Draft Environmental Assessment

KAWAIHAE ROAD - WAIAKA BRIDGE REPLACEMENT AND REALIGNMENT OF APPROACHES

Waiaka, South Kohala, Hawaii

Prepared for:
Department of Transportation
State of Hawaii

June 2011

DRAFT ENVIRONMENTAL ASSESSMENT

KAWAIHAE ROAD - WAIAKA BRIDGE REPLACEMENT AND REALIGNMENT OF APPROACHES

Waiaka, South Kohala, Island of Hawaii

Project No. AMTRK-01-99

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PROJECT SUMMARY

PROJECT NAME	Kawaihae Road – Waiaka Bridge Replacement and Realignment of Approaches
PROPOSING AGENCY:	State of Hawaii Department of Transportation 869 Punchbowl Street Honolulu, Hawaii 96813
ACCEPTING AGENCY:	State of Hawaii Department of Transportation 869 Punchbowl Street Honolulu, Hawaii 96813
TAX MAP KEY:	Kawaihae Road right-of-way parcels adjacent to right-of-way 6-5-001:033; 6-5-001:015; 6-6-004:001; 6-6-001:077
EXISTING USE:	Existing two-lane roadway corridor. Kawaihae Road State Route 19, Kohala Mountain Road, State Route 250, and Waiaka Bridge. Residential properties located along corridor.
STATE LAND USE DESIGNATION:	State Highway Right-of-Way Surrounding area is Agricultural
COUNTY GENERAL PLAN (LUPAG):	Surrounding area is Low Density Urban
COUNTY ZONING DESIGNATION:	Road. Surrounding area A-1a, A-5a, and RS-10.
PROPOSED ACTION:	The State of Hawaii Department of Transportation (HDOT) proposes to replace the existing Waiaka Stream Bridge with an approximate 53-foot wide by approximate 80-foot long replacement bridge to accommodate two travel lanes, one in each direction, a shoulder/bike lane, and raised sidewalk. In addition, the approaches will be realigned to

create a smooth transition to the replacement bridge and the Kawaihae Road – Kohala Mountain Road intersection would be reconfigured to include a traffic signal or roundabout. At this time, the HDOT has made no decision as to which of six alternatives will be selected for design and construction.

ANTICIPATED IMPACTS: No significant long-term environmental or community impacts are anticipated from the construction and operation of any of the six alternatives. Construction activities are anticipated to have short-term noise, traffic, and air quality impacts in the surrounding area.

ANTICIPATED DETERMINATION: Finding of No Significant Impact (FONSI)

PARTIES CONSULTED PRE-ASSESSMENT CONSULTATION:

Federal
U.S. Army Corps of Engineers
U.S. Fish & Wildlife Service
U.S.G.S. Pacific Island Ecosystems Research Center
U.S. Coast Guard

State of Hawaii
Department of Agriculture
Department of Business Economic Development & Tourism (DBEDT)
Department of Hawaiian Home Lands
Department of Land & Natural Resources (DLNR)
DLNR, Historic Preservation Division
DLNR, Historic Preservation Division, Hawaii Island
Department of Health (DOH)
Office of Hawaiian Affairs
University of Hawaii, Environmental Center and Water Resources Research Center
Senator Dwight Takamine
Representative Mark Nakashima

County of Hawaii
Civil Defense
Fire Department
Department of Environmental Management
Department of Parks & Recreation
Planning Department
Police Department
Department of Research & Development
Department of Water Supply
Department of Public Works

Councilmember Peter Hoffman
South Kohala Community Development Plan Steering Committee

Other
Kona Kohala Chamber of Commerce
Hawaii Electric Company
Hawaiian Telcom
Oceanic Cable
Kamehameha Schools
Waimea Community Association
South Kohala Traffic Safety Committee
Waimea Trails and Greenways
Waimea Outdoor Circle
Hawaii Preparatory Academy
Parker Ranch
Waimea Gardens
Kekamealei Family
Ms. Jadelyn Hoonanea Andrade
Mr. & Mrs. Nelson Doi
Mr. & Mrs. Harry Lewis
Mr. Ken Melrose
Mr. & Mrs. William Floyd Long
Mr. Harold F. Rice

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PREFACE

This Draft Environmental Assessment (EA) is prepared pursuant to Chapter 343, Hawaii Revised Statutes (as amended), and Title 11, Chapter 200, Administrative Rules (HAR), Department of Health, State of Hawaii. Proposed in as agency action by the State of Hawaii Department of Transportation.(HDOT) to replace Waiaka Bridge and realign roadway approaches along Kawaihae Road and Kohala Mountain Road, which are located near Waimea Town, South Kohala District, County of Hawaii. Referred to as the Kawaihae Road Waiaka Bridge Replacement and Realignment of Approaches project (Project No. AMTRK-01-99), it will be constructed with both state and federal funds. Preparation of this EA is required for this project as it will use state funds and state lands comprised of road rights-of-way in favor of HDOT along Kawaihae Road and Kohala Mountain Road.

Based on the findings and assessment of potential impacts contained in this Draft EA, which encompasses six alternatives for the Kawaihae Road Waiaka Bridge Replacement and Realignment of Approaches project, a Finding of No Significant Impact (FONSI) is anticipated. This anticipated determination was reached pursuant to HAR Section 11-200-9 (4). It is documented in this EA in Chapter 6 Anticipated Finding of No Significant Impact, which is based on an evaluation pursuant to Significance Criteria established in Section 11-200-12.

The project will also utilize federal funding provided by the U.S. Department of Transportation Federal Highway Administration (FHWA). Use of Federal funds subjects the project to environmental documentation requirements set forth under the National Environmental Policy Act (NEPA) of 1969, (42 U.S.C. Section 4321), the Council of Environmental Quality Regulations, 40 Code of Federal Regulations (CFR) Parts 1500-1508, and 23 CFR Parts 625, 640, 712, 771, and 790, Environmental Impact and Related Procedures.

The FHWA will review comments received on the Draft EA, and then prepare environmental documentation for their records.

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1 INTRODUCTION

1.1 Project Overview

Waiaka Bridge is located at mile marker 58.88 at the intersection of Kawaihae Road (State Route 19) and Kohala Mountain Road (State Route 250), about 2 miles west of Waimea Town, South Kohala District, Island of Hawaii See Figure 1-1). Waiaka Bridge, Kawaihae Road, and Kohala Mountain Road are all under the jurisdiction of the State of Hawaii Department of Transportation (HDOT). The HDOT Hawaii District maintains these roads and the bridge. Constructed in 1932, the existing Waiaka Bridge consists of a concrete slab structure about 26 feet wide, with a bolted on 3-foot wooden walkway. It is approximately 38 feet long with a center pier column. Waiaka Bridge, provides a major link between the east side of Hawaii to the west side, including Kawaihae Harbor.

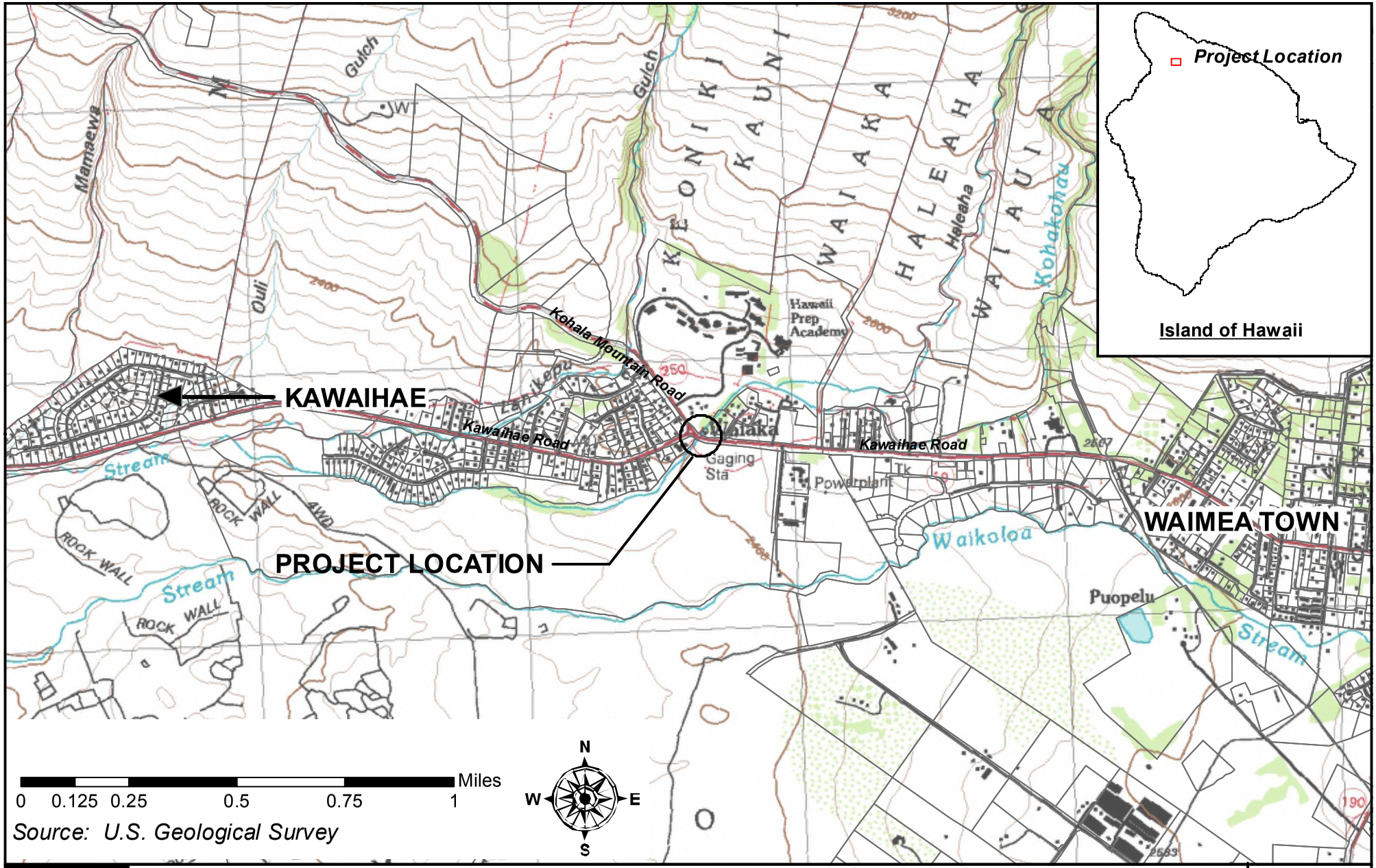
According to the National Bridge Inventory Standards (NBIS), the HDOT's biennial (every other year) inspection of Waiaka Bridge yielded a sufficiency rating of 26 on as scale of 100, where 100 is a sufficient bridge meeting current engineering design standards. The NBIS rating also identifies Waiaka Bridge as structurally deficient. Although its current rating does not mean that the bridge is unsafe to operate, it indicates that it is in need of repair or replacement. Since Waiaka Bridge's sufficiency rating is below 50, it also qualifies the bridge to receive a federal grant-in-aid for replacement.

Replacement of Waiaka Bridge to meet Federal and State design guidelines also presents an opportunity for HDOT to address other issues related to the operation of roadway approaches to the bridge and the nearby intersection of Kawaihae Road, Kohala Mountain Road. Hence, the Kawaihae Road Waiaka Bridge Replacement and Realignment of the Approaches (TRN 511 T80) project was included in the Statewide Transportation Improvement Program published in December 2010.

Waiaka Bridge is not listed on the National or Hawaii Register of Historic Places although it is eligible for listing because it is more than 50 years old.

1.2 Project Need and Objectives

The replacement of Waiaka Bridge is needed to address its structural deficiency. Replacement of Waiaka Bridge to meet Federal and State design guidelines also presents an opportunity for HDOT to address other needs related to the operation of roadway approaches to the bridge and the nearby intersection of Kawaihae Road, Kohala Mountain Road. Therefore, the project also includes realigning the approaches to provide smooth transitions and improve sight distances; improving intersection operations; and, improving hydraulic conditions for Keanuiomano Stream beneath Waiaka Bridge.



Source: U.S. Geological Survey

KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Location Map

FIGURE 1-1

National Bridge Inventory Standards

After the 1967 collapse of the Silver Bridge on U.S. Highway 35 in Point Pleasant, West Virginia, Congress passed the Federal-Aid Highway Act of 1968, which established the Federal bridge inspection program, and directed the states to maintain an inventory of Federal-aid highway system bridges. The U.S Department of Transportation subsequently issued the National Bridge Inventory Standards (NBIS). Federal regulations now require that bridges on the nation's Federal-aid highway system and the National Bridge Inventory (NBI) be inspected every two years.

The NBIS inspection produces a "sufficiency rating," which is a single number that can vary from a high score of 100 to a low score of 0 (with 100 being a bridge meeting current engineering design standards. The rating is meant to provide an overall measure of the bridge's condition. The calculations producing the rating include both safety elements (such as structural integrity) and factors such as the bridge's lane width and lane count relative to its current traffic volumes. The sufficiency rating determines if a bridge is structurally deficient and/or functionally obsolete.

The NBI Structure Inventory and Appraisal (SI&A) shows Waiaka Bridge with a sufficiency rating of 26 and identifies the bridge as structurally deficient. This rating does not imply that the bridge is unsafe to operate, but it is in need of repair. However, with a rating below 50 and a determination that is structurally deficient, Waiaka Bridge qualifies for the use a federal grant-in-aid for rehabilitation or replacement, as opposed to being limited to repairs only

The primary objective of the proposed project is to replace Waiaka Bridge with one that will conform to *A Policy on Geometric Design for Highways and Streets* (2004), herein referred to as AASHTO guidelines. These quidelines were adopted by HDOT for the planning and engineering of highway projects in Hawaii. The bridge design will follow current State planning and design guidelines for bridges encompassing lane widths, shoulders, pedestrian access, and railing heights. Replacement of the existing bridge with a structure meeting State and Federal design guidelines is one objective of the project.

In addition, the planning and engineering will need to conform to the *Hawaii Statewide Uniform Design Manual for Streets and Highway* (1980) and the guidelines related to Americans with Disabilities Act (ADA).

Transitions and Sight Distances

A second objective of the proposed project is to realign the intersection approaches along Kawaihae Road and Kohala Mountain Road to improve traffic operations and sight distances at the Waiaka Bridge. The alignment of the existing approaches at the intersection of Kawaihae Road and Kohala Mountain Road places the existing bridge on a horizontal curve, which results in limited

sight distance for the southbound approach of Kohala Mountain Road and for eastbound left-turn movements from Kawaihae Road onto Kohala Mountain Road. In addition, views to the east are also affected by the rails on the existing wooden walkway attached to the upstream (north) side of the bridge. The proposed improvements will incorporate the placement and orientation of the bridge such that the railings would not impede motorist visibility including the realignment of the adjacent intersection approaches for improved line of sight for motorists.

Intersection Operation

A third objective of the proposed project is to improve traffic operations at the Kawaihae Road-Kohala Mountain Road intersection. The existing roadway alignment can confuse drivers heading eastbound (from Kawaihae towards Waimea Town) on Kawaihae Road and intending to turn left onto northbound Kohala Mountain Road. Drivers must first negotiate a left turn between opposing westbound traffic on Kawaihae Road. Since there is no left turn storage lane for this movement, eastbound traffic can queue on Kawaihae Road, especially during peak travel periods.

In addition, vehicles southbound on Kohala Mountain Road making a left-turn to eastbound Kawaihae Road have limited sight distance due to the roadway curve when looking for vehicles approaching from the east.

Hydraulic Conditions for Keanuiomano Stream

A fourth objective of the proposed project is to improve the hydraulic conditions related to stream flows at Keanuiomano Stream. The existing Waiaka Bridge has a center pier which blocks debris, such as tree branches, from flowing down the stream. Although there have been no reports of stream flows overtopping the bridge during a storm event, flows have reached the bottom of the bridge structure. The current HDOT guidelines establish that the replacement bridge will need to accommodate a 100-year flood.

1.3 Statewide Transportation Improvement Program

The Hawaii Statewide Transportation Improvement Program (STIP) provides a multi-year listing of the State and County projects, including for the County of Hawaii, and identifies those projects slated for federal funding. It is a multi-modal transportation improvement program that is developed utilizing existing transportation plans and policies, and current highway, transit and transportation programming processes. The STIP delineates the funding categories and the federal and local share required for each project. Although projects are on the STIP, it does not necessarily mean those projects will be planned, designed, or constructed within the fiscal period due to unforeseen occurrences such as project readiness or project priorities.

With the passage of Safe, Accountable, Flexible, Efficient Transportation Equity Act and A Legacy for Users (SAFETEA-LU), the STIP is now a four-year programming implementation document that identifies State and County transportation projects statewide, to be funded, in part, with Federal Highway and Transit funds.

Regionally significant projects requiring an action by the Federal Highway Administration or the Federal Transit Administration should be included in the STIP, even when Federal Highway or Transit funds are not used.

On December 20, 2010, the State HDOT published the most recent Statewide Transportation Improvement Program (STIP), FFY 2011 thru FFY 2014, which includes the Kawaihae Road Waiaka Bridge Replacement and Realignment of Approaches (TRN 511 T80). The project is categorized as a system preservation project.

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2 PROJECT DESCRIPTION

2.1 Project Location

Waiaka Bridge is located at mile marker 58.88 at the intersection of Kawaihae Road (State Route 19) and Kohala Mountain Road (State Route 250), two miles west of Waimea Town, as shown in Figure 1-1. Waiaka Bridge crosses Keanuiomano Stream and provides a major link between the east side of Hawaii to the west side, including Kawaihae Harbor. Waiaka Bridge, Kawaihae Road, and Kohala Mountain Road are all under the jurisdiction of the State of Hawaii Department of Transportation (HDOT). Photos of Waiaka Bridge and the Kawaihae Road/Kohala Mountain Road intersection are included in Figures 2-1 and 2-2.

2.1.1 Surrounding Land Uses

The Waimea community is set on the broad plateau formed by the Kohala Mountains and Mauna Kea. Three streams are located in the vicinity of the project area, Keanuiomano, Lanikepu, and Waikoloa.

Existing residential subdivisions and landmarks in the vicinity of the project area include Ka La Loa and Lalamilo House Lots Subdivisions, and the Kamuela Museum (see Figure 2-3). The residential uses and the Museum are privately owned parcels.

Other land uses in the vicinity include Hawaii Preparatory Academy (HPA) campus to the east of Kohala Mountain Road and undeveloped vacant land owned by the State of Hawaii Department of Hawaiian Home Lands (DHHL) to the south-southeast of Waiaka Bridge. This area is sited for their proposed Lalamilo project. The land uses surrounding the Waiaka Bridge are mix of residential and rural uses.

1. North of the Bridge on the Kohala Mountain Road approach, a residential parcel is located on the north side of Kawaihae Road. The access to this parcel is on the west side of Kohala Mountain Road about 240 feet north of the Bridge. The main access to HPA is on the east side of Kohala Mountain Road about 480 feet north of the Bridge.

2. West of the Bridge on the Kawaihae Road approach, residential uses are located on the north and the Kamuela Museum on the south. The driveway access to the Museum is about 360 feet from the Bridge. This parcel includes an approximately 5- to 6-foot high wall at the edge of the right-of-way.

3. East of the Bridge on Kawaihae Road approach, there is a private driveway access located on the north side of Kawaihae Road about 320 feet east of the existing Bridge. This private driveway provides access to

five residential parcels located between the Keanuiomano Stream and Kawaihae Road. Undeveloped vacant lands under the control of the DHHL lie on the south. Also, east of the Bridge, South Kohala Distribution Road forms a T-intersection with Kawaihae Road and is located approximately 0.20 miles (1,056 feet) from the Bridge.

Parker Ranch lands and other land parcels used for ranching are scattered throughout the community. The center of Waimea Town is approximately 2 miles to the east, Waimea Airport two and half miles to the southeast, and Queen Kaahumanu Highway and Kawaihae Harbor about 7 miles to the west.

2.1.2 Other Nearby State and County Projects

In February 2002, the HDOT issued the Notice of Intent (NOI), under 42 USC 4321-4347, as amended, and 40 Code of Federal Regulations Part 1500-1508, for the Kawaihae Road Bypass Waimea to Kawaihae project. The NOI sets forth the HDOT intent to prepare an Environmental Impact Statement. The purpose of the Kawaihae Road Bypass project is to provide another roadway access between Mamalahoa Highway south of Waimea and Akoni Pule Highway near the Kawaihae Harbor area and to Queen Kaahumanu Highway. The Kawaihae Bypass project would provide a bypass that will remove regional and local traffic from the existing Kawaihae Road and its associated intersections. The proposed highway is needed to facilitate more efficient movement of goods and people in the east-west direction, by providing a faster and improved highway link. In addition, the proposed highway will provide: a transportation system to meet existing and future traffic demands as stated in the Hawaii Long Range Transportation Plan; consistency with State and County Regional Plans, and conformance with the State Route System; and an arterial to move goods and people in the east west direction in West Hawaii, in conjunction with the planned Saddle Road improvements, the planned Saddle Road extension, and the existing Waikoloa Road.

The bypass would be located south of and approximately parallel to the alignment of the existing Kawaihae Road. Although several alternatives are under consideration, the eastern end of the bypass would start from Mamalahoa Highway south of Waimea and the western end would be along the Kona coast terminating at Queen Kaahumanu Highway or near Kawaihae Harbor.

In April 2009, the HDOT published the Environmental Impact Statement Preparation Notice (EISPN) under Chapter 343 Hawaii Revised Statures, as amended, and Hawaii Administrative Rules Title 11, State of Hawaii Department of Health, Chapter 200, for the Kawaihae Bypass Waimea to Kawaihae project. The maps and figures in the EISPN show the various alignments being considered for the 14.5-mile bypass. None of alignments show a future connection to Kawaihae Road in the area of Waiaka Bridge. The preliminary

Westbound view of Kawaihae Road and Waiaka Bridge.

Westbound view of Kawaihae Road/Kohala Mountain Road intersection. Kohala Mountain Road on the right and Kawaihae Road on the left.

Westbound view of Kawaihae Road/Kohala Mountain Road intersection from pedestrian bridge.

Southwest bound view of Kawaihae Road (towards Kawaihae). Kohala Mountain Road in the foreground.

KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

FIGURE

2-1

Project Site Photos

Eastbound view of Waiaka Bridge (background) and Kohala Mountain Road/Kawaihae Road intersection. Right turn lane onto Kawaihae Road (Kawaihae bound).

Northtbound view of Kohala Mountain Road/Kawaihae Road intersection.

Side view of Waiaka Bridge looking south.

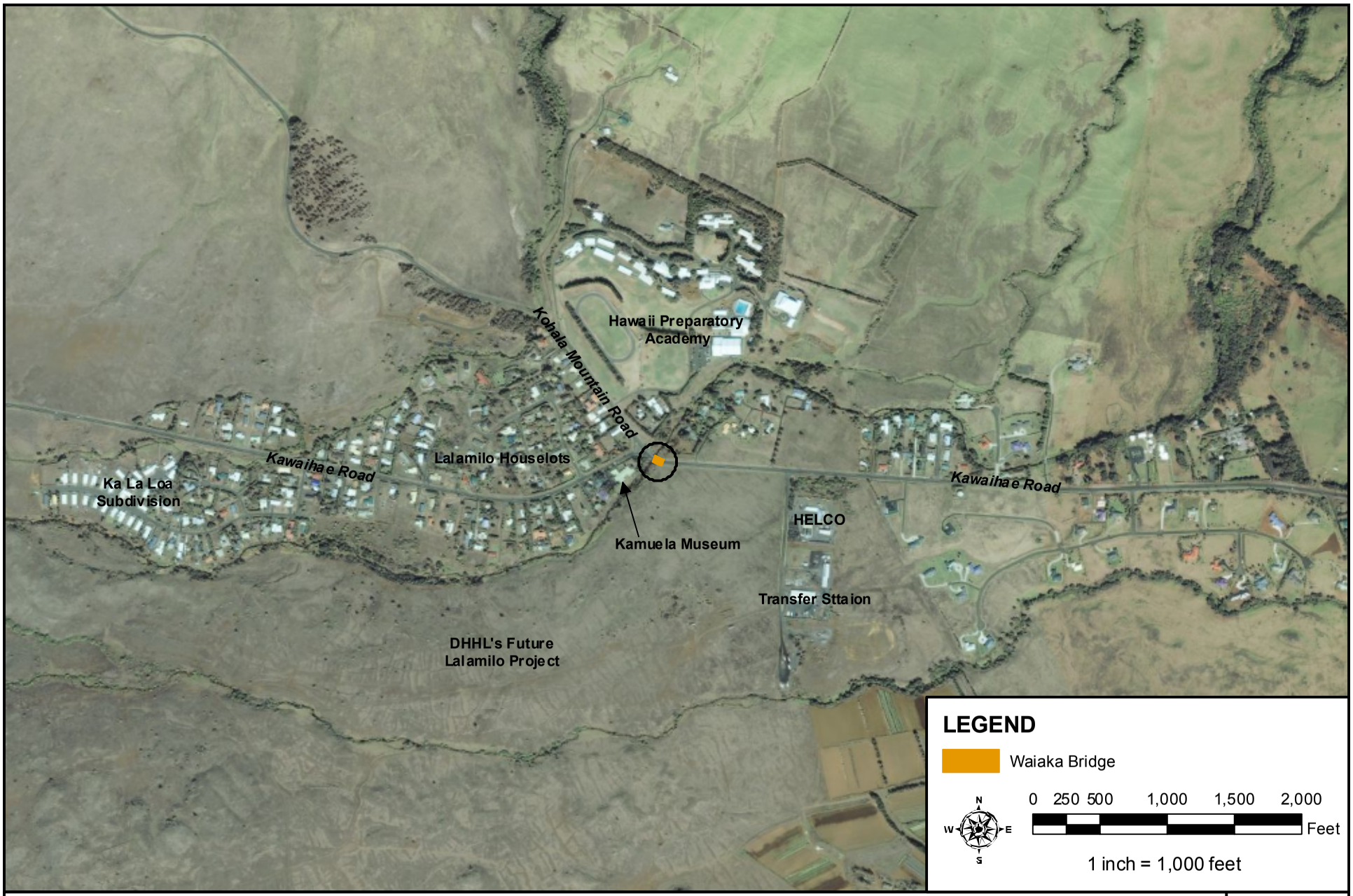
Right wingwall of Waiaka Bridge looking south..

KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

FIGURE

2-2

Project Site Photos



KAWAIHAE ROAD- WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Surrounding Uses Map

FIGURE 2-3

alignments show a 200-foot right-of-way (minimum) and sections for a four-lane divided roadway.

In 2006, the County of Hawaii Department of Public Works began studies to find a route to bypass the town of Waimea, including the Mamalahoa Highway-Lindsey Road intersection, a major point of congestion in the area (Lalamilo Bypass). The County study shows Lalamilo Bypass (also known as Kawaihae-Mamalahoa connector) connecting Mamalahoa Highway south of Waimea to Kawaihae Road east of Waiaka Bridge, near South Kohala Distribution Road. This bypass would join another roadway located south of the Parker Ranch Center to a point east of Waimea (Waimea Town Connector). These projects are outside the proposed project limits.

In December 2006, the County of Hawaii presented findings from the Waimea Traffic Circulation Study to the Waimea Community Association. This study examined various roadway improvements to relieve traffic congestion through the central area of Waimea. The identified improvements included changes to the turning movements at the Mamalahoa Highway-Lindsey Road intersection and a Parker Ranch connector roadway running south of Mamalahoa Highway. The Lalamilo Bypass is shown as a Phase II improvement.

In April 2009, the Hawaii District completed a road resurfacing project (Kawaihae Road Route 19 Resurfacing Waiaka Bridge Towards Waimea, Project No. 19D-01-06M) which began immediately west of the Waiaka Bridge (Sta 779+80) and extended east towards Waimea for about 4,970 feet and ended about at the beginning of the State Highway (Sta 829+50). This project included constructing a left-turn storage lane for westbound vehicles to provide access to the HDOT-Hawaii District Waimea baseyard and the County of Hawaii Waimea refuse transfer station.

2.2 Existing Conditions Along Project Corridor

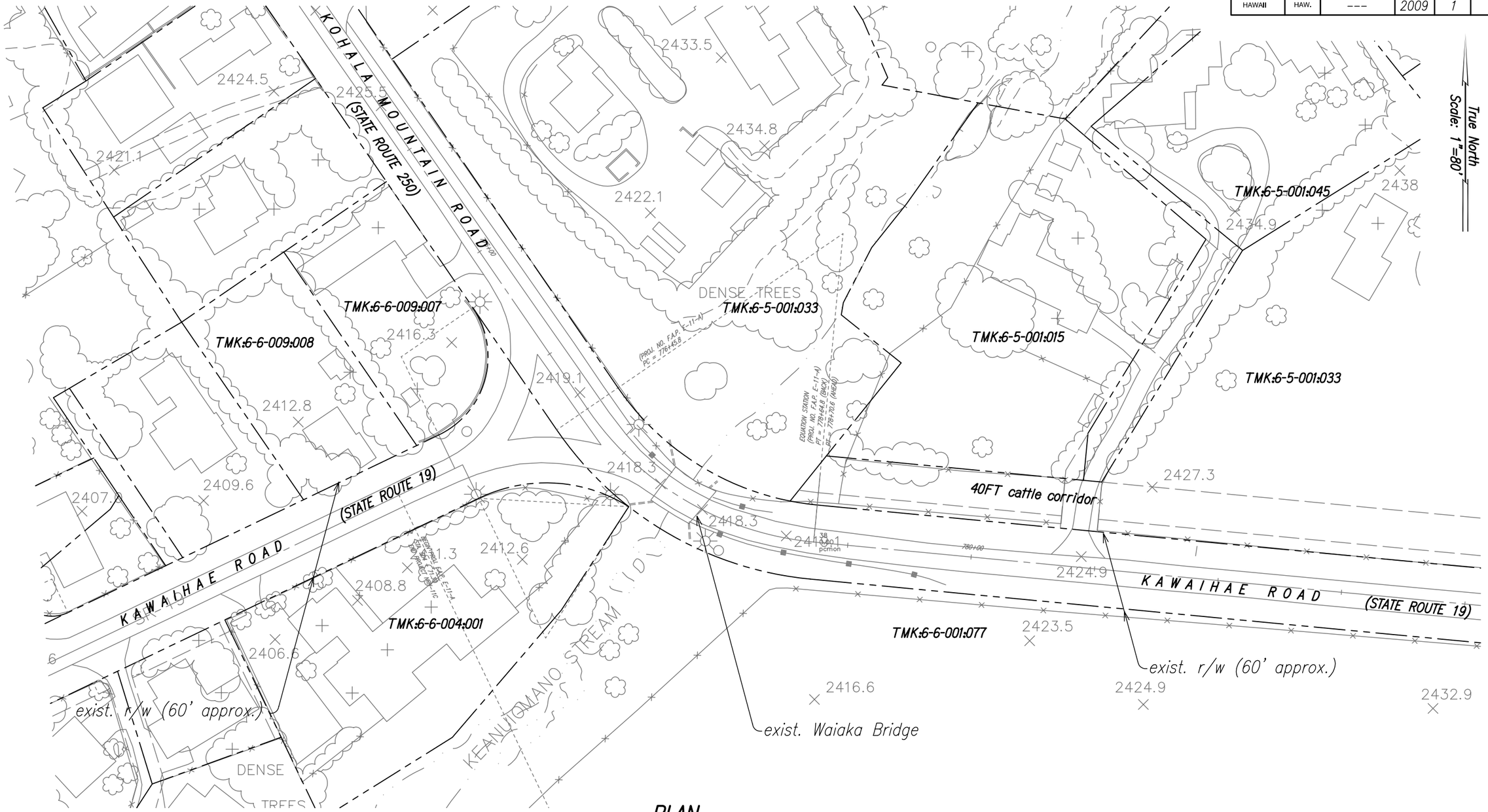
2.2.1 Right-of-Way and Surrounding Elevations

The project limits will extend to the west, east, and north for a sufficient distance to achieve a smooth transition to the existing roadway of Kawaihae Road. The right-of-way is 60 feet wide on Waiaka Bridge and associated approaches. At the intersection of Kawaihae Road and Kohala Mountain Road, the right-of-way width for both roadways is 60 feet (see Figure 2-4).

Waiaka Bridge is at an elevation of +2,418 feet mean sea level (msl). Approximately 300 feet east of the bridge, the elevation is +2,424 feet msl, and approximately 300 feet west of the bridge, the elevation is +2,407 feet msl.

On Kohala Mountain Road (north approach), approximately 300 feet from the bridge, the elevation is approximately +2,421 feet msl.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	---	2009	1	X



PLAN
Scale: 1" = 80'

GRAPHIC SCALES:
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SHEET No. 1 OF 1 SHEETS

FIGURE 2-4 EXISTING RIGHT-OF-WAY

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Immediately north of the bridge in the channelized or triangle area of the intersection, the elevation is +2,149 feet msl. This elevation appears to extend to the east towards an embankment that includes a row of trees.

2.2.2 Bridge Dimensions and Approaches

Constructed in 1932, the existing Waiaka Bridge is a concrete slab structure approximately 38 feet long with a center pier column. The bridge is about 26 feet wide, with a bolted 3-foot wooden walkway (see Figures 2-5 and 2-6).

The two existing travel lanes are 11 feet wide on Kawaihae Road and Kohala Mountain Road.

2.2.3 Infrastructure

An existing County of Hawaii Department of Water Supply 12-inch water line is attached to the south side of Waiaka Bridge.

Utility poles with overhead electric, telephone, and cable lines are located on the approaches to Waiaka Bridge. The utility poles and overhead lines also extend along Kohala Mountain Road. In addition, a transformer mounted on a platform between two utility poles is located on the north bank of Keaunuiomano Stream.

Communication system cabinets are located at-grade near the pole-mounted transformer.

One pole mounted, multi-directional Civil Defense warning siren, with related electrical connections is located south of the east approach.

2.2.4 Posted Speed Limits

Kawaihae Road has a posted speed limit of 35 miles per hour (mph), except for the approaches to Waiaka Bridge. On the east approach, the posted speed is reduced to 25 mph approximately 530 feet from the bridge. On the west approach, the posted speed is reduced to 25 mph approximately 630 feet from the bridge. In addition, both approaches include flashing amber beacons warning drivers of the speed reductions.

2.2.5 Traffic Volume

HHDOT conducted 24-hour traffic counts in 2008 at the following locations (see Table 2-1):

- Kawaihae Road between Ko Uka Street and Road to Baseyard (east of Waiaka Bridge)
- Kohala Mountain Road at Waimea/Kawaihae sign (northwest of Waiaka Bridge)

TABLE 2-1
HHDOT AM AND PM TRAFFIC VOLUMES (2008)

Location	AM Peak		PM Peak	
	Westbound	**Eastbound**	**Westbound**	**Eastbound**
Kawaihae Road between Ko Uka Street and Road to Baseyard (S. Kohala Distribution Road)	145	172	110	126
	Northbound	**Southbound**	**Northbound**	**Southbound**
Kohala Mountain Road at Waimea/Kawaihae sign	129	133	105	123

Source: Hawaii Department of Transportation, 2009

2.3 Proposed Action

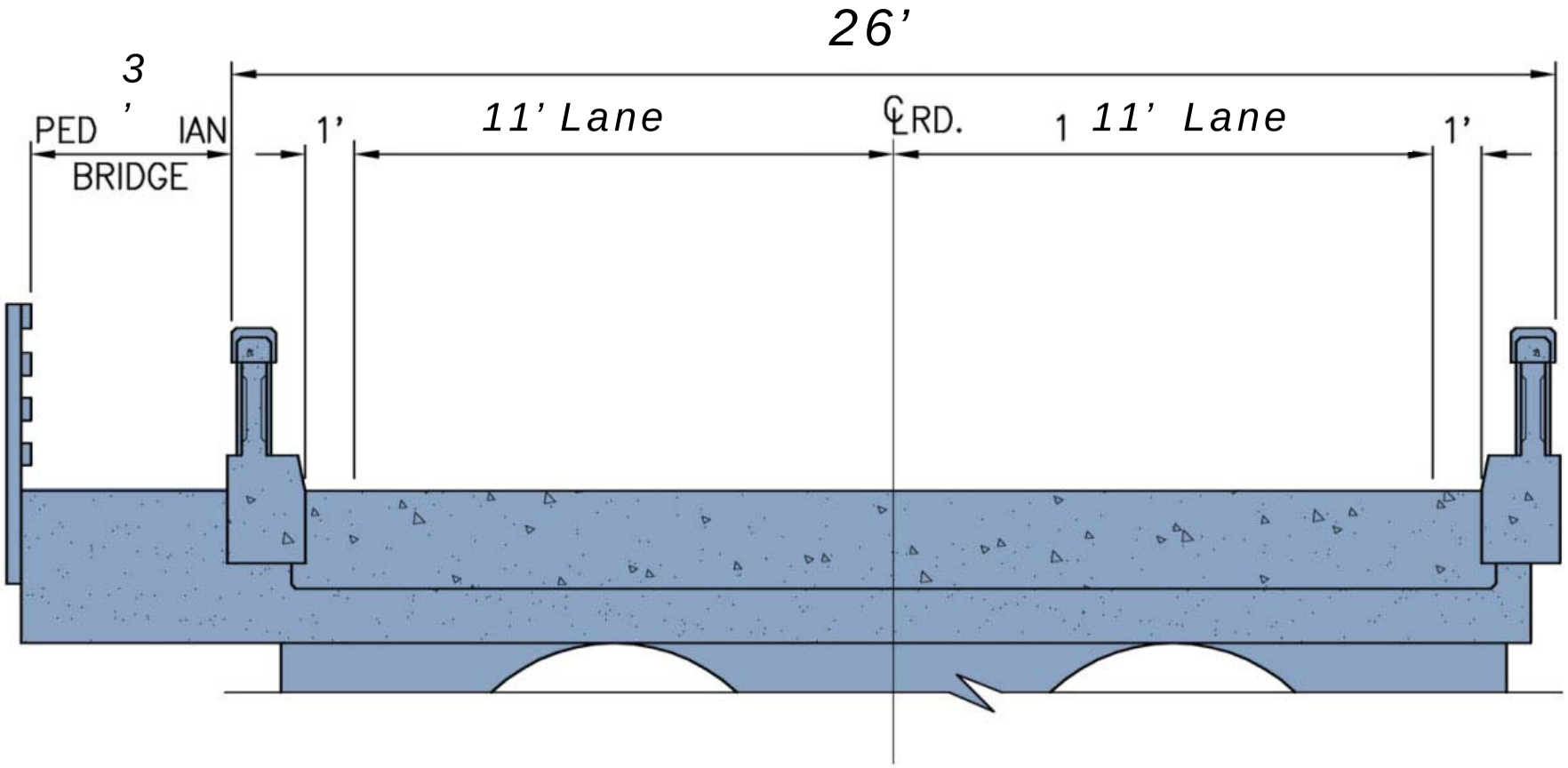
The Proposed Action is to replace Waiaka Bridge, realign the approaches to improve sight distances, and improve traffic operations at the intersection of Kawaihae Road and Kohala Mountain Road by improving the intersection, and installing a traffic signal, or construction of a roundabout. The Proposed Action will also improve the hydraulic capacity of the Bridge.

2.3.1 Project Limits and Right-of-Way

The project limits will extend to the west, east, and north for a sufficient distance to achieve a smooth transition to the existing roadway of Kawaihae Road. Realignment of the approaches outside of the existing 60-foot right-of-way would require acquisition or taking of lands. Easements or other agreements would be necessary during construction for a temporary bypass road and bridge. Based on preliminary analysis, the project limits are expected to be approximately 550 to 765 feet long along Kawaihae Road and approximately 250 feet along Kohala Mountain Road and extend approximately 60 to 80 feet beyond the right-of-way.

The travel lanes on the west and east directions of the approaches will be 12 feet wide and transition back to the 11-foot wide existing travel lane widths north of the intersection. The travel lane transitions would occur within the existing 60-foot right-of-way, which is centered along the roadway. In areas where the new roadway would extend beyond the existing right-of-way, the proposed right-of-way would also be 60 feet. The 12-foot approach travel lanes and shoulders will be designed to AASHTO and HDOT guidelines (*A Policy on Geometric Design for Highways and Streets,* 2004 ed., AASHTO, and *Hawaii Statewide Uniform Design Manual for Streets and Highways*, State Highway Division, October 1980).

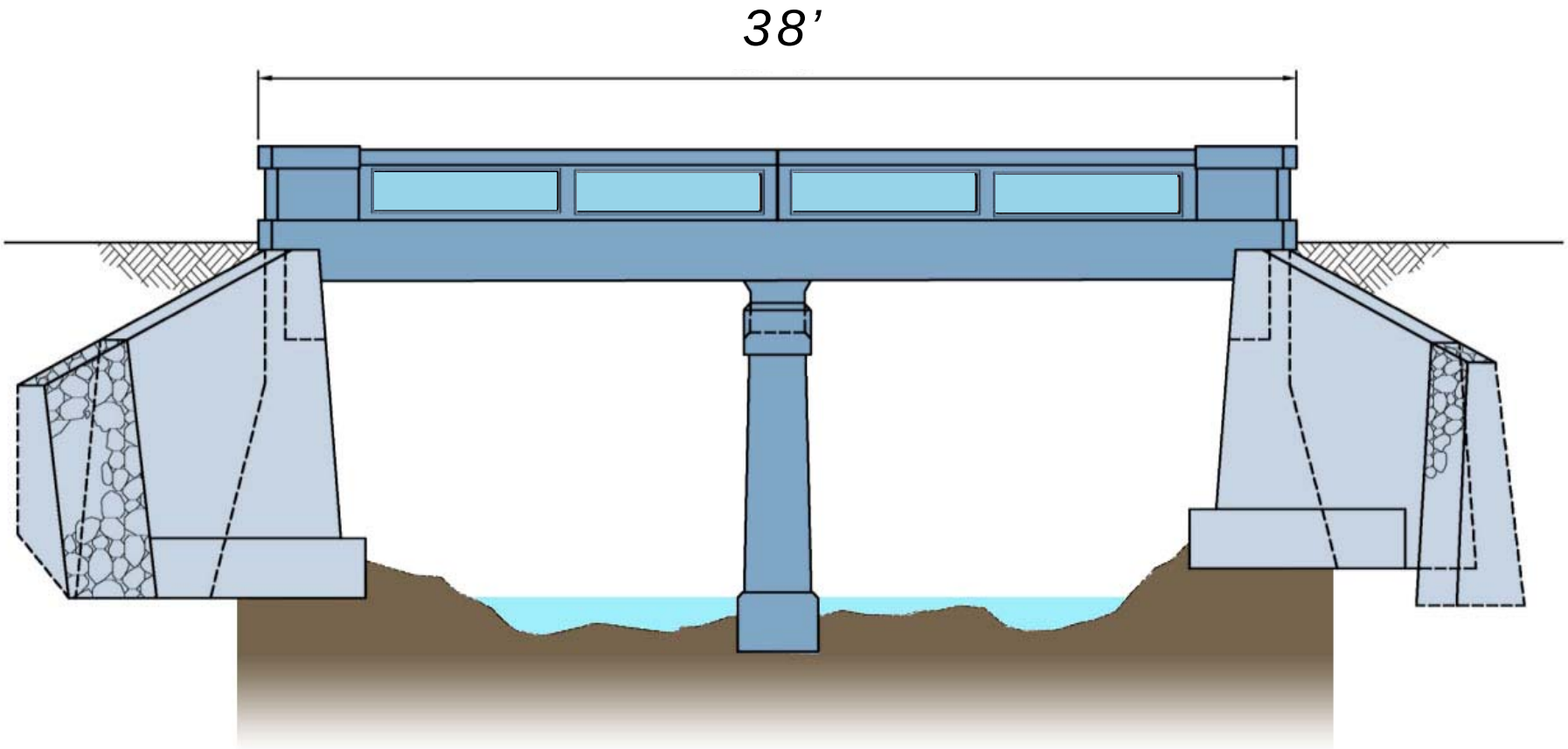
There would be no improvements or changes to the travel lanes or shoulders beyond the project limits. Through the project area, including limited areas beyond the highway transitions of the new bridge, the posted speed limit of 25 miles per hour (mph) will remain. Therefore, roadway horizontal curvatures



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Existing Bridge Cross-Section

FIGURE 2-5



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Existing Bridge Side View

FIGURE

2-6

would be equal or greater than the recommendations identified in AASHTO and HDOT guidelines.

2.3.2 Alignment of Approaches

The minimum radius curves were utilized for each applicable alternative to minimize the amount or avoid necessary land acquisitions of adjacent properties, as well as minimize adverse impacts to these surrounding properties. Additional land acquisition would increase project costs. In addition, larger horizontal roadway radii would place the road alignment closer to the residents in the area resulting in increased traffic noise levels as vehicles, including large trucks, decelerate upon approaching the intersection and accelerate upon departing the intersection, increased exposure to exhaust emissions as vehicles and large trucks travel along the roadway that would be placed closer to adjacent residents, promotion of increased traveling speeds with the larger radii that is contrary to community concerns, and safety concerns as a result of increased speeds with the presence of school children in the proximity due to the nearby school. Additional potential impacts to residents towards the east include disruption to access driveway connections that would be located within the larger radius of the highway creating potential limited sight distances and ingress and egress difficulties.

2.3.3 Replacement Bridge Section

The proposed bridge replacement applies to all of the proposed alternatives, except for Alternative 1 No Action. The replacement bridge will be approximately 80 feet in length and have 2, 12-foot travel lanes with a total width of 53 feet as shown in Figures 2-7 and 2-8 and Table 2-2). The replacement bridge will be designed according to AASHTO LRFD Bridge Design Specifications (5th Edition, 2010).

The railings should be 42 inches (3-foot 5-inches) high and include concrete base traffic railing (2-ft 1-in) with a pipe pedestrian railing (2-ft 5-in). The bridge deck would be sloped to include drain openings on the south (downstream) side.

The shoulders on the bridge would be 8 feet wide and would be designated for bicycles and other non-motorized modes of travel, excluding pedestrian use. No rumble strips would be used to delineate the shoulders.

The 5-foot wide raised sidewalks would be designated for pedestrian use and conform to the requirements and guidelines related to ADA to aid in the mobility of physically and visually impaired individuals.

Construction of the replacement bridge will require excavation to construct the abutments, or drilling to place drilled shafts. This subsurface work will remove material to construct the abutments. Typically, the abutments would be six feet

below the existing grades. This subsurface work will require removal of material prior to placing the reinforcing work and pouring concrete.

Table 2-2
Replacement Bridge Section

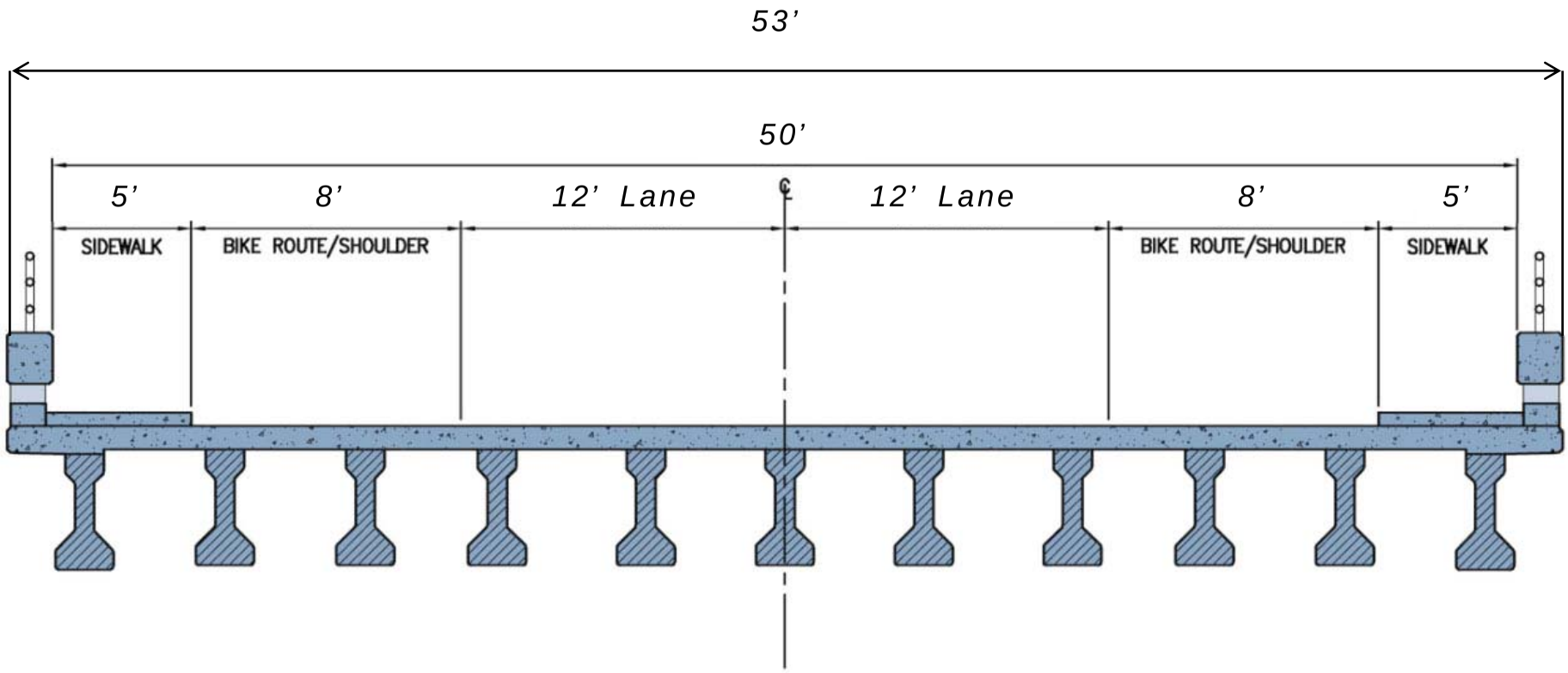
Section	Dimensions (Width)	Total
Travel lane	2 at 12 feet each	24 feet
Shared use shoulders	2 at 8 feet each	16 feet
Raised sidewalk	2 at 5 feet each	10 feet
Railings	2 at 1.5 feet each	3 feet
	TOTAL	**53 feet**

The deck would be constructed on top of precast concrete beams or steel beams, as shown in Figure 2-8. Based on the width of the existing stream channel, the abutments or drilled shafts would be constructed outside of the existing stream channel. Construction would have to ensure that flows would not be affected in the existing stream channel.

If the replacement bridge is constructed at a new location (upstream or downstream from existing bridge), the existing bridge would be demolished upon completion of the replacement bridge. It is likely that the existing below grade structure (abutments) would be left in-place to minimize excavation within the stream channel.

During the public meetings, there was discussion about retention of the existing bridge for pedestrian and bicycle use. Although retention of the existing bridge is possible, there are several drawbacks to consider:

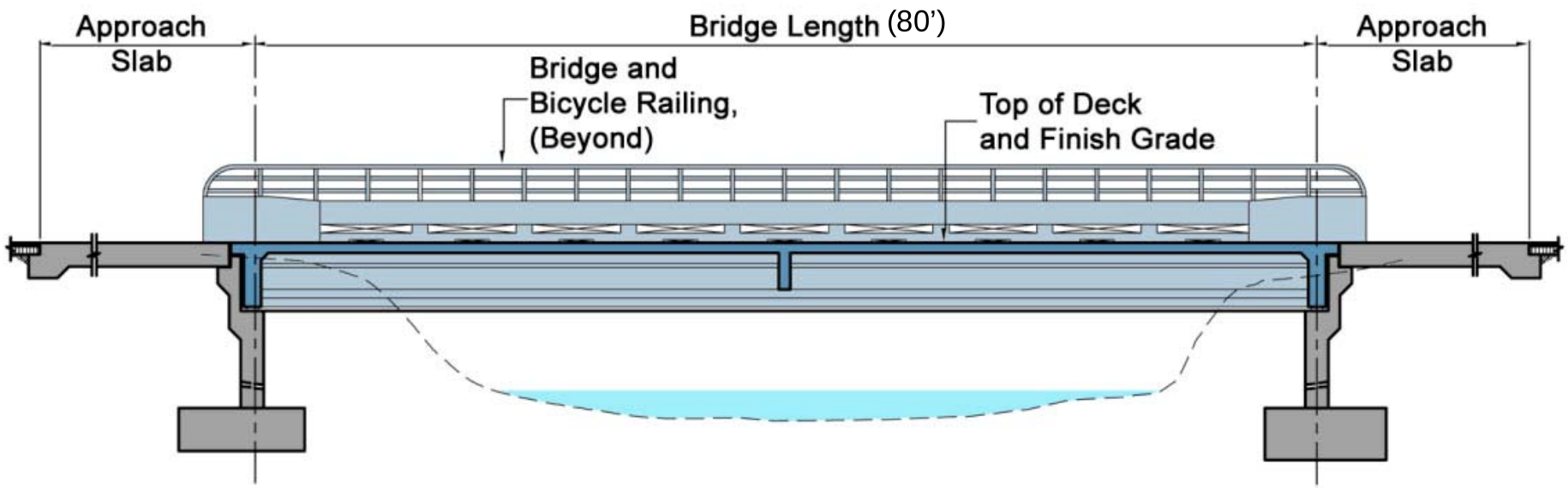
- Based on a stream hydraulic study, the hydraulic capacity of the existing bridge is inadequate for large storm events and retention of the existing bridge is likely to cause a flow restriction, resulting in an adverse backwater effect upstream during a 100-year storm.
- The center pier has the potential to prevent debris from flowing downstream during a storm event that would cause a backup of flows onto adjacent properties upstream of the bridge.
- Long-term maintenance of the bridge would add to the HDOT operation and maintenance costs. Without extensive maintenance by HDOT, a deteriorated bridge could become a hazard to users.



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Proposed Bridge Cross-Section

FIGURE 2-7



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Proposed Bridge Side View

FIGURE
2-8

2.3.4 T-intersection Improvements

The proposed T-intersection improves applies to all of the proposed alternatives, except for Alternative 1 No Action. The T-intersection improvements would include:

- Construction of a T-intersection with a left-turn storage lane for eastbound traffic heading northbound onto Kohala Mountain Road;
- Channelized right-turn lane from southbound Kohala Mountain onto westbound Kawaihae Road;
- Channelized right-turn lane from westbound Kawaihae Road onto northbound Kohala Mountain Road; and,
- Installation of a fully actuated traffic signal at the intersection.

The left-turn storage lane should be 75 feet in length to accommodate the 95th percentile queue on the highway during the peak hour traffic periods. Based on a traffic signal warrant study prepared in March 2009, the intersection traffic volumes warrant the installation of a traffic signal system. Under signalized conditions, the intersection should be able to service turning movements and reduce delays associated with turning vehicles impeding through traffic movements.

2.3.5 Temporary Bypass Bridge

To ensure continuous use for two-way traffic of the bridge and approaches, especially on Kawaihae Road, a temporary bypass bridge and road will be built during construction of the replacement bridge. Depending on the location of the replacement bridge, use of the existing Waiaka Bridge is possible. The temporary bypass bridge would be required for Alternatives 3, 3A, 4, and 5.

Activities to be undertaken for construction of the temporary bridge and detour include: clearing, grubbing, and grading; paving road, and striping. The temporary bypass bridge and detour would consist of two 11-foot travel lanes. Barricades and other traffic controls would be installed to clearly delineate the construction detour plan. Construction easements would be used for work outside of the right-of-way.

Upon completion of the replacement bridge and approaches, the bypass bridge and detour would be removed and the land area used for construction would be restored to the original grade and condition, including re-seeding and tree planting.

The easement would also be cancelled, and the land returned to the landowner.

2.3.6 Alternatives to the Proposed Action

At this time, the HDOT is considering six (6) alternatives for the proposed action as described below. Further, HDOT has made no decision as to the preferred alternative.

2.3.6.1 Alternative 1: No Action

The No Action alternative would retain the existing bridge with no changes. Also, the Kawaihae Road-Kohala Mountain Road intersection would be retained with no changes.

The no action alternative would retain the existing bridge and there would be no effort to repair or replace the bridge to meet current standards. In addition, the roadways would not be realigned and sight distance issues would remain. Under this option, environmental impacts resulting from bridge replacement activities would be averted and bridge replacement costs would not be incurred by HDOT. However, the existing bridge would continue to deteriorate, requiring regular inspection and increasing maintenance to maximize its useful lifespan. Eventually, the bridge may no longer provide a safe support for vehicle and pedestrian traffic and could face closure.

Figure 2-9 at the end of this chapter shows the No Action Alternative or existing conditions.

2.3.6.2 Alternative 2: Replacement Bridge North of Existing Bridge

Alternative 2 would construct a replacement bridge about 80 feet north (upstream) of the existing bridge. The project limits would be approximately 738 linear feet along Kawaihae Road and 250 feet along Kohala Mountain Road.

The Alternative 2 replacement bridge would permanently shift the alignment of Kawaihae Road to the north and would require taking or acquisition of about 12,139 square feet (0.276 acres) (HPA property TMK 6-5-01:33 and private property TMK 6-5-01:015) outside of the existing 60-foot right-of-way.

In addition, traffic operations would be improved at the intersection of Kawaihae Road and Kohala Mountain Road by adding a T-intersection, and installing a traffic signal (refer to Section 2.3.3).

The existing bridge would remain with no changes until the replacement bridge was constructed and available for traffic use. Construction of a temporary bypass bridge would not be needed. Once the replacement bridge has been completed, the existing bridge would be removed.

The existing posted speed will remain at 25 mph and will still meet current design standards.

The conceptual plan for Alternative 2 is shown in Figure 2-10 at the end of this chapter.

2.3.6.3 Alternative 3: Replacement Bridge at Existing Location

Alternative 3 would construct a replacement bridge at about the same location as the existing bridge. Realignment of the Kawaihae Road/Kohala Mountain Road intersection would require shifting of the roadway to the south. The project limits would be approximately 588 linear feet along Kawaihae Road and 250 feet along Kohala Mountain Road.

Alternative 3 would require a construction easement north of the existing bridge for the temporary bypass road and bridge during the construction period for the replacement bridge. Once construction was completed, the temporary bypass road and bridge would be removed and the easement would be cancelled, and the land returned to the landowner.

In addition, traffic operations would be improved at the intersection of Kawaihae Road and Kohala Mountain Road by adding a T-intersection, and installing a traffic signal (refer to Section 2.3.3).

Alternative 3 would retain the existing Kawaihae Road 60-foot right-of-way. There would be no permanent taking of private property.

The existing posted speed will remain at 25 mph and will still meet current design standards.

The conceptual plan for Alternative 3 is shown in Figure 2-11 at the end of this chapter.

2.3.6.4 Alternative 3A: Replacement Bridge at Existing Location and Realign East Approach

Alternative 3A was developed based on comments received during the public informational meetings. Alternative 3A involves minimal land acquisition as contrasted to Alternative 3 which was developed to stay within the existing right-of-way.

Alternative 3A would construct a replacement bridge slightly north of the existing bridge, realign the east approach slightly to the north outside of the existing right-of-way to provide a smoother approach. The slight realignment of the east approach would mitigate the S-curve along the roadway, while minimizing the land acquisition or taking. The project limits would be approximately 560 linear feet along Kawaihae Road and 250 feet along Kohala Mountain Road.

Alternative 3A would require a construction easement north of the existing bridge for the temporary bypass road and bridge during the construction period for the replacement bridge. Once construction was completed, the temporary bypass road and bridge would be removed and the easement would be cancelled, and the land returned to the landowner.

The Alternative 3A would require taking or acquisition of about 5,800 square feet (0.13 acres) (TMK 6-5-01:33) on the north side of Kawaihae Road.

In addition, traffic operations would be improved at the intersection of Kawaihae Road and Kohala Mountain Road by adding a T-intersection, and installing a traffic signal (refer to Section 2.3.3).

The existing posted speed will remain at 25 mph and will still meet current design standards.

The conceptual plan for Alternative 3A is shown in Figure 2-12 at the end of this chapter.

2.3.6.5 Alternative 4: Replacement Bridge at Existing Location and Roundabout

Alternative 4 would construct a replacement bridge at the existing location and construct a single lane roundabout to replace the Kawaihae Road-Kohala Mountain Road intersection. Use of the roundabout would obviate the need for a traffic signal.

In June 2000, the FHWA issued "Roundabouts: An Informational Guide," (FHWA-RD-00-067) to provide information and guidance on roundabouts that are suitable for a variety of typical conditions found in the US.

The FHWA guidelines show a 130-foot inscribed circle diameter for a single lane rural roundabout. The inscribed circle diameter is the basic parameter used to define the size of a roundabout. It is measured between the outer edges of the circulatory roadway. Based on a 12-foot travel lane, the central island of the roundabout would have a 106-foot diameter. An apron at the outer edge of the central island would be used to accommodate wheel tracking of larger vehicles.

The FHWA guidelines indicate that it is generally not desirable to locate roundabouts in locations where grades through the intersection are greater than four percent. The installation of roundabouts on roadways with grades lower than three percent is generally not problematic. A roundabout placed at the Kawaihae Road-Kohala Mountain Road intersection would result in grades of about 3 percent.

To accommodate the roundabout, the northern end of the replacement bridge would be approximately 88 feet wide, providing for two 12-foot vehicular travel lanes, 8-foot paved shoulders in both directions of travel, and 5-foot walkways in both directions of travel. The replacement bridge would have a wider cross section by approximately by 35 feet. Alternative 4 would include:

- Construction of a 80-foot long replacement bridge at about the same location as the existing location; and
- Construction of a single lane roundabout with an inscribed circle diameter of about 130 feet.

Alternative 4 would require a construction easement north of the existing bridge for the temporary bypass road and bridge during the construction period for the replacement bridge. Once construction was completed, the temporary bypass road and bridge would be removed and the easement would be cancelled, and the land returned to the landowner.

The phasing of construction could require construction of the roundabout first, then the temporary bypass bridge, followed by the replacement bridge. Further analysis of the phasing would be required during the design phase.

As previously discussed, the topographic survey shows the existing bridge at +2,418 feet msl and the area to the north generally at elevation +2,419-2,420 feet msl. Thus, the Kawaihae Road-Kohala Mountain Road intersection would meet the grade criteria set forth in the FHWA guidelines.

The Alternative 4 replacement bridge would permanently shift the alignment of Kawaihae Road-Kohala Mountain Road intersection to the east and would require taking or acquisition of about 9,350 square feet (0.21 ac.) from TMK 6-5-001:033 outside of the existing 60-foot right-of-way. The increase of impervious area as a result of the construction of Alternative 4 would not exceed one acre.

The existing posted speed will remain at 25 mph and will still meet current design standards.

The conceptual plan for Alternative 4 is shown in Figure 2-13 at the end of this chapter.

2.3.6.6 Alternative 5: Replacement Bridge South of Existing Bridge

Alternative 5 would construct a replacement bridge south of the existing bridge. Realignment of the intersection would require a shift of the roadway to the south. The project limits would be approximately 765 linear feet along Kawaihae Road and 250 feet along Kohala Mountain Road.

Alternative 5 would require a construction easement north of the existing bridge for the temporary bypass road and bridge during the construction period for the replacement bridge. Once construction was completed, the temporary bypass road and bridge would be removed and the easement would be cancelled, and the land returned to the landowner.

The Alternative 5 replacement bridge would permanently shift the alignment of Kawaihae Road-Kohala Mountain Road intersection to the south and would require taking or acquisition of about 10,197 square feet outside of the existing 60-foot right-of-way. The shift in the alignment would use approximately 0.059 acres of TMK: 6-6-004:001, an existing residence.

Alternative 5 would also include use of approximately 0.17 acres Department of Hawaiian Home Lands (DHHL) property TMK: 6-6-001:077 located south of Kawaihae Road. Typically, use of DHHL lands for other than those to be leased for homestead purposes is not allowed under the Hawaiian Homes Commission Act of 1920. However, DHHL lands can be exchanged for other lands of equal value.

In addition, traffic operations would be improved at the intersection of Kawaihae Road and Kohala Mountain Road by adding a T-intersection, and installing a traffic signal (refer to Section 2.3.3).

The existing posted speed will remain at 25 mph and will still meet current design standards.

The conceptual plan for Alternative 5 is shown in Figure 2-14 at the end of this chapter.

2.4 Properties Affected by the Project

The approximate acquisition outside of the 60-foot right-of-way is shown in Table 2-2 and Figures 2-10 to 2-14. The HDOT taking involves the following:

- Preparation of a right-of-way map to identify the parcels and areas of the taking;
- HDOT appraisal of the affected areas;
- Metes and bounds description of the taking;
- Acquisition of the affected area.

In addition, it may be necessary to use adjacent properties during construction. If this is the case, the HDOT will execute a construction parcel agreement to use the adjacent lands during construction.

Except for Alternative 3, the proposed action would require the taking or acquisition of private property outside of the existing 60-foot right-of-way. Taking

or acquisition would increase the costs related to the replacement project since the HDOT would have to fund the taking or acquisition of the property. Although the acquisition might not involve significant land areas, there would still be costs and time associated with the acquisition.

In addition to the HDOT costs, the taking would cause disruption to the affected landowner. Property would be taken for public purposes to realign the approaches. The landowner would no longer have use of the land for private purposes. Also, the County of Hawaii would no longer collect property tax on the land acquired by HDOT.

Based on the above, Alternative 3 would involve the least area of taking or acquisition. The approximate acquisition outside of the 60-foot right-of-way is shown in Table 2-2.

TABLE 2-2
LAND ACQUISITION

Alternative	Tax Map Key	Approximate Taking/Acquisition	Approximate Land Area Needed for Temporary Bypass Bridge and Road
Alternative 2	6-5-001:033 6-5-001:01	11, 431 SF 708 SF	None
	Total	12,139 SF	
Alternative 3	None	0 SF	8,000 SF
Alternative 3A	6-5-001:033	5,800 SF	8,000 SF
Alternative 4	6-5-001:033	9,350SF	10,000 SF
Alternative 5	6-6-004:001 6-6-001:077	7,623 SF 2,574 SF	6,000 SF
	Total	10,197 SF	

2.5 Preliminary Cost Estimate

Estimated construction cost for the proposed project ranges from $8 million to $14 million as shown below. Estimated construction cost excludes land acquisition fee.

Alternative	Estimated Construction Cost
Alternative 2	$8 million
Alternatives 3 and 3A	$10 million
Alternative 4	$12 million
Alternative 5	$12 million

Construction of this project will occur after completion of obtaining necessary entitlements and the project's design.

2.6 Project Schedule

The current schedule is for construction to begin in year 2012 and be completed in the year 2013.

2.7 Public Involvement

A series of three public informational meetings were held in Waimea to solicit comments on the Waiaka Bridge replacement project. During these meetings, the various alternatives were presented and public comments were solicited related to the alternatives. Meeting notices were published in the newspaper for the first and third meetings and meeting notices mailed to attendees for the later two meetings (see Appendices A – C).

The meetings were held on: March 6, 2002; January 15, 2008, and December 15, 2009. A total of about 45 attendees were at the March 6, 2002 meeting, 75 attendees at the January 15, 2008 meeting, and 40 attendees at the December 15, 2009 meeting. Comments received during the Public Information Meetings #2 and #3 are included in Appendices B and C.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	---	2009	1	X

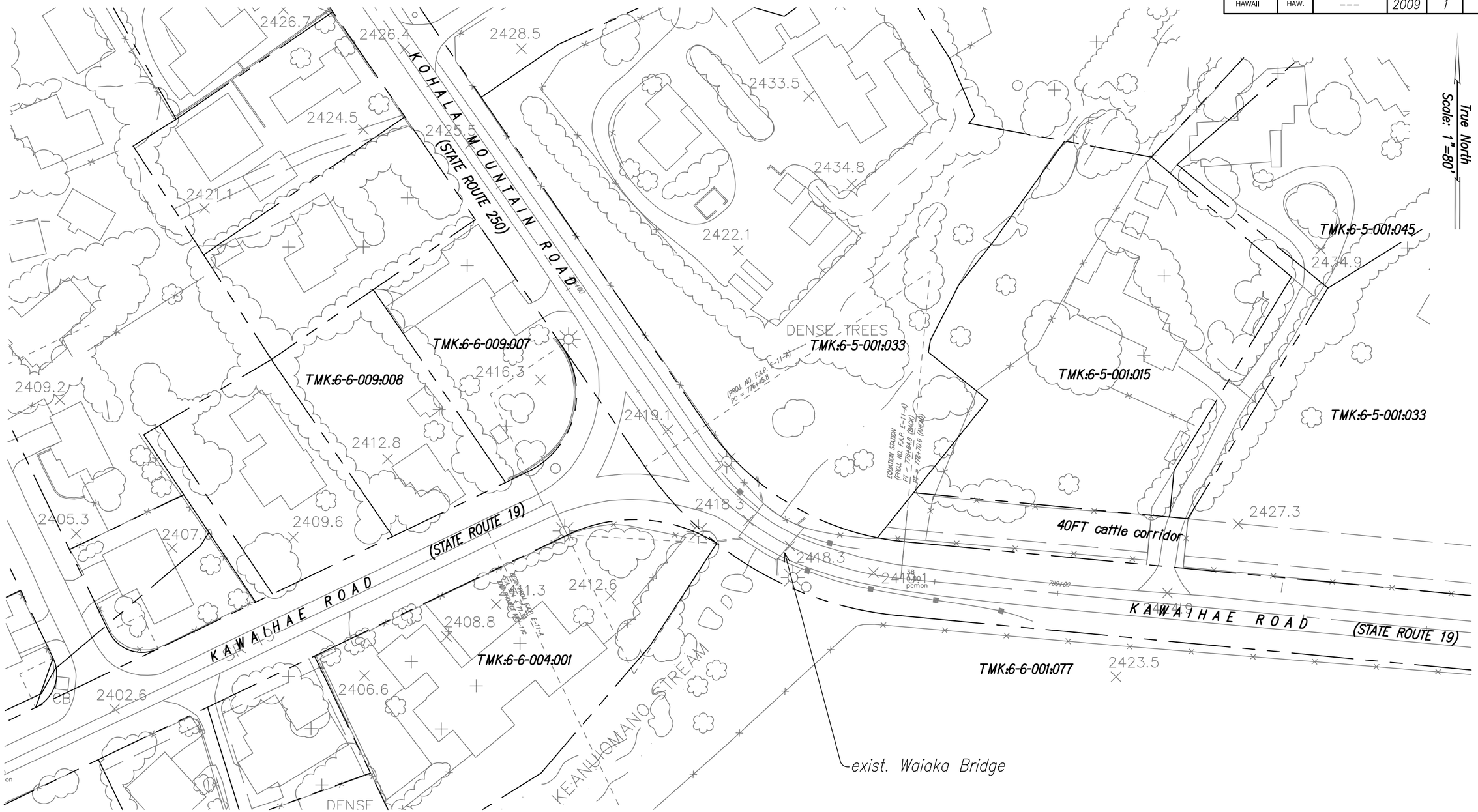


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FIGURE 2-9 ALTERNATIVE 1 NO ACTION OR EXISTING CONDITIONS

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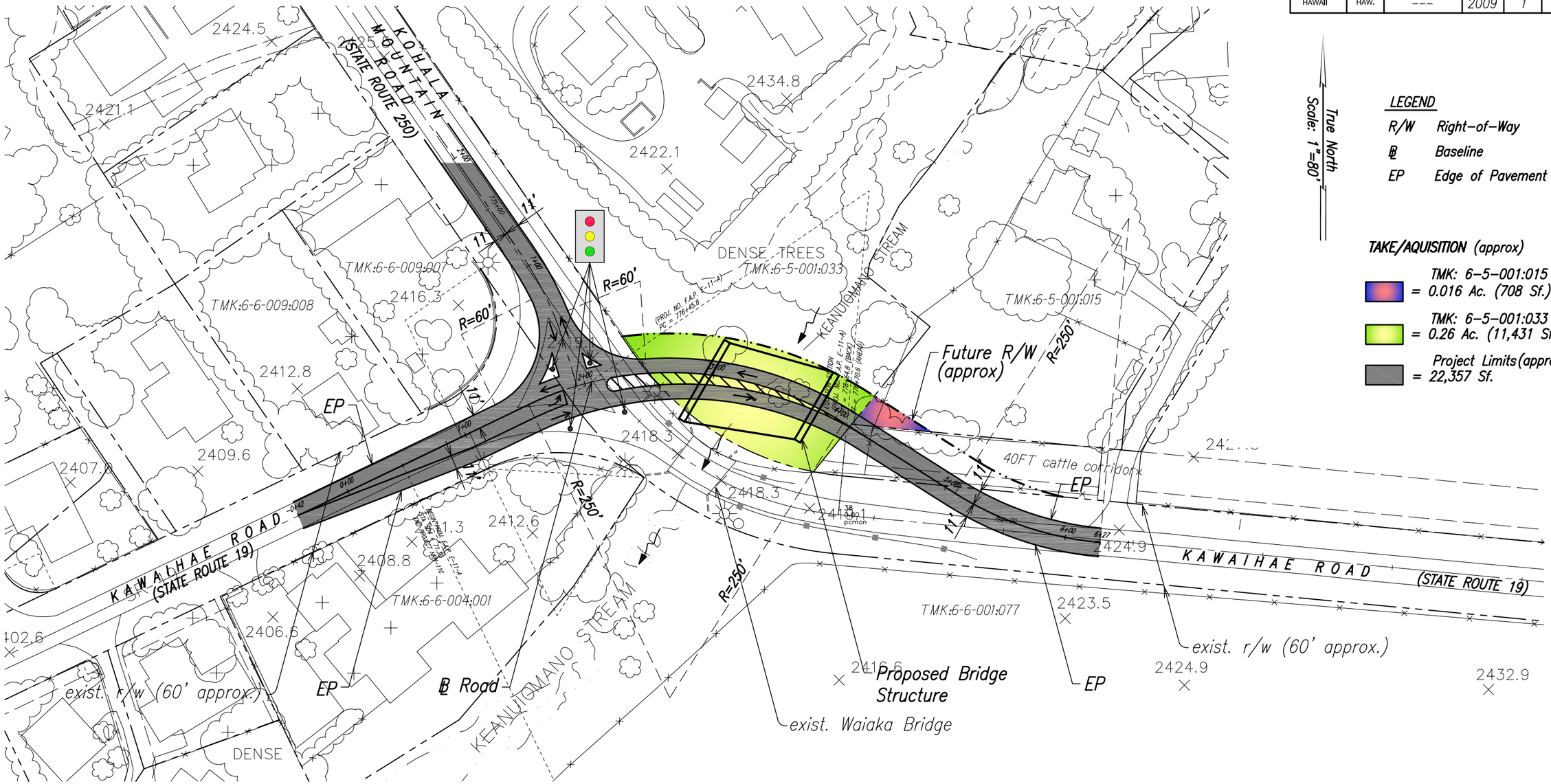
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	---	2009	1	X



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SHEET No. 1 OF 1 SHEETS

FIGURE 2-10 ALTERNATIVE 2 REPLACEMENT BRIDGE/NEW LOCATION NORTH OF EXISTING BRIDGE

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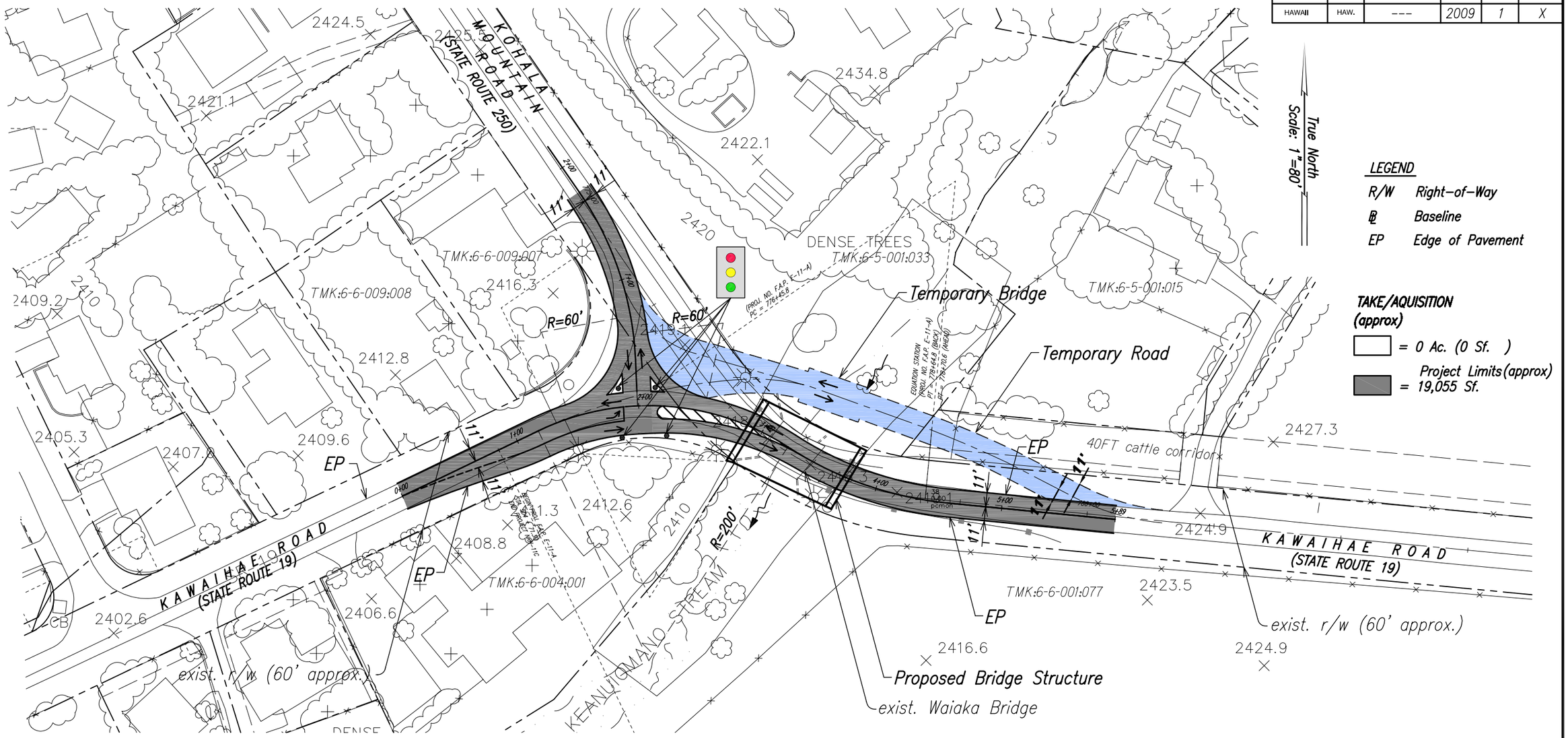
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	---	2009	1	X



GRAPHIC SCALES:

40' 20' 0 40' 80'

SCALE: 1" = 80'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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NOTE BOOK	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

SHEET No. 1 OF 1 SHEETS

FIGURE 2-11 ALTERNATIVE 3 REPLACEMENT BRIDGE/EXISTING LOCATION

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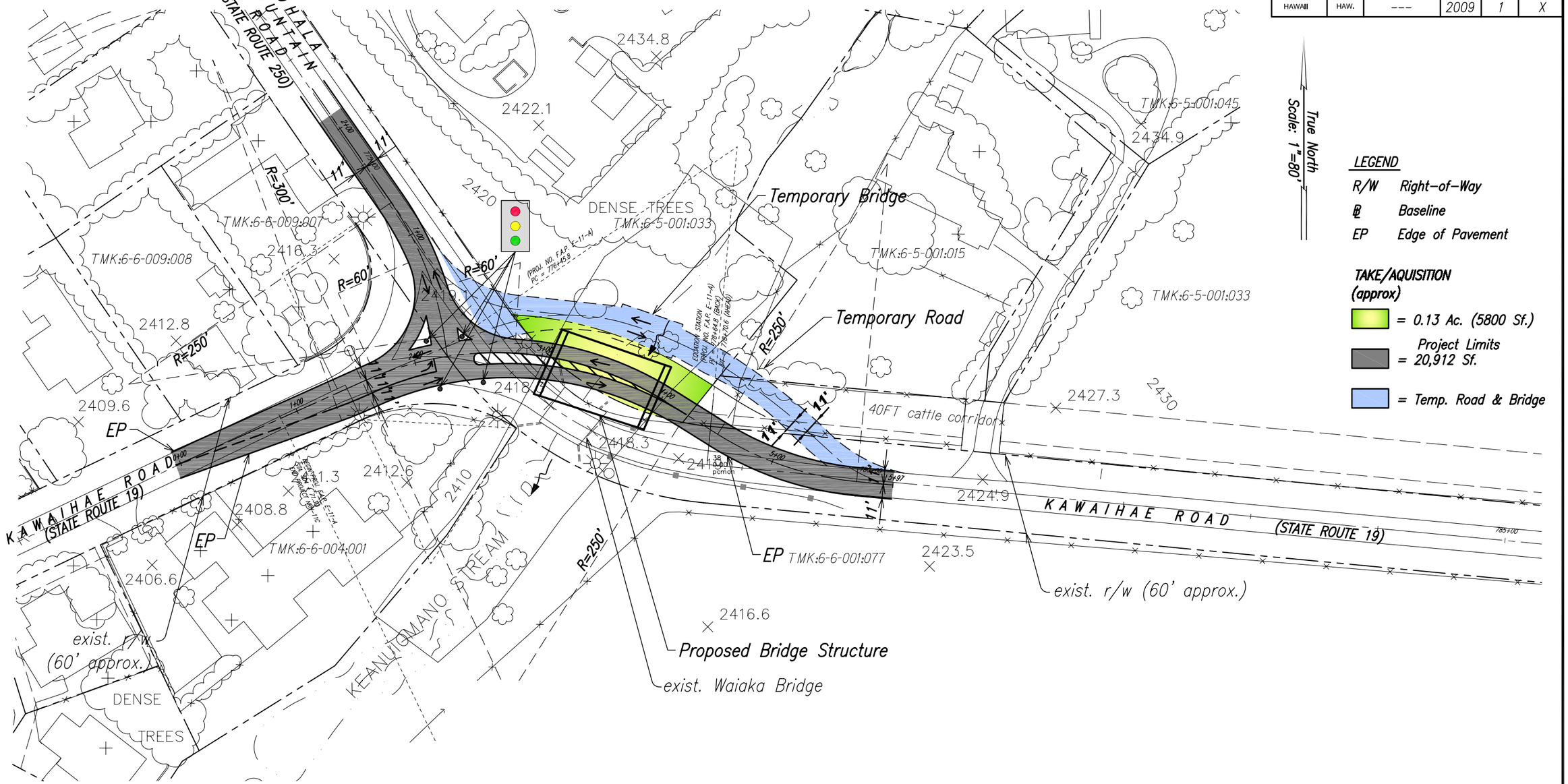
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	---	2009	1	X



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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SHEET No. 1 OF 1 SHEETS

FIGURE 2-12 ALTERNATIVE 3A REPLACEMENT BRIDGE EXISTING LOCATION/REALIGN EAST APPROACH

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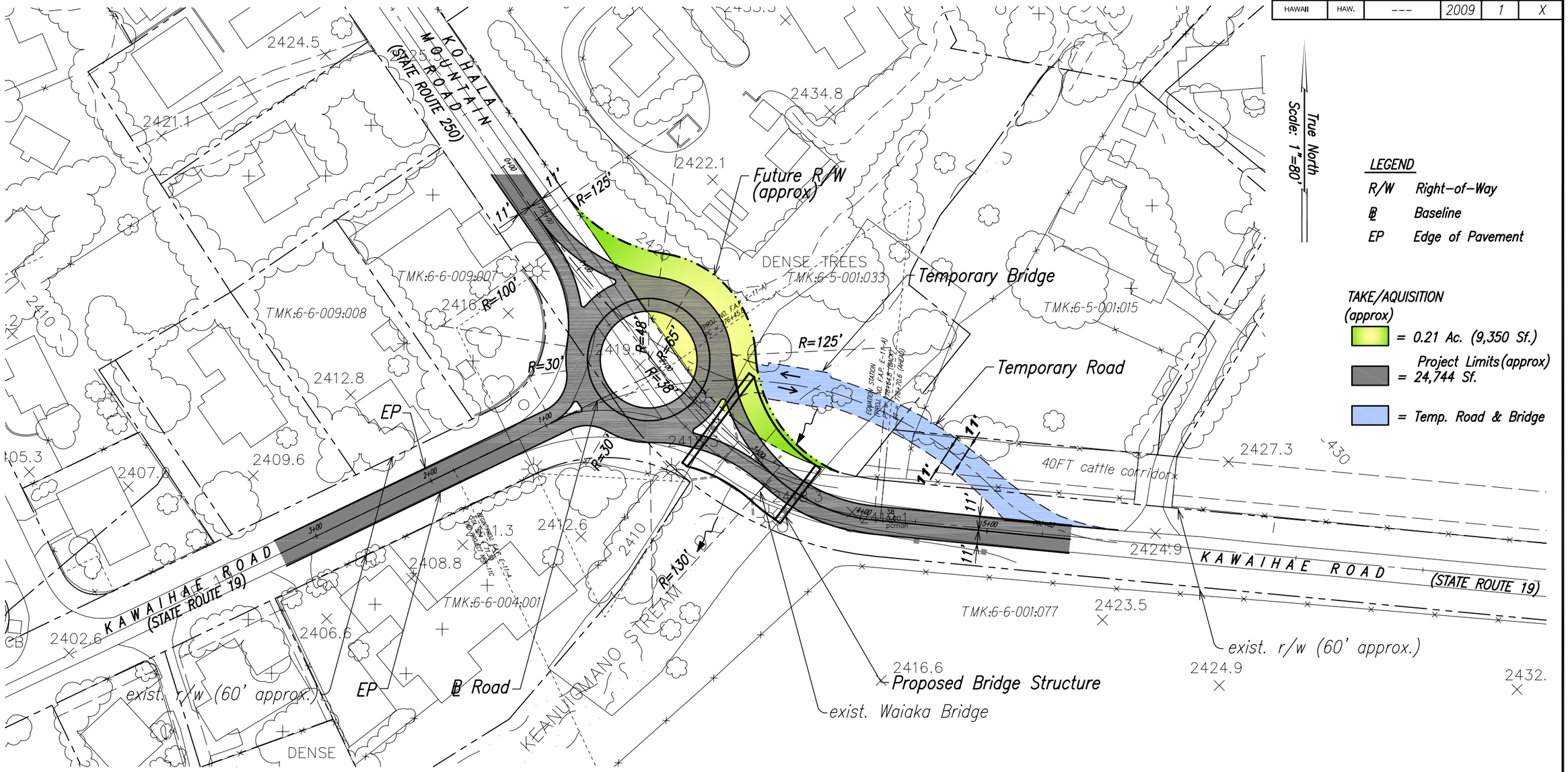
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	---	2009	1	X



GRAPHIC SCALES:
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SCALE: 1" = 80'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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	QUANTITIES BY	
No.	CHECKED BY	

SHEET No. 1 OF 1 SHEETS

FIGURE 2-13 ALTERNATIVE 4 REPLACEMENT BRIDGE AND ROUNDABOUT

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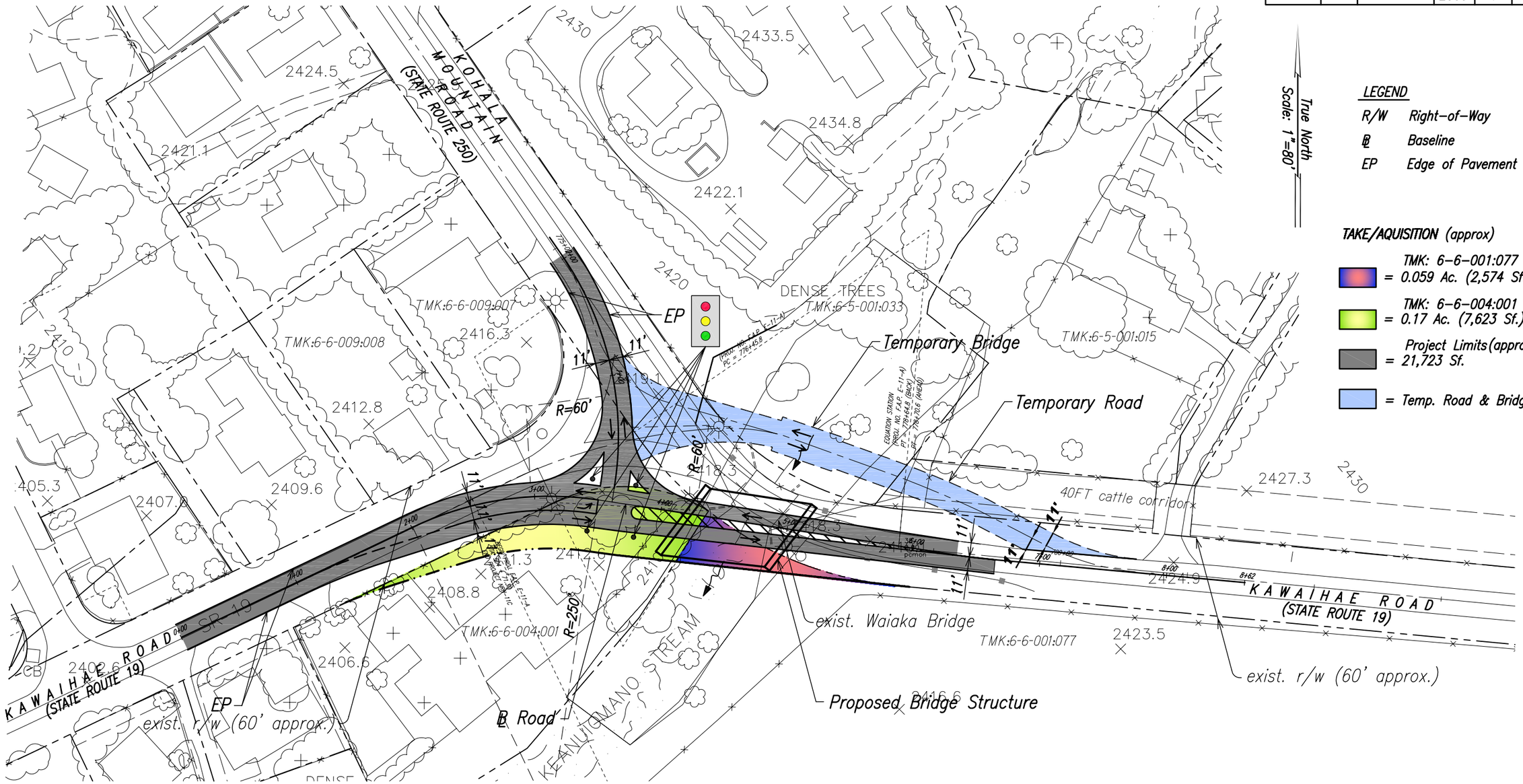
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	---	2009	1	X



GRAPHIC SCALES:
40' 20' 0 40' 80'
SCALE: 1" = 80'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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NOTE BOOK	DESIGNED BY	
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SHEET No. 1 OF 1 SHEETS

FIGURE 2-14 ALTERNATIVE 5 REPLACEMENT BRIDGE/SOUTH LOCATION

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3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Geology and Topography

3.1.1 Existing Conditions

The island of Hawaii was created by five separate shield volcanoes that erupted somewhat sequentially. These are (from oldest to youngest) Kohala, Mauna Kea, Hualalai, Mauna Loa, and Kilauea. Kohala Mountain is believed to be the oldest volcano that makes up the island of Hawaii. As Kohala's volcanic activity slowly waned, its southern flanks were buried by the flows from the younger volcano, Mauna Kea.

The project site is situated on the Waimea Plain, between Kohala Mountain and Mauna Kea, and is underlain by rocks of the upper member of the Hamakua series of Mauna Kea. The upper member of the Hamakua series is capped by a surface layer of Pahala ash.

3.1.2 Impacts and Mitigation Measures

Proposed Action: No significant impacts to geology and topography are anticipated as result of the construction and operation of the project. Short-term construction related impacts are anticipated with the proposed action. Construction of a temporary bypass bridge and road and the replacement bridge, and realignment of the approaches will require clearing, grading, excavating, and recontouring of soils, which would remove vegetation and expose soil, which could leave affected areas exposed to erosion. However, the construction contract documents will state the contractor shall not leave areas exposed by clearing, grading, and excavating unprotected without mitigation measures. In addition, these activities would be of limited duration and impact, and would be mitigated through implementation of site specific best management practices (BMPs). The area used for the detour road would be restored to its original elevation and condition upon completion. Therefore no significant impacts to geology are anticipated with implementation of the proposed action.

Construction of the replacement bridge will require excavation to construct for abutments, or drilling shaft to place the shafts. This subsurface work will remove material to construct the abutments. Typically, the abutments would be six feet below the existing grades. This subsurface work will require removal of material prior to placing the reinforcing work and pouring concrete. The excavation and drilling, although extending to six feet, will not create adverse effects to the geologic conditions to this area.

The replacement bridge will be designed and constructed to meet the requirements of latest version of the AASHTO Load and Resistant Factor Design (LRFD) dated 2007. This will ensure that the geological conditions of the area do not adversely affect the bridge structure.

The replacement bridge will also meet the Design Criteria for Bridges and Structures issued by HHDOT (2005), including guide specifications for LRFD related to horizontal peak ground acceleration for Hawaii.

Alternatives 3, 3A, 4 and 5 would require construction of a temporary bypass bridge and road while the existing bridge is removed and the replacement bridge constructed. Alternative 2 would affect about the same area as the temporary bypass bridge and road bridge would be constructed north of the existing bridge and the approaches permanently realigned to the north.

No Action: Under the No Action Alternative, no construction would occur and the geology and topography of the project area would remain the same.

3.2 Soils

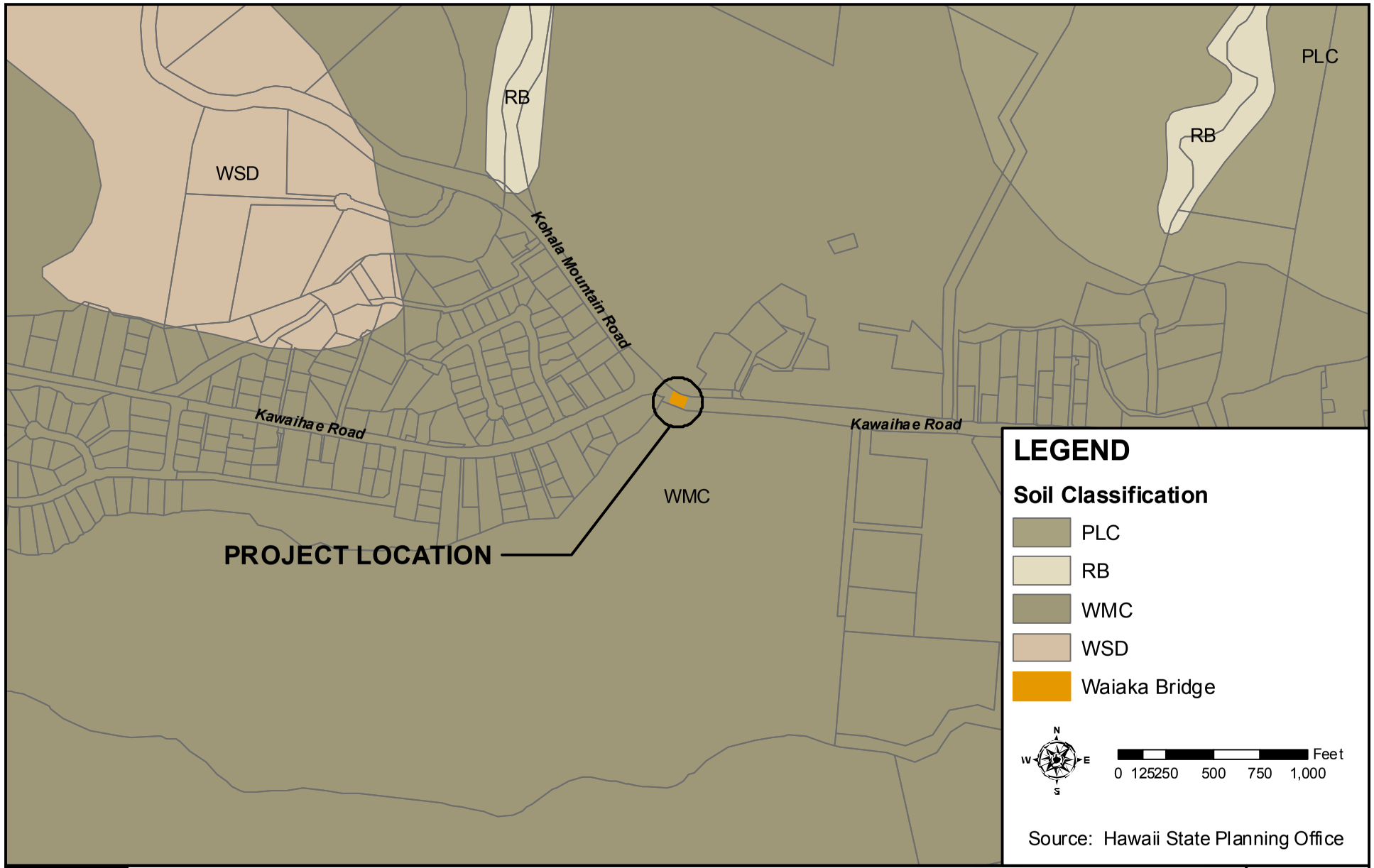
3.2.1 Existing Conditions

According to the U.S. Department of Agriculture Soil Conservation Services (SCS) *Soil Survey of Islands of Hawaii, State of Hawaii* (August 1972), the soil type in the project area is Waimea very fine sandy loam, 6 to 12 percent slopes (WMC) which exhibit the following characteristics (see Figure 3-1):

> *Waimea very fine sandy loam, 6 to 12 percent slopes (WMC). This soil is at intermediate elevations on the leeward side of Mauna Kea and the Kohala Mountains. A representative profile has a surface layer about 17 inches thick. This layer consists of dark-brown and very dark brown very fine sandy loam about 25 inches thick. Permeability is moderately rapid, runoff is slow, and the erosion is hazard is slight. The soil is used for pasture and irrigated truck crops.*

The University of Hawaii's Land Study Bureau Detailed Land Classification Report for the Island of Hawaii utilizes a five-class productivity rating using the letters A, B, C, D, and E, with "A" representing the class of highest productivity and "E" the lowest. The lands surrounding the project are classified as "C" and has "fair suitability" rating for soil base forms of agriculture (see Figure 3-2).

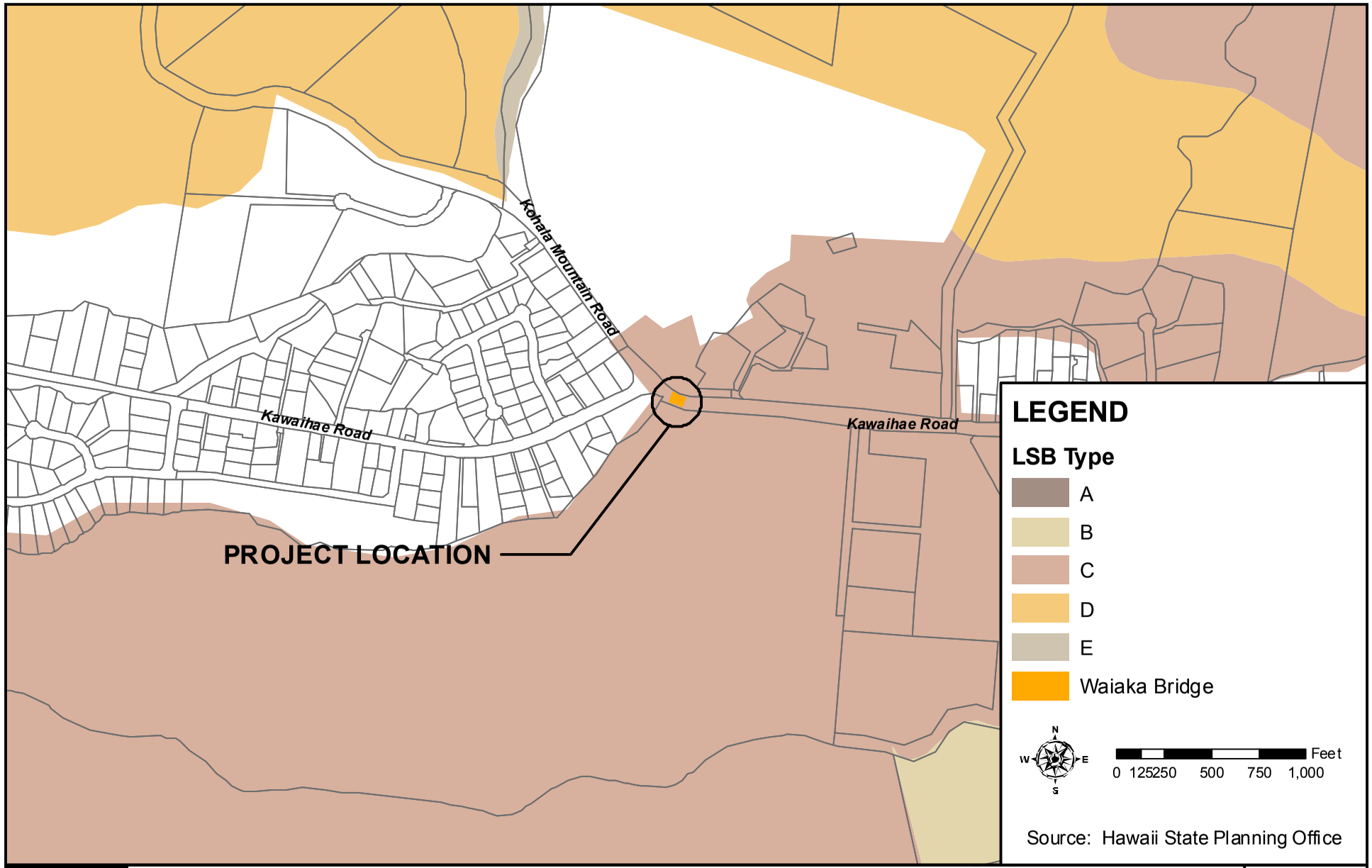
The State Department of Agriculture prepared The Agricultural Lands of Importance to the State of Hawaii (ALISH) Map. The ALISH map classifies agricultural lands into three categories: 1) prime agricultural land, 2) unique agricultural land, and 3) other important agricultural lands. The lands surrounding the project site is classified as prime agricultural land and other important agricultural lands (see Figure 3-3).



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Soil Classification Map

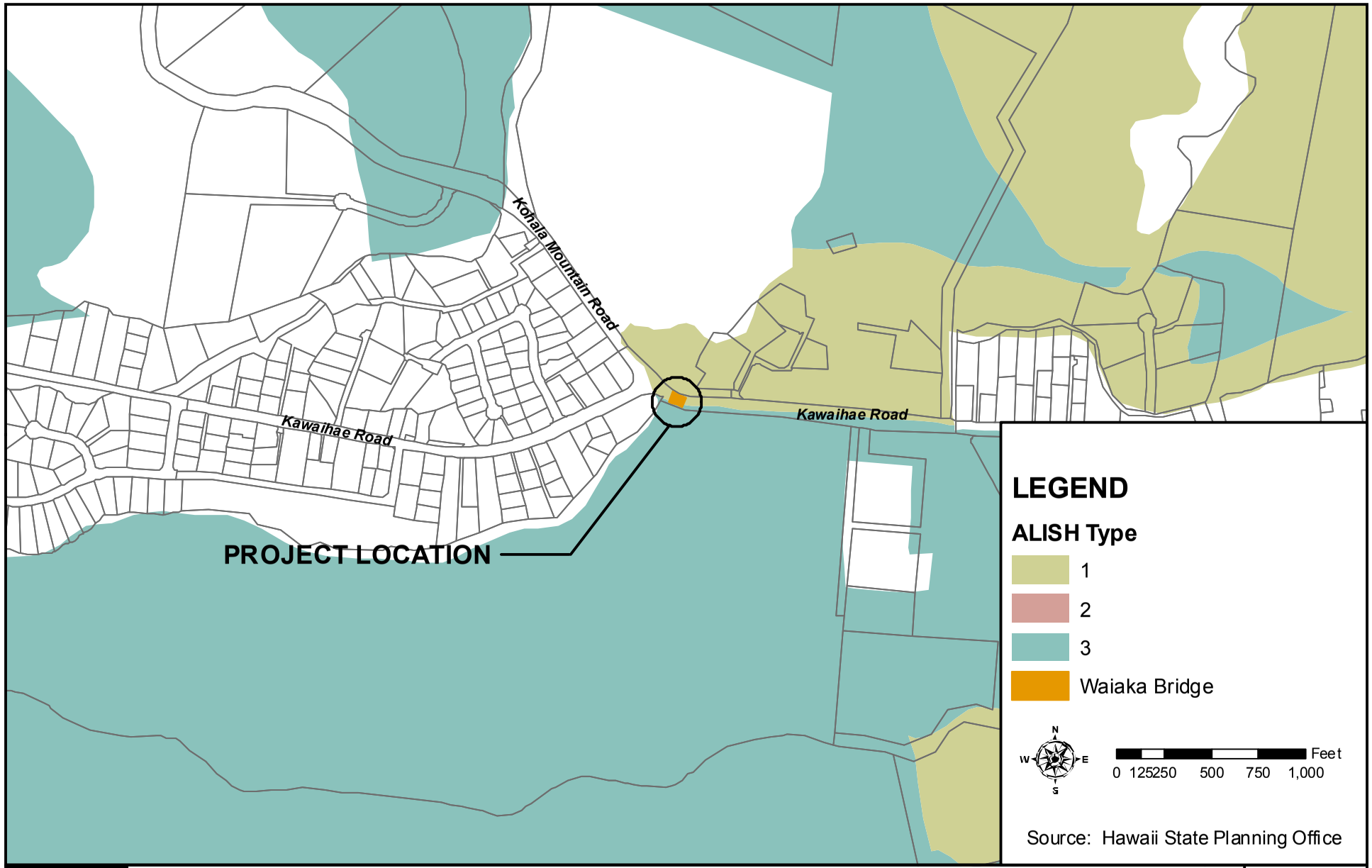
FIGURE 3-1



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Land Study Bureau Map

FIGURE 3-2



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Agricultural Lands of Importance State of Hawaii (ALISH) Map

FIGURE 3-3

3.2.2 Impacts and Mitigation Measures

Proposed Action: No significant impacts to soils are anticipated as a result of the construction and operation of the project. Short-term construction related impacts are anticipated with the proposed action. Clearing, grading, excavating, and recontouring of soils would remove vegetation and expose soil, leaving areas temporarily exposed to erosion during the construction period. However, these activities would be of limited duration and impact, and would be mitigated through implementation of site specific BMPs. The area used for the temporary bypass road would be restored to its original elevation and condition upon completion. Based on this, no significant impacts to soils are anticipated with implementation of the Proposed Action alternatives.

Excavation and grading activities during construction of the project will be regulated by the County's grading ordinances and the National Pollutant Discharge Elimination System (NPDES) permit administered by the State Department of Health.

A NPDES General Permit for Storm Water Associated with Construction will be required for construction of the proposed project as the area of soil disturbance from activities such as clearing and grubbing, grading and stockpiling will exceed one acre. In conjunction with the NPDES permit, a Best Management Practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control mitigative measures that are typically included in the BMP plan are appropriately stockpiling materials on-site to prevent runoff, covering or stabilizing topsoil stockpiles, use of sediment basins and sediment traps, and establishing re-vegetation or landscaping as early as possible on completed areas.

Section 404 of the Clean Water Act (CWA) regulates the discharge of dredge and fill material into the waters of the U.S., and requires a Department of the Army Permit from the U.S. Army Corps of Engineers. Section 401 of the CWA directs states to establish water quality certification (WQC) programs; in Hawaii, the Section 401 WQC is administered by the Department of Health (DOH), Clean Water Branch (CWB). The Proposed Action may result in discharges regulated under Section 404. A Section 401 WQC will also be required for "any activity including, but not limited to, the construction or operation of facilities, which may result in any "discharge" into navigable waters". This certification is in place to regulate water quality during and after the construction phase of the project to assure discharge will meet State Water Quality Standards.

Following construction, exposed soils at the project site will have been built over, paved over, or re-vegetated to control erosion.

The State Water Code (HRS Chapter 174C) establishes the Water Commission, which regulates activities affecting stream channels, which are defined as any natural or artificial watercourse with a definite bed and banks, which periodically or continuously contains flowing water. A Stream Channel Alteration Permit (SCAP) is required for any activity that would modify the bed or banks of the stream.

Modification to Keanuiomano Stream may require a SCAP as a result of the project.

Permits described in this section will be obtained as necessary and the respective agencies will be consulted as part of the design process.

No Action Alternative: Under the No Action Alternative, no construction would occur and the soil conditions in the project area would remain the same.

3.3 Water Resources

3.3.1 Ground Water

3.3.1.1 Existing Conditions

The island of Hawaii is divided into nine water sectors, which in total are comprised of approximately 24 aquifer systems (Commission on Water Resources Management, 2008). The Waimea area overlies the Mahukona aquifer system, a component of the Kohala Aquifer Sector. The Mahukona aquifer system has a sustainable yield of 17 million gallons per day (mgd).

3.3.1.2 Impacts and Mitigation Measures

Proposed Action: No significant impacts to ground water are anticipated as result of the construction and operation of the project. Short-term construction related impacts are anticipated with the proposed action. Construction of the replacement bridge will require excavation to construct for abutments, or drilling shaft to place the shafts. This subsurface work will remove material to construct the abutments. Typically, the abutments would be six feet below the existing grades. This subsurface work will require removal of material prior to placing the reinforcing work and pouring concrete. The excavation and drilling, although extending to six feet, will not create adverse effects to the groundwater conditions to this area.

No long-term significant impacts to surface water or groundwater within the project site are anticipated with the construction of the proposed project.

In the short-term, potential water quality impacts to surface and near shore coastal waters during construction of the project will be mitigated by adherence

to State and County water quality regulations governing grading, excavation, and stockpiling. A NPDES General Permit for Storm Water Associated with Construction Activity, administered by the State Department of Health (DOH), will be required to control storm water discharges. Mitigation measures will be instituted in accordance with site-specific assessments, incorporating appropriate structural and/or non-structural Best Management Practices (BMPs) such as silt fences and minimizing time of exposure between construction and re-vegetation or paving.

A Water Quality Certification (WQC), issued by the DOH, pursuant to Section 401 of the Clean Water Act, may be required for "any activity including, but not limited to, the construction or operation of facilities, which may result in any "discharge" into navigable waters". This certification is in place to regulate water quality during and after the construction phase of the project to assure discharge will meet State Water Quality Standards.

Construction activities are not likely to introduce to, nor release from the soil any materials which could adversely affect groundwater. Construction material wastes will be appropriately disposed of and must also be prevented from leaching into receiving bodies of water. Dewatering activity is not anticipated for this project. The proposed project will comply with HAR, Chapters 11-54 and 11-55, as applicable.

No Action Alternative: The No Action alternative would have no impact on groundwater resources in the project area.

3.3.2 Surface Water

3.3.2.1 Existing Conditions

Three streams are located within or near the project site. From south to north, these three streams are Waikoloa, Keanuiomano, and Lanikepu Streams. Two of these, Waikoloa and Keanuiomano, have been designated perennial despite the fact that the Department of Water Supply diverts the base flow from their upper reaches above Waimea for potable supply. The third stream, Lanikepu, is normally dry except during and immediately following significant rains.

Keanuiomano Stream is listed as a tributary of Waiulaula Gulch and connects to Waikaloa Stream which flows into the Pacific Ocean.

The existing Waiaka Bridge crosses over Keanuiomano Stream. Upstream from the bridge, the topographic survey maps show the stream sides slope to the streambed to form a well defined channel. Downstream of the bridge, the topographic survey maps show the streambed and channel are less defined.

The U.S. Department of the Interior Geological Survey (USGS) has an existing partial record gage station on Keanuimano Stream (No. 16756500) located about 150-200 feet upstream from Waiaka Bridge. The maximum discharge measured at this station during water year 2000 was 444 cubic feet per second (cfs). The period of record maximum for this station is significantly greater at 3,450 cfs. From 2005 to 2009, the discharge flow has ranged from 328 cfs to 935 cfs (USGS Website, 2011).

The Hawaii Stream Assessment lists Keanuiomano Stream as a perennial stream in which the flow is interrupted (not flowing year round at lower elevations).

Water Quality: AECOS, Inc. conducted an aquatic resources and water quality survey for Keanuiomano Stream in February 2003. The Hawaii Stream Assessment lists Keanuiomano Stream as a perennial stream in which the flow is interrupted (not flowing year round at lower elevations). The quality of water in Keanuiomano Stream was measured in three different locations: 2,500 feet upstream (Station #1), at the bridge (Station #2), and 2,140 feet downstream (Station #3). The following are the results of the water quality survey:

- Both turbidity and total suspended solids (TSS) at Waiaka Bridge appear to be within Hawaii Water Quality Standards criteria for wet season measurements;
- The measurements of pH and dissolved oxygen (DO) meet the criteria of not lower than 5.5 nor higher than 8.0 for pH and not less than 80 percent saturation for DO;
- The concentrations of nitrogen compounds (nitrate, nitrite, ammonia, and organic nitrogen) measured in Keanuiomano Stream are fairly typical for Hawaiian streams in rural or undeveloped watersheds, and fall below the perennial streams wet season;
- Total phosphorous (total P) values for Stations 2 and 3 were slightly elevated, but Station 1 exceeds the stream criterion of 50 µg P/L, which could be due to over fertilization in the housing complex next to the stream or from other upstream source; and
- Oil and grease yielded “not detected” (<0.61 mg/l) at all stations.

The water quality conditions were good with limited influence from anthropogenic sources.

3.3.2.2 Impacts and Mitigation Measures

Proposed Action: No significant impacts to surface waters are anticipated as a result of the construction and operation of the project. The Proposed Action alternatives would construct a replacement bridge with a clear span of about 80 feet. The existing bridge is 38 feet with a center pier which can block debris and

materials such as tree branches causing the stream not to continuous flow. Longer clear spans of the Proposed Action alternatives would not affect flows in Keanuiomano Stream. The longer clear span of the replacement bridge would allow the stream to flow without interruption or blockages. In addition, since the Proposed Action alternatives include removal the existing bridge, it would no longer adversely affect stream flows.

The USGS has an existing partial record gage station on Keanuimano Stream (No. 16756500) located about 150-200 feet upstream from Waiaka Bridge. Replacement of the bridge and realignment of the approaches could require relocation of the gauge station. USGS gauge stations have been relocated in the past to accommodate bridge replacement projects. Thus, the gage station near Waiaka Bridge probably can be relocated. USGS will make the final determination for the new site, if the station needs to be relocated. Eventually, if the station is to be relocated, USGS will need written notification from HDOT.

No long-term significant impacts to surface water within the project site are anticipated with the construction of the proposed project.

In the short-term, potential water quality impacts to surface waters during construction of the project will be mitigated by adherence to State and County water quality regulations governing grading, excavation, and stockpiling. A NPDES General Permit for Storm Water Associated with Construction Activity, administered by the State Department of Health (DOH), will be required to control storm water discharges during construction. Mitigation measures will be instituted in accordance with site-specific assessments, incorporating appropriate structural and/or non-structural Best Management Practices (BMPs) such as silt fences and minimizing time of exposure between construction and re-vegetation or paving.

A Water Quality Certification (WQC), issued by the DOH, pursuant to Section 401 of the Clean Water Act, may be required for “any activity including, but not limited to, the construction or operation of facilities, which may result in any “discharge” into navigable waters”. This certification is in place to regulate water quality during and after the construction phase of the project to assure discharge will meet State Water Quality Standards.

No Action Alternative: The No Action alternative would not change existing conditions on Keanuiomano Stream.

3.4 Natural Hazards

3.4.1 Existing Conditions

Flood Hazard: The Federal Emergency Management Agency Flood Insurance Rate Map (FIRM) Community Panel No. 155166 0164D (Map Revised July 16,

1990) and Community Panel No. 155166 0162C (Map Revised September 16, 1988) show Waiaka Bridge and other nearby areas are located with Zone A, defined as Special Flood Hazard Areas Inundated by 100-Year Flood, “no base flood elevation determined”. The FIRM maps define a 100-year flood as “the 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance: of being equaled of exceeded in any given year. Figure 3-4 shows the flood hazard map for the project site.

It should be noted that the FEMA maps are initially prepared from information developed from hydrologic models of the drainage basin. This information is overlayed on aerial topographic maps and shown on the FIRM maps. Subsequently, if necessary or desired by the owner of a facility affecting the flood hazard map, a detail flood study is prepared and the stream cross-section mapped to show the revised base flood elevation.

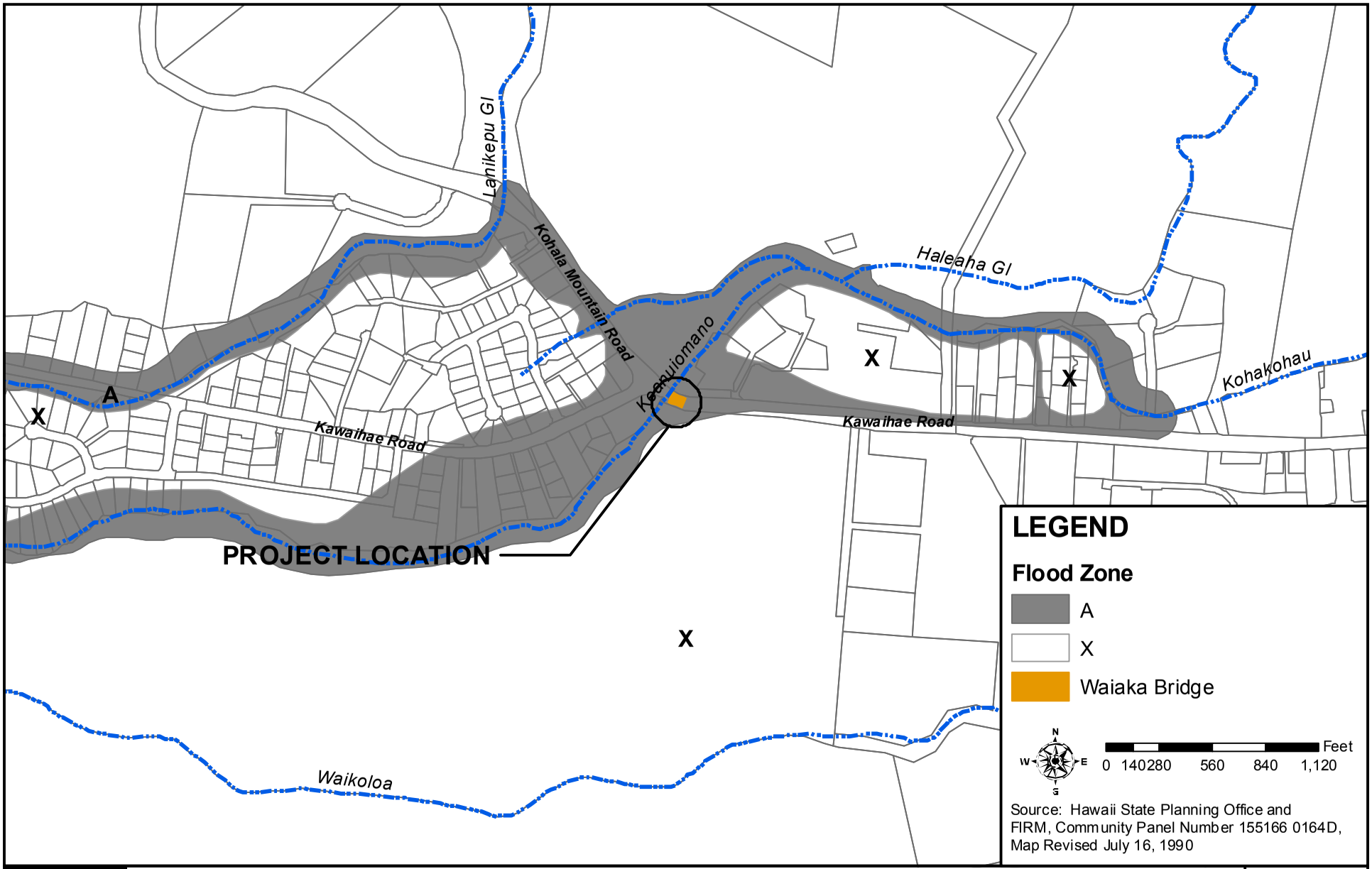
Volcanic Hazard: The U.S. Geological Survey (USGS) established nine hazard zones for the island of Hawaii. Hazard zones from lava flows are primarily based on the location and frequency of both historic and prehistoric eruptions. Zone 1 is the area of greatest hazard and Zone 9 is of the least hazard. The project area is in Zone 8.

Earthquake Hazard: According to the Multi-Hazard Mitigation Plan: County of Hawaii (February 2005) the USGS conducted a seismic hazard analysis for the County of Hawaii. As a result of this analysis, the entire island of Hawaii is in the Zone 4 category (10% chance of severe shaking in a 50-year interval).

3.4.2 Impacts and Mitigation Measures

Proposed Action: No significant impacts on natural hazards in the project area are anticipated as a result of the construction and operation of the project. The Proposed Action alternatives would construct a replacement bridge designed to meet the Design Criteria for Bridges and Structures (2011) issued by HHDOT, including guide specifications from the AASHTO Load and Resistant Factor Design (LRFD) guidelines that have been adopted by HDOT. Use of the latest LRFD related to horizontal peak ground acceleration for Hawaii would minimize the adverse impacts of an earthquake to the replacement bridge.

No Action Alternative: The No Action alternative would have no impact on natural hazards in the project area.



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Flood Zone Map

FIGURE 3-4

3.5 Biological Resources

3.5.1 Flora

3.5.1.1 Existing Conditions

Botanical Consultants Inc. conducted a flora survey of the project limits in 2002. This survey is included in Appendix D and summarized below. A total of three (3) vegetation communities were found on and along the project limits. The Urban Community is found in the area along Kohala Mountain Road and along the mauka or north side of Kawaihae Road. Ornamental trees, shrubs, flowers, lawn grasses and weeds usually associated with landscaping were observed.

The Stream Community includes vegetation along the banks of Waiaka Stream. At the stream crossing, the banks are mostly made of large boulders and very little vegetation. Kikuyu grass, black wattle trees, Vervain, Spanish reed, and a few others were observed.

The Pasture Community can be found from the stream to the end of the project limits, on the south side of Kawaihae Road. Kikuyu grass, guinea grass, buffel grass, and rat tail fescue were observed. Individual Panini cactus plants were also scattered throughout the pasture.

No native vegetation was found on or along the project limits. The vegetation on and along the project limits were made up alien species. No candidate, proposed, or listed threatened or endangered botanical species as set forth under the Endangered Species Act (16 USC Section 1531-1544, as amended) are known from this site and none were found during the survey.

Section 7 of the Endangered Species Act of 1973 (16 USC 1531-1544) requires that Federal agencies consult with the U.S. Department of Interior Fish and Wildlife Service (USFWS) for federally funded projects. If the project could affect a USFWS listed or candidate threatened or endangered species (botanical, biological, aquatic or marine), the USFWS must issue a biological opinion as to the project's effect on the continued existence of the particular species.

In May 1999, the HDOT notified USFWS about the Waiaka Bridge Replacement project. In response, on May 26, 1999, the USFWS replied, "*to the best of our knowledge, no Federal endangered, threatened, or candidate species, significant wetlands or other Federal trust resources occur at the immediate project site, nor any point along Waikoloa Stream below the Waiaka Stream Bridge. Furthermore, there are no native fish species in the Waikoloa Stream system*." Appendix E contains the USWFS letter. The USFWS will be notified as part of the Draft EA process.

3.5.1.2 Impacts and Mitigation Measures

Proposed Action: The Proposed Action alternatives would require removal of vegetation within the project limits to accommodate construction of the temporary bypass bridge and road and replacement bridge. Construction of the temporary bypass road and realignment of the approaches would require grading, grubbing and vegetation clearing for the approach travel lanes.

The botanical survey found no native vegetation on or along the project limits. The vegetation on and along the project limits consisted of alien species. No candidate, proposed, or listed threatened or endangered botanical species as set forth under the Endangered Species Act (16 USC Section 1531-1544, as amended) are known from this site and none were found during the survey. Thus, the Proposed Action alternatives would not create adverse affects to botanical species.

As previously discussed, in May 1999, the HDOT notified USFWS about the Waiaka Bridge Replacement project. In response, on May 26, 1999, the USFWS replied "to the best of our *knowledge, no Federal endangered, threatened, or candidate species, significant wetlands or other Federal trust resources occur at the immediate project site, nor any point along Waikoloa Stream below the Waiaka Stream Bridge. Furthermore, there are no native fish species in the Waikoloa Stream system."* Thus, based on the findings of the botanical survey and the USFWS letter, the Proposed Action alternatives would not create adverse affects to botanical species. Appendix E contains the USWFS letter.

Cleared areas would be revegetated upon completion of construction activities and are expected to recover quickly.

16 USC Section 1531-1544, as amended, mandates that Federal agencies seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes and to consult with the US Fish and Wildlife (USFWS) regarding affects of projects on species.

No Action Alternative: The No Action alternative would have no impacts on flora resources in the project area.

3.5.2 Fauna

3.5.2.1 Existing Conditions

Botanical Consultants Inc. conducted a fauna survey of the project limits in 2002. No native vegetation was found on or along the project limits. At the time of the survey, vegetation along the roads had been mowed, vegetation in the pasture were grazed and trampled on, offering little food for the many introduced, seeding birds that usually are attracted to the type of vegetation found on and

along the project limits. The white-eye, house sparrow, red crested cardinal, zebra dove, mynas, Erckel's Francolin, pigeons, and spotted doves were observed during the survey. Although there were a variety of bird species seen, they were very low in numbers.

The house mouse, the black rat, and the Indian mongoose are all believed to inhabit pasture lands such as those found on and along the project site however, none of these were observed during the survey.

No candidate, proposed, or listed threatened or endangered faunal species as set forth under the Endangered Species Act (16 USC Section 1531-1544, as amended) are known from this site and none were found during the survey.

AECOS, Inc. conducted an aquatic resources and water quality survey for Keanuiomano Stream in February 2003. The report is included in Appendix F and summarized below. The Hawaii Stream Assessment lists Keanuiomano Stream as a perennial stream in which the flow is interrupted (not flowing year round at lower elevations). Keanuiomano Stream is listed under the State Perennial Stream Code No. 8-5-03.0 as a tributary of Waiullaula Gulch. The designation of "Waikoloa" in the Hawaii Stream Assessment is presumed to encompass all of the watersheds (Waiulaula Gulch, and both Waikoloa and Keanuiomano Streams).

Aquatic biota in this section of Keanuiomano Stream is sparse. Guppies, flatworms, and leeches made up the majority of macrofauna observed. No native fishes, crustaceans, or insects were observed during the site visit, although endemic insects and crustaceans have been previously observed in Waiulaula Gulch.

Keanuiomano Stream and the stream to which it is a tributary (Waiulaula Gulch) becomes drier downstream of Waiaka Bridge, whereas conditions are wetter upstream where the stream may be perennially flowing. The aquatic resources and water quality survey indicated the ecology of these upstream segments is poorly known and the status of a native amphidromous aquatic fauna in the upper, perennial waters of the system is largely unknown. However, the proposed project should not have an effect on this fauna since opportunities for migrations up or down Waiulaula Gulch would be limited to times and conditions when construction is not likely to be occurring.

The deeper pools provide the most permanent habitat for aquatic species, including native fish, crustaceans, and insects. These pools should be left unfilled and as natural as possible to provide continued habitat for migrating and other aquatic animals.

No aquatic species listed as endangered, threatened, proposed or candidate as set forth under the Endangered Species Act (16 USC Section 1531-1544, as amended) were detected in the stream system.

Section 7 of the Endangered Species Act of 1973 (16 USC 1531-1544) requires that Federal agencies consult with the U.S. Department of Interior Fish and Wildlife Service (USFWS) for federally funded projects. If the project could affect a USFWS listed or candidate threatened or endangered species (botanical, biological, aquatic or marine), the USFWS must issue a biological opinion as to the project's effect on the continued existence of the particular species.

In May 1999, the HDOT notified USFWS about the Waiaka Bridge Replacement project. In response, on May 26, 1999, the USFWS replied, *"to the best of our knowledge, no Federal endangered, threatened, or candidate species, significant wetlands or other Federal trust resources occur at the immediate project site, nor any point along Waikoloa Stream below the Waiaka Stream Bridge. Furthermore, there are no native fish species in the Waikoloa Stream system*." Appendix E contains the USWFS letter.

3.5.2.2 Impacts and Mitigation Measures

Proposed Action: The Proposed Action alternatives would widen the stream channel to meet the HDOT hydraulic requirements related to stream flow at the replacement bridge. Site specific BMPs including erosion control measures would be implemented during construction to prevent the release of sediments or other potential pollutants to Keanuiomano Stream during construction. Implementation of construction BMPs would prevent degradation of surface water quality during construction. Therefore, no significant short-term or long-term adverse impacts to the aquatic environment are anticipated with implementation of the proposed action.

The Endangered Species Act (16 USC Section 1531-1544, as amended) provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the U.S. or elsewhere. The Act mandates that Federal agencies seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species.

No aquatic species listed as endangered, threatened, proposed or candidate species by the USFWS were detected in the stream system.

Vegetation clearing for the temporary bypass road and bridge replacement would remove cover and potential habitat for avifauna and mammals. Noise could also discourage avifauna from foraging or nesting in the area while construction activities are underway; however any adverse effects to these species or their

habitat would be short-term. No candidate, proposed, or listed threatened or endangered species as listed by the USFWS are known from this site and none were found during the survey. No significant adverse impacts to avifauna or mammals are anticipated.

The ecology of these upstream segments is poorly known and the status of a native diadromous aquatic fauna in the upper, perennial waters of the system is largely unknown. During construction, the project will ensure passage of diadromous fauna through Keanuiomano Stream at all times. A BMP plan will be designed and implemented to minimize environmental impacts to water quality and aquatic biota in the vicinity of or downstream of the project site.

In the long-term, no significant impacts from the project are anticipated after the project has been completed.

As previously discussed, in May 1999, the HDOT notified USFWS about the Waiaka Bridge Replacement project. In response, on May 26, 1999, the USFWS replied, *"to the best of our knowledge, no Federal endangered, threatened, or candidate species, significant wetlands or other Federal trust resources occur at the immediate project site, nor any point along Waikoloa Stream below the Waiaka Stream Bridge. Furthermore, there are no native fish species in the Waikoloa Stream system."* Appendix E contains the USWFS letter. Thus, based on the findings of the stream survey and the USFWS letter, the Proposed Action alternatives would not create adverse affects to aquatic species.

No Action Alternative: The No Action alternative would have no impacts on fauna resources in the project area.

3.6 Transportation

3.6.1 Existing Conditions

Kawaihae Road is a two-way, two-lane arterial highway between Kawaihae Harbor and Waimea Town in South Kohala, Hawaii. Kawaihae Road is a curvilinear roadway with unrestricted access along most of the roadway. The posted speed limit on Kawaihae Road is 35 mile per hour (mph), except on the approaches to Waiaka Stream Bridge. The posted speed limits on the approaches to the Waiaka Bridge are reduced to 25 mph.

Kohala Mountain Road is a roadway between Hawi and Kawaihae Road. Kohala Mountain Road is stop-controlled at its junction with Kawaihae Road, which is comprised of three closely spaced intersections, separated by a triangular island.

South Kohala Distribution Road is a two lane, local roadway, which provides access to the HDOT-Hawaii District Waimea baseyard, the County of Hawaii base yard and solid waste transfer station, and the Hawaiian Electric Light

Company Waimea electrical generation plant. South Kohala Distribution Road is stop-controlled at its T-intersection with Kawaihae Road.

In April 2009, the Hawaii District has completed a road resurfacing project (Kawaihae Road Route 19 Resurfacing Waiaka Bridge Towards Waimea, Project No. 19D-01-06M) which began immediately west of the Waiaka Bridge (Sta 779+80) and extended east towards Waimea for about 4,970 feet and ended about at the beginning of the State Highway (Sta 829+50). This project included constructing a left-turn storage lane for westbound vehicles to provide access to the HDOT-Hawaii District Waimea baseyard, the County of Hawaii base yard and solid waste transfer station.

Waiaka Street is a local roadway, which provides access to the residences located within the triangle formed by the Kohala Mountain Road and Kawaihae Road intersection. Waiaka Street is stop controlled at its T-intersection with Kawaihae Road. There is no left-turn storage lane on Kawaihae Road at Waiaka Street.

Ohina Street is a local roadway to the north of Kawaihae Road and opposite the west end of the DHHL property. Ohina Street provides access to the existing Kamuela View Estates and South Kohala View Estates subdivisions. Ohina Street is stop-controlled at its T-intersection with Kawaihae Road. There is no left-turn storage lane on Kawaihae Road at Ohina Street. Within the subdivision Ohina Street forms a T-intersection with Mahua Street which loops westward through the subdivisions and then connects to Kawaihae Road.

3.6.2 Impacts and Mitigation Measures

Proposed Action: Short-term impacts include minor changes to traffic patterns, traffic volume, and travel times during construction. Redirecting traffic from Kawaihae Road to the detour road and temporary bridge may cause minor disruptions in normal traffic patterns. The arrival and departure of construction crews and the periodic movement of construction vehicles and materials for staging may cause short-term increases in traffic volume and the traffic delays. The need to redirect traffic to a detour road and reduced speed limits within the work zone may also cause traffic delays during construction.

Traffic signs and controls would be posted along the detour route, as appropriate, to reduce traffic flow delays and potential hazards from reduced visibility. Signage informing highway users of reduced speed limits and potential traffic delays would be posted on the approach to the work zone.

Alternatives 2, 3, 3A, and 5 include installation of a fully-actuated traffic signal system at the Kawaihae Road-Kohala Mountain Road intersection. The traffic signal system would allow vehicles turning left from southbound Kohala Mountain Road to eastbound Kawaihae Road to execute the movement without the sight

distance limitation that currently exists. Westbound approaching vehicles that would be controlled by the proposed traffic signal system during the traffic signal phase change. Coupled with the realignment of the bridge at a new location, Alternatives 2, 3A and 5 provide improved visibility while Alternative 3 provides a slight visibility improvement with a replacement bridge at the existing bridge location.

Alternative 4 incorporates a modern roundabout at the intersection and would not include a traffic signal. However, one of the advantages of the roundabout is there should be no left-turn conflicts. Southbound vehicles on Kohala Mountain Road should not have conflicts with westbound vehicles on Kawaihae Road as with a typical T-intersection. Similarly, a roundabout would eliminate left-turn conflicts associated with the eastbound Kawaihae Road left-turn movement to northbound Kohala Mountain Road. However, vehicular conflicts could occur at the entry points to the roundabout, with yield-control operations on the roundabout approaches with vehicles impeded by movements circulating within the roundabout. As such Alternative 4 would also result in an improvement to existing sight distance limitations.

The long-term impacts of the proposed action are anticipated to be beneficial, as the replacement bridge would make Waiaka Bridge a structure constructed to current AASHTO and HDOT guidelines. The realignment and intersection improvements will also improve traffic operations for motorists.

The flow of traffic along a roadway is influenced by impediments within the roadway environment as well as traffic demand on the roadway. Not only does the S-curve on a roadway alignment affect traffic flow on the facility, but also introduces safety concerns if not properly designed. Alternative 2 incorporates an S-curve but provides a greater transition between curves to allow the maneuvering of motorists while Alternatives 3 and 3A generally maintains the same roadway alignment of Kawaihae Road with approximately the same length of roadway curvature. Alternative 4 incorporates roadway curvatures in the overall layout but reinforces the intent of the roundabout as a traffic calming device, while Alternative 5 eliminates the S-curve in its entirety and provides a smooth transition through the bridge and adjacent intersection.

Kawaihae Road has a posted speed limit to 35 mph, except for the approaches to Waiaka Bridge. On the east approach, the posted speed limit is reduced to 25 mph for about 530 feet from the bridge. On the west approach, the posted speed limit is reduced to 25 mph approximately 630 feet from the bridge. In addition, both approaches include flashing amber beacons warning drivers of the speed reductions.

Despite these measures, during the March 6, 2002 public information meeting, there were several comments stating the improvements should include measures

to reduce speed at the bridge. No similar comments were made during the January 8, 2008 public information meeting.

Alternatives 2, 3, 3A, and 5 include installation of a fully-actuated traffic signal system, which would stop through traffic on Kawaihae Road and allow left-turns from southbound Kohala Mountain Road to proceed on eastbound Kawaihae Road. Alternatives 2, 3, 3A and 5 would also include a left-turn storage lane for vehicles turning to northbound Kohala Mountain Road. The left-turn storage lane would allow continuous flow for eastbound vehicles on Kawaihae Road. This could result in increased speed for the eastbound vehicles that would have to stop for left-turn movements as under existing conditions. The left-turn lanes should be properly designed to accommodate the 95th percentile queue to minimize queuing effects that would impede through traffic flow on the roadway.

No long-term significant impacts from the project are anticipated after the project has been completed.

No Action Alternative: The No Action alternative would have no impacts on traffic in the project area and Waiaka Bridge would remain structurally deficient.

3.7 Air Quality

3.7.1 Existing Conditions

The State of Hawaii operates a network of air quality monitoring stations around the State. There are six quality monitoring stations on the island of Hawaii. The State Department of Health's (DOH) nearest air quality monitoring station is in Hilo near the Hilo Medical Center. This station was established to monitor vog during "Kona", or southerly wind conditions. This station samples $PM_{2.5}$ and SO_2.

According to the *State of Hawaii Annual Summary 2009 Air Quality Data* (September 2010), in March 2008, a second vent opened at the Kilauea volcano causing SO2 emissions to double. As a result, Special Purpose monitoring stations (i.e. Hilo) recorded higher levels of SO2 and PM2.5, with occasional exceedances of the National Ambient Air Quality Standards (NAAQS) for those pollutants.

The US Environmental Protection Agency (EPA) considers volcanic activity a natural, uncontrollable event and therefore the State is requesting exclusion of these NAAQS exceedances from attainment/non-attainment determination. Emissions related to volcanic activity will affect the Waimea area depending on wind conditions.

Regional air quality on Hawaii Island and in the State is generally characterized as relatively clean and low in pollution. The pollutant levels remain well below both State and Federal ambient air quality standards for all pollutants monitored.

The State DOH's 5-year trends of air quality data for PM_{10}, $PM_{2.5}$, SO_2, NO_2, O_3, and CO from 2005 to 2009 indicate levels are well below State and Federal ambient air quality standards at all State and Local Air Monitoring Stations (SLAMS) stations.

Except for emissions related to volcanic activity, air quality in the project area is currently mostly affected by emissions from mobile sources and natural resources. The primary mobile sources of emission are all types of vehicles which generate pollutants, primarily NO_x and CO, when traveling or idling.

3.7.2 Impacts and Mitigation Measures

Proposed Action: Short-term construction related impacts are anticipated with the proposed action. Construction activity will be the primary source of air quality impacts including vehicular traffic; fugitive dust emissions from clearing and grading. These impacts are short-term and will cease upon completion of the proposed improvements.

Emissions from construction equipment, trucks, commuting construction workers are not anticipated to significantly affect ambient air quality. Slow moving construction vehicles, however, can disrupt peak-hour traffic, increasing congestion and resulting in vehicular emissions. Traffic congestion and resulting emissions will be mitigated by transportation slower construction equipment during off-peak traffic hours.

During the construction phase, the air quality from construction equipment will create additional air quality degradation from construction equipment emissions and from fugitive dust.

During construction, activities such as clearing, grubbing and grading at the project site will generate dust while vehicles and equipment will produce exhaust emissions. Dust control measures stipulated by the Department of Health Administrative Rules, Title 11, Chapter 60, "Air Pollution Control" regulation will be employed, as appropriate, during construction and may include:

- Planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potentially dusty equipment in areas of least impact;
- Providing an adequate water source at the site prior to start of construction activities;
- Landscaping and rapid covering of bare areas;
- Provide adequate dust control measure during weekends, after hours, and prior to daily start of construction activities; and
- Controlling of dust from debris being hauled away from the project site.

Construction activities must comply with provisions of Hawaii Administrative Rules, Section 11-6-1.33 “Fugitive Dust” and the contractor shall prepare a dust control management plan which identified and addresses the activities having potential to generate fugitive dust.

Once construction has been completed, air quality in the area will be affected by vehicles traveling along the project limits.

In the long-term, operation of the project will have no significant impacts on ambient air quality in the project vicinity.

No Action Alternative: The No Action alternative would have no impacts on air quality in the project area.

3.8 Noise

3.8.1 Existing Conditions

Y. Ebisu & Associates prepared a noise impact study to evaluate potential noise impacts associated with the proposed project. The report is included in Appendix G and summarized below. In June 2010, existing traffic and background ambient noise levels were measured at three (3) locations in the project area (see Figure 3-5). The traffic noise measurements were used to calibrate the traffic noise model which was used to calculate Base Year (CY 2007) and future (CY 2027) traffic noise levels under the various Build Alternatives. The background ambient noise measurements were used to define existing noise levels at the closest noise sensitive receptors within the project’s limits of construction which may be affected by the project. Also, the measurements were used in conjunction with forecast traffic noise levels to determine if future traffic noise levels are predicted to “substantially exceed” existing background ambient noise levels at these noise sensitive receptors, and therefore exceed FHWA and HDOT noise abatement criteria. The results of the traffic noise measurements are summarized in Table 3-1 Traffic and Background Noise Measurement Results.

Table 3-2 Existing Traffic Volumes and Noise Levels summarizes the base year traffic noise levels during the am and pm peak traffic hours at receptor locations of 50, 100, and 150 feet from the centerlines of three existing roadways in the project area.

Source: Y. Ebisu & Associates, December 2010

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KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

FIGURE 3-5

Noise Measurement Locations

TABLE 3-1 TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS								
Location		Time of Day (Hours)	Avg. Speed (MPH)	Hourly Traffic Volume			Measured Leq (dB)	Predicted Leq (db)
				Auto	M. Truck	H. Truck		
A	33 ft. from centerline of Kawaihae Road	648 - 748	55	553	11	23	69.8	69.7
B	36 ft. from centerline of Mamalahoa Highway	752 - 852	45	730		26	68.8	68.8
C	33 ft. from centerline of Kohala Mountain Road.	906 - 1006	50	186	17	5	62.0	61.9
C	33 ft. from centerline of Kohala Mountain Road.	1232 -1332	44		8		63.2	62.0
B	36 ft. from centerline of Mamalahoa Highway	1337-1437	45	583		7	68.5	68.5
A	33 ft. from centerline of Kawaihae Road	1453-1553	47		10		69.0	69.3

TABLE 3-2 EXISTING (2007) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAY SECTIONS (AM AND PM PEAK HOUR)								
Roadway Section	Speed (MPH)	Total (VPH)	Traffic Volume (VPH)			50' Leq	100' Leq	150' Leq
			Auto	M. Truck	H. Truck			
AM Peak Hour								
Kohala Mountain Road	40	286	268	11	7	60.9	56.4	53.0
Kawaihae Road	55	695	655	13	27	68.8	64.1	60.6
Mamalahoa Highway	45	921	870	20	31	67.5	62.9	59.4
PM Peak Hour								
Kohala Mountain Road	44	434	414	17	3	63.3	58.6	55.0
Kawaihae Road	47	894	868	15	11	67.1	62.4	58.8
Mamalahoa Highway	45	1,192	1,169	19	4	67.4	62.7	59.0

Notes:
All distances shown are from the center of roadways.
Calculated Leq's are for unobstructed line-of-sight conditions

Table 3-3 Year 2007 and 2027 Distances to 66 and 71 presents the setback distances from the centerlines of the three existing roadways in the project area to the 66 and 71 Leq during the am and pm peak hours. Base year traffic noise levels currently exceed the "66 Leq" noise abatement criteria at 34 feet from the centerline of Kohala Mountain Road, at 76 feet from the centerline of Kawaihae Road, and at 63 feet from the centerline of Mamalahoa Highway. The 66 Leq criteria for noise sensitive uses were exceeded during the base year at existing residences along Kohala Mountain Road and Kawaihae Road. The Kamuela Museum is presently shielded by an existing wall along Kawaihae Road.

TABLE 3-3
YEAR 2007 AND 2027 DISTANCES TO 66 AND 71

Roadway Section	66 Leq Setback (Ft)		71 Leq Setback (Ft)	
	Existing	CY 2027	Existing	CY 2027
AM Peak Hour				
Kohala Mountain Road	23	45	11	21
Kawaihae Road	76	114	36	56
Mamalahoa Highway	63	100	30	47
PM Peak Hour				
Kohala Mountain Road	34	38	16	18
Kawaihae Road	59	79	28	38
Mamalahoa Highway	61	80	29	38

At locations along two (Kohala Mountain Road and Kawaihae Road) of the three approaches to Waiaka Stream Bridge, existing traffic and background ambient noise levels in the project area currently exceed the FHWA and HHDOT, Highways Division noise abatement criteria.

3.8.2 Impacts and Mitigation Measures

Predictions of future traffic noise levels along the three roadways approaching Waiaka Stream Bridge are summarized in Table 3-4. This table includes calculated traffic noise levels at 50, 100, and 150 feet from the centerlines of the three roadway approaches.

Table 3-3 summarizes calculated setback distances of the 66 and 71 Leq(h) traffic noise contours from the three roadway centerlines for 2027. The results show a right-of-way width of 90 to 228 feet would be required to insure that noise sensitive properties would not be exposed to future traffic noise levels greater than 66 Leq(h). Because the proposed right-of-way widths range from 50 to 70 feet, the 66 Leq(h) traffic noise contour can extend beyond the rights-of-way of

Source: Y. Ebisu & Associates, December 2010

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KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

FIGURE
3-6

Locations of Noise Sensitive Receptors

TABLE 3-4
FUTURE (2027) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAY SECTIONS
(AM AND PM PEAK HOUR)

Roadway Section	Speed (MPH)	Total (VPH)	Traffic Volume (VPH)			50' Leq	100' Leq	150' Leq
			Auto	M. Truck	H. Truck			
AM Peak Hour								
Kohala Mountain Road	40	765	715	31	19	65.3	60.7	57.3
Kawaihae Road	55	1,385	1,305	26	54	71.8	67.1	63.6
Mamalahoa Highway	45	1,910	1,803	42	65	70.6	66.0	62.6
PM Peak Hour								
Kohala Mountain Road	44	545	521	21	3	64.2	59.5	55.9
Kawaihae Road	47	1,415	1,375	24	17	69.1	64.4	60.8
Mamalahoa Highway	45	1,810	1,776	29	5	69.2	64.5	60.8

Notes:
All distances shown are from the center of roadways.
Calculated Leq's are for unobstructed line-of-sight conditions

all three approaches to Waiaka Stream Bridge. The same conclusion applies to the 71 Leq(h) contours along Kawaihae Road and Mamalahoa Highway, which are expected to extend 56 to 47 feet from the centerlines of those two roadways, respectively under unobstructed line-of-sight conditions.

Existing noise sensitive receptor locations closest to the three roadway approaches to Waiaka Stream Bridge are identified in Figure 3-6. The predicted increases in traffic noise levels at the receptor locations range from 1.0 to 4.9 dB (see Appendix G). Table 3-5 depicts the increases in future traffic noise levels associated only with the forecasted increases in traffic volumes by CY 2027, and do not include the effects of the changes in roadway alignments.

TABLE 3-5
CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (2027)
(AM AND PM PEAK HOUR)

Roadway Section	Noise Level Increase Due to:	
	Non-Project Traffic	Project Traffic
AM Peak Hour		
Kohala Mountain Road	4.40	0.0
Kawaihae Road	3.0	0.0
Mamalahoa Highway	3.10	0.0
PM Peak Hour		
Kohala Mountain Road	0.90	0.0
Kawaihae Road	2.00	0.0
Mamalahoa Highway	1.80	0.0

The following general conclusions can be made in respect to the potential noise impacts which can be expected by 2027 under the No Build and Build Alternatives without noise mitigation measures:

By CY 2027, traffic noise levels along Kohala Mountain Road are expected to increase by 4.4 dB during the am peak hour, and exceed 66 Leq(h) along the rights-of-way. Future traffic noise levels will exceed 66 Leq(h) at an existing noise sensitive residence along the west right-of-way at TMK: 6-6-009: 007, so traffic noise mitigation measures will need to be evaluated at this residence.

By CY 2027, traffic noise levels along Kawaihae Road are expected to increase by 3.0 dB during the am peak hour, and exceed 66 Leq(h) along the rights-of-way. Future traffic noise levels will exceed 66 Leq(h) at an existing noise sensitive residence located along the north right-of-way at TMK 6-6-009:008 and

along the south right-of-way at TMK 6-6-004: 121, so traffic noise mitigation measures will need to be evaluated at these residences.

The existing and future traffic noise levels at the Kamuela Museum should be below the 66 Leq(h) noise abatement threshold due to the presences of an existing wall along the boundary line south of Kawaihae Road. Under Alternative 5, most of the existing wall will need to be demolished to accommodate the realigned roadways, and it was assumed that the existing wall will be reconstructed along the right-of-way, and be similar to the existing wall in respect to construction materials, height, and length.

Within the various limits of project construction, exceedances of the "66 Leq" noise abatement criteria are expected to occur at two existing residences for the No Build as well as the Build Alternatives. These two existing residences are located on TMK 6-6-009: 007 and 008 (see Figure 3-6). Existing and future traffic noise levels at a two story residence located south of Kawaihae Road on TMK 6-6-007: 121 also exceed the "66 Leq" noise abatement criteria primarily because the existing wooden slat fence is too porous to provide adequate sound attenuation and because of the high elevation of the second floor windows. The residence is within the limits of Alternative 5.

No office, commercial or industrial structures within the limits of the project should experience future traffic noise levels which exceed the HHDOT noise abatement criteria of 71 Leq(h).

No existing park lands or public use structures within the limits of the project should experience traffic noise levels which exceed 66 Leq(h) or which exceed existing background ambient noise levels by 15 dB.

Future (CY 2027) traffic noise levels will also exceed the "66 Leq" HHDOT noise abatement criteria along the same two approaches (Kohala Mountain Road and Kawaihae Road) to Waiaka Stream Bridge. The HHDOT's "15 dB increase" criteria will probably not be exceeded at future developments along the three approaches to Waiaka Stream Bridge.

Future traffic noise levels are predicted to exceed the HHDOT 66 Leq(h) noise abatement criteria by CY 2027 under all of the No Build and Build Alternatives at total of three existing noise sensitive structures along Kohala Mountain Road and Kawaihae Road. Appendix G includes predicted performances of sound attenuation walls located in front of the three affected structures for the five Build Alternatives. The locations of the sound attenuation walls are shown in Figures 3-7 though 3-11. Sound attenuating walls were located along the rights-of-way fronting the three residential lots where future traffic noise levels are expected to exceed the HHDOT 66 Leq(h) noise abatement criteria, and the heights of the

walls were adjusted upward until the 5 dB minimum attenuation criteria was met at the various affected receivers.

Parcel 007: Two feet additions to the existing wall height will be required to provide 5 dB of sound attenuation at the residence located on the west side of the Kohala Mountain Road. The walls fronting parcel 007 for Alternatives 3 and 5 are not included in Figures 3-8 and 3-11 because they are beyond the limits of project construction for these two alternatives.

Parcel 008: A wall height of 8 to 10 feet will be required to provide 5 dB of sound attenuation at the residence located on the north side of Kawaihae Road (see Figures 3-7 to 3-11).

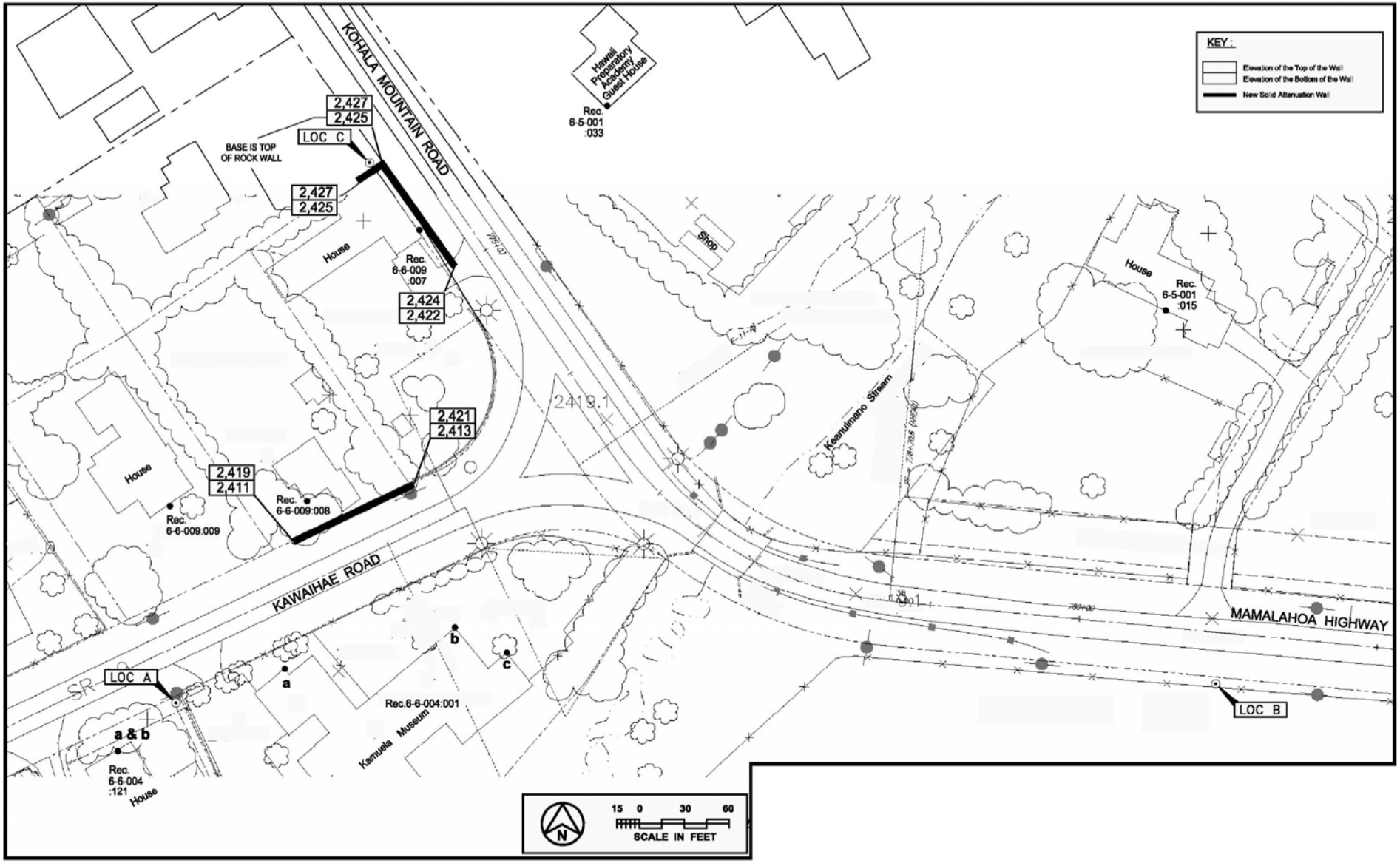
Parcel 121: A wall height of 7 to 8 feet will be required to provide 5 dB of sound attenuation at the ground floor window of Parcel 121a closest to Kawaihae Road (see Figure 3-11). For the second floor window, a wall height of 10 to 11 feet will be required to provide 5 dB of sound attenuation.

The predicted future noise levels for the required wall heights shown in Figures 3-7 to 3-11 are included in Appendix G. Because the HHDOT "5 dBA noise reduction" criteria will not be met in all cases within 6 foot wall heights, the construction of 8 to 11 foot high walls will be required at TMK 6-6-009: 008 and 6-6-004: 121. A variance from county building codes may be required to construct 8 to 11 foot high walls which are required to achieve at least 5 dB of noise reduction. Use of landscaping on the roadway side of the wall is also recommended to soften the visual impacts of the walls and to minimize graffiti.

By the existing HHDOT policy, if the cost of the sound attenuating wall does not exceed $35,000.00 per benefited residence, construction of wall can be considered to be "reasonable and feasible." The sound attenuating walls shown in Figures 3-7 t0 3-11 fronting the residences have an associated cost and the associated number of residences for each of the walls is unity. The estimate wall costs did not exceed the maximum $35,000.000 per benefited residence for all of the walls examined, and all the sound attenuating walls examined have a possibility of being considered as reasonable and feasible under the current HDOT traffic noise abatement policy.

It is anticipated that potential noise impacts at any new noise sensitive or commercial establishments located in the project area may be mitigated through the inclusion of sound walls or other noise mitigation measures within the individual lot development plans.

Short-term noise impacts associated with construction activities along the proposed Waiaka Stream Bridge and approaches will occur. These impacts will



Source: Y. Ebisu & Associates, December 2010

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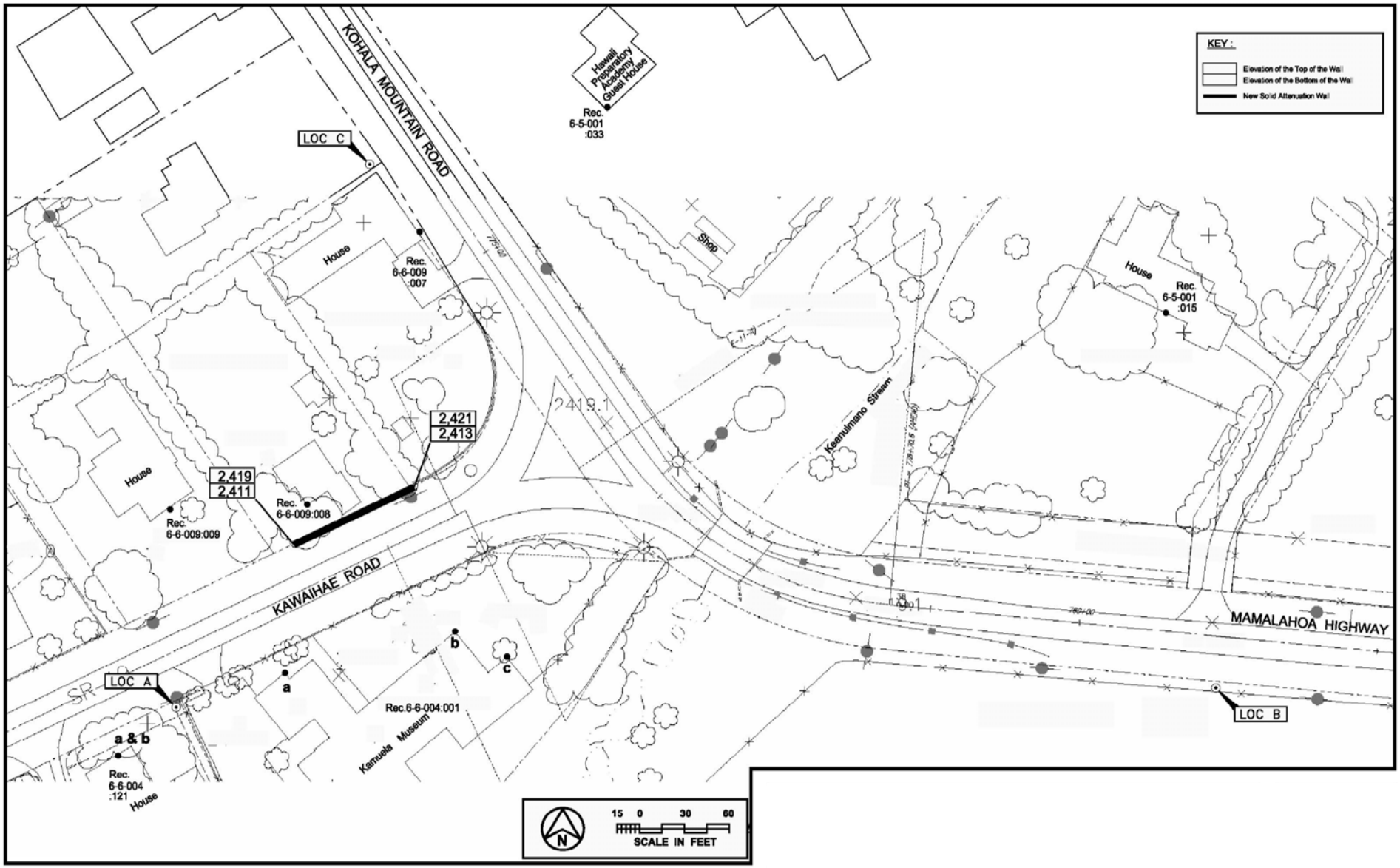
KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

FIGURE
3-7

Locations of Sound Attenuation Walls for Alternative 2



Source: Y. Ebisu & Associates, December 2010

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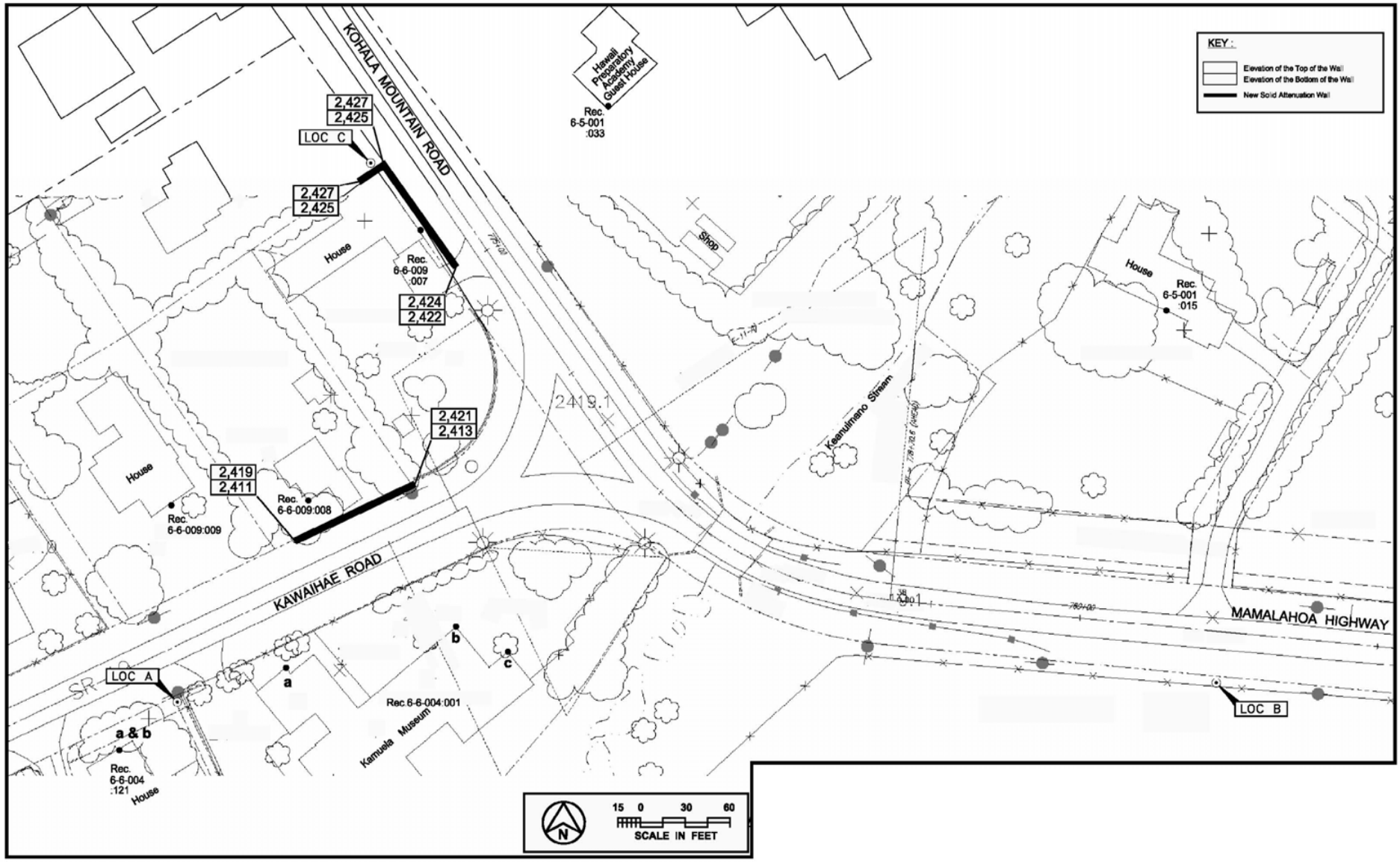
KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

FIGURE
3-8

Locations of Sound Attenuation Walls for Alternative 3



Source: Y. Ebisu & Associates, December 2010

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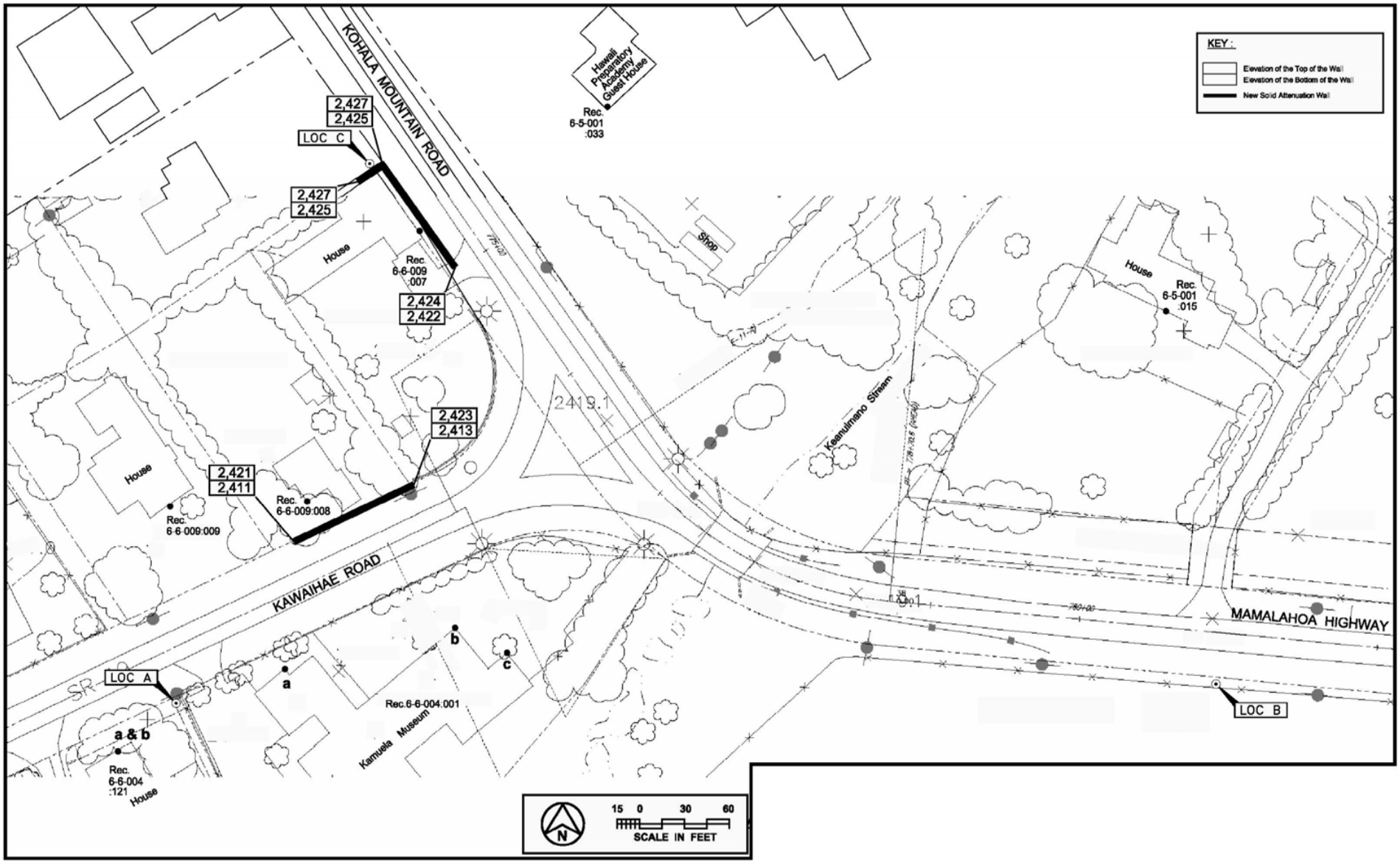
KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

FIGURE
3-9

Locations of Sound Attenuation Walls for Alternative 3A



Source: Y. Ebisu & Associates, December 2010

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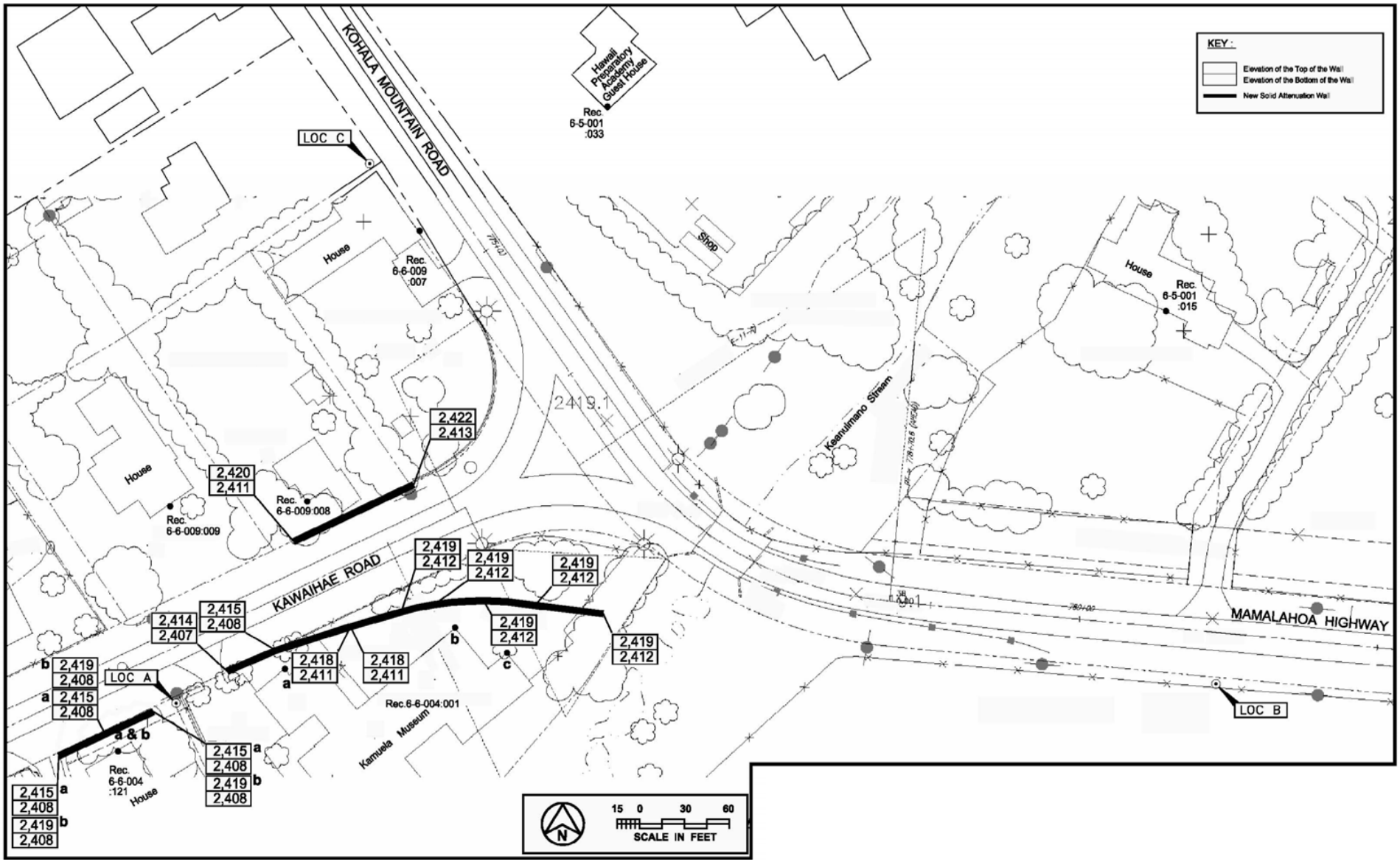
KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

FIGURE
3-10

Locations of Sound Attenuation Walls for Alternative 4



Source: Y. Ebisu & Associates, December 2010

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KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

FIGURE
3-11

Locations of Sound Attenuation Walls for Alternative 5

occur as a result of the low background ambient noise levels along the project corridor and the relatively high noise levels of heavy construction equipment.

Noise levels of diesel powered construction equipment typically range from 80 to 90 dB at 50 foot distance. Because the closest noise sensitive receptors are approximately 10 to 210 feet from the proposed approach roads, anticipated construction noise levels are expected to range from 65 to 100 dBA. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work.

Construction noise impacts will be mitigated by compliance with provisions of the State DOH Administrative Rules, Title 11, Chapter 46, "Community Noise Control". State DOH rules limits construction activities to the hours between 7:00 am and 6:00 pm on weekdays, except holidays, and 9:00 am to 6:00 pm on Saturday. Heavy vehicles required for construction must comply with Title 11, Chapter 42 and "Vehicular Noise Control for Oahu". It shall be the contractor's responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment, and to maintain noise levels within regulated limits. If noise levels from construction activities are expected to exceed the allowable limits set forth in Chapter 46, a noise permit may be required.

3.9 Archaeological Resources

3.9.1 Existing Conditions

In May 1999, the HDOT notified the State of Hawaii Department of Land and Natural Resources (DLNR) State Historic Preservation Division about the Waiaka Bridge Replacement project. In response, on June 24, 1999, the DLNR (REF: HP·LM, LOG NO: 23582, DOC NO: 9906tmIO, Architecture) replied (refer to Appendix H):

> *While it is difficult to ascertain what sites may be affected without knowing the proposed realignment, our inventory of historic sites does indicate that there is the Edwin Lindsey House nearby with a landscaped garden and family cemetery located at TMK: 6-6-04:61. Hale Kea is also located next to the Lindsey House and possibly some historic residences. The other TMKs do not indicate any known sites in our inventory…… .*

Analysis shows TMK: 6-6-004:061 was a relatively large parcel north of Kawaihae Road which was included in the Lalamilo Subdivision approved by the County of Hawaii on February 24, 1977. The subdivision created a total of 39 lots each about 10,000 square feet and two internal roadways, Waiaka Street and Waiaka Place, within the subdivision. The subdivision map also shows the Lalamilo Subdivision was part of Grant 6001 to Kaluna Lindsey. The area of the

Lalamilo Subdivision is now included in the area shown as TMK: 6-6-009 which includes lands north of Kawaihae Road and west of Kohala Mountain Road.

The review process for subdivisions used in 1977 by the County of Hawaii is not known. The review process for grading and building permits used by the County of Hawaii in the late 1970s-early 1980s is also not known. However, prior to subdivision approval, the area of TMK: 6-6-009 would, most likely, have gone through a zoning process which might have included a review of the historic properties in the area.

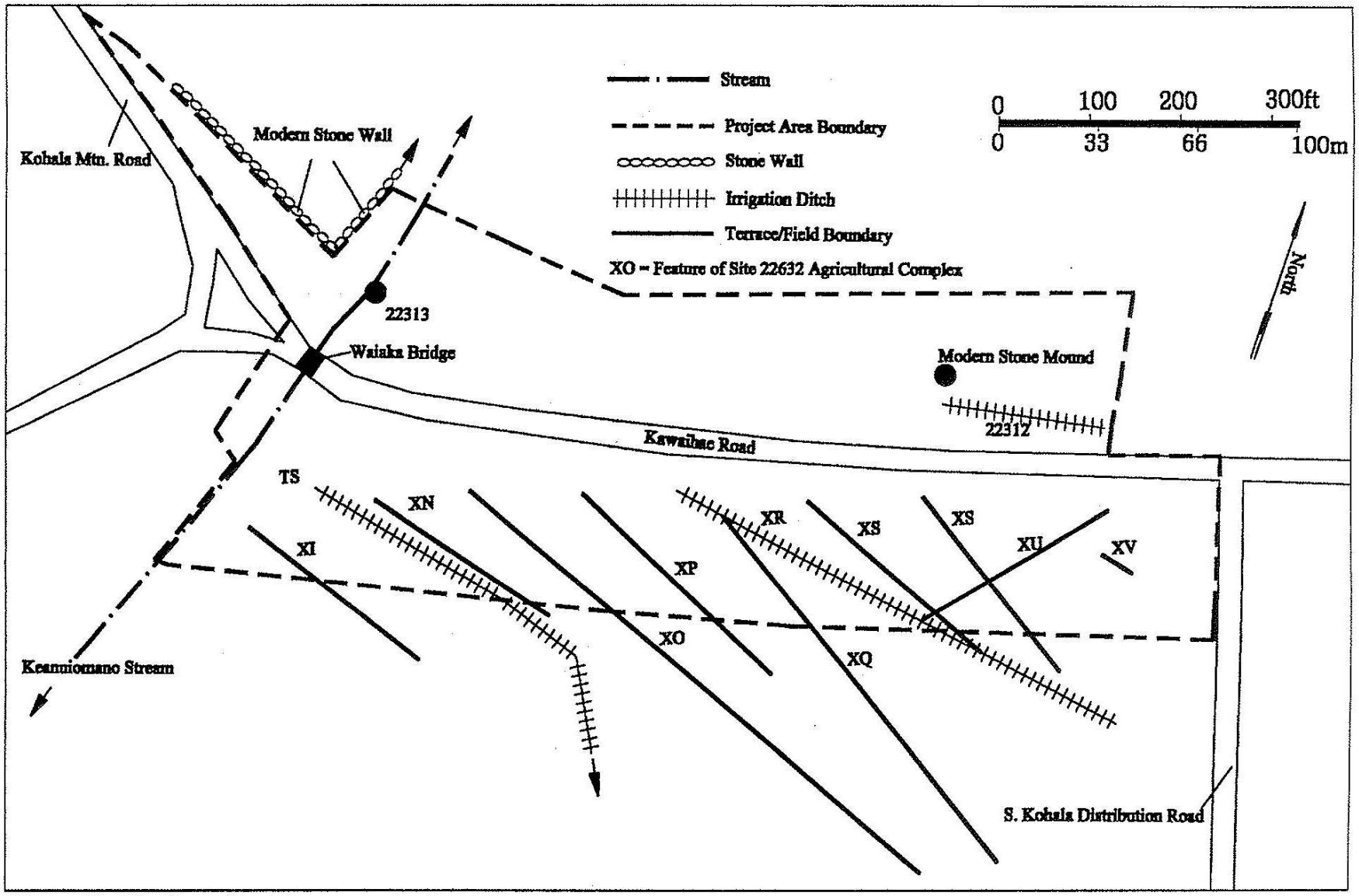
In any case, although information may not be available regarding the area included in TMK: 6-6-009, realignment on the west approach does not include lands on the north side of Kawaihae Road.

In response to the June 24, 1999 DLNR letter, an Archaeological Inventory Survey was also undertaken in the area of the project site by Haun & Associates. The survey is summarized below and included in Appendix I. The survey covered an area of about 150 feet wide by 925 feet long north of Kawaihae Road and about 200 feet wide by 1,100 feet long south of Kawaihae Road, including from Keanuiomano Stream to South Kohala Distribution Road, the access road to the County transfer station.

The survey identified three sites with a total 13 features (see Figure 3-12). Site 22632 is a large agricultural complex consisting of 700 agricultural features located south of Kawaihae Road within the lands owned by the State of Hawaii Department of Hawaiian Home Lands (DHHL). The portion of Site 22632 within near Waiaka Bridge contains 11 features between Keanuiomano Stream and South Kohala Distribution Road consisting of a series of terrace/filed boundaries and irrigation ditches which are part of the large agricultural complex. The archaeological survey mapping shows theses irrigation ditches are oriented at an angle of about between 120 to 130 degrees to Kawaihae Road and lie about 60 to 90 feet south of the Road in the areas near Waiaka Bridge (see Figure 3-12).

The other 2 features are located north of Kawaihae Road consist of an irrigation ditch (Site 23312) located about 700 feet east of Waiaka Bridge within the lands currently owned by Hawaii Preparatory Academy and a concrete foundation (Site 23313) located within Keanuiomano Stream.

According to Inventory Survey, all three sites were assessed as significant under Criterion “D”. The sites have yielded information important for understanding late prehistoric to historic land use in the area. Site 22632 was additionally assessed as significant under Criterion “C” as a well-preserved example of an agricultural field complex. The field complex was also assessed as significant under



Source: Haun & Associates, June 2002

NOT TO SCALE

KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

FIGURE
3-12

Archaeological Resources Map

Criterion "a" as it is associated with the broad pattern of traditional and early historic agricultural intensification in Hawaii.

According to Inventory Survey, the mapping, written descriptions, and photographs at Site 23313 adequately document the site and no further work or preservation is recommended. The remaining sites (23312 and 22632) retain the potential to yield information important for understanding prehistoric and historic land uses. The Inventory Survey recommended data recovery, if the sites are to be impacted by the realignment of Kawaihae Road in the area of the bridge.

3.9.1.1 1987 Historic Bridge Inventory and Evaluation Study

In 1987, the HDOT, in cooperation of the FHWA, prepared the Historic Bridge Inventory and Evaluation, Island of Hawaii. This 1987 study included 117 bridges that were categorized into 7 categories. The evaluation was based on three parts:

1. Part I Integrity (5 criteria);
2. Part II Historicity (7 criteria), and
3. Part III Technology (6 criteria).

Based on the evaluations, the bridges were identified as to:

- Category I, bridges with the most claim to historical significance;
- Category II bridges that have considerable historical significance, but not enough at this time to warrant being placed in Category I; and
- Category III bridges with little historical importance.

The 1987 study for the Island of Hawaii showed a total of 8 bridges listed in Category I and a total of 14 bridges in Category II. Waiaka Bridge was not listed in either Category I or Category II.

The Category III bridges (bridges with little historical importance) were listed by type of construction and then in order of significance. Waiaka Bridge is listed as a Category III bridge and as No. 11 out of 18 concrete slab bridges.

At the time of the 1987 study, since it was constructed in 1932, Waiaka Bridge would have been 55 years old. As previously discussed, Waiaka Bridge is not listed on the National or Hawaii Register of Historic Places.

3.9.1.2 1996 Historic Bridge Inventory Study

In 1996, as a follow up to a previous 1987 study, HDOT in conjunction with the State Historic Preservation Division, HDOT district offices, and the counties, conducted an evaluation of all of the bridges in the state. The results of the 1996 study were published by the HDOT as the Historic Bridge Inventory. The 1996

study categorized the state's bridges into three categories, Category I, Category II, and Category III.

- Category I bridges were determined eligible for the National Register of Historic Places.
- Category II bridges were determined to be potentially eligible for the National Register.
- Category III bridges were determined not eligible for the National Register.

A total of 18 criteria were used in the 1996 rating system. Of those, seven were integrity criteria: (location; design; setting; materials; workmanship; feeling; and association); nine were other National Register criteria: (events; persons; type; period; method of construction; work of a master; high artistic design; distinguishable entity; and information content); and two were HAER criteria; (early engineering structure and representative sample). Table 3-6 shows the 18 criteria from the 1996 study.

The 1996 Study shows a total of 17 bridges in the Historic Bridge Inventory for Hawaii. In addition, 44 bridges and 13 culverts are identified in the approximately 60-mile long Mamalahoa Highway Historic Bridge District, which covers the area from north of the Wailuku River to east of Waimea near the 52 mile marker.

Waiaka Bridge is not listed in any category in the 1996 Historic Bridge Inventory.

TABLE 3-6
SUMMARY OF DETAIL BRIDGE RATING CRITERIA 1996 STUDY

Integrity Criteria	National Register Criteria	HAER Criteria
Location	Events	Early engineering structure
Design	Persons	Representative sample
Setting	Type	
Materials	Period	
Workmanship	Construction	
Feeling	Work of master	
Association	Artistic design	
	Distinguishable entity	
	Information content;	

3.9.1.3 2008 Historic Bridge Inventory and Evaluation Study

In 2008, HDOT in conjunction with the State Historic Preservation Division, HDOT district offices, and the counties, conducted an evaluation of all of the bridges in the state. The results of the 2008 study were published by the HDOT as the Historic Bridge Inventory. The study involved the initial analysis of 569 potentially historic bridges constructed between 1894 and 1959 on the islands of

Oahu, Hawaii, Maui, Molokai and Kauai. Seventeen bridges on the island of Hawaii were nominated to the National Register of Historic Places as part of the Multiple Property Nomination Form for "Historic Highway Bridges of Hawaii, 1894 – 1941." In addition to the individual nominations, another 146 bridges were nominiated as contributiong resources in three historic bridge districts: the Hana Highway Historic District, the Old Mamalahoa Highway Historic Bridge District (57 bridges), and the Trans-Koolau Historic Bridge District.

Waiaka Bridge is not listed in the 2008 Historic Bridge Inventory.

3.9.2 Impacts and Mitigation Measures

Proposed Action: Based on preliminary analysis, the project limits are expected to be about 550 to 765 feet long along Kawaihae Road and 250 feet along Kohala Mountain Road. For Alternative 2, the project limit will extend 80 feet beyond the right-of-way north of the existing bridge. For Alternative 5, the project limit will extend 60 feet beyond the right-of-way south of the existing bridge, into TMK: 6-6-004:001. East of the existing bridge, the project limits do not extend into the area of Site 22312. The analysis indicates no adverse impacts to archaeological resources are anticipated with implementation of the Proposed Action alternatives.

If archaeological resources are discovered during the course of construction, work will cease in the immediate area and the SHPD would be contacted. If Native Hawaiian remains are encountered the Hawaii Island Burial Council will also be consulted.

Waiaka Bridge was constructed in 1932 and is not listed in the 1987 Historic Bridge Inventory and Evaluation or 1996 Historic Bridge Inventory prepared by HDOT. Removal of the existing bridge for the Proposed Action alternatives would not create an adverse impact to historic resources.

No Action Alternative: The No Action alternative would have no impacts on archaeological and cultural resources in the project area.

3.10 Cultural Resources

3.10.1 Historic Accounts

The Archaeological Inventory Survey, prepared by Haun & Associates (Appendix I) included research on historical accounts in the project area and is summarized below.

Early historic accounts refer to Lalamilo as an 'ili of Waimea. Later Lalamilo is referenced as an *ahupa'a*, which shared fishing rights with Puako. Traditional and legendary references to Waimea mention its strong gusty winds and chilly rain. Waimea was associated with royalty and chiefly lineages because of its

highly valued agricultural lands. Waimea was also a renowned training ground for young chiefly warriors from ancient times. Legendary accounts refer to over a dozen battles either fought in Waimea or fought by Waimea warriors. The rich agricultural lands of the area were intensively exploited to support armies.

At least three *heiau* are mentioned for the Waimea area. The High Chiefess Ho'opiliahae built and dedicated a Haleino Heiau approximately two miles from Waimea in the forest on the Lanikepu hills in the Ahupua'a of Ouli. Makuakuamana, who came with Paao from Tahiti, built a *heia*u on the land of Waiaka. Sometime between 1797 and 1811, while Kamehameha was living with the chiefs in Waimea, he restored the *heiau* of Uli in Waimea that was initially dedicated by Hakau.

Descriptions from early visitors, Mahele records, and native testimony indicate the native forest once extended much lower into the upland plains that it does today. There are many references to the Waimea region as being intensively cultivated and densely inhabited. Named crops included *wauke* and *mamaki* for making *kapa*, plantains, bananas, sugar cane, coconuts, hala trees, taro, and sweet potatoes. An extensive irrigation system was in use from at least late prehistory until the early 1900s. The cattle brought by Vancouver in 1790s thrived in the area and by the 1810s became a serious problem for farmers. Kamehameha I hired bullock catchers to hunt the cattle. Hides and salted beef became one of the commodities produced in Waimea that supplied ships at the developing port at Kawaihae.

Between the 1810s and earl 1840s, the port was the central depository for the sandalwood harvested from the surrounding district, including Waimea. A missionary station was established in Waimea in 1823 by Rev. Thurston who estimated the population to be somewhere between eleven and twelve hundred. The first sugar mill at Waimea is thought to have been established in Lihue in Lalamilo in the late 1820s. The mill at Lihue was known to operate until at least the mid-1840s. Waimea farmers increased production of sweet potatoes and Irish potatoes in response to the California Gold Rush in the late 1840s. Other vegetables, along sugar, molasses and coffee were also exported. Historically introduced crops included watermelons, cabbages, onions, tomatoes, mulberries, figs and beans.

During the Mähele, nineteen parcels in Lalamilo, Waiaka, and Puako were awarded to seventeen claimants. House lots and cultivation are described for the inland parcels. Sixteen claims included house lots with at least 31 houses. Most of the house lots were enclosed. Evidence of agriculture in the testimony includes references to farms, patches, and fields.

By 1850, the native population was severely reduced due to introduced diseases, displacement, and changes in land tenure. The forests of Waimea were largely

replaced by pasturelands owing to years of deforestation resulting from the sandalwood trade, cattle, sheep, agricultural clearing, and other factors. During the 1840s and 1850s, much of the land was converted to government pastureage. John Parker's cattle operation began in the 1830s. The Parker Ranch began acquiring large tracts of land in the 1850's and by the early 1900s controlled over 100,000 acres of pasture land. By 1867, the population of Waimea was estimated to be only four hundred.

During the Waimea Water Rights Case (1914) native and foreign informants provided testimony on the 'auwai system and agricultural practices in the Lalamilo / Waikoloa area. An important point to be made clear by testimonies was that the water was used for domestic household and not for large-scale irrigation.

Pertaining to the project area, a mauka ditch names "Amiikea" fed from the Kohakohau Stream, through LCA 3828 (south of Waiaka Bridge and Kawaihae Road), and flowed down to the Waikoloa Stream. The Amiikea 'auwai provided water to other LCAs further south.

During World War II, the U.S. military took over much of Waimea town and large areas of ranch lands for billeting and training exercises. The military presence was a boon to the remaining Waimea farmers because there was an immediate demand for vegetables. Lettuce, asparagus, celery, and broccoli were added to the cultigen inventory. The demand led to a shift from tenant to commercial farming. After the war, the military released control of the ranch lands back to Parker Ranch. Lalamilo, including the project area, was leased by Parker Ranch for pasturing cattle. The project area leases were subsequently passed to others, who continue to use the area for pasture today.

3.10.2 Existing Conditions

Department of Hawaiian Home Lands prepared a *Final Environmental Impact Statement for Lalamilo Project* (November 2002), located immediately south of Waiaka Bridge and Kawaihae Road. Haun & Associates prepared the *Cultural Impact Assessment for DHHL Residential Development at Lalamilo* (February 2002). The Cultural Impact Assessment (CIA) consisted of background review and research of existing ethnograhphic, historical, and anthropological literature relating to traditional cultural practices; consultation with knowledgeable individuals and organizations about cultural resources, practices, and beliefs found in the project area; and ethnographic / oral history interviews. Below is a summary of the community consultation taken from the Lalamilo project's CIA.

Haun & Associates contacted more than 50 individuals during the CIA process. The study did not identify any cultural practices occurring within the study area at that time. The project area was used by the military in the past, as a result the area was not ideal for gathering plants for medicinal purposes. Past cultural

practices related to traditional Hawaiian methods of agriculture were identified, as discussed earlier in this section.

There were many changes that impacted the traditional lifestyle of the Hawaiians in the early half of the 19th century. Introduced cattle were allowed to overpopulate the land. Undomesticated and left to roam at will, the cattle destroyed and ate crops, knocked down fences and disrupted traditional agricultural practices. The traditional lifestyle was further disrupted by the sandalwood trade. The lack of cultural practices are attributed to these activities.

The CIA did not identify any present-day cultural practices nor did it identify anyone who currently uses the Lalamilo project site for cultural practices of any kind. A Hawaii Preparatory Academy representative stated "there has been ongoing use of the subject property by a wide range of individuals in the community for purposes including but not limited to hunting, hiking, picnicking along the stream, visiting archaeological and historical sites, other cultural uses, gathering, exercise, dog training, and the like". Other recreational activities may occur along the roadway, such as biking, hiking, and horseback riding.

3.10.3 Impacts and Mitigation Measures

Proposed Action: Based on preliminary analysis, the project limits are expected to be about 550 to 765 feet long along Kawaihae Road and 250 feet along Kohala Mountain Road. For Alternative 2, the project limit will extend 80 feet beyond the right-of-way north of the existing bridge. For Alternative 5, the project limit will extend 60 feet beyond the right-of-way south of the existing bridge, into TMK: 6-6-004:001. The analysis indicates no adverse impacts to cultural resources are anticipated with construction of the Proposed Action alternatives.

There are no known traditional cultural practices occurring within or along the existing right-of-way. As discussed earlier in this section and in Section 3.9, the project area was used for agriculture. Site 22632 is a large agricultural complex located south of Waiaka Bridge and Kawaihae Road.

According to the Inventory Survey, the mapping, written descriptions, and photographs at Site 23313 adequately document the site and no further work or preservation is recommended. The remaining sites (23312 and 22632) retain the potential to yield information important for understanding prehistoric and historic land uses. The Inventory Survey recommended data recovery, if the sites are to be impacted by the realignment of Kawaihae Road in the area of the bridge.

The recreational activities that may occur along the roadway and Keanuiomano should not be significantly impacted by the proposed action. During construction, a detour and temporary bypass bridge will be provided for vehicles and pedestrians. The proposed action would also not restrict access to the

surrounding area which may potentially be used for other recreational activities. No significant impact to cultural resources is anticipated from the proposed action.

If archaeological resources are discovered during the course of construction, work will cease in the immediate area and the SHPD would be contacted. If Native Hawaiian remains are encountered the Hawaii Island Burial Council will also be consulted.

No Action Alternative: The No Action alternative would have no impacts on cultural resources in the project area.

3.11 Infrastructure

3.11.1 Water

3.11.1.1 Existing Conditions

The South Kohala District acquires its water from the Waimea and Lalamilo systems. The Waimea Water System primarily services the Waimea and Puukapu area. The source of feeding the Waimea System is the Waikoloa and the Kohakohau Streams. From Waimea Town, the system extends along Mamalahoa Highway westward and runs down Kawaihae Road for about eight miles. From Waimea Town, the system extends eastward to the two connections at the Haina Water System at the South Kohala district boundary near Mud Lane. The water system spans three aquifer sector areas; but the majority of the service area is within the Kohala aquifer sector, including the majority of Waimea Town, and the areas north of Mamalahoa Highway from Kawaihae to the Kamuela Highlands subdivision. Improvements to the system have increased reservoir capacity and enlarged the distribution pipelines. The primary water sources for the Waimea Water System are from the Waikoloa Stream and Kohakohau Stream diversions (Hawaii County Water Use and Development Plan Update, 2006).

There is an existing County Department of Water Supply 12-inch water line attached to the south side of Waiaka Bridge.

3.11.1.2 Impacts and Mitigation Measures

Proposed Action: The existing water main is currently attached to the existing bridge. The proposed action would require relocation of the existing water main with the bridge. No interruption of services to local residents is anticipated. Therefore, no significant impacts to utilities are anticipated from the proposed action.

The contractor would need to coordinate with the Department of Water Supply, to determine proper support and protection of water line during construction.

No Action Alternative: The No Action alternative would have no impact on infrastructure in the project area.

3.11.2 Wastewater

3.11.2.1 Existing Conditions

Waimea and surrounding areas are not served by a County of Hawaii wastewater collection system or treatment facility. All of Waimea is on individual wastewater systems (IWS) consisting of cesspools or septic tank leachfield systems with the exception of the Parker Ranch 2020 expansion area (County of Hawaii, 2005 and Department of Hawaiian Home Lands, 2002). The project area is not serviced by the County wastewater system.

3.11.2.2 Impacts and Mitigation Measures

Proposed Action: No significant impact to the surrounding wastewater system is anticipated from the proposed action.

No Action Alternative: The No Action alternative would have no impact on the wastewater system in the project area.

3.11.3 Electrical and Communication

3.11.3.1 Existing Conditions

Island-wide electrical service is provided by Hawaii Electric Light Company (HELCO). A HELCO baseyard and electrical generating plant is located near the project site on South Kohala Distribution Road.

Utility poles with overhead electric, telephone, and cable lines are located on the approaches to Waiaka Bridge. The utility poles and overhead lines also extend along Kohala Mountain Road. In addition, a transformer mounted on a platform between two utility poles is located on the north bank of Keanuiomano Stream. Communication system cabinets are located at-grade near the pole-mounted transformer.

One pole mounted, multi-directional Civil Defense warning siren, with related electrical connections is located south of the east approach.

3.11.3.2 Impacts and Mitigation Measures

Proposed Action: These utility poles and overhead lines will have to be relocated with the realignment of the approaches and replacement of the bridge.

Preliminary analysis shows approximately 6 utility poles and the transformer will have to be relocated as well.

Lastly, the multi-directional Civil Defense warning siren may have to be relocated.

No interruption of services to local residents is anticipated. Therefore, no significant adverse impacts to utilities are anticipated from the proposed action.

The contractor would need to coordinate with utility companies, including Hawaiian Telcom and the Electric Company to determine the current status of utility lines within the proposed project area and for assistance in providing proper support and protection of utility lines during construction.

No Action Alternative: The No Action alternative would have no impact on infrastructure in the project area.

3.12 Bicycle and Pedestrian Access

3.12.1 Existing Conditions

The existing bridge provides a 3-foot wide pedestrian walkway along the northern side of the bridge.

Bike Plan Hawaii 2003 is a HDOT master plan to create a guide for enhancing the bicycling environment through a variety of channels – from grass roots initiatives to government actions.

The master plan shows existing bike facilities and a plan of proposed of improvements, including a priority list for implementation of the plan. Bike Plan Hawaii shows existing bike facilities at Waiaka Bridge or within the project limits. Bike Plan Hawaii also includes a list of proposed projects for each island, including the Big Island. The plan shows a total of 106 proposed bicycle facilities for the Big Island. Waiaka Bridge is listed as a “signed shared road” proposed project. The plan further assigned a priority and priority level for each project according to four categories from “I” defined as near term; “II” defined as mid-term; “III” defined as long-term; and “IV” defined as contingent on road development. The Waiaka Bridge project is shown as number 99 of the proposed 106 projects and as priority level “II”.

In January 2011, the County of Hawaii Department of Parks and Recreation issued the Draft Environmental Assessment (EA) for the Waimea Trails and Greenways project. According to the Draft EA, the Department of Parks and Recreation in collaboration with the Waimea Preservation Association (formerly Waimea Main Street) proposed to construct an approximately 4.8 mile long multi-use trail for bicycles and pedestrians following the meandering path of Waikoloa

Stream. The trail would start near Church Row on the east, run parallel and north of Mamalahoa Highway, cross to the south near the Lindsey Road-Mamalahoa Highway intersection, continue to the west parallel to and south of Kawaihae Road, until it connected to Kawaihae Road well west of the DHHL Lalamilo Subdivision. The trail does not connect to Kawaihae Road near Waiaka Bridge.

3.12.2 Impacts and Mitigation Measures

Proposed Action: During construction, temporary bypass bridge and road will be provided for vehicles and pedestrians. The proposed action would also not restrict access to the surrounding area which may potentially be used for other recreational activities. No significant impact to bicycle and pedestrian access is anticipated from the proposed action. The new bridge would provide 8-foot bike/shoulder lane and 5-foot sidewalk in each direction, therefore improving pedestrian access along the bridge.

No Action Alternative: The No Action alternative would have no impact on bicycle and pedestrian access in the project area.

3.13 Visual Considerations

3.13.1 Existing Conditions

The Waimea region lies in a plateau between the Kohala Mountains and Mauna Kea. The Kohala Mountains provides a back drop of rolling hills and volcanic cones covered with pastures. Mauna Kea provides a distant but dramatic mass as it rises steeply above the plateau.

3.13.2 Impacts and Mitigation Measures

Proposed Action: Construction of the Proposed Action alternatives would have short-term impacts to the visual quality of the project area from construction-related activities (grading, clearing of vegetation, stockpiling, and staging). Long-term effects are not expected and the overall visual quality of the bridge area would not change significantly. The replacement bridge would not obstruct any view planes or scenic vistas. Therefore, no significant visual impacts are anticipated from implementation of the Proposed Action.

No Action Alternative: The No Action Alternative would have no impact on visual resources.

3.14 Socioeconomic Characteristics

3.14.1 Existing Conditions

The proposed project site is located within the Waimea Census Designated Place (CDP). The 2000 Census provides information about the CDP, which is a

designation used by the U.S. Census Bureau to collect data on a community basis. (Note: Comparable data is not yet available from the 2010 U.S. Census).

A comparison between Waimea CDP and the County of Hawaii shows: 1) The Waimea CDP represents about 4.7 percent of the total County population; 2) The percentage of the white population in the Waimea CDP is the same as the County; 3) The percentage of Native Hawaiian and Pacific Islanders in the Waimea CDP is lower than the County; 4) The median family income for the Waimea CDP is about 20 percent higher than the County (see Table 3-6).

Median family income and per capita income area are $55,822 and 20,773, respectively within the CDP. Median family income is higher within the CDP compared to the County and the per capita income is slightly higher within the CDP compared to the County. Poverty rates are low within the CDP compared to the County.

3.14.2 Impacts and Mitigation Measures

Proposed Action: The Proposed Action alternatives would replace the existing bridge with one that meets current HDOT design guidelines for bridge. The replacement bridge is intended to replace a bridge currently rated as structurally deficient with one designed to current guidelines. The Proposed Action alternatives would not cause population growth in the area.

The area surrounding the Proposed Action alternatives does not show a proportional population of minority or a low-income population. Thus, under Executive Order 12898, Environmental Justice, the Proposed Action alternatives would not create disproportionately high adverse human health or environmental effects on minority and low income populations.

No Action Alternative: The No Action Alternative would have not impact employment, income or demographics within the project area. The no action alternative would also not disproportionately affect a minority or low-income population.

TABLE 3-6
DEMOGRAPHIC CHARACTERISTICS: WAIMEA CDP, 2000

Subject	Waimea CDP		County of Hawaii	
	Number	Percent	Number	Percent
Total population	**7,028**	**100.00**	**148,677**	**100.00**
AGE				
Under 5 Years	442	6.0	9,130	6.0
5 – 17 years	1,647	24.0	29,722	20.0
18 – 64 years	4,228	60.0	89,706	60.0
65 years and over	711	10.0	20,119	14.0
Median age (years)	36.5	--	38.6	--
RACE (one race)				
White	2,154	31.0	46,904	31.5
Black or African American	23	0.3	698	0.5
American Indian and Alaska Native	12	0.2	666	0.5
Asian	1,426	20.0	16,724	11.2
Native Hawaiian and other Pacific Islander	1,097	16.0	39,702	26.7
Hispanic or Latino	548	7.8	14,111	9.5
Some Other Race	51	0.7	1,695	1.1
Population of two or more races	2,265	32.0	42,288	28.5
INCOME				
Median Family Income in 1999 ($)	55,822	--	46,480	--
Per Capita Income	20,773	--	18,791	--
POVERTY STATUS IN 1999				
Families Below Poverty Level	75	4.2	4,084	11.0
Individuals Below Poverty Level	418	6.0	22,821	15.7

Source: Census 2000, U.S Census Bureau

3.15 Public Services

3.15.1 Existing Conditions

Schools: The educational sector includes Hawaii Preparatory Academy (HPA) with a current total enrollment of 610 students in grades K through 12, which includes 175 boarders from grades 6 through 12 (Website accessed September 8, 2009). In addition, Parker School is a day school with an enrollment of 300 students. Waimea Elementary School had an enrollment of 650 and Waimea Middle Public Conversion Charter School had an enrollment of 400 students in 2008 (DHHL, November 2002). Kanu O Ka Aina Public Charter School in Waimea has an enrollment of approximately 220 students (Website access September 8, 2009).

Police: Police protection in the South Kohala District is provided by officers located at the Waimea Police station. A police substation at the Mauna Lani Resort, and a mini police station at Waikoloa Village. South Kohala has four beats in operation. The mauka beats are in and around Waimea. The makai beats include Waikoloa and Mauna Lani. The minimum watch is four police officers which is one officer per beat, and five officers are generally available.

Fire: Fire protection is provided by the Waimea Fire Station No. 9 located in Waimea Town approximately two miles from the Waiaka Bridge. This fire station is an engine company with one engine, a tanker, and a medic unit.

The back-up company is Engine Company No. 14 located on South Kohala. Four to five firefighters are on duty at all times at both fire stations.

Health Care Facilities: According to the County of Hawaii Data Book, the non-profit North Hawaii Community Hospital is a community owned facility and serves as the 10th largest single employer in the County with 438 employees. The hospital opened in May 1996 and serves approximately 30,000 residents and visitors of the northern region of the Big Island which includes the districts of South Kohala, North Kohala and parts of Hamakua and North Kona (Website accessed September 8, 2009).

Recreational Facilities: The County of Hawaii provides recreational facilities for the community in the Waimea area. The State and Federal governments also provide recreational facilities on Hawaii. Maps show there are no County, State, or Federal recreational facilities within the project limits. The nearest County facility is located in Waimea, about 2 miles east of the project limits.

Solid Waste: The County of Hawaii does not provide solid waste collection services in Waimea. The waste generated is self hauled or private companies haul to County landfills. The former Waimea landfill site located near the project site has been closed and replaced by a solid waste transfer station where refuse is collected from residential areas and then transported to Puuanahulu Landfill in West Hawaii.

3.15.2 Impacts and Mitigation Measures

Proposed Action: The proposed action is not anticipated to significantly impact public services. Although it is likely that the proposed action would require the occasional police and fire protection and medical services, it would likely not represent a significant amount relative to the overall regional demand. To mitigate traffic impacts, a traffic control plan will be developed and coordinated with the appropriate State and County agencies.

Short-term impacts include minor changes to traffic patterns, traffic volume, and travel times during construction. Redirecting traffic from Kawaihae Road to the

detour road and temporary bridge may cause minor disruptions in normal traffic patterns. The arrival and departure of construction crews and the periodic movement of construction vehicles and materials for staging may cause short-term increases in traffic volume and the traffic delays. The need to redirect traffic to a temporary bypass road and reduced speed limits within the work zone may also cause traffic delays during construction.

Traffic signs and controls would be posted along the detour route, as appropriate, to reduce traffic flow delays and potential hazards from reduced visibility. Signage informing highway users of reduced speed limits and potential traffic delays would be posted on the approach to the work zone.

The proposed action would improve highway safety along this corridor. Improvements to the bridge and intersection are needed to provide safer roadway conditions for drivers.

In March 2007, the FHWA issued a memorandum related to Public Law 109-59, August 10, 2005, Section 1805, “Use of Debris From Demolished Bridges and Overpasses.” The legislation directs the State to first make the debris from the demolition of such a structure available for beneficial use by a Federal, State, or local government, unless such use obstructs navigation. The “beneficial use”" is defined as the use of the debris for purposes of shore erosion control or stabilization, ecosystem restoration, and marine habitat creation.

Concrete debris from the demolition of the abandoned bridge could be made available for re-use.

The proposed action is not anticipated to have long-term impacts on public services.

No Action Alternative: The No Action Alternative would have no impact on public services in the project area.

3.16 Cumulative Impacts

Cumulative impacts are effects on the environment which result from the incremental impact of a project when added to past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individual minor but collectively significant projects taking place over a period of time.

In February 2002, the HDOT issued the Notice of Intent (NOI) for the Kawaihae Road Bypass Waimea to Kawaihae project. The NOI sets forth the HDOT intent to prepare and Environmental Impact Statement (EIS). The purpose of the Project is to provide another roadway access between Mamalahoa Highway south of Waimea and Akoni Pule Highway near the Kawaihae Harbor area and to Queen Kaahumanu Highway. The EISPN was published in April 2009.

3.17 Secondary Impacts

Secondary impacts, or indirect effects, are effects which are caused by an action and are later in time or farther removed from distance, but are still reasonably foreseeable. Such efforts may include growth inducing impacts and other effects related to changes in land use patterns, population density or growth rate, and related effects on air, water, and other natural systems. The proposed project is expected to have minimal secondary impacts on resident population, land use patterns, public facilities and infrastructure, and the natural environment.

Construction of the proposed project is expected to generate only minor short-term impacts. Creation of short-term construction jobs are not expected to generate a substantial number of workers. It is anticipated that local contractors on Hawaii or within the State of Hawaii would likely be used for construction of the proposed project. These workers would thus have minimal if any effect on the County's residential population or housing demand.

The proposed improvements are needed to make the roadway and bridge safe to drive. The improvements would not increase the use of the bridge or corridor and would not generate substantial secondary affects increasing infrastructure demands, necessitating off-site improvements, constraining public facilities, or influence population growth.

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4 RELATIONSHIP TO PLANS, POLICIES AND CONTROLS

The plans and policies relating to the proposed project range from broad program guidance to land use controls governing the project site. Construction of the proposed improvements is in consonance with the various plans, policies and regulatory controls, as discussed below.

4.1 Federal

The proposed project would include the use of Federal funds through the U.S. HDOT, FHWA. As a result, the proposed project needs to be consistent with various Federal statutory and regulatory requirements.

4.1.1 National Environmental Policy Act (NEPA) of 1970

The proposed project will partially be funded by FHWA; this federal funding subjects the project to the environmental review requirements of the National Environmental Policy Act (NEPA), prescribed under 40 CFR Parts 1500 – 1508 (Council on Environmental Quality). FHWA serves as the lead federal agency, or Administrator, responsible for the project's compliance with NEPA documentation and processing requirements, as provided in 23 CFR Part 771, Environmental and Related Procedures (U.S. Department of Transportation, Federal Highway Administration).

The National Environmental Policy Act (NEPA) determination of "significant impacts" is related to the type of NEPA document and process that will be required to comply with NEPA for a proposed action. There are three types of environmental documents under NEPA, 1) Categorical Exclusions (CE), 2) Environmental Assessments (EA), and 3) Environmental Impact Statements (EIS). A CE is appropriate where there are no "significant impacts" on the environment, an EA when the "significance" of the effects are not clearly established, and an EIS when the action will have a significant impact on the environment.

Significance is defined in the Council of Environmental Quality (CEQ) regulations (40 CFR 1508.27). A "significant impact" is assessed in terms of an impact's "context" and "intensity". Context refers to the environment and the level of relative abundance of resources in the project area. Intensity refers to the specific impact, or how much of the resource(s) would be used or affected by the project.

The HDOT and FHWA made a preliminary assessment that a CE is appropriate based on the current understanding of the environmental impacts of the Proposed Action. CE are actions which meet the definition contained in 40 CFR 1508.4. They are actions which:

- Do not induce significant impacts to planned growth or land use for the area;

- Do not require the relocation of significant numbers of people;
- Do not have a significant impact on any natural, cultural, recreational, historic or other resources;
- Do not involve significant air, noise, or water quality impacts;
- Do not have significant impacts on travel patterns; and
- Do not otherwise, either individually or cumulatively, have any significant impacts.

Actions which meet the criteria for a CE in the CEQ regulations (40 CFR 1508.4) and Environmental Impact and Related Procedures (23 CFR 771.771(d)) may be designated as CEs only after FHWA approval. "Bridge rehabilitation, construction or replacement or construction of grade separation to replace existing at-grade railroad crossings" is an action listed which meets the CE criteria.

According to FHWA's regulations for NEPA compliance, the proposed project qualifies as a CE. Based on the findings of this EA, FHWA anticipates issuing a CE, and a NEPA EA will not be required for this project. The FHWA will determine if the CE is appropriate for the proposed project following receipt of comments on this Draft EA.

This Environmental Assessment has been prepared under the requirements of the National Environmental Policy Act (NEPA) of 1970 (23 CFR 771 and 40 CFR 1500).

4.1.2 Section 106 of the National Historic Preservation Act of 1966

The National Historic Preservation Act of 1966, as amended (PL 89-665, codified as 16 USC 470), recognizes the nation's historic heritage and establishes a national policy for the preservation of historic properties as well as the National Register of Historic Places. Section 106 of the National Historic Preservation Act of 1966 (16 USC 470f) requires that Federal agencies consider the effects of their projects on historic properties and allow the Advisory Council on Historic Preservation a reasonable opportunity to comment on such projects. Use of Federal funds sets forth the need for Section 106 consultation. The purpose of the Section 106 consultation process is to evaluate the potential for effects on existing historic sites, if any, resulting from the project. Findings relating to historic properties are discussed in Section 3.9.

The Section 106 review process encompasses "good faith effort" in ascertaining the existence and location of historic properties near and within the project site, establishing an Area of Potential Effects (APE) of the project, identifying whether a potential for "adverse effects" on historic properties by the project exists, and developing a reasonable and acceptable resolution in the monitoring and treatment of any historic sites that is agreed upon by the agency, Hawaii State Historic Preservation Officer (SHPO) (State of Hawaii Department of Land and

Natural Resources, State Historic Preservation Division), and consulting government agencies, community associations, and Native Hawaiian organizations and families.

In May 1999, the HDOT notified the State of Hawaii Department of Land and Natural Resources (DLNR) State Historic Preservation Division about the Waiaka Bridge Replacement project. In response, on June 24, 1999, the DLNR (REF: HP·LM, LOG NO: 23582, DOC NO: 9906tmIO, Architecture) replied (Appendix E):

> *While it is difficult to ascertain what sites may be affected without knowing the proposed realignment, our inventory of historic sites does indicate that there is the Edwin Lindsey House nearby with a landscaped garden and family cemetery located at TMK: 6-6-04:61. Hale Kea is also located next to the Lindsey House and possibly some historic residences. The other tmk's do not indicate any known sites in our inventory. However, our inventory is far from complete and we would ask for an inventory survey of the area that may be affected by the realignment.*

As previously discussed, analysis shows TMK: 6-6-004:061 was a relatively large parcel north of Kawaihae Road and west of Kohala Mountain Road. Realignment on the west approach does not include lands on the north side of Kawaihae Road.

According to Inventory Survey, the mapping, written descriptions, and photographs at Site 23313 adequately document the site and no further work or preservation is recommended. The remaining sites (23312 and 22632) retain the potential to yield information important for understanding prehistoric and historic land uses. The Inventory Survey recommended data recovery, if the sites are to be impacted by the realignment of Kawaihae Road in the area of the bridge.

Based on preliminary analysis, the project limits are expected to be about 550 to 600 feet long along Kawaihae Road and near the Bridge about 80 feet north of the right-of-way for Alternative 2 and 60 feet south of the right-of-way into TMK: 6-6-004:001 for Alternative 5. East of the Bridge, the project limits do not extend into the area of Site 22312. The analysis indicates no adverse impacts to cultural resources are anticipated with implementation of the Proposed Action alternatives.

If archaeological resources are discovered during the course of construction, work will cease in the immediate area and the SHPD would be contacted. If Native Hawaiian remains are encountered the Hawaii Island Burial Council will also be consulted.

Waiaka Bridge was constructed in 1932 and is not listed in the 1987 Historic Bridge Inventory and Evaluation or 1996 Historic Bridge Inventory prepared by HDOT. Removal of the existing bridge for the Proposed Action alternatives would not create an adverse impact to historic resources.

4.1.3 Historic Bridge Program

As part of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (23 USC 144(o), State highway agencies were required to complete an inventory of bridges on and off the Federal-aid system to determine the historic significance. According to the 1987 and 1996 Historic Bridge Inventory and Evaluation Study, Waiaka Bridge is not listed as a historic bridge (see Sections 3.9.1.1 and 3.9.1.2).

4.1.4 Department of Transportation Act of 1966

The Department of Transportation Act of 1966 (49 U.S.C. 303 and 23 U.S.C. 138 (referred to as Section 4(f)) permits the use of publicly owned park land, recreational area, wildlife and waterfowl refuge, or land of an historic site of National, State, or local significance for a transportation project only if: 1) there is no prudent and feasible alternative to using that land; and 2) the project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use. The purpose of Section 4(f) requirements is to preserve significant parkland recreation areas, refuges, and historic and archaeological sites by limiting the circumstances under which such land can be used for transportation projects.

As discussed in Section 3.14.3 Recreational facilities there are no County, State, or Federal recreational facilities within the project limits. The closest County facility is located in Waimea, about 2 miles east of the project limits. Based on this, no Section 4(f) lands or properties would be affected by the Proposed Action alternatives.

4.1.5 Section 6(f) of the Land and Water Conservation Fund Act of 1965

Section 6(f) of the Land and Water Conservation Fund Act (16 USC 4601-4 et seq.) requires impacts on recreational facilities funded under the Land and Water Conservation Fund (LWCF) to be avoided and fully compensated in-kind if impacts are unavoidable. Any land conversions on property funded under LWCF must be approved by the Department of the Interior, National Park Service.

As discussed in Section 3.14.3 Recreational facilities there are no County, State, or Federal recreational facilities within the project limits. The closest County facility is located in Waimea, about 2 miles east of the project limits. Based on this, no Section 6(f) lands or properties would be affected by the Proposed Action alternatives.

4.1.6 Uniform Relocation Assistance and Real Property Acquisition Act of 1970

The Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (42 U.S.C. 4601 et seq. and 49 CFR 24), as amended by the Uniform Relocation Act Amendments of 1987 is commonly referred to as the "Uniform Act." The Uniform Act, provides important protections and assistance for people affected by Federally funded projects. The law was enacted by Congress to ensure that people whose real property is acquired, or who move as a result of projects receiving Federal funds, will be treated and equitably and will receive assistance in moving from the property they occupy. Except for Alternative 3, the proposed action would require the taking or acquisition of private property outside of the existing 60-foot right-of-way.

The approximate acquisition outside of the 60-foot right-of-way is shown in Table 2-2. The HDOT taking involves the following:

- Preparation of a right-of-way map to identify the parcels and areas of the taking;
- HDOT appraisal of the affected areas;
- Metes and bounds description of the taking;
- Acquisition of the affected area.

In addition, it may be necessary to use adjacent properties during construction. If this is the case, the HDOT will execute a construction parcel agreement to use the adjacent lands during construction.

4.1.7 Endangered Species Act of 1973

The Endangered Species Act (ESA) of 1973 (16 USC 1531-1544) establishes a process for identifying and listing threatened and endangered species. It requires federal agencies to carry out programs for the conservation of federally listed endangered and threatened plans and wildlife and designated critical habitats for such species, and prohibits actions by federal agencies that would likely jeopardize the continued existence of those species or result in the destruction or adverse modification of designated critical habitat. Section 7 of the ESA requires consultations with federal wildlife management agencies, such as U.S. Fish & Wildlife Service and National Marine Fisheries.

As previously discussed, in May 1999, the HDOT notified USFWS about the Waiaka Bridge Replacement project. In response, on May 26, 1999, the USFWS replied, *"to the best of our knowledge, no Federal endangered, threatened, or candidate species, significant wetlands or other Federal trust resources occur at the immediate project site, nor any point along Waikoloa Stream below the Waiaka Stream Bridge. Furthermore, there are no native fish species in the Waikoloa Stream system."*

Thus, based on the findings of the botanical survey and the USFWS letter, the Proposed Action alternatives would not create adverse affects to biological resources. Appendix E contains the USWFS letter.

The biological surveys found no Federal or state listed threatened or endangered species or critical habitat within the project area.

AECOS, Inc. conducted an aquatic resources and water quality survey for Keanuiomano Stream in February 2003 (Appendix F). No aquatic species listed as endangered, threatened, proposed or candidate as set forth under the Endangered Species Act (16 USC Section 1531-1544, as amended) were detected in the stream system.

4.1.8 Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC 760), protects migratory wild birds found in the United States. The MBTA makes it unlawful to pursue, hunt, take, capture, possess, sell, purchase, barter, import, export, or transport any migratory bird or any part, next, or egg of any such bird, unless authorized under a permit issued by the Secretary of the U.S. Department of the Interior. The proposed action is limited to a disturbed environment and not expected to have any impact on migratory birds.

4.1.9 Wild and Scenic Rivers Act (16 USC 1271-1287)

The Wild and Scenic Rivers Act was first passed in October 1968 and has been amended a number of times. (16 U.S.C. § 1271-1287, October 2, 1968, as amended 1972, 1974-1976, 1978-1980, 1984, 1986-1994 and 1996.)

This Act established a National Wild and Scenic Rivers System for the protection of rivers with important scenic, recreational, fish and wildlife, and other values. Rivers are classified as wild, scenic or recreational. The Act also designated specific rivers for inclusion in the System and prescribes the methods and standards by which additional rivers may be added. The Act contains procedures and limitations for control of lands in federally administered components of the System and for disposition of lands and minerals under Federal ownership. Hunting and fishing are permitted in components of the System under applicable federal and state laws.

The purpose of this act, as stated in Section (b) of its preamble is as follows:

> *It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.*

> *The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes.*

There are no rivers in Hawaii designated as wild and scenic as part of the Wild and Scenic Rivers Act.

4.1.10 Clean Water Act of 1972

The Federal Water Pollution Control Act (FWPCA) (33 USC §§1251 et seq.), is the federal statute regulating the discharge of water pollution. Congress revised the FWPCA into the Clean Water Act (CWA) in 1972. The goals of the CWA included: *(1) "the discharge of pollution into the navigable waters be eliminated by 1985," (2) "the discharge of toxic pollutants in toxic amounts be prohibited," and (3) an "interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and... recreation in and on the water... by July 1, 1983*" (CWA §101a, 33 USC §1251a).

Federal protection of navigable and tidally-influenced waterways is also provided under Section 10 f the Rivers and Harbors Act of 1899 and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972. Keanuiomano Stream is not a navigable waterway and not tidally influenced.

Section 404 of the CWA regulates discharge of dredge and fill material in the waters of the United States, including wetlands, and requires a Department of the Army permit from the U.S. Army Cops of Engineers. Section 401 of the CWA directs states to establish water quality certification (WQC) programs; in Hawaii the Section 401 WQC is administered by the DOH, Clean Water Branch. The project may result in discharges regulated under Section 404, so a Department of Army Permit may be pursued under Section 404. Section 401 WQC may also be required.

Section 402of the CWA requires a National Pollutant Discharge Elimination System (NPDES) permit for point source discharges, including storm water discharges associated with construction activities. The permit is required for construction activities that disturb one acre or more and discharge storm water from the project site to waters of the United States.

Coordination will take place with the U.S. Army Corps of Engineers regarding permitting under CWA. All permits described in this section will be obtained if necessary.

4.1.11 Clean Air Act of 1970

The Clean Air Act (CAA) and amendments (42 USC §7401 et seq.) is the comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. This law authorizes the U.S. Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. Pursuant to the CAA and amendments, state operated permit programs serve to control emissions. In Hawai‘i, the operating permit program is implemented by the State of Hawai‘i Department of Health (DOH), and emissions of regulated air pollutants within the state may be subject to permitting as required under Hawai‘i Administrative Rules (HAR) 11-60.1.

Once construction has been completed, air quality in the area will be affected by vehicles traveling along the project limits. In February 2006, the FHWA issued interim guidance related to analysis of air quality impact from roadway projects. In September 2009, the FHWA updated these interim guidelines. The FHWA guidance relates to Mobile Source Air Toxics (MSAT), which is based on an assessment from the Environmental Protection Agency (EPA) list of 21 mobile source air toxics, set forth in an EPA final rule, Control of Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17235). The EPA extracted a subset of this list of 21 mobile source air toxics that it now labels as the seven priority MSATs. These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases, formaldehyde, naphthalene, and polycyclic organic matter. While these MSATs are considered the priority transportation toxics, the EPA stresses that the lists are subject to change and may be adjusted in future rules.

The EPA has issued a number of regulations that will dramatically decrease MSATs through cleaner fuels and cleaner engines. On February 26, 2007 the EPA issued their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS). The 2007 EPA rule requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles travelled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050.

Given the emerging state of the science and of project-level analysis techniques, there are no established criteria for determining when MSAT emissions should be considered a significant issue. Therefore, the FHWA has established a range of responses may be appropriate for addressing this issue, including a qualitative analysis of emissions.

The FHWA has developed a three-tiered approach for analyzing MSATs effects:

1. Projects with No Meaningful Potential MSAT Effects or Exempt Projects
2. Projects with Low Potential on MSAT Effects
3. Projects with Higher Potential MSAT Effects

The proposed action would fall into the category of Projects with Low Potential MSAT Effects. These types of projects include minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street or where design year traffic is not projected to meet 140,000 to 150,000 annual average daily traffic (AADT) volume.

The Proposed Action will replace Waiaka Bridge, realign approaches, and improve intersection operations at Kawaihae Road and Kohala Mountain Road. The HHDOT traffic counts show approximately 2,200 vehicles crossing Kawaihae Road between Ko Uka Street and S. Kohala Distribution Road and Kohala Mountain Road (see Table 4-1). The proposed action is not anticipated to affect the traffic volumes, vehicle miles traveled (VMT), and vehicle mix. As a result, the adverse effects of MSATs toxics would not be expected to be significant.

TABLE 4-1
HHDOT 24-HOUR TRAFFIC VOLUME (2008)

Location	Westbound	Eastbound	Total 24-Hour Period
Kawaihae Road between Ko Uka Street and Road to Baseyard (S. Kohala Distribution Road)	1,109	1,153	2,262
	Northbound	**Southbound**	**Total 24-Hour Period**
Kohala Mountain Road at Waimea/Kawaihae sign	1,096	1,124	2,220

Source: Hawaii Department of Transportation, 2009

Moreover, as previously discussed, national trends show substantial overall reductions in emissions due to stricter engine and fuel regulations issued by EPA. Since the emission effects of these projects are low, there would be no appreciable change in overall MSAT emissions.

In addition, since much of the data related MSATs is incomplete or unavailable for a project specific assessment, analysis of MSAT impacts is an emerging field and current scientific techniques tools and data are not sufficient to accurately estimate human health impacts that would result from the proposed action.

4.1.12 Floodplain Management, Executive Orders 11988 and 12148

Executive Order 11988, Floodplain Management, dated May 24, 1977 requires Federal agencies to take action to reduce the risk of flood loss, restore the natural and beneficial values of floodplains, and minimize the impacts of floods on human safety, health, and welfare. Executive Order 12148, July 20, 1979, amended Executive Order 11988. The main feature of the amendment added that agencies with responsibilities for Federal real estate properties and facilities shall, at a minimum, require the construction of Federal structures and facilities to be in accordance with the criteria of the National Flood Insurance Program.

The proposed project crosses Keanuiomano Stream. According to the Flood Insurance Rate Map (FIRM), Community Panel Number 155166 0164D (revised July 16, 1990) the area along Keanuiomano Stream is delineated Zone A which is subject to inundation by a IOO-year flood, as shown in Figure 3-4. Design of the project will try to minimize effects on floodplains as much as possible.

4.1.13 Protection of Wetlands, Executive Order 11990

Executive Order 11990, Protection of Wetlands, dated 1977 requires Federal agencies to avoid, preserve, or mitigate effects of new construction projects on lands which have been designated wetlands.

There are no wetlands within the project limits.

4.1.14 Invasive Species, Executive Order 13112

Executive Order 13112 (64 FR 6183), issued by President Clinton in 1999, required federal agencies to implement policies to minimize the spread of invasive species. Federal agencies cannot authorize, fund or carry out action(s) believed are likely to cause or promote the introduction of spread of invasive species unless all reasonable measures to minimize risk have been analyzed or considered.

Following construction, exposed soils at the project site will have been built over, paved over, or re-vegetated.

4.1.15 Coastal Zone Management Act (16 USC § 1456(C)(1))

In 1972, the U.S. Congress enacted the Federal Coastal Zone Management Act to ensure that each Federal agency undertaking an activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs. Each Federal agency carrying out an activity subject to the Act shall provide a consistency determination to the relevant State agency designated under section 1455(d)(6) of this title at the earliest practicable time.

In 1977, Hawaii enacted Chapter 205A, HRS, Hawaii Coastal Zone Management (CZM) Program. The CZM area encompasses the entire state, including all marine waters seaward to the extent of the state's police power and management authority, including the 12-mile U.S. territorial sea and all archipelagic waters.

The project site is located on in Waimea, Hawaii Island at an elevation of approximately 2,400 feet msl. The project site is not located within the County SMA and will not significantly impact shoreline and coastal resources. The project is consistent with CZM objectives and is further discussed in Section 4.2.4.

4.1.16 Environmental Justice, Executive Order 12898

Executive Order 12898, Environmental Justice, was signed on February 11, 1994. The intent of Executive Order 12898 (full title Federal Actions to Address Environmental Justice to Minority and Low Income Populations) is to avoid disproportionately high adverse human health or environmental effects of projects on minority and low income populations. Executive Order 12898 also requires Federal agencies ensure that minority and low income communities have adequate access to public information related to health and the environment.

Guidance from the Council on Environmental Quality indicate minority populations should be identified where either: 1) the minority population of the affected area exceeds 50 percent or 2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage of the general population. Minorities are defined as members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. U.S Census Bureau poverty status data are used to identify low income populations. Poverty status is assigned to individuals and families whose income is below the poverty threshold appropriate for that person's family size and composition, as reported in the U.S. Census Bureau, 2000 Census of Population and Housing.

In 2000, the Waimea CDP reported to have a population of 7,028 persons. Of this total, 36.4 percent were minority and 6.0 percent reported income below poverty level. Therefore, for the purpose of compliance with EO 12898 on Environmental Justice, neither a minority nor a low-income population is determined to be present. Refer to Section 3.13 for additional information.

The construction and operation of the proposed project will not result in adverse effects to the environment near the project limits, including on adjacent properties or minority and low income populations.

4.1.17 Title VI of the Civil Rights Act of 1964

Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d and 49 CFR 21) establishes that no person shall, on the grounds of race, color, or national origin be excluded from participation in, be denied the benefit of, or subjected to discrimination under any program or activity receiving Federal financial assistance.

The project will adhere to the Title VI requirements.

4.2 State of Hawaii

4.2.1 Hawaii State Plan

The Hawaii State Plan (Chapter 226, Hawaii Revised Statutes, as amended) provides the overall theme, goals, objectives, policies and priority guidelines for statewide planning. The Hawaii State Plan also directs the appropriate State agencies to prepare functional plans for their respective program areas.

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

> *Facility Systems – Transportation*
> *(a)(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.*
>
> *(a)(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.*
>
> *(b)(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives.*
>
> *(b)(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties.*
>
> *(b)(6) Encourage transportation systems that serve to accommodate present and future development needs of communities.*
>
> *(b)(10) Encourage the design and the development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment.*
>
> *Facility systems – in general.*
> *(a) 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.

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

Comment: The mission of the State HDOT is to provide a safe, efficient, and accessible transportation system for the public. The State HDOT recognizes the need to provide for the replacement bridge of the existing bridge. The replacement bridge and realignment of approaches will be designed using current American Association of State Highway Transportation Officials (AASHTO) guidelines that have been adopted the State HDOT for planning and engineering for highway projects in Hawaii.

4.2.2 State Functional Plans

State Functional Plans serve as the primary implementing vehicle for the goals, objectives and policies of the Hawaii State Plan. The functional plans guide implementation of State and County actions in the following areas: agriculture, transportation, conservation lands, education, tourism, water resources, energy, recreation, historic and preservation, health, housing, higher education, employment, and human services.

The following are related objectives and polices applicable to the proposed project:

Objective I.A.Expansion of the transportation system.

Policy I.A.1. Increase transportation capacity and modernize transportation infrastructure in accordance with existing master plans and laws requiring accessibility for people with disabilities.

Policy I.A.2. Improve regional mobility in areas of the State experiencing rapid urban growth and road congestion.

Comment: The mission of the State HDOT is to provide a safe, efficient, and accessible transportation system for the public. The State HDOT recognizes the need to provide for the replacement bridge of the existing bridge. The replacement bridge and realignment of approaches will be designed using current American Association of State Highway Transportation Officials (AASHTO) guidelines that have been adopted the State HDOT for planning and engineering for highway projects in Hawaii.

4.2.3 State Land Use Designation

Chapter 205, Hawaii Revised Statutes (HRS) classifies all lands in the State of Hawaii into one of four land use designations: Urban, Rural, Agricultural, and Conservation. The lands surrounding the project limits are designated Agricultural and Urban (see Figure 4-1).

4.2.4 Coastal Zone Management Program and Federal Consistency Determination

The purpose of the Coastal Zone Management Act (CZMA) of 1972, as amended (16 U.S.C. §1451 et seq.) is to encourage States to manage and conserve coastal areas as a unique, irreplaceable resource. Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs.

The State's Coastal Zone Management policies and regulations are prescribed under Chapter 205A, Hawaii Revised Statutes. The coastal zone management area is defined to include all lands of the State and the area extending seaward from the shoreline to the limit of the State's management authority. As a result, the project is within the CZM area and subject to being consistent with the CZM program objectives and policies. The Hawaii Coastal Zone Management Program focuses on ten policy objectives:

- Recreational Resources. To provide coastal recreational opportunities accessible to the public and protect coastal resources uniquely suited for recreational activities that cannot be provided elsewhere.

  Comment: The project will not affect access to the shoreline as it is not a shoreline property, nor is it in the vicinity of the island's shoreline.

- Historic Resources. To 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.

  Comment: Based on preliminary analysis, the project limits are expected to be about 550 to 765 feet long along Kawaihae Road and 250 feet along Kohala Mountain Road. For Alternative 2, the project limit will extend 80 feet beyond the right-of-way north of the existing bridge. For Alternative 5, the project limit will extend 60 feet beyond the right-of-way south of the existing bridge, into TMK: 6-6-004:001. East of the existing bridge, the project limits do not extend into the area of Site 22312. The analysis indicates no adverse impacts to archaeological resources are anticipated with implementation of the Proposed Action alternatives.

If archaeological resources are discovered during the course of construction, work will cease in the immediate area and the SHPD would be contacted. If Native Hawaiian remains are encountered the Hawaii Island Burial Council will also be consulted.

Waiaka Bridge was constructed in 1932 and is not listed in the 1987 Historic Bridge Inventory and Evaluation or 1996 Historic Bridge Inventory prepared by HDOT. Removal of the existing bridge for the Proposed Action alternatives would not create an adverse impact to historic resources.

- Scenic and Open Space Resources. To protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.

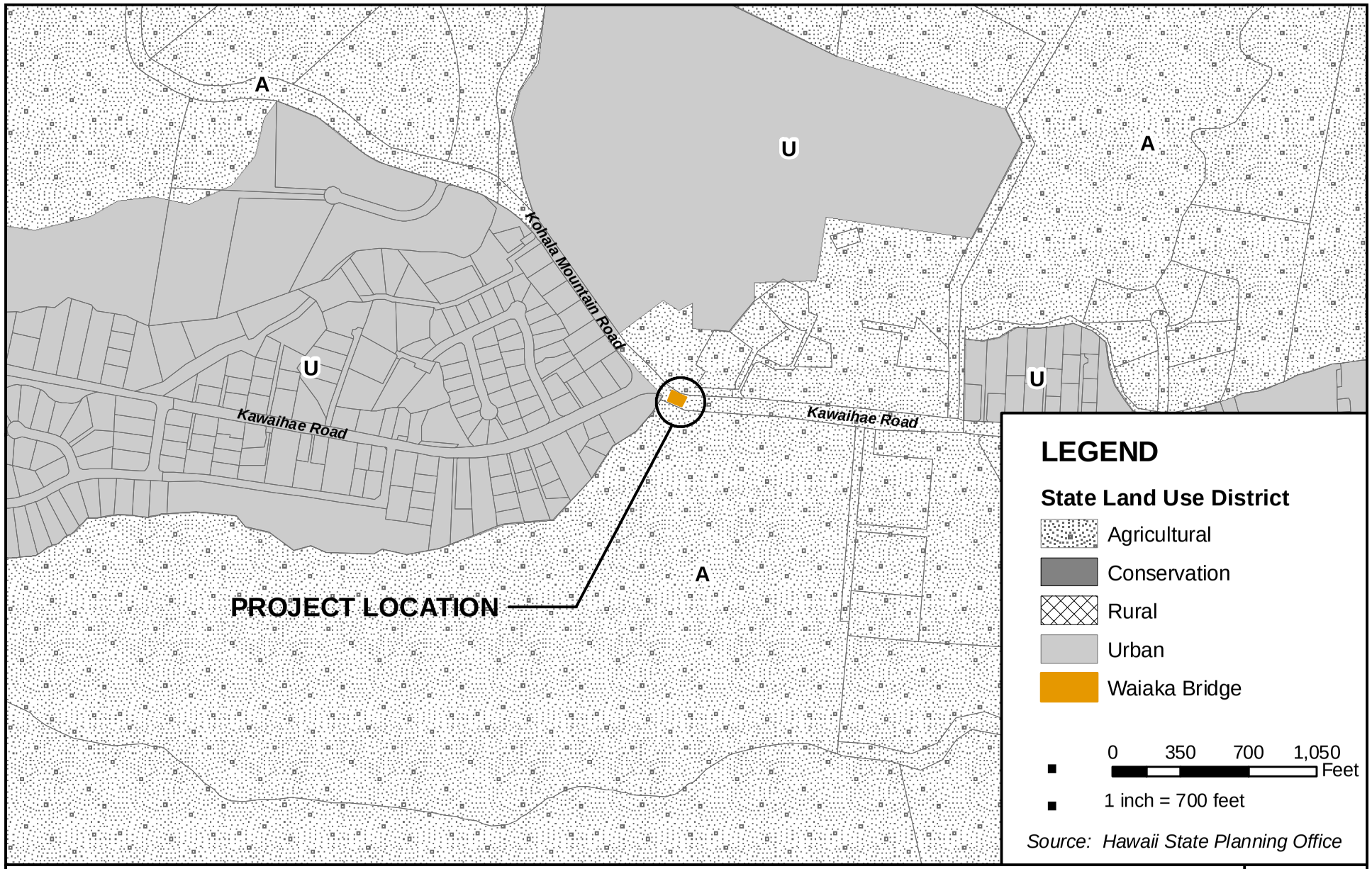
  Comment: The project will be developed to ensure visual compatibility with the surrounding environment. The project is not located along the shoreline and is not anticipated to negatively impact coastal and scenic and open space resources.

- Coastal Ecosystems. To protect valuable coastal ecosystems, including reefs, from disruption and to minimize adverse impacts on all coastal ecosystems.

  Comment: The project site is not located along the shoreline and will not impact coastal ecosystems.

- Economic Uses. To provide public or private facilities and improvements important to the State's economy in suitable locations; and ensure that coastal dependent development such as harbors and ports, energy facilities, and visitor facilities are located, designed, and constructed to minimize adverse impacts in the coastal zone area.

  Comment: The project is located in Waimea and is not a coastal dependent development.



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

State Land Use District Map

FIGURE 4-1

- Coastal Hazards. To reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

  Comment: The project is not located in a tsunami, erosion or subsidence area. The Federal Emergency Management Agency Flood Insurance Rate Map (FIRM) Community Panel No. 155166 0164D (Map Revised July 16, 1990) and Community Panel No. 155166 0162C (Map Revised September 16, 1988) show Waiaka Bridge and other nearby areas are located with Zone A, defined as Special Flood Hazard Areas Inundated by 100-Year Flood, "no base flood elevation determined". The FIRM maps define a 100-year flood as "the 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance: of being equaled of exceeded in any given year. Figure 3-4 shows the flood hazard map for the project site.

  Appropriate mitigation measures will be implemented to mitigate storm water runoff associated the Health Center project.

- Managing Development. To improve the development review process, communication, and public participation in the management of coastal resources and hazards.

  Comment: Opportunities for public review of the project is provided through the Environmental Assessment public comment process.

- Public Participation. To stimulate public awareness, education, and participation in coastal management; and maintain a public advisory body to identify coastal management problems and provide policy advice and assistance to the CZM program.

  Comment: A series of three public informational meetings were held in Waimea to solicit comments on the Waiaka Bridge replacement project. During these meetings, the various alternatives were presented and public comments were solicited related to the alternatives. Meeting notices were published in the newspaper for the first and third meetings and meeting notices mailed to attendees for the later two meetings (see Appendices A – C).

  The meetings were held on: March 6, 2002; January 15, 2008, and December 15, 2009. A total of about 45 attendees were at the March 6, 2002 meeting, 75 attendees at the January 15, 2008 meeting, and 40 attendees at the December 15, 2009 meeting. Comments received during the Public Information Meetings #2 and #3 are included in Appendices B and C).

Opportunities for public review of the project is also provided through the EA process.

- Beach Protection. To protect beaches for public use and recreation; and locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion.

  Comment: The project site is located inland in Waimea at an elevation of about 2,400 feet msl. No significant impacts on beaches are anticipated.

- Marine Resources. To implement the State's ocean resources management plan.

  Comment: The project site is not located on or near the shoreline and is not anticipated to significantly impact marine resources.

Other key areas of the CZM program include: a permit system to control development within a Special Management Area (SMA) managed by each County and the Office of Planning; a Shoreline Setback Area which serves as a buffer against coastal hazards and erosion, and protects view-planes; and marine and coastal resources. Finally, a Federal Consistency provision requires that Federal activities, permits and financial assistance be consistent with the Hawaii CZM program.

The proposed project is not located within the County of Hawaii SMA. The Proposed Action does not involve the placement, construction, or removal of materials near the coastline. The Proposed Action does not have the potential to significantly affect coastal resources. The Proposed Action is consistent with the CZM objectives that are relevant to this type of project.

4.2.5 Act 50, Cultural Practices

Hawaii Act 50 (2000) sought to "promote and protect cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups" and requires the proposing agency/applicant under Chapter 343 HRS to consider cultural practices in a cultural impact assessment (CIA).

Department of Hawaiian Home Lands prepared a Final Environmental Impact Statement for Lalamilo Project (November 2002), located immediately south of Waiaka Bridge and Kawaihae Road. Haun & Associates prepared the Cultural Impact Assessment for DHHL Residential Development at Lalamilo (February 2002). The CIA consisted of background review and research of existing ethnograhphic, historical, and anthropological literature relating to traditional cultural practices; consultation with knowledgeable individuals and organizations about cultural resources, practices, and beliefs found in the project area; and ethnographic/oral history interviews.

There are no known traditional cultural practices occurring within or along the existing right-of-way. As discussed in Sections 3.9 and 3.10, the project area was used for agriculture. Site 22632 is a large agricultural complex located south of Waiaka Bridge and Kawaihae Road.

According to the Inventory Survey, the mapping, written descriptions, and photographs at Site 23313 adequately document the site and no further work or preservation is recommended. The remaining sites (23312 and 22632) retain the potential to yield information important for understanding prehistoric and historic land uses. The Inventory Survey recommended data recovery, if the sites are to be impacted by the realignment of Kawaihae Road in the area of the bridge.

The recreational activities (walking, biking, horseback riding) that may occur along the roadway and Keanuiomano should not be significantly impacted by the proposed action. During construction, a detour and temporary bypass bridge will be provided for vehicles and pedestrians. The proposed action would also not restrict access to the surrounding area which may potentially be used for other recreational activities. No significant impact to cultural resources is anticipated from the proposed action.

If archaeological resources are discovered during the course of construction, work will cease in the immediate area and the SHPD would be contacted. If Native Hawaiian remains are encountered the Hawaii Island Burial Council will also be consulted.

4.3 County of Hawaii

4.3.1 County of Hawaii General Plan

The County of Hawaii General Plan is a policy document for the long-range comprehensive development of the island of Hawaii and also provides the direction for future growth of the County. The current General Plan was adopted as Ordinance 05-25 which became effective on February 9, 2005 and repeals the previous plan adopted on November 14, 1989.

The General Plan included an assessment of the General Plan elements relative to new data, laws, and methods of analysis. Each study element was then analyzed and evaluated in relation to all other elements, County and district goals, and the land use pattern. A total of 21 study elements are set forth in the General Plan. The proposed improvements are in consonance with the following objectives and policies of the General Plan

The General Plan includes land use maps referred to as the Land Use Pattern Allocation Guides (LUPAG) (see Figure 4-2).

4.3.2 South Kohala Community Development Plan

The County of Hawaii General Plan requires that community development plans (CDPs) be adopted by the County Council for each judicial district in the County. It is intended to provide detail to the elements presented in the General Plan and emphasize those elements most relevant to the issues and conditions of the specific area plan.

The County Council approved the South Kohala Community Development Plan on November 20, 2008 (Bill No. 369, Ordinance No. 08-159). Recognizing the uniqueness and special qualities of the different communities in the South Kohala District, the South Kohala CDP has been organized into four specific area plans for the communities of Waimea, Waikoloa Village, Kawaihae, and Puako. The proposed project is located within the Waimea Town Plan and is identified as a future roadway project.

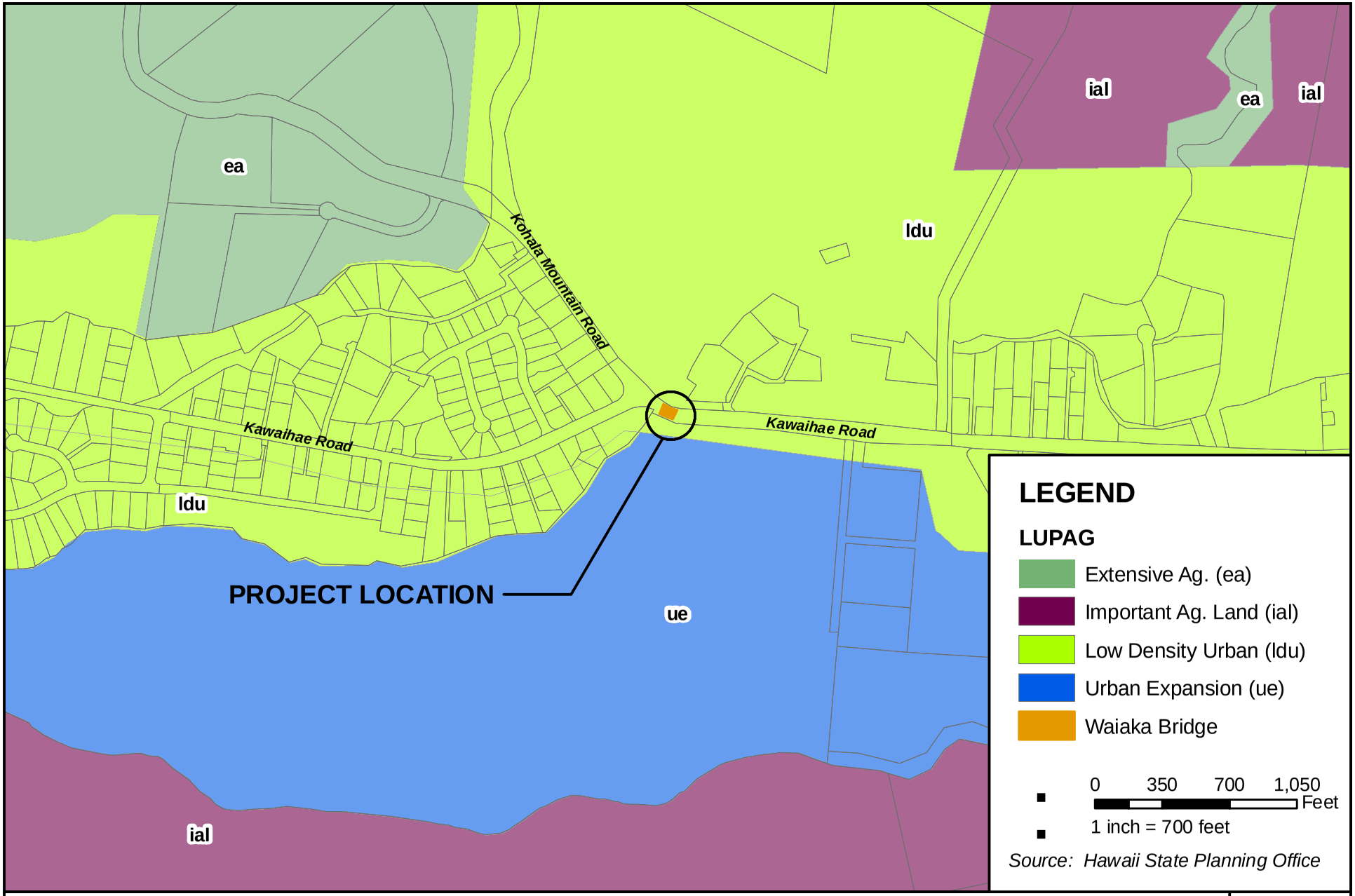
4.3.3 Zoning

The County of Hawaii zoning is primarily RS-10 (Single-Family Residential 10,000 square foot minimum lot size), A-1a (Agricultural-1 acre minimum lot size), and A-5a (Agricultural-5 acre minimum lot size), along the project limits (see Figure 4-3).

4.3.4 Special Management Area (SMA)

The Coastal Zone Management Act contains the general objectives and policies upon which all counties within the State have structured specific legislation which created Special Management Areas (SMA). Any development within the Special Management Area boundary requires a SMA Use permit which is administered by the County of Hawaii.

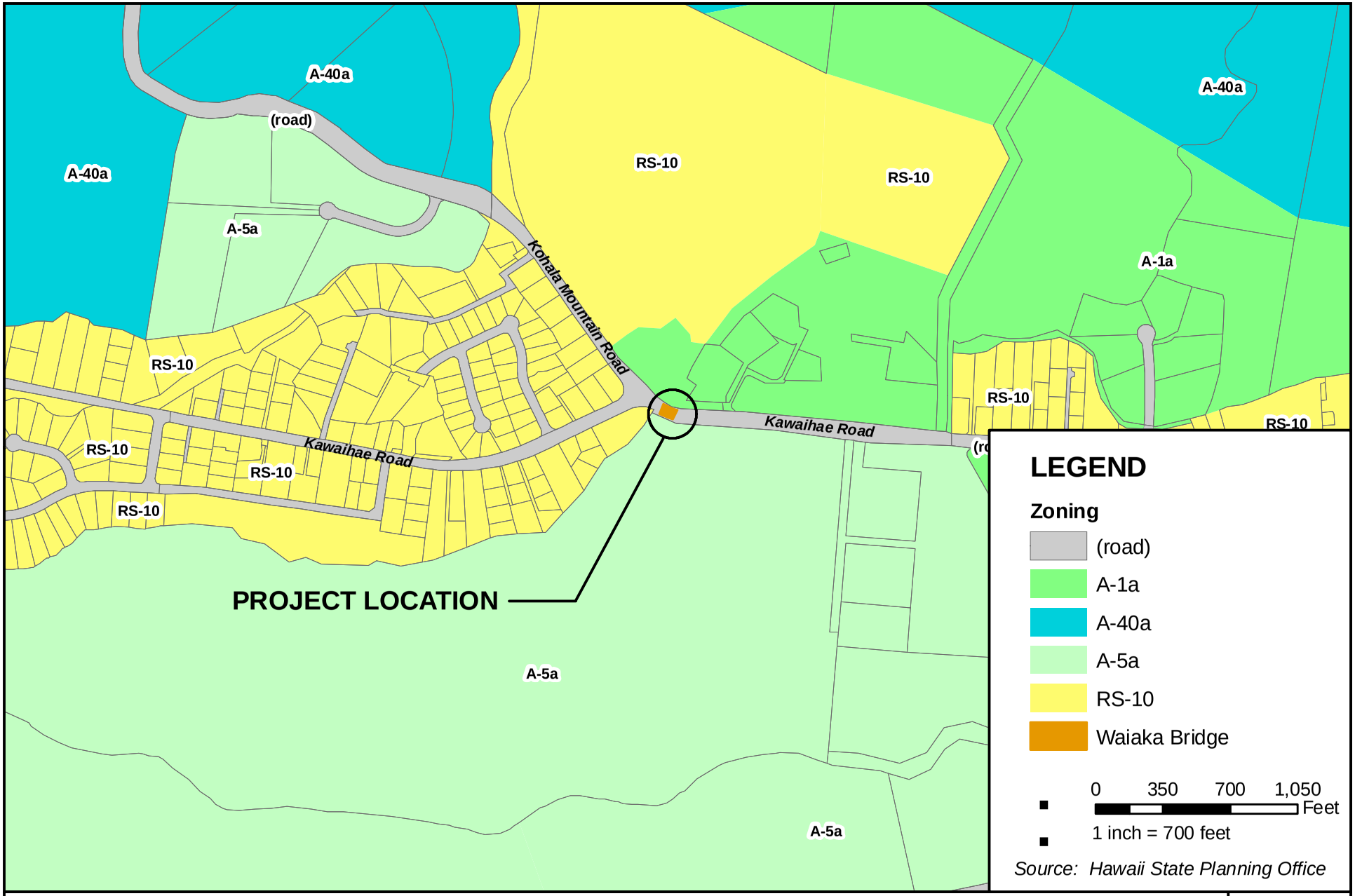
The Proposed Action is not located within the County's SMA.



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

Land Use Pattern Allocation Guide (LUPAG) Map

FIGURE 4-2



KAWAIHAE ROAD - WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES

County of Hawaii Zoning Map

FIGURE 4-3

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5 PERMITS AND APPROVALS

Below is a list of permits and approvals that may be needed for the proposed project:

Federal

Department of Army
- Department of the Army, Nationwide Permit, Section 404, Clean Water Act

Section 106 (NHPA)
Section 7 (ESA)

State of Hawaii

State of Hawaii Department of Health
- Section 401, Water Quality Certification
- National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Stormwater Activities
- Noise Permit
- Construction Noise Variance – if required

State of Hawaii Department of Land and Natural Resources
- Stream Channel Alternation Permit
- Chapter 6E, HRS Historic Preservation Review

Department of Transportation
- Permit to Perform Work Within State Highways

Office of Planning
- Coastal Zone Management (CZM) Program Consistency Determination

County of Hawaii

Department of Public Works
- Grubbing, Grading, Excavation and Stockpiling
- Building Permit
- Landfill Disposal Permit

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6 ANTICIPATED FINDING OF NO SIGNIFICANT IMPACT

6.1 Hawaii Revised Statutes, Chapter 343

This Draft EA was prepared for review in accordance with the consultation process of Chapter 343, Hawaii Revised Statutes. Potential impacts of the proposed project have been evaluated in accordance with the significance criteria set forth in State of Hawaii Department of Health Hawaii Administrative Rules Title 11 Section 200-12. Discussion of the project's conformance to the criteria is presented as follows:

1. *Involve an irrevocable commitment to loss or destruction of any natural cultural resources;*

The Proposed Action would not cause significant adverse impacts to biological resources, cultural resources, soils and geology or water resources, and therefore does not involve irrevocable commitment to, loss or destruction of any natural or cultural resources. Areas disturbed for construction of the temporary bypass bridge and road would be restored to original grade and conditions upon project completion, including seed planting and tree planting.

2. *Curtail the range of beneficial uses of the environment;*

The Proposed Action would replace an existing structure that is structurally deficient and would have no impact on the beneficial uses of the environment within the project area.

In addition, the project area does not provide unique habitat in the area, therefore no candidate, proposed, or listed threatened or endangered species will be disturbed.

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

As discussed in Chapter 4, the potential impacts related to the Proposed Action is associated with short-term construction-related activities and can be mitigated through adherence to construction mitigation practices. The Proposed Action does not conflict with the long-term environmental policies, goals, and guidelines of the State of Hawaii.

4. *Substantially affect the economic or social welfare of the community or state;*

The Proposed Action would have no significant socio-economic impacts on the community or state, as it would not result in an increase population or change the

demographic characteristics in the local area. The Proposed Action will create a number of short-term employment opportunities. Short-term employment will consist primarily of construction-related jobs generated by the proposed action.

5. Substantially affect public health;

With the exception of short-term, construction-related impacts to ambient air and noise levels, no long-term significant impacts to the public's health and welfare are anticipated.

6. Involve substantial secondary impacts, such as population changes or effects on public facilities;

No adverse secondary impacts on the environment (such as increase in population changes or effects on public facilities) would be anticipated with the implementation of the Proposed Action.

7. Involve a substantial degradation of environmental quality;

The Proposed Action would not cause any impacts that would substantially degrade environmental quality. Construction activities associated with the Proposed Action are anticipated to result in relatively insignificant short-term impacts to noise, air quality, and traffic in the immediate project vicinity. The incorporation of the recommended mitigation measures during the construction period would prevent adverse impacts to the environmental quality.

8. Individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

Land use in the project area consists of residential and agricultural uses. No other past, present, or future actions associated with these land uses have been identified that would contribute to significant cumulative impacts for any of the resources considered in this EA.

9. Substantially affect a rare, threatened or endangered species, or its habitat;

No aquatic, botanical, avifaunal or mammalian species that are rare, threatened or endangered, or associated habitat were observed within the project limits. Avian diversity is low and only alien species of birds were observed in the project limits.

10. Detrimentally affect air or water quality or ambient noise levels;

No long-term significant impacts to air quality within the project site are anticipated with the construction of the Proposed Action.

During construction, two potential types of air pollution emissions will likely occur, resulting in air quality impacts: 1) airborne dust from construction activities such as grading and excavation within the project site; and 2) exhaust emissions from construction vehicles and equipment from the project site.

Potential air quality impacts during construction of the proposed development will be mitigated by complying with the State DOH Administrative Rules, Title 11, Chapter 60 “Air Pollution Control”. The construction contractor is responsible for complying with the State DOH regulations which prohibit visible dust emissions at property boundaries. Compliance with State regulations will require adequate measures to control airborne dust by methods such as water spraying and sprinkling of loose or exposed soil or ground surface areas and dust-generating equipment during construction. As may be deemed appropriate, planting of landscaping or re-paving as soon as possible on completed areas will also help to control dust. Increased vehicular emissions due to disruption of traffic by construction equipment and/or commuting construction workers can be alleviated by moving the equipment and personnel to the site during off-peak hours. Exhaust emissions from construction vehicles are anticipated to have negligible impact on air quality in the project vicinity as the emissions would be relatively small and readily dissipated.

Operation of the project will have no significant long-term impact on ambient air quality in the project vicinity. Air quality levels would be most affected by vehicular emissions generated by project-related traffic, however, the elevated vehicular emission concentrations are anticipated to dissipate.

No long-term significant impacts to water quality within the project site are anticipated with the construction of the proposed project.

In the short term, potential water quality impacts to surface waters during construction of the project will be mitigated by adherence to State and County water quality regulations governing grading, excavation, and stockpiling. A National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Associated with Construction Activity, administered by the State Department of Health (DOH), will be required to control storm water discharges. Mitigation measures will be instituted in accordance with site-specific assessments, incorporating appropriate structural and/or non-structural Best Management Practices (BMPs) such as silt fences and minimizing time of exposure between construction and re-vegetation or paving.

A Water Quality Certification (WQC), issued by the DOH, pursuant to Section 401 of the Clean Water Act, may be required for "any activity including, but not limited to, the construction or operation of facilities, which may result in any "discharge" into navigable waters". This certification is in place to regulate water quality during and after the construction phase of the project to assure discharge will meet State Water Quality Standards.

Construction activities are not likely to introduce to, nor release from the soil any materials which could adversely affect groundwater. Construction material wastes will be appropriately disposed of and must also be prevented from leaching into receiving bodies of water. Dewatering activity is not anticipated for this project.

No long-term significant impacts to noise levels within the project site are anticipated with the construction of the proposed project.

In the short term, noise from construction activities such as excavation, grading, cutting and paving will be unavoidable. The increase in noise level will vary according to the particular phase of construction. Noise may also increase as a result of operating heavy construction vehicles and other power equipments during the construction period.

Construction noise impacts will be mitigated by compliance with provisions of the State DOH Administrative Rules, Title 11, Chapter 46, "Community Noise Control" noise control regulations. These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels stated in the DOH Administrative Rules. It shall be the contractor's responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment, and to maintain noise levels within regulatory limits. Also, the guidelines for hours of heavy equipment operation and noise curfew times as set forth by the DOH noise control rules will be adhered to; or if necessary, a noise permit will be obtained.

In the long-term, no significant noise impact from is anticipated once the proposed project has been completed. Noise from vehicles will continue to be the primary noise source along the project site, however, no adverse noise effects from the project are anticipated since the project will not generate additional traffic in the vicinity.

11. Affect or is likely to suffer damage by being located in an environmentally-sensitive are such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;

The proposed project crosses Keanuiomano Stream. According to the Flood Insurance Rate Map (FIRM), Community Panel Number 155166 0162C (revised

September 16, 1988) and 155166 0164D (revised July 16, 1990) areas along Keanuiomano Stream are delineated Zone A which is subject to inundation by a IOO-year flood (Figure 3-4).

Bridges are typically structures with a low flood damage potential and low potential for obstructing the regulatory flood, affecting the capacity of the floodway, or increasing the regulatory flood elevations. The Proposed Action would be constructed in accordance with current seismic design criteria.

12. Substantially affect scenic vistas and viewplanes identified in county of state plans or studies; or

The overall visual quality of the bridge area would not change significantly as a result of bridge replacement. The Proposed Action would not obstruct any view planes or scenic vistas.

13. Require substantial energy consumption.

Construction activities associated with the Proposed Action would require relatively high short-term energy use, however, once completed, the proposed action would not require substantial energy consumption.

Based on Hawaii Administrative Rules Title 11, State of Hawaii Department of Health, Chapter 200, Environmental Impact Statement Rules, Subchapter 6, Section 11-200-9 (4), construction and operation of the Kawaihae Road Waiaka Bridge Replacement and Realignment of Approaches does not warrant the preparation of an environmental impact statement preparation notice.

6.2 National Environmental Policy Act

The National Environmental Policy Act (NEPA) determination of “significant impacts” is related to the type of NEPA document and process that will be required to comply with NEPA for a proposed action. There are three types of environmental documents under NEPA, 1) Categorical Exclusions (CE), 2) Environmental Assessments (EA), and 3) Environmental Impact Statements (EIS). A CE is appropriate where there are no “significant impacts” on the environment, an EA when the “significance” of the effects are not clearly established, and an EIS when the action will have a significant impact on the environment.

Significance is defined in the Council of Environmental Quality (CEQ) regulations (40 CFR 1508.27). A “significant impact” is assessed in terms of an impact’s “context” and “intensity”. Context refers to the environment and the level of relative abundance of resources in the project area. Intensity refers to the specific impact, or how much of the resource(s) would be used or affected by the project.

The HDOT and FHWA made a preliminary assessment that a CE is appropriate based on the current understanding of the environmental impacts of the Proposed Action. CE are actions which meet the definition contained in 40 CFR 1508.4. They are actions which:

- Do not induce significant impacts to planned growth or land use for the area;
- Do not require the relocation of significant numbers of people;
- Do not have a significant impact on any natural, cultural, recreational, historic or other resources;
- Do not involve significant air, noise, or water quality impacts;
- Do not have significant impacts on travel patterns; and
- Do not otherwise, either individually or cumulatively, have any significant impacts.

Actions which meet the criteria for a CE in the CEQ regulations (40 CFR 1508.4) and Environmental Impact and Related Procedures (23 CFR 771.771(d)) may be designated as CEs only after FHWA approval. "Bridge rehabilitation, construction or replacement or construction of grade separation to replace existing at-grade railroad crossings" is an action listed which meets the CE criteria.

According to FHWA's regulations for NEPA compliance, the proposed project qualifies as a CE. Based on the findings of this EA, FHWA anticipates issuing a CE, and a NEPA EA will not be required for this project. The FHWA will determine if the CE is appropriate for the proposed project following receipt of comments on this Draft EA.

This Environmental Assessment has been prepared under the requirements of the National Environmental Policy Act (NEPA) of 1970 (23 CFR 771 and 40 CFR 1500).

7 PUBLIC INVOLVEMENT AND AGENCY CONSULTATION

7.1 Pre-Assessment Consultation

The following agencies and organizations were contacted during the preparation of the Draft EA. Of those who formally replied during the pre-assessment period, some had no comments while others provided substantive comments as indicated by the ✓ and ✓✓, respectively. All written comments are reproduced herein (Appendix J).

<u>Federal</u>
U.S. Army Corps of Engineers
U.S. Fish & Wildlife Service
U.S.G.S. Pacific Island Ecosystems Research Center
U.S. Coast Guard

<u>State of Hawaii</u>
Department of Agriculture
Department of Business Economic Development & Tourism (DBEDT)
DBEDT, Strategic Industries Energy Resources and Technology Division
Department of Hawaiian Home Lands ✓✓
Department of Land & Natural Resources (DLNR)
- Land Division ✓
- Forestry & Wildlife ✓
- Aquatic Resources ✓
- Commission on Water Resource Management ✓✓

DLNR, Historic Preservation Division
DLNR, Historic Preservation Division, Hawaii Island
Department of Health (DOH)
- Clean Water Branch ✓✓
- Environmental Management Division

Office of Hawaiian Affairs
University of Hawaii, Environmental Center and Water Resources Research Center

Senator Dwight Takamine
Representative Mark Nakashima

<u>County of Hawaii</u>
Civil Defense
Fire Department ✓✓
Department of Environmental Management ✓✓
Department of Parks & Recreation
Planning Department ✓✓

Police Department ✓
Department of Research & Development
Department of Water Supply
Department of Public Works

Councilmember Peter Hoffman
South Kohala Community Development Plan Steering Committee

Other
Kona Kohala Chamber of Commerce
Hawaii Electric Company
Hawaiian Telcom
Oceanic Cable ✓✓
Kamehameha Schools
Waimea Community Association
South Kohala Traffic Safety Committee ✓✓
Waimea Trails and Greenways ✓✓
Waimea Outdoor Circle
Hawaii Preparatory Academy ✓✓
Parker Ranch
Waimea Gardens
Kekamealei Family
Ms. Jadelyn Hoonanea Andrade
Mr. & Mrs. Nelson Doi
Mr. & Mrs. Harry Lewis
Mr. Ken Melrose
Mr. & Mrs. William Floyd Long
Mr. Harold F. Rice

7.2 Community Participation

A series of three public informational meetings were held in Waimea to solicit comments on the Waiaka Bridge replacement project. During these meetings, the various alternatives were presented and public comments were solicited related to the alternatives. Meeting notices were published in the newspaper for the first and third meetings and meeting notices mailed to attendees for the later two meetings (see Appendices A – C).

The meetings were held on: March 6, 2002; January 15, 2008, and December 15, 2009. A total of about 45 attendees were at the March 6, 2002 meeting, 75 attendees at the January 15, 2008 meeting, and 40 attendees at the December 15, 2009 meeting. Comments received during the Public Information Meetings #2 and #3 are included in Appendices B and C).

7.3 Draft Environmental Assessment Review

The Draft EA will be sent to the following agencies and organizations.

Federal
U.S. Army Corps of Engineers
U.S. Fish & Wildlife Service
U.S.G.S. Pacific Island Ecosystems Research Center

State of Hawaii
Department of Agriculture
Department of Business Economic Development & Tourism (DBEDT)
DBEDT, Strategic Industries Energy Resources and Technology Division
Department of Hawaiian Home Lands
Department of Land & Natural Resources (DLNR)
DLNR, Historic Preservation Division
DLNR, Historic Preservation Division, Hawaii Island
Department of Health (DOH)
Office of Hawaiian Affairs
University of Hawaii, Environmental Center and Water Resources Research Center

Senator Malama Solomon, District 1
Representative Mark Nakashima, District 1

County of Hawaii
Civil Defense
Fire Department
Department of Environmental Management
Department of Parks & Recreation
Planning Department
Police Department
Department of Water Supply
Department of Public Works

Councilmember Peter Hoffman
South Kohala Community Development Plan Steering Committee

Other
Kona Kohala Chamber of Commerce
Hawaii Electric Company
Hawaiian Telcom
Oceanic Cable
Kamehameha Schools
Waimea Community Association

South Kohala Traffic Safety Committee
Waimea Trails and Greenways
Waimea Outdoor Circle
Hawaii Preparatory Academy
Parker Ranch
Waimea Gardens
Kekamealei Family
Ms. Jadelyn Hoonanea Andrade
Mr. & Mrs. Nelson Doi
Mr. & Mrs. Harry Lewis
Mr. Ken Melrose
Mr. & Mrs. William Floyd Long
Mr. Harold F. Rice

8 REFERENCES

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US Department of Transportation Federal Highway Administration. Memorandum. Use of Debris from Demolished Bridges and Overpasses. March 7, 2006.

U.S. Geological Service Website. Peak Streamflow for USGS 16756500 Keanuiomano Stream http://nwis.waterdata.usgs.gov/hi/nwis/peak?site_no=16756500&agency_cd=USGS&format=html Accessed January 27, 2011.

State of Hawaii, Department of Transportation, Design Criteria for Highway Drainage, October 2010.

Appendix A

Public Information Meeting #1, March 6, 2002

6413-01 BT

3/7/02 File

Miscellaneous

NOTICE OF ORDER
Setting the Minimum Price Paid Per Hundredweight of Class I Milk in the Honolulu Milk Shed

Notice is given that pursuant to section 157-33, Hawaii Revised Statutes, and section 4-60-9, Hawaii Administrative Rules, the Board of Agriculture, by and through the manager of the Commodities Branch of the Department of Agriculture, on February 12, 2002, proposed the establishment of the minimum price for class I milk in the Honolulu milk shed, based on milk with a butterfat content of 3.3 per cent, at $25.47 per hundredweight in Order No. 02-MK-03 effective March 1, 2002. Order No. 02-MK-03 was approved by the Governor on February 19, 2002.

Copies of Order No. 02-MK-03 are available at the Department of Agriculture, 1428 South King Street, Honolulu, Hawaii 96814 (Ph. 973-9577) and will be mailed to interested parties upon request. A reproduction fee of 50 cents per page or fraction thereof, will be assessed for all requested copies.

James J. Nakatani
Chairperson,
Board of Agriculture
(MW04502226: 3/4/02)

Notices To Offerors

NOTICE TO OFFERORS INVITATION FOR BID IFB-02-BESSD-101-OHM

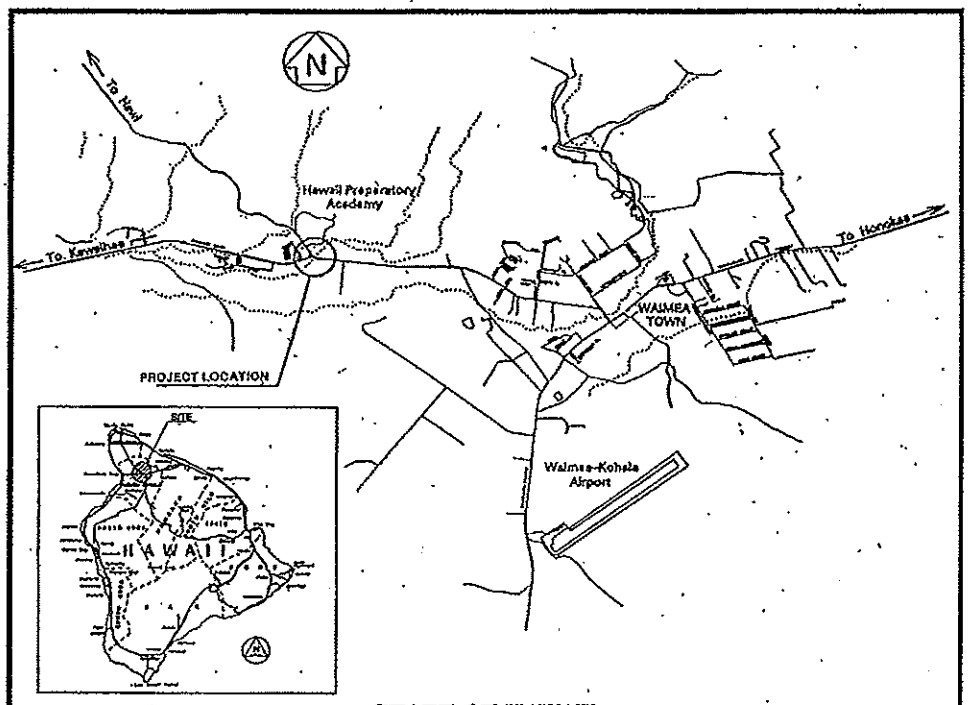
Sealed bids to **FURNISH AND DELIVER TOYS, FURNITURE, AND EQUIPMENT TO PRE-PLUS SCHOOL FACILITIES ON THE ISLANDS OF OAHU, HAWAII, AND MAUI** will be received at the State of Hawaii, Department of Human Services, 1390 Miller Street, Room 206, Honolulu, Hawaii 96813 until March 18, 2002, 2:00 p.m., H.S.T.

The bid packet and forms may be obtained and/or examined at the above office from March 1, 2002, 9:00 a.m. to 3:00 p.m., H.S.T.

For information call (808) 586-4864 – 8:00 a.m. to 3:00 p.m., H.S.T.

Susan M. Chandler, Director
Department of Human Services
(MW05506313 3/4/02)

Meetings



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS
KAWAIHAE ROAD, WAIAKA STREAM BRIDGE REPLACEMENT AND REALIGNMENT OF APPROACHES
ISLAND OF HAWAII

NOTICE

Notice is hereby given that the State Department of Transportation, Highways Division, will hold a public informational meeting on Wednesday, March 6, 2002, at the Waimea Civic Center, State Office Building Conference Room, at 7:00 PM, for the proposed Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches. The purpose of this first public informational meeting is to solicit comments from affected parties and to further involve the public in the planning process. Should special accommodations be needed to participate in this meeting, please call Ronald Tsuzuki, Head Planning Engineer, Highways Division, at (808) 587-1830.

BRIAN K. MINAAI
Director
Department of Transportation
(MW04502202: 3/4/02)

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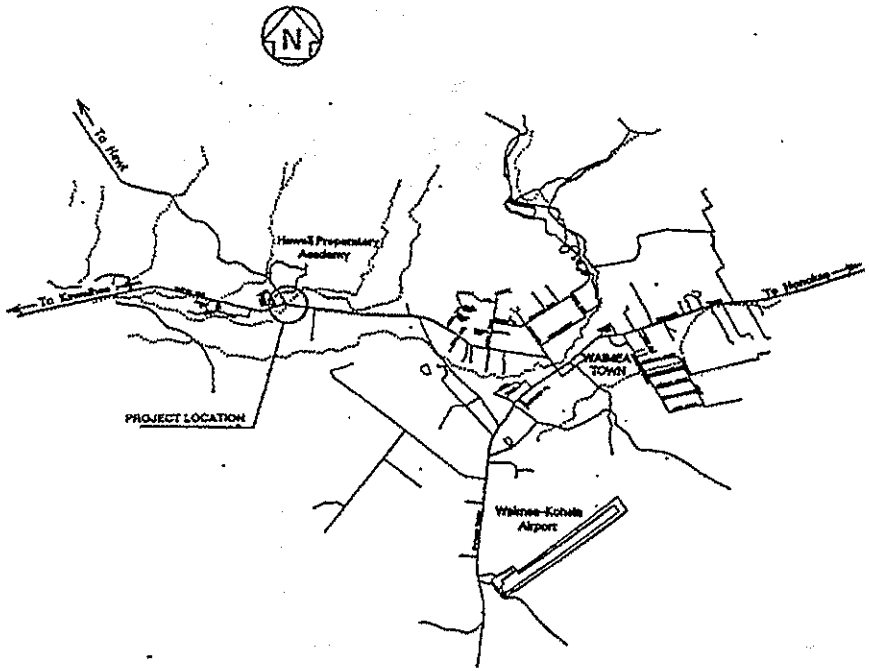
Bridge meeting Wednesday

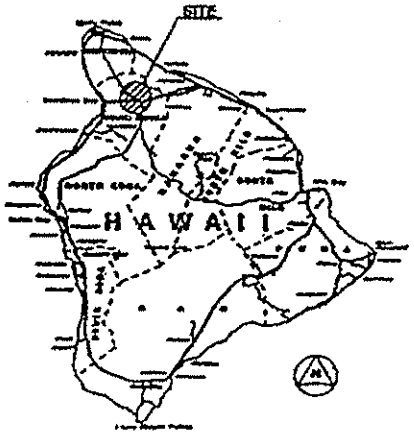
The state Department of Transportation will discuss the proposed Kawaihae Road, Waiaka Bridge replacement and approach realignments at a meeting this week in Waimea.

An informational hearing is scheduled for 7 p.m. Wednesday at Waimea Civic Center. The bridge is at the junction of Kawaihae Road and Kohala Mountain Road near Hawaii Preparatory Academy.

The purpose of the meeting, state officials said, is to involve the public in the planning process.

CC: DOT HWY-PA, VIA FAX 3/8/02
H LEE 8/5/02





STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS

KAWAIHAE ROAD, WAIAKA STREAM BRIDGE REPLACEMENT AND REALIGNMENT OF APPROACHES

ISLAND OF HAWAII

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BRIAN K. MINAAI
Director
Department of Transportation

(No. 2260 - West Hawaii Today: March 4, 2002)

6413-01

6413-01
March 8, 2002

WILSON
OKAMOTO
& ASSOCIATES, INC.

ENGINEERS
PLANNERS

1907 S. BERETANIA STREET
HONOLULU, HAWAII 96826
PH: (808) 946-2277
FAX: (808) 946-2253

cc: DOT HWY-PA
VIA DEL 3/14/02
H LCB 8/5/02

MEETING DATE: March 6, 2002
7:00p, State Office Building, Waimea Civic Center, Waimea, Hawaii

PUBLIC INFORMATIONAL MEETING MEMO

SUBJECT: Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches

PERSONS PRESENT: 45 signed-in attendees (See attached)
John Sakaguchi Wilson Okamoto & Associates (WOA)

PURPOSE: To discuss the Kawaihae Road (K-R), Waiaka Bridge Replacement and Realignment of Approaches project and to solicit public comments.

INFORMATION ITEMS:

Lester Fushikoshi, Commissioner of Transportation, opened the meeting at 7:08p, stated the purpose of the meeting, and introduced the project team members.

Barry Toyota, WOA, presented slides showing: the purpose of the project, the work tasks, the project location, the conditions of the approaches from photographs; existing sections of the bridge and approaches, proposed sections of the bridge, and the tentative project schedule.

After the presentation, the meeting was opened for questions, comments, and concerns, as summarized below.

1. What are the safety problems at the bridge?
2. The bridge and the intersection have sight distance problems. Also, vehicles approaching the bridge from Waimea and from Kawaihae are traveling too fast. Turning left from Kohala Mountain Road (the HPA side) is hazardous. One cannot see on-coming traffic from Waimea.
3. A bicycle rider was fatally injured on the bridge when struck by a vehicle. Vehicles also travel too fast down Kohala Mountain Road toward the bridge.

This is especially applies to construction trucks coming from a site further up the hill.

4. Will the bridge be widened? There is a problem now when 2 large trucks or 2 large buses are on the bridge at the same time. Problems also occur when a large truck or a large bus is on the bridge at the same time as a smaller vehicle. This creates problems for both types of vehicles.
5. If the bridge is widened or lengthened, more traffic will be on the bridge and the speeds will be higher. The State should build the bypass road to shift the traffic from the bridge to the bypass.
6. Since the late 1960's, the State has been planing to build the bypass road. What has happened to the bypass road project? Has bypass project been split into 2 sections? If the bypass is built, most of the traffic will go to the coast via the bypass road and will not use the bridge.

The State has split the bypass project into 2 segments, from Mud Lane, east of Waimea, to near the Kohala-Waimea Airport (Waimea Bypass) and from Waimea to the coast (Kawaiha Bypass). Both of these projects are very high cost projects and would require a long lead time for preparation and processing of an environmental assessment. More importantly, based on preliminary cost estimates, construction of these 2 projects would use all of the State's highway CIP funds for one year. The high cost makes it difficult to implement these types of bypass projects. Funding for replacement of the bridge could be done with less difficulty.

7. The bypass would not eliminate traffic from the bridge. The bridge project is needed to improve conditions at the bridge. Now, a driver making a left turn from Kohala Mountain Road onto Kawaihae Road cannot see oncoming traffic from the Waimea direction. Also, HPA plans to move their campus to the area and DHHL plans to build 400 homes near the bridge. How will this impact the bridge and road?

8. How many years will it take to build the bridge? The main issue to be considered is reducing speeds near the bridge. Any project must include speed abatement measures. Traffic must be slowed down near the bridge.

9. The State should install an "iron policeman" to take photos of cars that are speeding near the bridge. The "iron policeman" is used in Europe to control speeders along the highways.
10. Speed is the main problem. The State should put in speed bumps to reduce speed.
11. Improving the bridge will increase speed along the highway, not decrease speed. The State should let the bridge deteriorate so that big trucks can be eliminated from using the bridge. This would help the problem. Right now it takes 10 minutes to exit the driveway nearest the bridge. When exiting the driveway, the driver must wait until the traffic is clear all the way to the Rubbish Dump Road before making the left turn onto the highway. Improving the highway will increase speeds. It would be better to slow down the vehicles.
12. Improving the highway will increase traffic and increase speeds. The State should not make the bridge wider. A stop sign should be added to slow down the traffic.
13. The Waimea Greenway and Trails project will provide bicycle trails in the area. This will also bring more bicycle riders to the area. The bridge is now dangerous for bicycle riders. The new bridge should include a bike path. The bike path should not be deleted to reduce costs.
14. The area near the bridge and stream has other uses. How will a 58-foot wide new bridge be placed in the stream?
15. The Waimea-bound approach from Kawaihae has a sight problem. The museum wall should be knocked down to improve the sight problem.
16. The new bridge should be moved downstream to avoid this section of the highway. The new bridge should be located to bypass this section of the highway. The State should "do nothing", as an alternative.

The "do nothing" alternative is always considered as part of the EA. "Do nothing" is also an alternative to be considered in the engineering.

17. The problem is speed of the traffic on the highway, especially if the approach and bridge are straightened out. What research has been done to study methods to slow down the traffic?

18. What is the daily traffic volume on the bridge?
19. A study 4 or 5 months ago showed 23,000 vehicles through Waimea over a 24-hour period.
20. How many accidents have occurred at the bridge? How many fatalities?
21. The bridge approach guard rails are a problem. With the guardrails, there is no place to go off the highway to avoid an oncoming vehicle. The approach guardrails exiting the bridge from Kawaihae should be removed. This would give drivers a place to maneuver out of the way of an oncoming vehicle.
22. What is the cost to remove the guardrails? What is the cost to add speed bumps?
23. The improvements should include pedestrian and horse paths on the bridge. Is there a way to remove trucks from the highway and bridge?
24. The rails on the bridge are a problem. The rails block the view of oncoming traffic when making a left turn from Kohala Mountain Road onto Kawaihae Road.
25. Can the State remove the wall built by the museum?
26. The State should include a study for a left turn from the highway onto the Rubbish Dump Road. This is a problem area. The study should be funded to examine adding a left turn storage lane on the highway and the Rubbish Dump Road.
27. Will the community have a say in the improvements to the bridge and highway?

The State is not sure what the community wants. That is one of the reasons for this meeting and the ones to follow. The entire community needs to be considered when the State makes a decision on a project, not just the opinions of those attending the meetings. Users of the bridge from other communities should also be allowed to give input into the State's decision.

28. What will solve these problems? The bypass road is needed to solve the problem. The State has been studying the bypass for at least 22 years.
29. Provide more information about the bridge rating. Doesn't the bridge need to be replaced because of the seismic rating?

30. Speed bumps should be added to slow down the vehicles. Also, a stop sign should be added to slow down the vehicles.
31. The meeting notice should have a longer lead time.
32. The new bridge needs to consider all of the communities that use the bridge, including Hilo and Kohala. The bridge belongs to the public, not just those in Waimea. The bridge is a Big Island bridge. Funds collected from the entire state will be used to construct the bridge.
33. Can the community have both the bridge and bypass?

The likelihood of constructing the bypass is slim. All of the studies related to the bypass need to be re-done starting from scratch. These will take a long time to conduct and get approved. The bypass is on the 20-year plan. It will take a long time to get Federal funds to construct.

34. Would the bypass have to be built all at one time? Couldn't the construction be phased so that it could be built over time.

Phasing can be done. However, unless the phases are connected to existing roads, all of the construction would have to be done before the bypass could be used.

35. Funds can be made available. The State can form a public-private partnership to build the bypass. It can be done.

The State is currently considering a plan to partnership with private developers to build new roads in the Ewa area of Oahu. This concept could be used for the bypass.

Commissioner Fushikoshi adjourned the meeting at 8:40p.

Appendix B

Public Information Meeting #2, January 15, 2008

DRAFT

WILSON OKAMOTO
CORPORATION
ENGINEERS PLANNERS CONSULTANTS

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HONOLULU, HAWAII 96826
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6413-01
March 11, 2008

MEETING INFORMATION AND SUMMARY

MEETING DATE: January 15, 2008
5:30p open; 7:00p presentation; 8:25p end

MEETING LOCATION: Waimea Elementary School Cafeteria

PERSONS PRESENT: 74 attendees (see attached sign-in sheets)

PROJECT TEAM PRESENT:

Brennon Morioka, DOT
Robert Taira, DOT-H
Dina Lau, DOT-P
Tracy Fukuda, WOC
Stanley Tamra, DOT-H
Darell Young, DOT-PA
John Sakaguch, WOC
Pete Pascua, WOC
Sal Panem, DOT-H
Nelson Sagum, DOT-P
Bruce Gorst, WOC

SUBJECT: Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches Island of Hawaii, Project No. AMTRK-01-99

PURPOSE: To solicit input and comments on the alternatives and discuss other aspects of the project.

INFORMATION ITEMS:

Director Morioka opened the meeting, provided a project summary, and introduced Pete Pascua who gave a presentation identifying the purpose of the project, overview of the existing Waiaka Bridge and adjacent intersection, existing and proposed bridge sections, findings from Public Meeting #1, and 5 alternatives for the replacement of the bridge and realignment of approaches and intersection.

The alternatives include the following:

Alternative #1 – No Build
Alternative #2 – Replacement Bridge/New Location
Alternative #3 – Replacement Bridge/Existing Location
Alternative #4 – Replacement Bridge/Roundabout
Alternative #5 – Replacement Bridge/South Location

Sketches of each alternative are attached to this memo.

The following are questions that surfaced during the meeting followed by general responses by the project team:

1. *The stream that flows beneath Waiaka Bridge is Kohakohau Stream. Why is the name different, and will the name of the new bridge be changed to the stream name?*

Response: It is unclear why the bridge and stream have different names. There are no plans to change the name of the bridge once replaced. A history of the bridge will be prepared for the EA which will compile available historical data.

2. *Have funds been allocated for the project?*

Replacement of the bridge reconstruction is listed in the most recent STIP (Statewide Transportation Improvement Plan). Planning and design funds are identified for Federal FY 2010, which begins at the end of September 2009.
Over 200 comments were received by DOT on the Waiaka Bridge during the STIP review process. The comments indicated the bridge is a low priority to the community. There is a possibility of a shortfall of Federal funds for DOT projects. Current DOT plans are that Federal funds will be available for the project.

3 *Will the replacement bridge be able to accommodate horses?*

The replacement bridge will have wider travel lanes, and include 8-foot shoulders. This should provide space for horses. Riders must still use their own judgment.

4. *Will there be any physical barrier between the 12-foot travel lane and the 8-foot shoulder? (Concern is for bicycle safety).*

The travel lanes and shoulders will be delineated with pavement striping based on standard roadway bridge and roadway designs.

5 *How long will construction last?*

A replacement bridge of this type takes about 1-½ to 2 years to construct.

6. The proposed alternatives are shown in two dimensions, but they do not indicate what the specific design guidelines of the reconstructed bridge and intersection will be on the ground. Is it a goal of the project to increase the design speed? (Posted speed limit is 25 mph).

There will be no changes to the designated speed for the facility. The project will be designed for 30 mph, with a posted regulatory speed limit of 25 mph The realigned approaches will also result in improved sight-distances.

7. Which alternative would be considered the safest alternative?

It's difficult to say, since each alternative brings something different and results in different driving characteristics. Possibly the roundabout, since it naturally slows traffic. However, the replacement bridge and approaches would meet current design standards incorporating safety.

(Clarification from HWY-H: The roundabout is slower, but it is not necessarily safer. Driving behavior is not predictable, and drivers who are unfamiliar with roundabout design can negatively affect road safety. Aging drivers is another factor. When pedestrian safety is considered, the roundabout design could also be less favorable).

8. Regarding the incidences of overtopping, isn't the Army Corps responsible for maintaining the stream?

The Corps oversight generally goes into effect only when work is performed anywhere within the high water mark of the stream. The landowner is responsible for maintaining the stream. A replacement bridge without the center pier should prevent overtopping by preventing debris blockage.

9. Will the removal of the center pier compromise the strength of the new bridge?

No. Current bridge technology allows bridges to have longer spans without compromising structural integrity. The removal of the center pier should facilitate stream flow under the bridge.

Comment from audience. The ownership of streams is a problem - which was also discussed in the Waimea Trails project. Each landowner owns to the center of the stream,

or one-half of the stream, with the opposite adjacent landowner owning the other half. This makes it difficult to determine who is responsible for the maintaining the stream.

10. Comment: Regarding pedestrian safety, there are no sidewalks on either side of the bridge now, so pedestrians must still use the road shoulder after crossing the improved new bridge (same is true for bicyclists). The existing bridge should be retained for pedestrians and bicyclists.

Both approaches would retain the current travel lane-shoulder configuration. Pedestrians and bicycles would to use the proposed available shoulder area.

11. *Comment. The replacement bridge should be connected to the County's Lalamilo Bypass Road.*

The Lalamilo Bypass is a County of Hawaii project. A connection would be contrary to the intent of the Lalamilo Bypass Road – that is to allow traffic to bypass the area. It is anticipated that traffic on the existing roads in the vicinity would reduce as shifting in the traffic demand occurs with the bypass route.

12. Has a study been done of the speed at which drivers currently use the intersection? Most drivers are driving over 45 mph when approaching the bridge, including large tour buses.

Not of the bridge and intersection. DOT conducted a study at the Kawaihae Road /County transfer station intersection as part of a resurfacing project. As a result of the study, a left-turn storage lane will be added for vehicles making left turns going to the transfer station. The modifications to the bridge and approaches will be designed to current standards and should improve safety at this location.

13. The recent asking price for the Kamuela Museum has gone up appreciably. Could this affect the selection/rejection of Alternative 5?

Should acquisition be involved in the selected alternative, DOT must purchase any property at fair market value. DOT will conduct an appraisal to determine the fair market value. If the landowner agrees with the DOT appraisal, the purchase can proceed. If the landowner does not agree, they can have their own appraisal done. If condemnation occurs, a judge reviews

the case and makes a decision. A large increase in the asking price would not necessarily influence the ultimate purchase price, nor the selection of the preferred alternative.

13. Comment: Alternative #2 seems to be the least expensive alternative.

Aside from the no build Alternative #1, Alternative #2 would be the least expensive. However, the ultimate location of the bridge would be further upstream of the existing bridge with the exception of Alternative #5, which would locate the new bridge downstream of the existing bridge. Alternative #5 however requires the acquisition of the museum property. The other alternatives use a temporary bridge during construction, which increases the construction cost.

14. There is concern that the bridge/ intersection will become a choke point during the 2-year construction period. Can the bridge construction be timed such that the Kawaihae Bypass road is available for use prior to the bridge construction?

The Waimea and Kawaihae Bypass projects have been in the planning stages since the 1967. Currently, the DOT intends to publish the EIS for the Kawaihae Bypass by the end of 2008, so that planning and design of the two projects could run concurrently. Also, the current construction cost estimate for the Kawaihae Bypass is $125.0 million. The EIS is also to discuss phasing, so the timing of completion of the Bypass section near the bridge/intersection is not known. It is likely that the bridge will be constructed before the bypass is completed. However, during the construction or reconstruction of Waiaka Bridge, the plan is to provide two lanes of traffic, one lane in each direction, to maintain traffic flow through the area.

Comment: The Kawaihae Bypass has been discussed since 1967. The bridge needs to be replaced now.

The bridge replacement or modification is necessary to mitigate its poor sufficiency rating. Such a rating is based on structural adequacy and safety, amongst other factors. Should the bridge not be modified or replaced, the bridge is expected to deteriorate further.

Comment: The area near the bridge is very noisy from vehicle traffic, especially heavy trucks. The Bypass is needed to bring back quiet to the area.

It is expected that the bypass would reduce the traffic demands on the bridge. Hence, the reduction in noise levels.

15. Comment: The replacement bridge will only widen the travel lanes by 1 foot, from 11 to 12 feet wide. Why not go to 14-feet wide travel lanes and eliminate the shoulders? If the bridge is constructed according to the bridge section diagram, vehicles and heavy trucks will use the entire width of 20 feet and try to pass each other.

The replacement bridge will be designed to current standards for bridges on functional classification. Providing travel lanes wider than the standards would be conducive to speeding.

16. The bridge currently has a sufficiency rating of 26, down from 39 in 2002. How low would this rating have to go before the bridge would need to be closed?

The bridge sufficiency rating depends on a number of factors. A low number does not mean a bridge is unsafe to operate. Factors such as absence of bridge railings, etc. all contribute to the rating. Thus, a bridge can be structurally sound and still be rated very low. If load bearing capacity becomes an issue, weight restrictions for vehicles using the bridge may be enforced, such as limiting vehicle tonnage from 25 to 20 tons, with further restrictions as needed until the bridge is replaced. This is not the case with Waiaka Bridge.

17. The priority should be to improve the bridge. No piers under the bridge will mean that it can be kept open during storms. Also, something must be done to slow down traffic. One alternative should show a left turn to go to Kawaihae. This would slow traffic.

The alternatives would be designed to meet current design standards. With the exception of the "No Build" alternative and the "Roundabout" alternative, a left-turn lane is proposed for movements from Kawaihae to Kohala Mountain Road. That provision should allow continuous traffic movement along Kawaihae Road.

18. Under Alternative 2, the existing bridge should be retained for pedestrians and bicycles.

This can be considered. However, the existing center pier could be a problem related to debris in the stream. The bridge pier is located within the stream flow. Should debris

flowing downstream get caught by the bridge pier, stream flow could be impacted resulting in potent overtopping of the bridge.

19. Speed bumps should be used to slow down traffic. Also, the roundabout would slow traffic.

The "roundabout" alternative is expected to slow traffic. However, such a design would require careful analysis since the roundabout facility would not be consistent with other intersections along the Kawaihae Road alignment. Inconsistencies in the roadway may result in driver confusion. The roundabout alternative will require further study to ensure its applicability for this project. Speed bumps serve as a traffic calming device similar to roundabouts. Speed bumps change vehicle paths in the vertical plane while roundabouts generally change vehicle paths in the horizontal plane. Similar to roundabouts, speed bumps require careful analyses and work well in the right locations, especially low-volume residential roadways. The analyses will be conducted during the detailed design of the project.

20. Which alternative would be best for emergency situations, where drivers need to pullover?

All about the same. The roundabout may be slightly slower to negotiate by emergency vehicles.

21. The roundabout has the entry coming from Kawaihae too close to the entry from Waimea. Vehicles entering from Waimea will not know whether the other vehicle is going to Kohala Mountain Road or to Waimea. The two entries should be separated.

Alternative 5 is conceptual. If the alternative is selected, the actual layout of the roundabout will be done during the design phase and will consider separation of the approaches.

22 How can kids access the planned Waimea trails and greenways routes from the Waiaka neighborhood? Could the pedestrian walkway on the bridge be eliminated if the mauka trail route is proximate to the bridge?

The Waimea project is a County project and would require coordination. The trail routes and access in the vicinity of the Waiaka Bridge should be incorporated in the design. Such effort

will require coordination with the County. The County will also have the opportunity to review and coordinate their plans with DOT-Highways through the EA process.

23. If the bridge is replaced, will it take away funds from construction of the Kawaihae Bypass?

No. DOT is currently committed to proceed with both projects. Potential funding for each of the project should not affect the availability of funds for the other.

Comment: Two bridges should be used for the roundabout. This would separate vehicles entering the roundabout. The roundabout would also increase noise from trucks, since they will have to go around at a slow speed.

24. Who decides which alternative to do?

DOT will decide which alternative to undertake. The goal is to identify a preferred alternative that represents the best option of those expressed by the community.

25. Are construction costs current or future costs?

The costs are future costs. It is expected that costs will revise even higher if the project schedule is moved to later years.

26. Would the bridge be designed with any restrictions?

The bridge would be designed to current standards which means an HS-20 rating. This would allow trucks hauling a D-8 or D-9 tractor to proceed through the bridge without any problem.

27. Is there a DOT project to widen the road?

No. DOT has no plans to widen the road to 4 lanes. With the Kawaihae Bypass, there are no plans for a 4-lane road.

Comment. DOT should coordinate their plans with the County Lalamilo Bypass and the DHHL Lalamilo houselots.

28. Which alternative would be the quickest to construct?

With the exception of the "No Build" alternative, the schedule to construct the remaining alternatives in the range of 1½ to 2 years.

29. Comment: DOT should consider the impact of flooding to adjacent areas, especially if the existing bridge is to be retained.

30. Will there be bicycle lanes on the approaches? Bicycle lanes on the bridge won't help if there are no bicycle lanes on the roadways near the bridge.

The DOT-H resurfacing project will increase the existing roadway shoulder from 3 feet wide to 4 wide. The shoulders will also have 2.0 percent cross-slopes to meet ADA standards. The bridge replacement project would include shoulders on the bridge that will link with the shoulders of the approaches to provide continuity within the project limits.

31. Can the alternatives add a left-turn refuge lane for vehicles turning left from Kohala Mountain Road?

A left-turn refuge lane is oftentimes incorporated in an intersection design since a remnant area is created when providing a left-turn lane on the opposing approach. The inclusion of a refuge lane will be considered in the detailed design of the intersection and will be dependent on space availability and sight distance constraints.

Other miscellaneous comments:

One Waiaka resident indicated that the project is a priority for safety reasons, despite the opinion expressed by others to complete the bypass first.

Waiaka was once as big as Waimea.

Traffic lights work, traffic bumps work

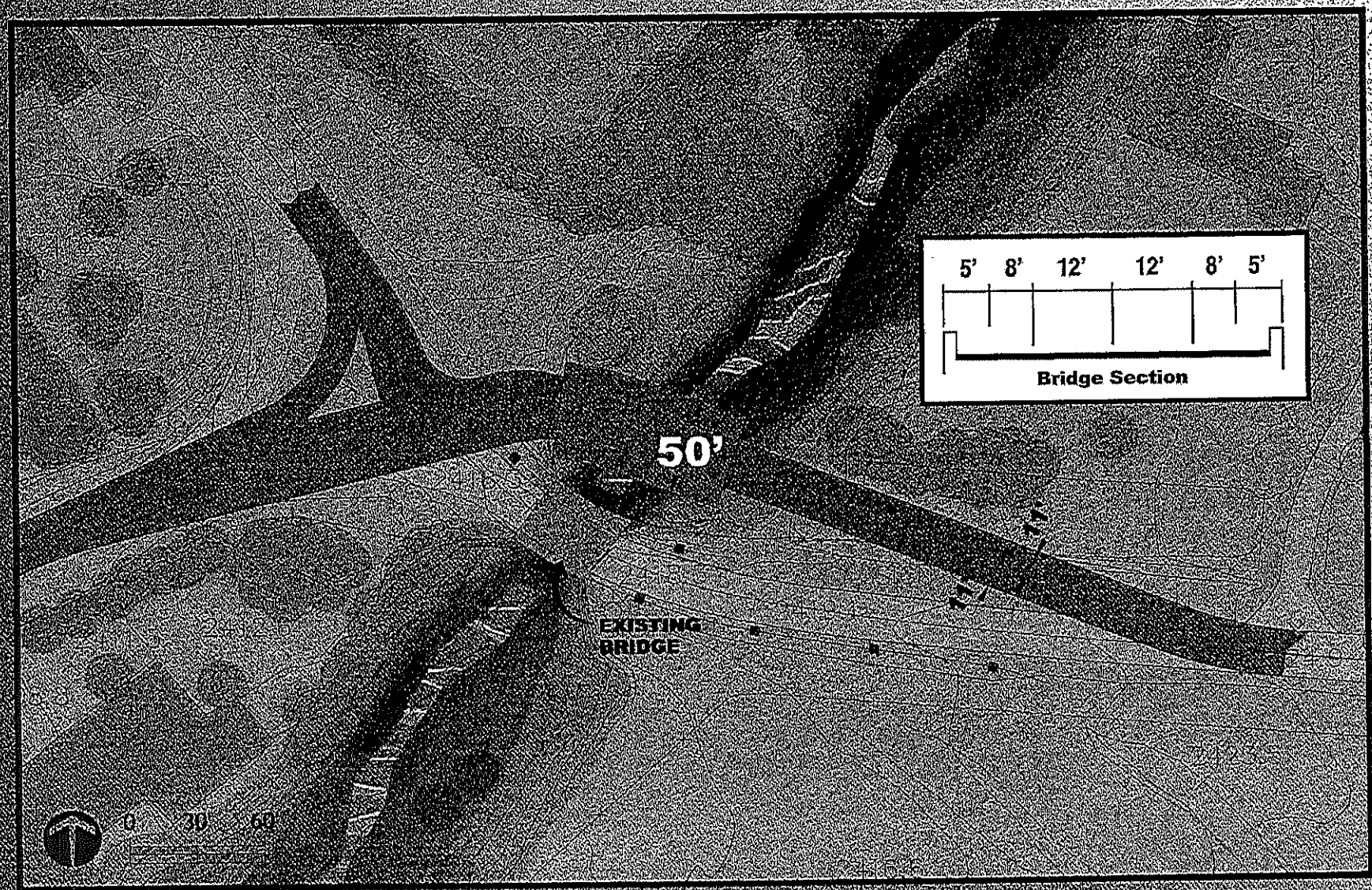
The roundabout will contribute to increased noise, as trucks decelerate and then accelerate to negotiate the curves.

Should consider leaving the existing bridge and constructing a new bridge for an in and out (Note: this would not resolve the hydraulic issue, as the center pier on the existing bridge would remain).

See 5 additional written comments.

Alternative 1 – No Build

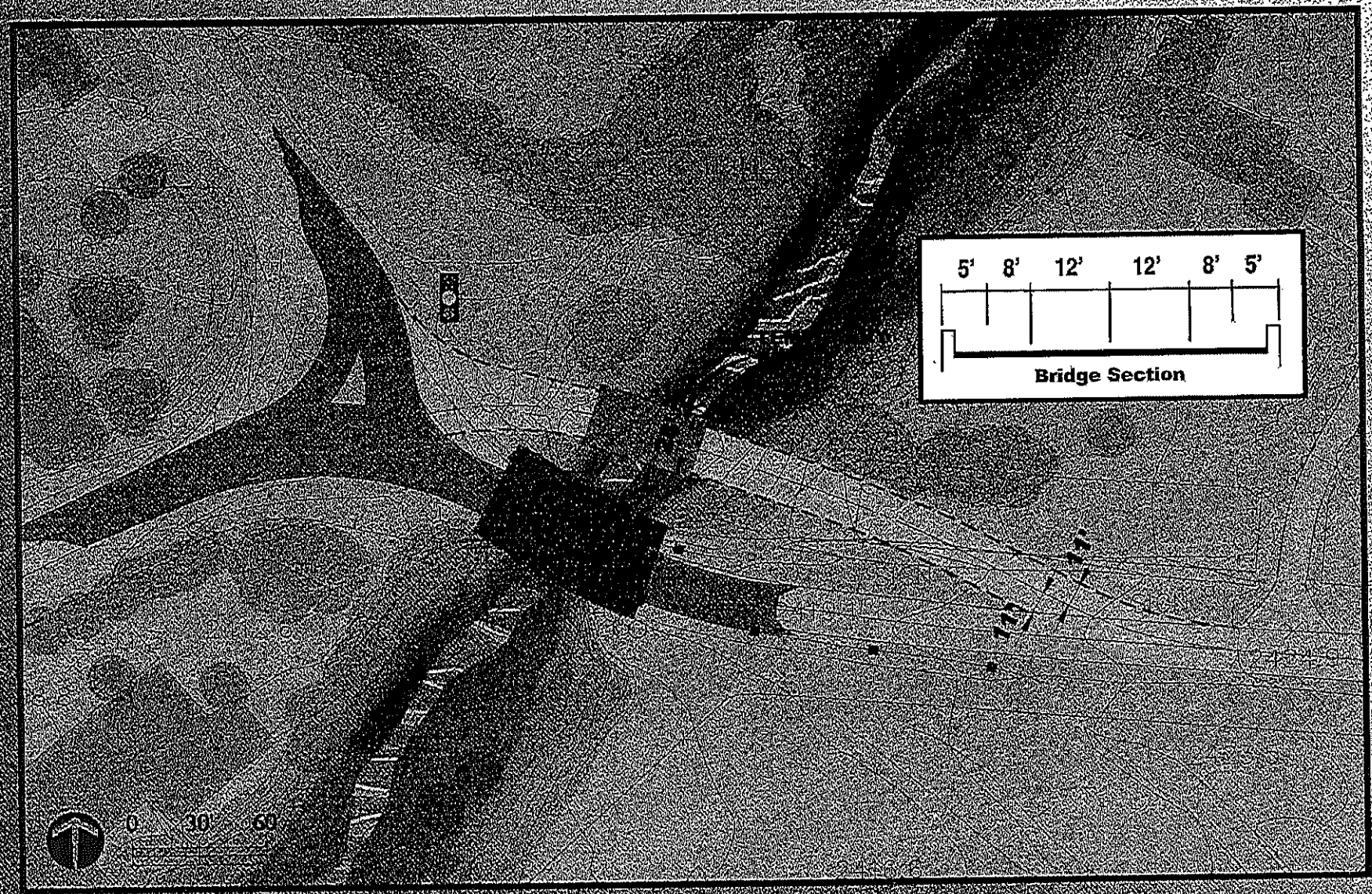
Alternative 2 – Replacement Bridge / New Location



Estimated Construction Cost : $8M

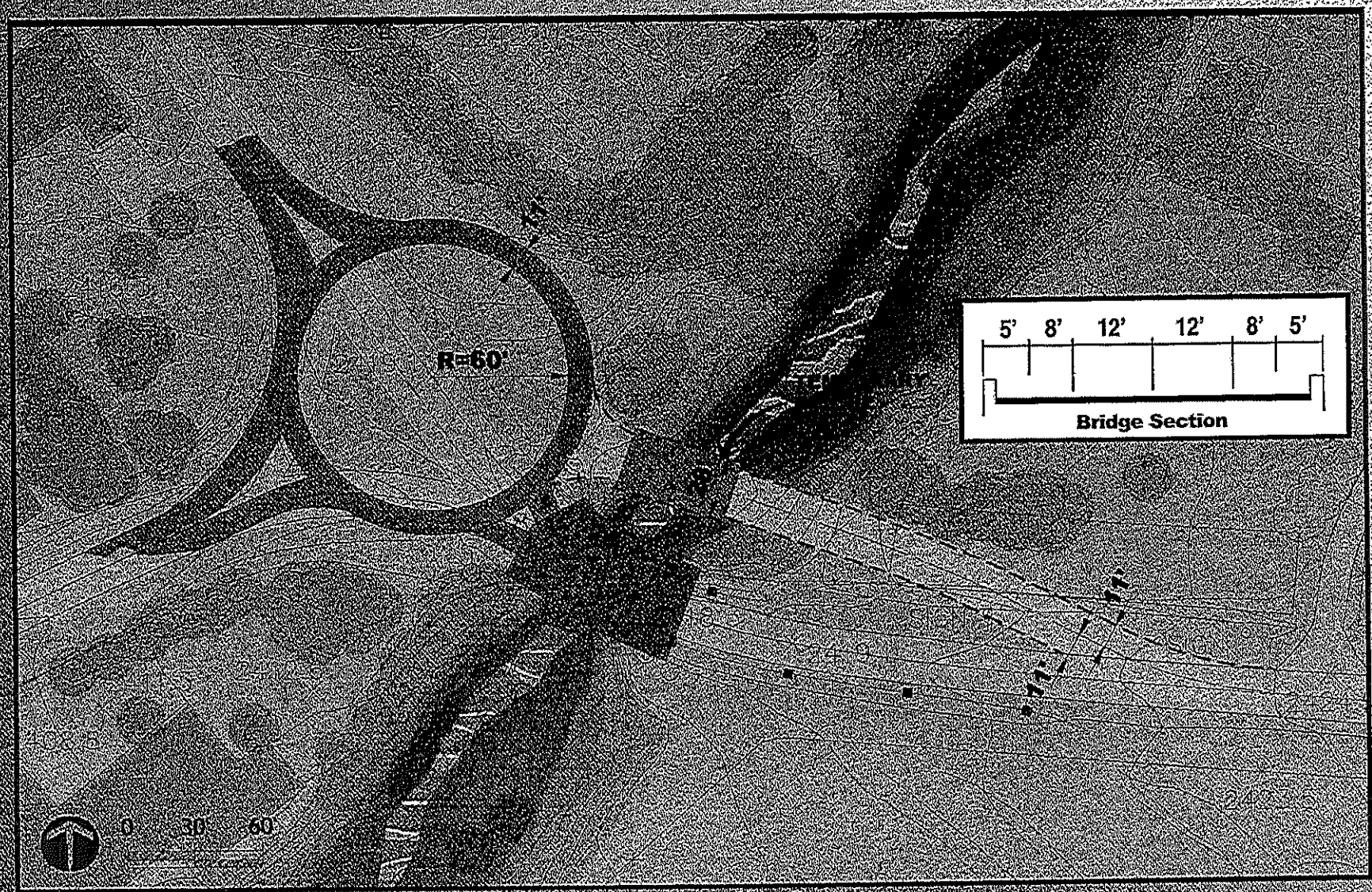
(Excludes Land Acquisition Costs)

Alternative 3 – Replacement Bridge / Existing Location



Estimated Construction Cost : $10M

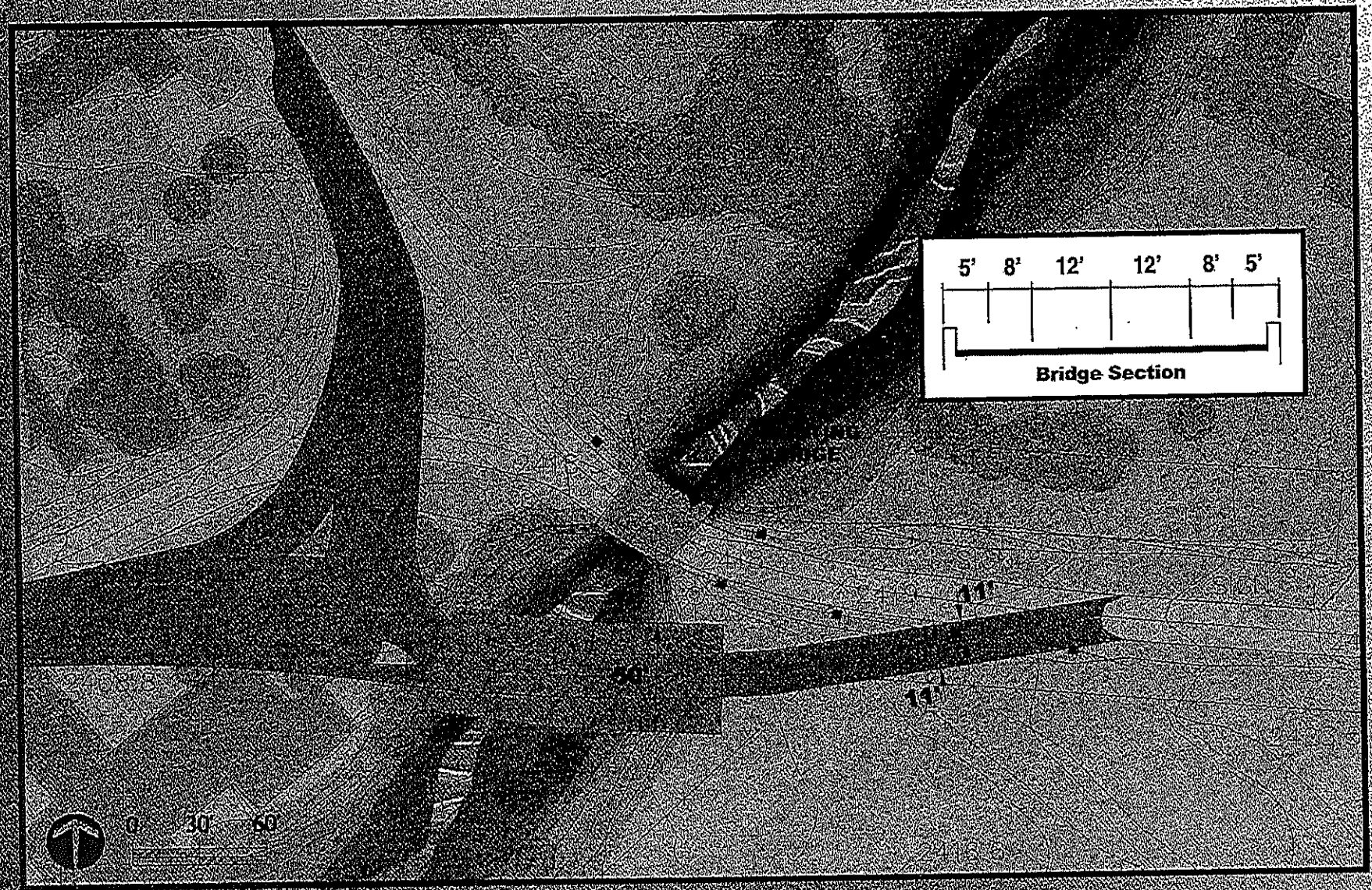
Alternative 4 – Replacement Bridge / Roundabout



Estimated Construction Cost : $12M

(Excludes Land Acquisition Costs)

Alternative 5 – Replacement Bridge / South Location



Estimated Construction Cost : $12M

(Excludes Land Acquisition Costs)

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

(1) Pedestrian - bike safety - high priority
?? (2) Go with alternate 2 but
(3) do not remove old bridge instead use it for pedestrians bike + equestrian use

My name is: Margaret Wille

My mailing address is: 65-1316 Lihipali Rd
Kamuela Hi 96743

My email address is: margaretwille@mac.com

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

(1)

thank you

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

I propose that we encourage the DOT to implement Alternative #2 as a preferred choice. This alternative will discourage speeding and still increase the safety factor.
The ~~[illegible]~~ cost factor is reasonable and minimizes impact on adjoining properties.
Alt. #2 will ~~[illegible]~~ preserve the 1932 Bridge look.

We need the replacement! We need improved safety. We don't need a Cadilac Bridge to serve for the next 200 years.

Safe – functional – pratical – User friendly.

My name is: Leningrad Elarionoff
My mailing address is: P.O. Box 1737
Kamuela, Hi. 96743

My email address is: hoelike@AOL.Com

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

(2)

thank you

✓

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

I would prefer Alternate #2 at this point. Leaving the existing road and bridge for alternate pedestrian/equestrian traffic, if that is not possible.

Could I ask - why are there no bus stops in Hawaii? As part of public transportation - these are needed! The situation right now is that we have almost a 'secret' transportation system, because there are no obvious places to (catch) the bus. Also, why is there no bus from the Kona airport into Kona, and also N. to Waimea / Kohala. Every airport I've been to in the world has public transport from the airport, to the towns. (at least three times a day)
thank you.

My name is: Betty Hannah

My mailing address is: P.O. Box 2573
KAMUELA, HAWAII
96743

My email address is: betty.hannah@hotmail.com

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

(3)

thank you

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

ALOHA@BARRIE ROSE.NET Barrie Rose

would like the figure No. 8
Proposed and public Alignments
Kawaihae Road Bypass
(aerial photo) (emailed to him)

My name is:

My mailing address is:

My email address is:

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

(4)

thank you

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

Take (buy) the Kamuela Museum by eminent domain. Cross the stream with the new Waiaka Bridge. That crossing continues (becomes) as the Lalamilo Connector Rd. The new road connects with the Parker Ranch Connector Rd at Waimea Hwy. The new road also connects with the State Bypass Road. Alternative #5 is the crossing that takes the Kamuela Museum. * The Waiaka Bridge needs to be part of a larger transportation system * See other side for example for details. Need to realign Kawaihae Rd. with the new bridge. Keep the existing Waiaka Bridge as a footpath / horsepath / walking path if possible.

Alternative #4 (ROUNDABOUT) is not safe + too expensive

Alternative #2 is okay.

Alternative #1 is not acceptable

My name is: FRAN TABOR

My mailing address is: P.O. BOX 2045
KAMUELA, HI 96743
885-5864

My email address is: FRAN.TABOR@YAHOO.COM

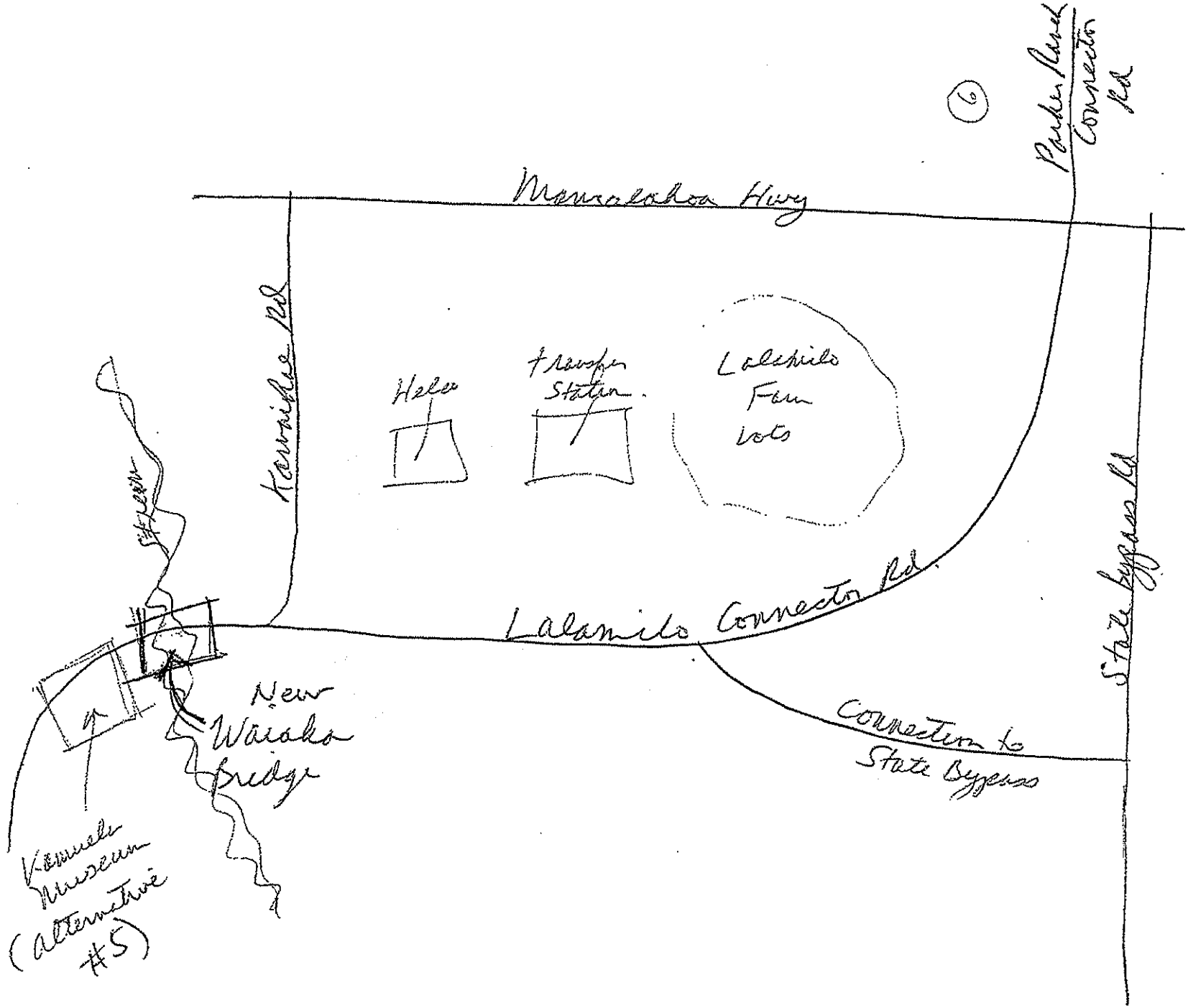
Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

See other side (5)

thank you

Need to include Waimea Greenway path into the larger plan


6
Parkinson Connector Rd
Mamalahoa Hwy
Kamililoa Rd
Helco
Transfer Station
Lalakiloa Farm Lots
Stream
Lalamilo Connector Rd
State bypass Rd
New Waiaha Bridge
Connection to State Bypass
Kennedy Museum (alternative #5)

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

I prefer Alternative 3 - Replacement Bridge at Existing location because:

1. It does not require land acquisition costs
2. retaining some of the "S-curve" attributes of the current bridge, while improving lane width + sightlines will help control speeds and improve safety
   options 5, in addition to being too expensive, would make speeding problem worse
3. Someday, somewhere there should be a roundabout on the Big Island, but this isn't the place for local drivers to learn how to use them

My name is: Sherman Warner
My mailing address is: P.O. Box 1185
Kamuela, HI 96743

My email address is: shermnw@hawaiiantel.net

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

thank you

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

Thank you for the meeting on 1/15/08 at Waimea School. The presentation and question and answer session was very informative.

I select Alternative 2 - Replacement Bridge / New Location because the T intersection is safest for the route that I drive to and from my residence. I travel through this intersection by car to town and to HPA three times each day. I especially like the Alternative 2 because cost is within budget and the land acquisition costs may be less since there isn't a house to purchase.

My name is: Linda Paisley

My mailing address is: P.O. Box 437399
Kamuela, HI. 96743

My email address is: pllsa@hotmail.com

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

thank you

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

Number 2 is the best. Please! I dont like the circle because of the semis. And I think It's good because its kinda like the original one but better.

My name is: Andrew Paisley

My mailing address is: P.O. Box 437399
Kamuela, HI

My email address is: Apaisley@HPA.EDU

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

thank you

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

Please move forward as fast as possible before someone over analyzes the plans and it comes to a halt. #2 seems the most logical to construct.

My name is: PETER PAISLEY

My mailing address is: P.O. BOX 437399
KAMUELA HI 96743

My email address is: pllsa@hotmail.com

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

thank you

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

Alternative 3 is the best plan. It makes the road safer and more functional with lights so no one coming from Waimea has to wait forever, and ~~the~~ it would make less traffic than it would if we didn't have a light because you would move car by car and not group by group.

My name is: Sean Paisley

My mailing address is: P.O. Box 437399
Kamuela, HI. 96743

My email address is:

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

thank you

✓

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

I feel #5 or 2 is a good alternative because it illiminates the blind turn and the small existing bridge for a better one. Ultimatley we really just need a bigger, safer bridge and a less confusing △ intersection. As a student of HPA, I drive through the intersection every day and its a real hazard and obsticle for new and experienced drivers. Please try to eliminate blind turns and narrow roads, and things should be better. ☺

My name is: Lauren Paisley

My mailing address is: P.O. Box 437399
Kamuela HI
96743

My email address is: lpaisley@hpa.edu.

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

thank you

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

Our family lives just below the bridge on Waiaka Place. We travel across the bridge at least twice daily. My husband has been riding his bicycle across the bridge, daily for nine years. He rides on the wrong side of the road because it is too dangerous to ride across the bridge on the right, following traffic flow. We have two main concerns w/ regard to any plan that's adopted: 1. That the construction disrupt traffic flow as little as possible. Our traffic backup is bad enough as it is; the thought of one-lane-at-a-time during construction is awful. 2. That the bridge be made safer, with more space for the large trucks that currently have a tendency to cross over into the opposite lane, leaving oncoming traffic with nowhere to go; & a safe pathway for pedestrians & cyclists. Clearly Alternative 1 is a non-option, although delaying work until the bypass roads are in place seems worth considering. Alternative 3 does not adequately address the dangerous curve makai of the bridge; it creates another lane but the curve w/ poor visibility is still there. Alternatives 2, 4 & 5 all have possibilities, although the road in Alt. 4 remains narrow makai of the bridge. The roundabout is a compelling idea though. With Alts 2 & 5, the road is straightened enough to make it safer than it currently is. I think the willingness of landowners to have their property acquired should also be taken into consideration.

My name is: Gillian Culff

My mailing address is: PO Box 444
Kamuela, HI 96743

My email address is: laughingwater@turquoise.net

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

thank you

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

COMMENT SHEET

To me, alternative 2 looks the best. However making a more gradual right turn onto the Kohala Mountain Road would make it a little better in the event that long loads (utility poles) need to be delivered on that road. Should acquisition of land take too long and raise the total costs of this project too much, I suggest alternative 3.

Controlling the speed of vehicles is controlled by the driver of the vehicle and nobody else. In my 35 years of working, I've have not heard of many vehicle accidents at the Waiaka bridge area as compared to the number of accidents on the Queen Kaahumanu Highway (Kawaihae to Kona) which is very wide and straight as compared to the road through the Waiaka bridge area.

In the meantime until the new bridge is completed, I ask the department if installing warning signals or mirrors that would warn drivers that a large vehicle is entering the bridge from the other side be possible???

Our trucks use the Waiaka Bridge ten to eighteen times a day seven days a week 365 days a year during dark and daylight hours.

My name is: Wayne Kuwaye
My mailing address is: P. O. Box 707
Hilo, HI 96721-0707

My email address is: kuwayebigw@yahoo.com

Please mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

Or, please FAX at: (808) 587-1787

thank you

Ronald Tsuzuki/HWY/HIDOT
12/31/2007 01:11 PM

To Fran Tabor <fran.tabor@yahoo.com>@STATEHIUS
cc jhdewell@beltcollins.com, PHoffmann@co.hawaii.hi.us, robert.m.hunter@hawaiiantel.net, Nelson Sagum/HWY/HIDOT@HIDOT, Dina
bcc
Subject Re: Waiaka Bridge

Thank you for your comments. We will consider them together with other input that we receive.

Fran Tabor <fran.tabor@yahoo.com>

Fran Tabor
<fran.tabor@yahoo.com>
12/31/2007 10:57 AM

To ronald.tsuzuki@hawaii.gov
cc jhdewell@beltcollins.com, robert.m.hunter@hawaiiantel.net, PHoffmann@co.hawaii.hi.us
Subject Waiaka Bridge

Aloha and Happy New Year I would like to comment in advance of the Waimea community meeting on January 15 regarding the Waiaka Bridge.

I have recommended this proposal to Pete Hoffmann and others and would like to make this recommendation to you as well.

The Waiaka Bridge should be looked at as an integral part of the larger Lalamilo Connector Road. My proposal follows:

1. Purchase/take the Kamuela Museum by eminent domain. The property is currently for sale. With depressed real estate values, this would be ideal timing to do this. It would be less costly to buy out the museum than several Sandalwood homes or Lalamilo Farm Lots for the Lalamilo Connector Road.
2. Run the Waiaka Bridge through the museum property.
3. Connect the Lalamilo Connector Road with the new Waiaka Bridge.
4. Continue the new road up to Mamalahoa Hwy. around the Lalamilo Farm Lots giving them a buffer. It would also protect the farmers and homeowners in Sandalwood.
I

This route has many advantages:
1. The Waiaka bridge issues are addressed and solved. This solution prevents having to build a second bridge across the Wailoloa Stream for the Lalamilo Connector Road.
2. The Lalamilo Connector Road issues are addressed and solved.
3. This route would provide the by-pass around Waimea and connect to Mamalahoa Hwy and to the proposed Parker Ranch Connector Road

4. It provides the least costly most effective route.
5. This proposed road would also provide easy connection to the Hawi mountain road.
6. This proposed route avoids any road conflicts with the new HPA proposed campus.
7. This proposed route avoids conflicts with the Waimea Greenways Nature trail.
8. It provides protection from flooding, noise and light pollution, auto pollution, crop safety, environmental protection and the other major issues brought up the Lalamilo farmers and residents of Sandalwood in other documents and meetings.

There are additional reasons that this proposal would be the most cost-effective and efficient solution, but it means addressing the big picture of comprehensive road planning, including the Waiaka Bridge as part of the Lalamilo Connector, the Parker Ranch Connector, and the State By-Pass Road as a comprehensive road system, not as isolated projects (of course, they are paid for and built as isolated projects).

I have a map of my proposal that I will bring to the January 15 meeting.

Thank you for taking your time in considering this proposal.

Never miss a thing. Make Yahoo your home page.
http://www.yahoo.com/r/hs

6413-01

FM: DOT
2/15/08

Jan 13, 2008

Dear Someone,

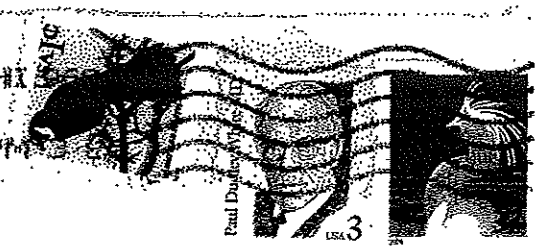
Sorry, I can not attend the meeting in Kamuela. If many cars are waiting for traffic to clear on Kohala Mt. Rd. at the "Stop" sign, it is VERY hard to see traffic on Kawaihae Rd. making a possible R turn to go toward Hawi if one is coming from Kona up the Kawaihae Rd.

Please, do construct a new bridge!

Sincerely,
Roberta Hale Barlow

Ms. Roberta H. Barlow
P.O. Box 6808
Kamuela, HI 96743

HONOLULU HI 96
16 JAN 2008 PM



State of HI
Dept. of Transportation
Highways Division
Planning Branch
869 Punchbowl St
Honolulu HI 96813

(3)

96813+5003

Kawaihae Road
WAIAKA BRIDGE
REPLACEMENT AND REALIGNMENT OF APPROACHES
Island of Hawaii
Project No. AMTRAK-01-99

2/19/08

COMMENT SHEET

WHY NOT MAKE SURE THE PLANNING FOR THAT JUNCTION INCLUDES THINGS LIKE:
- HPA DRIVEWAYS
- FUTURE LALAMILO CONNECTOR CONNECTION/ FINAL
- LONG TERM ROADWAYS FOR DHHL LANDS
- TRANSFER STATION UPGRADES OR RELOCATION?

BEFORE FINAL ALIGNMENT IS SELECTED AND MOVING FORWARD

My name is: J. WILLIAM SANBORN

My mailing address is: POB 190
KAMUELA, HI 96743

My email address is: Jws@aloha.net

ease mail to: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813

r, please FAX at: (808) 587-1787

(2)

ank you

16

Young/HWY/HIDOT@HIDOT
Subject Re: Proposed Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches projectLink

Thank you for your comments. We will pass them on to our consultant and have them considered together with others that we will receive at the public meeting.

"Jim Bell" <jbell@keck.hawaii.edu>

12/28/2007 09:54 AM

To <ronald.tsuzuki@hawaii.gov>
cc
Subject Proposed Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches project

To whom it may concern:

I would like to comment on the subject project in lieu of attending the Jan 15th meeting at Waimea Elementary School.

I am a bicycle commuter and cross the Waiaka Bridge twice a day, five days a week with my destination the HPA campus. It is very narrow with no shoulder which forces me to take the full lane when crossing. This creates a very dangerous situation for me when heading toward Waimea town as heading uphill and upwind I am very slow completing the crossing and getting to an area where the shoulder is wide enough for me to get out of the lane and allow cars to pass. The primary danger is that there is a sharp curve making a blind spot for oncoming traffic and they might not see me in the lane with enough time to slow down for me. I would hope that this project would make allowances for bicycle traffic on the bridge by both widening the road, providing a shoulder and removing the sharp curve to eliminate the blind spot.
Can I also request that caution signs, like 'Share the Road' for bicycles be installed as soon as possible to minimize the danger?
Please fell free to contact me if you need any other information. I would be glad to show your road/bridge design engineers the issues I have with the current bridge.

Aloha,

Jim

HAWAII TODAY | SUNDAY, JANUARY 13, 2008

Waiaka Bridge, road plans to be discussed

The state Department of Transportation and the Federal Highway Administration will hold an informational meeting at 5:30 p.m. Tuesday in the cafeteria at Waimea Elementary School. The agencies will discuss the proposed Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches project.

A formal presentation is scheduled at 7 p.m. However, the public is encouraged to arrive as early as 5:30 p.m. to view the project displays and to provide comments to the project team members. Comments will also be received after the presentation and by mail.

This project involves the proposed replacement and/or relocation of Waiaka Bridge, as well as the realignment of both approaches and other improvements. The Waiaka Bridge is situated along Kawaihae Road in the vicinity of the Kohala Mountain Road.

This meeting aims to provide information regarding the state's planning efforts thus far and to solicit comments and recommendations regarding these studies. The project team will display various alternative improvements and have available data and reports, which have been gathered or developed for this project.

Anyone having concerns or are interested in this project is asked to attend and participate in the meeting.

Following the meeting, comments on this project may be submitted by e-mail, mail or fax.

- E-mail address: ronald.tsuzuki@hawaii.gov
- Mailing address: State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl St., Honolulu, HI 96813
- Fax number: 587-1787

Taiko program slated at Kail

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WAIAKA BRIDGE

Relocating bridge most favored option

JAN 17, 2007

BY CAROLYN LUCAS
WEST HAWAII TODAY
clucas@westhawaiitoday.com

The 76-year-old Waiaka Bridge could be closed to vehicular traffic, opening the roadway over Kohakohau Stream to bicycling, walking, skating and other recreational uses, under a recommendation being considered by state Department of Transportation officials.

Waimea resident Margaret Wille recommended preserving Waiaka Bridge from demolition after building a new bridge to help Waimea be a more livable community.

More than 70 residents reviewed DOT's proposals for Waiaka Bridge replacement Tuesday evening. Most supported Wille's suggestion. A few criticized DOT for its long planning process.

"We keep moving onto the next project and planning," Wille said. "There needs to be more leadership. Someone needs to make decisions and what's best for the community as a whole."

Waimea resident Avi Kohler said the bridge is in dire need of straightening and widening. However, he still thinks the Kawaihae Road bypass should be built first.

Residents commenting called Waiaka Bridge replacement "low priority." Other projects they want constructed first included the Parker Ranch connector, Lalamilo connector road and Waimea Trails and Greenways Committee's green corridor.

▶ SEE BRIDGE PAGE 4A

▶ BRIDGE: Officials anticipate completing report in six months

CONTINUED FROM PAGE 1A

During the three-hour meeting, DOT and Wilson Okamoto Corp. representatives answered questions about structural sufficiency ratings for bridges, intersection modifications, bike lanes, sidewalks, detours, speed, site selection, roundabouts and other details of the project. Residents reviewed the five alternatives and offered solutions or modifications.

In accordance with national design standards, two 10-foot-wide lanes will be provided across Waiaka Bridge, as well as 8-foot shoulders and 5-foot raised sidewalks. No rails or physical barriers are planned to separate pedestrians and bikers from vehicles, said Brennon Morioka, DOT interim director.

Alternatives included doing nothing, reconstructing the existing bridge, replacing the intersection with a roundabout, building a new bridge and shifting Kawaihae Road south. The option favored most was relocating Waiaka Bridge immediately north of the existing bridge and removing the old structure. The intersection and its approaches would be realigned to improve traffic flow.

Waiaka Bridge replacement alternatives

- ▶ Leave the existing bridge and intersection.
- ▶ Relocate the bridge immediately north of the existing bridge, realign the intersection.
- ▶ Reconstruct the existing bridge.
- ▶ Replacing the intersection with a traffic circle, also known as a roundabout, and reconstruct bridge.
- ▶ A new bridge and shift Kawaihae Road south, traversing the existing museum property; realign the intersection.

Waimea resident Greg Mooers called that alternative the "straightest." However, he thinks the proposed northern turn onto Kohala Mountain Road is still too sharp and a better one is needed.

Waimea resident Josh Akana insisted relocating the bridge was "less disruptive" and "the best." Akana disliked the roundabout, calling it inappropriate for the terrain.

Studies for this project began in July 2001, with the present planning phase estimated to cost $985,000. Officials anticipate completing the preliminary assessment report and draft environmental assessment in six months, with the final EA and a findings of no significant impact report in fall 2008. The project's estimated cost is more than $13.5 million, of which $8 million will be spent on construction, scheduled to be completed in fall 2012. The design, expected to cost $1 million, should be completed in fall 2010. The anticipated cost for rights-of-way is $3.6 million.

Built in 1932, Waiaka Bridge is a narrow structure, approximately 24 feet wide. Residents have complained about large trucks and buses, traveling in opposite directions, having difficulty passing on this bridge and limited visibility. Morioka called the bridge "functionally obsolete."

DOT wants to realign the intersection approaches of Kawaihae Road and Kohala Mountain Road to improve various design deficiencies, Morioka said.

Comments about the proposed Waiaka Bridge replacement project should mailed to State of Hawaii, Department of Transportation, Highways Division, Planning Branch, 869 Punchbowl St., Room 301, Honolulu, HI 96813.

(413-01)
1/21/06
PP
FILE
cc: DWTEM

E: Only a small will be enacted ssion ends May 1

said Senate Minority Leader Fred Hemmings, R-Lanikai-Waimanalo.

"I know we can realize a future where growth in these beautiful islands has been stabilized, where transportation gridlock has been alleviated, where energy independence is real, and where Hawaii's natural beauty is protected and nourished," Hemmings said.

Specific proposals to wean the state from dependence on foreign oil, develop nontourism industries and control land development will be suggested over the next few months, along with hundreds of other bills to be considered by state lawmakers.

Only a small number of bills will be enacted into law before the Legislature finishes business for the year May 1.

"In the session ahead, let's ask ourselves: Are we operat-

Appendix C

Public Information Meeting #3, December 15, 2009

6413.01
12/6/09
PP
FILE

900 Specialty Vehicles
920 Motorcycles & Mopeds
940 Campers & Trailers
960 Auto Parts
980 Auto Services

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ADVERTISERS
Please check your ad on the first run date. You are responsible to know the RUN DATES, & CLASSIFICATION of your advertisement. Also please check for any TYPOGRAPHICAL ERRORS on your ad. We will make correction on the next available edition.
West Hawaii Today

State/County Notices 15

State/County Notices 15

NOTICE
EPARTMENT
F HAWAII
ivision Applications Accepted
6-31, 2009
n Code, NOTICE IS HEREBY GIVEN that the
lanning Department during that period of October

ANCH, INC.
40. Kanaueue 1&2, Halekii, Keekee 2,
1&2, Kalukalu 1 & Onouli, North & South Kona
acres

STRUCTION, INC./STATE-DLNR
2 & 2-4-005:001, Waiakea, South Hilo
quare feet
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1, Waiakea, South Hilo

e, Trustee
9, Kealakehe, North Kona
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ILY TRUST
6 & 074, Waipunalei, North Hilo
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ATE-DLNR
tion of 001, Makuu-Keonepoko, Puna
Site and Remainder Lot
acres

wrence & Gwenn Ojiri, et al,
& 079, Kaiwiki, South Hilo
quare feet

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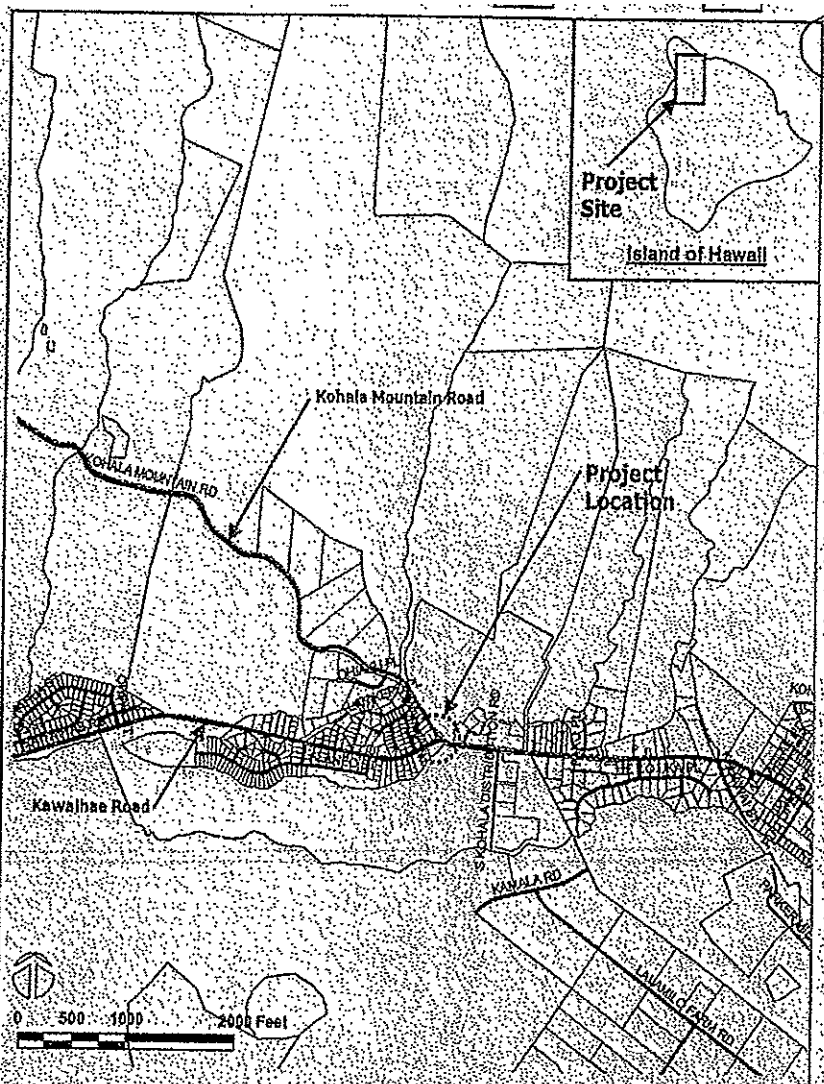
DD

tunity Provider and Employer



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Comments on this project may also be submitted by e-mail, regular mail, or FAX to:

Email Address: *dina.lau@hawaii.gov*

Mailing Address: State of Hawaii
Department of Transportation
Highways Division, Planning Branch
869 Punchbowl Street, Room 301
Honolulu, HI 96813

FAX Number: (808) 587-1787

BRENNON T. MORIOKA
Director of Transportation

(No. 1942-West Hawaii Today: November 30, 2009)

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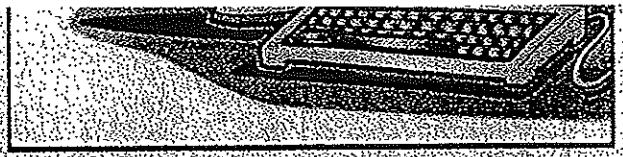

State/County Notices 015

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State/County Notices 015

State/County Notices 015

6413.01
12/16/09
PP
FILE

09-145, 09-146, & 09-147
nances passed second and final
ouncil on November 4, 2009, by

nce Amending Chapter 14, Article
the Hawai'i County Code 1983
to Consumption of Intoxicating
ch Park. AYES: Council Members
hi, Yagong, and Chair Yoshimoto
embers Enriquez and Naeole – 2;

nance Amending Chapter 24 of
dition, as Amended), Relating to
bers Ford, Greenwell, Hoffmann,
moto – 7; NOES: None; ABSENT:
– 2; EXCUSED: None.

An Ordinance Amending Chapter
3 (2005 Edition, as Amended),
ouncil Members Ford, Greenwell,
hair Yoshimoto – 7; NOES: None;
nd Naeole – 2; EXCUSED: None.

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– 2; EXCUSED: None.

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Clerk
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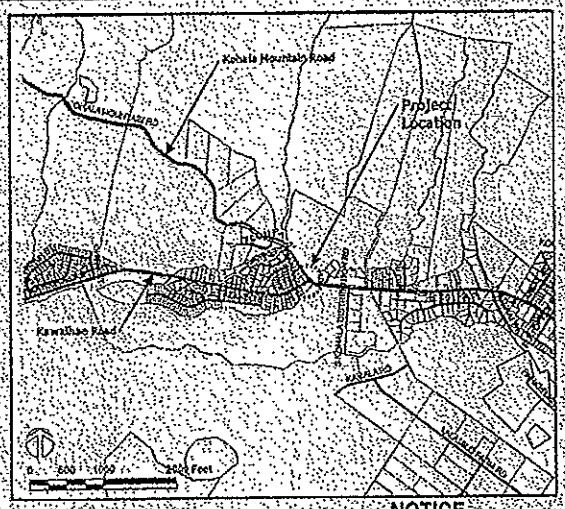

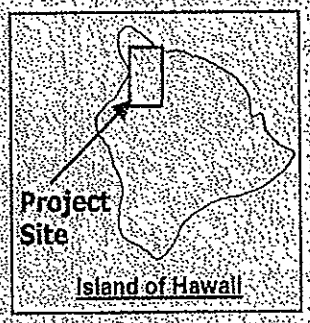

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Honolulu, HI 96813
FAX Number: (808) 587-1787

BRENNON T. MORIOKA
Director of Transportation

(11165r1 Hawaii Tribune-Herald; December 2, 2009)

Help Wanted 100

RESIDENT MANAGER-Small Kona oceanfront complex. In exchange for apartment and utilities. Requires care of pool & spa, general maintenance of building/ grounds and security duties. Send resume to: irenencd@comcast.net

Instructions 180

AIKIDO in KEAAU
Free Class Youth/ Adult 12/4, 6:00pm. 895-1533

Certified Nursing Assistant Instruction
Start off the new year by training for a rewarding profession! Sweetwater Health Education offers day and evening classes starting January 4th. We have excellent training equipment, and provide personal attention to our students. Lowest tuition on the Island plus many free extras. Call us in Hilo at 315-7886 or 895-9432

Services Offered 190

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Haul 4 U
aggregates cinder soil
PUC 5209-C.
640-5932/ 966-6869.

18 ton Affordable
Dump Truck Hauling
Cinder, Rock, Free Mulch. 965-7438; 217-4567.

Services Offered 190

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For ALL Your D9 Needs! Affordable, Reliable, Experienced.
To $1,000 430-2870

A1 TREE WORK
Pruning and Removals
Save in Hilo!
345-8691 To $1,000

AALA LAWN Service
Mow, Trim, Spray...
Dependable, Quality.
Hilo area. 938-4371.

AFFORDABLE LAWN MOWING. Tree and brush removal, reliable, experienced. Free estimates. Senior discount 963-6344, 895-1687.

AFFORDABLE, QUALITY Chainlink Fencing, Remodeling, Kitchens, Baths. References. To $1,000. Call 769-3906.

AGGREGATE

Services Offered 190

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Services Offered 190

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One Call Does It All!
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Over 30 years carpenter/cabinet making experience. *Veteran U.S. Navy*

CDL-A TRUCK DRIVER [2]
Fourteen years experience as a truck driver. *Veteran, U.S. Navy*

ADMINISTRATIVE/CLERICAL POSITION [3]
Has accounts receivable/ mental health residential manager work experiences. *Veteran U.S. Navy*

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Services Offered 190

ASHTON'S LANDSCAPE MAINTENANCE. Mow-

Services Offered 190

AVAILABLE NOW D-9H.

KAWAIHAE ROAD, WAIAKA BRIDGE PROJECT
Project No. AMTRK-01-99
Department of Transportation
State of Hawaii

PUBLIC INFORMATIONAL MEETING NO. 3
December 15, 2009

Name: CLEMSON LAM
Mailing Address: PO BOX 1893

Email Address: c.lam4@hawaiiantel.net

Comments:

PLEASE MAKE ACCOMODATIONS FOR BICYCLES & PEDESTRIAN IN THE APPROACHES TO THE BRIDGE.

THANK FOR MAKING AN 8' SHOULDER FOR BICYCLES!

LEAVE THE TEMPORARY CONSTRUCTION BRIDGE FOR PERMANENT BICYCLE, PED & HORSE USE.

PLEASE MAIL TO:

Ms. Dina Lau
Planning Branch, Highways Division
Department of Transportation
State of Hawaii
869 Punchbowl Street, Room 301
Honolulu, Hawaii 96813

EMAIL TO: dina.lau@hawaii.gov
FAX TO: (808) 587-1787

KAWAIHAE ROAD, WAIAKA BRIDGE PROJECT
Project No. AMTRK-01-99
Department of Transportation
State of Hawaii

PUBLIC INFORMATIONAL MEETING NO. 3
December 15, 2009

Name: CAROL BUCK
Mailing Address: P.O. BOX 489
KAMUELA HI 96743-0489
Email Address: FIBROCAB@HAWAII.RR.COM

Comments:

ALTERNATIVE #4 IS THE MOST VIABLE OPTION OF THE 4 PRESENTED. HOWEVER, HAVING BEEN EXPERIENCED THE NUMEROUS ROUNDABOUTS NEAR GALWAY, IRELAND, I BELIEVE THERE MUST BE 2 LANES ON KAWAIHAE ROAD GOING MAUKA: RIGHT LANE TO MAKE A RIGHT ONTO THE BRIDGE; LEFT LANE TO ENTER THE ROUNDABOUT ONTO KOHALA MOUNTAIN RD.

NO MATTER WHICH ALTERNATIVE IS CHOSEN, THE BRIDGE MUST BE STRAIGHT, NOT CURVED.

ALTERNATIVE #2 INC. A 5% GRADE — NOT GOOD - DANGEROUS FOR TRUCKS AND OLDER VEHICLES

PLEASE MAIL TO:

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Planning Branch, Highways Division
Department of Transportation
State of Hawaii
869 Punchbowl Street, Room 301
Honolulu, Hawaii 96813

EMAIL TO: dina.lau@hawaii.gov
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KAWAIHAE ROAD, WAIAKA BRIDGE PROJECT
Project No. AMTRK-01-99
Department of Transportation
State of Hawaii

PUBLIC INFORMATIONAL MEETING NO. 3
December 15, 2009

Name: Dr William C. and Patricia C. Bergin
Mailing Address: 66-1520 Puuhulutulu Rd.
Kamuela, Hawaii 96743
Email Address: drbillybergin@hawaiiantel.net

Comments:

We are in Favor of Alternative 3 as it is least disruptive of neighboring properties while effectively resolving all issues with the existing Waiaka Bridge.

Apart from this support we raise significant concern with lack of pre-planning (State & County) for accomodation of:

A - NPA's desired access east of the bridge
B - Rice/Campbell " " " " "
C - County Transfer Station & Baseyard issues
D - State Highway Dept " " "
E - Helco's Access consideration
F - Proposed DHHL subdivision access issues

Patricia C. Bergin

PLEASE MAIL TO:

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Department of Transportation
State of Hawaii
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KAWAIHAE ROAD, WAIAKA BRIDGE PROJECT
Project No. AMTRK-01-99
Department of Transportation
State of Hawaii

PUBLIC INFORMATIONAL MEETING NO. 3
December 15, 2009

Name: Michelle Medeiros
Mailing Address: PO Box 2183
Kamuela, HI 96743
Email Address: ~~Kamuel~~ zspamtrap@yahoo.com

(4) I favor Alternative 4 for the following reasons.

Comments:

(1) The master plan for Waimea specifies that we preserve our ~~the~~ rural qualities/nature. ~~of~~ Adding a stoplight to the Waiaka bridge intersection violates the master plan. The roundabout alternative #4 preserves our rural nature and allows safe flow of traffic.

(2) The long term costs of maintaining ~~the high~~ a traffic light may outway the ~~costs of the~~ short term costs of other alternatives such as alternative # 4, the roundabout

(3) The posted speed limit on Kawaihae Rd is 25 mph. Cars traveling west often exceed this speed even though the road curves and narrows. Improving the bridge and Straightening the road will likely increase the hazard as shown in Alternative #5 which is undesirable.

(4) Alternative #4 provides traffic from Kohala Mountain Road with a saferway to access Kawaihae Road than is presently available

PLEASE MAIL TO:

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(#5) Alternative #4 does not ~~require~~ displace ~~[illegible]~~ people from their residence which is a plus.

Ken Melrose

COMMENT FORM
ALTERNATIVE #2
REPLACEMENT BRIDGE NORTH OF EXISTING BRIDGE
Tuesday, December 15, 2009

Critical Flow as Tides
has cooperating neighbors land
MAXIMUM take from HPA
Still a long curve in the
new bridge

Min disruption to
exist traffic

~~Requires Temp bypass~~

Mahalo!

COMMENT FORM
ALTERNATIVE #3
REPLACEMENT BRIDGE AT EXISTING LOCATION
Tuesday, December 15, 2009

All alternatives should include bus shelters and park + rides

Pedestrian/Multiuse paths should be incorporated

Consider refuge areas for pedestrians crossing

&

~~[illegible]~~

Mahalo!

COMMENT FORM
ALTERNATIVE #3
REPLACEMENT BRIDGE AT EXISTING LOCATION
Tuesday, December 15, 2009

Requires Temp bypass on HPH

Consider Comm Serv for HFA/Red Cross

Temp bypass interferes w/ HPH Elec Service, & Impacts HK facilities

Mahalo!

COMMENT FORM
ALTERNATIVE #3
REPLACEMENT BRIDGE AT EXISTING LOCATION
Tuesday, December 15, 2009

This seems the most practical with the least amount of private land needed

Mahalo!

COMMENT FORM
ALTERNATIVE #3
REPLACEMENT BRIDGE AT EXISTING LOCATION
Tuesday, December 15, 2009

WHAT IS THE DIFFERENCE IN COST OF:

ALT 3 TEMPORARY BRIDGE (WHERE?)

ALT 2 ACQUIRE LAND FOR MAKAI LOCATION

" " " "

ALT 4 " "

ALT 5 " " "

MAKAI LOCATION

~~ALSO~~

MIKE PRICE

Mahalo!

COMMENT FORM
ALTERNATIVE #3
REPLACEMENT BRIDGE AT EXISTING LOCATION
Tuesday, December 15, 2009

NEED BUS STOP & SHELTER

NEED PARK & RIDE AS MUSTER POINT TO USE MASS TRANSIT

MIKE PRICE

Mahalo!

COMMENT FORM
ALTERNATIVE #3
REPLACEMENT BRIDGE AT EXISTING LOCATION
Tuesday, December 15, 2009

PEDESTRIAN REFUGES FOR PEDESTRIANS & HORSE ARE NEEDED

MIKE PRICE

Mahalo!

COMMENT FORM
ALTERNATIVE #3
REPLACEMENT BRIDGE AT EXISTING LOCATION
Tuesday, December 15, 2009

WHAT EVER ALIGNMENT IS SELECTED WORK WITH COUNTY PROVIDING PROPERTY OWNER, STATE, CO, DHHL AND OTHERS ACCESS IN NEAR 1/4 MILE SAFELY. NUMEROUS DRIVEWAYS EXIST AND HPR WANTS ANOTHER. DHHL IS PLANNING LARGE INTERSECTION FOR LALA-MILO HOMESTEADS.

THE POTENTIAL FOR CONGESTION & SAFETY PROBLEMS IS A CONCERN

STATE/COUNTY TASK FORCE TO DESIGN CONSOLIDATING FRONTAGE ROAD W LESS HWY ACCESS POINTS

Mike Price

MIKE PRICE

Mahalo!

COMMENT FORM
ALTERNATIVE #4
REPLACEMENT BRIDGE AT EXISTING LOCATION
AND ROUNDABOUT
Tuesday, December 15, 2009

This will be very confusing to both local drivers and tourist

The triple curve that must be negotiated by traffic coming up Kalanianaole Road headed to Waimanalo will be more difficult than existing bridge

Mahalo!

COMMENT FORM
ALTERNATIVE #4
REPLACEMENT BRIDGE AT EXISTING LOCATION
AND ROUNDABOUT
Tuesday, December 15, 2009

MAX Acquire HPA

Poor cross section matches

Requires temp by pass

Poor alternative

Mahalo!

COMMENT FORM
ALTERNATIVE #4
REPLACEMENT BRIDGE AT EXISTING LOCATION AND ROUNDABOUT
Tuesday, December 15, 2009

NO ROUNDABOUT

Mahalo!

COMMENT FORM
ALTERNATIVE #4
REPLACEMENT BRIDGE AT EXISTING LOCATION AND ROUNDABOUT
Tuesday, December 15, 2009

Roundabout should be lowest priority - too many concerns

Alternative #3 is most feasible, considering cost and least impact to the topography. Hopefully traffic signals will alleviate left turn concerns.

Mahalo!

COMMENT FORM
ALTERNATIVE #5
REPLACEMENT BRIDGE SOUTH OF EXISTING BRIDGE
Tuesday, December 15, 2009

1. Turn lane going W on Kawaihae Rd from town, turning R → extend it as a 2nd lane to both HPA entrances.

2. Turn lane going S on Kohala Mt Rd turning R → extend turn lane as a 2nd lane. This way, vehicles going S on Kohala Mt Rd waiting to turn L to go up Kaw Rd to town, won't back up + prevent R turners from continuing on down Kaw Rd

3. Take entire Museum property - Raze the old museum/residence building + create open space all the way to the stream. Maybe County "open space" funds could be tapped for this.

Mahalo!

#2

COMMENT FORM
ALTERNATIVE #5
REPLACEMENT BRIDGE SOUTH OF EXISTING BRIDGE
Tuesday, December 15, 2009

(1)

BUY THE MUSEUM PROPERTY, ADD THE VIEWS OF THE MUSEUM

MICHAEL ARONOWITZ
885-9001

— ENSURE BYPASS DURING CONSTRUCTION TO AVOID LONG DELAYS!

Mahalo!

THIS ARE FURTHER ACTS

COMMENT FORM
ALTERNATIVE #5
REPLACEMENT BRIDGE SOUTH OF EXISTING BRIDGE
Tuesday, December 15, 2009

the best solution!

Mahalo!

COMMENT FORM
ALTERNATIVE #5
REPLACEMENT BRIDGE SOUTH OF EXISTING BRIDGE
Tuesday, December 15, 2009

Please consider improving access to North to HPA by extending turn lanes on both sides of North bound as short turn to notify intersection left turners coming town bound.

(1)

(2) Burn abandoned museum and demolish walls + buildings to reveal stream views. This is a special "gateway" to Waimea and would make a joyful welcome at the light.

Mahalo!

COMMENT FORM
ALTERNATIVE #5
REPLACEMENT BRIDGE SOUTH OF EXISTING BRIDGE
Tuesday, December 15, 2009

Best Sight distance
Makai Bound
Requires Temp By Pass

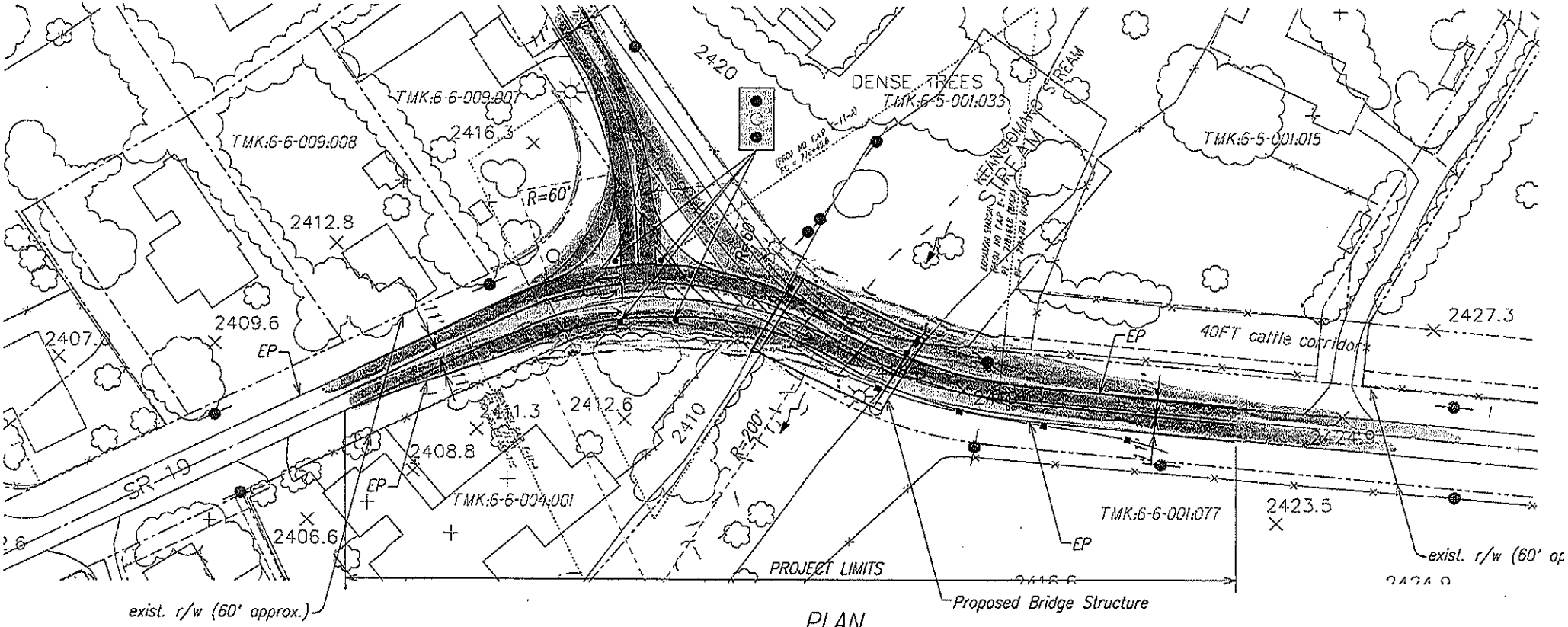
Mahalo!

COMMENT FORM
ALTERNATIVE #5
REPLACEMENT BRIDGE SOUTH OF EXISTING BRIDGE
Tuesday, December 15, 2009

Suggest slight modification by moving right of way approx 25 ft north at intersection by aquiring a small section on the northeast side of the bridge and similiarly a small section on the southwest side to create a combination of Alternative #3 & #5

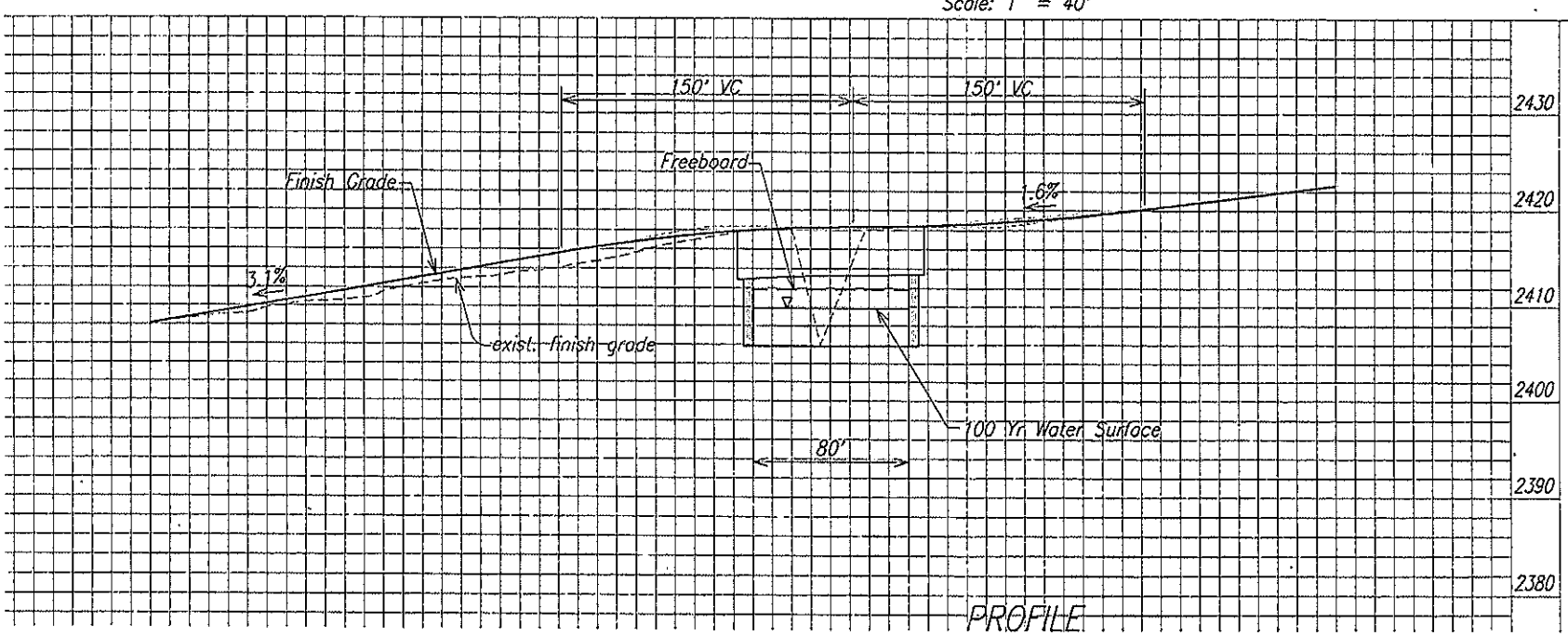
Aloha
David B Stone

Mahalo!

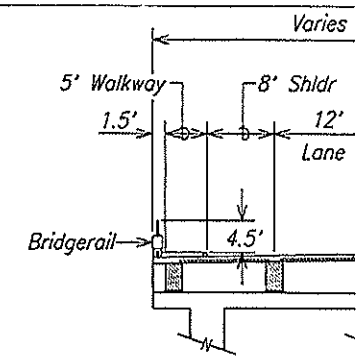


PLAN

Scale: 1" = 40'

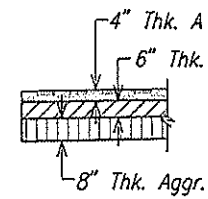


PROFILE



BRIDGE

Not



Waiaka Bridge Replacement and Alignment of Approaches
Public Meeting No. 3
December 15, 2009
Waimea Elementary School

ADDITIONAL NOTES

Alternative 2:

- Suggest placing bus shelter/stop for school kids and county transit.
- This alternative is better during construction, however Alternative 5 works better for functionality.

Alternative 3:

- Consider including pedestrian and bike paths on the approaches.
- How will the intersection work with the traffic signals and where will they be located?
  - Traffic signals will work like a t-intersection.
  - The locations of the traffic poles/signals have not been determined yet.
- What is the cost difference between traffic signal and roundabout?
  - Roundabout will be more costly due to grading.
- Suggest acquiring a portion of the museum parcel, as in Alternative 5, to create less of a curve
- Will there be protective measures in place at the corner of Kawaihae Road and Kohala Mountain Road (if you're coming down from Kohala Mountain Road, the corner on the rights as you approach the intersection)?
  - Guardrails or other structures may be considered.
- Consider refuge areas for pedestrians.
- Should consider park and ride facility and bus shelters/stops.
- Alternative 3 should be chosen as it takes the least amount of private property. Several commenters made same statement. (See also written comments.)
- Alternative 3 could work if the road alignment was slightly shifted to the north. This would straighten out the bend. (See mark up drawing submitted by commenter)
- Would Alternative 3 with the widened bridge increase speed through the bridge?

Alternative 4:

- No roundabouts.
- Roundabout too confusing for drivers and may be dangerous.
- Looks dangerous and will cause more accidents.
- Roundabouts may work but unsure.
- Roundabout may look nice if center is maintained or landscaped.
- Will be too noising with trucks circulating around the roundabout.
- May work in other states but not in Hawaii.
- Dangerous for pedestrians – especially children walking to and from the nearby school.

Alternative 5:

- Suggest placing bus shelter/stop for school kids and county transit.
- Alternative 5 should purchase the entire museum parcel and turn the land into a park.
- The views from the bridge would be a scenic point of the area.

Other general comments:

- There are 38 turns (curves) from Kawaihae to Waimea.

Appendix D

Biological Resources Survey Report
for the Proposed Waiaka Stream Bridge and Approaches
Botanical Consultants
February 2002

(6410-01)

CC: DOT HWY PA
8/19/02

7/30/07

BIOLOGICAL RESOURCES SURVEY REPORT FOR THE PROPOSED WAIAKA STREAM BRIDGE AND APPROACHES PROJECT SITE

FOR
WILSON OKAMOTO & ASSOCIATES
1907 SOUTH BERETANIA STREET, SUITE 400
HONOLULU, HAWAII 96826

BY
EVANGELINE J. FUNK, PH.D.
BOTANICAL CONSULTANTS
HONOLULU, HAWAII 96815
FEBRUARY 2002

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FLORA SURVEY REPORT FOR THE PROPOSED WAIAKA STREAM BRIDGE REPLACEMENT AND REALIGNMENT OF APPROACHES PROJECT SITE

INTRODUCTION AND METHODS

A botanical survey of the proposed Waiaka Stream Bridge Replacement and Realignment of Approaches Project Site, Waimea, Island of Hawaii, Hawaii was carried out on February 10 and 11, 2002. The project site is located west of Waimea Town, Island of Hawaii at the junction of Kawaihae and Kohala Mountain Roads. The project site consists of rather narrow stripes of land that extend along both sides of Kohala Mountain Road from the entrance to the Hawaii Preparatory Academy to the Waiaka Stream Bridge. It then continues from Waiaka Stream eastward for fifteen-hundred feet along both sides of Kawaihae Road.

RESULTS

A total of three vegetation communities are to be found on this small site. The Urban Community is found in the area along Kohala Mountain Road and along the mauka or north side of Kawaihae Road. In the Urban Community can be found the ornamental trees, shrubs, flowers, lawn grasses and weeds usually associated with urban landscaping. Landscape plants are not usually included in botanical surveys, although we did record the grasses and forbs found in this community.

The Stream Community includes the vegetation along the banks of Waiaka Stream. At the stream crossing, the banks are mostly made up of large boulders and the vegetative community is depauperate. We found kikuyu grass (*Pennisetum clandestinum* Chiov), black wattle trees (*Acacia mearnsii* De Wild.), Vervain (*Stachytarpheta*

jamaicensis (L.) Vahl.), *Senecio madagascariensis* Poir., Spanish reed (*Arundo donax* L.) and a few others.

Pasture Community is the third vegetation type found on this small site. From the stream to the end of the project site, on the south side of Kawaihae Road and in a small portion of the land on the north side of Kawaihae Road can be found a robust Pasture Community. The near normal rains during the 2001 and 2002 wet season has contributed to the dense vegetative cover in the pasture. On the project site grasses such as kikuyu grass (*Pennisetum clandestinum* Chiov), guinea grass (*Panicum maximum* Jacq.), buffel grass (*Cenchrus ciliaris* L.), and rat tail fescue (*Vulpia myuros* (L.) C.C.Gmelin are thriving along with such forbs as black mustard (*Brassica nigra* (L.) W. Koch.), cheese weed (*Malva parviflora* L), sow thistle (*Sonchus oleraceus* L.), and Senecio madagascariensis. Scattered throughout the pasture can be found large individual panini cactus plants (*Opuntia ficus-indica* (L.) Mill.)

CONCLUSIONS

The vegetation of the project site was found to be made up of all alien species. No native taxa were found and none were expected (AECOS, 6/22/01, Smith 6/25/99). The sunflower, Senecio madagascariensis, is widespread in the pastures and along the roads. This fairly new introduction is believed to be toxic to cattle (Pers. Comm. Clyde Imada, Bis. Mus.). If the flora of this site is disturbed, it will all regenerate very quickly.

ENDANGERED SPECIES

No candidate, proposed, or listed threatened or endangered species as set forth in the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) are known from this site and none were found during this survey.

SPECIES LIST OF THE PLANTS FOUND ON THE PROPOSED

WAIAKA BRIDGE SITE

The plant families in the following species list have been alphabetically arranged within two groups, Monocotyledons, and Dicotyledons. The genera and species are arranged alphabetically within families. The taxonomy and nomenclature follow that of Wagner, Herbst, and Sohmer (1990). For each taxon the following information is provided:

1. An asterisk before the plant name indicates a plant introduced to the Hawaiian Islands since Cook or by the aborigines.
2. The scientific name of the plant.
3. The Hawaiian name or the most widely used common name of the plant.
4. Abundance ratings are for this site only and they have the following meanings:
   Uncommon = a plant that was found less than fine times.
   Occasional = a plant that was found between five and ten times.
   Common = a plant considered an important part of the vegetation.
   Locally abundant = plants found in large numbers over a limited area. For example the plants found in grassy patches.

This species list is the result of an extensive survey of this site during the hot cool winter season (February 2002) and it reflects the vegetation composition of the flora during a single season. Minor changes in the vegetation will occur due to introductions and losses and a slightly different species list would result from a survey conducted during a different growing season.

Scientific Name	Common Name	Abundance
MONOCOTYLEDONS		
AGAVACEAE – Agave Family		
**Agave sisalana* Perrine	Sisal	Uncommon
COMMELINACEAE - Spiderwort Family		
**Commelina diffusa* N. L. Burm.	Honohono	Locally abundant
POACEAE - Grass Family		
**Arundo donax* L.	Spanish reed	Uncommon
**Cenchrus ciliaris* L.	Buffel grass	Abundant
**Eleusine indica* (L.) Gaertn.	Wiregrass	Locally abundant
**Eragrostis pectinacea* (Michx.) Nees	Carolina lovegrass	Locally abundant
**Eragrostis pilosa* (L.) P. Beauv.		Common
**Panicum maximum* Jacq.	Guinea grass	Common
**Pennisetum clandestinum* Chiov.	Kikuyu grass	Common
**Sporobolus africanus* (Poir.) Robyns & Tournay	Smutgrass	Occasional
**Vulpia myuros* (L.) C.C.Gmelin	Rat tail fescue	Occasional
DICOTYLEDONES		
ACANTHACEAE – Acanthus Family		
**Asystasia gangetica* (L.) T. Anderson	Chinese violet	Locally abundant
AMARANTHACEAE – Amaranth Family		
**Amaranthus spinosus* L.	Spiny amaranth	Occasional
**Amaranthus viridis* L.	Slender amaranth	Occasional
**Gomphrena globosa* L.	Globe amaranth	Occasional
ANACARDIACEAE – Mango Family		
**Schinus terebinthifolius* Raddi	Christmas berry	Occasional
APIACEAE – Parsley Family		
**Ciclospermum leptophyllum* (Pers.) Sprague	fir-leaved celery	Uncommon

Scientific Name	Common Name	Abundance
ASTERACEAE – Sunflower Family		
Ambrosia artemisiifolia L.	Common ragweed	Occasional
Bidens alba (L.) DC		Occasional
Bidens pilosa L.	Spanish needle	Locally abundant
Crassocephalum crepidioides (Benth.) S. Moore		Uncommon
Emilia sonchifolia (L.) DC	Flora's paint brush	Occasional
Erigeron karvinskianus DC	Daisy fleabane	Common
Galinsoga parviflora Cav.		Occasional
Senecio madagascariensis Poir.		Common
Sonchus oleraceus L.	Pualele	Occasional
Taraxacum officinale W. W. Weber	Dandelion	Occasional
BRASSICACEAE – Mustard Family		
Brassica nigra (L.) W. Koch	Black mustard	Common
Capsella rubella Reut.	Shepard's purse	Occasional
Lipidium virginicum L.		Occasional
Lobularia maritima (L.) Desv..	Sweet alyssum	Locally abundant
CACTACEAE – Cactus Family		
Opuntia ficus-indica (L.) Mill.	Panini	Occasional
CHENOPODIACEAE – Goosefoot Family		
Chenopodium murale L.	Aheahea	Occasional
CONVOLVULACEAE – Morning glory Family		
Ipomoea indica (J. Burm.) Merr.)	Koali 'awa	Occasional
EUPHORBIACEAE – Spurge Family		
Chamaesyce hirta (L.) Millsp.	Hairy spurge	Occasional
Chamaesyce prostrata (Aiton) Small	Prostrate spruge	Occasional
Ricinus communis L.	Castor bean	Occasional
FABACEAE – Bean Family		
Acacia mearnsii De Wild.	Black wattle	Uncommon
Desmodium incanum DC	Spanish clover	Occasional
Glycine wightii (Wight & Arnott) Verdc.		Locally abundant
Indigofera suffruticosa Mill.	'Iniko	Common

Scientific Name	Common Name	Abundance
FABACEAE – Bean Family con't		
Macroptilium lathyroides (L.) Urb.	Wild bean	Occasional
Medicago polymorpha L.	Bur clover	Locally abundant
Vicia sativa L.	Spring vetch	Occasional
GERANIACEAE – Geranium Family		
Erodium cicutarium (L.) L'Her.	Pin clover	Occasional
LYTHRACEAE – Loosestrife Family		
Cuphea carthagenensis (Jacq.) Macbr.	Tarweed	Uncommon
MALVACEAE – Mallow Family		
Abutilon grandifolium (Wild.) Sweet	Hairy abutilon	Occasional
Malva parviflora L.	Cheese weed	Common
Malvastrum coromandelianum (L.) Garcke	False mallow	Occasional
NYCTAGINACEAE – Four o'clock Family		
Boerhavia coccinea Mill.		Occasional
OLEACEAE- olive Family		
Olea europaea spp. *cuspidata* Ciferri	Olive	Uncommon
OXALIDACEAE – wood sorrel Family		
Oxalis corniculata L.	Yellow wood sorrel	Uncommon
Oxalis debilis var. *corymbosa* (DC) Lourt.	Pink wood sorrel	Uncommon
PLANTAGINACEAE - Plantain Family		
Plantago lanceolata L.	Narrow leaved plantain	Common
Plantago major L.	Common plantain	Occasional
POLYGONACEAE – Buckwheat Family		
Polygonum punctatum Elliot	Water smartweed	Uncommon
Rumex acetosella L.	Sheep sorrel	Occasional

Scientific Name	Common Name	Abundance
PORTULACACEAE – Purslane Family		
**Portulaca oleracea* L.	Pig weed	Occasional
RRIMULACEAE – Primrose Family		
**Anagallis arvensis* L.	Scarlet pimpernel	Uncommon
PROTEACEAE –Protea Family		
**Grevillea robusta* R. Br.	Silk oak	uncommon
ROSACEAE – Rose Family		
**Rubus argutus* Link	Florida blackberry	Occasional
VERBENACEAE – Verbena Family		
**Stachytarpheta jamaicensis* (L.) Vahl	Vervain	Occasional
**Verbena litoralis* Kunth	Owi	Occasional
ZYGOPHYLLACEAE – Creosote bush Family		
**Tribulus terrestris* L.	Puncture vine	Uncommon

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FAUNA SURVEY REPORT FOR THE PROPOSED WAIAKA STREAM BRIDGE PROJECT SITE

INTRODUCTION AND METHODS

This report summarizes the results of a fauna survey of the proposed Waiaka Stream Bridge Project Site located west of Waimea town along Kawaihae Road on the Island of Hawaii. This survey was performed on February 10 and 11, 2002 during the late and early morning hours to take advantage of the higher activity levels of both birds and mammals. The project site consists of two narrow L-shaped strips of land that are bisected by Kawaihae and Kohala Mountain Roads. A broad area located along the verge of these roads had recently been mowed and most of the seed bearing vegetation was in flower providing little food for seed eating birds. In addition, traffic along the roads is very heavy and the weather was very windy during the time of the survey. All of these factors may have contributed to the resulting low species count.

Three fixed station observation points of from fifteen to thirty minutes duration were carried out. There was one near the entrance to Hawaii Preparatory Academy, one on the bridge over the stream, and one in the pastureland.

RESULTS

No native vegetation was found on the project site. The vegetation near the roads had been mowed, the vegetation inside the horse corrals had been grazed and trampled, and the vegetation in the cattle land was all in flower offering little food for the many introduced, seeding birds that usually are attracted to the type of vegetation found on the project site land. Therefore, although there was a variety of bird species, the numbers were low.

MAMMALS

The house mouse (*Mus musculus*), the black rat (Rattus rattus) and the Indian mongoose (*Herpestes auropunctatus auropunctatus*) are all believed to inhabit pasture lands such as those found on the project site even though none of these were seen during the survey. Two dogs (*Canis f. familiaris*) and one cat (*Felis catus*) were seen in the urban area.

AVIFAUNA

The most rewarding observation station was the one in the pastureland. Here birds could hide from the high winds. In all six bird species were seen or heard. None of which can be classed as native.

Family Zosteropidae: White-eye

Zosterops japonicus (Japanese white-eyes). White-eyes are one of the most widespread, introduced bird species in Hawaii. They appeared to be well adapted to this site and were seen on the pasture fences

Family Passeridae: Old World Sparrows

Passer domesticus (House sparrow) The streaky brown and gray house sparrow is a familiar commensal species. Often referred to as flying mice, these little birds were seen on the mowed grass in the Urban Community and in the Pastureland Community fence.

Family Emberizidae: Emberizine Finches

Paroaria coronata (Red crested cardinal)

The red crested cardinal is a very easily recognized by its bright red head and breast. These bird seem to favor the mowed lawns of Hawaii Preparatory Acadamy.

Family Columbidae: Pigeons and Dove

Streptopelia chinensis (Spotted Dove) The spotted dove is a large, gray brown bird with rosy blushed breast feathers. At the sides and back of its neck is a patch of black and white spots. Spotted doves were mostly seen in flight. They were very few in number.

Geopelia striata (Zebra Dove)

Smaller and usually more abundant than the spotted dove, ground dwelling zebra doves were seen in trees and along the roads that traverses this site. They were few in number.

Family Sturnidae: Starlings and Mynas

Acridotheres tristis (Common Mynas)

The ubiquitous myna, a plump, brown bird with a black head and tail. It has a white belly, tail and wing patches, and bright yellow legs, feet, bill, and eyeliners. Mynas were seen along Kohala Mountain Road and in flight

Family Phasianidae Gallinaceous Birds

Francolinus erckelii (Erckel's Francolin)

Erckel's francolin is a large game bird that inhabits the rainy grasslands. It has a very distinctive call. A single bird was heard in the pastureland.

ENDANGERED SPECIES

No candidate, proposed, or listed threatened or endangered species as set forth in the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) are known from

this site and none were found during this survey.

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Appendix E

U.S. Fish & Wildlife Service Letter, Dated May 26, 1999 (will submit updated request)

6413-01

7/27/09

✓ cc: MGO

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Ecoregion
300 Ala Moana Blvd, Rm 3-122
Box 50088
Honolulu, HI 96850

MAY 26 1999

In reply refer to: MR

Douglas Orimoto
Hawaii Dept. of Transportation
Highways Division
869 Punchbowl St.
Honolulu, HI 96813-5097

Re: Environmental Impact Statement Preparation Notice for the Kawaihae Road, Waiaka Stream Bridge Replacement and Realignment of Approaches Project, Waimea, Island of Hawaii, Hawaii.

Dear Mr. Orimoto:

The U.S. Fish and Wildlife Service (Service) has reviewed the Environmental Impact Statement Preparation Notice (EISPN) for the Kawaihae Road, Waiaka Stream Bridge Replacement and Realignment of Approaches Project, Waimea, Island of Hawaii, Hawaii. The project sponsor is the Hawaii Department of Transportation (HDOT). The applicant proposes to replace the Waiaka Stream bridge and realign its approaches on Kawaihae Road. The proposed project site is located west of Waimea Town. This letter has been prepared under the authority of and in accordance with the National Environmental Policy Act of 1969[42 U.S.C. *et seq.*; 83 Stat. 852], as amended, the Endangered Species Act of 1973 [16 U.S.C. 1531 *et seq.*; 87 Stat. 884], as amended, and other authorities mandating Service concern for environmental values. Based on these authorities, the Service offers the following comments for your consideration

We have reviewed the information provided in the project summary and in our own files. To the best of our knowledge, no Federal endangered, threatened, or candidate species, significant wetlands, or other Federal trust resources occur at the immediate project site, nor at any point along Waikoloa Stream below the Waiaka Stream Bridge. Furthermore, there are no native fish species in the Waikoloa Stream system.

The Service appreciates your concern for endangered species and the opportunity to comment on the proposed project. We look forward to reviewing the draft EIS when it is available. If you have any questions regarding these comments, please contact Fish and Wildlife Biologist Mike Richardson at (808) 541-3441.

Sincerely,

Robert Smith
Pacific Islands Manager

cc: Mr. Michael Buck, DOFAW
Mr. John Giffin, DOFAW
Ms. Virginia Goldstein, CCHPD
Mr. Ted Sakai, DPS

Appendix F

Aquatic Resources and Water Quality Assessment for Kawaihae Highway (Waiaka) Bridge Over Keanuiomano Stream

AECOS, Inc.

June 2003

AECOS No. 993

Aquatic resources and water quality assessment for Kawaihae Highway (Waiaka) Bridge over Keanu'i'omano Stream, Wai'aka, Island of Hawai'i

AECOS, Inc., 45-939 Kamehameha Hwy., No. 104
Kane'ohe, Hawai'i 96744

Aquatic resources and water quality assessment for Kawaihae Highway (Waiaka) Bridge over Keanu'i'omano Stream, Wai'aka, Island of Hawai'i[1]

June 11, 2003 *AECOS* No. 993

Eric Guinther & Susan Burr
AECOS, Inc. 45-939 Kamehameha Highway, No. 104
Kaneohe, Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: aecos@aecos.com

Introduction

This report covers a biological survey of Keanu'i'omano Stream and includes an analysis of water quality samples for a proposed bridge renovation on Kawaihae Road (State Rte. 19) in the District of South Kohala, Island of Hawai'i (Big Island; Figure 1). In some sources, the highway bridge at Waiaka south of Kamuela Town is termed "Waiaka Stream Bridge." However, there is a separate stream in the area (in Wai'aka Gulch) tributary to Keanu'i'omano Stream further to the west. Therefore, this site is correctly called Waiaka Bridge over Keanu'i'omano Stream. Keanu'i'omano Stream is listed under State Perennial Stream Code No. 8-5-03.01 as a tributary of Waiulaula Gulch.

The purpose of the survey was to assess the aquatic resources of Keanu'i'omano Stream at and near the Waiaka Bridge, proposed for renovation. A biological survey encompassing terrestrial plants and vertebrates in the vicinity of the bridge was prepared by E. Funk (Botanical Consultants, 2002).

Methods

Aquatic Biota.— A survey of the aquatic environment was conducted on 20 February 2002 by *AECOS*, Inc. biologists Eric Guinther and Susan Burr. Conditions and aquatic inhabitants of the segment of Keanu'i'omano Stream above and below the bridge were determined by walking in and along the stream to make visual observation and sample selected features with fine-mesh hand nets and by over-turning rocks. An insect net

[1] Report prepared for Wilson Okamoto & Associates for use in an environmental assessment for the Kawaihae Road, Waiaka Bridge Replacement project. This report will become part of the public record. This version re-edited on June 22, 2007

was used to capture flying insects along the survey route. Observations of aquatic biota were of an incidental nature. In general, the water was too shallow for snorkeling to be of any advantage. More intrusive methods (i.e., electrofishing or chemical treatments such as rotenone) might have revealed additional species not observed by our survey. As is nearly always the case, repeated visits will reveal species not observed during any single visit to an area.

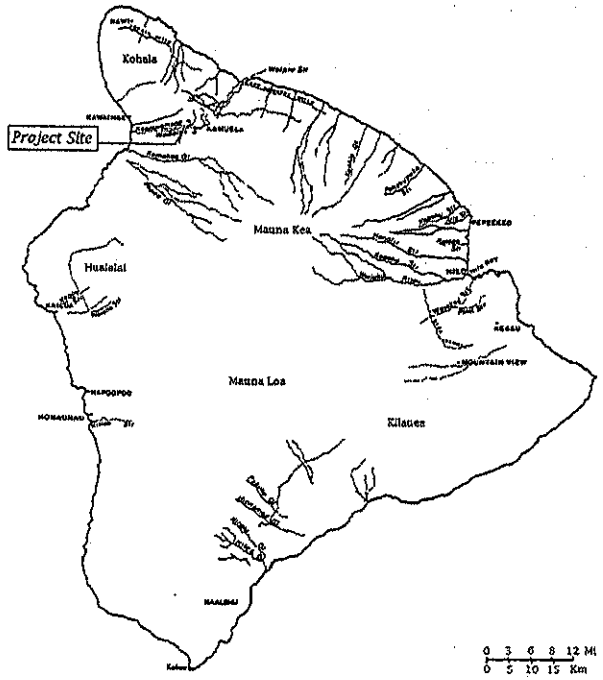

Figure 1. Location of Keanu'i'omano Stream and project location on a map of Big Island streams.

AECOS biologists conducted surveys of Waiulaula Gulch and its tributaries (including Keanu'i'omano Stream) in 2000, and some of the results of those earlier surveys are included in this report as applicable (AECOS, 2001; and AECOS Consultants, 2000).

Water Quality — Water quality data were collected primarily to characterize aquatic habitats encountered. These measurements, limited in both spatial and temporal coverage, are not intended to serve as a baseline of stream water quality - merely to contribute to such an effort. Water quality data collected for this survey are discussed in the report section on Field Observations. Some measurements were made *in situ*, while others were obtained from water samples collected and shipped to *AECOS*, Inc. laboratory on O'ahu. Analytical methods used for these samples are listed in Table 1.

Table 1. Analytical methods and instruments used for the February 2002 sampling of Keanu'i'omano Stream, Hawai'i.

Analyses List	Method	Reference	Instrument
Ammonia	alkaline phenol	Koroleff in Grasshoff et al. (1986)	Technicon AutoAnalyzer II
Dissolved Oxygen	EPA 360.1	EPA (1979)	YSI Model 95 DO meter
Nitrate + Nitrite	EPA 353.2	EPA (1993)	Technicon AutoAnalyzer II
Oil & Grease	EPA 413.2	EPA (1979)	Perkin Elmer 1430 Infrared Spectrophotometer
pH	EPA 150.1	EPA (1979)	Orion SA 250 pH meter / Ross combination electrode
Temperature	thermister calibrated to NBS cert. Thermometer (EPA 170.1)	EPA (1979)	YSI Model 95 DO meter
Total Nitrogen	persulfate digestion /EPA 353.2	D'Elia et al. (1977) / EPA (1993)	Technicon AutoAnalyzer II
Total Phosphorus	persulfate digestion /EPA 365.1	Koroleff in Grasshoff et al. (1986) / EPA (1993)	Technicon AutoAnalyzer II
Total Suspended Solids	Method 2540D (EPA 160.2)	Standard Methods 18th Edition (1992); EPA (1979)	Mettler H31 balance
Turbidity	Method 2130B (EPA 180.1)	Standard Methods 18th Edition (1992); EPA (1993)	Hach 2100P Turbidimeter

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Stream Description

Waiulaula Gulch lies along the fold of the relatively recent lava flows of Mauna Kea and the older slopes of the south flank of Kohala Mountain. Waiulaula Gulch is a moderately large and complex system with numerous branches. Regionally, it is one of only three systems with perennial stream reaches (Table 2). Some of its headwaters can be traced above 1500 m (5000 ft); whereas the other regional stream systems arise below 1200 m (4000 ft). Waikoloa Stream and Keanu'i'omano Stream are tributary to Waiulaula Gulch, which is an intermittent stream.

The Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit, 1990) lists Keanu'i'omano Stream (State code No. 8-5-03.01) as a perennial stream in which the flow is interrupted (not flowing year round at lower elevations). Presumably the designation of "Waikoloa" in much of that document is intended to encompass all of the watershed (Waiulaula Gulch, and both Waikoloa and Keanu'i'omano streams).

The Stream Assessment report rates Hawaiian perennial streams on a number of characteristics using a four-point scale. Waikoloa Stream is rated "L" for limited (lowest ranking) under aquatic resources and "O" or outstanding for cultural resources. Elsewhere in the report this stream is not ranked (W or without) for aquatic resources; and anyway all references are to Waikoloa Stream, not Keanu'i'omano. Waikoloa is not ranked for either recreational or riparian resources. The stream is indicated as having a palustrine wetland associated with it.

The limited aquatic resources ranking is based upon various reports providing information on the biota in Waikoloa Stream. With respect to the lack of a rating for riparian resources, further detail is provided in the Hawaii Stream Assessment indicating that none of the stream flows through native forest and wild pig (*Sus scrofa*) is potentially a problem species (detrimental animal) in this environment. Although Waikoloa Stream is not given a recreational resources score because opportunities for camping, hiking, fishing, swimming, boating, hunting, and scenic views are presently few, future plans for Waikoloa Stream include a bikeway and hiking trail going through and south of Kamuela town (see *AECOS*, 2001). This level of access could signal relatively high recreational value.

A U.S. Geological Survey (USGS) crest-stage partial-record station (No. 16756500) is located on the left bank of "Waiaka" (Keanu'i'omano) Stream 50 m (150 ft) above the highway bridge, capturing a drainage area of 11.1 km² (4.3 mi²). The maximum discharge measured at this station during water year 2000 was 446 ft³/s (cfs). The period of record maximum for this station is significantly greater at 3,540 cfs (USGS, 2001).

Table 2. Summary of stream relationships, characteristics, and other aquatic features for a portion of South Kohala District, Island of Hawai'i.

Stream / Gulch		State Code	Stream Class[1]	"Headwaters" Elevation[2] or feature name	F[3]	F elev.	RANK[4]	Survey Data[5]
Kamakoe Gulch to PUAKŌ / WAIKOLOA								
Unnamed		8-5-98	I	1120				
Unnamed		8-5-98	I	~2200				
Hāloa		8-5-01	P	*3920*				
				Pā'iakuli	R	~2830		
PU'UKAPU HMSTDS					B	*2900*		
Lanimaumau		8-5-02	PI	~3600				
PU'UKAPU HMSTDS					B	*2850*		
Hauani Gulch	*r*		P	3480				
"				16759000	Gp	3117		
"				livestock	Do	?		
unnamed	*l*		P	~3520				
Waiulaula Gl.		8-5-03	I	(1430)				*AECOSC* 2000
unnamed	*l*		I	~850				
Waikoloa	*s*	8-5-03.02	PI	(3180)				*AECOS* 2001
WAIMEA					B	*2660*		
Waikoloa	*e*	8-5-03.02	P	3930				
"				Marine Dam	Do	~3455		
"				16758000	Gp	3460		
"				Parker Ranch	Do	3550		
"					G	3570		
unnamed	*w*		P	3540				
Keanu'i'omanō	*n*	8-5-03.01	PI	(2440)				
"				16756500	Gc	2420		
WAI'AKA					B	*2410*		THIS REPORT
Kohākōhau	*e*	8-5-03.01	P	~5080				
"				16756100	Gp	3410		
"				Hawaii DWS	Do	4250		domestic water supply
O'olāmakapehu	*l*		I	3610				
unnamed	*l*		P	~5120				
Hale'aha Gulch	*w*		*P*	~3700				
Lanikepu Gulch	*r*		*PI*	~3840				
Wai'aka Gulch	*l*		*P*	~3950				
'Ōuli Gulch	*r*		I	3870				
Mamaewa Gulch	*r*		I	~4080				
Momoualoa Gulch	*r*		I	~4400				

(continues)

Table 2 (continued).

Stream / Gulch		State Code	Stream Class[1]	"Headwaters" Elevation[2] or feature name	F[3]	F elev.	RANK[4]	Survey Data[5]
Unnamed		?8-5-97	I	~1480				
WAIKUI								
Makeāhua Gulch		8-5-97	I	(2000)				
"			I	*Kemole*	WF	990		
KOHALA MTN.						*0*		
Pauahi Gulch	*l*		I	~4400				
'Umipoho Gulch			I	~4700				
Waiakamali Gl.	*r*		I	~4800				
Luahine Gl.	*r*		I	~4880				
"				16755800	Gc	~3200		
unnamed	*r*		I	~3200				
unnamed	*r*		I	~4960				
unnamed	*r* ?		I	4930				
unnamed	*r*		I	~2600				
unnamed	*r*		I	~1800				
Makahuna Gl.		8-5-97	I	~2400				
Palihae Gulch	*l*	8-5-97	I	~2400				
to KAWAIHAE ⇓								

FOOTNOTES:

1 - P= perennial; I = intermittent; c = continuous; i = interrupted. Where given in *italics*, the class is inferred from topographic sheet by solid, dash-dotted, or no blue line. Otherwise, class is inferred from observation or as indicated in the Hawaii Stream Assessment. P,I indicates a stream segment that is intermittent above a perennial part.

2 - In feet, estimated (from topographic maps) upper elevation of stream channel; generally somewhat higher than headwaters shown on topographic map, but may be lower than drainage basin boundary. Elevation in 0 indicates top of stream segment and point of significant branch or name change to tributary in a row below.

3 - F: Natural or man-made aquatic features, such as wetlands, reservoirs, and irrigation ditch systems, which capture flow from the natural stream or feed water into the natural stream. The following codes are used: Di - diversion in; discharge into stream from a ditch or auwai (includes overflow from ditch system), Do - diversion out, from a stream into an auwai, flume, or ditch; Gc - USGS crest-stage gaging station; Gp - USGS partial-record gaging station; M - marsh; R - reservoir; RD - reservoir with diversion to a ditch; WF - waterfall. The actual or estimated elevation (in feet) of the feature is provided in Column 7. Multiple features are listed from lowest to highest on branch. The feature name (if known) is given in Column 5.

4 - Summary from the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit, 1990); aquatic rankings: M = moderate; O = outstanding; S = substantial; U = unknown. If blank, then stream was not ranked.

5 - Lists any references that provide biological or water quality data for the indicated stream segment.

Table 2 presents a summary of information for the stream system in the project area and adjacent streams on this part of the Big Island. This table provides a systematic approach to listing multi-branched streams and gulches with a table row entry for every stream branch in the selected geographic area. Essentially, U.S. Geological

Survey (USGS) topographic map (7.5-minute quadrangle series or "quad map") information has been converted into a table, allowing the map information to be combined with other data sources or references. These data or references may be site specific (pertinent to a specific location on the system) or more general (pertinent to one or more stream branches). Small streams or ravines not seen on the quad map may not be included, although could be easily added to the listing, which is open-ended. The "features" listing ("F" column) provides information on stream diversion systems, wetlands, USGS gages, reservoirs, and other aquatic features associated with each stream branch.

The listing in Table 2 starts with an unnamed gulch north of Kamakoa Gulch near Waikoloa Village (State code No. 8-5-98, which covers the "watershed" designated "Pohakoloa" and encompasses most of the northwest flank of Mauna Kea) on the south and moves clockwise around Mauna Kea, then Kohala Mountain from their saddle (Waimea Plain) to Makahuna Gulch near Kawaihae on the coast. Streams and/or dry gulches are listed in order as they appear along this coast for the each of the drainage basins. Watersheds are separated by horizontal dashed lines in the table. Streams or gulches that empty directly into the sea are listed first below each horizontal dashed line and usually presented in larger typeface than branches of these features. Every stream and gulch that appears in blue on USGS topographic maps (*Kawaihae, Kamuela, Puu Hinai*, and *Nohonaohae* quadrangles) is listed, many simply as unnamed features. In the first column, streams appear in italics and gulches are given in regular type (a style adapted from USGS topographic maps). Although gulches and ravines are generally considered dry much of the time, whereas "streams" might be flowing much or all of the time, the distinction here is simply one established by USGS in mapping and is not meant to imply a particular class (see Column 4 for stream class). A sans serif font (TrueType® "Arial") is used to indicate non-aquatic features, in some cases replacing the designation "unnamed" with a place name appropriate to the location of the origin of an unnamed stream branch.

In this part of the Big Island, the more recent lava flows of Mauna Kea bank up against the much older slopes of the south flank of Kohala Mountain. Makeahua Gulch (and higher up, Waiulaula Gulch) lies along the fold between these lava flows. Most of the upper stream branches arise on Kohala. In the table, this is indicated by gray shading of all stream names (column 1) that are predominantly on Mauna Kea. All others are predominantly or entirely on Kohala Mountain. The listing of branches from south to north (on Mauna Kea) or east to west (on the south slope of Kohala) is continued in the arrangement of tributaries given for each stream system outlet in the table. The arrangement starts with left bank tributaries nearest to the mouth moving around to the uppermost headwaters, then downstream to the right bank tributary nearest the mouth (essentially counter-clockwise in this area). As a further guide, the letters "*l*" or "*r*" appear in Column 2 to indicate a branch entering on the left or right bank,

respectively. "Segments" represent the confluence of two branches, which are indicated as either "*e*" and "*w*" (east and west) or "*n*" and "*s*" (north and south).

Column 2 provides vertical and horizontal bars which show the relationships between tributaries. A double vertical line identifies the root stream (discharging to the sea) of each watershed; for example Waiulaula Gulch of the Waikoloa watershed (8-5-03). Tributaries are then joined by a solid or dotted vertical line, the solid line marking a segment or branch, the dotted line used to connect these across rows used for other features. Jogs in the line indicate to which segment the various branches connect (and thus provides a sense of stream order). Thus, the jog in the vertical line at Keanu'i'omano Stream, for example, indicates that the next nine stream branches are tributaries of Keanu`i`omanō Stream and not the Waikoloa branch, or Waiulaula Gulch below the confluence.

Two watersheds in this area have streams that do not empty into the sea, but discharge instead onto the dry slopes of Mauna Kea (into Pa'iakuli Reservoir in one case). These streams are Haloa and Lanimaumau. Note that wavy lines are used to indicate that these streams do not have a mouth at the ocean shore.

Column 3 (Code) lists the State code number for perennial streams. Codes have been assigned by DLNR only to perennial streams and not to intermittent streams or gulches, although codes for these features can sometimes be inferred from the State Delineation of Watersheds. Unfortunately, this system combined many watersheds together where these were either small or uncertain owing to the lay of the land (the dry slopes of most parts of the Big Island are only weakly dissected by stream courses).

Column 4 (Class) presents the type of stream feature: "P" for perennial stream and "I" for intermittent stream. A lower case "I" indicates an interrupted stream, usually one that is perennial at higher elevations but intermittent at lower elevations. A "c" indicates continuous flowing to the sea. A code given in italics is one determined from the quad map only. Otherwise the class comes from the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit, 1990) or field observation. Note that the table allows the class of each stream segment or branch to be indicated, a feature particularly important in this part of the Hawaiian Islands where a perennial stream seldom if ever reaches the sea over the ground surface because of the highly porous geology of relatively recent lavas.

Column 5 gives the elevation of headwaters in feet above sea level. The value is estimated by examination of the quad map, and represents an attempt to determine the highest elevation at which a distinct channel for the stream is probably present. Usually, this is higher than the upper end of the blue line on the quad map, but lower than the highest point in the particular drainage basin. Where this value is particularly

difficult to determine because of numerous small tributaries or a lack of channel down-cutting to an extent that would be evident from a 40-foot contour interval, the value is preceded by a "~" meaning "about." An elevation in parentheses indicates that the row represents a stream segment: two stream branches come together at this elevation. Thus, Waiulaula Gulch "ends" at 1430 ft. elevation, which is the confluence of Waikoloa and Keanu'i'omano streams. This column is also used for "feature" names (see below).

Natural or man-made aquatic features (Column 5, 6, and 7), such as wetlands, reservoirs, and irrigation ditch systems which capture flow from, or feed water into, the natural stream are each given a line in the table under the appropriate stream branch. Multiple features are listed from lowest to highest on a branch. The feature name (if known) is given in Column 5. The feature type is given in Column 6 and could also represents a part of the feature name. Thus Pa'iakuli and "R" is Pa'iakuli Reservoir. Codes are defined in a footnote in the table. The actual or estimated elevation (in feet) of the feature is provided in Column 7.

Column 8 summarizes the aquatic resources rankings from the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit, 1990). None of the streams listed in Table 2 are ranked. Column 9 gives references to previous studies on streams or branches as indicated. Full references are given in the bibliography at the end of the report. Water quality station locations and other pertinent water quality or biological information about a particular branch may also appear in this column.

Although Table 2 is designed as a means of summarizing in tabular form known information about a particular stream system, the table also includes adjacent stream systems so that the area of interest can be seen in regional geographic perspective. It is clear from the table that Waiulaula Gulch is a moderately large and complex system with numerous branches. Regionally, it is one of only three systems with perennial stream segments. Some of its headwaters of Waiulaula Gulch can be traced above 1500 m (5000 ft); whereas all of the other regional stream systems arise below 1200 m (4000 ft). This part of Hawai'i includes some stream features such as reservoirs and diversions for irrigation systems, mostly related to ranching. It is particularly significant to the local stream ecology that the streams have their origins in the relatively wet eastern summit of Kohala, but flow towards the dry leeward Kohala and western slopes of Mauna Kea. Thus, these streams serve as sources of water for ranching (and domestic water) on an adjacent, dry part of the Big Island.

Field Observations

During the February 2002 survey, Keanu'i'omano Stream was observed to have a fair amount of swiftly flowing water, in contrast with observations made during the summer 2000 surveys (*AECOS*, 2001 and *AECOS* Consultants, 2000), which revealed a

dry streambed with scattered pools. Keanu'i'omano Stream occupies a wide channel with short, and in some cases, steeply eroding banks. The streambed consists of exposed bedrock with rocks and boulders creating a variety of habitats, including pools, riffles, runs, and small steps. The deeper pools probably retain their water throughout the year, whereas the other features disappear during the dry season. This hypothesis is supported by the fact that fish were observed in the pools.

Waiaka Bridge is at approximately 656 m (2000 ft) elevation. The stream gradient is not very steep here, although it is slightly steeper above the bridge than it is below. There is more canopy cover (~10%) of the stream above the bridge than below (~5%) and the embeddedness and organic matter retained in the stream appear to be greater in the more gently sloping sections of the stream below the bridge. A few side channels were observed both above and below the bridge. Backyards of houses and pasture fields occupy the floodplain on either side of the stream. It appears as if some stream channel alteration has occurred next to houses below the bridge to create permanent pools in the stream whenever flow diminishes. Some pipes, possibly used for backyard drainage, were observed on the left bank of the stream above the bridge.

Despite the very rocky streambed, the bulrush (*Schoenoplectus lacustris validus*), is conspicuous in many of the scattered pools. Algae were observed growing in some pools. Detailed observations on riparian vegetation are provided by E. Funk (Botanical Consultants, 2002).

Aquatic biota - The aquatic macrofauna in this section of Keanu'i'omano Stream is rather sparse. Guppies (*Poecilia reticulata*), flatworms, and leeches make up the majority of the macrofauna observed. Aquatic insects were also observed, although possibly not as many as might otherwise be expected because of the strong winds experienced during the site visit. No native fishes, crustaceans, or insects were observed during this site visit, although endemic insects and crustaceans have been previously observed in Waiulaula Gulch (AECOS, 2001; AECOS Consultants, 2000; and Montgomery, 2000). Aquatic biota observations are summarized in Table 3.

Table 3. Checklist of aquatic fauna observed or previously reported from Keanu'i'omano Stream.

Species	Common name	Status	QC Code	Abundance
	ALGAE			
CHLOROPHYTA, ZYGNEMATALES	(green algae)			
ZYGNEMATACEAE				
Spirogyra sp.		?nat	10	C

Table 3. Aquatic biota (continued)

	INVERTEBRATES			
unidentified worm			20	U
TURBELLARIA, TRICLADIDA				
PLANARIIDAE	(flatworms)			
indet.		nat	20	C
ANNELIDA, HIRUDINEA	(leeches)			
indet.		nat	20	C
MOLLUSCA, GASTROPODA	(mollusks)			
PHYSIDAE				
Physa virgata	pond snail	nat	01	(2)
indet.	pond snail eggs	nat	10	R
ARTHROPODA, CRUSTACEA	(crustaceans)			
OSTRACODA				
indet.	clam shrimp		10	U
DECAPODA, ATYIDAE				
Atyoida bisulcata Randall	*`opae kala `ole*	end	01	(1)
ARTHROPODA, INSECTA	(insects)			
COLEOPTERA, DYTISCIDAE				
Rhantus cf. *pacificus* (Boisduval)	larvae	end	01	(2)
ODONATA, AESHNIDAE	(dragonflies)			
Anax junius (Drury)	green darner	nat	10	R
ODONATA, LIBULELLIDAE	(dragonflies)			
Pantala flavescens (Fabricius)	nymph	nat	20	U
Pantala flavescens (Fabricius)	globe skimmer, adult	nat	01	(2)
ODONATA, COENAGRIONIDAE	(damselflies)			
Enallagma civile (Hagen)	bluet, adult	nat	10	R
Megalagrion blackburni McLachlan	Blackburn's damselfly	end	01	(2)
	VERTEBRATES			
VERTEBRATA, PISCES	(fishes)			
POECILIIDAE				
Poecilia reticulata Peters	guppy, rainbow fish	nat	10	C
VERTEBRATA, AMPHIBIA	(frogs & toads)			
BUFONIDAE				
Bufo marinus	marine toad, tadpole	nat	01	(2)
RANIDAE				
Rana catesbeiana Shaw	bullfrog, adult	nat	01	(2)

KEY TO SYMBOLS USED:

Status:

nat. - naturalized. An introduced or exotic species.
ind. - indigenous. A native species also found elsewhere in the Pacific.
end. - endemic - A native species found only in the Hawaiian Islands.

QC Code:

01 - Observed in the stream system and reported in *AECOS* Consultants (2000) or collected by Dr. S. Montgomery downstream from the project area (Montgomery, 2000) (1); or observed in the stream and reported in *AECOS* (2001) (2).
10 - Observed in the field by aquatic biologists on 20 February 2002.

Table 3. Aquatic biota (continued)

20 - Collected 20 February 2002, identified in the laboratory; specimen(s) not saved.
21 - Collected 20 February 2002; identified in the laboratory; voucher specimen(s) saved.

Abundance categories:

R - Rare - only one or two individuals seen.
U - Uncommon - several to a dozen individuals observed.
C - Common - Seen everywhere, although generally not in large numbers.
A - Abundant - found in large numbers and widely distributed.
P - Present - noted as occurring, but quantitative information lacking.

Water Quality — The quality of the water in Keanu'i'omano Stream was measured in three different locations on 20 February 2002 (Figure 2). Station No. 1 was located upstream from the bridge off of Pako Place at 820 m (2500 ft) elevation. Station No. 2 was located at the bridge at 735 m (2410 ft) elevation. Station No. 3 was located downstream from the bridge at approximately the 650 m (2140 ft) elevation.

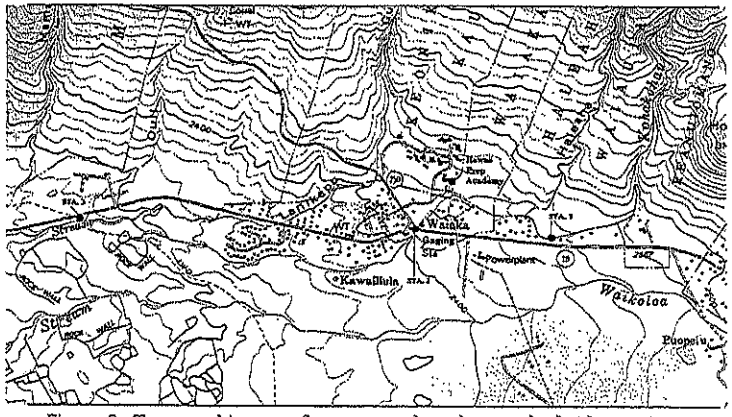

Figure 2. Topographic map of streams and roads near the bridge project at Waiaka, with water quality Stations 1, 2, and 3 shown.

As stated earlier, the primary purpose of these data is to characterize the aquatic environments, not necessarily to establish baseline values or determine compliance with Hawaii's Water Quality Standards. State criteria for particulates and nutrients are based upon geometric mean values and a set of three separate samples is required to

compute a geometric mean (DOH, 2000). Because we have measurements taken from beneath the Waiaka Bridge for a least some of the analytes in May and June 2000, geometric means can be calculated for these for Station 2 and evaluated against the appropriate State criteria (see Table 4). However, ideally, there should be at minimum three separate measurements each for the wet and dry seasons.

Table 4. Basic water quality characteristics of Keanu'i'omano Stream near Wai'aka, Island of Hawai'i (additional data from *AECOS*, 2001).

	Time sampled	Location	Temp. (°C)	pH (pH units)	Dissolved oxygen (mg/L)	Dissolved oxygen (% sat)	Turbidity (ntu)	TSS (mg/l)
5-23-00								
Sta. 2	1430	Waiaka Bridge	—	—	—	—	—	1.2
6-06-00								
Sta. 2	1345	Waiaka Bridge	—	7.36	—	—	2.46	1.4
2-20-02								
Sta. 1	1400	Pako Place	19.1	7.6	7.60	82	2.92	1.5
Sta. 2	1130	Waiaka Bridge	18.4	—	8.55	91	—	—
Sta. 2	1415	Waiaka Bridge	20.5	6.8	7.52	84	3.24	1.6
Sta. 3	1435	Mahua Street	24.3	7.4	7.83	94	1.94	0.9
MEANS			—	—	—	—	—	1.4

	Time sampled	Location	Nitrate + nitrite (µg N/l)	Ammonia (µg N/l)	Total N (µg N/l)	Total P (µg P/l)		Oil & grease (mg/l)
5-23-00								
Sta. 2	1430	Waiaka Bridge	—	—	199	17		—
6-06-00								
Sta. 2	1345	Waiaka Bridge	4	2	191	24		—
2-20-02								
Sta. 1	1400	Pako Place	1	3 *	226 *	70		<0.61
Sta. 2	1130	Waiaka Bridge	—	—	—	—		—
Sta. 2	1415	Waiaka Bridge	<1	<1 *	160 *	24		<0.61
Sta. 3	1435	Mahua Street	<1	<1 *	142 *	14		<0.61
MEANS			—	—	183	21		—

— Analysis not done (sample for this analysis not collected at this date/time).
* Total Nitrogen and Ammonia were analyzed after the hold time had expired.
MEANS presented above are geometric means for Sta. 2 measurements only.

The water quality results show good water quality conditions with limited influence from anthropogenic sources. Despite the lack of shade, the temperature of the stream at the upper two stations (No.s 1 and 2) is fairly low (18.4 °C - 20.5 °C), but higher at the lower elevation Station No. 3 (24.3 °C). Because small, natural streams typically reflect local air temperature, the cooler climate of higher elevations should result in

cooler water temperatures. More extensive temperature measurements were obtained in June 2000 by placing recording temperature probes in flowing water under the highway bridge on Keanu'i'omano Stream (water quality Station 2; see *AECOS*, 2000). Another probe was set in a stream pool on Waikoloa Stream at the upper end of Kamuela Town. The results (after *AECOS*, 2000) are summarized in Table 5.

Table 5. Summary of temperature (°C) recording probes setup in Waikoloa and Keanu'i'omano Streams, May-June 2000.

RECORDING PROBE	MEAN ± STD. DEV.	MIN	MAX	N ~ (DAYS)
Waikoloa Stream				
May 22-23, 2000	16.2 ± 0.14	16.0	16.3	96 (2)
Keanu'i'omanō Stream				
May 22-23, 2000	18.8 ± 2.22	16.6	24.4	84 (2)
June 5 - 6, 2000	19.0 ± 3.58	17.1	36.5	110 (2)

N = number of data points (15 min recording interval).

The difference in temperature (see Figure 3) between the recording made in Waikoloa Stream (815 m elevation) and that in Keanu'i'omano Stream (735 m) partly reflects the differences in elevation of the two sites and the minimal solar input at the Waikoloa site. The Waikoloa Stream site is a moderately deep, shaded pool that barely changed temperature over 24-hours, whereas the probe in flowing Keanu'i'omano Stream, demonstrates a typical diurnal cycle of daytime warming of some 8 C° on May 22-23 (Table 5).

The temperature recorded on June 5-6, 2000 at the Keanu'i'omano Stream location (see Figure 4) provided a curious mix, with June 5 showing minimal diurnal variation (less than in May) and June 6 temperature rising rather suddenly near mid-day, even more steeply than was the case on May 23. Although variation in solar input (cloudy vs. cloudless day) might explain the difference, a more likely cause is variation in stream flow related to stream withdrawals or inputs further up slope. It is suspected that water flow all but ceased around 11:00 AM on June 6.

Both turbidity and TSS at Waiaka Bridge appear be within Hawaii Water Quality Standards criteria for wet season (November - May) measurements of a geometric mean not to exceed 5 ntu and 20 mg/l, respectively. The measurements of pH and dissolved oxygen (DO) meet the criteria of not lower than 5.5 nor higher than 8.0 for pH and not less than 80 percent saturation for DO.

The concentrations of nitrogen compounds (nitrate, nitrite, ammonia, and organic nitrogen) measured in Keanu'i'omano Stream are fairly typical for Hawaiian streams in rural or undeveloped watersheds, and fall below the perennial streams wet season geometric mean criteria of 250 μg N/l for total N and 70 μg N/l for nitrate + nitrite,

respectively (there are no criteria for ammonia in streams) set forth in Hawaii's Water Quality Standards DOH, 2000). Total phosphorus (total P) values for Stations 2 and 3 are slightly elevated, but Station 1 exceeds the stream criterion of 50 μg P/L (as a wet season geometric mean). This could possibly be due to over-fertilization in the housing complex next to the stream or from some other upstream source. Additional measurements on a larger temporal and spatial scale would need to be taken to determine compliance with the water quality standards and to evaluate potential sources of pollutants.

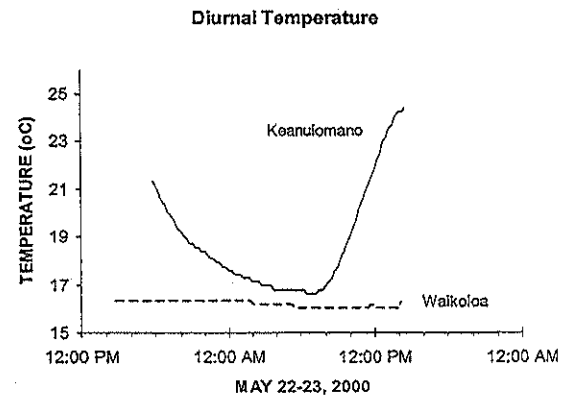

Figure 3. Temperature recordings for May 22-23, 2000 in Waikoloa and Keanu'i'omano Streams near Kamuela.

Oil and grease analysis yielded "not detected" (< 0.61 mg/l) results at the three stations. This analysis was made to satisfy a compliance requirement in the event that an application is made to the Hawaii Department of Health for a dewatering permit for the project.

Conclusions

Keanu'i'omano Stream and the stream to which it is tributary (Waiulaula Gulch) becomes drier downstream of the Waiaka bridge; whereas conditions are wetter upstream where the stream may be perennially flowing. The ecology of these

upstream segments is poorly known and the status of a native amphidromous aquatic fauna in the upper, perennial waters of the system is largely unknown. However, the proposed project to renovate Waiaka Bridge should not have an effect on this fauna, since opportunities for migrations up or down Waiulaula Gulch would be limited to times and conditions when construction is not likely to be occurring.

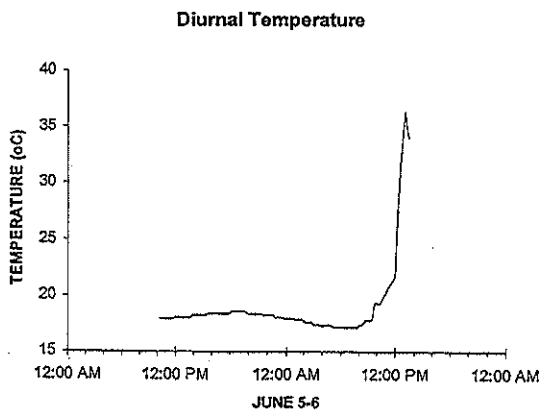

Figure 4. Temperature recording for June 5-6, 2000 in Keanu'i'omano Stream at Wai'aka.

The deeper pools provide the most permanent habitat for aquatic species, including native fish, crustaceans, and insects. These pools should be left unfilled and as natural as possible to provide continued habitat for migrating and other aquatic animals.

No aquatic species listed as endangered, threatened, proposed or candidate species by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*; see CFR; 1999; Federal Register, 1999a, 1999b, 2001) or the State of Hawaii under HRS §13-124 (3a) were detected in the stream system.

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CLIENT: Wilson Okamoto & Associates

ATTENTION:

FILE No.:	993
REPORT DATE:	04/18/02
PAGE:	1 of 1

AECOS REPORT OF ANALYTICAL RESULTS

SAMPLE TYPE: Streamwater
DATE SAMPLED: 02/20/02

AECOS LOG No.: 15454
DATE RECEIVED: 02/21/02

SAMPLE ID ⇨ / ANALYTE ⇩	Station 1	Station 2	Station 3		Analysis Date Analyst ID
Temperature (° C)	19.1	20.5	24.3		02/20/02 sb
Dissolved Oxygen (mg/L)	7.60	7.52	7.83		02/20/02 sb
pH	7.6	6.8	7.4		02/20/02 sb
Turbidity (NTU)	2.92	3.24	1.94		02/21/02 ml
Total Suspended Solids (mg/L)	1.5	1.6	0.9		02/21/02 ml
Ammonia * (µg N/L)	3	<1	<1	*	04/08/02 dh
Nitrate+Nitrite (µg N/L	1	<1	<1		03/06/02 dh
Total Nitrogen (µg N/L)	226	160	142	*	03/28/02 dh
Total Phosphorus (µg P/L)	70	24	14		03/14/02 dh
Oil & Grease (mg/L)	<0.61	<0.61	<0.61		03/18/02 dh

Waiaka Stream

Total Nitrogen and Ammonia were analyzed after the hold time had expired.

J. Mello, Laboratory Director

Appendix G

Acoustic Study for the Waiaka Stream Bridge Improvements and Approach Road Alignments Project

Y. Ebisu & Associates

December 2010

ACOUSTIC STUDY FOR THE WAIAKA STREAM BRIDGE IMPROVEMENTS AND APPROACH ROAD REALIGNMENTS PROJECT WAIMEA, HAWAII, HAWAII

Prepared for:

WILSON OKAMOTO CORPORATION

Prepared by:

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DECEMBER 2010

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CHAPTER I. SUMMARY

The existing and future traffic noise levels in the environs of the proposed Waiaka Stream Bridge Improvements and Approach Road Realignments Project on the island of Hawaii were studied to evaluate potential noise impacts associated with the Build Alternatives. The No Build and five Build Alternatives were evaluated, and the general project location is shown in Figure 1. Noise measurements were obtained, traffic noise predictions developed, and noise abatement alternatives evaluated.

At locations along two (Kohala Mountain Road and Kawaihae Road) of the three approaches to Waiaka Stream Bridge, existing traffic and background ambient noise levels in the project area currently exceed the U.S. Federal Highway Administration (FHWA) and Hawaii State Department of Transportation, Highways Division (HDOT) noise abatement criteria. Future (CY 2027) traffic noise levels will also exceed the "66 Leq" HDOT noise abatement criteria along the same two approaches to Waiaka Stream Bridge. The HDOT's “15 dB increase” criteria will probably not be exceeded at future developments along the three approaches to Waiaka Stream Bridge.

The following general conclusions can be made in respect to the potential traffic noise impacts which are possible by CY 2027 under the Build Alternative. These conclusions are valid for the future traffic volumes, mix, and average speed assumptions used for this traffic noise study.

- The HDOT's 66 Leq(h) noise abatement criteria for noise sensitive properties will exceeded at three existing noise sensitive developments located along the two approaches (Kohala Mountain Road and Kawaihae Road) to Waiaka Stream Bridge.

- The HDOT's 71 Leq(h) noise abatement criteria for commercial and industrial properties will not be exceeded at any developments located along the three approaches to Waiaka Stream Bridge.

- The HDOT's "15 dB increase” noise abatement criteria will probably not be exceeded at existing or future developments located along the three approaches to Waiaka Stream Bridge. As long as the project construction precedes any future development along the three approaches to Waiaka Stream Bridge, the "15 dB increase" criteria will not be exceeded at these future developments.

- Traffic noise mitigation measures in the form of sound attenuating walls may be employed to provide at least 5 dB of sound attenuation at the three existing noise sensitive developments. The estimated construction costs of the sound attenuating walls are within the HDOT criteria of $35,000.00 per benefited residence, and are therefore considered to be “reasonable and feasible” noise mitigation measures.

PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

FIGURE 1

- No parks or public structures (such as churches) are located within the limits of project construction; therefore, none should be affected by the proposed project or require noise mitigation measures.

- Potential short term construction noise impacts are possible during the project construction period in the project environs wherever noise sensitive receptors are located. However, minimizing these types of noise impacts is possible using standard curfew periods, properly muffled equipment, administrative controls, and construction barriers as required.

CHAPTER II. GENERAL STUDY METHODOLOGY

Noise Measurements. Existing traffic and background ambient noise levels at 3 locations in the project area were measured in June 2010. The traffic noise measurements were used to calibrate the traffic noise model which was used to calculate the Base Year (CY 2007) and future (CY 2027) traffic noise levels under the various Build Alternatives. The background ambient noise measurements were used to define existing noise levels at the closest noise sensitive receptors within the project's limits of construction which may be affected by the project. Also, the measurements were used in conjunction with forecast traffic noise levels to determine if future traffic noise levels are predicted to "substantially exceed" existing background ambient noise levels at these noise sensitive receptors, and therefore exceed FHWA and HDOT noise abatement criteria.

The noise measurement locations are shown in Figure 1. Traffic noise measurements were obtained at Locations "A," "B," and "C." The results of the traffic noise measurements are summarized in Table 1. In Table 1 and in subsequent tables, Leq represents the average (or equivalent), A-Weighted, Sound Level. A list and description of the acoustical terminology used are contained in Appendix B.

Traffic Noise Predictions. The Federal Highway Administration (FHWA) Traffic Noise Model, Version 2.5 (or TNM, see Reference 1) was used as the primary method for calculating Base Year and future traffic noise levels, with model parameters adjusted to reflect terrain, ground cover, and local shielding conditions. The traffic noise measurement Locations "A," "B," and "C" were used to validate the traffic noise model along the three existing approaches to the Waiaka Stream Bridge. At these traffic noise measurement locations, the measured traffic noise levels were compared with TNM model predictions to determine if the measured and calculated noise levels for the existing conditions were consistent and in general agreement. As indicated in Table 1, spot counts of traffic volumes were also obtained during the measurement periods and were used to generate the Equivalent Sound Level (Leq) predictions shown in the table. Traffic mix by vehicle types and average vehicle speeds for the various sections of the existing and future roadways were derived from observations during the traffic noise monitoring periods.

The Equivalent (or Average) Hourly Sound Level [Leq(h)] noise descriptor was used to describe the Base Year and CY 2027 traffic noise levels as required by References 2 and 3. The approach road plans and profiles, topographic maps (where available) of the area, and visual survey of the area were used to determine terrain, ground cover, and local shielding effects and distances from building structures, which were entered into the noise prediction model. Receptor elevations were estimated using these maps.

TABLE 1
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

	LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A	33 FT from the centerline of Kawaihae Road (6/14/10)	0648 TO 0748	55	553	11	23	69.8	69.7
B	36 FT from the centerline of Mamalahoa Highway (6/14/10)	0752 TO 0852	45	730	17	26	68.8	68.8
C	33 FT from the centerline of Kohala Mountain Road (6/14/10)	0906 TO 1006	40	186	8	5	62.0	61.9
C	33 FT from the centerline of Kohala Mountain Road (6/14/10)	1232 TO 1332	44				63.2	62.0
A	33 FT from the centerline of Kawaihae Road (6/14/10)	1337 TO 1437	47	583	10	7	68.5	68.5
B	36 FT from the centerline of Mamalahoa Highway (6/14/10)	1453 TO 1553	45				69.0	69.3

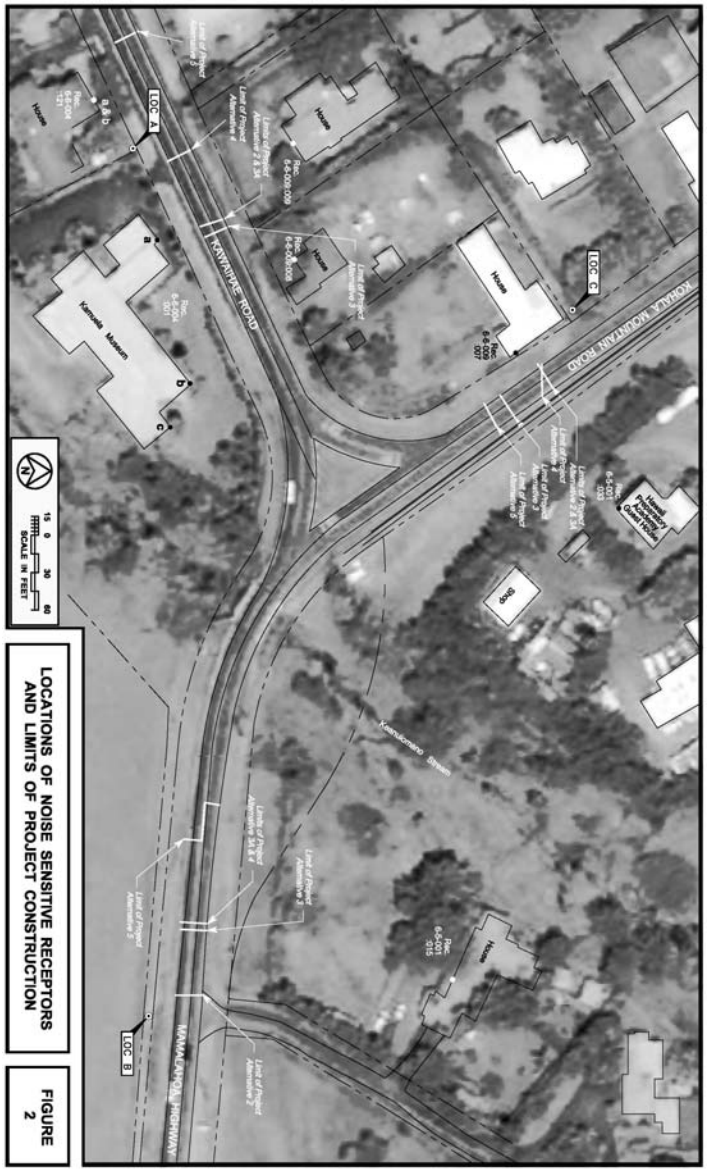
Future year (2027) traffic noise levels were then developed for the No Build and five Build Alternatives along the three approaches to the Waiaka Stream Bridge using the future am and pm peak hour traffic volumes from Reference 4. Existing average vehicle speeds and mixes were assumed to remain the same between the Base Year and future year (2027).

Noise sensitive residential and museum structures are located in the vicinity of the proposed Waiaka Stream Bridge Improvement Project. These noise sensitive receptor locations are identified by their applicable Tax Map Key (TMK) numbers, are shown in Figure 2, and represent the closest noise sensitive buildings within the various limits of project construction for the proposed Waiaka Stream Bridge Improvement Project. Future traffic noise levels at these existing receptor locations within the limits of project construction were evaluated using the 2027 pm peak hour volumes from Reference 4. The limits of project construction for the five Build Alternatives are shown in Figures 1 and 2.

Impact Assessments and Mitigation. Following the calculation of the future traffic noise levels, evaluations were made of the future traffic noise levels and impacts at receptor locations which were within the limits of project construction. Comparisons of predicted future traffic noise levels with FHWA and HDOT noise abatement criteria (see Table 2) were made at these receptor locations to determine specific locations where the noise abatement criteria are expected to be exceeded.

The HDOT 66 Leq(h) noise abatement criteria and the HDOT "15 dB increase" criteria were applied to all noise sensitive buildings in Activity Category B (see Table 2) and within the limits of project construction. By Reference 3, the HDOT has replaced the FHWA 67 Leq(h) criteria with their 66 Leq(h) criteria for Activity Category B. Along the three approaches to the Waiaka Stream Bridge, the locations of the 66 Leq(h) traffic noise contour, without the benefit of shielding from natural terrain or man-made sound barriers, were also used to identify noise sensitive receptor locations where the HDOT's 66 Leq(h) noise abatement criteria would not be exceeded due to their locations outside the 66 Leq(h) contours. In addition, the HDOT's criteria of "15 dB increase or more above existing background noise levels" was also used as a noise abatement criteria for this project (from Reference 3). Where noise mitigation measures were indicated for this project, the effectiveness of sound attenuating barriers and other possible noise mitigation measures were evaluated. The ability to meet the HDOT criteria of 5 dBA noise reduction was also examined for various noise barrier heights.

The noise barriers which would be required to meet the HDOT's 5 dBA noise reduction criteria were then examined in respect to potential cost per benefited residence. By HDOT policy (Reference 3), the sound attenuation walls were considered "reasonable and feasible" if their costs did not exceed $35,000 per benefited residence. The estimated construction costs the sound attenuating walls



LOCATIONS OF NOISE SENSITIVE RECEPTORS AND LIMITS OF PROJECT CONSTRUCTION

FIGURE 2

TABLE 2

FHWA & HDOT NOISE ABATEMENT CRITERIA
[Hourly A–Weighted Sound Level––Decibels (dBA)]

ACTIVITY CATEGORY	LEQ (h)*	DESCRIPTION OF ACTIVITY CATEGORY
A	57 (Exterior)	Lands on which serenity and quiet are of extra–ordinary significance and serve an important public need and where the preservation of those qualities is essential if the areas are to continue to serve their intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, activity sports areas, parks, residences, motels, hotels, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	–––––––	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

––––––––––

* The Hawaii State Department of Transportation, Highways Division, utilizes Leq criteria levels which are 1 Leq unit less than the FHWA values shown.

were developed and provided in Reference 5. Walls whose estimated cost did not exceeded $35,000 per benefited residence were identified for inclusion within the highway improvement project's various Build Alternatives.

If the proposed Waiaka Stream Bridge Improvement Project is constructed prior to the development of new noise sensitive residences along the Rights-of-Way which border the project, background noise levels will probably be higher than existing values when the noise sensitive buildings are completed. For this situation, future noise sensitive residences should not experience a noise level increase of 15 dB resulting from the construction of this project, so the only noise abatement criteria applicable to these residences will be the 66 Leq(h) criteria for Activity Category B. In addition, unless building permits for planned noise sensitive structures have been received prior to this noise study, the HDOT will not be responsible for providing noise abatement at these future noise sensitive structures along Rights-of-Way which border the Waiaka Stream Bridge Improvement Project.

For the potential office/commercial/industrial receptors in Activity Category C (see Table 2), the HDOT 71 Leq(h) and "15 dB increase" noise abatement criteria were also applied. However, because future (2027) traffic noise levels were not expected to exceed 71 Leq(h) at office/commercial/industrial receptors along the project Rights-of-Way, potential noise impacts at receptors in Activity Category C were considered to be very unlikely.

CHAPTER III. EXISTING ACOUSTICAL ENVIRONMENT

For the purposes of this study, 2007 was used as the Base Year for calculating changes in traffic and background ambient noise levels between the Base Year and 2027 under the five Build Alternatives. The Base Year noise environment in the environs of the Waiaka Stream Bridge Improvements and Approach Road Realignments Project was described by using the 2007 traffic counts from Reference 4 to calculate the Base Year traffic noise levels along the three approach roads to the Waiaka Stream Bridge. In addition, the measured noise levels at Locations "A," "B," and "C" were used to validate the method of calculating the Base Year traffic noise levels using the FHWA computer noise model. Table 1 contains the traffic noise measurement results at Locations "A" through "C", which were used to calibrate the traffic noise model and to refine estimates of Base Year traffic noise levels along the three existing roadways in the Waiaka Stream Bridge environs.

Table 3 presents the Base Year traffic noise levels during the am and pm peak traffic hours at receptor locations of 50, 100, and 150 feet from the centerlines of three existing roadways in the project environs. Also shown in Table 3 are the assumptions used for hourly traffic volumes, average vehicle speeds, and mix of vehicle types during the calculations of the existing Base Year traffic noise levels. "Loose soil" propagation loss factor was assumed in the computer modeling of the Base Year traffic noise levels.

Table 4 presents the setback distances from the centerlines of the three existing roadways in the project environs to the 66 and 71 Leq contours during the am and pm peak hours. Base Year traffic noise levels currently exceed the "66 Leq" noise abatement criteria at 34 feet from the centerline of Kohala Mountain Road, at 76 feet from the centerline of Kawaihae Road, and at 63 feet from the centerline of Mamalahoa Highway. The 66 Leq criteria for noise sensitive uses was exceeded during the Base Year at existing residences along Kohala Mountain Road and Kawaihae Road. The Kamuela Museum is presently shielded by an existing wall along Kawaihae Road.

The existing traffic noise levels at noise sensitive receptors which are located within the various limits of project construction were calculated using the FHWA computer noise model. The locations of these existing noise sensitive receptors (which are identified by their applicable TMK numbers) are shown in Figure 2. At receptor locations Rec. 6-6-004:121(a,b), Rec. 6-6-004:121a is at the ground floor window and Rec. 6-6-004:121b is at the second floor window. The existing traffic noise levels at these receptor locations during the am and pm peak traffic hours are shown in Tables 5A and 5B. Based on the results shown in Tables 5A and 5B, it was concluded that Base Year traffic noise levels exceed the 66 Leq HDOT noise abatement criteria at residences located on lots at TMK: 6-6-009:007, TMK:6-6-009:008, and TMK:6-6-004:121.

TABLE 3

EXISTING (CY 2007) TRAFFIC VOLUMES AND NOISE LEVELS ALONG VARIOUS ROADWAY SECTIONS IN PROJECT ENVIRONS (AM AND PM PEAK HOUR)

ROADWAY SECTION	SPEED (MPH)	TOTAL VPH	********** VOLUMES (VPH) ********** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	150' Leq
AM Peak Hour:								
Kohala Mountain Road	40	286	268	11	7	60.9	56.4	53.0
Kawaihae Road	55	695	655	13	27	68.8	64.1	60.6
Mamalahoa Highway	45	921	870	20	31	67.5	62.9	59.4
PM Peak Hour:								
Kohala Mountain Road	44	434	414	17	3	63.3	58.6	55.0
Kawaihae Road	47	894	868	15	11	67.1	62.4	58.8
Mamalahoa Highway	45	1,192	1,169	19	4	67.4	62.7	59.0

Notes:
1. All distances shown are from the center of roadways.
2. Calculated Leq's are for unobstructed line-of-sight conditions.

TABLE 4

YEAR 2007 AND 2027 DISTANCES TO 66 AND 71 LEQ CONTOURS (AM AND PM PEAK HOUR)

ROADWAY SECTION	66 Leq SETBACK (FT) EXISTING	66 Leq SETBACK (FT) CY 2027	71 Leq SETBACK (FT) EXISTING	71 Leq SETBACK (FT) CY 2027
AM Peak Hour:				
Kohala Mountain Road	23	45	11	21
Kawaihae Road	76	114	36	56
Mamalahoa Highway	63	100	30	47
PM Peak Hour:				
Kohala Mountain Road	34	38	16	18
Kawaihae Road	59	79	28	38
Mamalahoa Highway	61	80	29	38

Notes:

1. All distances shown are from the center of roadway.
2. See TABLES 3 and 6 for traffic volume, speed, and mix assumptions.
3. Setback distances are for unobstructed line-of-sight conditions.

TABLE 5A

EXISTING AND FUTURE TRAFFIC NOISE LEVELS AT VARIOUS RECEPTOR LOCATIONS (4.92 FT RECEPTOR, AM PEAK HOUR)

RECEPTOR LOCATION	EXISTING (CY 2007) Leq		FUTURE W/O PROJ. (2027) / CHANGE Leq				FUTURE WITH PROJ. (2027) / CHANGE Leq			
ALTERNATIVE 2:										
REC. 6-6-009:007	65.3		69.2	/	3.9	*	69.5	/	4.2	*
REC. 6-6-009:008	67.5	*	70.1	/	2.6	*	70.1	/	2.6	*
REC. 6-6-009:009	61.9		64.5	/	2.6		64.6	/	2.7	
REC. 6-6-004:121a	65.7		68.5	/	2.8	*	68.5	/	2.8	*
REC. 6-6-004:121b	68.2	*	71.0	/	2.8	*	71.0	/	2.8	*
REC. 6-6-004:001a	62.5		65.2	/	2.7		65.4	/	2.9	
REC. 6-6-004:001b	60.7		63.2	/	2.5		63.5	/	2.8	
REC. 6-6-004:001c	59.7		62.0	/	2.3		61.9	/	2.2	
REC. 6-5-001:015	56.1		59.1	/	3.0		60.4	/	4.3	
REC. 6-5-001:033	57.7		60.8	/	3.1		62.2	/	4.5	
Location A	70.3		73.1	/	2.8		73.1	/	2.8	
Location B	69.7		72.8	/	3.1		72.8	/	3.1	
Location C	65.1		69.1	/	4.0		69.3	/	4.2	
ALTERNATIVE 3:										
REC. 6-6-009:007	65.3		69.2	/	3.9	*	69.4	/	4.1	*
REC. 6-6-009:008	67.5	*	70.1	/	2.6	*	70.2	/	2.7	*
REC. 6-6-009:009	61.9		64.5	/	2.6		64.6	/	2.7	
REC. 6-6-004:121a	65.7		68.5	/	2.8	*	68.3	/	2.6	*
REC. 6-6-004:121b	68.2	*	71.0	/	2.8	*	71.0	/	2.8	*
REC. 6-6-004:001a	62.5		65.2	/	2.7		65.4	/	2.9	
REC. 6-6-004:001b	60.7		63.2	/	2.5		64.2	/	3.5	
REC. 6-6-004:001c	59.7		62.0	/	2.3		63.2	/	3.5	
REC. 6-5-001:015	56.1		59.1	/	3.0		59.4	/	3.3	
REC. 6-5-001:033	57.7		60.8	/	3.1		61.5	/	3.8	
Location A	70.3		73.1	/	2.8		73.0	/	2.7	
Location B	69.7		72.8	/	3.1		72.9	/	3.2	
Location C	65.1		69.1	/	4.0		69.2	/	4.1	
ALTERNATIVE 3A:										
REC. 6-6-009:007	65.3		69.2	/	3.9	*	69.5	/	4.2	*
REC. 6-6-009:008	67.5	*	70.1	/	2.6	*	70.1	/	2.6	*
REC. 6-6-009:009	61.9		64.5	/	2.6		64.5	/	2.6	
REC. 6-6-004:121a	65.7		68.5	/	2.8	*	68.3	/	2.6	*
REC. 6-6-004:121b	68.2	*	71.0	/	2.8	*	71.0	/	2.8	*

TABLE 5A (CONTINUED)

EXISTING AND FUTURE TRAFFIC NOISE LEVELS AT VARIOUS RECEPTOR LOCATIONS (4.92 FT RECEPTOR, AM PEAK HOUR)

RECEPTOR LOCATION	EXISTING (CY 2007) Leq		FUTURE W/O PROJ. (2027) / CHANGE Leq		FUTURE WITH PROJ. (2027) / CHANGE Leq	
ALTERNATIVE 3A (CONTINUED):						
REC. 6-6-004:001a	62.5		65.2 / 2.7		65.4 / 2.9	
REC. 6-6-004:001b	60.7		63.2 / 2.5		63.9 / 3.2	
REC. 6-6-004:001c	59.7		62.0 / 2.3		62.5 / 2.8	
REC. 6-5-001:015	56.1		59.1 / 3.0		59.5 / 3.4	
REC. 6-5-001:033	57.7		60.8 / 3.1		61.8 / 4.1	
Location A	70.3		73.1 / 2.8		73.0 / 2.7	
Location B	69.7		72.8 / 3.1		72.7 / 3.0	
Location C	65.1		69.1 / 4.0		69.2 / 4.1	
ALTERNATIVE 4:						
REC. 6-6-009:007	65.3		69.2 / 3.9	*	69.4 / 4.1	*
REC. 6-6-009:008	67.5	*	70.1 / 2.6	*	70.4 / 2.9	*
REC. 6-6-009:009	61.9		64.5 / 2.6		65.0 / 3.1	
REC. 6-6-004:121a	65.7		68.5 / 2.8	*	69.9 / 4.2	*
REC. 6-6-004:121b	68.2	*	71.0 / 2.8	*	70.9 / 2.7	*
REC. 6-6-004:001a	62.5		65.2 / 2.7		65.7 / 3.2	
REC. 6-6-004:001b	60.7		63.2 / 2.5		64.0 / 3.3	
REC. 6-6-004:001c	59.7		62.0 / 2.3		62.6 / 2.9	
REC. 6-5-001:015	56.1		59.1 / 3.0		58.9 / 2.8	
REC. 6-5-001:033	57.7		60.8 / 3.1		62.1 / 4.4	
Location A	70.3		73.1 / 2.8		73.0 / 2.7	
Location B	69.7		72.8 / 3.1		72.5 / 2.8	
Location C	65.1		69.1 / 4.0		69.2 / 4.1	
ALTERNATIVE 5:						
REC. 6-6-009:007	65.3		69.2 / 3.9	*	69.4 / 4.1	*
REC. 6-6-009:008	67.5	*	70.1 / 2.6	*	69.8 / 2.3	*
REC. 6-6-009:009	61.9		64.5 / 2.6		64.6 / 2.7	
REC. 6-6-004:121a	65.7		68.5 / 2.8	*	68.6 / 2.9	*
REC. 6-6-004:121b	68.2	*	71.0 / 2.8	*	70.9 / 2.7	*
REC. 6-6-004:001a	62.5		65.2 / 2.7		63.5 / 1.0	
REC. 6-6-004:001b	60.7		63.2 / 2.5		65.0 / 4.3	
REC. 6-6-004:001c	59.7		62.0 / 2.3		64.6 / 4.9	
REC. 6-5-001:015	56.1		59.1 / 3.0		59.8 / 3.7	
REC. 6-5-001:033	57.7		60.8 / 3.1		61.4 / 3.7	
Location A	70.3		73.1 / 2.8		73.0 / 2.7	
Location B	69.7		72.8 / 3.1		73.0 / 3.3	
Location C	65.1		69.1 / 4.0		69.2 / 4.1	

Note:
* Exceeds HDOT 66 Leq noise abatement criteria for Activity Category B.

TABLE 5B

EXISTING AND FUTURE TRAFFIC NOISE LEVELS AT VARIOUS RECEPTOR LOCATIONS (4.92 FT RECEPTOR, PM PEAK HOUR)

RECEPTOR LOCATION	EXISTING (CY 2007) Leq		FUTURE W/O PROJ. (2027) / CHANGE Leq		FUTURE WITH PROJ. (2027) / CHANGE Leq	
ALTERNATIVE 2:						
REC. 6-6-009:007	66.2	*	67.2 / 1.0	*	67.4 / 1.2	*
REC. 6-6-009:008	67.2	*	69.1 / 1.9	*	69.0 / 1.8	*
REC. 6-6-009:009	61.5		63.3 / 1.8		63.3 / 1.8	
REC. 6-6-004:121a	65.5		67.5 / 2.0	*	67.5 / 2.0	*
REC. 6-6-004:121b	68.2	*	70.2 / 2.0	*	70.2 / 2.0	*
REC. 6-6-004:001a	61.0		62.9 / 1.9		63.1 / 2.1	
REC. 6-6-004:001b	59.4		61.0 / 1.6		61.1 / 1.7	
REC. 6-6-004:001c	58.5		59.9 / 1.4		59.3 / 0.8	
REC. 6-5-001:015	55.2		56.9 / 1.7		58.3 / 3.1	
REC. 6-5-001:033	57.9		58.9 / 1.0		60.2 / 2.3	
Location A	70.3		72.3 / 2.0		72.3 / 2.0	
Location B	69.5		71.3 / 1.8		71.2 / 1.7	
Location C	66.0		67.0 / 1.0		67.1 / 1.1	
ALTERNATIVE 3:						
REC. 6-6-009:007	66.2	*	67.2 / 1.0	*	67.3 / 1.1	*
REC. 6-6-009:008	67.2	*	69.1 / 1.9	*	69.1 / 1.9	*
REC. 6-6-009:009	61.5		63.3 / 1.8		63.3 / 1.8	
REC. 6-6-004:121a	65.5		67.5 / 2.0	*	67.3 / 1.8	*
REC. 6-6-004:121b	68.2	*	70.2 / 2.0	*	70.2 / 2.0	*
REC. 6-6-004:001a	61.0		62.9 / 1.9		63.1 / 2.1	
REC. 6-6-004:001b	59.4		61.0 / 1.6		61.9 / 2.5	
REC. 6-6-004:001c	58.5		59.9 / 1.4		60.6 / 2.1	
REC. 6-5-001:015	55.2		56.9 / 1.7		57.1 / 1.9	
REC. 6-5-001:033	57.9		58.9 / 1.0		59.3 / 1.4	
Location A	70.3		72.3 / 2.0		72.2 / 1.9	
Location B	69.5		71.3 / 1.8		71.4 / 1.9	
Location C	66.0		67.0 / 1.0		67.1 / 1.1	
ALTERNATIVE 3A:						
REC. 6-6-009:007	66.2	*	67.2 / 1.0	*	67.4 / 1.2	*
REC. 6-6-009:008	67.2	*	69.1 / 1.9	*	69.0 / 1.8	*
REC. 6-6-009:009	61.5		63.3 / 1.8		63.1 / 1.6	
REC. 6-6-004:121a	65.5		67.5 / 2.0	*	67.3 / 1.8	*
REC. 6-6-004:121b	68.2	*	70.2 / 2.0	*	70.2 / 2.0	*

TABLE 5B (CONTINUED)

EXISTING AND FUTURE TRAFFIC NOISE LEVELS AT VARIOUS RECEPTOR LOCATIONS (4.92 FT RECEPTOR, PM PEAK HOUR)

RECEPTOR LOCATION	EXISTING (CY 2007) Leq		FUTURE W/O PROJ. (2027) / CHANGE Leq				FUTURE WITH PROJ. (2027) / CHANGE Leq			
ALTERNATIVE 3A (CONTINUED):										
REC. 6-6-004:001a	61.0		62.9	/	1.9		63.1	/	2.1	
REC. 6-6-004:001b	59.4		61.0	/	1.6		61.7	/	2.3	
REC. 6-6-004:001c	58.5		59.9	/	1.4		59.9	/	1.4	
REC. 6-5-001:015	55.2		56.9	/	1.7		57.2	/	2.0	
REC. 6-5-001:033	57.9		58.9	/	1.0		59.7	/	1.8	
Location A	70.3		72.3	/	2.0		72.2	/	1.9	
Location B	69.5		71.3	/	1.8		71.3	/	1.8	
Location C	66.0		67.0	/	1.0		67.1	/	1.1	
ALTERNATIVE 4:										
REC. 6-6-009:007	66.2	*	67.2	/	1.0	*	67.3	/	1.1	*
REC. 6-6-009:008	67.2	*	69.1	/	1.9	*	69.3	/	2.1	*
REC. 6-6-009:009	61.5		63.3	/	1.8		63.8	/	2.3	
REC. 6-6-004:121a	65.5		67.5	/	2.0	*	69.0	/	3.5	*
REC. 6-6-004:121b	68.2	*	70.2	/	2.0	*	70.0	/	1.8	*
REC. 6-6-004:001a	61.0		62.9	/	1.9		63.7	/	2.7	
REC. 6-6-004:001b	59.4		61.0	/	1.6		62.2	/	2.8	
REC. 6-6-004:001c	58.5		59.9	/	1.4		60.8	/	2.3	
REC. 6-5-001:015	55.2		56.9	/	1.7		57.0	/	1.8	
REC. 6-5-001:033	57.9		58.9	/	1.0		60.2	/	2.3	
Location A	70.3		72.3	/	2.0		72.2	/	1.9	
Location B	69.5		71.3	/	1.8		71.5	/	2.0	
Location C	66.0		67.0	/	1.0		67.1	/	1.1	
ALTERNATIVE 5:										
REC. 6-6-009:007	66.2	*	67.2	/	1.0	*	67.2	/	1.0	*
REC. 6-6-009:008	67.2	*	69.1	/	1.9	*	68.6	/	1.4	*
REC. 6-6-009:009	61.5		63.3	/	1.8		63.1	/	1.6	
REC. 6-6-004:121a	65.5		67.5	/	2.0	*	67.6	/	2.1	*
REC. 6-6-004:121b	68.2	*	70.2	/	2.0	*	70.1	/	1.9	*
REC. 6-6-004:001a	61.0		62.9	/	1.9		61.7	/	0.7	
REC. 6-6-004:001b	59.4		61.0	/	1.6		62.5	/	3.1	
REC. 6-6-004:001c	58.5		59.9	/	1.4		62.2	/	3.7	
REC. 6-5-001:015	55.2		56.9	/	1.7		57.5	/	2.3	
REC. 6-5-001:033	57.9		58.9	/	1.0		59.2	/	1.3	
Location A	70.3		72.3	/	2.0		72.1	/	1.8	
Location B	69.5		71.3	/	1.8		71.4	/	1.9	
Location C	66.0		67.0	/	1.0		67.0	/	1.0	

Note:
* Exceeds HDOT 66 Leq noise abatement criteria for Activity Category B.

CHAPTER IV. DESCRIPTION OF FUTURE TRAFFIC NOISE LEVELS

The traffic noise levels along the three roadway approaches to the Waiaka Stream Bridge during CY 2027 were evaluated for the No Build and five Build Alternatives. The same methodology that was used to validate the measured Base Year traffic noise levels in Table 1 was also used to calculate the Year 2027 noise levels under the No Build and Build Alternatives. Predictions of future traffic noise levels along the three roadways which approach Waiaka Stream Bridge utilized the traffic volume, average speed, and vehicle mix assumptions shown in Table 6. Table 6 also includes the calculated traffic noise levels at 50, 100, and 150 feet from the centerlines of the three roadway approaches during the am and pm peak traffic hours for unobstructed line of sight conditions between the receptor and the roadway lanes.

Table 4 presents the calculated setback distances of the 66 and 71 Leq(h) traffic noise contours from the three roadway centerlines for 2027 based on the results and assumptions shown in Tables 4 and 6. From the results shown in Table 4, it was concluded that Right-of-Way widths of 90 to 228 feet would be required to insure that noise sensitive properties would not be exposed to future traffic noise levels greater than 66 Leq(h). Because the actual Right-of-Way widths are in the order of 50 to 70 feet, the 66 Leq(h) traffic noise contour can extend beyond the Rights-of-Way of all three approaches to Waiaka Stream Bridge. The same conclusion applies to the 71 Leq(h) contours along Kawaihae Road and Mamalahoa Highway, which are expected to extend 56 to 47 feet from the centerlines of those two roadways, respectively, under unobstructed line-of-sight conditions.

Existing noise sensitive receptor locations closest to the three roadway approaches to Waiaka Stream Bridge are listed in Tables 5A and 5B. Figure 2 depicts the locations of the noise sensitive receptors closest to the three roadways where the future traffic noise levels were calculated. Also shown in Tables 5A and 5B are the predicted future traffic noise levels under the No Build and Build Alternatives. The predicted increases in traffic noise levels at the receptor locations are shown in Tables 5A and 5B, and range from 1.0 to 4.9 dB. Table 7 depicts the increases in future traffic noise levels associated only with the forecasted increases in traffic volumes by CY 2027, and do not include the effects of the changes in roadway alignments.

The following general conclusions can be made in respect to the potential noise impacts which can be expected by CY 2027 under the No Build and Build Alternatives without noise mitigation measures. These conclusions are valid as long as the future vehicle mixes and average speeds do not differ from the assumed values shown in Table 6.

By CY 2027, traffic noise levels along Kohala Mountain Road are expected to increase by 4.4 dB during the am peak hour, and exceed 66 Leq(h) along the Rights-of-Way. Future traffic noise levels will exceed 66 Leq(h) at an existing

TABLE 6

FUTURE (CY 2027) TRAFFIC VOLUMES AND NOISE LEVELS ALONG VARIOUS ROADWAY SECTIONS IN PROJECT ENVIRONS (AM AND PM PEAK HOUR)

ROADWAY SECTION	SPEED (MPH)	TOTAL VPH	********* VOLUMES (VPH) ********** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	150' Leq
AM Peak Hour:								
Kohala Mountain Road	40	765	715	31	19	65.3	60.7	57.3
Kawaihae Road	55	1,385	1,305	26	54	71.8	67.1	63.6
Mamalahoa Highway	45	1,910	1,803	42	65	70.6	66.0	62.6
PM Peak Hour:								
Kohala Mountain Road	44	545	521	21	3	64.2	59.5	55.9
Kawaihae Road	47	1,415	1,374	24	17	69.1	64.4	60.8
Mamalahoa Highway	45	1,810	1,776	29	5	69.2	64.5	60.8

Notes:
1. All distances shown are from the center of roadways.
2. Calculated Leq's are for unobstructed line-of-sight conditions.

TABLE 7

CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (CY 2027) (AM AND PM PEAK HOUR)

ROADWAY SECTION	NOISE LEVEL INCREASE DUE TO: NON-PROJECT TRAFFIC	PROJECT TRAFFIC
AM Peak Hour:		
Kohala Mountain Road	4.40	0.0
Kawaihae Road	3.00	0.0
Mamalahoa Highway	3.10	0.0
PM Peak Hour:		
Kohala Mountain Road	0.90	0.0
Kawaihae Road	2.00	0.0
Mamalahoa Highway	1.80	0.0

noise sensitive residence located along the west Right-of-Way at TMK: 6-6-009: 007, so traffic noise mitigation measures will need to be evaluated at this residence.

- By CY 2027, traffic noise levels along Kawaihae Road are expected to increase by 3.0 dB during the am peak hour, and exceed 66 Leq(h) along the Rights-of-Way. Future traffic noise levels will exceed 66 Leq(h) at an existing noise sensitive residence located along the north Right-of-Way at TMK: 6-6-009: 008 and along the south Right-of-Way at TMK:6-6-004:121, so traffic noise mitigation measures will need to be evaluated at these residences.

- By CY 2027, traffic noise levels along Mamalahoa Highway are expected to increase by 3.1 dB during the am peak hour, and exceed 66 Leq(h) along the Rights-of-Way. Future traffic noise levels could exceed 66 Leq(h) at any existing noise sensitive residence located along the Rights-of-Way and within the limits of project construction. There are no existing residences located within the future 66 Leq(h) noise contours and within the limits of project construction.

- The existing and future traffic noise levels at the Kamuela Museum should be below the 66 Leq(h) noise abatement threshold due to the presence of an existing wall along the boundary line south of Kawaihae Road. Under Build Alternative 5, most of the existing wall will need to be demolished to accommodate the realigned roadways, and it was assumed that the existing wall will be reconstructed along the relocated Right-of-Way, and be similar to the existing wall in respect to construction materials, height, and length.

- Within the various limits of project construction, exceedances of the "66 Leq" noise abatement criteria are expected to occur at two existing residences for the No Build as well as for the Build Alternatives. These two existing residences are Rec. 6-6-009:007 and 6-6-009:008, with their predicted future noise levels shown in Tables 5A and 5B. Existing and future traffic noise levels at a two story residence located south of Kawaihae Road (Rec. 6-6-004:121) also exceed the "66 Leq" noise abatement criteria primarily because the existing wooden slat fence is too porous to provide adequate sound attenuation and because of the high elevation of the second floor windows. This residence is within the limits of project construction for only Build Alternative 5.

- No office, commercial, or industrial structures within the limits of project construction should experience future traffic noise levels which exceed the HDOT noise abatement criteria of 71 Leq(h) for Activity Category C.

- No existing park lands or public use structures within the limits of project construction should experience traffic noise levels which exceed 66 Leq(h) or which exceed existing background ambient noise levels by 15 dB.

CHAPTER V. POSSIBLE NOISE MITIGATION MEASURES

Possible noise mitigation measures considered included the following:

A. Restricting the Growth In the Number of Noisy Buses, Heavy Trucks, Motorcycles, and Automobiles with Defective Mufflers. The percentage contribution to the total traffic noise by heavy trucks, buses, and noisy vehicles is currently about 50 percent, and elimination of these noise sources would reduce total traffic noise levels by approximately 3.0 Leq(h) units. At the existing noise sensitive receptor locations (Rec. 6-6-009:007, 6-6-009:008, and 6-6-004:121), future traffic noise levels are expected to be greater than 69 Leq(h), so elimination of all heavy trucks, buses, and noisy vehicles will not lower future traffic noise levels below the 66 Leq(h) noise abatement criteria. While elimination of these vehicles could produce noise reductions in the order of 3.0 dB, other noise abatement measures would still be required. Because of this limitation, and due to the level of regulatory efforts required, this mitigation measure was not recommended.

B. Alteration of the Horizontal Or Vertical Alignment of the Roadway. This project involves alterations to the vertical and horizontal alignments of the three roadway approaches to Waiaka Stream Bridge. Five realignment alternatives were evaluated in respect to their resulting noise impacts. None of the five realignment alternatives was more favorable than another in respect to minimizing predicted noise impacts at existing noise sensitive properties. Other major alterations of the horizontal alignment of the existing roadway lanes were not considered appropriate due to the scope of this roadway improvement project, and due to the constraints imposed by the possible locations of the existing intersections and Waiaka Stream Bridge within the project corridor. Noise sensitive receptors where the 66 Leq criteria is exceeded are located on both the north and the south sides of Kawaihae Road, so mitigation of traffic noise on both sides using roadway realignment techniques would not be possible. Realignment of Kohala Mountain Road by at least 15 feet toward the Hawaii Preparatory Academy Guest House will be required to mitigate the high noise levels at Rec. 6-6-009:007. The cost of the realignment of Kohala Mountain Road should be compared with the cost of alternative noise mitigation measures involving the construction of a sound attenuating wall. Vertical realignment of the highway is not a reasonable noise mitigation measure because of the need to match the grades of existing roadways beyond the immediate approaches to Waiaka Stream Bridge as well as at the elevation of the Waiaka Stream Bridge, because of the need to depress the roadway to achieve the noise shielding effects of the highway cuts, and because of the need for additional Right-of-Way width so as to properly slope the sides of the cuts and to not create detrimental reflections off any vertical side walls along the cuts.

C. Acquisition of Property Rights for Construction of Noise Barriers, and/or Construction of Noise Barriers Along the Right-of-Way. For single story, noise

sensitive buildings, construction of a sound attenuating wall is normally the preferred noise mitigation measure. The 5 to 7 dB of noise attenuation achievable with a 6 FT high wall is normally sufficient for single story structures. For multistory structures, the required height of the sound attenuating wall increases significantly, and typically exceeds the "reasonable and feasible" limits for noise mitigation measures under the HDOT noise abatement policy (Reference 3). It should also be noted that the sound barrier will block the views to the roadway which some of the residents may enjoy. For this reason, concurrence from the affected homeowners should be obtained prior to construction of a sound barrier as a noise mitigation measure.

D. Acquisition of Real Property Interests To Serve As A Noise Buffer Zone. Where tall (or multistory) structures are expected to be impacted by future traffic noise, the use of sound attenuating barriers (see para. C above) will not be practical due to the excessive heights required to shield the upper levels from traffic noise. In these situations, the only other noise mitigation possibilities are sound insulation of the affected upper level units or acquisition of the property interests. Noise buffer zones extending approximately 45 to 114 feet from the center of the affected roadway approaches and at substantial cost would be required to meet the HDOT 66 Leq criteria. In general, the acquisition of property for the creation of noise buffer zones for noise mitigation has seldom been applied in Hawaii.

E. Noise Insulation of Public Use or Nonprofit Institutional Structures. No public use structures should require noise insulation as a result of the proposed roadway improvements.

CHAPTER VI. FUTURE TRAFFIC NOISE IMPACTS AND POSSIBLE NOISE MITIGATION MEASURES

Future traffic noise levels are predicted to exceed the HDOT 66 Leq(h) noise abatement criteria by CY 2027 under all of the No Build and Build Alternatives at at total of three existing noise sensitive structures along Kohala Mountain Road and Kawaihae Road. Tables 8A through 8C present the predicted performances of sound attenuation walls located in front of the three affected structures (Rec. 6-6-009:007, 6-6-009:008, and 6-6-004:121) for the five Build Alternatives. The locations of the sound attenuation walls are shown in Figures 3 through 7. Sound attenuating walls were located along the Rights-of-Way fronting the three residential lots where future traffic noise levels are expected to exceed the HDOT 66 Leq(h) noise abatement criteria, and the heights of the walls were adjusted upward until the 5 dB minimum attenuation criteria was met at the various affected receivers.

Table 8A depicts the predicted traffic noise levels for various wall heights at Receiver 6-6-009:007 located on the west side of Kohala Mountain Road. Based on the results shown in Table 8A, 2 feet additions to the existing wall height will be required to provide 5 dB of sound attenuation at the residence located on the west side of the Kohala Mountain Road. The walls fronting Receiver 6-6-009:007 for Build Alternatives 3 and 5 are not included in Figures 4 and 7 because they are beyond the limits of project construction for these two alternatives.

Table 8B depicts the predicted traffic noise levels for various wall heights at Receiver 6-6-009:008 located on the north side of Kawaihae Road. Based on the results shown in Table 8B, a wall height of 8 to 10 feet will be required to provide 5 dB of sound attenuation at the residence located on the north side of the Kawaihae Road.

Table 8C depicts the predicted traffic noise levels for various wall heights at Receivers 6-6-004:121 (a and b) located on the south side of Kawaihae Road. Based on the results shown in Table 8C, a wall height of 7 to 8 feet will be required to provide 5 dB of sound attenuation at the ground floor window (Receiver 6-6-004:121a) closest to Kawaihae Road. For the second floor window closest to Kawaihae Road (Receiver 6-6-004:121b), a wall height of 10 to 11 feet will be required to provide 5 dB of sound attenuation.

In Figures 3 through 7, the top wall elevations shown are required to comply with the minimum 5 dB attenuation criteria of HDOT for ground level receptors. It should be noted that complete topographic maps at the three dwelling units were not available for this study, and the wall heights shown in Figures 3 through 7 are best estimates based on the available highway plans, sections, and profiles. Also shown in Figure 7 are the wall heights required for the relocated sound attenuating wall fronting the Kamuela Museum under Build Alternative 5. Under the other four Build Alternatives, the existing wall fronting the Kamuela Museum was assumed to remain in place, so the relocated wall shown in Figure 7 for the Kamuela Museum would not be required.

TABLE 8B

PREDICTED TRAFFIC NOISE ATTENUATION VS. BARRIER HEIGHTS
(4.92 FT RECEPTOR AT RECEIVER 6-6-009:008, AM PEAK HOUR)

BUILD ALTERNATIVE	EXISTING (CY 2007) Leq	FUTURE NOISE LEVELS WITH PROJECT (CY 2027) Leq: W/O BAR./ (CHANGE)	7.0 FT WALL/ (CHANGE)	8.0 FT WALL/ (CHANGE)	9.0 FT WALL/ (CHANGE)	RECOM. WALL/ (CHANGE)
ALTERNATIVE 2:	67.5 *	70.1 / 2.6 *	66.0 / -1.5 **	65.1 / -2.4	64.8 / -2.7	65.1 / -2.4
ALTERNATIVE 3:	67.5 *	70.2 / 2.7 *	66.0 / -1.5 **	65.0 / -2.5	64.7 / -2.8	65.0 / -2.5
ALTERNATIVE 3A:	67.5 *	70.1 / 2.6 *	66.0 / -1.5 **	65.1 / -2.4	64.8 / -2.7	65.1 / -2.4
ALTERNATIVE 4:	67.5 *	70.1 / 2.6 *	66.6 / -0.9 **	66.3 / -1.2 **	65.4 / -2.1 **	64.9 / -2.6 ***
ALTERNATIVE 5:	67.5 *	69.8 / 2.3 *	66.0 / -1.5 **	65.1 / -2.4 **	64.8 / -2.7	64.8 / -2.7

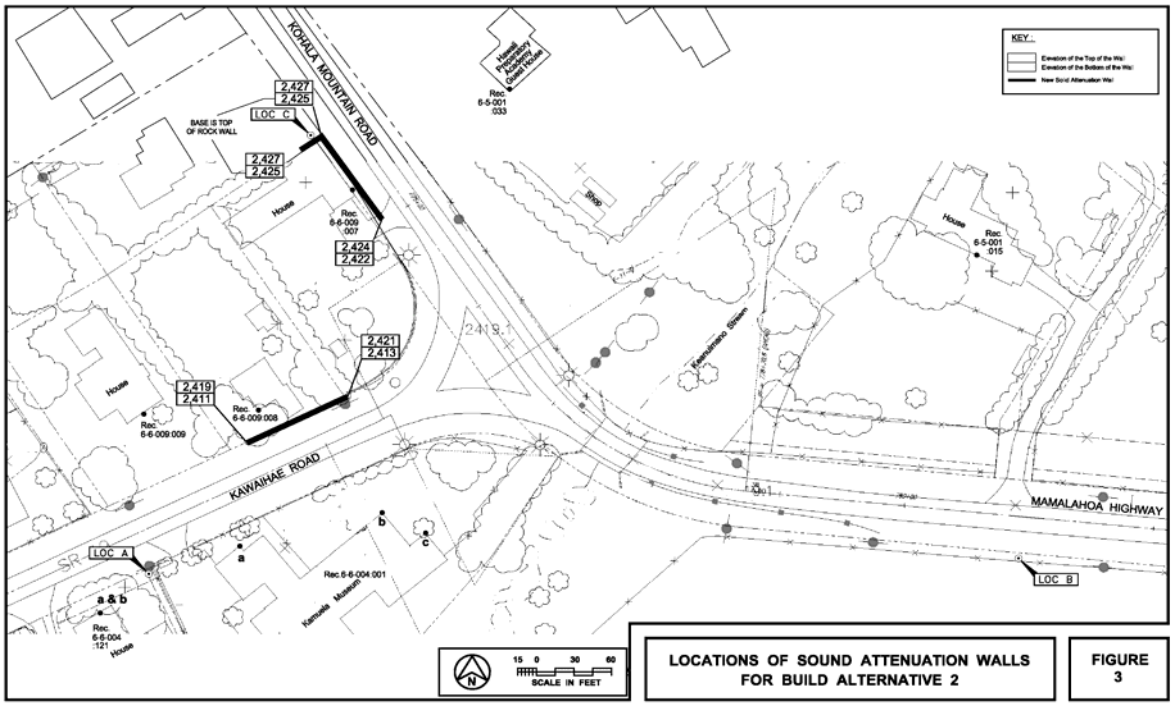
Notes:
* Exceeds HDOT 66 Leq noise abatement criteria for Activity Category B.
** Denotes need for additional barrier height to meet State DOT "5 dBA Minimum Attenuation" Criteria.
*** Wall height of 10 feet required for Build Alternative 4 to achieve the "5 dBA Minimum Attenuation" Criteria.

TABLE 8A

PREDICTED TRAFFIC NOISE ATTENUATION VS. BARRIER HEIGHTS
(4.92 FT RECEPTOR AT RECEIVER 6-6-009:007, AM PEAK HOUR)

BUILD ALTERNATIVE	EXISTING (CY 2007) Leq	FUTURE NOISE LEVELS WITH PROJECT (CY 2027) Leq: W/O BAR./ (CHANGE) (1)	1.0 FT WALL/ (CHANGE) (2)	2.0 FT WALL/ (CHANGE) (2)	3.0 FT WALL/ (CHANGE) (2)	RECOM. WALL/ (CHANGE) (2)
ALTERNATIVE 2:	65.3	69.5 / 4.2 *	66.9 / 1.6 **	64.5 / -0.8	62.9 / -2.4	64.5 / -0.8
ALTERNATIVE 3A:	65.3	69.5 / 4.2 *	66.4 / 1.1 **	64.4 / -0.9	62.9 / -2.4	64.4 / -0.9
ALTERNATIVE 4:	65.3	69.4 / 4.1 *	66.1 / 0.8 **	64.3 / -1.0	62.8 / -2.5	64.3 / -1.0

Notes:
* Exceeds HDOT 66 Leq noise abatement criteria for Activity Category B.
** Denotes need for additional barrier height to meet State DOT "5 dBA Minimum Attenuation" Criteria.
(1) With existing 2 foot high rock wall.
(2) Wall heights are additions to existing wall height.



LOCATIONS OF SOUND ATTENUATION WALLS FOR BUILD ALTERNATIVE 2

FIGURE 3

TABLE 8C

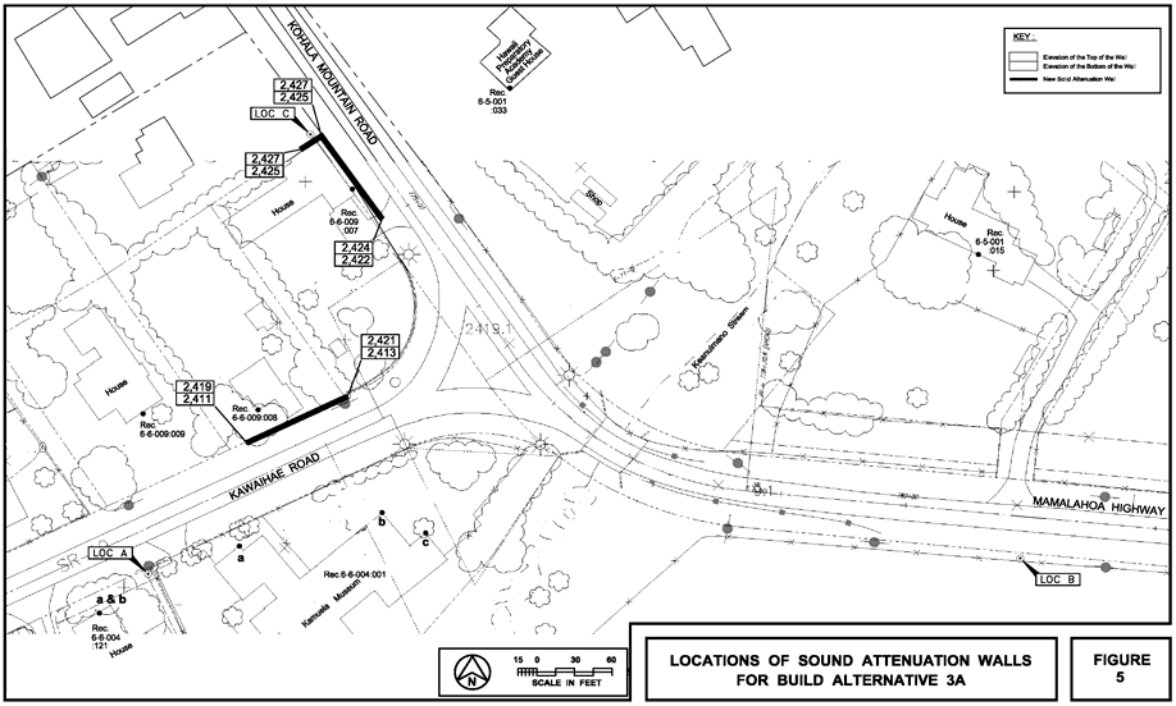
PREDICTED TRAFFIC NOISE ATTENUATION VS. BARRIER HEIGHTS
(4.92 FT GROUND FLOOR RECEPTOR AT RECEIVER 6-6-004:121, AM PEAK HOUR)

BUILD ALTERNATIVE	EXISTING (CY 2007) Leq	FUTURE NOISE LEVELS WITH PROJECT (CY 2027) Leq: W/O BAR./ (CHANGE)	6.0 FT WALL/ (CHANGE)	7.0 FT WALL/ (CHANGE)	8.0 FT WALL/ (CHANGE)	RECOM. WALL/ (CHANGE)
ALTERNATIVE 2:	65.7	68.5 / 2.8 *	63.8 / -1.9 **	63.6 / -2.1 **	63.4 / -2.3	63.4 / -2.3
ALTERNATIVE 3:	65.7	68.3 / 2.6 *	63.7 / -2.0 **	63.5 / -2.2 **	63.3 / -2.4	63.3 / -2.4
ALTERNATIVE 3A:	65.7	68.3 / 2.6 *	63.6 / -2.1 **	63.4 / -2.3 **	63.3 / -2.4	63.3 / -2.4
ALTERNATIVE 4:	65.7	69.9 / 4.2 *	63.9 / -1.8	63.7 / -2.0	63.5 / -2.2	63.9 / -1.8
ALTERNATIVE 5:	65.7	68.6 / 2.9 *	63.8 / -1.9 **	63.6 / -2.1	63.4 / -2.3	63.6 / -2.1

(14.92 FT SECOND FLOOR RECEPTOR AT RECEIVER 6-6-004:121, AM PEAK HOUR)

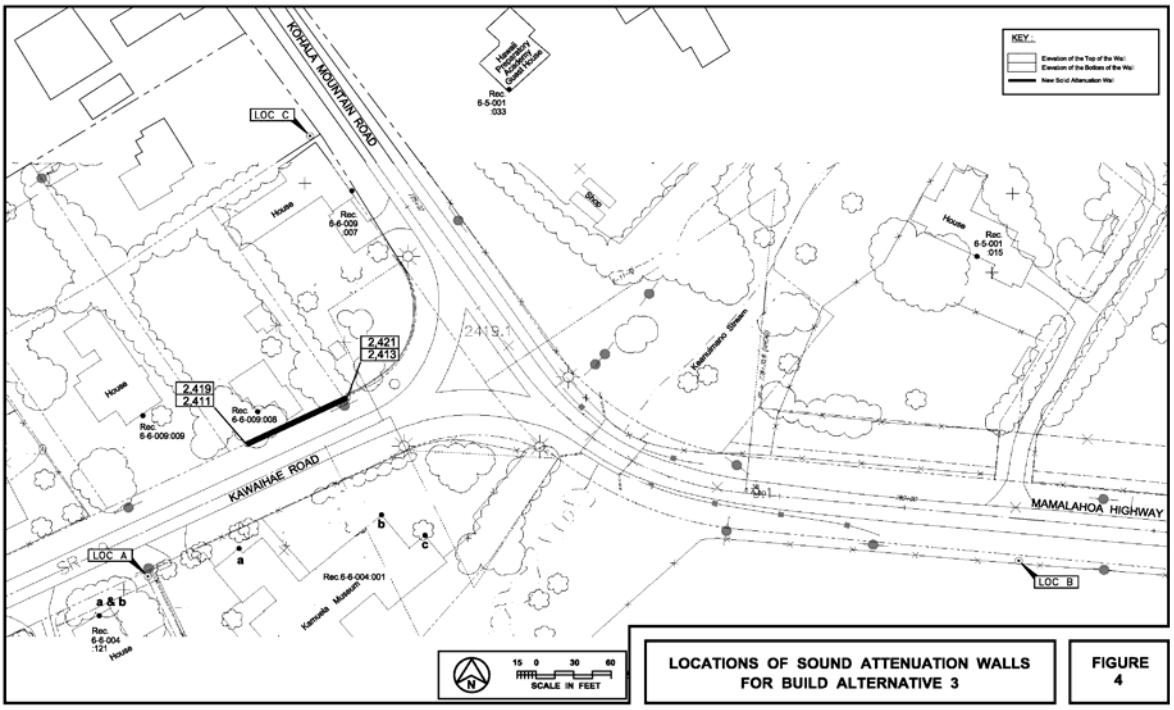
BUILD ALTERNATIVE	EXISTING (CY 2007) Leq	FUTURE NOISE LEVELS WITH PROJECT (CY 2027) Leq: W/O BAR./ (CHANGE)	9.0 FT WALL/ (CHANGE)	10.0 FT WALL/ (CHANGE)	11.0 FT WALL/ (CHANGE)	RECOM. WALL/ (CHANGE)
ALTERNATIVE 2:	68.2 *	71.0 / 2.8 *	66.7 / -1.5 **	65.9 / -2.3	65.0 / -3.2	65.9 / -2.3
ALTERNATIVE 3:	68.2 *	71.0 / 2.8 *	66.6 / -1.6 **	65.9 / -2.3	64.8 / -3.4	65.9 / -2.3
ALTERNATIVE 3A:	68.2 *	71.0 / 2.8 *	66.7 / -1.5 **	66.0 / -2.2	64.9 / -3.3	66.0 / -2.2
ALTERNATIVE 4:	68.2 *	70.9 / 2.7 *	67.1 / -1.1 **	66.6 / -1.6 **	65.5 / -2.7	65.5 / -2.7
ALTERNATIVE 5:	68.2 *	70.9 / 2.7 *	66.7 / -1.5 **	66.1 / -2.1 **	64.9 / -3.3	64.9 / -3.3

Notes:
* Exceeds HDOT 66 Leq noise abatement criteria for Activity Category B.
** Denotes need for additional barrier height to meet State DOT "5 dBA Minimum Attenuation" Criteria.



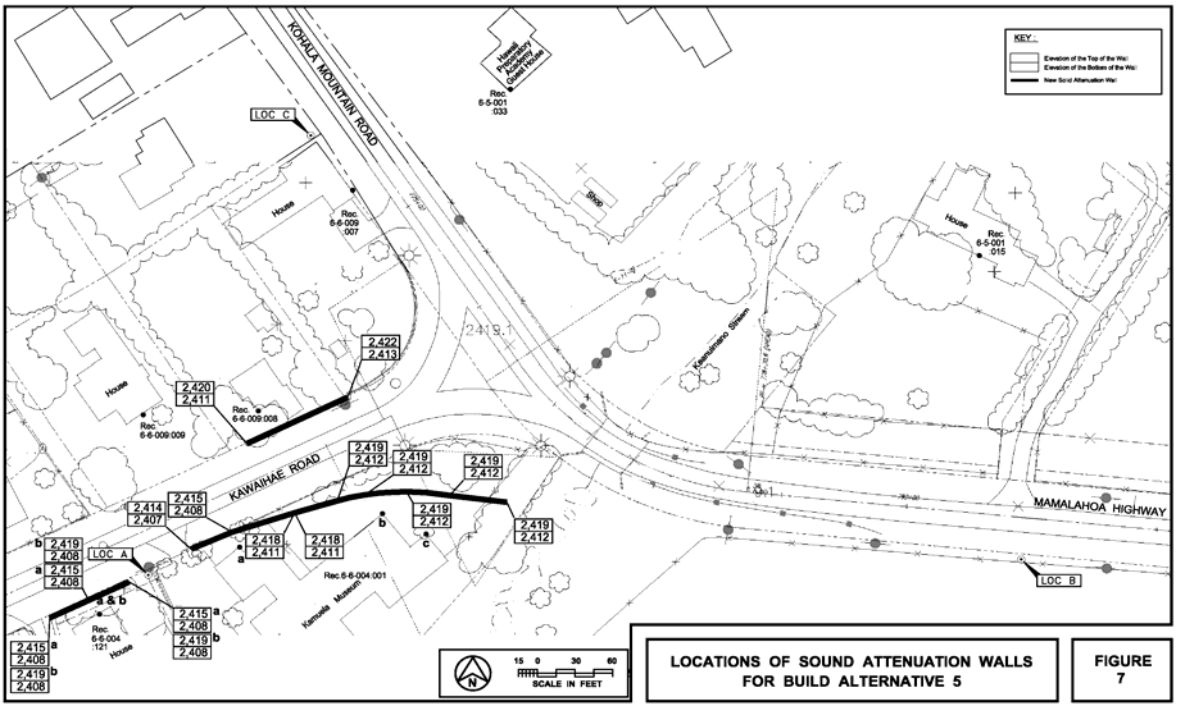
LOCATIONS OF SOUND ATTENUATION WALLS FOR BUILD ALTERNATIVE 3A

FIGURE 5



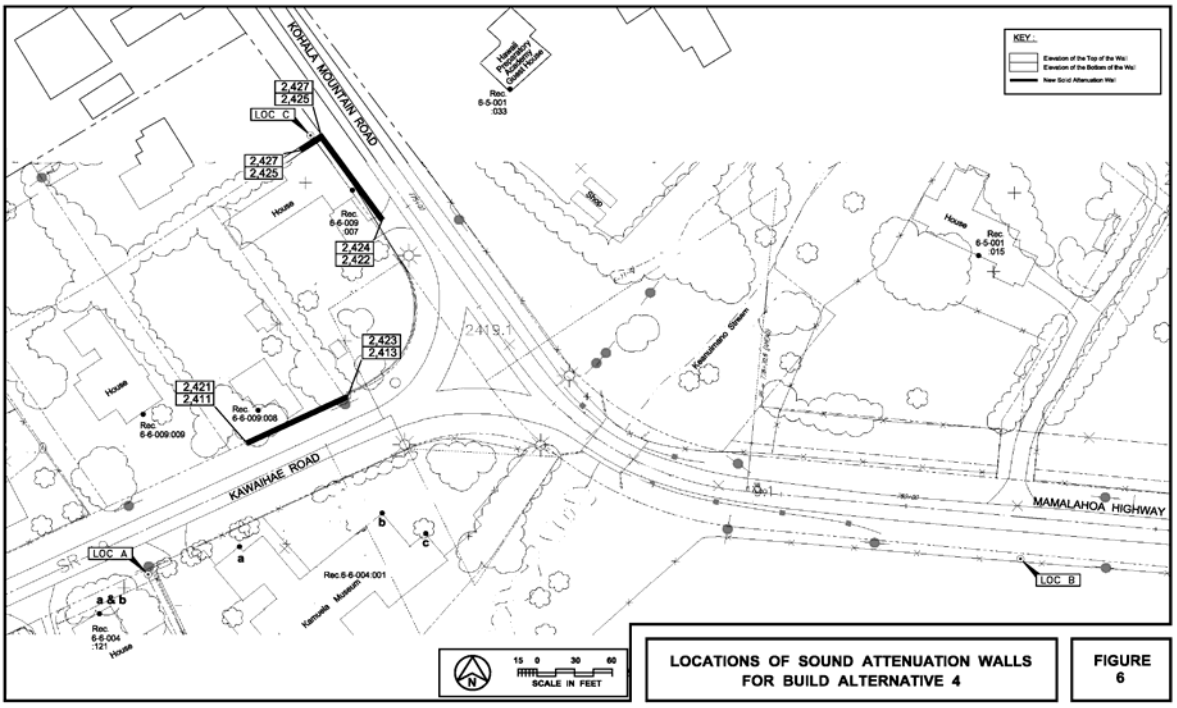
LOCATIONS OF SOUND ATTENUATION WALLS FOR BUILD ALTERNATIVE 3

FIGURE 4



LOCATIONS OF SOUND ATTENUATION WALLS FOR BUILD ALTERNATIVE 5

FIGURE 7



LOCATIONS OF SOUND ATTENUATION WALLS FOR BUILD ALTERNATIVE 4

FIGURE 6

The predicted future noise levels for the required wall heights shown in Figures 3 through 7 are shown in Tables 8A through 8C under the "RECOM. WALL" column. Because the HDOT "5 dBA noise reduction" criteria will not be met in all cases with 6 foot wall heights, the construction of 8 to 11 foot high walls will be required at Receivers 6-6-009:008 and 6-6-004:121. A variance from local building codes may be required to construct the 8 to 11 foot high walls which are required to achieve at least 5 dBA of noise reduction. The sound attenuating walls must be continuous without see-through openings, and may be constructed from solid materials which have a minimum surface weight of 5 pounds per square foot. Use of landscaping on the roadway side of the wall is also recommended to soften the visual impacts of the walls and to minimize the potential for graffiti.

By the existing HDOT policy (see Reference 3), if the cost of the sound attenuating wall does not exceed $35,000 per benefited residence, construction of wall can be considered to be reasonable and feasible. The sound attenuating walls shown in Figures 3 through 7 fronting the residences have an associated construction cost and the associated number of benefited residences for each of the walls is unity. In Table 9, the estimated cost per benefited residence for each sound attenuating wall was calculated so as to identify those walls which can be considered to be reasonable and feasible by HDOT policy. The cost of the relocated Kamuela Museum wall was considered to be a replacement-in-kind rather than a noise mitigation cost, and its cost was considered to be an included cost in Build Alternative 5.

The estimated wall costs shown in Table 9 did not exceed the maximum $35,000 per benefited residence for all of the walls examined, and all the sound attenuating walls examined have a possibility of being considered as reasonable and feasible under the current HDOT traffic noise abatement policy.

It is anticipated that potential noise impacts at any new noise sensitive or commercial establishments located in the project area may be mitigated through the inclusion of sound walls or other noise mitigation measures within the individual lot development plans. In addition, any new commercial establishments, public use facilities, or housing units which may be planned alongside the roadway represent areas of potential adverse noise impacts if adequate noise mitigation measures are not incorporated into the planning of these future projects. It is anticipated that the project's roadway improvements will be completed prior to any redevelopment of the presently open areas or commercial lots adjacent to a roadway, and that noise abatement measures such as adequate setbacks, sound attenuating walls or berms, or closure and air conditioning will be incorporated into these new developments along the roadway as required. In any event, new structures whose building permits were obtained after the date of this noise study will not qualify for noise abatement measures under existing HDOT procedures.

TABLE 9

ESTIMATED COSTS OF SOUND ATTENUATING WALLS

WALL LOCATION	Benefited Residences	Total Area (SF) of New Wall	Estimated Cost of New Wall	Estimated Cost Per Benefited Residence
ALTERNATIVE 2:				
TMK: 6-6-009: 007*	1	207	$10,000	$10,000
TMK: 6-6-009: 008	1	771	$20,000	$20,000
ALTERNATIVE 3:				
TMK: 6-6-009: 008	1	771	$20,000	$20,000
ALTERNATIVE 3A:				
TMK: 6-6-009: 007*	1	207	$10,000	$10,000
TMK: 6-6-009: 008	1	771	$20,000	$20,000
ALTERNATIVE 4:				
TMK: 6-6-009: 007*	1	207	$10,000	$10,000
TMK: 6-6-009: 008	1	889	$20,000	$20,000
ALTERNATIVE 5: **				
TMK: 6-6-009: 008	1	780	$20,000	$20,000
TMK: 6-6-004: 121 **	1	490	$20,000	$20,000
TMK: 6-6-004: 121 **	1	770	$31,000	$31,000

Notes:
* Rock wall added on top of existing rock wall.
** Costs of reconstruction of Kamuela Museum wall not included as additional noise mitigation cost.
*** Rock wall added on top of existing rock wall for ground floor receptor.
**** Rock wall added on top of existing rock wall for second floor receptor.
All costs for CMU walls include antigraffiti paint on both sides of wall.

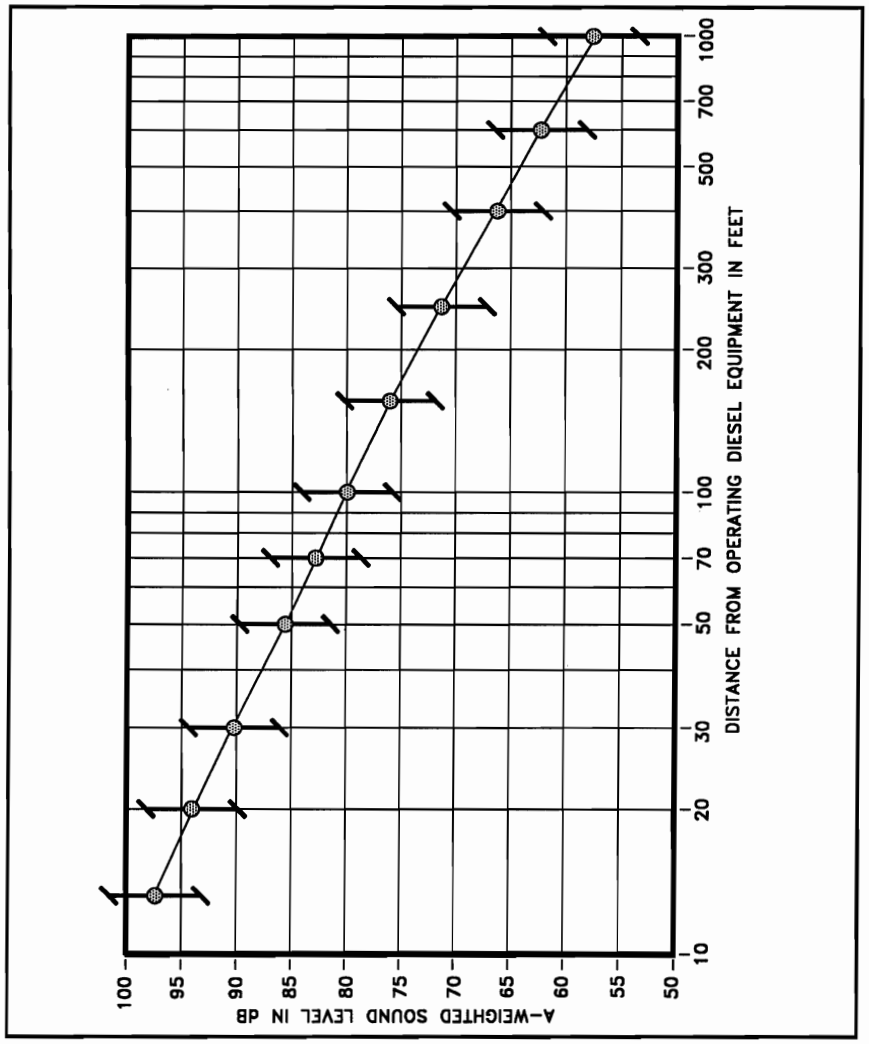
CHAPTER VII. CONSTRUCTION NOISE IMPACTS

Short-term noise impacts associated with construction activities along the proposed Waiaka Stream Bridge and Approach Road Improvements Project may occur. These impacts can occur as a result of the low background ambient noise levels along the project corridor and the relatively high noise levels of heavy construction equipment. The total duration of the construction period for the proposed project is not known, but noise exposure from construction activities at any one receptor location is not expected to be continuous during the total construction period.

Noise levels of diesel powered construction equipment typically range from 80 to 90 dB at 50 FT distance. Typical levels of noise from construction activity (excluding pile driving activity) are shown in Figure 8. Because the closest noise sensitive receptors are approximately 10 to 210 feet from the proposed approach roads, anticipated construction noise levels are expected to range from 65 to 100 dBA. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

Where land developments along the approach roads' Rights-of-Way precede the Waiaka Stream Bridge and Approach Road Improvements Project, distances between the construction sites and receptors can be as close as 10 feet, and construction noise levels may intermittently exceed 90 dB. The State Department of Health currently regulates noise from construction activities under a permit system (Reference 6). Under current permit procedures (see Figure 9), noisy construction activities are restricted to hours between 7:00 AM and 6:00 PM, from Monday through Friday, and exclude certain holidays. Noisy construction activities are normally restricted to the hours of 9:00 AM to 6:00 PM on Saturdays, with construction not permitted on Sundays. These restrictions would minimize construction noise impacts on noise sensitive residences along the roadway project corridor, and have generally been successfully applied. In this way, construction noise impacts on noise sensitive residences can be minimized. Construction activities during the evening and nighttime hours are possible but require the issuance of a noise variance by the State Department of Health.

In addition, the use of quieted portable engine generators and diesel equipment should be specified for use on this project. Heavy truck and equipment staging areas should also be located at areas which are as far from noise sensitive properties as feasible. Truck routes which avoid residential communities should be identified wherever possible. The use of 8 to 12 FT high construction noise barriers may also be used where close-in construction work to noise sensitive structures is unavoidable.



ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 8

APPENDIX A. REFERENCES

(1) "FHWA Highway Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 2.5 Upgrade (April 14, 2004).

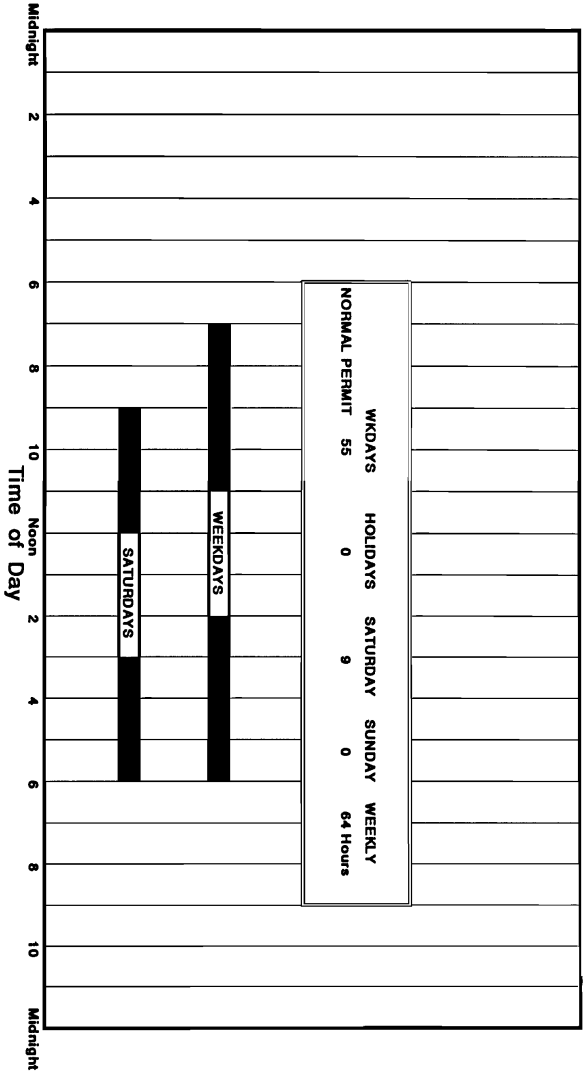
(2) Federal Highway Administration; “Procedures for Abatement of Highway Traffic Noise and Construction Noise;” 23 CFR Chapter I, Subchapter H, Part 772;” April 1, 1995.

(3) "Noise Analysis and Abatement Policy;" Hawaii State Department of Transportation, Highways Division, Materials Testing and Research Branch; June 1997.

(4) Existing and future traffic turning movements for the Waiaka Stream Bridge Improvement Project; Wilson Okamoto Corporation; September 16, 2010.

(5) Email from Wilson Okamoto Corporation; November 24, 2010.

(6) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 9

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LAdn.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq, is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

TERM	SYMBOL
1. A-Weighted Sound Level	L_A
2. A-Weighted Sound Power Level	L_{WA}
3. Maximum A-Weighted Sound Level	L_{max}
4. Peak A-Weighted Sound Level	L_{Apk}
5. Level Exceeded x% of the Time	L_x
6. Equivalent Sound Level	L_{eq}
7. Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8. Day Sound Level	L_d
9. Night Sound Level	L_n
10. Day-Night Sound Level	L_{dn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$
12. Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

APPENDIX B (CONTINUED)

TABLE II

RECOMMENDED DESCRIPTOR LIST

TERM	A-WEIGHTING	ALTERNATIVE[1] A-WEIGHTING	OTHER[2] WEIGHTING	UNWEIGHTED
1. Sound (Pressure)[3] Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2. Sound Power Level	L_{WA}		L_{WB}	L_W
3. Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4. Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5. Level Exceeded x% of the Time	L_x	L_{Ax}	L_{Bx}	L_{px}
6. Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7. Equivalent Sound Level[4] Over Time(T)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8. Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9. Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10. Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12. Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13. Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14. Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15. Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

APPENDIX C

SUMMARY OF BASE YEAR AND FUTURE YEAR (2027) TRAFFIC VOLUMES ALONG PROJECT ROADWAYS

ROADWAY LANES	**** CY 2007 ***** AM VPH	PM VPH	CY 2027 (NO BUILD) AM VPH	PM VPH	CY 2027 (BUILD) AM VPH	PM VPH
Kohala Mountain Road (NB)	154	216	395	285	395	285
Kohala Mountain Road (SB)	132	218	370	260	370	260
Two-Way	286	434	765	545	765	545
Kawaihae Road (EB)	326	535	695	835	695	835
Kawaihae Road (WB)	369	359	690	580	690	580
Two-Way	695	894	1,385	1,415	1,385	1,415
Mamalahoa Highway (EB)	443	685	940	1,020	940	1,020
Mamalahoa Highway (WB)	478	507	970	790	970	790
Two-Way	921	1,192	1,910	1,810	1,910	1,810

Appendix H

State of Hawaii Department of Land & Natural Resources Letter, Dated June 24, 1999 (will submit updated request)

7-1787

BEN. ANTHONY J. CAYETANO
GOVERNOR OF HAWAII

Post-It® Fax Note 7671	Date	# of pages ▶ 1
To Pat	From Pat McCoy	
Co./Dept. DOT	Co.	
Phone #	Phone # 692-8029	
Fax #	Fax #	

F HAWAII

ND NATURAL RESOURCES

VATION DIVISION
ding, Room 555
Boulevard
HI 96707

JUN 24 1999

TIMOTHY E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JANET E. KAWELO

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

6413-01
7/27/00

√ cc: MGO

REF:HP-LM

MEMORANDUM

LOG NO: 23582
DOC NO: 9906tm10
Architecture

TO: Mr. Kazu Hayashida
Director of Transportation

FROM: Timothy Johns, Chairperson and
State Historic Preservation Officer

SUBJECT: Waiaka Stream Bridge Replacement and Realignment of Kawaihae Road TMK: 6-6-04, 09, 01, Waimea, Island of Hawaii

Thank you for your submittal on the above project proposal. While it is difficult to ascertain what sites may be affected without knowing the proposed realignment, our inventory of historic sites does indicate that there is the Edwin Lindsey House nearby with a landscaped garden and family cemetery located at TMK: 6-6-04:61. Hale Kea is also located next to the Lindsey house and possibly some historic residences. The other tmk's do not indicate any known sites in our inventory. However, our inventory is far from complete and we would ask for an inventory survey of the area that may be affected by the realignment.

Thank you for seeking comments early in the project. Should you have further questions, please call Tonia Moy at 692-8030.

TM:lm

Appendix I

Archaeological Inventory Survey
Waiaka Bridge Replacement and Realignment of Approaches
Haun & Associates
June 2002

(6413-01)

Report 030-032202

CC: DOT HWY-PA
8/19/02

7/30/07

ARCHAEOLOGICAL INVENTORY SURVEY

WAIAKA BRIDGE REPLACEMENT AND REALIGNMENT OF APPROACHES

LANDS OF LALAMILO, KEONIKI, KAUNIHO AND WAIAKA 1

SOUTH KOHALA DISTRICT

ISLAND OF HAWAI'I

(TMK:6-6-01: POR. 33, 40 AND 77)

Haun & Associates

Archaeological, Cultural, and Historical Resource Management Services
HCR 1 Box 4730, Keaau, Hawaii 96749 Phone: 982-7755 Fax: 982-6343

ARCHAEOLOGICAL INVENTORY SURVEY

WAIAKA BRIDGE REPLACEMENT AND REALIGNMENT OF APPROACHES LANDS OF LALAMILO, KEONIKI, KAUNIHO AND WAIAKA 1 SOUTH KOHALA DISTRICT ISLAND OF HAWAI'I (TMK:3-6-6-01:POR. 33, 40 AND 77)

By

Alan E. Haun, Ph.D.,

Dave Henry, B.S.,

and

Ka'ohulani McGuire, B.A.

Prepared for:

Wilson Okamoto & Associates
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

June 2002

Haun & Associates

Archaeological, Cultural, and Historical Resource Management Services
HCR 1 Box 4730, Keaau, Hawaii 96749 Phone: 982-7755 Fax: 982-6343

SUMMARY

At the request of Wilson Okamoto & Associates, Haun & Associates conducted an archaeological inventory survey of a TMK: 6-6-01: por. 33, 40 and 77, a 9.8-acre parcel situated in the Lands of Lilāmilo, Keoniki, Kaumiho and Waiaka 1st, South Kohala District, Island of Hawai'i. The objective of the survey was to satisfy 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 13, State Historic Preservation Rules.

The inventory survey identified three sites with 13 features. Site 22632 is a large agricultural complex comprised of 700 features noted by Haun et al. (2002) during a survey of an overlapping parcel. The portion of this site within the current project area contains 11 features. The two remaining sites consist of an irrigation ditch (Site 23312) and a concrete foundation located within Keanuiomano Stream (Site 23313).

All three sites are assessed as significant under Criterion "d". The sites have yielded information important for understanding late prehistoric to historic land use in the project area. Site 22632 was additionally assessed by Haun et al. (2002) as significant under Criterion "c" as a well-preserved example an agricultural field complex. The field complex also assessed as significant under Criterion "a" because it is associated with the broad pattern of traditional and early historic agricultural intensification in Hawaii.

The mapping, written descriptions, and photography at Site 23313 adequately document it and no further work or preservation is recommended. The remaining sites retain the potential to yield information important for understanding prehistoric and historic land use. The remaining two sites are recommended for data recovery if the sites are to be impacted by the proposed road improvements. The plan for data recovery would be detailed in a Data Recovery Plan prepared for DLNR-SHPD review and approval.

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INTRODUCTION

This report presents the results of an archaeological inventory survey conducted of TMK: 6-6-01: Por. 33, 40 and 77 located in the Lands of Lālāmilo, Keoniki, Kauniho, and Waiaka 1st, South Kohala District, Island of Hawai'i (*Figure 1*). 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 13, State Historic Preservation Rules (DLNR 1998).

The survey fieldwork was conducted February 11, 2002 under the direction of Dr. Alan Haun. This report includes the project scope of work, project area description, field methods, background information relevant to the project area, survey findings, site significance assessments and recommended 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 (a) to determine the presence or absence of potentially significant buried cultural deposits or features, and (b) to obtain suitable samples for radiocarbon age determination analyses;

5. Analyze background research and field data; and

6. Prepare and submit Final Report.

Project Area Description

The project area is a c. 9.8-acre parcel located in the Lands of Lalamilo, Keoniki, Kauniho, and Waiaka 1st, at elevations ranging from 2,400 to 2,440 ft. The long axis of the parcel is bisected by Kawaihae Road in a roughly east-west direction, and Keanuiomano Stream extends through the western portion of the project area in a north-south direction (*Figure 2*). The soils within the project area consist of Waimea very fine sandy loam (6-12% slopes), which is located at intermediate elevations along the leeward slopes of Mauna Kea and the Kohala Mountains (Sato et al. 1973:54). This soil series is characterized by a surface layer of dark brown sandy loams above a dark brown silt loam subsoil. Hard, weathering basalt is situated below the subsoil. The Waimea series soils evidence a moderately rapid permeability, slow runoff and slight erosional hazard, and is listed as suitable primarily for pasturelands. Rainfall in the general vicinity of the project area averages 20 inches per year (Juvik and Juvik 1983).

The portion of the parcel within Lalamilo encompasses c. 5.2-acres, and is comprised of a c. 150 to 211 foot (45.7 to 64.3 m) wide by to 1,090 to 1,175 ft (332.2 to 358.1 m) long corridor on the south side of Kawaihae Road. Vegetation in this area is comprised of grasses and weeds (*Figure 3*). This portion of

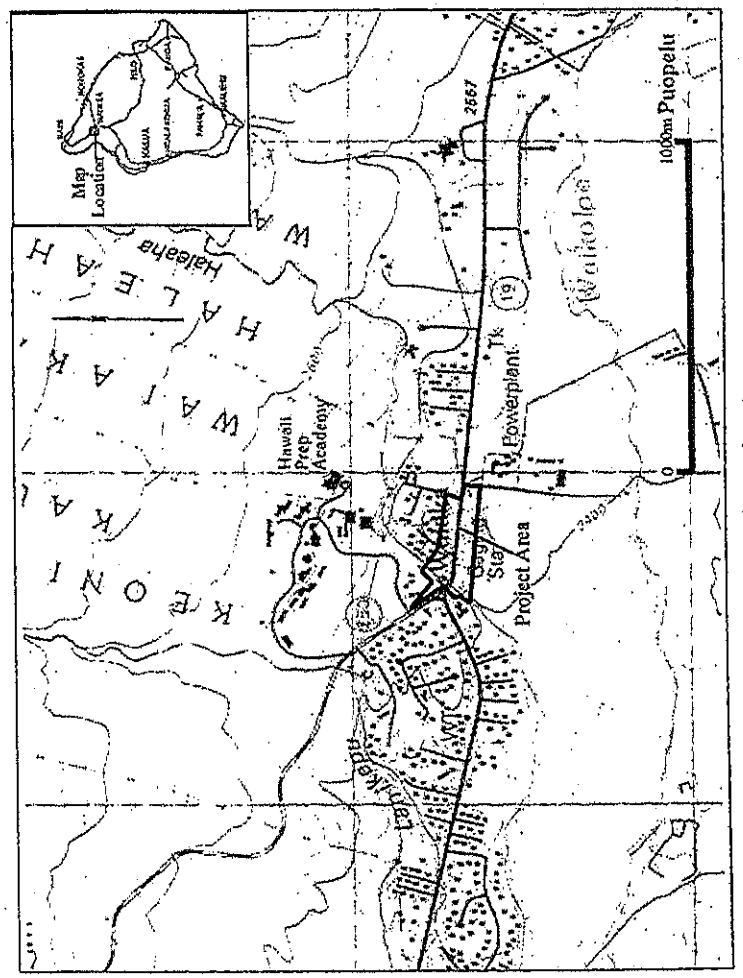

Figure 1. Portion of Kamuela Quadrangle showing Project Area

Figure 2. Keanuiomano Stream, view to North-northeast

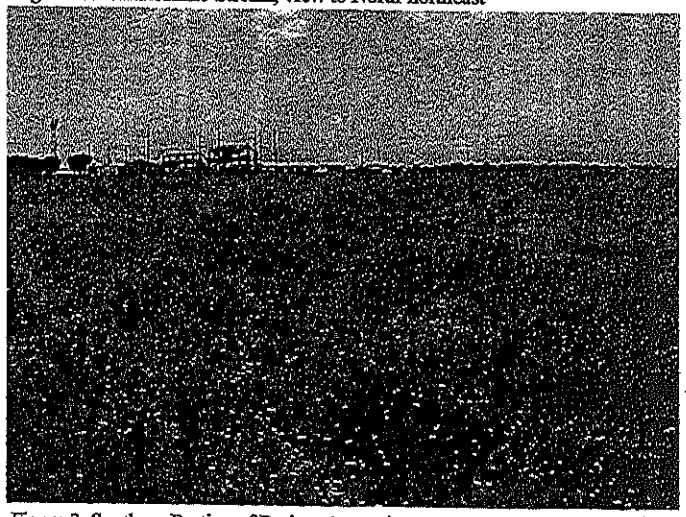

Figure 3. Southern Portion of Project Area, view to southeast

the parcel is bordered on the east by the South Kohala Distribution Road, on the west by Keanuiomano Stream, on the north by Kawaihae Road and on the south by undeveloped pasture land.

The portion of the project area within the Lands of Keoniki, Kauniho and Waiaka 1st is c. 4.6-acre in size, and is comprised of a c. 120 to 190 foot (36.5 to 57.3 m) wide by 875 to 938.0 foot (266.7 to 286.0 m) long corridor on the north side of Kawaihae Road, and a triangular-shaped strip that extends from the northwestern banks of Keanuiomano Stream c. 364.5 feet (111 m) to the northwest. The Waiaka Bridge is located at the western end of the parcel (*Figure 4*). Vegetation in this area consists of low grasses, which appear to be periodically mowed (*Figure 5*). This portion of the survey area is bordered by Kawaihae Road to the south, by the Kohala Mountain Road (Highway 250) to the west, by private residences and Hawaii Preparatory Academy property to the north and by a road leading to private residences to the east. The portion of the project area is bisected by Keanuiomano Stream at its western end.

A stacked and piled stone wall is located along the northern side of the triangular-shaped portion of the project area, adjacent to the Hawaii Preparatory Academy property (*Figure 6*). This wall appears to have been relatively recently constructed. The wall parallels a line of trees planted along the southern side of the Hawaii Preparatory Academy property. The wall also extends to the north out of the project area, along the western side of Keanuiomano Stream. A piled stone mound is located in the northeastern portion of the project area, south of a private residence (*Figure 7*). The occupant of this residence indicated that the mound was created during recent grass mowing of the parcel.

Field Methods

The project area was subjected to a 100% surface examination with the surveyors spaced at 10 m intervals. The transects were oriented in a roughly east-west direction or parallel to Kawaihae Road. The identified sites were flagged with pink and blue flagging tape and their locations plotted with the aid of a Garmin Global Positioning System (GPS) III+. The agricultural sites and features were subjected to minimal recording consisting of the recording of length, width, height, and shape. Photographs were taken of representative feature types. A non-agricultural site consisting of a concrete foundation in Keanuiomano Stream (Site 22313) was subjected to detailed recording, consisting of the preparation of a scaled plan map, the completion of a standardized site form and photographic documentation. No subsurface testing was undertaken during the project.

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Historical Documentary Research

At the time of the Mahele, there seemed to be some confusion of the different Hawaiian land classifications and use of the terms differed slightly from island to island (e.g., *kalana*, *`okana*) (Barrere 1983:25). An 1893 article published in the Hawaiian newspaper illustrates this.

> The island of Hawaii is divided into six districts, Kohala, Hamakua, Hilo, Puna, Ka`u and Kona. The chiefs appointed by the *ali`i* `ai-apuni over these districts were called `ai-moku such as were mentioned in the days of Keawe-nui-a-`Umi. The very last of these were in the days of Hikikaukoli`I (Kamehameha III). Thus were they placed on Hawaii. It was not the same on other islands, because Maui was all cut up into moku, kalana and ahupua`a, which was not so on Hawaii, for its kalana and ahupua`a were within the moku (district). It is difficult now to distinguish the various kalana within the six districts of Hawaii. (Hawai`i Holomua, May 13, 1893)

There was also confusion between the designations of different types of *`ili*. According to Curtis J. Lyons, surveyor and son of Lorenzo Lyons, *`ili* of the *ahupua`a* (*`ili `aina*, according to Pukui & Elbert 1986: 97) belonged to the *ahupua`a* and were an integral part of the *ahupua`a*. *`Ili kupono* were nearly politically independent of the *ahupua`a*. In other words, when an *ahupua`a* changed hands to a new chief, the *`ili kupono* did not change hands as well – the main difference being, who taxes were paid to – the king or the *ahupua`a* chief.

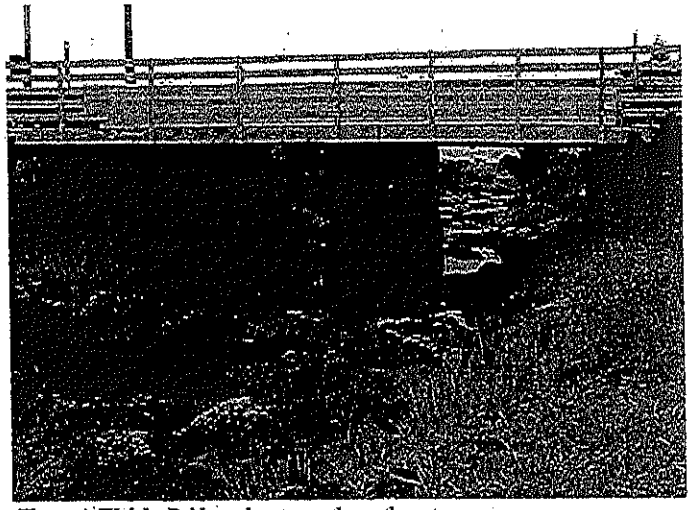

Figure 4. Waiaka Bridge, view to south-southwest

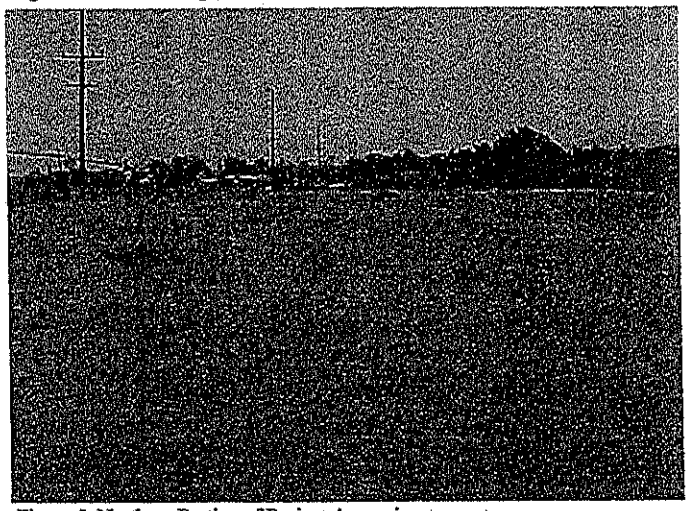

Figure 5. Northern Portion of Project Area, view to west

Figure 6. Stone Wall along Hawaii Preparatory Academy Property, view to north

Figure 7. Stone mound in Northern Portion of Project Area, view to south

The history of Waimea as a land unit is unclear. In earlier times, Waimea may have been its own district, separate from Kohala (Nakamura 1981: 29). This is alluded to in the Boundary Commission records (No. 1: 6) which indicate that "Waimea is an *ahupua`a* of Waimea, which is a *kalana*, with eight divisions." One native witness (Mi 1st) who testified for George Davis on the boundaries of Waikoloa described Waimea as being a *kalana* ". . . which is the same as an island divided into districts – there are eight Okana in Waimea. In those Okana are those lands said to extend out (*lele ma waho*)" [running to the sea] (Boundary Commission No. 1: 7).

C. J. Lyons, considered Waimea an *ahupua`a* comprised of predominantly ("Nine-tenths") two larger independent *`ili kāpono* of Waikoloa and Pu`ukapu and as well as smaller *`ili* (Lyons 1875: 119). Boundary Commission records and Land Commission Awards (LCAs) for Hawai`i Island indicate the lands of Waikoloa, Wai`aka 1st and 2nd, and `Ōuli were considered *`ili* of Waimea rather than separate *ahupua`a (Figure 8)*. The State of Hawai`i, in an attempt to clarify the matter determined that South Kohala District comprised only three *ahupua`a*: Kawaihae 1, Kawaihae 2 and Waimea (Kelly & Nakamura 1981: 29).

Traditional and Legendary Associations

Following is a brief summary of the traditional and legendary associations of Waimea, to give the project area a frame of reference for cultural importance and use during traditional times. Although place names around and near Lālāmilo, Keoniki, Kauniho, and Waiaka 1st are mentioned in traditional sources, archival and historical research did not reveal any legends specific to the *ahupua`a* and, in particular, the project area. This does not denote a lack of importance but rather shows the incompleteness of the historic record.

"In the early days Waimea meant all the plateau between the Kohala Mountains and Mauna Kea, inland from Kawaihae. This area is from eight to ten miles long and from three to five miles wide" (Judd: 1932:14). The name Waimea means "reddish water" (Pukui, et al., 1974:226) due to the discoloration of the water from the rich fertile soil found there. Albert Lyons described Waimea's water as ". . . no sweeter or purer water anywhere on earth, despite the sherry-like tint it has taken from the forest morass at its source" (Lyons *in* Doyle 1945:45).

Traditionally, Waimea is renowned for its strong gusty winds and its chilly rain. The two famous winds of Waimea are the *Kīpu`upu`u* and the *Kolo `āpu`upu`u*. The *Kīpu`upu`u* is the name of a rain as well. The *Kolo `āpu`upu`u* (*Lit.*, rough creep) is a wind usually accompanied by rain and common to the Waimea area (Kent 1986:440; Pukui & Elbert 1986:163). In *mele* (song/chant), *Waimea i ka ua kīpu`upu* (Waimea, land of the Kīpu`upu`u rain) is a famous reference to Waimea and the cold drenching rain which pelts the skin (Pukui 1983: 319; O.N. #2913). In fact, Kamehameha had a trained army of spear fighters and runners from Waimea who called themselves the Kīpu`upu`u after the cold wind and icy rain of their homeland (*Ibid.*:169; O.N. #1571

Another reference to the elements is the *`e`elekoa*, a storm which approaches Waimea from the northeast (Kent 1986:438). From this storm name comes the saying *Kū `ia ka malama `e`elekoa* which is an allegory for enduring hardships (stormy weather) (Pukui & Elbert 1986:37). The *mālana* rain of Waimea is a fine rain that "comes from the northeast, as it moves along before the trade wind" (Kent 1986: 441). The *mālana* was also the name of one of Kamehameha's regiments (Desha 2000: 191). The *mumuku* is the renowned wind of Kawaihae. However, this fierce wind accompanied by a misty rain is said to originate near the Waimea area and blows over the land between the Kohala mountains and Mauna Kea, as if cut off from the main wind, especially in the late afternoons (*Ibid.*: 441; Cordy 2000:23). An 1840 description of this wind was given by the Charles Wilkes of the U. S. Exploring Expedition:

> The trade wind is exceedingly strong, bringing with it a mist toward sunset. It rushes furiously down between the mountains which bound the valley of Waimea and becomes very dangerous to shipping in the bay. It is called by the natives "*mumuku*" and is foretold by them from an illuminated streak that is seen far inland. This is believed to be

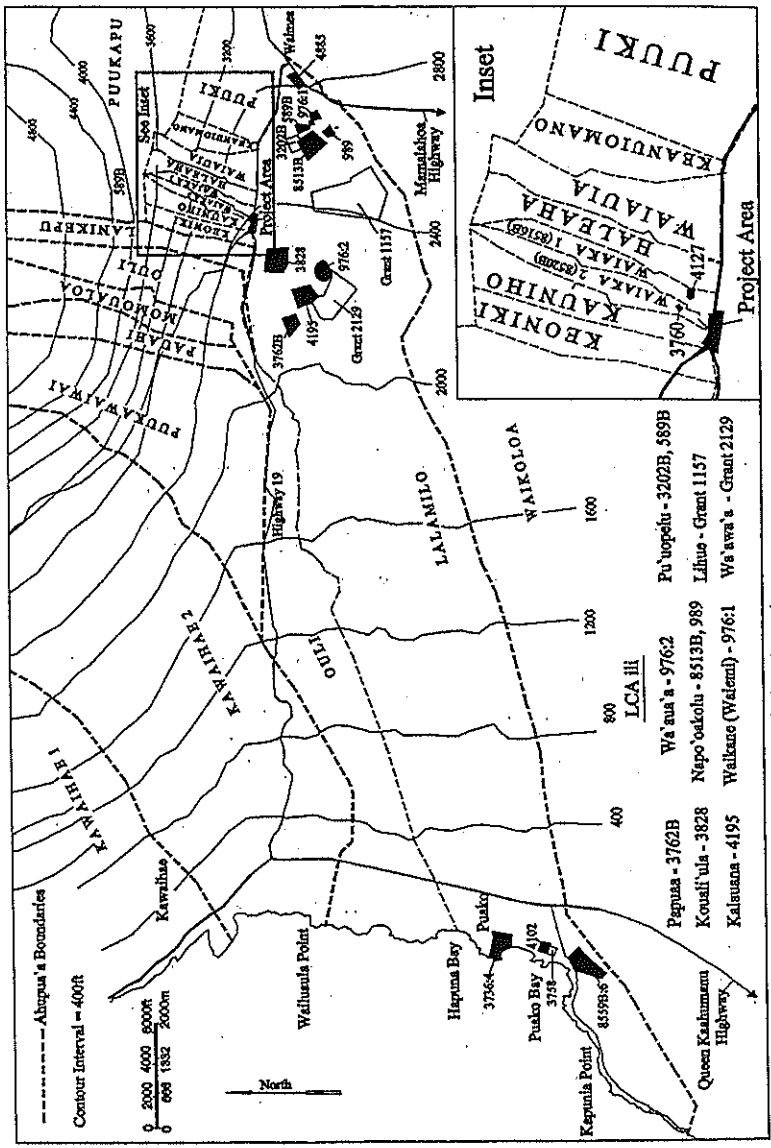

Figure 8. Ahupua'a Boundaries and Land Commission Awards

caused by a reflection of the twilight on the mist that always accompanies this *mumuku* . . . (Wilkes *in* Doyle 1945:50)

From ancient times, Waimea has been associated with royalty and chiefly lineages. Waimea was one of the lands which was highly valued by the *ali'i* (chiefs) and traditional stories indicate they maintained a dominant presence there. After the death of Kalani'ōpu'u, Keawema'uhili, acting on behalf of Kīwala'ō, divided the lands of Hawai'i Island. In doing so, he reserved the best and largest portions for himself and the rest he apportioned out to the other chiefs and warriors. Upon hearing this, Keoua Kuahu'ula went to his brother Kīwala'ō and asked, "Waipi'o and Waimea are ours?" Kīwala'ō answered, "They have been given away; they are not ours . . . You and I are left without land in this division. Our uncle has taken it . . ." (Kamakau 1992:120).

Native testimony from Lucy Peabody, the grand-daughter of Hū'eo, reveals that "The land where the Waimea Village lots now are was known as "Lauali'i" - meaning *Many Chiefs* . . . presumably because there were many chiefs living at that place at the time the name was given" (Waimea Water Rights Case: 1914-1915).

Besides being associated with royalty, Waimea was a renowned training ground for young chiefly warriors from ancient times. In the battle at Kakanilua between Kahekili of Maui and Kalani'ōpu'u of Hawai'i, the Hawai'i armies were defeated. Kalani'ōpu'u's armies were made up of the 'Ālapa and Pi'ipi'i regiments and were "chosen from the chiefs of the land who had been instructed in the profession of war and who were ready for battle" (Desha 2000:37). Desha gives a colorful description of these chiefly warriors numbering 800 strong, "These men were of equal height and were garbed in feather cloaks of various colors. They were those of whom King Kalani'ōpu'u thought a great deal, for they were skilled in the martial arts of those days (*Ibid.*: 34). Of the battle at Kakanilua Desha writes:

> Those persons who had been slain and whose bones were laid in the sand dunes of Wailuku and Waikapū were of the chiefly blood of Hawai'i. It was also said that half of those people were the young chiefs of Waimea, who had been most carefully selected by King Kalani'ōpu'u. They were persons accomplished in performing warlike deeds . . . Pi'ipi'i armies were the foremost warriors of Kalani'ōpu'u, chosen from amongst the chiefs of the entire island of Hawai'i. Half of them were from the famous land of Waimea. (*Ibid.*: 43-44)

The story of Kekūhaopi'o (Desha 2000) sheds much light on Waimea as a center of training for Kamehameha's best and fiercest warriors. But, in fact, Desha reiterates that Waimea was a famous "battlefield for numerous *ali'i* from ancient times" (*Ibid.*: 192).

Kekūhaopi'o, was an expert in the art of war and weaponry and was especially skilled in *lua* (a bone-breaking form of wrestling). He was Kamehameha's mentor and trainer during his youth and became his trusted advisor later on during his rise to power. It was during this time that Kamehameha sent his most skilled warrior, Kekūhaupi'o to Waimea for the purpose of training the men there and

> ". . . to instruct the young men of that place in the ancient ways of preparedness for battle. The land of Waimea was one of the lands where there were many warriors from ancient times. That place, Waimea, furnished Kamehameha with armies of men trained in battle. Under this war instructor of Kamehameha, those young men were taught proficiency in whirling spears and also in defending against the enemy's spears. At this same time Kekūhaupi'o instructed in defense against the *mākini* type of fighting of the Maui people. This type of fighting encountered by the people of Hawai'i at the Battle of Kepaniwai o 'Īao became as *wai 'au'au* [bath water] to Hawai'i's young warriors. (Desha 2000: 188)

This special group of warriors called themselves the Kīpu'upu'u, a group of runners and messengers, known for their speed who were trained in warfare and in "body-strengthening". They were particularly adept in spear fighting as well as using various other types of weaponry such as the *olonā* bow strings, slings and battle-adzes. (*Ibid.*: 191-192, 197). The traditional chant, *Hole Waimea*, makes reference to these *Kīpu'upu'u* warriors of old (Elbert & Mahoe 1970: 52).

Hole Waimea i ka ihe a ka makani	Waimea is stripped by the spear of the wind
Hao mai nā `ale a ke Kīpu`upu`u	Blown by the gusts of the Kīpu`upu`u
He lā`au kala`ihi ia na ke anu	A staff made still in the cold
`Ō`ō i ka nahele o Mahīki.	Pierced is the forest of Mahiki.

(Translation follows Frazier *in* Desha 2000: 192)

Desha explains his understanding of this chant:

> There is a hidden meaning in this old *mele*, as that forest of Mahiki was a place for making spears for the warriors in ancient times. In times of peace, the *ali`i* and the men would go there to prepare for the times of war to come.
>
> When Kamehameha was staying at Kawaihae, he went with his many warriors to that forest for the making of spears. Some of his court accompanied them, in other words, the chiefly women. At this place of the story, the writer conceals the hidden meaning of the "stripping of Waimea by the spear of the wind" and it is for the reader to guess the meaning. (*Ibid.*) [An allusion to love-making.]

The story of Kekūhaupi`o lists some of the famous battles either fought in Waimea or fought by Waimea warriors, as follows:

1. The battle of `Umi and Hākau, his *hoahānau*, at a certain time of their lives.

2. Battle of `Umi and Holoholoku, the *ali`i* of Waimea, when `Umi was victorious.

3. Rebellion of Mahi`ololi against Mahiaee, the *ali`i* of Kona, also known as Mahina I.

4. Battle of Kuahu`ia, the *ali`i* of Hilo against Keakealaniwahine. This was a battle joined in by all of Waimea.

5. Battle of Kauauanimahi [Kauauaamahi] against Mokulani, the *ali`i* of Hāmākua. This was the battle at Kahuenaha. This was a very long-fought war lasting five years. It was said that the warriors were scattered from Hokuula, down to Mahiki, ascending up Mauna Kea, and descending seaward of Kalaieha, ascending up Mauna Loa, and going down seaward at Manukā, and as far as Kapu`a in Kona. This war was called "The House of Fragmented Warriors (*He Hale Māmala Koa*)."

6. The war of Alapa`inui which went to Moloka`i and as far as O`ahu. However, this fight was not begun on the Waimea battlefield, but his warriors were from Waimea, together with those from Kohala.

7. The battle between Keawe`ōpala and Kalani`ōpu`u, which was started by Ke`eaumoku, the war-loving father of Ka`ahumanu, later of one of Kamehameha's great generals. Ke`eaumoku supported Keawe`ōpala and they were put to flight by Kalani`ōpu`u. Keawe`ōpala was killed and Ke`eaumoku fled to Maui.

8. From Waimea also came numerous warriors of Kalani`ōpu`u when he went to battle with Kahekili on Maui. Waimea had brave warriors in those days.

9. Battle at Hakalau with Kahekili's warriors, nicknamed Kahekili's Black. This battle was described in a past issue of this story. Most of Kamehameha's men were from Waimea and Kohala in that battle.

10. The famous battle of Moku`ōhai when Kamehameha was victorious over his *hoahānau* Kīwala`ō. Most of Kamehameha's men came from Waimea, Kohala, and the Kona districts.

11. The battle at Pā`ie`ie and Pua`aloa, previously described, called the Bitter Rain. Most of Kamehameha's men were from Waimea.

12. The very last Battle of Hāpu`u. Most of Kamehameha's warriors were from Waimea in this battle with the intruders from Maui. (*Ibid.*: 192-193)

Another battle of note is the war between Kamalālāwalu of Maui and Lonoikamakahiki from Hawai`i (ca. late 16th to early 17th century). There are several varying accounts of this story as told by Kamakau (1992) and Fornander (1918-1919). Encouraged to battle by two old men who were spies of Lonoikamakahi, Kamalālāwalu and his forces landed at Kawaihae. Ignoring his own counselors, he followed the advice of the two old men to carry the war canoes inland and remove the outriggers to prevent the escape of Lonoikamakahiki's troops should they try to escape by the sea route.

Kamakau's version places the battle of Pu`oa`oaka (Pu`u`owā`owaka Hill) on the "grassy plain of Waimea" where the Maui warriors could not find water except for rain water caught in the hollows of rocks in Lanimaumau Stream (Kamakau 1992: 58-60). In the Fornander version, the battle occurs at Hōkū`ula. The Hawai`i warriors were placed in various strategic positions across Waimea: the Kona warriors were at Pu`upā to Haleopla, the Ka`ū and Puna troops spread out from Holoholokū to Waikoloa, while Hilo and Hāmākua covered the area from Mahiki to Pu`ukanikanihia, and those of Kohala were stationed at Momualoa to Waiaka (Fornander 1916: IV, 344). In this particular battle, the Hawai`i forces were the victors over the invaders from Maui (*Ibid*: 348).

Waimea's warrior background presents a picture of people who were not only skilled in warfare, but were brave and fearless in fighting and were trustworthy and loyal to their *ali`i* during times of war. A natural response to the economic support of warfare and the support of numerous troops and chiefly personages during the pre-historic period probably led to the development of the large agricultural field systems still evident in Waimea today. This field system can be seen on a clear day from the top of Kohala Mountain Road as one looks down over the plains below – especially in the Lālāmilo and Waikoloa areas. On this subject, Barrere writes:

> It may well have been that during the times of Alapa`inui and of Kalani`ōpu`u that the cultivating places at Waimea were first expanded to supply the chiefs' needs while they sojourned there and at Kawaihae. The abandoned cultivated patches, so often attributed to the decrease in the Hawaiian populations, were, in fact, as much the result of this practice of chiefs of traveling about their domains, feeding off the land until supplies were exhausted, then moving off to another. (Barrere *in* Clark & Kirch 1983: 27)

Although sparse, there is some mention of *heiau* in traditional and early historic accounts. One of the earliest legends tells of a *heiau* dedicated to training young virgins in the healing arts. This *heiau* is attributed to Hoopiliahae, the wife of Keawenui a`Umi and daughter of Pae a Molenole – *kahuna* to Liloa. There are two similar versions of the story in the Edgar Henriques Collection [n.d.].

> Hoopiliahae, the Alii of Waimea, built and dedicated a heiau at Ouli, a little mauka of where Spencer's residence now stands at Puuiki, and called it Haleino. Hoopilihae had five children and named them after the rains of this Heiau (Edgar Henriques Collection: [n.d.]).

The second version adds more detail to the legend.

> On the way from Kawaihae, some two miles before reaching the village of Waimea, Hawaii, are the Lanikepu hills in the Ahupuaa of Ouli. The home of the High Chiefess Kaoanaeha grandmother of her late Majesty Queen Emma, near the old Spencer premises Puuiki. Directly back of this place was once a beautiful forest where the Heiau of Haleino was located.

The only Heiau ever founded, dedicated and consecrated by a woman, the High Chiefess Hoopiliahae, an ancestor of the sovereigns of Hawaii and the ruling High Chiefs of Waimea.

Haleino noted for the red rain and vivid rainbow symbols of the sacredness of this locality, was exclusively for girls of the age of purity who performed the duties of dedicating and participating in the different ceremonies, in which the spirit of love, purity of body and mind was imbued; also the science of healing was taught, thus consecrating their lives for the betterment of others..

Haleino today, although neglected still stands as a memorial to the High Chiefess Hoopiliahae, to which her descendants and off-spring of her subjects point with pride to the travelers who visit the Waimea plains (Edgar Henriques Collection: [n.d.]).

There is reference to another *heiau*, built on a nearby ridge by:

. . . another Akua or God, named Maknakuamana who came with Paao the High Priest from Tahiti. He also built a Heiau. While he was building his heiau, he noticed a fine red rain called uakoko or blood, falling in front of Hokuula on the land of Waiaka. Noticing this rain every day, accompanied by a very brilliant rain-bow, one day he flew to a high mountain ridge to get a better view, to try to find out the cause of this beautiful sight. To his great surprise he beheld a beautiful goddess, whose only clothing was a great quantity of very long and silky hair. He was so entranced with her great beauty, he immediately flew down to where she was. He was pleased to learn it was the High Chiefess Wao being greatly impressed by his handsome face and Apollo form, and learning that he was the great Akua from Tahiti, she could not refuse him. The marriage ceremony was performed before all the High Chiefs of the surrounding country, and a great concourse of their followers. After the ceremonies, which lasted for days, were over, they with all their followers went to reside at Hokuula. Often would Wao go to Laelae, the hill above Kohakohau Falls on the land of Waiaka, where she would give birth to her children. For that reason the hill was called Palikapu o na `lii o Waimea or sacred hill of the Chiefs of Waimea.

The servants of Wao would roll a stone down the hill to a flat of land and wherever the stone would stop, that would be the tabu line, and no one would be allowed to pass. Especially would it be a sign for the people who lived below the hill called Pekepekelaui who were a class known as Kauas or low born.

At night Wao would change her servants to stone and would then return to the spring where she spent the night; a little before the dawn of day, she would return and turn them back to their human selves.

It is said that Wao can be seen when any of the Waimea Chiefs or Monarchs die at this same spring, to this day (Edgar Henriques Collection: [n.d.]).

In 1867, Kamakau wrote about a *heiau* being restored at Uli in Waimea sometime between the years of 1797 - 1811.

While Kamehameha was living with the chiefs of Waimea [he] was engaged in restoring the old heiaus. When the fence of images (*paehumu*), the oracle tower (*anu`unu`u*), and the pavement (*Kipapa*) of the heiau of Uli had been restored, all the people had to go down to Puako after coconuts. When each had taken up his load to return there remained still 480 nuts unhusked. All had gone except Kamehameha and one other to whom the chief was unknown. Kamehameha turned to him and said, "It looks as if there would not be enough coconuts for the dedication in the morning." It is possible that the man recognized the chief for he replied, "They will all be there." The two put the nuts into nets and fastened them together into a huge load that stood taller than either of them. The road

from Puako to Waimea is twenty miles in length. Occasionally when the man seemed tired Kamehameha took a turn at the load. At dusk as they neared their destination, and it came time for evening prayer, Kamehameha left the man, saying, "When you get to the heiau spend the night with the people of that place, but do not tell them that Kamehameha helped to carry the load on his back." Because of this feat of strength and another later, when he took up two hops each more than a fathom long and carried them without help, this Ku-i-helani, as his name was, became a great favorite of the chief and held an important office under him. He was allowed to have ten wives, an honor allowed to no other chief besides, and there was no home happier than his, no governor of a district to be compared with Ku-i-helani (Kamakau 1992:183).

This is the same *heiau* Thrum (1908:42) recorded as being opposite the church in Waimea. This *heiau* had already been destroyed at the time of his visit but Thrum was able to glean a few details from local informants. Initially, this *heiau* had been dedicated by Hakau and rebuilt by Kamehameha.

Early Historic Accounts of Waimea (1778-1848)

Descriptions from early visitors, *Māhele* records, and native testimony (Carter vs. Territory of Hawai`i:1914-1915) indicate the native forest once extended much lower into the upland plains than it does today. Portions of the project area were probably comprised of sandalwood forest up until the early 1800s. Depletion of the forest zone no doubt affected general rainfall and precipitation patterns as well as the notoriously strong *mumuku* winds that originate in the Waimea area and blow down to Kawaihae. This is evident from reading native testimony from the Waimea Water Rights Case (1914-1915).

One of the earliest glimpses of Waimea from a distance was given in 1793 by Archibald Menzies, the British naturalist who traveled with Captain Vancouver's expedition. Landing at Kawaihae, Menzies took a short excursion inland in the hopes of collecting plants. He wrote:

I traveled a few miles back . . . through the most barren, scorching country I have ever walked over. A little higher up, however, than I had time to penetrate, I saw in the verge of the woods several fine plantations, and my guides took great pains to inform me that the inland country was very fertile and numerously inhabited. Indeed, I could readily believe the truth of these assertions, from the number of people I met loaded with the produce of their plantations and bringing it down to the water side to market, for the consumption was now great, not only by the ship, but by the concourse of people which curiosity brought into the vicinity of the bay (Menzies 1920: 55-56).

Vancouver's trip had monumental impacts for Waimea and the Hawaiian Islands. It was on two separate trips 1793 and 1794 that Vancouver presented Longhorn cattle, along with some sheep to Kamehameha as a gift. At the request of Vancouver, Kamehameha put a ten-year *kapu* on the cattle. They were not to be touched or hunted, but were left to breed and multiply. The cattle were taken to a large penned area in upland Waimea which was ". . . very rich and productive, occupying a space of several miles in extent, and winding at the foot of . . . lofty mountains far into the country. In this valley is a great tract of luxuriant, natural pasturage, whither all the cattle and sheep . . . were to be driven, there to roam unrestrained, to "increase and multiply" far from the sight of strangers" (Vancouver *in* Knykendall 1965:28, 40-41). Along with cattle, other early western visitors introduced goats, horses, a new pig breed, and new vegetable, fruit and plant varieties. Kawaihae and its port became the impetus for the development of trade and commerce. Waimea provided much of the produce and later on, salted beef, to refurbish supplies for foreign ships.

Though the sandalwood trade did not really accelerate until 1810 or 1811, sandalwood was imported on a small scale as early as 1790 (on Kaua`i). In the early 1800s, Hawai`i began exporting sandalwood to the Orient. The early records say the first shipments were of poor quality and therefore unsellable. However, in 1811, three American entrepreneurs signed a contact with Kamehameha to have exclusive rights to export sandalwood from Hawai`i. In return, Kamehameha received one fourth of the net profits. Thus, trade in sandalwood became the strict monopoly of the *ali`i*. At the height of the sandalwood boom,

Kamehameha bought foreign ships, including six vessels between 1816 to 1818, in order to transport his own wood to the Orient (Kuykendall 1965: 87). After Kamehameha's death in 1819, Liholiho (Kamehameha II) allowed his chiefs to share in the sandalwood trade, resulting in an unrestricted demand on the stocks of the wood and upon the commoners who did the harvesting. As a result, the common people of the land suffered many hardships to meet the demands of the *ali'i*. Kamakau writes:

> The chiefs, old and young, went into the mountains with their retainers, accompanied by the king and his officials, to take charge of the cutting, and some of the commoners cut while others carried the wood to the ships at the various landings; none was allowed to remain behind. Many of them suffered for food; because of the green herbs they were obliged to eat they were called "Excreters-of-green-herbs" (*Hilalele*), and many died and were buried there. The land was denuded of sandalwood by this means. (1992:252)

At Kawaihae, John Young supervised royal warehouses that were the central depository for the wood brought in from the surrounding district, including Waimea. A description of the magnitude of labor involved was witnessed by Rev. William Ellis during an 1823 visit to Kawaihae. He wrote:

> Before daylight on the 22d [*sic.*], we were roused by vast multitudes of people passing through the district from Waimea with sandal-wood, which had been cut in the adjacent mountains for Karaimoku [Kalanimoku], by the people of Waimea, and which the people of Kohala, as far as the north point, had been ordered to bring down to his storehouse on the beach [at Kawaihae], for the purpose of its being shipped to O'ahu. There were between two and three thousand men, carrying each from one to six pieces of sandal wood, according to their size and weight. It was generally tied on their backs by bands made of *ti* leaves, passed over the shoulders and under the arms, and fastened across their breast. When they had deposited the wood at the storehouse, they departed to their respective homes. (Ellis 1969:397)

The commerce flourished until the supply dwindled in the mid-1830s and by early 1840s the industry came to a stand still. Wilkes reported that "there are now no trees left larger than mere saplings" (1845:217).

Actual early descriptions of Waimea come from early missionary accounts. In March of 1820, the first company of American missionaries arrived at Kawaihae and the first mission station in the district was established there for a brief period. In 1823, William Ellis wrote about the village of Waimea through the eyes of his fellow missionary peers who walked there from the Hāmākua Coast. Messrs. Bishop and Goodrich described the fertile countryside through which they passed: "Here a number of villages appeared on each side of the path, surrounded with plantations, in which plantains, sugar cane, and taro were seen growing unusually large" (Ellis 1969: 354).

Soon after, Asa Thurston walked to Waimea from Kawaihae. He stopped at Kalaloa, the home of Kumuokapiki, a chief of Waimea (*Ibid.*: 399). He goes on to say,

> Leaving Kalaloa, we walked on to Waiakea [Waiaka], from thence to Waikoloa [Waikoloa], Pukalani, and Puukapu, which is sixteen or eighteen miles from the sea-shore, and is the last village in the district of Waimea . . .
>
> The soil over which he had traveled was fertile, well watered, and capable of sustaining many thousands of inhabitants. In his walks he had numbered 220 houses, and the present population is probably between eleven and twelve hundred (*Ibid.*).

A few years later, the missionary Hiram Bingham visited Waimea and made these observations:

> When we had . . . reached the height of about 2,000 feet, we were met by a chilly wind, which made our muscles shiver, though covered with a cloak . . . The clear rippling streams that wind their way along the verdant plain, through the alternating plats of shrubbery, grass, *kalo*, sugarcane, bananas, flowering bushes, and wild vines, occasionally crossed my path. Beyond the scattered cottages, the wild cattle were grazing unrestricted on their own territories bordering on the mountain. The green hills and mountains of Kohala, covered with trees and shrubbery, and their sides partly cultivated and partly covered with grass of spontaneous growth, rose on the north side of the plain. (Bingham 1969:374)

In 1832, the Reverend Lorenzo Lyons and his wife Betsy settled in Waimea to start a mission station. His territory included the broad districts of Waimea, Kohala and Hāmākua. Lyons kept a detailed diary of his daily activities and impressions. Of their arrival at Waimea he wrote in his diary:

> 22 natives accompanied us. Our wives were carried in rocking chairs, there being no other way. The others carried our light baggage. Mr. Baldwin and I had an old worn out horse between us, and I walked most of the way. It is all up hill, some pretty steep up hill too. We soon came to where it was cool and rainy. We passed a stream, and a waterfall and also cultivated ground.
>
> About 11 AM we reached the place that is to be our home for a while at least, a grass house surrounded by shrubbery, a very comfortable place for us. Rain and wind soon set in and made it dismal indeed . . . (Doyle 1945:41)

A September 24th entry of the same year in Lyons' diary indicates that he traveled to an area called Kekula, four to five miles away. There he found a group of Hawaiians salting beef for drying. Of cultivation, he noted seeing watermelons, beans and corn as well as *wauke* and *mamaki* for making *kappa*. He also commented on the presence of prickly pear growing in the *kula* area (*Ibid.* 63). Testimony from Lucy Peabody, sheds some light on this area visited by Lyons in 1832.

> The lands below Lihue were known generally as Ke Kula and it was down here on Ke Kula that the people who lived mauka at Waimea used to do the most of their planting as this locality was much warmer than at Waimea. There were people living at Ke Kula and she thinks these people got their water from auwais. She remembers seeing water running in the ditches makai of Lihue . . . (Waimea Water Rights Case, 1914-1915)

In September 1837, Lyons reported on a famine due to an insect which was attacking and damaging the crops.

> Something like a famine has been raging for about a year. The common food of the people has failed and they have been compelled to resort to the use of roots such as grow wild in woods and mountains, and yielding but very little nourishment, just enough to prevent starvation and enable the people to walk about some and attend to some of their ordinary business. The famine does not arise from the indolence of the people, but from the ravages of a worm that abounds in Waimea. As soon as food begins to sprout the worm commences the work of destruction. The famine does not prevail in all parts of the field. But the people are very poor. (Doyle 1945:101)

Ironically, the California Gold Rush impacted the economy of Waimea as well as other parts of the Hawaiian Islands. There was a shortage of Irish potatoes and vegetables on the West Coast. Traditionally, Hawaiians had always grown sweet potatoes and had been supplying provisioning ships since contact (1778). Prior to the Gold Rush craze, Irish potatoes were already being grown in Waimea on a small scale. With the demand of early settlers in California, Waimea farmers were able to quickly benefit by increasing their production and shipping barrels of sweet potatoes and Irish potatoes to California. Other vegetables, along with sugar, molasses and coffee were also exported during this same time (Kuykendall 1965: 313-314; 322-321). In December 1849, Lyons wrote:

> A great call for potatoes from California. Never so much cash before! Large quantities of sweet potatoes brought to light, hitherto concealed - growing wild for years unknown. The demands have revealed them. People took to it like good fellows to get a few dollars each. Some have never had so much cash before - never had any before! Many natives growing rich. Potatoes bring 4 or 5 $ cash per bbl. (Doyle 1945: 151)

Under the protection of the *kapu*, the Longhorn cattle left by Vancouver in 1793 and 1794 rapidly multiplied beyond manageable control. Left to roam the surrounding lands on their own, the cattle were undomesticated and feral. Less than ten years after their arrival in the islands, a visitor wrote that the *kapu* ". . . was most rigidly preserved till that time expired . . . Though the inhabitants themselves have frequently suffered thus severely from their [the cattle's] incursions, they have closely adhered to the condition of the original gift . . . The animals have become so wild, that none of the natives dare approach them; so that, ranging at their full liberty, they have destroyed the fences, trampled down the crops and done much other damage (Turnbull 1813: 243). By 1858, the wild cattle on Mauna Kea were estimated to number 10,000 (Doyle 1945:49).

The cattle caused havoc for Hawaiian farmers who traditionally did not put up fences around their gardens and who kept non-contiguous agricultural plots scattered here and there. To combat the problem after the 10-year *kapu* was lifted, Kamehameha I hired bullock catchers to hunt the cattle and shoot them. As the cattle were originally a gift to Kamehameha I, they technically belonged to the Crown. Thus bullock hunting was controlled by the king and his chiefs. Selling salted beef to provisioning ships at Kawaihae became another economic market for the government. In 1831, Kuakini (Governor Adams) hired William Hughs, a foreigner, to act as his bullock catcher. In the 1830s cattle were hunted to such an extent that in 1841 the Government placed a five-year *kapu* on killing cattle only for their hides and tallow (Brundage 1971: 9). This suggests perhaps that some underhandedness on the part of the bullock hunters was taking place. The Government continued to be involved in the cattle business. In 1847, William Beckley was responsible for branding the Government cattle. In 1848, John Needles was employed by the Government to slaughter, butcher, pack and sell cattle for the Government. His pay was $40 per month plus 25 cents for each head killed and the offal to pay his work help (*Ibid.*). Lorenzo Lyons commented on the problem of cattle in Waimea:

> "Pilikia" enters cattle history in 1847 . . . two thirds of Waimea has been converted into government pasture land. People are compelled to leave their cultivated spots and seek distant corners of the woods beyond the reach of the roaming cattle, sheep and goats. But the cattle follow, and soon destroy the fruit of their labors. "There is a despairing spirit among my people, and great suffering among them."

One of the renowned bullock hunters was John Palmer Parker who settled in Hawai`i in 1815. He became friends with John Young and spent much of his early years at Kealakekua, where Kamehameha held court. After the death of Kamehameha in 1819, Parker moved to Waiapuka in Kohala with his *ali`i* wife, Kipikane and their new-born daughter (Wellmon 1970: 20-26).

An 1823 account describes a visit to Waimea and Mauna Kea where John Parker was found shooting wild cattle.

> . . . several herds of wild cattle, which are very numerous in the mountains and inland parts of the island . . . became so wild and ferocious that the natives are afraid to go near them. Although there are immense herds of them, they do not attempt to tame any and the only advantage they derive is by employing persons, principally foreigners, to shoot and salt the meat in the mountains and bring it down to the shore for the purpose of provisioning the native vessels. But this is attended by great labor and expense. They first carry all the salt to the mountains. When they have killed the animals, the flesh is cut off their bones, salted immediately and afterwards put in small barrels which are brought on men's shoulders, ten or fifteen miles to the seashore (Ellis 1963: 291).

Several other methods were employed for capturing the wild cattle: bullock pits and pens. A description of a bullock pen was given in the *Sandwich Island Gazette*.

> Pens for catching the bullocks on the southward side of the plain of Waimea . . . are built of strong posts of hardwood with cross bars of the same, strongly lashed together with strips of rawhide; they are all varying dimensions. From the entrance of the pen are two diverging fences built of the same materials, extending from a quarter to half mile in length; through this funnel a herd of wild cattle are driven by a number of horsemen and propelled on until they enter the pen, the entrance of which is immediately closed . . . The bulls are mainly killed for their hides and tallow, the flesh is generally wasted; part of the cows are slaughtered but their flesh is either eaten or jerked for the Oahu market or packed in barrels for ship use; the rest of the cows and calves are sent by ship loads to Honolulu (September 17, 1836).

An 1840 account by Francis Olmsted gives a very colorful description of these notorious and somewhat mysterious bullock hunters.

> In front of the door a bright fire was blazing in a cavity in the earthen floor displaying in strong light the dark features of the natives congregated around it in their grotesque attitudes. Immediately back of these a group of fine looking men in a peculiar costume were leaning against the counter of the store. Some of them were Spaniards from California and they were all attired in the poncho, an oblong blanket of various brilliant colors having a hole in the middle through which the head is thrust. The pantaloons are open from the knee downwards along the outside seam. A pair of boots armed with prodigiously long spurs completed their costume. They were bullock hunters that roam the mountains and had just returned from an expedition of eight or ten days in which they had been very successful (Olmsted 1841:230).

In 1837 James Jarves noted that there were sixty foreigners in Waimea, "mostly mechanics and bullock hunters" (Jarves *in* Brundage 1971: 7). On the subject of foreigners, Lorenzo Lyons also reported to the A.B.C.F. M. (1839-1840), "In my field are sixty or seventy foreigners, from seven or eight different nations. They are beef catchers, sugar manufacturers, shoe makers, merchants, masons, doctors, farmers, and what not" (Doyle 1945: 118)

Bullock hunting was directly related to several other entrepreneurial pursuits -- tanning hides for leather and making tallow to supply factories in California and New England (Kuykendall 1938: 317; Judd 1932: 17). Despite the lack of proper facilities, Waimea had a reputation for the fine and durable leather it produced. Although ecologically, the tanning business had a negative impact to the landscape. The bark from native trees was used to tan hides. Lyons reports that the "*Konohikis* demanded high prices for bark gathering permits; and *koa* and *ohia* were used more than scarcer trees that made handsomer leather . . . "Kukui was richest in tannin" (Doyle 1945:50). Lyons' comment implies there had already been loss of the native forest besides sandalwood. The tanneries no doubt contributed to more loss of the native forest. There were several tanneries in operation during the 1840s and 1850s. One tan works was "under the direction of Chinamen" ; one owned by James Fay; and two others were at Waiemi and Pukalani, owned and run by William Burke (Olmsted 1841:233; Barrera & Kelly 1974: 45; Native Testimony, Waimea Water Rights Case 1914-1915).

The first sugar mill at Waimea is thought to have been established in the late 1820s (c. 1827) by a Chinese man named Laukī . However, research by Dorrance and Morgan (2000) indicate the first documented date of a mill at Lihu`e was 1835. The earlier date is based on a story told by Alfred W. Carter about his grandfather, Captain Joseph Carter. In 1825, Captain Carter, commandeered a brigantine that sailed from Boston to China via California. The following anecdote was told by Alfred Carter.

> On his [Captain Carter's] first trip to China, he brought to Honolulu a Chinese who afterwards became known as Lau Ki (Kalauki). My grandfather was a wonderfully skilful [*sic*] navigator and jovial company. He knew the Premier at that time (I think the King was in England) and took Lau Ki to the Palace to present tea to the rulers. They had never seen tea before. It was the first tea, I think, ever brought to Hawaii and hence the bearer was dubbed Lau Ki (Tea Leaf). (*In* Brundage 1971:30)

Sometime afterward [date uncertain] Laukī ended up in Waimea and established a mill at Lihu`e in Lalamilo. Prior to this, the Hawaiians had grown sugar cane at Lihu`e for their own use only. Laukī took on two Chinese partners, `Aiko and Apokani. He had a few native Hawaiians working for him as well. The mill was quite primitive, with the cane being ground by mule power. After the boiling process, the sugar was dried on mats and then bagged. The Lihu`e mill had the advantage of a water wheel utilizing water from Waikoloa Stream. The Hawaiians in the surrounding Waimea area and Kamaloo also grew cane for the mill in the hopes of making a profit. Laukī's business venture at Lihu`e was unsuccessful

probably due to the variety of cane he was planting and after a number of years he gave up. He made two other unsuccessful attempts at starting sugar plantations before getting out of the sugar business completely (Brundage 1971: 30-31).

The mill at Lihu'e was known to operate until at least 1843 (Dorrance & Morgan 2000: 13), although it is uncertain if Laukī and his partners were still the ones running the mill then. Testimony from Kaina Pau states the following:

> Aiko and Kalauki were together planting cane. I knew Lihue before Aiko planted cane there. The Chinese went to Kohala after leaving here and later to Hilo . . . My aunt was Aiko's wife (Kaaopea). I remember when Aiko married my aunt. I did not know my aunt before she lived with Aiko. The cane was ground three times and then Aiko stopped and Aiko went to Kohala. I saw the cane ground all three times . . . Got married in 1852. Aiko had gone some time before I got married. (Testimony of Kainapau; Waimea Water Rights Case, 1914-1915)

Based on Kainapau's testimony, the normal growing cycle of cane (24 to 36 months to maturity), and the last known date of operation (1843), suggests that Laukī and his friends had the mill for a period of about 6 to 10 years, placing the beginnings of the mill in the early to mid-1830s.

The ending date of 1843, when Laukī and his partners moved on to North Kohala, seems to fit in with an agreement between Kuakini and A. H. Fayerweather to plant cane and produce sugar and molasses at Waimea. The agreement, which was to be effective in 1844, stated that Kuakini would supply the cane and the firewood while Fayerweather would furnish the machinery and labor. The agreement was for five years. However, these plans were foiled when Kuakini died in 1844. George Macy and James Louzada (Grant 1157) also unsuccessfully attempted to plant cane at Lihu'e (Judd 1932: 23-24). Testimony from Macy's son, Samuel indicated his father went to Lihu'e in 1846 or 1847 and that he bought the place from Fairweather (Waimea Water Rights Case, 1915-1915).

After several unsuccessful attempts to run the Lihu'e Sugar Mill by subsequent owners, cultivated sugar on a large scale was more or less abandoned in the Waimea area. Historically, the sugar industry did not really gain momentum until the latter half of the 19th century and North Kohala dominated the sugar industry rather than South Kohala.

Early 19th Century Impacts and Changes to Hawaiian Culture

There were many changes that impacted the traditional lifestyle of the Hawaiians in the early half of the 19th century. Introduced cattle were allowed to overpopulate the land. Undomesticated and left to roam at will, the cattle destroyed and ate crops, knocked down fences and disrupted traditional agricultural practices. Sheep and goats left their mark on the land as well. The traditional lifestyle was further disrupted by the sandalwood trade which was controlled by the king and, after 1819, the chiefs. The working people were ordered to leave their fields to go to the mountains to cut sandalwood. The sandalwood trade was another main contributor to the loss of the native forest in the Waimea area.

Following is an observer's description of the Waimea plains in 1856:

> [The Waimea plains is an] . . . elevated plateau some ten miles long, four or five miles wide and perhaps four thousand feet above the level of the sea. At each end they are bounded by a steep slope towards the sea. On one side of the plains is Mauna Kea and on the other side, the Kohala range of hills . . . Some twenty-five or thirty years ago, woods extended over the whole of the plains and to the very edge . . . It is in the memory of many foreigners now living there, when the whole of these plains were covered with a thick wood. Where now hardly a tree is to be seen for miles, we were informed by an old resident that twenty-five years ago he lost himself with his team in the woods. This

> clearing of land has been almost entirely effected by the cattle. (*Sandwich Islands Monthly Magazine* February, 1856)

Another old-time Waimea resident concurred with the above.

> There were lots of trees, except immediately in Waimea, but some distance out and around the locale were mostly ohia and mauka were found mamane, pua, koa, aaka and naio. Makai grew koaei and wiliwili. Cactus [later to become a pest] was used for fencing around gardens to protect them from the cattle which roamed everywhere. (*In* Brundage 1971: 68)

What was once forest became pasture land which was further impacted by the cattle. In the 1840s, large tracts of land in Waimea were designated Government pasture lands. Any one who pastured "cattle, hogs, sheep, goats, horses" were taxed per head (Doyle 1945: 150). People were forced to relocate, not to mention the extra burden put on the people who had very little cash income. Additional changes were noted by Lyons in two 1845 diary entries:

> Feb. 8, 1945: Many moving from Waimea on Account of change of land holders. Waimea has fallen to the hands of a half foreigner, Mr. [William] Beckley.
>
> Dec. 5, 1845: People are driven to the mountains to cultivate secure from cattle. Koele days have ceased. Population of Waimea rapidly diminishing by death and removal . . . (Doyle 1945: 140, 141)

The ending of *kō'ele* days, when native tenants were required to work on the *konohiki* or chief's farm land, is an indication that the traditional lifestyle had undergone dramatic changes and was coming to an end.

The following excerpt from a Hawaiian newspaper in 1867 aptly describes the many changes that took place in their homeland.

> News of the Mountain Land
>
> What the Land is Like: There is a great change in the land these days because there is something here to change it, that is, the increase of wild animals. So the grass is gone and the earth is bare instead. The sheep does most to put an end to low growing plants and therefore the sheep has done enough to hurt Waimea.
>
> The Way People are Living: Most of the natives are with the whites, working by the year (ku-makahiki_ and some by the month. They work hard for the whites and are called shepherds [*sic*] (kahu hipa), cow herders (kahu bipi), cowboys (paniolo hoohei), livery men (kahu kaa), and many other names. They work hard through the long wintry nights, bearing with patience the cold and chills that stiffen (koekoe maeele) in the pelting Kipuupuu rain of this land.
>
> Farming: The young people of this land do not farm much because their time is taken up by the whites. When I lived as a stranger in this land, I did not see any of the natives of the place farming except the old men who attempt to do as much as they are able to. For this reason, the land is left untilled. It isn't because the plants will not grow but because the hands do not work. The hands are occupied with the burdensome task of the whites and there they work with all their might.
>
> Where Food Comes From: Most of the food (poi) of this place is obtained from Waipio. Those who work for the whites receive their food from the whites, but they get it from Waipio. Some people buy their own but the price is high. A short time ago, it was only a quarter for a bundle of hard poi weighing forty pounds or more but now it ranges from ten to twenty-five pounds for half a dollar. It seems that the time will come when this

place will have no poi to eat and the children are to be pitied. (Signed, Imiola) (Nūpepe Kū`oko`a, 4/13/1867)

The Mid-1800s

The most memorable event of this period was the *Māhele*. During this time span traditional land tenure changed from a feudal system to the privatization of land ownership. This new system was implemented through a series of government acts from the late 1840s to the mid-1850s.

The Waihona 'Aina Mahele Database (Waihona 'Aina Corp. 2000); 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.); does not list any Land Commission Award (LCA) claims for the Ahupua'a of Lalamilo, Keoniki, Kauniho, and Waiaka 1st; however, examination of current tax maps and other historic maps discussed below identified eighteen awarded claims in Lalamilo and Waiaka for which most list the *ahupua'a* as Waimea. The database also lists four claims that were not awarded in Puako. There are probably other claims within these *ahupuaa'a* that were not awarded, but it is not possible to distinguish them from the over 140 claims that are listed as being in the *ahupua'a* of Waimea. *Table 1* summarizes the testimony given in support of the claims and *Figure 8* shows the locations of awarded parcels. *Figure 9* is probably a late 1800s map that shows several of the LCAs in the vicinity of the project area.

Out of a total of thirty claimed parcels, nineteen parcels were awarded to thirteen claimants. The awarded parcels range from 0.14 to 48.0 acres in area with an average of 15.3 acres; however, if the small house lot parcels are omitted, then the average awarded parcel was 23.0 acres in area.

The awarded parcels are concentrated in two areas, at the coast and inland between 2,100 ft and 2,900 ft elevation. House lots are described in the testimonies for coastal parcels. House lots and cultivation are described for the inland parcels. Sixteen claims included house lots with at least 31 houses. A slaughter house, an unspecified number of grass houses, four salt ponds, and a cookhouse are also mentioned in the testimony. Evidence of agriculture in the testimony includes references to two farms, a patch, ten fields, a taro farm, 6 patches of taro and *mamaki*. Specifically mentioned crops include taro, coconuts (19 to 26 trees), bala trees (2), *mamaki*, and two trees of unspecified types.

Testimony from the Native Register for Waimea indicate that many of the *kuleana* house lots already had enclosure walls built around them at the time of the Māhele. If there was no wall, most of the native tenants indicated they were either building or were planning to build a wall to enclose their house lot. This probably was a response to free-ranging cattle.

Late 1800s

The sugar industry did not really gain momentum prior to 1850 for several reasons. Prior to the *Māhele*, all land was owned by the Kingdom. Leases were uncommon and growers depended on Hawaiian farmers to supply them with cane. The Māhele aided sugar growers by allowing them to purchase land in fee simple to grow their own cane. California became a viable market for sugar export when homesteaders settled there in the 1830s. This market was further expanded by the1849 Gold Rush. However, when California became a state in 1850, they imposed a strict sugar tariff which lowered profit margins and made it impossible for Hawai`i growers to compete with sugar imported to America from Manila or China. By 1857, there were only five sugar plantations in Hawai`i, none of them in South Kohala. During the Civil War (1861-1865), another market opened up for Hawaiian sugar planters (Dorrance & Morgan 2000: 11, 13). It was not until the Reciprocity Treaty of 1876 that the sugar industry made real strides. But the locus of the sugar industry became North Kohala rather than South Kohala.

In the early 1900s (1903-1913), Robert and John Hind started Puakō Plantation, which proved to be disastrous. The Hinds hoped to get water from a flume that was built eight miles *mauka* (upland). The water supply was irregular and any rainfall quickly evaporated due to frequent heavy windstorms. Production peaked in 1909 and the mill closed after the last harvest in 1913 (Dorrance & Morgan 2000: 90).

Table 1. Land Commission Award Claims

LCA	Claimant	Apana claimed	Apana awarded	Ahupua'a	Ili	Section No.	Land Use	Boundary Maka'i	Boundary Waimea/Kona	Boundary Makai	*Boundary Kawaihae/Kohala	Date Rec'd	Ohana Sector	Acreage	Royal Patent	Sources	Comment
5528	Nakolowa	1	1	Waimea	Puuopelu		house lot and 3 fields	konohiki	konohiki	konohiki	konohiki	1848	Beckley	4.88	6862	FT 65x5	
878	William Beckley	2	2	Waimea	Waikani		house lot and farm	konohiki	konohiki	konohiki	konohiki	ND	Kam. III	29.59	5065	NR 67x12, FT 201x3, 62x5	awarded 2 ayana
638	John Davis	1	1	Waimea	Napoelaki		enclosed house lot with 2 houses and 3 fields	konohiki	konohiki	stream	konohiki	1839	Mt. Gardner	4.83	4497A	NR 130x2, FT 65x5	
22715	Mokihi	1	0	Waimea	Puukapu		house lot	ND	ND	ND	ND	ND	ND	0.00	none	NT 145x4	
22028	Joes Bowers	1	1	Waimea	Puuopelu		house lot and 3 fields	ND	ND	ND	ND	ND	ND	7.8	8443	FT62x4	
3973	Iakeka Mahoe	1	0	Waimea	Puako		house lot, enclosed with 2 houses	konohiki	konohiki	Bakila (Beckley)	Bakila (Beckley)	ND	parental konohiki	0.00	none	NR 379x6, NT 141x4	
3756	Wahakane	1	1	Waimea	Puako		house lot, enclosed with 2 houses	Waho	Pakala (Beckley)	Pakala (Beckley)	Pakala (Beckley)	1824	Manae	1.08	5010	NR 52x8, NT 19x4, 177x4	testimony also refers to Lalamilo as ili of Puako
3758	Akahi (wahine)	1	1	Waimea	Puako		house lot, enclosed with 2 houses	Ulama	Ulama	Huau	Pakala (Beckley)	ND	ND	0.37	3656	NR 52x8, NT 20x4	Ulama described as konohiki
3760	Jose Ka	1	1	Waimea	Waiaka		house lot, enclosed with 2 houses	ND	ND	ND	ND	ND	Huau	0.14	7917	NR 47x8, NT 35x4	
3762	Auwea	1	1	Waimea	Kaauokamano		taro farm	Bakila (Beckley)	Bakila (Beckley)	Bakila (Beckley)	Bakila (Beckley)	ND	ND	26.00	3782	NR 47x8, 35x4	awarded 2 apana; one in Waiakoa
3325	Paoakou	1	0	Waimea	Puako		12 or 19 coconut trees	ND	ND	ND	ND	time of Kam. II	ND	0.00	none	NR 350x8, NT 148x4	land taken by konohiki
3528	L.A. Pilale and wife	3	1	Waimea								1847	Huau	48.00	8428	NR 350x8, NT 31x4	William Beckley described as konohiki
					Puako	1	house lot, formerly enclosed with 2 houses	Huau	Huau	Huau	Beckley						
					Keaiki'a	2	farm and house lot	konohiki	konohiki	konohiki	konohiki						
					Waiakoa	3	house lot, partially enclosed	konohiki	konohiki	konohiki	konohiki						
4088	Kaawakuka	2	0	Waimea	Puako							before Kam. I	grand-parents	0.00	none	NR 348x8, NT 147x4	
						1	house lot, enclosed with 3 houses, 7 coconuts, 2 bala trees, salt pond	Beckley	Beckley	Huau	Huau						
						2	4 salt ponds, sweet potato patches	konohiki	konohiki	konohiki	konohiki						

*Island parcel boundaries are Waimea/Kawaihae and coastal parcels are Kona/Kohala
ND= No data

Table 1. Land Commission Award Claims (cont.)

LCA	Claimant	Apana claimed	Apana awarded	Ahupua'a	Ili	Section No.	Land Use	Boundary Mauka	*Boundary Waimea/Kona	Boundary Makai	*Boundary Kawaihae/ Kohala	Date Rec'd	Giver/ Seller	Acreage	Royal Patent	Sources	Comment
4102	Kamahiai	1	1	Waimea	Puako		house lot with 3 houses and 2 trees	N/D	N/D	N/D	N/D	N/D	N/D	0.38	7137	NR 85v8	
4127	Kuahine	1	1	Waimea	Walakamui		house lot; enclosed	N/D	N/D	N/D	N/D	N/D	Huea	2.40	7500	NR84v8, NT 12v4	
4195	Kanehalikua	3	1	Waimea	Kalusana							1848	Uilama Pekele (Wm. Beckley)	35.20	7552	NR 61v8, NT 17v4	
						1	1 house, 45 gardens	Uilama Pekele (Wm. Beckley)	Uilama Pekele (Wm. Beckley)	Uilama Pekele (Wm. Beckley)	Uilama Pekele (Wm. Beckley)						
						2	1 patch	"	"	"	"						
						3	6 patches of taro and mamaki	"	"	"	"						
4555	William French	2	1	Waimea	N/D		house and slaughter house with enclosure, grass houses, cookhouse	N/D	N/D	N/D	N/D	1840	Wm. Hughes	21.00	67	FR 6v3; FT 187, 177v2; NT 483v2	also had claims in Honolulu and Kawaihae, claimant built a wharf and was a bullock catcher
85138	Hookiki	1	1	Waimea	Napoeakolu		field	konohiki	konohiki	konohiki	konohiki	1848	Wm. Beckley	29.44	5082	FT 64v5	
85166	Kamaikui	1	1	Waimea	Walaka 2		N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	1889	NR 700v3, NT 170v10	awarded entire ahupua'a
8520	Gid Lahilahi	2	2	Waimea	Walaka, Walaka 2		N/D	N/D	N/D	N/D	N/D	N/D	Kaoni Ana	N/D	1868	NR 342v4, FT 183v10	awarded Walaka 1
85569	Wm. C. Lunalilo	1	1	Puako	N/D		N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	8547	FT 651v3, 82v16; NT 450v10, 82v18	many other claims elsewhere
10280	Makole	1	0	Waimea	Puako		N/D	N/D	N/D	N/D	N/D	N/D	N/D	0.00	none	NR 119v8	

Figure 9. Portion of Register Map 2785

Although the era of sugar continued into the latter half of the 20th century, Waimea was not to figure prominently in this epic. The Lands at Lihu`e had long been converted to ranch lands by George Macy (Testimony of Samuel Macy; Waimea Water Rights Case, 1914-1915). By 1878, the Lihu`e lands were part of what was to become the Parker dynasty. A note in Lorenzo Lyons' diary reads, "Learned that Lihue ranch lands, cattle and all have gone into the hands of John and Sam Parker (Doyle 1945: 218).

Though the actual date when the Spanish *vaquero* (cowboy) first arrived in Waimea is not known, it is thought they were here by no later than 1830 (Kuykendall 1938:318). The *vaquero* or *paniolo* [from *paniola* after *espanol*], as they came to be called, brought their culture with them -- the art of saddle making, rawhide lariats, as well as their traditional garb of ponchos, leggings, spurs and wide-brimmed hats. By 1832, the Hawaiians were being taught to rope wild cattle in the mountains by three Mexican cowboys, Kossuth, Lonzada and Ramon (Brundage 1971: 6).

The development of Waimea's ranching history in the second half of the 19th century was directly linked to the introduction of cattle and the outgrowth of economic pursuits (salted beef, tanning, tallow making, slaughterhouses) resulting from the overpopulation of cattle. The humble beginnings of Parker Ranch began when John Parker essentially started his first herd from taming wild cattle sometime during 1837-1838 (Brundage 1971: 7).

In the early 1850s, ranchers began to see that Hawai`i cattle were of inferior quality due to inbreeding. Organized ranching methods were spearheaded by the Royal Hawaiian Agricultural Society who recommended fencing to contain the wild cattle (1851) and that owners castrate their bulls or keep their bulls contained on their own land. The Society also recommended improving the stock and to this effect, several new breeds were imported from Australia and later Scotland, the British Colonies and America. The Society also stressed against overstocking the land. Several other factors were important to the development of organized ranching. The Society realized there was a potential market to sell quality beef if it could be produced and they determined that Hawai`i had a higher percentage of grazing lands than arable lands. The Waimea Grazing Company (Janion & Green) began to acquire and lease acres of land in Waimea which they converted to pasture land. They also contracted with the Hawaiian Government to catch all unbranded wild cattle on public lands. Prior to this, the Government had claimed all wild cattle (Brundage 1971: 11-12). Waimea Grazing Company remained in business until 1878 (Wellmon 1970:136). Their closure was probably a direct result of the big drought of 1877 wherein hundreds of cattle died.

Also of note is the rise of the Parker dynasty in Waimea. In 1850, John Parker purchased 640 acres of land at Manā from the Hawaiian Government. The following year, Parker purchased an additional 1,000 acres. In 1852, Kamehameha III granted a lease to Parker for the lands of Waikoloa, giving Parker the competitive edge to control the developing ranching industry (Wellmon 1970: 75). In 1877, Rev. Lyons wrote to his son, Albert about the changes occurring in Waimea.

> Waimea has changed some since you left. It is mostly owned by J. P. Parker, Old Man Parker's son. He is a Noble in the Legislature, and one of the richest men on the Islands. But there are few people here. Very few foreigners, not more than ½ dozen. (Doyle 1945: 218)

In the early 20th century, the Parker family acquired Waikoloa and `Ōuli in fee-simple, giving them 100,000 acres of grazing land (Wellmon 1970: 175). Today Parker Ranch is the State's second largest private landowner with lands comprising 139,000 acres (Juvik and Juvik 1998:22).

The Missionary Census

When Rev. Thurston visited Waimea in 1823, he estimated the population to be somewhere between eleven to twelve hundred, based on his count of 220 houses (Ellis 1963: 289).

Upon Lorenzo Lyons' arrival at the Waimea mission station in 1832, he estimated his whole district (including Kohala and Hāmākna) had a population of about 16,000 (Doyle 1945: 58). It is not clear how he came by this number. An 1833 diary entry noted that he had attended yet another funeral -- the

fourth in three weeks. Deaths were more numerous than births and the population was decreasing. Three years later in 1835, he wrote, "During the past year I have taken a census of the population of this district and find it to be as follows: Waimea, 1,396; Kohala 6,175; Hamakna 4,015; total 11,586 from which it appears there has been a diminution of the people 3,500 within three and a half years (*Ibid.* 82). In 1839, Lyons noted that the population census actually showed an increase because the census taken some years ago was incorrect (*Ibid.* 107).

In 1843, Lyons indicated the count for Waimea was 1,012; Hāmākua 3,820, Puakō and Kawaihae combined was 734; totaling 5,576. Of the total amount, 1,507 were children. He noted there was a "decrease in population of four hundred in two year (*Ibid.*: 124). By 1845, Lyons' diary indicated that the "Population of Waimea [was] rapidly diminishing by death and removal [displacement from the land] (*Ibid.*: 141).

By 1850, the native population had already been severely reduced due to introduced diseases (Bushnell 1993). The smallpox epidemic of 1853 had devastating effects on all the islands, including Hawai`i. Bushnell writes:

> No one ever knew how many people sickened, how many died. Official government figures released in 1854 declared "between 5,000 and 6,000 fatalities," in a total population of about 84,000. Comparison census counts taken in 1850 and 1855 indicate much greater losses. Estimates range from 10,000 to 15,000. "Nearly all the victims were Hawaiians" . . . (Bushnell 1993: 210)

In 1853, Lyons noted there was one case in of small pox in Waimea and "very many at Kawaihae" (Doyle 1945:157.)

Lyons noted noticeable change in population movement during 1859 due to displacement and changes in land tenure:

> Visited Puukapu. What changes in four months! All the people are leaving in consequence of the land being leased to Luzada and Co. A few remain. Cabbages, bananas, kalo are grown. The women make kapa, catch small fish, make mats, or sew. The land holders will allow no hogs, hence all are killed. Some of the men own horses and bullocks. (*Ibid.*: 161)

Another entry in 1860 noted that "there is much sickness . . . I notice a diminution of population since the census of 1854" (*Ibid.*: 175-176).

It seems that by 1865 the situation had worsened. Lyons commented that "Waimea is going downwards, population diminishing, those who remain sickly. How few well bodied are left! It will perhaps not be long before Waimea becomes a desolation. (*Ibid.*: 194)

Indeed, by 1867, Lyons wrote in his diary, "The whole population of Waimea is now about four hundred" (*Ibid.*: 195). Lyons made several entries, one in 1869 and one in 1872, that he was vaccinating people as a precaution due to smallpox outbreaks in Honolulu (*Ibid.*: 199, 201).

The picture of population diminution is one of a gradual decline, but also one that fluctuated depending on the activities of the general population (Clark 1983: 51). During the pre-historic and early historic period, shifts in population were due to demands imposed on the people by the chiefs such as building a major *heiau* like Pu`ukoholā which involved massive amounts of labor and supplies; or seasonal movements -- going to the coast to gather salt and fish during cooler seasons in the uplands. Lyons made several comments about people being gone from their homes for extended periods of time and the hardship it imposed on them.

> Most of the people have gone to the mountains after canoes (Hollowed from forest trees), and will be gone 2 or 3 weeks. Hence we are rather lonely. The Governor must be obeyed whatever else must suffer. A thousand people will probably be employed in

> drawing five large and heavy canoes from Mauna Kea, to somewhere near the shore, a great work. The man who refuses to engage in it is to have his house burned down. (Doyle 1945: 73-74)

> Parents and children are taxed for articles not obtained in the neighborhood. They must go in search of them, at a distance from home. That means an absence of several weeks . . . Men and women are ordered by the chief to build a stone wall ten or twenty miles distant from their residence. Children must leave school to accompany their parents. (Doyle (1945: 88)

In the early historic period the sandalwood trade was a major impact on population shifts. People were forced to abandoned their fields and spend weeks in the mountains cutting sandalwood to meet the quotas of the chiefs. By the 1820s and 1830s bullock hunting and salted beef was another commerce controlled by the chiefs. The people were obliged to carry out their wishes. A notation from Lyons' diary follows:

> To carry beef, hides, and horns to the shore to ships sent by the king, requires much of the time of the natives . . . Besides, when they find they can procure beef for food by carrying certain quantities of it, they neglect to cultivate the ground. (Doyle 1945:64)

As cattle became an increasing problem, people moved their agricultural plots to places farther away where the cattle could not harm them.

> Passing through a wilderness where are many majestic *ohia* trees, one of the elders with me directed me to his plantation. It consisted of Irish potatoes, corn, onions, sugar cane, tomatoes, mulberries, *kapa* trees, figs, and *kalo*. He has his plantation in the remote wilderness that it may be protected from the ravages of cattle, for native gardens are generally without fences (*Ibid.*: 126).

Some threw up their hands in despair and gave up farming all together.

In the 1850s, the *pulu* trade sent people into the forest once more, many abandoning their homes and fields for weeks at a time.

Beginning in the 1830s and 1840s, Hawaiians began to be employed by the influx of foreigners cashing in on hunting cattle and related business pursuits such as tanneries, shoemaking, etc. However, Hawaiians often traded labor for food rather than getting paid with money. As cash crops failed, Hawaiians became even more dependent on foreigners for money. In 1849, there seems to have been a slight shift in the foreign population as quite a few left for California in hopes of striking it rich in the Gold Rush (*Ibid.*: 137). Changes in land tenure initiated by the *Māhele* also contributed to changing agricultural practices and population shifts. By the 1860s, the *pulu* business was failing. Many Hawaiians, having already abandoned their fields, were increasingly dependent on foreigners for cash. In 1860, Lyons lamented about the constantly fluctuating foreign population on whom the Hawaiians depend on for money (*Ibid.*: 176). By the 1860s there was also "very little demand for Irish potatoes" and Kawaihae Uka potatoes were "few, and poor and dear" (*Ibid.*:176, 194).

It seems by 1860 the Hawaiian population at Waimea had shifted to a near cash-based economy and taxes were being required in money rather than in goods. This was probably an outgrowth of selling a variety of cash crops to provisioning ships since the early 1800s -- vegetable produce, sweet potatoes, Irish potatoes and *pulu*. An 1860 notation from Rev. Lyons' diary is very revealing and shows the difficulty some people had in meeting the cash-based tax requirements put on them. As a result many sold their lands in order to pay taxes or, being unable to pay, their lands were auctioned off. Displacement from the land was the sad result.

> Here is the Government Tax Collector. He goes over the district and collects on the first tour -- say ten dollars of the $1600, whole sum. He has taken all the money there is. He notifies the people that he shall be around again in two weeks, and they must be ready. He makes a second and third, or fourth, or fifth, or sixth tour, collecting sometimes more,

> sometimes less. Meanwhile the people are working with all their might, selling their property, going off to other Islands to beg money of friends, or to sell property in time to pay the tax. Then for unpaid taxes property must be attached, and sold at auction at great sacrifice. (Doyle1945: 177)

The 1870s heralded several new businesses in Waimea which now had five stores and a hotel as well as the company of Spencer, Green & Macfarlane who raised sheep (*Ibid.*: 200, 204, 218). An 1870 diary entry by Lyons gives the passing away of traditional lifestyle in Waimea a sense of finality -- Papa, the last grass thatcher in Waimea, passed away (*Ibid.*: 206).

Early-Mid 1900s

Someone who was a guiding force in the ranching industry in the early 1900s was Alfred W. Carter, guardian of Thelma Parker and manager of Parker Ranch. Mr. Carter did much to aid ranching by improving cattle stock, conserve tree-less ranch lands by planting new and better grasses and organizing the Hawai`i Meat Company to provide ranchers an outlet to market their beef and beef products (Brundage 1971: 59, 28). Being a strong leader, Carter was able to facilitate networking among the different ranches so that everyone could learn from each other and help each other when problems arose. Mr. Carter managed Parker Ranch until 1937 when he was forced to step down because of health problems. His son, Hartwell Carter took over the position of ranch manager and remained in that capacity for the next twenty-five years.

The Waimea Water Rights Case

In the year 1914, Alfred Carter, on behalf of his trustee, Thelma Parker, filed a petition against the Territory of Hawai`i and 62 individuals over appurtenant water rights to Waikoloa Stream for the purposes of irrigation. Carter alleged that in 1905 the Territory wrongfully diverted water from Waikoloa stream when it constructed a dam and ran connecting pipe-lines from the stream above the lands of the petitioner (Carter) to Waimea Village (Hawaiian Reports Vol. 24: 49). In essence, Carter was protecting the interests of Parker Ranch and their right to utilize water from Waikoloa Stream for purposes other than normal household use (e.g., irrigation for pasturelands). The majority of the respondents did not show up and the Territory of Hawai`i was the only one to contest Carter's claim. The "Hawaiian Report" summarized the case as follows:

> This is a proceeding . . . for the purpose of determining water rights in the Waikoloa stream, at Waimea, Island of Hawai`i . . . In the petition the petitioner's ownership of certain lands was alleged and the right to the quantities of water claimed as appurtenant thereto for irrigation purposes by immemorial custom was stated as follows: An area of 94.3 acres at Kaomaloo, within and a part of the ili of Waikoloa, through the ditch known as the "Lyons" ditch, not less than 940,000 gallons per day; three *kuleanas* in the government land of Waikoloaiki, comprising an area of about nine acres, through a ditch (called Lanakila), not less than 95,000 gallons per day; five *kuleanas* in the government land of Lalamilo (adjoining Waikoloa), and a grant (R. P. 1157) of a parcel of land containing an area of 250 acres at Lihue (stipulated to be a portion of the "land or so-called ahupuaa" of Waimea), not less than 2,000,000 gallons per day through the ditch known as the "Akona" ditch. Also water for domestic use upon a parcel of land described in a deed from Kamehameha IV to Waimea Grazing Co., adjoining Waikoloa stream; and the right to the surplus fresbet water of the stream as it flows into and upon the *ahupuaa* of Ouli (adjoining Lalamilo) was claimed. (*Ibid.: 49-50*)

The record seems to suggest that this was the first modernization of a water system in the South Kohala district. Prior to the dam being built, Waimea residents received their water from the streams and from a series of ancient `*auwai* (ditches) which had been in use from "time immemorial" (Nakamura 1982:19; Carter vs. Territory of Hawai`i: 17-18). Handy, Handy and Pukui described the utilization of the ditch system by the Hawaiians.

> . . . With farms along the water system upon which all depended, a farmer took as much as he required and then closed the inlet so that the next farmer could get his share of water – and so it went until all had the water they needed. This became a fixed thing, the taking of one's share and looking after his neighbor's rights as well, without greed or selfishness (1972: 58).

What is remarkable about this case is the native and foreign testimony, where there would otherwise be none, from informants with first-hand knowledge of the *'auwai* system and agricultural practices in the Lālāmilo/Waikoloa area. The testimonies describe the various land areas and provide glimpses into the lives of Hawaiians living during that time. Most of the informants were born around the mid-19th century, around the time of the *Māhele*. Many of the informants recalled seeing the water run through the ditches to various lands where people were living or seeing the remnant ditches no longer in use of settlements long gone. An important point made clear by the testimonies was that the water was used for domestic household use and not for large-scale irrigation. The point being made that in the "old days" there was no need to irrigate on a large scale because there was usually enough rainfall – even on what local residents today consider the "dry" side of Waimea. However, if there was water to spare and plants needed watering, they were irrigated. Lucy Peabody, grand-daughter of Hū'eo and born in 1840 testified that, "There was very little, if any, irrigation at Waimea in the old days as it rained more or less nearly every day and there was an abundance of water. The rainfall in the old days was much heavier than it is now and the forest came much farther down. The cattle have been causing the forest to recede". This was also recognized by the State Supreme Court when Carter appealed the 1915 decision.

> The evidence is to the effect that there were a very few *lois* of taro in the locality in question. It was shown that the Hawaiians habitually raised in their house-lots dry land taro, bananas and vegetables as well as sugar cane which they cultivated for human consumption as well as for food for their animals. And it is a fair inference from the evidence that the ditch system at Waimea was constructed for the purpose of supplying water to the inhabitants for household purposes and for the irrigation, when the natural rainfall was insufficient, of their crops (Hawaiian Reports Vol. 24: 59).

Barry Nakamura (1982) aptly discusses the ancient *'auwai* system in detail and it is briefly summarized here. The main sources of surface water for this *'auwai* system were the streams of Lanimaumau, Waikoloa (also known as Paliilii) and Kohākōhau. According to the testimony, Kohākōhau was known by several names: Wai'auia, Keanu'i'omanō and Wai'aka. Depending on which part of the stream being referred to, this still holds true for local residents today. At the time of the lawsuit, it was determined the main *'auwai* feeding off of Waikoloa Stream were the Lyons, Akona and Lanakila ditches. Off of these three ditches was a network of smaller ditches that watered the lands below (south) of the project area. What was evident from the testimony was that these ditches were very old networks developed by the Hawaiians long ago and that portions of the *'auwai* were used up until the late 19th to very early 20th century.

Relative to Lālāmilo, the Akona *'auwai* watered the lands of Lihu'e below the project area (Grant 1157 to G. Macy and J. Louzada) and continued west toward Kolea where it turned south and was said to flow as far as Pu'uhuluhulu and Pu'upā. In addition to Grant 1157, the Akona *'auwai* watered the following five *kuleana* in Lālāmilo (*see Figure 8*):

> LCA 4885 to William French
> LCA 976, Apana 1 to William Beckely
> LCA 3202-B to Jose Bowers
> LCA 589-B to Naholowaa
> LCA 8513-B to Kuamuu [Kuamoo] Ho'olulu
> (Carter vs. Territory of Hawai'i: 774)

The testimonies indicate that in previous times there was a very large settlement on the *makai* lands of Lālāmilo, especially below Lihu'e and even spreading across toward Wa'awa'a, Papuaa and beyond toward Kona. By the mid-19th century when most of the informants were born, these settlements were gone. But, many informants reported hearing this from grandparents or older *kama'āina* and most recalled seeing outlines of remnant ditches on the landscape. Martin Campbell, born in 1864 and whose wife used to live at Papuaa said, "I was told there was a large settlement makai on Lalamilo and was told

they got water from the stream going through Lihue. I was told that the people living there had a village of nearly 10,000" (Waimea Water Rights Case, 1914-1915; Campbell: 3).

Waimea's warrior tradition was recalled by Charles Notley who was born at Lanikeapu'u, Waimea in 1861.

> The land down in behind [below] Puopelu and LCA 8513-B [to Kuamoo Hoolulu] was thickly populated in the old days. Kamehameha got the flower of his army from these lands round about. In the old days the most populous portion of the land was below Puopelu and below Lihue. I knew this from the kamaainas. The signs of the old kuaunas or patches were evident in the old days. I have seen them. The people makai of Puopelu would get their water from the Akona auwai and from Waikoloa Stream. There were pools in the solid rock in the Waikoloa Stream which would hold water for a long while, in dry season . . .
>
> I heard that they only stayed there one or two seasons, and then moved to Kohala. . . In the olden days there were auwais running through Lihue down to the settlement makai. I was told that in the old days the residents below Lihue would use the water from these auwais. In dry times they would go to Waikoloa and Waiauia streams. Times that I have gone beyond Lihue down makai looking for cattle, I have seen water running in the artificial auwais. When there would be an average flow in the stream I have seen the water down in the ditches makai of Lihue – down into the settlement makai – I don't know how far makai they go (Waimea Water Rights Case, 1914-1915; Notley:).

Of interest is Notley's comment about the lands *makai* being occupied for "one or two seasons" inferring that perhaps there was a specific intent for the occupation of these lands. This possibly gives substance to the theory that agricultural expansion in this marginal area was due to the construction of Pu'ukoholā *hēiau* (ca. 1790) by Kamehameha I (Reeve 1983: 236).

The "pools in the solid rock" that Notley referred to were well known among the *kama'āina* who lived there. During drought and dry spells when the streams did not flow, the large rocks in the streams held remnant water where the people would draw water from for domestic use. This practice was also mentioned by Kamakau in reference to Lanimaomao [Lanimaumau] Stream in the battle between Lono-i-kamakahiki and Kamalālāwalu (1992: 60).

Paul Jarrett, a non-native informant related that though he never saw people living there, he was told "that in the olden days there was quite a settlement below Lihue . . . The part in between Lihue and Waawaa and Papuaa and way towards Kona side, and all around there was cultivated. I was told this by the kamaainas. I was told that there was a large settlement there. (Nui kanaka oia wahi). . . The only places where I heard of the settlements makai of Lihue were on Lalamilo and mauka of Ouli. Jarrett was manager of Parker Ranch from 1888-1901.

By the early 1850s when Samuel Macy was growing up, there were not very many people living at Lihu'e itself. Still, there were about "50 of us altogether living at Lihue." At that time, there were still 25 or 30 thatched houses. Many of the cowboys lived there as well. Macy's recollection was that when he was a boy, "the forest used to go from Puukapu over to Waipio." Samuel Macy was the son of George W. Macy (Grant 1157) and he was born in 1848 (Waimea Water Rights Case; Macy: 2-3). Macy also recalled going to Waiemi (also know as Waikane) to catch plover in a pond there (*Ibid.*).

Another informant born in 1858, told about cultivation practices when he was a child.

> The Hawaiians in Lihue and in the remainder of the district of Waimea, when I was a little boy, cultivated their lands only in the old Hawaiian fashion, that is to say, they planted a few holes with sugar cane, sufficient for themselves and their friends who called, and a few mounds of sweet potatoes and sometimes, also, Irish potatoes, but all such planting depended in the main, upon rainfall; it was only in dry times that these plants were watered; sometimes they were so watered by running water from the auwais to them, but

most of the time the water was carried in buckets by the old Hawaiians. There was no such watering on a large scale as is done nowadays by plantations. In a one-acre house lot there would be only a very small portion of the land so cultivated sometimes . . . Sometimes the Hawaiians planted small pieces of land at some distance from their house lots; the pieces so planted being chosen because, being in a depression, the land was richer or retained moisture longer . . . My grandfather cultivated such a piece distant from his home, containing, I should say, as much as four acres of land, but he was an exception; the average Hawaiian who planted at a distance from his home, planted ordinarily, not more than ¼ acre, and on those patches also, there was very little irrigation indeed . . . When I was young, the rainfall in Waimea district was very much heavier and more frequent than it is now. (Waimea Water Rights Case; W. C. Achi: 1-2)

Achi also testified that the main taro supply for Waimea came from Waipi`o, implying that not much taro cultivation was being done in Waimea by the 1860s. There were only a few cultivated plots of dry-land taro scattered here and there (*Ibid.*).

Pertaining to the project study area, a *mauka* ditch named "Amiikea" fed from the Kohākōhau Stream, through Palea's LCA 3828 (within the project area), and flowed down to the Waikoloa Stream. Beyond the Waikoloa Stream was yet another network of intricate ditches. The Amiikea `*auwai* reportedly also watered LCA 3762 to Auwae at Papuaa, LCA 4185 to Kanehailua at Kaluaana, LCA 976:2 to William Beckley at Waawaa and Grant 2129 to G. K. Lindsey (Nakamura 1982: 49-51).

Nainoa was born in 1842 at the Rev. Lyons' homestead in Waimea. Seventy-two years of age, he was the District Magistrate at Hau`ula and living at Lā`ie at the time testimony was taken. Nainoa states his father's name is Auwae. It is not known if this is the same Auwae who was awarded LCA 3762 at Papuaa, just southwest of the project area, but it is a very likely possibility. Nainoa lived at Papuaa and his brother taught school there. When Nainoa was old enough, he took over the school. He says, "My parents lived above with Lyons, but we children, my brother and myself, lived down below, where my brother taught school" (Waimea Water Rights Case, 1914-1915; Nainoa Testimony: 3). Nainoa talks about the general Lālāmilo area and of the Papuaa settlement a little southwest of the project area. Although not mentioned by name, he also talks about the Amiikea ditch where they got water. But, of particular interest is his mention of a burial ground.

In Lihue there were a lot of branch *auwais*. The hollow on the makai side in Lihue was not cultivated -- it was open pasture. Nothing but prickley pear on the Kohala makai side of the wall. I recollect the burial ground along towards Waawaa. Formerly the land between the burial ground and the makai part of Lihue was pretty well cultivated . . . That land was pretty thickly populated. I had many students in the school. The school was on a hill. Just below outside of the wall was quite a big settlement on the makai side of the road going to Puako. That is where Beckley was brought up. We lived at Papuaa and they lived below the schoolhouse. Formerly the land between the school house and Kaluaana was settled. They were there at the time I was teaching school. The people mauka of the school house got their water from the streams of Waiauia and Waikoloa. The Waikoloa stream flowed down further to a dam which furnished water to our homestead at Papuaa . . . The water for the school house came from the ditch that comes to our place. The ditch used to run just below the school house and that supplied the water. The ditch going to Papuaa often went dry because the people living at Kaluaana dammed up the water mauka. The ditch running to Kaluaana dries up during dry season. The people at Waawaa got their water from the branch ditch that went towards Kaluaana. (*Ibid.*)

According to Nainoa, the burial ground was located somewhere between Lihu`e and Waawaa.

In 1917, Alfred Carter appealed the case to the Hawai`i State Supreme Court. The court maintained that the Territory owned all the waters of Waikoloa stream, that the petitioner (Carter) had rights to use the water from the stream for domestic use (according to "ancient custom"), the petitioner was entitled to surplus flow for artificial purposes only after all the domestic use requirements were satisfied and that freshet waters were "subject to reasonable use" by both the Territory and the petitioner (Hawaiian Reports Vol. 24: 70-71).

Two World Wars

As a major supplier of beef, Parker Ranch played a pivotal role in providing beef and mutton to the Armed Forces in Hawai`i during both WWI (1914) and WWII (1941). During WWII, the military (Army and Marines) basically took over Waimea town. Large areas of ranch lands were turned over to the U.S. Government for a campsite, and a firing range for training the U.S. Marines -- all for the sum of $1.00 (Brundage 1971: 109). When the war was over in 1945, Mr. Carter wrote the following:

At the present time, there is a division, I think, consisting of something over 20,000 men, located in Waimea. They are moving out now. The licenses and leases which we gave the Armed Forces run for the duration and six months thereafter. Much, if not all, of the installations I expect will be removed within that time. The U.S.O. also has two leases upon which they have built. They have the right to remove their improvements unless we can agree to a price.
(*Ibid.*)

The daily operations of the ranch were disrupted and Carter commented on the difficulties faced:

. . . the period of occupation by the Armed Forces has been difficult. It could not have been otherwise than difficult. Tenting as many as 30,000 men practically in the village of Waimea resulted in numerous infringements and headaches. Very often fires were started which we had to fight; the breaking down of gates, cutting down of fences, the breaking of pipes and the mixup of cattle, and a thousand and one other things made it difficult. We were shorthanded in our assistants and labor but it was handled well and I must say the officers cooperated in every way possible. (*Ibid.*)

A Pasture Lease map for Lālāmilo, Lihu`e, `Ōuli, Koali`ula and Wai`aka 1 was obtained from Woody Ramos (*Figure 10*). The map indicated an easement for a "tank trail" which was used by the military during WW II (Personal Communication, Woody Ramos).

The firing range was one of the last properties to be released by the military. Mr. Carter wrote:

The Army and Marines have released most of the property which we had turned over to them except what is known as the Firing Area. This is the land below the Kona Road and runs down to the sea, consisting of about 50,000 acres. On this land they used their artillery and many of the shells which came down did not explode and are called duds. They have about 200 men retained there in this area, detonating the duds as they find them. It is surprising how many were on the place. They are extremely dangerous because if a man going along on horseback should hit one, it would explode with fatal results so it is senseless to put our men into this area until we are well satisfied that all of the duds have been exploded. We have been promised they will keep this gang of men there as long as we wish them. It will be several months before it will be safe for us to use the land -- it is a big country to go over. (*Ibid.*: 110)

World War II reshaped the farming industry in Waimea and ironically the war was a boon to the farmers -- most of whom were Japanese. Prior to the war, there was only a relatively small market for fresh produce. Once the war started, there was an immediate demand for vegetables to supply the Armed Forces stationed in Waimea and O`ahu. Parker Ranch played a role in this effort by leasing land to the farmers. Each farmer leased twenty acres of lands combined between the Ranch and Waimea homesteaders. The farmers learned to grow new kinds of vegetables they had never grown before -- lettuce, asparagus, celery, and broccoli were especially requested by the servicemen (Nakano 1992: 101). The war helped the Waimea farmers make the shift from tenant farmers to commercial farmers.

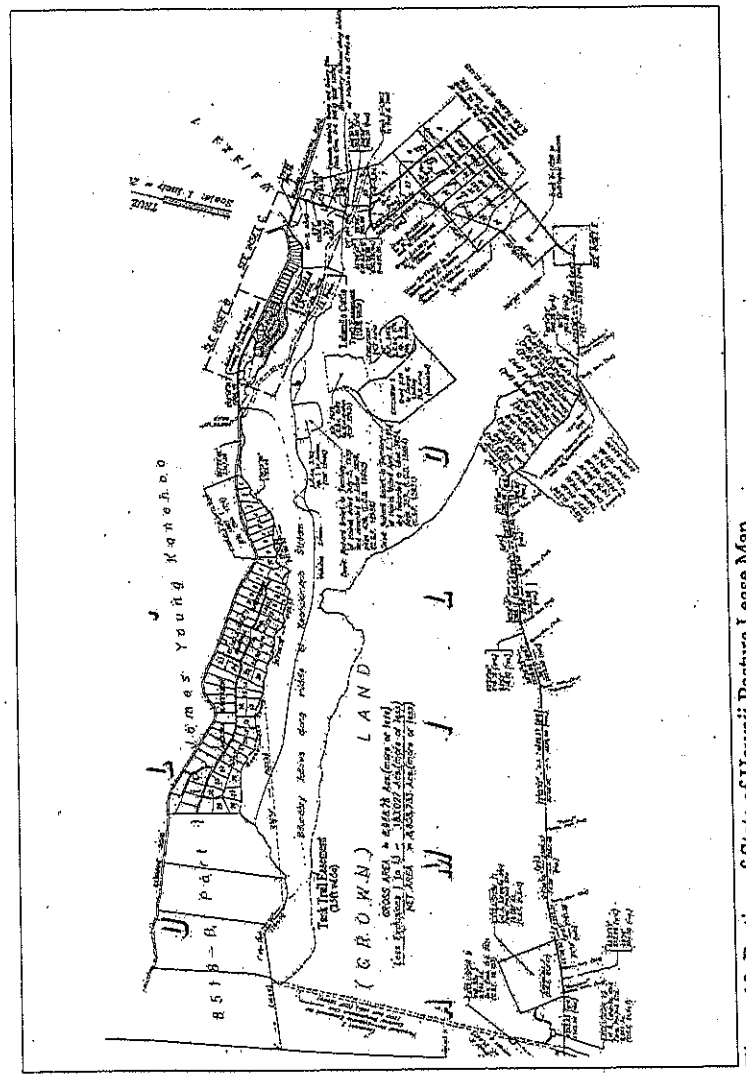

Figure 10. Portion of State of Hawaii Pasture Lease Map

Lālāmilo Farm Lots

After the war, the Japanese farmers found other venues to market their produce. Using their profits from the war, many of the farmers began to purchase land outright rather than lease farmlands. Besides mechanizing their farming equipment, they organized to form a cooperative (*Ibid.*: 113).

The birth of Lālāmilo farm lots stems from an amusing anecdote about how the lands were acquired. Several farmers wanted to purchase Government land around the area of Richard Smart's home at Pu`uopelu. Paniolo Yutaka Kimura foresaw that Mr. Smart's home would be a dustbin from the farmers plowing their fields so close to Mr. Smart's residence. Parker Ranch came up with a viable solution for the farmers by exchanging the Government owned land for Parker Ranch lands that would in turn be granted to the farmers. In 1963 a legislative bill was passed authorizing the sale of ranch lands at Lālāmilo to Parker Ranch in exchange for the Government lands at Pu`uopelu. The outcome actually benefited the farmers in the long run. Today, most of the privately owned farmland in Waimea belongs to Japanese farmers and they are the largest vegetable producers in the State (*Ibid.*: 113-115).

Late 1900s

Other than military use during the war, the project area has been used almost entirely for ranching purposes. At one time Lālāmilo, including the project area, was leased by Parker Ranch for pasturing their cattle. A Pasture Lease map for Lālāmilo and the surrounding area indicated a 100 ft.-wide easement for a "Lālāmilo Cattle Trail" (see *Figure 10*). Yutaka Kimura recollected that in the "old days" the cowboys used to drive cattle through this area (Personal Communication). Having more productive pasture lands elsewhere, the Ranch opted not to renew their lease when it came up for review in the late 1950s or early 1960s. The pasture lands of Lālāmilo are marginal. They are considered "seasonal" pasture lands and are not used for pasturing year-round. They are most productive for grazing during the winter months and early spring (Personal Communication, Radcliffe Greenwell & Woody Ramos).

Parcel 77 is currently under lease to Jack Ramos who uses the land for cattle grazing and branding. The ranch was formerly known as the Palekoki Ranch (Petticoat Ranch) after two women owners who had the lease before Ramos (Personal Communication, Jack Ramos). People today refer to it as the "Ramos Ranch".

Summary of Historical Documentary Research

Early historic accounts refer to Lālāmilo is an *`ili* of Waimea. Later Lālāmilo is referenced as an *ahupua`a*, which shared fishing rights with Puako. Traditional and legendary references to Waimea mention its strong gusty winds and chilly rain. Waimea was associated with royalty and chiefly lineages because of its highly valued agricultural lands. Waimea was also a renowned training ground for young chiefly warriors from ancient times. Legendary accounts refer to over a dozen battles either fought in Waimea or fought by Waimea warriors. The rich agricultural lands of the area were intensively exploited to support armies.

At least three *heiau* are mentioned for the Waimea area. The High Chiefess Hoopiliahae built and dedicated a Haleino Heiau approximately two miles from Waimea in the forest on the Lanikepu hills in the Ahupua`a of Ouli. Makuakuamana, who came with Paao from Tahiti, built a *heiau* on the land of Waiaka. Sometime between 1797 and 1811, while Kamehameha was living with the chiefs of Waimea, he restored the *heiau* of Uli in Waimea that was initially dedicated by Hakau.

Descriptions from early visitors, Mahele records, and native testimony indicate the native forest once extended much lower into the upland plains than it does today. There are many references to the Waimea region as being intensively cultivated and densely inhabited. Named crops included *wauke* and *mamaki* for making *tapa*, plantains, bananas, sugar cane, coconuts, hala trees, taro, and sweet potatoes. An extensive irrigation system was in use from at least late prehistory until the early 1900s. The cattle brought

by Vancouver in 1790s thrived in the area and by the 1810s became a serious problem for farmers. Kamehameha I hired bullock catchers to hunt the cattle. Hides and salted beef became one of the commodities produced in Waimea that supplied ships at the developing port at Kawaihae.

Between the 1810s and early 1840s, the port was the central depository for the sandalwood harvested from the surrounding district, including Waimea. A missionary station was established in Waimea in 1823 by Rev. Thurston who estimated the population to be somewhere between eleven and twelve hundred. The first sugar mill at Waimea is thought to have been established at Lihu`e in Lalamilo in the late 1820s. The mill at Lihu`e was known to operate until at least the mid-1840s. Waimea farmers increased production of sweet potatoes and Irish potatoes in response to the California Gold Rush in the late 1840s. Other vegetables, along with sugar, molasses and coffee were also exported. Historically-introduced crops included watermelons, cabbages, onions, tomatoes, mulberries, figs, and beans.

During the Māhele, nineteen parcels in Lalamilo, Waiaka, and Puako were awarded to seventeen claimants. House lots and cultivation are described for the inland parcels. Sixteen claims included house lots with at least 31 houses. Most of the house lots were enclosed. Evidence of agriculture in the testimony includes references to farms, patches, and fields.

By 1850, the native population was severely reduced due to introduced diseases, displacement, and changes in land tenure. The forests of Waimea were largely replaced by pasturelands owing to years of deforestation resulting from the sandalwood trade, cattle, sheep, agricultural clearing, and other factors. During the 1840s and 1850s, much of the land was converted to government pasturage. John Parker's cattle operation began in the 1830s. The Parker Ranch began acquiring large tracts of land in the 1850s and by the early 1900s controlled over 100,000 acres of pasture land. By 1867, the population of Waimea was estimated by be only four hundred.

During WWII, the U.S. military took over much of Waimea town and large areas of ranch lands for billeting and training exercises. The military presence was a boon to the remaining Waimea farmers because there was an immediate demand for vegetables. Lettuce, asparagus, celery, and broccoli were added to the cultigen inventory. The demand led to a shift from tenant to commercial farming. After the war, the military released control of the ranch lands back to Parker Ranch. Lālāmilo, including the project area, was leased by Parker Ranch for pasturing their cattle. The project area leases were subsequently passed to others, who continue to use the area for pasture today.

PREVIOUS ARCHAEOLOGICAL RESEARCH

A search of DLNR-SHPD archaeological report database and other sources identified 32 reports covering portions of Lalamilo and adjacent areas. *Table 2* summarizes the studies and *Figure 11* shows the project locations. Not included in the table or figure are the early surveys by Thrum (1908), Stokes (Stokes and Dye 1991), Reincke (n.d.), and an unreported survey by the Department of Hawaiian Homelands (DHHL). Thrum (1908:42) reported the former presence of a *heiau* at Uli in Waimea.

Two previous studies have been conducted within the southern portion of the current project area. Thompson and Rosendahl (1992) conducted an inventory survey of an approximately 9.5 acre parcel on the south side of Kawaihae Road just inland of the bridge across Waiaka Stream and Haun et al. (2002) recently completed a survey of a c. 266.4-acre parcel situated south of Kawaihae Road and north of Waikoloa Stream. Thompson and Rosendahl identified six agricultural fields designated Site 18054. Seven backhoe trenches excavated through the field boundaries all identified a layer interpreted to be a buried agricultural soil. Haun et al. (2002) identified several terraces and an irrigation ditch in the area surveyed by Thompson and Rosendahl, but the features could not be readily correlated with the previously identified ones. The features in this area were subsequently designated as components of a large agricultural complex (Site 22632) that contained 700 features. Eleven of the features identified during the current survey are components of Site 22632.

Haun et al.'s survey resulted in the identification of 75 sites with 818 features. The 818 features were comprised of terraces (358), mounds (275), enclosures (30), field boundaries (29), stone walls (27), irrigation ditches (21), platforms (20), walled terraces (15), C-shapes (10), U-shapes (9), modified outcrops

Table 2. Summary of Previous Archaeological Work

Study	Land	Elevation (feet)	Area (ac)	Historic Use	Total sites	Sites/ acre	Total feas	Feas/ acre	Hab Feas	Hab Feas/ acre	Farm Hab Feas	Temp. Hab Feas	Ag Feas	Ag Feas/ acre	Burial Feas	Ritual Feas	Trail	Abd	Rock art	Historic Feas	Miscfin det. Feas
Yent and Gitten (1978), Burgett and Rosendahl (1980), Yent (1981), Jensen (1984)	Lalamilo	0-320	750	Military/ Ranching	164	0.22	425	0.57	134	0.18	30	104	62	0.08	2	1	8	18		163	10
Burgett (1980)Dunn and Rosendahl (1980)	Lalamilo	4-20	2.3	Ranching	25	10.87	75	32.61	58	25.22		58							18		1
Smith (1984)	Lalamilo	6-10	7.42		0																
Rosendahl (1989)	Lalamilo	5-5	0.5		1	2.00															
Bishop Museum (1994)	Lalamilo	5-10	0.5		5	10.00	7	14.00	2	4.00			4					1			
Kennedy (1990), Burgett et al. (1992)	Lalamilo	5-50	600	Ranching	1	0.00	1987	2.48	18	2.42		7	11	1.48	1	1			1987		
	Lalamilo	9-14	7.428	Ranching	28	3.50	47	6.33											3	6	13
Tomonari-Tuggle (1992)	Lalamilo	10-30	0.34		2	5.88	2	5.88													
Barnes and Kelly (1974), Kirch and Clark (1981)	Kawaihae, Lalamilo, Puako	10-1110	736	Ranching	44	0.06	242	0.33	85	0.13			47	0.06	78		1	8	1	11	2
Ching (1971), Rosendahl (1972)	Waikoloa-Kawaihae	50-300	3.5		98	28.00	98	28.00	58	16.57								34		5	
Barnes and Kelly (1974), Kirch and Clark (1981)	Lalamilo	1100-2100	1560		25	0.02	109	0.07	12	0.01			27	0.03		2	8	23		37	
Hess and Williams (1987)	Lalamilo and Waiaka	1200-2600	521	Military/ Ranching	2	0.00	2	0.00	2	0.00											
Southard (1994)	Lalamilo	1260-1360	80	Military/ Ranching	4	0.05	4	0.05	2	0.03										1	1
Rock (1989)	Various	1400-2800	500	Ranching	1	0.01	2	0.01													
Barnes and Kelly (1974), Kirch and Clark (1981)	Lalamilo, Waikoloa	2100-2900	810		25	0.03	93	0.11	14	0.02		14	2	0.00	1					83	8
Haun et al. (2002)	Lalamilo	2120-2450	266.4	Ranching	75	0.28	818	3.07	60	0.34	79	20	702	2.64	17						
Hammatt and Borthwick (1988)/ Hammatt et al. (1988)/ Hammatt and Shideler (1989)	Lalamilo	2175-2375	12.4	Ranching	7	0.56	34	2.74	2	0.16			31	2.50						4	4
																				1	
Ching (1976), Clark (1981), Clark (1987)	Lalamilo	2260-2460	295	Ranching	264	0.89	2143	7.26	226	0.08	74	93	1721	5.83	27					28	123
Thompson and Rosendahl (1992)	Waikoloa, Puakapu and Lalamilo	2410-2440	9.1	Ranching	1	0.11	6	0.66													
Barrera (1993)	Lalamilo	2440-2500	50	Ranching	1	0.02	33	0.66					33	0.66							
Franklin, May and Rosendahl (1994)	Waiaka 2	2460-2560	14.9	Ranching	7	0.47	9	0.60	1	0.07			5	0.34	1					1	1
Rosendahl (1993)	Lalamilo	2500-2515	0.75	Ranching	0																
Barnes and Kelly (1974), Kirch and Clark (1981)	Waikoloa, Puakapu	2600-3500	1740		11	0.01	44	0.03	18	0.01			15	0.00			1			8	4
Erkelens (1993, 1995)	Waikoloa	2640-2740	29.8	Ranching	5	0.19	7	0.26							2					5	
Total/Average			8214.1		814	2.87	6197	8.03	730	3.28	174	296	2480	1.45	129	4	18	84	2007	354	167

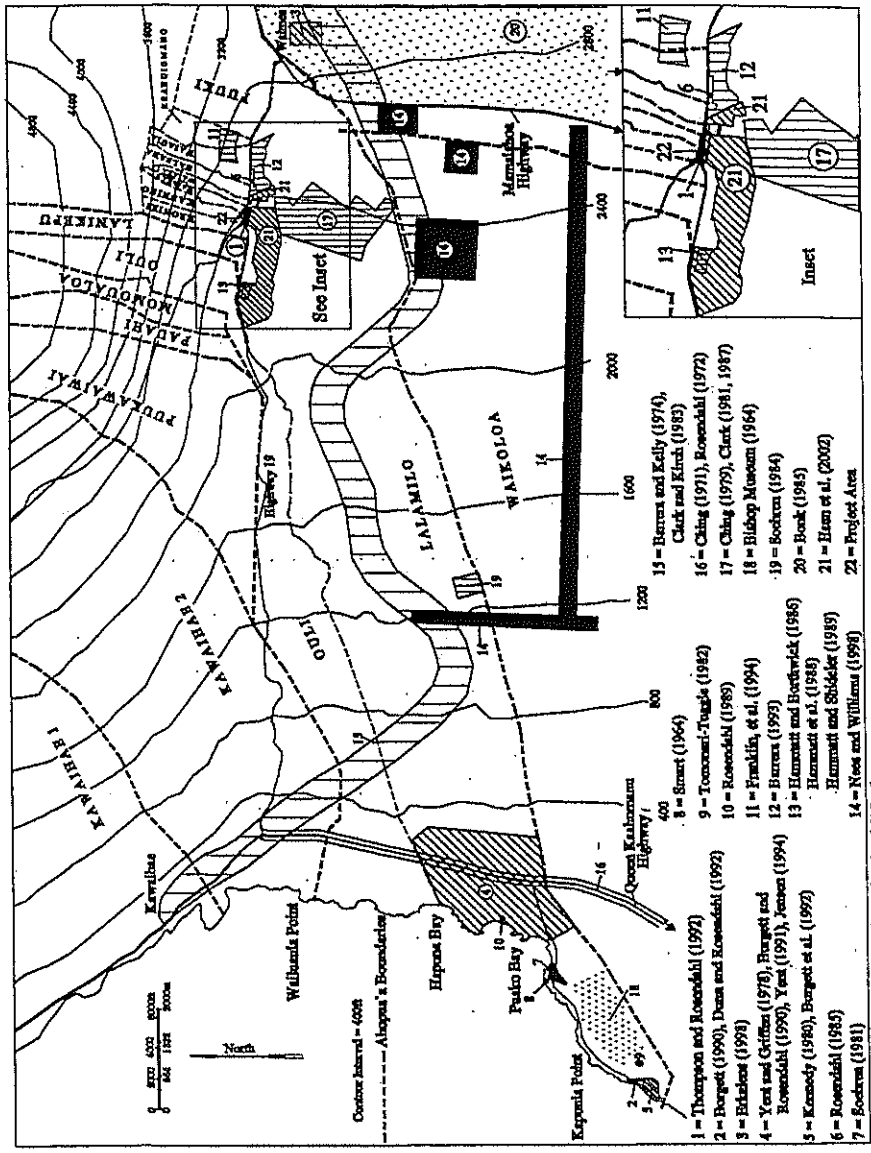

Figure 11. Previous Archaeological Work

(5), surface hearths (4), L-shapes (4), cairns (3), pond fields (2), concrete piers (2), and one each of the following; cupboard, lithic scatter, a possible seat, and a trail. Functionally, the 818 features were classified as agriculture (702), permanent habitation (69) and permanent habitation/burial (1), temporary habitation (20) and temporary habitation/burial (1), burial (16), marker (3), military defensive position (2), historic foundation (2), storage (1), and quarry (1).

In 1906, John Stokes, then Curator of Polynesian Ethnology at Bishop Museum, did fieldwork on the island of Hawai'i, documenting *heiau* and drawing plans of the better-preserved ones. Using Thrum's list as a guide, Stokes began his fieldwork in Kailua-Kona. "Once in the field, however, Stokes discovered that local Hawaiians could identify many more *heiau* than appeared on Thrum's list" (Stokes & Dye 1991:10). In the South Kohala District, Stokes recorded only two *heiau*, Mailekini and Pu'ukoholā, at Kawaihae. He recorded none in the vicinity of Waimea. In addition, Stokes heard about four other *heiau* at Puakō, near the coast, but he was unable to gather any information about these sites from local informants (Stokes & Dye 1991).

During his 1930 survey conducted for the Bishop Museum, Reinecke examined the western coast of the island and, " walked along the coast from Kalahaipua'a [near Puako] to Kawaihae, but considered it not worth while to attempt a survey of this algarroba-covered [*kiawe*] coast unless... [he]... had a base there" (Reinecke n.d.). He makes no mention of archaeological sites within Lalamilo.

During the mid-1990s, DHHL archaeologists conducted a reconnaissance survey of several hundred acres immediately south of Waikoloa Stream to the south of the project area (Ross Cordy, personal communication). The survey area extended from Waikoloa Stream to the southern boundary of Lalamilo, and from approximately 1,200 ft to 2,300 ft elevation. The survey demonstrated that agricultural features are rare below 1,900 ft elevation. The survey identified burials, small shrines, and habitation sites.

The surveys in *Table 2* cover more than 8,200 acres identifying 814 sites with 6,187 features. Clark (1981, 1987) reports a total of 321 sites including 182 nonagricultural sites with 458 features; however, only 422 features are listed in his tables. A rough count of features depicted on the site maps yields 63 *auwai* branches, 297 field ridges, and approximately 1,379 other, presumably agricultural features that consist of terraces, swales, mounds, and modified outcrops. The feature count is exaggerated by the Bishop Museum study of the Puako petroglyph field that documented nearly 2,000 petrogyphs. If these are removed from the feature count the total number of identified features is 4,200.

To aid in reconstructing settlement patterns, features were quantified by probable age and function, and the studies are ordered by elevation. The data from the studies connected within the Mudlane-Waimea-Kawaihae road corridor (Barrera and Kelly 1974, Kirch and Clark 1981) are subdivided into four entries in *Table 2* based on 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 include salt pans, *papamu*, fishponds, and pahoehoe excavations. Habitation sites are further subdivided into temporary and permanent for studies making this distinction.

Density per acre values are given for sites, features, and habitation and agricultural features. Overall, the studies have identified 730 habitation features including 174 permanent habitation features and 296 temporary habitations, 2,660 agricultural features, 129 burials, 4 ritual features, 18 trail segments, 84 *ahu*, and 2,007petroglyphs. Two hundred and sixty habitation features were not categorized by residential permanence. Historic features were not segregated by function. The majority of the historic features are ranch walls.

Density values for surveys of at least 50 acres indicate the highest densities of habitation features between 2,100 ft and 2,480 ft elevation (0.15 features per acre) and at the coast (0.18). Agricultural feature density is high between 2,100 ft and 2,500 ft elevation. Overall feature density ranges from 0.03 to 7.26 features per acre. Habitation feature density ranges from 0 to 0.34 features per acre with an average of 0.09. Agricultural feature density ranges from 0 to 5.83 features per acre with an average of 1.18. Burial and ritual sites are concentrated near the coast, but nearly 37% of the burials are reported from inland sites between 2,000 ft and 2,740 ft elevation.

Seventy-eight radiocarbon dates are reported in the studies by Clark and Kirch (1983), Rosendahl (1972), Hammatt et al. (1988), Hammatt and Shideler (1989), Burgett et al. (1992), Barrera (1993), Jensen (1994) and Haun et al. (2002). Most of the results were calibrated using older, and less precise calibration tables. When all potential age ranges are examined five ranges span the 1200s, eleven include the 1300s, twenty-four span the 1400s, thirty-two span the 1500s, forty-nine include the 1600s, fifty-two span the 1700s, and fifty-four include the 1800s to early 1900s. One early age range, AD 791 to 1341, is discounted by Kirch and Clark (1983) as anomalous. The results indicate initial use of the area in the 1200s to 1300s followed by a rapid increase between the 1400s and 1500s. The most intensive use dates to between the 1600s to early 1900s.

The project area lies within Field Complex 2 of the Waimea Field System (Newman 1970; Clark and Kirch 1983, Clark 1981, 1987). Clark (1987) proposed a settlement pattern model for the Kawaihae-Waimea region that consists of four zones as follows:

Coastal Zone — Extends from the coast to between 200 m and 400 m inland with most sites below 30-45 m (98-148 ft) elevation. The Coastal Zone is subdivided into shoreline and inland sub-zones. Subsistence activity had a marine exploitation emphasis including fishing, collecting, and salt making. Agricultural crops included coconut, sweet potato, gourds, and other medicinal, utilitarian, and food plants. Archaeological features include "residential structures, community-oriented structures, burial monuments, agricultural features, military features [recent], and miscellaneous" (1987:247). Habitation sites include single use sites, extended and recurrent occupations, and permanently occupied sites. Habitation features include small walled shelters, caves, overhangs, terraces, platforms, and enclosures. The more intensively occupied habitation sites are clustered in neighborhoods sometimes larger wards.

Intermediate Zone — Extends from the Coastal Zone to between 7.3 and 9.7 km inland at approximately 585 m (1,919 ft) elevation. Subsistence activity limited to small scale seasonal cultivation of alluvial flats near drainages and bird catching. Archaeological features include short-term occupation sites including midden scatters, fireplaces, small walled shelters, caves, and overhangs, which are typically situated near drainages.

Kula Zone — Extends from the Intermediate Zone to between 7.3 and 9.7 km inland. It ranges in elevation from 585 m to 830 m (1,919-2,722 ft) in elevation, with small sections extending to as much as 975 m (3,198 ft) elevation. Subsistence activity is dominated by agriculture. The zone is divided into two primary sub-zones based on the nature of cultivation. Sub-zone 1 is defined by the presence of formal fields mound complexes, small terraces, modified outcrops, and animal and garden enclosures. Sub-zone 2 is characterized by the absence of formal fields and limited to planting swales, clusters of mounds, and modified outcrops. Irrigation ditches occur in both sub-zones. Crops included sweet potatoes, dry-land taro, gourds, and *wauke*. Habitation sites include single use sites, extended and recurrent occupations, and permanently occupied sites. Habitation features include small walled shelters, caves, overhangs, terraces, platforms, and enclosures. The more intensively occupied habitation sites are clustered in neighborhoods sometimes larger wards. Burial features are also present.

Wilderness Zone — Zone extends inland from the *Kula* Zone to the mountain tops. The zone is divided into two sub-zones. Sub-zone 1 consists of areas that were exploited for a variety of resources including, wood, bark, birds, wild plants foods, fine-grained basalt for tool manufacture. Sub-zone 2 consists of the highest elevation areas that were not economically exploited and largely untouched except for some religious activity.

PROJECT EXPECTATIONS

Based on historical documentary evidence and previous archaeological work, prehistoric sites in the project area should include extensive agricultural features including irrigation ditches, formal fields, mounds, swales, modified outcrops, and small terraces. Habitation, sites, burials, and small ritual feature may also be present. Habitation sites should consist of temporary and permanent habitations (walled shelters, platforms, terraces and enclosures). Prehistoric sites would be expected to date no earlier than the 1200-1300s with most post-dating the 1600-1800s. Historic sites, except WWII military training features, primarily should be limited to ranching and farming features with scattered habitations. Ranch-related features should be represented by roads and cattle walls and pens. The military training features should be represented by small fortifications such as low C-shaped enclosures and alignments.

FINDINGS

The survey identified three sites with 13 features (*Figure 12*). The sites consist of a portion of a previously identified site (Site 22632), and two newly identified sites. Site 22632 is a large agricultural complex comprised of 700 features noted by Haun et al. (2002) during a survey of an overlapping parcel. The portion of this site within the current project area contains 11 features. The two remaining sites consist of an irrigation ditch (Site 23312) and a concrete foundation located within Keanniomano Stream (Site 23313). The sites are described below.

Site 22632

Site 22632 is a complex of 700 agricultural features previously identified by Haun et al. (2002) during a survey within the Land of Lalamilo. The southern portion of the current project area, on the south side of Kawaihae Road and east of Keanniomano Stream, encompasses a portion of the area surveyed by Haun et al. (2002). Site 22632 is comprised of 368 terraces and field boundaries, 280 agricultural clearing piles, 21 irrigation ditches, 26 walls, three enclosures and two pond fields. These features were interpreted as agricultural elements based on their formal type, informal construction, and lack of habitation debris (2002:43).

The survey of the current parcel identified 11 of the 700 features documented by Haun et al. (2002; see *Figure 12*). The features consist of seven soil terraces (Features XI, XN, XO, XP, XQ, XS, and XU), two irrigation ditches (Features TS and XR) ,and two field boundaries (Feature XT and XV). Of these 11 features, only two (Features XT and XV) are located entirely within the current project area. The nine remaining features extend out of the project area to the south and southeast. No cultural remains were found in association with any of the Site 22632 features. The features of this complex within the project area are altered and in fair condition. The 11 features are described below.

At the time of the current survey, vegetation within the portion of the project area containing Site 22632 consisted of thick grass. As these features consist of low soil structures or excavations, it was difficult to obtain clear photographs depicting the extent of this agricultural system. Haun et al.'s survey was conducted during a dry period when ground cover was minimal. *Figure 13* was taken during this earlier survey from a low ridge overlooking the current project area.

Feature TS is a shallow irrigation ditch located in the southwestern corner of the parcel. According to Haun et al. (2002:57), this ditch has an overall length of 254.3 m. The majority of the ditch is oriented in a roughly north-south direction, though the portion within the project area is oriented in a northwest by southeasterly direction. The portion of Feature TS within the project area is 74.0 m in length, 1.8 m in width and 0.25 to 0.4 m in depth. The northwestern end of the ditch terminates to the southeast of Keanniomano Stream, but likely was originally fed by this stream. The portion of the ditch outside the parcel connects to a series of other ditches that extend through Haun et al.'s project area, eventually emptying into Waikoloa Stream.

Feature XI is a terrace located 24.0 m south-southwest of Feature TS. Haun et al. (2002:C-6) indicate that the terrace is 72.3 m long, although only 28.0 m of the terrace is located within the project area. The terrace is 4.1 m in width, with an upslope height of 0.1 m above ground surface, and a downslope height of 0.5 m. This terrace forms the boundary of two agricultural fields defined by Haun et al. (2002). Field 300 is 2,506.1 sq m in area and is bordered by Feature XI on the downslope side and Feature XN (discussed below) on the upslope side (Haun et al. 2002:C-14). The Feature TS ditch extends through this field in a northwest by southeast direction. Field 301 is 646.8 sq m in area and is bordered by Feature XH (located outside the project area) on the downslope side and by Feature XI on the upslope side.

Feature XN is a terrace located 5.5 to 6.5 m northeast of Feature TS. The terrace is 70.1 m long, though only 61.0 m is located within the project area. The terrace is 4.0 m wide, 0.21 m in height on the upslope side and 0.7 m in height on the downslope side. As stated above, this terrace forms the upslope

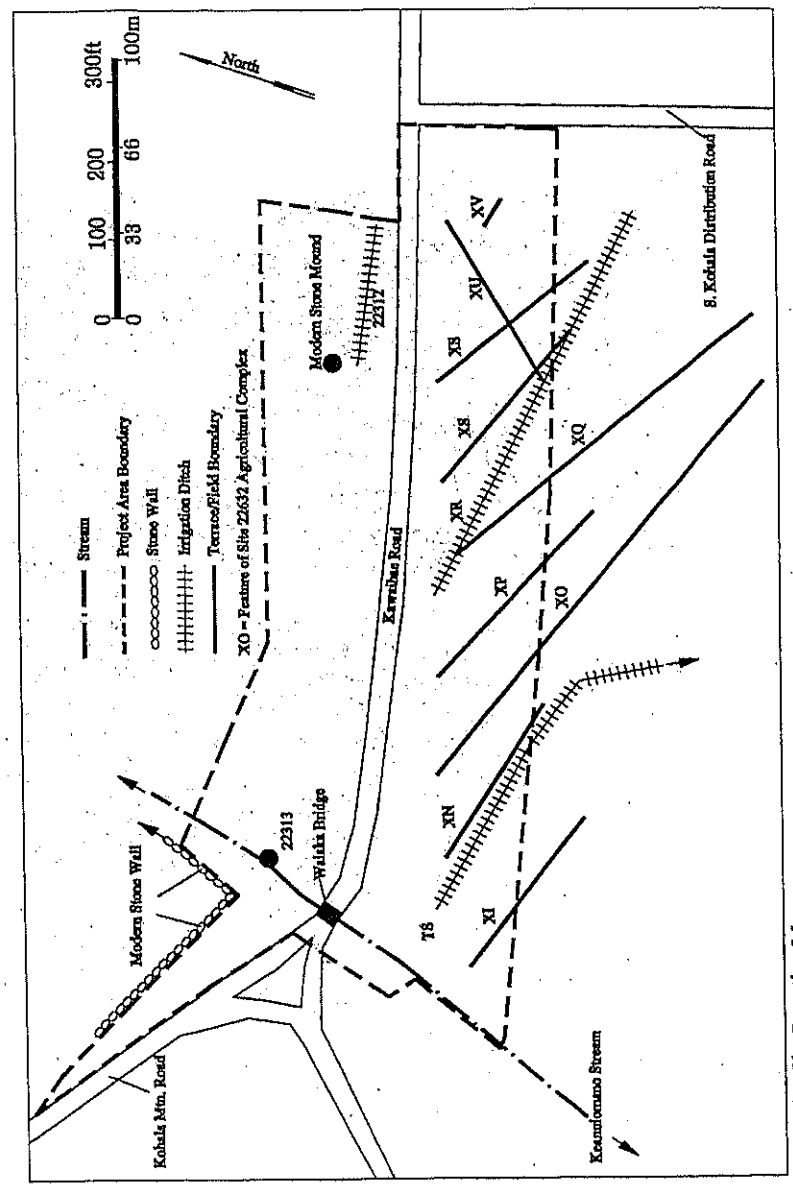

Figure 12. Site Location Map

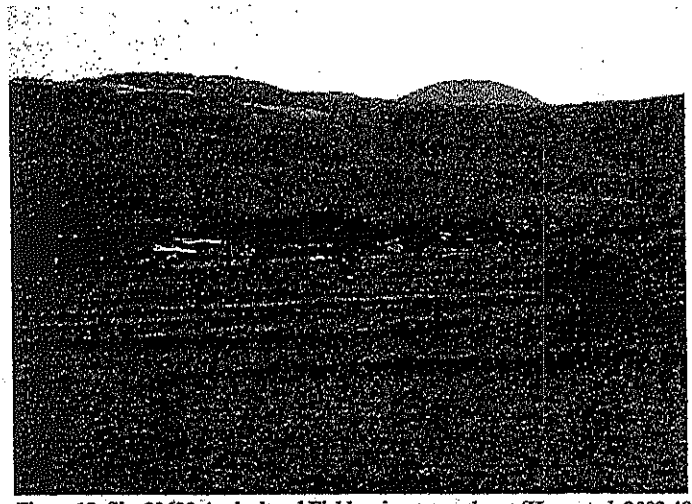

Figure 13. Site 22632 Agricultural Fields, view to northeast (Haun et al. 2002:49)

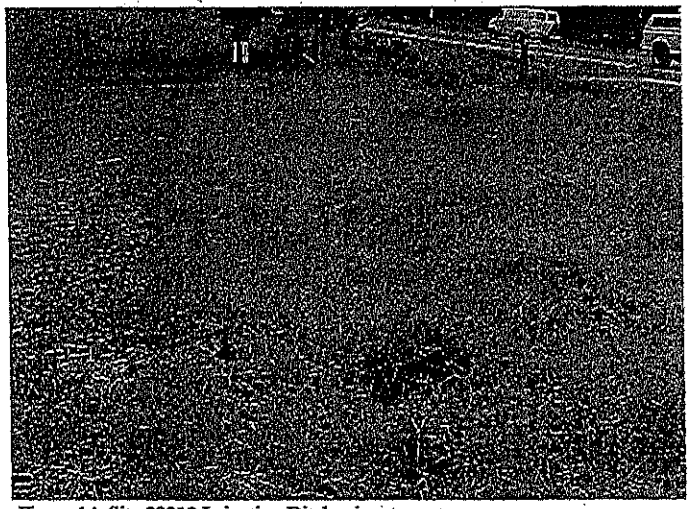

Figure 14. Site 23312 Irrigation Ditch, view to east

boundary of Field 300. It also forms the downslope side of Field 299, with the Feature XO terrace (discussed below creating the upslope boundary. Field 299 is 929.1 sq m in area (Haun et al. 2002: C-14).

Feature XO is a linear terrace situated 13.5 to 18.0 m northeast of Feature XN. This terrace is 197.5 m in length, with only 59.2 m situated within the project area. Feature XO is 3.5 m in width, 0.08 m in height on the upslope side and 0.65 m on the downslope side. Along with forming the upslope boundary of Field 299, Feature XO forms the downslope boundary of Field 298 with Feature XP delineating the upslope side. Haun et al. indicates that Field 298 encompasses an area of 2,095.5 sq m (2002: C-14).

Feature XP is a terrace situated 16.5 to 22.0 m northeast of Feature XO. The overall length of Feature XP is 87.7 m, although only 61.0 m of the terrace is located within the project area. The terrace is 2.75 m in width, 0.25 m in height on the upslope side and 0.72 m on the downslope side. Feature XP forms the downslope boundary of Field 297, as well as the upslope boundary of Field 298. Field 297 is 1,643.7 sq m in area (Haun et al. 2002: C-14).

Feature XQ is a terrace located 19.5 to 25.0 m northeast of Feature XP. Haun et al. (2002:C-6) indicate that the terrace is 146.6 m long, however only 46.3 m of the feature are within the project area. The terrace is 3.2 m wide with a downslope height of 0.35 m. The upslope side of the feature is level with the surrounding ground surface. This terrace forms the downslope boundary of two fields, though only one of the fields is within the project area. Field 294 is 1,722.2 sq m in area, with Feature XQ located on the downslope side and Feature XS situated on the upslope side (Haun et al. 2002: C-14). The Feature XR ditch, discussed below, extends across the surface of Field 294. The second field (Field 295) is situated south of the project area boundary, encompassing an area of 1,820.5 sq m (Haun and Henry 2002: C-14). Feature XQ also forms the downslope side of this field, with Feature XS delineating the upslope side (see *Figure 11* in Haun et al. 2002).

Feature XR is an irrigation ditch located on the northern side of Feature XQ. The ditch has an overall length of 167.2 m, although only 99.0 m is within the current project area. The western end of the trench is located 10.0 m south of Kawaihae Road. The trench is oriented perpendicularly to Keanuiomano Stream and it is likely that the trench was used to channel water from the stream into the agricultural fields. Feature XR is 3.5 m in width and 0.4 to 0.65 m in depth.

Feature XS is a terrace situated 25.0 to 38.0 m northeast of Feature XQ. The majority of the terrace is located within the project area (55.5 m), although Haun et al. indicate that it extends an additional 21.6 m to the southeast. The terrace is 3.5 m in width, 0.15 m in height on the upslope side and 0.65 m on the downslope side. Feature XS forms the downslope boundary of two agricultural fields (Fields 292 and 293) divided by a field boundary (Feature XT). Both of these fields are bordered on the upslope side by the Feature XT terrace, discussed below. Field 292 has an area of 550.0 sq m and Field 293 is 1,067.9 sq m (Haun et al. 2002: C-14).

Feature XT is a soil field boundary that bisects the Feature XS and XU terraces. This feature is situated entirely within the current project area, with an overall length of 71.5 m. The field boundary is 1.7 m in width and 0.2 to 0.41 m in height. Feature XT functions to subdivide this area into four agricultural fields (Fields 290- 293).

Feature XU is a terrace located 15.5 to 25.0 m northeast of Feature XS. Haun et al. indicate that this terrace is 73.8 m in length (2002: C-6), although only 57.3 m of the feature are located within the project area. The feature is 3.5 m in width, 0.45 m in height on the upslope side and 0.75 m on the downslope side. Feature XU delineates the downslope side of two agricultural fields (Fields 290 and 291). Field 290 is 1,121.2 sq m in area, and is bordered on the upslope side by Feature XV, and on the northwestern side by the Feature XT field boundary. Field 291 is 1,660.0 sq m in size. The upslope side of this field is bordered by the southern side of Kawaihae Road, but was likely bordered by a terrace prior to the development of the road.

Feature XV is a 12.2 m long section of field boundary located in the southeastern portion of the project area. Though oriented parallel to the terraces in the area, Feature XV is situated in a very level area and does not appear to have retained any soil. The feature is 1.0 m wide and 0.3 to 0.5 m in height.

Site 23312

Site 23312 is a shallow ditch located on the north side of Kawaihae Road, in the northeast corner of the project area. The ditch is 55.5 m in length (east-west), 1.1 to 1.3 m in width and 0.25 to 0.6 m in depth (*Figure 14*). The ditch is oriented roughly parallel to the Feature TS and XR ditches of the Site 26362 complex, and is oriented perpendicularly to Keanuiomano Stream (see *Figure 12*). The proximity of this ditch to the Site 22632 agricultural features in the area suggests that Site 23312 functioned to divert water from the stream into the agricultural fields. Road construction and ranching activity in this area has likely destroyed the western portion of this ditch, as well as the northwestern extents of the Features XP, XQ, XS and XU terraces, which potentially extended into the northern portion of the project area. The site is altered and in fair condition.

Site 23313

Site 23313 is a concrete foundation located within the Keanuiomano Stream drainage, on the eastern side of the stream. The site is situated 38.5 m upstream to the north from Waiaka Bridge. The foundation consists of two concrete slabs and a concrete curb located on the eastern side of the stream (*Figures 15* and *16*). The main slab is 4.18 m long (east-west) and 1.25 m wide. The western portion of the slab is built on a bedrock outcrop situated adjacent to the stream, with the eastern portion constructed on the stream bank. The southern half of the slab is buried beneath a soil mound. The slab is 0.47 to 0.51 m in height on the north side.

A low, irregularly-shaped slab is located adjacent to the main slab, 0.2 m to the west. This slab has been poured onto the surface of the outcrop, possibly to level a depressed area. This slab is 0.73 m long (north-south) and 0.65 m wide. The surface of this slab is level with outcrop.

There is a rectangular-shaped curb situated adjacent to the smaller slab to the west. This curb is 1.15 m long (north-south), 0.22 m wide at the top, and 0.4 m wide at the base. The top of the curb is 0.38 m in height above the stream on the west side, and 0.21 m in height above the outcrop on the east side.

A metal bolt is imbedded in the outcrop to the north of the north of the curb. The bolt has been cut off level with the surface of the outcrop and is 0.02 m in diameter. There is a 2" galvanized metal pipe set vertically in the ground 0.7 m north of the northeastern corner of the main slab. A threaded pipe cap has been screwed onto the top of the pipe. A circular brass United States Geologic Survey benchmark is located on the top of the outcrop to the south of the site. No cultural remains were found in association with the site.

Site 23313 is unaltered and in fair condition. The nature of the slab and its location within the stream drainage suggests it potentially functioned as the foundation for a pump used to obtain water from the stream. The concrete used in the construction of the foundation is weathered and does not appear recent. However, the galvanized pipe is modern suggesting that a pump may have existed here relatively recently.

Figure 15. Site 23313 Concrete Foundation, view to east

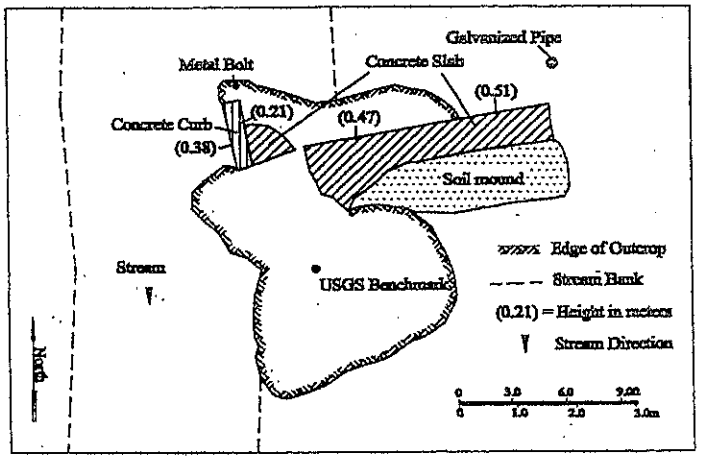

Figure 16. Site 23313 Plan Map

CONCLUSION

Discussion

The identified sites and features conform to the site/feature types expected in Clark's (1987) Kula Zone of the Waimea-Kawaihae region based on previous archaeological work and historic documentary research. The project area lies within Field Complex 2 of the Waimea Field System (Newman 1970; Clark and Kirch 1983, Clark 1981, 1987). Probable late prehistoric to historic agricultural features, consisting of terraces, field boundaries, and irrigation ditches, are distributed across much of the project area. Traditional crops included plantains, bananas, sugar cane, dryland taro, sweet potatoes and *wauke* and *mamaki* for making *tapa* based on early historic accounts and LCA testimony.

The terraces and field boundaries of Site 22632 define eleven discrete fields covering 1.57 hectares. Remnants of the irrigation system consist of three ditches with a combined length of 477 m. As noted in the Findings section, the fields and ditches extend beyond the boundary of the current project area. Clark (1983) characterized the irrigation system in a nearby area (Field System 3) as a supplemental one that provided water to crops during dry periods and not on a continuous basis. This interpretation was based on testimony in the Carter vs. Territory of Hawai'i water rights case that suggests ditch water was primarily for domestic use. Crops only were irrigated when excess water was available or when rainfall was insufficient.

Only two of the five irrigation subsystems documented by Haun et al. (2002) channeled water close to habitation sites and all of the subsystems flow through fields. This pattern suggests that providing water for domestic purposes was not the primary function of the ditch systems, but would not preclude a supplemental, as opposed to continuous, irrigation regime. It is possible that the importance of water for domestic use increased in the late 1800s to early 1900s because of increased aridity resulting from deforestation caused by timber harvesting, agricultural clearing, and pasture improvement. The recollections of most of the individuals who testified in the water rights case were limited to the late 1800s and early 1900s.

The extensive nature of the irrigation system suggests that its construction was a large scale communal effort that could only have been organized by chiefly authority. The system was probably intended to increase agricultural production initially to support military campaigns as suggested by Barrere (*in* Clark & Kirch 1983) and later foreign trade.

The combined evidence from radiocarbon dating, artifact assemblages, and historic documentary research presented by Haun et al. (2002) documents traditional Hawaiian utilization of the project area vicinity beginning as early as the 1500s. This use continued until at least the mid-1800s. The Site 23313 foundation probably dates to the 1900s and probably served as a foundation for a pump. Ranching-related infrastructure including wire fences documents the longstanding and current use of the area for grazing.

Significance Assessments

Pursuant to DLNR (1998) Chapter 275-6 (d), the initial significance assessments provided herein are not final until concurrence from the DLNR has been obtained. Sites identified and relocated during the survey are assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DLNR 1998: Chap 275). 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:

> Criterion "a". Be associated with events that have made an important contribution to the broad patterns of our history;
>
> Criterion "b". Be associated with the lives of persons important in our past;

> 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;
>
> Criterion "d". Have yielded, or is likely to yield, information important for research on prehistory or history; and
>
> 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, all three sites are assessed as significant under Criterion "d". The sites have yielded information important for understanding late prehistoric to historic land use in the project area. Site 22632 was additionally assessed by Haun et al. (2002) as significant under Criterion "c" as a well-preserved example an agricultural field complex. The field complex also assessed as significant under Criterion "a" because it is associated with the broad pattern of traditional and early historic agricultural intensification in Hawaii.

Recommended Treatments

The mapping, written descriptions, and photography at Site 23313 adequately document it and no further work or preservation is recommended. The remaining sites retain the potential to yield information important for understanding prehistoric and historic land use. The remaining two sites are recommended for data recovery if the sites are to be impacted by the proposed road improvements. The plan for data recovery would be detailed in a Data Recovery Plan prepared for DLNR-SHPD review and approval.

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Appendix J

Pre-Assessment Consultation Letters

LINDA LINGLE
GOVERNOR
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KAULANA H. R. PARK
CHAIRMAN
HAWAIIAN HOMES COMMISSION

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TF

September 1, 2010

SEP 08 2010

Ms. Tracy Fukuda
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
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Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road, Waiaka Bridge Replacement and
Realignment of Approaches
Project No. AMTRK-01-99
Lālāmilo, South Kohala, Island of Hawai'i

Aloha Ms. Fukuda,

Thank you for the opportunity to provide pre-assessment comments prior to the Draft Environmental Assessment (DEA) for the Kawaihae Road and Waiaka Bridge Replacement and Realignment of Approaches project. The Department of Hawaiian Home Lands (DHHL) owns approximately 250 acres in Lālāmilo that is adjacent to the proposed project.

As adjacent landowners, engaging in our own planning process, it is our responsibility to participate and plan appropriately for the larger region. In addition, it is our priority to ensure that DHHL's plans are as consistent as possible with other plans in the area.

Please consider the following comments on your proposed project:

1. The DHHL Lālāmilo-Pu'ukapu Regional Plan, originally developed in December 2006 and last update in December 2008, identified this project as a potential road infrastructure improvement, so we are excited that the Kawaihae Road and Waiaka Bridge Replacement and Realignment of Approaches is becoming a reality in the region.

2. This project addresses a major health and safety concern for pedestrians, as well as traffic, and is integral to our Lālāmilo homestead development both current and future.
3. There are currently 34 homestead lots (Phase I of 442 total lots) in Lālāmilo that are situated near the project area. Please consider the potential impacts of construction, noise, odors, vibrations, and traffic congestion that will result from the proposed project. We recommend that the contractor take photos to document existing conditions.
4. Please consult with the Waimea Homestead Association Inc. who may have programs that will be directly affected by the proposed project.
5. If use of Hawaiian home lands is required for the project, please contact our Land Management Division at 620-9450 to request use and access.

We thank you for the opportunity to comment on the project. We will continue, as an adjacent landowner, to do what we can to assist in your planning efforts. If you have any questions, please contact Kaleo Manuel at our Planning Office at 620-9485.

Aloha and mahalo,

Kaulana H.R. Park, Chairman
Hawaiian Homes Commission

Enclosures

WILSON OKAMOTO CORPORATION
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Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6413-01
June 27, 2011

Mr. Albert "Alapaki" Nahale-a, Chairperson
State of Hawaii
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, Hawaii 96805

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Mr. Nahale-a:

Thank you for September 1, 2010 comment letter on the pre-assessment consultation for the proposed Kawaihae Road, Waiaka Bridge Replacement and Realignment Approaches Project. Our responses are in the order of your comments:

1. We acknowledge that the Department of Hawaiian Home Land's Lalamilo - Puukapu Regional Plan, December 2008 identifies the proposed project as a road infrastructure improvement.
2. The proposed project will replace Waiaka Bridge, realign the approaches to improve sight distances, and improve traffic operations at the intersection of Kawaihae Road and Kohala Mountain Road by installing a traffic signal, or construction of a roundabout. The widening of the bridge will accommodate a sidewalk and bike path.
3. Discussion on potential impacts related to construction, noise, air quality, etc. will be in the Draft Environmental Assessment (EA).
4. A pre-assessment package was mailed to the Waimea Homestead Association. We will also send the Association a copy of the forthcoming Draft EA.
5. The use of DHHL lands is anticipated during construction. State of Hawaii – Department of Transportation (HDOT) will contact your office to discuss access.

We appreciate your participation in the environmental review process.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

TF

September 9, 2010

RECEIVED
SEP 10 2010
WILSON OKAMOTO CORPORATION

Wilson Okamoto Corporation
1907 South Beretania Street
Honolulu, Hawaii 96826

Attention: Ms. Tracy Fukuda, Senior Planner

Ladies and Gentlemen:

Subject: Pre-Assessment Consultation for Environmental Assessment for Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches, Project No. AMTRK-01-00

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

Other than the comments from Commission on Water Resource Management, Division of Forestry & Wildlife, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Historic Preservation will be submitting comments through a separate letter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charlene E. Unoki
for Morris M. Atta
Acting Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 24, 2010

2010 AUG 25 PM 2:13

MEMORANDUM

TO: **DLNR Agencies:**
x 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
__Historic Preservation

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Pre-Assessment Consultation for Environmental Assessment for Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches, Project No. AMTRK-02-99
LOCATION: Island of Hawaii
APPLICANT: Wilson Okamoto Corporation on behalf of Department of Transportation

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2010.

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

Attachments

RECEIVED
LAND DIVISION
2010 SEP -1 P 2:59
DEPT. OF LAND & NATURAL RESOURCES STATE OF HAWAII

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: Lenny K. Ohye
Date: AUG 31 2010

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON

WILLIAM D. BALFOUR, JR.
SUMNER ERDMAN
NEAL S. FUJIWARA
CHIYOME L. FUKINO, M.D.
DONNA FAY K. KIYOSAKI, P.E.
LAWRENCE H. MIKE, M.D., J.D.

LENORE N. OHYE
ACTING DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

August 31, 2010

REF: Waiaka Bridge Replacement Pre-EA

TO: Morris Atta, Administrator
Land Division

FROM: Lenore N. Ohye, Acting Deputy Director
Commission on Water Resource Management

RECEIVED
SEP 10 2010
WILSON OKAMOTO CORPORATION

SUBJECT: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches, Project No. AMTRK-01-99, Lalamilo, South Kohala, Island of Hawaii

FILE NO.: NA
TMK NO.: NA

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore, all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://www.hawaii.gov/dlnr/cwrm.

Our comments related to water resources are checked off below.

☐ 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

☐ 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

☐ 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.

☐ 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EPA as having high water efficiency can be found at http://www.epa.gov/watersense/pp/index.htm.

☐ 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://hawaii.gov/dbedt/czm/initiative/lid.php.

☐ 6. We recommend the use of alternative water sources, wherever practicable.

☐ 7. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

Permits required by CWRM:
Additional information and forms are available at http://hawaii.gov/dlnr/cwrm/resources_permits.htm.

☐ 8. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water.

☐ 9. A Well Construction Permit(s) is (are) required any well construction work begins.

☐ 10. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

☐ 11. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 12. Ground water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☒ 13. A Stream Channel Alteration Permit(s) is (are) required before any alteration(s) can be made to the bed and/or banks of a stream channel.

☐ 14. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is (are) constructed or altered.

☐ 15. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☐ 16. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☒ OTHER:
If the bed and/or banks of the stream channel may need to be altered, we request that this be thoroughly discussed in the Environmental Assessment (EA) to avoid the need for a supplemental EA that may be triggered by the filing of a stream channel alteration permit application for this project.

If there are any questions, please contact Robert Chong at 587-0266.

→ NATT Seibon

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 24, 2010

MEMORANDUM

TO: **DLNR Agencies:**
x 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
__Historic Preservation

RECEIVED
LAND DIVISION
2010 SEP -7 P 3:11
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Pre-Assessment Consultation for Environmental Assessment for Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches, Project No. AMTRK-02-99
LOCATION: Island of Hawaii
APPLICANT: Wilson Okamoto Corporation on behalf of Department of Transportation

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2010.

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

Attachments

(X) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed: Paul J. Conry
Date: SEP - 3 2010
PAUL J. CONRY, ADMINISTRATOR
DIVISION OF FORESTRY AND WILDLIFE

LINDA LINGLE
GOVERNOR OF HAWAII

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

TF

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 22, 2010

Wilson Okamoto Corporation
1907 South Beretania Street Suite 400
Honolulu, Hawaii 96826

SEP 23 2010
WILSON OKAMOTO CORPORATION

Attention: Ms. Tracy Fukuda, Senior Planner

Ladies and Gentlemen:

Subject: Pre-Assessment Consultation for Environmental Assessment for Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches, Project No. AMTRK-01-00

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 Division of Aquatic Resources and Land Division-Hawaii District for their review and comment.

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

Sincerely,

Charlene Unoki
Assistant Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 24, 2010

DAR 3309

MEMORANDUM

TO: **DLNR Agencies:**
x 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
__ Historic Preservation

RECEIVED
AUG 25 2010
DLNR LAND & NATURAL RESOURCES

RECEIVED
2010 SEP 15 P 5:53
DEPT. OF LAND & NATURAL RESOURCES STATE OF HAWAII
LAND DIVISION

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Pre-Assessment Consultation for Environmental Assessment for Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches, Project No. AMTRK-02-99
LOCATION: Island of Hawaii
APPLICANT: Wilson Okamoto Corporation on behalf of Department of Transportation

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2010.

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

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed:
Date: 9/7/2010

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 24, 2010

MEMORANDUM

TO: **DLNR Agencies:**
x 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
__ Historic Preservation

RECEIVED
2010 SEP 22 A 9:50
DEPT. OF LAND & NATURAL RESOURCES STATE OF HAWAII
LAND DIVISION

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Pre-Assessment Consultation for Environmental Assessment for Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches, Project No. AMTRK-02-99
LOCATION: Island of Hawaii
APPLICANT: Wilson Okamoto Corporation on behalf of Department of Transportation

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2010.

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

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed:
Date: 9.20.10

WILSON OKAMOTO CORPORATION
ENGINEERS · PLANNERS · ENVIRONMENTALISTS

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6413-01
June 27, 2011

Mr. William Aila, Chairperson
State of Hawaii
Department of Land and Natural Resources
1151 Punchbowl Street, Room 130
Honolulu, Hawaii 96813

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Mr. Aila:

Thank you for your September 9 and 22, 2010 letters. We offer the following responses in order of your comments:

Commission on Water Resource Management

We acknowledge that a Stream Channel Alteration Permit may be required prior to construction if alterations are made to the bed and/or banks of the stream channel.

Division of Forestry and Wildlife

We acknowledge you have no objections to the proposed project.

Land Division, Hawaii District

We acknowledge you have no comments to offer at this time.

Division of Aquatic Resources

We acknowledge you have no comments to offer at this time.

We appreciate your participation in the environmental review process.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii

LINDA LINGLE
GOVERNOR OF HAWAII

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

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
DOH/CWB

09003CEC.10

September 1, 2010

RECEIVED
SEP 07 2010
WILSON OKAMOTO CORPORATION

Ms. Tracy Fukuda
Senior Planner
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Ms. Fukuda:

SUBJECT: Environmental Assessment, Pre-Assessment Consultation
Waiaka Bridge Replacement and Realignment of Approaches
Keanuiomano Stream, Lalamilo, South Kohala, Island of Hawaii
Project No. AMTRK-01-99

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated August 16, 2010, requesting pre-assessment consultation and soliciting comments for the preparation of a draft Environmental Assessment (DEA) for the subject project.

Waiaka Bridge is located at the intersection of Kawaihae Road (State Route 19) and Kohala Mountain Road (State Route 250) and crosses Keanuiomano Stream about 2 miles west of Waimea in the South Kohala District on the island of Hawaii.

According to the introduction submitted with your letter of August 16, 2010, the State Department of Transportation, Highways Division (DOT-HWYS), proposal includes:

A. Replacing the existing 23 feet wide (curb to curb) and approximately 38 feet long (with a center pier column) and the 3-foot wide wooden pedestrian walkway (bolted to the north (upstream) side of the bridge) with a bridge, with a replacement bridge of "53-foot width, which would include: 12-foot travel lanes (one lane in each direction), 8-foot bike lane/shoulders, 5-foot raised sidewalks, and 4.5-foot high railings. "The approaches to the bridge will be realigned to allow a smooth transition to the existing 11-foot travel lanes.

B. Intersection improvements consider a traffic signal or roundabout at the Kawaihae Road Kohala Mountain Road intersection along with intersection reconfigurations and auxiliary lanes. The existing roadway and 11-foot lane widths beyond the approaches would remain unchanged. A total of six alternatives are being considered for realigning the approaches and intersection, and replacing the bridge..."

C. To minimize traffic impacts during construction the project proposes, depending on the selected alternative, the use of a temporary bypass bridge during construction of the replacement bridge and approaches.

The CWB has reviewed limited information submitted with your letter 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 Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. Your client, DOT-HWYS, 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. The Army Corps of Engineers should be contacted at (808) 438-9258 for this project. Pursuant to Federal Water Pollution Control Act (commonly known as the "Clean Water Act" (CWA)), Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (Emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40, Code of Federal Regulations, Section 122.2; and HAR, Chapter 11-54.

3. The DEA should discuss the potential National Pollutant Discharge Elimination System (NPDES) permitting requirements authorized under CWA, Section 402 and managed by the DOH-CWB.

   In accordance with HAR, Sections 11-55-04 and 11-55-34.05, the Director of Health may require the submittal of an individual permit application or a Notice of Intent (NOI) for general permit coverage authorized under the NPDES.

   a. An application for an NPDES individual permit is to be submitted at least 180 calendar days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at: http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

b. An NOI to be covered by an NPDES general permit is to be submitted at least 30 calendar days before the commencement of the respective activity. A separate NOI is needed for coverage under each NPDES general permit. 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.

   i. 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. **An NPDES permit is required before the commencement of the construction activities.** [HAR, Chapter 11-55, Appendix C]

   ii. Discharges of hydrotesting water. [HAR, Chapter 11-55, Appendix F]

   iii. Discharges of construction dewatering effluent. [HAR, Chapter 11-55, Appendix G]

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the 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 586-4309.

Sincerely,

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

EC:ml

c: Chief, DEHP, Hawaii [via fax (808) 974-6000 only]
Mr. Clifford Furukado, CWB-Hilo, Hawaii District Health Office [via e-mail only]
Mr. Neil Mukai, CWB-Kona, Hawaii District Health Office [via e-mail only]]
DOH-EPO #I-3309 [via e-mail only]

WILSON OKAMOTO CORPORATION
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Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6413-01
June 27, 2011

Mr. Alec Wong, P.E., Division Chief
State of Hawaii
Department of Health
Clean Water Branch
919 Ala Moana Boulevard, Rm. 300
Honolulu, Hawaii 96814-4920

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Mr. Wong:

Thank you for September 1, 2010 letter (09003CEC.10). We offer the following responses in the respective order of your comments.

1. The Draft EA will state that the proposed project will comply with HAR, Chapters 11-54 and 11-55, as applicable.
2. The Army Corps of Engineers will be consulted with and a 401 Water Quality Certification (WQC) may be needed for work which may result in any discharge into navigable waters.
3. The Draft EA will state that the proposed action will require an NPDES permit for Construction Storm Water Activities.
4. The Draft EA will state 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.

We appreciate your participation in the environmental review process.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii

William P. Kenoi
Mayor

Darryl J. Oliveira
Fire Chief

Glen P. I. Honda
Deputy Fire Chief

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

August 26, 2010

RECEIVED
SEP 14 2010

Mr. Tracy Fukuda
Wilson Okamoto Coporation
1907 South Beretania Street
Artesian Plaza Suite 400
Honolulu, Hawaii 96826

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
PROJECT: KAWAIHAE ROAD, WAIAKA BRIDGE REPLACEMENT & REALIGNMENT OF APPROACHES, PROJECT NO. AMTRK-01-99
LALAMILO, SOUTH KOHALA, HAWAII

In regards to the above-mentioned draft 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%)

"(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

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www.wilsonokamoto.com

6413-01
June 27, 2011

Chief Darryl Oliveira, Fire Chief
County of Hawaii
Fire Department
25 Aupuni Street
Hilo, Hawaii 96720

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Chief Oliveira:

Thank you for your August 26, 2010 letter. The proposed action shall be in accordance with UFC Section 10.207. Plans will be submitted to the Department for review and comment.

We appreciate your participation in the environmental review process.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii

William P. Kenoi
Mayor

William T. Takaba
Managing Director

Ivan M. Torigoe
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

August 30, 2010

RECEIVED
SEP 01 2010
WILSON OKAMOTO CORPORATION

Wilson Okamoto Corporation
1907 South Beretania
Honolulu, HI 96826

Attention: Ms. Tracy Fukuda, Senior Planner

RE: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches
Project No. AMTRK-01-99
Lalamilo, So. Kohala, Island of Hawai'i

Dear Ms. Fukuda,

We have no comments to offer on this project.

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

Sincerely,

Ivan M. Torigoe
DEPUTY DIRECTOR

12691R

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6413-01
June 27, 2011

Mr. Ivan M. Torigoe, Deputy Director
County of Hawaii
Environmental Management Department
25 Aupuni Street
Hilo, Hawaii 96720

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Mr. Torigoe:

Thank you for your August 30, 2010 letter. We acknowledge you have no comments to offer at this time.

We appreciate your participation in the environmental review process.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii

William P. Kenoi
Mayor

BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

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

September 2, 2010

Ms. Tracy Fukuda, Senior Planner
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawai'i 96826

RECEIVED
SEP 09 2010
WILSON OKAMOTO CORPORATION

Dear Ms. Fukuda:

SUBJECT: Early Consultation for Draft Environmental Assessment
Project: Kawaihae Road, Wai'aka Bridge Replacement and Realignment of Approaches
Location: Lālāmilo, South Kohala, Hawai'i

Thank you for your letter dated August 16, 2010 requesting comments from this office regarding the preparation of a Draft Environmental Assessment (DEA).

According to the Project Location Map provided, the surrounding properties are zoned A-5a (Agricultural-5 acre minimum lot size), A-1a (Agricultural-1 acre minimum lot size), and RS-10 (Single-Family Residential 10,000 square foot minimum lot size). The properties are situated within the State Land Use Agricultural and Urban districts. The subject area is not within the Special Management Area (SMA).

The proposed project will replace the existing Wai'aka Bridge and realign the bridge approaches to improve the safety and operations at and on the bridge. Additionally, the intersection of Kawaihae Road and Kohala Mountain Road will be considered for this project for the purpose of improving safety and operations at the intersection due to the transportation interconnectivity of the bridge and the intersection. The DEA should include discussion as to the disposal of the replaced structure(s). The demolition of the structures and the disposal of waste material are subject to the requirements of Chapter 20 - Refuse, of the Hawai'i County Code and may require a Landfill Disposal Permit from the Department of Environmental Management.

The South Kohala Community Development Plan (CDP), adopted by Ordinance No. 08-159 effective on November 20, 2008, lists the Wai'aka Bridge and Intersection Replacement Project as a current and future road project. Please note that at the time of adoption of the South Kohala CDP, the public preferred a new alignment mauka of the existing bridge location, with provisions for pedestrian, bicycle, and equestrian use. In addition, one possibility that received general community support was to retain the current bridge and use it solely for non-vehicular traffic.

Please also note that one of the possible alternative alignments for the Waimea Trails and Greenways Project (Ke Ala Kahakai O Waimea) is located near the Wai'aka Bridge. Please consider this project and any impacts the bridge replacement may have.

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

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

BJ LEITHEAD TODD
Planning Director

BJM:cs
P:\wpwin60\Bethany\EA-EIS Review\preconsultdrafteaWaiakabridgereplacement.doc

WILSON OKAMOTO CORPORATION
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6413-01
June 27, 2011

Ms. Bobby Jean Leithead-Todd, Director
County of Hawaii
Planning Department
101 Pauahi Street, Suite 3
Hilo, Hawaii 96720

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Ms. Leithead-Todd:

Thank you for your September 2, 2010 letter. We offer the following responses in the respective order of our comments.

1. We acknowledge that the project site is surrounded by properties zoned A-5a (Agricultural-5 acre minimum lost size), A-1a (Agricultural-1 acre minimum lot size), and RS-10 (Single-Family Residential 10,000 square feet minimum lots size).
2. We acknowledge that the project site is within the State Land Use Agricultural and Urban districts.
3. We acknowledge that the proposed project is not within the Special Management Area (SMA).
4. A discussion on the disposal of the existing bridge will be included and meet Chapter 20 Refuse, of the Hawaii County Code and may require a landfill disposal permit from the Department of Environmental Management.
5. We acknowledge that the proposed action is included in the South Kohala Community Development Plan. The proposed action includes 8-foot bike route/shoulder and 5-foot raised sidewalk in both directions. If a new bridge is constructed, Hawaii State – Department of Transportation (HDOT) will consider keeping the existing bridge for pedestrian traffic.
6. We acknowledge that the Waimea Trails and Greenways Project (Ke Ala Kahakai O Waimea) has proposed a trail south of Kawaihae Road and Waiaka Bridge. To the extent that construction work associated with the Waimea Trails and Greenways Project may coincide with the proposed project, the HDOT will communicate and coordinate with appropriate agencies to minimize construction impacts.

We appreciate your participation in the environmental review process.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii

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 25, 2010

RECEIVED
SEP 03 2010
WILSON OKAMOTO CORPORATION

Mr. Tracy Fukuda, Senior Planner
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawai'i 96826

RE: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches
Project No. AMTRK-01-99
Lalamilo, South Kohala, Island of Hawai'i

Dear Ms. Fukuda:

The above-referenced Environmental Assessment Pre-Assessment Consultation has been reviewed, and we have no comments to offer at this time.

Captain James Sanborn, Commander of the South Kohala District, or his representative will be in attendance at the public informational meeting scheduled for December 15, 2010, at 5:30 p.m., at the Waimea Elementary School.

We anticipate submitting any comments shortly after this meeting. If you have any concerns, you may contact Captain Sanborn at (808)887-3080.

Sincerely,

HARRY S. KUBOJIRI
POLICE CHIEF

HENRY J. TAVARES JR.
ASSISTANT CHIEF
AREA II OPERATIONS

JNS:dmv
RS0901063

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6413-01
June 27, 2011

Chief Harry S. Kubojiri, Chief of Police
County of Hawaii
Police Department
349 Kapiolani Street
Hilo, Hawaii 96720

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Chief Kubojiri:

Thank you for your August 25, 2010 letter. We acknowledge that you have no comments to offer at this time. Three public meetings have been conducted since 2009 and another future meeting has not been determined. We will notify you of any future meetings.

We appreciate your participation in the environmental review process.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii

[illegible] Street
[illegible], Hawaii 96706
Tel 808-539-2498
Fax 808-526-6436

OCEANIC
TIME WARNER
CABLE

RECEIVED
AUG 2 4 2010
WILSON OKAMOTO CORPORATION

August 20, 2010

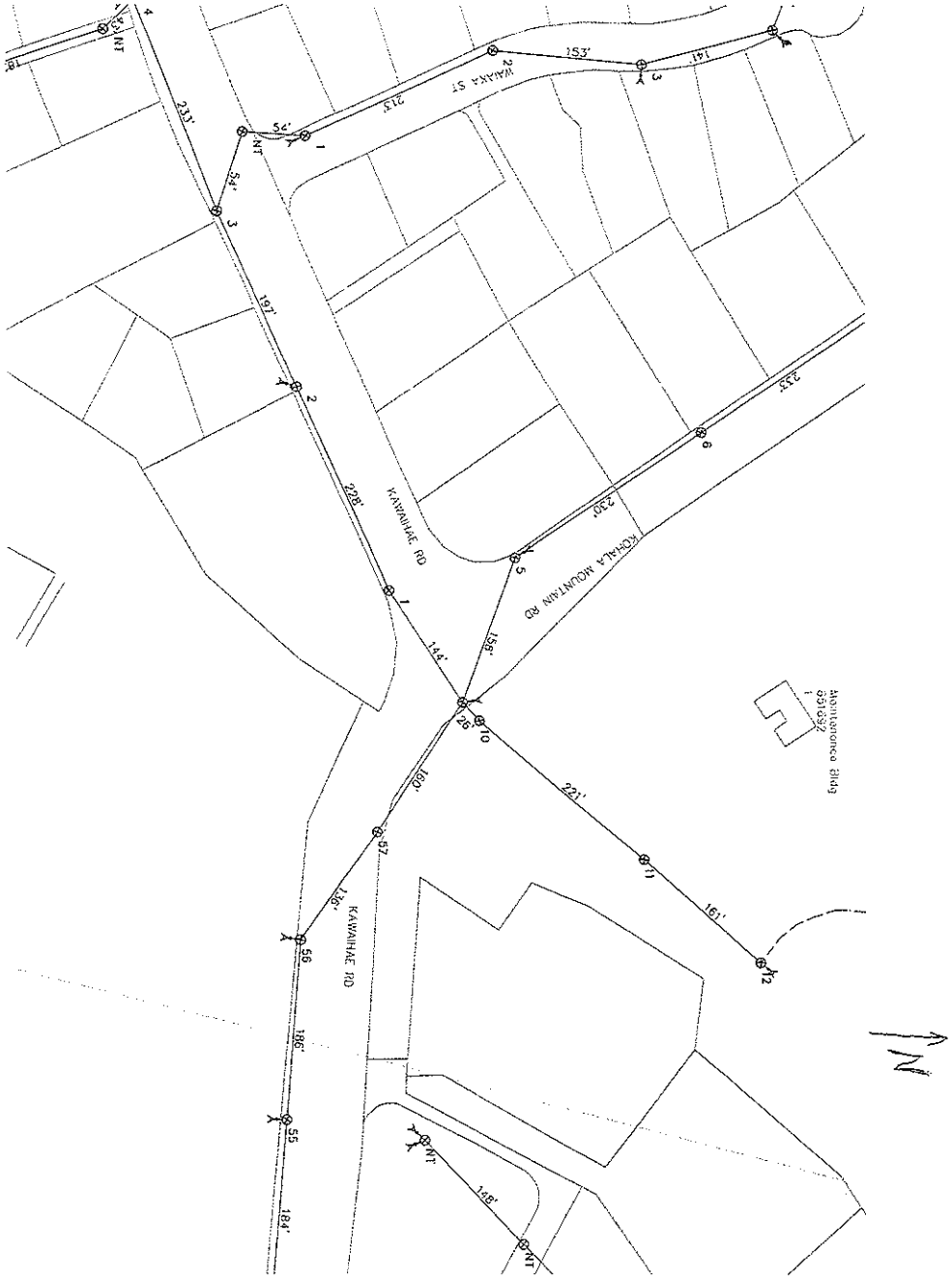
Tracey Fukuda, Senior Planner
Wilson Okamoto Corporation
1907 South Beratania Street
Artesian Plaza Suite 400
Honolulu HI 96826

Dear Tracey,
Thanks you for the notification regarding the replacement of the Waiaka Bridge and the associated widening of the Kawaihae roadway. Oceanic has fiber and coaxial cables on the poles crossing through that intersection. The poles are owned by HELCO and Hawaii Telecom. When and if the poles are relocated we will be obliged to move and if necessary rebuild our lines. This may trigger a Utility relocation agreement at that point.

I realize this is very preliminary and have enclosed a site plan showing the poles we are attached to. These should be the identical poles that HELCO and HTCOM will submit to you as the owners. There may be other poles but my plan shows only the poles Oceanic TWC is contacting. Hope this will be useful. Please keep us informed of the future planning as it progresses.

Aloha,
Robert Moeller
Robert Moeller
Construction Engineer
Oceanic Time Warner Cable

A Division of Time Warner Entertainment Company, L.P.



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6413-01
June 27, 2011

Mr. Robert Moeller, Construction Manager
Oceanic Time Warner Cable
73-4876 Kanalani Street
Kailua-Kona, Hawaii 96740

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Mr. Moeller:

Thank you for your August 20, 2010 letter. Thank you for providing information on existing fiber and coaxial cables located along the project corridor. This information will be included in the Draft EA.

We appreciate your participation in the environmental review process.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii

South Kohala Traffic Safety Committee
P.O. Box 383375
Waikoloa, HI 96738

TF

RECEIVED
AUG 30 2010
WILSON OKAMOTO CORPORATION

Tracy Fukuda
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

August 28, 2010

Ref: Comment on EA for Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches, Lalamilo . AMTRK-01-99

In response to your August 16, 2010 letter requesting comments on this project we offer the following. The South Kohala Traffic Safety Committee (SKTSC) attended the December 15, 2009 public meeting regarding this project hosted by HDOT and your firm. The membership following that meeting, approved the comments found in attached SKTSC letter dated January 4, 2010 for your consideration in drafting the EA.

Since the December 15, 2010 public meeting, SKTSC has not been informed about the progress or narrowing of the list of 6 alternate designs presented that night. Hopefully our comments in the attached letter are considered and helpful. Please consider another public meeting to provide new information on this very important safety improvement project. We invite you to attend one of out future monthly meetings to inform and update the community regarding current proposed design and other details about the project.

Please provide data and details at one of our future meetings (2nd Tuesday every month, 4:00 PM at the Waimea Civic Center Conference Room) or by mail. We can assist your staff with the logistics of a meeting. I can be contacted at 883-2918 or whao@hawaii.rr.com .

Thank you for this opportunity to comment. We request an electronic copy of the draft EA upon report completion.

Sincerely,

Mike Price-Chair South Kohala Traffic Safety Committee

CC: SKTSC
Ken Tatsuguchi – HDOT Planning Branch
Stanley Tamura – District Engineer HDOT
State Senator Josh Green
State Senator Dwight Takamine
State Representative Cindy Evans
Linda Chinn – DHHL Lands Management Division Administrator
Mayor William Kenoi – Hawaii County
Warren Lee – Director Hawaii County Department of Public Works
Councilman Pete Hoffmann – Hawaii County Council

South Kohala Traffic Safety Committee
P.O. Box 383375
Waikoloa, HI 96738

January 4, 2009

Ms. Dina Lau
State of Hawaii Department of Transportation
Highways Division, Planning Branch
869 Punchbowl Street, Room 301
Honolulu, HI 96813

RE: Waiaka Bridge Replacement and Realignment of Approaches Project #AMTRK-01-99

Dear Ms. Lau;

At past meetings of South Kohala Traffic Safety Committee safety and other concerns related to this project were discussed by the membership. The Committee supports this project as a needed safety improvement. The Committee has reviewed the 4 proposed configurations presented at the December 15, 2009 Public Information Meeting. At this time the Committee has not decided which configuration is preferred.

The following items are requested as additions to the final design of the configuration selected;

1. A Park & Ride/Ride Share parking area needs to be incorporated in the design. This parking area should be located near the intersection of Kohala Mountain Road and Kawaihae Road. The parking area needs to be designed for access by County buses (HELON), school buses and for a future bus shelter. This area could then be used as a pick up/drop off for students and commuters that then could ride a school shuttle or the Waimea Shuttle into town center. In town congestion would be reduced.

2. Along with a Park & Ride/Ride Share parking area, pedestrian cross walks need to be provided at the intersection. Due to the speed of vehicle travel there needs to be pedestrian protection islands between the opposing lanes for safe crossing of all users

3. The best sight distance for all lanes should be a priority in selection of the final configuration.

4. Additional right turn lane from Kawaihae to the Kohala Mountain Road needs consideration.

5. The ¼ mile between the Bridge and the access road to the County/State Maintenance Yards is a concern to the community. This is outside the scope of the present project, but the engineering effort encompasses looking at present and projected future traffic flow. There are already 2 roads intersecting Kawaihae Road in this section. Lalamilo DHHL Development will be building another approved intersection in the future. Hawai'i Preparatory Academy has plans for another intersection. Prior discussions with the DOT Director revealed that the County has planning responsibility for future access to Kawaihae Road adjacent to Waiaka Bridge for all properties. State DOT volunteered participation as one of the stakeholders in a County planning process. Unless there is an approved basic design developed with collaboration between the County and State designating the number, location, established ROW and traffic control for future access to this area of road, the new bridge will be adjacent to the future traffic bottleneck on Kawaihae Road. Without good planning there will be increased risk of traffic accidents. Currently you are not considered a long term resident in the area until you have had a rear end collision turning into the Solid Waste Transfer Station road. This safety risk will only increase in the future unless there is a good traffic plan in place.

We appreciate the opportunity to comment on this long awaited project and hope you will keep South Kohala Traffic Safety Committee informed as the project progresses. Again, the Committee strongly supports this project. Hopefully the end result will be a well designed, safe bridge and roadway that serves present and future needs. Mahalo for your consideration of these comments and your efforts organizing the recent meeting.

Sincerely,

Mike Price-Chair South Kohala Traffic Safety Committee

CC: Mr. Ken Tatsuguchi-Planning Branch, Hawaii DOT Highways Division
State Representative Cindy Evans
William Kenoi-Hawaii County Mayor
Pete Hoffmann-Hawaii County District 9 Councilman
Stanley Tamura-District Engineer DOT Highways Division
Warren Lee-Director County Department of Public Works

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6413-01
June 27, 2011

Mr. Mike Price, Chair
South Kohala Traffic Safety Committee
P.O. Box 383375
Waikoloa, Hawaii 96738

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Mr. Price:

Thank you for your letter dated August 28, 2010. Your suggestion regarding another public meeting and the State of Hawaii Department of Transportation's (HDOT) attendance at one of your future meetings has been forwarded to HDOT for their consideration. We offer the following responses in the respective order of comments offered in your letter dated January 4, 2009:

1. The purpose of the proposed action is to 1) replace the existing structurally deficient Waiaka Bridge, 2) realign approaches to improve sight distances, and 3) to improve hydraulic conditions of Keanuiomano Stream, and 4) to improve intersection operations. Funds are currently not available for a Park & Ride Share parking area at the intersection of Kawaihae Road and Kohala Mountain Road. Nevertheless, the proposed project would not preclude such a project in the future.

2. The upcoming Draft EA will include six alternatives to the proposed action. The State DOT has not determined the preferred alternative and may not do so until the Environmental Assessment (EA) process is completed. The six alternatives being considerd would not preclude crosswalks although the need for crosswalks will be determined as the preferred alternative progresses through subsequent design refinement.

3. Improvement of sight distances is an objective for all alternatives under consideration.

4. Improvement of intersection operation at Kawaihae Road and Kohala Mountain Road is also an objective for all alternatives under consideration.

5. We concur that the EA for the proposed project is limited in scope to Waiaka Bridge and the intersection of Kawaihae Road and Kohala Mountain Road. Nevertheless, HDOT takes regional and long-term perspective as the context for the proposed improvements.

We appreciate your participation in the environmental review process.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii

August 18,2010

Tracy Fukuda, Senior Planner
Wilson Okamoto Corporation
1907 S. Beretania, Ste 400
Honolulu, HI 96826

Re: Environmental Assessment Project AMTRK-01-99 Waiaka Bridge

Dear Tracy,

In your redesign of the Waiaka Bridge, please include safe accomodation for bicycles and pedestrians traveling in both directions. As much as possible approaches to the bridge should be safe for such use also.

Sincerely,

Clemson Lam

Clemson Lam

WILSON OKAMOTO CORPORATION
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6413-01
June 27, 2011

Mr. Clem Lam
Waimea Trails & Greenways
P.O. Box 1893
Kamuela, Hawaii 96743

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Mr. Lam:

Thank you for your letter dated August 18, 2010. The proposed action includes 8-foot bike route/shoulder and 5-foot raised sidewalk in both directions.

We appreciate your participation in the environmental review process.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii

MOOERS ENTERPRISES, LLC
Land Use Alternatives

Post Office Box 1101
Kamuela, Hawaii 96743
Phone (808) 880-1455
Fax (808) 880-1456
gmooers@hawaii.rr.com

September 3, 2010

RECEIVED
SEP 1 0 2010
WILSON OKAMOTO CORPORATION

Tracy Fukuda
Wilson Okamoto Corporation
1907 South Beretenia Street, Suite 400
Honolulu, Hawaii 96826

Re: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road, Waiaka Bridge Replacement and Realignment of Approaches
Project No. AMTRK-01-99
Lalamilo, South Kohala, Hawaii

Dear Ms. Fukuda:
Thank you for allowing Hawaii Preparatory Academy the opportunity to comment on the Draft Environmental Assessment (DEA) for this important project. I am the chair of the Board of Trustees' Committee on Building and Grounds and I will be taking the lead for the Academy on commenting on this DEA. We have participated in various public meetings on the proposed improvements to Waiaka Bridge and have studied the various options that have been proposed by the Department of Transportation (DOT).

As you are aware, because many of our school operations take place on land in close proximity to the intersection of Kohala Mountain Road and Kawaihae Road, the proposed improvements will impact our operations in a significant manner. Utility connections and vehicular access to our campus will be impacted by each of the design options currently considered by DOT.

The eastern approach to Waiaka Bridge is being, or will be, impacted by a number of development initiatives. Within one-quarter of a mile of the bridge is a pending intersection design for Parker Ranch; the new Department of Hawaiian Homes residential project (400+ dwellings); the South Kohala Distribution Road to the County Transfer Station, County Highways, State Highways and HELCO; the HPA access to the school's houses in Waiaka; and a proposed County by-pass from the Lalamilo Farm Lots area. It is our opinion that these developments should be considered during your environmental review so that the impacts to the various initiatives can be considered.

We look forward to working with you during your environmental review and DOT during the design and constructions of these important improvements to Waiaka Bridge. Should you have any questions or need additional information, please contact me using the contact information on my letterhead.

Sincerely,

Gregory R. Mooers
President

WILSON OKAMOTO CORPORATION

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Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

6413-01
June 27, 2011

Mr. Gregory R. Mooers, President
Mooers Enterprises, LLC
P.O. Box 1101
Kamuela, Hawaii 96743

Subject: Environmental Assessment, Pre-Assessment Consultation
Kawaihae Road - Waiaka Bridge Replacement and Realignment of Approaches,
Project No. AMTRK-01-99
Waiaka, South Kohala, Island of Hawaii

Dear Mr. Mooers:

Thank you for your letter dated September 3, 2010. We offer the following responses in the respective order of your comments:

1. The forthcoming Draft Environmental Assessment (EA) will discuss potential short-term disruption of traffic. During construction, transportation of construction materials and equipment will cause a slight increase in local traffic congestion, however, travel will be unrestricted along Kawaihae Road and Kohala Mountain Road. Once the temporary bypass bridge and detour roadway is in place, the existing Waiaka Bridge will be blocked off to both vehicular and pedestrian travel, and traffic along Kawaihae Road will be redirected to the detour roadway and bypass bridge. Therefore, while the overall traffic pattern should not be significantly altered by the proposed action, however, it is expected that there will be some periodic delays during peak traffic hours.
2. Hawaii State – Department of Transportation (HDOT) will coordinate work with the respective utility companies to minimize any potential conflicts with services to adjacent areas.
3. We acknowledge there are a number of development initiatives that may be occurring within the vicinity of Waiaka Bridge. To the extent that construction work with these initiatives may coincide with the proposed project, the HDOT will communicate and coordinate with appropriate entities to minimize cumulative construction traffic impacts.

Sincerely,

Tracy Fukuda, Senior Planner

cc: Lance Manabe, Department of Transportation, State of Hawaii
Lindsay Barnes, Jr., Hawaii Preparatory Academy

WILSON OKAMOTO
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ENGINEERS | PLANNERS | CONSULTANTS
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Honolulu, Hawaii, U.S.A. 96826 PH 808-946-2277 FX 808-946-2253