities for visitors; installed signs to inform of prohibited activities (*Figure 10*); and implemented plans to protect the cultural and natural resources (PHRI 2004a; Audubon Environmental 2009). A Special Management Area (SMA) Use Permit was issued for portions of the property containing anchialine pools at The Shores at Kohanaiki development in 2003 (Rutter 2003). There were 88 conditions of the SMA designed to protect the area. Many of the conditions were designed to preserve and protect the anchialine pond resource:

- Condition 57 requires the development and implementation of an Anchialine Pond Management Plan.
- Condition 58 requires the hiring of a pond manager.
- Condition 59 requires the removal of sediment and exotic vegetation from selected ponds.
- Condition 60 requires that anchialine ponds on the property be preserved intact.

- Condition 61 requires all pond management/monitoring to be the responsibility of the applicant.
- Condition 65 states that any significant decline in ocean or anchialine pond water quality be immediately reported to the Planning Director.

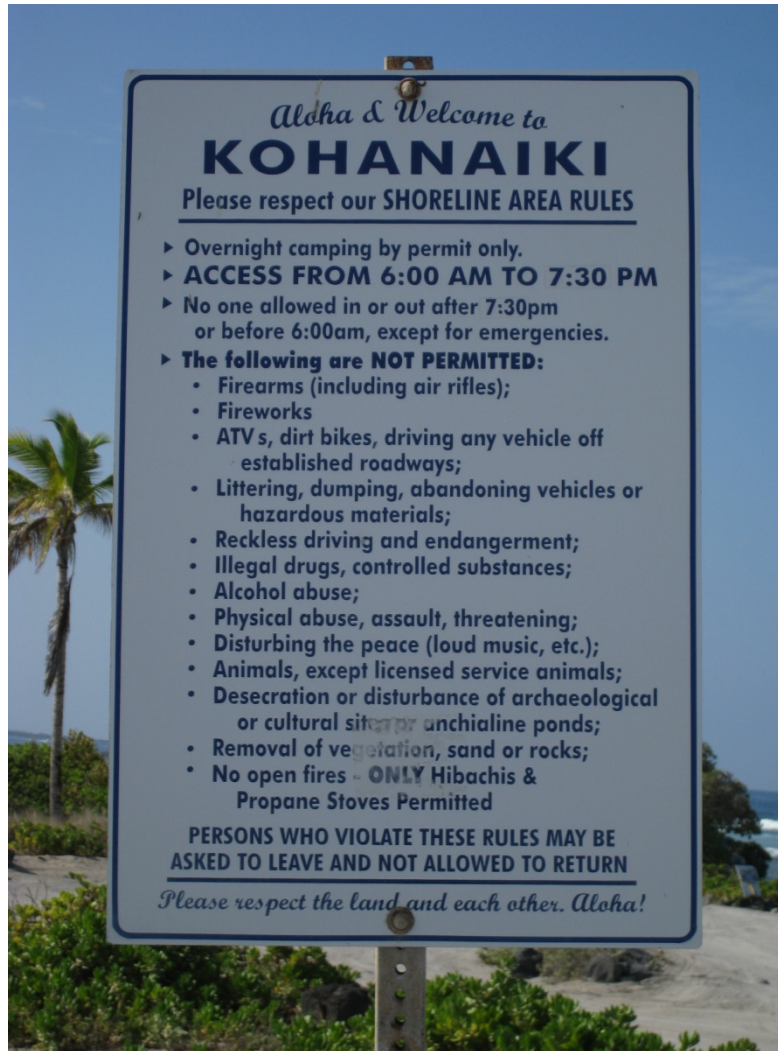


Figure 10. Kohanaiki shoreline park sign

Kohanaiki Shores, LLC developed an Anchialine Pool Management Plan (Brock 2004) and also obtained a Letter of Permission to perform work to improve the ponds pursuant to Section 10 of the River and Harbor Act of March 3, 1899 (33 U.S.C. 403). Since 2004, pond management and maintenance including removal of exotic vegetation and debris and posting of signs prohibiting introduction of fish into the ponds has demonstrated a good-faith effort to enhance, preserve and protect the ponds. There has

been significant improvement in the water quality of the ponds due to the maintenance and management work that has taken place to date, which will continue into the future.

The Kohanaiki Shores developers are required to monitor the surface, ocean and ground waters in and around the ponds. Monitoring provides information regarding water quality within the ponds and guides further management measures if pond degradation is documented.

The Kohanaiki Natural Resource Management Plan for the Kohanaiki Golf Club (Audubon Environmental 2009: 10-8) specifies that *“No-mow / no-spray buffer zones should be established adjacent to all water features and the anchialine pools. A 40-foot minimum buffer is being maintained for the anchialine pools. To be useful for wildlife, surface waters and upland habitat must be clean (i.e., free of chemical residues) and safe for animals to use (i.e., surrounded by natural vegetation). Both of these functions can be accomplished by naturalized buffer zones.”*

The Kohanaiki Anchialine Pool Management Plan (Brock 2004) prohibits:

- disposal of trash, chemicals, wastewater, and storm water in the pools;
- introduction of fish or other aquatic life unless directed by the pond manager;
- feeding of anchialine pool organisms; and
- hydrologic modification of the pools.

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APPENDIX A: KOHANAIKI 'OHANA COMMITTEE LETTER OF SUPPORT

September 19, 2011

Alan Haun
Alan Haun & Associates
73-1168 Kahuna A`o Road
Kailua-Kona, HI 96740

Re: Cultural Impact Assessment

Dear Mr. Haun:

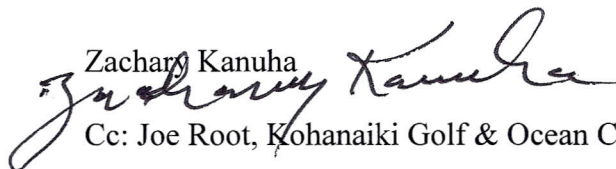
As a result of your recent interviews for the Cultural Impact Assessment for the area of the proposed frontage road on the adjacent parcel to the Kohanaiki Shores project, at the last meeting of the Kohanaiki Ohana Committee held on Wednesday, August 31, 2011, it was discussed and agreed that the committee unanimously supports the placement of the frontage road on parcel #07-03-09:18 connecting the Hulikoa intersection to the Kohanaiki entry road.

Mahalo for your efforts.

Sincerely,

Kohanaiki Ohana Committee
Representatives


Reggie Lee

Zachary Kanuha

Cc: Joe Root, Kohanaiki Golf & Ocean Club

Traffic Engineering Study &
Technical Addendum

**TRAFFIC ENGINEERING STUDY
FOR THE
INTERSECTION OF
QUEEN KAAHUMANU HIGHWAY & HULIKOA ROAD**

OCTOBER 2008

PREPARED FOR
KOHANA'IKI BUSINESS PARK ASSOCIATION, INC.

PREPARED BY



**TRAFFIC ENGINEERING STUDY
FOR THE
INTERSECTION OF
QUEEN KAAHUMANU HIGHWAY & HULIKOA DRIVE**

October 2008

Prepared for:

KOHANAIKI BUSINESS PARK ASSOCIATION, INC.

Prepared by:

FEHR & PEERS

201 Santa Monica Boulevard, Suite 500
Santa Monica, California 90401
(310) 458-9916

Ref: LA08-2295

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I. INTRODUCTION

This report summarizes the results of a traffic analysis conducted by Fehr & Peers for the intersection of Queen Kaahumanu Highway (SR-19) & Hulikoa Drive in North Kona, Hawaii. The objective of the report was to determine the future traffic demands on the intersection based on growth projections for the area and to identify the short-term and long-term geometric configuration for the intersection that would accommodate these future volumes.

PROJECT DESCRIPTION AND BACKGROUND

As illustrated in Figure 1, Hulikoa Drive is currently the only means of access for the 52-parcel Kohanaiki Business Park on the mauka side of Queen Kaahumanu Highway in North Kona. Forty-one of its 52 parcels are presently occupied, and the remaining 11 parcels are expected to be developed in the next few years. Two new proposed developments on the makai side of the highway, The Shores at Kohanaiki and 'O'oma Beachside Village, have proposed access to Queen Kaahumanu Highway from the same access point. The Shores would consist of 500 residential units, an 18-hole golf course and 120 public beach parking spaces, with expected project completion in 2015. 'O'oma would include 1,190 residential units, commercial uses, a school and beach access in phased construction between 2015 and 2029.

The proposal for access onto Queen Kaahumanu Highway for both projects, The Shores and 'O'oma, was discussed with the State of Hawaii Department of Transportation (HDOT). It was determined that the ultimate long-range plan of the HDOT is to convert Queen Kaahumanu Highway into a multi-lane expressway with access to the highway confined to a limited number of arterials with a minimum of one-mile spacing between these access points. These cross access arterials would have grade-separated crossings with Queen Kaahumanu Highway, with access provided by on- and off-ramps. However, in the interim, the access points with the highway would be four-way signalized at-grade intersections with full access in all directions.

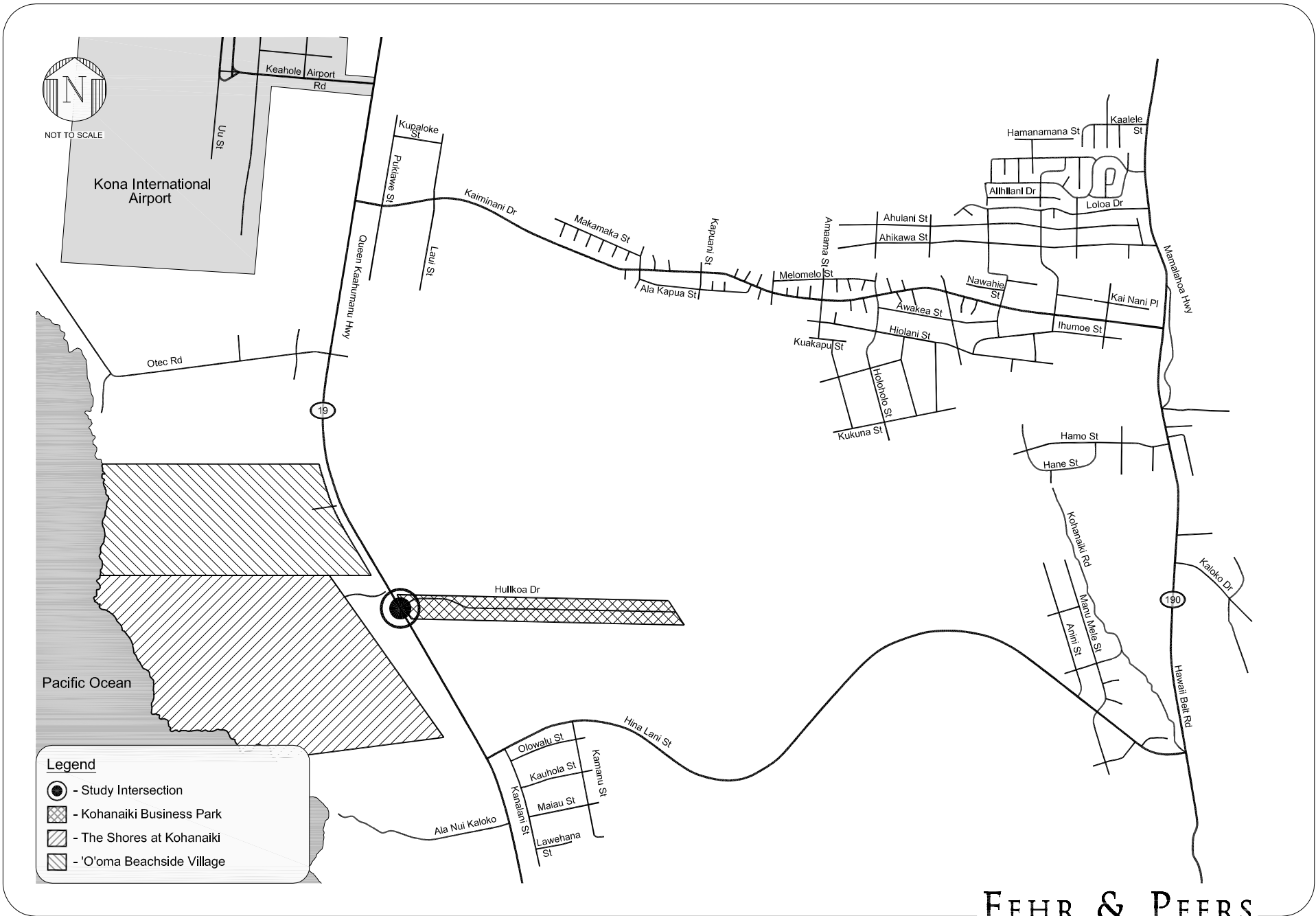


FIGURE 1
STUDY AREA AND DEVELOPMENT MAP

Therefore, the access for the two new development projects and the future access for the Kohanaiki Business Park would be accomplished by converting the intersection of Queen Kaahumanu Highway & Hulikoa Drive into a four-way fully signalized intersection. This would require that a west leg be added to the intersection, and its access would be controlled by a traffic signal. Figure 1 indicates the study area with the location of the Kohanaiki Business Park and the two new development projects.

HDOT is currently involved in the widening of Queen Kaahumanu Highway from two to four lanes from Kailua-Kona to the airport, north of the study area. The southern portion of the widening project is near completion. The portion that would affect Hulikoa Drive has not begun, but a design-build contractor has been selected and will soon be under contract to commence the last leg of the widening project. HDOT has informed the three projects that they are responsible for the development of the schematic layout of the intersection of Hulikoa Drive and Queen Kaahumanu Highway to be used by the state's contractor to redesign this intersection for its construction as a four-legged full-access signalized intersection adequate to accommodate all the future traffic generated by the completion of the three development projects.

The objective of this traffic study is to develop all necessary information so the conceptual layout of the intersection can be prepared.

STUDY SCOPE

In order to prepare the schematic layout of this intersection, it was necessary to conduct the following scope of work:

- Develop an understanding of the existing conditions in the area
- Develop short-term and long-term traffic forecasts for the three projects
- Develop forecasts of future traffic unrelated to the three development projects (i.e., Kohanaiki Business Park, The Shores, and 'O'oma) at this location expected to use Queen Kaahumanu Highway.
- Use the traffic forecasts for the three projects and the future projections for the area in general to develop short- and long-term traffic projections for the intersection of Queen Kaahumanu & Hulikoa Drive.

- Use these future forecasts to develop a schematic layout for the intersection of Queen Kaahumanu Highway and Hulikoa Drive for the short-term as well as the long-term that would satisfy the requirements established by the HDOT.

II. EXISTING CONDITIONS

In order to properly assess the future needs of the intersection, it was necessary to develop an overview and description of the existing conditions at the intersection and the surrounding area. These included an inventory and description of the other streets in the area, the land uses adjacent to the study area, and the existing traffic volumes.

EXISTING STREET SYSTEM

The following is a brief description of the key roadways in the area:

- Queen Kaahumanu Highway (SR-19) – Queen Kaahumanu Highway is one of the major highways running north and south along the west side of the island of Hawaii. It is a two-lane highway with intersections at key locations. Intersections with primary activity generators are signalized with turn lanes. It is currently being widened to four lanes from Kailua-Kona to the airport.
- Hulikoa Drive – Hulikoa Drive is a local street providing access from Queen Kaahumanu Highway to the Kohanaiki Business Park mauka of the highway. Its intersection with Queen Kaahumanu Highway is stop-controlled (on Hulikoa Drive) and allows access in all directions.
- Kaiminani Drive – Kaiminani Drive is an arterial running east and west between Queen Kaahumanu Highway and Mamalahoa Highway. It intersects with Queen Kaahumanu Highway approximately one and a half miles north of Hulikoa Drive.
- Hina Lani Street – Hina Lani Street is an arterial running east and west between Kaahumanu Highway and Mamalahoa Highway. It intersects with Queen Kaahumanu Highway approximately half a mile south of Hulikoa Drive.
- Mamalahoa Highway (SR-190) – Mamalahoa Highway is the other major north-south highway in Kona. It is approximately two miles mauka of Queen Kaahumanu Highway.

EXISTING DEVELOPMENTS

The only significant developed land in the vicinity of the study area is the Kohanaiki Business Park, a 52-parcel business and industrial park that stretches approximately one mile along Hulikoa Drive mauka of the highway. Of the 52 parcels in the park, 41 are presently occupied.

Approximately one mile north of Hulikoa Drive is the access driveway for the Natural Energy Laboratory of Hawaii Authority, a research and education facility makai of Queen Kaahumanu Highway. It is not a significant generator of trips for the purposes of this study.

EXISTING TRAFFIC VOLUMES AND LEVELS OF SERVICE

Traffic count data was collected for the intersections and for a section of Queen Kaahumanu Highway to develop an understanding of the traffic operational conditions at the intersection. This section presents the results of the data collection effort, provides a description of the technical methodology used to analyze the operating conditions of the intersection, and contains a discussion of the current average vehicle delay at the intersection as well as the operating level of service (LOS).

Existing Traffic Volumes

New peak period traffic counts were conducted at the intersection on Wednesday, August 13, 2008 during the morning peak period (6:00 to 9:00 AM) and the afternoon peak period (3:00 to 6:00 PM). Figure 2 provides a summary of these weekday morning and afternoon peak hour traffic volumes.

Automatic traffic counting machines were installed on Queen Kaahumanu Highway just south of Hulikoa Drive for 48 hours between 12:00 AM Tuesday, August 19, 2008 and midnight Wednesday, August 20, 2008. These counts were used to verify that the actual peak periods of



NOT TO SCALE

'O'oma Beachside Village

Queen Kaahumanu Highway

'O'oma Access Road

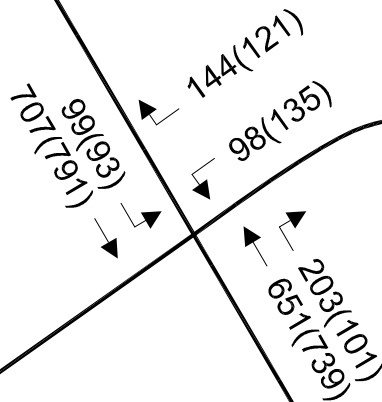
Hulikoa Dr

Kohanaiki Business Park

The Shores at Kohanaiki

Legend

##(##) - AM(PM) Peak Hour Traffic Volumes



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FIGURE 2
EXISTING PEAK HOUR TRAFFIC VOLUMES

Traffic activity for the intersection were counted and to develop an indication of the variation in traffic during the remainder of the day.

The traffic count data can be found in Appendix A of this report.

Level of Service Methodology

Level of service (LOS) is a qualitative measure used to describe the condition of traffic flow, ranging from excellent conditions at LOS A to overloaded conditions at LOS F. LOS D or higher is generally considered acceptable in most urbanized areas. The intersection was analyzed using the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2000) methodology. HCM methodology uses the traffic volumes at each leg of the intersection and the intersection configuration to calculate the average delay per vehicle traveling through the intersection and the corresponding LOS. The determination of the LOS is based on the LOS definitions shown in Table 1 for unsignalized intersections and Table 2 for signalized intersections.

Existing Peak Hour Levels of Service

The results of the analysis indicate that the intersection operates at LOS F during both the morning and afternoon peak hour, as indicated in Table 3. This poor LOS is primarily caused by the worst case delay experienced by drivers waiting to make a left turn from southbound Queen Kaahumanu Highway onto Hulikoa Drive and drivers making a westbound left turn out of Hulikoa Drive onto Queen Kaahumanu Highway.

TABLE 1
LEVEL OF SERVICE DEFINITIONS FOR
STOP-CONTROLLED INTERSECTIONS

Level of Service	Average Control Delay (seconds/vehicle)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

**TABLE 2
LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTIONS**

Level of Service	Average Stopped Delay per Vehicle (seconds)	Definition
A	≤10	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	>10 and ≤20	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	>20 and ≤35	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	>35 and ≤55	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	>55 and ≤80	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	>80	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

**TABLE 3
INTERSECTION LEVEL OF SERVICE
EXISTING CONDITIONS**

Intersection	Control	Peak Hour	Existing	
			Delay	LOS
<i>Year 2008</i>				
Queen Kaahumanu Highway & Hulikoa Drive	2-Way Stop	AM PM	58.5 191.2	F F

Delay (in seconds) and LOS shown is for the most constrained movement of the intersection.

III. FUTURE TRAFFIC PROJECTIONS

To properly estimate the required configuration of the reconfigured intersection, it was necessary to develop estimates of the future traffic volumes that expected to utilize this intersection. The HDOT long-range plan projects that all access off this highway will ultimately be provided by a series of grade-separated intersections with on- and off-ramps to provide access to the crossroads that would serve the adjacent properties. Regardless of whether or not Hulikoa Drive would be one of the cross streets with the grade-separated intersection with Queen Kaahumanu Highway, it would be prudent to expect that the at-grade intersection being configured in this study would be in place for a significant period of time into the foreseeable future. Therefore, it must have sufficient capacity not only to accommodate future traffic from the three development projects that will use it for direct access to Queen Kaahumanu Highway, but all projected future traffic anticipated in the 21-year timeframe projected for the analysis. This traffic is the ambient, or regional, growth anticipated from all other changes expected to occur in the Kailua-Kona and Kohala areas of the island. Significant increases in traffic are expected from both sources over the next 21 years.

TRAFFIC GENERATED BY THREE DEVELOPMENT PROJECTS

The first major element of future traffic using the proposed intersection is traffic generated by the three development projects adjacent to Queen Kaahumanu Highway that will use the intersection as a primary access point. The trip generation estimates developed as part of the traffic impact assessment report (TIAR) for each of the projects was used as the basis for future traffic forecasts for each. Although traffic generated by each of the parcels of the Kohanaiki Business Park can access Hulikoa Drive directly, this is not necessarily the case for the various elements of The Shores and the 'O'oma projects. This analysis does not address the internal circulation requirements of the individual projects. Therefore, for the purpose of this analysis, it is assumed that each project would have the necessary internal circulation system, including the possibility of a frontage road parallel to and on the makai side of Queen Kaahumanu Highway, to provide access from the respective projects to the south leg of Hulikoa Drive.

Kohanaiki Business Park

A TIAR by Lyon Associates was prepared in August 2006 for the development of the Matsuyama Commercial Center, a five-acre retail development, at the southeast corner of the intersection. Since this analysis only addressed one site of the entire 52-parcel development, the trip generation projections do not address the entire Kohanaiki Business Park. However, information from this analysis was used as a reference for the geographic distribution of the traffic.

Trip generation estimates for the entire Kohanaiki project were developed by expanding the current traffic generated by the existing uses based on the future growth that is projected for the remainder of the site. A three-step process was used to develop these estimates:

1. Conduct traffic counts at the intersection of Queen Kaahumanu Highway & Hulikoa Drive to determine the volume of traffic that currently enters and exits the Kohanaiki Business Park during the peak periods.
2. Identify the number of parcels currently occupied and in operation at the site and the number projected at full occupancy.
3. Calculate the proportional growth in traffic expected at the site once full occupancy occurs.

As indicated in Table 4, the Kohanaiki Business Park currently generates about 544 vehicle trips per hour during the morning peak hour and 450 trips per hour during the evening peak hour.

There are currently 41 occupied parcels, with 52 parcels expected at full occupancy. Assuming a proportional growth in traffic, the project is expected to generate 690 vehicles per hour during the morning peak hour and 571 vehicles per hour during the evening peak hour.

A TIAR was prepared for the 'O'oma project that included the Kohanaiki Business Park as a cumulative project in the preparation of future traffic projections. This TIAR indicated that the full buildout of the Kohanaiki Business Park would generate a total of 640 vehicle trips during the morning peak hour (315 inbound, 325 outbound) and 615 vehicle trips during the afternoon peak hour (165 inbound, 450 outbound). Given the similarity of the two sets of numbers, it was determined that a trip generation estimate calculated with empirical data, i.e., the peak hour traffic counts, would be used in this analysis.

TABLE 4
LONG-TERM (YEAR 2029) PROJECT TRIP GENERATION

Development	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
KOHANAIKI BUSINESS PARK						
<i>A 52-parcel business park zoned for Village Commercial usage mauka of Queen Kaahumanu Highway</i>						
2008 Counts with 41 of 52 parcels occupied	302	242	544	194	256	450
<i>Growth by 26.8% to reflect full 52-parcel buildout</i>	383	307	690	246	325	571
Subtotal	383	307	690	246	325	571
THE SHORES AT KOHANAIKI						
<i>500 residential units, an 18-hole golf course, and 120 public beach parking stalls makai of Queen Kaahumanu Highway</i>						
500 Detached Dwelling Units	96	289	385	326	184	510
18-hole Golf Course	25	29	54	28	37	65
120 Stalls of Public Beach Parking	120	24	144	24	120	144
Subtotal	241	342	583	378	341	719
'O'OMA BEACHSIDE VILLAGE YEAR 2029						
<i>Up to 1,190 single-family, multi-family and live/work dwelling units, 200,000 square feet of commercial space, a school and a public beach</i>						
475 Units of Single-Family Residential	90	255	345	284	160	444
715 Units of Multi-Family or Live/Work Residential	145	435	580	323	234	557
30 ksf Mixed-Use Commercial - Area A	19	12	31	54	59	113
135 ksf Mixed-Use Commercial - Area B	248	31	279	38	232	270
15 ksf Grocery Store	15	9	24	106	102	208
20 ksf Restaurant	8	8	16	100	49	149
225 Student Charter School	109	89	198	68	77	145
Public Beach Clubhouse	70	20	90	25	70	95
Subtotal	704	859	1,563	998	983	1,981
TOTAL OF ALL DEVELOPMENTS	1,328	1,508	2,836	1622	1,649	3,271

Based on existing traffic count data and area traffic patterns, it was estimated that 50% of the traffic generated by the Kohanaiki Business Park would travel south on Queen Kaahumanu Highway and 45% would travel north. The remaining 5% is projected to cross the highway and enter The Shores or 'O'oma projects. As much as 30% of the total Kohanaiki traffic is expected to access Hulikoa Drive by way of Kamanu Street or Ane Keohokalole Highway, future street extensions that would connect to Hulikoa Drive on the mauka side of Queen Kaahumanu Highway. However, for the purposes of this analysis, it was assumed that the mauka-bound traffic would travel makai-bound and use the Queen Kaahumanu Highway & Hulikoa Drive intersection to access the highway and travel north or south to eventually reach its mauka destination. This approach recognizes the uncertainty associated with the completion of the mauka connections to Hulikoa Drive and ensures that the traffic projections for the intersection with Queen Kaahumanu Highway are not underestimated.

Full project occupancy is assumed by the year 2015.

The Shores at Kohanaiki

A memorandum prepared by Julian Ng, Incorporated in 2003 detailed the results of a traffic study for The Shores project, identifying the potential traffic impacts. The traffic forecasts from this document were used to estimate the trip generation for this project. This document indicated that the proposed development, which included public beach parking, would generate a total of 583 vehicle trips during the morning peak hour (241 inbound, 342 outbound) and 719 vehicle trips during the evening peak hour (378 inbound, 341 outbound) upon project completion in 2015. Appendix C contains trip generation analysis tables from the Ng memorandum.

Forty-eight percent of the traffic was assigned south on Queen Kaahumanu Highway, 42% north on the highway, and the remainder as internal trips between the 'O'oma and Kohanaiki projects.

Table 4 provides a summary of the trip generation for The Shores project.

'O'oma Beachside Village

A traffic study for the 'O'oma Beachside Village project was prepared by M&E Pacific, Inc. in May 2008. This TIAR was used to identify the project's trip generation and the geographic distribution of these trips for each of its three phases of development. The project plans to complete its three phases in 2015, 2020 and 2029. In 2015, the project is expected to generate 318 vehicle trips during the morning peak hour (131 inbound, 187 outbound) and 552 vehicle trips during the evening peak hour (309 inbound, 243 outbound). 'O'oma will begin to generate additional trips when the second phase is complete in 2020. In 2029, it is expected to be totally built out and would generate 1,563 vehicle trips during the morning peak hour (704 inbound, 859 outbound) and 1,981 vehicle trips during the evening peak hour (998 inbound, 983 outbound). This is the design year of the long-term intersection configuration. Appendix D contains trip generation tables from the TIAR.

Because of the diversity of the land uses (i.e., single- and multi-family residential, commercial uses, grocery store, restaurant, school, and a beach house) and the density of development for many of these uses, the traffic study projected that a high percentage of the total number of trips would be internal to the site, i.e., many of the trips from the residential area would actually be work trips to the commercial uses or shopping trips to the grocery store, etc. It was estimated that 37% of the total trips would be internal to the site and would not access Queen Kaahumanu Highway or use the intersection. Of the trips external to the site, 29% of the total trips would travel north and south along Queen Kaahumanu Highway, with the remaining 5% traveling across the intersection toward Kohanaiki Business Park.

The 'O'oma project would have its own right-turn in, right-turn out access to Queen Kaahumanu Highway north of Hulikoa Drive. Of the 29% of trips leaving the site to the south, 4% were expected to use this driveway. Of the 29% of trips arriving from the north, 19% were expected to enter via the driveway.

One of the key assumptions of the 'O'oma TIAR was a frontage road parallel to and makai of the highway running north to the airport. Once completed, it is expected to attract a significant portion of the traffic heading to and from the project from the north. However, to ensure that this TIAR is conducted with a conservative set of assumptions so that projected needs are not underestimated, it is assumed that none of the 'O'oma-generated traffic would be diverted to

this facility. Therefore, for the purposes of this analysis, all traffic would enter and leave the site via the right-in, right-out access driveway or the Hulikoa Drive intersection. By omitting the impact the frontage road would have on the assignment of project-generated traffic to the proposed intersection, the analysis does not understate the capacity needs of the three development projects. The actual impact of the frontage road would be to provide internal circulation between the 'O'oma project and the land uses to the north and to redirect some of the traffic projected to use the intersection to another route.

Table 4 provides a summary of the trip generation for this project in the long-term design year of 2029.

AMBIENT GROWTH IN TRAFFIC

The regional ambient growth in highway traffic volumes was estimated as a percentage increase of the existing traffic volumes. Previous traffic impact assessment reports for 'O'oma, The Shores and Kohanaiki have estimated future traffic growth along Queen Kaahumanu Highway by between 3.74 and 6 percent per year. This study assumed 6 percent simple growth per year.

This long-term analysis projects traffic out to 2029, the year the final phase of 'O'oma is scheduled for completion. At a growth rate of 6 percent per year for 21 years, ambient growth along Queen Kaahumanu Highway was calculated at 126%. The County of Hawaii and the State of Hawaii are both involved in a major expansion program for the roadway system in the area. As a result of the increase in highway capacity expected in the area over the next 21 years, some of the 126% increase in traffic that would normally be expected on Queen Kaahumanu Highway would be able to use other routes. The following sections discuss these potential alternative roadways and the proportion of Queen Kaahumanu Highway traffic that they may accommodate.

Future Roadway Improvements

A number of major roadway improvements that could have a significant affect on future traffic on Queen Kaahumanu Highway and other existing roadways are planned for the area. These improvements will expand the system-wide capacity and have the additional affect of relieving some of the pressure on existing roadways. The following improvements are assumed to be in place by the year 2020, within the timeframe of the long-term analysis. They are illustrated in Figure 3.

Queen Kaahumanu Highway (SR-19) Widening. Queen Kaahumanu Highway is undergoing a two-phase construction project to widen the highway from the existing two lanes to four lanes with a wide median between Henry Street in Kailua to the airport north of Kaiminani Drive. Phase I of this project widens the highway from Henry Street to Kealakehe Parkway and is nearing completion at the writing of this report. The design work on Phase II of this widening project is expected to begin soon. This report is directed at providing the lane configuration and other geometric elements of the intersection at Hulikoa Drive to the design team.

Kamanu Street Extension. Kamanu Street is a north-south street that would pass by the Costco store south of Hina Lani Street. A planned extension northward would intersect with Hulikoa Drive midway between the mauka and makai ends of the street. It would continue north to Kaiminani Drive, providing an alternative access point to Kohanaiki.

Ane Keohokalole Highway Extension. Ane Keohokalole Highway, or Henry Street, would be extended northward from Palani Road (SR-190) to Kaiminani Drive. This would be a major north and south highway to provide an alternative to both Queen Kaahumanu Highway and Mamalahoa Highway (Palani Road).

Potential Traffic Diversion

The cumulative affect of these roadway improvements would be a diversion of traffic from existing highways onto these new roadways. *Traffic Study for the Keahuolu Affordable Housing Master Plan, North Kona, Island of Hawaii, Hawaii* (Fehr & Peers, January 2008) projected that 20% of the future traffic on Queen Kaahumanu Highway would be diverted to other north-south



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FIGURE 3
PROPOSED FUTURE ROADWAY EXTENSIONS AND IMPROVEMENTS

roadways in the area. Assuming that each of the roadway improvements described above are completed, a similar diversion can be expected on this portion of Queen Kaahumanu Highway by 2029. By reducing the future traffic on Queen Kaahumanu Highway by 20 percent to represent this diversion, the growth in traffic on the highway projected for year 2029 would be an increase of 80.8 percent between existing conditions in 2008 and 2029.

TOTAL PROJECTED TRAFFIC VOLUMES

The total future traffic projections are the sum of the existing traffic conditions, ambient traffic growth along Queen Kaahumanu Highway, and the traffic from the completion of the three development projects that would use the intersection at Hulikoa Drive to access Queen Kaahumanu Highway. The short-term traffic projections are based on the assumption that no roadway improvements other than the widening of Queen Kaahumanu Highway would be completed, while the long-term traffic projections include adjustments for diversion of some traffic based on the assumption that the other roadway improvements planned for the area are completed. The long-term 2029 traffic forecasts are illustrated in Figure 4.



NOT TO SCALE

'O'oma Beachside Village

Queen Kaahumanu Highway

'O'oma Access Road

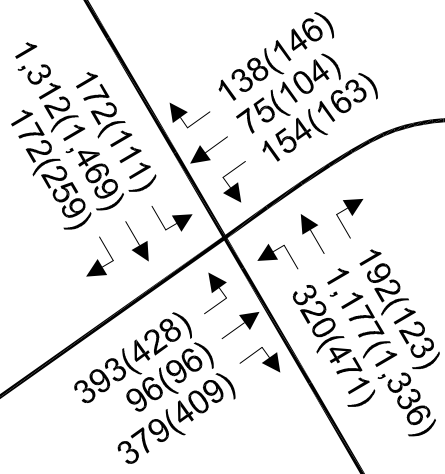
Hulikoa Dr

Kohanaiki Business Park

The Shores at Kohanaiki

Legend

##(##) - AM(PM) Peak Hour Traffic Volumes



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FIGURE 4
PROJECTED LONG-TERM (2029) PEAK HOUR TRAFFIC VOLUMES

IV. INTERSECTION REQUIREMENTS

The traffic projections shown in Figure 4 were evaluated to develop intersection configuration schemes that were re-tested with the objective of bringing the overall LOS to acceptable conditions, i.e. LOS D or better. Field observations in the study area were used to survey existing signalized intersections along Queen Kaahumanu Highway that provide full access for all approaches. The following observations were made with regard to intersection design along the Highway:

- Right turns from Queen Kaahumanu Highway are provided with long deceleration/turning lanes leading up to intersections.
- Right turns onto Queen Kaahumanu Highway from cross streets are provided with long acceleration/merging lanes leading away from intersections.
- Right turns from both major and minor approaches are separated from through- and left-turning traffic by “pork chop”-style raised medians channeling the turns.
- Protected left turns are provided at all high-volume left-turn pockets.

Queen Kaahumanu Highway is expected to have two travel lanes in both directions, with a wide median. This is the standard used for the portion currently under construction and is assumed for use in the section that would intersect with Hulikoa Drive.

LONG-TERM INTERSECTION REQUIREMENTS

Using the standards and observations described above, the long-term configuration of the at-grade intersection of Queen Kaahumanu Highway & Hulikoa Drive, and a review of the operational needs of the intersection based on the projected volumes and the anticipated level of service, a preliminary configuration for the long-term needs of the intersection were developed. This configuration would have the following characteristics:

- Northbound – Two left-turn lanes, two through lanes and one right-turn lane. The left-turn lanes should be 540 feet long to provide adequate storage.

- Southbound – One left-turn lane, two through lanes and one right-turn lane. The left-turn lane should be 280 feet long to provide adequate storage.
- Eastbound – One left-turn lane, one through lane and one right-turn lane.
- Westbound – One left-turn lane and one shared through/right-turn lane.

The signal phases of the intersection would include protected left-turn phasing in all directions. In the eastbound and westbound directions, protected right-turn arrows would also be provided during the overlapping northbound and southbound left turn phase. As in the interim, the westbound shared through/right-turn lane would be wide enough to permit a flow of right-turn traffic even when through traffic is queued up.

If implemented, the intersection configuration described above would provide adequate capacity to allow the intersection to operate at LOS D during both the morning and evening peak hours in 2029, with an average delay of 46.6 seconds in the AM peak hour and 49.8 seconds in the PM peak hour. However, with only one left-turn lane in the eastbound direction, vehicle queues at that movement could reach 34 vehicles (approximately 680 feet) in the AM peak hour and 40 vehicles (approximately 800 feet) in the PM peak hour.

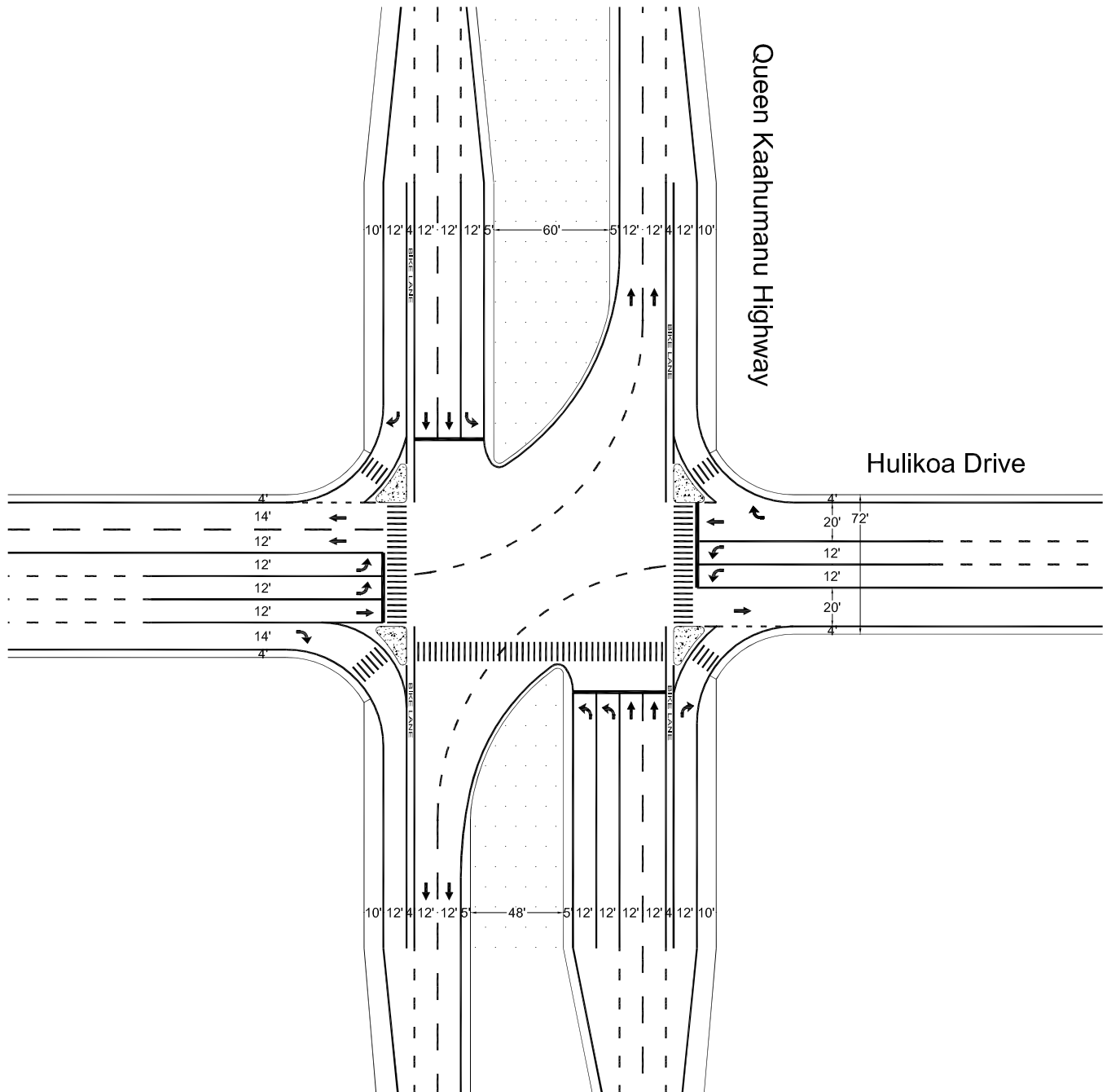
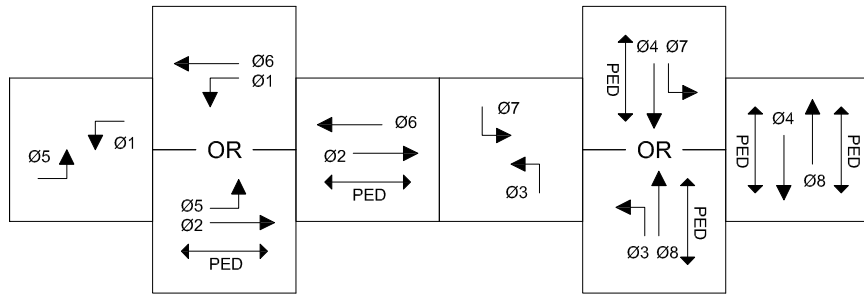
LONG-TERM INTERSECTION CONFIGURATION

Although the long-term traffic volumes are expected to operate at an acceptable level of service under the preliminary configuration described above, the analysis also indicated that the queues in the left-turn lane of the eastbound approach would exceed acceptable levels. Therefore, as illustrated in Figure 5, the final proposal for the long-term configuration of the intersection would include the following characteristics:

- Northbound – Two left-turn lanes, two through lanes and one right-turn lane. The left-turn lanes should be 500 feet long to provide adequate storage.
- Southbound – One left-turn lane, two through lanes and one right-turn lane. The left-turn lane should be 260 feet long to provide adequate storage.
- Eastbound – Two left-turn lanes, one through lane and one right-turn lane.
- Westbound – Two left-turn lanes and one shared through/right-turn lane.



NOT TO SCALE



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FIGURE 5
LONG-TERM INTERSECTION CONFIGURATION

It should be noted that the two-left-turn lanes are proposed for both the eastbound and westbound approaches to the intersection. The second left-turn lane was required in the eastbound approach because of the unacceptably long queues projected for the intersection. The second left-turn lane for the westbound approach is recommended to ensure that the various lanes, in particular the through lanes, align across Queen Kaahumanu Highway. The second left-turn lane in the westbound approach would also ensure that long queues would not accumulate on this leg of the intersection.

The signal phasing would be the same as in the preliminary configuration and would include protected left-turn phasing in all directions. In the eastbound and westbound directions, protected right-turn arrows would also be provided during the overlapping northbound and southbound left turn phase. The westbound shared through/right-turn lane would be wide enough to permit a flow of right-turn traffic even when through traffic is queued up.

LEVEL OF SERVICE

With implementation of the proposed configuration, the intersection is projected to operate at LOS D during both the morning and evening peak hours in 2029, with an average delay of 41.4 seconds in the AM peak hour and 41.5 seconds in the PM peak hour. This is an improvement over the preliminary configuration of 5.2 seconds in the AM peak hour and 8.3 seconds in the PM peak hour of average vehicle delay. With two left-turn lanes in the eastbound direction, vehicle queues at that movement would be reduced to 19 vehicles (approximately 380 feet) in the AM peak hour and 23 vehicles (approximately 460 feet) in the PM peak hour. Table 5 shows the level of service at the intersection and LOS worksheets can be viewed in Appendix B.

ALTERNATIVES TO PROPOSED INTERSECTION CONFIGURATIONS

Alternatives concepts for this intersection were considered as part of this analysis and include:

- A right-turn in and right-turn out only intersection with U-turns allowed at various mid-block locations using the median to provide storage for vehicles waiting to access the lanes in the opposite direction, or U-turns only at neighboring signalized intersections.

**TABLE 5
INTERSECTION LEVEL OF SERVICE
FUTURE CONDITIONS**

Intersection	Control	Peak Hour	Future		
			Delay	V/C	LOS
<i>Interim (Year 2015)</i>					
Queen Kaahumanu Highway & Hulikoa Drive	Signal	AM	46.9	0.606	D
		PM	47.9	0.727	D
<i>Long-Term (Year 2029)</i>					
Queen Kaahumanu Highway & Hulikoa Drive	Signal	AM	41.4	0.642	D
		PM	41.5	0.718	D

Delay shown is average control delay per vehicle, in seconds.

- Allowing left turns in and out at a non-signalized intersection with a left-turn storage lane for turns off Queen Kaahumanu Highway and a storage lane in the median for left turns out of Hulikoa Drive for vehicles that have crossed traffic from the left and are waiting for clearance of traffic from the right.

The size of these developments is such that the traffic volumes using either of these two concepts would encounter long delays and queues and would be required to make unsafe maneuvers to complete their desired movements. A full-access signalized intersection at Queen Kaahumanu Highway & Hulikoa Drive is the most viable option if the access plan for these three projects is to serve the needs of the users adequately.

ALLOCATION OF TRAFFIC

As indicated, the future traffic volumes are derived from three primary sources: existing traffic, future regional traffic unrelated to the three development projects in the study area, and the three projects. Table 6 provides a breakdown of the percent contribution of the total traffic from the three developments making each movement at the intersection. For example, it shows that Kohanaiki would contribute approximately 28% of the total development trips through the intersection; The Shores would contribute approximately 29% of the trips, and 'O'oma the remaining 43%. The table also indicates that of the project traffic that would use the two northbound left-turn lanes, The Shores project would contribute 38% of the total traffic, the 'O'oma project would contribute 62%, and the Kohanaiki Business Park, which is on the mauka side of the highway, none of the traffic. In contrast, all of the traffic using the southbound left-turn lane would be contributed by the business park and none by the two projects on the makai side of the highway.

**TABLE 6
INTERSECTION TRAFFIC CONTRIBUTION PERCENTAGES BY PROJECT**

	Trips at each Turning Movement												Total
	SBR	SBT	SBL	WBR	WBT	WBL	NBR	NBT	NBL	EBR	EBT	EBL	
2029 Project Volumes - AM Peak Hour													
Kohanaiki Business Park	0	0	172	138	15	154	192	0	0	0	19	0	690
The Shores at Kohanaiki	101	0	0	0	24	0	0	0	116	164	34	144	583
'O'oma Beachside Village	70	34	0	0	35	0	0	0	204	215	43	249	850
Total Projected AM Volumes	171	34	172	138	74	154	192	0	320	379	96	393	2,123
2029 Project Volumes - PM Peak Hour													
Kohanaiki Business Park	0	0	111	146	16	163	123	0	0	0	12	0	571
The Shores at Kohanaiki	159	0	0	0	38	0	0	0	181	164	34	143	719
'O'oma Beachside Village	100	39	0	0	50	0	0	0	290	246	49	285	1,059
Total Projected PM Volumes	259	39	111	146	104	163	123	0	471	410	95	428	2,349
Total AM and PM Peak Hour Project Volumes													
Kohanaiki Business Park	0	0	283	284	31	317	315	0	0	0	31	0	1,261
The Shores at Kohanaiki	260	0	0	0	62	0	0	0	297	328	68	287	1,302
'O'oma Beachside Village	170	73	0	0	85	0	0	0	494	461	92	534	1,909
Total Projected Volumes	430	73	283	284	178	317	315	0	791	789	191	821	4,472
Individual Project Share													
Kohanaiki Business Park	0%	0%	100%	100%	17%	100%	100%	0%	0%	0%	16%	0%	28%
The Shores at Kohanaiki	60%	0%	0%	0%	35%	0%	0%	0%	38%	42%	36%	35%	29%
'O'oma Beachside Village	40%	100%	0%	0%	48%	0%	0%	0%	62%	58%	48%	65%	43%

V. INTERIM INTERSECTION REQUIREMENTS

Because full completion of the three development projects is not expected for a number of years, and to avoid the cost and inefficiency of an overbuilt intersection during the interim, short-term traffic projections were prepared to assess the short-term intersection needs. The interim projection was based on expected traffic conditions in 2015 when Kohanaiki Business Park and The Shores are expected to be fully occupied and the first phase of 'O'oma will be complete. The long-term projection was based on year 2029 conditions, when all three development projects would be complete and fully occupied.

FUTURE TRAFFIC PROJECTIONS

Traffic conditions for the intersection in 2015 were developed using methods similar to those used to develop long-term forecasts for 2029. The short-term analysis projects traffic out to 2015, the year The Shores and the first phase of 'O'oma is expected to be complete. At a growth rate of 6 percent per year for seven years, ambient growth along Queen Kaahumanu Highway was calculated at 42%. Figure 6 illustrates the year 2015 interim traffic forecasts for this intersection.

INTERIM INTERSECTION CONFIGURATION

Using the standards and observations described above for the long-term intersection configuration in the future and a review of the projected traffic volumes expected in the short-term future of this intersection, the proposed interim, or short-term, configuration for the intersection of Queen Kaahumanu Highway & Hulikoa Drive was developed. The interim configuration is designed to satisfy the short-term traffic needs of the intersection but must also be consistent with the potential expansion into the long-term configuration. The interim configuration, which is illustrated in Figure 7, would have the following characteristics:



NOT TO SCALE

'O'oma Beachside Village

Queen Kaahumanu Highway

'O'oma Access Road

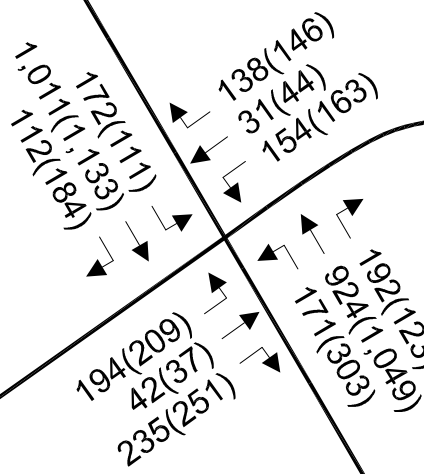
Hulikoa Dr

Kohanaiki Business Park

The Shores at Kohanaiki

Legend

##(##) - AM(PM) Peak Hour Traffic Volumes

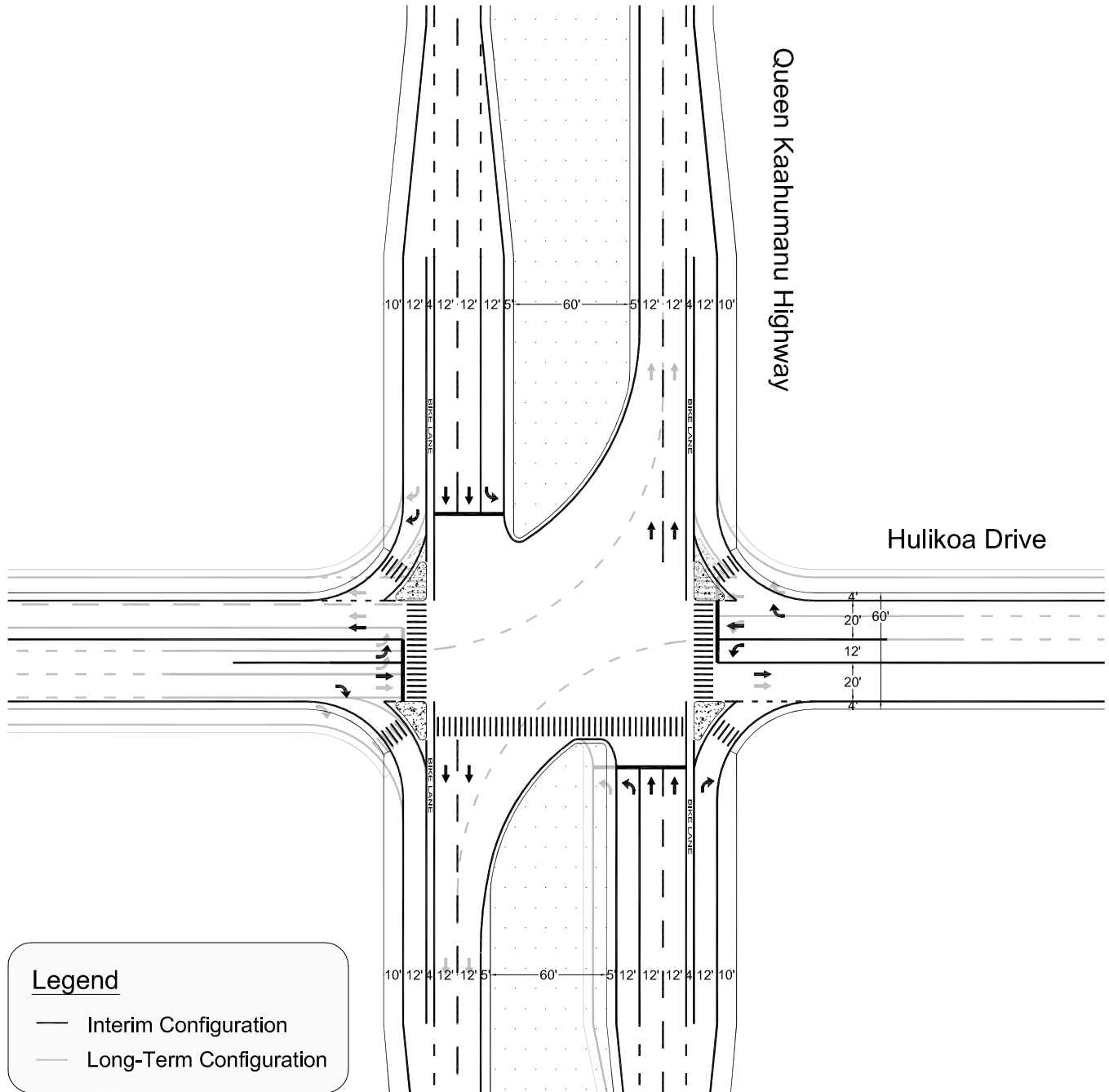
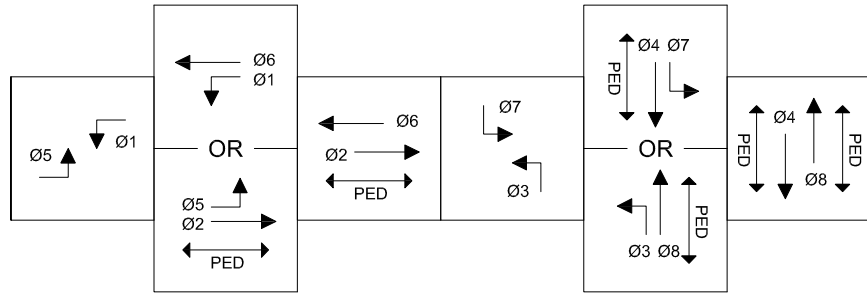


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FIGURE 6
PROJECTED INTERIM (2015) PEAK HOUR TRAFFIC VOLUMES



NOT TO SCALE



Legend

- Interim Configuration
- Long-Term Configuration

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FIGURE 7
INTERIM INTERSECTION CONFIGURATION

- Northbound – One left-turn lane, two through lanes and one right-turn lane. The left-turn lane should be 580 feet long to provide adequate storage.
- Southbound – One left-turn lane, two through lanes and one right-turn lane. The left-turn lane should be 260 feet long to provide adequate storage.
- Eastbound – One left-turn lane and one shared through/right-turn lane.
- Westbound – One left-turn lane and one shared through/right-turn lane.

The signal phases of the intersection would include protected left-turn phasing in all four directions. Additionally, there is enough width in the eastbound and westbound shared through/right-turn lanes for them to function as separate through and right-turn lanes, allowing a free flow of right-turning traffic into the Queen Kaahumanu Highway acceleration lanes. This configuration accommodates the future traffic volumes in the 2015 timeframe and is consistent with a future widening of the approaches to accommodate the long-term configuration described below.

LEVEL OF SERVICE

With the interim configuration in place in the year 2015, the intersection is projected to operate at LOS D during both the morning and evening peak hours, with an average delay of 46.9 seconds in the AM peak hour and 47.9 seconds in the PM peak hour. This is an acceptable level of service and is an improvement over the existing operating conditions of LOS F in both peak periods. These operating conditions would continue at least through 2020, when the intersection should be modified to the long-term configuration. Table 5 shows the interim levels of service at the intersection and LOS worksheets can be viewed in Appendix B.

IMPLEMENTATION

The intersection conversion from the interim design to the long-term design, which should occur before 'O'oma opens the second phase of development in 2020, would require the following changes:

- Addition of a second left-turn lane in the northbound approach
- The widening of Hulikoa Drive on both sides of Queen Kaahumanu Highway.
- On the mauka side, Hulikoa Drive would need widening to allow the installation of a second westbound left-turn lane.
- On the makai side, it would need widening to install both a second eastbound left-turn lane and a separate eastbound right-turn lane. The makai leg would also need to be re-striped to allow two receiving lanes.

VI. SUMMARY AND CONCLUSIONS

This study was undertaken to assess the lane configuration requirements for long-term performance of a signalized four-legged intersection at Queen Kaahumanu Highway & Hulikoa Drive in Kona, Hawaii. The key findings and conclusions of the study are summarized below:

DESCRIPTION OF DEVELOPMENT PROJECTS

Three developments are expected to rely heavily or exclusively on this intersection for traffic coming to and from their sites.

- Kohanaiki Business Park is a 52-parcel business and industrial park along Hulikoa Drive mauka of Queen Kaahumanu Highway. Forty-one of its parcels are currently occupied.
- The Shores at Kohanaiki is a proposed residential and recreational project makai of the highway. It would consist of 500 residential units and an 18-hole golf course along with 120 public beach parking spaces.
- 'O'oma Beachside Village is a proposed mixed-use development also makai of the highway. It would consist of up to 1,190 dwelling units, 200,000 square feet of commercial space, a school and public beach access. Construction is planned in phases with the first phase complete in 2015 and full buildout complete in 2029.

KEY ASSUMPTIONS

The key assumptions used to conduct the TIAR include:

- It was assumed that a long-term plan to grade-separate Queen Kaahumanu Highway from all cross-streets will not occur in the foreseeable future. Thus the long-term intersection configuration must accommodate all foreseeable traffic.
- It was assumed that a frontage road running makai of Queen Kaahumanu Highway from 'O'oma north to the airport would not be constructed. Thus, all traffic making left turns onto or off of the highway must use the intersection at Hulikoa Drive.

- It was assumed that 'O'oma would have a right-turn in, right-turn out driveway access to the highway north of Hulikoa Drive.
- Ambient growth along Queen Kaahumanu Highway was estimated at 6% simple growth per year to 2015 (42%), the short-term design year, and 2029 (126%), the proposed buildout year of the final phase of 'O'oma Beachside Village.
- It was assumed that by the year 2020, a number of road and highway improvements and extensions would be in place, relieving pressure on the existing road system. A 20% overall reduction in highway volumes was applied to the long-term future conditions.
- It was assumed that traffic from Kohanaiki would exclusively use Queen Kaahumanu Highway to access Hulikoa Drive. Potential mauka connections of Hulikoa Drive to proposed extensions of Kamanu Street or Ane Keohokalole Highway were not considered in this analysis.

SUMMARY OF RESULTS

- An intersection capacity and operation analysis was conducted at the site and indicated that the existing stop-controlled intersection operates at LOS F during both the AM and PM peak hours.
- Trip generation estimates were forecast for the three developments at short-term (2015) and long-term (2029) buildout based on growing existing volumes to full buildout (Kohanaiki) and projections from existing TIARs (The Shores and 'O'oma).

Interim Configuration

- The proposed short-term configuration for the signalized at-grade full access intersection of Queen Kaahumanu Highway & Hulikoa Drive would be the following:
 - Northbound – One left-turn lane, two through lanes and one right-turn lane. The left-turn lanes should be 580 feet long to provide adequate storage.
 - Southbound – One left-turn lane, two through lanes and one right-turn lane. The left-turn lane should be 260 feet long to provide adequate storage.
 - Eastbound – One left-turn lane and one shared through/right-turn lane.
 - Westbound – One left-turn lane and one shared through/right-turn lane.
- The signal phasing should provide protected left turns in all four directions.

- With this configuration, the intersection is projected to operate at LOS D in both the AM and PM peak hours in 2015. It is projected to have an average delay of 46.9 seconds in the AM peak hour and 47.9 seconds in the PM peak hour. It will remain at LOS D at least through 2020.

Long-Term Intersection Configuration

- Before completion of the second phase of 'O'oma, expected in 2020, the intersection should be modified to a long-term configuration consisting of:
 - Northbound – Two left-turn lanes, two through lanes and one right-turn lane. The left-turn lanes should be 500 feet long to provide adequate storage.
 - Southbound – One left-turn lane, two through lanes and one right-turn lane. The left-turn lane should be 260 feet long to provide adequate storage.
 - Eastbound – Two left-turn lanes, one through lane and one right-turn lane.
 - Westbound – Two left-turn lanes and one shared through/right-turn lane.
- The signal phasing should provide protected left turns in all four directions. It should also provide overlapping protected right turns eastbound and westbound during the northbound and southbound left-turn phases.
- With this configuration, the intersection is projected to operate at LOS D in both the AM and PM peak hours in 2029. It is projected to have an average delay of 41.4 seconds in the AM peak hour and 41.5 seconds in the PM peak hour.
- The eastbound left-turn queue at the intersection could reach as many as 19 vehicles (380 feet) in the AM peak hour and 23 vehicles (460 feet) in the PM peak hour.

REFERENCES

Highway Capacity Manual, Transportation Research Board, 2000.

Traffic Impact Analysis Report – 'O'oma Beachside Village, M&E Pacific, Inc., May 2008.

Traffic Impact Analysis Study – Kohanaiki Business Park, Kailua-Kona, Hawaii, Lyon Associates, August 2006.

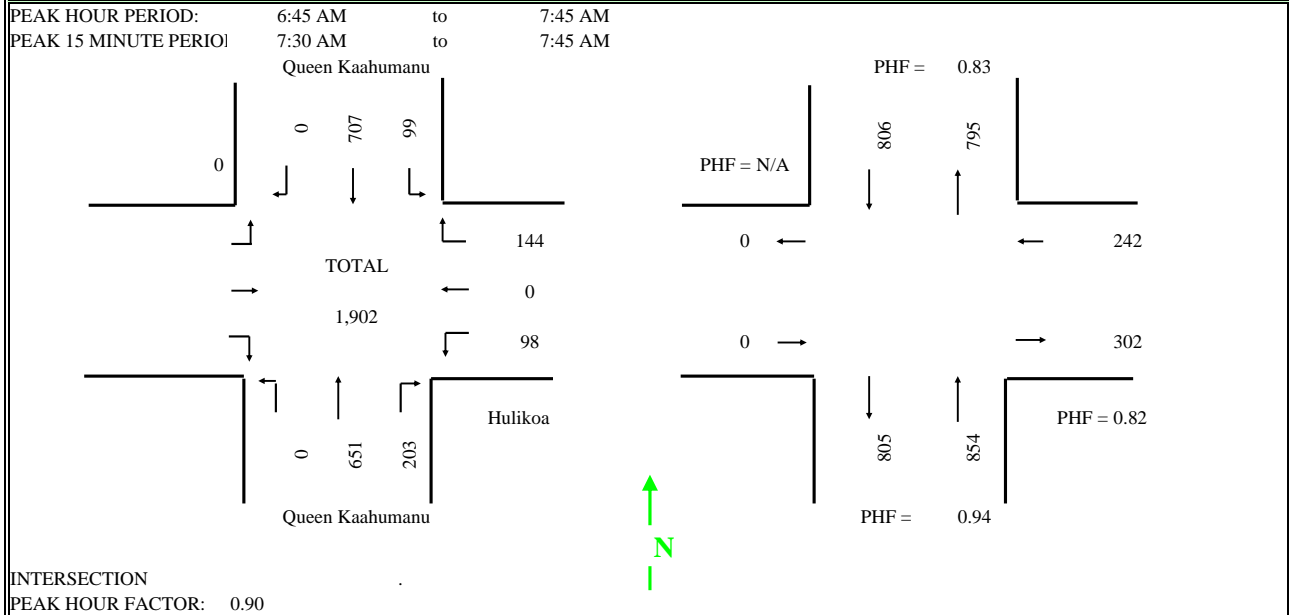
Traffic Study for the Keahuolu Affordable Housing Master Plan, North Kona, Island of Hawaii, Hawaii, Fehr & Peers, January 2008.

Update of Previously Identified Traffic Impact – Kohanaiki Project, North Kona, Hawaii, Julian Ng, Incorporated, April 21, 2003.

APPENDIX A
TRAFFIC COUNTS DATA

INTERSECTION TURNING MOVEMENT SUMMARY

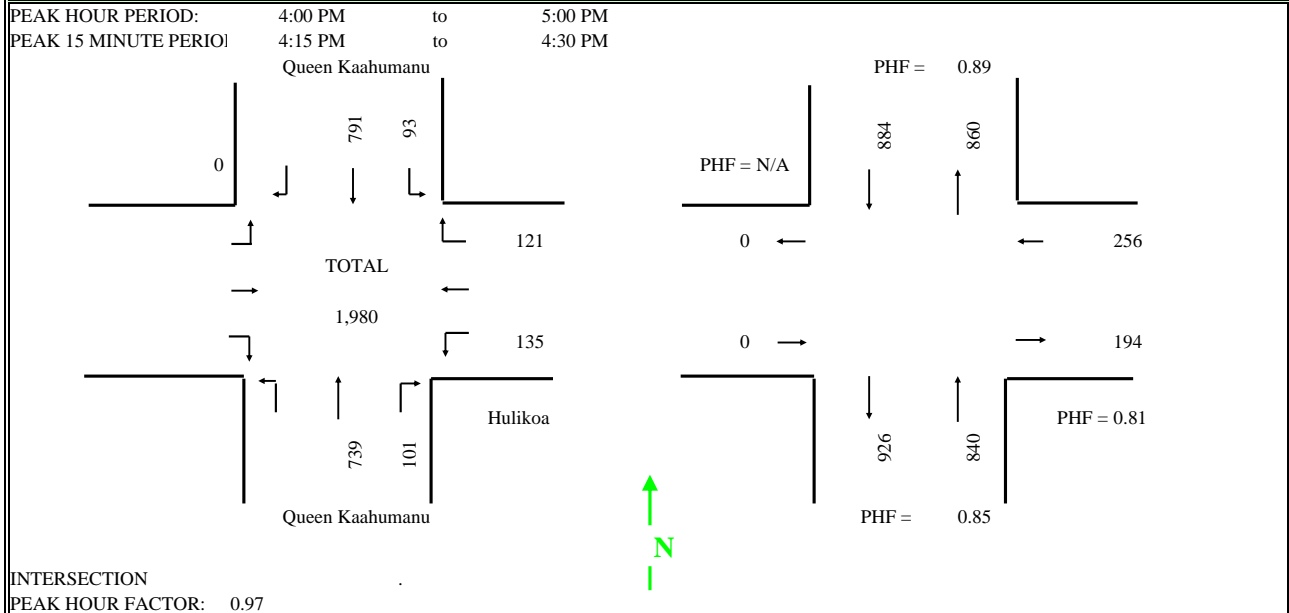
INTERSECTION: Queen Kaahumanu & Hulikoa **TIME:** 6:00 AM to 9:00 AM
JURISDICTION: **DATE:** 8-13-08, Wed
PROJECT TITLE: **PROJECT NO:**



RUNNING COUNTS	Eastbound			Hulikoa Westbound			Queen Kaahumanu Northbound			Queen Kaahumanu Southbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	A	B	C	D	E	F	G	H	I	J	K	L	TOTAL
6:15 AM				15	0	28	0	175	48	26	93	0	385
6:30 AM				32	0	74	0	420	111	46	208	0	891
6:45 AM				47	0	115	0	643	172	80	334	0	1391
7:00 AM				69	0	155	0	824	217	104	491	0	1860
7:15 AM				93	0	184	0	974	265	138	630	0	2284
7:30 AM				113	0	217	0	1142	317	163	815	0	2767
7:45 AM				145	0	259	0	1294	375	179	1041	0	3293
8:00 AM				167	0	287	0	1446	406	196	1214	0	3716
8:15 AM				189	0	308	0	1595	449	217	1372	0	4130
8:30 AM				218	0	334	0	1770	481	246	1547	0	4596
8:45 AM				247	0	365	0	1933	520	266	1720	0	5051
9:00 AM				269	0	380	0	2087	559	276	1848	0	5419
PERIOD COUNTS													
Period End	A	B	C	D	E	F	G	H	I	J	K	L	TOTAL
6:15 AM				15	0	28	0	175	48	26	93	0	385
6:30 AM				17	0	46	0	245	63	20	115	0	506
6:45 AM				15	0	41	0	223	61	34	126	0	500
7:00 AM				22	0	40	0	181	45	24	157	0	469
7:15 AM				24	0	29	0	150	48	34	139	0	424
7:30 AM				20	0	33	0	168	52	25	185	0	483
7:45 AM				32	0	42	0	152	58	16	226	0	526
8:00 AM				22	0	28	0	152	31	17	173	0	423
8:15 AM				22	0	21	0	149	43	21	158	0	414
8:30 AM				29	0	26	0	175	32	29	175	0	466
8:45 AM				29	0	31	0	163	39	20	173	0	455
9:00 AM				22	0	15	0	154	39	10	128	0	368
HOURLY TOTALS													
Beginning At	A	B	C	D	E	F	G	H	I	J	K	L	TOTAL
6:00 AM				69	0	155	0	824	217	104	491	0	1860
6:15 AM				78	0	156	0	799	217	112	537	0	1899
6:30 AM				81	0	143	0	722	206	117	607	0	1876
6:45 AM				98	0	144	0	651	203	99	707	0	1902
7:00 AM				98	0	132	0	622	189	92	723	0	1856
7:15 AM				96	0	124	0	621	184	79	742	0	1846
7:30 AM				105	0	117	0	628	164	83	732	0	1829
7:45 AM				102	0	106	0	639	145	87	679	0	1758
8:00 AM				102	0	93	0	641	153	80	634	0	1703

INTERSECTION TURNING MOVEMENT SUMMARY

INTERSECTION: Queen Kaahumanu & Hulikoa **TIME:** 3:00 PM to 6:00 PM
JURISDICTION: **DATE:** 8-13-08, Wed
PROJECT TITLE: **PROJECT NO:**



RUNNING COUNTS	Eastbound			Hulikoa Westbound			Queen Kaahumanu Northbound			Queen Kaahumanu Southbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	A	B	C	D	E	F	G	H	I	J	K	L	TOTAL
3:15 PM				23		18		193	18	21	231		504
3:30 PM				51		40		418	40	42	431		1022
3:45 PM				69		69		580	75	60	622		1475
4:00 PM				89		95		772	101	77	775		1909
4:15 PM				127		136		929	122	101	972		2387
4:30 PM				162		159		1101	155	129	1192		2898
4:45 PM				199		197		1294	172	155	1378		3395
5:00 PM				224		216		1511	202	170	1566		3889
5:15 PM				241		238		1708	231	181	1715		4314
5:30 PM				260		261		1900	244	191	1850		4706
5:45 PM				280		287		2089	262	201	2041		5160
6:00 PM				290		301		2222	276	216	2165		5470
PERIOD COUNTS													
Period End	A	B	C	D	E	F	G	H	I	J	K	L	TOTAL
3:15 PM				23		18		193	18	21	231		504
3:30 PM				28		22		225	22	21	200		518
3:45 PM				18		29		162	35	18	191		453
4:00 PM				20		26		192	26	17	153		434
4:15 PM				38		41		157	21	24	197		478
4:30 PM				35		23		172	33	28	220		511
4:45 PM				37		38		193	17	26	186		497
5:00 PM				25		19		217	30	15	188		494
5:15 PM				17		22		197	29	11	149		425
5:30 PM				19		23		192	13	10	135		392
5:45 PM				20		26		189	18	10	191		454
6:00 PM				10		14		133	14	15	124		310
HOURLY TOTALS													
Beginning At	A	B	C	D	E	F	G	H	I	J	K	L	TOTAL
3:00 PM				89		95		772	101	77	775		1909
3:15 PM				104		118		736	104	80	741		1883
3:30 PM				111		119		683	115	87	761		1876
3:45 PM				130		128		714	97	95	756		1920
4:00 PM				135		121		739	101	93	791		1980
4:15 PM				114		102		779	109	80	743		1927
4:30 PM				98		102		799	89	62	658		1808
4:45 PM				81		90		795	90	46	663		1765
5:00 PM				66		85		711	74	46	599		1581

24-Hour ADT Counts - Island Traffic Data Service

Location: Queen Kaahumanu Highway South of Hulikoa Drive

Date: Tuesday, August 19, 2008

Start Time: 12:00:00 AM

	Period Ending	15-Min Totals		1 Hour Totals		
		South	North	South	North	Total
1	12:15 AM	15	9			
2	12:30 AM	11	10			
3	12:45 AM	6	4			
4	1:00 AM	5	9	37	32	69
5	1:15 AM	6	2	28	25	53
6	1:30 AM	4	2	21	17	38
7	1:45 AM	5	7	20	20	40
8	2:00 AM	2	1	17	12	29
9	2:15 AM	2	8	13	18	31
10	2:30 AM	4	9	13	25	38
11	2:45 AM	5	13	13	31	44
12	3:00 AM	5	7	16	37	53
13	3:15 AM	3	5	17	34	51
14	3:30 AM	4	9	17	34	51
15	3:45 AM	9	7	21	28	49
16	4:00 AM	14	19	30	40	70
17	4:15 AM	16	23	43	58	101
18	4:30 AM	8	32	47	81	128
19	4:45 AM	16	59	54	133	187
20	5:00 AM	23	65	63	179	242
21	5:15 AM	28	108	75	264	339
22	5:30 AM	55	148	122	380	502
23	5:45 AM	59	172	165	493	658
24	6:00 AM	107	201	249	629	878
25	6:15 AM	116	266	337	787	1124
26	6:30 AM	100	257	382	896	1278
27	6:45 AM	187	250	510	974	1484
28	7:00 AM	166	207	569	980	1549
29	7:15 AM	207	220	660	934	1594
30	7:30 AM	218	204	778	881	1659
31	7:45 AM	217	212	808	843	1651
32	8:00 AM	147	201	789	837	1626
33	8:15 AM	197	195	779	812	1591
34	8:30 AM	177	192	738	800	1538
35	8:45 AM	158	187	679	775	1454
36	9:00 AM	145	180	677	754	1431
37	9:15 AM	161	161	641	720	1361
38	9:30 AM	161	166	625	694	1319
39	9:45 AM	179	155	646	662	1308
40	10:00 AM	180	177	681	659	1340
41	10:15 AM	162	172	682	670	1352
42	10:30 AM	182	180	703	684	1387
43	10:45 AM	159	209	683	738	1421
44	11:00 AM	167	165	670	726	1396
45	11:15 AM	165	180	673	734	1407
46	11:30 AM	213	188	704	742	1446
47	11:45 AM	194	185	739	718	1457
48	12:00 PM	197	191	769	744	1513

	Period Ending	15-Min Totals		1 Hour Totals		
		South	North	South	North	Total
49	12:15 PM	193	169	797	733	1530
50	12:30 PM	165	208	749	753	1502
51	12:45 PM	148	179	703	747	1450
52	1:00 PM	180	181	686	737	1423
53	1:15 PM	174	205	667	773	1440
54	1:30 PM	175	190	677	755	1432
55	1:45 PM	208	195	737	771	1508
56	2:00 PM	189	212	746	802	1548
57	2:15 PM	270	199	842	796	1638
58	2:30 PM	220	207	887	813	1700
59	2:45 PM	230	173	909	791	1700
60	3:00 PM	205	195	925	774	1699
61	3:15 PM	178	218	833	793	1626
62	3:30 PM	233	192	846	778	1624
63	3:45 PM	204	193	820	798	1618
64	4:00 PM	255	182	870	785	1655
65	4:15 PM	195	201	887	768	1655
66	4:30 PM	223	213	877	789	1666
67	4:45 PM	163	212	836	808	1644
68	5:00 PM	166	193	747	819	1566
69	5:15 PM	172	179	724	797	1521
70	5:30 PM	206	182	707	766	1473
71	5:45 PM	144	177	688	731	1419
72	6:00 PM	149	167	671	705	1376
73	6:15 PM	135	148	634	674	1308
74	6:30 PM	156	138	584	630	1214
75	6:45 PM	120	151	560	604	1164
76	7:00 PM	126	114	537	551	1088
77	7:15 PM	128	147	530	550	1080
78	7:30 PM	100	99	474	511	985
79	7:45 PM	86	127	440	487	927
80	8:00 PM	91	117	405	490	895
81	8:15 PM	75	103	352	446	798
82	8:30 PM	103	82	355	429	784
83	8:45 PM	72	79	341	381	722
84	9:00 PM	67	59	317	323	640
85	9:15 PM	54	83	296	303	599
86	9:30 PM	61	53	254	274	528
87	9:45 PM	58	55	240	250	490
88	10:00 PM	56	45	229	236	465
89	10:15 PM	57	47	232	200	432
90	10:30 PM	73	26	244	173	417
91	10:45 PM	45	32	231	150	381
92	11:00 PM	44	21	219	126	345
93	11:15 PM	33	14	195	93	288
94	11:30 PM	31	8	153	75	228
95	11:45 PM	17	14	125	57	182
96	12:00 AM	8	17	89	53	142

24-Hour ADT Counts - Island Traffic Data Service

Location: Queen Kaahumanu Highway South of Huliko'a Drive

Date: Wednesday, August 20, 2008

Start Time: 12:00:00 AM

	Period Ending	15-Min Totals		1 Hour Totals		
		South	North	South	North	Total
97	12:15 AM	11	10			
98	12:30 AM	5	7			
99	12:45 AM	5	3			
100	1:00 AM	4	8	25	28	53
101	1:15 AM	4	4	18	22	40
102	1:30 AM	3	2	16	17	33
103	1:45 AM	5	0	16	14	30
104	2:00 AM	2	9	14	15	29
105	2:15 AM	4	8	14	19	33
106	2:30 AM	2	9	13	26	39
107	2:45 AM	3	8	11	34	45
108	3:00 AM	4	6	13	31	44
109	3:15 AM	4	4	13	27	40
110	3:30 AM	6	5	17	23	40
111	3:45 AM	12	18	26	33	59
112	4:00 AM	7	20	29	47	76
113	4:15 AM	10	29	35	72	107
114	4:30 AM	12	45	41	112	153
115	4:45 AM	12	55	41	149	190
116	5:00 AM	20	76	54	205	259
117	5:15 AM	35	108	79	284	363
118	5:30 AM	52	144	119	383	502
119	5:45 AM	84	150	191	478	669
120	6:00 AM	91	219	262	621	883
121	6:15 AM	104	297	331	810	1141
122	6:30 AM	113	278	392	944	1336
123	6:45 AM	160	249	468	1043	1511
124	7:00 AM	173	199	550	1023	1573
125	7:15 AM	181	215	627	941	1568
126	7:30 AM	221	221	735	884	1619
127	7:45 AM	216	203	791	838	1629
128	8:00 AM	186	202	804	841	1645
129	8:15 AM	204	223	827	849	1676
130	8:30 AM	174	193	780	821	1601
131	8:45 AM	204	187	768	805	1573
132	9:00 AM	169	173	751	776	1527
133	9:15 AM	173	145	720	698	1418
134	9:30 AM	165	190	711	695	1406
135	9:45 AM	185	149	692	657	1349
136	10:00 AM	183	170	706	654	1360
137	10:15 AM	167	155	700	664	1364
138	10:30 AM	182	191	717	665	1382
139	10:45 AM	161	182	693	698	1391
140	11:00 AM	181	203	691	731	1422
141	11:15 AM	171	183	695	759	1454
142	11:30 AM	201	185	714	753	1467
143	11:45 AM	159	176	712	747	1459
144	12:00 PM	222	185	753	729	1482

	Period Ending	15-Min Totals		1 Hour Totals		
		South	North	South	North	Total
145	12:15 PM	190	186	772	732	1504
146	12:30 PM	187	164	758	711	1469
147	12:45 PM	178	191	777	726	1503
148	1:00 PM	209	179	764	720	1484
149	1:15 PM	165	183	739	717	1456
150	1:30 PM	174	192	726	745	1471
151	1:45 PM	192	209	740	763	1503
152	2:00 PM	179	186	710	770	1480
153	2:15 PM	186	173	731	760	1491
154	2:30 PM	200	194	757	762	1519
155	2:45 PM	194	182	759	735	1494
156	3:00 PM	199	196	779	745	1524
157	3:15 PM	189	175	782	747	1529
158	3:30 PM	222	191	804	744	1548
159	3:45 PM	214	203	824	765	1589
160	4:00 PM	233	214	858	783	1641
161	4:15 PM	222	202	891	810	1701
162	4:30 PM	205	209	874	828	1702
163	4:45 PM	162	191	822	816	1638
164	5:00 PM	154	200	743	802	1545
165	5:15 PM	167	174	688	774	1462
166	5:30 PM	200	164	683	729	1412
167	5:45 PM	146	188	667	726	1393
168	6:00 PM	144	160	657	686	1343
169	6:15 PM	116	172	606	684	1290
170	6:30 PM	117	154	523	674	1197
171	6:45 PM	137	145	514	631	1145
172	7:00 PM	116	118	486	589	1075
173	7:15 PM	87	126	457	543	1000
174	7:30 PM	119	110	459	499	958
175	7:45 PM	100	105	422	459	881
176	8:00 PM	84	103	390	444	834
177	8:15 PM	70	96	373	414	787
178	8:30 PM	88	112	342	416	758
179	8:45 PM	85	87	327	398	725
180	9:00 PM	77	89	320	384	704
181	9:15 PM	64	77	314	365	679
182	9:30 PM	57	72	283	325	608
183	9:45 PM	57	56	255	294	549
184	10:00 PM	58	52	236	257	493
185	10:15 PM	52	34	224	214	438
186	10:30 PM	69	32	236	174	410
187	10:45 PM	61	29	240	147	387
188	11:00 PM	52	21	234	116	350
189	11:15 PM	31	11	213	93	306
190	11:30 PM	26	20	170	81	251
191	11:45 PM	11	15	120	67	187
192	12:00 AM	14	14	82	60	142

APPENDIX B
LEVEL OF SERVICE WORKSHEETS

EXISTING CONDITIONS

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Existing Intersection

Average Delay (sec/veh): 8.0 Worst Case Level Of Service: F[58.5]

Table with columns for Street Name, Approach, Movement, Control, Rights, and Lanes. Rows include Queen Kaahumanu Highway and Hulikoa Drive with North, South, East, and West bounds.

Volume Module:

Table showing volume adjustments: Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, and Final Volume.

Critical Gap Module:

Table showing critical gap and follow-up time values for different movements.

Capacity Module:

Table showing capacity metrics: Conflict Vol, Potent Cap., Move Cap., and Volume/Cap.

Level Of Service Module:

Table showing level of service metrics: 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., Shared Queue, Shrd ConDel, Shared LOS, ApproachDel, and ApproachLOS.

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Existing Intersection

Average Delay (sec/veh): 25.2 Worst Case Level Of Service: F[191.2]

Table with columns for Street Name, Approach, Movement, Control, Rights, and Lanes. Rows include Queen Kaahumanu Highway and Hulikoa Drive with North, South, East, and West bounds.

Volume Module:

Table showing volume calculations: Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, and Final Volume across different movements.

Critical Gap Module:

Table showing Critical Gap and FollowUpTim values for different movements.

Capacity Module:

Table showing Capacity calculations: Conflict Vol, Potent Cap., Move Cap., and Volume/Cap for different movements.

Level Of Service Module:

Table showing Level of Service calculations: 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., Shared Queue, Shrd ConDel, Shared LOS, ApproachDel, and ApproachLOS.

Note: Queue reported is the number of cars per lane.

INTERIM (2015) CONDITIONS

Level Of Service Computation Report

2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Future Intersection

Cycle (sec): 180 Critical Vol./Cap.(X): 0.606
Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 46.9
Optimal Cycle: 58 Level Of Service: D

Table with columns for Street Name (Queen Kaahumanu Highway, Hulikoa Drive), Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control (Protected), Rights (Include), Min. Green (0), and Lanes (1, 0, 2, 0, 1).

Volume Module:

Table with 13 columns for traffic volume metrics: Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module:

Table with 13 columns for saturation flow metrics: Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module:

Table with 13 columns for capacity analysis metrics: Vol/Sat, Crit Moves, Green/Cycle, Volume/Cap, Uniform Del, IncremntDel, InitQueueDel, Delay Adj, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

Note: Queue reported is the number of cars per lane.

 Level Of Service Detailed Computation Report (HCM2000 Queue Method)
 2000 HCM Operations Method
 Base Volume Alternative

Intersection #2 Future Intersection

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Green/Cycle:	0.16	0.45	0.45	0.17	0.46	0.46	0.21	0.24	0.24	0.14	0.17	0.17
ArrivalType:	3			3			3			3		
ProgFactor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q1:	8.0	17.9	6.0	7.9	19.9	3.2	8.6	1.6	10.4	7.2	1.3	6.3
UpstreamVC:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UpstreamAdj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EarlyArrAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q2:	1.4	1.3	0.4	1.2	1.5	0.2	1.0	0.1	1.4	1.4	0.1	1.0
HCM2KQueue:	9.4	19.2	6.3	9.1	21.4	3.4	9.5	1.7	11.9	8.6	1.4	7.2
70th%Factor:	1.18	1.16	1.19	1.18	1.16	1.19	1.18	1.20	1.17	1.18	1.20	1.18
HCM2k70thQ:	11.0	22.3	7.5	10.8	24.7	4.1	11.3	2.1	13.9	10.2	1.7	8.6
85th%Factor:	1.52	1.46	1.54	1.52	1.45	1.57	1.52	1.58	1.50	1.53	1.59	1.54
HCM2k85thQ:	14.2	28.0	9.8	13.9	30.9	5.3	14.5	2.7	17.8	13.1	2.2	11.1
90th%Factor:	1.65	1.55	1.69	1.65	1.54	1.74	1.65	1.77	1.62	1.66	1.77	1.68
HCM2k90thQ:	15.5	29.8	10.7	15.1	32.8	5.9	15.7	3.1	19.2	14.3	2.5	12.2
95th%Factor:	1.86	1.71	1.92	1.86	1.68	2.00	1.85	2.04	1.81	1.87	2.05	1.90
HCM2k95thQ:	17.4	32.8	12.2	17.0	35.9	6.8	17.7	3.5	21.5	16.1	2.9	13.8
98th%Factor:	2.19	1.93	2.31	2.20	1.89	2.47	2.18	2.58	2.10	2.22	2.60	2.27
HCM2k98thQ:	20.5	37.1	14.7	20.0	40.4	8.4	20.8	4.5	25.0	19.1	3.7	16.5

Level Of Service Computation Report

2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Future Intersection

Cycle (sec): 180 Critical Vol./Cap.(X): 0.727
Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 47.9
Optimal Cycle: 84 Level Of Service: D

Table with columns for Street Name (Queen Kaahumanu Highway, Hulikoa Drive), Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control (Protected), Rights (Include), Min. Green (0), and Lanes (1, 0, 2, 0, 1).

Volume Module:

Table with 13 columns for volume metrics: Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module:

Table with 13 columns for saturation flow metrics: Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module:

Table with 13 columns for capacity analysis metrics: Vol/Sat, Crit Moves, Green/Cycle, Volume/Cap, Uniform Del, IncremntDel, InitQueueDel, Delay Adj, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

Note: Queue reported is the number of cars per lane.

 Level Of Service Detailed Computation Report (HCM2000 Queue Method)
 2000 HCM Operations Method
 Base Volume Alternative

 Intersection #2 Future Intersection

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Green/Cycle:	0.23	0.55	0.55	0.12	0.43	0.43	0.19	0.21	0.21	0.12	0.15	0.15
ArrivalType:	3			3			3			3		
ProgFactor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q1:	14.0	17.6	3.0	5.2	24.7	5.9	9.6	1.5	11.7	7.8	1.9	6.8
UpstreamVC:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UpstreamAdj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EarlyArrAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q2:	2.3	1.1	0.2	1.0	2.5	0.4	1.4	0.1	2.2	2.1	0.2	1.4
HCM2KQueue:	16.3	18.8	3.2	6.3	27.2	6.3	11.0	1.6	13.9	9.9	2.1	8.2
70th%Factor:	1.17	1.16	1.19	1.19	1.15	1.19	1.18	1.20	1.17	1.18	1.19	1.18
HCM2k70thQ:	19.0	21.8	3.8	7.4	31.3	7.4	13.0	1.9	16.3	11.7	2.5	9.7
85th%Factor:	1.47	1.46	1.57	1.54	1.42	1.54	1.51	1.58	1.49	1.52	1.58	1.53
HCM2k85thQ:	24.0	27.4	5.0	9.7	38.6	9.7	16.6	2.5	20.7	15.1	3.3	12.6
90th%Factor:	1.58	1.56	1.74	1.69	1.50	1.69	1.63	1.77	1.60	1.64	1.76	1.66
HCM2k90thQ:	25.7	29.2	5.5	10.6	40.8	10.6	18.0	2.8	22.3	16.3	3.7	13.7
95th%Factor:	1.74	1.71	2.00	1.92	1.63	1.92	1.83	2.05	1.78	1.85	2.03	1.88
HCM2k95thQ:	28.4	32.1	6.4	12.1	44.3	12.0	20.1	3.2	24.7	18.3	4.3	15.5
98th%Factor:	1.99	1.94	2.48	2.32	1.82	2.32	2.13	2.59	2.04	2.17	2.55	2.23
HCM2k98thQ:	32.4	36.3	7.9	14.5	49.5	14.5	23.5	4.1	28.4	21.5	5.4	18.4

LONG-TERM (2029) CONDITIONS

PRELIMINARY CONFIGURATION

Level Of Service Computation Report

2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Future Intersection

Cycle (sec): 180 Critical Vol./Cap.(X): 0.712
Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 46.6
Optimal Cycle: 79 Level Of Service: D

Table with columns for Street Name (Queen Kaahumanu Highway, Hulikoa Drive), Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control (Protected, Ovl), Rights (Include), Min. Green, and Lanes.

Volume Module:

Table with 13 columns for traffic volume metrics: Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module:

Table with 13 columns for saturation flow metrics: Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module:

Table with 13 columns for capacity analysis metrics: Vol/Sat, Crit Moves, Green/Cycle, Volume/Cap, Uniform Del, IncremntDel, InitQueueDel, Delay Adj, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

Note: Queue reported is the number of cars per lane.

 Level Of Service Detailed Computation Report (HCM2000 Queue Method)
 2000 HCM Operations Method
 Base Volume Alternative

Intersection #2 Future Intersection

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Green/Cycle:	0.13	0.49	0.49	0.14	0.51	0.51	0.31	0.23	0.35	0.13	0.06	0.20
ArrivalType:	3			3			3			3		
ProgFactor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q1:	7.9	23.2	5.5	8.1	26.6	4.7	17.4	3.9	16.0	7.3	3.7	6.0
UpstreamVC:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UpstreamAdj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EarlyArrAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q2:	2.0	1.9	0.3	1.7	2.3	0.3	2.2	0.3	1.8	1.5	1.7	0.7
HCM2KQueue:	9.9	25.1	5.8	9.8	28.9	5.0	19.7	4.2	17.8	8.8	5.4	6.8
70th%Factor:	1.18	1.15	1.19	1.18	1.15	1.19	1.16	1.19	1.16	1.18	1.19	1.18
HCM2k70thQ:	11.7	28.9	6.9	11.6	33.2	5.9	22.8	5.0	20.7	10.4	6.4	8.0
85th%Factor:	1.52	1.43	1.55	1.52	1.41	1.55	1.46	1.56	1.47	1.52	1.55	1.54
HCM2k85thQ:	15.0	35.9	9.0	14.9	40.8	7.7	28.6	6.5	26.1	13.4	8.4	10.4
90th%Factor:	1.64	1.51	1.70	1.64	1.49	1.71	1.55	1.72	1.56	1.66	1.71	1.69
HCM2k90thQ:	16.3	38.0	9.9	16.1	43.1	8.5	30.5	7.2	27.8	14.6	9.2	11.4
95th%Factor:	1.85	1.65	1.93	1.85	1.62	1.96	1.70	1.98	1.72	1.87	1.94	1.91
HCM2k95thQ:	18.3	41.4	11.3	18.1	46.8	9.7	33.4	8.3	30.7	16.4	10.5	12.9
98th%Factor:	2.17	1.85	2.34	2.17	1.81	2.38	1.92	2.42	1.95	2.21	2.36	2.29
HCM2k98thQ:	21.5	46.3	13.6	21.3	52.2	11.9	37.8	10.2	34.8	19.4	12.7	15.5

Level Of Service Computation Report

2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Future Intersection

Cycle (sec): 180 Critical Vol./Cap.(X): 0.833
Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 49.8
Optimal Cycle: 137 Level Of Service: D

Table with columns for Street Name (Queen Kaahumanu Highway, Hulikoa Drive), Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control (Protected, Ovl), Rights (Include, Ovl), and Lanes.

Volume Module:

Table with 13 columns for traffic volume metrics: Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module:

Table with 13 columns for saturation flow metrics: Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module:

Table with 13 columns for capacity analysis metrics: Vol/Sat, Crit Moves, Green/Cycle, Volume/Cap, Uniform Del, IncremntDel, InitQueueDel, Delay Adj, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

Note: Queue reported is the number of cars per lane.

 Level Of Service Detailed Computation Report (HCM2000 Queue Method)
 2000 HCM Operations Method
 Base Volume Alternative

Intersection #2 Future Intersection

Approach: Movement:	North Bound			South Bound			East Bound			West Bound		
	L	T	R	L	T	R	L	T	R	L	T	R
Green/Cycle:	0.16	0.56	0.56	0.09	0.49	0.49	0.28	0.20	0.36	0.15	0.07	0.16
ArrivalType:	3			3			3			3		
ProgFactor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q1:	11.8	24.7	2.9	5.4	33.4	7.9	20.1	4.0	17.5	7.6	5.1	6.8
UpstreamVC:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UpstreamAdj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EarlyArrAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q2:	3.3	1.9	0.2	1.6	4.1	0.5	3.7	0.3	2.2	1.3	2.5	1.2
HCM2KQueue:	15.0	26.6	3.1	7.0	37.5	8.4	23.8	4.4	19.7	9.0	7.7	8.0
70th%Factor:	1.17	1.15	1.19	1.18	1.14	1.18	1.16	1.19	1.16	1.18	1.18	1.18
HCM2k70thQ:	17.5	30.6	3.7	8.3	42.7	9.9	27.5	5.2	22.8	10.6	9.1	9.4
85th%Factor:	1.48	1.42	1.57	1.54	1.39	1.53	1.44	1.56	1.46	1.52	1.53	1.53
HCM2k85thQ:	22.3	37.9	4.9	10.7	51.9	12.8	34.1	6.8	28.6	13.6	11.8	12.2
90th%Factor:	1.59	1.51	1.74	1.68	1.46	1.66	1.52	1.72	1.55	1.66	1.67	1.67
HCM2k90thQ:	23.9	40.1	5.4	11.7	54.8	13.9	36.2	7.6	30.5	14.8	12.8	13.3
95th%Factor:	1.76	1.64	2.00	1.91	1.57	1.88	1.66	1.97	1.70	1.86	1.89	1.89
HCM2k95thQ:	26.4	43.6	6.2	13.3	59.0	15.7	39.5	8.6	33.5	16.7	14.5	15.0
98th%Factor:	2.02	1.83	2.49	2.28	1.76	2.22	1.86	2.41	1.92	2.20	2.25	2.24
HCM2k98thQ:	30.3	48.7	7.7	15.9	65.8	18.6	44.2	10.6	37.8	19.7	17.3	17.9

LONG-TERM (2029) CONDITIONS

FINAL CONFIGURATION

Level Of Service Computation Report

2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Future Intersection

Cycle (sec): 180 Critical Vol./Cap.(X): 0.642
 Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 41.4
 Optimal Cycle: 64 Level Of Service: D

Street Name:	Queen Kaahumanu Highway					Hulikoa Drive														
Approach:	North Bound			South Bound			East Bound			West Bound										
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Include					Include					Ovl					Ovl				
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2	0	2	0	1	1	0	2	0	1	2	0	1	0	1	2	0	1	0	1

Volume Module:

Base Vol:	320	1177	192	172	1312	172	393	96	379	154	75	138
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	320	1177	192	172	1312	172	393	96	379	154	75	138
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	320	1177	192	172	1312	172	393	96	379	154	75	138
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	320	1177	192	172	1312	172	393	96	379	154	75	138
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	320	1177	192	172	1312	172	393	96	379	154	75	138

Saturation Flow Module:

Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.92	0.95	0.85	0.95	0.95	0.85	0.92	1.00	0.85	0.92	1.00	0.85
Lanes:	2.00	2.00	1.00	1.00	2.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00
Final Sat.:	3502	3610	1615	1805	3610	1615	3502	1900	1615	3502	1900	1615

Capacity Analysis Module:

Vol/Sat:	0.09	0.33	0.12	0.10	0.36	0.11	0.11	0.05	0.23	0.04	0.04	0.09
Crit Moves:	****				****				****	****		
Green/Cycle:	0.14	0.55	0.55	0.16	0.57	0.57	0.22	0.22	0.37	0.07	0.08	0.24
Volume/Cap:	0.64	0.59	0.22	0.59	0.64	0.19	0.52	0.23	0.64	0.64	0.52	0.36
Uniform Del:	72.9	27.3	20.9	70.2	26.6	19.0	62.3	57.2	47.3	81.7	80.0	57.4
IncrcmntDel:	2.8	0.5	0.1	3.3	0.7	0.1	0.6	0.3	2.4	5.8	3.4	0.6
InitQueueDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	75.7	27.8	21.0	73.5	27.3	19.1	63.0	57.5	49.8	87.5	83.4	58.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	75.7	27.8	21.0	73.5	27.3	19.1	63.0	57.5	49.8	87.5	83.4	58.0
LOS by Move:	E	C	C	E	C	B	E	E	D	F	F	E
HCM2kAvgQ:	9	22	5	9	25	4	10	4	17	5	5	6

Note: Queue reported is the number of cars per lane.

 Level Of Service Detailed Computation Report (HCM2000 Queue Method)
 2000 HCM Operations Method
 Base Volume Alternative

Intersection #2 Future Intersection

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Green/Cycle:	0.14	0.55	0.55	0.16	0.57	0.57	0.22	0.22	0.37	0.07	0.08	0.24
ArrivalType:	3			3			3			3		
ProgFactor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q1:	7.8	20.8	4.9	8.0	23.5	4.2	8.9	3.9	15.7	3.9	3.6	5.8
UpstreamVC:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UpstreamAdj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EarlyArrAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q2:	1.6	1.4	0.3	1.3	1.7	0.2	1.0	0.3	1.7	1.4	1.0	0.6
HCM2KQueue:	9.4	22.2	5.2	9.3	25.3	4.4	10.0	4.2	17.4	5.3	4.6	6.3
70th%Factor:	1.18	1.16	1.19	1.18	1.15	1.19	1.18	1.19	1.16	1.19	1.19	1.19
HCM2k70thQ:	11.0	25.7	6.2	11.0	29.1	5.2	11.8	5.0	20.3	6.3	5.4	7.5
85th%Factor:	1.52	1.44	1.55	1.52	1.43	1.56	1.52	1.56	1.47	1.55	1.56	1.54
HCM2k85thQ:	14.2	32.0	8.1	14.2	36.1	6.9	15.1	6.6	25.5	8.2	7.1	9.8
90th%Factor:	1.65	1.53	1.71	1.65	1.51	1.72	1.64	1.72	1.57	1.71	1.72	1.69
HCM2k90thQ:	15.5	34.0	8.9	15.4	38.2	7.6	16.4	7.3	27.3	9.0	7.9	10.7
95th%Factor:	1.86	1.67	1.95	1.86	1.65	1.97	1.84	1.97	1.73	1.95	1.97	1.92
HCM2k95thQ:	17.4	37.2	10.1	17.3	41.6	8.7	18.4	8.3	30.1	10.3	9.0	12.2
98th%Factor:	2.19	1.88	2.37	2.19	1.84	2.41	2.16	2.42	1.96	2.37	2.40	2.31
HCM2k98thQ:	20.5	41.8	12.3	20.4	46.6	10.6	21.6	10.2	34.1	12.5	11.0	14.6

Level Of Service Computation Report

2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Future Intersection

Cycle (sec): 180 Critical Vol./Cap.(X): 0.718
Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 41.5
Optimal Cycle: 81 Level Of Service: D

Table with columns for Street Name, Approach, Movement, Control, Rights, Min. Green, and Lanes for Queen Kaahumanu Highway and Hulikoa Drive.

Volume Module:

Table showing Volume Module data including Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, and Final Volume.

Saturation Flow Module:

Table showing Saturation Flow Module data including Sat/Lane, Adjustment, Lanes, and Final Sat.

Capacity Analysis Module:

Table showing Capacity Analysis Module data including Vol/Sat, Crit Moves, Green/Cycle, Volume/Cap, Uniform Del, IncremntDel, InitQueueDel, Delay Adj, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, and HCM2kAvgQ.

Note: Queue reported is the number of cars per lane.

 Level Of Service Detailed Computation Report (HCM2000 Queue Method)
 2000 HCM Operations Method
 Base Volume Alternative

Intersection #2 Future Intersection

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Green/Cycle:	0.19	0.65	0.65	0.11	0.57	0.57	0.17	0.18	0.36	0.07	0.08	0.18
ArrivalType:	3			3			3			3		
ProgFactor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q1:	11.4	19.7	2.4	5.3	28.3	6.7	10.4	4.2	17.4	4.1	5.1	6.6
UpstreamVC:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UpstreamAdj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EarlyArrAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q2:	2.2	1.3	0.1	1.2	2.4	0.4	2.1	0.4	2.1	1.6	1.9	0.9
HCM2KQueue:	13.6	21.1	2.5	6.5	30.7	7.1	12.6	4.6	19.5	5.7	6.9	7.5
70th%Factor:	1.17	1.16	1.19	1.19	1.15	1.18	1.17	1.19	1.16	1.19	1.18	1.18
HCM2k70thQ:	15.9	24.4	3.0	7.7	35.2	8.4	14.7	5.4	22.6	6.7	8.2	8.8
85th%Factor:	1.49	1.45	1.58	1.54	1.41	1.54	1.50	1.56	1.46	1.55	1.54	1.53
HCM2k85thQ:	20.2	30.5	3.9	10.0	43.2	10.9	18.8	7.1	28.4	8.8	10.7	11.5
90th%Factor:	1.60	1.54	1.75	1.69	1.49	1.68	1.61	1.72	1.55	1.70	1.68	1.68
HCM2k90thQ:	21.7	32.4	4.4	10.9	45.6	11.9	20.3	7.8	30.2	9.6	11.7	12.5
95th%Factor:	1.78	1.69	2.02	1.92	1.61	1.90	1.80	1.97	1.70	1.94	1.91	1.90
HCM2k95thQ:	24.2	35.5	5.0	12.4	49.3	13.5	22.6	9.0	33.2	11.0	13.3	14.2
98th%Factor:	2.05	1.90	2.53	2.31	1.79	2.28	2.08	2.40	1.92	2.35	2.29	2.26
HCM2k98thQ:	27.8	40.0	6.3	15.0	55.0	16.1	26.1	11.0	37.5	13.3	15.9	16.9

APPENDIX C

THE SHORES AT KOHANAIKI TRIP GENERATION ANALYSIS

Julian Ng, Incorporated

Mr. Michael Eadie
 April 21, 2003
 Page 2 of 4

Traffic Update for Currently Proposed Project - The proposed project has been revised to include only 500 dwelling units, an 18-hole golf course, and 120 parking spaces for public beach access. Traffic volumes generated by the dwelling units and the golf course were based on trip rates from the widely used *Trip Generation, 6th Edition* (1997), a publication of the Institute of Transportation Engineers.

	Trip Generation Rates			
	<u>detached dwelling units</u>		<u>holes, golf course</u>	
	<u>rate</u>	<u>% enter</u>	<u>rate</u>	<u>% enter</u>
Average weekday	9.57	50%	35.74	50%
AM Peak Hour	0.75	25%	2.22	79%
PM Peak Hour	1.01	64%	2.74	44%
AM Peak Hour (site)	0.77	25%	3.01	47%
PM Peak Hour (site)	1.02	64%	3.56	43%
Saturday	10.09	50%	40.63	50%
peak hour	0.94	54%	4.59	49%
Sunday	8.78	50%	39.53	50%
peak hour	0.86	53%	4.43	50%

Source: Institute of Transportation Engineers, *Trip Generation, 6th Edition*. Washington, D.C., 1997

The revised estimates of total project traffic are:

	Project Traffic Estimates					
	<u>500 dwellings</u>		<u>18-hole golf course</u>		<u>Total Project Trips</u>	
	<u>Entering</u>	<u>Exiting</u>	<u>Entering</u>	<u>Exiting</u>	<u>Entering</u>	<u>Exiting</u>
Average weekday	2,390	2,390	320	320	2,710	2,710
Saturday	2,520	2,520	370	370	2,890	2,890
Sunday	2,200	2,200	360	360	2,560	2,560
Peak Hours						
Weekday AM Peak Hour	94	281	32	8	124	289
Weekday PM Peak Hour	323	182	22	28	345	210
Weekday AM Site Peak Hour	96	289	25	29	121	318
Weekday PM Site Peak Hour	326	184	28	37	354	221
Saturday peak hour	254	216	40	42	294	258
Sunday peak hour	228	202	40	40	268	242

The current project will generate less traffic than the project previously proposed. Daily volumes would be less than 2,900 vehicles each way, compared to the previous estimate of 4,320 vehicles per day entering and 4,320 vehicles per day exiting the site. Project traffic volumes during peak hours will also be less than previously estimated.

Julian Ng, Incorporated

Mr. Michael Eadie
April 21, 2003
Page 3 of 4

The 120 parking spaces for beach access were assumed to generate 10 trips per day per space. Morning peak hour traffic was assumed to be 1.0 trip entering and 0.2 trip exiting per hour per space; with the opposite flow in the afternoon peak hour. Weekend peak hour volumes for the parking spaces were assumed to be 0.75 per hour per space in each direction. The 1,200 daily trips would be between 20% and 25% of the traffic generated by the project itself. Peak hourly volumes of 120 vehicles per hour in the peak direction and 24 vehicles per hour in the opposite direction, or 90 vehicles per hour in each direction during weekend peak hours, would also be significant additions to project traffic. The traffic due to beach access, however, is expected to occur with or without development of the proposed project.

Recent Traffic Data - The latest available traffic counts taken on Queen Kaahumanu Highway by the State Highways Division are from counts taken in 2000. Daily totals from the biennial counts back to 1994 are also shown.

Existing Traffic on Queen Kaahumanu Highway

	<u>Southbound</u>	<u>Northbound</u>	<u>Two-way total</u>
July, 1994	4,639	4,627	9,266
July, 1996	5,590	4,748	10,338
October, 1998	6,101	6,211	12,312
May, 2000	6,478	6,558	13,036
7:00 AM - 8:00 AM	520	405	925
3:15 PM - 4:15 PM	395	703	1,098

Source: State of Hawaii, Department of Transportation, Highways Division,
Traffic Count Data - Island of Hawaii 2000. Traffic count Station 8-P

Highway traffic has increased at a rate of nearly 6% per year from 1994 to 2000. If this rate of growth were to continue, traffic volumes in year 2010 would be 76.6% higher than in year 2000. Assuming that this growth would occur without the proposed project provides a future baseline (without project) condition. Project traffic volumes (at buildout) are added to the baseline volumes to determine project impact. Levels of service on the two-lane highway were based on traffic density at the posted 45 miles per hour speed limit, using the criteria from the *Highway Capacity Manual* for multilane highways. (Note: the manual's analysis procedure for two-lane highways would not be appropriate for the limited distances between intersections that typify conditions along the highway)

Level of Service A	maximum of 11 vehicles per mile per lane
Level of Service B	maximum of 18 vehicles per mile per lane
Level of Service C	maximum of 26 vehicles per mile per lane
Level of Service D	maximum of 35 vehicles per mile per lane
Level of Service E	maximum of 45 vehicles per mile per lane
Level of Service F	greater than 45 vehicles per mile per lane

Level of Service C or better is considered acceptable for rural conditions. Level of Service D or better is acceptable for urban conditions.

APPENDIX D

'O'OMA BEACHSIDE VILLAGE TRIP GENERATION ANALYSIS

**TABLE 1
PROJECT MILESTONE SCHEDULE**

LAND USE	PLANNING YEAR MILESTONE			TG REPORT LAND USE
	2015	2020	2029	
	Cumulative Number of Units			
Single Family DU Residential	120	275	475	SFDU (210)
Multi-family DU Residential	115	355	715	Low-rise Townhome (231)
TOTAL RESIDENTIAL	235	630	1,190	
Makai Village - MU Commercial (sf)	30,000	30,000	30,000	Shopping Center (820)
Restaurant & Canoe Club (sf)	20,000	20,000	20,000	Quality Restaurant (931)
TOTAL COMMERCIAL - Area A (sf)	50,000	50,000	50,000	
Mauka Village - MU&LW Commercial (sf)	0	35,000	135,000	Office Park (750)
Grocery Store (sf)		15,000	15,000	Supermarket (850)
TOTAL COMMERCIAL - Area B (sf)	0	50,000	150,000	
Charter School (students)			225	Private School (534)
Public Beach Clubhouse (ac)	1	1	1	Constant assumed

Proposed development schedule assumed for forecasting project generated traffic.
This schedule does not reflect the actual project development schedule.

**TABLE 2
TRIP GENERATION ANALYSIS**

TIME PERIOD Land Use	Cumulative Units	Trip Generation Equation	Ln(T)	T = Number of Trips	Direction of Travel	Percent	Number of Trips
PLANNING YEAR 2015							
WEEKDAY AM PEAK HOUR							
Single Family Residential	120 units	$T = 0.7(x) + 12.05$		96	Enter	26%	25
					Leave	74%	71
MF & Mixed Use Vill Residential	115 units	$T = 0.88(x) - 49.7$		115	Enter	25%	29
					Leave	75%	86
Mixed Use Commercial (Area A)	30 ksf GLA	$T = 1.03(X)$		31	Enter	61%	19
					Leave	39%	12
Restaurant	20 ksf GLA	$T = 0.81(X)$		16	Enter	50%	8
					Leave	50%	8
Public Beach Clubhouse					Enter		50
					Leave		10
TOTAL					Enter		131
					Leave		187
WEEKDAY PM PEAK HOUR							
Single Family Residential	120 units	$\text{Ln}(T)=0.89\text{Ln}(X)+0.61$	4.87	130	Enter	64%	83
					Leave	36%	47
MF & Mixed Use Vill Residential	115 units	$T = 0.78(X)$		90	Enter	58%	52
					Leave	42%	38
Mixed Use Commercial (Area A)	30 ksf GLA	$T = 3.75(X)$		113	Enter	48%	54
					Leave	52%	59
Restaurant	20 ksf GLA	$T = 7.49(X)$		150	Enter	67%	100
					Leave	33%	49
Public Beach Clubhouse					Enter		20
					Leave		50
TOTAL					Enter		310
					Leave		243

**TABLE 2 (continued)
TRIP GENERATION ANALYSIS**

TIME PERIOD Land Use	Cumulative Units	Trip Generation Equation	Ln(T)	T = Number of Trips	Direction of Travel	Percent	Number of Trips
PLANNING YEAR 2029							
WEEKDAY AM PEAK HOUR							
Single Family Residential	475 units	$T = 0.7(x) + 12.05$		345	Enter	26%	90
					Leave	74%	255
MF, M/U, LW Residential	715 units	$T = 0.88(x) - 49.7$		580	Enter	25%	145
					Leave	75%	435
Mixed Use Commercial (Area A)	30 ksf GLA	$T = 1.03(X)$		31	Enter	61%	19
					Leave	39%	12
M/U, LW Commercial (Area B)	135 ksf GLA	$\ln(T)=0.84\ln(X)+1.51$	5.63	279	Enter	89%	248
					Leave	11%	31
Grocery Store	15 ksf GLA	$\ln(T)=0.170\ln(X)-1.42$	3.18	24	Enter	61%	15
					Leave	39%	9
Restaurant	20 ksf GLA	$T = 0.81(X)$		16	Enter	50%	8
					Leave	50%	8
Charter School (K-8)	225 students	$\ln(T)=\ln(X)-0.13$	5.29	198	Enter	55%	109
					Leave	45%	89
Public Beach Clubhouse					Enter		70
					Leave		20
TOTAL					Enter		703
					Leave		859

TABLE 2 (continued)
TRIP GENERATION ANALYSIS

TIME PERIOD Land Use	Cumulative Units	Trip Generation Equation	Ln(T)	T = Number of Trips	Direction of Travel	Percent	Number of Trips
PLANNING YEAR 2029							
WEEKDAY PM PEAK HOUR							
Single Family Residential	475 units	$\text{Ln}(T)=0.89\text{Ln}(X)+0.61$	6.10	444	Enter	64%	284
					Leave	36%	160
MF, M/U, L/W Residential	715 units	$T = 0.78(X)$		558	Enter	58%	323
					Leave	42%	234
Mixed Use Commercial (Area A)	30 ksf GLA	$T = 3.75(X)$		113	Enter	48%	54
					Leave	52%	59
M/U, L/W Commercial (Area B)	135 ksf GLA	$T = 1.21(x) + 106.22$		270	Enter	14%	38
					Leave	86%	232
Grocery Store	15 ksf GLA	$\text{Ln}(T)=0.79\text{Ln}(X)+3.20$	5.34	208	Enter	51%	106
					Leave	49%	102
Restaurant	20 ksf GLA	$T = 7.49(X)$		150	Enter	67%	100
					Leave	33%	49
Charter School (K-8)	225 students	$T = 0.58(x) + 14.03$		145	Enter	47%	68
					Leave	53%	77
Public Beach Clubhouse					Enter		25
					Leave		70
TOTAL					Enter		999
					Leave		982



MEMORANDUM

Date: June 10, 2009

To: Burke Matsuyama, Kohanaiki Business Park Association, Inc.

From: Dick Kaku, Anjum Bawa, and Julie Kentosh

**Subject: *Interim Intersection Configuration
Intersection of Queen Kaahumanu Highway & Hulikoa Road***

SM09-2295.01

This memorandum is a technical addendum to *Traffic Engineering Study for the Intersection of Queen Kaahumanu Highway & Hulikoa Road* (Fehr & Peers, October 2008). This addendum presents a revised assessment of capacity requirements for the intersection of Queen Kaahumanu Highway & Hulikoa Road for the Interim Year 2015 pursuant to the most recent information available on expected construction of proposed projects in the immediate vicinity of the intersection.

The assessment involved the following:

- Conducting revisions to proposed project trip generation and background traffic assumptions
- Level of service and queuing analysis for the intersection of Queen Kaahumanu Highway & Hulikoa Road
- Revising the proposed design of the intersection based on the level of service and queuing analysis results

MODIFIED TRAFFIC PROJECTIONS (2015)

Ambient Growth in Traffic

The regional ambient growth in highway traffic volumes was estimated as a percentage increase of the existing traffic volumes. Previous traffic impact assessment reports for 'O'oma, The Shores and Kohanaiki have estimated future traffic growth along Queen Kaahumanu Highway to be between 3.74 and 6 percent per year. This revised study assumes 5 percent simple growth per year. At a growth rate of 5 percent per year for seven years, the ambient growth along Queen Kaahumanu Highway was calculated at 35% up to the Interim Year 2015 conditions.

Traffic Generated by Three Development Projects

The three developments, Kohanaiki Business Park, The Shores at Kohanaiki and 'O'oma Beachside Village, are expected to rely heavily or exclusively on the intersection of Queen Kaahumanu Highway & Hulikoa Road for inbound and outbound traffic to/from their sites. The interim traffic volume projections were based on expected traffic conditions in 2015, with the assumption that Kohanaiki Business Park and The Shores will be fully occupied by Year 2015. It was assumed that the 'O'oma Beachside Village would not be constructed and occupied until Year 2029, and was therefore not included in the 2015 traffic

projections. The long-term projection, based on year 2029 conditions, assumes that all three development projects would be complete and fully occupied.

The projected Interim Year 2015 morning and evening peak hour traffic volumes are shown in Figure 1.

INTERIM INTERSECTION CONFIGURATION

Using the standards described in *Traffic Engineering Study for the Intersection of Queen Kaahumanu Highway & Hulikoa Road* and a review of the modified traffic projections, the proposed interim configuration was developed. The interim configuration is designed to satisfy the traffic capacity needs of the intersection during the interim period but still have the flexibility and room to expand its vehicular capacity for Year 2029 full buildout conditions. Figure 2 illustrates the proposed conceptual design for the Interim Year 2015 configuration of the intersection of Queen Kaahumanu Highway & Hulikoa Road. The intersection is proposed with the following lane configuration and turn-lane storage capacities:

- Northbound – One left-turn lane, two through lanes and one right-turn lane. To provide adequate storage, the left-turn lane should be 310 feet long and the right-turn lane should be 110 feet long.
- Southbound – One left-turn lane, two through lanes and one right-turn lane. To provide adequate storage, the left-turn lane should be 250 feet long and the right-turn lane should be 90 feet long.
- Eastbound – One left-turn lane and one shared through/right-turn lane. The left-turn lane should be 220 feet long to provide adequate storage.
- Westbound – One left-turn lane and one shared through/right-turn lane. The left-turn lane should be 250 feet long to provide adequate storage.

The proposed signal phasing would include protected left-turn phasing in all four directions. The above configuration would accommodate interim Year 2015 traffic volumes and would be consistent with Year 2029 expansion of capacity at the intersection.

LEVEL OF SERVICE

With the interim Year 2015 proposed intersection design, the study intersection is estimated operate at a LOS C during both the morning and evening peak hours, with an average delay of 24.3 seconds in the AM peak hour and 23.7 seconds in the PM peak hour. Table 1 shows the level of service at the intersection. LOS worksheets are provided in the Attachment to this memorandum.



NOT TO SCALE

'O'oma Beachside Village

Queen Kaahumanu Highway

'O'oma Access Road

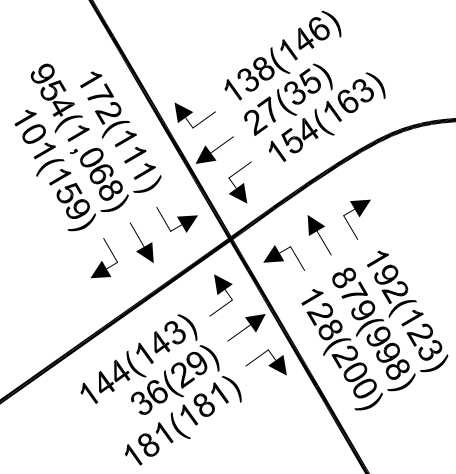
Hulikoa Dr

Kohanaiki Business Park

The Shores at Kohanaiki

Legend

##(##) - AM(PM) Peak Hour Traffic Volumes

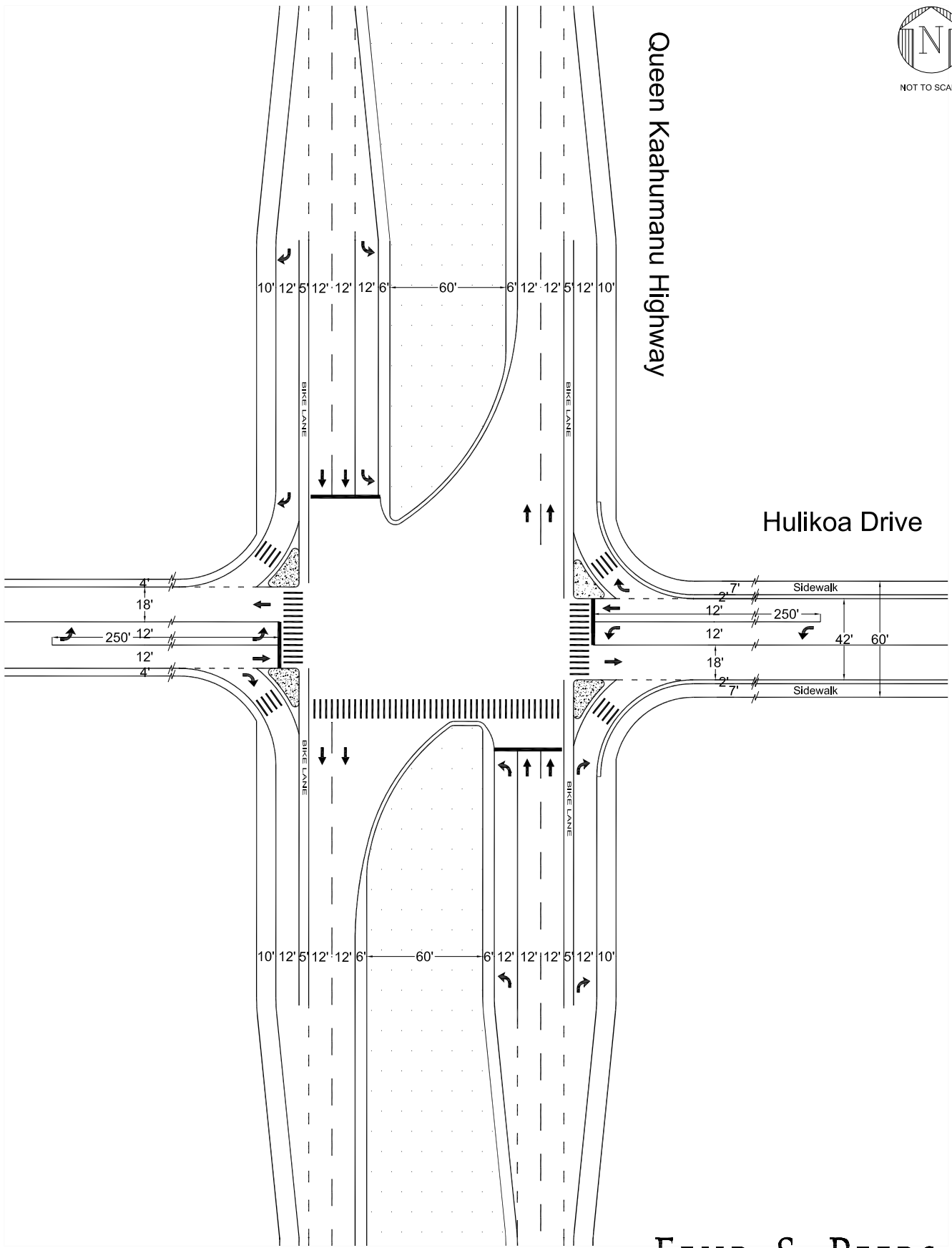


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TRANSPORTATION CONSULTANTS

FIGURE 1
PROJECTED INTERIM (2015) PEAK HOUR TRAFFIC VOLUMES



NOT TO SCALE



FEHR & PEERS
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FIGURE 2
REVISED INTERIM INTERSECTION CONFIGURATION

**TABLE 1
INTERSECTION LEVEL OF SERVICE
FUTURE CONDITIONS**

Intersection	Control	Peak Hour	Future		
			Delay	V/C	LOS
<i>Interim (Year 2015)</i>					
Queen Ka'ahumanu Highway & Hulikoa Drive	Signal	AM	24.3	0.492	C
		PM	23.7	0.569	C

Delay shown is average control delay per vehicle, in seconds.

ATTACHMENT

LEVEL OF SERVICE WORKSHEETS

Level Of Service Computation Report

2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Future Intersection

Cycle (sec): 120 Critical Vol./Cap.(X): 0.492
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 24.3
Optimal Cycle: 41 Level Of Service: C

Table with columns for Street Name (Queen Kaahumanu Highway, Hulikoa Drive), Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, and Lanes.

Volume Module: Table with columns for Base Vol, Growth Adj, Initial Bse, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module: Table with columns for Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module: Table with columns for Vol/Sat, Crit Moves, Green/Cycle, Volume/Cap, Uniform Del, IncremntDel, InitQueueDel, Delay Adj, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

Note: Queue reported is the number of cars per lane.

Level Of Service Detailed Computation Report
2000 HCM Operations Method
Base Volume Alternative

Intersection #2 Future Intersection

Table with 4 columns: North Bound, South Bound, East Bound, West Bound. Rows include Approach, Movement, HCM Ops Adjusted Lane Utilization Module, Lanes, Lane Group, and #LnsInGrps.

Table with 13 columns for various input parameters. Rows include HCM Ops Input Saturation Adj Module, Lane Width, CrsswalkWid, % Hev Veh, Grade, Parking/Hr, Bus Stp/Hr, Area Type, Cnft Ped/Hr, ExclusiveRT, and % RT Prtct.

Table with 4 columns for f(lt) Case. Row includes HCM Ops f(lt) Adj Case Module.

Table with 13 columns for various adjustment factors. Rows include HCM Ops Saturation Adj Module, Ln Wid Adj, Hev Veh Adj, Grade Adj, Parking Adj, Bus Stp Adj, Area Adj, RT Adj, LT Adj, PedBike Adj, HCM Sat Adj, Ustr Sat Adj, MLF Sat Adj, and Fnl Sat Adj.

Table with 13 columns for delay adjustment factors. Rows include Delay Adjustment Factor Module, Coordinated, Signal Type, and DelAdjFctr.

 Level Of Service Detailed Computation Report (HCM2000 Queue Method)
 2000 HCM Operations Method
 Base Volume Alternative

 Intersection #2 Future Intersection

Approach: Movement:	North Bound			South Bound			East Bound			West Bound		
	L	T	R	L	T	R	L	T	R	L	T	R
Green/Cycle:	0.15	0.49	0.67	0.19	0.54	0.72	0.18	0.04	0.00	0.17	0.03	0.00
ArrivalType:	3			3			3			3		
ProgFactor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q1:	3.9	10.3	2.4	5.1	10.4	1.0	4.3	1.2	0.0	4.6	0.9	0.0
UpstreamVC:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UpstreamAdj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EarlyArrAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Q2:	0.9	1.0	0.2	0.9	0.9	0.1	0.8	0.8	0.0	0.9	0.7	0.0
HCM2KQueue:	4.8	11.3	2.6	6.0	11.3	1.1	5.0	2.0	0.0	5.6	1.6	0.0
70th%Factor:	1.19	1.18	1.19	1.19	1.18	1.20	1.19	1.20	1.20	1.19	1.20	1.20
HCM2k70thQ:	5.7	13.2	3.1	7.2	13.3	1.3	6.0	2.4	0.0	6.6	1.9	0.0
85th%Factor:	1.56	1.51	1.57	1.55	1.51	1.59	1.55	1.58	1.60	1.55	1.58	1.60
HCM2k85thQ:	7.5	17.0	4.1	9.3	17.1	1.7	7.8	3.2	0.0	8.6	2.5	0.0
90th%Factor:	1.71	1.63	1.75	1.70	1.63	1.78	1.71	1.76	1.80	1.70	1.77	1.80
HCM2k90thQ:	8.3	18.3	4.6	10.2	18.5	1.9	8.6	3.5	0.0	9.5	2.8	0.0
95th%Factor:	1.96	1.82	2.02	1.93	1.82	2.06	1.95	2.04	2.10	1.94	2.05	2.10
HCM2k95thQ:	9.5	20.5	5.3	11.7	20.6	2.3	9.9	4.1	0.0	10.8	3.2	0.0
98th%Factor:	2.39	2.12	2.52	2.33	2.12	2.62	2.38	2.56	2.70	2.35	2.59	2.70
HCM2k98thQ:	11.5	23.9	6.6	14.1	24.0	2.9	12.0	5.1	0.0	13.1	4.1	0.0

Level Of Service Computation Report

2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Future Intersection

Cycle (sec): 120 Critical Vol./Cap.(X): 0.569
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 23.7
Optimal Cycle: 47 Level Of Service: C

Street Name: Queen Kaahumanu Highway Hulikoa Drive
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R
Control: Protected Protected Protected Protected
Rights: Ovl Ovl Ignore Ignore
Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0
Lanes: 1 0 2 0 1 1 0 2 0 1 1 0 0 1 0 1 0 0 1 0

Volume Module:
Base Vol: 200 998 123 111 1068 159 143 29 181 163 35 146
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 200 998 123 111 1068 159 143 29 181 163 35 146
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.00 1.00 1.00 0.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.00 1.00 1.00 0.00
PHF Volume: 200 998 123 111 1068 159 143 29 0 163 35 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 200 998 123 111 1068 159 143 29 0 163 35 0
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.00 1.00 1.00 0.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.00 1.00 1.00 0.00
FinalVolume: 200 998 123 111 1068 159 143 29 0 163 35 0

Saturation Flow Module:
Sat/Lane: 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
Adjustment: 0.95 0.95 0.85 0.95 0.95 0.85 0.95 1.00 1.00 0.95 1.00 1.00
Lanes: 1.00 2.00 1.00 1.00 2.00 1.00 1.00 1.00 0.00 1.00 1.00 0.00
Final Sat.: 1805 3610 1615 1805 3610 1615 1805 1900 0 1805 1900 0

Capacity Analysis Module:
Vol/Sat: 0.11 0.28 0.08 0.06 0.30 0.10 0.08 0.02 0.00 0.09 0.02 0.00
Crit Moves: **** **** ****
Green/Cycle: 0.19 0.58 0.74 0.13 0.52 0.67 0.15 0.03 0.00 0.16 0.03 0.00
Volume/Cap: 0.57 0.47 0.10 0.47 0.57 0.15 0.53 0.57 0.00 0.57 0.53 0.00
Uniform Del: 43.8 14.3 4.3 48.4 19.6 7.2 47.0 57.7 0.0 46.7 56.9 0.0
IncrcmntDel: 2.2 0.2 0.0 1.5 0.4 0.1 1.9 14.4 0.0 2.7 7.6 0.0
InitQueuDel: 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.00 1.00 1.00 0.00
Delay/Veh: 46.0 14.5 4.3 49.9 20.1 7.3 48.9 72.1 0.0 49.4 64.5 0.0
User DelAdj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 46.0 14.5 4.3 49.9 20.1 7.3 48.9 72.1 0.0 49.4 64.5 0.0
LOS by Move: D B A D C A D E A D E A
HCM2kAvgQ: 7 11 1 4 14 2 5 2 0 6 2 0

Note: Queue reported is the number of cars per lane.

Level Of Service Detailed Computation Report
2000 HCM Operations Method
Base Volume Alternative

Intersection #2 Future Intersection

Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

HCM Ops Adjusted Lane Utilization Module:
Lanes: 1 0 2 0 1 1 0 2 0 1 1 0 0 1 0 1 0 0 1 0
Lane Group: L T R L T R L RT RT L RT RT
#LnsInGrps: 1 2 1 1 2 1 1 1 1 1 1 1 1

HCM Ops Input Saturation Adj Module:
Lane Width: 12 12 12 12 12 12 12 12 12 12 12 12 12
CrsswalkWid: 8 8 8 8 8 8 8 8 8 8 8 8 8
% Hev Veh: 0 0 0 0 0 0 0 0 0 0 0 0 0
Grade: 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%
Parking/Hr: No No No No No No No No No No No No No
Bus Stp/Hr: 0 0 0 0 0 0 0 0 0 0 0 0 0
Area Type: < < < < < < < < < < < Other > > > > > > > > > > > > > > >
Cnft Ped/Hr: 0 0 0 0 0 0 0 0 0 0 0 0 0
ExclusiveRT: Include Include Include Include
% RT Prtct: 0 0 0 0 0 0 0 0 0 0 0 0 0

HCM Ops f(lt) Adj Case Module:
f(lt) Case: 1 xxxx xxxx 1 xxxx xxxx 1 xxxx xxxx 1 xxxx xxxx

HCM Ops Saturation Adj Module:
Ln Wid Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 xxxxxx 1.00 1.00 xxxxxx
Hev Veh Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 xxxxxx 1.00 1.00 xxxxxx
Grade Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 xxxxxx 1.00 1.00 xxxxxx
Parking Adj: xxxx xxxx 1.00 xxxx xxxx 1.00 xxxx 1.00 xxxxxx xxxx 1.00 xxxxxx
Bus Stp Adj: xxxx xxxx 1.00 xxxx xxxx 1.00 xxxx 1.00 xxxxxx xxxx 1.00 xxxxxx
Area Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 xxxxxx 1.00 1.00 xxxxxx
RT Adj: xxxx xxxx 0.85 xxxx xxxx 0.85 xxxx xxxx xxxxxx xxxx xxxx xxxxxx
LT Adj: 0.95 xxxx xxxxxx 0.95 xxxx xxxxxx 0.95 xxxx xxxxxx 0.95 xxxx xxxxxx
PedBike Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
HCM Sat Adj: 0.95 1.00 0.85 0.95 1.00 0.85 0.95 1.00 1.00 0.95 1.00 1.00
Usr Sat Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Sat Adj: 1.00 0.95 1.00 1.00 0.95 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Enl Sat Adj: 0.95 0.95 0.85 0.95 0.95 0.85 0.95 1.00 1.00 0.95 1.00 1.00

Delay Adjustment Factor Module:
Coordinated: < < < < < < < < < < < No > > > > > > > > > > > > > > >
Signal Type: < < < < < < < < < < Actuated > > > > > > > > > > > > > > >
DelAdjFctr: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.00 1.00 1.00 0.00

 Level Of Service Detailed Computation Report (HCM2000 Queue Method)
 2000 HCM Operations Method
 Base Volume Alternative

 Intersection #2 Future Intersection

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Green/Cycle:	0.19	0.58	0.74	0.13	0.52	0.67	0.15	0.03	0.00	0.16	0.03	0.00
ArrivalType:	3			3			3			3		
ProgFactor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q1:	6.0	10.1	1.1	3.4	12.8	1.9	4.4	1.0	0.0	5.0	1.1	0.0
UpstreamVC:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UpstreamAdj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EarlyArrAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Q2:	1.2	0.9	0.1	0.9	1.3	0.2	1.0	1.0	0.0	1.2	0.9	0.0
HCM2KQueue:	7.3	10.9	1.3	4.3	14.1	2.1	5.4	1.9	0.0	6.2	2.1	0.0
70th%Factor:	1.18	1.18	1.20	1.19	1.17	1.19	1.19	1.20	1.20	1.19	1.20	1.20
HCM2k70thQ:	8.6	12.9	1.5	5.1	16.5	2.5	6.5	2.3	0.0	7.4	2.5	0.0
85th%Factor:	1.54	1.51	1.59	1.56	1.49	1.58	1.55	1.58	1.60	1.54	1.58	1.60
HCM2k85thQ:	11.2	16.5	2.0	6.7	20.9	3.3	8.4	3.1	0.0	9.6	3.2	0.0
90th%Factor:	1.68	1.63	1.78	1.72	1.60	1.76	1.70	1.76	1.80	1.69	1.76	1.80
HCM2k90thQ:	12.2	17.9	2.2	7.4	22.5	3.7	9.3	3.4	0.0	10.6	3.6	0.0
95th%Factor:	1.90	1.83	2.06	1.97	1.77	2.03	1.94	2.04	2.10	1.92	2.04	2.10
HCM2k95thQ:	13.8	20.0	2.6	8.4	25.0	4.3	10.6	3.9	0.0	12.0	4.2	0.0
98th%Factor:	2.27	2.13	2.61	2.42	2.04	2.55	2.36	2.56	2.70	2.32	2.55	2.70
HCM2k98thQ:	16.5	23.3	3.3	10.4	28.7	5.4	12.8	4.9	0.0	14.5	5.2	0.0

Hydrology Report

QUEEN KAAHUMANU FRONTAGE ROAD HYDROLOGY REPORT

November 02, 2011

TMK: 7-3-09:018 por. & 7-3-9:016 por.

Kohanaiki, North Kona Hawaii

Prepared for:

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Background

This hydrology report is for the “Queen Ka`ahumanu Frontage Road” (Frontage Road) project located in Kohanaiki, North Kona on the Island of Hawaii, TMK: 7-3-09:018 por. and 7-3-09:016 por. The Frontage Road will connect the existing Shores at Kohanaiki access road, identified as Kohanaiki Way to a signalized intersection at the existing Hulikoa Drive/Queen Ka`ahumanu Highway intersection. Once the Frontage Road is open, the existing Kohanaiki Way intersection at Queen Ka`ahumanu Highway will be closed.

Purpose

The purpose of this report is to: 1) analyze the hydrology of the watershed upstream from the proposed Frontage Road; and 2) estimate the peak stormwater runoff from the upstream watershed to adequately size the proposed culverts for the Frontage Road. Design of the culvert crossing will be based on a 100-year, 24-hour, Type I storm analysis. This report also addresses the disposal of roadway drainage for the 10-year, 1-hour storm.

Hydrologic Analysis Method

Several sources and tools were utilized in this analysis. See descriptions below and a list of sources at the end of this report for more information.

-Hydrologic Information/Formulae: The watershed for the proposed culvert is quite large (1497 acres, 2.34 square miles), which means the simple Rational Method for estimating peak runoff is not suitable. The TR-55 method was used instead, which has an upper limit of 200 square miles. The TR-55 handbook was used in conjunction with a spreadsheet that was loaded with the relevant TR-55 formulae to produce a final peak runoff value in cubic feet per second.

-Site Topography: Since the watershed was so large and extensive, topography in CADD format was unavailable. A Google map showing site topography was used in conjunction with the site CADD drawing.

-Soils/Geotech: Part of the analysis included analyzing the types of soils and their related properties to estimate runoff. Soil maps from the County of Hawaii were used in conjunction with a USDA NRCS Engineering Field Handbook to determine soil hydrologic properties.

-Rainfall Depth: A Rainfall Frequency Atlas of Hawaii was used to determine rainfall depths for a given design storm event.

Site & Watershed Conditions

The watershed for the proposed culvert crossing under Frontage Road is fairly large: 1497 acres, 2.34 square miles. Currently, only a small portion of this area is developed, and the undeveloped areas are composed mainly of open grass-covered land and a small forested area. The open grass-covered portion consists of highly permeable lava rock (basalt). Only a small portion of the watershed (14.87 acres, 0.75%) is downstream of the existing 14'-10" x 9'-1" arch culvert (between Queen Kaahumanu Highway and Frontage Road). The remainder of the watershed is upstream of Queen Kaahumanu Highway, and the slope steadily increases from about 7% just mauka of the highway, all the way up to about 20% at the top of the watershed.

Most of the developed area upstream of Queen Kaahumanu Highway consists of 1-acre residential units and a few paved roadways. Also notable, is that the terrain consists of many local depressions that have the effect of trapping runoff, which allows for percolation through the soils. This has the overall effect of reducing runoff at the bottom of the watershed. These depressions and an overall lack of a defined channel are mainly evident toward the bottom of the watershed in between Queen Kaahumanu Highway and Frontage Road.

An overall Curve Number (CN) in Worksheet No. 1 below was configured to represent future conditions of the entire watershed (excluding the forested area) being developed with 1-acre residential units. This future development assumption was made in order to provide a more conservative runoff estimate.

The computed CN value was adjusted to the corresponding AMC (antecedent Moisture Condition) due to the site's dry characteristics. Antecedent soil moisture is known to have a significant effect on both volume and rate of runoff. The NRCS methodology classifies antecedent moisture conditions into three antecedent moisture conditions as follows:

Total 5-day Antecedent Rainfall (inches)

AMC	Dormant Season	Growing Season
I	Less than 0.5	Less than 1.4
II	0.5 to 1.1	1.4 to 2.1
III	over 1.1	over 2.1

According to National Oceanic and Atmospheric Administration (NOAA) rainfall records the AMC for the area is classified as Condition I.

Curve numbers provided in the NRCS TR-55 are for AMC II. According to the National Engineering Handbook Section 4, Hydrology (NEH-4) adjustments for AMC Conditions I and III are as follows:

Antecedent Moisture Condition Adjustment Table

CN for Condition II	Corresponding CN for Condition	
	I	III
100	100	100
95	87	99
90	78	98
85	70	97
80	63	94
75	57	91
70	51	87
65	45	83
60	40	79
55	35	75
50	31	71
45	27	65
40	23	60
35	19	55
30	15	50
25	12	45
20	9	39
15	7	33
10	4	26
5	2	17
0	0	0

The computed CN value (condition II) was 71. Using the table above, and interpolated CN value for condition I was computed to be 53. The effective CN value of 53 was in the runoff calculations, as shown below.

Results & Recommendations

The results of the TR-55 analysis are shown below in spreadsheet format. According to the results of this analysis, a peak runoff rate of **637.21 cfs** (cubic feet per second) could be accommodated using **6-48"** diameter culverts or equivalent culverts depending on headwater available when the roadway profile is finalized.

Rather than allowing runoff from the roadway surfaces to flow through the proposed culverts, drainage from the roadways will be diverted to swales along both sides of the roads, with excess flows directed to drywells. Due to the porous nature of the lavas underlying the Site, it is expected that the majority of runoff will infiltrate within the swales. Calculations using the County of Hawaii Storm Drainage Standards will determine the amount of runoff generated from the roadway. This excess runoff will be infiltrated using drywells. Additional runoff due to the Frontage Road will be retained on-site in accordance with County standards. An underground injection control permit will be required in order to construct the drywells. Once completed, the drywells will be tested and an Underground Injection Control permit will be obtained from the Department of Health to operate the drywells.

Sources

- (1) TR-55, "Urban Hydrology for Small Watersheds. USDA NRCS (National Resources Conservation Service). Washington, DC. 1986.
- (2) Technical Paper No. 43, "Rainfall-Frequency Atlas of the Hawaiian islands. US Department of Commerce, Weather Bureau. Washington, DC. 1962.
- (3) "Soil Survey of the Island of Hawaii". USDA Soil Conservation Service & University of Hawaii Agricultural Experiment Station. Washington, DC. 1973.
- (4) Notice HI-35, Engineering Field Handbook (EFH). USDA NRCS (National Resources Conservation Service). Washington, DC. 2006.

Worksheet 2: Time of Concentration (T_c) or Travel Time (T_t)

Project	Kohanaiki	By	FH	Date	10/10/2011
Location	Proposed Culvert Crossing	Checked		Date	

Check One: Present Developed

Check One: T_c T_t through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments

Sheet Flow (Applicable to T_c only)

	Segment ID	A-B		
1. Surface description (table 3-1).....		Grass		
2. Manning's roughness coefficient, <i>n</i> (table 3-1).....		0.8		
3. Flow Length, L.....ft		300		
4. Two-Year 24-hour rainfall, p ₂ in		3		
5. Land Slope, <i>s</i>ft/ft		0.1233		
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} S^{0.4}}$ Compute T _t hr		0.75	+	=
				0.75

Shallow Concentrated Flow

	Segment ID	B-C		
7. Surface description (paved or unpaved).....		Unpaved		
8. Flow length, L.....ft		27243		
9. Watercourse slope, <i>s</i>ft/ft		0.0949		
10. Average velocity, V (figure 3-1).....ft/s		5		
11. $T_t = \frac{L}{3600V}$ Compute T _t hr		1.51	+	=
				1.51

Channel Flow

	Segment ID			
12. Cross sectional flow area, <i>a</i>ft ²				
13. Wetted perimeter, P _wft				
14. Hydraulic Radius, <i>r</i> = <i>a</i> /P _w Compute <i>r</i>ft				
15. Channel Slope, <i>s</i>ft/ft				
16. Manning's Roughness coefficient, <i>n</i>				
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V.....ft/s				
18. Flow Length, L.....ft				
19. $T_t = \frac{L}{3600V}$ Compute T _t hr			+	=
				0.00

Channel Flow

	Segment ID			
12. Cross sectional flow area, <i>a</i>ft ²				
13. Wetted perimeter, P _wft				
14. Hydraulic Radius, <i>r</i> = <i>a</i> /P _w Compute <i>r</i>ft				
15. Channel Slope, <i>s</i>ft/ft				
16. Manning's Roughness coefficient, <i>n</i>				
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V.....ft/s				
18. Flow Length, L.....ft				
19. $T_t = \frac{L}{3600V}$ Compute T _t hr			+	=

Total T_c **2.26**
Use 2.30 hr

Worksheet 3: Graphical Peak Discharge Method

Project	Kohanaiki		By	FH	Date	10/10/2011
Location	Proposed Culvert Crossing		Checked		Date	

Check One: Present Developed

1. Data

Drainage Area.....Am= 2.34 mi² (acres/640)
Runoff curve number.....CN= 53 (From worksheet 2)
Time of concentration.....Tc= 2.30 hr (From worksheet 3)
Rainfall distribution.....= I (I, IA, II, III)
Pond and swamp areas spread
throughout watershed.....= 0 percent of A_m (_____ acres or mi² covered)

	Storm #1	Storm #2	Storm #3
2. Frequency.....yr	10	100	
3. Rainfall, P (24-hour).....in	6.0	8.0	
4. Initial abstraction, I _ain (Use CN with table 4-1)	1.774	1.774	
5. Compute I _a /P.....	0.30	0.22	
6. Unit peak discharge, q _ucsm/in (Use T _c and I _a /P with exhibit 4- II _____)	85	106	
7. Runoff, Q.....in	1.36	2.57	
8. Pond and swamp adjustment factor, F _p (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)	1.00	1.00	
9. Peak discharge, q _pft ³ /s (Where q _p = q _u A _m QF _p)	270.40	637.21	

**QUEEN
KAAHUMANU
HIGHWAY**

**THE SHORES AT
KOHANAIKI
TMK: 3-7-3-09:03**

**FRONTAGE ROAD
CULVERTS**

**DRAINAGE AREA:
1497.00 AC
2.34 SQ MI**

