

MAY 2015

HONOLULU COMPLETE STREETS IMPLEMENTATION STUDY LOCATION REPORT

Kailua Road from Wanaao Road to Kalaheo Avenue (FINAL)



City & County of Honolulu
Department of Transportation Services

Prepared by
SSFM International



With

Blue Zones
Nelson\Nygaard

This page has been left blank intentionally.

Kailua Road from Wanaao Road to Kalaheo Avenue

Ko'olau Poko Planning Area, Kailua Sub-Area, Council District III

NEED FOR PROJECT

Kailua Road serves as a residential and visitor connection from the town's commercial district and high density multi-family residential buildings to the beach. A large number of children use the road to access schools, local residents walk and cycle along it, and approximately 11,000 vehicles per day travel along it. Current conditions constrain walking and bicycling movement into a narrow space with poor drainage and few crossing opportunities.

Applying Complete Streets to this location will: 1) encourage walking and biking, 2) create a gateway entrance to Kailua Road, and 3) calm vehicle traffic.

SUMMARY OF RECOMMENDATIONS

The recommendations for Kailua Road create a safe and pleasant environment for walking and biking. Recommendations include:

- Connect new sidewalks at Mahealani Place to Kailua Road sidewalks
- Install 10' shared-use path along both sides of Kailua Road, separated from traffic with a raised asphalt concrete berm
- Build mini roundabout at Kailua Road and Kainalu Drive
- Create a single-lane roundabout at Kailua Road and Wanaao Road
- Connect sidewalks and paths for a seamless connection from Wanaao Road to Kailua Road
- Connect existing bike lanes on Kainalu Drive to a new path on Kailua Road



COST BREAKDOWN

Total: \$5,937,023.96

Design: \$336,057.96

Construction: \$5,600,966.00

Table of Contents

Part One: Introduction, Study Area, & Need for Project	1
What are Complete Streets?.....	1
Study Area.....	1
Need for Project.....	3
Existing Land Use, Transportation Facilities, and Usage Patterns	4
Land Use, Transportation Facilities and Crashes	4
Part Two: Field Work and Key Findings	7
Stakeholder Input	7
Findings	10
Part Three: Recommended Application of Complete Streets Concepts.....	15
Complete Streets Recommendations	15
Conceptual Illustrations of Recommendations.....	15
Description of Recommendations	15
Part Four: Implementation	27
Part Five: Cost Sheet	31

List of Figures

Figure 1 Study Area.....	2
Figure 2 Existing Land Use, Transportation Facilities, and Accidents in the Study Area	5
Figure 3 Concepts for Kailua Road at Mahealani Place	21
Figure 4 Concepts for Kailua Road near South Kainalu Drive	23
Figure 5 Concepts for Kailua Road at Wanaao Road	25

List of Tables

Table 1 Existing Usage Patterns along Kailua Road	6
Table 2 Proposed Design Changes to Kailua Road.....	19

Part One: Introduction, Study Area, & Need for Project

WHAT ARE COMPLETE STREETS?

Complete Streets is a transportation policy and design approach that aims to create a comprehensive, integrated network of streets that are safe and convenient for all people whether traveling by foot, bicycle, transit, or automobile, and regardless of age or ability. Complete Streets moves away from streets designed with a singular focus on automobiles towards a design approach that is context-sensitive, multi-modal, and integrated with the community's vision and sense of place. The end result is a road network that provides safe travel, promotes public health, and creates stronger communities.

Implementing Complete Streets requires integrating transportation with community planning. Changes are brought about by transforming the built environment. Engineers, planners, architects, landscape architects, and urban design professionals work along with health providers, business leaders, elected officials, community organizations, and residents to promote Complete Streets implementation. Actively engaged community members in Complete Streets are important participants and stakeholders. They help to ensure that efforts are relevant to the community's use, values, and priorities for the neighborhood.

The State of Hawaii adopted Complete Streets in 2009 and required each County to follow suit. In May 2012, the Honolulu City Council adopted a "Complete Streets" policy and passed Ordinance 12-15. The City and County of Honolulu is now taking aggressive steps to implement Complete Streets by updating policies, applying guidelines during maintenance and paving projects, and designing projects in specific locations. The City and County of Honolulu selected fourteen across the island of Oahu for in-depth study to illustrate how Complete Streets can be applied to specific locations. This report describes one of the selected sites and presents recommendations to implement Complete Streets at that location.

STUDY AREA

The subject location of this assessment is Kailua Road from Wanaao Road to Kalaheo Avenue (Figure 1). It is located in the Koolaupoko planning area, Sub-Area of Kailua, in City Council District III. Kailua Road acts as a major link in the bicycle and pedestrian networks. There are no parallel corridors that directly connect the high-density, multi-use residential buildings on the east side of the Kailua town center to the beach (although Awakea Rd and Aumoe Rd are frequently used for cut-through traffic), making the street popular for drivers as well as pedestrians and cyclists. During the morning peak, long queues were observed at the signalized intersection with Wanaao Road. The intersection of Kailua Road and Wanaao Road is also heavily used by children on bicycles traveling to school.

NEED FOR PROJECT

Peoples' willingness to walk and bicycle between destinations depends upon how safe and comfortable people feel using street infrastructure. While the volumes of vehicles on Kailua Road are not especially high (less than 11,000 ADT), the lack of traffic control/calming measures cause speeding. In addition, the skinny shoulder provides no buffer between pedestrians and passing traffic. The east side of the road contains a narrow, meandering asphalt sidewalk, separated from traffic by a narrow landscaped strip in places. Lack of maintenance, such as street sweeping, in combination with a recent resurfacing of just the center vehicle lanes has resulted in broken up asphalt, drainage problems, and unlevel walking surfaces on the west side. Adding protected and attractive walking and bicycling facilities with wayfinding along Kailua Road will encourage the use non-motorized modes and will help Kailua and the County achieve its goals of sustainability and changes in travel behavior.

Kailua Road was selected for Complete Streets treatment because of its potential as a multi-modal gateway for linking neighborhoods and tourists to the popular Kailua Beach. Communities understand that transporting more people by walking or bicycling reduces congestion, reduces the need for costly parking expansion, and improves public health.



Pedestrians must walk along a narrow shoulder.



The intersection of Kailua Road and Wanaao Road presents a gateway opportunity.

EXISTING LAND USE, TRANSPORTATION FACILITIES, AND USAGE PATTERNS

Land Use, Transportation Facilities and Crashes

Figure 2 depicts existing land use, transportation facilities, and traffic crash data within the study area. The half-mile long study area begins at the junction of Wanaao Road, which experiences high turning volumes of cars but also heavy usage by pedestrians, especially children during school commute hours. The intersection has the potential to serve as a welcoming gateway to Kailua Road, with a mature monkey pod tree growing in the triangle formed by Kailua Road and Wanaao Road.

Makai of Wanaao Road, Kailua Road passes through a quiet residential area full of single-family housing. The street is pleasant and green, but walking conditions vary in quality from an asphalt path with a narrow landscaped buffer to a narrow shoulder abutting the vehicle way. Closer to the beach, the zoning includes parcels of business uses mixed into the residential. The walk scores¹ for Kailua range between low 60s to mid 40s, which indicates a mediocre pedestrian environment.

At South Kalaheo Avenue, another triangle intersection, the walking facilities are buffered with raised berms and bollards. Wanaao Road contains the only traffic control along the study area, which results in Kailua Road being prone to speeding drivers.

Existing and proposed bicycle routes bookend Kailua Road along Kalaheo Avenue and Wanaao Road. While Kailua Road is not marked as a bicycle lane, the asphalt path and shoulder provide enough room such that the street is classified as having a bicycle lane in the Oahu Bicycle Plan.

Usage Patterns

Table 1 describes existing usage patterns by pedestrians, bicyclists, vehicles, and transit users in the study area. Kailua Road experiences moderate pedestrian use; during a walking audit conducted in the summer of 2014, light but continuous pedestrian traffic was observed.

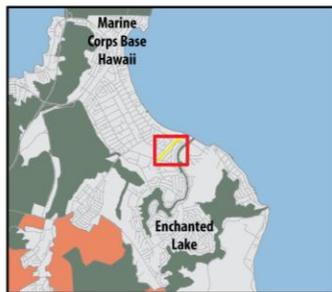
Bicycle count data is not available for the study area, although anecdotally many of the area school children use Kailua Road. During the field audit, a large number of school children on bicycles were observed, especially at Kailua Road and Wanaao Road. According to Kailua Intermediate School staff, about 200 students bike to school, another 180 students walk, and 60 students catch the school bus. A large percentage of Kailua Elementary School students also walk to school, 30% or about 100 students.

A total of 270 daily boardings and alightings occur along Kailua Road on the three transit routes that travel the corridor.

Traffic data shows that Kailua Road carries approximately 11,000 vehicles per day.

¹ Walk scores are an index of walkability based on proximity to amenities and destinations (e.g., grocery stores, schools, parks, restaurants, and retail). Walk scores are developed by “Walk Score” a private company (<https://www.walkscore.com/>)

Figure 2 Existing Land Use, Transportation Facilities, and Accidents in the Study Area



0' 100' 200' 300' 400' NORTH

Source: City and County of Honolulu, Department of Planning & Permitting, Honolulu Land; *www.walkscore.com



Kailua Road, from Wanaao Road to Kalaheo Avenue

Bicycle Facilities

Existing=Solid, Proposed=dashed

- Lane
- Path
- Route

Transit Facilities

- Bus Route
- Bus Stop

Walk Scores

- Walk Score

Traffic Accidents

- 1 crash
- 2 crashes
- 3-9 crashes
- 10+ crashes

- Red = Car/Truck,
- Orange = Motorcycle/Moped,
- Blue = Bicyclist,
- Green = Pedestrian

Traffic Counts

- Average Daily Traffic

Street Trees

- Canopy Diameter

Existing Land Use

- Apartment
- Business
- Institutional
- Park/Open Space
- Residential

Pedestrian Facilities

- No Sidewalk
- Sidewalk
- Crosswalk

Table 1 Existing Usage Patterns along Kailua Road

Pedestrian use	Moderate pedestrian usage A high percentage of students walk to school: ~60 (out of 600) Kailua Intermediate School students, ~108 (out of 360) Kailua Elementary School students.
Bicycle Use	High bicycle usage by school children before and after school hour. More than 200 school children bike to surrounding schools.
Transit Use -Average daily boardings + alightings (Source: <i>Global Stop Summary by Trip, TheBus, 2012</i>)	<u>Stops</u> Kailua Rd + Aumoe Rd (Westbound) – 8 Average Daily Ridership Kailua Rd + Kainalu Dr (Eastbound) – 1 ADR Kailua Rd + Kainalu Dr (Westbound) - 2 ADR Kailua Rd + Aumoe Rd (Eastbound) – 5 ADR Other stops on Kailua Rd within ¼ mile of the project location (three bus stops): 133 ADR Other stops on Wanaao Rd ¼ mile of the project location (eight bus stops): 125 ADR <u>Boardings and Alightings for Stops with ¼ mile of the project location by Route</u> Route 57 - 220 ADR Route 70 - 27 ADR Route 85 - 27 ADR
Daily Vehicular Volumes (Source: <i>Historical Traffic Station Maps, HDOT, 2013-2009</i>)	Awakea Road: Wanaao Road to Auwinala Road - 2,684 Wanaao Road: Paopua Loop to Palawiki Street - 8,103 Kailua Road: Hahani Street to Aoloa Street - 11,836 Kailua Road: Wanaao Road to Kainalu Drive - 10,952 S. Kalaheo Avenue: Kailua Road to Makalii Place - 14,342 Kainalu Drive: Kuuhale Street to Kuukama Street - 5,435
Use by Trucks or Large Vehicles	Not known
Peak Periods (Source: <i>Historical Traffic Station Maps, HDOT, 2013</i>)	Awakea Road: Wanaao Road to Auwinala Road - 07:30 AM to 08:30 AM, 04:30 PM to 05:30 PM Wanaao Road: Paopua Loop to Palawiki Street - 07:30 AM to 08:30 AM, 04:15 PM to 05:15 PM Kailua Road: Hahani Street to Aoloa Street - 11:00 AM to 12:00 PM, 03:00 PM to 04:00 PM S. Kalaheo Avenue: Kailua Road to Makalii Place - 11:00 AM to 12:00 PM, 04:00 PM to 05:00 PM
Accident History (Sources: <i>Motor Vehicle Accident Reports, Honolulu Police Department, 2011-2014</i>)	Accident data from 2007 to 2011 reveals 25 total crashes. Nearly half involved only cars and trucks. No pedestrians were injured. Five crashes involved bicyclists.

Part Two: Field Work and Key Findings



The walking audit brought together 12 stakeholders on Sept. 17, 2014 from the City of Honolulu, the Department of Transportation Services, and neighborhood leaders.

STAKEHOLDER INPUT

Community stakeholders participated in a walking audit along Kailua Road on Wednesday, Sept. 17, 2014. SSFM International, Inc., and a team of national consultants, including Dan Burden, national walkability expert, led a walking audit with members of the community and DTS. The following stakeholder groups participated in the walking audit:

- City and County of Honolulu Department of Transportation Services (DTS), including Mark Garrity, Li Jaena, Yamato Milner, Randall Kurashige, Craig Chung, Jay Egusa, Paul Texeira, and Diane Overland;
- Representatives from state agencies, including Heidi Smith from the Department of Health;
- Neighborhood leaders including Daniel Alexander from the Hawaii Bicycling League;
- Community members from the Kailua Urban Design Task Force (Barrie Morgan and Sarah Shanahan);
- Representatives from political offices, including Jennifer Bara from the Office of Senator Thielen;
- Consultant Team: Mike Packard, Alan Fujimori, Juanita Wolfgramm, and Mike Motoki from SSFM, Dan Burden and Samantha Thomas from Blue Zones, Stephanie Wright from Nelson\Nygaard.

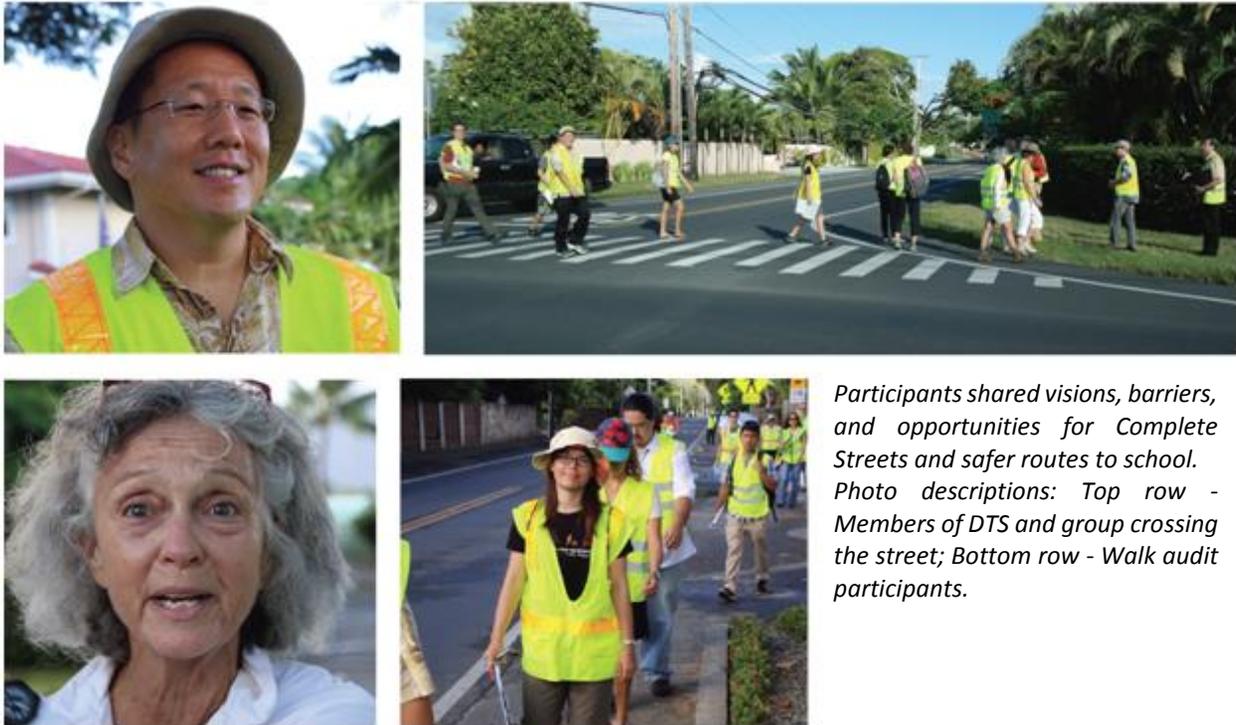
Together, the group identified conditions that affect active living, social connectivity, access to daily needs, and safe routes to school, work and play. The audit began at 7:30 am so the team could experience the study area during the morning peak.

The key issues identified by participants included:

- Heavy bicycle volumes.
- Awkward connection from Wanaao Road path to Kailua Road (most cyclists observed, used the crosswalk connecting Wanaao Road to the triangle island, then rode along the edge of the island to the west side of Kailua Road.
- Sharp curb for west bound traffic on Wanaao Road turning onto Kailua Road, which impedes visibility.
- Curve of Kailua Road at the intersection with Wanaao Road plus a hedge makes visibility difficult. Since people travel in both directions on both sides of Kailua Road, pedestrians cited nearly being hit by makai-bound cyclists.
- Speeding, especially at the intersection with South Kainalu Drive.
- Drainage problems close to the business area.

The key opportunities included:

- Potential for a single-lane roundabout at Wanaao Road to smooth operations for vehicles and cyclists/pedestrians.
- In the short term, direct cyclists to streets like Kainalu Drive, which has bike facilities.
- Take advantage of the easement on the west side of the street to create a more robust walking/cycling facility.



Participants shared visions, barriers, and opportunities for Complete Streets and safer routes to school. Photo descriptions: Top row - Members of DTS and group crossing the street; Bottom row - Walk audit participants.



Photo descriptions (from top left to bottom right): Numerous children were observed biking along Wanaao and Kailua Roads; A pedestrian uses the existing asphalt sidewalk; The existing path is not swept by street sweepers, yet receives a lot of tree litter from ironwood trees; Crossings are few and far between; The current path is narrow; Pedestrians use the existing shoulder.

FINDINGS

This section summarizes key findings based on observations made by the consultant team with input from Department of Transportation Services staff, and community stakeholders.

Finding: The intersection of Kailua Road and Wanaao Road is heavily used by all modes of traffic.

A constant stream of cyclists was observed during the morning peak at Wanaao Road, the bulk of whom were children. A narrow path exists along Wanaao Road, then a signalized crosswalk brings people across Wanaao Road onto the triangle island formed by Kailua and Wanaao Roads. Traffic coming toward the island is channeled into a right turn lane to head west or a left turn lane eastbound.



Cyclists use signalized crosswalk at Wanaao Road.



Children on bikes observed riding against traffic, around triangle due to out-of-way connection.

Finding: The intersection of Kailua Road and Wanaao Road suffers from peak congestion.

Very high turning volumes were observed at Wanaao Road during the peak hour. The most common movement was the left turn from Kailua Road to Wanaao Road.



Traffic queued at the signal on Wanaao Road.



Traffic waiting at the signal at Kailua Road.

Finding: The curve along Kailua Road limits visibility.

The curve along Kailua Road at Wanaao Road reduces visibility between drivers and pedestrians, and also between pedestrians and cyclists. For example, those walking on the west side of Kailua Road cited safety concerns from not being able to see oncoming cyclists (cyclists use both sides of Kailua Road in a bi-directional pattern). The curb of the road, plus overgrown hedges, reduces visibility.



For those traveling on Wanaao Road making a right turn onto Kailua Road makai-bound, a sharp curb limits visibility for drivers and the shoulder is very narrow—just a couple feet wide.



Participants in the walk audit stated that the road's curve limits visibility. Bollards exist along the edge of the travel lane to provide protection for pedestrians and cyclists using the shoulder.

Finding: The west side of Kailua Road suffers from potholes, poor drainage, and leaf debris.

The west side of Kailua Road generally appeared more heavily used than the east side, largely due to the direct connection to the schools and beach entrances further makai. In some areas, the asphalt shoulder is at least 5' wide (meeting ADA standards) while in other areas the shoulder suffers from drainage problems and potholes. The vehicle travel way was resurfaced at some point, yet the shoulder was not, resulting in a visible edge between the car lanes and the pedestrian and bicycle way – which exacerbates the drainage problems.



Puddling along the shoulder of Kailua Road due to poor inlet drainage.



The edge between the repaved car surface and the shoulder provides an additional hazard for cyclists.

Finding: The west side of Kailua Road has an asphalt shoulder, but it is too narrow for the demand.

Pedestrians walking along the west side of Kailua Road have no buffer between vehicle traffic. To encourage more walk and bike trips to the beach, and reduce congestion, more generous facilities are needed. The walk audit occurred on a weekday in September, not during peak season, yet a high number of people were walking along Kailua Road throughout the morning.



Pedestrians along the west side of Kailua Road.

Finding: The public right-of-way is wider than the existing traveled way and path on Kailua Road.

The current traveled way measures 20'. The east side path is about another 8-10', and the asphalt shoulder varies from around 4-6' throughout. The true right-of-way from parcel to parcel measures 40', which extends into grass fronting homes on the west side. This provides an opportunity to develop more generous non-motorized facilities on the west side. However, property owners may not be aware of this, because in many cases, parts of the public right-of-way are being used (or landscaped) for private purposes.

Finding: The path along the east side is attractive but narrow.

Along the east side of Kailua Road, a narrow but well maintained path is used by pedestrians and cyclists. In many areas, a narrow landscaped buffer is also present. This is a great resource for the community, but the narrowness of the path does not make it well-suited for the heavy pedestrian and bicycle travel to Kailua Beach. Some areas of the path narrow to less than 4'.



Pedestrian must step aside to allow cyclist to pass.

Finding: Wide curb radii and high speeds at South Kainalu Drive.

The only traffic control along Kailua Road in the study area is at Wanaao Road, which incites speeding. At South Kainalu Drive, high-visibility crosswalks have been installed, but no stop lines along the uncontrolled approach exist and the intersection has very wide curb radii, fostering faster turns.



This crosswalk measures twice the length (44') of the street width (20').



There are no advanced stop lines at uncontrolled crosswalks.

Finding: Unprotected crosswalk at Aumoe Road/Mahealani Place does not encourage drivers to stop for pedestrians.

The crossing at Aumoe Road/Mahealani Place gives residents of the adjoining neighborhoods access to Kailua Road and the retail pod closer to South Kalaheo Avenue. A pedestrian warning sign is present, but there are no advanced stop lines or direction for drivers to stop. Hawaii law requires drivers to stop for pedestrians in crosswalks.



Existing crosswalk at Aumoe Road/Mahealani Place

Finding: Wayfinding can be used to channel inexperienced cyclists to routes with more generous facilities.

Kailua Road presents challenges to inexperienced cyclists. The east side path is narrow and also looks like a sidewalk, leading a novice rider to believe she should ride in the road (which has 10' wide narrow travel lanes). The west side shoulder is wider so that it should be used by both pedestrians and cyclists, but there is no signage saying "bicycle lane" or "bicycle route."

In the short term, one participant recommended that cyclists be routed along the paved path through the district park to the west and onto Kainalu Drive (which has bike lanes), up one of the residential streets, then onto South Kalaheo Avenue (which also has bike lanes), which is just one block from the beach. Since many cyclists will be coming from Kailua town center, signage directing people to this alternate route would catch many before they get to Kailua Road.

Part Three: Recommended Application of Complete Streets Concepts

This section describes the recommended application of Complete Streets concepts for Kailua Road. It includes a written description of recommendations accompanied by illustrative drawings. The Complete Streets principles incorporated are:

- Encourage multiple modes of transportation, particularly walking and biking,
- Promote safety for all modes of transportation,
- Promote safer street crossings, and
- Strengthen the sense of arrival.

COMPLETE STREETS RECOMMENDATIONS

Conceptual Illustrations of Recommendations

Figures 3, 4, and 5 graphically show how Complete Streets principles can be applied to transform Kailua Road within the study area. The conceptual drawings depict the recommended improvements along three segments of the road:

- Kailua Road at Mahealani Place (Figure 3)
- Kailua Road near South Kainalu Drive (Figure 4)
- Kailua Road at Wanaao Road (Figure 5)

Description of Recommendations

The recommendations in Figures 3-5 are summarized below.

A) Relocate Utility Poles

- Several utility poles along the east side of Kailua Road obstruct the pathway and create choke points. Moving the utility poles to the back of sidewalk or relocating them underground would free-up additional space for off-street facilities.

B) Enhance existing crosswalks and add crosswalks to all legs at the Aumoe Road and South Kainalu Drive intersections

- Stripe crosswalks on all legs of the intersection.
- Install advanced stop lines to signal to drivers that they must stop for pedestrians.

C) Add a continuous 8' shared-use path on both sides of Kailua Road

- A path, rather than a shoulder, signifies to people that Kailua Road is a walking and bicycling route, not just a vehicle way. The town can expand the existing paved area of Kailua Road by using the street widening easement adjacent to Kailua Road. This treatment will also alleviate drainage issues.
- Install raised asphalt berm (or similar) between travel lane and path for added protection.
- To reduce pedestrian and cyclist conflicts, the path should be marked for directional travel.



The Indianapolis Cultural Trail, for example, uses pavers and contrasting colors to demarcate the direction of travel.



Pedestrian and bicycle lane markings

D) Install a mini-roundabout at South Kainalu Drive

- Mini-circles or mini-roundabouts are used as traffic calming device in many communities. Since there is no traffic control/calming device over the half-mile of Kailua Road, having a roundabout at South Kainalu Drive will help slow both through and turning traffic.



Neighborhood roundabout in Cambridge, MA.

E) Connect Kailua Road’s new shared-use path to existing bicycle facilities along Kailua Road, Wanaao Road, South Kainalu Drive, Kalaheo Avenue, and Kailua Beach Park path.

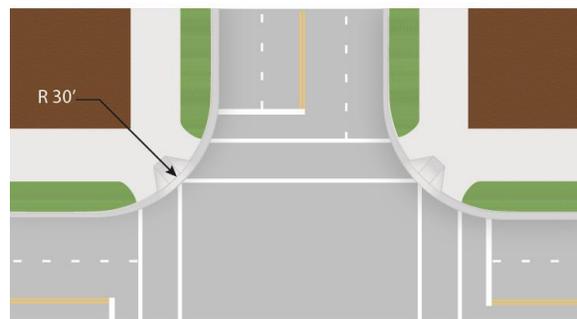
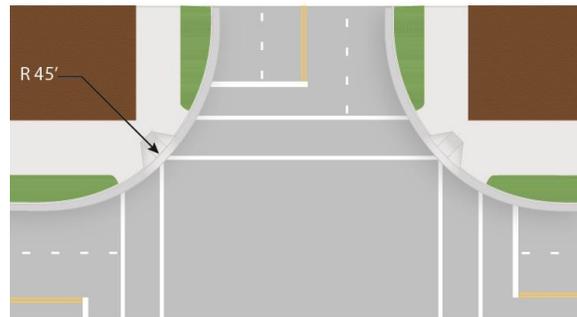
- Kailua has a high quality bicycle network, with a designated route along South Kalaheo Avenue, lanes along Kailua Road, lanes along Kainalu Drive, and an existing path and proposed route along Wanaao Road. Yet connecting between links is not easy for cyclists, especially novice cyclists, to understand. For example, at Kailua Road and Wanaao Road, there is no direction telling cyclists on Wanaao Road that a lane exists on Kailua Road. Sidewalks with more direct links between infrastructure increases legibility and will ultimately increase usage.

F) Install a single-lane roundabout at Wanaao Road with splitter islands and improved crossing facilities.

- Roundabouts work well at irregular intersections with 3 or 5 legs, and at locations with high turning movements. At Kailua Road and Wanaao Road, high turning movements make this junction a great candidate for a roundabout. The mature monkey pod tree would be preserved in the center. Splitter islands with crosswalks at all legs plus connections to the existing path on Wanaao Road will facilitate bicycle and pedestrian movements.
- Tightening the intersection into a roundabout means vehicle traffic can operate freely around the circle rather than waiting at the signal. It also allows for added green space and buffers (see sheet #3 of the concept drawings).

G) Add curb extensions at the intersection of Kailua Road and Aumoe Road

- Curb extensions create smaller corner radii, which results in shorter pedestrian crossing distances and slower vehicular turning speeds. It also allows for better curb ramp placement.



Tighter Corner Radii Reduce Crossing Distance and Slow Turning Traffic

H) Implement a wayfinding system to direct visitors from the town center to the beach.

- A person's walk or bicycle trip is as easy as its hardest step. Information and wayfinding are methods that can be used to alleviate stressful points in the network, such as the transition from a path to a bike lane.



Example of wayfinding showing distance and time (average).



Wayfinding maps help direct both pedestrians and cyclists.



In-pavement wayfinding markers direct cyclists and pedestrians through transitional areas and delineate proper paths of travel.



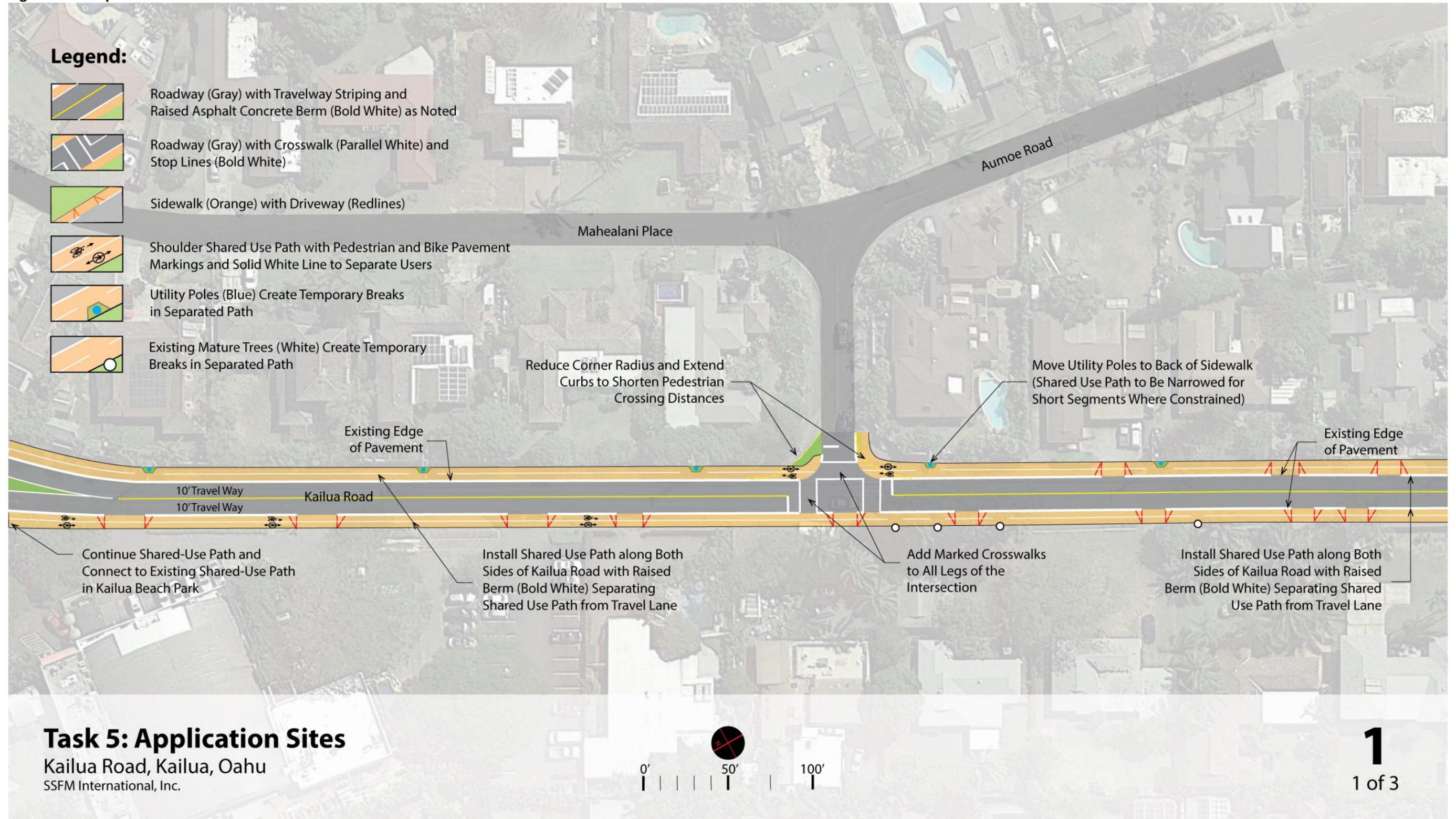
Example of signage directing pedestrians to keep right in the direction of travel and cyclists to ride around pedestrians.

Table 2 Proposed Design Changes to Kailua Road

	CURRENT	AFTER RECOMMENDATIONS ARE IMPLEMENTED
Type of Facility	Major Collector (There are large trip generators along this road).	Same
Street Width	Kailua Rd - 20'	Same
Speed Limit	25 mph	25 mph
Crosswalk Length (longest)	Kailua Rd and South Kainalu Dr: 50'	Wanaao Rd and Kailua Rd (east leg): 30'
Number of Lanes	Kailua Rd – 2 lanes	Same
Distance to side Streets	Block spacing along Kailua Rd ~700-900', block spacing along Wanaao Rd ~300'	Same
Driveways	Curb cuts for lots fronting Kailua Rd (~35 lots)	Same
Parking	None	Parking prohibited on shared-use path
Sidewalks	Paved shoulder on one side of Kailua Rd and a pedestrian path on the other side	Replace paved shoulder and pedestrian path with 2-8' shared-use paths with curb
Transit Routes, Stops, Shelters	Four stops on Kailua Rd: Stop 3627 Kailua Rd + Aumoe Rd (Westbound) Stop 3628 Kailua Rd + Kainalu Dr (Eastbound) Stop 3666 Kailua Rd + Kainalu Dr (Westbound) Stop 3667 Kailua Rd + Aumoe Rd (Eastbound) Other stops on Wanaao Rd and Kalaheo Ave	Same
Proximity to Future Rail	No direct access to the future rail	Same
Bicycle features	Existing bike lane on the west shoulder of Kailua Road; Bike route on Kalaheo Avenue and Wanaao Rd	Supplement shoulder bike lane with 2-8' shared-use paths on either side
Nearby Schools	Kailua Intermediate School and Kailua Elementary School	Same
Nearby Institutions	Kailua Town Center (1/4 mile), Kaelepulu Mini Park and Kailua Beach Park (1/4 mile)	No change

THIS PAGE INTENTIONALLY LEFT BLANK

Figure 3 Concepts for Kailua Road at Mahealani Place



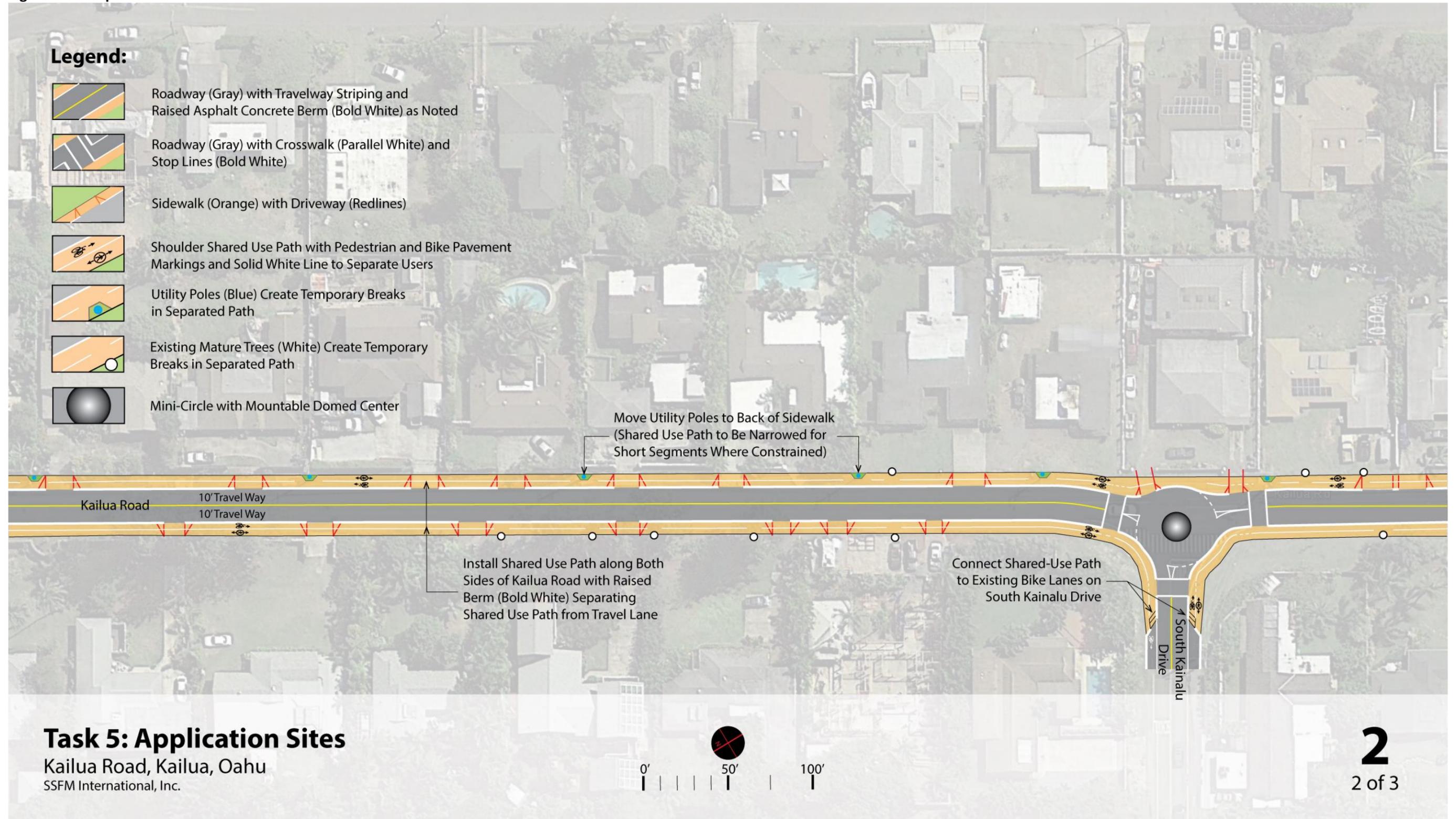
Task 5: Application Sites

Kailua Road, Kailua, Oahu
 SSFM International, Inc.



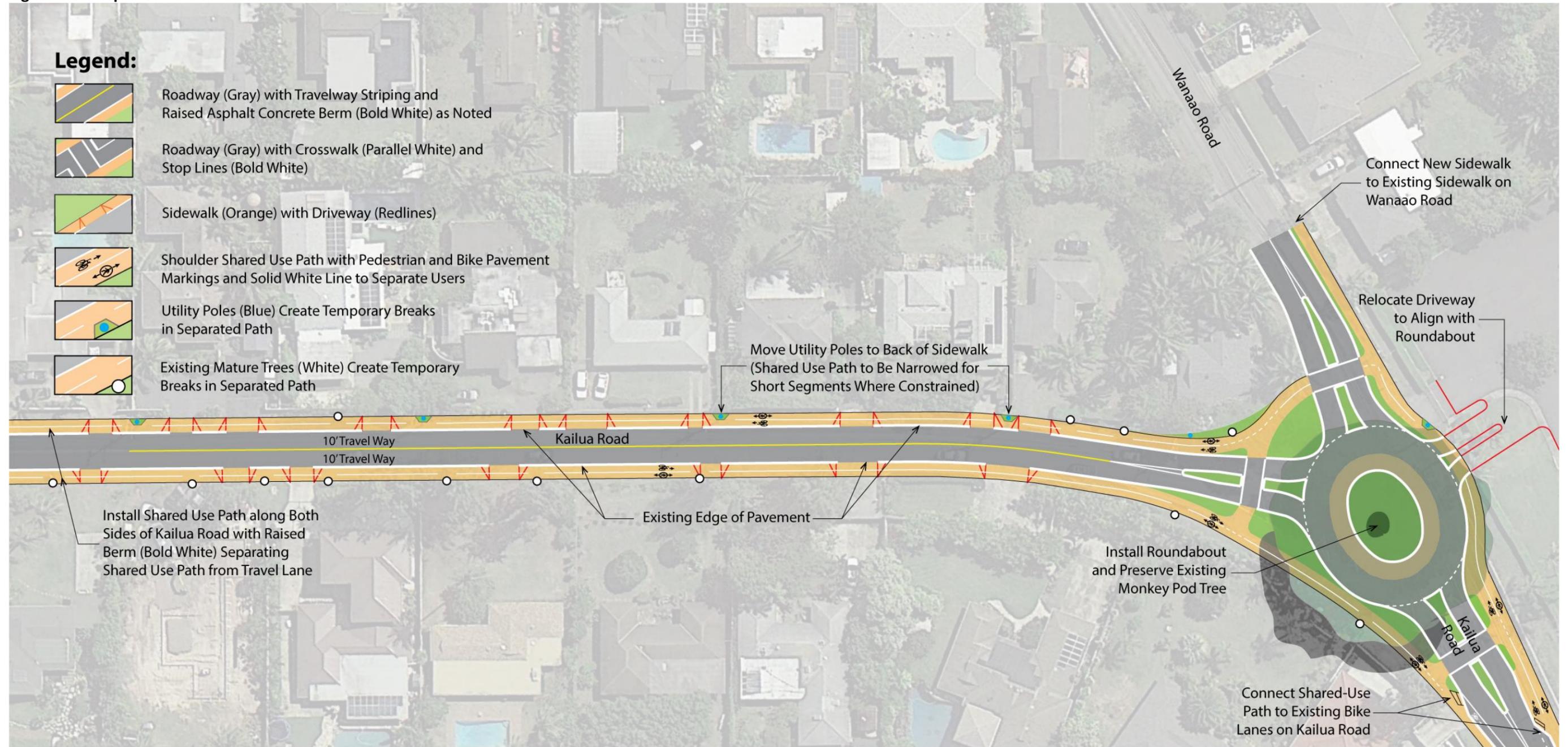
THIS PAGE INTENTIONALLY LEFT BLANK

Figure 4 Concepts for Kailua Road near South Kainalu Drive



THIS PAGE INTENTIONALLY LEFT BLANK

Figure 5 Concepts for Kailua Road at Wanaao Road



Task 5: Application Sites

Kailua Road, Kailua, Oahu

SSFM International, Inc.



3

3 of 3

THIS PAGE INTENTIONALLY LEFT BLANK

Part Four: Implementation

This section presents a timeline for actions that support implementation of the Complete Streets recommendations. Recommendations are numbered according to how they were presented in the preceding section, with actions bulleted beneath. Near-term actions are those that may be implemented immediately through incorporation into existing City paving, marking, or signage projects or maintenance funding. Mid-term actions are those that may require or warrant a longer planning horizon (1 to 5 years) due to logistical, financial, or other considerations. Longer-term actions are those that may require or warrant an even longer planning horizon (5 years and beyond).

Near-Term Actions (0-1 year):

A) Relocate Utility Poles.

- Conduct land survey of existing utilities. Work with utilities to plan relocation.

B) Enhance existing crosswalks and add crosswalks to all legs at the Aumoe Road and South Kainalu Drive intersections.

- Mark crosswalks and advanced stop bars at all legs of the Aumoe Road and South Kainalu Drive intersections.

C) Add a continuous 8' shared-use path along both sides of Kailua Road.

- Pave 8' shoulder (omitted in recent re-paving project) on the west side of the roadway and mark for shared use path.
- Install raised berm along edge of travel-lane to add protection for pedestrians and cyclists.

D) Install a mini-roundabout at South Kainalu Drive.

- Design roundabout.

E) Connect Kailua Road's new shared-use path to existing bicycle facilities along Wanaao Road, South Kainalu Drive, and Kalaheo Avenue.

- None.

F) Install a single-lane roundabout at Wanaao Road with splitter islands and improved crossing facilities.

- Design roundabout.

H) Add curb extensions at the intersection of Kailua Road and Aumoe Road.

- Stripe curb extensions.

G) Implement wayfinding system to direct visitors from the town center to the beach.

- Determine typical walking/bicycling routes around Kailua, from major retail centers and neighborhoods to popular attractions like the beach.
- Obtain funding for new signage.
- Map out the best and safest routes for novice cyclists and vulnerable pedestrians.
- Install signage.

Mid-Term Actions (1 to 5 years):

A) Relocate Utility Poles.

- Move utility poles to back of sidewalk.

B) Enhance existing crosswalks and add crosswalks to all legs at the Aumoe Road and South Kainalu Drive intersections.

- None.

C) Add a continuous 8' shared-use path along both sides of Kailua Road.

- Pave 8' shared-use path on east side of the roadway.
- Install raised berm along edge of travel-lane to add protection for pedestrians and cyclists.
- Install proper signage and pavement markings to indicate separated paths and where the path must be shared due to constrained path width. Pavement markings should be located at street crossings and high-use driveways.

D) Install a mini-roundabout at South Kainalu Drive.

- Install mini-roundabout using striping and asphalt concrete (A/C) berms (or similar) to delineate splitter islands and to protect center island planter.

E) Connect Kailua Road's new shared-use path to existing bicycle facilities along Wanaao Road, South Kainalu Drive, and Kalaheo Avenue.

- Install striping, signage, and pavement markings that indicate the beginning and end of on-street bike facilities.

F) Install a single-lane roundabout at Wanaao Road with splitter islands and improved crossing facilities.

- Install single lane roundabout using striping and (A/C) berms (or similar) to delineate splitter islands and to protect center island.

H) Add curb extensions at the intersection of Kailua Road and Aumoe Road

- Build curb extensions using A/C berms (or similar).

G) Implement wayfinding system to direct visitors from the town center to the beach.

- Revise bike facility signage and wayfinding signage to include new shared-use path.

Longer-Term Actions (5 years and Beyond):

A) *Relocate Utility Poles.*

- Move utility poles underground.
- Retain utility poles with street lighting.
- Install pedestrian-scale pathway lighting.

B) *Enhance existing crosswalks and add crosswalks to all legs at the Aumoe Road and South Kainalu Drive intersections.*

- Add safety enhancements if needed.

C) *Add a continuous 8' shared-use path along both sides of Kailua Road.*

- Construct concrete 8' shared-use paths.

D) *Install a mini-roundabout at South Kainalu Drive.*

- Construct mini-roundabout with mountable splitter islands and domed center island

E) *Connect Kailua Road's new shared-use path to existing bicycle facilities along Wanaao Road, South Kainalu Drive, and Kalaheo Avenue.*

- None.

F) *Install a single-lane roundabout at Wanaao Road with splitter islands and improved crossing facilities.*

- Construct single-lane roundabout.
- Reconstruct off-street shared-use path around new roundabout.
- Provide space for landscaping.

H) *Add curb extensions at the intersection of Kailua Road and Aumoe Road.*

- Build concrete curb extensions with two curb ramps per corner.
- Connect curb extensions with new shared-use path.

G) *Implement wayfinding system to direct visitors from the town center to the beach.*

- None

THIS PAGE INTENTIONALLY LEFT BLANK

Part Five: Cost Sheet

<i>ITEM</i>	<i>UNIT</i>	<i>QUANTITY</i>	<i>UNIT COST</i>	<i>TOTAL COST</i>
Removals/Demo				
Remove existing traffic signal	each	1	\$ 100,000.00	\$ 100,000.00
Erosion Control	L.S.	1	\$ 10,000.00	\$ 10,000.00
Site improvements				
Roadway				
Mill and Overlay existing AC pavement	Sq. Ft.	49750	\$ 6.00	\$ 298,500.00
8' Shared Use Path	Lin. Ft.	5960	\$ 96.00	\$ 572,160.00
Raised Asphalt Concrete Berm	Lin. Ft.	4370	\$ 15.00	\$ 65,550.00
Drainage works	each	8	\$ 14,000.00	\$ 112,000.00
4" Stripe (white/Yellow)	Lin. Ft.	2260	\$ 6.00	\$ 13,560.00
12"stripe (white)	Lin. Ft.	280	\$ 9.00	\$ 2,520.00
Striping Symbols	each	38	\$ 300.00	\$ 11,400.00
Intersection				
Full Single Lane Roundabout	each	1	\$ 1,300,000.00	\$ 1,300,000.00
includes sidewalk, roadway, striping and lighting				
Mini-Circle with Mountable Domed Center	each	1	\$ 15,000.00	\$ 15,000.00
Move and Re-set Utility Pole	each	15	\$ 100,000.00	\$ 1,500,000.00
Misc.				
Traffic Control	L.S.	1	5%	\$ 200,034.50
Mobilization	L.S.	1	10%	\$ 400,069.00
Contingency - 25%			25%	\$ 1,000,172.50
Design				
Design Cost			6%	\$ 336,057.96
TOTAL CONSTRUCTION				\$ 5,600,966.00
TOTAL COST				\$ 5,937,023.96