DRAFT
ENVIRONMENTAL ASSESSMENT

Ane Keohokalole Mid-Level Highway

Prepared by:

Belt Collins Hawaii Ltd.

June 2009

PROJECT SUMMARY

Project Name:	Ane Keohokalole Mid-Level Highway
Location:	North Kona, Hawai‘i
District:	North Kona
Project Site Tax Map Key:	Various (See Section 3.1)
Project Study Area:	Approximately 148 acres (the area of the 400-foot-wide, 3.0-mile-long corridor of the proposed highway and a 100-foot-wide, 900-foot-long corridor along Palani Road).
Project Site Existing Use:	Vacant undeveloped land, except for a small one half mile improved portion of the road area between Kealakehe Parkway and Puohulihuli Street.
Project Site Existing Land Use Designations:	*State Land Use:* .....Agricultural and Urban Districts *Hawai‘i County General Plan's Land Use Pattern Allocation Guide (LUPAG):* .....Urban Expansion *Hawai‘i County Zoning:* .....Agricultural (A-5a, A-200a) General Commercial (CG-7)
HRS Chapter 343 Proposing Agency:	County of Hawai‘i Department of Public Works 101 Pauahi Street, Suite 7 Hilo, Hawai‘i 96720 Contact:: Mr. Warren Lee Telephone: 808-961-8321
HRS Chapter 343 Accepting Authorities:	State of Hawai‘i Department of Transportation (HDOT) 869 Punchbowl Street, Room 509 Honolulu, HI 96813 Contact: Mr. Brennon Morioka, Director Telephone: 808- 587-2150
Anticipated Determination:	Finding of No Significant Impact

Project Site Permits/Approvals Required (not an exhaustive list):	-- National Pollutant Discharge Elimination System (NPDES) -- State of Hawai'i DOH – Underground Injection Control (UIC) permit for drainage injection. -- State of Hawai'I DBEDT – Coastal Zone Management Federal Consistency -- State of Hawai'i DLNR/SHPD – Archaeological Inventory Survey, Archaeological Mitigation Plan, and Burial Treatment Plan approvals -- HDOT - permit to perform work upon State highways for any work within the Kealakehe right of way -- Grubbing, Grading, Excavation and Stockpile Permits
EA Preparer:	Belt Collins Hawaii Ltd. 2153 North King Street, Suite 200 Honolulu, Hawai'i 96819 Contact: Ms. Lesley Matsumoto Telephone: 808-521-5361
Individuals, Community Groups, and Agencies Consulted:	(See Chapter 8)

TABLE OF CONTENTS

Acronyms and Abbreviations vii

CHAPTER ONE
INTRODUCTION

1.1 Purpose of this Document 1-1
1.2 Background 1-1
1.3 Purpose of and Need For Action 1-4
1.4 Scope of the Environmental Review 1-5

CHAPTER TWO
ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Proposed Action 2-1
2.2 No Action Alternative 2-4
2.3 Alternatives Considered But Not Evaluated Further in this EA 2-4
2.4 Summary of Potential Environmental Impacts 2-9

CHAPTER THREE
AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

3.1 Land Use 3-1
3.1.1 Affected Environment 3-1
3.1.2 Potential Impacts 3-5
3.2 Climate 3-5
3.2.1 Affected Environment 3-5
3.2.2 Potential Impacts 3-6
3.3 Air Quality 3-7
3.3.1 Affected Environment 3-7
3.3.2 Potential Impacts 3-8
3.4 Cultural Resources 3-9
3.4.1 Historic Properties 3-9
3.4.1.1 Affected Environment 3-10
3.4.1.2 Potential Impacts 3-22
3.4.2 Traditional Cultural Practices 3-26
3.4.2.1 Affected Environment 3-26
3.4.2.2 Potential Impacts 3-28
3.5 Flora and Fauna 3-29
3.5.1 Terrestrial Flora 3-29
3.5.1.1 Affected Environment 3-29
3.5.1.2 Potential Impacts 3-36
3.5.2 Terrestrial Mammals and Birds 3-36
3.5.2.1 Affected Environment 3-36

3.5.2.2 Potential Impacts 3-38
3.6 Geology, Topography, and Soils 3-39
3.6.1 Affected Environment 3-39
3.6.2 Potential Impacts 3-40
3.7 Surface Water and Drainage 3-42
3.7.1 Affected Environment 3-42
3.7.2 Potential Impacts 3-42
3.8 Groundwater and Hydrogeology 3-43
3.8.1 Affected Environment 3-43
3.8.2 Potential Impacts 3-44
3.9 Roads and Traffic 3-46
3.9.1 Affected Environment 3-50
3.9.2 Potential Impacts 3-55
3.10 Noise 3-66
3.10.1 Affected Environment 3-67
3.10.2 Potential Impacts 3-69
3.11 Natural Hazards 3-79
3.11.1 Affected Environment 3-79
3.11.2 Potential Impacts 3-81
3.12 Infrastructure 3-81
3.12.1 Utilities and Solid Waste 3-81
3.12.1.1 Affected Environment 3-81
3.12.1.2 Potential Impacts 3-81
3.12.2 Drainage 3-82
3.12.2.1 Affected Environment 3-82
3.12.2.2 Potential Impacts 3-82
3.12.3 Bicycle, Pedestrian, and Transit Facilities 3-83
3.12.3.1 Affected Environment 3-83
3.12.3.2 Potential Impacts 3-83
3.13 Visual Resources 3-83
3.13.1 Affected Environment 3-83
3.13.2 Potential Impacts 3-84
3.14 Public Services 3-84
3.14.1 Affected Environment 3-84
3.14.2 Potential Impacts 3-85
3.15 Socio-Economic Conditions 3-86
3.15.1 Affected Environment 3-86
3.15.2 Potential Impacts 3-87

CHAPTER FOUR
CUMULATIVE IMPACTS

4.1 Cumulative Impacts 4-1
4.1.1 Climate and Air Quality 4-2
4.1.2 Cultural Resources 4-3
4.1.3 Surface Water and Drainage 4-4
4.1.4 Groundwater and Hydrogeology 4-5
4.1.5 Roads and Traffic 4-5
4.1.6 Noise 4-7
4.1.7 Socio-economic Conditions 4-8

CHAPTER FIVE
CONSISTENCY WITH GOVERNMENT PLANS, POLICIES AND CONTROLS

5.1 Federal 5-1
5.1.1 Laws 5-1
5.1.1.1 U.S. Department of Transportation Act 5-1
5.1.1.2 National Historic Preservation Act 5-2
5.1.1.3 Coastal Zone Management Act 5-3
5.1.1.4 Endangered Species Act 5-3
5.1.1.5 Migratory Bird Treaty Act 5-3
5.1.1.6 Clean Water Act 5-4
5.1.1.7 Clean Air Act 5-4
5.1.1.8 Resource Conservation and Recovery Act 5-4
5.1.2 Executive Orders 5-5
5.2 State of Hawai‘i 5-6
5.2.1 State Land Use Law, Chapter 205, Hawai‘i Revised Statutes 5-6
5.2.2 Coastal Zone Management Act, Chapter 205A, Hawai‘i Revised Statutes 5-7
5.2.3 Hawai‘i State Plan 5-15
5.2.4 State Transportation Functional Plan (1991) 5-16
5.2.5 DHHL Kealakehe/La‘i ‘Opua Regional Plan (December 2008) 5-17
5.3 County of Hawai‘i 5-17
5.3.1 County of Hawai‘i General Plan 5-17
5.3.2 County of Hawai‘i Zoning 5-18
5.3.3 West Hawai'i Regional Plan 5-18
5.3.4 Keahole-to-Kailua Plan 5-18
5.3.5 Keahole to Honaunau Regional Circulation Plan – County Action Plan (2006) 5-19
5.3.6 Kona Community Development Plan 5-19
5.4 List of Required Permits, Approvals, and Consultations 5-20

CHAPTER SIX
OTHER CONSIDERATIONS

6.1 Unavoidable Adverse Effects 6-1
6.2 Relationship Between Short-term Uses and Maintenance of Long-term Productivity 6-1
6.3 Irreversible and Irretrievable Commitments of Resources 6-1

CHAPTER SEVEN
ANTICIPATED DETERMINATION, FINDINGS AND REASONS

7.1 Determination 7-1
7.2 Findings and Reasons 7-1

CHAPTER EIGHT
AGENCIES, ORGANIZATIONS AND INDIVIDUALS CONSULTED IN THE PREPARATION OF THE DRAFT EA

CHAPTER NINE
REFERENCES 9-1

LIST OF FIGURES

Figure 1-1: Vicinity of Project Location Map 1-2
Figure 2-1: Proposed Ane Keohokalole Highway Project 2-2
Figure 2-2a: Proposed Ane Keohokalole Highway - Typical Section 2-3
Figure 2-2b: Proposed Palani Road Widening - Typical Section 2-5
Figure 2-3: Alternative Alignments 2-7
Figure 2-4: Archaeological Sites within the Mauka and Makai Corridors 2-8
Figure 3-1: Existing State Land Use Districts Map 3-3
Figure 3-2: General Plan's Land Use Pattern Allocation Guide Map 3-4
Figure 3-3: Northern Corridor Archaeological and Cultural Survey Area 3-11
Figure 3-4: Northern Corridor Archaeological Sites 3-12
Figure 3-5: Southern Corridor Archaeological and Cultural Survey Area 3-15
Figure 3-6a: Southern Corridor Archaeological Sites—Puohulihuli to 1,000 Feet North of Palani Road 3-16
Figure 3-6b: Southern Corridor Archaeological Sites—1,000 Feet North of Palani Road to Palani Road 3-17
Figure 3-6c: Southern Corridor Archaeological Sites—South of Palani Road Between Henry Street and Kamakaeha Avenue 3-18
Figure 3-7a: Northern Botanical Survey Area 3-30

Figure 3-7b: Southern Botanical Survey Area 3-34
Figure 3-8: Soil Types 3-41
Figure 3-9: Bioretention Area – Typical Cross Section 3-45
Figure 3-10: Traffic Study Area 3-47
Figure 3-11: Existing Peak Hour Traffic Volumes 3-51
Figure 3-12: Locations of Future Development in the Region 3-56
Figure 3-13: Future Base Peak Traffic Volumes 3-59
Figure 3-14: Future Project Peak Traffic Volumes Under Proposed Action 3-64
Figure 3-15: Location of Ane Keohokalole Highway and Noise Measurement Sites 3-70
Figure 3-16: Traffic and Background Noise Measurement Results 3-71
Figure 3-17: Existing and Future Receptor Locations Evaluated Along the Ane Keohokalole Highway Alignment 3-73
Figure 3-18: Existing and Predicted Traffic Noise Levels vs. Barrier Heights 3-75

LIST OF TABLES

Table 2-1 Summary of the Environmental Effects of the Proposed Action and Alternative 2-10
Table 3-1 Tax Map Keys of Properties Adjacent to the Proposed Highway 3-2
Table 3-2 Summary of Identified Sites, General Significance Assessments, and Recommended General Treatments for Archaeological Sites in the Northern Alignment 3-13
Table 3-3 Summary of Identified Sites, General Significance Assessments, and Recommended General Treatments for Archaeological Sites in the Southern Alignment 3-19
Table 3-4 Level of Service Definitions for Signalized Intersections 3-48
Table 3-5 Level of Service Definitions for Unsignalized Intersections 3-48
Table 3-6 Capacity of Roadway Facilities 3-49
Table 3-7 Intersection Level of Service Analysis – Existing Conditions 3-52
Table 3-8 Street Segment Level of Service Analysis – Existing Conditions 3-53
Table 3-9 Trip Generation for Future Development Projects (Related Project Traffic Growth) 3-57
Table 3-10 Intersection Level of Service Analysis – Future Conditions 3-61
Table 3-11 Street Segment Level of Service Analysis – Future Conditions 3-62
Table 3-12 Future (CY 2028) Traffic Volumes and Noise Level Analysis 3-76
Table 4-1 Related Project Trip Generation in the Vicinity of the Proposed Action 4-2
Table 4-2 Intersection Level of Service Analysis – Cumulative Impacts 4-6

APPENDICES

Appendix A Archaeological Inventory Surveys
A-1: Cultural Surveys Hawai‘i, Inc. – Archaeological Inventory Surveys
A-2: Pacific Legacy, Inc. - Archaeological Inventory Survey
A-3: State Historic Preservation Division Correspondence

Appendix B Cultural Impact Assessments
B-1: Cultural Surveys Hawai‘i, Inc. – Cultural Impact Assessment
B-2: Helen Wong Smith under contract to Paul H. Rosendahl, Ph.D., Inc. – Cultural Impact Assessment
B-3: Cultural Impact Assessment Coverage of Palani Road

Appendix C Botanical Surveys

Appendix D Fauna Survey and Palani Road Floral and Faunal Survey

Appendix E Geotechnical Engineering Evaluation

Appendix F Traffic Study

Appendix G Noise Study

ACRONYMS AND ABBREVIATIONS

AAQS	Ambient Air Quality Standards
AIS	Archeological Inventory Survey
APE	Area of Potential Effect
BMP	Best Management Practices
BTP	Burial Treatment Plan
CDP	Community Development Plan
CIA	Cultural Impact Assessment
CSD	Context Sensitive Design
CSH	Cultural Surveys Hawaii
CSS	Context Sensitive Situation
CWA	Clean Water Act
CZ	Coastal Zone
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
dB	decibel
dBA	Decibel (“A” weight filter)
DHHL	Department of Hawaiian Homelands
DLNR	Department of Land and Natural Resources
DOH	Department of Health
DPW	Department of Public Works
EA	Environmental Assessment
EIS	Environmental Impact Statement
FTOD	Federal Department of Transportation
FHWA	Federal Highway Administration (U.S.)
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
GHGs	Greenhouse Gases
H.B.	House Bill
ha	Hectare
HAR	Hawaii Administrative Rules
HDOT	State of Hawai‘i Department of Transportation
HELCO	Hawaii Electric Light Company
HHFDC	Hawaii Housing Finance & Development Corporation
HRS	Hawai‘i Revised Statutes
HUD	Housing and Urban Development (U.S. Department of)
KCDP	Kona Community Development Plan
km	kilometer

L_{eq}	equivalent continuous sound pressure level [dB]
LID	Low-Impact Development
LOS	Level of Service
LUC	Land Use Commission (Hawaii)
LUPAG	Land Use Pattern Allocation Guide
MOA	Memorandum of Agreement
mph	Miles Per Hour
msl	Mean Sea Level
NHP	National Historical Park
NHPA	National Historic Preservation Act
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OEQC	Office of Environmental Quality Control (Hawaii)
PAH	Polycyclic Aromatic Hydrocarbons
PHRI	Paul H. Rosendahl, Ph.D., Inc.
PLI	Pacific Legacy Inc.
Proposed Action	Ane Keohokalole Mid-level Highway project
QLT	Queen Lili‘uokalani Trust
ROW	Right-of-Way
SHPD	State Historic Preservation Division (Hawaii)
SHPO	State Historic Preservation Officer
SIHP	State Inventory of Historic Places
SMA	Special Management Areas
TMK	Tax Map Key
TOD	Transit-oriented Development
UIC	Underground Injection Control
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service (Department of the Interior)
USGS	U.S. Geological Survey
Vog	“Volcanic Smog” – Poor air quality resulting from volcanic emissions

CHAPTER ONE: INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this environmental assessment (EA) is to evaluate the potential environmental impacts of the County of Hawai‘i’s proposed new construction of the Ane Keohokalole Mid-Level Highway, widening of a segment of Palani Road, development of utility corridors, and improvements within existing right-of-ways (ROWs) in North Kona, Hawai‘i (Proposed Action). Figure 1-1 illustrates the location of the Proposed Action.

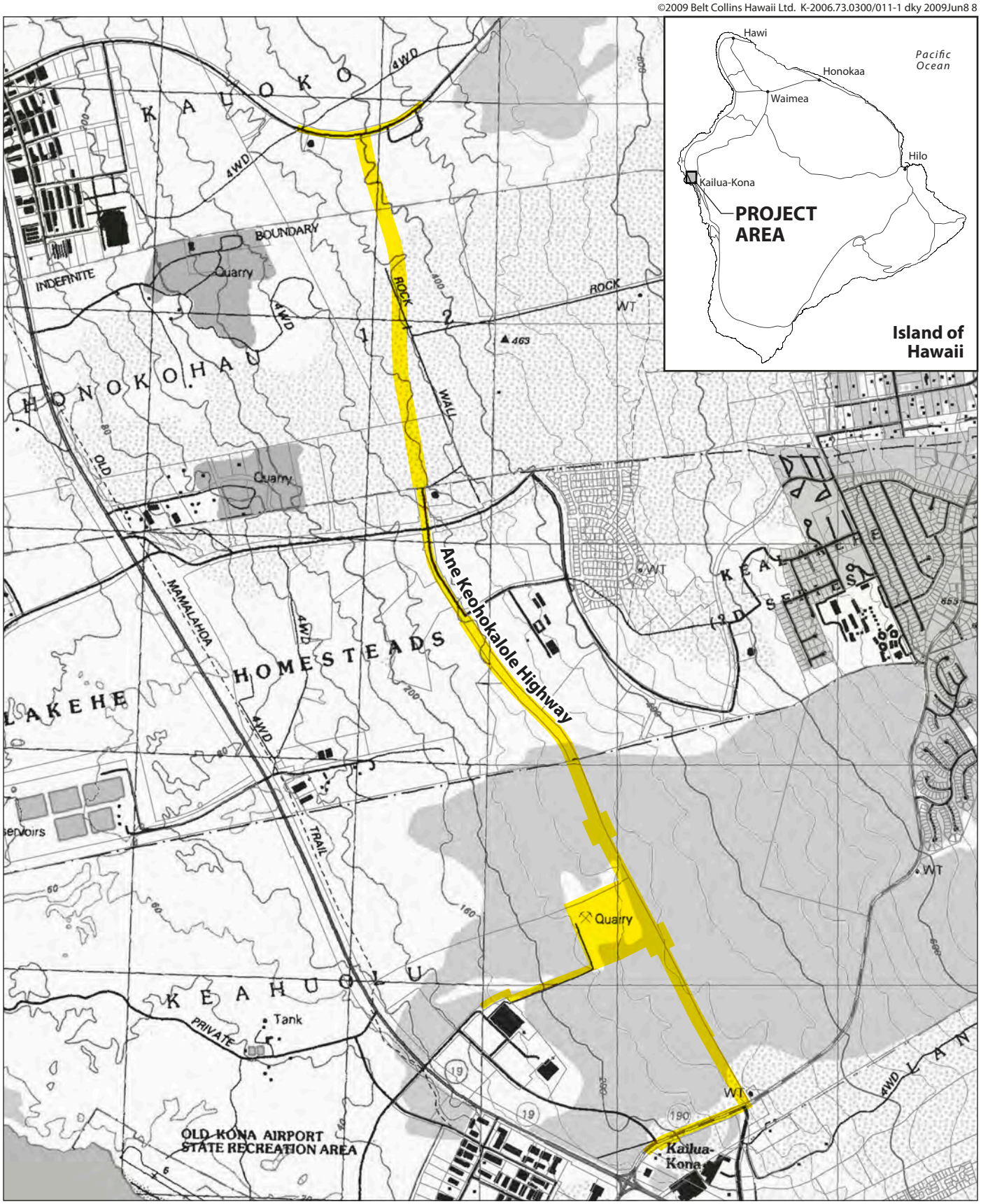
This Draft EA is being prepared in accordance with Hawai‘i Revised Statutes (HRS) Chapter 343 and its implementing rules. HRS Chapter 343 compliance is required as the Proposed Action will use county funds and state and county lands. The proposing agency is the County of Hawai‘i Department of Public Works (DPW). The Final EA will also be prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and its implementing regulations. Compliance with the NEPA is required with the use of federal funds for this functionally classified “major collector” road. The Federal Highways Administration (FHWA) would be the lead agency in the NEPA process.

Findings from this EA process will be used to issue one of the following determinations: a Finding of No Significant Impact (FONSI), preparation of an Environmental Impact Statement (EIS), or no action. The County of Hawai‘i DPW will make this determination under HRS Chapter 343 with the State of Hawai‘i Department of Transportation (HDOT) serving as the accepting agency. FHWA will make this determination with the information presented in the Final EA under the NEPA.

1.2 BACKGROUND

The Proposed Action introduced in this EA is a product of the Kona Community Development Plan (KCDP), and the resulting County of Hawai‘i Ordinance 08-131. The KCDP area includes Kailua-Kona, the second largest city within the County of Hawai‘i and a major commercial center in the North Kona district. Two major roadways serving Kailua-Kona are Queen Ka‘ahumanu Highway (classified as a state arterial primary roadway; State Route 19) and Mamalahoa Highway

©2009 Belt Collins Hawaii Ltd. K-2006.73.0300/011-1 dky 2009Jun8 8



NORTH

0 1000 2000
SCALE IN FEET

Figure 1-1
VICINITY/PROJECT LOCATION MAP

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

(classified as a major county collector roadway; State Route 190).[1] Queen Ka'ahumanu Highway was completed and opened for use in 1975 and is the main transportation route connecting Kailua-Kona, the large resort areas of Kaupulehu, Hualalai, Kalahuipua'a, Waikoloa, and Hapuna Beach, as well as the deep draft harbor at Kawaihae.

In accordance with the Hawai'i County General Plan, community development plans are required to be adopted by the County Council for all judicial districts. The KCDP was intended to be first of the new plans and serves as a model for the remaining districts. It provides detail to elements presented in the General Plan, emphasizing those elements most relevant to the issues and conditions of Kona. The purpose of the KCDP is to translate the broad General Plan Goals, Policies, and Standards into an implementation plan that applies to the Kona region. It requires state and county government, together with the community of the region, to work in partnership on common goals to improve the quality of life in Kona for those who work, live, and visit.[2] Development of the KCDP included a broad public planning process led by a 15-member steering committee. Forums were conducted for community input, including over 100 public meetings, workshops, working groups, and charrettes. The transportation section of the KCDP contains objectives, policies, and actions to establish a sensible transportation-oriented basis for future property developments to support multi-modal transportation systems, and to provide efficient connectivity between housing, retail, jobs, and services, thus minimizing urban sprawl.

As identified in the KCDP, traffic congestion has been fueled by rapid growth, poor connectivity, dependence on automobiles, and road improvements that have not kept pace with development. New developments mauka and makai of the arterial and collector roadways have occurred without local road connectivity. In the absence of local roads, all traffic from these developments funnels to the arterial (e.g., Queen Ka'ahumanu Highway and Mamalohoa Highway) and collector roadways (e.g., Palani Road and Henry Street), resulting in congested traffic conditions that negatively impact residents' quality of life, visitors' experience, and overall public safety. Widening, improving, and extending major arterials, together with increasing connectivity between and within existing and future developments to divert local traffic off the arterials, are both necessary to enhance mobility in the Kona area. The Proposed Action will provide this connectivity.

One of the KCDP transportation goals is to develop "an efficient, safe and attractive multi-modal transportation system integrated with land use planning that allows movement around and through Kona with minimal reliance on the

[1] Wilson Okamoto Corp. *Kona Community Development Plan Volume 1*, adopted as Hawai'i County Ordinance #08-131 on September 25, 2008.

[2] *Ibid.*

automobile."[3] The proposed Ane Keohokalole Mid-Level Highway project was created as a policy action (Action TRAN-1-2a)[4] through the planning process. According to the KCDP, the "new Keohokalole Highway (Mid-Level Road) shall function as the trunk transit route connecting Kailua Village with the airport, along which transit-oriented developments (TODs) will be located. As the trunk transit route, there will be future allowance for a dedicated transit-way within the right-of-way and the headways will be of the highest among all transit routes in Kona." The Proposed Action will provide this function.

The Proposed Action was previously evaluated in the *Keahuolu Lands of Kailua-Kona Final Environmental Impact Statement (EIS),* (Belt Collins & Associates, October 1990) as part of a regional transportation network to support urban and business expansion, as well as residential community development. The EIS evaluated impacts of a change in land use classification proposed by Queen Lili‘uokalani Trust (QLT) for its Keahuolu lands. During the change of zone process, the County and QLT identified the future development of a mid-level road on QLT land.

1.3 PURPOSE OF AND NEED FOR ACTION

The purpose of the Ane Keohokalole Mid-level Highway project (Proposed Action) is to improve connectivity, reduce traffic congestion, provide a multi-modal corridor, and support future regional development. The need for the action is specifically cited as a critical element in the Kona Community Development Plan (KCDP), which was adopted by the County of Hawai‘i as an Ordinance 08-131 on September 25, 2008.

The Proposed Action would create the initial link of a north-south arterial roadway and serve as the central corridor for multi-modal transportation and utilities for future regional development. Construction of Ane Keohokalole Highway at this time would be consistent with the principle of concurrency, i.e., appropriately timing the development of infrastructure to support planned development. This project would provide a well-connected local transportation network with safe, direct, and convenient access for automobiles, bicycles, and pedestrians.

QLT, the Hawai‘i Housing Finance and Development Corporation (HHFDC), and the State of Hawai‘i Department of Hawaiian Home Lands (DHHL) would contribute to the planned development that would be served by the Ane Keohokalole Mid-Level Highway project:

[3] *Ibid.*
[4] *Ibid.*

- QLT is an institution dedicated to providing support and services to orphaned and destitute children in the State of Hawai‘i, with preference given to those of native Hawaiian ancestry. Funds generated from Trust lands support QLT’s charitable mission, which aims to support families so that they can raise healthy, happy, resilient children with positive family attachments. Developed Trust lands in the Kona area include Kona Commons, Makalapua Center, Kona Coast Shopping Center, Kona Industrial Subdivision, and the Queen Lili‘uokalani Children’s Center Kona Unit. Construction of the Ane Keohokalole Highway will enhance QLT’s ability to proceed with development projects to support its charitable mission.

- HHFDC was created in 2006 to increase the availability of affordable housing within the State of Hawai‘i and serves as the primary agency tasked with developing and financing low- and moderate-income housing projects and administering homeownership programs. HHFDC’s Keahuolu Affordable Housing project, which is needed to meet the strong demand for affordable homes for working families in and around North Kona, is relying on the construction of Ane Keohokalole Highway to serve as the site’s primary access roadway.

- DHHL’s mission is to manage the Hawaiian Home Lands trust effectively and to develop and deliver lands to Native Hawaiians, and the agency will partner with others towards developing self-sufficient and healthy communities. DHHL manages 1,400 acres of homestead lands in the Kona area, including the Villages of La‘i ‘Opua. The Villages of La‘i ‘Opua, which are located both makai and mauka of the proposed Ane Keohokalole Highway, would benefit from the improved connectivity provided by development of this north-south roadway.

In providing a transportation and utilities corridor to support future regional development, the Proposed Action enables QLT, HHFDC, and DHHL to better serve the needs of their respective beneficiaries statewide.

1.4 SCOPE OF THE ENVIRONMENTAL REVIEW

This EA identifies potential impacts associated with implementing the Proposed Action and the No Action Alternative. The analysis of environmental conditions addresses resources with the potential to be affected by the Proposed Action. Locations and resources with no potential to be affected need not be analyzed. Several approaches were initiated to identify resources that may be potentially affected by the project, including results from the KCDP planning process (steering committee, public meetings, and working groups), as well as public informational meetings and charrettes conducted for the project in April 2008 in

Kona. One outcome of these processes was the identification of the following resource areas that are evaluated in this EA:

- Land Use
- Climate
- Air Quality
- Cultural Resources
- Flora and Fauna
- Surface Water and Drainage
- Geology, Topography, and Soils
- Groundwater and Hydrology
- Noise
- Roads and Traffic
- Natural Hazards
- Infrastructure
- Public Health and Safety
- Visual Resources
- Socio-Economic Conditions

CHAPTER TWO: ALTERNATIVES INCLUDING THE PROPOSED ACTION

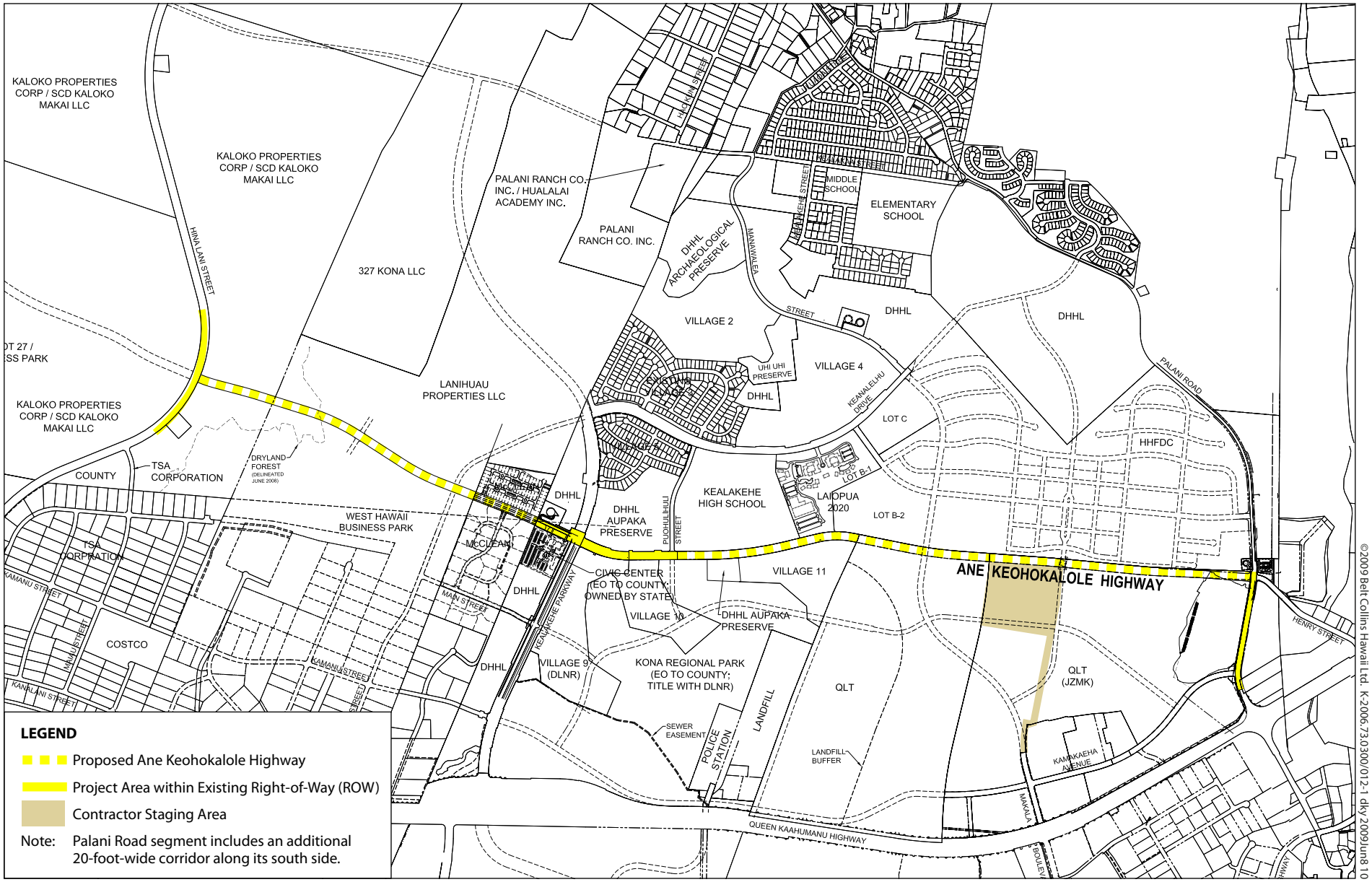
This chapter describes the alternatives evaluated: the Proposed Action and the No Action Alternative. An additional alignment was considered but not adopted as an alternative and hence not analyzed further in this EA (see Section 2.3).

A summary of the potential environmental impacts of the Proposed Action and the No Action Alternative is presented at the end of this chapter (Table 2-1).

2.1 PROPOSED ACTION

The Ane Keohokalole Mid-Level Highway project (Proposed Action) is the development of a new regional roadway link and utility corridor connecting Palani Road to the south and Hina Lani Street to the north (proposed highway), widening of Palani Road to provide additional vehicular lanes and a utility corridor between Henry Street and, Queen Ka‘ahumanu Highway, and associated improvements within existing ROWs (Figure 2-1). The highway would serve as a multi-modal transportation corridor, including options for pedestrians and bicycles. Roundabouts would facilitate traffic flow, with signalization as a back-up option. The posted speed limit would be 35 miles per hour.

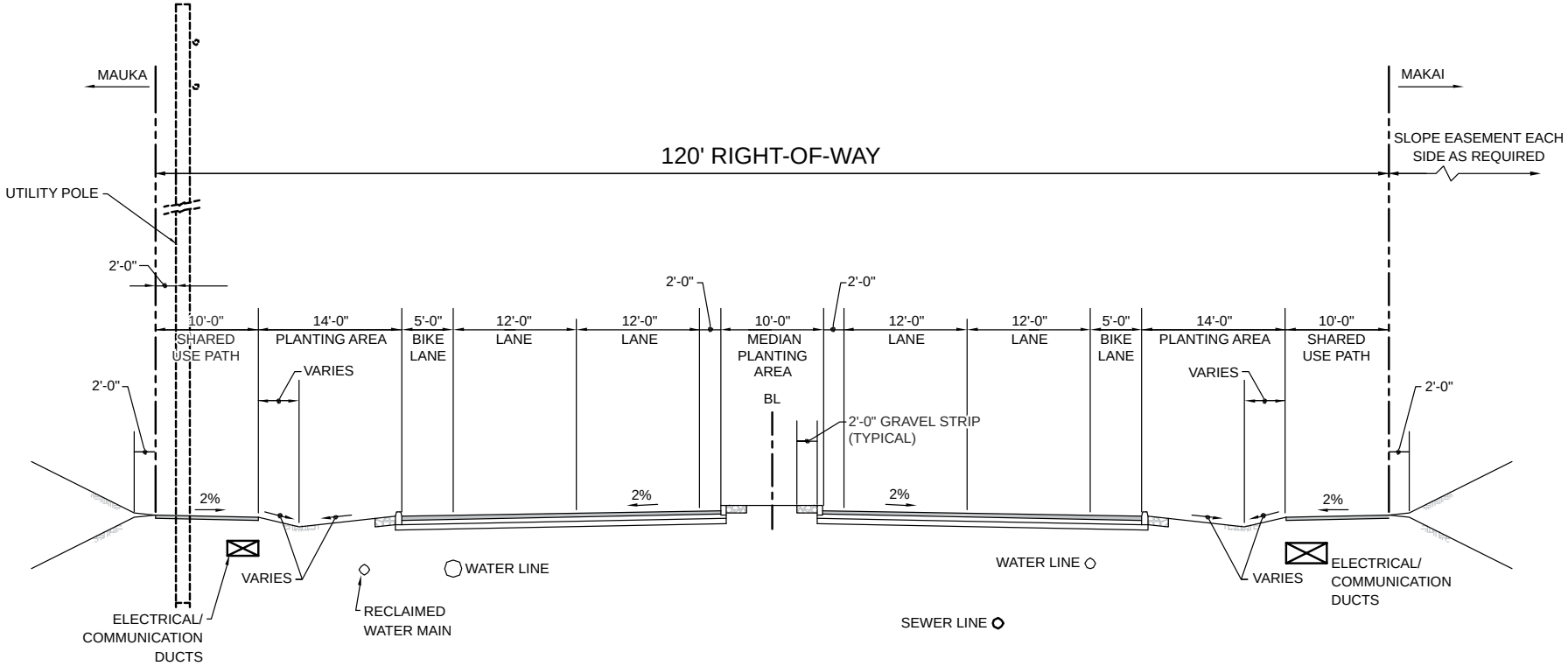
The proposed highway would function as a major collector roadway and would roughly parallel (and be approximately 0.7 miles farther inland than) Queen Ka‘ahumanu Highway. It would extend from Palani Road at the Henry Street junction, connect to the existing portion of roadway called “Ane Keohokalole Highway” at Puohulihuli Street, continue along the existing section of roadway through the Villages of La‘i ‘Opua, and then continue northward to Hina Lani Street. The proposed highway, a 120-foot ROW approximately 3.0 miles long, would allow for four lanes of two-way vehicular travel and a utility corridor at full build-out (Figure 2-2a). Utilities for water, reclaimed water, and wastewater would be installed underground. Electrical, telephone, and cable may be installed overhead or underground. Landscaping and drainage would be designed with bio-retention cells to prevent runoff from affecting groundwater flow and quality.



BELT COLLINS

Figure 2-1
PROPOSED ANE KEOHOKALOLE HIGHWAY PROJECT

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment



©2009 Belt Collins Hawaii Ltd. K-2006.73.0300-024-1 dky 2009Apr28 4

BELT COLLINS

NOT TO SCALE

Figure 2-2a
PROPOSED ANE KEOHOKALOLE HIGHWAY—TYPICAL SECTION

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

The segment of Palani Road to be widened would be approximately 1,700 feet in length. The total width would be approximately 100.5 feet and include the existing 80-foot (approximate) ROW and an additional 20.5 feet (approximate) to the south. Widening would increase the existing two lanes of two-way vehicular travel to four lanes of two-way travel with an additional auxillary lane for turns, and an underground utility corridor (Figure 2-2b). Specifically, one additional mauka-and makai-bound lane would be constructed along with an auxillary lane to provide a left-turn lane from Palani Road onto the proposed highway. Traffic signals are planned at the intersection of Palani Road and Kamakaeha Avenue, and existing traffic signals at the intersection of Palani Road and Henry Street would be upgraded. Utilities for water, reclaimed water, and wastewater would be installed underground. Electrical, telephone, and cable may be installed overhead or underground. Additional land would be acquired or easements secured by the County of Hawai‘i for the approximately 21.5-foot-wide corridor south of Palani Road.

Improvements within existing ROWs would include those within Hina Lani Street, the existing segment of Ane Keohokalole Highway, and Kealakehe Parkway.

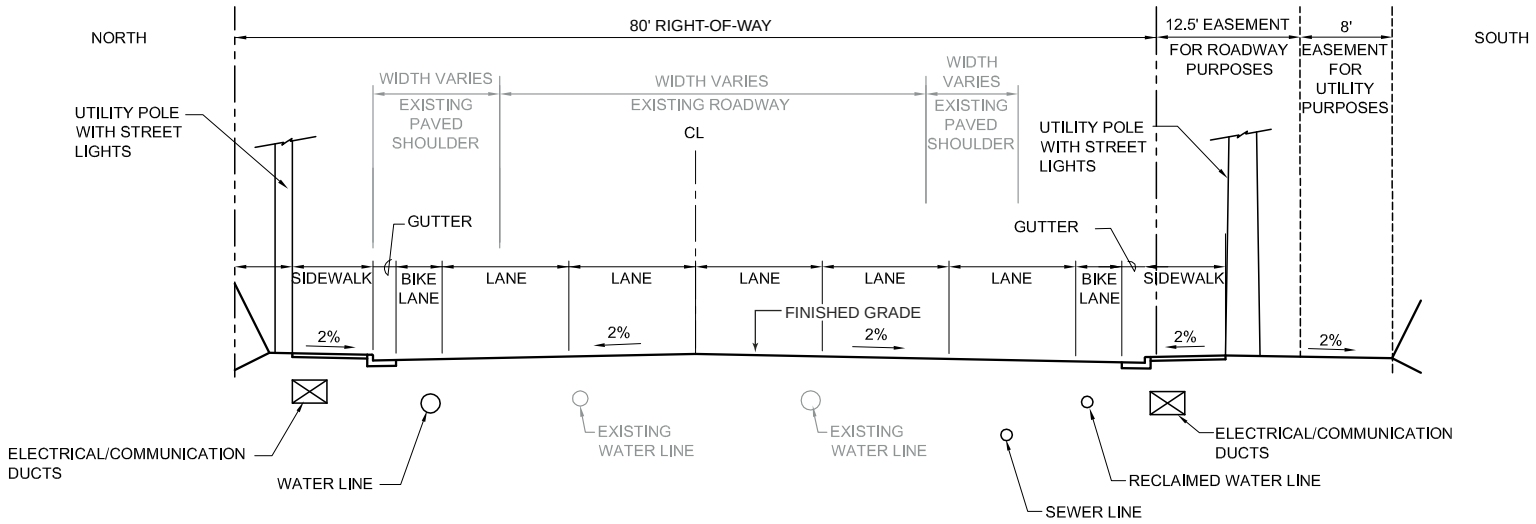
Construction would occur in phases. The first phase may consist of constructing two vehicular lanes and ancillary developments (e.g., shared use paths for bikes and pedestrians, utility corridors, etc.) between Palani Road and Kealakehe Parkway. The second phase may be the widening of Palani Road with its underground utility corridor. And the third phase may be the construction of two vehicular lanes and ancillary developments between Kealakehe Parkway and Hina Lani Street. The order of the phasing is not yet defined and will be dependent upon funding. A contractor staging area is proposed (Figure 2-1).

2.2 NO ACTION ALTERNATIVE

The No Action Alternative is defined as maintaining the status quo. Under this alternative, the Proposed Action would not be implemented. No additional roadway connectivity and utility corridors would be provided for future housing and other developments in the area. The No Action Alternative would not meet the purpose and the need as described in Section 1.3.

2.3 ALTERNATIVES CONSIDERED BUT NOT EVALUATED FURTHER IN THIS EA

Multiple project alignments were evaluated during the preliminary planning stage of this project to meet the purpose and need identified in Section 1.3 and understanding that there are environmental (e.g., expansive native dryland forest on the a‘a lava flow) and cultural resources (e.g., archaeological sites) to respect.



NOT TO SCALE

Figure 2-2b
PROPOSED PALANI ROAD WIDENING—TYPICAL SECTION

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

©2009 Belt Collins Hawaii Ltd. K-2006.73.0300-024-2 dky 2009Jun8 7

Figure 2-3 illustrates the project alignments considered. Because the project needed to serve existing and future planned development in the region, a core alignment with various spur and bridge alternatives were considered. In addition to the proposed alignment, five other alternatives were considered (mauka, Alternative 1 (bridge), Alternative 2, Alternative 3, and Alternative 4).

Northern Makai and Mauka Alternatives

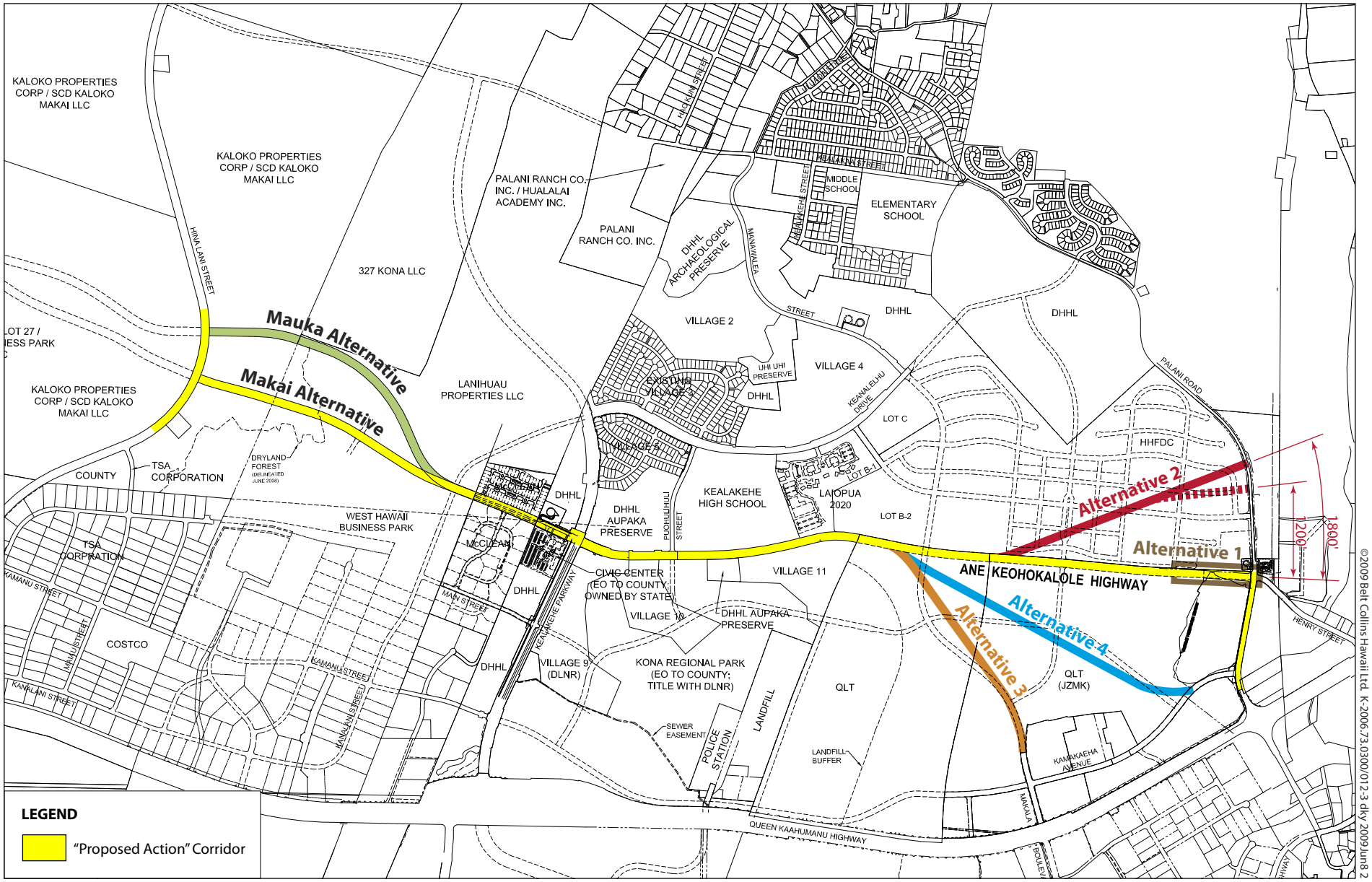
In the northern area, makai and mauka corridors were studied. Both study corridors were 400 feet wide, substantially wider than the 120-foot ROW (and wider than the 230-foot area of potential effect used to consider slope easements and construction related disturbances in this segment of the proposed project) needed for the proposed highway.

The “mauka corridor” is 400 feet wide and approximately 5,400 feet long. It is designed to meet at Hina Lani Street in an area previously bulldozed during the construction of Hina Lani Street and within the native dryland forest. The “makai corridor” is also 400 feet wide but approximately 4,950 feet long. The centerline of the corridor meets up with Hina Lani Street approximately 650 feet makai of the centerline of the mauka corridor.

During the course of the biological field investigations, it was discovered that a road alignment within the mauka corridor would effectively fragment the forest into two parts. However, moving the alignment to its current makai location would minimize potential impacts because the vegetation in the makai alignment comprises a mediocre quality dryland forest, which is more of a woodland given the scattered nature of the trees. Further details are provided in the botanical surveys in Appendix C.

During the course of the archaeological inventory surveys, archaeological sites were confirmed and new sites identified within both the makai and mauka corridors (Figure 2-4). Although a majority of the sites are recommended for data recovery only, in order to avoid and minimize the potential impacts to archaeological resources, the highway is proposed within the makai corridor to avoid all or most of the historic properties recommended for preservation or data recovery. Further details are provided in the archaeological survey reports in Appendix A.

In addition to addressing the environmental and cultural resource constraints in the northern project area, options for bicycle use (part of the purpose and need for the Proposed Action) are part of the project. A preliminary review of the roadway profiles shows that the makai alignment meets the grade control (5 to 6 percent grade not to exceed 800 feet in length) presented in the *Final Draft Roadway Design Standards for the County of Hawai‘i*, but the mauka alignment



©2009 Belt Collins Hawaii Ltd. K-2006.73.0300/012-3 dky 2009 Jun 8 2

BELT COLLINS

NORTH

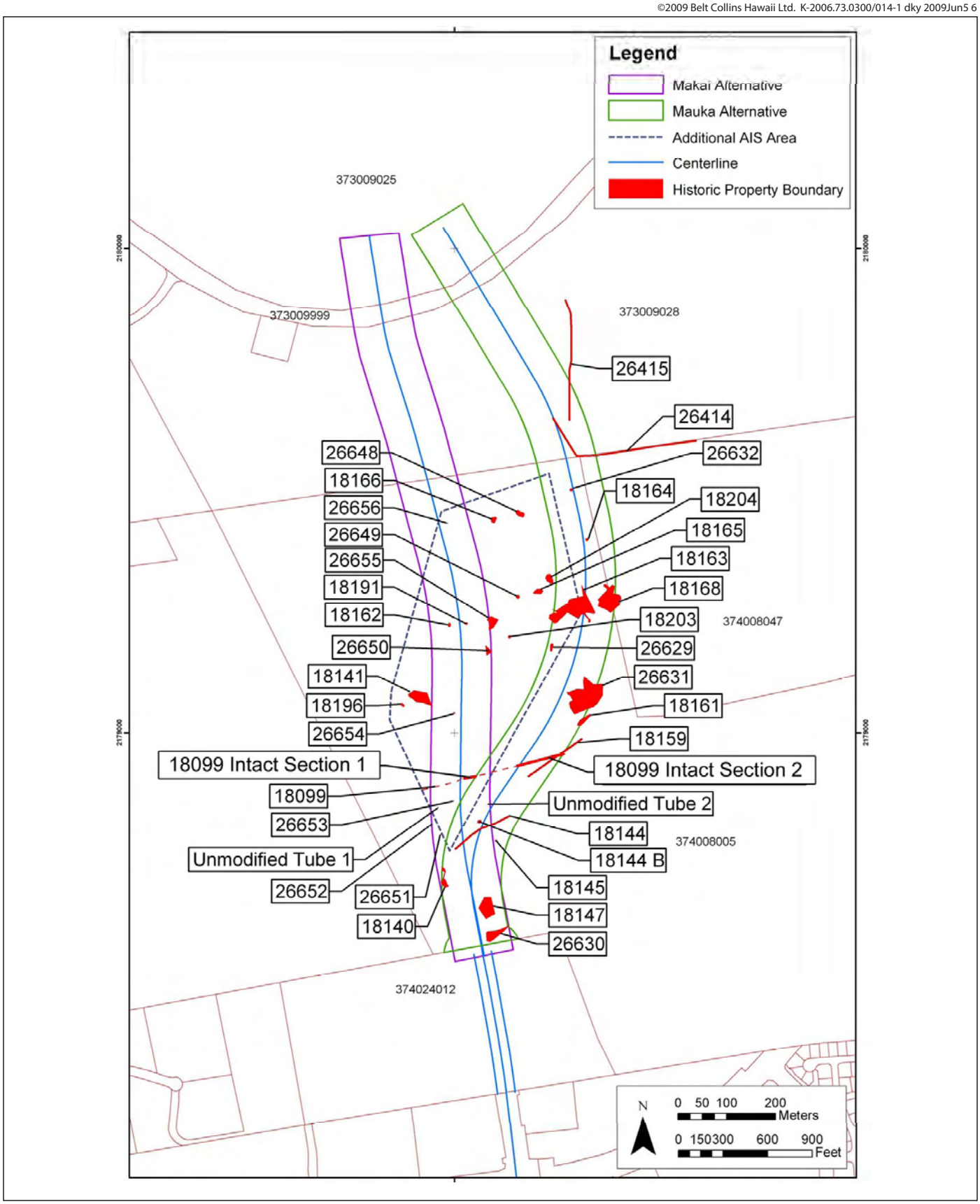
0 1000 2000

SCALE IN FEET

Figure 2-3
ALTERNATIVE ALIGNMENTS

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

©2009 Belt Collins Hawaii Ltd. K-2006.73.0300/014-1 dky 2009Jun5 6



Source: Cultural Surveys Hawaii. May 2009.

Figure 2-4
ARCHAEOLOGICAL SITES WITHIN THE MAUKA AND MAKAI CORRIDORS

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

BELT COLLINS

exceeds the grade control as its grade is approximately 5 percent over a distance exceeding 2,400 feet.

Therefore, based upon the presence of environmental and cultural resources discussed above, as well as design standards for roadways with bicycle use, the makai alignment was made part of the Proposed Action and the mauka alignment is not evaluated further in this EA.

Southern Alternatives 1, 2, 3, and 4

Four alternative alignments or design (bridge) were considered in the southern area of the project. These alternatives are depicted on Figure 2-3.

- Alternative 1 bridges over archaeological sites by elevating the highway. This alternative is not practical for two reasons: (1) with archaeological sites close to Palani Road, sufficient clearance can not be achieved to match the existing grade at Palani Road and (2) bridging over Palani Road is not practical because Henry Street is already at a very steep grade (it exceeds desirable grades for a major collector roadway) and the grade need to sufficiently clear the archaeological sites would be worse.

- Alternative 2 is a less direct route between the proposed highway and Henry Street. This would result in high-volume turning movements and further degrade traffic and roadway safety along Palani Road.

- Alternative 3 shifts new highway traffic to Queen Ka‘ahumanu Highway. Under this alternative, Palani Road traffic would not be relieved and the intent of the mid-level highway identified in previous planning documents would not be met.

- Alternative 4 represents a less direct route between the proposed highway and Palani Road. Several design concerns result from this alignment: (1) because of its connection to Kamakaeha Avenue, traffic is placed on Palani Road at a point too close to Queen Ka‘ahumanu Highway to accommodate high-volume traffic movements on the two highways, (2) the existing Kamakaeha Avenue ROW is too narrow, and (3) the sharp reverse curve at the connection to Kamakaeha Avenue is a safety concern.

2.4 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

Table 2-1 presents a summary of the environmental effects of the Proposed Action and the No Action Alternative.

Table 2-1: Summary of the Environmental Effects of the Proposed Action and Alternative

Resources/ Issues		Proposed Action	No Action Alternative
Land Use		No significant impacts. The proposed corridor would be located within the County ROW and would be consistent with and supportive of land use polices and development plans.	No impact.
Climate		No significant impacts. The Proposed Action would not substantially increase regional GHG emissions potentially contributing to climate change.	No impact.
Air Quality		No significant impacts. Construction-related impacts would be temporary and comply with applicable regulations. Operational use of the highway would alleviate traffic congestion anticipated in the region and therefore serve to reduce the impact of additional air pollutant emissions.	No impact.
Cultural Resources	Archaeological Resources	No significant impacts. The historic properties and burial site mitigation planned and designed into the Proposed Action will prevent significant impacts on these resources. Mitigation includes implementing data recovery and obtaining approval of a burial treatment plan. In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 CFR Part 800, the FHWA is consulting or will be consulting with the Advisory Council on Historic Preservation, the State Historic Preservation Officer (SHPO), native Hawaiian organizations, and other consulting parties concerning this Proposed Action and its potential effect on historic properties eligible for listing or listed on the National Register of Historic Places (NRHP). The Great Wall of Kuakini and the Kona Field System are two such sites. A determination of “adverse effect” under the NHPA Section 106 process would result in a Memorandum of Agreement (MOA) that will be used to identify stipulations to mitigate adverse effects. MOA signatories are expected to be the FHWA and the State Historic Preservation Officer (SHPO). The results of the Section NHPA 106 process will be documented in the Final EA.	No impact.

Resources/ Issues		Proposed Action	No Action Alternative
	Traditional Cultural Practices	No significant impacts with recommendations resulting from the Cultural Impact Assessment (CIA) processes. Based on the findings of the CIAs, the Proposed Action could adversely affect Hawaiian cultural resources, beliefs, and practices if recommendations in the CIA are not implemented. With implementation of the recommendations in the CIA, such as distributing the CIA contained in this EA to the community for review and providing the opportunity for OHA to review the findings pertaining to archaeological resources, no significant impacts on Hawaiian cultural resources, beliefs, and practices are anticipated.	No impact.
Flora and Fauna		No significant impacts. No federal- or state-listed threatened or endangered flora or fauna, or critical habitat, have been identified in the project area. The Proposed Action is designed to avoid the majority of the dryland forest by using the makai corridor that traverses through the drier, more sparsely vegetated portion of the forest. FWHA is initiating consultation in accordance with Section 7 of the Endangered Species Act (ESA). A determination of no effect to threatened and endangered species and critical habitat is anticipated.	No impact.
Geology, Topography, and Soils		No significant impacts. Ground surfaces disturbed during the construction of the Proposed Action will be restored. Any fill material used will be selected for use in accordance with the specifications provided by a licensed soils engineer to ensure stability of the built environment without an increase in maximum peak flow rates of stormwater drainage. Use of soil or mulch will comply with best management practices (BMPs) to reduce risk of erosion and sedimentation to storm water drainage systems.	No impact.
Surface Water and Drainage		No significant impacts. The Proposed Action will be designed in accordance with Clean Water Act (CWA) regulations and County of Hawai‘i ordinances and rules that address stormwater drainage and associated water quality. Patterns of surface water flow and maximum peak flow rates of storm drainage, downstream drainage, and water quality will be similar to pre-construction conditions. The contractor will obtain an National Pollution Discharge Elimination System (NPDES) construction storm water permit for discharge of storm water from construction activities that disturb one acre (0.4 ha) or more of total land area, including appropriate BMPs for the project area.	No impact.

Resources/ Issues	Proposed Action	No Action Alternative
Groundwater and Hydrogeology	No significant impacts. Groundwater would not be exposed during construction activities, and construction BMPs will prevent the release of petroleum products or other hazardous substances used during construction. To prevent changes in groundwater quantity and quality during the operational use of the proposed highway, bio-retention sites will be designed to capture and treat runoff and prevent pollutants from entering the groundwater. And as required by DOH regulations, including HAR 11-62-27 "Recycled Water Systems", an irrigation use plan that includes information on application rates, intended uses and schedules for recycled water use will be prepared. The irrigation use plan will also include information on types of vegetation, types and methods of irrigation, proposed irrigation schedules, vegetative consumption rates, water balance calculations, nutrient balance calculations, and the corresponding acreage to be used for irrigation, among other requirements. To prevent changes in groundwater quantity and quality from future development that would occur with the presence of the proposed highway, the County of Hawai'i has initiated a study with the U.S. Geological Survey (USGS) to study the issue and will consider additional controls to prevent regional groundwater impacts. This is of particular importance to the National Park Service (NPS) as changes to groundwater could affect the downgradient anchialine ponds.	No impact.
Noise	No significant impacts. Temporary impacts associated with demolition and construction would occur. Construction-related noise may be minimized by noise suppression equipment and restricting construction activities to daylight hours. Traffic noise will be mitigated where necessary with posted speed limits, noise attenuating walls, and setbacks.	No impact.
Roadways and Traffic	No significant impacts. Level of Service (LOS) is expected to improve or be maintained at most intersections as a result of the Proposed Action. County of Hawai'i coordination with HDOT will allow restriping at the intersection of Queen Ka'ahumanu Highway and Henry Street so that the intersection would operate at LOS D or better.	Without development of the Proposed Action, traffic congestion will continue to increase and existing roadways will operate at a poor level (LOS D or worse).
Natural Hazards	No significant impacts to public health and safety related to natural hazards will result from the Proposed Action.	No impact.

Resources/ Issues		Proposed Action	No Action Alternative
Infrastructure	Utility Systems (water, wastewater, electrical, and communication) and Solid Waste Disposal	No significant impacts. Recycled water, R1, would be used to maintain landscaping along the proposed highway, and electricity would be used to operate the traffic signals. All waste generated from the project would be taken to the West Hawai‘i Landfill in Pu‘uanahulu, a county transfer station that has an estimated life of 55 years, or waste would be recycled to the extent possible.	No impact.
	Drainage	No significant impacts. Drainage features will be constructed along the proposed corridor to control runoff from the impervious roadway.	No impact.
	Bicycle, Pedestrian, and Multi-Modal Facilities	No significant impacts. The Proposed Action will beneficially impact bicycle, pedestrian, and multi-modal facilities by providing additional roadways and dedicated paths.	No impact.
Visual Resources		No significant impacts. Visual impact of the highway is projected to be minimal from other vantage points after vegetation grows back after construction.	No impact.
Public Services	Police	No significant impacts. The proposed corridor would improve the delivery of public services to the surrounding areas.	No impact.
	Fire	No significant impacts. The Proposed Action would provide better access to neighborhood for emergency responders.	No impact.
	Civil Defense	No significant impacts. No additional demand on civil defense would be created with the Proposed Action.	No impact.
	Education	No significant impacts. The Proposed Action would not directly affect demand for schools, but would increase the accessibility to schools by encouraging multi-modal transportation, including bicycling and walking.	No impact.

Resources/ Issues	Proposed Action	No Action Alternative
Socio-Economics	No significant impacts. The Proposed Action would enhance the roadway infrastructure of the surrounding area and North Kona district, and provide a minor but beneficial impact on socio-economic conditions, with the possible creation of new construction jobs. The Proposed Action would not adversely affect minority or low-income populations, and would not negatively affect the environment in a way that disproportionately affects minority or low-income populations. Rather, the Proposed Action is expected to benefit these populations as it is a part of a regional plan to develop a multi-modal transportation network to serve a number of mixed-use, affordable developments, including DHHL's properties.	Adverse effects on the socio-economic environment of the region could occur. Traffic congestion along Queen Ka'ahumanu Highway would continue to degrade and, thus, affect quality of life for residents (with greater commute times), possibly leading to declines in road safety. It is possible that the economic development of the Kona area would be negatively affected, as visitors, particularly those traveling from the airport or trying to get around town in heavy traffic, are likely to perceive that the character of the region is declining, and they would avoid congested areas entirely.

CHAPTER THREE: AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

This chapter describes the existing conditions of the affected environment, potential impacts of the Ane Keohokalole Mid-level Highway project, and the measures to minimize these impacts.

3.1 LAND USE

3.1.1 AFFECTED ENVIRONMENT

The proposed Ane Keohokalole Mid-level Highway project (Proposed Action) would be developed approximately between Hina Lani Street to the north and the Henry Street-Palani Road junction to the south. It would also include widening of Palani Road between Henry Street and Kamakaeha Avenue. The mauka side of the proposed highway from north to south is bordered by undeveloped land owned by Kaloko Properties Corporation (Stanford Carr), undeveloped land owned by Lanihau Properties, land owned by McClean Honokohau Properties, future Department of Hawaiian Home Lands (DHHL) Villages of Laʻi ʻOpua (Village 7), an aupaka preserve, Kealakehe High School, future DHHL Villages of Laʻi ʻOpua (Village 6), Hawaii Housing Finance & Development Corporation's (HHFDC) future Keahuʻolu Affordable Housing Project, and the County of Hawaiʻi Palani Reservoir.

The makai side of the proposed highway from north to south is bordered by undeveloped land owned by Lanihau Properties, land owned by McClean Honokohau Properties, the future site of the County Civic Center, future DHHL Villages of Laʻi ʻOpua, and undeveloped land owned by Queen Liliʻuokalani Trust (QLT), which includes an archaeological preserve.

Ahupuaʻa affected by the Proposed Action are Keahuolu, Kealakehe, Honokohau, and Kaloko. Tax Map Keys (TMKs) affected are listed in Table 3-1.

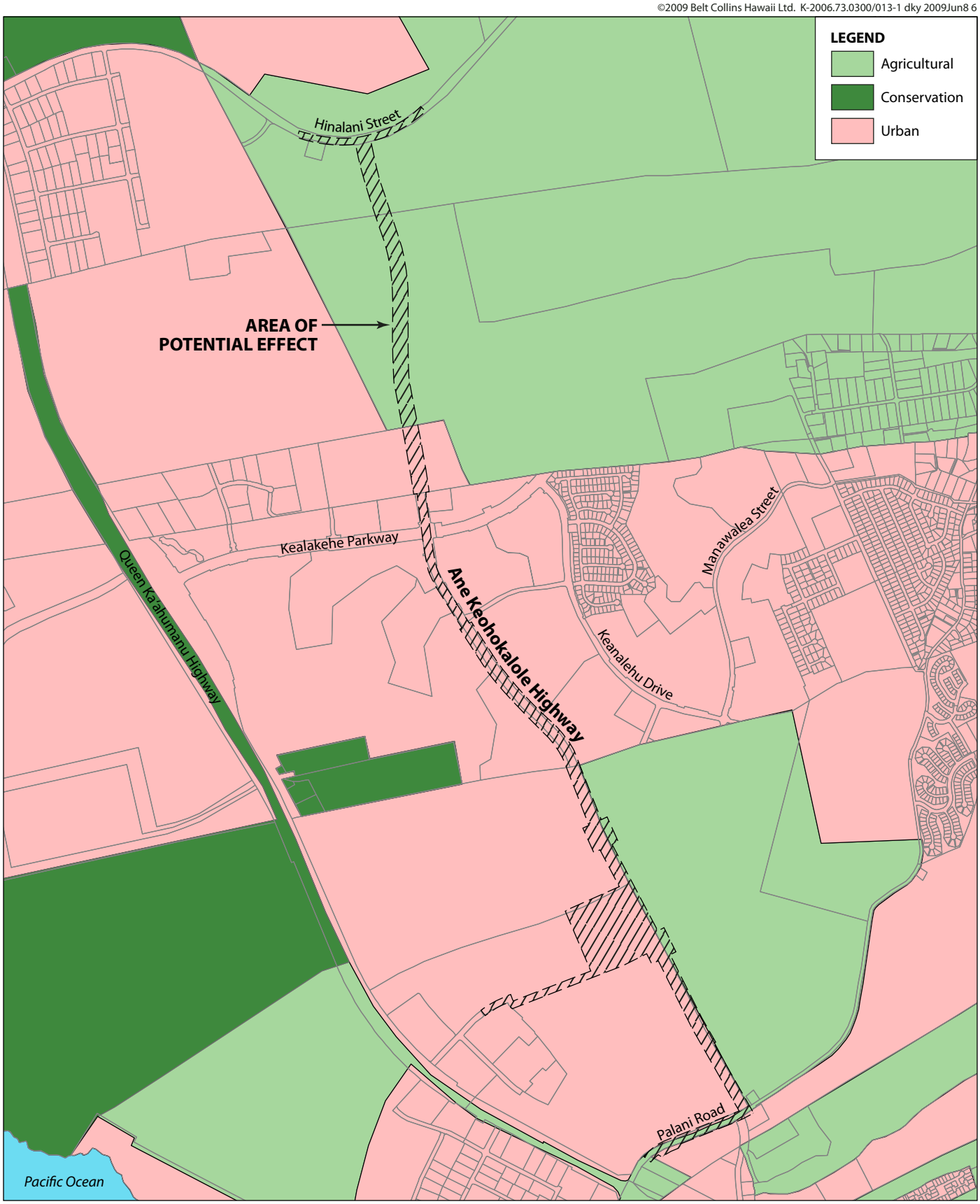
Table 3-1: Tax Map Keys of Properties Adjacent to the Proposed Highway

TMK Number	Property Name/Owner
Properties Mauka of the Proposed Highway	
7-4-021:022	County of Hawai'i Palani Reservoir
7-4-021:020	HHFDC Future Keahuolu Affordable Housing Project
7-4-021:003	Future DHHL Villages of La'i 'Opua (Village 6)
7-4-021:004	Kealakehe High School
7-4-021:005	Aupaka Preserve (DHHL)
7-4-021:008	Future DHHL Villages of La'i 'Opua (Village 7)
7-4-024:012	McClean Honokohau Properties
7-4-008:047 and 005 (por)	Undeveloped Lanihau Properties
7-3-009:028	Undeveloped Kaloko Properties (Sanford Carr)
Properties Makai of the Proposed Highway	
7-4-020:010	QLT archaeological preserve land
7-4-020:022	QLT undeveloped land
7-4-020:006	Future DHHL Villages of La'i 'Opua (Village 11), includes small Aupaka Preserve
7-4-020:005	Future DHHL Villages of La'i 'Opua (Village 10)
7-4-020:004	Future DHHL Villages of La'i 'Opua (Village 9)
7-4-020:007	Kealakehe (DHHL Property)
7-4-020:025	Future County Civic Center Site (DHHL/County)
7-4-024:012	McClean Honokohau Properties
7-4-008:005	Undeveloped Lanihau Properties
Properties South of Palani Road	
7-4-008: 020	GTE Hawaiian Telephone Co, Inc.
7-4-008: 021	State of Hawai'i
7-4-008: 027	County of Hawai'i
7-4-008: 063	QLT undeveloped land

State-designated land use districts along the proposed highway are Urban and Agricultural (Figure 3-1). The Hawai'i County General Plan Land Use Allocation Guide Map shows areas along the proposed highway allocated for urban (mixed residential, commercial, and industrial) and agricultural with nature/cultural preserves (Figure 3-2).[1] The only existing developed land along the proposed highway is Kealakehe High School (Figure 2-1). Anticipated development would be mostly mixed-use residential with some commercial activities.

[1] County of Hawai'i. *County of Hawai'i General Plan*. February 2005.

©2009 Belt Collins Hawaii Ltd. K-2006.73.0300/013-1 dky 2009Jun8 6



BELT COLLINS

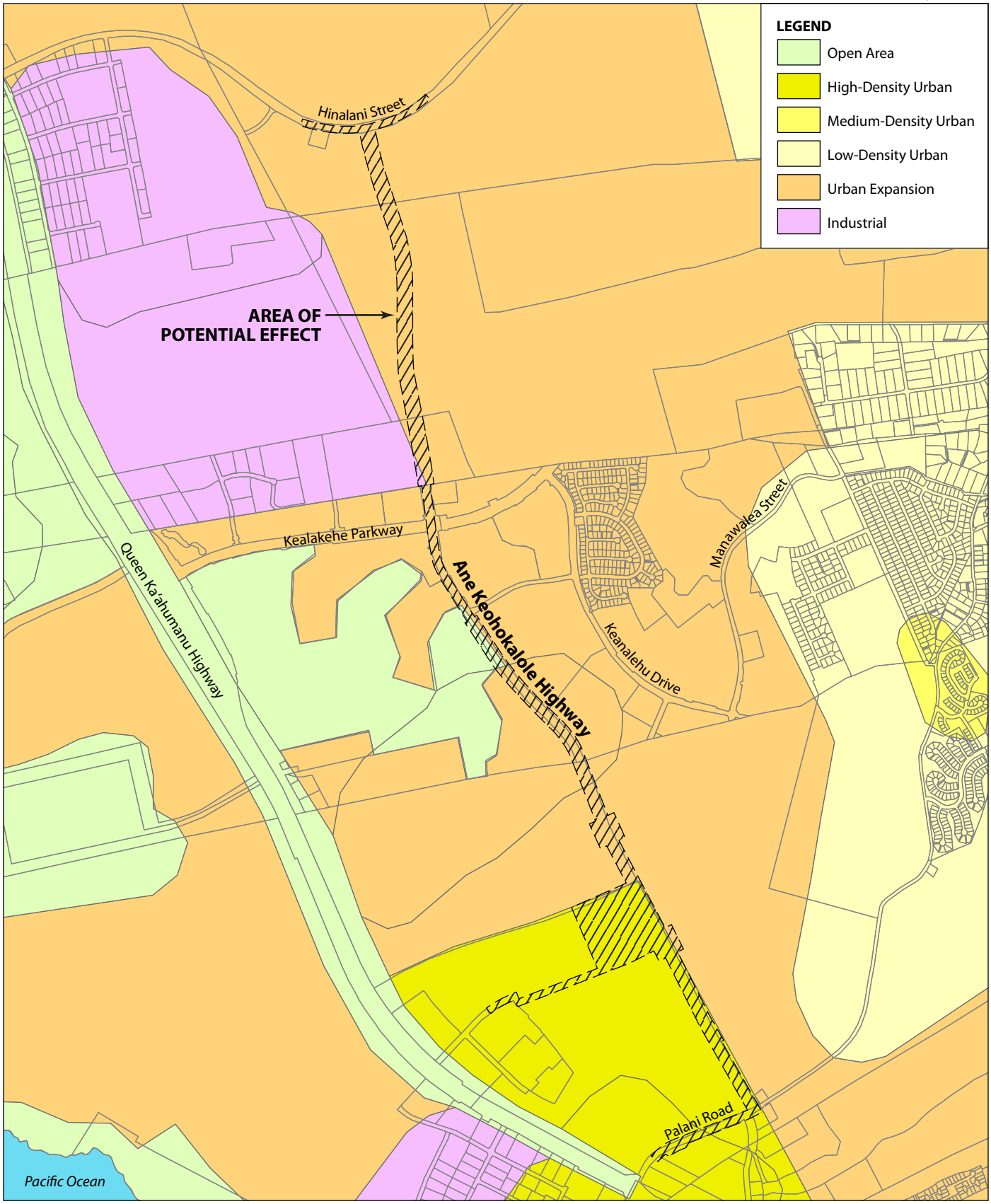
NORTH

0 1000 2000
SCALE IN FEET

Figure 3-1
EXISTING STATE LAND USE DISTRICTS MAP

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

©2009 Belt Collins Hawaii Ltd. K-2006.73.0300/013-2 dky 2009Jun8 6



NORTH

0 1000 2000
SCALE IN FEET

Figure 3-2
GENERAL PLAN'S LAND USE PATTERN ALLOCATION GUIDE MAP

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

The future context of the Proposed Action is urban, which is consistent with the KCDP land use adopted as Ordinance 08-131 by the County of Hawai‘i on September 25, 2008. The vacant and undeveloped project site is comprised of lava flows of various ages that are covered mostly by alien-dominated scrub vegetation. The majority of the land adjacent to the project site was formerly used for grazing cattle and goats and is currently undeveloped. Land owners within the vicinity include the entities identified in Table 3-1.

According to the Kona Community Development Plan (KCDP), future urban and rural growth should be channeled into compact, village-style developments that allow workers to live near their jobs. This concept departs from the current trend of sprawling low-density developments, disconnected subdivisions, and business centers. Urban sprawl has led to long-distance commutes, traffic congestion, and a general decline in the quality of life.

3.1.2 POTENTIAL IMPACTS

Property would be conveyed to the County of Hawai‘i for the proposed highway right-of-way (ROW). Additional acreage would be either conveyed or set aside as easements for the ROW to widen Palani Road. No significant impacts associated with land use would occur as the Proposed Action would be consistent with and supportive of State and County land use policies and development plans as discussed in Chapter 5.

No impacts to land use would occur under the No Action Alternative.

3.2 CLIMATE

3.2.1 AFFECTED ENVIRONMENT

Geological features heavily influence Hawai‘i Island’s climate. The island consists of five volcanoes, and the peaks of Mauna Loa (13,679-foot summit elevation) and Mauna Kea (13,796-foot summit elevation) dominate ground-based atmospheric influences. The Kona region receives an average annual rainfall of between 11 and 24 inches, depending on the year, with mauka areas typically experiencing larger amounts of rainfall than makai areas. Regional temperatures range between the winter and summer months from 64 to 85 degrees Fahrenheit.[2]

[2] Hawaii State Climate Office, Annual Precipitation and Temperature Summaries www.soest.hawaii.edu/MET/Hsco accessed February 25, 2009.

The trade winds determine the overall pattern of Hawaiian rainfall. In winter, trade winds blow 50 percent of the time and the subsidence trade wind inversion occasionally disappears; in summer, trade winds and the inversion prevail for more than 90 percent of days.[3] The mountains of Hualalai and Mauna Loa further influence the wind direction and speed. In the early morning, the prevailing wind blows from inland areas to the ocean, and in the afternoon, the wind blows from the ocean to inland areas.[4]

Greenhouse gases (GHGs) are a concern as anthropogenic emissions are having a discernible influence on global temperatures and sea levels. Currently, there are no federal standards limiting GHG emissions and no clear guidance from the State of Hawai‘i on regulation or reporting. The Governor of Hawai‘i signed the Global Warming Solutions Act in 2007, which is intended to reduce statewide GHG emissions to 1990 levels by 2020, and mandates procedures to define GHG emissions and develop measures to significantly reduce them, but does not directly regulate emissions.

3.2.2 POTENTIAL IMPACTS

No significant impacts to climate would occur under the Proposed Action. Construction would result in temporary or short-term emissions of GHGs from vehicles and equipment, mostly from the combustion of diesel and gasoline. The overall contribution of these emissions is extremely small relative to total emissions from all sources in the state (electricity generation, transportation, manufacturing, etc.). GHG emissions from power generation sources would experience a small, permanent increase as a result of increased electricity use for street lights and traffic signals, but would not constitute a significant addition to total electricity use on the island of Hawai‘i or resulting GHG emissions. These potential increases could be minimized through the use of lighting design and energy-efficient lighting technologies. GHG emissions would also increase as a result of traffic on the new highway. Additional traffic supported by the proposed highway would represent an increase of less than one percent in vehicle miles travelled within the Kona region.[5] This increase would constitute a very small proportion of future regional emissions from vehicles and would not be significant.

No substantial effect on GHG emissions in the region, and therefore the climate, would occur under the No Action Alternative.

[3] Hawaii State Climate Office, Monthly Report. http://www.soest.hawaii.edu/MET/Hsco/monthlyreport/monthlyreport.html accessed February 25, 2009.

[4] Juvik, Sonia P., and James O. Juvik, *Atlas of Hawai‘i 3rd Edition*. University of Hawai‘i Press, Honolulu, Hawai‘i, 1998.

[5] Personal communication with Dick Kaku, Fehr & Peers Transportation Consultants, May 7, 2009.

3.3 AIR QUALITY

3.3.1 AFFECTED ENVIRONMENT

Regional and local climate, together with the amount and type of human activity, generally dictate the air quality of a given location. State and national Ambient Air Quality Standards (AAQS) are established to regulate ambient concentrations of particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and lead. In addition, the State has set a standard for hydrogen sulfide. State AAQS for nitrogen dioxide and carbon monoxide are more stringent than the national standards, while the AAQS for the other parameters are comparable.

Limited air quality data available from the State Department of Health (DOH) indicate that, despite the volcanic emissions (vog) and possible impacts from localized traffic congestion, air quality in the North Kona area is good, with pollutant concentrations well within state and national AAQS.

The present air quality in the project area is mostly affected by air pollutants from natural, industrial, agricultural, and/or vehicular sources. Natural sources that may affect the project area but cannot be accurately quantified include the ocean (salt spray), plants (aeroallergens), wind-blown dust, and volcanoes (vog). Of these natural sources, volcanoes are the most significant, especially with the ongoing eruption phase of Kilauea Volcano that began in 1983. Air pollution emissions from Kilauea Volcano consist primarily of sulfur dioxide, which are carried to the project area by prevailing winds. The volcanic emissions are seen in the form of vog which persistently hangs over a majority of West Hawai‘i.

The major industrial sources of air pollutants in the project area include the Keahole Power Plant, operated by Hawaii Electric Light Company (HELCO). Air pollution from the power plant consists mostly of sulfur dioxide and oxides of nitrogen.

The State DOH operates a network of air quality monitoring stations, but very limited data are available for the island of Hawai‘i, and even less for the Kona area. Monitoring at Kealakekua between 2000 and 2004 showed consistently low concentrations of sulfur dioxide and particulates.[6]

[6] Belt Collins Hawaii Ltd. *Final Environmental Impact Statement Keahu‘olu Affordable Housing Project*. October 2008.

3.3.2 POTENTIAL IMPACTS

Short-term direct and indirect impacts on air quality could potentially occur during construction of the proposed highway. Direct impacts could include (1) fugitive dust from vehicle movement and soil excavation, and (2) exhaust emissions from on-site construction equipment. Indirect impacts could result from slow-moving construction equipment travelling to and from the project area, and from a temporary increase in local traffic caused by commuting construction workers.

State of Hawai‘i Air Pollution Control rules prohibit visible emissions of fugitive dust from construction activities at the property line. A dust control program will be developed and followed to control dust from construction activities according to the requirements of HAR 11-60.1-33. Fugitive dust emissions can be controlled to a large extent by watering active work areas, using wind screens, keeping adjacent paved roads clean, and covering open-bodied trucks. Other measures include limiting the area to be disturbed at any given time, mulching or chemically stabilizing inactive areas, paving and landscaping areas early in the construction schedule, and monitoring dust at the project boundary to ensure these measures are effective.

The largest air emissions contributions by construction equipment are usually from diesel exhaust. Nitrogen oxides emissions rates from diesel engines can be higher than from gasoline-powered equipment. However, the standard for nitrogen dioxide is set on an annual basis and is not likely to be violated by short-term construction equipment emissions. Carbon monoxide emissions from diesel engines, on the other hand, are relatively low and are not anticipated to significantly impact air quality. The substantive construction related emission sources are generally regulated stationary sources which operate with an air permit issued by the State DOH, but only after it is determined that air quality standards are not likely to cause an exceedance of ambient air quality standards (either by size of source equipment or computer modeling). No significant impacts to air quality would occur from these short-term or temporary emission sources.

Once the Proposed Action is completed, changes in localized and regional emissions and their impacts would occur. Localized vehicular emission impacts would decrease with decreasing vehicular delays (traffic congestion), leading to improved air quality. Regional vehicular emissions would increase with the additional development that could only occur with the Proposed Action. However, the impact of these emissions on air quality is not expected to result in a significant degradation in air quality as no significant deterioration in traffic conditions would occur (see traffic impact section). Considering the effects of the Proposed Action along with (1) Hawai‘i’s weather patterns and trade winds, which serve to efficiently disperse vehicular emissions so that they do not concentrate, and (2) the national standards imposed on lowering vehicular emissions, pollutant

concentrations are expected to remain well within state and national AAQS, and no significant impacts to air quality would occur.

No significant impacts to air quality would occur under the No Action Alternative. With the greater vehicular delays (traffic) under the No Action Alternative relative to the Proposed Action, air emissions and localized concentrations of air pollutants are also likely to be greater but are not anticipated to significantly impact air quality.

3.4 CULTURAL RESOURCES

3.4.1 HISTORIC PROPERTIES

Five archaeological inventory survey (AIS) investigations were conducted as part of this EA and are described herein from north to south (Hina Lani Street to Palani Street). A sixth AIS was previously conducted for the existing graded area through the McClean parcel (see Figure 2-3) and is also described.

The northern portion of the proposed highway corridor (Hina Lani Street to the existing paved area just south of the property owned by McClean) is covered by the archaeological surveys described below:

- Cultural Surveys Hawai‘i (CSH) performed a survey of the northern-most third of the proposed highway alignment consisting of a 400-foot-wide corridor (the makai alternative) extending approximately 4,950 feet from Hina Lani Street in the north to the northern boundary of the McClean Honokohau Properties in the south (hereinafter referred to as “KALOKO 3” AIS).
- Paul H. Rosendahl, Ph.D., Inc. (PHRI) previously conducted a survey, January 1990, for the Honokohau Industrial Park (Parcel VII) which includes the proposed highway alignment from the northern boundary to the southern boundary of the McClean Honokohau Properties.

The existing paved portion of the proposed highway extends from the southern boundary of the McClean Honokohau Properties in the north to Puohulihuli Street in the south. The existing graded area is approximately 130 feet wide and will encompass the area of potential effect (APE) associated with the proposed project. The APE defines the area in which all activity, including construction related disturbances, would occur; it varies depending upon slope easements and other site-specific conditions.

The southern portion of the proposed highway corridor (Puohulihuli Street to Palani Road) is covered by the archaeological surveys described below:

- CSH performed a survey of an approximately 1.4-mile-long portion of the proposed highway alignment consisting of a 400-foot-wide corridor extending south from Puohulihuli Street to a point approximately 1,000 feet north of Palani Road (hereinafter referred to as "KEALAKEHE 1" AIS).
- Pacific Legacy Inc. (PLI) performed a survey of the segment of the proposed highway from approximately 1,000 feet north of Palani Road to Palani Road. As part of the AIS, PLI conducted a reconnaissance survey of the archaeological preserve, located makai of the AIS study area and mauka of Kamakaeha Avenue, to obtain contextual information for the sites found within the AIS study area.
- CSH performed a survey of a 100-foot-wide corridor on the south side of Palani Road extending approximately 1,500 feet between the Kailua-Kona Fire Station to the west and Henry Street to the east (hereinafter referred to as "KEAHUOLU 5" AIS).
- CSH performed a survey of the proposed construction base yard and base yard access road located adjacent to the makai (western) boundary of the proposed highway corridor within the footprint of an abandoned rock quarry and quarry access road (hereinafter referred to as "KEAHUOLU 6" AIS). The proposed base yard access road extends from the northern end of Makala Boulevard northeast around the edge of the existing Kmart parking lot and continues northeast within the well-defined abandoned quarry access road.

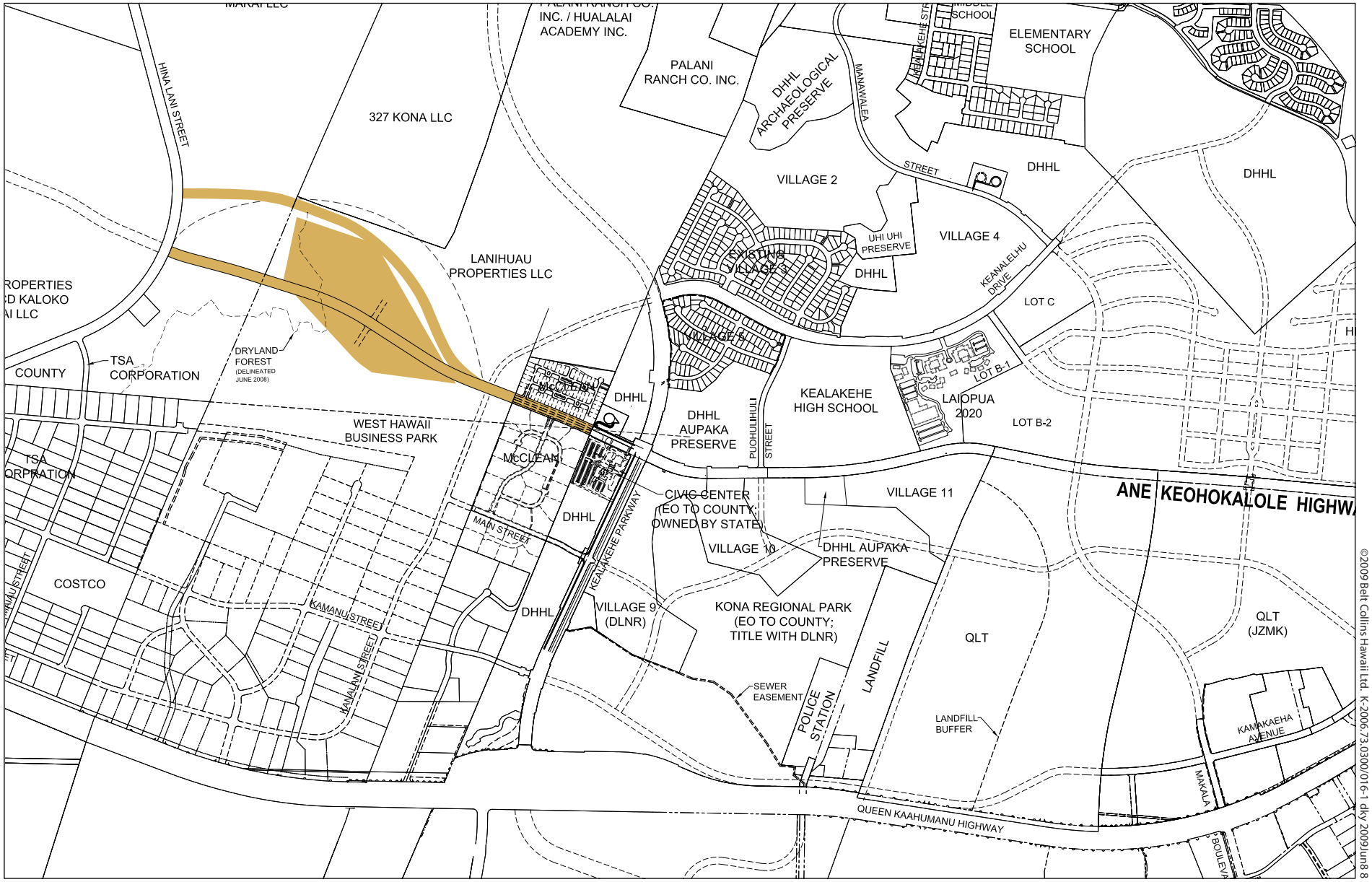
The purpose of these archaeological surveys was to comply with the current historic preservation requirements of the Hawai'i State Historic Preservation Division (SHPD). Additionally, boundaries of the archaeological preserve on QLT land were further defined based on these findings.

The AIS reports, including findings and recommendations, as well as SHPD correspondence, are provided in Appendix A.

3.4.1.1 Affected Environment

Northern Corridor Survey Area

The survey area coverage of the AIS investigations in the northern corridor of the proposed highway is shown in Figure 3-3. Using the findings from the AIS, a narrower APE was designed within the surveyed corridor to avoid as many historic properties as possible. The APE defines the area in which all activity, including construction related disturbances, would occur. Figure 3-4 illustrates the location of the historic properties identified within the APE in the northern corridor and Table 3-2 summarizes the site type, functional interpretation, significance category, and general recommendations for treatment of the properties.



BELT COLLINS

NORTH

0 800 1600

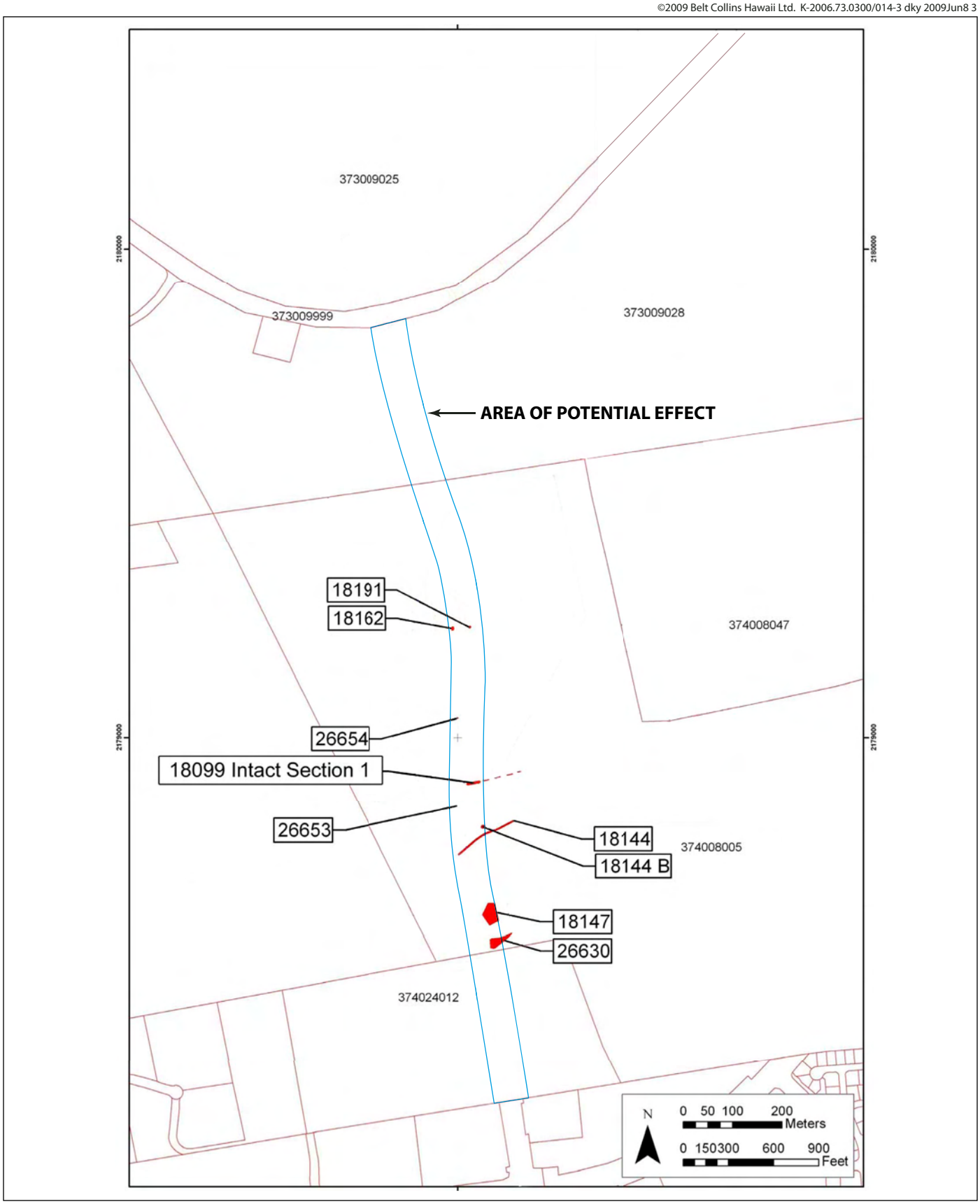
SCALE IN FEET

Figure 3-3

NORTHERN CORRIDOR ARCHAEOLOGICAL AND CULTURAL SURVEY AREA

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

©2009 Belt Collins Hawaii Ltd. K-2006.73.0300/014-3 dky 2009Jun8 3



Source: Cultural Surveys Hawaii. May 2009.

Figure 3-4
NORTHERN CORRIDOR ARCHAEOLOGICAL SITES

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

The findings of the "KALOKO 3" AIS conducted by CSH for the northern-most third of the proposed highway, from Hina Lani Street to the northern boundary of the McClean Honokohau Properties, are summarized as follows:

- Nearly 100 percent of the current survey area has been previously surveyed and documented as part of prior AIS investigations (Robbins et al. 2000; Esh et al. 2008; Bell et al. 2008). The Robbins et al. 2000 AIS report was reviewed and accepted by SHPD on February 12, 2000 (SHPD correspondence LOG NO: 26972 DOC NO: 0102RC15). The Bell et al. 2008 and Esh et al. 2008 AIS reports are currently in draft form and will be submitted to SHPD for review and approval.
- A total of nine historic properties were identified within the APE (see Table 3-2). All nine historic properties are recommended eligible for the Hawai'i Register of Historic Places, but do not meet the eligibility criteria for the National Register of Historic Places (NRHP).

Table 3-2: Summary of Identified Sites, General Significance Assessments, and Recommended General Treatments for Archaeological Sites in the Northern Alignment

SIHP Site Number	Formal Site Type	Functional Interpretation	Significance Category *					General Recommendations **			
			A	B	C	D	E	FDC	NFW	PID	PAI
Cultural Surveys Hawai'i "KALOKO 3" AIS Sites											
50-10-27-18099	Trail, curbstone	Transportation, Commemorative (Comm.)	✓		✓	✓				✓	
50-10-27-18144	Complex	Permanent Habitation, Ag.,				✓		✓			
50-10-27-18147	Complex	Recurrent Habitation, Marker				✓		✓			
50-10-27-18162	Terrace	Recurrent Habitation				✓		✓			
50-10-27-18191	Terrace	Recurrent Habitation				✓			✓		
50-10-27-26630	Complex	Temporary Habitation, Ag.				✓			✓		
50-10-27-26653	Modified Outcrop	Agriculture				✓			✓		
50-10-27-26654	Trough	Animal Husbandry				✓			✓		
50-10-27-26656	Cairn	Marker				✓			✓		
Paul H. Rosendahl, Ph.D., Inc. AIS Sites											
50-10-27-12996	Complex	Temporary Habitation				✓		✓			

SIHP Site Number	Formal Site Type	Functional Interpretation	Significance Category *					General Recommendations **			
			A	B	C	D	E	FDC	NFW	PID	PAI
50-10-27-13005	Complex	Quarry/indeterminate				✓		✓			
50-10-27-13007	Complex	Agriculture/Temporary Habitation				✓		✓			
50-10-27-13020	Complex	Agriculture-quarry/indeterminate				✓		✓			

Notes:
SIHP = State Inventory of Historic Places

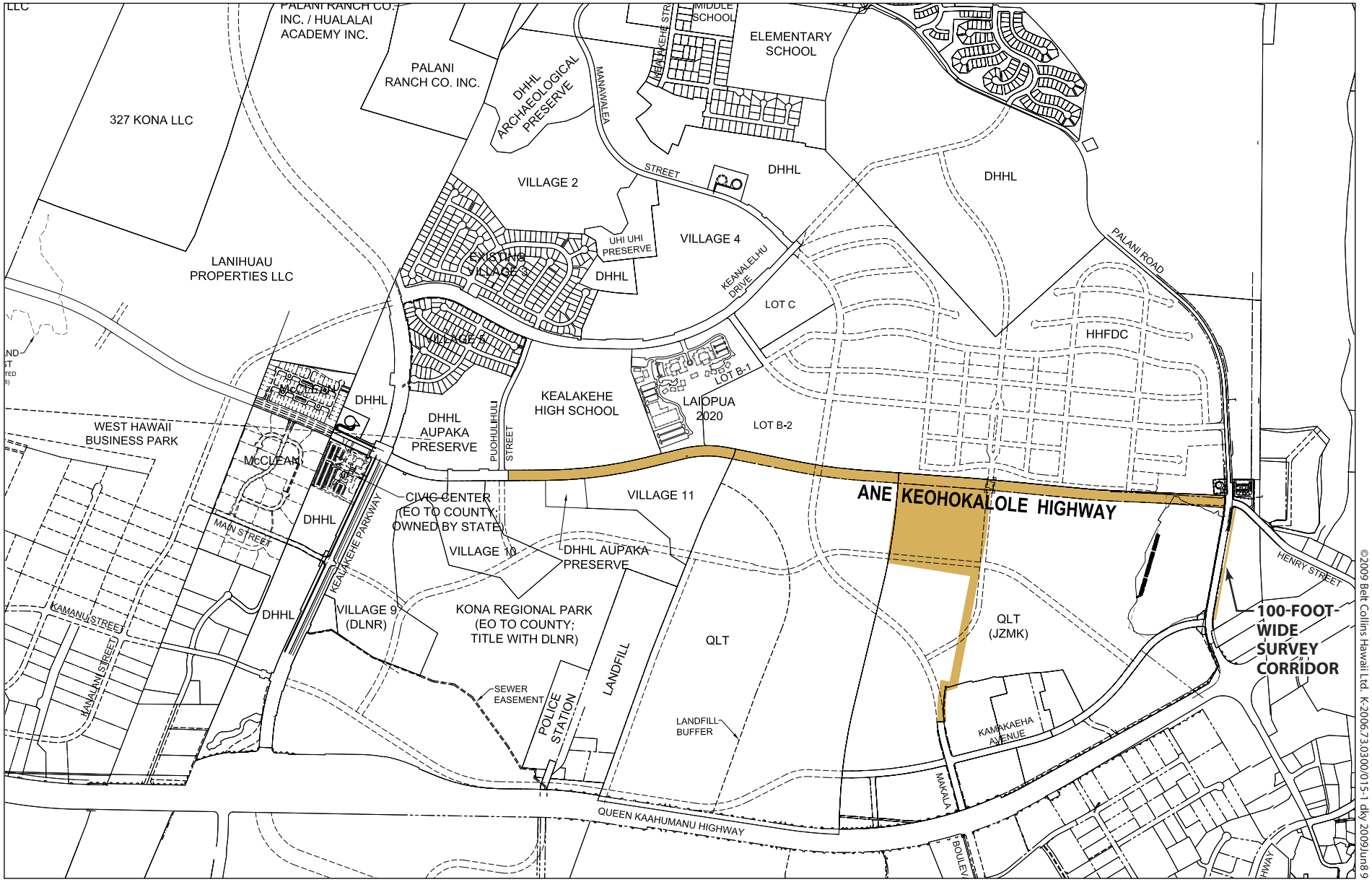
* General Significance Categories:
A = Important for historical contribution to significant events and/or broad patterns of history.
B = Important for association with the lives of important individuals in history.
C = Excellent example of site type at local, region, island, state, or national level.
D = Important for information content.
E = Culturally significant.

** Recommended Mitigation Treatments:
FDC = Further data collection necessary (detailed recording, surface collections, and limited excavations, and possibly subsequent data recovery/mitigation excavations).
NFW = No further work of any kind necessary, sufficient data collected, archaeological clearance recommended, no preservation potential.
PID = Preservation with some level of interpretive development recommended (including appropriate related data recovery work).
PAI = Preservation "as is," with no further work (and possible inclusion into landscaping), or possible minimal further data collection necessary.

Historic properties identified in the vicinity of the APE and documented in the January 1990 AIS conducted by PHRI for the McClean Honokohau property are listed in Table 3-2. Data recovery has since been conducted and is documented in *Archaeological Mitigation Program Honokohau Industrial Park (Parcel VII), Phase II: Data Recovery* (PHRI, January 1993).

Southern Corridor Survey Area

The survey area coverage of the AIS investigations in the southern corridor of the proposed highway is shown in Figure 3-5. Using the findings from the AIS, a narrower APE was designed to avoid as many historic properties within the study corridor as possible. The APE defines the area in which all activity, including construction related disturbances, would occur. Figures 3-6a, 3-6b, and 3-6c



©2009 Belt Collins Hawaii Ltd. K-20067.3.0300/015-1 dkv 2009Jun8 9

BELT COLLINS

NORTH

0 800 1600

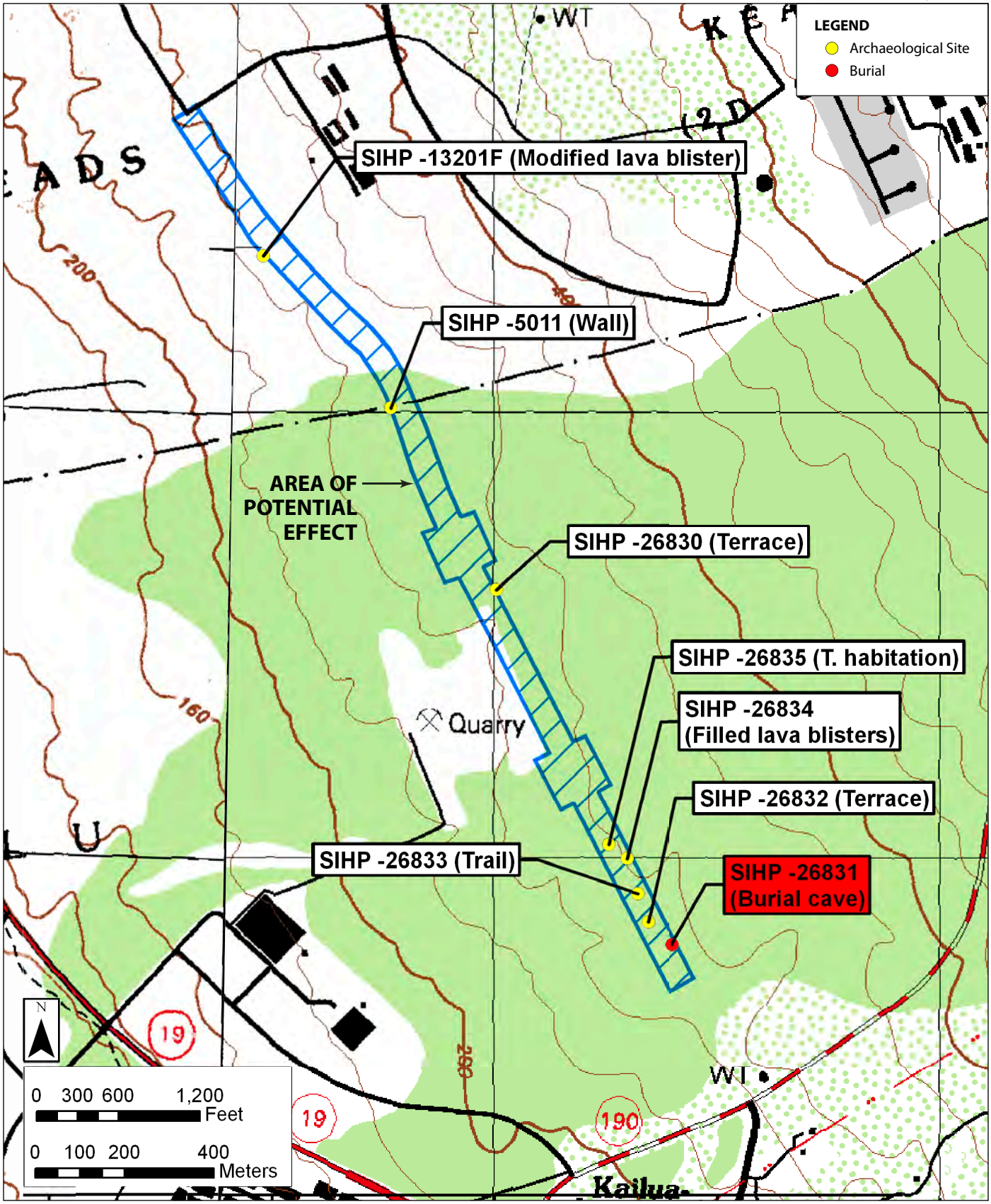
SCALE IN FEET

Figure 3-5

SOUTHERN CORRIDOR ARCHAEOLOGICAL AND CULTURAL SURVEY AREA

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

©2009 Belt Collins Hawaii Ltd. K-2006.73.0300/034-1 dky 2009Jun8 3



Source: Cultural Surveys Hawaii. June 2009.

Figure 3-6a
SOUTHERN CORRIDOR ARCHAEOLOGICAL SITES—PUOHULIHULI TO 1,000 FEET NORTH OF PALANI ROAD

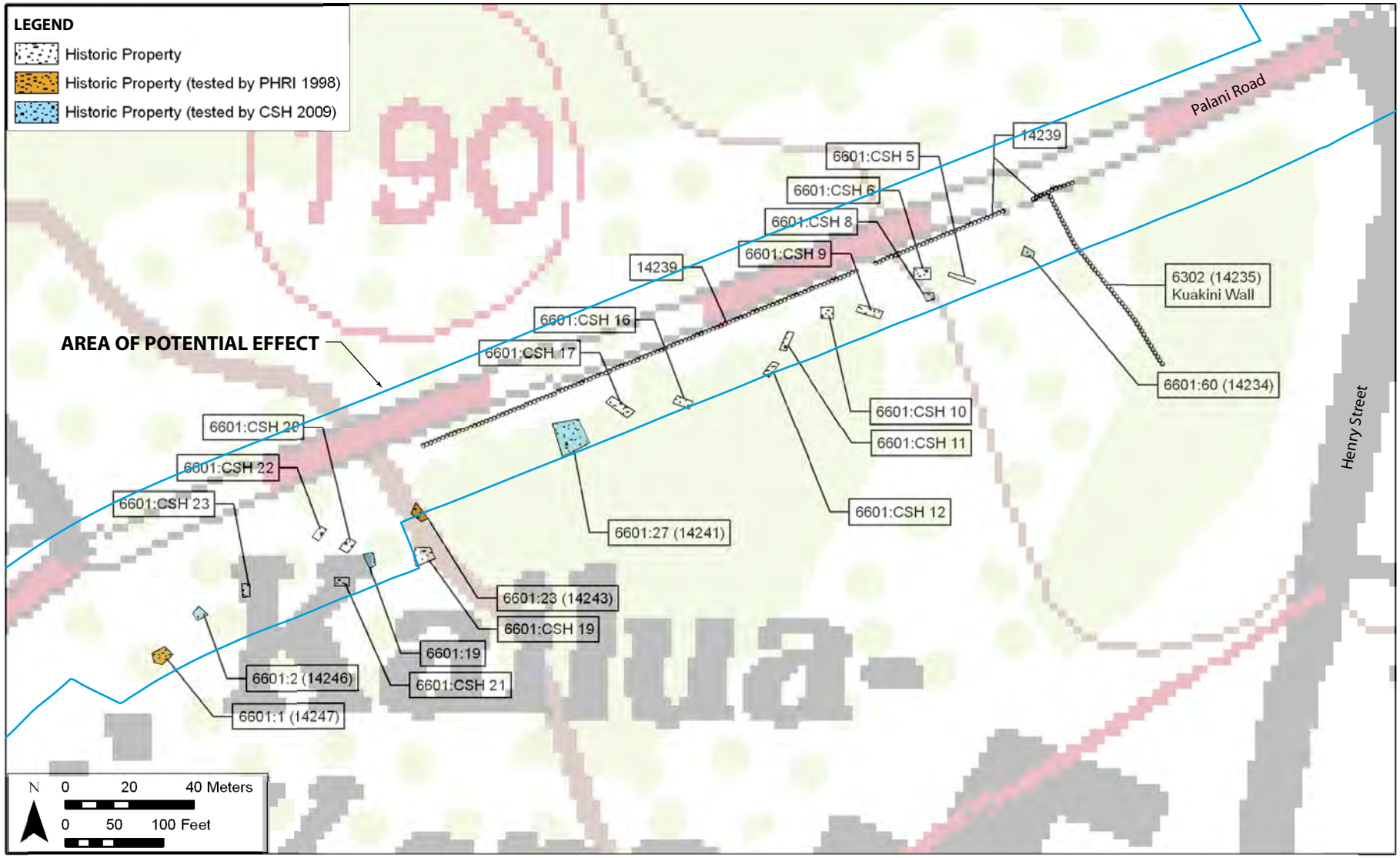
BELT COLLINS

NORTH

©2009 Belt Collins Hawaii Ltd. K-20067.3.0300/035-1 dky 2009Jun8 3

Figure 3-6b
SOUTHERN CORRIDOR ARCHAEOLOGICAL SITES—
1,000 FEET NORTH OF PALANI ROAD TO PALANI ROAD

Source: Pacific Legacy Incorporated. June 2009.



©2009 Belt Collins Hawaii Ltd. K-2006.73.0300/035-2 kya 2009Jul8 3

Figure 3-6c
SOUTHERN CORRIDOR ARCHAEOLOGICAL SITES—
SOUTH OF PALANI ROAD BETWEEN HENRY STREET AND KAMAKAEHA AVENUE

BELT COLLINS

Source: Cultural Surveys Hawaii. June 2009.

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

illustrate the locations of historic properties and a burial site identified in the southern corridor survey area and Table 3-3 summarizes the site type, functional interpretation, significance category, and general recommendations for treatment of the identified sites.

Table 3-3: Summary of Identified Sites, General Significance Assessments, and Recommended General Treatments for Archaeological Sites in the Southern Alignment

SIHP* Site Number	Formal Site Type	Functional Interpretation	Significance Category ***					Recommended Treatments ****			
			A	B	C	D	E	FDC	NFW	PID	PAI
Cultural Surveys Hawai'i "KEALAKEHE 1" AIS Sites											
50-10-28-05011	Wall	Livestock, Land Division Boundary				✓			✓		
50-10-28-13201F	Modified blister	Agriculture				✓			✓		
50-10-28-26830	Terrace	Temporary Habitation				✓			✓		
50-10-28-26831	Cave	Burial				✓	✓			✓	
50-10-28-26832	Terrace	Temporary Habitation				✓			✓		
50-10-28-26833	Trail	Transportation				✓			✓		
50-10-28-26834	Filled lava blisters	Marker				✓			✓		
50-10-28-26835	Lava tube	Temporary Habitation				✓			✓		
Pacific Legacy AIS Sites (SIHP numbers not yet assigned with exception of those previously identified)											
T-001	Complex	Agriculture				✓		✓			
T-002	Complex	Agriculture				✓		✓			
T-003	Platforms	Habitation				✓		✓			
T-004	Complex	Agriculture				✓		✓			
T-005	Complex	Habitation/Agriculture				✓		✓			
T-006	Complex	Agriculture/Habitation				✓		✓			
50-10-28-13384/T-007	Complex	Agriculture/Habitation				✓		✓			
T-008	Complex	Agriculture				✓		✓			
T-009	Complex	Agriculture				✓		✓			
T-010	Complex	Agriculture/Habitation				✓		✓			
T-011	Complex	Agriculture				✓		✓			

SIHP* Site Number	Formal Site Type	Functional Interpretation	Significance Category ***					Recommended Treatments ****			
			A	B	C	D	E	FDC	NFW	PID	PAI
T-012	Complex	Agriculture				✓		✓			
T-013	Complex	Habitation				✓		✓			
50-10-28-13391/T-015	Modified Sinkhole	Habitation				✓		✓			
T-021	Modified Outcrop	Agriculture				✓		✓			
T-022	Complex	Agriculture				✓		✓			
T-023	Complex	Agriculture/Habitation				✓		✓			
Cultural Surveys Hawai‘i “KEAHUOLU 5” AIS Sites											
50-10-27-06302 (14235)	Kuakini Wall	Livestock Boundary	✓		✓	✓				✓	
50-10-27-06601	Kona Field System	Agriculture, Habitation Complex	✓			✓			✓		
50-10-27-14239	Wall	Livestock Boundary				✓			✓		

Notes:
* State Inventory of Historic Places

*** General Significance Categories:
A = Important for historical contribution to significant events and/or broad patterns of history.
B = Important for association with the lives of important individuals in history.
C = Excellent example of site type at local, region, island, state, or national level.
D = Important for information content.
E = Culturally significant.

**** Recommended General Treatments:
FDC = Further data collection necessary (detailed recording, surface collections, and limited excavations, and possibly subsequent data recovery/mitigation excavations).
NFW = No further work of any kind necessary, sufficient data collected, archaeological clearance recommended, no preservation potential.
PID = Preservation with some level of interpretive development recommended (including appropriate related data recovery work).
PAI = Preservation “as is,” with no further work (and possible inclusion into landscaping), or possible minimal further data collection necessary.

The results of the “KEALAKEHE 1” AIS conducted by CSH for the southern portion of the proposed highway, from Puohulihuli Street to a point approximately 1,000 feet north of Palani Road, are summarized as follows:

- Portions of the current survey area have been covered by prior AIS investigations that have been reviewed and accepted by SHPD (Donham

1990a; Donham 1990b; Burgett and Rosendahl 1992; Corbin and Wong-Smith 2008). Due to discrepancies among the previous studies, it was determined in consultation with SHPD that a supplemental AIS should be conducted for the current project area.

- A total of eight historic properties were identified within the APE, of which two have been previously identified (SIHP 50-10-28-05011 and SIHP 50-10-28-13201F). One of the sites contained a burial. All eight historic properties are recommended eligible to the Hawai‘i Register of Historic Places, but do not meet the eligibility criteria for the NRHP (see Table 3-3).

PLI is preparing the AIS for the southern-most portion of the proposed highway. Its draft AIS is anticipated to be submitted to SHPD at the end of June 2009. Findings from the field are summarized as follows:

- A total of 17 historic properties containing 105 component features were identified within the APE. Two of the sites had been previously recorded (SIHP 50-10-28-13384 and 50-10-28-13391) during a 1990 survey.
- The vast majority of the features were low stone walls, mounds, and modified outcrops, which are associated with intensive traditional agricultural practices in the area. Associated with these sites are what appear to be habitation features, e.g., enclosures, platforms, and terraces.
- An agricultural landscape of rough stacked stone field walls delineating cleared areas of rich soil was revealed. The loose stones that had once covered that soil had been removed and either placed within the walls or piled atop natural bedrock outcrops to form stone clearance mounds.
- A modified sinkhole and its associated lava tubes was a unique archaeological feature, SIHP 50-10-28-13391. However, much of the site’s integrity has been destroyed by looters and other vandals.
- The sites within the APE are components of the extensive Kona Field System (SIHP 50-10-27-06601), which is eligible for listing on the NRHP.
- To better evaluate the archaeological resources within the proposed project area, a reconnaissance survey was conducted in the adjacent 28-acre Archaeological Preserve. Twenty-five large and very visible sites, which included enclosures, lava tubes, platforms, terraces, and walls were recorded. Most are associated with habitation, with at least one site that appears to be ceremonial and may be a small heiau. The density of sites in the Preserve is “phenomenal” and hundreds of low walls, mounds, and modified outcrops were observed. The results of the reconnaissance survey indicate that the types of sites found in the proposed highway alignment are not unique and are very common in the Preserve. These findings support the assessment that the sites in the proposed highway alignment are significant for their information content only.

The findings of the "KEAHUOLU 5" AIS conducted by CSH on the south side of Palani Road, from the Kailua-Kona Fire Station to Henry Street, are summarized as follows:

- Portions of the current survey area have been covered by prior AIS investigations that have been reviewed an accepted by SHPD (Jensen 1990; Henry et al. 1998; Corbin and Wong-Smith 2008). Due to the discrepancies between the three previous studies, as well as a desire for additional subsurface testing, SHPD requested that further AIS investigation be conducted on the current survey area.
- Three historic properties were identified in the western portion of the survey area (see Table 3-3). All three historic properties are recommended eligible for the Hawai'i Register of Historic Places. Two of the historic properties, the Kuakini Wall (SIHP 50-10-27-06302 [14235]) and the Kona Field System (SIHP 50-10-27-06601), were also determined eligible for listing on the NRHP in 1977.
- No historic properties were identified east of the Kuakini Wall (SIHP 50-10-27-06302 [14235]). The eastern portion of the survey area, near the Palani Road-Henry Street intersection, is presently covered by extremely dense vegetation that generally prohibited observation of the ground surface. Although Jensen (1990) previously reported two historic properties in this area, the subsequent study by Henry et al. (1998) indicated that they had been destroyed.

The findings of the "KEAHUOLU 6" AIS conducted by CSH for the proposed construction base yard and base yard access road are summarized as follows:

- The entirety of current survey area has been covered by a prior AIS that was reviewed and accepted by SHPD (Donham 1990a). In consultation with SHPD, it was determined that an additional AIS should be conducted on the current survey area.
- No historic properties were identified within the survey area. Excavation and grading related to the previous rock quarry likely destroyed or severely impacted any surface or subsurface historic properties that may have existed within the survey area.

3.4.1.2 Potential Impacts

All of the historic properties and the one burial site identified and/or recorded during the surveys were assessed for their significance based upon criteria established by Department of Land and Natural Resources (DLNR)-SHPD and contained in HAR 13-284-6. Findings are summarized below.

Northern Corridor Survey Area

Nine historic properties would be affected by the APE in the northern part of the proposed project. The determination resulting from the AIS for the Proposed Action along the northern corridor is an effect to historic properties, with agreed upon mitigation measures. Appropriate mitigation measures will include data recovery (see Table 3-2) subject to SHPD approval. An archaeological monitoring plan will be approved by SHPD prior to any groundbreaking activities.

Appropriate treatment for a portion of the mauka-makai trail, SIHP 50-10-27-18099 (a curbstone trail) affected by the proposed project is being reviewed by SHPD. The portion of the trail affected by the proposed project is suggested to be of significantly less import and its potential sacrifice, if need be, appears to be in keeping with the previous AIS recommendations (see excerpt below) and SHPD letter of February 12, 2001 (CSH's "KALOKO 3" AIS in Appendix A).

> "*. . .it is suggested that only certain, intact sections be preserved, specifically those trail sections in proximity to other preserved Hawaiian sites. The decision as to which trail sections provide the greatest degree of interpretative possibilities and thus, warrant preservation treatment will be identified during future work in the project area and presented in the Preservation Plan.*"

It is recognized that some organizations strongly desire to preserve the mauka-makai route of the original trail. Hence, further investigations to better understand the trail led to the findings from Na Ala Hele, Hawai'i Trail & Access System, dated July 14, 2006:

> "*The mauka-makai trail does qualify as being subject to the Highways Act of 1892, and therefore eligible to be claimed by the State. However, in 2001 Mr. Oshiro determined that the trail did not serve a Na Ala Hele programmatic purpose, or had linear recreation or access value. This was due to the fact that the government had previously relinquished its interest in the Mamalahoa Trail that this feature had once connected to. Nonetheless, those remnants and other sites have been slated for preservation and will be included as part of an interpretive complex.*"

Consultation is ongoing with organizations expressing interest in the mauka-makai trail to respect the interests of those concerned and the historic nature of the area.

Southern Corridor Survey Area

Findings from the Kealakehe 1 AIS indicate that eight historic properties, including one containing a burial, would be affected by the APE (sites shown on Figure 3-

6a). The determination resulting from the AIS for the Proposed Action is "effect, with proposed mitigation commitments." Recommended mitigation measures, subject to SHPD approval, include the preparation of a Burial Treatment Plan in accordance with HAR 13-300-33 and in consultation with SHPD, Hawai'i Island Burial Council, and any recognized lineal and cultural descendants. An archaeological monitoring plan is also recommended to be approved by SHPD prior to any groundbreaking activities. Monitoring provisions should include on-site and on-call monitoring, with on-site monitoring primarily focused on the immediate vicinity of SIHP 50-10-28-26836, a complicated area of braided lava tubes used for temporary habitation and burial. The possibility of significant, as yet unidentified, historic properties is suggested to be significantly higher in the immediate vicinity of this site, as lava tube entrances may have been deliberately well-concealed and/or obscured by thick vegetation.

Based on the results of the AIS performed in the southern-most area of the proposed highway, 17 historic properties would be adversely affected within the APE (sites shown on Figure 3-6b). Adverse effects could be mitigated with a combined approach of (1) conducting data recovery excavations within selected sites and features and (2) developing the Preserve into an interpretive preserve. Mitigation could also include data recovery (see Table 3-3) subject to SHPD approval and the approval of an archaeological monitoring plan by SHPD prior to any groundbreaking activities.

In the area proposed for use in widening Palani Road (Figure 3-6c), the project-specific effect recommendation is "effect, with proposed mitigation commitments." The recommended mitigation measures could reduce or eliminate the proposed highway's potential adverse effect to these significant historic properties.

- Table 3-3 indicates the recommended mitigation treatment for each of the historic sites identified.

- Generally, preservation in the form of avoidance and protection is recommended for the Kuakini Wall (SIHP 50-10-27-06302 [14235]). As the Kuakini Wall is a linear feature that extends south beyond the project area, removal of the northern portion of the wall nearest to Palani Road may occur without significantly detracting from the integrity of the historic property. Any proposed removal of portions of the wall will require consultation with and approval of SHPD.

In the former quarry and access road, no historic properties were identified. Consequently, CSH's project-specific effect recommendation is "no historic properties affected." No historic preservation mitigation measures are recommended for the proposed project and no further archaeological work is warranted. If in the unlikely event that intact cultural resources are encountered

during the course of development activities, all work in the immediate area should be stopped and SHPD should be promptly notified.

Summary

In sum, with the historic properties and burial site mitigation planned and designed into the Proposed Action, no significant impacts on historic properties and burial sites will occur. Reasons for this determination follow.

- The Proposed Action is anticipated to primarily result in effects on historic properties that are recommended significant for their information content only. With the implementation of data recovery as specified by a data recovery plan approved by SHPD, these effects can be mitigated.

- For the two sites recommended for preservation, they would be addressed as follows:

    - **One burial discovered within SIHP 50-10-28-26831.** A burial treatment plan will be developed with the intent of preserving in place with an appropriate buffer zone between the project hard-scape (shared-use walkway and bikeway located outside of the roadway) and the burial chamber/cave. The burial treatment plan will be developed in consultation with the SHPD, Hawai‘i Island Burial Council, and any recognized lineal and cultural descendants.

    - **The Great Wall of Kuakini, SIHP 50-10-27-06302.** This site is eligible for listing on the NRHP and is recommended for preservation. However, breaches up to 33 feet have been allowed by SHPD for road construction and the extent of the breach needed to widen Palani Road would be less than 33 feet. Any proposed removal of portions of the wall will require consultation with and the approval of SHPD.

- One intact section of the mauka-makai trail affected by the proposed highway is not recommended for preservation, but because this is part of a mauka-makai trail and greater intact sections outside of the APE are recommended for preservation (SIHP 50-10-27-18099), consultation with organizations expressing interest in the mauka-makai trail is ongoing.

- An archaeological monitoring plan will be prepared for SHPD’s approval prior to any groundbreaking activities.

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 CFR Part 800, the Federal Highway Administration (FHWA) is in the process of consulting with the Advisory Council

on Historic Preservation, the State Historic Preservation Officer (SHPO), native Hawaiian organizations, and other consulting parties concerning this Proposed Action and its potential effect on historic properties. A determination of "adverse effect" under the NHPA Section 106 process would result in a Memorandum of Agreement (MOA) that will be used to identify stipulations to mitigate adverse effects. The results of the Section NHPA 106 process will be documented in the Final Environmental Assessment (EA).

No impacts to historic properties or burial sites would occur under the No Action Alternative.

3.4.2 TRADITIONAL CULTURAL PRACTICES

CSH and PHRI conducted cultural impact assessments (CIAs) for the proposed Ane Keohokalole Mid-Level Highway project. CSH conducted the assessment for the areas potentially affected by the northern portion of the proposed highway and PHRI conducted the assessment for the area potentially affected by the southern portion. The CIA's are presented in Appendix B.

The purpose of a CIA is to comply with the requirements of HRS Chapter 343, as amended by House Bill (H.B.) No. 2895 H.D. 1 of the Hawaii State Legislature (2000) and approved by the Governor as *Act 50* on April 26, 2000. Among other things, Act 50 requires that EAs identify and assess the potential effects of any proposed project upon the "…cultural practices of the community and State…." Hawaii Revised Statutes (HRS) Chapter 343 was amended by the State Legislature because of the perceived need to assure that the environmental review process explicitly addressed the potential effects of any proposed project upon "…Hawaii's culture, and traditional and customary rights." Guidelines previously prepared and adopted by the State Office of Environmental Quality Control (OEQC) (1997) provide compliance guidance. Both *Act 50* and the OEQC *Guidelines for Assessing Cultural Impacts* mandate consideration of all the different groups comprising the multi-ethnic community of Hawai'i. This inclusiveness, however, is generally understated, and the emphasis, intent, and evolution of both the legislative action and the guidelines are clearly meant to be primarily upon aspects of Native Hawaiian culture, particularly traditional and customary access and use rights.

3.4.2.1 Affected Environment

Northern Corridor Survey Area

CSH completed a CIA affected by the northern-most third of the proposed highway (within the Koloko and Honokohau ahupua'a). The CIA also addressed

the potential cumulative impacts of the entire three-mile proposed highway corridor, from Palani Road to Hina Lani Street.

The results of the CIA are summarized as follows:

- Hawaiian organizations, agencies, and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the project area.
- Background research and community consultation yielded historic and cultural history aspects of the project area, including oral histories, trails, and plant resources. For example, the project area is associated with specific *mo‘olelo* (oral histories) concerning various chiefs, legends, and spirits in the region.
- The project area is likely to contain substantial additional subsurface deposits, as yet undiscovered and undocumented, associated with lava tubes and subterranean chambers, including burials and other sacred materials and features (e.g., water-collection devices).
- Offering the community the opportunity to review and comment on the CIA and findings would help mitigate potentially adverse effects of the proposed highway on the Hawaiian cultural practices and resources in the project area.
- In a follow-up letter, dated April 14, 2009 and presented in Appendix B-1, the National Park Service (NPS) requested that SIHP Site Number 18099, a mauka to makai trail across Queen Ka‘ahumanu Highway to the south of Aimakapa Fishpond, be acknowledged as entering Kaloko-Honokohau National Historical Park. Because this trail connects the mauka lands of the ahupua‘a to Kaloko-Honokohau National Historical Park (NHP), the NPS supports preservation of segments of the trail wherever possible. Communication with representative of NPS’ Ala Kahakai National Historic Trail and the State’s Na Ala Hele Trail and Access Program’s Hawai‘i Island office is also recommended.

Care should be taken to protect and preserve the natural and cultural resources identified in the CIA to help mitigate potentially adverse effects of the proposed highway on the Hawaiian cultural practices and resources in the project area. The community should have an opportunity to review mitigation plans prior to the finalization of the highway design.

Southern Corridor Survey Area

PHRI conducted a CIA along the southern portion of the proposed highway (within the Kealakehe and Keahuolu ahupua‘a). The assessment area included the southern area of the proposed highway, along with the area affected by the proposed widening of Palani Road (Figure 3-5).

PHRI, through a contracted cultural resources specialist, developed a list of potential contacts with knowledge of and/or historical or family ties to the area. Using a questionnaire, face-to-face interviews and follow-up conversations by telephone were conducted with these individuals to gather information on the project area and its potential import to cultural history and practices.

The results of the CIA are summarized as follows:

- The CIA survey was conducted for the proposed Ane Keohokalole Highway project corridor (TMK:3-7-4-08: var), located in the lands of Keahuolu and Kealakehe, North Kona District, island of Hawai‘i.
- Review of the information presented in this CIA – historical documentation, archaeological surveys and research, and oral reminiscences – revealed limited cultural sites in the project area.
- Contemporary or continuing cultural practices include gathering activities of ocean resources and specific plants from the 300-foot elevation seaward, makai of the proposed highway corridor.

Based upon the findings of the CIA, the Proposed Action would have limited impacts on Hawaiian cultural resources, beliefs, and practices, as the activities they embody take place outside of the project area.

3.4.2.2 Potential Impacts

Based upon the findings of the CIAs, with appropriate mitigation, including sensitivity to cultural histories, practices, materials, and remains, the Proposed Action will have no significant impact on Hawaiian cultural resources, beliefs, and practices.

Based on consultation with the participants in the CIAs, care should be taken to protect and preserve cultural and historic properties (e.g., *puakini, ala, ilina*) and cultural and natural resources and associated practices (e.g., medicinal and lei plants) in and immediately adjacent to the project area that may be negatively affected by the Proposed Action. These measures would help mitigate the potentially adverse effects of the proposed highway on Hawaiian cultural practices and resources in and near the project area.

No impacts to Hawaiian cultural resources, beliefs, and practices would occur under the No Action Alternative.

3.5 FLORA AND FAUNA

Separate studies of flora and fauna were conducted for the proposed Ane Keohokalole Highway corridor. A single survey of flora and fauna was performed for the within a 100-foot-wide corridor along the south side of Palani Road. The results of these surveys follow.

3.5.1 TERRESTRIAL FLORA

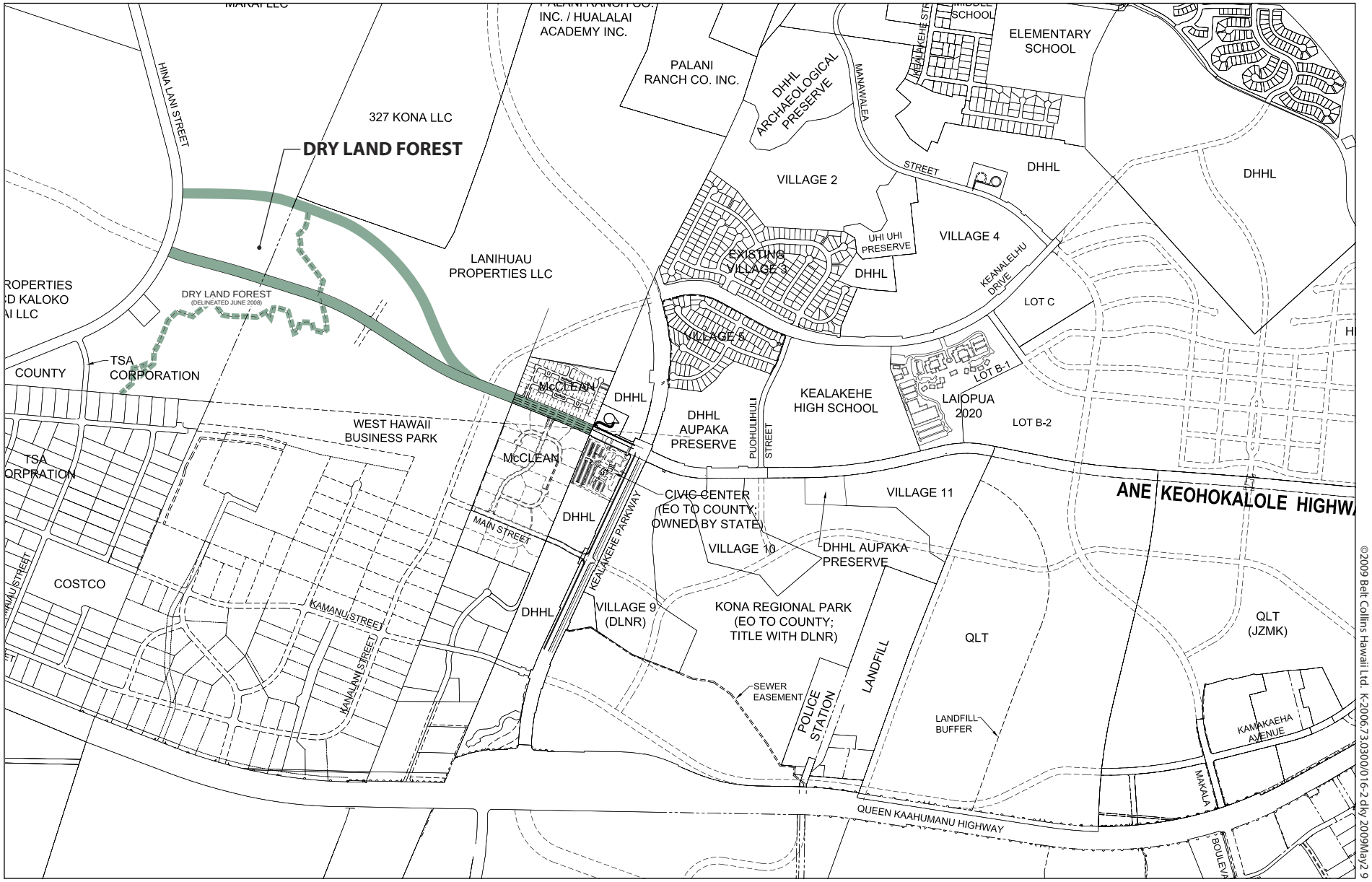
A botanical field survey was conducted by Isle Botanica (Art Whistler, Ph.D.) on April 4-5 and August 5, 2007 for the southern portion, and February 27, 2008 for the northern portion. The objectives of the field study were to provide a general description of the vegetation types present in the project area (particularly any habitat that may harbor rare plant species), to make a checklist of all native and naturalized vascular plants found, and to search for threatened and endangered species on or in the immediate vicinity of the proposed highway corridor. The study site consisted of two survey areas: the southern and northern portions of the proposed highway. Both survey areas were approximately 400 feet wide. The botanical survey reports are included in Appendix C.

On April 20 and 21, 2009, a biological survey for the proposed widening of Palani Road was conducted by Rana Productions, Ltd. The primary purpose of the survey was to address concerns raised by the U.S. Fish and Wildlife Service (USFWS) in its Technical Assistance letter dated March 13, 2009. Concerns included the possible occurrence of one of the secondary host plants, tree tobacco (*Nicotia glauca*), that is occasionally used by the endangered Blackburn's sphinx moth (*Manduca blackburni*). Findings are summarized herein; the full survey is presented in Appendix D.

3.5.1.1 Affected Environment

Northern Corridor Botanical Survey Results

The northern corridor survey area encompassed the area starting at Kealakehe Parkway and extending north about 4,200 feet to Hina Lani Street (Figure 3-7a).



BELT COLLINS

NORTH

0 800 1600

SCALE IN FEET

Figure 3-7a

NORTHERN BOTANICAL SURVEY AREA

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

The mauka alignment was proposed and surveyed in March 2008, but because of concerns for archaeological sites and native dryland forest, the site was moved slightly to the west, which required a revised botanical survey. The northern corridor survey area is covered with lava flows of various ages, some of them with ‘a‘a lava surfaces (on the northern portion) and others with pahoehoe (on the southern portion).

The results of the September 2008 botanical survey are as follows:[7]

- Most of the survey area has been highly disturbed in the past and is dominated by scrubby vegetation composed mostly of alien species.
- Three kinds of vegetation are found at the site: (1) Managed Land Vegetation; (2) Koa Haole Scrub, the major type of vegetation present at the survey area, which is dominated by the alien tree or shrub koa haole (*Leucaena leucocephala*) and a few other much less common species in a matrix of fountain grass (*Pennisetum setaceum*); and (3) Dryland Forest found on the ‘a‘a lava flow. Only the latter is classified as a native plant community.

A total of 53 plant species was recorded in the survey area. Eighteen (18) of these are native (seven endemic species and 11 indigenous species). None of these are federal-listed as threatened or endangered species. Although several federal-listed endangered plant species have been found in the general vicinity, none were found within the survey area during the present study.

- At the north end of the proposed highway, an area of native dryland forest on rough ‘a‘a lava is home to a number of native species, including the federal-listed endangered plant species hala pepe (*Pleomele hawaiiensis*), uhiuhi (*Caesalpinia kavaiensis*), ‘aiea (*Nothocestrum breviflorum*), ma‘oloa (*Neraudia ovata*), and *Cyperus fauriei.* The hala pepe in the area occurs east of the proposed alignment, and it is believed that the other species have been extirpated from the remnant dryland forest.
- The federal-listed endangered uhiuhi (*Caesalpinia kavaiensis*) was previously identified and recorded on the Hawai‘i Natural Heritage Program Database map. However, this site is out of the survey area and the tree is believed to have disappeared from the site. There is also a zone of hala pepe shown to the east of the survey area, but no individuals of this endangered species were seen during the present study, as the population is generally found only at higher elevations.

  No wetlands or any other type of sensitive vegetation was present within the survey area.

[7] Isle Botanica. *Botanical survey of the revised route of the proposed Ane Keohokalole Highway extension between Kealakehe Highway and Hina Lani Highway, North Kona, Island of Hawai‘i.* September 2008.

Dryland Forest Delineation

In June 2008, Isle Botanica conducted a survey to delineate the boundaries of the dryland forest in the area of the proposed highway corridor. The dryland forest delineation report is provided in Appendix C. The study site comprised the western portion of what is referred to as the Kaloko dryland forest, located in the North Kona District, north of Kona Town and mauka of Queen Ka‘ahumanu Highway and the Kaloko Light Industrial Subdivision. Hawaiian dryland forest is classified as a sensitive type of vegetation, since nearly all of it has been cleared for development, grazing land, and agriculture over the last thousand years.

The Kaloko dryland forest is important since it includes four federal-listed endangered plant species. One of these, halapepe (*Pleomele hawaiiensis*), was recorded in the dryland forest during a 2006 survey. Twenty-four individuals were recorded then, but all of these are located east (upslope) from the present study site. Kaloko represents one of only two known populations of halapepe that are successfully regenerating. The other three endangered species, ‘aiea (*Nothocestrum breviflorum*), ma‘oloa (*Neraudia ovata*), and *Cyperus fauriei* (no common name) were not found during the 2006 survey, and all are thought to have disappeared from this remnant forest. These latter three were last recorded near the midline of the mauka alignment of the proposed highway. Another species that is a candidate for federal listing as threatened or endangered is ko‘oko‘olau (*Bidens micrantha* ssp. *ctenophylla*). Ko‘oko‘olau is fairly common at the present study site; it has no official status and is not uncommon in this area of the North Kona District.

The Kaloko dryland forest is an open, relatively intact native forest. The most common trees are the native species ‘ohi‘a lehua (*Metrosideros polymorpha*), lama (*Diospyros sandwicensis*), ‘alahe‘e (*Psydrax odoratum*), pua pilo (*Capparis sandwichiana*), and mamane (*Sophora chrysophylla*). The native trees or shrubs ‘ohe (*Reynoldsia sandwicensis*), naio (*Myoporum sandwicensis*), and ‘a‘ali‘i (*Dodonaea viscosa*) are also present but are less common than the formerly mentioned species. The only alien tree species noted in this open forest are the Polynesian introduction noni (*Morinda citrifolia*), Christmas berry (*Schinus terebinthifolius*), and koa haole.

The southern boundary of the Kaloko dryland forest has recently been bulldozed in quarry activities, and fountain grass is spreading in the newly disturbed habitat. The ground cover in the makai edge this forest is very sparse due to the increasingly inhospitable growing conditions proceeding downslope. The most common species in this category are lantana (*Lantana camara*), the native vines huehue (*Cocculus trilobus*) and kowali ‘awa (*Ipomoea indica*), fountain grass, and hairy swordfern (*Nephrolepis multiflorum*).

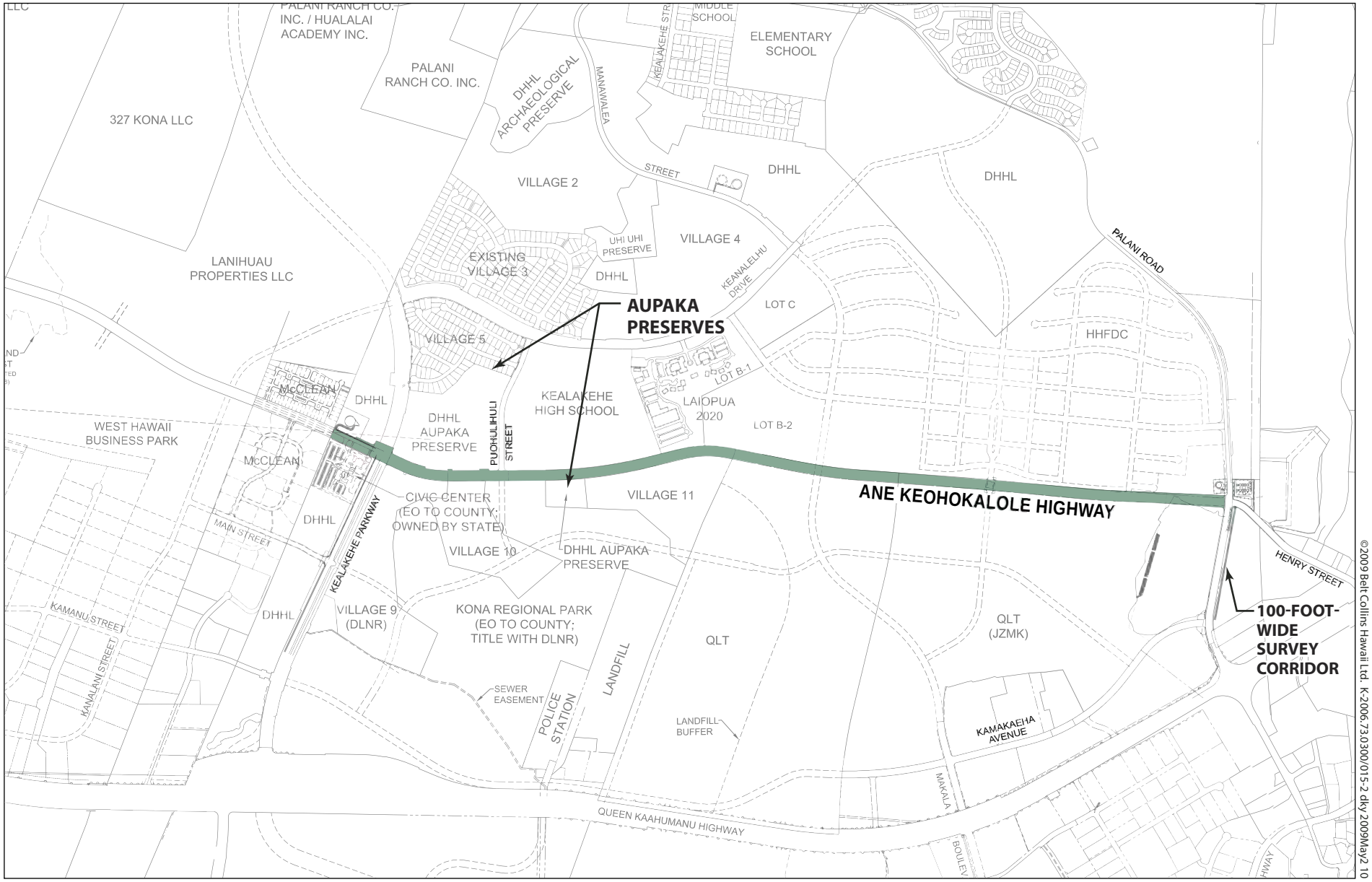
Because of the gradual thinning of the forest as one moves west, there is no hard-and-fast line that can be called the western (lower) boundary of the Kaloko dryland forest. Different biologists provide different opinions. From a botanical point of view, Dr. Whistler believes a logical solution is to make the western (lower) boundary the unpaved road that leads from Hina Lani Street just west of the water tank, across the nearly barren ‘a‘a flow to a construction site (McClean Properties), because west of this unpaved road only scattered trees occur (about half of them alien species and half native species).

Southern Corridor Botanical Survey Results

Figure 3-7b illustrates the surveyed areas for the southern corridor. The southern corridor surveyed in 2007 and 2008 extended approximately 2.5 miles from the southwest corner of Kealakehe High School, where it meets the existing Ane Keohokalole Highway, to the junction of Henry Street and Palani Road. A small section of roadside north of Palani Road, from Henry Street west to the road leading into the Makalapua Shopping Center, was also included in the survey area. The southern corridor survey area is covered with ‘a‘a and pahoehoe lava flows of various ages. The vegetation in the survey area has been highly disturbed in the past and is dominated by scrub vegetation composed mostly of alien species. At the north end of the southern corridor survey area, however, there is an area of rough ‘a‘a lava that was previously recorded as home to a number of native species, including the federal-listed endangered plant species hala pepe (*Pleomele hawaiiensis*), uhiuhi (*Caesalpinia kavaiensis*), ‘aiea (*Nothocestrum breviflorum*), ma‘oloa (*Neraudia ovata*), and *Cyperus fauriei*. This area and an adjacent area across the proposed highway have been designated as aupaka preserves.

The results of the April 2008 botanical survey are as follows:

- Four main kinds of vegetation predominate the survey area: (1) Managed Land Vegetation; (2) Prosopis Woodland; (3) Leucaena Scrub, the major type of vegetation present in the survey area; and (4) Remnant Dryland Forest, found on the ‘a‘a lava flow of the aupaka preserve. Only the latter is classified as a native plant community.
- Sixty-eight (68) plant species were recorded in the survey area. Of these, 16 are native (11 indigenous species and 5 endemic species). None of these are federal-listed threatened or endangered. Although several federal-listed endangered plant species had been previously recorded in the general vicinity, none were found within the survey area.



©2009 Belt Collins Hawaii Ltd. K-2006.73.0300/015-2 dky 2009May2 10

BELT COLLINS

NORTH

0 800 1600

SCALE IN FEET

Figure 3-7b
SOUTHERN BOTANICAL SURVEY AREA

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

- The Hawai‘i Natural Heritage Program database map shows a zone of the federal-listed endangered tree uhiuhi (*Caesalpinia kavaiensis*) that appears on paper, at least, to overlap the survey area. This tree was not found in the survey area during the present study, nor has it specifically been reported in previous studies. Currently, fewer than 50 reproductive individuals are known. A preserve of 11.2 acres, mostly east of Kealakehe High School, has been set aside for their protection.
- Three other federal-listed threatened or endangered species have been recorded in the general vicinity on the Hawai‘i Natural Heritage Program Database map: hala pepe (*Pleomele hawaiiensis*), ‘aiea (*Nothocestrum breviflorum*), and aupaka (*Isodendrion pyrifolium*). Hala pepe has populations in the Kaloko to Kona area (USFWS 1995), but the single record of its presence just northwest of Kealakehe High School is probably in error, or the tree has long since died. ‘Aiea was formerly recorded in the aupaka preserve, but has not been located in recent years. Two individuals of aupaka have been reported from the aupaka preserve, but apparently only one of those is alive today. This living aupaka is found outside the proposed road corridor in a newly-created preserve of 3.2 acres makai of the proposed highway corridor, across from Kealakehe High School.
- No wetlands were identified within the survey area. A small patch of dryland forest was identified at the northern end of the survey area. According to Dr. Whistler, this dryland forest is smaller in size and less biologically significant than the dryland forest located at Kaloko approximately one to two miles to the north. Although threatened or endangered plants were previously found in the survey area, none were identified during the present study or during a study conducted in 2006 (Whistler 2006). The endangered plant, aupaka (*Isodendrion pyrifolium*), is located in a preserve on the mauka side of the survey area adjacent to the northern boundary of Kealakehe High School, and in a preserve makai of the survey area across from Kealakehe High School, (Figure 3-7a). In general, the survey area is comprised of lava flows of various ages which are covered mostly by alien-dominated scrub vegetation that has been highly disturbed in the past.

The portion of the southern corridor surveyed in 2009 is a 100-foot-wide corridor along the south side of Palani Road extended approximately 900 feet between Henry Road and Kamakaeha Avenue. The corridor is undeveloped, with very dense vegetation; many foot trails, and one large homeless campsite. The vegetation is dominated almost to the exclusion of native species by alien species and can be best characterized as being a Guinea Grass/Koa Haole grassland. No species listed as threatened, endangered, or proposed for listing under either the

federal or state programs were detected during the survey. No host plants of USFWS concern were identified.

3.5.1.2 Potential Impacts

No identified or known threatened or endangered species of terrestrial flora inhabiting the project area. Although several federal-listed endangered plant species have been identified in previous surveys, none were found within the survey areas during the present studies. The survey areas have been highly disturbed in the past and are dominated by scrubby vegetation composed mostly of alien species.

A dryland forest habitat, which is becoming increasingly uncommon, was identified along the northern portion of the proposed highway corridor. The quality of the remaining habitat is considered poor due to the encroachment of the alien species fountain grass, which is an aggressive invader that suppresses the native vegetation and fuels dangerous wildfires that have proved devastating to native species.[8] The re-alignment of the corridor under the Proposed Action avoids the majority of the dryland forest present and routes the corridor through the drier, more sparsely vegetated portion. This will minimize impacts on the remaining dryland forest area to the maximum extent practicable

No significant impacts to terrestrial flora would occur under the Proposed Action. Disturbance to the existing soils and vegetation will be kept to a minimum, preserving as much vegetation as possible. Appropriate protection measures will be implemented during construction of the Proposed Action should any endangered flora be unexpectedly encountered during construction. Native species will be considered for landscaping within the highway corridor where feasible.

The No Action Alternative would not impact terrestrial flora species at the project site or in the surrounding area. The existing flora would remain unchanged under this alternative.

3.5.2 TERRESTRIAL MAMMALS AND BIRDS

3.5.2.1 Affected Environment

Two avian and terrestrial mammalian species surveys were conducted for the proposed highway corridors (Figure 2-1). The study sites consisted of (1) the proposed highway alignment, including the area from the Henry Street and Palani

[8] Personal Communication with Reginald Davis, Rana Productions. November 6, 2008.

Road junction north to the Hina Lani Street intersection; and (2) a strip running along the south side of Palani Road from Henry Street to the intersection with Kamakaeha Avenue. The first survey area, approximately three miles in length and 400 feet wide was conducted October 6-8 and 25, 2007. The second survey area, approximately 900 feet by 100 feet, was conducted on April 20 and 21, 2009.

The purpose of the first survey was to determine if there were any federal- or state-listed threatened, endangered, or candidate species of birds or mammals on or in the immediate vicinity of the proposed Ane Keohokalole Highway corridor. The purpose of the second survey was to assess the flora and fauna of the project area and address concerns raised by USFWS in their Technical Assistance letter dated March 13, 2009. In that letter the USFWS raised concerns over the possible occurrence in the study area next to Palani Road of endangered Hawaiian hoary bats (*Lasiurus cinereus semotus*) and Hawaiian hawks (*Buteo solitaris*).

The survey reports are included in Appendix D.

The results of the first avian and terrestrial mammalian species survey are summarized as follows:

- The terrain is extremely rugged. The bulk of the proposed highway corridor is dominated by alien vegetation. This dominant vegetation can be best characterized as a Fountain Grass/Koa Haole Grassland subtype of a Lowland Dry Grassland. The vegetation present on the oldest ‘a‘a flows (not covered by newer flows) located close to the northern terminus of the proposed highway along Hina Lani Street still supports numerous native plants, including several that are uncommon or have limited distributions.
- A total of 333 individual birds of 18 different species, representing 12 separate families, were recorded during station counts. One of the species recorded, the Pacific golden plover (*Pluvialis fulva*), is an indigenous migratory shorebird that nests in the high Arctic, returning to Hawai‘i and the tropical Pacific to spend the fall and winter months each year. The remaining 17 species detected are considered to be alien to the Hawaiian islands.
- Although not detected during the survey, it is possible that small numbers of Hawaiian petrels (*Pterodroma sandwichensis*) and Newell’s shearwaters (*Puffinus auricularis newelli)* over-fly the project area between May and November.
- No federal- or state-listed threatened, endangered, or candidate avian species were detected during the course of the survey.

- No mammalian species were seen during the course of the survey. The skeletal remains of a feral sheep (*Ovis aries*) was encountered, as was scat and sign of small Indian mongoose (*Herpestes a. auropunctatus*), cat (*Felis catus*), goat (*Capra h. hircus*), and dog (*Canis f. familiaris*).
- Hawai‘i’s sole endemic terrestrial mammalian species, the endangered Hawaiian hoary bat, was not detected during the course of the survey. All of the alien mammalian species recorded during this survey are deleterious to avian and floral components of the remaining native ecosystems present on the island.

The results of the Palani Road survey are as follows:

- The vegetation on the site is dominated almost to the exclusion of native species by alien species. The vegetation present can be best characterized as being Guinea Grass (*Panicum maximum)*/Koa Haole grassland, populated by several other plant species that are typical colonizers of disturbed land, such as fountain grass.
- No tree tobacco plants were found during the survey.
- A total of 57 individual birds of 17 different species were recorded. All 15 species are considered alien to the Hawaiian Islands. No avian species currently listed as endangered, threatened, or proposed for listing under either the federal or the State of Hawai‘i’s endangered species programs were detected during the survey, including the Hawaiian hawk.
- Although not detected during the survey, it is possible that small numbers of Hawaiian petrel and Newell’s shearwater over-fly the project area between the months of May and November.
- Two mammalian species, cat and small Indian mongoose, were observed during the survey. Dogs were also heard barking nearby. Although not observed, it is probable that several species of alien rodents (rats) can also be found in the project area.
- The endangered Hawaiian hoary bat was not detected during the course of the survey, although it is probable that bats do occasionally fly through and use resources within the general project area.

3.5.2.2 Potential Impacts

No significant impacts to flora or fauna would occur with the Proposed Action. No federal- or state-listed threatened, endangered, or candidate species of bird or mammal were identified or recorded in the project area. Modification of habitat in the project area is not expected to result in significant impacts to any federal- or state-listed threatened, endangered, or candidate species of birds or mammals.

Under the Proposed Action, no significant impacts are expected on terrestrial faunal or avian species found within the project area or the North Kona District. Measures to prevent nocturnally flying birds, such as Hawaiian petrels and Newell's shearwaters, from colliding with lighting infrastructure include complying with the Hawai'i County Code §14 – 50 et seq. which requires the shielding of exterior lights so as to lower ambient glare. As a precaution to avoid impacts to Hawaiian hoary bats during the period when the females are carrying young pups, it is recommended that clearing of dense vegetation on the Palani Road site not occur during the two months when this species is at the most risk from disturbance, namely between June and July.

No impacts to terrestrial fauna or birds would occur under the No Action Alternative.

3.6 GEOLOGY, TOPOGRAPHY, AND SOILS

3.6.1 AFFECTED ENVIRONMENT

The project area consists of approximately 55 acres extending northward from Palani Road to Hina Lani Street. Situated on the western slope of Hualalai Volcano, the project area is composed of prehistoric lava flows estimated to be from 3,000 to 5,000 years old. Hualalai Volcano shaped the landscape of North Kona. Its most recent flow (1800-1801) and earlier flows have created a harsh landscape that slopes steadily towards the sea. Multiple flows of differing ages overlap each other creating a layered landscape with lava colors reflecting differences in age, chemical composition, and state of weathering. Hualalai Volcano has been dormant since 1801, but a series of earthquakes in 1929 and other seismic activity indicate its most recent eruptive phase may not have concluded.[9] The geomorphology of the project area consists of multiple interbedded pahoehoe and 'a'a flows. Pahoehoe flows harden and form a smooth, ropey surface, while 'a'a flows harden as a rough, jagged surface. Both lavas contain buried voids: pockets, blisters, and extensive lava tubes and tunnels that form as the molten rock cools and residual lava drains beneath the solidified surface. Many of these lava tubes and voids have been found in the general vicinity. The thin roofs of lava tubes can collapse when placed under additional weight.

[9] Juvik, Sonia P. and James O. Juvik, eds. 1998. *Atlas of Hawai'i 3rd Edition*. Honolulu University of Hawai'i Press, Honolulu, Hawaii.

Soils

The U.S. Department of Agriculture (USDA) National Resources Conservation Service (NRCS) classifies the soils of the project area as ‘a‘a Lava Flows (rLV), Pahoehoe Lava Flows (rLW), Kaimu extremely stony peat (rKED), and Punalu‘u extremely rocky peat (rPYD). Both Kaimu series and Punalu‘u series consist of well-drained, thin organic soils that have developed over ‘a‘a lava and pahoehoe lava bedrock, respectively. These soils, found on uplands, have rapid permeability, slow run-off, and a slight erosion hazard. The bare ‘a‘a Lava Flows and bare Pahoehoe Lava Flows dominate the project area (Figure 3-8).

Agricultural Potential

The project area has poor agronomic conditions. Soils are extremely rocky, rainfall is low, and water is not available for crop farming. There are no existing irrigation improvements. No agricultural activities are currently taking place in the project area.

Topography

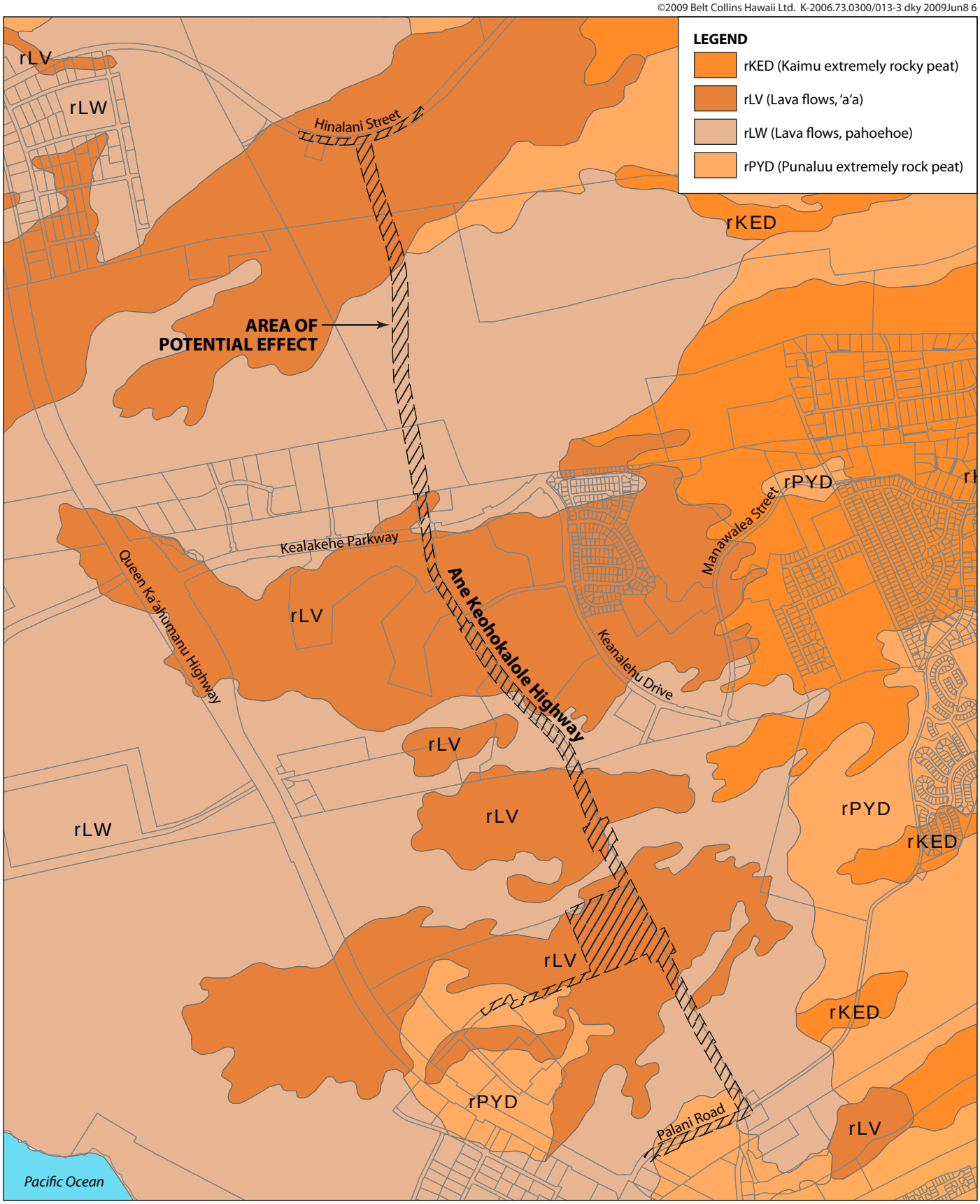
The project area slopes in an east to west (mauka to makai) direction, with a cross-slope of approximately three percent. The elevation of the corridor ranges between 300 and 425 feet above mean sea level (msl). The southern portion of the corridor would be located at approximately 300 feet above msl, and the northern extent would be located at approximately 425 feet above msl.

3.6.2 POTENTIAL IMPACTS

The Proposed Action would involve site clearing, grubbing, and grading work. A description of this work is contained in the geotechnical engineering exploration report in Appendix E. Soils present in the project area have been classified as predominately poor, low quality, and extremely rocky. Due to the relatively level topography of the project site, changes in topography are expected to be relatively insignificant, although some localized areas may require cuts and fills of up to about 25 feet in height. The Proposed Action would result in the disturbance of soil and ground cover. Construction activities will be conducted in compliance with the erosion control requirements of county, state, and federal regulations.

Potential short-term impacts associated with construction of the proposed highway may occur during grading activities which would disturb the project area and potentially cause soil erosion. Compliance with the Hawai‘i County Code, Chapter 10 – Erosion and Sedimentation Control, the Department of Public Works (DPW) Storm Drainage Standards, and the National Pollutant Discharge Elimination System (NPDES) permit will be required to control erosion and

©2009 Belt Collins Hawaii Ltd. K-2006.73.0300/013-3 dky 2009Jun8 6



BELT COLLINS

NORTH

0 1000 2000

SCALE IN FEET

Figure 3-8
SOIL TYPES

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

prevent discharge of sediment from the project area. Construction activities will include the implementation of Best Management Practices (BMPs) to control erosion and sedimentation from the project area. Based upon the regulation requirements and implementation of BMPs, short-term impacts resulting from grading operations are anticipated to be insignificant and appropriately mitigated.

No impacts to geology, topography, or soils would occur under the No Action Alternative.

3.7 SURFACE WATER AND DRAINAGE

3.7.1 AFFECTED ENVIRONMENT

There are no perennial streams, existing drainage facilities, or defined natural drainage ways in the project area. No floodways or flood zones have been identified here. The proposed highway is located in Flood Zone X according to the Flood Insurance Rate Maps (FIRM).[10] The National Flood Insurance Program does not have any regulations for developments within Zone X. The high permeability of the existing soils is evident by the absence of any natural storm water channels or gullies in the project area.

3.7.2 POTENTIAL IMPACTS

No surface water bodies exist in or surrounding the project area. Under the Proposed Action, construction will be carried out in accordance with NPDES permit requirements, including BMPs, and the Hawai‘i County Code Chapter 10 – Erosion and Sedimentation Control requirements, to prevent the discharge of sediment from the project area. As sections of the proposed highway are developed, drainage systems will collect and discharge runoff to the subsurface. The proposed highway will be designed to comply with the County of Hawai‘i’s Storm Drainage Standards, such that runoff volumes and rates would not increase as a result of site development. In addition, BMPs such as storm drain filtration devices and other physical and biological barriers to water-borne pollution will be implemented to mitigate the impact of pollutants to groundwater (see Groundwater and Hydrogeology, below). The Proposed Action would have no significant impacts on surface waters or drainage because there would be no increase of runoff from the project area.

No impacts to surface waters or drainage would occur under the No Action Alternative.

[10] FEMA Map Service Center. www.fema.gov/hazard/flood/info.shtm. Map ID 1551660712C, 1551660692C, 1551660703C, and 1551660684C. Last accessed February 19, 2009.

3.8 GROUNDWATER AND HYDROGEOLOGY

3.8.1 AFFECTED ENVIRONMENT

Kona's regional water resources are classified in three distinct reserve types: basal groundwater, brackish basal groundwater, and dike-impounded perched groundwater. The region's rainfall pattern is responsible for recharging the basal aquifer that extends from the upper slopes of Hualalai Volcano to the shoreline. Seawater intrusion at the shoreline results in the creation of brackish water. The extent of brackish water inland is highly variable within the Kona region and depends on the character of rainfall, specific terrain, and geologic formations. Dike-impounded perched groundwater may exist at higher elevations on Hualalai.

The project area is located in the Keauhou aquifer system which is part of the Hualalai aquifer sector (80901).[11] The minimum average annual rainfall of 20 inches occurs at the coast and near the summit of the volcano. Within about two miles of the coast the groundwater is basal and generally brackish, with high-level water occurring farther inland.[12]

The proposed highway is located makai of the DOH-established Underground Injection Control (UIC) line.[13] The UIC program was established to protect the quality of underground sources of drinking water from pollution by subsurface disposal of fluids.[14] The UIC line is the boundary between non-drinking water aquifers (generally seaward of the UIC line) and underground sources of drinking water (generally inland of the UIC line).

In general, because of the high permeability of the soil types on the project lands, drainage of surface waters into the underlying soils is rapid, and the potential exists for rapid transport of pollutants in stormwater through these soils to groundwater. This is of particular concern to the NPS' Kaloko-Honokohau National Historical Park with respect to impacts on coastal anchialine ponds (brackish coastal ponds). Because anchialine ponds are hydrologically connected to the ocean and also fed by freshwater springs or percolation from ground water, they are potentially sensitive to upstream changes in water quantity and quality.

[11] John Mink and Stephen Lau. *Aquifer Identification and Classification for the Island of Hawaii: Groundwater Protection Strategy for Hawaii.* May 1993.

[12] *Ibid*.

[13] State of Hawaii Department of Health Underground Injection Control Map. *Island of Hawaii Keahole Point Quadrangle Topographic Map* 1982.

[14] HAR Title 11, Chapter 23. *Underground Injection Control*. November 12, 1992.

3.8.2 POTENTIAL IMPACTS

The construction and operation of the proposed highway would not impact groundwater and hydrogeological resources. No impact to the groundwater underlying the project area will occur during the construction or operation of the proposed highway. The contractor will be required to conform to NPDES permit requirements to protect groundwater during the construction phase of the project.

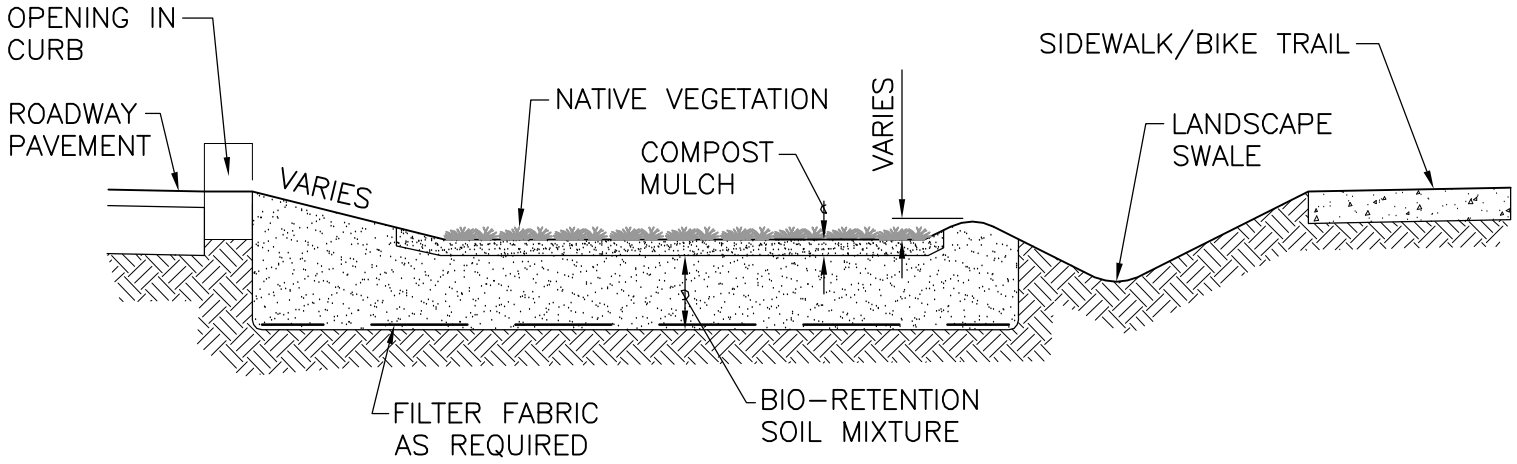
NPS' concern over potential effects on downgradient anchialine ponds resulted in the incorporation of bio-retention cells into the Proposed Action. The unusual geological conditions make the use of traditional bioswales particularly challenging, as runoff would not normally linger in the swales long enough for normal pollutant degradation to take place. For this reason, a carefully designed system has been developed for the Proposed Action, whereby runoff from the road surface will be diverted to bio-retention cells at intervals along its length. The bio-retention cells will capture and treat all runoff from the proposed highway and prevent pollutants from entering the groundwater during the highway's operation.

Figure 3-9 shows a typical bio-retention cell. These cells will be sized to capture, retain, and treat the "first flush" of stormwater runoff from the proposed highway. Each cell will be filled to a prescribed depth (18-24 inches is fairly typical, depending on the size of the cell and the amount of water to be treated) with amended soils specifically designed to retain the runoff for sufficient time to biodegrade the oils, solvents, and other contaminants that may be present in runoff from the proposed highway. These soils will be planted with native grasses (e.g. akiaki grass, *Sporobolus virginicus;* pili grass, *Heteropogon contortus*) and other plants to enhance the action of biological media in the soil and to protect the soils from erosion by water and wind.

Because of their demonstrated ability to treat urban runoff, the U.S. Environmental Protection Agency (USEPA) has identified bioretention as "one the most important BMP tools for the application of LID [Low-Impact Development] technology for controlling runoff volume and pollutants."[15] Peer-reviewed scientific research has demonstrated the effectiveness of this approach to removing pollutants from runoff, including the pollutants typically found in runoff from roads such as oils, grease, and heavy metals. Bioretention media have demonstrated the ability to capture 80-95% of oil, grease, total suspended solids, polycyclic aromatic hydrocarbons (PAHs), and metals; 70-85% of phosphorus; and 55-65% of total Kjedahl nitrogen (TKN – the sum of total organic nitrogen). [16, 17, 18]

[15] USEPA "Stormwater Best Management Practice Design Guide Volume 2, Vegetative Biofilters" September 2004. p. 7-1.

[16] Hsieh, C.-h, and Allen P. Davis "Evaluation and Optimization of Bioretention Media for Treatment of Urban Storm Water Runoff" *Journal of Environmental Engineering, ASCE,* 131(11), 1521-1531 (2005). pp.1521 and 1529-1530.



NOT TO SCALE

NOTE:

BIO–RETENTION SOIL MIXTURE SHALL CONSIST OF COMPOST AND MINERAL AGGREGATE. THE MIXTURE SHALL BE WELL BLENDED TO PROVIDE A HOMOGENEOUS MIX. EFFORTS SHALL BE MADE TO ATTAIN ORGANIC MATTER CONTENT CLOSE TO 10 PERCENT, WITH THE FINAL MIX TO BE DETERMINED BY THE ENGINEER.

©2009 Belt Collins Hawaii Ltd. K-2006.73.0300-025-1 dky 2009May2 2

BELT COLLINS

NOT TO SCALE

Figure 3-9
BIORETENTION AREA—TYPICAL CROSS SECTION

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

Because the local climate is prone to lengthy dry spells, some irrigation with R1 water will be necessary to keep these plants alive and maintain the viability of the cells. To minimize the need for irrigation, drought-tolerant plants will be selected, and the irrigation plan will comply with DOH regulations including Hawaii Administrative Rules (HAR) 11-62-27 "Recycled Water Systems", to minimize impacts to groundwater and associated ecosystems. These regulations require the submission of "An irrigation use plan that includes information on application rates, intended uses and schedules for recycled water use. The irrigation use plan shall also include information on types of vegetation, types and methods of irrigation, proposed irrigation schedules, vegetative consumption rates, water balance calculations, nutrient balance calculations, and the corresponding acreage to be used for irrigation"; among other requirements.

R-1 treated water has also been proposed for use in irrigation on the other landscaped areas of the proposed highway, and its use in these areas will also comply with DOH regulations. Irrigation will be of the non-spray type to avoid the irrigation-associated corrosion issues that have been experienced by projects elsewhere in the area.

No impacts to groundwater or hydrogeology would occur under the No Action Alternative.

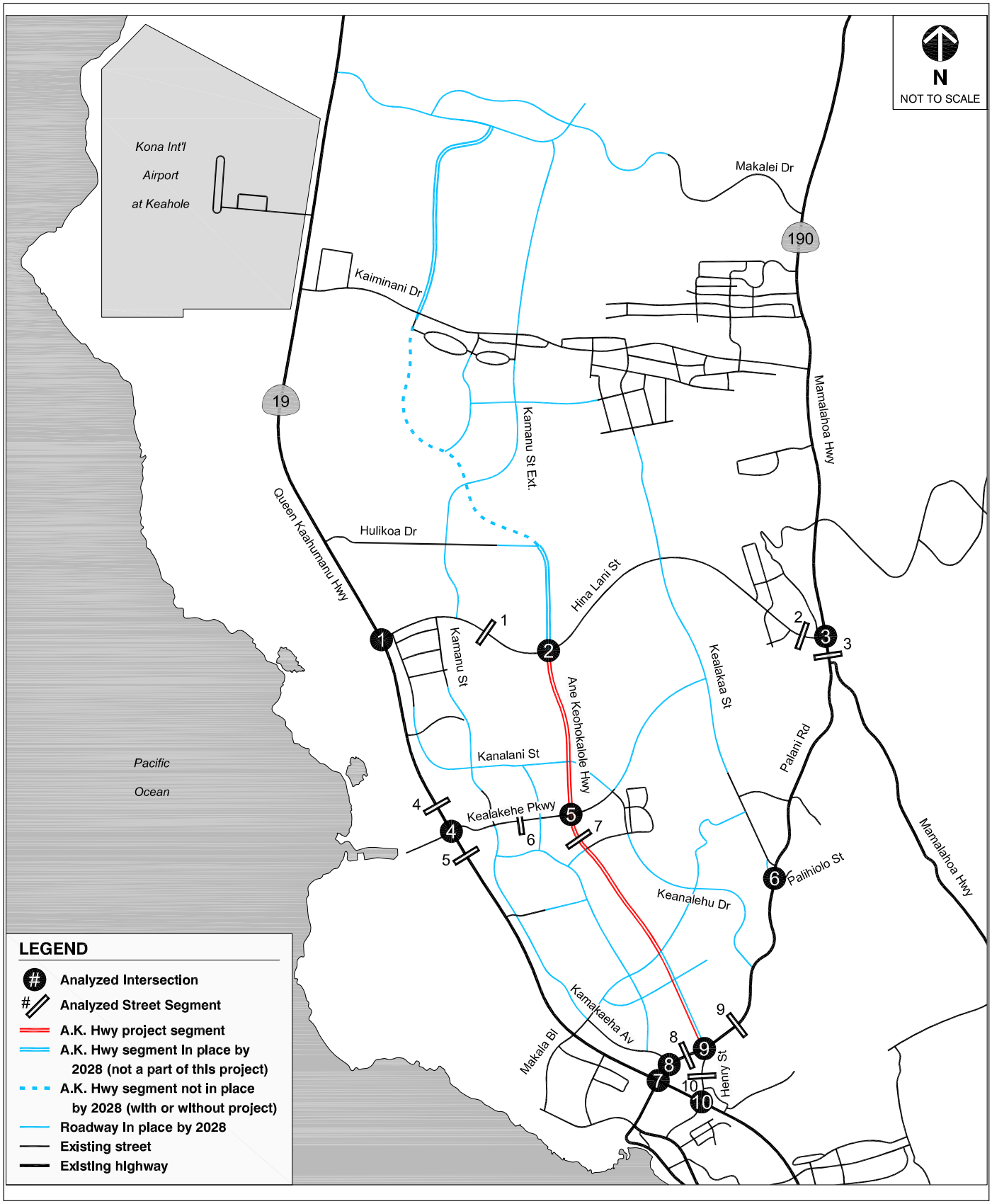
3.9 ROADS AND TRAFFIC

The traffic impact analysis report, summarized below, was prepared by Fehr & Peers Transportation Consultants and is included in Appendix F. Potential impacts on roadways and traffic in the vicinity of the proposed highway were analyzed by projecting and evaluating future traffic conditions for the study area to the horizon year 2028, when most of the planned streets in the region are expected to be in place. The study area, shown in Figure 3-10, comprises the total street network between and including Queen Ka'ahumanu Highway (makai boundary), Mamalahoa Highway (mauka boundary), Henry Street (southern boundary), and Hina Lani Street (northern boundary). In order to determine potential impacts of the Proposed Action, the following traffic scenarios were analyzed:

- Existing (2007) Conditions – The analysis of existing traffic conditions provides a basis for the remainder of the study and includes an assessment of baseline traffic volumes and operating conditions.

- Future (2028) Base (No Action Alternative) Conditions – The objective of this scenario is to project future traffic growth and operating conditions

©2009 Belt Collins Hawaii Ltd. K 2006.73.0300/022-1 dky 2009May2 3



BELT COLLINS

Source: Fehr & Peers, April 2009. Traffic Impact Analysis Report for the Proposed Ane Keohokalole Highway Extension.

Figure 3-10
TRAFFIC STUDY AREA

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

resulting from regional growth and known development projects in the vicinity of the proposed highway, without consideration of traffic shifts that would be expected to result from the Proposed Action.

- Future (2028) Project (Proposed Action) Conditions – The objective of this scenario is to identify potential impacts of the Proposed Action on future traffic operating conditions at key locations. The proposed highway itself would not generate additional vehicle trips but would provide alternative routes for the projected traffic in the study area. The difference between the future base conditions and the future project conditions represents the impacts of the Proposed Action.

Level of service (LOS) methodology, based on the *2000 Highway Capacity Manual* (Transportation Research Board, 2000), is used to characterize traffic conditions at study intersections. LOS is a qualitative measure which describes the condition of traffic flow, ranging from excellent, free-flowing conditions at LOS A to very congested, overloaded conditions at LOS F. Table 3-4 and Table 3-5 define LOS for signalized and unsignalized intersections, respectively. In general, the minimum acceptable LOS in an urbanized area is LOS D.

Table 3-4: Level of Service Definitions for Signalized Intersections

Level of Service	Volume/Capacity Ratio	Average Stopped Delay per Vehicle (seconds)
A	0.000 – 0.600	≤10
B	>0.600 – 0.700	>10 and ≤20
C	>0.700 – 0.800	>20 and ≤35
D	>0.800 – 0.900	>35 and ≤55
E	>0.900 – 1.000	>55 and ≤80
F	>1.000	>80

Table 3-5: Level of Service Definitions for Unsignalized Intersections

Level of Service	Worst Case Delay per Vehicle (seconds)
A	≤10.0
B	>10.0 and ≤15.0
C	>15.0 and ≤25.0
D	>25.0 and ≤35.0
E	>35.0 and ≤50.0
F	>50.0

The following 10 intersections were assessed (see Figure 3-10):

1. Queen Ka‘ahumanu Highway & Hina Lani Street

2. Ane Keohokalole Highway & Hina Lani Street (*Note: Does not yet exist.*)
3. Mamalahoa Highway & Hina Lani Street
4. Queen Ka‘ahumanu Highway & Kealakehe Parkway
5. Ane Keohokalole Highway & Kealakehe Parkway
6. Palani Road & Palihiolo Street
7. Queen Ka‘ahumanu Highway & Palani Road
8. Kamakaeha Avenue & Palani Road
9. Henry Street/Ane Keohokalole Highway & Palani Road
10. Queen Ka‘ahumanu Highway & Henry Street

In addition to these intersections, key street segments in the study area were also analyzed. The roadway facility types are based on their physical characteristics as defined in the County of Hawai‘i General Plan (February 2005) and described in Table 3-6. The capacity of each facility, defined as the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time under prevailing roadway, traffic, and control conditions, is based on *2000 Highway Capacity Manual* (Transportation Research Board, 2000) methodology.

Table 3-6: Capacity of Roadway Facilities

Facility Type	Definition	Capacity per lane per hour
Primary Arterial	Includes major highways, parkways, and primary arterials that move vehicles in large volumes and at higher speeds from one geographic area to another; highest traffic volumes corridor. Designed as a limited access roadway.	1,700
Secondary Arterial	A street of considerable continuity that is primarily a traffic artery between or through large areas; interconnect with and augment primary system. Designed as a limited access roadway. Secondary arterials shall have a minimum right-of-way of 80 feet.	1,250
Major Collector	Any street supplementary to the arterial street system that is a means of transit between this system and smaller areas; used to some extent for through traffic and to access abutting properties; collect and distribute traffic between neighbor hood and arterial system. Major collectors shall have a minimum right-of-way of 60 feet.	800

Local Streets – Commercial/Industrial	Local streets within commercial and industrial areas shall have a minimum right-of-way of 60 feet.	600
Minor Collector & Local Street	Minor collectors are used at times as through street and for access to abutting properties. The principal purpose of a local street is to provide access to property abutting the public right-of-way.	450

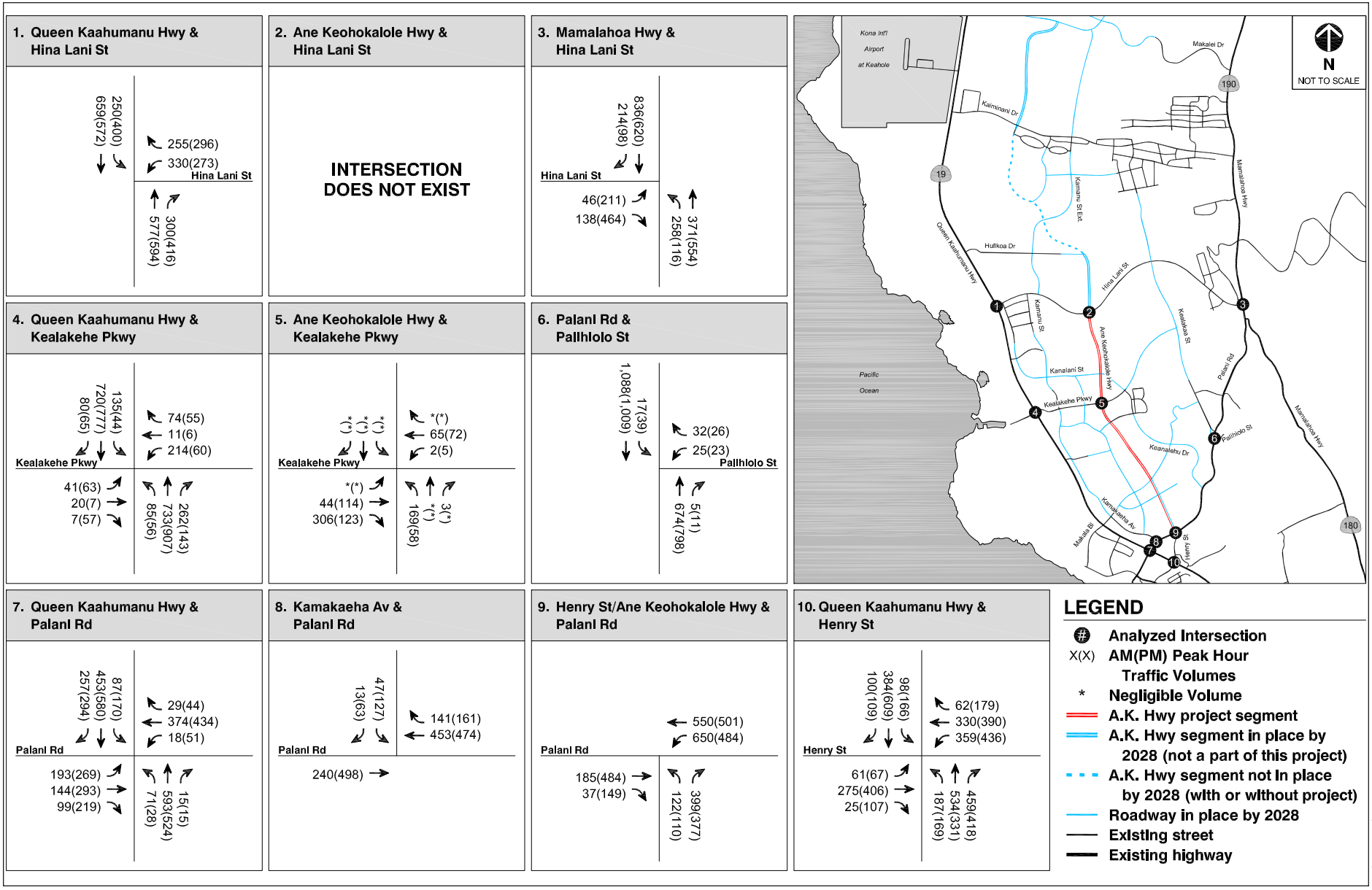
The following 10 street segments were assessed (see Figure 3-10):

1. Hina Lani Street between Kamanu Street and Ane Keohokalole Highway
2. Hina Lani Street makai (west) of Mamalahoa Highway
3. Mamalahoa Highway south of Hina Lani Street
4. Queen Ka‘ahumanu Highway north of Kealakehe Parkway
5. Queen Ka‘ahumanu Highway south of Kealakehe Parkway
6. Kealakehe Parkway mauka (east) of Queen Ka‘ahumanu Highway
7. Ane Keohokalole Highway south of Kealakehe Parkway
8. Palani Road between Kamakaeha Avenue and Henry Street
9. Palani Road mauka (east) of Henry Street
10. Henry Street south of Palani Road

3.9.1 AFFECTED ENVIRONMENT

Primary regional access to the study area is currently provided by Queen Ka‘ahumanu Highway and Mamalahoa Highway, which both run north-south, makai and mauka of the proposed highway, respectively. Major existing mauka-makai roadways include, from north to south: Kaiminani Drive, Hina Lani Street, Kelalakehe Parkway, and Makala Boulevard.

Existing weekday peak period intersection turning movement counts were conducted from 6:00 to 9:00 am (AM peak period) and from 3:00 to 6:00 pm (PM peak period) at the nine existing study intersections on Tuesday, August 12; Wednesday, August 13; and Thursday, August 14, 2007. Existing weekday AM and PM peak hour turning movements, depicted in Figure 3-11, were used in conjunction with LOS methodology to determine the existing operating conditions at each study intersection. Table 3-7 summarizes the results of this analysis.



©2009 Belt Collins Hawaii Ltd. K 2006.73.0300/021-1 dky 2009May2 3

BELT COLLINS

Source: Fehr & Peers, April 2009. Traffic Impact Analysis Report for the Proposed Ane Keohokalole Highway Extension.

Figure 3-11
EXISTING PEAK HOUR TRAFFIC VOLUMES

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

The analysis indicates that one existing study intersection, the unsignalized intersection of Palani Road and Palihiolo Street (Intersection 6), currently operates at LOS E during AM peak hours and LOS F during PM peak hours. The other eight existing study intersections currently operate at an acceptable LOS (LOS D or better) during both the AM and PM peak periods.

Table 3-7: Intersection Level of Service Analysis – Existing Conditions

Intersection	Control Method	Peak Period	Existing (2007) LOS
1. Queen Ka'ahumanu Highway & Hina Lani Street	Signalized	AM	C
		PM	C
2. Ane Keohokalole Highway & Hina Lani Street is a future intersection.			*N/A*
3. Palani Road & Hina Lani Street	Signalized	AM	B
		PM	C
4. Queen Ka'ahumanu Highway & Kealakehe Parkway	Signalized	AM	B
		PM	B
5. Ane Keohokalole Highway & Kealakehe Parkway	Two-way Stop	AM	B
		PM	B
6. Palani Road & Palihiolo Street	Two-way Stop	AM	E
		PM	F
7. Queen Ka'ahumanu Highway & Palani Road	Signalized	AM	C
		PM	C
8. Kamakaeha Avenue & Palani Road	Two-way Stop	AM	B
		PM	D
9. Henry Street/Ane Keohokalole Highway & Palani Road	Signalized	AM	B
		PM	B
10. Queen Ka'ahumanu Highway & Henry Street	Signalized	AM	C
		PM	C

Street segment traffic volumes were derived from the approach and departure volumes of the adjacent study intersections. Existing peak period traffic volumes for the ten analyzed street segments are shown in Table 3-8. The analysis indicates that one directional street segment, makai-bound Palani Road mauka (east) of Henry Street (Street Segment 9), currently operates at LOS E. The other analyzed street segments currently operate at an acceptable LOS (LOS D or better).

Table 3-8: Street Segment Level of Service Analysis – Existing Conditions

Street Segment	Facility Type	Peak Period	Direction	Existing (2007) Operating Conditions			
				Volume	Lanes	V/C	LOS
1. Hina Lani Street between Kamanu Street and Ane Keohokalole Highway	Secondary Arterial	AM	eastbound	151	1	0.12	A
			westbound	448	1	0.36	A
		PM	eastbound	872	1	0.54	A
			westbound	156	1	0.12	A
2. Hina Lani Street makai (west) of Mamalahoa Highway	Secondary Arterial	AM	eastbound	184	1	0.15	A
			westbound	472	1	0.38	A
		PM	eastbound	675	1	0.54	A
			westbound	214	1	0.17	A
3. Mamalahoa Highway south of Hina Lani Street	Primary Arterial	AM	northbound	629	1	0.50	A
			southbound	974	1	0.79	C
		PM	northbound	670	1	0.54	A
			southbound	1,084	1	0.87	D
4. Queen Ka‘ahumanu Highway north of Kealakehe Parkway	Primary Arterial (2 lanes)	AM	northbound	848	1	0.50	A
			southbound	935	1	0.55	A
		PM	northbound	1,025	1	0.60	B
			southbound	886	1	0.52	A
5. Queen Ka‘ahumanu Highway south of Kealakehe Parkway	Primary Arterial (2 lanes)	AM	northbound	1,080	1	0.64	B
			southbound	941	1	0.55	A
		PM	northbound	1,106	1	0.65	B
			southbound	894	1	0.53	A
6. Kealakehe Parkway mauka (east) of Queen Ka‘ahumanu Highway	Secondary Arterial	AM	eastbound	417	2	0.17	A
			westbound	299	1	0.24	A
		PM	eastbound	194	2	0.08	A
			westbound	121	1	0.10	A

Table 3-8: Street Segment Level of Service Analysis – Existing Conditions *(continued)*

Street Segment	Facility Type	Peak Period	Direction	Existing (2007) Operating Conditions			
				Volume	Lanes	V/C	LOS
7. Ane Keohokalole Highway south of Kealakehe Parkway	Secondary Arterial	AM	northbound	172	1	0.14	A
			southbound	308	1	0.25	A
		PM	northbound	58	1	0.05	A
			southbound	128	1	0.10	A
8. Palani Road between Kamakaeha Avenue and Henry Street	Major Collector	AM	eastbound	222	1	0.18	A
			westbound	672	1	0.54	A
		PM	eastbound	633	1	0.51	A
			westbound	611	1	0.49	A
9. Palani Road mauka (east) of Henry Street	Major Collector	AM	eastbound	584	1	0.47	A
			westbound	1,200	1	0.96	E
		PM	eastbound	861	1	0.69	B
			westbound	985	1	0.79	C
10. Henry Street south of Palani Road	Secondary Arterial	AM	northbound	521	2	0.21	A
			southbound	687	2	0.27	A
		PM	northbound	487	2	0.19	A
			southbound	633	2	0.25	A

3.9.2 POTENTIAL IMPACTS

In order to evaluate the potential impacts of the proposed highway on the surrounding roadway system, it is necessary to develop estimates of future traffic conditions in the area both with the construction of the Ane Keohokalole Highway (i.e., future project conditions) and under the No Action Alternative (i.e., future base conditions). Estimates included the proposed construction of an additional eastbound lane on Palani Road as a measure to minimize traffic impacts to Palani Road. The incremental change in the LOS between future base conditions and future project conditions represents the potential impacts of the Proposed Action. In this analysis, LOS D is considered the minimum acceptable LOS. Significant adverse project-specific impacts were identified using the following criteria:

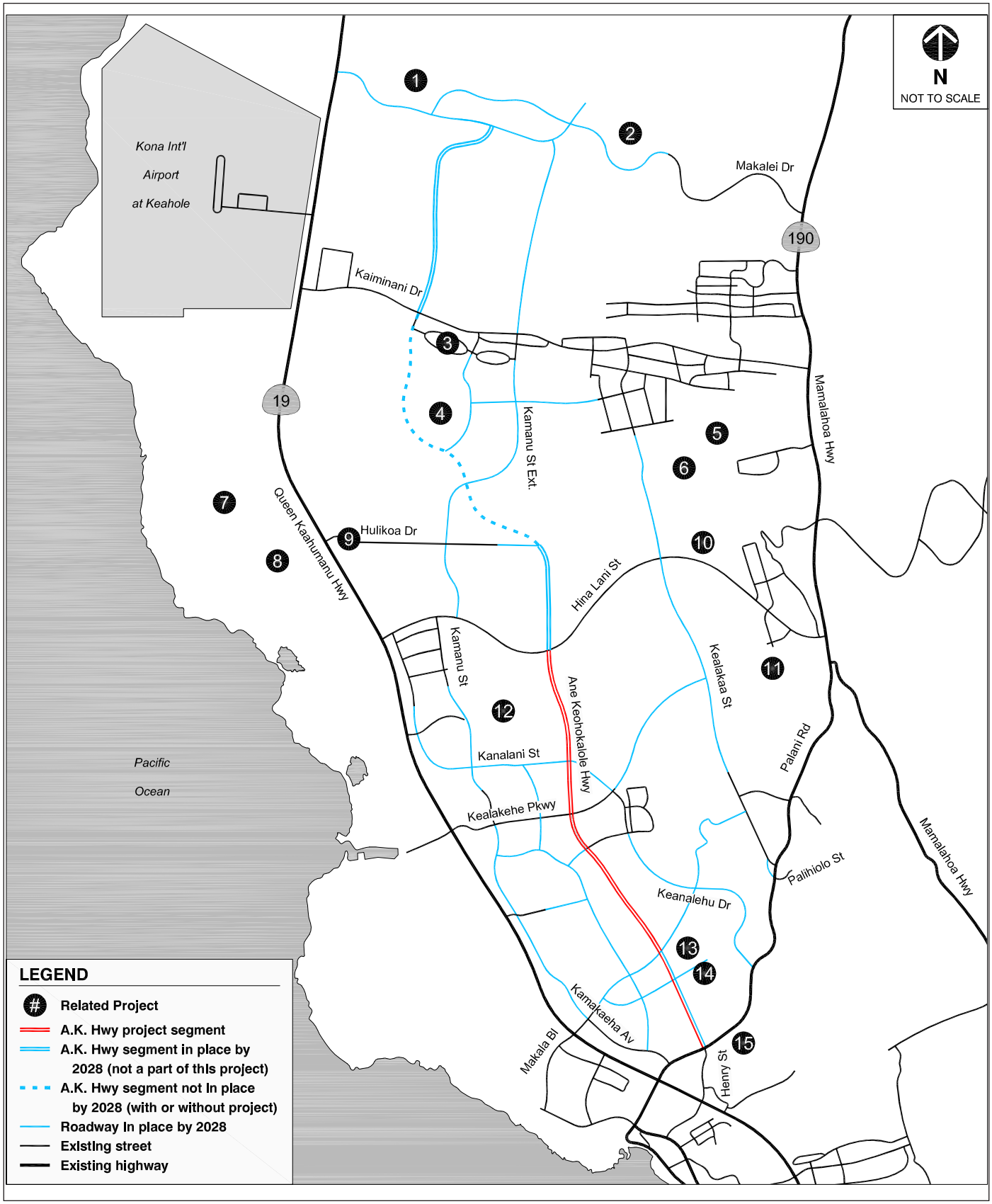
No Action Alternative (Future Base Conditions)	Proposed Action (Future Project Conditions)	Significant Project Impact?
LOS D or better	LOS D or better	No
LOS D or better	LOS E or LOS F	Yes
LOS E or LOS F	LOS E or LOS F	No

Future (2028) Base (No Action Alternative) Traffic Projections

Future base conditions reflect traffic increases as a result of general growth and development, as well as traffic increases generated by specific development projects in the vicinity of the proposed highway, that are assumed to occur by the horizon year 2028.

Future street network improvements, as shown in Figure 3-12, and future intersection improvements may alter the capacity, configuration, and operating conditions of traffic in the study area. Additionally, related project traffic growth is expected to occur as a result of future development projects. Figure 3-12 illustrates the locations of known development projects in the study area and Table 3-9 displays the estimated traffic generated by these projects, as well as projects north and south of the study area that would generate traffic traveling into and through the study area. Trip generation estimates of traffic volume were distributed throughout the future street network.

©2009 Belt Collins Hawaii Ltd. K 2006.73.0300/022-2 dky 2009May2 3



Source: Fehr & Peers, April 2009. Traffic Impact Analysis Report for the Proposed Ane Keohokalole Highway Extension.

Figure 3-12
LOCATIONS OF FUTURE DEVELOPMENT IN THE REGION

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

Table 3-9: Trip Generation[a] for Future Development Projects (Related Project Traffic Growth)

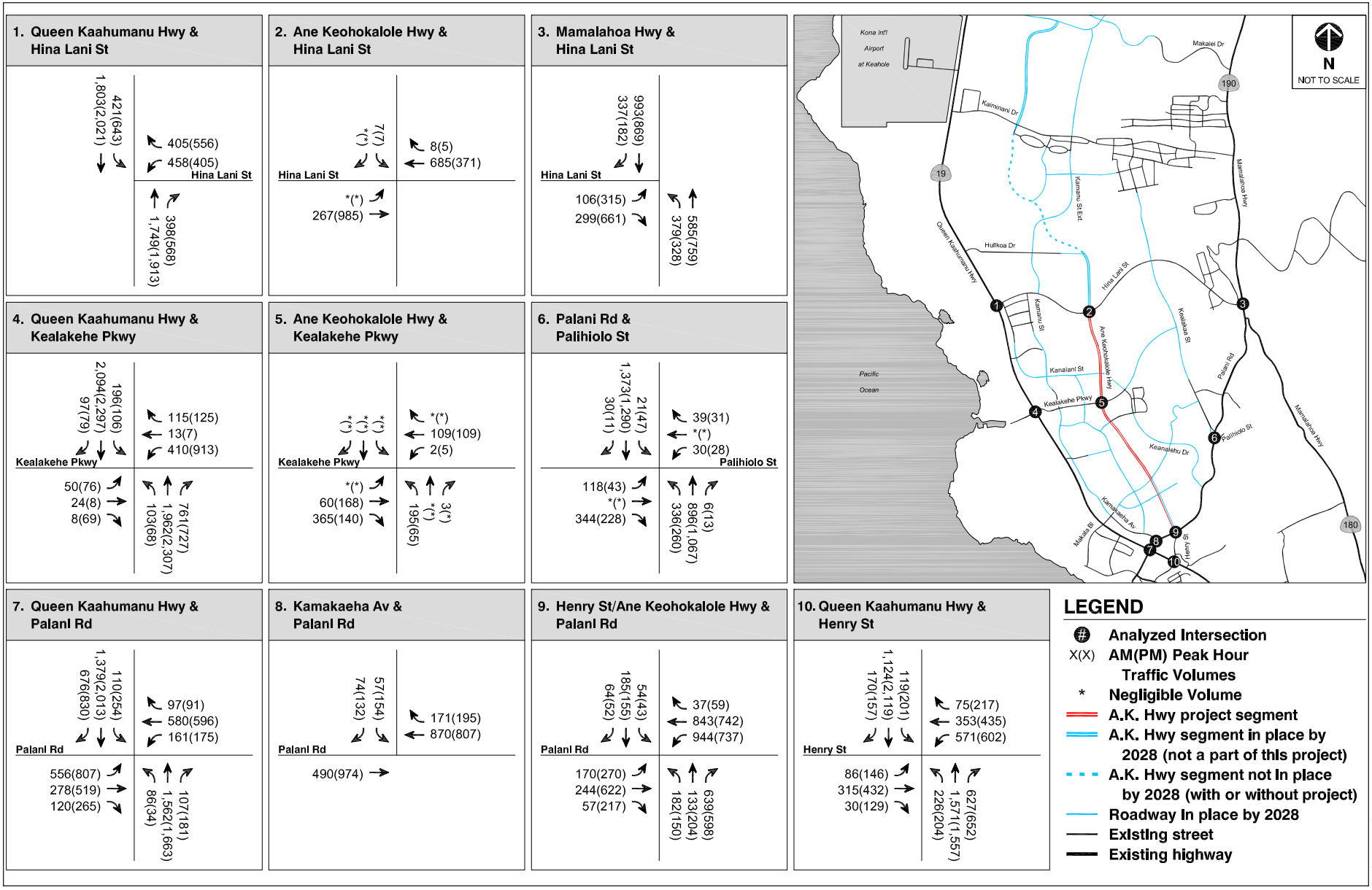
Index	Project Name	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Projects in the Study Area							
1	Palamanui	152	394	546	422	255	677
2	Makalei Estates	15	45	60	51	30	81
3	Lokahi Makai	36	107	143	121	71	192
4	Seascape (a.k.a. Lokahi Ka‘u)	11	44	55	44	23	67
5	O‘oma Plantation	4	10	14	12	7	19
6[b]	Kula Nei Residential Development	51	152	203	172	101	273
7	O‘oma Beachside Village	704	859	1,563	998	983	1,981
8	The Shores at Kohana‘iki	241	342	583	378	341	719
9	Kohana‘iki Business Park	81	65	146	52	69	121
10	Kaloko Heights	56	169	225	191	112	303
11	Kona 327 LLC	66	197	263	223	131	354
12[c]	West Hawai‘i Business Park	822	276	1,098	911	1,383	2,294
13	Villages at La‘i‘opua	75	225	300	255	149	404
14[d]	Keahu‘olu Affordable Housing	665	846	1,511	918	711	1,629
15	Rutter Affordable Housing	50	151	201	171	100	271
	Subtotal	***3,029***	***3,882***	***6,911***	***4,919***	***4,466***	***9,385***
Projects North of the Study Area							
	Kuki‘o Bay Beach Club	28	137	165	131	64	195
	Manini‘owali (a.k.a. Kua Bay)	11	51	62	49	24	73
	Nanea Golf Course	50	17	67	33	63	96
	Subtotal	***89***	***205***	***294***	***213***	***151***	***364***
Projects South of the Study Area							
	Ali‘i Cove	20	82	102	81	43	124
	U of Nations	41	163	204	161	87	248
	Kona Sea Village/Ali‘i Park Place	5	27	32	25	13	38
	Pualani Estates	22	65	87	74	43	117
	Sugar Cane Land Subdivision	4	12	16	13	8	21
	Makana Aloha Plantation	2	6	8	7	4	11
	Kona Vistas	9	28	37	31	18	49
	Hokuli‘a	56	274	330	261	129	390
	‘Iolani Phase I-IV	8	24	32	27	16	43

Index	Project Name	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
	Unknown	15	32	47	50	40	90
	Hale Nanea Condos	9	38	47	37	20	57
	White Sands Project Mauka	15	74	89	71	35	106
	White Sands Project Makai	9	44	53	42	20	62
	Kahakai Place Subdivision	3	8	11	9	5	14
	Suffolk	26	102	128	101	54	155
	Ali‘i Parkway Heights	22	86	108	85	46	131
	Kona Sea Villas	30	119	149	118	63	181
	Subtotal	***296***	***1,184***	***1,480***	***1,193***	***644***	***1,837***
	Total	**3,414**	**5,271**	**8,685**	**6,325**	**5,261**	**11,586**

Notes:
[a] Trip generation estimates based on *Trip Generation, 7th Edition*, Institute of Transportation Engineers, 2003, unless otherwise noted.
[b] Source: *Final Environmental Impact Statement for the Kula Nei Project*, Belt Collins Hawaii Ltd., September 2007.
[c] Source: *Traffic Impact Analysis Report Update for the Proposed West Hawaii Business Park*, The Traffic Management Consultant, February 2007.
[d] Source: *Traffic Study for the Keahuolu Affordable Housing Master Plan Project*, Fehr & Peers/Kaku Associates, January 2008.

In addition to related project traffic growth, other unidentified projects and general population growth contribute to what is known as ambient traffic growth. Ambient traffic growth is calculated as an annual percentage increase in traffic volumes from the existing (2007) traffic counts. Based on several years of traffic count data and projections of future growth, traffic running north and south on the major highways in Kona is estimated to increase at five percent per year for the foreseeable future. This five percent annual growth rate was applied to traffic on Queen Ka‘ahumanu Highway and Mamalahoa Highway; however, due to the future street network improvements, this growth is not expected to occur in the same patterns as the existing traffic volumes. Thus, resultant traffic volumes were redistributed across the future street network. To account for local ambient traffic growth, a one percent annual growth rate was applied to all intersection movements not covered by the north-south growth and redistribution.

Projected traffic from related project growth and ambient growth represent the future base traffic projections. To simply add these two sources of traffic growth together, however, would overestimate the total growth. The ambient traffic growth is the total projected area-wide growth, while the related project traffic growth is specific growth expected to follow particular paths. Therefore, at each turning movement location, the greater of the two sources was assigned as the total growth. The future base peak period traffic volumes based on the projected total growth are depicted in Figure 3-13.



©2009 Belt Collins Hawaii Ltd. K 2006.73.0300/022-1 dky 2009May2 3

BELT COLLINS

Source: Fehr & Peers, April 2009. Traffic Impact Analysis Report for the Proposed Ane Keohokalole Highway Extension.

Figure 3-13
FUTURE BASE PEAK HOUR TRAFFIC VOLUMES

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

Intersection LOS analysis for future base conditions is summarized in Table 3-10. The analysis indicates that two study intersections, the signalized intersections of Queen Ka‘ahumanu Highway and Hina Lani Street (Intersection 1) and Queen Ka‘ahumanu Highway and Kealakehe Parkway (Intersection 4), are projected to operate at LOS E during the PM peak hours under future base conditions. The other eight study intersections are expected to operate at an acceptable LOS (LOS D or better) during both the AM and PM peak periods under future base conditions.

Projected peak period traffic volumes and LOS analysis for the ten analyzed street segments under future base conditions are presented in Table 3-11. The analysis indicates that three directional street segments are projected to operate at LOS E or LOS F during the PM peak hours under future base conditions:

- Queen Ka‘ahumanu Highway south of Kealakehe Parkway (Street Segment 5) – northbound
- Queen Ka‘ahumanu Highway south of Kealakehe Parkway (Street Segment 5) – southbound
- Palani Road mauka (east) of Henry Street (Street Segment 9) - eastbound

The other eight analyzed street segments are expected to operate at an acceptable LOS (LOS D or better).

Future (2028) Project (Proposed Action) Traffic Projections

While the Proposed Action will allow development to occur along the proposed highway, and therefore allow additional vehicle trips to be generated, the proposed highway will service traffic from existing roadways. Thus, the process for developing future project conditions involves removing trips from routes of the future base condition street network and reassigning them to routes made possible by the proposed highway. Factors considered in the estimates of the traffic redistribution patterns include historic traffic volume data, existing traffic patterns, geographic distribution of employment and commercial activity in the vicinity, and connections to other future street in the study area.

The proposed highway will provide for two major circulation needs. The first is direct traffic drawn to the highway because it provides the most convenient route to a destination in the study area. The second is traffic passing through the vicinity that is drawn to the highway because it would provide an alternative route to Queen Ka‘ahumanu Highway or Mamalahoa Highway. Both circulation patterns were considered when estimating how the proposed highway would affect traffic patterns in the study area. The future project peak period traffic volumes based on the projected traffic redistribution patterns are depicted in Figure 3-14.

Table 3-10: Intersection Level of Service Analysis – Future Conditions

Intersection	Control Method	Peak Period	Future (2028) Base Operating Conditions			Future (2028) Project Operation Conditions			Change in Delay	Project Impact?
			Delay	V/C	LOS	Delay	V/C	LOS		
1. Queen Ka'ahumanu Highway & Hina Lani Street	Signalized	AM	43	1.067	D	26	0.989	C	-17	No
		PM	70	1.404	E	50	1.105	D	-20	No
2. Ane Keohokalole Highway & Hina Lani Street	Two-way Stop (Base) Signalized (Project)	AM	19	*N/A*	C	12	0.499	B	-7	No
		PM	30	*N/A*	D	12	0.658	B	-18	No
3. Palani Road & Hina Lani Street	Signalized	AM	28	0.871	C	19	0.758	B	-9	No
		PM	46	0.997	D	25	0.779	C	-21	No
4. Queen Ka'ahumanu Highway & Kealakehe Parkway	Signalized	AM	22	0.904	C	14	0.756	B	-8	No
		PM	66	1.108	E	24	0.910	C	-42	No
5. Ane Keohokalole Highway & Kealakehe Parkway	Two-way Stop (Base) Signalized (Project)	AM	13	*N/A*	B	18	0.435	B	5	No
		PM	11	*N/A*	B	9	0.341	A	-2	No
6. Palani Road & Palihiolo Street	Signalized	AM	16	0.675	B	15	0.651	B	-1	No
		PM	13	0.713	B	12	0.693	B	-1	No
7. Queen Ka'ahumanu Highway & Palani Road	Signalized	AM	28	0.912	C	24	0.784	C	-4	No
		PM	55	1.084	D	34	0.977	C	-21	No
8. Kamakeha Avenue & Palani Road	Signalized	AM	6	0.564	A	6	0.588	A	0	No
		PM	11	0.670	B	11	0.733	B	0	No
with additional eastbound through lane	*Signalized*	*AM*	*6*	*0.564*	*A*	*5*	*0.588*	*A*	*0*	*No*
		PM	*11*	*0.670*	*A*	*9*	*0.660*	*A*	*-2*	*No*
9. Henry Street/Ane Keohokalole Highway & Palani Road	Signalized	AM	25	0.530	C	29	0.778	C	4	No
		PM	43	0.899	D	62	1.104	E	19	Yes
With additional eastbound through lane	*Signalized*	*AM*	*25*	*0.530*	*C*	*27*	*0.772*	*C*	*2*	*No*
		PM	*43*	*0.899*	*D*	*39*	*0.948*	*D*	*-4*	*No*

Table 3-10: Intersection Level of Service Analysis – Future Conditions *(continued)*

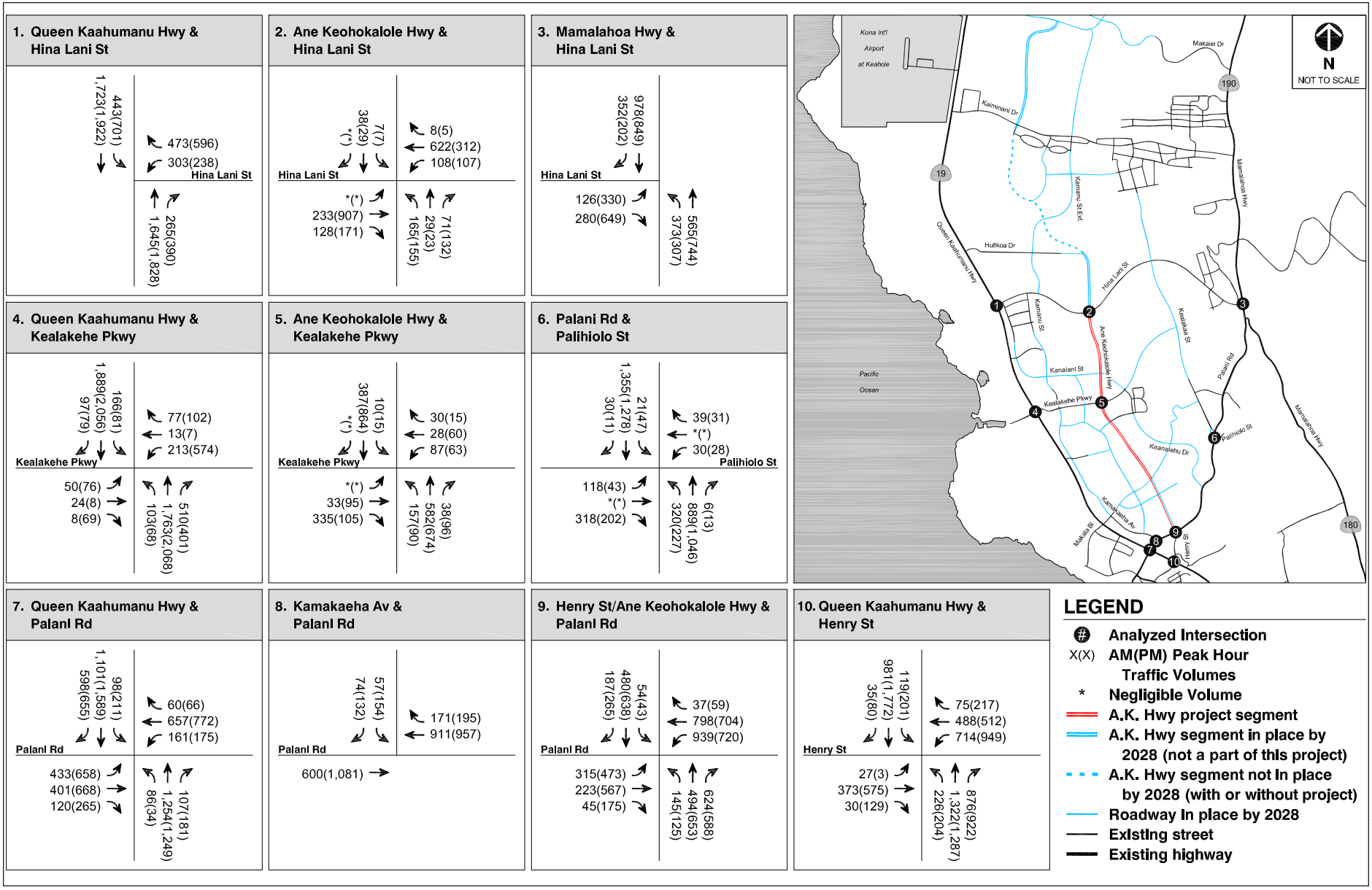
10. Queen Ka'ahumanu Highway & Henry Street	Signalized	AM	30	0.884	C	32	0.804	C	2	No
		PM	44	0.994	D	59	0.953	E	15	Yes
Restripe westbound approach and modify signal phasing	*Signalized*	*AM*	*30*	*0.884*	*C*	*25*	*0.778*	*C*	*-5*	*No*
		PM	*44*	*0.994*	*D*	*36*	*0.945*	*D*	*-8*	*No*

Table 3-11: Street Segment Level of Service Analysis – Future Conditions

Street Segment	Facility Type	Peak Period	Direction	Future (2028) Base Operating Conditions				Future (2028) Project Operating Conditions				Project Impact?
				Volume	Lanes	V/C	LOS	Volume	Lanes	V/C	LOS	
1. Hina Lani Street between Kamanu Street and Ane Keohokalole Highway	Secondary Arterial	AM	eastbound	313	2	0.13	A	303	2	0.12	A	No
			westbound	802	1	0.64	B	815	1	0.85	B	No
		PM	eastbound	1,126	2	0.45	A	1,118	2	0.45	A	No
			westbound	460	1	0.37	A	445	1	0.36	A	No
2. Hina Lani Street makai (west) of Mamalahoa Highway	Secondary Arterial	AM	eastbound	405	1	0.32	A	406	1	0.32	A	No
			westbound	716	1	0.57	A	725	1	0.58	A	No
		PM	eastbound	976	1	0.78	C	879	1	0.78	C	No
			westbound	510	1	0.41	A	509	1	0.41	A	No
3. Mamalahoa Highway south of Hina Lani Street	Primary Arterial	AM	northbound	964	1	0.77	C	938	1	0.75	C	No
			southbound	1,292	2	0.52	A	1,258	2	0.50	A	No
		PM	northbound	1,087	1	0.87	D	1,051	1	0.84	D	No
			southbound	1,530	2	0.61	B	1,498	2	0.60	A	No
4. Queen Ka'ahumanu Highway north of Kealakehe Parkway	Primary Arterial (4 lanes)	AM	northbound	2,127	2	0.63	B	1,890	2	0.56	A	No
			southbound	2,387	2	0.70	C	2,152	2	0.63	B	No
		PM	northbound	2,508	2	0.74	C	2,246	2	0.66	B	No
			southbound	2,482	2	0.73	C	2,216	2	0.65	B	No
5. Queen Ka'ahumanu Highway south of Kealakehe Parkway	Primary Arterial (4 lanes)	AM	northbound	2,828	2	0.83	D	2,376	2	0.70	B	No
			southbound	2,512	2	0.74	C	2,2110	2	0.62	B	No
		PM	northbound	3,102	2	.091	E	2,537	2	0.75	C	No
			southbound	3,279	2	0.96	E	2,699	2	0.79	C	No

Table 3-11: Street Segment Level of Service Analysis – Future Conditions *(continued)*

Street Segment	Facility Type	Peak Period	Direction	Future (2028) Base Operating Conditions				Future (2028) Project Operating Conditions				Project Impact?
				Volume	Lanes	V/C	LOS	Volume	Lanes	V/C	LOS	
6. Kealakehe Parkway mauka (east) of Queen Ka'ahumanu Highway	Secondary Arterial	AM	eastbound	981	2	0.39	A	700	2	0.28	A	No
			westbound	538	1	0.43	A	303	1	0.24	A	No
		PM	eastbound	841	2	0.34	A	490	2	0.20	A	No
			westbound	1,045	1	0.84	D	683	1	0.55	A	No
7. Ane Keohokalole Highway south of Kealakehe Parkway	Secondary Arterial	AM	northbound	198	2	0.08	A	777	2	0.31	A	No
			southbound	367	2	0.15	A	809	2	0.32	A	No
		PM	northbound	65	2	0.03	A	860	2	0.34	A	No
			southbound	145	2	0.06	A	1,032	2	0.41	A	No
8. Palani Road between Kamakaeha Avenue and Henry Street	Secondary Arterial	AM	eastbound	471	1	0.38	A	583	1	0.47	A	No
				with second eastbound lane				*583*	*2*	*0.23*	*A*	*No*
			westbound	1,089	2	0.44	A	1,130	2	0.45	A	No
		PM	eastbound	1,109	1	0.89	D	1,215	1	0.97	E	Yes
				with second eastbound lane				*1,215*	*2*	*0.49*	*A*	*No*
			westbound	944	2	0.38	A	1,094	2	0.44	A	No
9. Palani Road mauka (east) of Henry Street	Secondary Arterial	AM	eastbound	937	1	0.75	C	901	1	0.72	C	No
				with second eastbound lane				*901*	*2*	*0.36*	*A*	*No*
			westbound	1,824	2	0.73	C	1,774	2	0.71	C	No
		PM	eastbound	1,263	1	1.01	F	1,198	1	0.96	E	No
				with second eastbound lane				*1,198*	*2*	*0.48*	*A*	*No*
			westbound	1,538	2	0.62	B	1,483	2	0.59	A	No
10. Henry Street south of Palani Road	Secondary Arterial	AM	northbound	954	2	0.38	A	1,263	2	0.51	A	No
			southbound	1,186	2	0.47	A	1,464	2	0.59	A	No
		PM	northbound	952	2	0.38	A	1,366	2	0.55	A	No
			southbound	1,109	2	0.44	A	1,533	2	0.61	B	No



©2009 Belt Collins Hawaii Ltd. K 2006.73.0300/022-3 dky 2009May2 3

BELT COLLINS

Source: Fehr & Peers, April 2009. Traffic Impact Analysis Report for the Proposed Ane Keohokalole Highway Extension.

Figure 3-14
FUTURE PEAK HOUR TRAFFIC VOLUMES UNDER PROPOSED ACTION

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

Intersection LOS analysis for future project conditions without the widening of Palani Road is summarized in Table 3-10. Compared to the future base conditions, the proposed highway is expected to improve operating conditions at the following six study intersections:

- Queen Ka‘ahumanu Highway and Hina Lani Street (Intersection 1)
- Ane Keohokalole Highway and Hina Lani Street (Intersection 2)
- Mamalahoa Highway and Hina Lani Street (Intersection 3)
- Queen Ka‘ahumanu Highway and Kealakehe Parkway (Intersection 4)
- Ane Keohokalole Highway and Kealakehe Parkway (Intersection 5, p.m. only)
- Queen Ka‘ahumanu Highway and Palani Road (Intersection 7)

The proposed highway is expected leave the LOS at the following intersection unchanged:

- Palani Road and Palihiolo Street (Intersection 6)
- Kamakaeha Avenue & Palani Road (Intersection 8)

The proposed highway is expected to degrade operating conditions at the following two study intersections:

- Henry Street/Ane Keohokalole Highway and Palani Road (Intersection 9)
- Queen Ka‘ahumanu Highway and Henry Street (Intersection 10)

At one study intersection, Ane Keohokalole Highway and Kealakehe Parkway (Intersection 5), the proposed highway is projected to degrade operating conditions during AM peak hours, but improve operating conditions during PM peak hours.

Projected peak period traffic volumes and LOS for the ten analyzed street segments without the widening of Palani Road and under future project conditions are presented in Table 3-11. Two of the street segments analyzed are projected to operate at LOS E or LOS F during PM peak hours under future base conditions (Table 3-11). With the proposed highway, conditions would improve one the two segments (Segment 5) to LOS D or better. For the second segment (Segment 9), conditions would improve from LOS F to LOS E.

With the widening of Palani Road, included in the Proposed Action, traffic degradation would be prevented at Intersection 9 and a LOS D or better would result. Specific design aspects include:

- Widening the eastbound approach to provide a second through lane, resulting in one left-turn lane, one through lane, and one shared through/right-turn lane.
- Providing protected left-turn phasing in the eastbound and westbound directions and corresponding northbound and southbound overlapping right-turn phases.

With the planned restriping of Queen Ka‘ahumanu Highway at Henry Street, to be coordinated between the County of Hawai‘i and the HDOT, traffic degradation would be prevented at Intersection 10 and a LOS D or better would result. Restriping the westbound approach would provide two left-turn lanes, one through lane, and one right-turn lane. This would allow the existing separate eastbound and westbound signal phases to be removed and instead be operated with protected left-turn phasing for the eastbound and westbound approaches and protected/permitted left-turn phasing for the northbound and southbound approaches.

As the Proposed Action is currently designed, no significant project-related impacts on traffic would occur.

The No Action Alternative is represented by the future base conditions described above. Under the No Action Alternative, a greater number of intersections and street segments are projected to operate at an unacceptable LOS than under the Proposed Action.

3.10 NOISE

The existing dominant noise source in the vicinity of the proposed highway is traffic from the regional roadway system, including Palani Road and Queen Ka‘ahumanu Highway. Other noise sources include the sound of wind moving through vegetation, birds, and fixed source noises. The latter is primarily associated with light industrial activities at the industrial subdivision.

Y. Ebisu Associates was contracted to directly measure or otherwise determine existing noise levels, and then model the noise levels along the proposed highway out to the horizon year 2028 based on the data from the traffic study (Appendix F, summarized in Section 3.9). The FHWA Traffic Noise Model, Version 2.5 was used as the primary method for calculating base year (2008) and future (2028) traffic noise levels. In addition to assessing traffic related noise, the

study also examined noise levels associated with short-term, construction-related activity. The noise study report is contained in Appendix G

3.10.1 AFFECTED ENVIRONMENT

Noise Standards

U.S. Department of Housing and Urban Development (HUD) environmental noise criteria and standards (24 CFR 51) were established to determine housing project site acceptability. These standards are intended to protect housing from noise pollution and govern the development of housing near noise sources. These standards do not govern the development of roads near housing and, therefore, do not have direct bearing on the Proposed Action, but inform the conditions under which local officials should be notified of impacts on future developments.

The HUD site acceptability criteria rank sites as Acceptable, Normally Unacceptable, or Unacceptable. "Acceptable" sites are those where exterior noise levels do not exceed an L_{eq}(h) of 65 dBA. Proposed housing projects on "Acceptable" sites do not require additional noise attenuation other than that provided by customary building techniques. "Normally Unacceptable" sites are those where the L_{eq}(h) is between 65 dBA and 75 dBA. Housing on "Normally Unacceptable" sites requires some form of noise abatement, either at the property line or in the building construction, to ensure that interior noise levels are acceptable. "Unacceptable" sites are those where the L_{eq}(h) is 75 dBA or higher. The term does not necessarily mean that housing cannot be built on those sites, but indicates that more extensive sound attenuation will likely be needed in their construction.

Currently, most of the area around the proposed highway is undeveloped. However, as the area will eventually be primarily residential, it is appropriate to consider the Proposed Action in view of the potential interaction of noise with housing projects. In undeveloped areas, attenuation will not be required for noise as part of highway construction. Developments that take place after the highway is built, however, may have to provide sound attenuation, depending on the noise levels at each location.

U.S. Federal Highway Administration (FHWA) regulations for noise abatement criteria are delineated in 23 CFR Part 772. The FHWA defines four land use categories and assigns corresponding maximum hourly equivalent sound levels L_{eq}(h) (equivalent continuous sound pressure level dB) for traffic noise exposure. For example, Category B (picnic and recreation areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals) has a corresponding exterior L_{eq} of 67 dBA and a maximum interior L_{eq} of 52 dBA. Category B corresponds to

the anticipated use of the land surrounding the proposed highway. If a noise impact is identified (i.e. these levels are exceeded), specific abatement measures must be considered. The U.S. Department of Transportation (USDOT) acceptable cost for noise abatement for residential areas is $30,000 per benefited residence. In some cases, lands which are undeveloped at the time of the project may be known to be under consideration for development in the future. If this is the case and definite commitments have been made to develop the land, then these lands are treated as developed and the highway noise impacts assessed accordingly. Highway agencies shall inform local officials of the results of noise projections and provide information that may be useful to protect future land development from becoming incompatible with anticipated highway noise levels.

State of Hawai‘i Department of Transportation (HDOT) has adopted FHWA's design goals for traffic noise exposure in its noise analysis and abatement policy. According to the policy, a traffic noise impact occurs when the predicted traffic noise levels "approach" or exceed FHWA's design goals, or when the predicted traffic noise levels "substantially exceed the existing noise levels." The policy also specifies that "approach" means at least 1 dB less than FHWA's design goals and "substantially exceed the existing noise levels" describes an increase of 15 dBA or more. To meet the requirement for noise abatement, HDOT requires that attenuation measures be implemented to reduce projected noise levels by 5 dBA.

State of Hawai‘i Community Noise Control (DOH) HAR 11-46 is intended to protect, control, and abate noise pollution from *stationary* sources, which would apply to construction activities associated with the Proposed Action. The Community Noise Control Rule does not address most *moving* sources and, therefore, does not apply to traffic noise. The rule defines three classes of zoning districts and specifies corresponding maximum permissible sound levels. With respect to mixed zoning districts, the rule specifies that the primary land use designation shall be used to determine the applicable zoning district class and sound level. With respect to the Proposed Action, the surrounding area would fall into Class B (Multi family dwellings, apartment, business, commercial, hotel, resort or similar type) where the maximum permissible sound level is 60 dBA (decibel "A" weight filter) during daytime hours and 50 dBA at night. Sound levels for Class C (which includes industrial areas) are 70 dBA for the entire 24-hour period.

The maximum permissible noise levels for any given location are enforced by the State DOH at or beyond the property line and shall not be exceeded for more than 10 percent of the time during any 20-minute period without a variance. For impulsive noise (e.g. drilling, pile-driving), the State DOH defines the maximum permissible sound level as 10 dBA above the levels specified in HAR 11-46.

State of Hawai'i Board of Education. Because Kealakehe High School is located in the vicinity of the proposed highway, noise pollution as it applies to educational environments may be a relevant factor. Board of Education policy references State DOH standards and requires schools to implement attenuation when sounds emanating from schools impact surrounding neighborhoods, and also when ambient noise levels negatively impact classrooms.

Existing Acoustical Environment

Existing traffic and background ambient noise levels at six locations in the project area were measured in February 2008. The traffic noise measurements were used to calibrate the traffic noise model which was used to calculate the base year (2008) and future (2028) traffic noise levels under the Proposed Action. The noise measurement locations are shown in Figure 3-15. Traffic noise measurements were obtained at Locations A, E1, and E2. Background and ambient noise measurements were obtained at Locations B, C, and D at Kealakehe High School. The results of the background measurements are summarized in Figure 3-16.

Developed Areas. Existing noise levels in developed areas were dominated by traffic. Measured average background ambient noise levels ranged from 54 to 58 decibels (dB) with instantaneous levels dropping below 35 dB and rising as high as 70 dB. Along Palani Road, existing traffic noise levels already exceed the HDOT noise abatement criteria of 66 dB at location A, which is 50 feet from the centerline of the roadway.

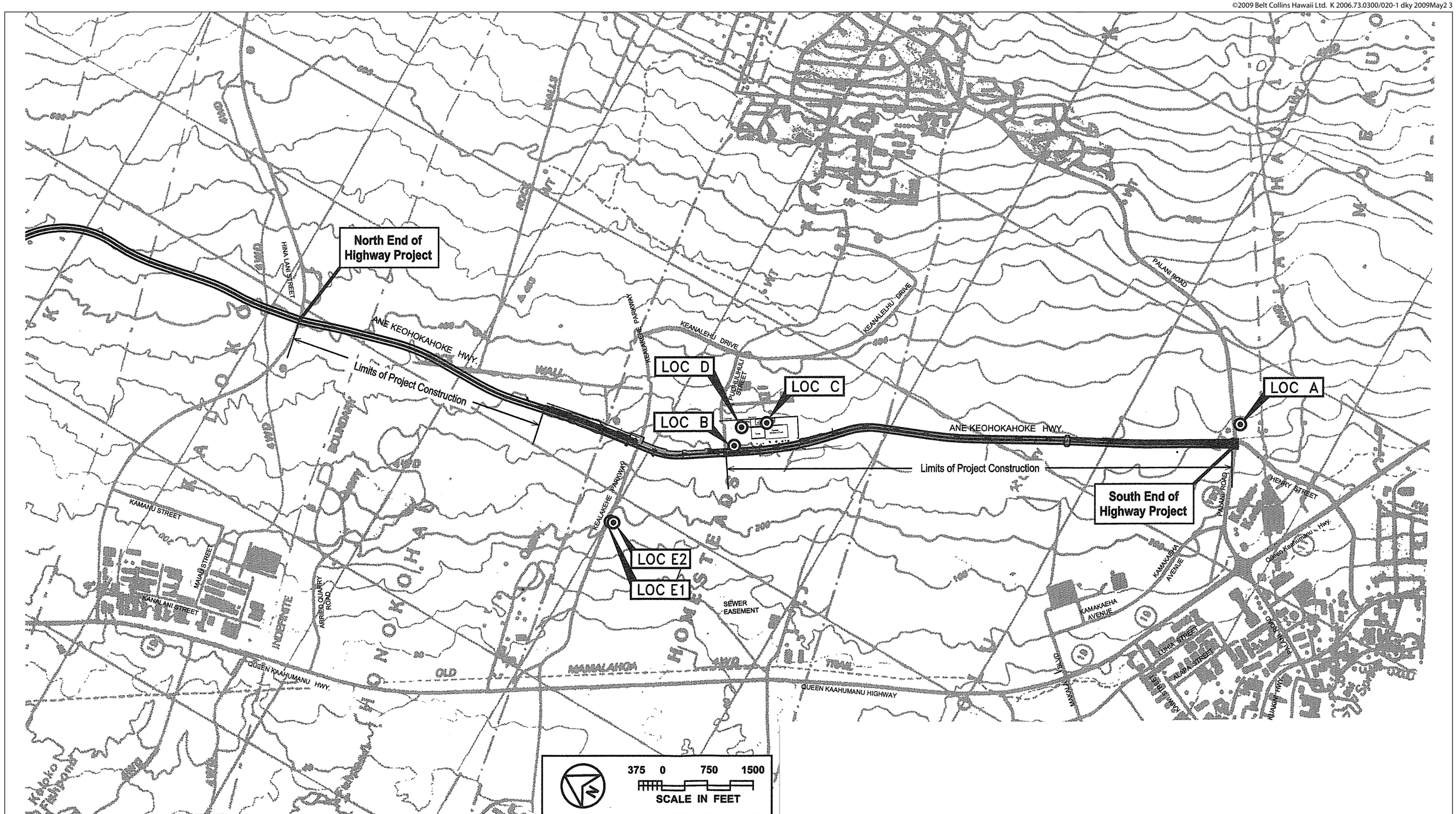
Undeveloped Areas. Existing background ambient noise levels in undeveloped areas consist of distant traffic or construction activities, the sounds of birds, and foliage moving in the wind. Noise levels were estimated to range from 45 to 50 dB (L_{eq}), based on residual noise levels at Locations B, C, D, and E1 during quiet periods.

3.10.2 POTENTIAL IMPACTS

Short-Term, Construction-Related Impacts

The Proposed Action would involve site preparation activities, such as excavation and grading, and construction of the roadway. The dominant noise sources during construction would be earth moving equipment such as bulldozers and trucks. Some area residences may be temporarily impacted by construction

©2009 Belt Collins Hawaii Ltd. K 2006.73.0300/020-1 dky 2009May2 3



Source: Y. Ebisu & Associates, February 2009. Acoustic Study for the Ane Keohokalole Highway Project.

Figure 3-15
LOCATION OF ANE KEOHOKALOLE HIGHWAY AND NOISE MEASUREMENT SITES

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. 50 FT from the double yellow line of Palani Road (2/11/08)	0645 TO 0745	45	1,737	9	12	68.8	69.0
A. 50 FT from the double yellow line of Palani Road (2/11/08)	1550 TO 1650	40	2,188	9	2	67.5	68.3
E1. 50 FT from the median on south side of Kealakehe Parkway (2/11/08)	1406 TO 1506	45	331	7	11	63.3	63.7
E2. 100 FT from the median on south side of Kealakehe Parkway (2/11/08)	1406 TO 1506	45	331	7	11	55.2	57.6
B. On the west boundary of Kealakehe H.S. next to nw parking area (2/10/08)	0845 TO 0945	N/A	N/A	N/A	N/A	55.0	N/A
C. At nw corner of Bldg. Y at Kealakehe H.S. (2/11/08)	0830 TO 0930	N/A	N/A	N/A	N/A	54.4	N/A
D. At nw corner of Bldg. BB at Kealakehe H.S. (2/11/08)	0935 TO 1035	N/A	N/A	N/A	N/A	57.9	N/A

©2009 Belt Collins Hawaii Ltd. K 2006.73.0300/019-2.dky 2009May25

BELT COLLINS

Source: Y. Ebisu & Associates, February 2009. Acoustic Study for the Ane Keohokalole Highway Project.

Figure 3-16
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

Ane Keohokalole Mid-Level Highway
Draft Environmental Assessment

noise depending on their proximity to the project area. Noise levels associated with construction equipment typically range from 80 to 95 dBA at 50 feet from the source. Varying in location and duration, noise levels may be continuous (e.g., generator motors), fluctuating (e.g., crane operations), or impulsive (e.g., metal drill pipes banging together).[19]

Construction work will be conducted in compliance with applicable State DOH noise regulations. The State DOH currently regulates noise from construction activities under a permit system. Under current permit procedures, noisy construction activities are restricted to hours between 7 AM and 6 PM, from Monday through Friday, and exclude certain holidays. Minimizing noise impacts from construction is possible using standard curfew periods, properly muffled equipment, administrative controls, and construction barriers as required. Heavy truck and equipment staging areas should be located at areas which are as far from noise sensitive properties as possible. Truck routes that avoid residential communities should be identified and used wherever possible. These restrictions would minimize construction noise impacts on noise sensitive residences along the proposed highway corridor.

No significant impacts as a result of construction noise would occur under the Proposed Action for all locations, with the exception of the existing Kealekehe High School. Because school buildings are naturally ventilated (i.e., windows are kept open for ventilation and occupant comfort) and not sufficiently distant from the proposed highway for noise attenuation, loud construction noise could have negative impacts. Therefore, highway construction near the school is recommended for weekends and holidays.

No impacts from construction noise would occur under the No Action Alternative.

Long Term, Roadway Traffic Noise Impacts

Federal and state DOT agencies set the standards under which attenuation is required to reduce noise levels from newly constructed highways. HDOT noise abatement criteria in this case are 66 L_{eq}(h) or a 15 dB increase. L_{eq} represents the average (or equivalent), A-Weighted, Sound Level. A list and descriptions of acoustical terminology are contained in the acoustic study. Under HDOT requirements, where projected noise increases meet or exceed these criteria, attenuation must be considered to reduce the projected increase by 5 dBA.

The noise measurements were used in conjunction with forecasted traffic data from the traffic report (Appendix F) and the traffic noise model, and applied to four cross-sections of the existing and proposed highway alignment (Figure 3-17). Each cross-section consisted of four receivers at different distances from the highway, allowing

[19] American Industrial Hygiene Association, *Noise and Hearing Conservation Manual*, 1996.

©2009 Belt Collins Hawaii Ltd. K 2006.73.0300/020-2 dky 2009May2 3

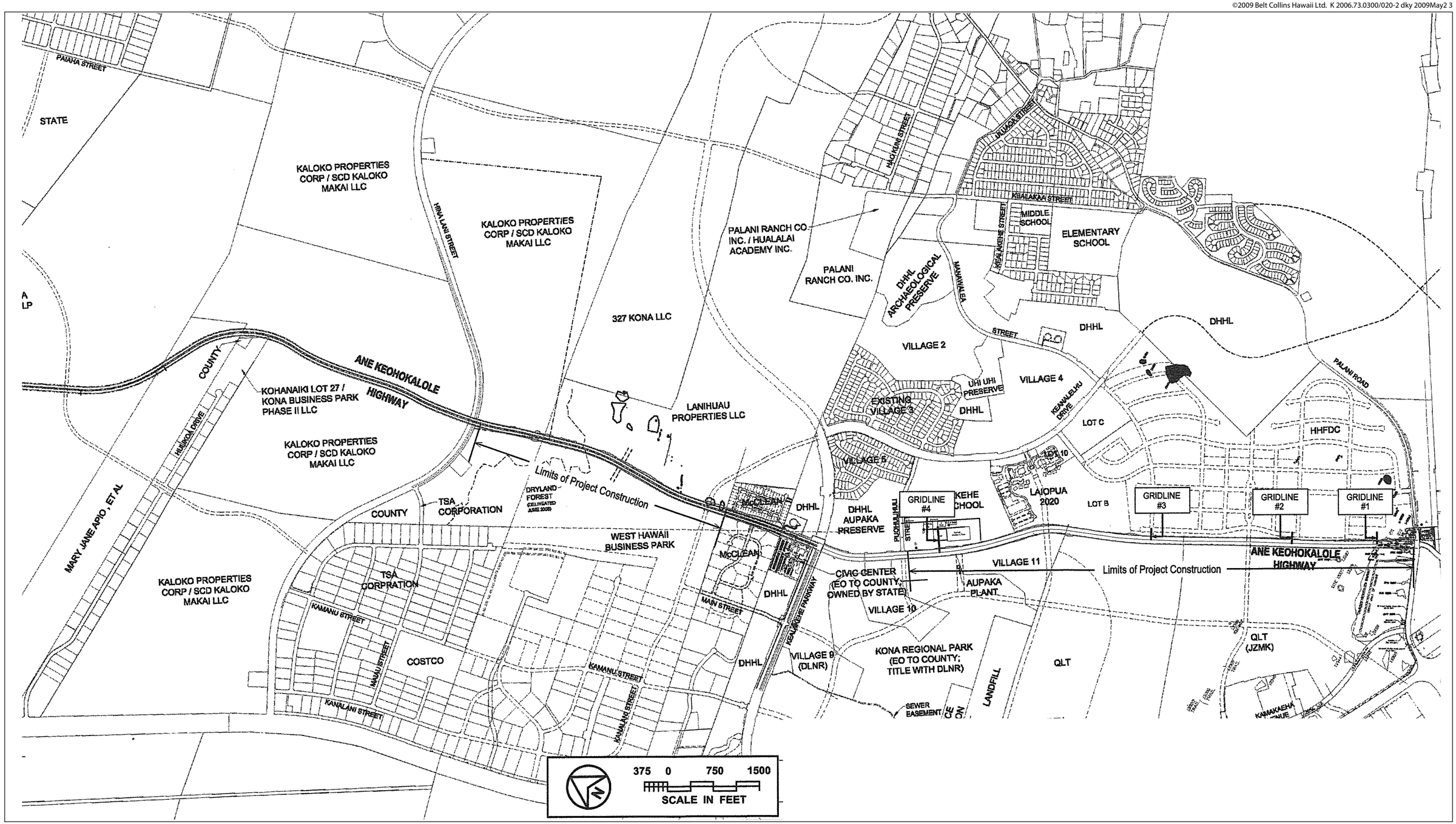


Figure 3-17
EXISTING AND FUTURE RECEPTOR LOCATIONS EVALUATED ALONG THE ANE KEOHOKALOKE HIGHWAY ALIGNMENT

BELT COLLINS

Source: Y. Ebisu & Associates, February 2009. Acoustic Study for the Ane Keohokalole Highway Project.

the analysis of setback on noise attenuation. These sections were also analyzed for the impact of sound attenuating walls of various heights at the various distances.

The existing traffic noise levels at the highest peak hour are below the HDOT threshold of 66 L_{eq} at all receivers. Noise levels at these same locations in the horizon year 2028 were predicted to exceed this threshold at some of the receivers, depending on the intensity of the noise source and distance from it. However, the 15 dBA increase was exceeded at almost all locations in horizon 2028, triggering the attenuation requirement at these locations. The use of walls ranging from 5 to 8 feet in height (depending on the location) would meet the abatement requirement of 5 dB. The results of the traffic noise model analysis are summarized in Figure 3-18.

The acoustical study also analyzed the impacts of a 25 mph speed limit (versus a 35 mph speed limit) as a potential attenuation design measure on traffic noise levels at five locations along the proposed highway alignment. The study also predicted the setback needed to achieve to the 66 L_{eq}(h) level and the 71 L_{eq}(h) level for the horizon year 2028 at these five locations. The model showed that a reduction of the posted speed limit from 35 to 25 mph, causing a reduction in actual vehicle speed from 45 to 35 mph, resulted in a noise reduction of about 3 to 4 dBA. Although not sufficient in and of itself to achieve the necessary 5 dBA reduction, combined with a setback of 12 to 25 feet (depending on the location), the HDOT attenuation requirements would be met. The results of this analysis are summarized in Table 3-12.

The report reached the following general conclusions on the impacts of traffic noise levels as a result of the Proposed Action that are possible by the horizon year 2028. These conclusions are valid for the future traffic volumes, mix, and average speed assumptions used for this traffic noise study:

- By the horizon year 2028, traffic noise levels along the proposed highway (north of Palani Road to north of Kealakehe Parkway) are expected to exceed 66 L_{eq}(h) along the mauka and makai rights-of-way, impacting noise sensitive developments within 27 to 39 feet of the rights-of-way. Noise sensitive developments located within 27 to 39 feet of the highway rights-of-way would be candidates for traffic noise attenuation measures. Developments located farther from the rights-of-way would need no attenuation.
- By the horizon year 2028, traffic noise levels along the mauka and makai ROWs of the proposed highway (just south of Hina Lani Street) are not expected to exceed 66 L_{eq} (h).

EXISTING AND PREDICTED TRAFFIC NOISE LEVELS VS. BARRIER HEIGHTS
(4.92 FT HIGH RECEPTOR, HIGHEST PEAK HOUR)

RECEPTOR LOCATION	SETBACK DIST. FROM HWY. B.L.	RECEPTOR GROUND ELEVATION (FT)	EXISTING (CY 2008) Leq	FUTURE (CY 2028) Leq W/O BAR./ (CHANGE)	5.0 FT WALL (CHANGE)	6.0 FT WALL (CHANGE)	7.0 FT WALL (CHANGE)	8.0 FT WALL (CHANGE)
HHFDC (GRIDLINE #1)								
Receiver #1A	65 FT East	300	50.0	69.2 / 19.2 *	63.8 / 13.8	60.0 / 10.0	58.1 / 8.1	56.5 / 6.5
Receiver #1B	90 FT East	301	50.0	66.1 / 16.1 *	61.1 / 11.1	59.3 / 9.3	58.3 / 8.3	57.3 / 7.3
Receiver #1C	120 FT East	301	50.0	63.1 / 13.1	58.8 / 8.8	57.4 / 7.4	56.6 / 6.6	55.9 / 5.9
Receiver #1D	200 FT East	312	50.0	59.2 / 9.2	57.5 / 7.5	57.1 / 7.1	56.2 / 6.2	55.3 / 5.3
HHFDC (GRIDLINE #2)								
Receiver #2A	77 FT East	319	48.0	68.2 / 20.2 *	67.6 / 19.6 ***	63.8 / 15.8 ***	60.7 / 12.7	58.7 / 10.7
Receiver #2B	90 FT East	319	48.0	66.9 / 18.9 *	64.4 / 16.4 ***	62.1 / 14.1 ***	60.5 / 12.5	59.3 / 11.3
Receiver #2C	120 FT East	322	48.0	64.6 / 16.6 *	62.3 / 14.3 ***	61.0 / 13.0 ***	60.0 / 12.0 ***	58.9 / 10.9
Receiver #2D	200 FT East	325	48.0	59.9 / 11.9	57.7 / 9.7	56.9 / 8.9	56.2 / 8.2	55.5 / 7.5
HHFDC (GRIDLINE #3)								
Receiver #3A	77 FT East	302	47.0	67.9 / 20.9 *	65.4 / 18.4 ***	62.2 / 15.2	60.3 / 13.3	58.6 / 11.6
Receiver #3B	90 FT East	302	47.0	66.5 / 19.5 *	63.0 / 16.0 ***	61.1 / 14.1	59.7 / 12.7	58.6 / 11.6
Receiver #3C	120 FT East	305	47.0	64.2 / 17.2 *	61.6 / 14.6 ***	60.3 / 13.3 ***	59.2 / 12.2	58.2 / 11.2
Receiver #3D	200 FT East	312	47.0	60.0 / 13.0	58.6 / 11.6	58.1 / 11.1	57.1 / 10.1	56.3 / 9.3
KEALAKEHE HIGH SCHOOL (GRIDLINE #4)								
Receiver Location "B"	105 FT East	274	55.0	64.8 / 9.8	N/A	N/A	N/A	N/A
Receiver Location "C"	430 FT East	279	54.4	48.9 / -5.5	N/A	N/A	N/A	N/A
Receiver Location "D"	400 FT East	279	57.9	50.1 / -7.8	N/A	N/A	N/A	N/A

1. Gridline locations as shown in Figure 2.
2. * Denotes exceedance of State DOT "66 Leq" Criteria for Activity Category B or exceedance of State DOT "15 dB increase" Criteria.
3. ** Denotes exceedance of State DOT "71 Leq" Criteria for Activity Category C or exceedance of State DOT "15 dB increase" Criteria.
4. *** Denotes need for additional barrier height to meet State DOT "5 dBA Minimum Attenuation" Criteria.
5. For Receiver Locations "B", "C", and "D" at Kealakehe High School, see Figure 1 and Table 1.

©2009 Belt Collins Hawaii Ltd. K 2006.73.0300/019-2.dky 2009May25

BELT COLLINS

Source: Y. Ebisu & Associates, February 2009. Acoustic Study for the Ane Keohokalole Highway Project.

Figure 3-18
EXISTING AND PREDICTED TRAFFIC NOISE LEVELS VS. BARRIER HEIGHTS

Table 3-12: Future (CY 2028) Traffic Volumes and Noise Level Analysis

	Location	Total Vehicles per Hour	45 mph			35 mph		
			60' L_{eq}	100' L_{eq}	200' L_{eq}	60' L_{eq}	100' L_{eq}	200' L_{eq}
AM Peak Period	Ane Keohokalole Hwy. – North of Palani Road	1,567	69.4	64.2	57.3	65.9	60.9	54.3
	Ane Keohokalole Hwy. – At Keahuolu Access	1,549	69.1	64.0	57.1	65.9	60.8	54.3
	Ane Keohokalole Hwy. – South of Kealakehe Pkwy	1,586	69.2	64.1	57.2	66.0	60.9	54.3
	Ane Keohokalole Hwy. – North of Kealakehe Pkwy	1,009	67.3	62.1	55.2	64.1	59.0	52.4
	Ane Keohokalole Hwy. – South of Hina Lani St.	539	64.5	59.4	52.5	61.2	56.2	49.7
PM Peak Period	Ane Keohokalole Hwy. – North of Palani Road	2,131	70.5	65.3	58.5	67.2	62.2	55.6
	Ane Keohokalole Hwy. - At Keahuolu Access	2,012	70.3	65.1	58.2	67.0	61.9	55.3
	Ane Keohokalole Hwy. – South of Kealakehe Pkwy	1,892	70.0	64.8	57.9	66.7	61.7	55.1
	Ane Keohokalole Hwy. – North of Kealakehe Pkwy	1,568	69.2	64.0	57.1	65.9	60.9	54.3
	Ane Keohokalole Hwy. – South of Hina Lani St.	617	65.0	59.9	53.1	61.7	56.7	50.2

Note: Noise levels exceeding the 66 dBA level are shown in red.

- If noise sensitive developments precede construction of the proposed highway, the Proposed Action should include traffic noise attenuation measures for developments located within distances of approximately 100 feet from the highway ROWs. If the existing background noise levels at these noise sensitive developments are less than 51 L_{eq}(h), traffic noise attenuation measures may be applied if the forecasted traffic noise from the proposed highway exceeds the base year noise levels by 15 dB. At these particular noise sensitive developments, the application of traffic noise attenuation measures could occur for forecasted noise levels below 66 or 71 L_{eq}(h) and at buffer distances within approximately 100 feet from the highway ROWs.
- The HDOT 66 L_{eq}(h) or 15 dB increase noise abatement criteria should not be exceeded at Kealakehe High School.
- No office, commercial, or industrial structures should experience future traffic noise levels which exceed the HDOT noise abatement criteria of 71 L_{eq}(h) for Activity Category C. Office, commercial, or industrial structures could experience future traffic noise levels which exceed the HDOT 15 dB increase noise abatement criteria if they are built prior to construction of the proposed highway, and if their background noise levels are less than 55 dBA.
- No existing park lands or public use structures should experience traffic noise levels from the proposed highway which exceed 66 L_{eq}(h) or which exceed existing background ambient noise levels by 15 dB.

Attenuation

If the proposed highway is built before these developments are planned or constructed, noise abatement would not be required as part of highway construction. If the proposed highway is constructed *after* the development of noise sensitive residences, and future traffic noise levels at developed properties are projected to exceed the 15 dB increase or the 66 L_{eq}(h) maximum, the application of reasonable and feasible traffic noise attenuation measures at these developed properties must be considered as part of highway construction. Lands which are undeveloped at the time of the project, but are known to be under consideration for development in the future, are treated as developed and the highway noise impacts assessed accordingly.

The maximum price for cost-effective noise attenuation is $30,000 per benefited residence, a condition that must be met in each case for attenuation to be considered reasonable and feasible. The acoustical study considered the following five approaches to noise attenuation, in addition to studying the impact of a 10 mph reduction in vehicle speed:

A. Restrict growth in the number of noisy vehicles. This would not be effective because the number of noisy vehicles is already too low for a reduction in noise to be significant.

B. Alter the horizontal or vertical alignment of the roadway. This may be feasible in the case of horizontal alignment in some cases (changing the vertical alignment is not feasible), although achieving the 5 dB attenuation would require a major shift in the alignment, incurring more than the $30,000 cost per benefited residence.

C. Use or acquire land along the ROW for the construction of noise barriers. Informed by the results of the study's examination of sound attenuating walls, the 5 dB requirement could be achieved in most cases by a 5- to 6-foot high wall.

D. Acquire land to serve as a noise buffer zone. This may be necessary in cases where structures are too tall to be shielded by walls but may not be cost-effective. In general, the acquisition of land to create a noise buffer has not been practiced in Hawai'i.

E. Insulate public use or non-profit institutional structures against noise. This option does not apply in this scenario as there are no existing public use or non-profit institutional structures along the proposed highway corridor requiring sound attenuation.

Based on this analysis, Options B, C, and D, in combination with reducing the posted speed limit from 35 to 25 mph, are the most feasible and lowest-cost approaches to noise attenuation. Reducing the posted speed limit would reduce noise levels by 3 to 4 dB, requiring only the combined application of noise barriers and set-backs to achieve the necessary noise attenuation of 5 dBA.

No significant noise impacts would occur under the Proposed Action. Although noise level thresholds would be exceeded in some locations as a result of increases in traffic, design measures such as reducing posted speed limits, building noise-attenuating walls, and using setbacks would reduce noise levels sufficiently to meet HDOT requirements. In undeveloped locations where future developments such as housing may be affected by highway noise, local officials will be notified and provided with information on the projected noise levels along the proposed highway to ensure that future land developments are informed on anticipated highway noise levels and can take appropriate measures.

No impacts to the noise environment would take place under the No Action Alternative.

3.11 NATURAL HAZARDS

The natural hazards to which the project area could be subjected include earthquakes, and volcanic eruptions. Because of the nature of the land, rainfall patterns, and soil types, floods due to stormwater surface runoff are unlikely to occur. The affected area is outside of the tsunami inundation zone. [20]

3.11.1 AFFECTED ENVIRONMENT

EARTHQUAKE HAZARDS

The county of Hawai‘i is one of the most seismically active areas on Earth with more destructive earthquakes than in any other comparably sized area in the United States. The Kona area is subject to earthquakes with intensities up to VIII on the Modified Mercalli Scale.[21]

The most recent damaging earthquakes to impact Hawai‘i occurred on October 15, 2006. According to the Hawaiian Volcano Observatory: "…two damaging earthquakes struck the northwest side of Hawai‘i Island early on Sunday morning, October 15, … preliminary locations for most of the aftershocks placed them at depths less than 20 kilometers (km)."

Over 80 aftershocks with magnitudes greater than 1.7 were recorded in the first 24 hours after the quakes. The largest was a magnitude-4.2 that occurred at 10:35 AM on October 15.

VOLCANIC HAZARDS

The proposed highway corridor is situated on the west-facing flank of Hualalai Volcano. Of the three active volcanoes on the island of Hawai‘i, Hualalai Volcano is considered to be the least active. Its last eruption in 1801 produced lava flows that inundated the Ka‘upulehu and Keahole areas of North Kona. Hualalai Volcano is considered by geologists to be representative of a post-shield stage of Hawaiian volcanism, which is characterized by a marked decrease in the eruption rate as the volcano drifts off the Hawaiian hotspot. The estimated lava production

[20] Civil Defense Tsunami Evacuation Zones for Hawaii County http://co.hawaii.hi.us/cd/tsunami/maps.htm, accessed January 2009.

[21] According to the Federal Emergency Management Agency, during an earthquake with an intensity of VIII on the Modified Mercalli Scale, drivers have trouble steering. Houses that are not bolted down might shift on their foundations. Tall structures such as towers and chimneys might twist and fall. Well-built buildings suffer slight damage. Poorly built structures suffer severe damage. Tree branches break. Hillsides might crack if the ground is wet. Water levels in wells might change.

rate for Hualalai Volcano over the past 3,000 years is about two percent of the current rate of Kilauea Volcano.[22]

During the last eruption of Hualalai Volcano in 1800-1801, lavas emerged from the northwest volcanic rift zone at about the 1,600-foot elevation (in the vicinity of the Puhi-a-Pele Cinder Cone, just makai of Mamalahoa Highway), creating a flow that entered the ocean north of Keahole Point. Although lava flows from Hualalai Volcano have typically covered large areas, the rift zones of the volcano do not seem to have a distinctly higher degree of hazard than do its flanks. As such, lava flow hazards for the project area are relatively low.

Lava Flows. Hualalai Volcano is identified as being fully contained in lava-flow Hazard Zone 4. Maps showing volcanic hazard zones on the island of Hawai‘i were first prepared in 1974 by Donald Mullineaux and Donald Peterson of the U.S. Geological Survey (USGS) and were revised in 1987. The USGS divides the island into zones that are ranked from 1 through 9 based on the probability of coverage by lava flows, with 9 being the lowest probability. The proposed highway is located in lava-flow Hazard Zone 4. Other direct hazards from eruptions, such as tephra fallout and ground cracking and settling, are not specifically considered on the hazard map; however, these hazards also tend to be greatest in the areas of highest hazard from lava flows.[23]

Tephra. In addition to lava-flow hazard zones, hazard zones for tephra falls (ash fall) have also been defined for the island of Hawai‘i (Mullineaux et al., 1987). The hazard from tephra fall for all of Hualalai Volcano is ash fall Hazard Zone 2, which indicates that tephra falls from lava fountains could be frequent but thin. Tephra is a general term for fragments of volcanic rock and lava that are blown into the air by explosive volcanic eruptions, hot gases in eruptive columns, or by lava fountains

According to a geological study conducted in 2005 for the Keahole Generating Station, there is no evidence that tephra has fallen in low-lying areas away from Hualalai Volcano’ s summit and rift zone. As the project area is over nine miles down slope from Hualalai’s summit, it is outside of the volcano’s high summit area. While it is possible that a high fountaining episode during some future eruption of Hualalai could produce ash fall, based on the volcano’s eruptive character, this hazard is expected to be slight in relation to the subject property.[24] Hualalai Volcano is a geologically active volcano with clusters of eruptions occurring about every 500 years. Thus, the probability is relatively high that Hualalai Volcano could erupt somewhere within the next few centuries. However,

[22] Belt Collins Hawaii Ltd. *Final Environmental Impact Statement Keahuolu Affordable Housing Project.* October 2008.

[23] USGS Lava Flow Hazard Zone Maps, http://pubs.usgs.gov/gip/hazards/maps.html, accessed February 19, 2009.

[24] Ibid.

the odds are low that such an eruption would threaten the area of the proposed highway.[25]

3.11.2 POTENTIAL IMPACTS

The Proposed Action is unlikely to significantly impact human health and safety as a result of natural hazards, including earthquakes, and volcanic eruptions.

No impacts to potential threats from natural hazards would occur under the No Action Alternative.

3.12 INFRASTRUCTURE

3.12.1 UTILITIES AND SOLID WASTE

3.12.1.1 Affected Environment

No utilities are currently present along the proposed highway alignment. No waste service is currently required as the project area is undeveloped and vacant.

3.12.1.2 Potential Impacts

Construction of the proposed highway would not require the use of any utility (e.g., water, wastewater, electrical or communication) systems. Operation of the proposed highway would require electricity for streetlights and traffic signals. The Proposed Action would serve as a utility corridor for service to the future developments planned in the surrounding areas. Utilities located within the proposed highway corridor would include water, sewer, reclaimed water (irrigation), electrical, cable, and telephone.

The County of Hawai‘i requires all construction, demolition, and solid waste to be disposed of at an approved solid waste disposal facility. All waste generated from the project would be taken to the West Hawai‘i Landfill in Pu‘uanahulu, a county transfer station, or recycled to the extent possible. The current life of the West Hawai‘i Landfill is 55 years based on current tonnage.[26] No significant impacts on utilities and waste disposal facilities would occur.

[25] *Volcanic Hazards at the HELCO Keahole Generating Station, North Kona, Hawai‘i Final Report.* Prepared for Belt Collins Hawaii, Ltd. by Lockwood, John P. and Michael O. Garcia, February 28, 2004.

[26] Waste Management, Inc. West Hawaii Landfill http://www.keepinghawaiiclean.com/whawaii.htm accessed February 26, 2009.

No impacts to utilities and construction, demolition, and solid waste infrastructure would occur under the No Action Alternative.

3.12.2 DRAINAGE

3.12.2.1 Affected Environment

There are currently no man-made drainage systems in the area, as the area is undeveloped.

3.12.2.2 Potential Impacts

Traditionally, storm water management has involved the rapid conveyance of water via storm sewers to surface waters, in this case the Pacific Ocean. Low Impact Development (LID) is a different approach that retains and infiltrates rainfall on-site. The purpose of LID is to reduce the speed, volume, and polluting capacity of runoff, particularly large runoff events. The LID approach emphasizes site design and planning techniques that mimic the natural infiltration-based, groundwater-driven hydrology of the historic landscape.

Bioswales are one component of LID.[27] They consist of a drainage courses filled with vegetation, compost, and/or riprap. The storm water flow path, along with the wide and shallow ditch, is designed to maximize the time storm water spends in the swale, which aids the trapping of pollutants and silt. Biological factors also contribute to the retention and breakdown of certain pollutants, including petroleum-based pollutants, silt, inorganic contaminants, organic chemicals, and pathogens. After a certain residence period in the biotreatment areas, the treated water will run into the ground through injection wells.

Drainage along the proposed highway would be provided by biotreatment areas into which stormwater would be funneled for filtration and contaminant removal. After treatment, the treated runoff would be returned to the ground via drywells. These landscaped elements would eliminate or minimize the need for storm drains (which could negatively impact receiving waters, particularly those with sensitive coastal ecosystems such as coral reefs), while permitting treated runoff to permeate through the lava rock, thus maintaining the hydrologic profile of the area.

No significant impacts to the drainage of the project area would occur under the Proposed Action. Appropriate drainage infrastructure would be constructed and installed along the proposed highway and any associated increase in paved

[27] Natural Resources Conservation Service Bioswales Absorb and Transport Large Runoff Events ftp://ftp-fc.sc.egov.usda.gov/MT/www/technical/water/Bioswale.pdf

areas would include storm water design features such as those described above to prevent an increase in discharge of runoff from the project area.

No impacts to drainage infrastructure would occur under the No Action Alternative.

3.12.3 BICYCLE, PEDESTRIAN, AND TRANSIT FACILITIES

3.12.3.1 Affected Environment

The area is undeveloped and does not currently have any bicycle and pedestrian facilities or transit services.

3.12.3.2 Potential Impacts

In accordance with the KCDP, the region shall include a network of transit, pedestrian, and bicycle routes that provide alternatives to the automobile. With Kona's consistently mild climate, a network of interconnected bike lanes, trails, and sidewalks within and outside the ROW would provide a safe, healthy, and fuel-efficient alternative to automobile use that would be available year-round. The Proposed Action would provide bicycle lanes in both the northbound and southbound directions and options for multi-modal transportation.

No adverse impacts to bicycle and pedestrian facilities or transit services would occur under the Proposed Action. The Proposed Action would have a beneficial impact by providing additional roadways and dedicated paths for pedestrians and bicyclists.

No impacts to bicycle and pedestrian facilities or transit services in the Kona area would occur under the No Action Alternative.

3.13 VISUAL RESOURCES

3.13.1 AFFECTED ENVIRONMENT

The present view of the project area from Queen Ka'ahumanu Highway looking mauka can be characterized as gently upward sloping land, lava fields with dense stands of kiawe, and stands of various grasses, with the backdrop of Hualalai Volcano and residential areas bordering the project area. The makai view across the project area from the upper elevations at Palani Road to Hina Lani Street is across this landscape to the Pacific Ocean, with Kailua-Kona to the south. The

proposed highway corridor is presently undeveloped land overgrown with scrub vegetation that includes trees and dense undergrowth, and the short section of the existing Ane Keohokalole Highway which runs from Kealakehe Highway to Puohulihuli Street.

3.13.2 POTENTIAL IMPACTS

The construction and development of the proposed highway would not generate any adverse visual impacts. The Proposed Action would result in the replacement of scrub vegetation, a short section of road, and exposed lava with a highway. Initially, during and after construction, the project development would be visible from surrounding roadways and the existing neighboring developments. Once the highway is completed, it would be visible from Queen Ka‘ahumanu Highway until the vegetation grows back along the road bed. At that point, all that would be visible may be an occasional vehicle top moving along the road. The visual impact is projected to be minimal.

No impacts to visual resources would occur under the No Action Alternative.

3.14 PUBLIC SERVICES

3.14.1 AFFECTED ENVIRONMENT

Police and Fire Protection

The Hawai‘i County Police Department’s Kona station is located at Kealakehe, just above Queen Ka‘ahumanu Highway. It serves as the local station and main office for West Hawai‘i bureaus. Some 78 positions were authorized for the Kona district as of 2005.[28]

The Hawai’i County Fire Department employs 350 paid fire fighters and 225 volunteer fire fighters at 20 fire stations across the island.[29] The North Kona fire station is located in Kailua-Kona, about 0.75 miles from the project area.

The Public Facilities and Programs working group of the KCDP process issued a “Final Actions” report in 2006, urging improvements in fire and police protection, accomplished by increased citizen patrols and higher wages for police officers.[30]

[28] Hawai‘i County Police Department, *2004-2005 Annual Report. Hilo, HI*. http://www.hawaiipolice.com/topPages/annualreports.html accessed February 2009.

[29] *County of Hawai‘i Annual Report FY 2007-2008.*

Civil Defense

The role of the Civil Defense Agency is to direct and coordinate the development and administration of the county's total emergency preparedness and response program to ensure prompt and effective action when natural or man-caused disaster threatens or occurs anywhere in the county of Hawai'i.[31] Recently, the major focus of the Civil Defense Agency has been the ongoing eruption of Kilauea Volcano.[32]

Education

The proposed highway will be located within the Kealakehe school catchment area. It is served by:

- Kealakehe Elementary School, located on Kealaka'a Street, approximately one mile mauka of the proposed alignment.
- Kealakehe Intermediate School, located on Kealaka'a Street; approximately one mile from the proposed alignment.
- Kealakehe High School. Opened in 1997 in the Villages of La'i 'Opua, serving students from Hualalai to Waikoloa Village. Kealakehe High School is located at the junction of the existing stretch of Ane Keohokalole Highway and Pouhulihuli Street. The classroom buildings are set back approximately 300 feet from the proposed alignment.

3.14.2 POTENTIAL IMPACTS

Development of the proposed highway would not create additional demand for police, fire, civil defense, or educational services. Population growth and development would increase demand for public services, but the impact of the Proposed Action itself is not anticipated to be significant. The Proposed Action would improve the delivery of public services, since it would provide an alternative to existing roadways whereby the public could access these services and emergency services could be provided.

No impacts to public services would occur under the No Action Alternative.

[30] KCDP http://www.hcrc.info/cdp-documents/kona/working-groups/working-group-reports/FinalActions_Facilities Programs_061212.doc/view

[31] County of Hawai'i Civil Defense Agency http://co.hawaii.hi.us/cd/ accessed February 2009.

[32] *County of Hawai'i Annual Report FY 2007-2008. http://www.co.hawaii.hi.us/annual_reports/annual2008/toc.htm* accessed February 27, 2009.

3.15 SOCIO-ECONOMIC CONDITIONS

3.15.1 AFFECTED ENVIRONMENT

The proposed highway is located in the Hawai‘i County district of North Kona on the west side of Hawai‘i. The most populated region on this side of the island, North Kona stretches from Keahole to Waikoloa and includes major commercial and tourist centers.

For much of the 20th century, West Hawai‘i was an agricultural area, with coffee (from South Kona), sugar (from North Kohala), and cattle (from the uplands of South Kohala) as major commodities. Major public facilities for West Hawai‘i, such as the hospital and the area’s first high school, were located in Kealakekua in the South Kona district.

According to the 2000 Census, the population of Hawai‘i County numbered 148,677 individuals. The most recent American Community Survey, conducted for Hawai‘i County in 2006 by the Census Bureau, reported 171,191 residents, representing a 15 percent increase in population. Approximately 27 percent of county residents have obtained a bachelor’s degree or higher. The county has 66.8 percent of its residents actively participating in the workforce, with a household median income of $55,390 per year.

The visitor industry in North Kona grew after statehood, and the district received the majority of the island’s visitor units. By 1990, however, the South Kohala coastal resorts had become important tourist destinations as well. As the coastal resorts expanded, West Hawai‘i became more dependent on tourism. Kailua-Kona is now a regional center with commercial, industrial, and resort facilities. The North Kona district has seen continuing increases in population, visitor numbers, and commercial activity. As of 2002, Kailua-Kona had 165 retail establishments with gross sales of $410 million, 24 percent of the island total. The retail workforce in Kailua-Kona numbered 2,174.

Island-wide, the ratio of visitors to residents in Hawai‘i County is about 1 to 6. In West Hawai‘i, the ratio is about 1 to 3. In 2000, West Hawai‘i had 56,301 residents and an average visitor census of 17,784. The primary industry in North Kona is tourism. Agriculture (coffee, ranching, etc.) also contributes to the regional economy. The Natural Energy Laboratory of Hawai‘i Authority’s facilities house biotechnology start-up corporations, creating a small industry in this field.

If historical trends continue, the North Kona population will exceed 43,700 in 2020.[33] The populations of North Kona and South Kohala include a larger share of recent U.S. mainland in-migrants than the general island population.

In 2000, approximately 10,000 people worked in Kailua-Kona. Of this number, 70 percent commuted to Kailua-Kona from other places on the island.[34] Data for West Hawai‘i zip codes from 2000 show that the length of commutes typically increases the farther a home area is from the job centers of Kailua-Kona and the South Kohala coast.[35] West Hawai‘i residents have repeatedly pointed to traffic congestion as a problem affecting their quality of life. The problem is exacerbated by the high cost of housing near Kailua-Kona. This forces workers to seek more affordable housing considerable distances away from their jobs. Many Kona-area workers are living in areas such as Hawai‘i Ocean View Estates, which is affordable but located 45 miles south of Kailua-Kona with a mean travel time to work of one hour.

The region’s visitor plant extends along the coast, from Keauhou to the Mauna Kea Resort. Retail activity is centered at the intersection of Queen Ka‘ahumanu Highway with Palani Road. New and proposed retail areas are dispersed, but much is within a few miles of this intersection (e.g., Lowe’s on Henry Street, Costco in the Kaloko Industrial Park, and the new Kona Commons next to the existing QLT industrial subdivision makai of Queen Ka‘ahumanu Highway).

The idea that development is eroding residents’ quality of life has motivated protests over new development proposals along Queen Ka‘ahumanu Highway and generated demands that the state and county move quickly to improve major roadways. Residents’ urgent demands for road improvements have been heard in roadside demonstrations, planning focus groups, meetings with County authorities, and hearings on development proposals. A small survey of registered voters in West Hawai‘i suggests that education and housing are also prominent concerns.

3.15.2 POTENTIAL IMPACTS

The Proposed Action would have a positive economic impact on the local economy as it is part of a regional plan to develop a multi-modal transportation

[33] The County developed three projections at the district level in 2000 for planning purposes. Since these projections did not draw on 2000 Census data, they are viewed here as outdated. It should be noted that the County’s projections showed more rapid growth than the State projections discussed here.

[34] This Census calculation is for the Kailua-Kona Census Designated Place (CDP). Residents of the subdivisions to the north of Kailua-Kona such as Kona Palisades would count as “commuters” to Kailua-Kona along with residents of more distant areas (US Census data calculated by Department of Business, Economic Development and Tourism (DBEDT), available at http://www.hawaii.gov/dbedt/info/census/Folder.2005-10-13.2927/DaytimePop).

[35] County of Hawai‘i, Planning Department. August 14, 2006. *Keahole to Honaunau Regional Circulation Plan. County Action Plan.*

network to serve a number of mixed-use, affordable developments, including DHHL's properties. Related jobs for local workers and local material suppliers and much needed affordable housing will result.

The Proposed Action, together with the ongoing improvements on Queen Ka'ahumanu Highway and Palani Road to improve safety and traffic flow north of Kailua-Kona, would result in less traffic congestion. [36,37] The current roadway improvements, combined with the Proposed Action, are consistent with the objectives and goals of the KCDP in providing essential infrastructure, facilities, transportation choices, and connectivity options that are concurrent with growth in order to enhance the quality of life for the residents and visitors of Kona. The current and future development of transportation infrastructure and facilities would ensure that all communities are adequately connected and served, and that a safe and efficient multi-modal transportation system is integrated into the planning of future land uses to further mitigate traffic congestion.

Under the No Action Alternative, traffic congestion along Queen Ka'ahumanu Highway would continue to worsen, as regional traffic is projected to increase in the future. The increase in regional traffic would affect quality of life for residents, as commute times would increase, possibly leading to declines in road safety and increasing frustration associated with traffic. Public sentiment on the subject of development of projects without supporting infrastructure is already generally negative. It is possible that Kona's economic development would be negatively affected as visitors, particularly those traveling from the airport or trying to get around town in heavy traffic, are likely to perceive that the character of the region is declining, and they would avoid congested areas entirely. As a consequence, with no action, significant adverse effects on the socio-economic environment of the region would occur.

[36] Quirk, J. "Kona-side Traffic Should Ease in Three Years." *Hawai'i Tribune-Herald.* March 18, 2007.

[37] Fehr and Peers/Kaku Associates. *Traffic Study for the Keahuolu Affordable Housing Master Plan Project*. January 2008.

CHAPTER FOUR: CUMULATIVE IMPACTS

4.1 CUMULATIVE IMPACTS

Cumulative impacts are effects on the environment that result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions, regardless of what entity undertakes such actions. The proposed Ane Keohokalole Mid-level Highway would connect Henry Street to Palani Road and beyond to the future West Hawai‘i Civic Center (another long-range County of Hawai‘i project), the Kealakehe Schools, and the Villages of La‘i ‘Opua. A smaller project, the Manawalea Connector, would link the Kealakehe Schools with residential areas located above, bypassing Queen Ka‘ahumanu Highway and improving traffic connectivity and circulation.

The cumulative impact analysis considered reasonable future actions within the reasonable geographic boundaries for each potentially affected resource. At the current time, a number of large housing, commercial, and mixed-use developments are planned in and around the project area that would add population, human activities, and traffic to the region (summarized in Table 4-1). Addressing traffic generated by these planned developments is a major justification for the Proposed Action.

Various infrastructure projects are also in the planning or construction stages. The Department of Water Supply (DWS) is planning to upgrade its water system by providing a new transmission line from Mamalahoa Highway to Palani Road. DWS is also converting exploratory wells at Keopu-Pu‘uhonua and Palani Ranch into production wells and building reservoirs to provide storage. HDOT is widening Queen Ka‘ahumanu Highway to four lanes from Kailua-Kona to the Kona International Airport.

The cumulative impact analysis was used to evaluate potential impacts of the Proposed Action in the context of these other activities. Resources impacted by the Proposed Action and evaluated for cumulative impacts include climate and air quality, cultural resources, surface water and drainage, groundwater and hydrogeology, roads and traffic, noise, and socio-economics. The following resources were not evaluated for cumulative impacts as the Proposed Action would not have a direct or indirect impact on the resource or result in cumulative

impacts: land use; flora and fauna; geology, topography and soils; natural hazards; infrastructure; visual resources; and public services.

Table 4-1: Related Project Trip Generation in the Vicinity of the Proposed Action*

Location on Map	Proposed Project	Number of Units	Daily Trips
1	Palamanui	965	7,486
2	Makalei Estates	80	766
3	Lokahi Makai	190	1,818
4	Seascape (aka Lokahi Kau)	108	726
5	O ‘oma Plantation	19	182
6	Kula Nei Residential Development	270	2,584
7	O ‘oma Beachside Village	n/a	n/a
8	The Shores at Kohanaiki	500	4,785
9	Kohanaiki Business Park	n/a	n/a
10	Kaloko Heights	300	2,871
11	Kona 327 LLC	350	3,350
12	West Hawaii Business Park	n/a	n/a
13	Villages of La‘i ‘Opua	400	3,828
14	Keahuolu Affordable Housing	n/a**	16,034
15	Rutter Affordable Housing	268	2,565
		3,450	46,995

* Related project trip generation data obtained from the traffic analysis, Appendix F.

** Keahuolu Affordable Housing subsequently reported 2,330 units in 2008 EIS.

4.1.1 Climate and Air Quality

The reasonable geographic boundary for air quality is defined by the immediate project area and globally (the latter for GHG concerns).

Some cumulative short- and long-term impacts on air quality would be associated with the future regional developments. Since several projects could occur at the same time, coordination between the agencies and the developers would help to minimize short-term construction related air quality impacts. Traffic management plans will keep vehicles moving and thus reduce vehicular emissions and their impacts on air quality. Fugitive dust emissions will be minimized as required by HAR 11-60.1-33. These temporary cumulative impacts on air quality would not be significant.

Long-term cumulative impacts from the planned future residential and commercial developments may include an increase in GHG emissions, but this increase would not significantly contribute to climate change. Any increases in vehicular emissions and associated pollutant concentrations would be offset by the effects on air quality resulting from improved traffic flow, therefore, no significant cumulative impacts on air quality are expected.

4.1.2 Cultural Resources

The reasonable geographic boundaries for cultural resources are the ahupuaʻa affected by the Proposed Action.

Historic and Archaeological Sites

The project area is located within the Kona Field System, which is listed on the Hawaiʻi State Register of Historic Places (Site number 10-27-6601)[1] and in the ahupuaʻa of Keahuʻolu, Kealakehe, Kaloko, and Honokohau. The North Kona District in which the project area is located contains a vast number of resources representing the evolution of Hawaiian settlement patterns and house types; fishing and agricultural activities; social, political, religious, economic, and land use systems; and recreational and artistic pursuits. These resources include habitation, recreational, and religious sites; items of material culture, such as tools, utensils, and artwork; roads and trails; and structures associated with agriculture, husbandry, and fishing. Section 3.4.1.1 describes in detail the historic and archeological sites present within the project area.

With each new project being developed in the North Kona area, the potential exists for historic and archaeological sites to be affected, and these effects are cumulative. The cumulative impacts of the area were evaluated in *Keahulou Lands of Kailua-Kona Final Environmental Impact Statement* (Belt Collins & Associates, October 23, 1990). The 1,135-acre development of Keahuolu Lands included the Ane Keohokalole Highway. As identified in the EIS, loss of some archaeological sites would occur. Compliance with applicable federal and state laws and rules, together with the implementation of proper mitigation measures such as data recovery and monitoring plans, as well as appropriate consultation with the SHPO, will minimize cumulative impacts, ensuring that proper documentation takes place and sites of unusual significance are not adversely affected.

Cumulative impacts on historic and archaeological sites would occur as a result of the Proposed Action and other projects identified in Table 4-1, but with the design constraints identified in this EA, impacts would be minimized.

[1] State Register of Historic Places http://hawaii.gov/dlnr/hpd/register/biind/biqu28.pdf. Accessed February 2009.

Traditional Cultural Practices

The cultural background for the project area is presented in the CIAs described in Section 3.4.2 and contained in Appendix B. These documents were the principal source for the assessment of cultural resources and traditional uses in the project area. Existing published information was compiled and early consultation was conducted with organizations that may possess knowledge of cultural resources in the region. Information gathered from the archival research and consultations facilitated the search for potential historic sites or traditional cultural practices.

Contemporary or continuing cultural practices include gathering of ocean resources and specific plants from the 300-foot elevation, makai of the proposed highway. Cumulative impacts on traditional cultural practices are not anticipated to be significant.

It is reasonable to conclude that, based upon the limited range of resources, including native plants, the exercise of native Hawaiian rights related to gathering, access, or other customary activities would not be affected, and there would be no adverse impact upon cultural practices or beliefs. This Draft EA will be distributed to agencies and groups who might have knowledge in order to confirm this finding.

4.1.3 Surface Water and Drainage

The reasonable geographic boundary for surface water and drainage is defined by the immediate project area and down gradient water bodies (i.e., surface and groundwater).

Of primary relevance to the discussion of surface water and drainage impacts from the Proposed Action are cumulative impacts of sedimentation and storm water.

The Proposed Action and other future development projects will be designed and constructed in accordance with Clean Water Act (CWA) regulations, as well as state and county requirements that address storm drainage and associated water quality. Following CWA, state, and county requirements will ensure that patterns of flow and maximum peak flow rates of storm water drainage, downstream drainage, and water quality will be similar to pre-construction conditions. The implementation of sustainable storm water designs, such bio-retention cells (Section 3.8), will control storm water flow rates and quality. These will treat and filter first-flush runoff to remove pollutants and sediment. Drainage injection wells or subsurface drainage structures will be designed with a debris catch basin to allow the detention and periodic removal of rubbish and sediment deposited by runoff. Storm water runoff will first enter the debris catch basin before flowing into

the drainage well. The volume of the debris catch basin will be designed using current industry and engineering standards.

With the implementation of these BMPs, cumulative impacts on surface or ground water quality in and around the project site and other future developments would not be significant.

4.1.4 Groundwater and Hydrogeology

The reasonable geographic boundary for groundwater and hydrogeology is defined by the immediate project area and the underlying affected aquifer.

With implementation of bio-retention cells and other drainage structures that are part of the Proposed Action, the highway improvements would not adversely affect groundwater. However, since the highway would facilitate a portion of future regional development, cumulative effects should be considered. The NPS is concerned about regional development effects on groundwater that could affect downstream anchialine ponds located at Kaloko-Honokohau National Historical Park. The County of Hawai‘i DPW has initiated a study by the U.S. Geological Survey (USGS) to assess the potential for County of Hawai'i Department of Public Works (DPW) roadside dry wells to deliver contaminants to nearshore areas or drinking-water wells. The study will be completed in two phases. The objective of phase 1 is to provide an island-wide inventory of DPW dry wells, determine the drainage area of each, and rank them on the basis of criteria that pertain to their potential to contaminate receiving waters. The objective of phase 2 is to assess the nature of contaminants and the flow to receiving waters for selected dry wells. This phase will use water and sediment sampling and dye-tracer tests. Findings from this study can then be used to develop plans to appropriately address these regional concerns.

4.1.5 Roads and Traffic

The Proposed Action represents a potentially significant contribution to the much larger “landscape” of the emergence of the city of Kailua-Kona and future regional developments. Over the past 40 years, Kailua-Kona has grown from a small community to a regional growth center, with much of the growth occurring in the past 10 years. The pace of commercial and residential growth, however, has exceeded the development of transportation infrastructure to accommodate it, leaving traffic conditions along the principal arterials (Queen Ka‘ahumanu Highway and Mamalahoa Highway) to deteriorate.

In the traffic impact analysis report prepared by Fehr & Peers Transportation Consultants (see Appendix F), LOS methodology was used to analyze the

operating conditions at a number of key intersections and street segments in the study area in the horizon year 2028, both under the No Action Alternative (i.e., future base conditions) and with the Proposed Action (i.e., future project conditions). Significant adverse cumulative impacts were identified using the following criteria:

No Action (Future Base Conditions)	Proposed Action (Future Project Conditions)	Significant Cumulative Impact?
LOS D or better	LOS D or better	No
LOS D or better	LOS E or LOS F	Yes
LOS E or LOS F	LOS E or LOS F	Yes

Note: Both the Proposed Action and cumulative analyses include ambient traffic growth. When intersections representing No Action and Proposed Action both operate at LOS E or F, this is not a significant direct impact as the Proposed Action is not the cause of the degraded intersection. However, impacts are considered significant in the cumulative impacts analysis.

Table 4-2 summarizes the cumulative impacts for the ten study intersections. One study intersection, the intersection of Queen Ka‘ahumanu Highway and Hina Lani Street (Intersection 1), is projected to operate at LOS E during the PM peak hours under future base conditions, resulting in a significant cumulative impact.

Table 4-2: Intersection Level of Service Analysis – Cumulative Impacts

Intersection	Peak Period	Future (2028) Base LOS	Future (2028) Project LOS	Cumulative Impact?
1. Queen Ka‘ahumanu Highway & Hina Lani Street	AM	D	C	No
	PM	E	D	Yes
2. Ane Keohokalole Highway & Hina Lani Street	AM	C	B	No
	PM	D	B	No
3. Palani Road & Hina Lani Street	AM	C	B	No
	PM	D	C	No
4. Queen Ka‘ahumanu Highway & Kealakehe Parkway	AM	C	B	No
	PM	E	C	No
5. Ane Keohokalole Highway & Kealakehe Parkway	AM	B	B	No
	PM	B	A	No
6. Palani Road & Palihiolo Street	AM	B	B	No
	PM	B	B	No
7. Queen Ka‘ahumanu Highway & Palani Road	AM	C	C	No
	PM	D	C	No
8. Kamakaeha Avenue & Palani Road	AM	A	A	No
	PM	A	A	No

9. Henry Street/Ane Keohokalole Highway & Palani Road	AM	C	C	No
	PM	D	D	No
10. Queen Ka'ahumanu Highway & Henry Street	AM	C	C	No
	PM	D	D	No

Despite the adverse cumulative impact identified under the Future (2028) Base (No Action Alternative), the Proposed Action would provide beneficial cumulative effects (i.e., the Proposed Action would improve traffic conditions at most of the intersections). Without the Proposed Action, the cumulative impacts of these future development projects on the LOS at these study intersections would be overwhelmingly negative.

4.1.6 Noise

With concurrent project construction (mostly housing and mixed-use developments in the parcels adjacent to the project area), construction-related noise would increase. This increase in noise would be temporary. Construction of the proposed highway would be divided into several phases as the southern and then the northern section would be built. Noise impacts from construction would be distributed both temporally and geographically over these phases and confined to the particular area under construction at any given time. In each case, construction activities would comply with DOH noise rules, HAR 11-46, which serve to minimize the impact of noise from construction and related activities. All construction projects at other future developments would also have to comply with these rules. Construction activities would not all take place simultaneously, but be distributed temporally and geographically. With all projects in compliance with State DOH noise rules, no cumulative impacts from construction noise would occur.

Once the proposed highway is built and operational, and other developments have been completed, ambient noise in the area would rise. Noise from traffic would be the major contributor as a result of increased local trips generated by the population increases at the new developments, as well as from through traffic on the proposed highway. The noise study was prepared based on data from the traffic study that explicitly identified the cumulative effects of development on traffic. Therefore, the results presented in the noise study reflect both project-related and cumulative impacts of traffic and development on noise. According to the noise study, cumulative noise effects could occur in some specific locations along the proposed highway, but with the implementation of noise attenuation measures in accordance with federal and state requirements, cumulative noise

would be within acceptable levels. Cumulative noise effects from the Proposed Action would not be significant.

4.1.7 Socio-economic Conditions

By serving the stated goals of a variety of land use plans as discussed in Chapter 5, the Proposed Action and other developments in the region would have a beneficial cumulative impact on socio-economic conditions in the Kona area. As discussed in Section 3.15, a regional roadway network connecting dense, mixed-use neighborhoods with businesses, services, and other amenities would increase job opportunities, raise the standard of living, and enhance the quality of life in the region.

The KCDP identifies a number of economic policies and goals that are necessary to achieve its vision of a sustainable community planned and built through the application of smart growth principles. Redevelopment is identified as an important economic factor in achieving this vision, including multi-modal transportation, infill development, and mixed-use and affordable housing projects. The proposed highway would deliberately support multi-modal transportation and provide infrastructure to enable infill in the areas it is intended to serve. Moreover, the proposed highway would serve a number of development projects that in their own planning documents have specifically cited the principles of smart growth as goals (i.e., mixed-use, compact development, mixed price-point housing, a variety of transportation choices, job opportunities close to housing, and diverse, healthy communities). These plans echo the guiding principles of the KCDP.

No significant cumulative impacts on socio-economic conditions would occur as a result of the Proposed Action and other future development projects with the implementation of sustainable community plans described above.

CHAPTER FIVE: CONSISTENCY WITH GOVERNMENT PLANS, POLICIES AND CONTROLS

Federal, State, and County of Hawai‘i laws, regulations, executive orders, land use plans and policies, and required permits and approvals relevant to proposed Ane Keohokalole Mid-Level Highway project are described below.

5.1 FEDERAL

5.1.1 Laws

5.1.1.1 U.S. Department of Transportation Act

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 (49 USC §303) was enacted as a means of protecting publicly owned parks, recreation areas, wildlife and wildfowl refuges, and historic sites of local, state, or national significance from conversion to transportation uses. The USDOT has established a review process for any Section 4(f) resource that may be impacted by a federally aided transportation project or program. If the USDOT makes a determination that its project will have a minimal – or "*de minimis"* – impact on a protected resource, or the Section 4(f) property is "excepted" from the requirement for Section 4(f) approval in accordance with 23 CFR Part 774.13, then the Section 4(f) process is complete. If a 4(f) use is not *de minimis*, then the agency must evaluate whether there are "feasible and prudent" avoidance alternatives to use of the property, and if not, then it must undertake all possible planning to minimize harm to the property.

Two Section 4(f) resources are in the Proposed Action area of potential effect (APE):

- A segment of the Great Wall of Kuakini, and
- A part of the Kona Field System.

The geographic extents of both resources are very broad. The Great Wall of Kuakini is an intermittent structure that runs parallel to and approximately one mile inland from the coastline for several miles. At least 200 feet separate a segment of the Wall and the centerline of the proposed Ane Keohokalole alignment. Considering its distance from the centerline, the undertaking may not affect the Wall north of Palani Road. However, with the proposed widening of Palani Road to the south, a breach in the Wall is expected to be proposed and evaluated. Breaches in the Kuakini Wall have been permitted in other locations in the past to allow road construction.

The Kona Field System describes an entire agricultural district beginning just north of Kailua-Kona and running south in a 4-mile-wide strip for about 23 miles, parallel to the coastline. Boundaries of the Kona Field System are not finite or fixed and are subject to changes as more archaeology is discovered. For the purposes of the USDOT's evaluation, the extent of the Kona Field System is defined by four coordinates provided in the archaeological submittal forms for the Hawaii Registry of Historic Places. This area includes the towns of Kailua-Kona, Holualoa, Kealakekua, Captain Cook, and other communities in South Kona. The Kona Field System includes such archaeological and agricultural features as walls, enclosures, fields, boundary markers, and rock piles (ahu).

The State Historic Preservation Officer (SHPO) is being consulted on this matter. Section 4(f) compliance will be documented in the Final EA to satisfy NEPA purposes.

5.1.1.2 National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966, as amended (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 (NRHP). Section 106 of the NHPA requires federal agencies to take into account the effects of federal undertakings on historic properties, such as the historic support buildings within the project area, and affords the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on "adverse effect" determinations. The Section 106 process, as defined in 36 CFR §800, provides for the identification and evaluation of historic properties, for determining the effects of undertakings on such properties, and for developing ways to resolve adverse effects in consultation with consulting parties.

Based on the findings and recommendations of the archaeological survey reports (Appendix A), together with related correspondence from the State Historic Preservation Division (SHPD) concurring with these findings and recommendations (Appendix A), FHWA will make its effects determination. FHWA

is currently meeting with consulting parties as required under NHPA Section 106. Findings from this process will be documented in the Final EA used to satisfy the NEPA.

5.1.1.3 Coastal Zone Management Act

The purpose of the Coastal Zone Management Act (CZMA) of 1972 (16 USC §§1451-1465) is to encourage coastal states to manage and conserve coastal areas as a unique, irreplaceable resource. To the maximum extent practicable, federal actions affecting land/water use or coastal zone natural resources must be consistent with the enforceable policies of an approved state coastal zone management program. Coastal Zone Management (CZM) consistency determinations are required for federal actions that would have reasonably foreseeable direct or indirect effects on any use of or resource in the coastal zone. The FHWA has evaluated the Proposed Action and has determined that it is consistent to the maximum extent practicable with the State of Hawai‘i CZM program. The consistency determination is being submitted to the Office of Planning, State of Hawai‘i Department of Business, Economic Development, and Tourism (DBEDT).

5.1.1.4 Endangered Species Act

The Federal Endangered Species Act (ESA) of 1973 (16 USC §§1531-1534) 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 plants 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 on actions that may affect species or designated critical habitat. No federal- or state-listed threatened or endangered species or critical habitat is present in the affected area. FHWA is in the process of consulting with USFWS. Findings will be documented in the Final EA used to satisfy the NEPA.

5.1.1.5 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC §§703-712), is a law governing and implementing a bilateral treaty with Canada, Mexico, Japan, and Russia to protect migratory birds that may spend time in more than one country. The MBTA makes it unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird, unless authorized under a permit issued

by the Secretary of the U.S. Department of the Interior. Bird species listed as protected under the MBTA that are found in Hawai‘i include the Pacific golden plover (*Pluvialis fulva*), the Hawaiian coot (*Fulica alai*), the Hawaiian goose (*Branta sandvicensis*), the Laysan albatross (*Phoebastria immutabilis*), and the wedge-tailed shearwater (*Puffinus pacificus*). Pacific golden plovers have been observed in the project area.

5.1.1.6 Clean Water Act

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). Section 402, 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 (0.4 hectare) or more and discharge storm water from the site to waters of the United States.

5.1.1.7 Clean Air Act

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.

5.1.1.8 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) of 1976, as amended (42 USC §§6901 *et seq.*), is the nation's primary law governing the disposal of solid and hazardous waste. RCRA amended the Solid Waste Disposal Act of 1965 and set national goals for: protecting human health and the environment from the potential hazards of waste disposal, conserving energy and natural resources, reducing the amount of waste generated, and ensuring that wastes are managed in an environmentally sound manner. RCRA provides USEPA the

authority to control hazardous waste from the "cradle-to-grave," including generation, transportation, treatment, storage, and disposal. RCRA also set forth a framework for the management of nonhazardous wastes.

5.1.2 Executive Orders

Executive Orders (EOs) identified during development of this document are identified below. Applicable EOs with which this project will comply include:

- **EO 11514, Protection and Enhancement of Environmental Quality, 5 March 1970 (as amended by EOs 11541 and 11991).** This EO states that federal agencies shall initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals. Preparation of this EA in accordance with the USDOT Technical Advisory 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*, dated 30 October 1987, complies with this EO.

- **EO 11593, Protection and Enhancement of the Cultural Environment, 13 May 1971.** This EO (implemented by USDOT Order 5650.1, dated 20 November 1972) states that federal agencies shall: (1) administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations; (2) initiate measures necessary to direct their policies, plans, and programs in such a way that federally owned sites, structures, and objects of historical, architectural, or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people; and (3) in consultation with the Advisory Council on Historic Preservation (16 USC §470i), institute procedures to assure that federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures, and objects of historical, architectural, or archaeological significance. The evaluation of cultural resources, presented in Section 3.4, addresses the policies established by this EO.

- **EO 12898, Environmental Justice, 11 February 1994.** This EO requires federal agencies to address the potential for disproportionately high and adverse environmental effects of their actions on minority and low-income populations. Agencies are required to ensure that their programs and activities that affect human health or the environment do not directly or indirectly use criteria, methods, or practices that discriminate on the basis of race, color, or national origin. NEPA documents are specifically required to analyze effects of federal actions on minority and low-income populations and, whenever feasible, to develop mitigation measures to address significant and adverse effects on such communities.

  The proposed action will not adversely affect minority or low-income populations, and will not negatively affect the environment in a way that will disproportionately affect minority or low-income populations. The Kailua-Kona area currently does not provide many affordable housing

options (see Section 3.15 Socioeconomic Conditions). The lack of affordable housing is considered to be one of the most pressing, if not *the* most pressing, issues for the area. The Proposed Action is part of a regional plan to develop a multi-modal transportation network that will serve a number of mixed-use, affordable developments, including DHHL's and HHFDC's properties in the immediate vicinity of the highway. Without the proposed highway, access to these developments and the housing and jobs therein would be severely limited, continuing to deprive the local workforce of economic and social opportunities.

5.2 STATE OF HAWAI'I

5.2.1 State Land Use Law, Chapter 205, Hawai'i Revised Statutes

The State Land Use Law (Chapter 205, HRS) established the State Land Use Commission (LUC) and authorized this body to designate all lands in the state into one of four districts: Urban, Rural, Agricultural, or Conservation. These districts are defined and mapped by the LUC to ensure compatibility with neighboring land uses and protection of public health. The project area lies within the Urban and Agricultural Districts (Figure 3-1).

The Urban District generally includes city-like concentrations of people, structures, services, and vacant areas to accommodate future development and foreseeable growth. Approximately 54,267 acres or 2 percent of the county's total land area comprise the Urban District. Individual counties govern the zoning within the district.

The Agricultural District includes activities or uses such as farming, aquaculture, and game and fish propagation; agricultural services; farm buildings and employee housing; district mills, storage facilities and processing facilities; vehicle and equipment storage areas; roadside stands; wind turbines, wind farms, and other renewable energy installations; small-scale meteorological, air quality, noise, and other scientific and environmental data collection and monitoring facilities; agricultural parks; and open-area recreational facilities, including golf courses and golf driving ranges, provided that they are not located on land in the highest productivity categories as determined by the LUC. This district includes lands with both a high and low capacity for intensive cultivation. Minimum lot sizes in this district under the State Land Use Law are one acre. This district has the second greatest land area with approximately 1,184,599 acres or slightly over 46 percent of the total land area of the county.

The LUC and/or county regulate special uses within the Agricultural District depending upon lot size. Land uses within the Urban and Agricultural Districts are

governed by ordinances or regulations of the county in which the district is situated.

The proposed Ane Keohokalole Mid-Level Highway project is a permitted use in both the Urban and Agricultural Districts. In addition, the Ane Keohokalole Mid-Level Highway is an integral part of land use approvals that have been previously granted by the LUC, including the Queen Lili‘uokalani Trust and the Kealakehe Affordable Housing Project.

5.2.2 Coastal Zone Management Act, Chapter 205A, Hawai‘i Revised Statutes

The Coastal Zone Management Act (CZMA) of 1972 provides guidelines for development regulations within the coastal zone. In Hawaii, all lands in the state are considered to be within the coastal zone. In enacting HRS Chapter 205A in response to the Federal Coastal Zone Management Act of 1972, the State of Hawai‘i delegated authority to the counties to regulate uses in the coastal zone as Special Management Areas (SMAs). Although located within the coastal zone, the project is outside the SMA and will not require an SMA permit. As part of the NEPA process, the project will require a federal consistency determination from the Office of Planning, Coastal Zone Management Program.

The objectives of the Coastal Zone Management (CZM) Program are to provide the public with recreational opportunities, protect historic resources, protect scenic and open space resources, protect coastal ecosystems, provide facilities for economic development, reduce hazards and manage development. Program objectives and applicability to the proposed Ane Keohokalole Mid-Level Highway are discussed below:

Recreational Resources

Objective:

Provide coastal recreational opportunities accessible to the public.

Policies:

A) Improve coordination and funding of coastal recreational planning and management; and

B) Provide adequate, accessible and diverse recreational opportunities in the coastal zone management area by:

(i) *Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;*

(ii) *Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;*

(iii) *Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*

(iv) *Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*

(v) *Ensuring public recreational use of county, state and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;*

(vi) *Adopting water quality standards and regulating point and non-point sources of pollution to protect and where feasible, restore the recreational value of coastal waters;*

(vii) *Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches and artificial reefs for surfing and fishing; and*

(viii) *Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of Section 46-6, HRS.*

Discussion: The proposed Ane Keohokalole Mid-Level Highway would be located well inland, at a minimum of 1.5 miles away from the shoreline, mauka of the existing Queen Ka‘ahumanu Highway. Therefore, there will be no effect on existing coastal or inland recreational resources.

Historic Resources

Objective:

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

Policies:

A) Identify and analyze significant archaeological resources;

B) Maximize information retention through preservation of remains and artifacts or salvage operations; and

C) Support state goals for protection, restoration, interpretation and display of historic resources.

Discussion: The proposed Ane Keohokalole Mid-Level Highway will be constructed in keeping with the guidelines and objectives of the aforementioned objective and policies. Plans for the highway have been designed to improve public safety while preserving the historic nature of the area.

As part of the EA, a review of the results of prior archaeological surveys of the area was conducted, as well as field work to verify these surveys. The proposed highway would be partially located within the Kona Field System, which is on the Hawai'i Register of Historic Places and eligible for the National Register of Historic Places (NRHP). The proposed highway would also be located next to the Great Wall of Kuakini, which is also on the State list and eligible for the NRHP.

Discussions to date with the Hawai'i State Historic Preservation Division (SHPD) suggest that with the implementation of appropriate measures the proposed highway would not have a significant impact on these and other historic properties or cultural practices and resources in and near the project area. Both AISs and CIAs have been conducted for the project area, the reports of which concluded that, with appropriate mitigation that would include sensitivity to cultural histories, practices, materials, and remains, the proposed highway will have no significant impact on Hawaiian cultural resources, beliefs, and practices.

Scenic and Open Space Resources

Objective:

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

Policies:

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

B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

D) Encourage those developments that are not coastal dependent to locate in inland areas.

Discussion: The proposed Ane Keohokalole Mid-level Highway will not impact shoreline views or open space resources. Developments adjacent to the proposed highway will be located inland, at a distance from the coastline. Shoreline open space and scenic resources will be preserved. The project site is adjacent to undeveloped land both mauka and makai, with the exceptions of the Kealakehe High School and two aupaka preserves. Anticipated future land uses in the area are single-family residential, multi-family residential, retail/commercial, public use, and open/park space.

Coastal Ecosystems

Objective:

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

Policies:

A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

B) Improve the technical basis for natural resource management;

C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine water ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Discussion: The construction and operation of the proposed highway would not impact groundwater and hydrogeological resources. No impact to the groundwater underlying the project area will occur during the construction of the

proposed highway. The contractor will be required to conform to NPDES permit requirements to protect groundwater during the construction phase of the project. Appropriate BMPs will be implemented in order to protect the groundwater during construction of the project and preserve the integrity of the coastal ecosystems located approximately 1.5 miles from the project site

To address concerns about potential effects on the coastal anchialine ponds located at the Kaloko-Honokohau National Historical Park (approximately 1.5 miles makai of the project site) which are hydrologically connected the aquifer, bio-retention cells have been incorporated into the design of the Proposed Action. The installation of bioretention cells as a mitigation measure for will prevent any nonpoint source pollution of groundwater. The bio-retention cells will capture and treat all runoff from the proposed highway and prevent pollutants from entering the groundwater during the highway's operation (Section 3.8.2 describes the function of bioretention cells in further detail).

ECONOMIC USES

Objective:

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

Policies:

B) Concentrate in appropriate areas the location of coastal dependent development necessary to the State's economy;

C) Insure that coastal dependent development such as harbors and ports, visitor industry facilities, and energy generating facilities are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

D) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such development and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

   i. Utilization of presently designated locations is not feasible;

   ii. Adverse environmental effects are minimized; and

   iii. Important to the State's economy.

Discussion: The construction of the proposed highway will have a short term beneficial impact on the economy during construction by providing construction-related employment. The proposed highway will also have long-term beneficial impacts. It is located on land that has been zoned for urban expansion with the explicit purpose of confining urbanization to designated areas, limiting urban sprawl, and promoting sustainable economic development. Growth without sprawl contributes more to local economies than does urban sprawl. The development of transportation infrastructure and facilities will ensure that all the communities are adequately connected and served, and that a safe and efficient multi-modal transportation system is integrated into the planning of future land uses.

COASTAL HAZARDS

Objective:

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

Policies:

A) Develop and communicate adequate information on storm wave, tsunami, flood erosion, and subsidence hazard;

B) Control development in areas subject to storm wave, tsunami, flood, erosion, and subsidence hazard;

C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

D) Prevent coastal flooding from inland projects.

Discussion: The proposed highway runs parallel to the coastline, located approximately 1.5 miles inland, and is outside of all potential tsunami inundation areas and flood zones. The design of the proposed project will conform to all regulatory requirements to ensure adequate and proper storm drainage and erosion control to the surrounding properties.

MANAGING DEVELOPMENT

Objective:

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

Policies:

A) Effectively utilize and implement existing law to the maximum extent possible in managing present and future coastal zone development;

B) Facilitate timely processing of application for development permits and resolve overlapping or conflicting permit requirements; and

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

Discussion: The proposed highway is an integral part of several State and County land use plans, including the Kona Community Development Plan (KCDP) which was adopted as an ordinance by the County of Hawai'i in 2008. The public has been notified of plans for the proposed highway through the public development process for the KCDP. Also, the EA process, which is currently underway, requires public notification and two periods for public comment, one for the Draft EA and one for the Final EA.

Furthermore, the proposed highway will require a National Pollution Discharge Elimination System (NPDES) for storm water discharges related to construction; a County of Hawai‘i Department of Public Works (DPW) Grubbing, Grading, Excavation and Stockpiling Permit; a State of Hawai‘i Department of Health (DOH) Underground Injection Control (UIC) permit for drainage injection and a State of Hawai‘i Department of Transportation (DOT) permit to perform work in the state Right-of-Way (ROW). These permits will require review of plans and documents from State and County agencies, which may include the solicitation for public comment.

PUBLIC PARTICIPATION

Objective:

Stimulate public awareness, education, and participation in coastal management.

Policies:

A) Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;

B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for

persons and organizations concerned with coastal-related issues, developments, and government activities; and

C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Discussion: The Proposed Action is not contrary to the objectives of public awareness, education and participation. As previously noted, public awareness of the project is being promoted through the EA process, as well as the County's permitting and review process. Copies of the Draft EA will be sent to applicable departments and organizations to solicit and encourage comments regarding the project. In addition, a public information meeting may be held to discuss the proposed project with area residents.

The County of Hawaii shall make available, during all phases of construction, a public outreach person to provide the general public with information about the project activities and to answer and/or resolve concerns regarding the project construction from the general public. The County of Hawaii shall publicize and maintain a telephone "hotline" to facilitate this process. The proposed project is not contrary to the objectives of public awareness, education and participation.

BEACH PROTECTION

Objective:

Protect beaches for public use and recreation.

Policies:

A) Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;

B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Discussion: The proposed highway will not adversely affect any coastal areas, sites, or resources, as it is located 1.5 miles from the shoreline. During construction activities, appropriate BMPs will be utilized to ensure the

downstream coastal environment is not adversely impacted, and will not contribute to erosion or sedimentation.

MARINE RESOURCES

Objective:

Implement the State's ocean resources management plan.

Policies:

A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

B) Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

C) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;

D) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

E) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

F) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Discussion: The proposed highway construction will not adversely impact coastal marine resources. Efforts will be made during the design and construction of the proposed highway to minimize potential environmental impacts, including those related to marine and coastal resources and activities.

5.2.3 Hawai‘i State Plan

The Hawai‘i State Plan, Chapter 226 HRS (1995) provides guidelines for the future growth of the State of Hawai‘i. The Hawai‘i State Plan identifies broad goals, objectives, policies and priorities for allocating the state's resources,

including public funds, services, human resources, land, energy, and water. The Plan articulates a number of specific objectives related to transportation. These objectives include: supporting transportation infrastructure to accommodate planned growth objectives; developing a transportation system that is consistent with the economic growth objectives of the state and local communities; and encouraging multi-modal, energy-efficient, environmentally-benign transportation networks that include mass transit.

Discussion: The Ane Keohokalole Mid-Level Highway would provide an initial link for a north-south arterial roadway to reduce demands on the existing regional roadways. The highway would meet many of the stated objectives of the Hawai‘i State Plan. It would facilitate development of high-density neighborhoods and regional centers to support the planned growth objectives of the region, including mixed-use TODs. Together with the planned developments along the corridor, it would enable the more efficient movement of people, particularly the local workforce, while meeting their housing needs. It would accommodate a number of modes of transportation, including automobiles, transit, pedestrians, and bicyclists, providing a range of transportation choices and minimizing air pollution and the dependence on fossil fuels.

5.2.4 State Transportation Functional Plan (1991)

The 1991 State Transportation Functional Plan sought to (1) construct facility and infrastructure improvements in support of Hawai‘i’s economy and growing population base, (2) develop a transportation system balanced with an array of new alternatives, (3) implement Transportation Systems Management to maximize the use of existing facilities and systems, (4) foster innovation and use of new technology in transportation, (5) maximize joint efforts with the private sector, (6) pursue land use initiatives which help reduce travel demand, and (7) encourage resident quality of life improvements through improved mobility opportunities and travel reduction.

Discussion: The Ane Keohokalole Mid-Level Highway would meet the objectives of the State Transportation Functional Plan by playing a significant role in the regional transportation network, helping to serve growing local mixed-use communities, connecting residential areas with jobs, relieving congestion on major arterials such as the Queen Ka‘ahumanu Highway, providing opportunities for alternative transportation, and incorporating design elements that ensure that the highway is aligned with the economic, transportation, recreation, and housing needs of the community.

5.2.5 DHHL Kealakehe/La‘i ‘Opua Regional Plan (December 2008)

The Kealakehe/La‘i ‘Opua Regional Plan (December 2008) was prepared to facilitate the ongoing projects of the DHHL to develop lands and improve community life in the three properties just north of Kailua-Kona: Honokohau, Keahuolu, and the Villages of La‘i ‘Opua. The Ane Keohokalole Mid-Level Highway would pass directly through the Villages of La‘i ‘Opua – some planned, some already built - and provide connectivity with another DHHL parcel at Keahuolu. These master-planned communities are intended to provide a substantial amount of affordable housing, employment opportunities, economic development, and amenities to their residents. For this reason, it is identified as a priority project in the Plan.[1]

Discussion: The construction of the Ane Keohokalole Mid-Level Highway is an essential element of DHHL’s plan to develop master-planned communities on two of its properties in the region. Because one of the objectives of the Mid-Level Highway is to relieve congestion on the Queen Ka‘ahumanu Highway, Honokohau would realize secondary benefits in the form of reduced traffic on the Queen Ka‘ahumanu Highway.

5.3 COUNTY OF HAWAI‘I

5.3.1 County of Hawai‘i General Plan

The County of Hawai‘i General Plan (February 2005) is the policy document for the long range comprehensive development of the island of Hawai‘i. It contains land use maps referred to as “General Plan Land Use Pattern Allocation Guides” (Figure 3-2). The transportation section of the Plan sets out two main goals: (1) provide a transportation system whereby people and goods can move efficiently, safely, comfortably, and economically and (2) make available a variety of modes of transportation that best meet the needs of the County.[2] In addition, the Plan identifies road improvements recommended by the 1997 Keahole to Kailua Development Plan-Revised Roadway Plan Implementation Strategy, to accommodate future traffic volumes upon full build-out of the area between the Queen Ka‘ahumanu and Mamalahoa Highways. These include extension of the Ane Keohokalole Highway.[3] The General Plan also supports the concept of concentrating development in areas already serviced by existing infrastructure, rather than scattering development, and incorporating mixed-use zoning into the zoning code.

---

1 Kealakehe/La‘i ‘Opua Regional Plan, p. 27
2 County of Hawai‘i General Plan Section 13.1.2
3 *Ibid* Section 13.2.5.7.2

Discussion: The Ane Keohokalole Mid-Level Highway project is within the Urban Expansion area designated in the General Plan. The General Plan encourages and supports the development and improvement of transportation services. The Ane Keohokalole Mid-Level Highway extension is specifically recommended as necessary to realize the transportation goals of the County of Hawai‘i General Plan. The purpose of the highway is congruent with the broader goals of the General Plan with respect to concentrating development in or near already developed areas, and providing opportunities for multiple modes of transportation.

5.3.2 County of Hawai‘i Zoning

The Ane Keohokalole Mid-Level Highway project would pass through portions of land designated as Agricultural A-5a, A-200a, and General Commercial CG-7 Districts.

Discussion: Since the proposed Ane Keohokalole Mid-Level Highway is a public facility-type use, the Proposed Action would be consistent with the existing zoning and is considered a permitted use in both the agricultural and general commercial districts.

5.3.3 West Hawai'i Regional Plan

The West Hawai‘i Regional Plan was developed by the Office of Planning in 1989. It was intended to complement the County of Hawai‘i’s General Plan and Community Development Plan to address regional issues arising from rapid development of West Hawai‘i.

Discussion: The West Hawai‘i Regional Plan includes the project area in the Kailua-Kona to Keahole Urban Expansion Planning Area. The Ane Keohokalole Mid-Level Highway project is consistent with the West Hawai‘i Regional Plan and is considered a permitted use.

5.3.4 Keahole-to-Kailua Plan

In 1988 the County of Hawai‘i launched the Keahole-to-Kailua Development Plan study with the intention of developing a mixed residential, commercial, resort, industrial, and recreational community, with appropriate shoreline uses, public facilities, and infrastructure. It was intended to be built in phases over the course of 20 years. The plan was adopted by the County in 1990. Objectives included (1) developing an efficient, safe, and attractive road network which operates at LOS C over the next 20 years which would interconnect various land uses within the planning area and accommodate various modes of travel; and (2) developing a plan for an integrated community that would be served by the required

infrastructure and provide a mix of land uses. The plan called for new north-south collector and arterial roads.

Discussion: The Ane Keohokalole Mid-Level Highway project is a critical segment of an arterial roadway network outlined in the Keahole-to-Kailua Development Plan. The traffic study indicated that, at the intersections studied out to the year 2028, the Proposed Action would improve the level of service in all cases with the exception of the intersection of the Ane Keohokalole Highway and Palani Road at Henry Street. All intersections would function at LOS C or better, with the exception of two intersections during the PM peak period: the intersection of Hina Lani Street and Queen Ka‘ahumanu Highway, and the intersection of Queen Ka‘ahumanu Highway and Henry Street .

5.3.5 Keahole to Honaunau Regional Circulation Plan – County Action Plan (2006)

The purpose of the action strategy outlined in the Keahole to Honaunau Regional Circulation Plan – County Action Plan is to relieve congestion, control the pace of development in relation to infrastructure capacity, preserve future roadway corridors, finance improvements, and advance the state of knowledge and monitor progress in the above areas.[4]

Discussion: The Ane Keohokalole Mid-Level Highway is named in section 4.1.2 Item 2-I as an action to alleviate congestion by increasing the capacity of north-south arterials. The Proposed Action is therefore consistent with this plan.

5.3.6 Kona Community Development Plan

The proposed project is part of the KCDP. Adopted by the Council of the County of Hawai‘i as ordinance #08-131 on September 25, 2008, the plan is part of the overall County of Hawai‘i General Plan. Community Development Plans (CDPs) help the County determine how it should distribute funds, pass laws, govern development, provide roads and public facilities, and generally make decisions in each area until the year 2015. The KCDP process provided forums for gathering, discussing, and articulating the community’s views on how the Kona area should be developed. Over 100 public meetings, including three large stakeholder meetings, were held throughout Kona from November 2005 through January 2006. Between May 2006 and November 2006, approximately 80 working group meetings were conducted to develop specific parts of the plan. Objectives of the KCDP include guiding development in accordance with the vision of the

[4] Keahole to Honaunau Regional Circulation Plan – County Action Plan, August 14, 2006.

community, providing an infrastructure financing plan, and directing growth to appropriate areas.

Discussion: The proposed project is consistent with the KCDP as adopted by the County of Hawai‘i. Construction of the Ane Keohokalole Mid-Level Highway is part of the overall strategy to reduce traffic congestion, serve as a multi-modal corridor, and support future regional development.[5] It is specifically cited as a critical element in that strategy.[6]

5.4 LIST OF REQUIRED PERMITS, APPROVALS, AND CONSULTATIONS

The following government consultations, approvals, and permits may be required to implement the Proposed Action and Alternatives:

- FHWA consultation in accordance with Section 106 of the NHPA with the ACHP and State Historic Preservation Officer (SHPO);
- FHWA consultation in accordance with Section 7 of the ESA with the USFWS;
- Consultation with DLNR Division of Forestry and Wildlife (DOFAW);
- Consultation as required under the USFWS Coordination Act;
- State of Hawai‘i DOH – NPDES permit for storm water discharges relating to construction activities;
- State of Hawai‘i DOH – Underground Injection Control (UIC) permit for drainage injection;
- State of Hawai‘i DBEDT – Coastal Zone Management Federal Consistency Review;
- State of Hawai‘i DLNR/SHPD – Archaeological Inventory Survey, Archaeological Mitigation Plan, and Burial Treatment Plan approvals;
- State of Hawai‘i DOT – permit to perform work upon State highways for any work within the Kealakehe right of way; and
- County of Hawai‘i DPW – Grubbing, Grading, Excavation and Stockpiling Permit.

[5] Kona County Development Plan, Volume 1, p. 4-5
[6] *Ibid* p. 4-7

CHAPTER SIX: OTHER CONSIDERATIONS

6.1 UNAVOIDABLE ADVERSE EFFECTS

There would be no unavoidable adverse effects from the Proposed Action.

6.2 RELATIONSHIP BETWEEN SHORT-TERM USES AND MAINTENANCE OF LONG-TERM PRODUCTIVITY

Short-term uses and long-term productivity relate to the short-term construction phases and the long-term socio-economic benefits that would accrue to the state and the county in the form of a major collector roadway and added revenue resulting from economic activity that would otherwise not occur in the area. Development of the project area as a transportation and utility corridor constitutes a permanent commitment that would remove the property from the inventory of available agricultural land. The site is unsuitable for agriculture due to poor soils and other conditions. This action is a permitted use and is consistent with the State and County plans for the area.

The Ane Keohokalole Mid-Level Highway project is a product of the KCDP and the resulting County of Hawai‘i Ordinance 08-131. The proposed highway will add capacity to the north-south arterial network and reduce demand on the existing regional facilities. It would also become the central multi-modal corridor serving future regional and local development, concentrating economic activity around transit-oriented developments, and allowing future growth to take advantage of the transportation infrastructure thus created. Long-term productivity in the region would increase.

6.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible commitments are those that result in the permanent loss of future options. The term applies primarily to non-renewable resources, such as minerals or cultural resources, or the loss of a species, and to those factors that are renewable only over long time spans. Irretrievable commitments represent the

loss of production, harvest, or use of renewable resources. These opportunities are foregone for the period of the Proposed Action, during which other resource utilization cannot be realized. These decisions are reversible, but the utilization opportunities foregone are irretrievable.

Construction of the proposed Ane Keohokalole Mid-Level Highway project would permanently alter the use and character of the area. However, the area is not pristine, as much of it has undergone decades or more of significant disturbance, and large areas are already planned for future development. The Proposed Action would require the expenditure of energy in the form of fuel for construction vehicles and equipment and the consumption of natural and man-made resources in the form of construction materials (metal, glass, concrete, asphalt, wood, plastic, etc.). The project would require the investment of human labor that might otherwise be employed elsewhere. No other irreversible and irretrievable commitments have been identified.

CHAPTER SEVEN: ANTICIPATED DETERMINATION, FINDINGS AND REASONS

7.1 DETERMINATION

To determine whether the Proposed Action will have a significant impact on the physical and human environment, all phases and expected consequences of the Proposed Action have been evaluated. Based on this evaluation, the County of Hawai‘i DPW has preliminarily determined that the Proposed Action will not have a significant effect on the environment, as significant impacts will be prevented with the Proposed Action design and plans, and is thus expected to issue a FONSI.

7.2 FINDINGS AND REASONS

HAR, §11-200-12, establishes 13 significance criteria that agencies shall use in evaluating an action’s impacts. Following is a discussion of how the proposed action relates to the 13 criteria.

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

Discussion:

No natural resources would be committed to loss or destruction due to the Proposed Action. The proposed alignment passes through an area of barren lava rock and earth that has been previously disturbed. Vegetation is dominated by scrub vegetation composed largely of alien species. The development of the road is not expected to have a significant deleterious impact on native faunal resources found within the North Kona District.

The proposed highway would be partially located within the Kona Field System, which is on the Hawai'i Register of Historic Places and eligible for the National Register of Historic Places (NRHP). The proposed highway would also be located next to the Great Wall of Kuakini, which is also on the State list and eligible for the NRHP.

Discussions to date with the Hawai'i State Historic Preservation Division (SHPD) suggest that with the implementation of appropriate measures the proposed highway would not have a significant impact on these and other historic properties or cultural practices and resources in and near the project area. Both AISs and CIAs have been conducted for the project area, the reports of which concluded that, with appropriate mitigation that would include sensitivity to cultural histories, practices, materials, and remains, the proposed highway will have no significant impact on Hawaiian cultural resources, beliefs, and practices.

(2) Curtails the range of beneficial uses of the environment:

Discussion: The proposed project does not curtail the range of beneficial uses of the environment. The project area is identified in State and County land use plans for future urban expansion, and the proposed project is a permitted use in both the Urban and Agricultural Districts. The project area is not heavily used in its current form. The proposed highway will not curtail the future beneficial use of the environment; rather the proposed highway will support future uses by providing connectivity with surrounding roads, a utility corridor, and integration of future transit services for the area.

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

Discussion: The stated purpose of Chapter 344 is to establish a state policy that will encourage productive and enjoyable harmony between people and their environment, promote efforts that will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawai'i. The proposed project is consistent with the environmental policies, goals and guidelines expressed in HRS, Chapter 343. Potential sources of impacts have been identified and appropriate measures have been developed to either avoid or minimize potential impacts to levels that are not significant.

(4) Substantially affects the economic or social welfare of the community or state;

Discussion: The proposed project will not have a substantial negative effect on the economic or social welfare of the community or state. Development of the Ane Keohokalole Mid-Level Highway is consistent with the County's desire to focus development in West Hawai'i in the region between Keahole and Kailua-Kona in order to support economic and housing opportunities and quality of life in the area. The project will have positive impacts on the social welfare of the North Kona community by providing alternative roadway infrastructure to alleviate traffic congestion in West Hawai'i and enabling the development of workforce housing close to jobs. The proposed project will also have positive short-term impacts on

the economic welfare of the community and the state through the creation of construction-related jobs.

(5) Substantially affects public health;

Discussion: The proposed project is anticipated to have no negative impact on public health. Factors affecting public health, including air quality, water quality, and noise levels, are expected to be only minimally affected and insignificant. The roadway and ancillary infrastructure systems will be constructed to comply with applicable state and county standards and rules, and any potential impacts will be mitigated in accordance with applicable regulations. The inclusion of infrastructure for transit, pedestrians, and cyclists will support modes of transportation that support physical activity and will have a positive impact on public health.

(6) Involves substantial secondary impacts such as population changes or effects on public facilities;

Discussion: There will be long-range impacts as the properties along the proposed corridor are developed. These changes are consistent with the vision and specific recommendations of a variety of regional planning documents and processes, including the County of Hawai‘i General Plan and the KCDP, which has been adopted as a county ordinance. These plans acknowledge that population change is taking place, and that population growth needs to be channeled into compact, rather than sprawling, developments. These developments would minimize the growth burden on public facilities and infrastructure, and would maximize the economic benefits that this population growth would bring to the region. The Ane Keohokalole Mid-Level Highway is needed to support the planned development in the region.

(7) Involves a substantial degradation of environmental quality;

Discussion: The Proposed Action does not involve substantial degradation of environmental quality. Construction will involve ground disturbance, including clearing, grubbing, and grading of the project area. Federal, state and county regulations and permit conditions will prevent substantial degradation of environmental quality.

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

Discussion: A cumulative effect related to the development of the Proposed Action is expected, which would be positive in terms of creating an alternative roadway and alleviating traffic congestion, and could provide a context for "larger actions" relating to traffic impacts. Mitigation measures to address the potential for these "larger actions" are presented in Chapter 3. In addition, cumulative effects on archaeological resources in the area are anticipated, as the region has

been a site of human habitation for centuries. Every development project will be required to consult with the SHPD on the appropriate treatment for archaeological sites, including data collection, preservation, and other actions that are intended to protect these important cultural resources. This process should ensure that the cumulative effects of development on the archaeological history of the region are minimized to the greatest extent possible.

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

Discussion: Botanical and faunal studies were conducted as part of this EA. The results of these surveys are discussed in Section 3.5, and the survey reports are contained in Appendices C and D. No rare, threatened, or endangered species or critical habitat have been identified within the boundaries of the project area.

(10) Detrimentally affects air or water quality or ambient noise levels;

Discussion: The Proposed Action will result in increased motor vehicle use in the area, which may affect air quality, although not significantly. The project is intended to create a multi-modal roadway that will support other transportation alternatives and help to minimize congestion and other factors detrimental to air quality. The anticipated short-term impacts to air quality most likely due to occur during the construction phase will be mitigated through the appropriate measures and BMPs. Water quality in and around the project area would not be affected as compliance with federal, state, and county regulations and permit conditions will prevent adverse impacts, and the Proposed Action includes specific drainage and bio-retention designs to prevent changes to existing ground water quality. Ambient noise levels may be increased in the project area, but are not expected to exceed acceptable levels with a few exceptions that are amenable to standard approaches to noise mitigation. Potential short-term construction noise impacts are possible during the project construction period. However, noise impacts would be minimized with the use of standard curfew periods, properly muffled equipment, administrative controls, and construction barriers as required.

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

Discussion: An assessment of the potential for natural hazards is contained in Section 3.11. The project site is not located within a flood plain, tsunami zone, erosion prone area, or near fresh or coastal waters. The North Kona District is, however, at some risk of volcanic hazards from the Hualalai Volcano as well as earthquakes. The project area is designated in County plans for further development, and the likelihood of volcanic activity impacting the project area is not significant. The property is also situated within a Zone 4 seismic zone, which is the highest zoning designation on a scale of 0 to 4. Earthquake construction

standards exist for road structures such as bridges and overpasses, but do not apply in this situation as bridges or elevated structures will not be built. There are no earthquake-specific construction standards in effect for road surfaces at grade.

(12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies;

Discussion: The effect of the Proposed Action on visual resources is considered in Section 3.13. The proposed project will not impact scenic vistas or viewplanes identified in county or state plans or studies. The proposed highway will be designed and constructed to be compatible with existing roads and surrounding developments, and landscaped to minimize visual impacts.

(13) Requires substantial energy consumption.

Discussion: The proposed project will not require substantial energy consumption. Energy resources will be consumed during construction of the project. Operational period energy consumption will be negligible. The proposed project will not have indirect or cumulative impacts on energy consumption. The alleviation of congestion on the Queen Ka‘ahumanu Highway may have a minor but positive impact on vehicle fuel economy.

For the reasons stated above, the Proposed Action will not have any significant impacts. It is expected that an EIS will not be required, and that a FONSI will be issued for this project.

CHAPTER EIGHT: AGENCIES, ORGANIZATIONS AND INDIVIDUALS CONSULTED IN THE PREPARATION OF THE DRAFT EA

The proposed Ane Keohokalole Mid-Level Highway project has been developed as part of the KCDP process over the course of more than two years and over 100 public meetings. In order to inform the public of the EA process and to obtain input for use in the EA for the proposed Ane Keohokalole Mid-Level Highway, early consultation was conducted through a charrette process held in April 2008. The charrette process allowed the public and various stakeholders (listed below) to provide input and comment on the proposed project. For the April 2008 charrette, an approach called Context Sensitive Solutions (CSS), also referred to Context Sensitive Design (CSD), was used. CSS is a collaborative, interdisciplinary approach that involves stakeholders in developing transportation facilities that fit their physical settings and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist. The approach was valuable in obtaining stakeholder input to determine what resources should be preserved and integrated into the planning and design.

The charrette was very successful in that stakeholders clearly identified their wishes/preferences for a multi-modal facility with enhanced pedestrian and bike provisions. They fully supported bus options and incorporating traffic calming devices such as round-abouts into the design and function of the road. Infrastructure such as bio-swales to maintain water quality of storm water recharge and the use of non-potable irrigation for landscaping were also important components for greater sustainability.

The following agencies, community organizations, and affected individuals have been consulted in the development of the Ane Keohokalole Mid-Level Highway project.

Federal

Department of the Interior - National Park Service

Department of the Interior - U.S. Fish and Wildlife Service

State of Hawai‘i

Department of Business, Economic Development, and Tourism (DBEDT), Office of Planning, Coastal Zone Management (CZM) Program

Department of Education (DOE)

Department of Hawaiian Home Lands (DHHL)

Department of Health, Environmental Planning

Department of Land and Natural Resources, Board of Land and Natural Resources

Department of Land and Natural Resources, Historic Preservation Division, State Historic Preservation Officer (SHPO)

Department of Land and Natural Resources, Na Ala Hele, Hawai‘i Trail & Access System

Department of Transportation, Highways Division

Hawaii Housing Finance and Development Corporation (HHFDC)

Hawaii State Library, Kailua-Kona Public Library

Office of Environmental Quality Control (OEQC)

Office of Hawaiian Affairs (OHA)

Hawai‘i County

Office of the Mayor

Hawai‘i County Council

Civil Defense Agency

Department of Environmental Management

Department of Public Works

Department of Research and Development

Mass Transit Agency

Planning Department

Community Organizations, Associations, and Other Individuals

Forest City

Hawaii Cycling Club

Hawaii Forest and Trail

Historic Hawaii Foundation

Historic Hawaii Foundation

Honokohau Properties

Hui Malama I Na Kupuna O Hawai‘i Nei

Kona Community Planning and Steering Committee

Kona Traffic Safety Committee

Lanihau Partners, LLC

National Trail Association Trail Cleaners

People's Advocacy for Trails Hawaii (PATH)

Queen Lili‘uokalani Trust

Sierra Club, Hawaii Chapter: Moku Loa Group; Chapter Office (O‘ahu)

Stanford S. Carr Development Corporation

CHAPTER NINE: REFERENCES

American Industrial Hygiene Association, *Noise and Hearing Conservation Manual,* 1996.

Belt Collins & Associates. *Keahuolu Lands of Kailua-Kona Final Environmental Impact Statement.* October 23, 1990.

Belt Collins Hawaii, Ltd. *Final Environmental Impact Statement Keahuolu Affordable Housing Project.* October 2008.

County of Hawai‘i *Annual Report FY 2007-2008* http://www.co.hawaii.hi.us/annual_reports/annual2008/toc.htm

County of Hawai‘i Civil Defense Agency http://co.hawaii.hi.us/cd/

County of Hawai‘i. Civil Defense Agency*. Tsunami Evacuation Zones for Hawai‘i County* http://co.hawaii.hi.us/cd/tsunami/maps.htm

County of Hawai‘i General Plan 2005. http://www.hawaii-county.com/la/gp/2005/main.html

County of Hawai‘i. Hawai‘i County Police Department, 2004-2005 Annual Report. Hilo, Hawaii. http://www.hawaiipolice.com/topPages/annualreports.html

County of Hawai‘i. Keahole-to-Kailua Plan 2002. http://luc.state.hi.us/k2k_forumandfair.htm

Diblasi, Catherine J. et al “Removal and Fate of Polycyclic Aromatic Hydrocarbon Pollutants in an Urban Stormwater Bioretention Facility” Diblasi, Catherine J, et al “Removal and Fate of Polycyclic Aromatic Hydrocarbon Pollutants in an Urban Stormwater Bioretention Facility” Environmental Science and Technology, Vol. 43. No. 2, 2009 pp. 494-502.

Federal Emergency Management Agency (FEMA) Map Service Center. Map ID 1551660712C, 1551660692C, 1551660703C, and 15516606484C. http://www.fema.gov/hazard/flood/info.shtm

Federal Highway Administration (FHWA) *Highway Traffic Noise Analysis and Abatement: Regulations and Guidance* http://www.fhwa.dot.gov/environment/noise/polguide/polguid.pdf

Fehr and Peers/Kaku Associates. *Traffic Study for the Keahuolu Affordable Housing Master Plan Project.* January 2008.

Keahole to Honaunau Regional Circulation Plan – County Action Plan, County of Hawai‘i, Planning Department, August 14, 2006.

Hsieh, C.-h and Allen P. Davis, “Evaluation and Optimization of Bioretention Media for Treatment of Urban Storm Water Runoff”, *Journal of Environmental Engineering, ASCE,* 131(11), 1521-1531 (2005).

Kona Community Development Plan, Wilson Okimoto Corp. adopted as Hawai‘i County Ordinance #08-131 on September 25, 2008. http://www.hcrc.info/community-planning/community-development-plans/kona/cdp-final-drafts/

Juvik, Sonia P., and James O. Juvik, *Atlas of Hawai‘i 3rd Edition.* University of Hawai‘i Press, Honolulu, Hawai‘i, 1998.

Lockwood, John P., and Michael O. Garcia. *Volcanic Hazards at the HELCO Keahole Generating Station, North Kona, Hawai‘i.* Prepared for Belt Collins Hawaii, Ltd. February 28, 2004.

Mink, John, and Stephen Lau. *Aquifer Identification and Classification for the Island of Hawaii: Groundwater Protection Strategy for Hawaii.* May 1993.

Natural Resources Conservation Service *Bioswales Absorb and Transport Large Runoff Events* ftp://ftp-fc.sc.egov.usda.gov/MT/www/technical/water/Bioswale.pdf

Rosendahl, Paul H. *Archaeological Mitigation Program Honokohau Industrial Park (Parcel VII), Phase II: Data Recovery*, January 1993.

State of Hawai‘i. Department of Hawaiian Homelands (DHHL) Kealakehe/La‘i ‘Opua Regional Plan. December 2008. http://hawaii.gov/dhhl/publications/regional-plans/hawai-i-regional-plans

Quirk, J. *Kona-Side Traffic Should Ease in Three Years.* Hawai‘i Tribune-Herald. March 18, 2007.

State of Hawai‘i, Department of Business, Economic Development, and Tourism (DBEDT) *Daytime Population Facts, 2000.* http://hawaii.gov/dbedt/info/census/Folder.2005-10-13.2927/DaytimePop

State of Hawai‘i Department of Health Underground Injection Control Map. *Island of Hawaii Keahole Point Quadrangle Topographic Map*, 1982.

State of Hawai‘i. Hawai‘i State Plan, State Transportation Functional Plan, State of Hawai‘i Department of Transportation, 1991.

State of Hawai‘i. State Register of Historic Places. http://hawaii.gov/dlnr/hpd/register/biind/biqu29.pdf

U.S. Environmental Protection Agency “Stormwater Best Management Practice Design Guide Volume 1: General Considerations”. September 2004.

U.S. Environmental Protection Agency “Stormwater Best Management Practice Design Guide Volume 2: Vegetative Biofilters”. September 2004.

U.S. Geological Survey Lava Flow Hazard Zone Maps. http://pubs.usgs.gov/gip/hazards/maps.html

Wolfe, E. W., and Jean Morris, *Geologic Map of the Island of Hawaii,* U.S. Geological Survey (USGS) Report Number 2425-A and 2425-B, 1996.