LA‘ALOA AVENUE EXTENSION

FINAL ENVIRONMENTAL ASSESSMENT

LA‘ALOA 1 AND 2 AND PAHOEHOE
NORTH KONA, HAWAI‘I

August 2008

Submitted Pursuant to the Hawai‘i Environmental Policy Act (HEPA),
Chapter 343, Hawai‘i Revised Statutes (HRS)

County of Hawai‘i
Department of Public Works
101 Pauahi Street, Suite 7
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SUMMARY

The County of Hawai‘i proposes to extend La‘aloa Avenue in North Kona in the mauka direction 1,500 feet to connect to Kuakini Highway. The proposed design would also address motor-vehicle, pedestrian and bicyclist safety through appropriate cross-sections and traffic calming devices on both the existing and extension sections. Presently there are no connectors between Kuakini Highway and Ali‘i Drive for the approximately 3.5 miles between Royal Poinciana Drive and King Kamehameha III Road, producing traffic congestion and poor Level of Service (LOS) on Ali‘i Drive and the La‘aloa area. Traffic levels are forecast to rise and worsen this situation unless new mauka-makai connectors are built. The project would provide a needed connector between Ali‘i Drive and Kuakini Highway and reduce traffic congestion in the vicinity. Three route alignment alternatives and two cross-section alternatives have been studied. A year-long context-sensitive solution process has resulted in recommendation of one alternative for construction.

The project would decrease traffic congestion and would increase overall traffic safety for the area. No scenic resources, rare ecosystems or threatened or endangered species would be affected, and effects to historic sites would be mitigated through data recovery and interpretation. Short-term impacts to water quality, air quality, traffic congestion and noise can be mitigated to minor levels by proper adherence to construction permits and other mitigation. The project is consistent with the Hawai‘i County General Plan.

1 INTRODUCTION AND PURPOSE AND NEED FOR PROJECT

1.1 Project Location and Basic Description

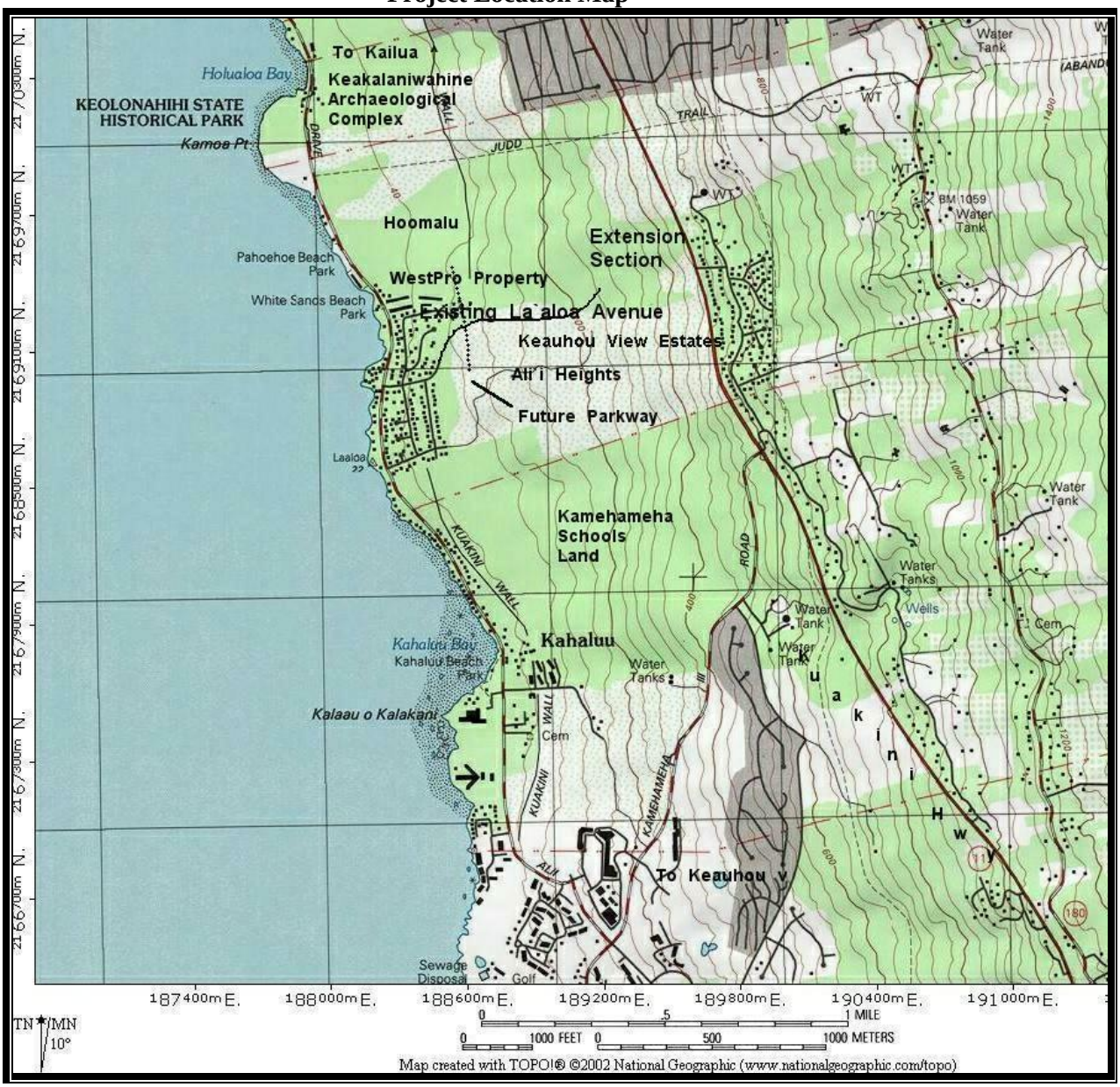
The project area is within the urban corridor between Kailua and Keauhou in North Kona. La‘aloa Avenue currently extends east and mauka from Ali‘i Drive about 4,000 feet before dead-ending at a point about 1,500 feet west and makai of Kuakini Highway (State Highway 11) (Figure 1-1). The proposed project would extend La‘aloa Avenue as a two-lane, 60-foot collector road from this existing mauka terminus 1,500 feet mauka to Kuakini Highway (further design details are provided in Section 2.2.2). The route extends through undeveloped land on three privately owned properties: TMKs 7-7-008: 29 (owner: Melitta Hodson), 7-7-008:114 (Robert Iwamoto Jr.) and 7-7-008: 120 (White Sands Estates LLC). After consideration of comments on the Draft EA and a year-long Context Sensitive Design Process, three Alignment (route of road) Alternatives and two Cross-Section (cross-section of road) Alternatives, as well as the No-Build Alternative, are under study.

After completion of the Draft EA, a series of public meetings were held to answer community concerns prior to completion of the environmental documentation and project design. There were several major concerns or elements that had the potential to impact the project. In order to resolve these and move the project forward to an acceptable conceptual design, a Context Sensitive Solution (CSS) public involvement process was undertaken. The result of this process has been to advance a recommended alternative that enhances the functionality of the project through greater attention to safety, mobility, preservation of neighborhood character, aesthetics, and other values. Several sections of the Final EA have been modified to reflect the extensive public involvement process and design changes. All sections of the Final EA that have been added or substantially altered since the Draft EA are indicated by double-underlines, as in this sentence. In particular, the following should be noted:

- Section 1.3, Purpose and Need, has been updated to reflect the CSS process.
- Section 2.5, Alternatives, distinguishes between alignment and cross-section alternatives, identifies an additional alignment, and identifies a recommended alternative.
- Section 4.2.3, Comments and Coordination, contains an extended summary of the CSS process, particularly as it relates to public involvement.
- Appendix 6, the Technical Memorandum for the La‘aloa Avenue Extension Context Sensitive Solutions, provides a detailed explanation of the process.

Section 3, which discusses the existing environment and alternatives, has also been updated in places to reflect the recommended alternative and also the passage of two years since the Draft EA was issued. It should be noted that there are no additional adverse impacts associated with the recommended alternative, and that impacts in general are reduced, especially with respect to traffic, pedestrian and bicyclist safety, and scenic impacts.

Figure 1-1
Project Location Map



1.2 Summary of Regulatory Requirements

The Hawai‘i County Department of Public Works (DPW) is serving as the proposing/approving agency in the preparation of this Environmental Assessment (EA). This EA is meant to comply with the Hawai‘i Environmental Policy Act (HEPA) requirements under Chapter 343, HRS.

HEPA was enacted by the State of Hawai‘i to require State and county agencies to consider the environmental impacts of their actions as part of the decision-making process. The Office of Environmental Quality Control (OEQC), mandated with implementing Chapter 343, HRS, has developed guidelines that specify how State and county agencies must carry out the requirements of HEPA. These regulations require State and county agencies to prepare an EA that investigates alternatives, discloses impacts and develops measures that mitigate adverse impacts. An important part of the process is the evaluation of the significance of impacts according to thirteen specific criteria.

Part 6 of this EA lists these criteria and the findings of the agency. These findings have been finalized in consideration of comments received on the Draft EA. DPW has determined that there are no significant impacts and has issued a determination of a Finding of No Significant Impact (FONSI), meaning that there is no need to prepare an Environmental Impact Statement (EIS).

1.3 Purpose and Need for Project

The need for additional mauka-makai connectors in the project area has long been recognized and continues to be an important community issue. Ali‘i Drive serves as the primary access for the hotels, resort homes and condominiums and associated development of urban Kailua-Kona to Keauhou, the major visitor accommodation area on the island of Hawai‘i (Figure 1-1). As residents, visitors, and workers arrive at or depart from this corridor, they are often obliged to travel long distances north or south on Ali‘i Drive due to the lack of connection to State Highway 11, the major transportation corridor to the airport and other visitor destinations. Both the *Hawai‘i County General Plan* and the *Keahole to Honaunau Regional Circulation Plan* (Hawai‘i County Planning Dept. 2002) recognize a crucial need for mauka-makai connectors that would reduce congestion, maintain the ambience of scenic Ali‘i Drive, and allow motorists to get to their destinations safely and efficiently.

There are currently no mauka-makai connectors between Kuakini Highway and Ali‘i Drive along the 3.5 miles between Royal Poinciana Drive and King Kamehameha III Road. Although an Environmental Assessment has been completed for the Lako Street Extension, the completion date for this project is uncertain; in any case, multiple connectors are required.

Although new mauka-makai connectors are critically needed components of the road system in Kona, when they involve existing residential roads they also induce transportation problems. La‘aloa Avenue travels through several neighborhoods, and thus the design of the roadway should complement the needs of the residential neighborhood while serving its circulation function. Increased traffic and speeding may decrease safety for other motor vehicles, pedestrians, bicyclists, and roadside property. Residents of the connector road often have difficulty exiting driveways. Taking into account all these factors, the County of Hawai‘i considers the project purposes as:

- Provide access between Ali‘i Drive and Kuakini Highway on La‘aloa Avenue;
- Construct a roadway and intersections that provide acceptable Levels-of-Service for current and future levels of traffic on La‘aloa Avenue and its intersections;
- Enhance the transportation network of the Kailua to Keauhou area;
- Be consistent with the *Hawai‘i County General Plan* (Hawai‘i County 2005), in which the project is listed as a recommended improvement;
- Provide an alternative evacuation route for tsunami or emergencies on Ali‘i Drive;
- Design cross-sections that take into account the characteristics of the neighborhoods through which the road passes;
- Utilize design and structural measures to achieve traffic calming;
- Accommodate all modes of travel, locating pedestrian and bike facilities such that connections beyond this project are not precluded;
- Include consideration of direct property access for adjacent landowners; and
- Maintain a high quality of life and historical/neighborhood identity.

2 TRAFFIC CONDITIONS AND ALTERNATIVES

2.1 System Linkage and Overview

As discussed in Section 1.3, La‘aloa Avenue would provide a connection between Ali‘i Drive, the primary access for the major development corridor from Kailua-Kona to Keauhou, and Kuakini Highway (State Highway 11), the major transportation corridor to the airport and other visitor destinations. Both the *Hawai‘i County General Plan* and the *Keahole to Honaunau Regional Circulation Plan* (Hawai‘i County Planning Dept. 2002) recognize a crucial need for mauka-makai connectors that would serve local subdivisions, reduce congestion, maintain the ambience of scenic Ali‘i Drive, provide corridors that promote bicycle and pedestrian safety, and allow motorists to get to their destinations safely and efficiently.

The La‘aloa Avenue extension would provide direct access for residents of La‘aloa Avenue to Kuakini Highway, and would also provide an alternative route for motorists bound between locations on Ali‘i Drive and Kuakini Highway (Fig. 1-1).

2.2 Current Traffic Conditions

Introduction

A Traffic Impact Assessment Report (TIAR) for the project was prepared by Phillip Rowell & Associates; it is attached as Appendix 1 and summarized below.

Traffic engineers use several methods to measure the amount of traffic on a road and the efficiency with which road segments and intersections handle that traffic.

> **Average Daily Traffic** (ADT) is a measure of the number of motor vehicles that pass a given road segment on an average day.
>
> **Capacity Analysis** is used to rate signalized intersections. The specific methodology for determining the capacity rating is complex, but the basic meaning is suggested by the ratings: under capacity (able to handle all traffic without congestion or delays), near capacity, and over capacity (unable to handle all traffic without congestion or delays).
>
> **Level of Service (LOS)** is often used to rate unsignalized intersections. LOS is determined by comparing the amount of traffic using a roadway and the amount that the road is designed to carry (its capacity). LOS has values between A (Free Flow, when traffic flows without congestion) and F (Forced Flow, when traffic must frequently come to a stop). LOS A, B, C, and D are considered acceptable, with D a desirable minimum operating level of service. LOS E is an undesirable condition, and F is unacceptable.

The traffic engineer determined existing peak hour volumes using traffic counts of the study intersection of La‘aloa Avenue at Ali‘i Drive, as well as traffic count data published by State of Hawai‘i Department of Transportation (HDOT). Future traffic volumes were estimated with a computer model based on the *Highway Capacity Manual* (Transportation Research Board 2000). Model inputs included existing traffic volumes, traffic data from traffic studies for the Kahului-Keauhou Parkway (hereinafter called the Parkway), and additional traffic from nearby subdivisions in construction or planning. Traffic was projected to the year 2020, in order to be consistent with projections for the future Parkway. Although the Final EA was delayed for two years, the County determined that since traffic projections already looked forward to the year 2020, a new TIAR would not be necessary.

Existing Traffic Conditions

Traffic volumes from 2004 are shown in a schematic diagram in Figure 2-1a. The results of the Level-of-Service (LOS) analysis of the one existing study intersection are summarized in Table 2-1. Shown in the table are the average vehicle delays and the LOS of the controlled lane groups. All traffic movements operate at LOS A or B, which implies good operating conditions and minimal delays at the study intersections. It should be noted that LOS has undoubtedly declined since 2004 as Ali‘i Heights subdivision built-out.

Table 2-1
Year 2004 Levels-of-Service

Intersection and Movement	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
Ali‘i Drive at La‘aloa Avenue				
Southbound Left & Thru	7.7	A	8.2	A
Westbound Left & Right	10.9	B	12.8	B

Notes: 1. Delay is in seconds per vehicle 2. LOS denotes Level-of-Service, based on delay.

2.3 Future Traffic Conditions Without Improvements

2020 traffic volumes along Ali‘i Drive and Kuakini Highway were derived from data provided in the traffic impact study for the Parkway, and by additionally accounting for traffic generated from the Keauhou View Estates and Ali‘i Heights subdivisions. The resulting 2020 background peak hour traffic projections are shown in Figure 2-1b.

Without the La‘aloa Avenue Extension, the westbound approach of La‘aloa Avenue at Ali‘i Drive will operate at LOS F, or “Unacceptable.” Accordingly, potential mitigation measures that might be accomplished independently of the proposed extension project were identified and assessed.

Figure 2-1a 2004 Peak Hour Traffic Volumes

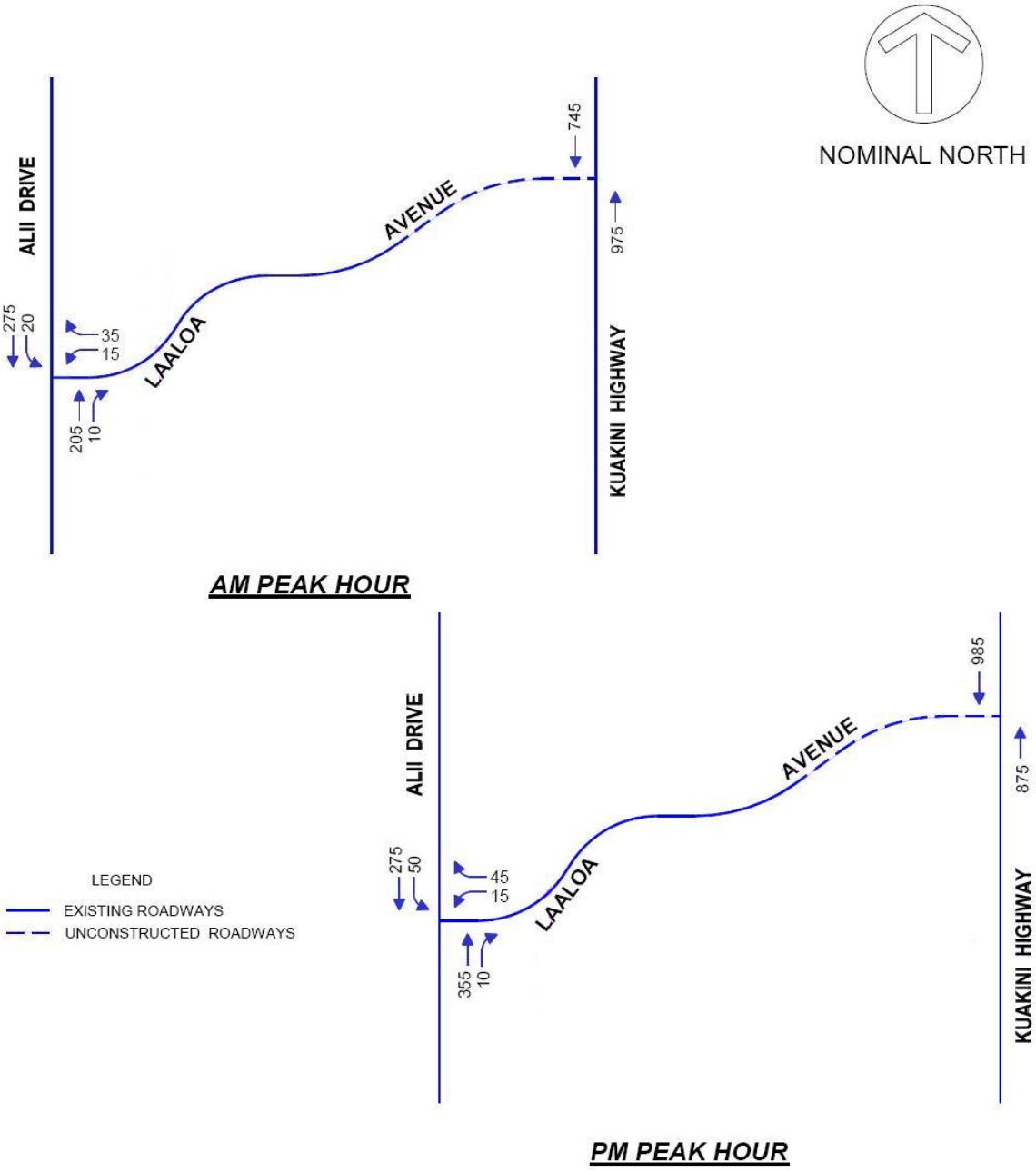
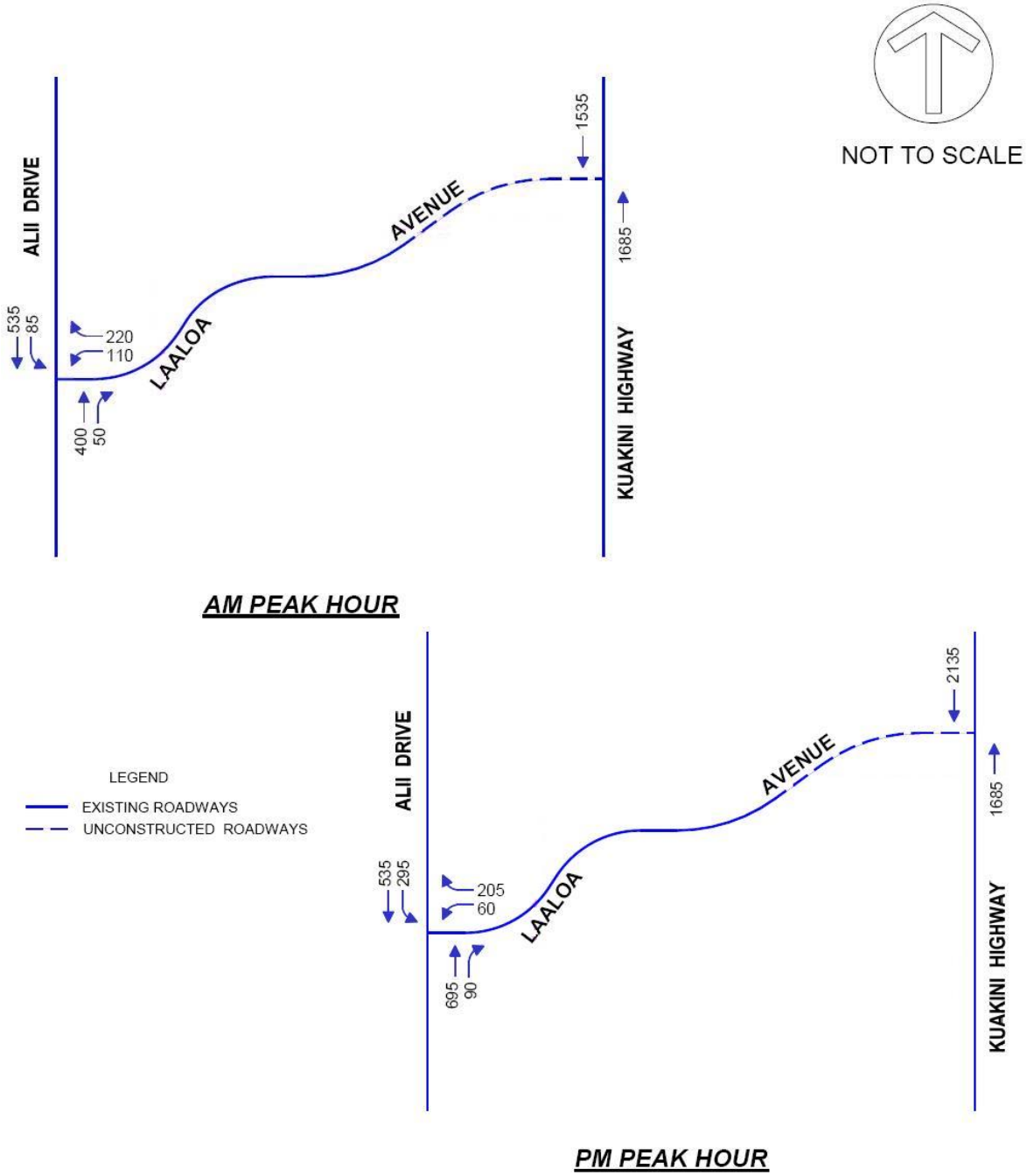


Figure 2-1b Estimated 2020 Peak Hour Traffic Volumes, No Build



The first measure considered was to install a separate southbound to eastbound left-turn lane on Ali‘i Drive, and a separate westbound to northbound right-turn lane on La‘aloa Avenue. The results of the LOS analysis without and with these improvements are shown in Table 4 of Appendix 1. To summarize, even with these improvements, the westbound approach would still operate at LOS F during the peak hours. Therefore, these improvements would not result in acceptable operating conditions at this intersection.

The second potential mitigation measure is to provide a refuge lane for westbound La‘aloa Avenue to southbound Ali‘i Drive left turns. As shown in Table 4 of Appendix 1 the delay is reduced significantly, but the level-of service is still LOS F.

The third potential mitigation measure is to signalize the intersection. A traffic signal warrant analysis concluded that, based on anticipated 2020 conditions without the extension of La‘aloa Avenue, traffic signals would indeed be warranted at the intersection of La‘aloa Avenue at Ali‘i Drive for both morning and afternoon peak hour conditions. As shown in Table 5 of Appendix 1, the signalized intersection would operate at LOS A during the morning peak hour, but at LOS F during the afternoon peak hour. As a signalized intersection with the additional lanes, the intersection would operate at LOS B during the morning peak hour and LOS C during the afternoon peak hour. Table 2-2 presents the results of analysis using signalization and additional lanes.

In conclusion, if La‘aloa Avenue is not extended, the intersection of La‘aloa Avenue at Ali‘i Drive will have to be signalized. It will also require a separate southbound to eastbound left-turn lane and separate westbound to northbound left turn lane in order for the intersection to operate at acceptable levels-of-service. Although these improvements are feasible, they would not provide a mauka-makai connector, worsening traffic on Ali‘i Drive, La‘aloa Avenue, and Kuakini Highway.

2.4 Future Traffic Conditions With Improvements

Scenarios

The TIAR considered how extending La‘aloa Avenue would affect traffic volumes and congestion on La‘aloa Avenue itself, as well as Ali‘i Drive and Kuakini Highway (and the Parkway, if it is built), by envisioning two scenarios. Both scenarios assumed that by 2020, Kuakini Highway would have two through-lanes in each direction, a separate northbound to westbound left-turn lane and a southbound to westbound right-turn deceleration lane, and that the eastbound approach of La‘aloa Avenue at Kuakini Highway would have separate left- and right-turn lanes. In addition to the year 2020, the TIAR also examined conditions in the year 2008 at the Kuakini Highway intersection, in order to account for a future condition in which Kuakini Highway still had only two (as opposed to four) lanes.

In *Scenario 1*, La‘aloa Avenue would be extended to Kuakini Highway, but the Parkway would not be built (Fig. 2-2a). As a starting point for intersection analysis, it was also assumed that the intersections of La‘aloa Avenue at Ali‘i Drive and La‘aloa Avenue at Kuakini Highway would be unsignalized.

Table 2-2
Summary of Projected Levels-of-Service in 2020*

ALTERNATIVE/SCENARIO/INTERSECTION (Includes all proposed intersection improvements)	AM Peak Hour		PM Peak Hour	
NO-BUILD				
La'aloa at Ali'i Drive (signalized, w/added lanes)				
Overall Intersection	**B**		**C**	
Westbound Left	C		C	
Northbound Thru & Right	A		C	
Southbound Left	D		D	
Southbound Right	A		A	
1. BUILD (No Parkway)				
La'aloa at Ali'i Drive (unsignalized)**				
Southbound Left & Thru	A		B	
Westbound Left	C		C	
Westbound Right	B		C	
La'aloa at Kuakini (signalized)	2008	2020	2008	2020
OVERALL	**B**	**B**	**B**	**D**
Eastbound Left	E	D	E	D
Eastbound Right	D	C	C	D
Northbound Left	E	D	C	C
Northbound Thru	A	A	B	A
Southbound Thru	B	A	B	B
Southbound Right	A	A	A	A
2. BUILD (Parkway also built)				
La'aloa at Ali'i Drive (unsignalized)				
Southbound Left & Thru	A		A	
Westbound Left	C		C	
Westbound Right	B		C	
La'aloa at Kuakini (signalized)	2008	2020	2008	2020
OVERALL	**B**	**A**	**B**	**A**
Eastbound Left	C	C	D	C
Eastbound Right	C	C	D	C
Northbound Left	C	D	D	A
Northbound Thru	B	A	A	A
Southbound Thru	B	A	B	A
Southbound Right	A	A	A	A
La'aloa at the Parkway (signalized)				
OVERALL	**C**		**B**	
Eastbound Left, Thru & Right	C		C	
Westbound Left, Thru & Right	C		C	
Northbound Left	C		C	
Northbound Thru & Right	B		B	
Southbound Left	C		C	
Southbound Thru & Right	B		B	

Source: Appendix 1, Tables 5-12.
Notes: * and for the Year 2008 at Kuakini Highway. ** Only westbound left is stop controlled.

In *Scenario 2*, La‘aloa Avenue would be extended to Kuakini Highway *and* the Parkway would be built (Fig. 2-2b). The lane configurations for intersections would also be as described above. Again, as a starting point for analysis, it was assumed that the intersection of La‘aloa Avenue at the Parkway would be unsignalized, with separate left-turn lanes along the northbound and southbound approaches of the Parkway. The eastbound and westbound approaches of La‘aloa Avenue would be one lane each, with STOP signs at the intersection with the Parkway.

It should be noted that there is a third, very unlikely scenario in which the Parkway is built and La‘aloa Avenue is not extended to Kuakini Highway. This scenario was not extensively analyzed in the TIAR because it is very unlikely to occur, and in any case, this EA would be moot.

Traffic Conditions Under Scenario 1 (No Parkway)

Modeling of the traffic similar to that described in Section 2.2 above was conducted in order to determine future Level-of-Service (LOS), and, if LOS deficiencies exist, to identify potential improvements such as signalization or lane changes that could address them. The results of the LOS analysis for the intersection of **La‘aloa Avenue at Ali‘i Drive** in unsignalized conditions are presented in Table 6 of Appendix 1. To summarize, LOS conditions are basically good (C or better) for most movements in the AM and PM peak hours. However, the westbound approach of La‘aloa Avenue to Ali‘i Drive would operate at Level-of-Service E and F during the afternoon peak hour. In response to this expected deficiency, various mitigation measures were explored, and the traffic engineer determined that the addition of a left-turn refuge lane long enough for one vehicle or more on Ali‘i Drive could improve LOS to C, or acceptable (Table 2-2).

The traffic signal warrant analysis concluded that extending La‘aloa Avenue would divert enough traffic to Kuakini Highway and away from the Ali‘i Drive/La‘aloa Avenue intersection that peak hour traffic signal warrants would no longer be satisfied – i.e., that there would be no need for a traffic signal there, at least at the year 2020.

At the **La‘aloa Avenue/Kuakini Highway** intersection, a warrant analysis was conducted for unsignalized conditions, which concluded that traffic signals are warranted for both morning and afternoon peak hour conditions. A signalized intersection was thus proposed with laneage that would maximize efficiency. As shown in Table 2-2, the intersection would operate at LOS B overall and all movements will operate at LOS D or better. Again, as with Scenario 1, for the interim year 2008 (at which time Kuakini Highway would still be two-lane), the intersection as a whole would operate at LOS B overall, but some individual movements would have LOS E (Table 2-2).

Figure 2-2a Estimated 2020 Peak Hour Traffic Volumes, Build Alternative, Scenario 1 (No Parkway)

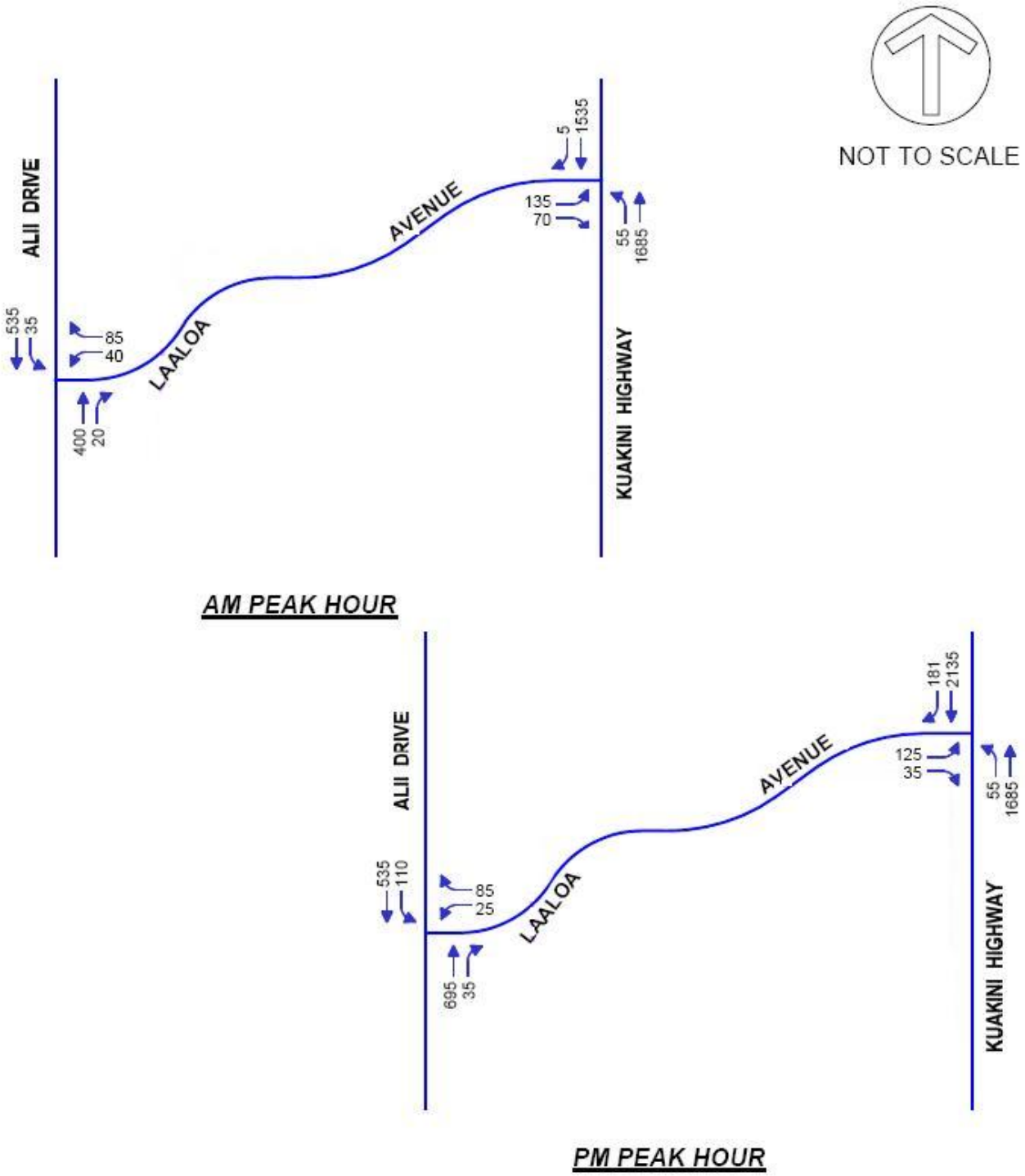
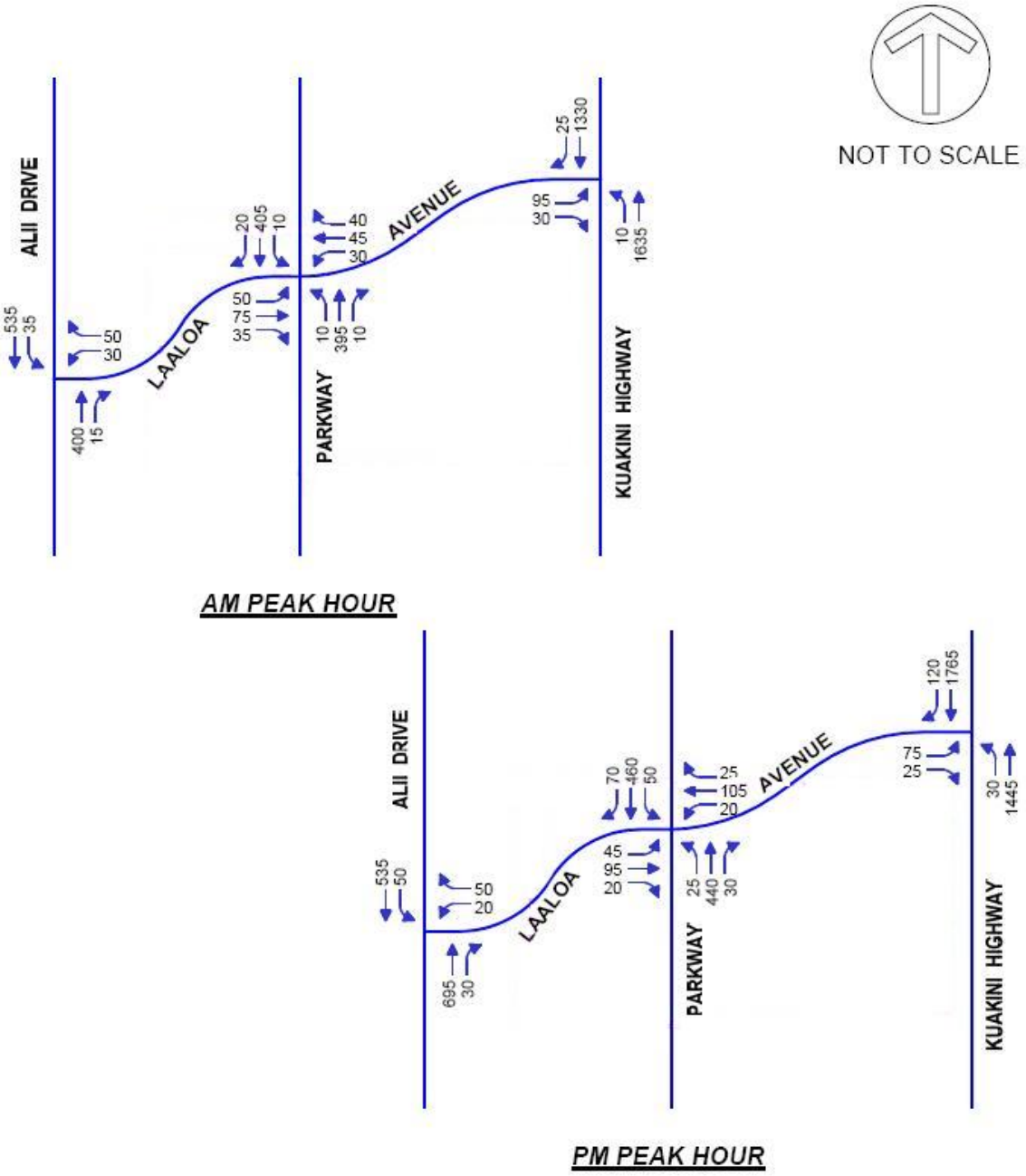


Figure 2-2b Estimated 2020 Peak Hour Traffic Volumes, Build Alternative, Scenario 2 (With Parkway)



Traffic Conditions Under Scenario 2 (Parkway Constructed)

For the intersection of **La‘aloa Avenue at Ali‘i Drive**, the conclusions and findings were consistent with those for Scenario 1 (Table 2-2). In summary, with the assumed lanes as listed above, and with the addition of a left-turn refuge lane along Ali‘i Drive, the intersection would provide acceptable levels-of-service during the morning and afternoon peak hours.

For the intersection of **La‘aloa Avenue at Kuakini Highway** for project year 2020, the peak hour volumes again would be great enough to satisfy the warrant for traffic signals. With a signalized intersection with lanes designed to maximize traffic flow, the intersection would operate at LOS A (reflecting the relief that the Parkway would add to traffic movement) and all movements will operate at LOS D or better, as shown in Table 2-2. For the interim year 2008 (at which time Kuakini Highway would still be two lanes), the intersection as a whole would operate at LOS B, with some individual movements operating at only LOS D.

As shown in detail in Table 10 of Appendix 1, with no traffic signal, the eastbound and westbound approaches of **La‘aloa Avenue to the Parkway** would operate at E and D during the morning peak hour and F during the afternoon peak hour. Accordingly, mitigation would be required.

The first mitigation measure assessed was conversion to an all-way STOP-controlled intersection. During the morning peak hour all approaches would operate at LOS C or better. During the afternoon peak hour, the northbound approach would operate at LOS E and the southbound approach would operate at LOS F. The STOP-controlled intersection was therefore rejected.

A traffic signal warrant analysis concluded that warrants were met for both AM and PM peak hours. As a signalized intersection, all movements at La‘aloa Avenue and the Parkway would operate at LOS C or better, and the intersection as a whole would operate at LOS B or better at the morning peak hour and LOS C or better at the afternoon peak hour (Table 2-2). It should be noted that a roundabout was also considered, but right-of-way considerations precluded the possibility at the time of consideration. The current design of the Parkway incorporates a roundabout.

Findings and Conclusions

The La‘aloa Avenue Extension would provide a much-needed mauka-makai road that would reduce congestion and provide more efficient motor-vehicle transportation in the project area.

Without the extension of La‘aloa Avenue to Kuakini Highway, a traffic signal would be required by 2020 at the intersection of La‘aloa Avenue at Ali‘i Drive to provide acceptable Level-of-Service during the peak hours. A separate southbound to eastbound left-turn lane and westbound to northbound right-turn lane will also be required.

If the La‘aloa Extension is built, along with intersection improvements including a traffic signal at Kuakini Highway and (and a roundabout at the Parkway, if that highway is built), and a STOP-controlled T-intersection at Ali‘i Drive, acceptable peak-hour Level-of-Service at all project intersections is expected, both in 2008 and 2020.

2.5 Alternatives

After the Draft EA, as discussed above in Section 1.1, a reformulation of the project definition was conducted as part as part of the Context Sensitive Solutions (CSS) process (see Section 4.2.3 for major discussion of CSS). This led logically to a rethinking of the alternatives analysis that had been presented in the Draft EA. Both the process and the various alternatives initially studied are discussed extensively in Appendix 6. It is important to emphasize that the process was time-intensive and iterative and involved an exhaustive analysis in a series of Advisory Group Meetings.

The scale of analysis in the CSS process was more refined than the one conducted for the Draft EA. The process considered both what have been termed *alignment alternatives*, or the various route that the roadway might take, and *cross-section alternatives*, or the cross sections that would be developed in various sections to achieve the project purpose, especially aspects dealing with pedestrian safety, bicycle lanes, speeding, and parking. The evaluation process focused on satisfaction of performance measures on criteria that were developed to express the project definition.

After consideration of other proposed concepts including the so-called "WestPro Alignment" (see Section 2.5.4), a series of three alignment alternatives (Alignment Alternatives 1, 2 and 3) and two cross-section alternatives (Cross-Section A and Cross-Section B) were evaluated in detail. These alternatives are described in detail below, illustrated in Figures 2-3a-d and 2-4 and compared in Table 2-3. In the end, on the basis of input provided as part of the CSS process, the County selected Alternative Alignment 3 and Cross-Section Alternative B as the recommended alternatives that would be advanced for design and construction.

2.5.1 Alignment Alternatives 1, 2 and 3

All three alignment alternatives for the proposed project involve closely related routes that would extend La'aloa Avenue from its existing mauka terminus 1,500 feet through undeveloped land to Kuakini Highway (see Figs. 2-3b-d). Although a number of routes involving quite different termini were considered (see Section 2.5.4), no alignments were advanced to consideration in either the Draft EA or this Final EA that would reroute or replace the La'aloa Avenue Extension from this basic course.

Common to all three alignments is a two-lane road with a 60-foot right-of-way that would accommodate the various configurations of underground electric lines, above-ground poles for street lighting, curbs, gutters, bike lanes, sidewalks, medians, and landscaping suggested under the two Cross-Section Alternatives (see Section 2.5.2, below).

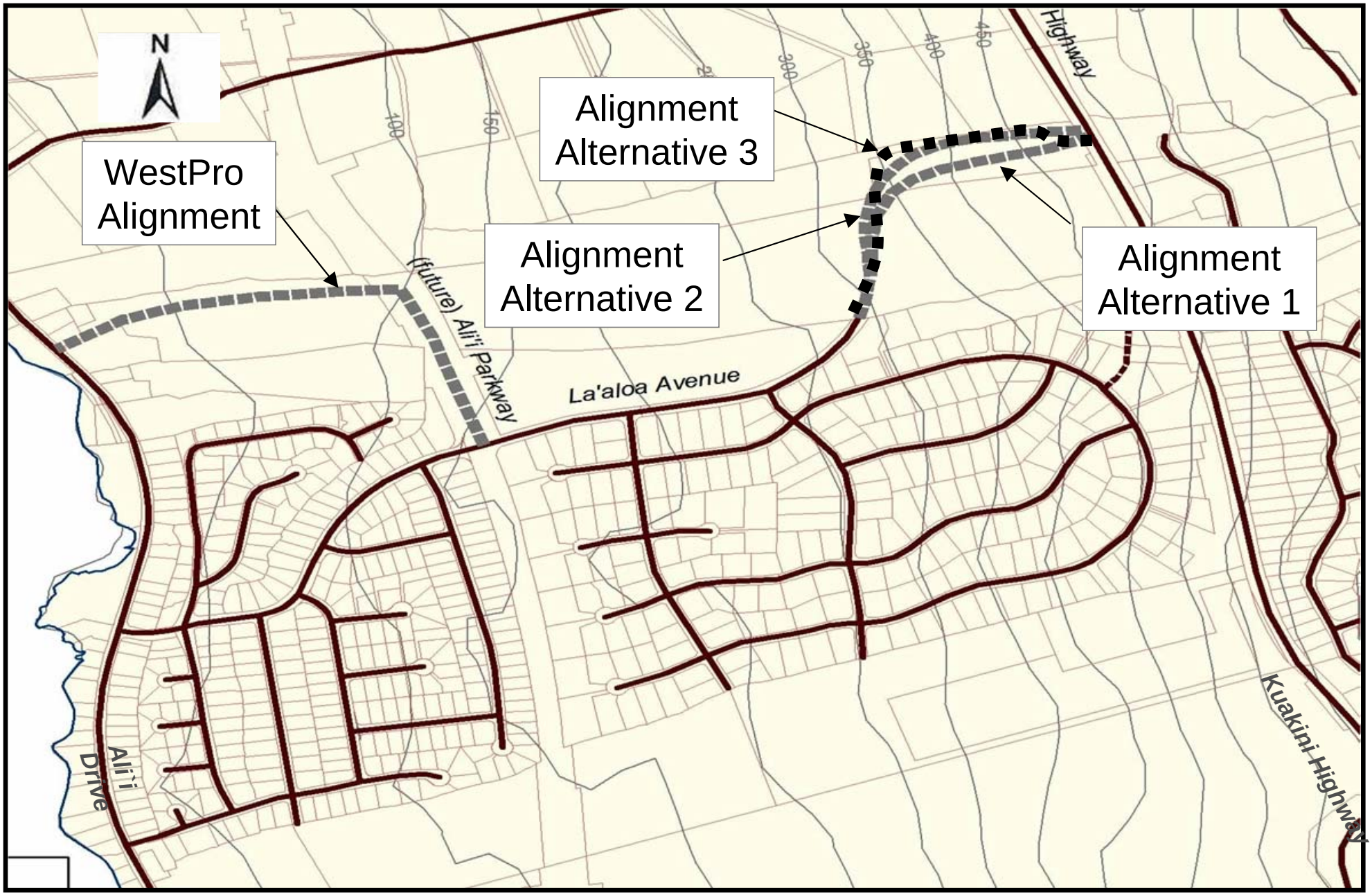
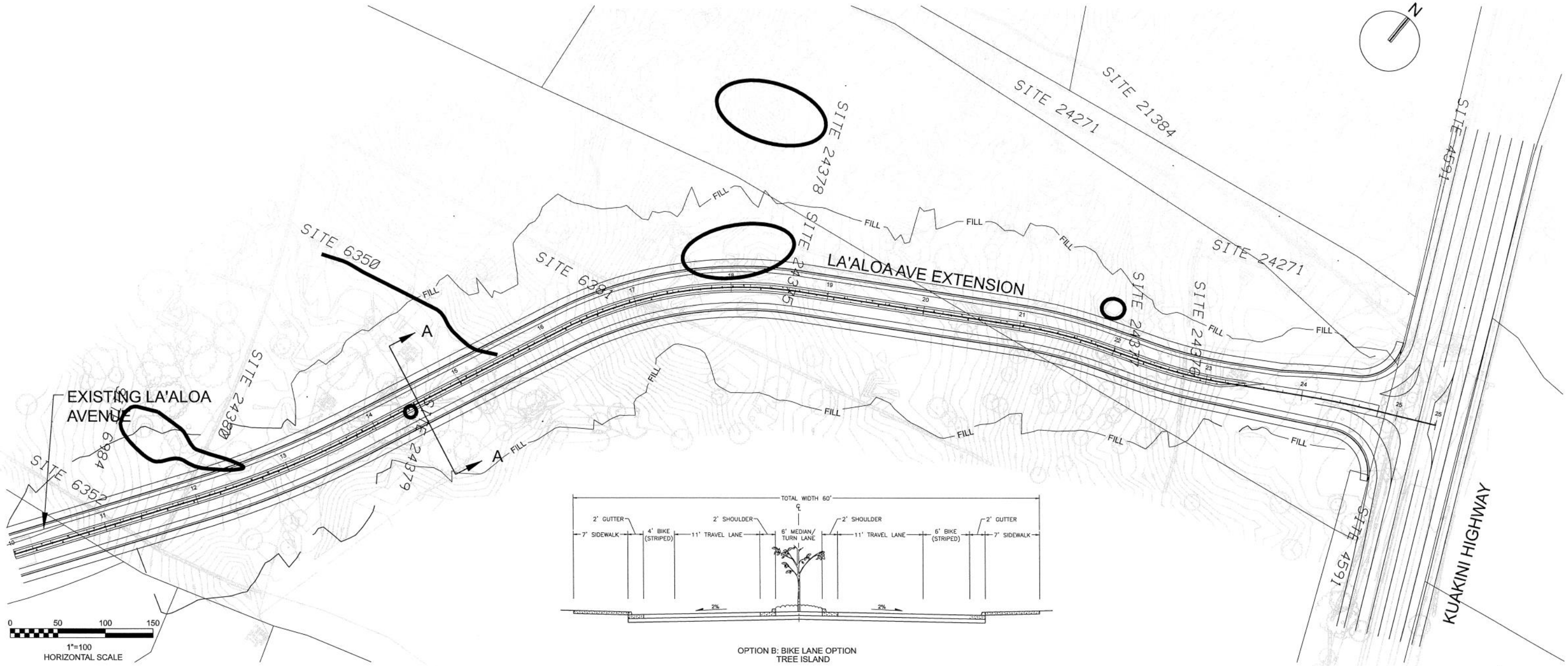
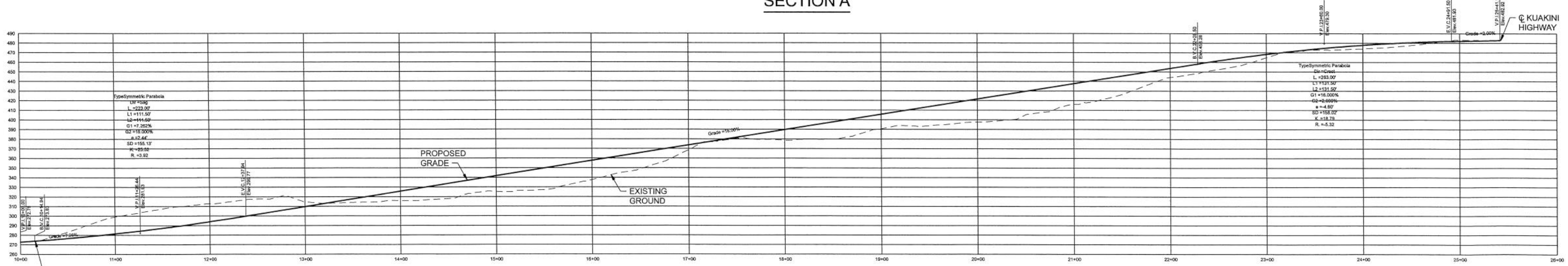


Figure 2-3a. Alignment Alternatives



OPTION B: BIKE LANE OPTION
TREE ISLAND

SECTION A



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1"=100
VERTICAL SCALE

FIGURE 2-3b Alternative 1, Extension Section

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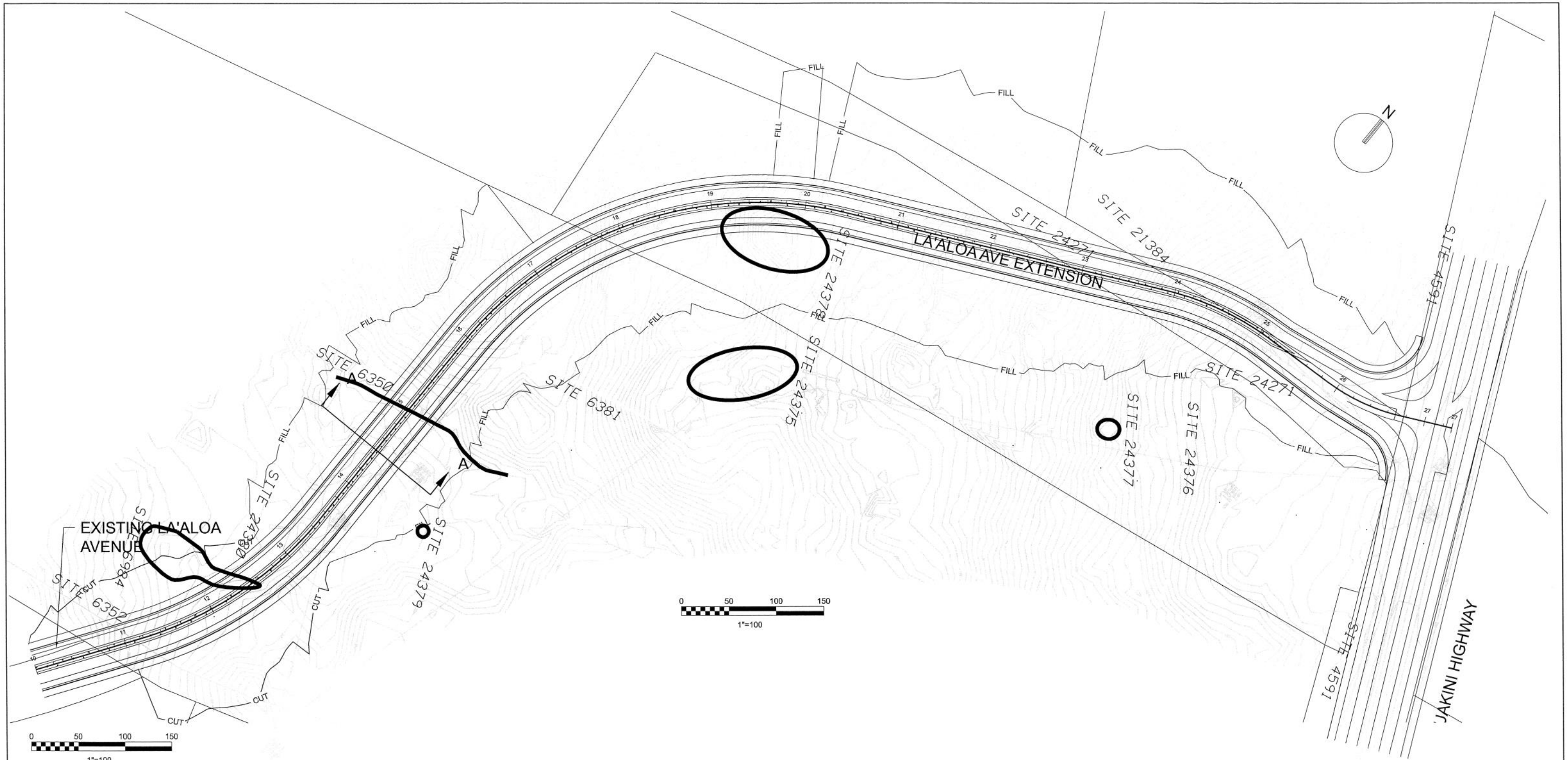
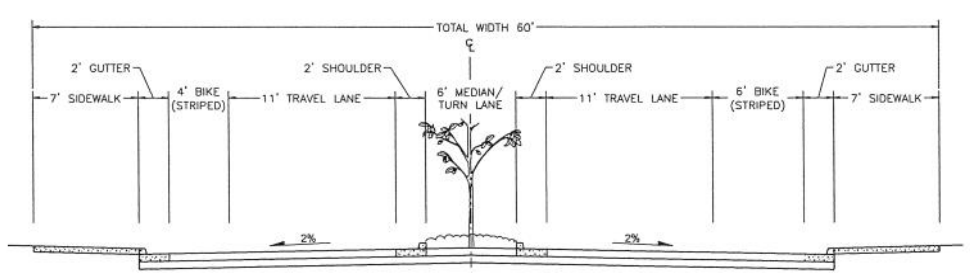
alt1 opta..dv Not Plotted Not Plotted



NOTE:
1. FOR ROADWAY PROFILE, SEE FIGURE 3.



OPTION B: BIKE LANE OPTION
TREE ISLAND

SECTION A

FIGURE 2-3c Alternative 2, Extension Section

CH2MHILL

LA'ALOA AVE EXTENSION

EXISTING LA'ALOA AVENUE

MSE WALL

MSE WALL

SITE 6381

SITE 24378

SITE 24375

SITE 24377

SITE 24376

SITE 24371

SITE 4591

SITE 6384

SITE 6980

SITE 24379

SITE 4591

KUAKINI HIGHWAY

CUT WALL

FILL

CUT

0 50 100 150

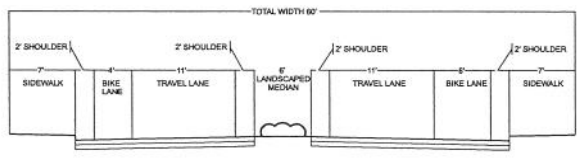
1"=100

HORIZONTAL SCALE

NOTE:

1. FOR ROADWAY PROFILE, SEE FIGURE 7.

SECTION A



OPTION B: BIKE LANE OPTION

LANDSCAPED MEDIAN

FIGURE 2-3d Alternative 3, Extension Section

CH2MHILL

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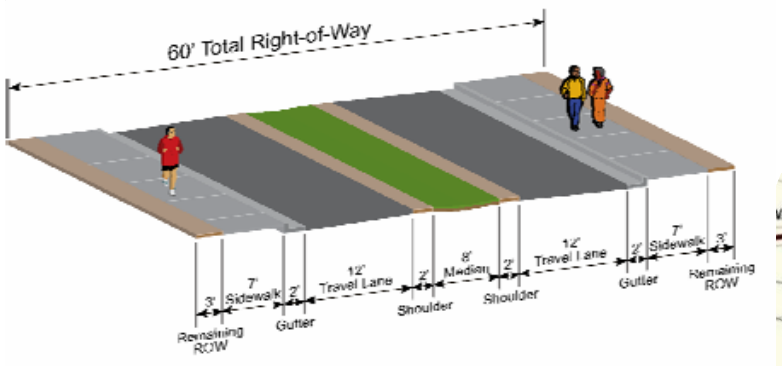
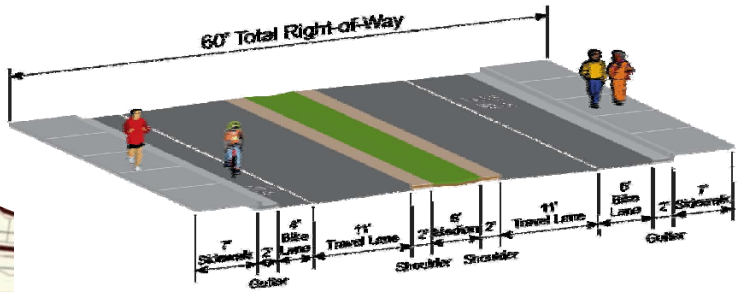
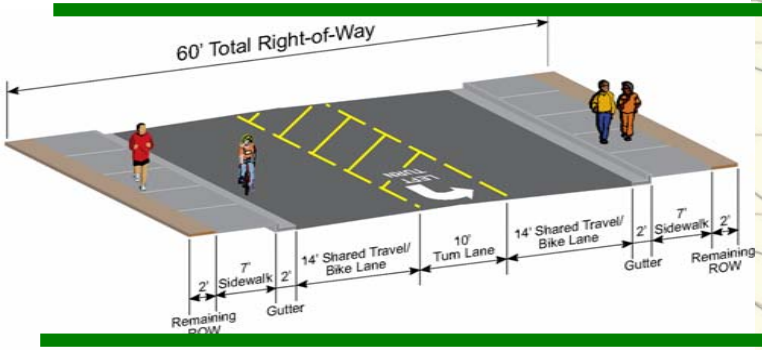
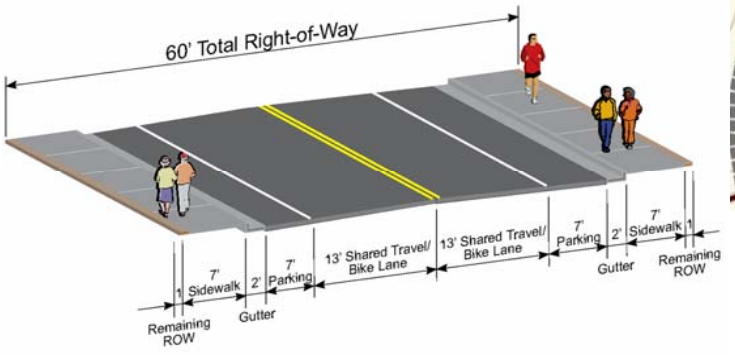
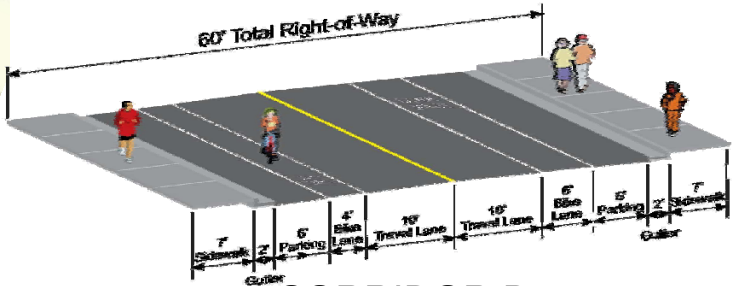










CORRIDOR A

CORRIDOR B

FIGURE 2-4. CROSS-SECTION ALTERNATIVES

The project would also involve intersection improvements to Kuakini Highway (Fig. 2-5a). The improvements would include widening the pavement to accommodate turn lanes and shoulders. Cut and fill slopes will require acquisition of additional right-of-way. Guardrails will be required on the makai side of the road. Utility poles and water meters will need to be relocated to accommodate the widening. The ultimate intersection configuration will include the following:

- Two through-lanes on Kuakini Highway in each direction;
- A separate northbound to westbound left-turn lane on Kuakini Highway;
- A southbound to westbound right-turn deceleration lane on Kuakini Highway;
- Separate left- and right-turn lanes on the eastbound approach of La‘aloa Avenue at Kuakini Highway; and
- A traffic signal at the intersection of La‘aloa Avenue and Kuakini Highway

The Draft EA considered two slightly different paths, called Alternatives 1 and 2, for the La‘aloa Avenue Extension. Alternative 1 would be direct but steeper route, while Alternative 2 would have a gentler slope and less effect on any future activities on TMK 7-7-08:114. As part of the CSS process, a hybrid alternative, called Alternative 3, was also developed, primarily to reduce the grade. As speed, steep roadway grades and property impacts were among the identified community concerns, an alignment that addressed these concerns was desired. Alignment 3 remained within the three originally studied properties but incorporated an ‘S’ curve to lengthen the extension and reduce the grade. Preliminary construction costs for the La`aloa Avenue Extension were calculated by CH2M Hill in 2007 as follows: Alternative 1: $6,379,000; Alternative 2: $10,653,000; Alternative 3: $7,348,000

Each alternative had various effects on landowner access for the three affected properties (property boundaries are shown in brown in Figure 2-3a). The County of Hawai‘i has worked with landowners to assure them that during final design provisions will be made through easements or parcel reconfiguration to ensure that access is not prevented or substantially degraded.

Table 2-3 provides a comparison among the three alignment alternatives on the criteria considered key by the CSS advisory group.

Figure 2-5a
Intersection Improvements at Kuakini Highway

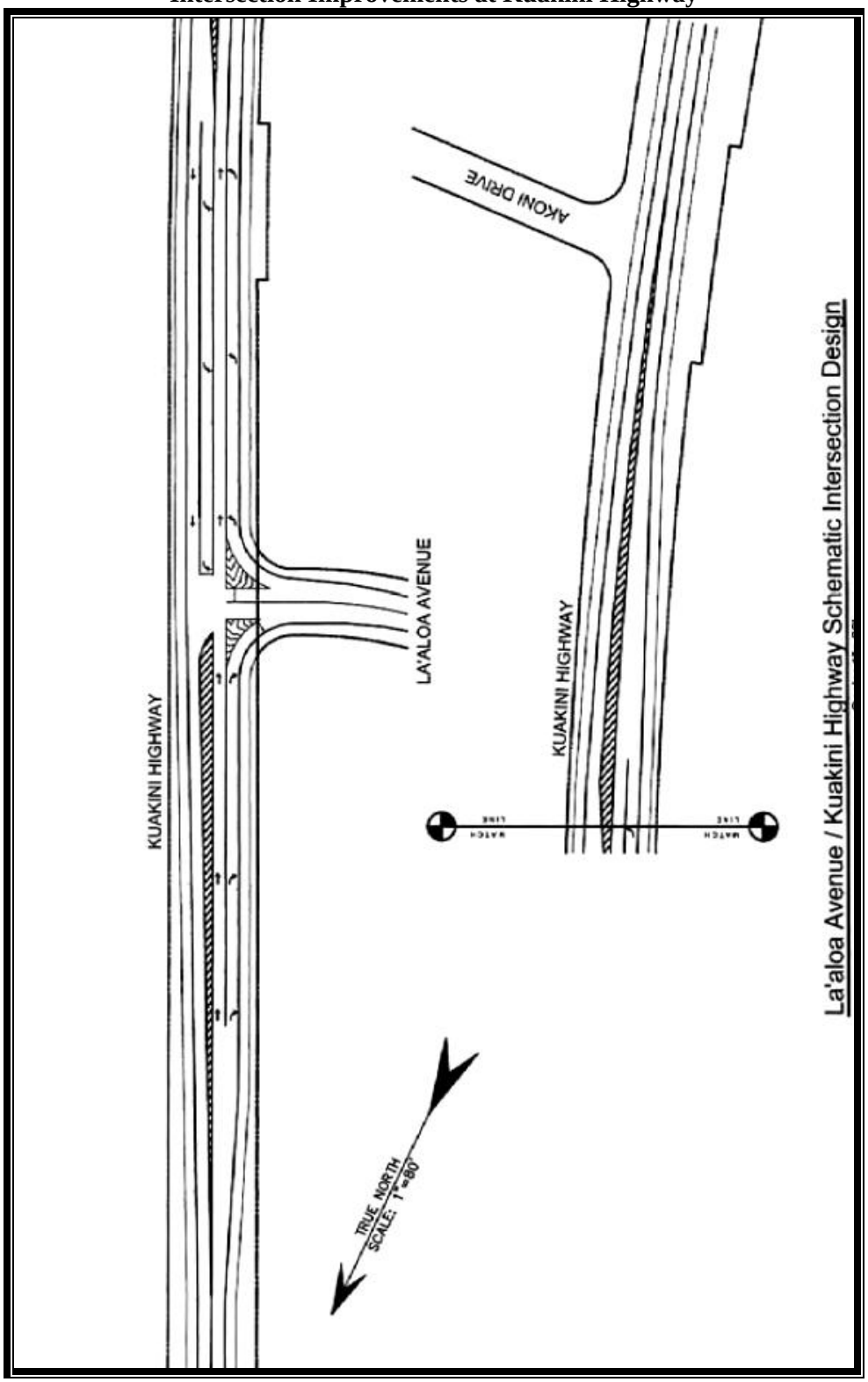


Table 2-3
Performance Measure Comparison for La‘aloa Avenue Extension Section

	Advisory Group Weighting	Alignment 1	Alignment 2	Alignment 3
Connection to Kuakini	200	●	●	●
Control Speeding	140	O	--	●
Impact to Cultural Sites	120	--	--	--
Right of Way Impacts	70	--	--	--
Cost		●	O	--
Acres		O	--	●
Minimize Grades	50	O	--	●
Cost	N/A	●	O	--
OVERALL		--	--	●

Note: Cost was not an advisory group consideration in weighting

LEGEND ● Alternative performs well in this criteria
-- Alternative performs adequately in this criteria
O Alternative performs poorly in this criteria

Based on the performance on criteria measures, the CSS advisory group considered Alignment Alternative 3 the preferred alternative, a recommendation that was adopted by the County of Hawai‘i.

2.5.2 Cross-Section Alternatives A and B

After discussion of a number of possible cross-sections that could be used to achieve varying degrees of speed reduction, access control, pedestrian and bicycle safety, visual impact reduction, and motor-vehicle efficiency, two basic cross-section alternatives were settled on. Each cross-section type varies in the three different sections of the project, i.e., the Extension Section, the existing La‘aloa Avenue mauka of the future Parkway, and the existing La‘aloa Avenue makai of the Parkway (see Figure 2-4).

Common to both Cross-Section A and Cross-Section B are the following:

- Two travel lanes, and curb/gutter/sidewalk treatment the entire length from Kuakini Highway to Ali‘i Drive;
- A landscaped, no-travel median in the La‘aloa Extension section;
- Striped medians with left-turn lanes at intersections in the existing La‘aloa Avenue mauka of the Parkway;
- On street parking with no median in the existing La‘aloa Avenue makai of the Parkway and
- Traffic calming measures to be determined after the conclusion of County/community demonstration projects.

Also common to Cross-Section Alternatives A and B is a roundabout at the intersection of La‘aloa Avenue and the future Parkway, and the following intersection improvements proposed at Ali‘i Drive (Fig. 2-5b):

- A separate southbound to eastbound left-turn lane along Ali‘i Drive;
- A separate westbound to northbound right-turn lane along La‘aloa Avenue; and
- A refuge lane along Ali‘i Drive for traffic turning from westbound La‘aloa Avenue to southbound Ali‘i Drive

The most important distinctions between the cross-section alternatives are that Cross-Section A divides the 60-foot right-of-way so as to have consistently wider travel lanes (12 to 14 feet, depending on section), which are shared with bicycles. Cross-Section B has narrower travel lanes (10 to 11 feet) to discourage speeding and a 4-foot dedicated bike lane along the entire length. Pedestrians will be facilitated along sidewalks 7’ wide will be built on both sides of the road. They will be provided both a horizontal and vertical buffer/ separation from vehicular traffic by a striped bicycle lane and a curb. Bike lanes will be striped in both directions of travel, adjacent to the sidewalk. The bike lane in the mauka-bound direction will be wider to allow for the more difficult movement. The mauka-bound bike lane will be 6 feet wide and the makai-bound lane 4 feet wide.

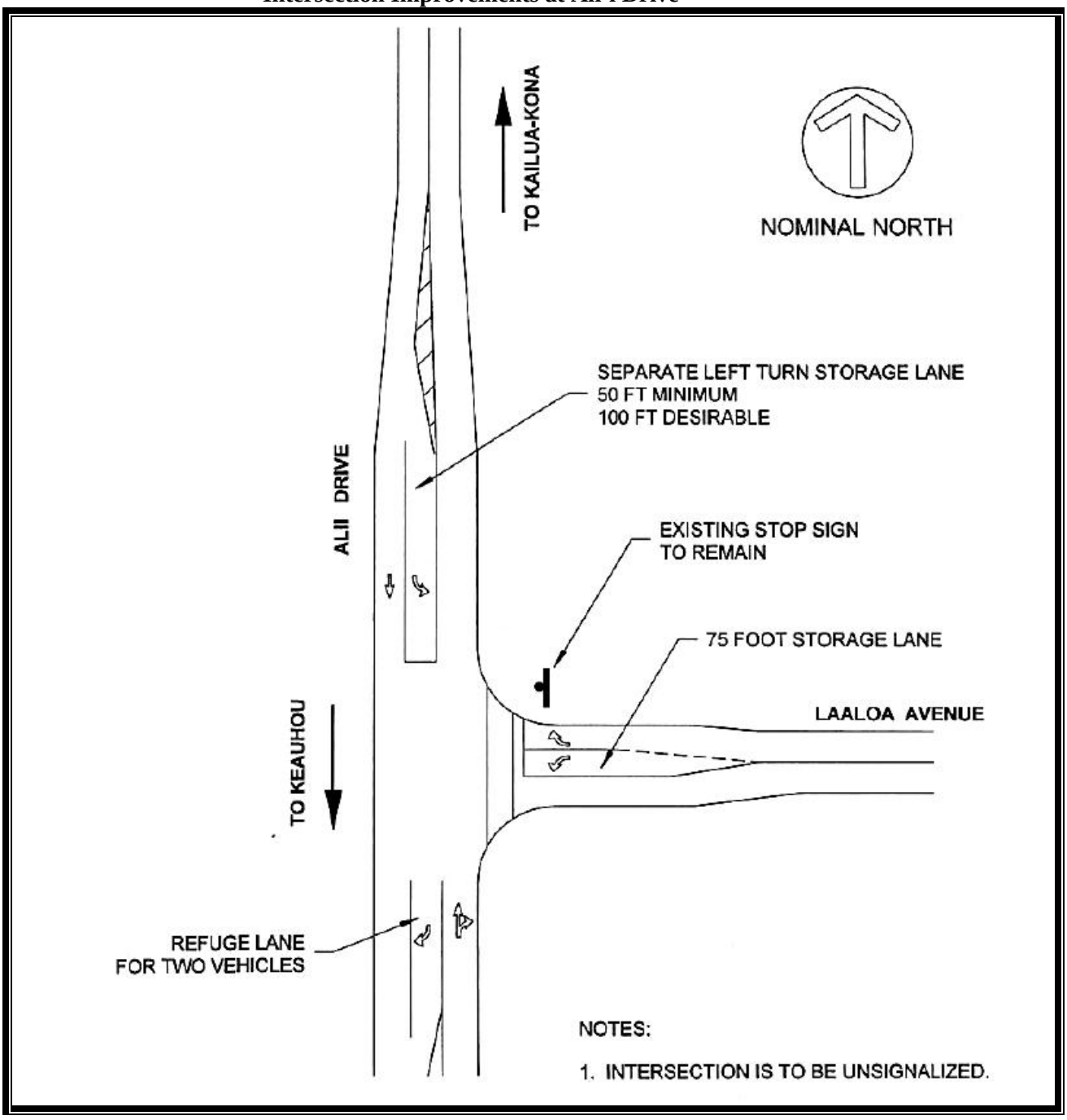
Based on the performance on criteria measures, the CSS advisory group considered Cross-Section Alternative B the preferred alternative, a recommendation that was adopted by the County of Hawai‘i.

2.5.3 No-Build Alternative

The No-Build Alternative is the baseline for comparing both the effects on traffic circulation and the impacts to the social and physical environment of the La‘aloa Avenue extension. The No-Build Alternative does not address current and future deficiencies of capacity and safety on La‘aloa Avenue, Ali‘i Drive, and Kuakini Highway. However, by definition the No-Build Alternative also avoids environmental impacts associated with taking of property, impacts to land and its resources, and construction-phase impacts to traffic, noise and air quality levels.

If the No-Build Alterative is selected, extensive improvements to the La‘aloa Avenue/Ali‘i Drive intersection should be undertaken, including signalization, to maximize Level-of-Service. No cost estimates, funding sources or schedule are currently available for this contingency.

Figure 2-5b
Intersection Improvements at Ali‘i Drive



2.5.4 Alternatives Evaluated & Dismissed From Further Consideration

During various phases of project planning, alternatives that did not involve the selected corridor were considered for their ability to provide a connection between Kuakini Highway and Ali‘i Drive that would help serve the traffic in the La‘aloa area.

Alternate Road Corridors

Several areas between Kamehameha III Road and Lako Street could potentially provide a needed mauka-makai road between Ali‘i Drive and Kuakini Highway (see Figure 1-1). North of La‘aloa is currently undeveloped land with a private mauka-makai subdivision road. Both the configuration of properties and the steep grade of the private Ho‘omalu subdivision road make this area far from suitable as a corridor for a mauka-makai road. Further north is an area of highly significant archaeological sites, including the Keakealaniwahine complex. South of the proposed corridor are lands belonging to Kamehameha Schools (KS). Again, these lands contain many significant archaeological sites, including an extensive system of caves with burials. Slopes makai of Kuakini Highway in this area are extremely steep and would pose substantial problems for intersection construction. Furthermore, any mauka-makai road on KS lands would be too close to the Kuakini Highway/Kamehameha III intersection to provide any regional benefit.

Within La‘aloa itself, the presence of existing development on all sides of the project, along with the fact that a roadway in this general location was required as a condition of rezoning for the Ali‘i Heights subdivision, narrowed the range of feasible construction alternatives to those within a corridor defined by TMKs 7-7-08:29, 114, 120, and 130.

An alternative alignment between Ali‘i Drive and the future Parkway, referred to as the WestPro alignment (then-owner of the traversed parcel) was also presented and evaluated. The WestPro alignment was developed in response to a Draft EA comment. This “zig-zag” alignment would utilize a portion of the future Parkway and then run along a new roadway parallel and north of the existing La‘aloa Avenue (see Figure 2-3a). The new alignment would serve the makai-bound traffic, while mauka-bound traffic would continue to utilize La‘aloa Avenue. A semi-diverter would be placed at the La‘aloa Avenue/Parkway intersection to block the makai-bound traffic from directly accessing the lower portion of La‘aloa Avenue. La‘aloa Avenue makai of the diverter would remain a two-way street. The purpose of the diversion would be to minimize makai-bound traffic past the existing residences and to keep downhill speeding vehicles to a minimum.

The physical details of the alternative included paving a 1,200-foot portion of the future Parkway corridor in its ultimate location. This section would consist of paved travel lanes and shoulders. Pedestrian, bicycle and landscaping elements would occur as part of the Parkway construction. The portion of roadway through the WestPro property would follow the roadway alignment proposed by WestPro, with sidewalks, on-street parking and two travel lanes. The new Ali‘i

Drive intersection would need to be improved to accommodate the additional traffic.

Discussions outside of the Advisory Group meetings between the County staff and property owners yielded the following results:

- Westpro would be amenable to use of their property as part of the La'aloa corridor if existing development conditions on their mauka parcel (Parcel 120) could be changed. Current conditions prohibit development of the property until specific advances related to the Parkway occur.
- WestPro would construct the new roadway alignment through their property. The development of Parcel 120 would create the funds to construct the roadway.
- The makai-bound diversion would only be a temporary route until the Parkway is constructed. This is due to access management restrictions planned for the Parkway. The WestPro intersection would be gated to be used only as emergency access when the Parkway is completed.
- Environmental and archaeological studies have been prepared for the property. Burials were identified, treatment for which may affect the timeframe for development of the parcel/roadway.
- The Planning Department was not in agreement with changing development conditions, as the current roadway infrastructure in Kona cannot accommodate the additional demands.
- Lower La'aloa Avenue improvements would still be required in the long term, as through makai-bound vehicles would utilize the section once the Parkway is completed. If not improved as part of this project, funding availability in the future is uncertain.
- The diversion would create additional traffic and delay along Ali'i Drive. The greatest impacts would be caused by the diverted traffic with destinations in the lower La'aloa neighborhood (left-turn movement from the WestPro roadway to southbound Ali'i Drive and the left turn movement from southbound Ali'i Drive to La'aloa Avenue).

As this alternative would only be a temporary solution, creating additional local and potentially regional traffic impacts while reasonable alternatives along the existing corridor exist, the WestPro alternative was not recommended for further consideration.

After consideration of topography, the three proposed alternatives (or extremely similar variants) appear to be the only feasible routes that will satisfy the project purpose and need. In consideration of the above, no additional alternative road corridors were proposed for study.

TDM/TSM and Mass Transit

Travel Demand Management/Transportation Systems Management (TDM/TSM) and Mass Transit were evaluated for their potential satisfy the purpose and need of the project. Considered under TDM/TSM are restrictions and/or programs involving existing roads, such as work- and school-time staggering, carpool incentives, and High Occupancy Vehicle Lanes, and minor changes to existing roads. These techniques often have great merit in relieving road congestion and in improving the general urban environment in certain situations.

The public transportation system on the island of Hawai‘i consists of a County bus system, a vanpool system and a rideshare program that involves a database matching drivers and passengers. A fleet of 25 buses serves several dozen routes around the island. Since the fees for bus-riding were waived in 2006, the buses often run at very high occupancy. Surveys indicate that the majority of riders are workers commuting between East Hawai‘i and Waimea and the Waikoloa Resorts, and the system is effective for getting workers to their jobs, which are concentrated in one location.

While TSM/TDM and Mass Transit alternatives can improve traffic congestion and overall safety in the community, and each may have a place in the overall transportation system in West Hawai‘i, they would not address the stated needs of the project of providing an additional mauka-makai road.

2.6 Project Schedule

If necessary approvals are obtained by Fall 2008, project design can be completed within 8-10 months, with construction complete within another 12-18 months. The La‘aloa Street Extension would be open for traffic sometime in late 2011 or early 2012.

3 ENVIRONMENTAL SETTING AND IMPACTS

This section describes the existing social, economic, cultural, and environmental conditions associated with the proposed project, along with the probable impacts of the proposed action and mitigation measures designed to reduce or eliminate adverse environmental impacts. For most categories of impact, the No-Build Alternative would result in no impacts. Therefore, unless explicitly mentioned, discussion of impacts and mitigation relates to the Build Alternatives only. Furthermore, as the only distinctions between the three alignment alternatives and the two cross-section alternatives – slight differences in slope, access, cost, and cross-section – are compared above, they are further compared in only limited portions of this chapter.

The island of Hawai‘i, home to approximately 171,191 residents in 2006 (Hawai‘i County R&D 2006), is largely rural. Major divisions include West Hawai‘i and East Hawai‘i. West Hawai‘i’s dry climate and calm ocean waters support a major tourism industry in the Kona and Kohala districts. East Hawai‘i has an economy based on agriculture and the business and government functions headquartered in Hilo, the major city on the island.

The project area is within the Kailua-Keauhou area (Fig. 1-1), which encompasses about 8 square miles. The area most directly affected is between Ali‘i Drive and Kuakini Highway, at elevations of 20 to 480 feet above sea level, in the ahupua‘a of La‘aloa and Pahoehoe, including the White Sands Beach Estates, Keauhou View Estates, and Ali‘i Heights subdivisions. Figure 3-1 is an airphoto of the project area taken in late 2004.

It should be noted that since the proposed action is a transportation project, traffic impacts are intrinsic elements of the project description. They also set the foundation for discussion of other impacts such as noise, neighborhood character and pedestrian and bicycle conditions. Accordingly, traffic circulation impacts have been discussed in Chapter 2, above.

3.1 Physical Environment

3.1.1 Geology, Hazards, and Soils

Existing Environment

The island of Hawai‘i, youngest and largest of the Hawaiian chain, formed from the coalescence of five volcanoes during the last million years. Kailua-Kona lies downslope of dormant Hualalai Volcano, which has not erupted since 1801.

The project area surface is composed of the oldest of the Hualalai volcanics, probably greater than 10,000 years old (Pleistocene). The surface is underlain by thin layers of basalt lava flows. The lava flows, with their porous rock structure, numerous cracks, lava tubes and interbedded

Figure 3-1
Aerial View of Project Area

ʻaʻa (clinker lava) flows, are highly permeable. Slopes range from 6% to 13%, and local relief across this generally uniform slope is variable. No lava tube caves or other caves are known to pass under the existing Laʻaloa Avenue or the planned extension. The soil in this area overlies recent lava flows and is thus moderately acidic, poorly developed, shallow, and rocky.

Permeability and runoff are fairly slow, although water may permeate rapidly through fractures. Erosion hazard is minor (U.S. Soil Conservation Service 1973). The engineering properties of the surface are quite adaptable to road construction.

This project (as all development in Kona) would be subject to volcanic hazard, particularly lava inundation. According to the USGS hazard classifications, the entire project area is contained in Lava Flow Hazard Zone 4, on a scale of ascending risk 9 to 1. Zone 4 is considered a less hazardous than Zone 3, which is adjacent to and downslope of active risk zones, because of greater distance from recently active vents and/or because the topography makes it less likely that flows will cover these areas (Heliker 1990:23).

According to the U.S. Geological Survey, although Hualalai Volcano has not erupted since 1801, it is likely to erupt again in the next 100 years. Between the late 1700s and 1801, Hualalai's eruptions produced two lava flows that reached the coast. The Kona International Airport was built on the surface of the larger of these flows (Heliker:1990).

In terms of seismic risk, the entire island of Hawai'i is rated Zone 4 Seismic Probability Rating (Uniform Building Code, Appendix Chapter 25, Section 2518). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built, as the 6.7-magnitude (Richter) quake of October 15, 2006, demonstrated.

Impacts and Proposed Mitigation Measures

Any roadway that serves this area is subject to the hazard of lava flows. There are no practical measures to avoid this impact. An improved road would provide a better escape route during natural disasters, including lava flows and tsunamis, or accidents that blocked or crowded alternate routes. The road and associated structures would be designed and built to appropriate seismic standards.

3.1.2 Hydrology and Floodplains

Existing Environment

Floodplain status for the project area has been determined by the Federal Emergency Management Agency (FEMA), which has mapped the area as part of the National Flood Insurance Program's Flood Insurance Rate Maps (FIRM). A summary of applicable Special Flood Hazard Areas (SFHA) designations is as follows:

1. Zone A. SFHAs subject to inundation by the 100-year flood without detailed hydraulic analyses and base flood elevations
2. Zone AE: SFHAs subject to inundation by the 100-year flood determined in a Flood Insurance Study by detailed methods. Base flood elevations are shown within these zones.
3. Zone AH: SFHAs subject to inundation by 100-year shallow flooding.
4. Zone X: Areas identified in the community flood insurance study as areas of moderate or minimal hazard from the principal source of flood in the area.

The project does not cross any areas of flood zone, and the entire project corridor is contained within Flood Zone X. The nearest FEMA designated Zone AE stream channel is the Kaumalumalu Drainageway, approximately 700 feet north of the proposed La'aloa Avenue / Kuakini Highway intersection, which has an existing 36-inch culvert under Kuakini Highway. Conceptual design indicates that impacts to the FEMA drainageway can be avoided.

An ephemeral drainage channel is located mauka of the proposed La'aloa Avenue alignments and below Kuakini Highway. The channel disappears below the proposed alignment. The tributary area is approximately 100 acres, and the estimated 10-year storm runoff is approximately 100 cubic feet per second (cfs).

Areas on the existing La'aloa Avenue have flood problems during heavy rain, particularly at Ali'i Drive. A resident also reported that water pools and flows onto private property at La'aloa Avenue and Princess Ke'elikolani Street

Impacts and Mitigation Measures

Road construction projects have the potential, if unmitigated, to adversely and permanently impact drainage in several ways. First, construction activities such as clearing and grubbing, excavation, and paving may temporarily alter the natural hydrology. Earthwork may leave soils vulnerable to erosion due to storm water runoff and can cause erosion and sediment pollution. Second, roadway paving increases the amount of impervious surface area, which increases the rate and volume of storm water runoff on a permanent basis. In addition, unregulated activities within a floodplain may raise flood levels or alter floodplain boundaries.

Properly designed drainage structures along with best management practices during construction can effectively mitigate impacts associated with construction and additional paved runoff surface. A drainage plan for the road will be developed and will undergo review, revision and approval by the Hawai'i County Department of Public Works (DPW) to ensure compliance with standards related to storm water runoff management. The drainage plan will not be finalized until the road is at a more advanced design state, but may include drywells, inlet boxes and drain lines to handle storm water road runoff.

The final roadway design will consider additional drywells and/or a retention basin to dispose of the storm water runoff, and will also consider the need for any other drainage structures. Mitigation measures during construction are described in Section 3.4.1.

3.1.3 Climate and Air Quality

Existing Environment

The climate of North Kona can be described as moderately dry and tropical. Average high temperatures in North Kona vary from approximately 81° Fahrenheit (F) in the winter to 85° F in the summer. Temperature lows average approximately 63° F in the winter and 69° F in the summer. Freezing temperatures or frost do not occur in the project area. Mean annual rainfall in the project area is estimated at 40 inches. Wind is important for its effect on dispersion or concentration of pollutants. Kona is sheltered from the north-easterly trade winds and experiences instead a diurnal cycle of daytime sea breezes and nighttime land breezes. Approximately 30 percent of the time, mostly in winter, the island of Hawai'i Island experiences

so-called Kona winds. These southerly winds are generally light, seldom exceeding an average daily speed of 10 miles per hour (UH-Manoa Dept. of Geography 1998).

Regional and local climate along with the type and amount of human activity generally dictate air quality of a given location. Federal and State air quality standards limit ambient concentrations of pollutants produced by motor vehicles. These include particulate matter, sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead. The ambient air quality standards (AAQS) are specified in Section 40, Part 50 of the Code of Federal Regulations (CFR) and Chapter 11-59 of the Hawai‘i Administrative Rules. Each regulated air pollutant has the potential to create or exacerbate some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentrations for a prolonged period of time.

The state and federal governments periodically monitor air quality to determine whether it meets AAQ standards. Areas that do not meet standards are termed non-attainment areas and are subject to Conformity Rules. These rules were issued by the Environmental Protection Agency (EPA) in response to Section 176 of the 1977 Clean Air Act. Conformity Rules prohibit any federal agency from engaging in any actions that do not conform to a state’s plan to correct non-attainment situations. The entire State of Hawai‘i is considered to have acceptable air quality and is thus an attainment area not subject to application of Conformity Rules.

Air quality in the project area is currently mostly affected by emissions from motor vehicles, industry and natural sources. Volcanic emissions of sulfur dioxide convert into particulate sulfate that causes a volcanic haze (vog), which moves around the southern end of the island and to blanket the southwest side of the island during normal trade wind weather. The major industrial source is oil-fired power plants which emit SO_2, nitrogen oxides, and particulate matter. Motor vehicles emit CO, nitrogen oxides and hydrocarbons (an ozone precursor), as well as smaller amounts of other pollutants.

The State of Hawai‘i operates a network of air quality monitoring stations around the state. Currently there are four air quality monitoring stations on Hawai‘i Island, one in Hilo, two in Puna, and one at Konawaena High School in Kealakekua, that measure SO_2 in order to gauge the presence and concentration of vog. These data indicate that concentrations are well within State and federal air quality standards. Although vog is a concern, the regional air quality in North Kona and on Hawai‘i Island generally benefits from the dispersive effects of winds and the isolation of the island from any outside sources of pollution. The more stringent State standards pertaining to CO and particulates are probably exceeded on occasion near high-volume intersections during periods when traffic congestion and poor dispersion conditions coincide.

Impacts and Mitigation Measures

The planned project will essentially upgrade traffic circulation in the area and will not generate any additional traffic. Impacts to regional air quality, which is currently excellent, would be somewhat beneficial because of the predicted decrease in congestion and queuing. The traffic Level of Service (LOS) at intersections in the project area would improve, reducing the possibility of microscale emissions that presently may temporarily approach or exceed air quality standards during periods of peak use. While an increase in the number of vehicles in this area due to the creation of a new thoroughfare has the potential to contribute to a long-term increase in air pollution emissions along the actual project corridor, the general improvement in LOS in the project area and Keauhou-Kailua area will result in an overall improvement in air quality.

3.1.4 Noise Levels

Existing Environment

A study of the acoustic environment of the project corridor along with estimates of the effects of both the Build and No-Build Alternatives was conducted for this EA (Appendix 2).

Noise may be defined as unwanted sound. Noise of sufficient severity may be a nuisance, and at even greater magnitude can even be a health hazard. Evaluation of noise requires a consideration of loudness at various pitches. Loudness is measured in units called decibels (dB). Since the human ear does not perceive all pitches or frequencies equally, noise levels are adjusted (or weighted) to correspond to human hearing. This adjustment is known as the A-weighted scale, abbreviated dBA. Noise levels over 70 decibels are considered unpleasant by most individuals; levels under 50 decibels are generally perceived as acceptably quiet. The specific sound level descriptor used in this study is the hourly energy equivalent sound level (Leq(h)) in A-weighted decibels (dBA), which considers the combined effects of all noises near and far and includes background noise and noise fluctuation.

The area of consideration for the study of the noise impacts for the project included the entire existing length of La‘aloa Avenue as well as the proposed extension.
Continuous ambient noise levels were measured within the undeveloped land near the proposed new road corridor, and approximately 150 feet from Kuakini Highway. The dominant noise source is vehicular traffic on Kuakini Highway, but other noises include aircraft, distant construction activities, wind, birds, and insects. The hourly Equivalent Sound Level (Leq(h)) generally ranged between 40 dBA and 58 dBA, depending on the time of day and traffic volume on Kuakini Highway. Peak hour noise averages about 64 dBA near Kuakini Highway, and 53 to 54 dBA 150 feet away (Table 3-1). Noise levels at the Ali‘i Drive intersection were calculated to average about 61 to 62 dBA at peak hour.

Table 3-1
Existing and Future Noise at Selected Sites

	Location 1* (Alii Drive)		Location 2* (Laaloa Ave)		Location 3* (Kuakini Hwy)	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**
Existing (Calculated)	61.0	62.4	52.6	54.6	63.6	63.9
Future Without Project (2020)	64.7	66.2	60.2	62.0	66.3	67.0
Future With Project Without Keauhou Pkwy (2020)	64.0	65.2	56.1	57.9	66.5	67.1
Future With Project and Keauhou Pkwy (2020)	63.9	64.6	57.8	57.6	66.0	66.3
Future Increase Without Project (2020)	3.7	3.8	7.6	7.4	2.7	3.1
Future Increase With Project Without Keauhou Parkway (2020)	3.0	2.8	3.5	3.3	2.9	3.2
Future Increase With Project & Keauhou Pkwy (2020)	2.9	2.2	5.2	3.0	2.4	2.4
Future Increase Due to Project Without Keauhou Pkwy (2020)	**-0.7**	**-1.0**	**-4.1**	**-4.1**	**0.2**	**0.1**
Future Increase Due to Project With Keauhou Pkwy (2020)	**-0.8**	**-1.6**	**-2.4**	**-4.4**	**-0.3**	**-0.7**

* Location 1 - 30 feet east of Alii Drive
Location 2 - 30 feet south of Laaloa Avenue
Location 3 - 100 feet west of Kuakini Highway

Source: Appendix 2, Table 1.

Impacts and Mitigation Measures

The State and federal governments have cooperated on determining Noise Abatement Criteria (NAC) (measured in decibels) for various categories of land use to determine whether the increase in noise associated with a highway project substantially impacts the acoustic environment. Although the La‘aloa Avenue Extension project is a County of Hawai‘i project and not required to adhere to these NAC, this noise analysis has utilized these criteria as accepted standards for measuring highway noise impact. Most relevant to this analysis are evaluations of increase in noise levels that are used to determine whether noise impacts have occurred and

mitigation measures should be considered. One is whether the FHWA noise abatement criterion of 67 dBA for residences, schools, churches, and similar land uses (U.S. Department of Transportation Policy and Procedure Memorandum 90-2) is exceeded or "approached," which is defined in Hawai'i as 66 dBA or greater. The second evaluation is the State DOT policy that defines any difference of 15 dB or greater between existing and predicted noise levels at the project year of 2020 as a "substantial" increase. If either criterion is exceeded, "reasonable and feasible" mitigation measures merit consideration. The noise study also considered various other noise policies, including those of the State Department of Health, the Environmental Protection Agency, and the Housing and Urban Development department (HUD), which affect the determination of housing project site acceptability.

The acoustical study used existing traffic noise measurements to develop and calibrate a model that projected future traffic noise levels associated with the proposed project under the No-Build and Build Alternatives under various scenarios (Table 3-1), with no distinction made for Alternative 1, 2 or 3, the impacts of which would be essentially identical. The FHWA Traffic Noise Prediction Model was the primary method. The model incorporates parameters for terrain, ground cover, and local shielding conditions. It is unsurprising that model results show noise levels rising in the project area with or without the project. However, because construction of the La'aloa Avenue Extension would increase traffic flow efficiency and result in lower volumes in critical areas, noise levels along Ali'i Drive and La'aloa Avenue would actually be lower with the project than without it – regardless of whether or not the Parkway is constructed. If undertaken, the Parkway project would generally further reduce noise levels by easing the traffic burden along Ali'i Drive, Kuakini Highway, and La'aloa Avenue.

Noise levels in the undeveloped land near the future location of the La'aloa Avenue Extension will naturally increase due to the project. However, at typical future home locations on either side of the future road, the noise level will increase less than 15 dB over the existing ambient noise levels. There are currently no residences in proximity to the future road location, and no thus noise impact is expected in this area.
Any new construction near the La'aloa Avenue Extension will obviously require consideration of noise levels. It is recommended that new homes there be built at least 30 feet from the edge of the road to meet the FHWA and HUD noise criteria. Homes that are at least 150 from Kuakini Highway should satisfy the FHWA and HUD noise criteria.

Although the Final EA was delayed for three years, the County determined that since the traffic projections upon which the noise analysis was based looked forward to the year 2020 and were not themselves updated, a new noise study would not be necessary.
Construction noise impacts are covered in Section 3.4.3.

3.2 Biological Environment

3.2.1 Terrestrial Vegetation

Existing Environment

Geometrician Associates conducted a botanical survey of the area in November 2004. The vegetation is a low-stature forest and scrubland dominated by the alien species typical of lowland North Kona: kiawe (*Prosopis pallida*), koa haole (*Leucaena leucocephala*), and opiuma (*Pithecellobium dulce*). A few natives common in Kona, including ilie‘e (*Plumbago zeylenica*), ‘ala ‘ala wai nui (*Peperomia leptostachya*), and ‘uhaloa (*Waltheria indica*) are present. A full species list is provided in Table 3-2.

Impacts and Proposed Mitigation Measures

Nearly all of the 58 plants species detected on the property are alien, and the few natives that are present are very common in Kona and throughout the Hawaiian Islands. No rare or threatened or endangered species are present or would be affected, and no adverse effects to any ecosystem is expected.

3.2.2 Wetlands and Aquatic Habitat

Existing Environment, Impacts and Mitigation Measures

No wetlands or aquatic habitat are present. No features offering aquatic habitat for native or introduced aquatic fauna are present.

The area directly affected by the project lacks aquatic habitat. Short and long-term impacts to marine habitat downslope of the proposed project will be avoided by the runoff containment measures that will occur through the drainage improvements and by adhering to the best management practices specified in the permits to which the project will be subject (see Section 3.4).

Table 3-2 Plant Species in Project Corridor

Scientific Name	Family	Common Name	Life Form	Status *
Abutilon grandifolium	Malvaceae	Hairy Abutilon	Herb	A
Acacia farnesiana	Fabaceae	Klu	Shrub	A
Aleurites moluccana	Euphorbiaceae	Kukui	Tree	A
Aloe sp.	Liliaceae	Aloe	Herb	A
Amaranthus spinosus	Amaranthaceae	Spiny Amaranth	Herb	A
Ambrosia sp.	Asteraceae	Ambrosia	Herb	A
Asystasia gangetica	Acanthaceae	Chinese Violet	Vine	A
Boerhavia coccinea	Nyctaginaceae	None	Herb	A
Borreria laevis	Rubiaceae	Buttonweed	Herb	A
Callistemon sp.	Myrtaceae	Red Bottlebrush	Tree	A
Chamaecrista nictitans	Fabaceae	Partridge	Pea	A
Chamaesyce hirta	Euphorbiaceae	Garden Spurge	Herb	A
Chamaesyce hypericifolia	Euphorbiaceae	Graceful Spurge	Herb	A
Chloris barbata	Poaceae	Swollen fingergrass	Herb	A
Cleome gynandra	Capparaceae	Spider Wisp	Herb	A
Clusia rosea	Clusiaceae	Autograph Tree	Tree	A
Coccinia grandis	Cucurbitaceae	Ivy Gourd	Vine	A
Commelina benghalensis	Commelinaceae	Hairy Honohono	Herb	A
Cynodon dactylon	Poaceae	Bermuda Grass	Herb	A
Digitaria insularis	Poaceae	Sourgrass	Herb	A
Digitaria setigera	Poaceae	Crabgrass	Herb	A
Eleusine indica	Poaceae	Goose Grass	Herb	A
Eragrostis tenella	Poaceae	Lovegrass	Herb	A
Euphorbia heterophylla	Euphorbiaceae	Kaliko	Herb	A
Euphorbia sp.	Euphorbiaceae	None	Shrub	A
Hyptis pectinata	Lamiaceae	Comb Hyptis	Shrub	A
Indigofera suffruticosa	Fabaceae	Indigo	Shrub	A
Ipomoea obscura	Convolvulaceae	Morning Glory	Vine	A
Kalanchoe pinnata	Crassulaceae	Air Plant	Herb	A
Kalanchoe tubiflora	Crassulaceae	Chandelier Plant	Herb	A
Lantana camara	Verbenaceae	Lantana	Shrub	A
Leonotis nepetifolia	Lamiaceae	Lion’s Ear	Herb	A
Leucaena leucocephala	Fabaceae	Haole Koa	Shrub	A
Malvastrum coromandelianum	Malvaceae	False Mallow	Shrub	A
Mimosa pudica	Fabaceae	Sensitive Plant	Herb	A
Momordica charantia	Cucurbitaceae	Bitter Gourd	Vine	A
Panicum maximum	Poaceae	Guinea Grass	Herb	A
Passiflora suberosa	Passifloraceae	Huehue Haole	Vine	A
Peperomia leptostachya	Piperaceae	Peperomia	Herb	I
Phyllanthus debilis	Euphorbiaceae	Niruri	Herb	A
Pithecellobium dulce	Fabaceae	Dulce	Tree	A
Plumbago zeylanica	Plumbaginaceae	‘Ilie’e	Herb	I
Plumeria sp.	Apocynaceae	Plumeria	Shrub	A
Portulaca oleracea	Portulaceae	Portulaca	Herb	A
Portulaca pilosa	Portulaceae	Akulikuli	Herb	A
Prosopis pallida	Fabaceae	Kiawe	Tree	A

TABLE 3-2 CONT'D				
Rhynchelytrum repens	Poaceae	Natal Red Top	Herb	A
Ricinus communis	Euphorbiaceae	Castor Bean	Shrub	A
Samanea saman	Fabaceae	Monkeypod	Tree	A
Senna occidentalis	Fabaceae	Coffee Senna	Shrub	A
Sida rhombifolia	Malvaceae	Sida	Herb	A
Sida spinosa	Malvaceae	Sida	Herb	A
Solanum nigrum	Solanaceae	Popolo	Herb	A
Stachytarpheta jamaicensis	Verbenacae	Jamaican Vervain	Shrub	A
Tridax procumbens	Asteraceae	Coat Buttons	Herb	A
Triumfetta rhomboidea	Tiliaceae	Bur Bush	Shrub	A
Verbena litoralis	Verbenaceae	Verbena	Shrub	A
Waltheria indica	Sterculiaceae	ʻUhaloa	Shrub	I

A = alien, E = endemic, I = indigenous, End = Federal and State listed Endangered Species

3.2.3 Fauna

Existing Environment

A faunal study of the area was performed by Rana Productions in December 2004; it is attached as Appendix 3 and summarized here.

The survey of alien mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. A running tally was kept of all vertebrate species observed and heard within the project area. Visual and electronic scans, using a Broadband AnaBat II® ultrasonic bat detector were made for bats during dusk and dawn. Three avian count stations were located within the project site, and eight-minute variable circular plot counts were made at each station, with visual and auditory observation. Evening and morning counts were also done to detect nocturnally flying seabirds and owls over-flying the project area.

Three alien mammalian species were detected during the course of this survey: dogs (*Canis f. familiaris*), cats (*Felis cattus*), and small Indian mongoosess (*Herpestes a. auropunctatus*). Although no live rodents were detected during the course of this survey, it is likely that roof rats (*Rattus r. rattus*), Norway rats (*Rattus norvegicus*), European house mice (*Mus domesticus*) and possibly Polynesian rats (*Rattus exulans hawaiiensis*) use resources within the general project area. All of these aliens are deleterious to native ecosystems and the native faunal species that are dependent on them.

Hawaiʻiʻs sole endemic terrestrial mammalian species, the endangered Hawaiian hoary bat, was not detected during this survey. It is likely that Hawaiian hoary bats forage within the general project area at least occasionally, as they have been seen in areas both *mauka* and *makai* of the proposed project site on a seasonal basis. It is currently difficult to gather information on the distribution, abundance and usage of resources within a given area of this cryptic species.

A total of 15 different bird species was recorded during station counts, all but one alien (Table 3-3). The single native species was a Pacific Golden-Plover (*Pluvialis fulva*) which is an indigenous migratory species commonly seen throughout Hawai‘i and the tropical Pacific from fall through spring. No species currently listed as endangered, threatened or proposed for listing under either the federal or the State of Hawai‘i’s endangered species programs was detected on the site.

Avian diversity was relatively low, and densities were also low, with the exception of four species: Zebra Dove (*Geopelia striata*), Common Myna (*Acridotheres tristis*), House Finch (*Carpodacus mexicanus frontalis*) and Java Sparrow (*Padda oryzivora*).

The relatively low diversity of avian species detected during this survey was in keeping with the results of similar surveys in North Kona. The habitat currently found within the project area and within the alien dominated lowland areas in North Kona is not conducive to supporting native forest birds, with the possible exception of Hawaiian Hawks (*Buteo solitarius*). There is no suitable foraging or nesting habitat for Hawaiian Hawks within the project site. There are no wetland features within the study area, thus no endemic waterbirds were expected, nor were any recorded.

Although not detected during this survey it is possible that small numbers of the endangered endemic Hawaiian Petrel (*Pterodroma sandwichensis*), or *ua‘u*, and the threatened Newell’s Shearwater (*Puffinus auricularis newelli*), or *‘a‘o*, overfly the project area (as they do most of the island) between the months of May and November. There is no suitable nesting habitat within or close to the proposed project site for either of these pelagic seabirds. The primary cause of death in these species in Hawai‘i is thought to be predation by alien mammalian species at the nesting colonies, but collision with man-made structures is also significant. Night-flying seabirds, especially fledglings on their way to sea in summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds often collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets for feral mammals.

Impacts and Mitigation Measures

The construction and operation of the proposed La‘aloa Avenue extension is not expected to result in any adverse impacts to the endangered Hawaiian hoary bat, the only listed terrestrial mammalian species present in Hawai‘i.

The principal potential impact that development of the project area poses to Hawaiian Petrels and Newell’s Shearwaters is the increased threat that birds will be downed after becoming disoriented by exterior lighting that may be required in conjunction with the construction and operation of the development. To reduce the potential for interactions between nocturnally flying Hawaiian Petrels and Newell’s Shearwaters with external lights and man-made structures, it is emphasized that that any external lighting planned to be used during construction or within the completed project should be shielded, in conformance with the Hawai‘i County Code. This mitigation would serve the dual purpose

Table 3-3
Bird Species Detected in Project Corridor

Common Name	*Scientific Name*	*ST*	*RA*
PHEASANTS & PATRIDGES – PHASIANIDAE			
Grey Francolin	*Francolinus pondicerianus*	A	*2.33*
PLOVERS & LAPWINGS - CHARADRIIDAE			
Pacific Golden-Plover	*Pluvialis fulva*	IM	0.33
PIGEONS & DOVES - COLUMBIDAE			
Spotted Dove	*Streptopelia chinensis*	A	5.33
Zebra Dove	*Geopelia striata*	A	7.00
SILVEREYES - ZOSTEROPIDAE			
Japanese White-Eye	*Zosterops japonicus*	A	5.00
STARLINGS - STURNIDAE			
Common Myna	*Acridotheres tristis*	A	7.00
EMBERIZIDS - EMBERIZIDAE			
Saffron Finch	*Sicalis flaveola*	A	2.67
Yellow-billed Cardinal	*Paroaria capitata*	A	3.00
SALTATORS, CARDINALS & ALLIES – CARDINALIDAE			
Northern Cardinal	*Cardinalis cardinalis*	A	4.67
CARDULINE FINCHES & ALLIES - FRINGILLIDAE			
House Finch	*Carpodacus mexicanus frontalis*	A	7.00
Yellow-fronted Canary	*Serinus mozambicus*	A	2.67
OLD WORLD SPARROWS – PASSERIDAE			
House Sparrow	*Passer d. domesticus*	A	1.00
WAXBILLS & ALLIES – ESTRILDIDAE			
African Silverbill	*Lonchura cantans*	A	3.33
Nutmeg Manikin	*Lonchura punctulata topela*	A	2.67
Java Sparrow	*Padda oryzivora*	A	7.33

Notes: *ST*=Status; A= Alien Species; IM= Indigenous Migratory Species: Native to Hawaii but also found elsewhere naturally; RM= Relative Abundance: Number of birds detected divided by the number of count stations (3)

of minimizing the threat of disorientation and downing of Hawaiian Petrels and Newell's Shearwaters, while at the same time lowering the ambient glare caused by unshielded lighting to the astronomical observatories located on Mauna Kea.

3.3 Socioeconomic

3.3.1 Land Use and Planning

Existing Land Uses

About half the land between Ali'i Drive and Kuakini Highway in the La'aloa-Pahoehoe area is currently developed for residential uses, with resort-residential surrounding Ali'i Drive. The remaining vacant land is zoned for agriculture or residential uses. Near Ali'i Drive, the White

Sands Terrace and the White Sands Beach Estates subdivisions were largely built before the 1990s. Mauka of this on both sides of La‘aloa Avenue lies Keauhou View Estates, which was built between 1999 and 2003. Mauka of the proposed Parkway and south of both the existing and proposed extension of La‘aloa Avenue lies Ali‘i Heights, a subdivision that has been built-out over the last five years. Makai and on both sides of the proposed extension are undeveloped lands, some of which have been rezoned for residential uses but not subdivided. Near the mauka end of the extension to the north are lands zoned for five-acre agricultural lots.

Existing Land Use Designations and Planning

Planning and zoning responsibility for the island of Hawai‘i rests with the Hawai‘i County Planning Department and Planning Commission, the Hawai‘i County Council, and the State Land Use Commission.

Hawai‘i County General Plan

The General Plan for the County of Hawai‘i (2005) is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The County General Plan calls for the following among its Transportation Goals:

- Provide a transportation system whereby people and goods can move efficiently, safely, comfortably and economically.
- Make available a variety of modes of transportation that best meet the needs of the County.
- Provide a system of thoroughfares and streets for the safe, efficient and comfortable movement of people and goods between and within the various sections of the County.
- Provide an integrated State and County system so that new major routes would complement and encourage proposed land uses.

The Transportation Section of the County General Plan calls for providing mauka-makai roads from Ali‘i Drive to Kuakini Highway as part of the Plan’s specific goals for improving transportation infrastructure in North Kona. Therefore the project is both mentioned in the County General Plan and is also consistent with the overall aims and goals of the Plan.

General Plan Facilities and LUPAG Maps

These map components of the General Plan together establish the basic urban and non-urban form for areas within the planned public and cultural facilities, public utilities and safety features, and transportation corridors.

The Transportation-Roadways map of the General Plan identifies a "C-11 Proposed Mauka-Makai" collector road in this general area. The General Plan defines collectors as 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 and to collect and distribute traffic between neighborhood and arterial system. Major collectors require a minimum right-of-way of 60 feet.

The Land Use Pattern Allocation Guide (LUPAG) map is a graphic representation of the Plan's goals and policies. Lands surrounding the project corridor are designated as Urban Expansion, consistent with use for the proposed project.

County Zoning and State Land Use District

All land in the State of Hawai'i is classified into one of four land use categories – Urban, Rural, Agricultural, or Conservation – by the State Land Use Commission. The project corridor is designated Urban, and the project would be an identified use for this district. County zoning for properties along the project corridor varies from Single Family Residential (RS-7.5), Multiple Family Residential (RM-3.5) to Single-Family Residential (RS-15), consistent with use for the proposed project. North of the project corridor land is zoned Agriculture, 5-acre minimum lot size (A-5a). The proposed road use is a permitted use in the Urban district and all applicable County zones. It should be noted that Hawai'i County Ordinances 96-60 and 97-42, which granted a change of zone for the Ali'i Heights subdivision, along with Condition 5 of Special Management Area Permit No. 385, required the construction or bonding of a road to Kuakini Highway.

Special Management Area

The entire project corridor is within the Special Management Area (SMA) of the coastal zone.

Impact of Project on Land Use and Planning Designations

The project is consistent with all planning. No rezoning, reclassification, or use permits are required. A subdivision permit will be necessary for acquisition of right-of-way. An SMA permit will be required for the project.

The proposed project would serve to correct problematic vehicle congestion in the Kailua-Kona to Keauhou area. Because vehicle congestion is, at particular times in certain areas, a significant problem in this area, reduction of this problem may encourage more people to reside in and travel through the area. In addition, the road will improve access for properties adjacent to it, perhaps increasing the opportunity for landowners to rezone and subdivide, or to renegotiate existing zoning conditions related to access by substituting use of the La'aloa Avenue Extension. There, on some level, the project may help induce growth. It is important to note that growth in the area would be consistent with the recently adopted Hawai'i County General Plan, which designates this area for urban expansion. Furthermore, plans for any change of zone must

undergo review and approval the County Council and County Planning Commission. Until the Parkway is complete, few rezonings in Kona are likely to be approved.

3.3.2 Demographics and Community Identity

Existing Environment

The 2000 U.S. Census of Population provides the most recent demographic information. The census data are still reasonably accurate for Kona, but there has been substantial construction and population growth. The project area is part of Census Tract 215.03, which comprises the area from Holualoa south to Kahalu‘u and Keauhou, as shown in Figure 3-2. This neighborhood is very typical of North Kona as a whole on most socioeconomic measures, as shown in Table 3-4, which presents demographic data for the census tract that contains the project area, for the North Kona District as a whole, and for the entire County of Hawai‘i.). The area is basically residential and without a distinct area of central focus such as a local shopping district, community center or park.

Figure 3-2
Map of Census Tract 215.03

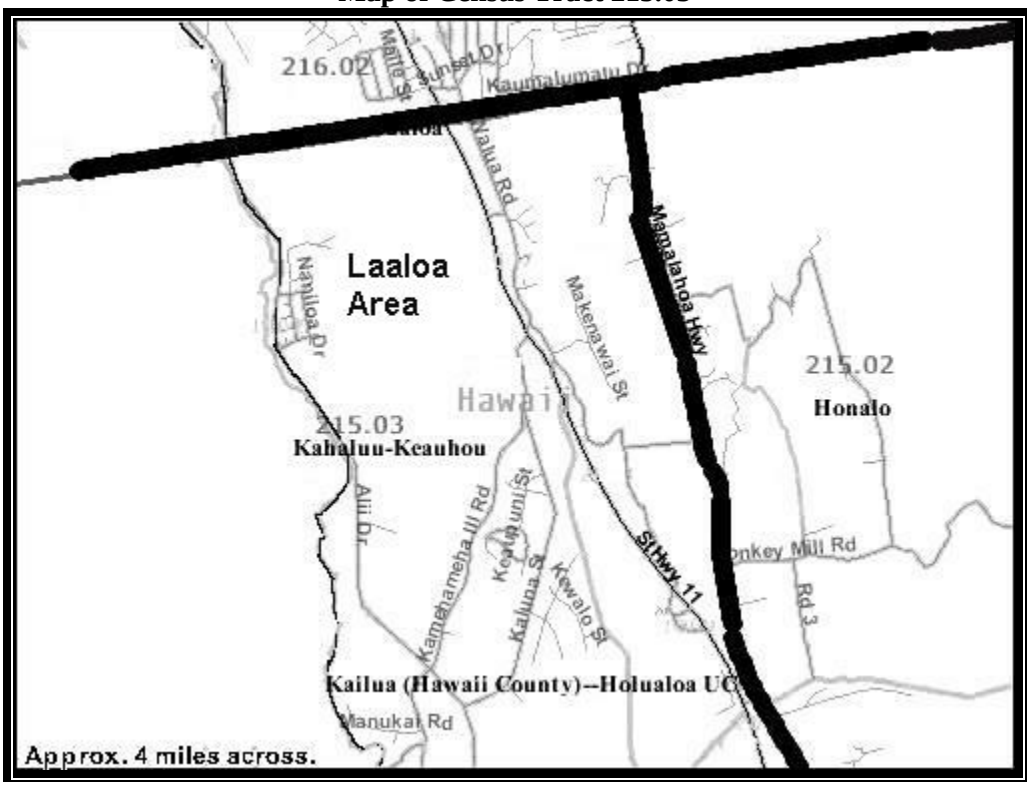


Table 3-4
Demographic Characteristics of Project Area Census Subdivisions

Area	Population	Persons/ House-hold	Ethnic Characteristics (in percent)	Percent Hawaiian
Census Tract 215.03	4095	2.51	Asia/Pac: 30. White 52. Other 16.	8.9
North Kona (Keauhou to Kawaihae) Tracts 215.01, 215.02, 215.03, 216.01, 216.02, and 217.02	35,659	2.76	Asia/Pac: 28. White 43. Other 27.	8.6
Hawai`i County	148,677	2.75	Asia/Pac: 44. White 31. Other 24.	11.2

Sources: U.S. Bureau of the Census: "2000 Census of Population. General Population Characteristics," 2000 CP-1-13.

Impacts and Mitigation Measures

No relocation of residences, businesses, community organizations or farms would occur because of the project. Some effect on community identity or cohesion is expected, as La‘aloa Avenue will change from being a local street providing access to one neighborhood to an important collector connecting Kuakini Highway to Ali‘i Drive. According to residents, this adverse effect already occurred as a result of the fast pace of construction in the Ali‘i Heights subdivision and the continued expansion of occupied units. Impacts related to pedestrian and bicycle safety are discussed in Section 3.3.7.

As the neighborhood is not characterized by a higher proportion of minority or low-income populations, and there are no long-established traditional enclaves on La‘aloa Avenue, minority or low-income groups are not expected to experience disproportionately high adverse impacts as a direct or indirect result of construction-phase impacts, right-of-way taking, long-term noise and air quality effects, and any other project effects.

Right-of-Way Taking

As mentioned above, no relocation of residences, businesses, community facilities or farms would occur because of the project. All property currently identified for acquisition is not yet developed. Depending on findings during final design, the frontage of some properties along Ali‘i Drive and/or Kuakini Highway may also be required. Acquisition of property for right-of-way will be conducted in conformance with the requirements of the County of Hawai‘i.

3.3.3 Economic Environment and Impacts

West Hawai‘i’s visitor industry is the foundation of its economy. It has evolved considerably over time, with the emphasis changing from hotel development to vacation home sales. In the Kailua

to Keauhou region, there has been a strong market for both townhomes and single-family homes, and the frantic pace of construction and growth in related service industries has made for a very strong economy. Unemployment rates are currently very low in West Hawai‘i and average wages high. On the negative side, rental housing and is scarce and costly, and there are very few affordable housing units for sale, contributing to a high cost of living for workers.

Impacts and Mitigation Measures

No adverse economic impacts are expected as a result of the project. Construction of the road will lead to construction jobs and income as well as indirect economic benefits. Although construction labor is currently scarce, the scale of the project is such that little or no long-term in-migration of workers to Kona is expected. Decreased congestion and more effective transportation will make this area better for visitors and residents and will contribute to economic vitality.

3.3.4 Public Services and Facilities

Existing Facilities and Services, Impacts and Mitigation Measures

Utilities

The existing La‘aloa Avenue contains an 8-inch water line that ends at the Ali‘i Heights boundary, an 8-inch sewer line ending on the east (mauka) side of the proposed Parkway right-of-way, and underground electric utilities that end at the Ali‘i Heights boundary. Water line and overhead electric utilities are also present along Kuakini Highway. The proposed extension of La‘aloa Avenue will not include water or sewer lines and will only provide underground power necessary for street lighting.

Relocation of some overhead electric and telephone poles will be required along Ali’i Drive and Kuakini Highway to accommodate the intersection design. Special Contract Requirements will specify that all construction activities will be done in coordination with and according to the requirements of the Hawai‘i County DPW Public Works and the public utility companies. Brief periods of utility interruption may occur during construction. Special Contract Requirements will specify that the Contractor will inform residents and businesses about the outages and will attempt to schedule them so as to minimize utility customer inconvenience.

Police, Fire and Emergency

Police, fire and emergency medical services response time will be substantially reduced by improving Level of Service and providing a new route for emergency vehicles.

Other Facilities and Services

Kahakai Elementary School is located about a mile and a half north on Royal Poinciana Drive. A number of County beach parks are located nearby on Aliʻi Drive. Laʻaloa Beach Park is 500-1,000 feet north, Pahoehoe Beach Park is located another 750 feet north, and Kahaluʻu Beach Park is located about a mile south of the Laʻaloa Avenue intersection. An 11-acre park is currently being developed by the YMCA on Laʻaloa Avenue.

No adverse effects to any of these facilities should result from the project. Improved traffic conditions should benefit both public safety and enjoyment of the parks.

3.3.5 Archaeological and Cultural Resources

An archaeological inventory survey of the area was conducted by Rechtman Consulting LLC. The report is attached as Appendix 4 and summarized below, where, in the interest of readability, most references to literature have been removed. The report included substantial cultural information that provides the basis for a cultural impact assessment.

Cultural-Historical Context

The current project area lies within what has been termed the Kona Field System. This area of dryland agricultural fields extends north from Hoʻokena to at least Kaū ahupuaʻa, and east from the coastline all the way to the forested slopes of Hualālai. A large portion of the field system is designated in the Hawaiʻi State Inventory of Historic Places (SIHP) as Site 50-10-37-6601 and has been determined eligible for inclusion in the National Register of Historic Places. The Kona Field System in the project area includes land in or near two of the bands that parallel the coast and are part of the ethnohistorical segregation of space within the region's *ahupuaʻa: kula* and *kaluʻulu* zones.

The *kula* zone is the area from sea level to roughly 600 feet elevation. Annual rainfall in the *kula* is 25 to 50 inches. This lower elevation zone is traditionally associated with habitation and the cultivation of sweet potatoes (*ʻuala*), paper mulberry (*wauke*), and gourds (*ipu*). Informal agricultural features, such as clearing mounds, planting mounds, planting depressions, modified outcrops, and planting terraces, are common throughout much of this zone, with scattered permanent habitation sites. The more *mauka* portion of this zone was primarily used for agricultural purposes with mainly temporary habitations and an occasional permanent habitation.

The *kaluʻulu* zone includes land from about 600 to 1,600 feet in elevation, and is thus just mauka of the project area. Formal walled agricultural fields consisting of *kuaiwi*, which are low, broad, long multifunctional piles of rocks created by land clearing and rock removal from soil areas, are present. *Kuaiwi* are oriented *mauka*/*makai* with shorter, perpendicular cross-wall segments connecting them. The cross-wall segments function as soil traps and retaining features, creating terrace-like areas to enhance planting. *Kuaiwi* can also function to move water downslope in a

controlled manner, ensuring optimal distribution of the available runoff water. The distribution of soils suitable for agriculture determines, in part, the locations of the formal walled fields, and there is a direct relationship between suitable soils and older lava flows. Consequently, areas of young lava flow may not have *kuaiwi*.

The archaeological record contributes to an understanding of how the Kona Field System developed over time. The Kona Field System represents a developmental adaptation to the leeward side that was concomitant with the evolving sociopolitical structure and increasing population of the island well after the era of original colonization in about 500 A.D.

The Late Expansion Period (A.D. 1100 to 1400) saw the spread of agricultural fields and habitation areas across the slopes and coastal areas of Hualālai. The beginning of the Kona Field System is marked by the development of formal walled agricultural fields sometime during the initial stages of the Intensification Period (A.D. 1400 to 1600), during which population in Kona increased dramatically. The Competition Period (A.D. 1600 to 1800) may have seen the environment reach its maximum carrying capacity, resulting in social stress between neighboring groups. The resulting hostility is reflected archaeologically with the frequent occurrence of refuge caves dating to this period. This volatile period was probably accompanied by internal rebellion and territorial annexation.

Land use during the post-Western Contact period (1778 to the present) underwent rapid and dramatic shifts. The earliest period of modern Hawai‘i, termed the Last of the Ruling Chiefs (A.D. 1778-1819), begins with Captain Cook’s arrival in the islands and ends with King Kamehameha’s death in 1819. Early historical accounts emphasize that modern day Kailua Town was a significant political seat and population center during this period. Settlement and subsistence practices within the Kona Field System continued to operate much as they had prehistorically through the first few decades of the historic era. The Merchants and Missionaries Period (A.D. 1820-1847) was a time of social change in Hawai‘i. This period begins with Kamehameha’s death and his son Liholiho becoming the successor. Six months after he became the successor, Liholiho, Ka‘ahumanu, and the Queen mother Keopuolani broke the *kapu* prohibiting men and women eating together. This act symbolized the end of the traditional *kapu* system. With the end of the *kapu* system changes in the social and economic patterns began to affect the lives of the common people. Liholiho moved his court to O‘ahu, lessening the burden of resource procurement for the chiefly class. Some of the work of the commoners shifted from subsistence agriculture to the production of foods and goods that they could trade to the early Western visitors. Introduced foods specific for trade with Westerners included yams, coffee, melons, Irish potatoes, Indian corn, beans, figs, oranges, guavas, and grapes (Wilkes 1845). Missionaries began arriving to Hawai‘i in the 1820s and brought more social and religious change.

The ever-growing population of Westerners forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership, and the Great *Māhele*

became the vehicle for determining ownership of native lands. During this period, termed the Legacy of the Great *Māhele* (1848-1899), land interests of the King (Kamehameha III), the high-ranking chiefs, and the low-ranking chiefs, the *konohiki,* were defined. The chiefs and *konohiki* were required to present their claims to the Land Commission to receive awards for lands provided to them by Kamehameha III. They were also required to provide commutations to the government in order to receive royal patents on their awards. The lands were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This process expedited the work of the Land Commission.

During the *Māhele* all lands were placed in one of three categories: Crown Lands (for the occupant of the throne), Government Lands, and *Konohiki* Lands. All three types of land were subject to the rights of the native tenants therein. In 1862, the Commission of Boundaries (Boundary Commission) was established in the Kingdom of Hawai‘i to legally set the boundaries of all the *ahupua‘a* that had been awarded as a part of the *Māhele*. Subsequently, in 1874, the Commissioners of Boundaries was authorized to certify the boundaries for lands brought before them. The primary informants for the boundary descriptions were old native residents of the lands, many of which had also been claimants for *kuleana* during the *Māhele*. This information was collected primarily between A.D. 1873 and 1885 and was usually given in Hawaiian and immediately transcribed into English.

Following the *Māhele* was the Territorial Period (1900 to 1959). This period is marked by a decline in population in the Kona area. Residences along the shore comprised of garden plots and animal pens were concentrated in Kailua and Keauhou. Inland residences were associated with agriculture and ranching. During this period many walls were constructed to keep cattle from entering the garden and residential areas.

Legendary and Historical References to Pāhoehoe 1st and 2nd Ahupua‘a

References to the area are somewhat scarce. A legendary reference to Pāhoehoe exists concerning the political relationship with the neighboring *ahupua‘a* Kaumalumalu to the north and is found in *Ka‘ao Ho‘oniua Pu‘uwai no Ka-Miki* (The Heart Stirring Story of Ka-Miki).

“…Kaumalumalu was named for the chief Kaumalumalu, who was the—*ali‘i ‘ai ahupua‘a, me nā paukū ‘āina a me nā ‘okana ‘āina o Pāhoehoe, La‘aloa, a me kāpala‘alaea*—chief who controlled the *ahupua‘a*, the land parcels, and combined subdivision (*‘okana*) of Pāhoehoe, La‘aloa and Kāpala‘alaea…”(*Ka Hōkū o Hawai‘i*, April 9, 1914) (Maly 1996:A-5).

The next mention of Pāhoehoe is in the early 1800s by John Papa I‘i, a Hawaiian historian who lived in Pāhoehoe ca. 1812. When I‘i’s grandfather became ill he recalled:

"Papa's health had become much worse after the king and chiefs had left for Kahaluu. His friends and the boy's father had gathered at Pahoehoe in Kaumalumalu, near Kailua, to be with him. The boy and his companion arrived there at dusk, to find that Papa could no longer speak clearly…" (I'i 1959:115) (Maly 1996-A-5).

On William Ellis' trip around the island of Hawai'i in the early 1800s he wrote that while he was in Pāhoehoe he "entered a large house, in which many workmen were employed in making canoes" (Ellis 1963:75). While this statement does not provide us with information on the inland zone in which the current study takes place, we are offered a glimpse into the coastal portion of the *ahupua'a*.

During the *Māhele* of 1848 the large land tract in North Kona known as Pāhoehoe was split into four different *ahupua'a* (Pāhoehoe 1st through 4th). Pāhoehoe 1st was allocated as Government Land, although it appears to have been under the stewardship of Pā'ele, the *konohiki* (Native Testimony Vol.8: 682)" (PHRI 1999:9). Land commission awards indicate that Gini Lahilahi, daughter of John Young, received the *ahupua'a* of Pāhoehoe (LCA 8520-B; Royal Patent 1668), but there is no distinction whether it is Pāhoehoe 1st, 2nd, 3rd or 4th. Furthermore, according to the Rosendahl and Rosendahl (1986) study, there was some confusion about who actually received the *ahupua'a* of Pāhoehoe 2nd during the *Māhele*. They write:

"Under the Great Māhele, Pahoehoe 2 in North Kona was awarded to two different chiefs, each claiming the land as rightfully his own. The first of the two chiefs laying claim to Pahoehoe 2 was Jane (Gini/Kini) Lahilahi Young Kaeo (L.C.Aw. 8520B-3). She received Pahoehoe 2 as an inheritance from the estate of her father, John Young, the trusted advisor to and companion of Kamehameha I. The second of the chiefs claiming Pahoehoe 2 in North Kona (L.C.Aw. 11216) was Miriam Keahikuni Kekauonohi, the great granddaughter of Kekaulike of Maui" (1986:6).

Whoever the rightful awardee was, the current tax map key lists the Pāhoehoe 2nd Ahupua'a as Royal Patent 1668, LCAw. 8520-B:3. Soon after the *Māhele*, Pāhoehoe 1st Ahupua'a was divided up and sold as grants. A small portion of the current study parcel (Parcel 29) was sold to Haleluhi in 1856 (Grant 2033).

The next mention of Pāhoehoe does not come until the early 1900s when Thrum (1908:44) wrote about a fruitless search for a reported *heiau* in Pāhoehoe. John Reinecke's *A Survey of Hawaiian Sites* (1930) recorded a number of historic house sites and animal enclosures in coastal Pāhoehoe. During Historic times the land encompassed by the current project area, and much of the adjacent lands within the Pāhoehoe *ahupua'a*, was utilized for cattle ranching purposes.

Previous Archaeological Studies in Project Area and Current Surface Conditions

Several surveys of a portion of this and adjacent properties had inventoried mounds, terraces, modified outcrops, walls, platforms, enclosures, and planting areas, with functions for the Precontact sites and features including temporary and permanent habitation, agriculture, trail, storage, and possible *heiau*. Permanent habitation sites and features were located mainly near the shore, with only a few in the upland agricultural areas, which instead contained more temporary habitation features. Historic Period sites included mainly walls that functioned as either animal control features or land division boundaries, and a Historic-era trail (the Judd Trail).

The study area has been previously grubbed and graded in places, and currently contains a small shed and a concrete slab, along with a number of bulldozer cuts associated with ranch roads or perhaps firebreaks. The ground surface over most of the current study area consists of sections of exposed *pāhoehoe* bedrock interspersed with patches of thin soil. The terrain in general slopes fairly steeply to the west (*makai*); however, several large bedrock outcrops within the project area are raised on all sides. A drainage mauka empties into the project area, where it has created a wide, level soil-filled flood basin.
Cattle had been grazing in the project area just prior to the current fieldwork, and as a result the vegetation was minimal.

Archaeological Fieldwork

Based on specific information from archaeological studies that covered areas partially within or near the project area, it appeared probable that Precontact agricultural features representative of the Kona Field System would be present and that habitation areas would be present among these agricultural features. The possibility of encountering burial features and trails also existed, as well as historic ranching-related features as an overlay on the earlier Precontact landscape.

Fieldwork was conducted in December 2003 and January 2004 by a team of archaeologists. The identification and mapping process proceeded by first mapping non-agricultural features with more substantial formal architecture, followed by the more crudely constructed agricultural features. The features were also evaluated at that time for the need of subsurface testing.

All test units excavated during the current project measured 1 x 1 meter. Excavation of the test units proceeded following natural stratigraphic layers with a systematic process of photographing, screening, laboratory analysis, identification, recording, and backfilling.

As a result of the current inventory survey six previously unrecorded archaeological sites and eight previously recorded sites were located and recorded on the subject parcel, as shown in Table 3-5 and Figure 3-3. The sites include seven Historic-era ranching/boundary walls, an alignment of possible Historic origins, a trail segment, four Precontact habitation sites including three

complexes and a terrace remnant, and a grouping of 213 agricultural features that spans the entire project area. Fifteen test units were excavated at six of these sites. Detailed descriptions and maps of all the recorded sites are contained in Appendix 4.

Table 3-5
Archaeological Sites in Project Area

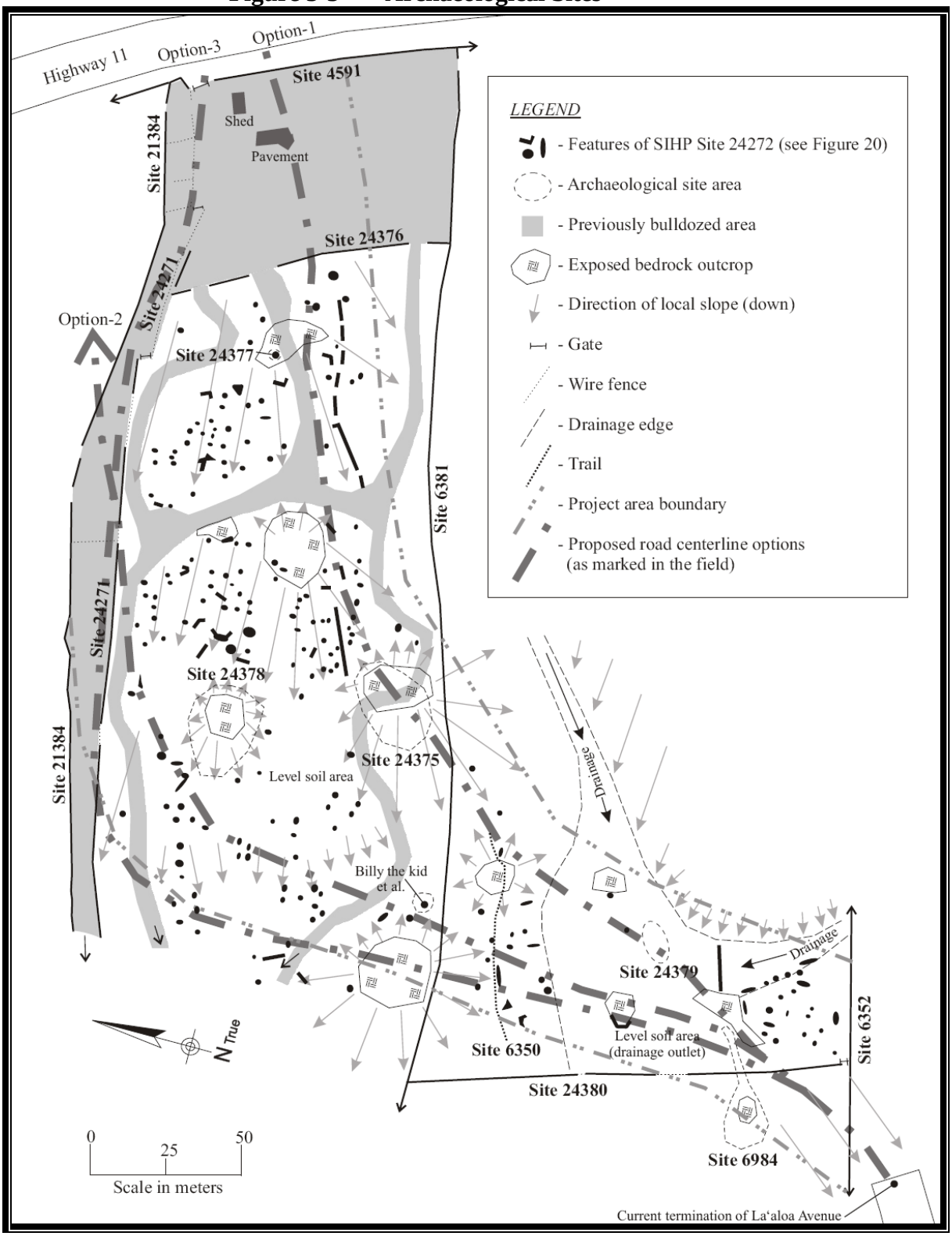
SIHP No.	*Formal Type*	*Function*	*Temporal Association*	*Significance*	*Recommended Treatment*
4591	Wall	Ranching/boundary	Historic	D	No further work
6350	Trail	Trail	Precontact/Historic	D	No further work
6352	Wall	Ranching/boundary	Historic	D	No further work
6381	Wall	Ranching/boundary	Historic	D	No further work
6984	Complex	Habitation	Precontact	D	Data Recovery
21384	Wall	Ranching/boundary	Historic	D	No further work
24271	Wall	Ranching/boundary	Historic	D	No further work
24272	Complex	Agricultural	Precontact	D	No further work
24375	Complex	Habitation	Precontact	D	Data recovery
24376	Wall	Ranching	Historic	D	No further work
24377	Terrace	Habitation	Precontact	D	Data Recovery
24378	Complex	Habitation	Precontact	D	Data recovery
24379	Alignment	Unknown	Historic	D	No further work
24380	Wall	Ranching	Historic	D	No further work

Sites 4591, 6352, 6381, 21384, 24271, 24376, and 24380 are all core-filled ranching/ boundary walls. All of these Historic-era sites were likely originally constructed during the middle to late 19th or early 20th century for cattle control purposes and/or as boundary markers. Haleluhi, who purchased a small portion of the current project area (Parcel 29) as Grant 2033 in 1856, may have constructed some of the boundary walls. All of these ranching related walls, with the exception of Site 24376, have been maintained to the present day for cattle control purposes.

Site 24379 is a rough alignment of stream-worn stones located at the outlet of a drainage that flows intermittently through the center of Pāhoehoe 2nd Ahupua‘a. Based on the presence of tin discovered in situ within the feature during the excavation of a test unit (TU-13), it appears that Site 24379 dates to Historic or Modern times. It is possible that the alignment could have been created naturally during a severe flood episode. But if Site 24379 was constructed, possible functions could include water control or pedestrian access across a sometimes swampy or flooded area (i.e. a walkway). Or it could have functioned as an agricultural terrace used to retain soil on its southern side and to channel water flow into a planting area.

Site 6350 is a stepping-stone trail segment that runs *mauka/makai* through the central portion of the current project area. Segments of this trial were previously recorded *makai* of the current project area and further segments were noted *mauka* of the current project area. Site 6350 was likely constructed during Precontact times as part of interconnected trail system that allowed for pedestrian travel *mauka*/*makai* within Pāhoehoe 2nd Ahupua‘a and among various *ahupua‘a* as well. Site 6350 likely accessed both agricultural and residential sites.

Figure 3-3 - Archaeological Sites



Sites 6984, 24375, 24377, and 24378 are all Precontact habitation sites. All of these complexes are located on exposed bedrock outcrops at the periphery of level soil areas that appear to be the best locations for planting within the project area. The residents of these habitations were most likely responsible for tending the nearby crops. One of the sites (Site 24378) had pineapple growing within a planting depression (Feature D) at the time of the current inventory survey. This suggests that the habitation sites also incorporated household planting areas. Furthermore, pineapples were a historically introduced crop to Hawai‘i, suggesting that perhaps the habitation sites, or at least the surrounding fields (Site 24272) were used into early Historic times. However, no Historic debris was observed at any of the habitation sites.

Site 24272 is a large agricultural complex comprised of 534 distinct features, 213 of which are located within the project area. This site was originally recorded as 321 distinct features located on Parcel 29 *makai* of the current project area (Ketner et al. 2004). The majority of the features found at Site 24272 were likely constructed during Precontact times, but the site may have been utilized continuously into early Historic times (Ellis 1963). Portions of the project area with the greatest amount of exposed bedrock and the least amount of soil (i.e., on slopes where the most run off occurs) seem to contain the highest density of features. The features in these sloped areas are almost exclusively terraced into the hillside and appear to aid in soil retention. They are usually located near small pockets of soil and on bedrock ground surface, suggesting that they were likely created during the process of clearing stones from the soil areas. On level ground where there is ample soil, such as occurs at a few locations throughout the project area, the features are generally concentrated around the outside edge of the soil creating clearings that could have been used for planting. The habitation areas recorded within the current project area and adjacent areas are located on the periphery of these cleared level soil areas.

Archaeological Features: Significance, Treatment Recommendations, and Impacts

The above-described archaeological sites were assessed for their significance based on criteria established and promoted by the DLNR-SHPD and contained in the Hawai‘i Administrative Rules 13§13-284-6. In a letter of July 27, 2005 (see Appendix 4, DLNR-SHPD concurred with this finding. For a resource to be considered significant it must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

A. Be associated with events that have made an important contribution to the broad patterns of our history;
B. Be associated with the lives of persons important in our past;
C. Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
D. Has yielded, or is likely to yield, information important for research on prehistory or history;

E. Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

The significance and recommended treatment for the eleven sites recorded are discussed below and presented in Table 3-5.

Sites 4591, 6350, 6352, 6381, 6984, 21384, 24271, and 24272 have all been determined to be significant under Criterion D based on prior studies. The previously approved treatments for all of these sites were no further work. The additional documentation of these sites during the current project supports the conclusion that no further work is needed at these sites.

Sites 24376, and 24380 are newly recorded core-filled walls. They are considered significant under Criterion D for the information they have provided relative to the Historic use of the study parcel. As very little data collection potential remains at these sites, no further work is the recommended treatment.

Sites 24375, 24377, and 24378 are all newly recorded Precontact habitation sites. These sites are considered significant under Criterion D for information they have provided relative to the Precontact settlement patterns on the current study parcel. As further data collection potential remains at these sites (to augment the information collected during the current inventory survey, establish a chronology of use, and refine functional interpretations), all four are recommended for data recovery.

Site 24379 is a rough alignment of stream worn stones at the outlet of a drainage. Subsurface testing revealed the possible natural origin of this site. This site has been fully documented during the current study and is potentially considered significant under Criterion D. No further work is the recommended treatment.

As all sites that are considered significant are significant for data recovery only, with proper implementation of an adequate data recovery plan there should be no adverse impact to historic sites.

Cultural Properties and Practices Impacts and Mitigation Measures

It is abundantly clear from the archaeological and historical record that the current study area was used during precontact and possibly early historic times for traditional Hawaiian residential and agricultural activities and practices. However, there is no evidence that any specific traditional cultural practices are currently being exercised on the property, which has been used for cattle pasture for many years and is thickly overgrown with alien species. In an effort to identify any former specific traditional cultural properties and associated practices, the pertinent sections of an earlier archival and oral historical study (Maly 1996) were reviewed, and a recognized descendant (J. Curtis Tyler III) with traditional cultural affiliation to the Pāhoehoe *ahupua'a* was consulted.

While the Maly (1996) study did not identify any former traditional cultural practices within the specific project area, his interviews with descendants of the Weeks and Kīpapa-Kekapahaukea families included details of family graves and associated sites in Pāhoehoe and provided an important perspective from a family with long-standing genealogical ties to this area.

Cultural Properties and Practices: Impacts and Mitigation Measures

As part of the current study, J. Curtis Tyler III was consulted, and specifically asked how he felt about the proposed extension of La'aloa Avenue and about any information and/or concerns he might have for cultural resources within the proposed roadway extension corridor. Mr. Tyler expressed his conceptual support for the proposed extension of La'aloa Avenue. The primary concern he raised was for the protection of burial sites and *mauka/makai* trails. To date there have been no burial sites identified within the proposed roadway extension corridor. A single *mauka/makai* trail segment was identified, but it is no longer an intact continuous feature, having been severely impacted by historic and modern land use. The right-of-way of another former *mauka/makai* trail, the construction of which is attributed to Mr. Tyler's ancestor (Kīpapa), while not within the current study area, has already been impacted by construction of the existing La'aloa Avenue. Mr. Tyler expressed a desire that some recognition of the significance of these former transportation features of the landscape be acknowledged.

As part of the data recovery effort referenced above, it is recommended that in recognition of the past traditional Hawaiian land uses within the area (habitation, agricultural, and *mauka/makai* trail usage), interpretive public displays (signage) be established at key locations associated with the proposed roadway. This could occur at a pedestrian sidewalk within the current subdivision area along existing La'aloa Avenue, and/or in pedestrian areas near the intersections with any future roads that may be built off of the La'aloa Avenue extension. The specific language for the interpretive signs acknowledging the archaeological and cultural significance of the region should be developed in consultation with *kūpuna* and cultural practitioners knowledgeable with the general area.

3.3.6 Agricultural Land

Existing Environment, Impacts and Mitigation Measures

Consultation of maps of important farmland provided by the U.S. Natural Resources Conservation Service (USNRCS) determined that lands identified as Other Important Lands in the *Agricultural Lands of Importance to the State of Hawai'i* (ALISH) map series are present. Field inspection determined that no farming is occurring within the corridor, so no farming operations would be adversely impacted by the project.

3.3.7 Pedestrian and Bicycle Transportation Patterns

Existing Conditions

Currently the project area is used heavily for walking and bicycling, particularly along Ali'i Drive, where visitors, residents and those training or participating in races share the road with motor vehicles, separated by striped shoulders. Residents often express the desire to have transportation facilities and routes that are bicycle-friendly. Bicycle safety is a major concern in the area, and several fatalities have occurred on Kuakini and Queen Ka'ahumanu Highways.

The *Bike Plan Hawai'i* (Hawaii Department of Transportation 2003: http://www.state.hi.us/dot/highways/bike/bikeplan/#bikeplan) serves as the guide for implementation of bikeways for the State of Hawai'i. According to this plan, there are several proposed bikeway improvements projects planned for the project area (Table 3-6).

Table 3-6
Proposed Bikeway Upgrades in Project Area

Facility	Status	Details of Planned Upgrade
Kuakini Highway	Planned: signed, shared road	$174,000, Priority 1, 3.5 miles
Ali'i Drive	Planned: signed, shared road	$283,000, Priority 1, 5.7 miles
Kahului-Keauhou Pkwy.	Planned: lane, path	$2,205,000, Priority 4, 3.2 miles
Kamehameha III Road	Planned: signed, shared road	$469,000, Priority 2, 1.4 miles

Impacts and Proposed Mitigation Measures

During the Context Sensitive Solutions (CSS) process (see Section 4.2.3 for major discussion), pedestrian and bicycle facilities and safety became a major concern. The inclusion of curb/gutter/sidewalks in all considered cross-section alternatives and the inclusion of a bike lane in the recommended cross-section alternative (B) is a reflection of this.

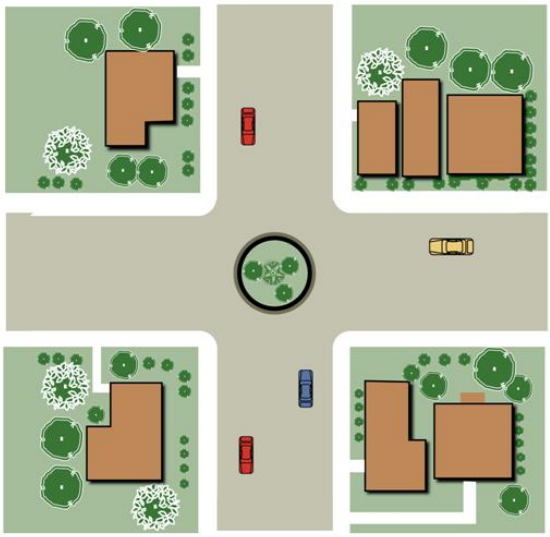
Even with a cross-section designed to maximize utility for pedestrians and bicycles, however, the fact that the steep road will be used as a connector between two major facilities has been a source of community concern. The CSS process therefore included considerable work on traffic calming, including workshops and demonstration projects in the field, which are still ongoing.

A variety of design and structural measures to achieve traffic calming are available (Figure 3-4), including traffic circles, speed humps, speed tables, curb extensions, chokers, center islands, and raised crosswalks. As few examples are present on the Big Island, the public has had very limited exposure to experiencing the advantages and disadvantages of each. In order to ensure that the traffic calming methods chosen for the La‘aloa Avenue Extension project truly fit the needs and desires of residents, the County of Hawai‘i sponsored a temporary demonstration project along the corridor to test various devices. The demonstration project allowed the CSS Advisory Group and public to provide educated opinions regarding the devices.

A collaborative effort with the CSS Advisory Group was performed to design various calming devices along the corridor, and an informational brochure and survey form was sent out and advertised to solicit input on the devices (see Appendix 6 for details). An informational meeting was also scheduled to answer any questions that the public had.
Due to various circumstances, the demonstration project installation was delayed, and only the devices makai of the future Parkway were installed. Generally the comments supported the use of the traffic calming devices, as noticeable slowing of vehicles occurred. Both the sinusoidal speed hump and speed table received about 50% favorable comments, with the other 50% evenly split between dislike of the devices for being to harsh or too gentle to slow traffic. The majority (80%) of respondents disliked the mini-hump due to the jarring and noise associated with the device. Speed measurements taken by the County indicate that the devices were effective in reducing speeds. The County plans to continue to demonstration project by installing the remaining devices and accepting additional comments. After the results are in, final design on the La‘aloa Avenue Extension project will incorporate traffic calming methods in order to mitigate effects on speeding and pedestrian and bicycle safety.

Figure 3-4 Traffic Calming Methods

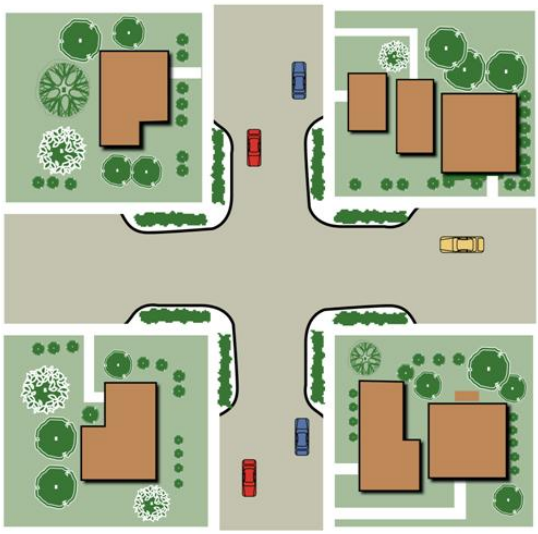
Traffic Circle



• Advantage – slows traffic and reduces the number of conflict points at an intersection

• Disadvantage - slows Emergency Response time, may require additional right-of-way, may affect on-street parking and bicyclists

Curb Extension

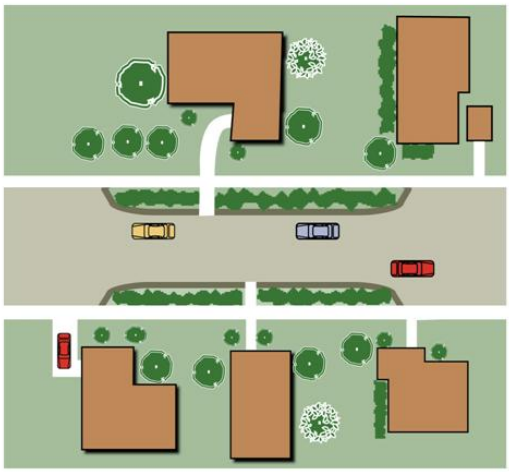


• Advantage – reduces pedestrian crossing distances and improves pedestrian visibility

• Disadvantage - may affect on-street parking and marked bicycle lanes, and may create drainage issues

Figure 3-4 Traffic Calming Methods (continued)

Choker



- Advantage – slows traffic by narrowing lanes

- Disadvantage - may affect on-street parking and may create drainage issues

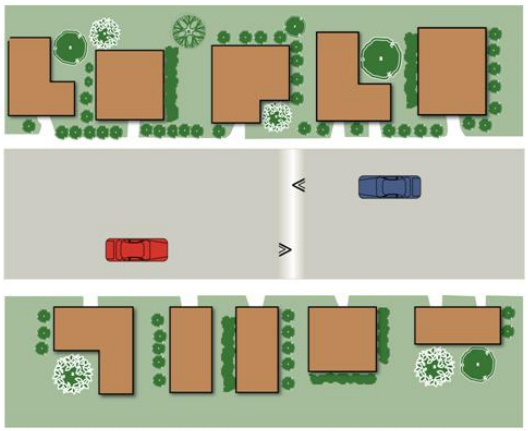
Center Island

- Advantage – slows traffic by narrowing lanes, prevents passing and separates opposing traffic

- Disadvantage - may affect on-street parking and may affect driveway access

Figure 3-4 Traffic Calming Methods (continued)

Speed Hump



• Advantage – slows traffic to ~15-20 mph over the vertical deflection

• Disadvantage - slows Emergency Response time, increases acceleration/deceleration noise adjacent to speed hump

Speed Table

• Advantage – slows traffic to ~25-30 mph over the vertical deflection, preferred over the speed hump by emergency vehicles

• Disadvantage - slows Emergency Response time, increases acceleration/deceleration noise adjacent to speed table

3.3.8 Visual Impacts

The only protected viewplanes in the Hawai‘i County General Plan are those towards the coastline from Kuakini Highway and Kamehameha III Road, which, because of the steep topography in this area, will not be impaired by the project.

3.3.9 Cumulative and Secondary Impacts

Cumulative impacts result when implementation of several projects that individually have minor impacts combine to produce more severe impacts or conflicts among mitigation measures. Other road projects are planned for the area. The planned Lako Street extension project will also provide a lateral thoroughfare between Kuakini Highway and Ali‘i Drive, and also serves the purpose of improving the Level of Service in the immediate area. The cumulative effect on traffic Level of Service in the area of these two projects taken together is beneficial. Presently, much traffic from the project area uses the low-capacity Royal Poinciana route to access Kuakini Highway. All adverse impacts of the current project related to native species/habitat, wetlands, water quality, erosion, historic sites, and other areas of concern are either non-existent or extremely restricted in geographic scale, negligible, and capable of mitigation through proper enforcement of permit conditions. Therefore, such adverse impacts would not tend to be cumulative in relation to this or other projects.

Construction projects sometimes have the potential to induce secondary physical and social impacts that are only indirectly related to project. For example, construction of a new recreation facility can lead to changes in traffic patterns that produce impacts to noise and air quality for a previously unimpacted neighborhood. In this case, the proposed project’s impacts are principally limited to direct impacts at the site itself. Secondary impacts are mainly limited to the potential for growth induction (discussed in Section 3.3.1, above) traffic (discussed in Chapter 2), and pedestrian and bicycle effects (discussed in Section 3.3.7). There does not appear to be any potential for secondary impacts to other resources of concern.

3.4 Construction-Phase Impacts

Construction of the proposed project, including intersection improvements, would last approximately twelve to eighteen months. During this period construction vehicles, power tools and heavy equipment would generate noise, traffic congestion, exhaust emissions and the potential for soil erosion.

As illustrated in the airphoto shown in Figure 3-1, few residences or other construction sensitive uses are currently located immediately adjacent to the proposed construction area. The principal impacted areas are likely to be the existing La‘aloa Avenue, as has been the case during the construction of the Keauhou View Estates and Ali‘i Heights subdivisions, and the intersections with Kuakini Highway and Ali‘i Drive.

Construction permits usually include a number of specific conditions calling for Best Management Practices (BMPs) or other practices that help mitigate the impacts of construction. The precise combination of conditions is determined during the permit application process, but typical mitigation is discussed below. Some further conditions beyond those necessarily imposed by permits are also recommended below.

3.4.1 Sediments, Water Quality and Flooding

Impacts

Uncontrolled excess sediment from soil erosion during and after road construction can impact natural watercourses, water quality and flooding potential. Contaminants associated with heavy equipment and other sources during construction may also impact receiving stream, ocean and ground water.

Proposed Mitigation Measures

If the project is built, provisions would be made during the construction grading and earthwork to minimize the potential for soil erosion and off-site sediment transport. Permits for the project will include a National Pollutant Discharge Elimination System (NPDES) permit and grading and grubbing permits. The permit process will involve preparation of a Storm Water Pollution Prevention Plan (SWPPP), which will include Best Management Practices (BMPs) for soil erosion, sediment control, and pollution prevention. Typical BMPs include the following:

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

3.4.2 Air Quality

Impacts

Short-term direct and indirect impacts on air quality could potentially occur due to project construction, principally through: 1) fugitive dust from vehicle movement and soil excavation; and 2) exhaust emissions from on-site construction equipment.

Fugitive dust emissions may arise from the grading and dirt-moving activities associated with site clearing and preparation work. The State of Hawai`i Air Pollution Control Regulations (Chapter 11-60, HAR) prohibit visible emissions of fugitive dust from construction activities beyond the property line. Thus, an effective dust control plan for the project construction phase will be required.

On-site mobile and stationary construction equipment also would emit air pollutants from engine exhausts. The largest of this equipment is usually diesel-powered. Nitrogen oxide emissions from diesel engines can be relatively high compared to gasoline-powered equipment, but 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 low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

Mitigation

It is recommended that the construction contract include requirements for a dust control plan, which is expected to include measures such as the following:

- Frequent watering program to keep bare-dirt surfaces in construction areas from becoming significant sources of dust;
- Limiting the area to be disturbed at any given time;
- Applying chemical soil stabilizers and mulching;
- Use of wind screens;
- Covering of open-bodied trucks at all times when in motion if transporting materials that could be blown away; and
- Road cleaning or tire washing for haul trucks tracking dirt onto paved streets from unpaved areas.

It is recommended that the construction contract include requirements to use equipment in good working order and to move slow-moving heavy construction equipment onsite and offsite during periods of low traffic volume, to minimize air quality impacts from construction equipment and vehicle exhaust.

3.4.3 Noise

Impacts

Construction would result in noise from grading, blasting, compressors, vehicle and equipment engines, and other sources. Construction activities may exceed 95 decibels (dB) at the project boundary line at times.

Mitigation

The State of Hawai‘i requires contractors engaged in road construction activities to conform with Title 11, Chapter 46, HAR (Community Noise Control). The Hawai‘i State Department of Health’s (HDOH) Noise, Radiation and Indoor Air Quality Branch issues permits for construction activities which may generate noise. The permit is applied for during the construction phase by the contractor. HDOH will review the type of activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures. Possible measures include restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers. The precise combination of mitigation measures, if any, shall be specified by HDOH prior to construction.

3.4.4 Traffic Congestion

Impacts

The proposed action would require construction vehicles needed for grading, hauling fill and construction access the project sites during a period of several months. For short intervals during the construction period, operation of construction equipment, trucks, and worker vehicles may temporarily impede traffic on Ali‘i Drive, Kuakini Highway and La‘aloa Avenue and their intersections. In addition, the widening of Kuakini Highway and Ali‘i Drive to accommodate the intersection will require some traffic delays.

Mitigation

It is recommended that the construction contract include requirements to develop a traffic control plan during the design phase of the project that will outline the steps needed to minimize congestion and maintain access to adjacent properties at all times during construction. Typical requirements would be to keep intersections open during the AM and PM peak hours, to move equipment on- an off-site during non-peak hours, and to utilize professional traffic control personnel.

3.4.5 Public Utilities

Impacts

Poles along Kuakini Highway and perhaps Ali‘i Drive will need to be relocated in order to accommodate the intersections, causing temporary disruption of service. Upgrading existing sections of La‘aloa Avenue to curb, gutter and sidewalks will also entail relocation of and disruption to existing utilities within the right-of-way.

Mitigation

It is recommended that the construction contract include requirements to coordinate all such activities with the public utility companies, to inform residents and businesses about the outages, and to attempt to schedule them so as to minimize utility customer inconvenience.

3.5 Required Permits and Approvals

Several permits and approvals are required to implement this project. They are listed here under their granting agencies.

State Historic Preservation Office

- Finding of No Adverse Effects or No Effects to Significant Historic Sites (obtained July 2005)

State Department of Transportation

- Permit to Work in State Highway Right of Way

State Department of Health:

- National Pollutant Discharge Elimination System Permit (NPDES)
- Community Noise Control Construction Noise Permit
- Underground Injection Control Permit

County Department of Public Works:

- Permits for Grading, Grubbing, and Stockpiling
- Permits for Outdoor Lighting
- Permits for Electrical Work
- Permit to Work in County Right of Way

County Planning Department

- Permit for Subdivision
- Special Management Area Permit

4 COMMENTS AND COORDINATION

4.1 Agencies Contacted

The following agencies received a letter inviting their participation in the preparation of the Environmental Assessment.

State of Hawai‘i

- Hawai‘i State Department of Land and Natural Resources
- State Historic Preservation Division
- HDOT – Hawai‘i District Highways
- Office of Hawaiian Affairs

County of Hawai‘i

- Hawai‘i County Planning Department
- Hawai‘i County Council

Copies of correspondence from agencies with substantive comments during the preparation of the EA are included in Appendix 5.

4.2 Public Involvement

4.2.1 Early Consultation

The following organizations and individuals received a letter inviting their participation in the preparation of the Environmental Assessment:

- Sierra Club
- Kona Outdoor Circle
- Kona Hawaiian Civic Club
- Ali‘i Drive Community Action Team
- YMCA
- La‘aloa Ohana
- Merry Anne Stone
- Marjorie Erway

Copies of correspondence from agencies with substantive comments during the preparation of the EA are included in Appendix 5, Part A.

The County of Hawai‘i shared information and invited public participation in the La‘aloa Avenue extension project through a meeting held on December 21, 2004, at the King Kamehameha Hotel concerning Kona road projects, and held other informal meetings with community members in

response to requests during early consultation. Information relative to this meeting is contained in Appendix 5, Part A.

4.2.2 Draft EA

Based on parties having expertise or jurisdiction, or expressing interest during early consultation, those on the following list were mailed a copy of the Draft EA.

State of Hawai'i

- Department of Land and Natural Resources
- State Historic Preservation Division
- Department of Transportation, Hawai'i District Highways
- Office of Hawaiian Affairs

County of Hawai'i

- Planning Department
- Department of Water Supply
- County Council
- Police Department

Organizations and Individuals

- Kona Outdoor Circle
- Kona Traffic Safety Committee
- Kona Hawaiian Civic Club
- Merry Anne Stone
- Marjorie Erway
- HELCO
- Hawaiian Telcom
- Oceanic Cable

Several copies of the EA were made available at the Kailua-Kona Public Library.

Comments received in response to the EA and responses to them are included in Appendix 5, Part B. Part C of Appendix 5 includes newspaper articles on the project from this period.

4.2.3 Post-Draft EA: Context Sensitive Solutions Process

After completion of the Draft EA, a series of public meetings were held to answer community concerns prior to completion of the environmental documentation and project design. There were several major concerns or elements that had the potential to impact the limits of the project.

There were numerous opposing viewpoints related to specific aspects of the extension and lingering distrust over past arrangements with developers in the area.

The County of Hawai‘i decided to apply a Context Sensitive Solution (CSS) public involvement process to the project to work with project stakeholders in order to move forward to reach an acceptable conceptual design solution. The CSS process involves a collaborative, interdisciplinary approach in which a diverse group of citizens and affected public agencies were part of the design team. Appendix 6 describes the public involvement process and specific steps leading to the final recommendations for the corridor, which are summarized in this section.

Applying the CSS process to the La‘aloa Avenue Extension project allowed the team to methodically identify and address key issues identified for the project. In addition to meeting the capacity and circulation needs of the region, the CSS process allowed concerns of the community to be addressed, including:

- Safety
- Mobility
- Preservation of neighborhood character
- Aesthetic characteristics
- Historic and cultural resources
- Environmental and other community values

The CSS process was completed within 5 meetings over an 8-month period that started in August, 2006.

Project meetings were conducted in the vicinity of the project corridor, during the evening to allow for ease of attendance, which promoted substantial participation by 50-80 people per meeting. The County of Hawai‘i staff worked closely with the Consultant in preparation for and during each of the meetings. Meeting announcements/ advertisements were made in multiple venues to provide notice to the general public and local residents:

- Newspaper ads and press releases were placed in West Hawai‘i Today
- Meeting announcements were posted on the Hawai‘i County Weekly News (electronic newsletter) and on the County’s project update website
- Meeting announcement postcards were mailed to residents in the direct vicinity of the La‘aloa Avenue corridor

Meeting announcements were e-mailed (if applicable) to all previous meeting attendees
The process also involved formation of an Advisory Group, whose purpose was to organize a diverse group of project stakeholders to advise the County on the goals, values, interests, and views relating to the La‘aloa Avenue corridor. A group with diverse interests was desired to

ensure that competing objectives could be discussed and that the goals and values of the wider community, not just the immediate neighborhood, were being accommodated into the transportation improvements. The range of the members' background and interests included: La'aloa Avenue and neighboring community residents, business owners, landowners, bicycle and pedestrian advocates, cultural advocates, and a resident who later became an elected County official. The goal of the CSS process was for members to reach consensus on a variety of variables, such as the importance of criteria for decision-making, the pros and cons of identified alignments, and the preferred alignment. The County of Hawai'i utilized the Advisory Group's input in its entirety in its own decision-making process.

The Advisory Group was then tasked to develop its own list of issues related to the corridor. After the group compiled its comprehensive issue list, each Advisory Group member was provided with "La'aloa Kala" (theoretical cash) to spend on the issues that mattered most to them. The prioritized list of issues is summarized below.

$310 Traffic Calming
$200 Connection to Kuakini Highway
$140 Speeding
$140 Sidewalks
$120 Cultural Sites
$110 Parking/Driveway
$100 Bikeways
$100 Transit Stop (Protected Area)
$90 Drainage/Utilities
$70 Right-of-Way Impact
$70 Neighborhood Character
$70 Noise/Air Pollution
$60 Truck Traffic Impacts
$60 Alternative Connection to Ali`i Drive
$60 Due Process
$50 Steep Grades
$40 Construction Phasing

Traffic calming, or the need to keep vehicle speeds at the posted speed limit, by far topped the list of issues. The next top issue, provision of a connection to Kuakini Highway reinforced that the community as a whole favors the roadway extension project both as a circulation alternative and an emergency access/egress route.

After this initial prioritizing of issues, intensive working sessions were conducted to develop a project definition that helped refine the purpose and need of the project (see Section 1.3):

"The extension of La'aloa Avenue will provide a connector route between Ali'i Drive and Kuakini Highway. The route has been identified to provide better access to/from the

coastal road and the highway for the traveling public, emergency vehicles, and for tsunami evacuation.

La'aloa Avenue travels through several neighborhoods, thus the design of the roadway should complement the needs of the residential neighborhood while serving its circulation function. The residential neighborhood needs include the means for direct property access, accommodating all modes of travel, locating pedestrian and bike facilities such that connections beyond this project are not precluded, and maintaining a high quality of life and historical/neighborhood identity."

A public meeting was conducted in November 2006 after the initial alternative evaluation to inform the public of the La'aloa Avenue project history, CSS process, and progress of the Advisory Group. The meeting was formatted as an Open House with four stations, followed by a formal project presentation and question/answer session. During the Open House and presentation of the project, the public was encouraged to compile their questions on post-it notes for the formal Question and Answer portion of the meeting. All questions were either answered at the meeting, or in the meeting notes.
Questionnaires were also provided to allow the public to provide input on the likes/dislikes of each of the alternative alignments and cross-sections.

An extensive process of alternative development, evaluation, and refinement followed. In the end, the alternatives discussed above in Section 2.5 were advanced by the group for evaluation, with a preferred alternative chosen.

5 LIST OF DOCUMENT PREPARERS

This Environmental Impact Statement was prepared for the County of Hawai‘i by Geometrician Associates. The following companies and individuals were involved:

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6 STATE OF HAWAI‘I ENVIRONMENTAL ASSESSMENT FINDINGS

Section 11-200-12 of the State Administrative Rules sets forth the criteria by which the significance of environmental impacts shall be evaluated. The following discussion paraphrases these criteria individually and evaluates the project's relation to each.

1. *The project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources*. The area is urbanized and has no substantial natural resources. Archaeological sites are present, but the State Historic Preservation Officer has concurred that with development and implementation of a data recovery plan as proposed in the archaeological inventory, no effect to any significant historic or cultural site would occur.

2. *The project will not curtail the range of beneficial uses of the environment*. No future beneficial use will be affected in any way by the proposed project.

3. *The project will not conflict with the State's long-term environmental policies*. The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. A number of specific guidelines support these goals. No aspect of the proposed project conflicts with these guidelines. The project supports a number of guidelines, including those calling for maintenance of an integrated system of state land use planning which coordinates state and county plans, and encouraging transportation systems in harmony with the lifestyle of the people and the environment.

4. *The project will not substantially affect the economic or social welfare of the community or State*. The improvements will benefit the social and economic welfare of Kona. It will improve the transportation system in terms of safety, efficiency, and energy consumption by providing a more efficient and safer roadway for motor vehicles, pedestrians, and bicyclists.

5. *The project does not substantially affect public health in any detrimental way*. No effects to public health are anticipated.

6. *The project will not involve substantial secondary impacts, such as population changes or effects on public facilities*. No adverse secondary effects are expected. The project will not enable development in any way that has not been anticipated in the General Plan.

7. *The project will not involve a substantial degradation of environmental quality*. Permits mandating implementation of best management practices for activities during construction will ensure that the project will not degrade environmental quality in any substantial way.

8. *The project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat*. No endangered species of flora or fauna are known to exist on the project site or would be affected in any way by the project.

9. *The project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions*. All adverse impacts of the related to native species/habitat, wetlands, water quality, erosion, historic sites, and other areas of concern are either non-existent or restricted in geographic scale, negligible, and capable of mitigation through proper enforcement of permit conditions. Therefore, such impacts would not tend to accumulate in relation to this or other projects.

10. *The project will not detrimentally affect air or water quality or ambient noise levels.* The project will have negligible effects in terms of water quality. The Build Alternative is preferable to the No-Build Alternative in terms of air quality, because it will reduce both travel distances and congestion. Noise impacts will not be substantial, except during construction, when they will be mitigated, because the area of the new road does not currently contain sensitive uses.

11. *The project will not affect or will likely be damaged as a result of being located within an environmentally sensitive area such as flood plains, tsunami zones, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters or coastal waters*. No flood zones exist in the project area. Although the project is located in a zone exposed to some earthquake and volcanic hazards, there are no reasonable alternatives.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* The only protected viewplanes in the Hawai‘i County General Plan are those towards the coastline from Kuakini Highway and Kamehameha III Road, neither of which will not be impaired by the project.

13. *The project will not require substantial energy consumption*. Although input of energy is required for road construction, a net benefit is expected because of reductions in travel time and increases in fuel efficiency resulting from improved Level of Service.

For the reasons above, the Hawai‘i County Department of Public Works has determined that the proposed project will not have any significant effect in the context of Chapter 343, Hawai‘i Revised Statues and section 11-200-12 of the State Administrative Rules, and has issued a Finding of No Significant Impact.

REFERENCES

Ellis, W.1963. *Journal of William Ellis, Narrative of a Tour of Hawaii, or Owhyee...* Honolulu: Advertiser Publishing Co.

Hawai‘i County Planning Department. 2005. *Hawai‘i County General Plan*. Hilo.

Hawai‘i County Planning Department. 2002. *Keahole to Honaunau Regional Circulation Plan* (in draft). Prep. by Townscape, Inc., for Hawai‘i County. Hilo. http://www.hawaii-county.com/info/k2h/info.htm.

Hawai‘i County Research and Development Department (R&D). 2006. *Hawai‘i County Data Book*. Hilo: R&D. [http://www.hawaii-county.com/databook].

Hawai‘i State Department of Transportation (DOT). 1994. *Bike Plan Hawaii: A State of Hawai`i Master Plan*. Honolulu: DOT.

Hawai‘i State DOT. 1998. *Hawai‘i Long Range Land Transportation Plan*. Rept. prep. in coop. with Hawai‘i County Depts. of Public Works and Planning by Frederic R. Harris Inc. and William L. Moore Planning.

Heliker, C. 1990. *Volcanic and Seismic Hazards on the Island of Hawai‘i.* Washington: U.S. GPO.

Macdonald, G.A., A.T. Abbott, and F.L. Peterson. 1986. *Volcanoes in the Sea: The Geology of Hawai‘i.* 2nd ed. Honolulu: University of Hawai‘i Press.

Maly, K. 1996. Appendix A: Historical Documentary Research IN *Archaeological Inventory Survey Proposed Sewage Pump Station Site, Land of Pāhoehoe 2nd, North Kona District, Island of Hawai‘i*. Head, J., and P. Rosendahl 1996. Paul H. Rosendahl, Ph.D., Inc., Report 1576-040496. Prepared for Hawai‘i County Department of Public Works, Wastewater Division, Hilo, Hawai‘i.

PHRI. 1999. *Inventory Survey of Ho‘omalu on Ali‘i Subdivision, Lands of Kaumalumalu and Pāhoehoe 1st, North Kona District, Island of Hawai‘i (TMK:3-7-7-04:2; 3-7-7-08;27)*. Paul H. Rosendahl Inc., Report 1881-093099. Prepared for Nohona Partners, Inc., Hilo, Hawaii.

Rosendahl, P., and M. Rosendahl.1986. *Archaeological Reconnaissance Survey Pahoehoe 2nd Project Area, Land of Pahoehoe 2nd, North Kona, Island of Hawaii*. Paul H. Rosendahl Inc. Report 172-121685. Hilo.

Thrum, T. 1908. *Heiaus and Heiau Sites Throughout the Hawaiian Islands*. Hawaiian Almanac and Annual, Honolulu.

Transportation Research Board. 2000. *Highway Capacity Manual, 3rd Ed. (Updated December 1997)*. Special Report 209. Washington: U.S. GPO.

U.S. Bureau of the Census. 2001. American Fact Finder Web Page: http://factfinder.census.gov/.

U.S. Soil Conservation Service. 1973. *Soil Survey of Island of Hawaii, State of Hawaii.* Washington: U.S. GPO.

U.S. Soil Conservation Service. 1981. *Erosion and Sediment Control Guide for Hawaii.* Honolulu:

University of Hawai‘i at Hilo, Dept. of Geography. 1998. *Atlas of Hawai‘i.* 3rd ed. Honolulu: University of Hawai‘i Press.