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BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



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IN REPLY REFER TO:

HWY-DD 2.1374

May 15, 2023

TO: SCOTT GLENN, DIRECTOR
OFFICE OF PLANNING AND SUSTAINABLE DEVELOPMENT

FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 DRAFT
ENVIRONMENTAL ASSESSMENT FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

With this letter, the State of Hawaii, Department of Transportation, transmits the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) for the proposed Bayfront Highway and Waianuenue Avenue Intersection Improvements project on the island of Hawaii, for review and publication in the next available edition of The Environmental Notice.

In addition to this letter, you will find the online Environmental Review Program (ERP) Publication Form that has been submitted through the ERP website. The online submittal includes one electronic copy of the DEA-AFONSI as an Adobe Acrobat PDF file.

Should you have any questions, please contact us via email or mail:

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OR

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From: webmaster@hawaii.gov
Sent: Tuesday, May 16, 2023 3:31 PM
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice

Action Name
Bayfront Highway and Waiianuenue Avenue Intersection Improvements
Type of Document/Determination
Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)
HRS §343-5(a) Trigger(s)
<ul style="list-style-type: none">(1) Propose the use of state or county lands or the use of state or county funds
Judicial district
South Hilo, Hawai'i
Tax Map Key(s) (TMK(s))
(3) 2-3-002:022 (portion); (3) 2-3-002-999 (portion); (3) 2-3-003:003; (3) 2-3-003:999 (portion); and (3) 2-3-005:999 (portion)
Action type
Agency
Other required permits and approvals
Special Management Area; Shoreline Setback Variance; Grading/Building Permits; Historic Preservation HRS 6E-8; National Historic Preservation Act - Section 106; Coastal Zone Management (CZM) Federal Consistency Review; HRS Chapter 195D; National Pollutant Discharge Elimination System (NPDES) Permit; Community Noise Permit; Noise Variance; Disability and Communication Access Board (DCAB) Document Review for ADA Compliance; Endangered Species Act – Section 7; National Environmental Policy Act (NEPA) Review; Jurisdictional Determination (USACE); Section 4(f) Review; Essential Fish Habitat (EFH) Review; Section D - Categorical Exclusion List
Proposing/determining agency
State of Hawaii, Department of Transportation (HDOT)
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State of Hawaii, Department of Transportation 869 Punchbowl Street Honolulu, Hawaii 96813 United States Map It
Was this submittal prepared by a consultant?
Yes

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[Map It](#)

Action summary

The proposed project includes improvements to the intersection of Bayfront Highway (Route 19) and Waianuenue Avenue (Route 1950) to enhance multimodal connectivity and address ongoing concerns involving poor vehicular maneuverability, restricted access to the downtown Hilo area, pedestrian safety concerns, and overall congestion of roadways in the vicinity. A preferred alternative has been identified which includes reconstruction of roadways to allow for construction of an intersection single-lane roundabout, ADA compliant sidewalks and roadway crossings, drainage improvements, reconfiguration of parking, and other roadway improvements including new highway lighting, electrical infrastructure relocations, signage, pavement markings, pedestrian signals, raised crosswalks, landscape, and traffic management devices, and other utility adjustments as required. To minimize traffic impacts during construction, the project will include both day and night work.

Reasons supporting determination

Reasons supporting determination are provided in Section 7.1 of the DEA "Significance Criteria"

Attached documents (signed agency letter & EA/EIS)

- [Bayfront-Waianuenue-DEA-May-2023.pdf](#)
- [HWY-DD-2.1374-HRS-Ch-343-DEA-Transmittal-Letter-Bayfront-Hwy-part-1-signed.pdf](#)

Action location map

- [Project-Ste-APE.zip](#)

Authorized individual

Dave Simpson

Authorization

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.



BAYFRONT HIGHWAY AND WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS

Draft Environmental Assessment
Anticipated Finding of No Significant Impact

PREPARED FOR:

State of Hawaii - Department of Transportation

PREPARED BY:



MAY 2023

BAYFRONT HIGHWAY AND WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS

*Draft Environmental Assessment –
Anticipated Finding of No Significant Impact
(Submitted Pursuant to Hawaii Revised Statutes, Chapter 343)*

Prepared for:

State of Hawaii - Department of Transportation

Prepared by:



May 2023

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SUMMARY

Project Name:	Bayfront Highway and Waianuenue Avenue Intersection Improvements
Location:	Downtown Hilo, Island and County of Hawaii See Figure 1 and Figure 2
Judicial District:	South Hilo
Tax Map Key (TMK):	(3) 2-3-002:022 (portion); (3) 2-3-002-999 (portion); (3) 2-3-003:003; (3) 2-3-003:999 (portion); and (3) 2-3-005:999 (portion) See Figure 3
Land Area Affected:	Approximately 5.27 acres
Proposing Agency:	State of Hawaii, Department of Transportation (HDOT)
Determining Agency:	State of Hawaii, Department of Transportation (HDOT)
Landowner:	State of Hawaii, County of Hawaii
Existing Uses:	Urban signalized intersection with multiple traffic signals and connections to various roadways; Sidewalks for pedestrian use; and green spaces with landscaping.
Proposed Action:	Involves the proposed conversion of the complex signalized intersection into a large roundabout traffic circle. An extension of the roadway improvements will include new shared use paths for pedestrian and bicycle use to facilitate multimodal transportation uses in Downtown Hilo.
Current Land Use Designations:	<i>State Land Use:</i> Urban (Figure 4) <i>County General Plan LUPAG:</i> Open Area and High Density Urban (Figure 5) <i>County Zoning:</i> Road (not zoned) and Open (O) (Figure 6) <i>Special Management Area (SMA):</i> Within SMA (Figure 7)

Bayfront Highway and Waianuenue Avenue Intersection Improvements
Draft Environmental Assessment / Anticipated Finding of No Significant Impact

Alternatives Considered:	<ol style="list-style-type: none">1. No action2. Typical intersection improvements, including re-striping and new traffic signals
Potential Impacts and Mitigation Measures:	<p>Any potential adverse impacts would be mitigated as follows:</p> <p>Short-term construction impacts to air quality, noise, solid waste generation, traffic, parking, storm water quality/quantity are anticipated. HDOT will address these impacts through compliance with County and State rules, regulations, permit, and variance requirements regarding fugitive dust, community noise control, and non-point source discharges. In addition, best management practices will be implemented which include structural and non-structural controls designed to inhibit run-off, erosion, and fugitive dust.</p> <p>Long-term impacts are anticipated to be beneficial in that the project will improve vehicular maneuverability with the roundabout intersection design, reduce traffic congestion, increase pedestrian safety with Americans with Disabilities Act (ADA) compliant sidewalks and roadway crossings, advance the multimodal transportation network in downtown Hilo, provide new parking facilities, improve drainage conditions. The project will also incorporate other roadway improvements including new highway lighting, electrical infrastructure relocations, signage, pavement markings, pedestrian signals, landscape, and traffic management devices, and other utility adjustments as required.</p>
Permits & Approvals	<ul style="list-style-type: none">• Special Management Area (County of Hawaii)• Shoreline Setback Variance (County of Hawaii)• Grading/Building Permits (DPW)• Historic Preservation HRS 6E-8 (SHPD)• National Historic Preservation Act - Section 106 (SHPD)• Coastal Zone Management (CZM) Federal Consistency Review (OPSD)• HRS Chapter 195D (DOFAW) (DAR)• National Pollutant Discharge Elimination System (NPDES) Permit (DOH)• Community Noise Permit (DOH)• Noise Variance (DOH)

Bayfront Highway and Waianuenue Avenue Intersection Improvements
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- Disability and Communication Access Board (DCAB) Document Review for ADA Compliance (DOH)
- NEPA (FHWA as Responsible Entity)
- Endangered Species Act – Section 7 (USFWS, NOAA-NMFS)
- National Environmental Policy Act (NEPA) Review (FHWA)
- Jurisdictional Determination (USACE)
- Section 4(f) Review (FHWA)
- Essential Fish Habitat (EFH) Review (NOAA-NMFS)
- Section D - Categorical Exclusion List (FHWA)

**Anticipated
Determination:**

Finding of No Significant Impact (FONSI)

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LIST OF ACRONYMS & ABBREVIATIONS

ADA	Americans with Disabilities Act
ALISH	Agricultural Lands of Importance to the State of Hawaii
amsl	Above mean sea level
ASEA	Aquifer Sector Area
ASYA	Aquifer System Area
BMPs	Best Management Practices
CATV	Cable TV
CDP	Census Designated Place
CFR	Code of Federal Regulations
CIA	Cultural Impact Assessment
COHDEM	County of Hawaii Department of Environmental Management
CRM	Concrete rubble masonry
CZM	Coastal Zone Management
DAGS	Department of Accounting and General Services,
DAR	Division of Aquatic Resources, Department of Land and Natural Resources, State of Hawaii
DBEDT	Department of Business, Economic Development, and Tourism, State of Hawaii
DHS	Department of Human Services, State of Hawaii
DLIR	Department of Labor and Industrial Relations, State of Hawaii
DLNR	Department of Land and Natural Resources, State of Hawaii
DOE	Department of Education, State of Hawaii
DOFAW	Division of Forestry and Wildlife, Department of Land and Natural Resources, State of Hawaii
DOH	Department of Health, State of Hawaii
DPW	Department of Public Works, County of Hawaii
DWS	Department of Water Supply, County of Hawaii
EA	Environmental Assessment
EFH	Essential Fish Habitat
EPA	Environmental Policy Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
HAR	Hawaii Administrative Rules
HCC	Hawaii County Code
HDOT	Department of Transportation, State of Hawaii
HELCO	Hawaii Electric Light Company, Inc.

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HMC	Hilo Medical Center
HRHP	Hawaii Register of Historic Places
HRS	Hawaii Revised Statutes
IPAC	Information for Planning and Consultation
LID	Low Impact Development
LOS	Level of service
LRFI	Literature review and field investigation
LSB	Land Study Bureau, University of Hawaii
LUC	State of Hawaii Land Use Commission
LUPAG	County of Hawaii General Plan Land Use Pattern Allocation Guide
mgd	Million gallons per day
mph	Miles per hour
msl	mean sea level
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHS	National Highway System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic Atmospheric Administration
NPDES	National Pollutant Discharge Elimination Systems
NRCS	Natural Resources Conservation Service, USDA
NRHP	National Register of Historic Places
OPSD	Office of Planning and Sustainable Development, State of Hawaii
PacIOOS	Pacific Island Ocean Observing System
PEP	U.S. Census Population Estimates Program
PHFS	Primary Highway Freight System
ROW	Right-of-way
SCD	Seismic design category
SIHP	State Inventory of Historic Places
SHPD	State of Hawaii Historic Preservation Division
SLR	Sea Level Rise
SMA	Special Management Area
TIAR	Transportation Impact Assessment Report
TMK	Tax Map Key
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

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1 INTRODUCTION

The State of Hawaii Department of Transportation (HDOT) is proposing a reconstruction and rehabilitation project utilizing both state and federal funding within the existing public right-of-way (ROW) to the intersection of Bayfront Highway (Route 19 on the National Highway System (NHS)), an Urban Principal Arterial, and on the Primary Highway Freight System (PHFS)) and Waianuenue Avenue (Route 1950). The project site includes lands owned by both the State of Hawaii (State) and County of Hawaii (County). The Project Site is mostly situated on dedicated roadway parcels: Bayfront Highway [State - portion of TMK (3) 2-3-002-999], Waianuenue Avenue [County - portion of TMK (3) 2-3-005-999], and Kamehameha Avenue [County - portion of TMK (3) 2-3-003-999]. The improvements will also require a reconfiguration of medians and land next to the roadway shoulders, and therefore the Project Site includes State and County lands within the right of way and parcels of State land identified as Tax Map Key (TMK) parcel number (3) 2-3-003:003 and a portion of TMK (3) 2-3-002:022. The cumulative area described is hereinafter referred to as the “Project Site” or “Site.”

The use of State (and County) lands or funds triggers the requirement to assess the environmental impacts of the proposed action pursuant to Hawaii Revised Statutes (HRS) Chapter 343. The project would also use federal funding provided by the Federal Highway Administration (FHWA). Use of Federal funds subjects the project to environmental documentation requirements set forth under the National Environmental Policy Act (NEPA) of 1969; (42 U.S. Code Section 4321); the Council of Environmental Quality Regulations; 40 Code of Federal Regulations (CFR) Parts 1500-1508; and 23 CFR Parts 625, 640, 712, 771, and 790, Environmental Impact and Related Procedures. To comply with NEPA, the FHWA is preparing environmental documentation which would be consistent with the findings of this Environmental Assessment (EA).

1.1 LANDOWNER

The landowners are the State of Hawaii and County of Hawaii.

1.2 PROPOSING AGENCY

The Applicant is the State of Hawaii Department of Transportation (HDOT).

Contact: Department of Transportation
State of Hawaii
ATTN: Robert Sun
869 Punchbowl Street
Honolulu, HI 96813
Phone: (808) 692-7578

1.3 DETERMINING AGENCY

The State of Hawaii, Department of Transportation (HDOT) will determine the significance of impacts pursuant to HRS Chapter 343-5(b).

Contact: Department of Transportation
State of Hawaii
ATTN: Robert Sun
869 Punchbowl Street
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1.4 ENVIRONMENTAL CONSULTANT

PBR HAWAII & Associates, Inc. is the environmental planning consultant.

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Honolulu, HI 96813
Telephone: (808) 521-5631

1.5 COMPLIANCE WITH STATE OF HAWAII ENVIRONMENTAL LAWS

Preparation of an EA is being undertaken to meet the applicable requirements of Chapter 343, HRS and Title 11, Chapter 200.1, Hawaii Administrative Rules (HAR). Section 343-5, HRS establishes nine “triggers” that require the completion of an EA. The proposed Project will involve the use of State or County lands and/or funds, which is one of the triggers listed under §343-5(a)(1). This EA has thus been prepared to consider the impacts of the proposed action on the human and natural environment.

1.6 STUDIES CONTRIBUTING TO THIS EA

The information contained in this report has been developed from site visits, consultation with local officials and community members, information available regarding the characteristics of the proposed Project Site and surrounding areas, and technical studies. A full list of references can be found in Section 9 and the appendices to this document include the complete technical studies providing more detailed assessment contributing to this report.

2 PROJECT DESCRIPTION

2.1 BACKGROUND INFORMATION

2.1.1 Location and Property Description

The Project Site is located on Hawaii Island in Downtown Hilo abutting Kaipalaoa Landing Park and Hilo Bay to the northeast, Wailuku River to the northwest and the Downtown Hilo commercial district to the west and south. The Site consists of 5.27 acres of land owned by the State of Hawaii and County of Hawaii and falls within the South Hilo District and the ahupuaa of Piihonua and Punahoa 2 (Figure 1 and Figure 2). The Project Site is mostly situated on dedicated roadway parcels: Bayfront Highway [State - TMK (3) 2-3-002-999 (portion)], Waianuenu Avenue [State - TMK (3) 2-3-005-999 (portion)], and Kamehameha Avenue [County - TMK (3) 2-3-003-999 (portion) and State - TMK (3) 2-3-002-999 (portion)], as well as TMK parcel number (3) 2-3-003:003 and a portion of TMK (3) 2-3-002-022 collectively referred to hereinafter as the “Project Site” or “Site.” While Bayfront Highway is currently HDOT-owned, the mauka half of the roundabout encompassing Kamehameha Avenue is County-owned. HDOT intends to have jurisdiction over the entire roundabout which would require the County-owned section of Kamehameha Avenue to be acquired. See Figure 3.

During the Draft EA pre-assessment consultation period, the State of Hawai‘i Department of Land and Natural Resources – Land Division provided the following comments:

The Hawaii District Land Office has reviewed the proposed project outline by HDOT Highways Division and has identified the two parcels [(3) 2-3-002:022 portion, & (3) 2-3-003:003] as having been approved by the Land Board to be set aside to the County of Hawaii.

In order to manage and maintain the proposed roundabout, HDOT intends to have jurisdiction over the entire area encompassing the roundabout, which would include a portion of the north end of TMK (3) 2-3-003:003 which had previously been set aside for the County of Hawaii. Jurisdictional determination will be resolved prior to construction. See Figure 3 for reference.

All of the lands have been graded and are currently used for roadways and associated transportation and infrastructure uses, such as sidewalks, bike paths, parking, landscaped medians, as well as above and below grade infrastructure, including drainage, wastewater, waterlines, and utilities for electrical and telecommunication. The Site is an urban setting featuring a series of signalized intersections with multiple traffic signals, turn lanes and connections to various roadways.

The intersection is a signalized five-legged, “T”-intersection located at the northern corner of downtown Hilo. The intersection allows for most vehicular turning movements except for the following movements:

Bayfront Highway and Waianuenue Avenue Intersection Improvements
Draft Environmental Assessment / Anticipated Finding of No Significant Impact

- Left turn from Bayfront Highway to Waianuenue Avenue
- Left turn from Waianuenue Avenue to Kamehameha Avenue
- Left turn from Kamehameha Avenue to Waianuenue Avenue

The intersection does not provide separate bike lanes and bicyclists currently maneuver the intersection and surrounding streets as motorists. Crosswalks are provided for pedestrians across Waianuenue Avenue on both sides of Kamehameha Avenue and across Kamehameha Avenue on the north side of the intersection. The intersection accommodates freight trucks and public, private, and school bus routes. This area of Hilo is a destination for residents and visitors.

Bayfront Highway provides regional access to and from Hilo to Kailua-Kona, the Hilo International Airport, and the southern areas of Hawaii island. This location serves as the primary gateway connection between the communities along the Hamakua coast and the central and southern portions of Hawaii Island. Bayfront Highway/Hawaii Belt Road or Route 19 is listed on the PHFS, which is a network of highways identified as the most critical highway portions of the U.S. freight transportation system as defined by FHWA. Hawaii Island’s freight network is a major component of the island’s economic success and needed to deliver the goods necessary for the island’s survival.

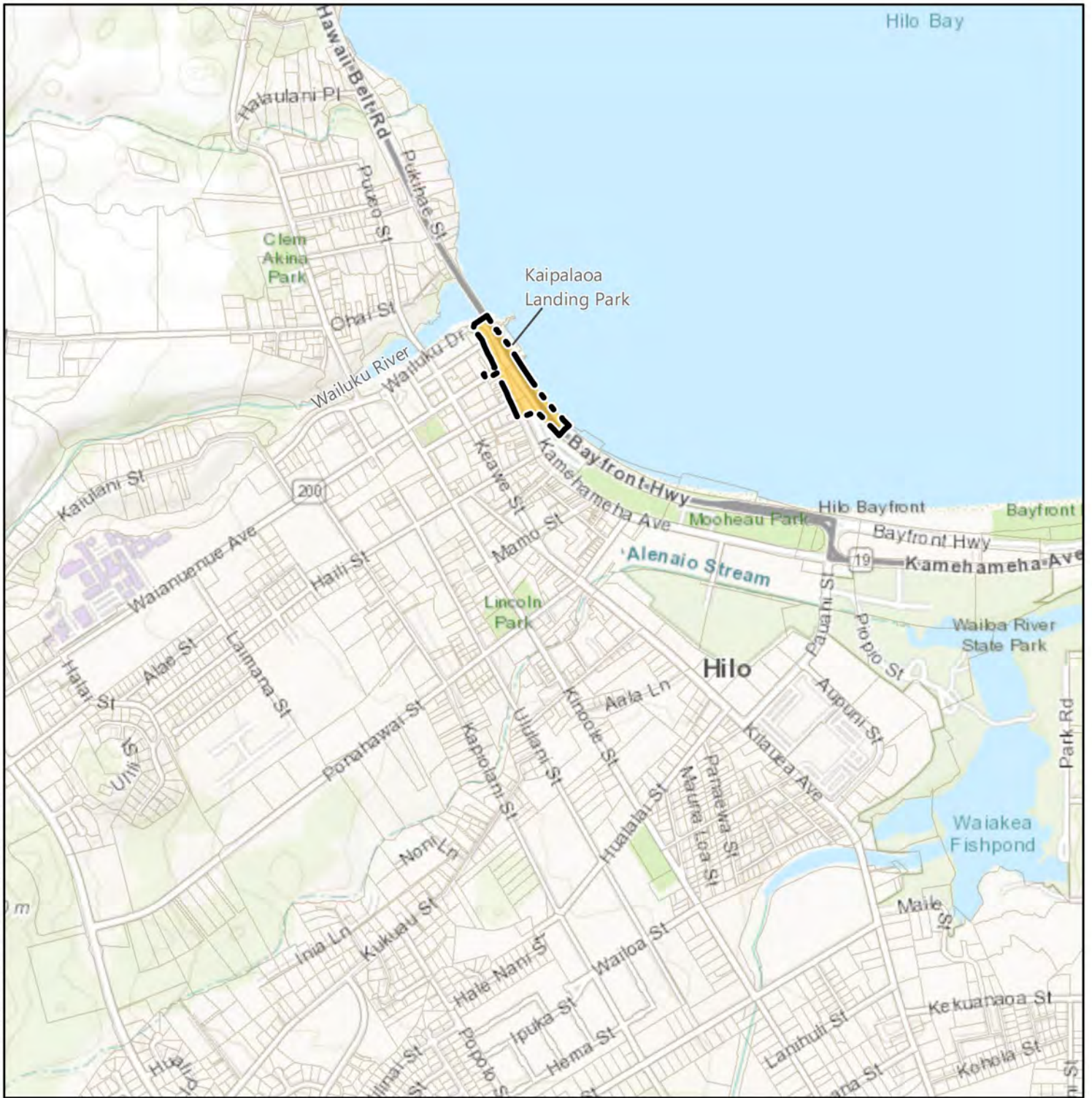
Kamehameha Avenue is a minor arterial roadway located along the makai edge of downtown Hilo, running parallel to Bayfront Highway. Majority of the local mauka-makai roads in downtown Hilo intersect with Kamehameha Avenue. It is mainly a four-lane roadway with on-street parking on either or both sides or provides access to off-street parking areas. serves as the sole arterial roadway between the Hamakua coast communities and Hilo during times when Bayfront is closed due to flooding or otherwise serves as a main frontage road to access various stores and eateries.

Waianuenue Avenue is a major collector road that provides regional access and connection between the east side of Hawaii Island and other arterial roadways connecting the west side of Hawaii Island. It is a two-lane, undivided roadway with left turn lanes or center turn lanes and on-street parking and sidewalks on both sides of the road.

This intersection is a crucial piece of the regional multimodal transportation system.

Table 2-1: Existing Parcels and Land Ownership

Land Owner	Existing TMK	General Description	Acreage
State of Hawaii	(3) 2-3-002:999 (portion) (Roadway)	Bayfront Highway and Kamehameha Avenue (portion)	3.37
County of Hawaii	(3) 2-3-005:999 (portion) (Roadway)	Waianuenue Avenue	0.14
County of Hawaii	(3) 2-3-003:999 (portion) (Roadway)	Kamehameha Avenue	1.16
State of Hawaii	(3) 2-3-003:003	Median	0.29
State of Hawaii	(3) 2-3-002:022 (portion)	Median and Parking	0.31
Total			5.27 Acres



File: Q:\Hawaii\Bayfront Waianuenue\GIS\Project\Regional Location.mxd

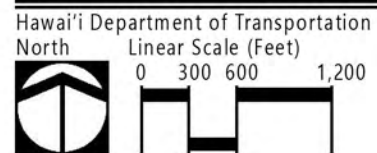


LEGEND

-  Project Area
-  TMK Parcels

**Figure 1:
Regional Location Map**

**Bayfront Hwy and Waianuenue Ave
Intersection Improvements**



Island of Hawai'i





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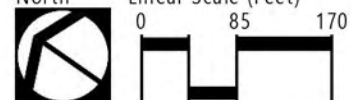
-  Project Area
-  TMK Parcels

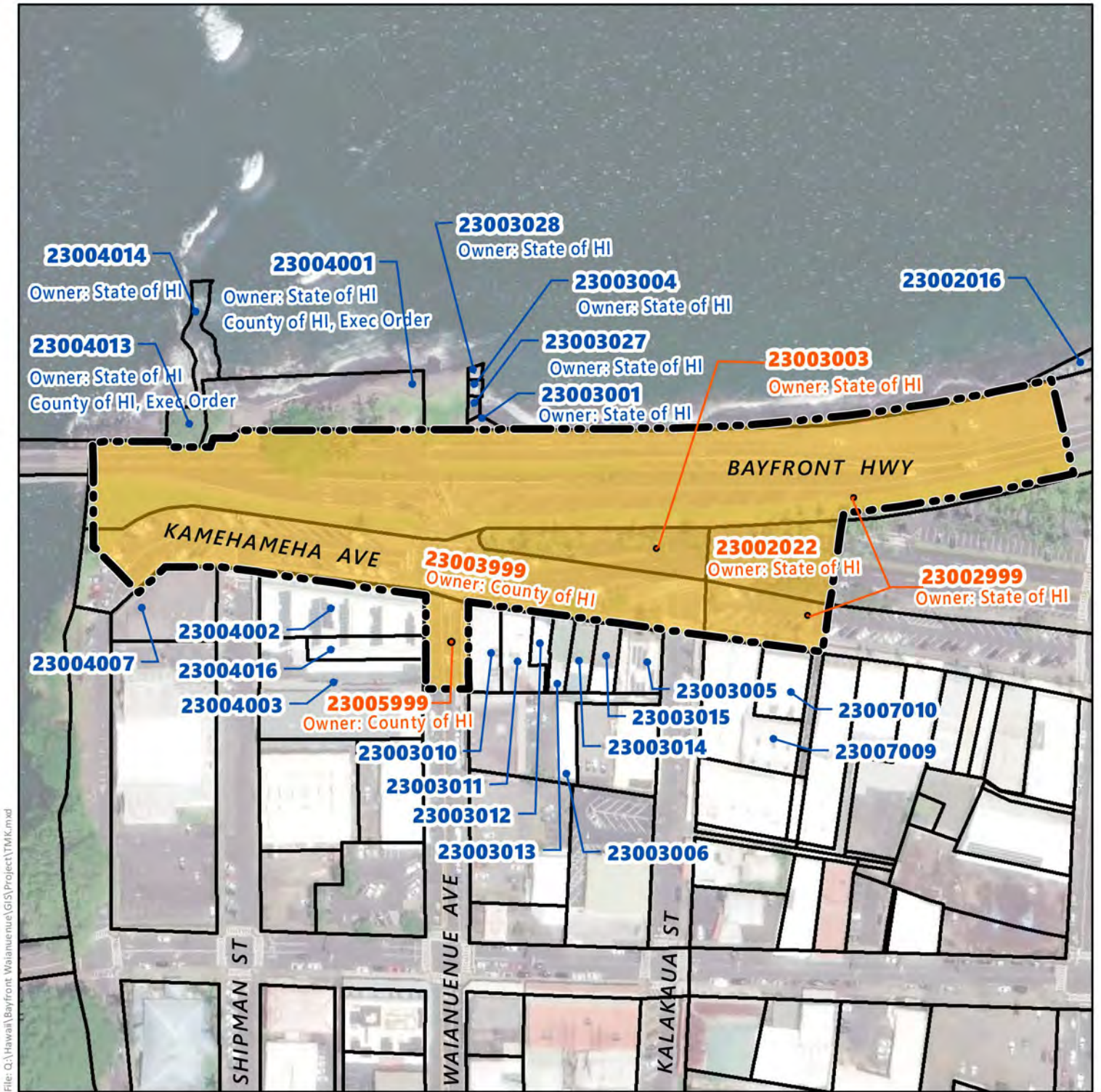
Figure 2:
Aerial Location Map

**Bayfront Hwy and Waianuenue Ave
Intersection Improvements**

Hawai'i Department of Transportation
North

Island of Hawai'i



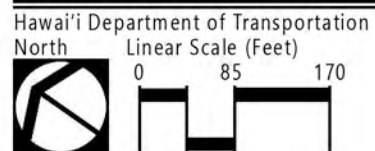


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-  Project Area
-  TMK Parcels

Figure 3:
Tax Map Key

**Bayfront Hwy and Waianuenue Ave
Intersection Improvements**



Island of Hawai'i



2.1.2 Existing Land Use Designations

Current land use designations for the proposed Project:

- *State Land Use: Urban (Figure 4)*
- *County General Plan LUPAG: Open Area and High Density Urban (Figure 5)*
- *County Zoning: Road (not zoned) and Open (O) (Figure 6)*
- *Special Management Area (SMA): Within SMA (Figure 7)*

2.1.3 Surrounding Land Uses

The Project Site is bounded by Kaipalaoa Landing Park and Hilo Bay to the north and east; Wailuku River to the north and west; and the Downtown Hilo commercial district to the west and south. The surrounding uses in the Downtown Hilo commercial district include markets, local businesses, restaurants/bars, office buildings, art galleries/museums, and educational institutions. The Project Site is not in a Historic District, but many of the buildings in Downtown Hilo are listed as historic sites, including the Palace Theater, Pacific Tsunami Museum, and East Hawaii Cultural Center. The abutting Kaipalaoa Landing Park just makai of the Project Site includes recreational uses such as fishing and general park uses. The project site is connected to a network of recreational trails and parks including Russell Carroll Mooheau County Park, Bayfront soccer fields, Bayfront Beach Park, and Wailoa River State Recreation Area. See Figure 8.

See Figure 9 for photographs of the Project Site.

2.2 PURPOSE AND NEED

The primary purpose of the project is to address traffic congestion at the Hilo Bayfront Highway intersection with Waianuenue Avenue caused by Highway closures due to flooding south of the intersection. The secondary purpose is to provide pedestrian accessibility and safety improvements. This project is intended to improve overall maneuverability of vehicles, particularly for large trucks, through the intersection of Bayfront Highway (State Route 19) and Waianuenue Avenue (Route 1950) and provide safer conditions for pedestrians and bicyclists in the intersection and immediate vicinity. In addition, the improvements are intended to mitigate existing vehicular congestion at the intersection and other roadways feeding into the intersection particularly during Highway closures due to flooding and address projected decreases in level of service for these roadways. The project will also contribute to achieving goals and objectives consistent with the Downtown Hilo Multimodal Master Plan (2018); State of Hawaii Bike Plan (2003) and 2045 Hawaii Statewide Transportation Plan to provide a more walkable and bike-friendly community.

The primary need for the project is that Hilo Bayfront Highway is occasionally closed due to flooding and vehicles (including large trucks) use Kamehameha Avenue as a detour. The existing

Bayfront Highway and Waianuenue Avenue Intersection Improvements
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geometrics and close proximity of the Hilo Bayfront Highway/Waianuenue Avenue intersection and Waianuenue Avenue/Kamehameha Avenue intersection are not conducive to large truck traffic. The secondary need for the project is that there is currently no pedestrian access crossing Hilo Bayfront Highway to connect Hilo Town and established recreational resources with the nearby Kaipalaoa Landing Park. Based on projected traffic volumes, the current traffic configuration will produce increased congestion for the intersection and a decreased level of service for the project area and adjacent roadways. In addition, pedestrian and bicycle safety in the project area is a significant concern, especially as it relates to accessibility for Kaipalaoa Landing Park and other pedestrian and bicycle routes along Hilo Bay. Improvements to pedestrian and bicycle facilities are also needed to fulfill the County of Hawaii's Downtown Hilo Multimodal Master Plan to accommodate future bicycle facilities identified in the State of Hawaii Bike Plan and make downtown Hilo a more walkable community. Assessments conducted by the County noted that the expansion of the intersection over time to accommodate traffic flow with multiple lanes has hindered pedestrian access throughout the project area and The Downtown Hilo Multimodal Master Plan specifically recommends that a single-lane roundabout should replace the existing intersection.

Based on traffic counts taken during April 2022 observations show that on weekday mornings, the peak hour of traffic is from 7:00am to 8:00am. The highest volume of traffic is traveling southbound towards Hilo from Hawaii Belt Road. The project intersection acts as funnel into Hilo with approximately 60% of the traffic volume continuing south onto Bayfront Highway and about 30% turning south onto Kamehameha Avenue or west onto Waianuenue Avenue in almost equal proportions. During weekday mornings while school is in session, Waianuenue Avenue is restricted to only makai-bound traffic between 7:15am and 8:00am.

In the afternoons, the PM peak hour of traffic was observed to occur from 3:45pm to 4:45pm, with the primary flow of traffic headed north, outbound out of Hilo. Approximately 60% of the traffic volume heading north comes from Bayfront Highway with the remaining portion coming from Waianuenue Avenue or Kamehameha Avenue.

The downtown area of Hilo can be considered mature with minimal regional growth expected for the Hilo and immediate surrounding areas. A minimal average annual growth rate of one percent is assumed for the traffic forecast purposes.

A Transportation Impact Assessment Report (TIAR) was developed to analyze existing and future traffic conditions and assess the performance of three alternatives: No Build, Conventional Improvements, and Roundabout. The roundabout alternative provided a higher degree of benefit in addressing the purpose and need described above.

Below is a list of benefits that are associated with the Roundabout alternative.

- Improves traffic flow during southern leg of Bayfront Highway closure due to tide issues.
- Allows for vehicular turning movements in all directions.

Bayfront Highway and Waianuenue Avenue Intersection Improvements
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- Reduction of vehicular speeds and of pedestrian/vehicle conflict points.
- Improves pedestrian access and safety around the project site and to the Kaipalaoa Landing Park.
- Consistent with the preferred alternative within existing planning documents.

See Section 6 for a more detailed description of the alternatives evaluated for the project area or Appendix D for the complete Transportation Impact Assessment Report.

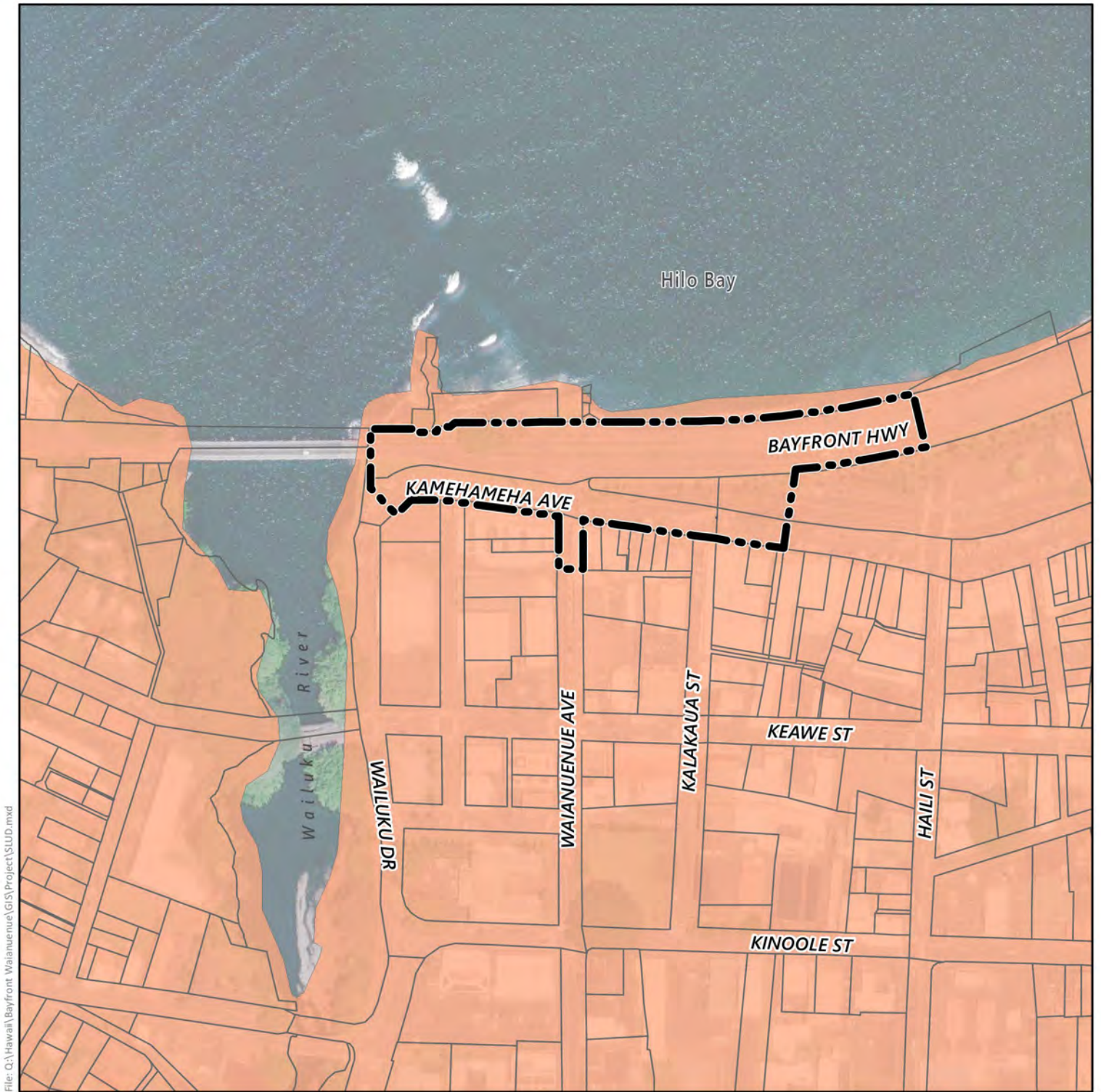
2.3 PROJECT DESCRIPTION

The proposed project includes improvements to the intersection of Bayfront Highway (Route 19) and Waianuenue Avenue (Route 1950) to enhance multimodal connectivity and address ongoing concerns involving poor vehicular maneuverability, restricted access to the downtown Hilo area, pedestrian safety concerns, and overall congestion of roadways in the vicinity. A preferred alternative has been identified which includes reconstruction of roadways to allow for construction of an intersection single-lane roundabout, ADA compliant sidewalks and roadway crossings, drainage improvements, reconfiguration of parking, and other roadway improvements including new highway lighting, electrical infrastructure relocations, signage, pavement markings, pedestrian signals, raised crosswalks, landscape, and traffic management devices, and other utility adjustments as required. To minimize traffic impacts during construction, the project will include both day and night work.

Figure 10 illustrates the conceptual site plan. More detailed site plans can be found in Appendix A.

2.4 DEVELOPMENT TIMETABLE AND PRELIMINARY COSTS

Construction is expected to commence in 2025 and take approximately two (2) years to complete. The anticipated timetable is based on assumptions given necessary land use approvals and construction permits. Construction includes removal of existing facilities, excavation, and potential mitigations such as archaeological monitoring and erosion control, landscaping, work zone traffic control, construction engineering. Construction costs are estimated to cost approximately \$18.4 million in 2022 dollars.



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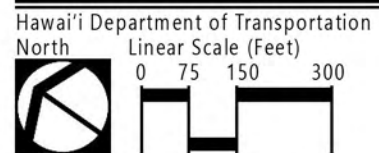
-  Project Area
-  TMK Parcels
- SLUD**
-  Urban

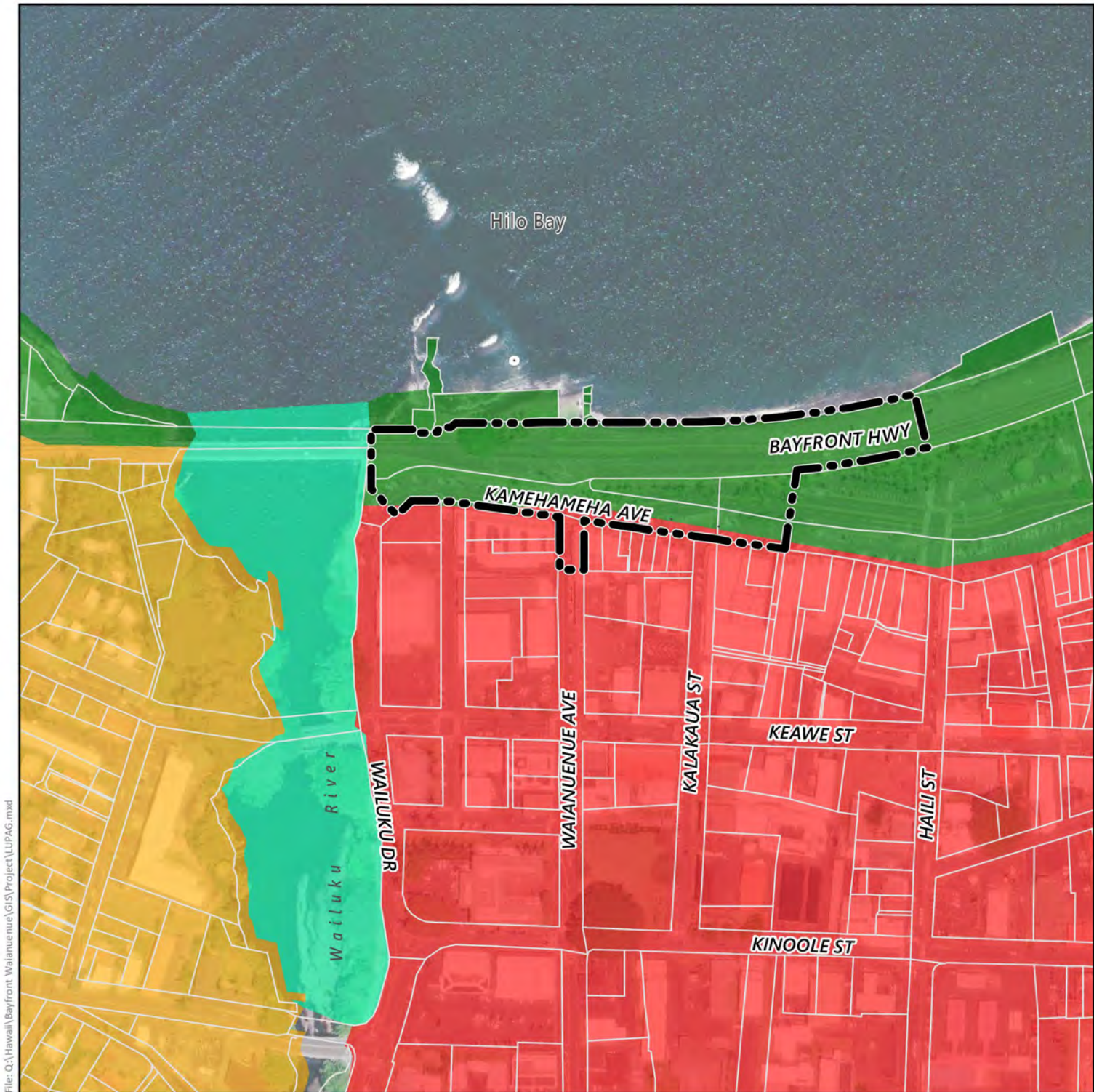
Figure 4:
State Land Use Districts (SLUD)

**Bayfront Hwy and Waianuenue Ave
Intersection Improvements**



Island of Hawai'i





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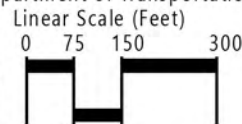
-  Project Area
-  TMK Parcels
- LUPAG**
-  Conservation
-  High Density Urban
-  Medium Density Urban
-  Open Area

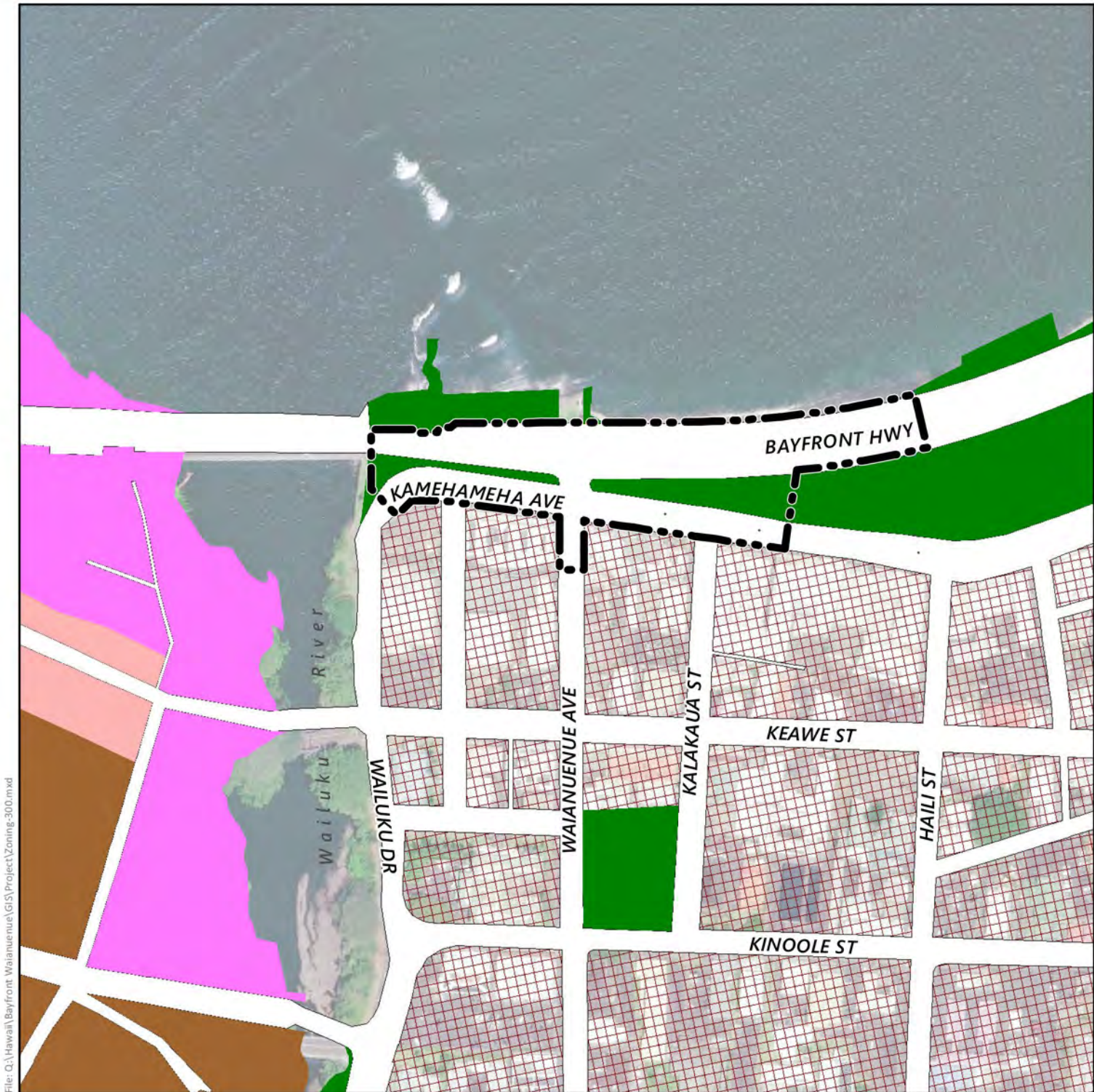
Figure 5
Land Use Pattern Allocation Guide

Bayfront Hwy and Waianuenu Ave Intersection Improvements

Hawai'i Department of Transportation
North









Island of Hawai'i





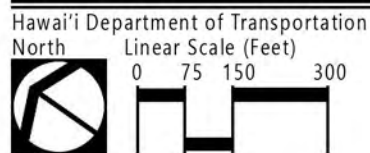
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	Project Area		CN-10
	(river)		OPEN
	(road)		RM-1
	CDH		V-.75

**Figure 6:
Zoning**

**Bayfront Hwy and Waianuenue Ave
Intersection Improvements**





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-  Project Area
-  TMK Parcels
-  Special Management Area

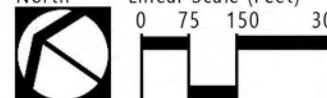

Figure 7:
Special Management Area

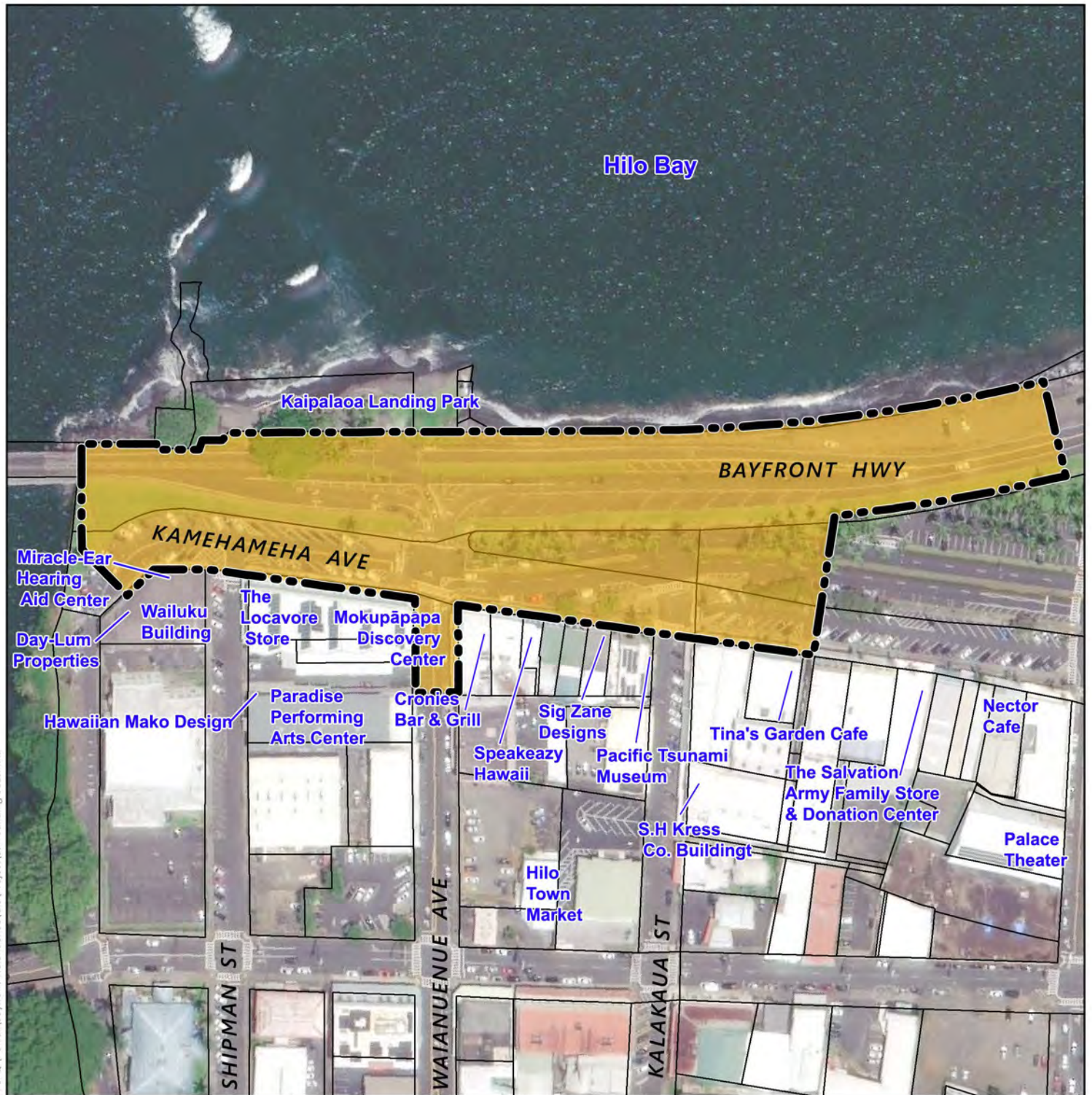
**Bayfront Hwy and Waianuenue Ave
Intersection Improvements**

Hawai'i Department of Transportation Island of Hawai'i

North Linear Scale (Feet)

0 75 150 300



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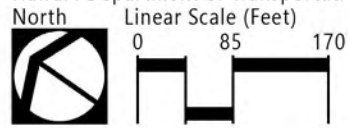
-  Project Area
-  TMK Parcels

**Figure 8:
Surrounding Uses**

**Bayfront Hwy and Waiianuenu Ave
Intersection Improvements**

Hawai'i Department of Transportation

Island of Hawai'i



Source: County of Hawai'i, 2021. USDA Aerial Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only.

Figure 9: Site Photographs



Figure 9: Site Photographs



LEGEND

- Project Area
- Right-Of-Way

HILO BAY

KAIPALAOA
LANDING PARK

HAWAII BELT RD. (ROUTE 19)
(STATE)

BAYFRONT HWY. (RTE. 19)
(STATE)

KAMEHAMEHA AVE.
(COUNTY)

KAMEHAMEHA AVE.
(COUNTY)

WAILUKU DR.
(COUNTY)

SHIPMAN ST.
(COUNTY)

WAIANUENUE AVE.
(COUNTY)

KALAKAUA ST.
(COUNTY)



200'

0'

Graphic Scale

CONCEPTUAL SITE PLAN

Bayfront Hwy and Waiānuenu Ave Intersection Improvements

Figure 10

Source: AECOM

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

This section describes existing conditions of the natural environment, potential impacts related to Proposed Project, and mitigation measures to minimize impacts.

3.1 CLIMATE

The climate of Hawaii Island varies greatly due to the microclimates generated by large-scale geological and topographic characteristics. The island is defined by its five major volcanoes, with the two major ones, Mauna Loa (13,679-foot elevation) and Mauna Kea (13,796-foot elevation), significantly impacting atmospheric conditions and the climate across the island. Northeast trade winds typically occur during the day, while winds from the southwest typically occur during the night due to cold air drainage from the mountains. The mean annual wind speed at the Project Site is about 2.7 miles per hour (mph), and usually varies between about 0.7 and 15.5 mph during the day (Giambelluca, et al., 2014).

Hilo has a warm semitropical climate and experiences abundant rainfall and relatively light trade winds. Average annual temperatures at the Site range from about 69 to 75 degrees Fahrenheit with the warmest temperatures typically in August and the coolest temperatures in February (Giambelluca, et al., 2014). According to *The Rainfall Atlas of Hawaii*, the Project Site receives an average annual rainfall of approximately 143 inches, with most rainfall occurring between the months of March through April, and again in November. Hilo's windward rainfall pattern is due to the orographic influences of the mountains and trade winds (Giambelluca, et al., 2013).

POTENTIAL IMPACTS AND MITIGATION MEASURES

It is anticipated that the Project will cause no significant impacts to the climate. The proposed improvements include new drainage systems to accommodate the reconfiguration of the intersection into the preferred alternative design with the traffic roundabout.

3.2 GEOLOGY AND TOPOGRAPHY

Hilo is located on the northeastern flank of Mauna Loa, the summit of which rises approximately 13,679-feet above mean sea level. Of the five volcanoes that formed the geological features of Hawaii Island — Kohala, Hualalai, Mauna Kea, Mauna Loa, and Kilauea—only Mauna Loa and Kilauea are presently considered active; the other three are considered dormant. The entire island is subject to geologic hazards, especially lava flows and earthquakes. The volcanic hazard zone map for Hawaii Island divides the island into zones ranked from 1 through 9, with 1 being the area of greatest hazard and 9 being the area of least hazard. The zones are based chiefly on the location of active vents, frequency of past lava coverage, and topography. According to this map, the proposed Project is within Zone 3 (Figure 11). Zone 3 areas have had 1 to 5 percent of

Bayfront Highway and Waianuenue Avenue Intersection Improvements
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their land area covered by lava or ash flows since the year 1800, but are at lower risk than Zone 2 areas because of their greater distance from recently active vents and/or because the local topography makes it less likely they will be covered by future flows.

The topography of the Project Site is generally flat with gentle gradient and minimal slope. Most of the surfaces have been previously graded to serve their existing conditions, primarily for roadway and pedestrian uses. The Site sits at approximately 12 feet above mean sea level (amsl) and slopes between 2 to 4 percent (Figure 12).

POTENTIAL IMPACTS AND MITIGATION MEASURES

The entire Project Site has been previously graded and developed. The improvements proposed for the preferred alternative traffic roundabout will require additional grading. Proposed grading for the project will be in conformance with the County of Hawaii Grading Ordinance and will involve consultation with a civil engineer. To minimize potential impacts, grading will be segmented and appropriate measures will be taken to maintain compliance with Chapter 10 (Erosion and Sedimentation Control) of the Hawaii County Code (HCC).

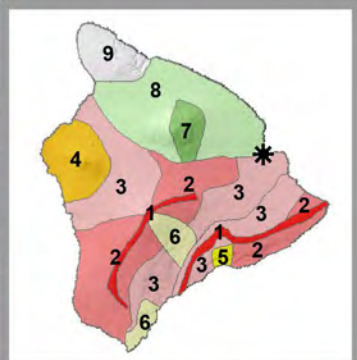
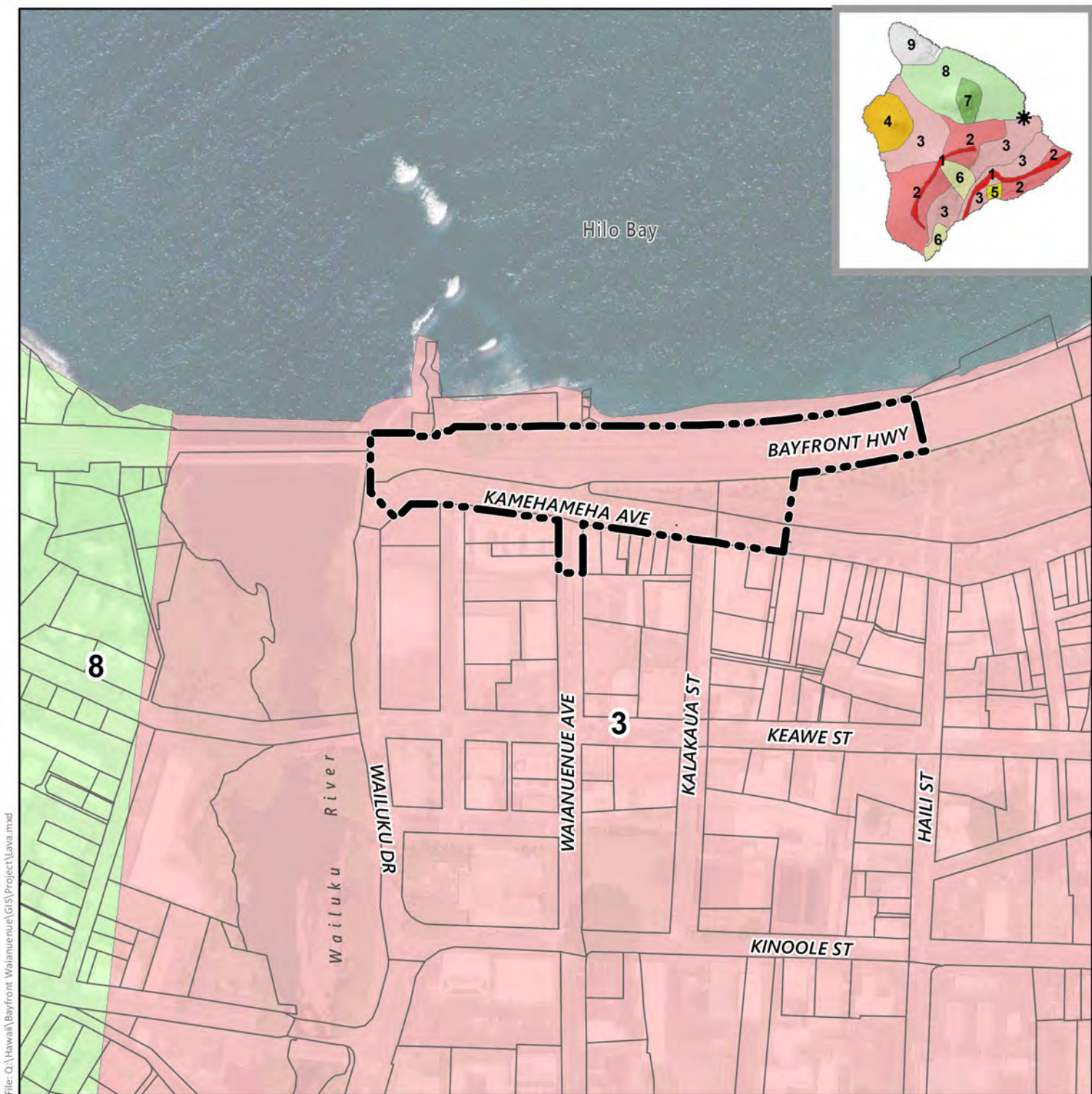
3.3 SOILS

There are three (3) soil suitability studies prepared for Hawaii that illustrate and describe the physical attributes of land and the relative productivity of different land types for agricultural production. These studies are: 1) the U.S. Department of Agriculture (USDA) Natural Resources Conservation Services (NRCS) Soil Survey; 2) the University of Hawaii Land Study Bureau (LSB) Detailed Land Classification; and 3) the State of Hawaii Department of Agriculture's Agricultural Lands of Importance to the State of Hawaii (ALISH) system.

3.3.1 NRCS Soil Survey








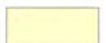



The USDA Natural Resources Conservation Service (NRCS) prepared the *Soil Survey of the Island of Hawaii, State of Hawaii* in 1973. This survey was patterned after a soil classification procedure adopted for nationwide, uniform application. Soil types are described according to characteristics such as permeability and water capacity, corrosivity, shrink/swell potential, and erosion hazards, as well as their suitability for a variety of commercial crops and agricultural uses.

According to the NRCS survey, all the soil within the Project Site are classified as Hilo hydrous silty clay loam (HoC). Refer to Figure 13. The Hilo series consists of well-drained soils formed in a series of volcanic ash that give them a banded appearance. The series occurs low on the windward side of Mauna Kea at elevations ranging from sea level to 800 feet and receives between 120 to 180 inches of annual rainfall.



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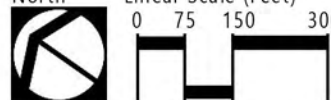

	Project Area	Lava-Flow Hazard Zones		5
	TMK Parcels		1	
			2	
			3	
			4	
			6	
			7	
			8	
			9	

**Figure 11:
Lava Flow Hazards**

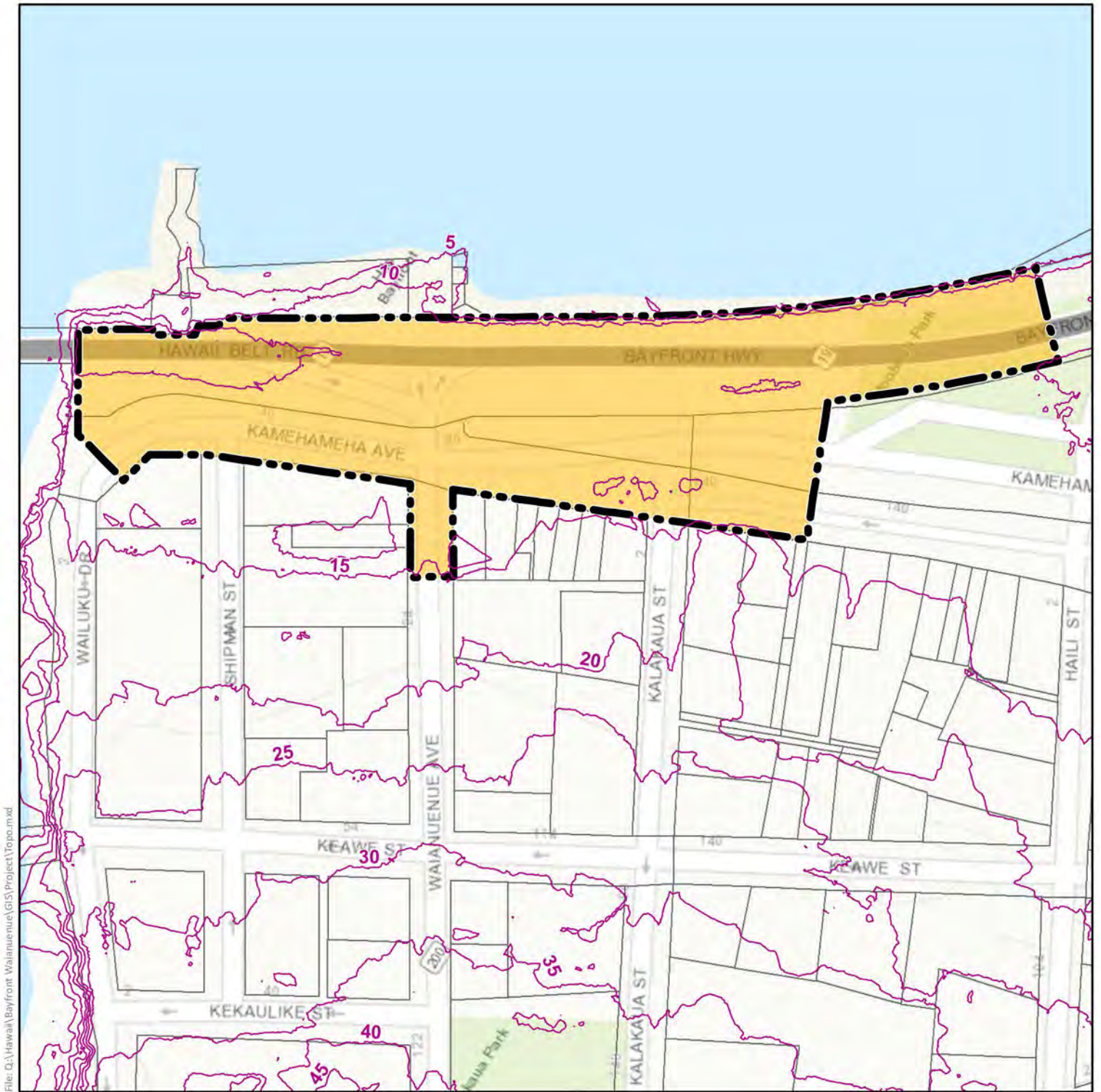
**Bayfront Hwy and Waianuenue Ave
Intersection Improvements**

Hawai'i Department of Transportation
North Island of Hawai'i

Linear Scale (Feet)
0 75 150 300

Source: U.S. Geological Survey, 1992. County of Hawai'i, 2021. ESRI Online Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only.

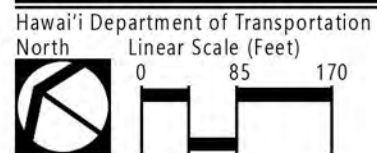


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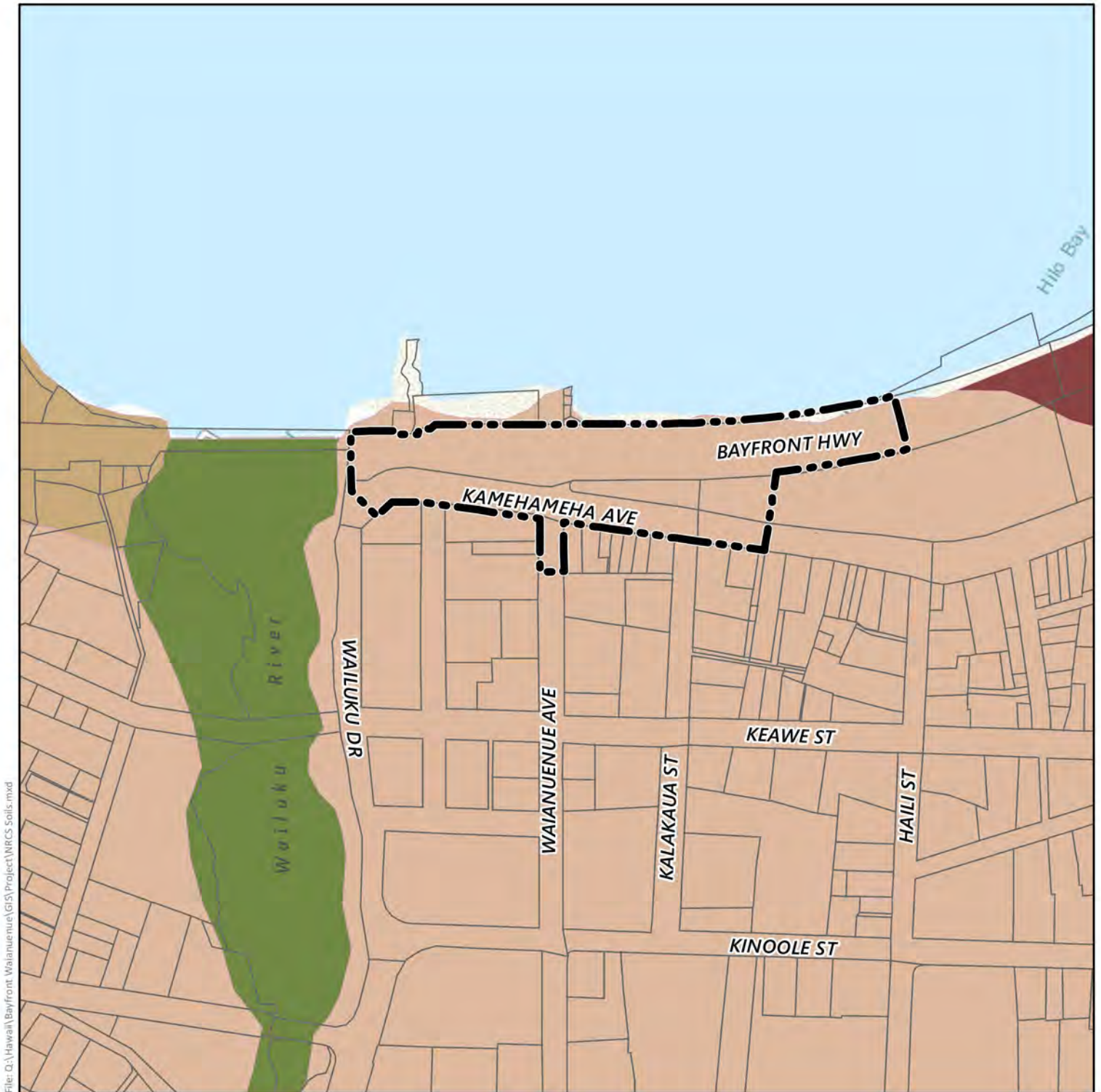
-  Project Area
-  5-ft Topo Lines
-  TMK Parcels

**Figure 12:
Topography
Bayfront Hwy and Waianuenu Ave
Intersection Improvements**




Island of Hawai'i





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 Project Area
NRCS Soil Classification





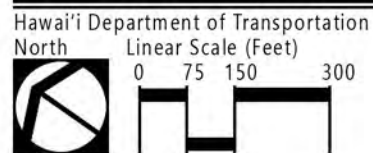
-  640: Opihikao-Urban land complex, 2-20% slopes
-  901: Hilo hydrous silty clay loam, 0-10% slopes
-  903: Hilo hydrous silty clay loam, 10-20% slopes
-  909: Hilo-Rock outcrop complex, 35-100% slopes

Figure 13:
Natural Resource Classification
Service (NRCS) Soil Classification
Bayfront Hwy and Waianuenue Ave
Intersection Improvements



Bayfront Highway and Waianuenue Avenue Intersection Improvements
Draft Environmental Assessment / Anticipated Finding of No Significant Impact

Hilo hydrous silty clay loam (HoC) generally maintains a slope range of 0 to 10 percent and consists of well-drained soils. Erosion hazard is slight with slow runoff and rapid permeability. It has an agricultural capability classification of IIIe if non-irrigated (sugarcane group 2; pasture group 9; woodland group 7). This soil is predominately used for sugarcane with small areas used for truck crops, orchards, and pasture. The natural vegetation consists of hilo grass, California grass, guava, ohia, and tree fern.

3.3.2 LSB Detailed Land Classification

The LSB Detailed Land Classification evaluates the quality or productive capacity of certain lands for selected crops and overall suitability in agricultural use for non-urbanized lands, which was conducted from 1965 through 1972. The study uses a five-class productivity rating system with “A” representing the highest productivity and “E” the lowest. This series of reports were produced with the intention of developing a land inventory and productivity evaluation based on statewide “standards” of crop yields and levels of management.

The Project Site is not classified under the LSB system (Figure 14).

3.3.3 Agricultural Lands of Importance to the State of Hawaii

The Agricultural Lands of Importance to the State of Hawaii (ALISH) classification system is based primarily, but not exclusively, on soil characteristics, the criteria for classification of lands, and the inventory of prime farm lands that meet the criteria or similar criteria for the respective classes in the national NRCS classification system. The ALISH system identifies and maps three broad classes of agricultural land – Prime, Unique, and Other Important Agricultural Land, as well as Unclassified Land.

The soils within the Project Site are “Unclassified” under the ALISH system (Figure 15).

POTENTIAL IMPACTS AND MITIGATION MEASURES

Potential impacts and possible mitigation measures include:

- Agricultural Lands. The Project Site has been previously disturbed and used for roadways and other urban associated uses since the early twentieth century and is zoned accordingly by County of Hawaii. The Project Site is not classified under the LSB and ALISH classification systems as productive or significant agricultural lands. Therefore, implementation of the proposed Project will not reduce the inventory of productive lands available for agricultural uses, and will not have short-term, long-term, direct, or indirect impacts on the inventory of productive agricultural lands available in the Hilo area.
- Construction Impacts. The proposed Project will require land disturbance activities during construction, which has the potential for short-term impacts consistent with construction activities. During construction and grading phases for the Project, there is potential for fugitive dust generation and soil erosion within the Project Site. All construction activities will be done in compliance with applicable Federal, State, and County regulations and rules for strict erosion control measures, including State Water Quality Standards as

Bayfront Highway and Waianuenue Avenue Intersection Improvements
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specified in HAR, Chapter 11-54 Water Quality Standards and Chapter 11-55 Water Pollution Control, Department of Health (DOH).

Prior to issuance of a grading permit by the County of Hawaii, an erosion control plan and Best Management Practices (BMPs) required for the National Pollutant Discharge Elimination System (NPDES) permit will be prepared describing the implementation of appropriate storm water runoff and/or soil disturbance mitigation and erosion control measures during construction activities. After construction, establishment of landscaping and/or other design features will provide long-term erosion control for unpaved areas. Measures to control erosion during construction and grading may include:

- Minimizing the time of construction;
- Constructing drainage control features early in phasing;
- Using temporary area sprinklers in non-active construction areas when ground cover is removed;
- Providing a water truck on-site during the construction period to provide for immediate sprinkling, as needed;
- Using temporary berms and cut-off ditches, where needed, for erosion control;
- Watering graded areas when construction activity for each day has ceased;
- Grassing or planting all cut and fill slopes immediately after grading work has been completed; and
- Installing silt screens, where appropriate.

3.4 HYDROLOGY AND DRAINAGE

Due to the relatively young and porous geology of Hawaii Island, most of the rainfall infiltrates to groundwater. In the vicinity, the uppermost groundwater aquifer beneath the Project area is typically encountered from 6 to 7 feet amsl, or about 70 to 90 feet below the ground surface. The State of Hawaii has classified groundwater under an aquifer coding system to identify and describe groundwater aquifers. The Project Site lies above the Department of Land and Natural Resources (DLNR) designated Northeast Mauna Loa Aquifer Sector Area (ASEA) and the Hilo Aquifer System Area (ASYA). The Northeast Mauna Loa ASEA has a sustainable yield of 740 mgd. The closest perennial stream is the Wailuku River, which lies just northwest of the Project Site. The portion of Bayfront Highway within the Project Site experiences flooding during high tide conditions several times throughout the year. These flooding impacts are exacerbated by the low-lying drainage infrastructure within the project area, which is not able to drain out into Hilo Bay. As a result, flooding occurs on the mauka corners of the Kamehameha Highway and Waianuenue Ave intersection during times of heavy rainfall and high tide conditions. See Figure 16 for a map of surface water and wetlands surrounding the Project Site.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The Project is not anticipated to have a significant adverse impact on hydrology or groundwater resources. Alternatively, the drainage improvements incorporated in the intersection design are expected to improve the existing conditions and address current issues with flooding along Bayfront Highway. During construction, best management practices for managing storm water and erosion control will be employed to avoid temporary inputs of sediment and pollutants into surface water resources. Where possible, the proposed project will integrate low impact development (LID) strategies into the design of the intersection and right of way. Post development stormwater discharge will be mitigated by the newly constructed drainage system within the Project Site.

Please see Section 4.7.3 for more details on proposed drainage improvements.

3.5 NATURAL HAZARDS

Hawaii Island is susceptible to potential natural hazards, such as flooding, tsunamis, hurricanes, earthquakes, volcanic hazards, and wildfires. This section provides an analysis of the Project Site's vulnerability to such hazards.

3.5.1 Flooding

The Federal Emergency Management Agency (FEMA) publishes flood information through the National Flood Insurance Program (NFIP) in the form of Flood Insurance Rate Maps (FIRM). These maps are used by government and insurance agencies to determine the relative potential for damage during flood events. According to the FIRM, the majority of the Project Site is designated Zone AE (an area with a 1% annual chance of flooding and base flood elevations). Portions of the Project Site on the north end and southeastern portion along Bayfront Highway are designated Zone VE (an area with a 1% or greater chance of flooding annually and base flood elevations). Areas designated as Zone VE are susceptible to coastal flooding and additional hazards associated with storm waves. These areas have a 26% chance of flooding over a 30-year period. See Figure 17 for more detailed information on base flood elevations within the designated flood zones.

3.5.2 Tsunami

Tsunamis are a threat to the Project area. Twenty-five tsunamis recorded in Hawaii since 1812 have had an adverse impact on the Island of Hawaii; seven caused major damage, and three were generated locally. Deadly tsunami destroyed much of downtown Hilo in 1946 and 1960 and are the subject of the nearby Pacific Tsunami Museum. The most recent major tsunami to impact Hawaii Island occurred on March 11, 2011, causing property damage at several locations on the Kona coast. The Project Site is located within the tsunami evacuation zone and is especially vulnerable to tsunamis due to the proximity to Hilo Bay (Figure 18).



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



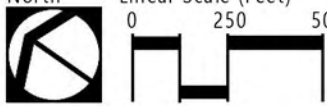

-  Project Area
-  TMK Parcels
- LSB Land Classification**
-  C - Fair
-  E - Very Poor

Figure 14:
Land Study Bureau (LSB)
Productivity Map
Bayfront Hwy and Waianuenue Ave
Intersection Improvements

Hawai'i Department of Transportation North Island of Hawai'i

Linear Scale (Feet)

0 250 500

Source: University of Hawaii Land Study Bureau, 1965, digitized by State OP, 2012. ESRI Basemap.
 Disclaimer: This graphic has been prepared for general planning purposes only.



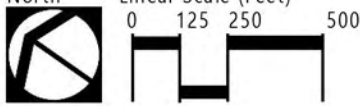
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LEGEND

-  Project Area
-  TMK Parcels
- ALISH Classification**
-  Prime ALISH

Figure 15:
Agricultural Lands of Importance
to the State of Hawai'i (ALISH)
Bayfront Hwy and Waianuenu Ave
Intersection Improvements

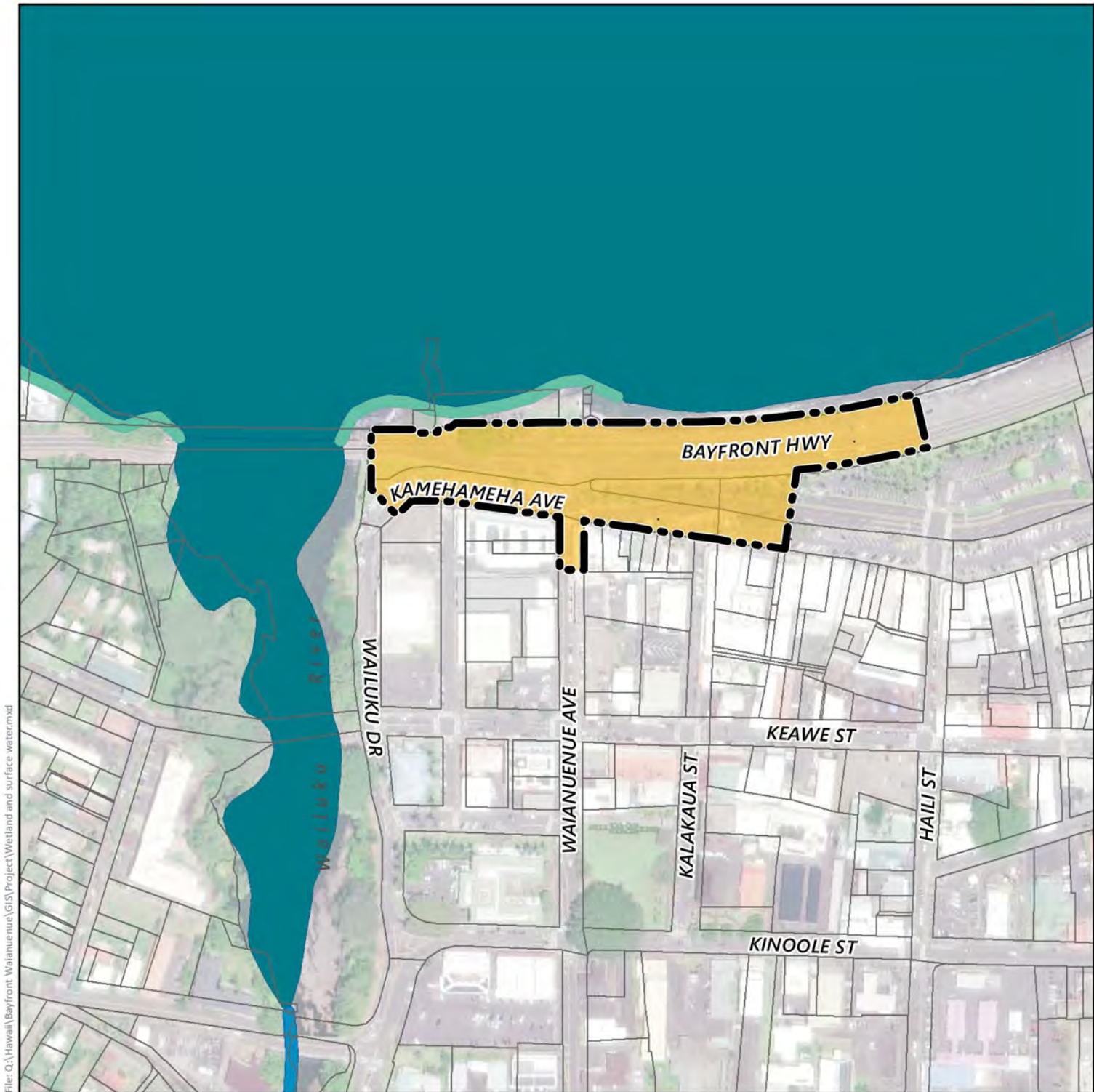
Hawai'i Department of Transportation
 North
 Linear Scale (Feet)
 0 125 250 500



Island of Hawai'i



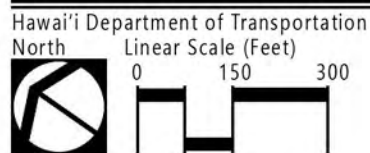
Source: State Department of Agriculture, 1977, digitized by OP. County of Hawaii, 2021. ESRI Basemap.
 Disclaimer: This graphic has been prepared for general planning purposes only.



LEGEND

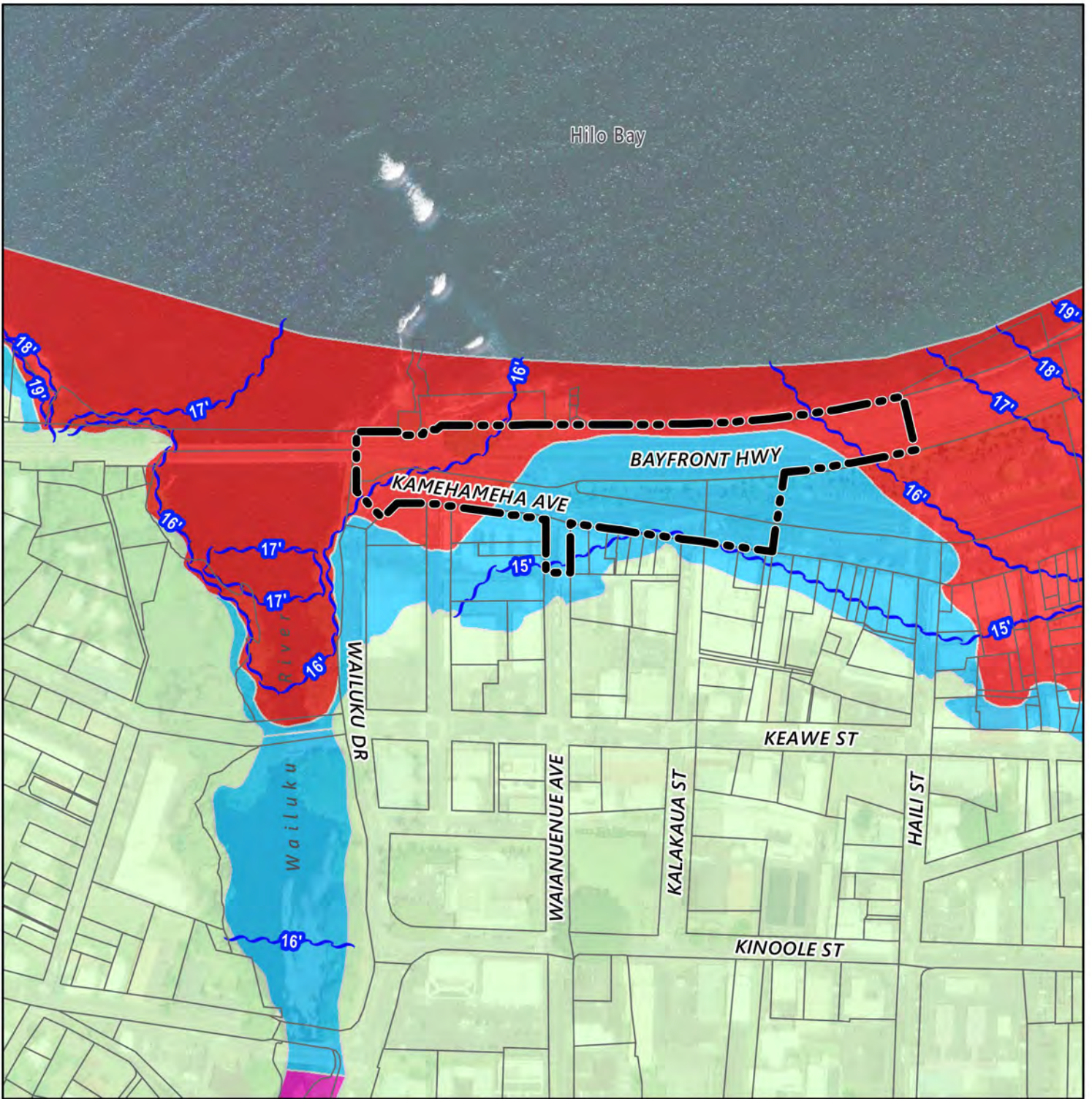
-  Project Area
-  Estuarine and Marine Wetland
-  TMK Parcels
-  Riverine
-  Estuarine and Marine Deepwater

Figure 16:
Surface Water and Wetlands
Bayfront Hwy and Waianuenue Ave
Intersection Improvements





Island of Hawai'i





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LEGEND

-  Project Area
-  Base Flood Elevation (BFE) Line

Flood Hazard Areas

Flood Zones





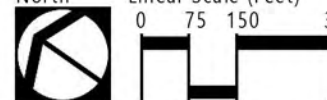
-  A: 1%-Annual-Chance Flood, no BFE
-  AE: 1%-Annual-Chance Flood, with BFE
-  VE: 1%-Annual-Chance Coastal Flood, with BFE
-  X: Outside 0.2%-Annual-Chance Floodplain

Figure 17:
Flood Insurance Rate Map

**Bayfront Hwy and Waianuenue Ave
Intersection Improvements**

Hawai'i Department of Transportation
North
Linear Scale (Feet)
0 75 150 300



Island of Hawai'i

PRR HAWAII
& ASSOCIATES, INC.

Source: FEMA, 2021. County of Hawai'i, 2021. ESRI Basemap
Disclaimer: This graphic has been prepared for general planning purposes only.



File: Q:\Hawaii\Bayfront Waianuenuue\GIS\Project\Tsunami.mxd

LEGEND




-  Project Area
-  TMK Parcels
-  Tsunami Evacuation Zone

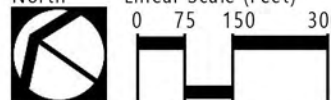

Figure 18:
Tsunami Evacuation Zone

**Bayfront Hwy and Waianuenuue Ave
Intersection Improvements**

Hawai'i Department of Transportation Island of Hawai'i

North Linear Scale (Feet)

0 75 150 300

3.5.3 Hurricanes

The Hawaiian Islands are seasonally affected by Pacific hurricanes from the late summer to early winter months. During hurricanes and storm conditions, high winds cause strong uplift forces on structures, particularly on roofs. Wind-driven materials and debris can attain high velocity and cause devastating property damage and harm to life and limb. It is difficult to predict these natural occurrences, but it is reasonable to assume that future events will occur. While direct hits from hurricanes are not common, the vulnerability of Hawaii Island is higher than other islands in the state. The Project Site would be especially vulnerable to flooding in the event of a hurricane due to its proximity to Hilo Bay.

3.5.4 Earthquakes

In Hawaii, most earthquakes are linked to volcanic activity, unlike in other places where a shift in tectonic plates is often the cause of an earthquake. Each year, thousands of earthquakes occur in Hawaii, but the vast majority are so small they are detectable only with highly sensitive instruments. However, moderate and disastrous earthquakes have occurred in the islands, particularly on Hawaii Island, due to its geologically active nature.

The Project Site is subject to a level of seismic risk similar to the entire Island of Hawaii. FEMA identifies earthquake hazards using seismic design categories (SDCs) that range from A (lowest risk) to E (highest risk). According to FEMA earthquake hazard maps, the Project Site falls under seismic design category (SDC) D2, the second highest seismic hazard category, which indicates the area “could experience very strong shaking” with potential effects of “damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse,” and “damage great in poorly built structures.” By comparison, Maui and part of Oahu fall within the D and D1 categories, which have the same potential seismic hazards and potential effects as the D2 category (FEMA, 2020).

Since 1868, nine disastrous earthquakes have occurred on the island. The largest series occurred between March 27 and April 2, 1868 with an epicenter a few miles north of Pahala in the district of Kau. It is estimated that the magnitude of these earthquakes were 7.1 and 7.9. These earthquakes resulted in 77 deaths (46 from tsunami and 31 from landslides triggered by the earthquake). In 1929, an earthquake with an epicenter in Hualalai and a magnitude of 6.5 resulted in extensive damage. Another earthquake in 1951, with its epicenter in the Kona area and a magnitude of 6.9 also resulted in extensive damage. A series of earthquakes, with magnitudes of 6.7 and 6.0, occurred at Kiholo Bay on October 15, 2006. These earthquakes resulted in more than \$100 million in damages to the northwest area of the island (USGS, 2006).

3.5.5 Volcanic Hazards

Volcanic hazards include lava flows and emission of volcanic gases (vog).

Lava Flows. The volcanic hazard zone map for Hawaii Island divides the island into zones ranked from 1 through 9, with Zone 1 being the area of greatest hazard and Zone 9 being the area of least hazard. The zones are based chiefly on the location of active vents, frequency of past lava coverage, and topography. According to this map, the proposed Project is within Zone 3 (Figure 11). Zone 3 areas have had 1 to 5 percent of their land area covered by lava or ash flows since the year 1800, but are at lower risk than Zone 2 areas because of their greater distance from recently active vents and/or because the local topography makes it less likely they will be covered by future flows (USGS, 1997).

The closest flow in the vicinity of the Project Site vicinity is one that approached Hilo from Mauna Loa in 1880-1881, terminating around what is now the University of Hawaii at Hilo Research and Technology Park, approximately 1.85 miles southwest of the Project Site. The most recently active lava flows have been from Kilauea's Lower East Rift Zone (Leilani Estates) fissures, located approximately 21.25 miles southeast of the Project Site.

Vog. Volcanic gases, which are visible as a fog known as vog, are emitted during all types of eruptions. Halemaumau, the crater located at the summit of Kilauea, as well as the latest 2018 eruption at Kilauea's Lower East Rift Zone, are currently erupting large amounts of volcanic gas. Any hazard posed by volcanic gases is greatest immediately downwind from active vents; the concentration of such gases diminishes quickly as they mix with air and are carried by winds away from the source (USGS, 1997). The Project site is located 24 miles northeast of the summit of Kilauea Volcano, and approximately 20 miles northwest of the nearest recently active fissures of 2018. The prevailing northeasterly trade wind flow tends to push vog and airborne particulates away from Hilo. However, the amount of vog and other airborne particulates can significantly increase during periods when the winds are from the southwest.

3.5.6 Wildfires

Approximately 70 to 80 wildfires occur annually in the County of Hawaii. Humans are the number one cause of fires in Hawaii.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The improvements for drainage infrastructure proposed with this project are expected to mitigate localized flooding within the Project Site. In addition, the proposed design will slightly decrease the amount of impervious surfaces in the Project Site to further improve existing drainage conditions. Occasional tidal flooding along the southern portion of Bayfront Highway is expected to persist causing temporary road closures, however, the reconfiguration of the intersection will mitigate traffic congestion compared to existing conditions, which could have the benefit of facilitating evacuations. Tsunami and hurricane hazards in the area are unavoidable due to the location of the Site, but the proposed project will not exacerbate any of these

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conditions as they relate to their impact on the Site or the surrounding area. The project will also have no impact on risk factors related to earthquakes and wildfires.

The Project Site is approximately 25 miles away from the nearest active volcano (Kilauea). Hazard and risk potential from shield volcanoes like the active volcanoes found on Hawaii Island can be responded to effectively as there is likely sufficient warning of a potential volcanic threat to relocate equipment and personnel. The location of the Project Site is unlikely to impact emergency response in such an event.

3.5.7 Climate Change and Sea Level Rise

Potential impacts due to global climate change, including localized changes in precipitation and temperature, increased storm frequency and intensity, and marine water inundation due to sea level rise, is projected to affect the State of Hawaii over the coming decades. While State and County efforts encourage climate change mitigation to the greatest extent possible, it is also urged that future development adapt to the anticipated impacts. County of Hawaii has begun addressing climate change through specific goals set up out by the Aloha + Challenge (Hawaii Green Growth, 2022). This effort brings together public and private sector stakeholders to address specific sustainability goals which are tracked over time.

The most immediate potential climate change impacts to the project area would be flooding due to larger or more frequent precipitation events and static marine inundation due to Sea Level Rise (SLR). These impacts from global climate change are especially taxing on the limited resources of an island ecosystem. While it cannot be known how the project area will be affected by sea level rise and climate change in the future, scientific models for potential climate change factors have been considered in the conceptual plan for the proposed project.

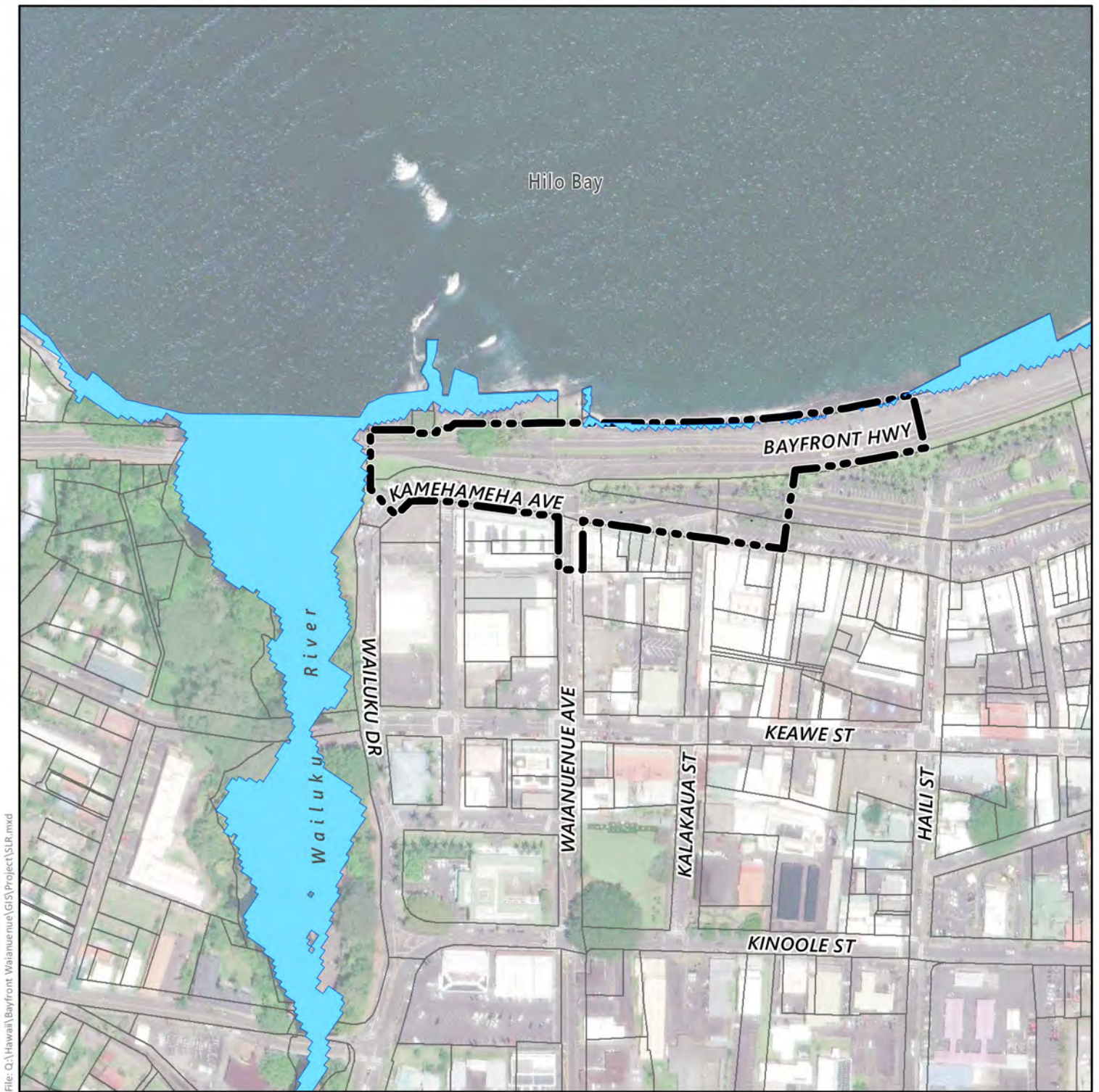
Research indicates that Hawaii may see an overall decline in rainfall with heavier rainfall events that cause flash flooding, increased runoff and sedimentation (UH Sea Grant, 2014). The State Climate Change Mitigation and Adaptation Commission's Sea Level Rise Vulnerability and Adaptation Report and Data Viewer provides projection and modeling to illustrate how SLR will impact the state (Pacific Island Ocean Observing System (PacIOOS), 2022). To estimate impacts related to sea level rise, it is recommended that development projects plan for a SLR scenario of 3.2 feet at this time (Hawaii Climate Change Mitigation and Adaptation Commission). Additionally, because of continued high global carbon emissions, the Climate Change Commission recommends consideration for a 6 feet of SLR scenario (higher high water, equivalent to 7.08 feet msl) in later decades of the century, especially for critical infrastructure with long expected lifespans and low-risk tolerance.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project addresses concerns related to climate change by providing drainage improvements to reduce localized flooding along the roadways. In an effort to mitigate future climate change, the project aims to promote multimodal transportation within the downtown Hilo area by prioritizing pedestrian facilities and creating safer means for traveling through the Site with raised crosswalks and reducing vehicular speeds through the roundabout design. By improving pedestrian facilities and connection to multimodal paths, the project encourages modes of transport that does not rely heavily on fossil fuel. There is the potential to limit greenhouse gas emissions and further the County Aloha + Challenge goal of reducing petroleum use in the ground transportation sector.

While it cannot be known for certain how the area will be affected by climate change, the need for increased stormwater management is expected. Currently the project area experiences flooding during heavy rain events as the current storm water infrastructure is inadequate to handle rain volumes. To address this issue, the project proposes to create new catch basin drains and drainage inlets throughout the Project Site. Where possible, the proposed project will integrate LID strategies into the design of the intersection and right of way. Post development stormwater discharge will be mitigated by the newly constructed drainage system. In addition, HDOT will implement strategies outlined in the Hawaii Highways Climate Adaptation Action Plan to enhance the capacity of the State’s highway network for future conditions. The project will be developed based on adaptive design guidelines to support the evaluation of climate adaptation and system resilience measures (State of Hawaii, Department of Transportation - Highways Division, 2021).

Under a 3.2 feet SLR scenario, most of the proposed project is not expected to become routinely flooded from anticipated static SLR or flooding due to tidal influences (Hawaii Green Growth, 2022). However, there are small portions along the makai side of Bayfront Highway that may be impacted under this scenario. See Figure 19.



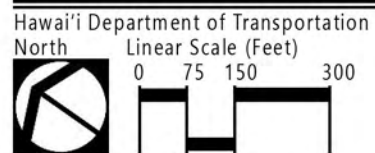
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LEGEND

-  Project Area
-  3.2-ft Sea Level Rise Exposure Area

Figure 19:
Sea Level Rise Exposure Area

**Bayfront Hwy and Waianuenue Ave
Intersection Improvements**



Island of Hawai'i



3.6 FLORA AND FAUNA

A pre-assessment consultation was conducted from January 2022 through April 2023 with relevant agencies such as the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the Hawaii Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife (DOFAW) and Division of Aquatic Resources (DAR). The purpose of the pre-assessment consultation was to identify potential project impacts on plant and animal species, including those that may be listed as threatened or endangered under the Endangered Species Act, as well as other protected species. Informal Consultation with USFWS in compliance with Endangered Species Act Section 7 was conducted and HDOT obtained a species list from the USFWS Information for Planning and Consultation (IPAC) online portal in September 2022. Endangered Species Act Consultation is ongoing and concurrent with the environmental review process. In addition, pre-assessment consultation was conducted in December 2022 through outreach to all relevant state agencies, including DLNR, DOFAW, and DAR. The findings, potential impacts, and mitigation measures are outlined below.

FLORA

Listed Hawaiian Plants

The entire project area is within a previously developed, modified, and maintained roadway ROW. Therefore, listed Hawaiian plant species are not anticipated to be present in the project area. Flora found within the Project Area is consistent with landscaping found throughout the downtown Hilo historic district.

During the Draft EA pre-assessment consultation period, DOFAW provided the following comments:

DOFAW recommends using native plant species for landscaping appropriate for the area; i.e., plants for which climate conditions are suitable for them to thrive, plants that historically occurred there, etc. Please do not plant invasive species. DOFAW also recommends referring to www.plantpono.org for guidance on the selection and evaluation of landscaping plants and to determine the potential invasiveness of plants proposed for use in the project.

DOFAW recommends minimizing the movement of plant or soil material between worksites. Soil and plant material may contain detrimental fungal pathogens (e.g., Rapid 'Ōhi'a Death), vertebrate and invertebrate pests (e.g., Little Fire Ants, Coqui Frogs, etc.), or invasive plant parts (e.g., African Tulip, Octopus Tree, Trumpet Tree, etc.) that could harm our native species and ecosystems. We recommend consulting the Big Island Invasive Species Committee (BIISC) at (808) 933-3340 to help plan, design, and construct the project, learn of any high-risk invasive species in

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the area, and ways to mitigate their spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

POTENTIAL IMPACTS AND MITIGATION MEASURES

New landscaping is not planned for the project area and the center island will comprise a hardscape surface design. Any vegetated landscaped areas that will be disturbed during construction will be revegetated where appropriate within the proposed design. The project will utilize landscape and a plant palette similar to the surrounding areas such as re-naturalized lava with native groundcover and shrub plants. In addition, listed Hawaiian plant species are not anticipated to be present in the Project Area and impacts are therefore not anticipated due to the previously disturbed urban setting. Appropriate measures will be taken during construction to reduce the potential transfer of plant or soil material between work sites that may contain detrimental fungal pathogens or invasive plant parts that could harm native species and ecosystems.

FAUNA

Hawaiian Hoary Bat (Opeapea)

The Hawaiian hoary bat roosts in both exotic and native woody vegetation across all the main Hawaiian Islands and will leave young unattended in trees and shrubs when they forage. If trees or shrubs 15 feet or taller are cleared during the pupping season, there is a risk that young bats could inadvertently be harmed or killed since they are too young to fly or may not move away. Additionally, Hawaiian hoary bats forage for insects from as low as 3 feet to higher than 500 feet above the ground and can become entangled in barbed wire used for fencing.

During the Draft EA pre-assessment consultation period, DOFAW provided the following comments:

The State listed Hawaiian Hoary Bat or 'Ōpe'ape'a (Lasiurus cinereus semotus) could potentially occur at or in the vicinity of the project and may roost in nearby trees. Any required site clearing should be timed to avoid disturbance to bats during their birthing and pup-rearing season (June 1 through September 15). During this period woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed. Barbed wire should also be avoided for any construction because bats can become ensnared and killed by such fencing material during flight.

POTENTIAL IMPACTS AND MITIGATION MEASURES

To avoid and minimize potential project impacts to Hawaiian hoary bats the following measures have been incorporated into the project:

- Woody plants greater than 15 feet in height shall not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1st through September 15th).
- No barbed wire for fencing shall be used.

Hawaiian Seabirds

The Hawaiian petrel, band-rumped storm petrel, and the Newell's shearwater (collectively known as seabirds) may transit over the project area at night, when flying between the ocean and their mountain nesting, during their breeding season (March 1 through December 15). Seabirds are attracted to lights and after circling the lights they may become exhausted and collide with nearby wires, buildings, or other structures or they may land on the ground. Downed seabirds are subject to increased mortality due to collision with automobiles, starvation, and predation by dogs, cats, and other predators. Any increase in the use of nighttime lighting, particularly during each year's seabird fledging season (September 15 through December 15), could result in additional seabird injury or mortality.

During the Draft EA pre-assessment consultation period, DOFAW provided the following comments:

Artificial lighting can adversely impact seabirds that may pass through the area at night by causing them to become disoriented. This disorientation can result in their collision with manmade structures or the grounding of birds. It is DOFAW's stance that permanent lighting would pose a very high risk of seabird attraction on the proposed stretch of road. New highway lights, therefore, should not be installed in this area to protect seabird flyways and preserve the night sky. For nighttime work that might be required, DOFAW recommends that all lights used be fully shielded to minimize the attraction of seabirds. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season from September 15 through December 15, the period when young seabirds make their maiden voyage to sea. For illustrations and guidance related to seabird-friendly light styles that also protect seabirds and the dark starry skies of Hawaii, please visit <https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf>.

POTENTIAL IMPACTS AND MITIGATION MEASURES

To avoid and minimize potential project impacts to Hawaiian seabirds the following measures have been incorporated into the project:

- All outdoor lighting shall be shielded so the bulb can only be seen from below.
- Night construction shall be avoided during the seabird fledging season, September 15 through December 15. For night construction occurring during other times of the year, all lighting shall be fully shielded and directed towards the ground.
- All outdoor lighting, with the exception of streetlights, will have automatic motion sensor switches and controls.
- Powerline and other existing above ground cables will be relocated within the roadway ROW within five feet of the height of the existing cables.

Due to the urban location of the project area, the proposed improvements will require construction of new lighting. However, the highway lighting incorporated in the design of the intersection reconfiguration will retain comparable lighting to the existing conditions and will adhere to modern design standards to mitigate adverse impacts to Hawaiian seabirds.

Hawaiian Goose (Nene)

Nene are found on the islands of Hawaii, Maui, Molokai, and Kauai. They are observed in a variety of habitats, but prefer open areas, such as pastures, golf courses, wetlands, natural grasslands and shrublands, and lava flows. Threats to the species include introduced mammalian and avian predators, wind facilities, and vehicle strikes.

During the Draft Environmental Assessment pre-assessment consultation period, DOFAW provided the following comments:

*The State listed Hawaiian Goose or Nēnē (*Branta sandvicensis*) could potentially occur in the vicinity of the proposed project site. It is against State law to harm or harass these species. If any are present during construction, all activities within 100 feet (30 meters) should cease and the bird or birds should not be approached. Work may continue after the bird or birds leave the area of their own accord. If a nest is discovered at any point, please contact the Hawai'i Island Branch DOFAW Office*

POTENTIAL IMPACTS AND MITIGATION MEASURES

To avoid and minimize potential project impacts to Hawaiian geese the following measures have been incorporated into the project:

- Nene will not be approached, fed, or disturbed.
- If nene are observed loafing or foraging within the project area during the breeding season (September through April), a biologist familiar with nene nesting behavior will survey for nests in and around the project area prior to the resumption of work. Surveys will be repeated after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest).
- If a nene nest is discovered within 150 feet of the work area all work will cease and the USFWS will be contacted for further guidance.
- If nene are observed in or near the project area the project personnel and contractor will be informed about the presence of nene at the site.

Hawaiian Waterbirds

Listed Hawaiian waterbirds are found in fresh and brackish-water marshes and natural or man-made ponds. Hawaiian stilts may also be found wherever ephemeral or persistent standing water may occur. Threats to these species include non-native predators, habitat loss, and habitat degradation. Hawaiian ducks are also subject to threats from hybridization with introduced mallards.

In addition, the creation of standing or open water may result in the attraction of Hawaiian waterbirds to a site (creative nuisance or habitat sink). In particular, the Hawaiian stilt is known to nest in sub-optimal locations (e.g., any ponding water), if water is present.

POTENTIAL IMPACTS AND MITIGATION MEASURES

There are no marshes or ponds in the project area that would provide suitable habitat for Hawaiian waterbirds. The entire project area is within roadway ROW. The roadway is subject to flooding during storm events, but standing water does not persist following such events. Therefore, Hawaiian waterbirds are not anticipated to be present in the project area.

Hawaiian Hawk (Io)

The Hawaiian Hawk, also known as the Io, is endemic to Hawaii Island and its habitat includes a diverse range of ecosystems, including tropical rainforests, montane forests, and open grasslands. They are often found near the slopes of volcanoes and inhabit areas with tall trees for nesting and hunting, as well as open areas for foraging.

During the Draft EA pre-assessment consultation period, DOFAW provided the following comments:

The State listed Hawaiian Hawk or 'Io (Buteo solitarius) may occur in the project vicinity. DOFAW recommends surveys of the area be conducted by a qualified biologist to ensure no Hawaiian Hawk nests are present if trees are to be cut. 'Io nests may be present during the breeding season from March to September.

POTENTIAL IMPACTS AND MITIGATION MEASURES

While it is unlikely that the roadway project area along the developed shoreline of Downtown Hilo would be a suitable habitat for this forest bird, appropriate measures will be taken if large trees require to be cut during construction to ensure that no Hawaiian Hawk nests are present. Particular attention will be taken during the breeding season from March to September.

Hawaii Akepa

The current range of this Hawaiian forest bird is predominately restricted to montane forests above 3,500 feet in elevation.

POTENTIAL IMPACTS AND MITIGATION MEASURES

There is no suitable habitat for this forest bird in the roadway project area, along the developed shoreline of Downtown Hilo. Therefore, the Hawaii akepa is not anticipated to be present in the vicinity of the project area.

Green Sea Turtle (Honu) and Hawaiian Monk Seal (Ilio holo i ka uaua)

Green sea turtles may nest on any sandy beach area in the Pacific Islands. Nesting occurs on Hawaiian beaches from May through September, peaking in June and July, with hatchlings emerging through November and December.

During the Draft EA pre-assessment consultation period, DOFAW provided the following comments:

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*The State endangered Hawaiian Monk Seal or Ilio-holo-i-ka-uaua (*Monachus schauinslandi*) and threatened Green Sea Turtle or Honu (*Chelonia mydas*) could potentially occur or haul out onshore within the vicinity of the proposed project site. If either species is detected within 100 meters of the project area all nearby construction operations should cease and not continue until the focal animal has departed the area on its own accord.*

POTENTIAL IMPACTS AND MITIGATION MEASURES

Construction on, or in the vicinity of, beaches can result in sand and sediment compaction, sea turtle nest destruction, beach erosion, contaminant and nutrient runoff, and an increase in direct and ambient light pollution which may disorient hatchlings or deter nesting females. Off-road vehicle traffic may result in direct impacts to sea turtles and nests, and also contributes to habitat degradation through erosion and compaction.

The proposed project does not involve any work on beaches. The entire project area is within roadway ROW. There is only a very narrow strip of black sand beach near the project area. This narrow strip of beach is regularly inundated and is not known to support turtle nesting. Therefore, green sea turtles are not anticipated to be present in the vicinity of the project area. The black sand beach area near the project area is also not known to be frequented by Hawaiian monk seals and they are not anticipated to be present.

However, appropriate measures will be taken to avoid and minimize potential impacts. If either species is detected within 100 meters of the project area during construction of the proposed improvements, all nearby construction operations will cease until the animal has departed the area.

Nonnative Predators

During the Draft EA pre-assessment consultation period, DOFAW provided the following comments:

DOFAW is concerned about attracting vulnerable birds to areas that may host nonnative predators such as cats, rodents, and mongooses. We recommend taking action to minimize predator presence; remove cats, place bait stations for rodents and mongoose, and provide covered trash receptacles.

POTENTIAL IMPACTS AND MITIGATION MEASURES

Appropriate measures will be taken during construction to deter undesirable conditions that might attract nonnative predators to the project area.

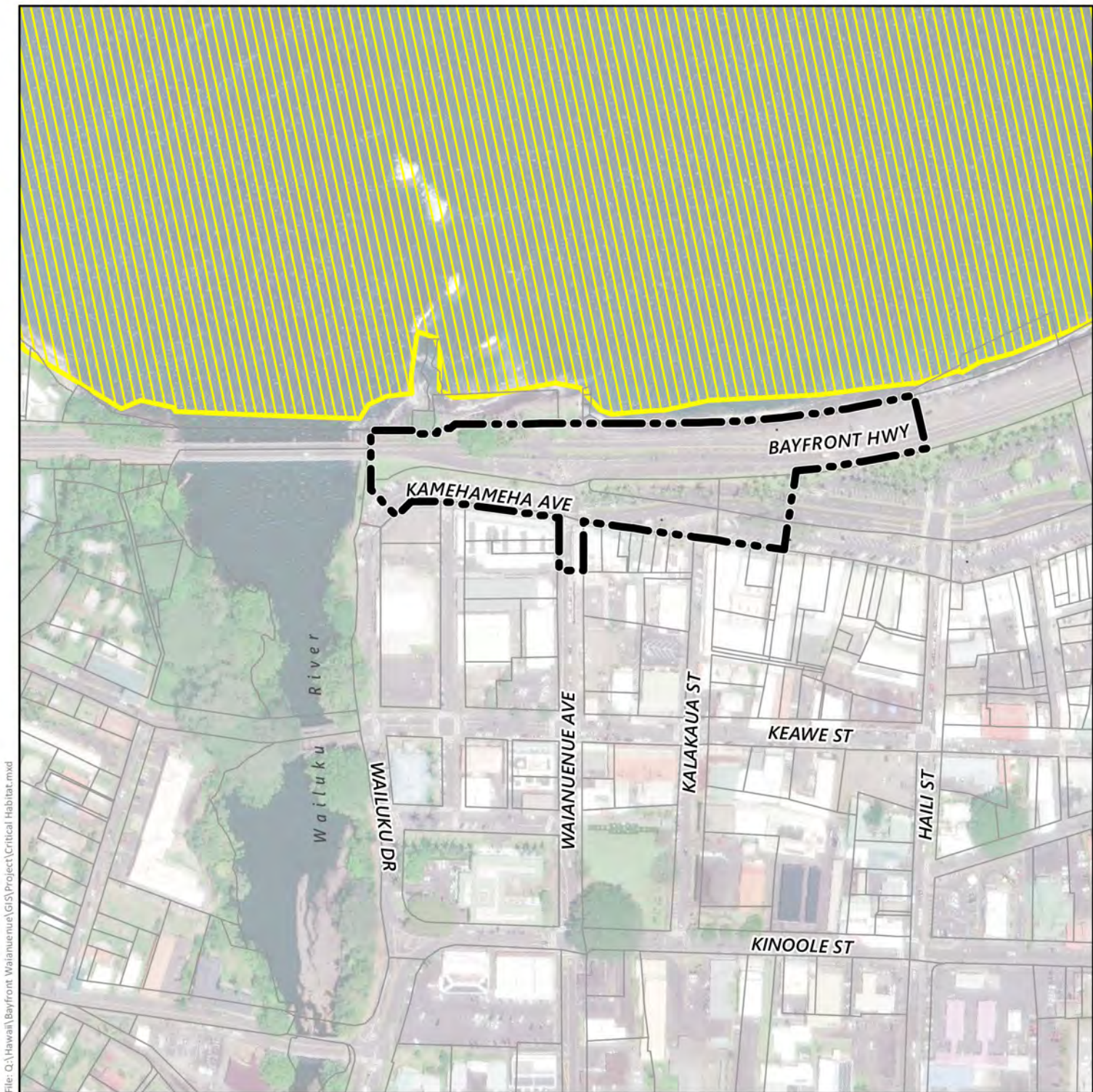
Mitigation measures will be conducted as described above concerning flora and fauna potentially impacted by the proposed project. Ongoing consultation will be conducted throughout the planning process and appropriate agencies will be contacted if unforeseen circumstances arise during construction that may require more thorough mitigation measures.

Bayfront Highway and Waianuenue Avenue Intersection Improvements
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During the Draft EA pre-assessment consultation period, DAR provided the following comments:

No Comments.

See Appendix G for the pre-assessment consultation comment letters and responses for more detail on each of the comments presented by DOFAW and DAR.



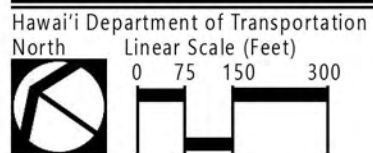
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LEGEND

-  Project Area
-  TMK Parcels
-  Critical Habitat (Hawaiian Monk Seal)

**Figure 20:
Critical Habitat**

**Bayfront Hwy and Waianuenue Ave
Intersection Improvements**



Island of Hawai'i



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

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

4.1 HISTORIC PROPERTIES

4.1.1 Historic Architectural Properties

AECOM conducted a review of the historic architectural properties in and adjacent to the project area. They assessed the project for potential impacts to these properties.

EXISTING CONDITIONS

The commercial bayfront area of Hilo prospered initially in the early to mid-nineteenth century as a port for the Pacific whaling industry; later, it experienced another period of rapid growth in the late nineteenth and early twentieth century due to the booming sugar industry. Downtown Hilo is defined by its large collection of historic commercial buildings, most of them built between 1900 and 1960. Representing a range of decades and architectural styles, the buildings still form a coherent group, with most one to three stories in height. Many have false-front storefronts with parapet roofs; styles and details of historic buildings range from highly ornate Italianate and Renaissance revival to simplified mid-century Modern. Hilo's downtown is eligible for inclusion in the National Register of Historic Places (NRHP) and Hawaii Register of Historic Places (HRHP).

Most of the project area is along Kamehameha Avenue. Known as Front Street prior to 1916, it is one of Hilo's oldest streets. Bayfront Highway was constructed in 1950 along the alignment of the former Hawaii Consolidated Railway Company track that was irreparably damaged in the 1946 tsunami. Due to its location, roads, rail tracks, buildings, and structures in the project area have historically been vulnerable to damage from both ocean floods such as tsunamis and storm surges, and to flooding from the adjacent Wailuku River, notorious for its violent and unexpected freshets (upland floods originating from rain events in its large mountain watershed). Regular damage from such natural disasters, together with incremental changes associated with the development of downtown Hilo's streets, railroad, waterfront, and highways, has contributed to frequent alterations to the landscape of this area over more than a century.

Background research for the identification of historic architectural properties included review of the following studies. In addition, desktop research was conducted to gather information about historic properties from State Historic Preservation Division (SHPD) State Inventory of Historic Places (SIHP) data, online newspaper archives; State of Hawaii Surveyor's Office online collection of Registered Maps and other digitized plats and survey documents; and the Hawaii State Archives online photograph collection. Qualified staff also reviewed historical documentation

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and secondary sources such as local histories from the collections of the library at University of Hawaii at Hilo (UH Hilo) and the Hilo Public Library.

Table 4-1: Relevant Studies for Historic Architectural Properties

Name (Year)	Location	Study Name (Type)	Findings
University of Hawaii at Manoa Historic Preservation Program (2003)	60 acres of Downtown Hilo, bounded by the Wailuku River, Bayfront Highway, Ponahawai Street, and Kapiolani Street/Kaiulani Street.	Downtown Hilo Historic District Study (architectural district study)	163 buildings and one site within downtown Hilo contribute to its historic significance and NRHP eligibility as a district.
Ranzetta et al. (2017)	Portion of Hilo urban area within coastal flood zone	Reconnaissance Level Survey of Coastal Communities (reconnaissance level survey)	Numerous buildings within downtown Hilo are historic and contribute to its NRHP eligibility as a district. 12 buildings in the project area were surveyed, 2 evaluated as individually NRHP eligible, 2 as non-contributing, and 8 as contributing to a NRHP eligible historic district.
Morrison (1992)	Volcano Block, 27-37 Waianuenue Avenue	National Register Nomination, Volcano Block (NRHP nomination form)	Volcano Block building NRHP listing.

In 1993, the UH Manoa Pacific Preservation Field School prepared a study proposing an area of downtown Hilo to be nominated to the NRHP as a Historic District. The district as proposed includes the area of Hilo bounded by the Wailuku River, Hilo Bayfront Highway, Ponahawai Street, and Kapiolani Street/Kaiulani Street. The Downtown Hilo Historic District Study (on file at the UH Hilo library) inventoried 293 buildings, and, using a cutoff date of 1950, recommended that 163 buildings and one site are contributing and 75 are non-contributing. It identifies the district as significant under Criterion A for “multi-ethnic culture and economic importance in the sugar and shipping industries,” and under NRHP Criterion C for “architectural significance as the largest concentration of historic buildings on the island, conveying outstanding examples of several architectural styles.” Within the district, in addition to buildings that convey association with these areas of significance, the defining characteristics of the district include its rectilinear street grid, makai-mauka orientation of main streets, the massing of two- to three-story buildings in a mix of vernacular and high styles, pedestrian access (sidewalks), small parks, and large shade trees. No specific characteristics of the district’s roads, sidewalks, or other urban streetscapes are defined as contributing or character-defining in the study.

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4.1.2 Identification of Historic Properties

Identification and evaluation of historic properties were conducted by Adriane Truluck, RLA, of AECOM. She holds a B.A. in Geography-Anthropology from Vassar College, a M.L.A. in Landscape Architecture and Certificate in Historic Preservation from the University of Virginia. With more than 20 years of experience in historical landscape architecture and historic preservation planning, Ms. Truluck meets the Secretary of Interior Professional Qualification Standards for Historic Landscape Architect as defined in the Federal Register, Volume 62 Issue 119 (June 20, 1997). See Figure 21 showing locations of historic properties described in this section.

Figure 21: Downtown Hilo Historic District Map



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4.1.3 Historic Buildings

Within the study area, adjacent to and near the project area boundary, there is one NRHP-listed building, and there are eleven other buildings that have been identified as NRHP and HRHP eligible. These stand within an eligible historic district that overlaps the project area slightly. None of the adjacent historic buildings would be touched by the project or affected by project activities.

Table 4-2: Historic Properties Identified Near the Project Area

Name/address	TMK	NRHP or SIHP #	Relationship to project area	Description
Downtown Hilo Historic District	n/a	Not listed	Includes buildings adjacent to project area along Kamehameha Avenue, parking areas, and Waianuenue Avenue.	NRHP Eligible, with 163 contributing historic buildings and one contributing site identified. Recommended for nomination in a study, but not formally nominated or listed in HRHP or NRHP.
Volcano Block, 27-37 Waianuenue Avenue	323003006	NRHP #92001748, HRHP #50-10-35-07507	Adjacent to, but outside, the corner of the project area where it terminates along Waianuenue Avenue.	NRHP Listed. Commercial building constructed in 1914. Italian Renaissance Revival details, reinforced concrete with metal roof. Significant as an excellent representation of a local commercial building, important business in development of Hilo's downtown, and early "fireproof" construction.
First Hawaiian Bank Kamehameha Branch/Pacific Tsunami Museum, 130 Kamehameha Avenue	323003005	Not listed; SIHP #50-10-35-30795	Adjacent to the project area along Kamehameha Avenue.	NRHP Eligible (per SASH survey, AECOM 2017). Former First Hawaiian Bank Kamehameha Branch building, constructed 1930. Designed by important Hawaii architect C.W. Dickey, this building is an excellent example of Hawaiian Classical Revival architecture, clad in cast stone with decorative wrought-iron grillework.
Koehnen's Building, 9 Shipman Street	323004002	Not listed. SIHP # 0471-72?	Adjacent to the project area along Kamehameha Avenue and Shipman Street.	NRHP Eligible (evaluated as contributing to historic district and likely individually eligible). Constructed 1910 for the Hackfeld Company, intact example of a local commercial

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Name/address	TMK	NRHP or SIHP #	Relationship to project area	Description
				building, important business in development of Hilo's downtown and the Hawaii sugar industry, and early "fireproof" construction.
14 Waianuenue Ave	323004016	Not listed	Adjacent to the project area on corner of Kamehameha Avenue and Waianuenue Avenue.	NRHP Eligible (evaluated as contributing to historic district). Constructed in 1940 as a modern commercial building.
100 Kamehameha Avenue	323003011	Not listed	Adjacent to the project area along Kamehameha Avenue.	NRHP Eligible (evaluated as contributing to historic district). Constructed in 1934 as a modern commercial building.
106 Kamehameha Avenue	323003012	Not listed	Adjacent to the project area along Kamehameha Avenue.	NRHP Eligible (evaluated as contributing to historic district). Constructed in 1949 as a modern commercial building.
116 Kamehameha Avenue	323003014	Not listed	Adjacent to the project area along Kamehameha Avenue.	NRHP Eligible (evaluated as contributing to historic district). Constructed in 1904 as a commercial building.
122 Kamehameha Avenue	323003015	Not listed	Adjacent to the project area along Kamehameha Avenue.	NRHP Eligible (evaluated as contributing to historic district). Constructed in 1932 as a modern commercial building.
Ralph Lau Building, 160 Kamehameha Avenue	323007010	Not listed	Adjacent to the project area along Kamehameha Avenue.	NRHP Eligible (evaluated as contributing to historic district). Constructed in 1925 as a neoclassical revival style modern commercial building.
34 Waianuenue Avenue	323004003	Not listed	Adjacent to the project area along Waianuenue Avenue.	NRHP Eligible (evaluated as contributing to historic district). Constructed in 1931 as a modern commercial building.
144 Kamehameha Avenue	323007009	Not listed	Adjacent to the project area along Kamehameha Avenue.	Over 50 years old. Evaluated as non-contributing to historic district. Constructed in 1941 in Modern style as a commercial building.
90 Kamehameha Avenue	323003010	Not listed	Adjacent to the project area along	Over 50 years old. Evaluated as non-contributing to historic district. Constructed in 1942 in

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Name/address	TMK	NRHP or SIHP #	Relationship to project area	Description
			Kamehameha Avenue.	Modern style as a commercial building.
Lava rock curbing	23002999	Not listed	In the project area along Kamehameha, Waianuenue, Kalakaua	Lava rock curbing is a common feature of historic downtown areas in Hawaii. While it is not eligible individually, the curbing may contribute to the NRHP eligible historic district.
CRM retaining wall	23002999	Not listed	In the project area along makai side of Kamehameha Avenue near the Wailuku River bridge southern approach.	Low CRM retaining wall with random, widely-spaced, flat rocks. It stands about 3 feet high. While the construction date is not known, research suggests the wall was likely built c. 1910 although it may have been altered in later years. It is not associated with a building or other property.

4.1.4 Historic Landscape Features

Within and adjacent to the project area several landscape features of interest were observed in survey and field inspection. These include lava rock curbs; what appeared to be stone pavers; and a concrete rubble masonry (CRM) wall along Kamehameha Avenue. Some of these features are located within the project area and in locations that would be affected by project activities.

Lava Rock Curbs

Lava rock curbs are recognized as a common feature of historic urban areas in Hawaii. They are well documented in Honolulu and are also present along some of the older streets in Hilo including Kamehameha Avenue, Kalakaua Avenue, and Waianuenue Avenue. Made of a dense basalt sometimes called bluestone, and typically locally quarried, these rough hand-cut curb segments often date to the late 1800s and early 1900s. During World War II, road-building technology changed, and poured-in-place and precast concrete curbs became commonplace. By the 1960s, lava rock curbs were no longer used. Front Street (now Kamehameha Avenue) in the project area appears to have been macadamized between 1909 and 1917; this is likely when the lava rock curbs were installed. It is likely that the other streets in and around the project area received their lava rock curbs when they were macadamized around the same time.

Lava rock curb segments are found along the mauka edge of Kamehameha Avenue between Waianuenue Avenue and Kalakaua Street, extending in a straight line along the roadway and then continuing in the same alignment, diverging from the road edge where Kamehameha Avenue now turns slightly to the east around a landscaped bump-out in along 116, 120, and 130

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Kamehameha Avenue. Lava rock curb segments are also located along a portion of the mauka side of Kamehameha Avenue between Shipman Street and Waianuenue Avenue; and along both sides of Waianuenue Avenue and Kalakaua Street. An additional segment of lava rock curb is along the makai side of Kamehameha Avenue between Waianuenue Avenue and just past Kalakaua Avenue. This segment does not appear to follow the historical pre-1946 tsunami street pattern and may have been relocated and realigned in a later reorganization of the roadways and parking lots in this area.

In general, the segments of curbing are in good condition. In some areas, lava rock curbs have been painted red to indicate no parking zones. For about 20 feet in each direction at the corners of all streets in and near the project area, lava rock curbs were removed, probably in the 1990s, and replaced with concrete to facilitate accessible curb cuts.

While it is not individually eligible for listing in the NRHP, lava rock curbing may be eligible as a contributing element of the NRHP eligible Downtown Hilo Historic District.

Paving Stones

Apparent areas of gray paving stones along Kamehameha Avenue were examined and determined to be concrete pavers installed as part of late twentieth century streetscape improvements. These are not representative of historic paving on this street, which is documented as a combination of poured concrete and macadam going back as early as 1903, based on review of newspaper articles and period photographs.

No historic paving was identified in the project area.

Concrete Rubble Masonry Retaining Wall

A CRM retaining wall extends approximately 160 feet in length within a grass median along the makai side of Kamehameha Avenue between Waianuenue Avenue and Shipman Streets. It varies from approximately 2 to 3 feet high. The masonry wall is faced in random, flat rocks with wide, mortared joints, and has no cap or other ornamentation. It runs in a straight line parallel to Kamehameha Avenue.

The exact construction date of the CRM retaining wall is not confirmed. Based on a review of historic newspaper articles, maps, and photographs as well as secondary sources, it is likely the wall was built c. 1910, although it may have been altered later.

The retaining wall is a component of a roadway that is on the makai edge of downtown Hilo. The association of the wall to historic resources is inadequate to assign it significance under the NRHP Criterion A. The wall has no known association with significant persons, and is therefore not NRHP-eligible under Criterion B. The use of CRM walls to retain slopes in urban areas is a common practice in Hawaii; the CRM wall is of a typical and non-distinctive masonry construction and does not appear to be a notable engineering or design effort. It does not rise to the level of NRHP eligibility under Criterion C.

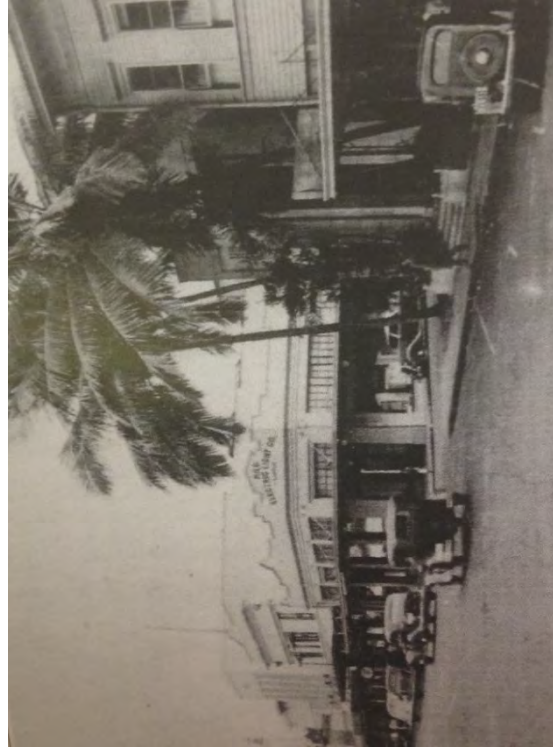
Figure 22: Images of Historic Properties Near Project Area



Volcano Block on Waiānuenuenu Avenue, constructed 1914 and listed in the National Register of Historic Places. (AECOM, 2017)



Pacific Tsunami Museum on Kamehameha Avenue, formerly a bank, constructed 1930 and designed by architect C.W. Dickey. (AECOM, 2017)



View of the mauka side of Kamehameha Avenue prior to the 1946 tsunami, at corner of Kalākaua Avenue. (Laupahoehoe Train Museum, reprinted in Lang 2007)



Hackfeld & Company building at the northwest corner of Kamehameha Avenue and Waiānuenuenu Avenue, c. 1910. (Koeppen's collection, reprinted in Lang 2007)



Google Street View with CRM wall, looking northeast from intersection of Waiānuenuē and Kamehameha Avenues (image Sept 2019)

Hilo Bayfront “Sea Wall” / Revetment

Construction drawings from 1949 specify a sea wall, or coastal revetment, along the Bayfront Highway for the Hilo Waterfront Highway project. The project was a response to the 1946 tsunami, undertaken to rehabilitate seismic wave damage. The construction drawings denote that the revetment shall contain a 5-ton face, or field stone armor, with a rock fill filter and that the rocks be obtained from the quarry, weighing at least 25 lbs. each and that over one half of the rock fill filter must weigh at least 1 ton.

The wall appears purely functional, and it does not have any ornamentation. The revetment is a component of Bayfront Highway, which has not been identified as a historic road. It does not have a state inventory of historic properties number. It is not identified as eligible to the National Register as it has no association to historic resources; no known association with significant persons; and is not of any distinctive construction or notable engineering or design effort.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The project area is in and adjacent to a historic portion of downtown Hilo, Hawaii. One NRHP-listed and several NRHP-eligible historic properties, all buildings, have been identified adjacent to and near the project area. The project activities will not adversely affect any NRHP or HRHP eligible or listed historic buildings, or the character of the historic district.

Within the project area, lava rock curbs and a CRM wall would be affected by the project. These are historic (more than 50 years of age) but are evaluated as not eligible for the NRHP due to a lack of significance and insufficient measure of historic integrity.

The project will include rehabilitation of the lava rock curbs. Any lava rock or basalt curbs identified within the project area will be surveyed and documented prior to work starting and will be rehabilitated as part of the project.

The project will include removal of a historic (50+ year old) CRM wall which is not NRHP or HRHP eligible. This wall will be surveyed and documented prior to work starting.

4.1.5 Archaeological Properties

Honua Consulting, LLC (Honua) conducted an archaeological literature review and field investigation (LRFI) for the project. To the best of their knowledge, no previous archaeological testing (i.e., subsurface excavation) has been conducted in the current project area. AECOM conducted a review of historic architecture and related resources in the project area and adjacent areas. It is included below. Honua also completed a cultural impact assessment (CIA) to identify traditional practices in the area and any potential impacts to those cultural resources.

As summarized in the LRFI (“Cultural and Historical Context”), although the Hilo bayfront is unusually blessed with a wide variety of wahi pana (legendary places), and other natural and cultural resources, two factors have combined to erase any above-ground traditional Hawaiian (i.e., pre-Contact or early historic period) archaeological sites from the project area:

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1. Historic use of the project area—including railroad construction and buildings (e.g., railroad depot and other light-industrial and commercial structures), and the numerous roads that have been built—removed any earlier structures; and,
2. The numerous tidal waves, including the historically-devastating one in 1946—Hilo has endured, have likewise wiped out any remnant structures dating from pre-Contact or early historic times.

Furthermore, as evidenced by aerial photographs dating from 1954 (see Appendix B - Figure 13), 1965 (see Appendix B - Figure 14) and 1977 (see Appendix B - Figure 15), the dense collection of light industrial businesses, warehouses, and a variety of service shops and markets were never rebuilt in this area, which, today is home to roadways, parks and retaining walls built against the ocean.

As noted by Rechtman’s (2009) archaeological assessment of the bayfront (see Table 4-3 below), however, none of these observations necessarily preclude the discovery of historic properties or their component features in subsurface context. Such evidence could date from as early as the pre-Contact period into late historic times.

Table 4-3: Previous Archaeological Studies and Results Near the Project Area

Reference	Type	Location	Results & Comments ¹
Rosendahl 1980	Reconnaissance survey	Puueo; along north side of Wailuku River	SIHP # 50-10-35-15415 identified in subsurface context along north bank of Wailuku River; site contained abundant pre-Contact (traditional) Hawaiian features and artifacts, as well as historic period material; early component radiocarbon dated to AD 1400-1670
Goodfellow 1991	Inventory survey		
Rosendahl 1988	Reconnaissance survey	Piihonua; about ½-mile mauka (west) of project area	No sites identified in the parcel located in Piihonua
Wilkinson & Hammatt 2009	Field inspection – Hilo High School campus		Several structures comprising the Hilo High School (SIHP # 50-10-35-7522) were identified; also, a ditch and rock alignment (above-ground resources) were assigned temporary site numbers
Kennedy 1992	Inventory survey	Puueo; lowermost portions about ½ mile northwest of project area	SIHP # 50-10-35-18074 identified (a low rock mound interpreted as a possible historic-period burial) mauka and north of Rainbow Falls
Rechtman 2009	Assessment / reconnaissance survey	Hilo bayfront – including project area and Waiakea	No sites identified – but archaeological monitoring recommended for subsurface digging along the bayfront

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Reference	Type	Location	Results & Comments ¹
O'Hare et al. 2013	Field inspection / subsurface testing	Puueo; along north side of Wailuku River	No sites identified
Tam Sing et al. 2017	Cultural impact assessment w. summary of previous archaeology	Wailuku River drainage	Reviewed previous archaeological findings in and around the Wailuku River

The field investigation did not identify any potential archaeological resources. The area is fully development and extensive previous ground disturbance has taken place. In early consultation with the SHPD, SHPD staff identified the potential for railroad tracks to still be present before the existing roadway. No evidence of the tracks was identified during geotechnical investigation of the site.

POTENTIAL IMPACTS AND MITIGATION MEASURES

There is no impact to archaeological or architectural features anticipated. The project was designed to avoid potential impacts to historic buildings and the historic district, including historic features like paving and the related streetscape.

Due to the potential for subsurface railroad tracks, the project will conduct further consultation with SHPD under HRS 6E-8 and HAR 13-275 to determine if archaeological monitoring for identification purposes may be appropriate. There are no mitigation measures being proposed. Coordination with SHPD in compliance with National Historic Preservation Act - Section 106 is ongoing.

4.2 CULTURAL PRACTICES

A cultural impact assessment (CIA) was conducted by Honua Consulting, LLC to identify cultural practices that may occur in the area and any potential effects the project may have on these practices. The CIA also included a *Ka Paakai* analysis for consideration by the state. See Appendix C.

EXISTING CONDITIONS

Hilo, traditionally divided into three sub-districts, is one of six major moku o loko (districts) of land on the island of Hawaii. The district adjoins Hamakua on the north and west, Puna, on the east, and Kau to the west. At least 77 ancient ahupuaa (mauka to makai land management units) were defined in the district of Hilo. As such, the CIA looks at the larger geographic extent of the region as well as the project area in identifying cultural practices.

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In moolelo (traditional stories and histories), we find a rich narrative describing traditions, beliefs and practices, and spiritual and familial relationships that Hawaiians share with one another and their natural environment. Every aspect of nature from the stars in the heavens, to the winds, clouds, rains, growth of the forests and life therein, and everything on the land and in the ocean, was (and is) believed to be alive. Tradition also tells us that the gods and goddesses of old were very protective of the natural environment. In olden times, travel on land and sea, through the forests and beyond was accompanied by prayer and care.

In the Hawaiian mind, care for each aspect of nature, the kino lau (myriad body-forms) of the elder life forms, was a way of life. This concept is still expressed by Hawaiian kupuna (elders) through the present day and passed on in many native families. Also, in this cultural context, anything which damages the native nature of the land, ocean, and forest (and the kino lau or myriad body-forms of the deity therein) damages the integrity of the whole. Thus, caring for, and protecting the land and ocean resources, is a way of life. In this traditional context we find that the intangible aspects of our living environment are also part of a sacred Hawaiian landscape. Thus, the landscape itself is a highly valued cultural property. It's protection, and the continued exercise of traditional and customary practices, in a traditional and customary manner, are mandated by native custom. The Hilo area served as the setting for numerous moolelo. These moolelo reveal that in traditional times, there were many practices that occurred in the area, including sharing of moolelo, habitation, travel and trail usage, fishing practices, farming practices, kilo, navigation and paddling, and music and dance traditions.

Ethnographic interviews were conducted with practitioners in the area. There was identification of practices in the larger region, but there was no concern that the project would impact any of these practices.

While many of the practices identified in the CIA do not currently take place in the project area, many are still practiced in the surrounding areas. Hilo is the center of modern Hawaiian language revitalization, as well as the home of the Merrie Monarch festival, the world's largest and most prestigious hula competition. Every year, this bayfront area becomes a hub of activities, as a number of these stores along the bayfront are owned by Hawaiian practitioners.

POTENTIAL IMPACTS AND MITIGATION MEASURES

While the project area was once likely a hub of cultural activity prior to foreign contact, early modernization of the area significantly reduced the use of this area by practitioners. This reduction was furthered by the impacts of historic tsunamis. Nonetheless, there are active practitioners in the area who are financially sustained through their businesses adjacent to the project area. These business activities, many of which incorporate cultural knowledge, are critical to their ability to serve as practitioners. Perhaps the most important week for these activities is the Merrie Monarch Festival, which takes place annually in Hilo during the week following Easter.

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To avoid potential impact to the livelihoods of practitioners, construction activities should be minimized during the week of the Merrie Monarch Festival to the extent feasible. If construction allows, all possible travel lanes should remain open. Any closed parking (i.e., for staging or stockpiling) should be opened if possible.

4.3 TRANSPORTATION

4.3.1 Roadways and Traffic

A Transportation Impact Assessment Report (TIAR) was conducted by AECOM to analyze the potential impacts of the proposed project to the surrounding transportation system, including roadways, traffic patterns, and pedestrian and bicycle facilities (see Appendix D). Manual transportation volume turning movement counts and observations were conducted in April 2022.

EXISTING CONDITIONS

Roadway Conditions

The Project Site is comprised of three roadways and associated transportation and infrastructure uses, such as sidewalks, bike paths, parking, landscaped medians. Roadways include Bayfront Highway (Route 19), Waianuenue Avenue (Route 1950), and Kamehameha Avenue. A description of each roadway follows.

Bayfront Highway is a two-way, two-lane divided principal arterial roadway with one traffic lane in each direction divided by a raised median. The roadway is owned and operated by the HDOT and extends north to south along the eastern coast of Hawaii Island serving significant transportation access across the region and direct connections to local roadways in downtown Hilo and intersects with Waianuenue Avenue within the Project Site. There are paved shoulders along both sides of the roadway and the raised median transitions to a painted median and then to a two-lane undivided road at both ends of the Project Site. The posted speed limit is 35 miles per hour (mph).

Waianuenue Avenue is a two-lane, two-way collector road owned and operated by the County of Hawaii, running mauka to makai and intersecting with Kamehameha Avenue and Bayfront Highway within the Project Site. The roadway provides access to downtown Hilo and connects to Saddle Road, which bisects Hawaii Island providing regional access terminating on the western side of the island. The posted speed limit is 25 mph.

Kamehameha Avenue is a four-lane, two-way arterial roadway owned and operated by the County of Hawaii, which runs parallel to Bayfront Highway and transitions to a two-lane, two-way roadway on the north side of the intersection with Waianuenue Avenue. The roadway is on the makai boundary of the historic downtown Hilo district. The north portion of Kamehameha Avenue within the Site includes angled parking stalls on both sides of the roadway. The posted speed limit is 20 mph.

Pedestrian Facilities

Pedestrian facilities consist of sidewalks, crosswalks, and pedestrian signals at some signalized intersections. Sidewalks are only present along both sides of Waianuenue Avenue and Kamehameha Avenue, with the exception of the makai side of Kamehameha Avenue south of the intersection with Waianuenue Avenue. Sidewalks and accompanying crosswalks within the Site are limited to areas mauka of Bayfront Highway. Bayfront Highway does not have sidewalks or crosswalks within the Project Site area and there are no facilities to allow pedestrians to safely traverse Bayfront Highway. During data collection for the traffic study, pedestrians were observed making use of the paved shoulder along the makai side of Bayfront Highway to access Kaipalaoa Landing Park and other recreational facilities along Hilo Bay.

Bicycle Facilities

There are no existing bicycle facilities within the Project Site along Bayfront Highway, Kamehameha Avenue, and/or Waianuenue Avenue. Under current conditions, bicyclists must share the roadway with vehicular traffic or travel along sidewalks as observed during the traffic study data collection.

Transit

“Hele-On Bus” is the County of Hawaii’s primary form of public transit that offers fixed-route transit services in the Hilo area. Bus routes that traverse through the Project Site include the following: Route 1, Route 2, Route 102, Route 80. The closest bus stops to the Site are located on Kekaulike Street near Shipman Street, at the Hilo Post Office on Waianuenue Avenue and the Mooheau Bus Terminal on Kamehameha Avenue.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project includes improvements to reconfigure the intersection of Bayfront Highway (Hawaii Belt Road Route 19) and Waianuenue Avenue (Route 1950) to enhance multimodal connectivity and address ongoing concerns involving poor vehicular maneuverability, restricted access to the downtown Hilo area, pedestrian safety concerns, and overall congestion of roadways in the vicinity.

The roundabout design will result in an immediate improvement to vehicular access for the intersections within the Project Site by allowing vehicular turning movements in all directions and offering overall improved maneuverability, particularly for large trucks. Under the projected future conditions, roadway operations will function at an acceptable level of service (LOS) during the AM and PM peak hours. Traffic congestion will be improved throughout the vicinity of the Site and will also improve traffic flow during periods of closure due to tidal flooding along the southern portion of Bayfront Highway.

The project will also enhance pedestrian safety and multimodal access throughout the Site, especially for Kaipalaoa Landing Park and connectivity across Bayfront Highway. The proposed

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project will also contribute to a reduction in overall vehicular speeds through the Project Site, further reducing potential conflicts between pedestrians and vehicles. The preliminary design has incorporated multimodal features including ADA compliant sidewalks, raised crosswalks, shared use paths, and improved connections to Kaipalaoa Landing Park and other pedestrian and bicycle routes along Hilo Bay. The project will contribute to achieving goals and objectives consistent with the Downtown Hilo Multimodal Master Plan, Statewide Pedestrian Master Plan and Bike Plan Hawaii Refresh to provide a more walkable and bike-friendly community.

The project is also consistent with HDOT's Statewide Federal-Aid Highways 2035 Transportation Plan (2014) and contributes to the following goals and objectives:

- Provide a Complete Streets transportation system of motorized and nonmotorized options.
- Promote efficient travel between modes by creating connections and removing barriers.
- Promote safe connections between modal alternatives.
- Maintain safe, efficient, complete transportation system for the long term.
- Improve capacity and efficiency, and reduce congestion within the existing transportation system for long-term benefit.
- Maintain a safe transportation system for all land transportation modes.
- Improve safety of the community through connectivity of the transportation infrastructure.

The detailed site plans for the proposed project can be found in Appendix A. See Appendix D for the complete Transportation Impact Assessment Report.

Construction Impacts

Construction of the roundabout is expected to take approximately two years, broken up into approximately five phases. The construction sequencing and temporary traffic control will maximize the use of existing pavement areas to provide undisturbed traffic movements for three of the phases. This means all currently permitted turning movements will continue to be allowed during construction but may be shifted to different portions of the pavement roadway with the use of barricades, traffic delineators or cones as appropriate.

One phase of construction would need to close the makai portion of Waianuenue Avenue between Kamehameha Avenue and Keawe Street to allow for the quickest and safest construction for the Waianuenue Avenue leg of the roundabout. Traffic during this phase would need to be detoured through adjacent streets (Kamehameha Avenue, Wailuku Drive, Shipman Street and Kalakaua Street). This phase is expected to be the shortest phase of construction as complete closure of the roadway would allow for efficient construction methods.

Work done on the portion of Hawaii Belt Road between Wailuku River Bridge and the roundabout would require a one lane closure to allow for the required lane transition to the fixed two-lane Wailuku River Bridge. During this phase, incoming traffic would be detoured through Wainaku

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Street, which is the same detour route implemented when any work is presently done on Wailuku River Bridge.

Any detour or lane closure will require a “Notice to Motorists” to be published in the local newspaper, the Hawaii Tribune-Herald, for three consecutive days within one week before any traffic pattern change. Information and updates for traffic pattern changes will also be posted on the HDOT Highways website. During the Draft EA pre-assessment consultation period, the County of Hawaii Mass Transit Agency provided the following comments:

The County of Hawai'i Mass Transit Agency (MTA) has reviewed the correspondence related to the Bayfront Highway and Waianuenue Avenue and would request consideration for transit improvements at this intersection as Routes 1, 2/Blue, 60, 80 and 103 travel through this intersection on a daily basis, multiple times throughout the day. The MTA would like to be made aware of any construction plans and mitigation measures as the improvements may potentially impact these routes.

During the Draft EA pre-assessment consultation period, the County of Hawaii Department of Environmental Management – Solid Waste Division provided the following comments:

The Solid Waste Divisions conveys municipal solid waste daily from the Honomu Transfer Station and the Papaikou Transfer Station through the project site to the East Hawaii Regional Sort Station, and replaces full bins with empty ones. Closure of the project site to traffic without an adequate detour for the hauling of solid waste may hamper the Division's ability to empty the bins at the transfer station and may result in the closure of a transfer station. If this were to be necessary, advance notice to the public of service interruptions would also be required.

If any temporary closure of the Project Area is deemed necessary during construction, HDOT will coordinate with relevant agencies with adequate notice to ensure that existing service is not impeded and will consult these agencies to determine sufficient detour options.

See Appendix G for the pre-assessment consultation comment letters and responses in more detail for the Mass Transit Agency and Department of Environmental Management.

4.3.2 Airports

The Project site is located approximately 1.5 miles south of Hilo International Airport.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project will not impact airport operations as it does not attract hazardous wildlife, create glint and glare hazard, or create an aerial obstruction hazard to flight operations.

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During the Draft EA pre-assessment consultation period, HDOT – Airports Division provided the following comment:

The proposed project is approximately 1.5 miles from Hilo International Airport. The project site is also approximately 1.86 miles from Runway 3 and 1.92 miles from Runway 8, respectively. All projects within 5 miles from Hawaii State airports are advised to read the Technical Assistance Memorandum (TAM) for guidance with development and activities that may require further review and permits. The TAM can be viewed at this link: http://files.hawaii.gov/dbedt/op/docs/TAM-FAA-DOTAirports_08-01-2016.pdf.

Federal Aviation Administration (FAA) regulation requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or Alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9, if the construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. Construction equipment and staging area heights, including heights of temporary construction cranes, shall be included in the submittal. The form and criteria for submittal can be found at the following website: <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>

HDOT will consult relevant guidance on development activities as they relate to airport operations and will comply with all FAA regulations.

See Appendix G for the pre-assessment consultation comment letters and responses.

4.4 NOISE

Ambient noise in the Project area is consistent with an urban setting and predominantly attributed to the combined noise levels of vehicular traffic, nearby park uses and human interactions and activities related to the various nearby commercial uses in downtown Hilo.

POTENTIAL IMPACTS AND MITIGATION MEASURES

During construction, the proposed action may result in short-term noise impacts generated by construction activities. In the long-term, noise will be consistent with existing urban conditions common in a central urban district, including motor vehicle traffic, human interactions, recreational uses along Hilo Bay and other activities related to nearby commercial uses abutting the Project Site.

The project will comply with all permissible community noise standards in accordance with the State DOH Administrative Rules, Title 11, Chapter 46 “Community Noise Control” regulations. Increased noise activity due to construction will be mostly limited to daytime hours and will be confined to the construction period, however, nighttime construction may be required as well. The use of pile drivers, hoe rams, jack hammers 25 pounds or heavier, and high-pressure sprayers may be required during certain construction phases. However, this will be restricted to 7:00am

to 3:00pm, Monday through Friday to the best degree possible. Construction equipment and on-site vehicles or devices requiring exhaust of gas or air must be equipped with mufflers. In addition, construction activities must satisfy the DOH's vehicle noise requirement.

4.5 AIR QUALITY

Air quality on Hawaii Island is impacted by emissions from motor vehicles, industrial uses, and natural sources. The main source of industrial-based emissions are power plants fueled by oil, which emit SO₂, nitrogen oxides, and particulate matter into the atmosphere. Oil-based automobiles emit CO, nitrogen oxides and hydrocarbons (an ozone precursor), as well as smaller amounts of other pollutants including particulates. The geothermal power plant, operated by Puna Geothermal Venture, also contributes to SO₂ emissions and supplies power to roughly 10-20% of electricity usage on the island. However, operations by Puna Geothermal Venture have been limited and below full power due to inconsistent geothermal conditions resulting from the volcanic eruptions of 2018. Natural volcanic emissions of sulfur dioxide also impact air quality, which convert into particulate sulfate and causes volcanic haze (vog) in the area during occasional episodes of southerly Kona winds. Vog concentrations are primarily dependent on the amount of volcanic emissions, the distance from the source vents, and the wind direction and speed on a given day. When trade winds are absent, which occurs most often during the winter months, East Hawaii, the entire island or the entire state can be impacted by vog.

The State maintains six air monitoring stations on the island of Hawaii, one of which is located in Hilo. According to DOH ambient air quality data, the quality of air in the Hilo area is considered to be "Good." The prevailing northeasterly trade winds tend to disperse pollutants toward the mountains, decreasing the concentration of pollution in the Hilo area. However, the amount of particulates and other air pollutants can significantly increase during periods when the winds shift to a southwesterly direction.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The project is not expected to have a negative impact on air quality. Long-term impacts from the proposed project are anticipated to be minimal, although there is potential that the project will have a beneficial impact on air quality in the downtown Hilo area and contribute to improving air quality in the region. Vehicle idling should be reduced with conversion of the intersection from one that is signal controlled to a roundabout. Additionally, the proposed project attributes providing new and improved pedestrian and bicycle facilities will encourage alternative transportation modes in the area, which could reduce air pollutants associated with vehicular emissions.

There may be short-term direct and indirect impacts related to air quality that could potentially occur during construction. However, these construction-related impacts will be minimized and confined to the immediate vicinity of the site and BMPs will be implemented to limit localized

impacts. Emissions associated with equipment used during construction are not anticipated to violate any state or federal air quality standards.

To minimize fugitive dust impacts during construction, all construction activities will comply with all applicable provisions of HAR Title 11, Chapter 59, related to Ambient Air Quality Standards and HAR §11-60.1-33, related to Fugitive Dust. Long-term negative impacts related to air quality are not anticipated as construction equipment will utilize technology and standards which meet State and Federal air quality requirements.

4.6 VISUAL RESOURCES

The Project Site generally consists of unobstructed views as there are very few large structures in the area. Makai views of Hilo Bay are partially and minimally obstructed by utility poles, traffic signals, various directional signs, and palm trees. Mauka views across the Site include scenic partial views of Mauna Kea and Mauna Loa during days with clear weather and the immediate visual resources include the historic buildings abutting the Project Site in downtown Hilo.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The impact on visual resources after completion of the project are generally considered to be positive with the removal of existing traffic signal poles at the intersection. The site will generally maintain the same view planes consistent with existing conditions except for the central island portion of the roundabout. The central island of the roundabout is the non-traversable area surrounded by the circulatory roadway and is required to be mounded up to approximately 4 to 6 feet above surrounding roadway elevations to enhance driver recognition upon the approach to the roundabout. The addition of the roundabout traffic design will offer a less obstructed makai view of Hilo Bay from the vantage point of Waianuenue Avenue above average pedestrian sight lines while the central island of the roundabout will be partially obstructed. Overall, the design will generally improve both mauka and makai views across the Project Area.

4.7 INFRASTRUCTURE AND UTILITIES

4.7.1 Water System

The County of Hawaii, Department of Water Supply (DWS) has an existing 8-inch cast iron water main along the mauka side of Kamehameha Avenue throughout the project area, which provides water service to several of the adjacent private properties along Kamehameha Avenue. Additionally, the water system supplies two fire hydrants located along Kamehameha Avenue and can be seen in the water system infrastructure figure (Figure 23). One fire hydrant is located on the west corner of the Kamehameha Avenue and Waianuenue Avenue intersection and another fire hydrant is in the Kamehameha Avenue median between Waianuenue Avenue and Kalakaua Street.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The impact on the existing water system after completion of the project is anticipated to be minimal. The proposed project does not require water demand or service. The existing underground water infrastructure will remain in place. The project will require adjustment of existing surface water infrastructure such as meter boxes, valve covers and fire hydrants to match the new roadway layout and elevations. See Figure 23 and Appendix A.

During the Draft EA pre-assessment consultation period, the DWS provided the following comments:

We have no objection to the proposed project with the condition that the applicant/contractor will be responsible for the cost of relocating or modifying any of our water system facilities within the project area.

If the final site plans require relocation/modification of the water system within the project boundaries, the HDOT will be responsible for the cost incurred by these improvements and will consult with the DWS for the logistics required to conduct the modifications/relocation, if necessary to construct the proposed improvements to the intersection.

During the Draft EA pre-assessment consultation period, DLNR – Engineering Division provided the following comments:







The applicant should include water demands and infrastructure required to meet project needs. Please note that all State projects requiring water service from their local Department/Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

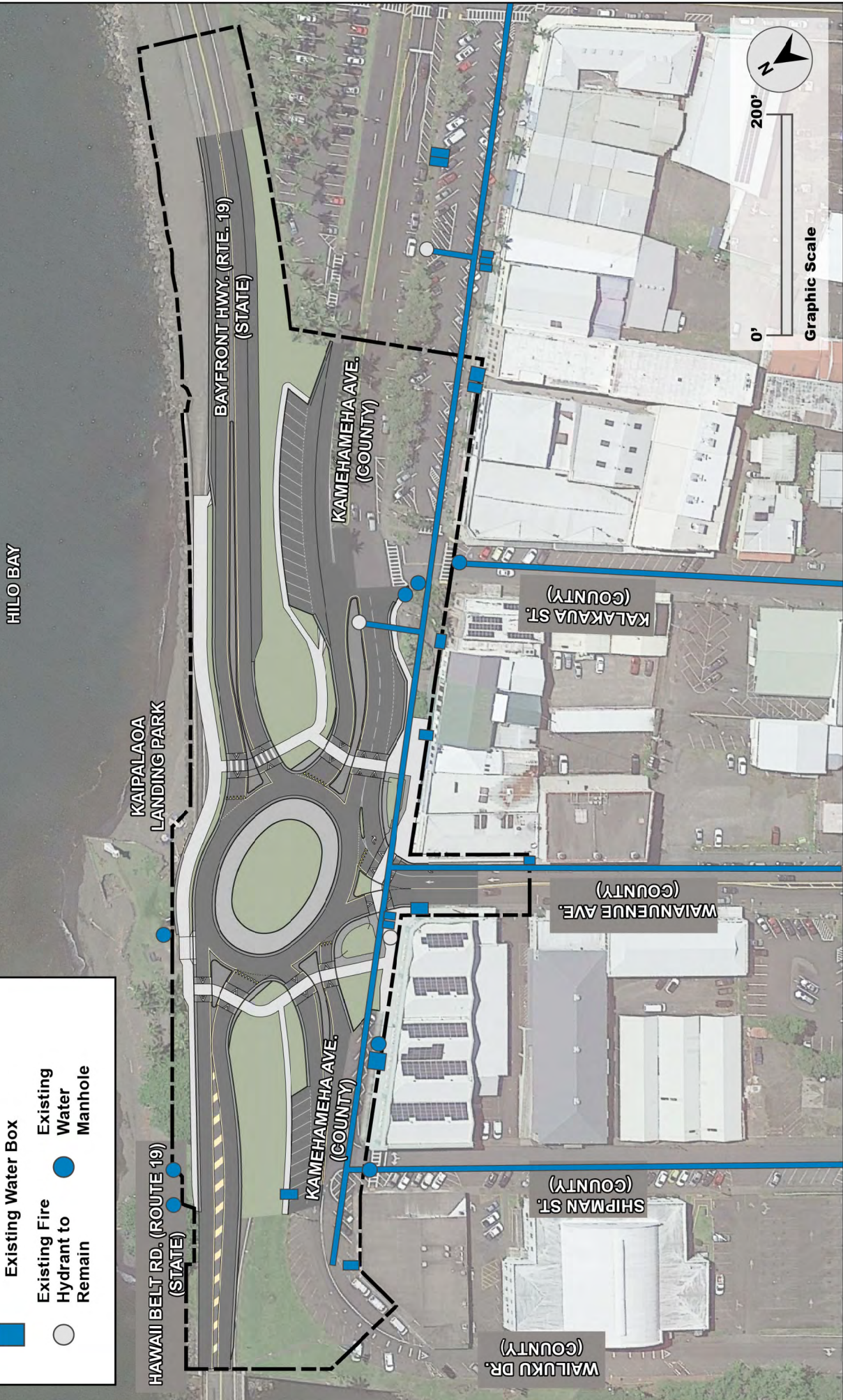
The applicant is required to provide water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update projections.

The project is not anticipated to require any proposed water service nor require water demands. The project may require infrastructure modifications to the water system to adjust to the new roadway conditions. The HDOT will coordinate with DWS for their requirements. The project is not anticipated to require any proposed water service not require water demands. The HDOT will provide a memo with this statement to the Engineering Division

See Appendix G for the pre-assessment consultation comment letters and responses.

LEGEND

-  Project Area
-  Proposed New Roadway
-  Existing Water Main
-  Existing Water Box
-  Existing Fire Hydrant to Remain
-  Existing Water Manhole



WATER SYSTEM INFRASTRUCTURE

Bayfront Hwy and Waiānuenu Ave Intersection Improvements

Figure 23

Source: AECOM

4.7.2 Wastewater System

The County of Hawaii, Department of Environmental Management (COHDEM) operates and manages the wastewater system in the project area. The Wailuku Sewer Pump Station is located on the makai side of the project area, adjacent to the Wailuku Bridge. A network of 10-inch to 18-inch gravity sewer mains and manholes exists throughout the project area, and runs primarily along Kamehameha Avenue until it crosses under Hawaii Belt Road to connect to the Wailuku Sewer Pump Station.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project is not anticipated to impact the existing sewage system. The existing underground wastewater infrastructure will remain in place. The project will require adjustment of existing surface wastewater infrastructure such as sewer manholes and clean outs to match new roadway layout and elevations. See Figure 24 and Appendix A.

During the Draft EA pre-assessment consultation period, COHDEM – Wastewater Division provided the following comment:

The COHDEM-Wastewater Division owns and maintains a significant amount of public sewer infrastructure within and adjacent to project site, as shown in the attached map. Close coordination with Wastewater Division will be required to identify the exact location of the infrastructure to determine whether any of it will need to be moved, repaired, or replaced.

The HDOT will contact the COHDEM-Wastewater Division to obtain available information on the existing infrastructure. Any infrastructure adjustments that are triggered by the project will be reflected in the proposed design accordingly.

See Appendix G for the pre-assessment consultation comment letters and responses.

4.7.3 Drainage System

Stormwater runoff collects on impervious surfaces and streetscapes within the project area and flows into a series of catch basin drains and grated drainage inlets located along Kamehameha Avenue, Waianuenue Avenue and the intersection of Bayfront Highway and Waianuenue Avenue. This network of grated inlets and catch basin drains capture stormwater runoff from the streetscape surfaces which is then conveyed into three separate storm drain conveyance systems that run under Bayfront Highway. The storm drain conveyance systems running under the highway ultimately discharge the collected stormwater on the makai side of the highway into Hilo Bay. Bayfront Highway experiences flooding during high surf conditions and severe weather events that result in closure of the highway. The mauka corners of the Waianuenue Avenue and Kamehameha Avenue intersection also experiences flooding during periods of high tide and heavy rainfall conditions.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project is anticipated to improve onsite drainage conditions throughout the project area. The intersection improvements will require physical reconfiguration of the existing drainage infrastructure involving the removal of 9 existing grated inlets and catch basin drains and replaced with 11 new grated inlets or catch basin drains in the same area to collect stormwater on roadways with the new roundabout design. The three storm drain conveyance systems and culverts that run under Bayfront Highway and discharge into Hilo Bay will not be modified. The newly constructed drainage structures collecting stormwater on roadways with the new design will be connected to the existing conveyance systems. In addition, the proposed roundabout design will slightly decrease the amount of impervious surfaces in the Project Site and improve existing drainage conditions through LID BMPs with infiltration basins to help improve water quality and decrease stormwater discharge. Refer to Figure 25 and Appendix A for more detail on proposed plans and Appendix E for the complete drainage report.

During the Draft Environmental Assessment pre-assessment consultation period, DLNR - Commission on Water Resource Management provided the following comments:






We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at <http://planning.hawaii.gov/czm/initiatives/low-impact-development>.

There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

To mitigate the impact on existing hydrology, the stormwater management design of the proposed project will consider incorporating best management practices as required by HDOT's Storm Water Post-Construction Best Management Practices Manual, February 2022. Hilo Bay is listed on the Clean Water Act §303(d) list of State waters that are determined to be impaired. Therefore, the project will consider installation of post-construction BMPs per HDOT-Highway's discretion.

During construction, best management practices for managing stormwater and erosion control will be employed so as to avoid temporary inputs of sediment and pollutants into surface water resources. Prior to construction, the HDOT will comply with requisite approvals needed, including consultation and review by the DOH to mitigate potential degradation to ground and/or surface water. Appropriate measures will be taken to adhere to any requirements for preserving water quality in the Project Area. See Appendix G for the pre-assessment consultation comment letters and responses.

LEGEND






-  Project Area
-  Proposed New Roadway
-  Existing Sewer Line
-  Existing Sewer Manhole
-  Existing Sewer Clean Out

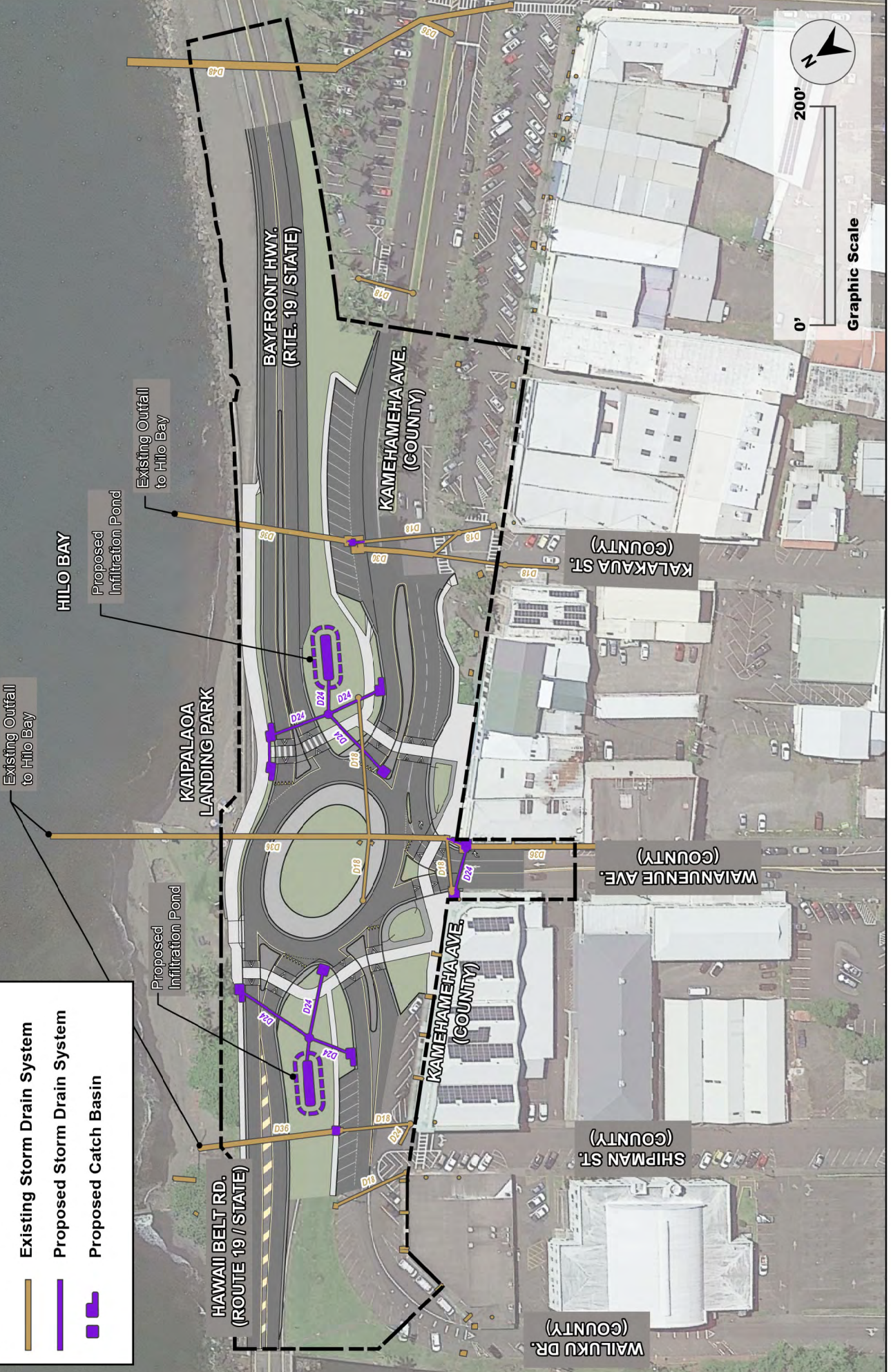


WASTEWATER SYSTEM INFRASTRUCTURE
 Bayfront Hwy and Waiānuenuē Ave Intersection Improvements

Figure 24
 Source: AECOM

LEGEND

-  Project Area
-  Proposed New Roadway
-  Existing Storm Drain System
-  Proposed Storm Drain System
-  Proposed Catch Basin



STORM DRAIN SYSTEM INFRASTRUCTURE
 Bayfront Hwy and Waiannuene Ave Intersection Improvements

Figure 25
 Source: AECOM

4.7.4 Electrical and Telecommunication Utilities

Hawaiian Electric Light Company (HELCO) serves all of County of Hawaii with oil generated power plants and renewable energy generated by the geothermal power plant operated by Puna Geothermal Venture, and Spectrum provide telephone and cable services to the island. Overhead HELCO power lines and Spectrum Cable TV (CATV) telecommunications lines with the Project Site run north to south along Kamehameha Avenue and makai to mauka along Waianuenue Avenue. HELCO is the owner of the utility poles within the Site and Spectrum leases space on the poles for their network cables. The HELCO overhead lines are 12.47kV. The CATV network consists of overhead low voltage telecommunications cabling.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project anticipates removing existing light poles and traffic signals that are in the areas needed for the proposed roundabout. Approximately nine traffic signals and nine traffic signal electrical boxes will be removed. New highway lighting will be installed to accommodate the new configuration of roadways. See Figure 26 and Appendix A.

4.8 SOCIO-ECONOMIC CHARACTERISTICS

County of Hawaii has experienced steady population growth in recent decades, increasing 8.4% between the decennial US Census counts in 2010 and 2020. Over this period, the county’s population increased from 185,079 in 2010 to a total of 200,629 in 2020. This growth outpaced the State’s overall population change, which increased only 7% over the same timeframe. Based on the 2020 Census, the Hilo Census Designated Place (CDP) maintained a total population of 44,186, which was a 2.1% increase from the 43,263 recorded in 2010 and represents roughly 22% of the total population for the county. The Hilo CDP also has a relatively dense population with 824 people per square mile, which is significantly more concentrated compared to the county-wide 49.8 people per square mile reflected in the 2020 Census. Average household size for Hilo is roughly 2.71 persons per household, slightly less than the 2.76 persons in the County of Hawaii. In addition to the decennial census counts, population data estimates are provided for the year 2021 from the U.S. Census Population Estimates Program (PEP) Quick Facts portal and the American Community Survey 5-Year Estimates shown in Table 4-4.

Table 4-4: Population Data 2021

Characteristic	Hilo CDP	County of Hawaii	State of Hawaii
Total population	Estimate not available	202,906	1,441,553
% of population under 18	21.1%	21.2%	21.1%
% of population 65 years and over	21.1%	22.7%	19.6%
Households 2016-2020	16,225	71,747	467,932
Persons per household, 2016-2020	2.71	2.76	2.94
Total Housing Units	Estimate not available	89,750	564,908

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Characteristic	Hilo CDP	County of Hawaii	State of Hawaii
Owner Occupied Housing Unit Rate 2016-2020	62.0%	69.3%	60.3%
Population per square mile (2010)	824.0	49.8	226.6
Mean travel time to work (minutes)	18.3	26.8	27.1

The City of Hilo serves as an important hub for industrial, commercial, and social service activities for the island due to its proximity to the island’s major deep draft harbor. Hilo includes the main offices of the County government and branch offices of federal and state agencies. The two major educational institutions, the University of Hawaii at Hilo and Hawaii Community College, also serve an important role in Hilo’s economy through affiliated research programs. Given the high density and concentration of businesses and institutions within the Hilo CDP, transportation improvements to provide roadway functionality and support pedestrian and bicycle accessibility in the area is appropriate.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project is not expected to impact population growth in Hilo or the broader region and will not create additional strain on other area facilities as a direct impact of the project. However, the intersection improvements are anticipated to enhance the functionality of the roadways and support conditions for better pedestrian and bicycle transportation choices. As a result, downtown Hilo may be viewed as a more desirable community, which may increase population growth in the area over the long term. Short-term employment benefits will be generated throughout the construction period, and long-term employment benefits could be created if downtown Hilo is perceived as a more suitable location to develop new commercial enterprises.





During the Draft EA pre-assessment consultation period, the State of Hawaii Department of Human Services (DHS) provided the following comment:

DHS has reviewed the Bayfront Highway and Waianuenue Avenue Intersection Improvements project and the map of the area. At this time, DHS has no comments.

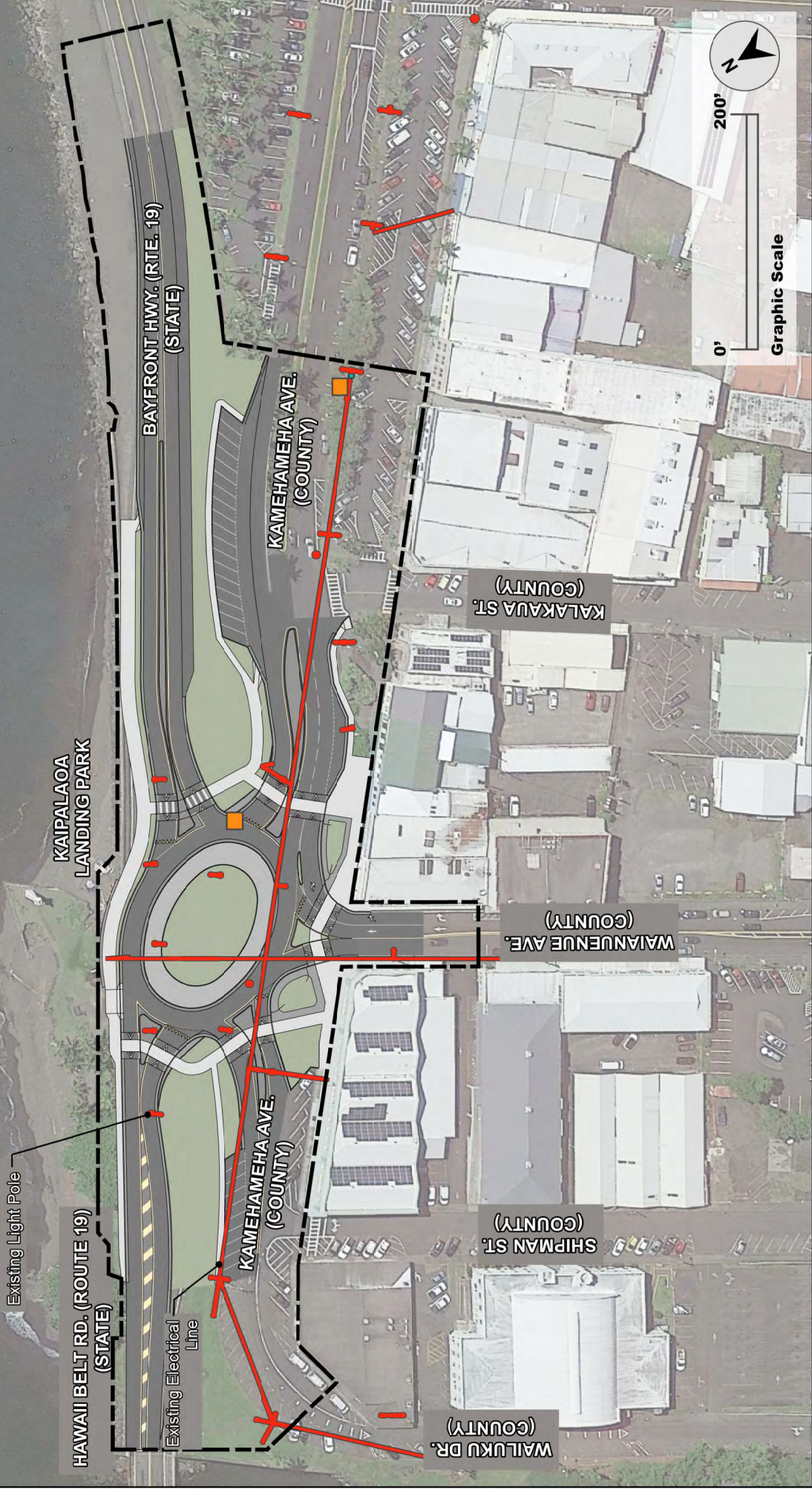
During the Draft EA pre-assessment consultation period, the State of Hawaii Department of Labor and Industrial Relations (DLIR) provided the following comments:

DLIR offers no comments on all EA matters which we defer to DAGS since they own most DLIR workforce facilities statewide.

LEGEND

-  Project Area
-  Proposed New Roadway
-  Existing Electrical
-  Existing Telecom Box

HILO BAY



ELECTRICAL AND TELECOMMUNICATIONS INFRASTRUCTURE
 Bayfront Hwy and Waiānuenu Ave Intersection Improvements

Figure 26
 Source: AECOM

4.9 PUBLIC SERVICES AND FACILITIES

4.9.1 Public Schools

Public schools under the jurisdiction of the State Department of Education (DOE) within the vicinity of the Project Site include: Hilo Union Elementary School, Chiefess Kapiolani Elementary School, Hilo Intermediate School, Hilo High School, Connections Public Charter School. Other public schools in the area include Hawaii Community College and University of Hawaii at Hilo.

POTENTIAL IMPACTS AND MITIGATION MEASURES

No significant impacts are anticipated. The proposed project will not generate new residents or introduce new school-aged children to the area and no additional demands will be placed on public school facilities. During construction, the project will generate noise and may generate dust. Appropriate measures will be taken to minimize these potential impacts to schools in the area.

During the Draft EA pre-assessment consultation period, DOE provided the following comment:

Based on the information provided, the proposed project will not impact Hawaii State Department of Education Facilities.

During the Draft EA pre-assessment consultation period, the Connections Public Charter School provided the following comment regarding access adjacent to their school:

The project area CUTS OFF the exit route of the parking lot directly in front of our main school entrance (which faces makai/east). This is a long (one-way northbound) single-lane parking lot, running north-south parallel to Kamehameha Ave. and Hwy.19. Our families utilize free access to this parking lot and its northbound lane TWICE a day for the drop off and pickup of their students. We at Connections PCS would need to be provided some type of alternative exit lane in order to properly access the front (east-facing) entrance of our school.

The project area CUTS OFF the parking stalls located on the west-side curb of Kamehameha Ave. for approximately 100 feet south of its Kalakaua St. intersection. This is exactly where we park our two school buses, and you will observe specifically designed bus parking slots painted into that very section of the west-side curb of Kamehameha Ave. for that expressed purpose. We at Connections PCS would need to be provided two alternative parking spots big enough for two full-sized school buses to park daily.

The project area also CUTS OFF access to our section of Kalakaua St (the secondary, and only other) entry/exit point of our Kress Building campus. Kalakaua St. is a one-way mauka/westbound street which therefore requires access at its intersection with Kamehameha Ave, which this project area shuts off completely. We at Connections PCS would need to be provided some type of alternative entry to access our secondary (north-facing) entrance to our school along Kalakaua St.

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Connections Public Charter School is the closest public educational facility and abuts the Project Area. While the Project Area does include the portion of Kamehameha Avenue directly in front of the school entrance, as well as the exit route and parking lot utilized by the school, the proposed design for the project will not impede the parking facilities and existing access after completion of the project. During construction, there may be temporary closures in the immediate vicinity, however, alternative routes will be provided, and adequate notice will be provided to allow time to adapt to temporary construction conditions. After completion of the proposed project, the parking lot and exit route to Kalakaua Street and Kamehameha Avenue will maintain similar conditions and the proposed project should not impact current usage by the school.

See Appendix G for the pre-assessment consultation comment letters and responses.

4.9.2 Police, Fire and Medical Services

Police Protection

The Project Site is located in the South Hilo District, which extends from Hakalau in the north, to the mid-point of Kanoiehua Avenue between Hilo and Keaau in the south, to Saddle Road in the west. The district includes the main police station, located at 349 Kapiolani Street, approximately 0.7 miles from the proposed project.

Fire Protection

Fire prevention and protection is provided by the Hawaii Fire Department. Fire Department personnel include paramedics who respond to medical as well as fire emergencies. The County of Hawaii Fire Department.

Medical Services

Hilo Medical Center (HMC) is the primary health care facility serving the South Hilo district. HMC is located approximately 1.65 miles from the Project site at 1190 Waianuenue Avenue. Ambulance service in Hilo is provided by the Hawaii Fire Department, which serves the Project site from the Central Fire Station.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The Project is not expected to create a significant increase in demand on existing police, fire, or emergency medical services after construction. It is acknowledged, however, that during the construction period there may be an occasional and unavoidable impact on transportation routes and traffic patterns in the immediate area that may impact one or more of these services.

During the Draft EA pre-assessment consultation period, the County of Hawaii Police Department provided the following comment regarding traffic congestion and access:

Staff, upon reviewing the provided documents, does not anticipate any significant public safety concerns.

Bayfront Highway and Waianuenue Avenue Intersection Improvements
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There is a concern regarding traffic congestion and access if the intersection along with Bayfront Highway are both shut down at the same time.

Highway 19 feeds Hilo from the North for thousands of vehicles daily; and even though there is an alternate entry through the Wainaku area, these streets are much narrower. These streets would not be able to accommodate large trucks along with the increased traffic.

Consideration will be taken for narrow roadways through the Wainaku area that may be considered for alternative routes during temporary road closures. These impacts will be mitigated through sequencing of construction and consultation with appropriate agencies so that they may effectively adapt to potential road closures needed.

During the Draft EA pre-assessment consultation period, the County of Hawaii Fire Department provided the following comment:

The Hawaii Fire Department has no comments.

See Appendix G for the pre-assessment consultation comment letters and responses.

4.9.3 Recreational Facilities

The abutting Kaipalaoa Landing Park just makai of the Project Site includes recreational uses such as fishing and general park uses. The project site is connected to a network of recreational trails and parks including, Russell Carroll Mooheau County Park, Bayfront soccer fields, Bayfront Beach Park, and Wailoa River State Recreation Area.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project will not have a direct impact on existing recreational facilities in the area. However, the improvements to the intersection will offer more access to recreational facilities along Hilo Bay for pedestrians and bicyclists and enhance overall connectivity between downtown Hilo and these facilities.

5 LAND USE CONFORMANCE

State of Hawaii and County of Hawaii land use plans, policies, and ordinances relevant to the Proposed Project are described below.

5.1 STATE OF HAWAII

5.1.1 Chapter 343, Hawaii Revised Statutes

Compliance with Chapter 343, HRS is required as described in Section 1.5.

5.1.2 State Land Use Law, Chapter 205, Hawaii Revised Statutes

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

5.1.3 Coastal Zone Management Act, Chapter 205A, Hawaii Revised Statutes

The U.S. Congress enacted the CZM Act to assist states in better managing coastal and estuarine environments. The act provides grants to states that develop and implement federally-approved CZM plans. The State of Hawaii’s CZM Act Program was enacted pursuant to Chapter 205A, HRS. The program outlines management objectives centered around ten areas: 1) Recreational Resources; 2) Historic Resources; 3) Scenic and Open Space Resources; 4) Coastal Ecosystems; 5) Economic Uses; 6) Coastal Hazards; 7) Managing Development; 8) Public Participation in Coastal Management; 9) Beach Protection; and 10) Marine Resources. All lands within the State of Hawaii fall within the CZM area.

Table 5-1: Hawaii Coastal Zone Management Program, Chapter 205A, HRS

COASTAL ZONE MANAGEMENT ACT, CHAPTER 205A, HRS (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
RECREATIONAL RESOURCES			
Objective: (A) Provide coastal recreational opportunities accessible to the public.			
Policies:			
• Improve coordination and funding of coastal recreational planning and management; and			X
• Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:	X		
a. Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;			X
b. Requiring restoration of coastal resources that have significant recreational and ecosystem value, including but not limited to coral reefs, surfing sites, fishponds, sand beaches, and coastal dunes, when these resources will be unavoidably damaged by development; or requiring monetary compensation to the State for recreation when restoration is not feasible or desirable;			X
c. Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;			X

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COASTAL ZONE MANAGEMENT ACT, CHAPTER 205A, HRS (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
d. Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;			X
e. Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;	X		
f. Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;	X		
g. Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and			X
h. Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.			X
Discussion: The proposed project is supportive of the State's goals as stated above, as it improves pedestrian and bicycle access to coastal recreational facilities.			
HISTORIC RESOURCES			
Objective: (A) Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.			
Policies:			
(1) Identify and analyze significant archaeological resources;	X		
(2) Maximize information retention through preservation of remains and artifacts or salvage operations; and	X		
(3) Support state goals for protection, restoration, interpretation, and display of historic resources.	X		
Discussion: There is no impact to archaeological or architectural features anticipated. The project was designed to avoid potential impacts to historic buildings and the historic district, including historic features like pavings and the related streetscape. The project activities will not adversely affect any NRHP or HRHP eligible or listed historic buildings, or the character of the historic district. Within the project area, lava rock curbs and a CRM wall would be affected by the project. These are historic (more than 50 years of age) but are evaluated as not eligible for the NRHP due to a lack of significance and insufficient measure of historic integrity. The project will include rehabilitation of the lava rock curbs. Any lava rock or basalt curbs identified within the project area will be surveyed and documented prior to work starting and will be rehabilitated as part of the project. The project will include removal of a historic (50+ year old) CRM wall which is not NRHP or HRHP eligible. This wall will be surveyed and documented prior to work starting.			
SCENIC AND OPEN SPACE RESOURCES			
Objective: (A) Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.			
Policies:			
(1) Identify valued scenic resources in the coastal zone management area;			X
(2) Ensure that new developments are compatible with their visual environment by designing and locating those developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;	X		
(3) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and	X		
(4) Encourage those developments that are not coastal dependent to locate in inland areas.			X
Discussion: The proposed project is supportive of the State's goals as stated above, as it improves scenic resources by enhancing coastal views.			

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COASTAL ZONE MANAGEMENT ACT, CHAPTER 205A, HRS (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
COASTAL ECOSYSTEMS			
Objective: (A) Protect valuable coastal ecosystems, including reefs, beaches, and coastal dunes, from disruption and minimize adverse impacts on all coastal ecosystems.			
Policies:			
(1) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;			X
(2) Improve the technical basis for natural resource management;			X
(3) Preserve valuable coastal ecosystems of significant biological or economic importance, including reefs, beaches, and dunes;			X
(4) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and			X
(5) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.	X		
Discussion: The proposed project is supportive of the State's goals as stated above, as it includes drainage improvements features to improve water quality for stormwater discharge from the Project Site.			
ECONOMIC USES			
Objective: (A) Provide public or private facilities and improvements important to the State's economy in suitable locations.			
Policies:			
(1) Concentrate coastal dependent development in appropriate areas;			X
(2) Ensure that coastal dependent development and coastal related development are located, designed, and constructed to minimize exposure to coastal hazards and adverse social, visual, and environmental impacts in the coastal zone management area; and			X
(3) Direct the location and expansion of coastal development to areas designated and used for that development and permit reasonable long-term growth at those areas, and permit coastal development outside of designated areas when:			X
a. Use of designated locations is not feasible;			X
b. Adverse environmental effects and risks from coastal hazards are minimized; and			X
c. The development is important to the State's economy.	X		
Discussion: The proposed project is supportive of the State's goals as stated above, as it will improve vehicular maneuverability to support efficient transportation services that will support overall economic activity.			
COASTAL HAZARDS			
Objective: (A) Reduce hazard to life and property from coastal hazards.			
Policies:			
(1) Develop and communicate adequate information about the risks of coastal hazards;			X
(2) Control development, including planning and zoning control, in areas subject to coastal hazards;			X
(3) Ensure that developments comply with requirements of the National Flood Insurance Program; and			X
(4) Prevent coastal flooding from inland projects.	X		
Discussion: The proposed project is supportive of the State's goals as stated above, as it includes drainage improvements features to assist in mitigating coastal flooding impacts			
MANAGING DEVELOPMENT			
Objective: (A) Improve the development review process, communication, and public participation in the management of coastal resources and hazards.			

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COASTAL ZONE MANAGEMENT ACT, CHAPTER 205A, HRS (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
Policies:			
(1) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;			X
(2) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and			X
(3) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.			X
Discussion: N/A			
PUBLIC PARTICIPATION			
Objective: (A) Stimulate public awareness, education, and participation in coastal management.			
Policies:			
(1) Promote public involvement in coastal zone management processes;			X
(2) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and			X
(3) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.			X
Discussion: N/A			
BEACH AND COASTAL DUNE PROTECTION			
Objectives: (A) Protect beaches and coastal dunes for: i. Public use and recreation; ii. The benefit of coastal ecosystems; and iii. Use as natural buffers against coastal hazards; and (B) Coordinate and fund beach management and protection.			
Policies:			
(1) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;			X
(2) Prohibit construction of private shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities;			X
(3) Minimize the construction of public shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities;			X
(4) Minimize grading of and damage to coastal dunes;			X
(5) Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor; and			X
(6) Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor; and			X
Discussion: N/A			
MARINE AND COASTAL RESOURCES			
Objective: (A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.			
Policies:			
(1) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;			X

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COASTAL ZONE MANAGEMENT ACT, CHAPTER 205A, HRS (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
(2) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;			X
(3) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;			X
(4) Promote research, study, and understanding of ocean and coastal processes, impacts of climate change and sea level rise, marine life, and other ocean resources to acquire and inventory information necessary to understand how coastal development activities relate to and impact ocean and coastal resources; and			X
(5) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.			X
Discussion: N/A			

5.1.4 Hawaii State Plan, Chapter 226, HRS

The Hawaii State Plan directs State agencies to prepare functional plans for their respective program areas. There are 14 State Functional Plans that serve as the primary implementing vehicle for the goals, objectives, and policies of the Hawaii State Plan.

Table 5-2: Hawaii State Plan, Chapter 226, HRS

HAWAII STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
HRS § 226-1: Findings and Purpose			
HRS § 226-2: Definitions			
HRS § 226-3: Overall Theme			
HRS § 226-4: State Goals. In order to guarantee, for the present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels of self-reliance and self-determination, it shall be the goal of the State to achieve:	X		
(1) A strong, viable economy, characterized by stability, diversity and growth that enables fulfillment of the needs and expectations of Hawaii’s present and future generations.			
(2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.	X		
(3) Physical, social and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring and of participation in community life.	X		
Discussion: The proposed project is supportive of the State’s goals as stated above, creating a desired physical environment to promote the physical, social, and economic well-being of the community. The proposed project will improve multimodal transportation modes, enhance the character of downtown Hilo, and improve vehicular maneuverability to support efficient transportation services that will support overall economic activity.			
HRS § 226-5: Objectives and policies for population.			
Objective: It shall be the objective in planning for the State’s population to guide population growth to be consistent with the achievement of physical, economic and social objectives contained in this chapter.			

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HAWAII STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
Policies:			
(1) Manage population growth statewide in a manner that provides increased opportunities for Hawaii’s people to pursue their physical, social and economic aspirations while recognizing the unique needs of each County.			X
(2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.	X		
(3) Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.			X
(4) Encourage research activities and public awareness programs to foster an understanding of Hawaii's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawaii's population.			X
(5) Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate family members.			X
(6) Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state’s population.			X
(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.			X
Discussion: The proposed project is supportive of the State’s goals as stated above, as it will help accommodate future population growth and resulting demand for transportation facilities by improving multimodal transportation modes and improving vehicular maneuverability through downtown Hilo.			
HRS § 226-6: Objectives and policies for the economy in general.			
Objectives: Planning for the State's economy in general shall be directed toward achievement of the following objectives:			
(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.			X
(2) A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.			X
Policies:			
(1) Promote and encourage entrepreneurship within Hawaii by residents and nonresidents of the State.			X
(2) Expand Hawaii's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.			X
(3) Promote Hawaii as an attractive market for environmentally and socially sound investment activities that benefit Hawaii's people.			X
(4) Transform and maintain Hawaii as a place that welcomes and facilitates innovative activity that may lead to commercial opportunities.			X
(5) Promote innovative activity that may pose initial risks, but ultimately contribute to the economy of Hawaii			X
(6) Seek broader outlets for new or expanded Hawaii business investments.			X
(7) Expand existing markets and penetrate new markets for Hawaii's products and services.			X

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(8) Assure that the basic economic needs of Hawaii's people are maintained in the event of disruptions in overseas transportation.			X
(9) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.			X
(10) Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawaii's small scale producers, manufacturers, and distributors.			X
(11) Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.			X
(12) Encourage innovative activities that may not be labor-intensive, but may otherwise contribute to the economy of Hawaii.			X
(13) Foster greater cooperation and coordination between the government and private sectors in developing Hawaii's employment and economic growth opportunities.			X
(14) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.			X
(15) Maintain acceptable working conditions and standards for Hawaii's workers.			X
(16) Provide equal employment opportunities for all segments of Hawaii's population through affirmative action and nondiscrimination measures.			X
(17) Stimulate the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.			X
(18) Encourage businesses that have favorable financial multiplier effects within Hawaii's economy, particularly with respect to emerging industries in science and technology.			X
(19) Promote and protect intangible resources in Hawaii, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.			X
(20) Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new or innovative potential growth industries in particular.			X
(21) Foster a business climate in Hawaii--including attitudes, tax and regulatory policies, and financial and technical assistance programs--that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.			X
Discussion: N/A			
HRS § 226-7: Objectives and policies for the economy - agriculture			
Objectives: Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:			
(1) Viability of Hawaii's sugar and pineapple industries.			X
(2) Growth and development of diversified agriculture throughout the State.			X
(3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.			X
Policies:			
(1) Establish a clear direction for Hawaii's agriculture through stakeholder commitment and advocacy.			X
(2) Encourage agriculture by making best use of natural resources.			X
(3) Provide the governor and the legislature with information and options needed for prudent decision making for the development of agriculture.			X
(4) Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.			X

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HAWAII STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
(5) Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawaii's economy.			X
(6) Seek the enactment and retention of federal and state legislation that benefits Hawaii's agricultural industries.			X
(7) Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawaii's producers and consumer markets locally, on the continental United States, and internationally.			X
(8) Support research and development activities that provide greater efficiency and economic productivity in agriculture.			X
(9) Enhance agricultural growth by providing public incentives and encouraging private initiatives.			X
(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.			X
(11) Increase the attractiveness and opportunities for an agricultural education and livelihood.			X
(12) Expand Hawaii's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.			X
(13) Promote economically competitive activities that increase Hawaii's agricultural self-sufficiency.			X
(14) Promote and assist in the establishment of sound financial programs for diversified agriculture.			X
(15) Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.			X
(16) Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.			X
(17) Perpetuate, promote, and increase use of traditional Hawaiian farming systems, such as the use of loko ia, mala, and irrigated loi, and growth of traditional Hawaiian crops, such as kalo, uala, and ulu.			X
(18) Increase and develop small-scale farms.			X
Discussion: N/A			
HRS § 226-8: Objectives and policies for the economy – visitor industry			
Objectives: Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawaii's economy.			
Policies:			
(1) Support and assist in the promotion of Hawaii's visitor attractions and facilities.			X
(2) Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people.			X
(3) Improve the quality of existing visitor destination areas.			X
(4) Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.			X
(5) Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawaii's people.			X
(6) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry.			X

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HAWAII STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
(7) Foster a recognition of the contribution of the visitor industry to Hawaii's economy and the need to perpetuate the aloha spirit.			X
(8) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values.			X
Discussion: N/A			
HRS § 226-9: Objective and policies for the economy – federal expenditures			
Objective: Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawaii's economy.			
Policies:			
(1) Encourage the sustained flow of federal expenditures in Hawaii that generates long-term government civilian employment.			X
(2) Promote Hawaii's supportive role in national defense.			X
(3) Promote the development of federally supported activities in Hawaii that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaii's environment.			X
(4) Increase opportunities for entry and advancement of Hawaii's people into federal government service.			X
(5) Promote federal use of local commodities, services, and facilities available in Hawaii.			X
(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawaii.			X
(7) Pursue the return of federally controlled lands in Hawaii that are not required for either the defense of the nation or for other purposes of national importance, and promote the mutually beneficial exchanges of land between federal agencies, the State, and the counties.			X
Discussion: N/A			
HRS § 226-10: Objectives and policies for the economy – potential growth and innovative activities.			
Objective: Planning for the State's economy with regard to potential growth activities shall be directed towards achievement of the objective of development and expansion of potential growth activities that serve to increase and diversify Hawaii's economic base.			
Policies:			
(1) Facilitate investment and employment growth in economic activities that have the potential to expand and diversify Hawaii's economy, including but not limited to diversified agriculture, aquaculture, renewable energy development, creative media, health care, and science and technology-based sectors.			X
(2) Facilitate investment in innovative activity that may pose risks or be less labor-intensive than other traditional business activity, but if successful, will generate revenue in Hawaii through the export of services or products or substitution of imported services or products;			X
(3) Encourage entrepreneurship in innovative activity by academic researchers and instructors who may not have the background, skill, or initial inclination to commercially exploit their discoveries or achievements.			X
(4) Recognize that innovative activity is not exclusively dependent upon individuals with advanced formal education, but that many self-taught, motivated individuals are able, willing, sufficiently knowledgeable, and equipped with the attitude necessary to undertake innovative activity.			X
(5) Increase the opportunities for investors in innovative activity and talent engaged in innovative activity to personally meet and interact at cultural, art, entertainment, culinary, athletic, or visitor-oriented events without a business focus;			X

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(6) Expand Hawaii's capacity to attract and service international programs and activities that generate employment for Hawaii's people.			X
(7) Enhance and promote Hawaii's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts.			X
(8) Accelerate research and development of new energy-related industries based on wind, solar, ocean, underground resources, and solid waste.			X
(9) Promote Hawaii's geographic, environmental, social, and technological advantages to attract new or innovative economic activities into the State.			X
(10) Provide public incentives and encourage private initiative to attract new or innovative industries that best support Hawaii's social, economic, physical, and environmental objectives.			X
(11) Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research.			X
(12) Develop, promote, and support research and educational and training programs that will enhance Hawaii's ability to attract and develop economic activities of benefit to Hawaii.			X
(13) Foster a broader public recognition and understanding of the potential benefits of new or innovative growth-oriented industry in Hawaii.			X
(14) Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawaii's social, economic, physical, and environmental objectives.			X
(15) Increase research and development of businesses and services in the telecommunications and information industries.			X
(16) Foster the research and development of non-fossil fuel and energy efficient modes of transportation.			X
(17) Recognize and promote health care and health care information technology as growth industries.			X
Discussion: N/A			
HRS § 226-10.5: Objectives and policies for the economy – information industry			
Objective: Planning for the State's economy with regard to telecommunications and information technology shall be directed toward recognizing that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawaii as a leader in broadband and wireless communications and applications in the Pacific Region.			
Policies:			
(1) Encourage the continued development and expansion of the telecommunications infrastructure serving Hawaii to accommodate future growth in the information industry;			X
(2) Facilitate the development of new business and service ventures in the information industry which will provide employment opportunities for the people of Hawaii;			X
(3) Encourage greater cooperation between the public and private sectors in developing and maintaining a well- designed information industry;			X
(4) Ensure that the development of new businesses and services in the industry are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people;			X
(5) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the information industry;			X
(6) Foster a recognition of the contribution of the information industry to Hawaii's economy; and			X

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HAWAII STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
(7) Assist in the promotion of Hawaii as a broker, creator, and processor of information in the Pacific.			X
Discussion: N/A			
HRS § 226-11: Objectives and policies for the physical environment – land-based, shoreline, and marine resources.			
Objectives: Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.			
(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.			X
(2) Effective protection of Hawaii's unique and fragile environmental resources.			X
Policies:			
(1) Exercise an overall conservation ethic in the use of Hawaii's natural resources.			X
(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.			X
(3) Take into account the physical attributes of areas when planning and designing activities and facilities.			X
(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.			X
(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.			X
(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.			X
(7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.			X
(8) Pursue compatible relationships among activities, facilities, and natural resources.			X
(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.	X		
Discussion: The proposed project is supportive of the State's goals as stated above, as it improves pedestrian and bicycle access to coastal recreational facilities.			
HRS § 226-12: Objectives and policies for the physical environment – scenic, natural beauty, and historic resources.			
Objective: Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.			
Policies:			
(1) Promote the preservation and restoration of significant natural and historic resources.			X
(2) Provide incentives to maintain and enhance historic, cultural, and scenic amenities.			X
(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.			X
(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.			X
(5) Encourage the design of developments and activities that complement the natural beauty of the islands.	X		
Discussion: The proposed project is supportive of the State's goals as stated above, as it improves scenic resources by enhancing coastal views.			
HRS § 226-13: Objectives and policies for the physical environment – land, air, and water quality.			
Objectives: Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:			

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(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.	X		
(2) Greater public awareness and appreciation of Hawaii's environmental resources.			X
Policies:			
(1) Foster educational activities that promote a better understanding of Hawaii's limited environmental resources.			X
(2) Promote the proper management of Hawaii's land and water resources.			X
(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.			X
(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.	X		
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.	X		
(6) Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.	X		
(7) Encourage urban developments in close proximity to existing services and facilities.	X		
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures and visitors.			X
Discussion: The proposed project is supportive of the State's goals as stated above, as it encourages multimodal activity that could improve air quality and wellbeing of residents by offering alternative transportation modes that reduce harmful vehicular emissions and improve physical health of residents through walking and bicycling. Drainage improvements within the design will help mitigate localized flooding. The project also encourages urban development in close proximity to existing services and facilities by providing more pedestrian connectivity in downtown Hilo that will enhance the physical quality of the community.			
HRS § 226-14: Objective and policies for facility systems – in general			
Objective: Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.			
Policies:			
(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.			X
(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.			X
(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.			X
(4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.			X
Discussion: N/A			
HRS § 226-15: Objectives and policies for facility systems – solid and liquid wastes.			
Objectives: Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:			
(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.			X
(2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.			X

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Policies:			
(1) Encourage the adequate development of sewerage facilities that complement planned growth.			X
(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.			X
(3) Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.			X
Discussion: N/A			
HRS § 226-16: Objectives and policies for facility systems – water.			
Objective: Planning for the State’s facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.			
Policies:			
(1) Coordinate development of land use activities with existing and potential water supply.			X
(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.			X
(3) Reclaim and encourage the productive use of runoff water and wastewater discharges.			X
(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.			X
(5) Support water supply services to areas experiencing critical water problems.			X
(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.			X
Discussion: N/A			
HRS § 226-17: Objectives and policies for facility systems – transportation.			
Objective: Planning for the State’s facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:			
(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.	X		
(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.	X		
Policies:			
(1) Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;	X		
(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;	X		
(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;			X
(4) Provide for improved accessibility to shipping, docking, and storage facilities;			X
(5) Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;			X
(6) Encourage transportation systems that serve to accommodate present and future development needs of communities;	X		
(7) Encourage a variety of carriers to offer increased opportunities and advantages to interisland movement of people and goods;			X

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(8) Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs;			X
(9) Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;			X
(10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii’s natural environment;	X		
(11) Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation;	X		
(12) Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and	X		
(13) Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.	X		
Discussion: The proposed project is supportive of the State’s goals as stated above, encourages multimodal in direct support of statewide goals that promote alternative non-polluting means of transportation and also offer diversified modes to accommodate future growth and improve pedestrian safety.			
HRS § 226-18: Objectives and policies for facility systems – energy.			
Objectives: Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:			
(1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;			X
(2) Increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawaii's dependence on imported fuels for electrical generation and ground transportation;			X
(3) Greater diversification of energy generation in the face of threats to Hawaii's energy supplies and systems;			X
(4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use; and			X
(5) Utility models that make the social and financial interests of Hawaii's utility customers a priority.			X
Policies:			
(1) Support research and development as well as promote the use of renewable energy sources;			X
(2) Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;			X
(3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;			X
(4) Promote all cost-effective conservation of power and fuel supplies through measures including:			X
(A) Development of cost-effective demand-side management programs;			X
(B) Education;			X
(C) Adoption of energy-efficient practices and technologies; and			X
(D) Increasing energy efficiency and decreasing energy use in public infrastructure;			X

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(5) Ensure, to the extent that new supply-side resources are needed, that the development or expansion of energy systems utilizes the least-cost energy supply option and maximizes efficient technologies;			X
(6) Support research, development, demonstration, and use of energy efficiency, load management, and other demand-side management programs, practices, and technologies;			X
(7) Promote alternate fuels and transportation energy efficiency;			X
(8) Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications;			X
(9) Support actions that reduce, avoid, or sequester Hawaii’s greenhouse gas emissions through agriculture and forestry initiatives;			X
(10) Provide priority handling and processing for all state and county permits required for renewable energy projects;			X
(11) Ensure that liquefied natural gas is used only as a cost-effective transitional, limited-term replacement of petroleum for electricity generation and does not impede the development and use of other cost-effective renewable energy sources; and			X
(12) Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawaii.			X
Discussion: N/A			
HRS § 226-18.5: Objectives and policies for facility systems—telecommunications.			
Objective: Planning for the State’s telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people.			
Policies:			
(1) Facilitate research and development of telecommunications systems and resources;			X
(2) Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning;			X
(3) Promote efficient management and use of existing telecommunications systems and services; and			X
(4) Facilitate the development of education and training of telecommunications personnel.			X
Discussion: N/A			
HRS § 226-19: Objectives and policies for socio-cultural advancement – housing.			
Objectives: Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:			
(1) Greater opportunities for Hawaii’s people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more affordable housing is made available to very low-, low- and moderate-income segments of Hawaii’s population.			X
(2) The orderly development of residential areas sensitive to community needs and other land uses.			X
(3) The development and provision of affordable rental housing by the State to meet the housing needs of Hawaii’s people.			X
Policies:			
(1) Effectively accommodate the housing needs of Hawaii’s people.			X

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(2) Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.			X
(3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.			X
(4) Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.			X
(5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.			X
(6) Facilitate the use of available vacant, developable, and underutilized urban lands for housing.			X
(7) Foster a variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods that reflect the culture and values of the community.			X
(8) Promote research and development of methods to reduce the cost of housing construction in Hawaii.			X
Discussion: N/A			
HRS § 226-20: Objectives and policies for socio-cultural advancement – health			
Objectives: Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:			
(1) Fulfillment of basic individual health needs of the general public.			X
(2) Maintenance of sanitary and environmentally healthful conditions in Hawaii's communities.			X
Policies:			
(1) Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.			X
(2) Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.			X
(3) Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.			X
(4) Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.			X
(5) Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.			X
(6) Improve the State's capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement.			X
(7) Prioritize programs, services, interventions, and activities that address identified social determinants of health to improve native Hawaiian health and well-being consistent with the United States Congress' declaration of policy as codified in title 42 United States Code section 11702, and to reduce health disparities of disproportionately affected demographics, including native Hawaiians, other Pacific Islanders, and Filipinos. The prioritization of affected demographic groups other than native Hawaiians may be reviewed every ten years and revised based on the best available epidemiological and public health data.			X
Discussion: N/A			

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HRS § 226-21: Objectives and policies for socio-cultural advancement – education.			
Objectives: Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.			
Policies:			
(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.			X
(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.			X
(3) Provide appropriate educational opportunities for groups with special needs.			X
(4) Promote educational programs which enhance understanding of Hawaii's cultural heritage.			X
(5) Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.			X
(6) Assist individuals, especially those experiencing critical employment problems or barriers, or undergoing employment transitions, by providing appropriate employment training programs and other related educational opportunities.			X
(7) Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.			X
(8) Emphasize quality educational programs in Hawaii's institutions to promote academic excellence.			X
(9) Support research programs and activities that enhance the education programs of the State.			X
Discussion: N/A			
HRS § 226-22: Objective and policies for socio-cultural advancement – social services			
Objective: Planning for the State's socio-cultural advancement with regard to social services shall be directed towards the achievement of the objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being.			
Policies:			
(1) Assist individuals, especially those in need of attaining a minimally adequate standard of living and those confronted by social and economic hardship conditions, through social services and activities within the State's fiscal capacities.			X
(2) Promote coordination and integrative approaches among public and private agencies and programs to jointly address social problems that will enable individuals, families, and groups to deal effectively with social problems and to enhance their participation in society.			X
(3) Facilitate the adjustment of new residents, especially recently arrived immigrants, into Hawaii's communities.			X
(4) Promote alternatives to institutional care in the provision of long-term care for elder and disabled populations.			X
(5) Support public and private efforts to prevent domestic abuse and child molestation, and assist victims of abuse and neglect.			X
(6) Promote programs which assist people in need of family planning services to enable them to meet their needs.			X
Discussion: N/A			

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HRS § 226-23: Objectives and policies for socio-cultural advancement – leisure.			
Objective: Planning for the State’s socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.			
Policies:			
(1) Foster and preserve Hawaii’s multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.			X
(2) Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.			X
(3) Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.	X		
(4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.	X		
(5) Ensure opportunities for everyone to use and enjoy Hawaii’s recreational resources.	X		
(6) Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.			X
(7) Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawaii’s people.			X
(8) Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.			X
(9) Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawaii’s population to participate in the creative arts.			X
(10) Assure adequate access to significant natural and cultural resources in public ownership.			X
Discussion: The proposed project is supportive of the State’s goals as stated above, as it improves access to coastal recreational facilities.			
HRS § 226-24: Objective and policies for socio-cultural advancement – individual rights and personal well-being.			
Objective: Planning for the State’s socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socio-economic needs and aspirations.			
Policies:			
(1) Provide effective services and activities that protect individuals from criminal acts and unfair practices and that alleviate the consequences of criminal acts in order to foster a safe and secure environment.			X
(2) Uphold and protect the national and state constitutional rights of every individual.			X
(3) Assure access to, and availability of, legal assistance, consumer protection, and other public services which strive to attain social justice.			X
(4) Ensure equal opportunities for individual participation in society.			X
Discussion: N/A			
HRS § 226-25: Objectives and policies for socio-cultural advancement – culture.			
Objective: Planning for the State’s socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawaii’s people.			
Policies:			
(1) Foster increased knowledge and understanding of Hawaii’s ethnic and cultural heritages and the history of Hawaii.			X

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(2) Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawaii's people and which are sensitive and responsive to family and community needs.			X
(3) Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawaii.			X
(4) Encourage the essence of the aloha spirit in people's daily activities to promote harmonious relationships among Hawaii's people and visitors.			X
Discussion: N/A			
HRS § 226-26: Objectives and policies for socio-cultural advancement – public safety.			
Objectives: Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:			
(1) Assurance of public safety and adequate protection of life and property for all people.	X		
(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.			X
(3) Promotion of a sense of community responsibility for the welfare and safety of Hawaii's people.			X
Policies related to public safety:			
(1) Ensure that public safety programs are effective and responsive to community needs.			X
(2) Encourage increased community awareness and participation in public safety programs.			X
Policies related to criminal justice:			
(1) Support criminal justice programs aimed at preventing and curtailing criminal activities.			X
(2) Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.			X
(3) Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.			X
Policies related to emergency management:			
(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.			X
(2) Enhance the coordination between emergency management programs throughout the State.			X
Discussion: Discussion: The proposed project is supportive of the State's goals as stated above, as it improves public safety through the design and provision of new pedestrian facilities top minimize conflicts between vehicle and pedestrian in the Project Site.			
HRS § 226-27: Objectives and policies for socio-cultural advancement – government.			
Objectives: Planning the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:			
(1) Efficient, effective, and responsive government services at all levels in the State.			X
(2) Fiscal integrity, responsibility, and efficiency in the state government and county governments.			X
Policies:			
(1) Provide for necessary public goods and services not assumed by the private sector.			X

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<i>(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)</i>			
(2) Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.			X
(3) Minimize the size of government to that necessary to be effective.			X
(4) Stimulate the responsibility in citizens to productively participate in government for a better Hawaii.			X
(5) Assure that government attitudes, actions, and services are sensitive to community needs and concerns.			X
(6) Provide for a balanced fiscal budget.			X
(7) Improve the fiscal budgeting and management system of the State.			X
(8) Promote the consolidation of state and county governmental functions to increase the effective and efficient delivery of government programs and services and to eliminate duplicative services wherever feasible.			X
Discussion: N/A			
HAWAII STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
HRS § 226-101: Purpose. The purpose of this part is to establish overall priority guidelines to address areas of statewide concern.			
HRS § 226-102: Overall direction. The State shall strive to improve the quality of life for Hawaii’s present and future present and future population through the pursuit of desirable courses of action in five major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, and quality education.			
HRS § 226-103: Economic priority guidelines.			
(a) Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawaii’s people and achieve a stable and diversified economy:			
(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.			X
(A) Encourage investments which:			X
(i) Reflect long term commitments to the State;			X
(ii) Rely on economic linkages within the local economy;			X
(iii) Diversify the economy;			X
(iv) Reinvest in the local economy;			X
(v) Are sensitive to community needs and priorities; and			X
(vi) Demonstrate a commitment to provide management opportunities to Hawaii residents.			X
(B) Encourage investments in innovative activities that have a nexus to the State, such as:			X
(i) Present or former residents acting as entrepreneurs or principals;			X
(ii) Academic support from an institution of higher education in Hawaii;			X
(iii) Investment interest from Hawaii residents;			X
(iv) Resources unique to Hawaii that are required for innovative activity; and			X
(v) Complementary or supportive industries or government programs or projects.			X
(2) Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.			X

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(3) Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.			X
(4) Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.			X
(5) Streamline the building and development permit and review process, and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where public health, safety and welfare would not be adversely affected.			X
(6) Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawaii's small-scale producers, manufacturers, and distributors.			X
(7) Continue to seek legislation to protect Hawaii from transportation interruptions between Hawaii and the continental United States.			X
(8) Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:			X
(A) An industry that can take advantage of Hawaii's unique location and available physical and human resources.			X
(B) A clean industry that would have minimal adverse effects on Hawaii's environment.			X
(C) An industry that is willing to hire and train Hawaii's people to meet the industry's labor needs at all levels of employment.			X
(D) An industry that would provide reasonable income and steady employment.			X
(9) Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawaii business.			X
(10) Enhance the quality of Hawaii's labor force and develop and maintain career opportunities for Hawaii's people through the following actions:			X
(A) Expand vocational training in diversified agriculture, aquaculture, information industry, and other areas where growth is desired and feasible.			X
(B) Encourage more effective career counseling and guidance in high schools and post-secondary institutions to inform students of present and future career opportunities.			X
(C) Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired.			X
(D) Promote career opportunities in all industries for Hawaii's people by encouraging firms doing business in the State to hire residents.			X
(E) Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on- the-job training opportunities.			X
(F) Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.			X

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(b) Priority guidelines to promote the economic health and quality of the visitor industry:			
(1) Promote visitor satisfaction by fostering an environment which enhances the Aloha Spirit and minimizes inconveniences to Hawaii's residents and visitors.			X
(2) Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provide for adequate shoreline setbacks and beach access.			X
(3) Support appropriate capital improvements to enhance the quality of existing resort destination areas and provide incentives to encourage investment in upgrading, repair, and maintenance of visitor facilities.			X
(4) Encourage visitor industry practices and activities which respect, preserve, and enhance Hawaii's significant natural, scenic, historic, and cultural resources.			X
(5) Develop and maintain career opportunities in the visitor industry for Hawaii's people, with emphasis on managerial positions.			X
(6) Support and coordinate tourism promotion abroad to enhance Hawaii's share of existing and potential visitor markets.			X
(7) Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.			X
(8) Support law enforcement activities that provide a safer environment for both visitors and residents alike.			X
(9) Coordinate visitor industry activities and promotions to business visitors through the state network of advanced data communication techniques.			X
(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:			
(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.			X
(2) Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawaii.			X
(3) Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.			X
(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:			
(1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.			X
(2) Assist in providing adequate, reasonably priced water for agricultural activities.			X
(3) Encourage public and private investment to increase water supply and to improve transmission, storage, and irrigation facilities in support of diversified agriculture and aquaculture.			X
(4) Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing costs.			X
(5) Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawaii's agricultural community.			X
(6) Seek favorable freight rates for Hawaii's agricultural products from interisland and overseas transportation operators.			X

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(7) Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.			X
(8) Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.			X
(9) Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.			X
(10) Support the continuation of land currently in use for diversified agriculture.			X
(11) Encourage residents and visitors to support Hawaii’s farmers by purchasing locally grown food and food products.			X
(e) Priority guidelines for water use and development:			
(1) Maintain and improve water conservation programs to reduce the overall water consumption rate.			X
(2) Encourage the improvement of irrigation technology and promote the use of nonpotable water for agricultural and landscaping purposes.			X
(3) Increase the support for research and development of economically feasible alternative water sources.			X
(4) Explore alternative funding sources and approaches to support future water development programs and water system improvements.			X
(f) Priority guidelines for energy use and development:			
(a) Encourage the development, demonstration, and commercialization of renewable energy sources.			X
(b) Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.			X
(c) Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.			X
(d) Encourage the development and use of energy conserving and cost-efficient transportation systems.			X
(g) Priority guidelines to promote the development of the information industry:			
(1) Establish an information network that will serve as the catalyst for establishing a viable information industry in Hawaii.			X
(2) Encourage the development of services such as financial data processing, a products and services exchange, foreign language translations, telemarketing, teleconferencing, a twenty-four-hour international stock exchange, international banking, and a Pacific Rim management center.			X
(3) Encourage the development of small businesses in the information field such as software development, the development of new information systems and peripherals, data conversion and data entry services, and home or cottage services such as computer programming, secretarial, and accounting services.			X
(4) Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.			X
(5) Encourage research activities, including legal research in the information and telecommunications fields.			X
(6) Support promotional activities to market Hawaii's information industry services.			X

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(7) Encourage the location or co-location of telecommunication or wireless information relay facilities in the community, including public areas, where scientific evidence indicates that the public health safety, and welfare would not be adversely affected.			X
Discussion: N/A			
HRS § 226-104: Population growth and land resources priority guidelines.			
(a) Priority guidelines to effect desired statewide growth and distribution:			
(1) Encourage planning and resource management to ensure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawaii's people.			X
(2) Manage a growth rate for Hawaii's economy that will parallel future employment needs for Hawaii's people.			X
(3) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.	X		
(4) Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.			X
(5) Explore the possibility of making available urban land, low-interest loans, and housing subsidies to encourage the provision of housing to support selective economic and population growth on the neighbor islands.			X
(6) Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.			X
(7) Support the development of high technology parks on the neighbor islands.			X
(b) Priority guidelines for regional growth distribution and land resource utilization:			
(1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.	X		
(2) Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.			X
(3) Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.			X
(4) Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.			X
(5) In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a noncontiguous new urban core.			X
(6) Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.			X
(7) Pursue rehabilitation of appropriate urban areas.			X
(8) Support the redevelopment of Kakaako into a viable residential, industrial, and commercial community.			X
(9) Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.			X

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(10) Identify critical environmental areas in Hawaii to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.			X
(11) Identify all areas where priority should be given to preserving rural character and lifestyle.			X
(12) Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.	X		
(13) Protect and enhance Hawaii's shoreline, open spaces, and scenic resources.			X
Discussion: The proposed project is supportive of the State's goals as stated above, as it improves transportation facilities to accommodate projected population growth and encourages growth in existing urban areas by enhancing walkability to services and recreational facilities in downtown Hilo.			
HRS § 226-105: Crime and criminal justice.			
Priority guidelines in the area of crime and criminal justice:			
(1) Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment.			X
(2) Target state and local resources on efforts to reduce the incidence of violent crime and on programs relating to the apprehension and prosecution of repeat offenders.			X
(3) Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities.			X
(4) Reduce overcrowding or substandard conditions in correctional facilities through a comprehensive approach among all criminal justice agencies which may include sentencing law revisions and use of alternative sanctions other than incarceration for persons who pose no danger to their community.			X
(5) Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions.			X
(6) Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization.			X
Discussion: N/A			
HRS § 226-106: Affordable housing.			
Priority guidelines for the provision of affordable housing:			
(1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.			X
(2) Encourage the use of alternative construction and development methods as a means of reducing production costs.			X
(3) Improve information and analysis relative to land availability and suitability for housing.			X
(4) Create incentives for development which would increase home ownership and rental opportunities for Hawaii's low- and moderate-income households, gap-group households, and residents with special needs.			X
(5) Encourage continued support for government or private housing programs that provide low interest mortgages to Hawaii's people for the purchase of initial owner-occupied housing.			X

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(6) Encourage public and private sector cooperation in the development of rental housing alternatives.			X
(7) Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.			X
(8) Give higher priority to the provision of quality housing that is affordable for Hawaii's residents and less priority to development of housing intended primarily for individuals outside of Hawaii.			X
Discussion: N/A			
HRS § 226-107: Quality education.			
Priority guidelines to promote quality education:			
(1) Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement;			X
(2) Continue emphasis on general education "core" requirements to provide common background to students and essential support to other university programs;			X
(3) Initiate efforts to improve the quality of education by improving the capabilities of the education work force;			X
(4) Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision-making responsibilities;			X
(5) Increase and improve the use of information technology in education by the availability of telecommunications equipment for:			X
(A) The electronic exchange of information;			X
(B) Statewide electronic mail; and			X
(C) Access to the Internet.			X
Encourage programs that increase the public's awareness and understanding of the impact of information technologies on our lives;			X
(6) Pursue the establishment of Hawaii's public and private universities and colleges as research and training centers of the Pacific;			X
(7) Develop resources and programs for early childhood education;			X
(8) Explore alternatives for funding and delivery of educational services to improve the overall quality of education; and			X
(9) Strengthen and expand educational programs and services for students with special needs.			X
Discussion: N/A			
HRS § 226-108: Sustainability.			
Priority guidelines and principles to promote sustainability shall include:			
(1) Encouraging balanced economic, social, community, and environmental priorities;			X
(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State;			X
(3) Promoting a diversified and dynamic economy;			X
(4) Encouraging respect for the host culture;			X
(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations;	X		
(6) Considering the principles of the ahupuaa system; and			X
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawaii.			X
Discussion: The proposed project is supportive of the State's goals as stated above, as it improves multimodal transportation facilities for more sustainable growth.			

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HAWAII STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	S	N/S	N/A
<i>(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)</i>			
HRS § 226-109: Climate change adaptation priority guidelines.			
Priority guidelines to prepare the State to address the impacts of climate change, including impacts to the areas of agriculture; conservation lands; coastal and nearshore marine areas; natural and cultural resources; education; energy; higher education; health; historic preservation; water resources; the built environment, such as housing, recreation, transportation; and the economy shall:			
(1) Ensure that Hawaii’s people are educated, informed, and aware of the impacts climate change may have on their communities;			X
(2) Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies;			X
(3) Invest in continued monitoring and research of Hawaii’s climate and the impacts of climate change on the State;			X
(4) Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change;			X
(5) Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change;			X
(6) Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments;			X
(7) Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options;	X		
(8) Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities and other nongovernmental entities, including nonprofit entities;			X
(9) Use management and implementation approaches that encourage the continual collection, evaluation, and integration of new information and strategies into new and existing practices, policies, and plans; and			X
(10) Encourage planning and management of the natural and built environments that effectively integrate climate change policy.			X
Discussion: The proposed project is supportive of the State’s goals as stated above, as it improves multimodal transportation facilities that may encourage alternative travel modes to help mitigate carbon emissions that contribute to climate change.			

5.1.5 Hawaii State Environmental Policy, Chapter 344, HRS

The State Environmental Policy provides guidelines for agencies to create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawaii. The environmental Guidelines (§344-4, HRS) suggest that insofar as practical, the development of programs consider: population; land, water, mineral, visual, air, and other natural resources; flora and fauna; parks, recreation, and open space; economic development; transportation; energy; community life and housing; education and culture; and, citizen participation. The Project’s consistency with the State Environmental Policy is outlined in the table below:

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Table 5-3: Hawaii State Environmental Policy and Guidelines, Chapter 344-3 and 344-4, HRS

State Environmental Policy, Chapter 344, Hawaii Revised Statutes (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
STATE ENVIRONMENTAL POLICY			
§344-3 Environmental policy. It shall be the policy of the State, through its programs, authorities, and resources to:			
(1) Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawaii.			X
(2) Enhance the quality of life by:			
(A) Setting population limits so that the interaction between the natural and artificial environments and the population is mutually beneficial;			X
(B) Creating opportunities for the residents of Hawaii to improve their quality of life through diverse economic activities which are stable and in balance with the physical and social environments;			X
(C) Establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian; and	X		
(D) Establishing a commitment on the part of each person to protect and enhance Hawaii's environment and reduce the drain on nonrenewable resources.	X		
Discussion: The proposed project is supportive of the State's goals as stated above, as it improves multimodal transportation and feature a more efficient roundabout design that improves vehicular maneuverability and enhances the aesthetic character of the community.			
GUIDELINES			
§344-4 Guidelines. In pursuance of the state policy to conserve the natural resources and enhance the quality of life, all agencies, in the development of programs, shall, insofar as practicable, consider the following guidelines:			
(1) Population.			
(A) Recognize population impact as a major factor in environmental degradation and adopt guidelines to alleviate this impact and minimize future degradation;	X		
(B) Recognize optimum population levels for counties and districts within the State, keeping in mind that these will change with technology and circumstance, and adopt guidelines to limit population to the levels determined.			X
Discussion: The proposed project is supportive of the State's goals as stated above, as it improves transportation facilities to accommodate projected population growth and encourages growth in existing urban areas by enhancing walkability in downtown Hilo.			
(2) Land, water, mineral, visual, air, and other natural resources.			
(A) Encourage management practices which conserve and fully utilize all natural resources;			X
(B) Promote irrigation and waste water management practices which conserve and fully utilize vital water resources;			X
(C) Promote the recycling of waste water;			X
(D) Encourage management practices which conserve and protect watersheds and water sources, forest, and open space areas;			X

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State Environmental Policy, Chapter 344, Hawaii Revised Statutes (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
(E) Establish and maintain natural area preserves, wildlife preserves, forest reserves, marine preserves, and unique ecological preserves;			X
(F) Maintain an integrated system of state land use planning which coordinates the state and county general plans;			X
(G) Promote the optimal use of solid wastes through programs of waste prevention, energy resource recovery, and recycling so that all our wastes become utilized.			X
Discussion: N/A			
(3) Flora and fauna.			
(A) Protect endangered species of indigenous plants and animals and introduce new plants or animals only upon assurance of negligible ecological hazard; and			X
(B) Foster the planting of native as well as other trees, shrubs, and flowering plants compatible to the enhancement of our environment.			X
Discussion: N/A			
(4) Parks, recreation, and open space.			
(A) Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses;			X
(B) Protect the shorelines of the State from encroachment of artificial improvements, structures, and activities; and			X
(C) Promote open space in view of its natural beauty not only as a natural resource but as an ennobling, living environment for its people.			X
Discussion: N/A			
(5) Economic development.			
(A) Encourage industries in Hawaii which would be in harmony with our environment;			X
(B) Promote and foster the agricultural industry of the State; and preserve and conserve productive agricultural lands;			X
(C) Encourage federal activities in Hawaii to protect the environment;			X
(D) Encourage all industries including the fishing, aquaculture, oceanography, recreation, and forest products industries to protect the environment;			X
(E) Establish visitor destination areas with planning controls which shall include but not be limited to the number of rooms;			X
(F) Promote and foster the aquaculture industry of the State; and preserve and conserve productive aquacultural lands.			X
Discussion: N/A			
(6) Transportation.			
(A) Encourage transportation systems in harmony with the lifestyle of the people and environment of the State;	X		
(B) Adopt guidelines to alleviate environmental degradation caused by motor vehicles;	X		
(C) Encourage public and private vehicles and transportation systems to conserve energy, reduce pollution emission, including noise, and provide safe and convenient accommodations for their users.			X
Discussion: The proposed project is supportive of the State's goals as stated above, as it improves multimodal transportation facilities to alleviate environmental degradation caused by motor vehicles.			

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State Environmental Policy, Chapter 344, Hawaii Revised Statutes (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
(7) Energy.			
(A) Encourage the efficient use of energy resources.			X
Discussion: N/A			
(8) Community life and housing.			
(A) Foster lifestyles compatible with the environment; preserve the variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods which reflect the culture and mores of the community;			X
(B) Develop communities which provide a sense of identity and social satisfaction in harmony with the environment and provide internal opportunities for shopping, employment, education, and recreation;			X
(C) Encourage the reduction of environmental pollution which may degrade a community;			X
(D) Foster safe, sanitary, and decent homes;			X
(E) Recognize community appearances as major economic and aesthetic assets of the counties and the State; encourage green belts, plantings, and landscape plans and designs in urban areas; and preserve and promote mountain-to-ocean vistas.			X
Discussion: N/A.			
(9) Education and culture.			
(A) Foster culture and the arts and promote their linkage to the enhancement of the environment;			X
(B) Encourage both formal and informal environmental education to all age groups.			X
Discussion: N/A.			
(10) Citizen participation.			
(A) Encourage all individuals in the State to adopt a moral ethic to respect the natural environment; to reduce waste and excessive consumption; and to fulfill the responsibility as trustees of the environment for the present and succeeding generations; and			X
(B) Provide for expanding citizen participation in the decision making process so it continually embraces more citizens and more issues.			X
Discussion: N/A.			

5.2 COUNTY OF HAWAII

County-specific land use plans and ordinances pertaining to the Project include the General Plan and the zoning code.

5.2.1 County of Hawaii General Plan

The County of Hawaii General Plan is the policy document for the long-range comprehensive development of the Island of Hawaii. Among the purposes of the General Plan are to guide the pattern of development in County of Hawaii and to provide the framework for regulatory decisions and capital improvement projects. The General Plan undergoes a comprehensive review every ten years, with the last review being completed in 2005. The next update to the General Plan is currently under review.

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The policy land use map, referred to as the Land Use Pattern Allocation Guide (LUPAG) Map, is intended to guide the direction and quality of future developments in a coordinated and rational manner. The Project Site is designated “Open” and “High Density Urban” (Figure 5).

Specific General Plan goals, policies, and courses of action most applicable to the Proposed Project are discussed below.

5.2.1.1 Flooding and Other Natural Hazards

Section 5.2 GOALS

- a) Protect human life.*
- b) Prevent damage to man-made improvements.*
- c) Control pollution.*
- d) Prevent damage from inundation.*
- e) Reduce surface water and sediment runoff.*
- f) Maximize soil and water conservation.*

Section 5.3 POLICIES

- g) Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.*
- q) Consider natural hazards in all land use planning and permitting.*

Discussion: The design of the proposed project includes drainage improvements, which will incorporate BMPs and LID features in order to control non-point source pollution, as well as reduce surface water and sediment runoff. The proposed roundabout design will slightly decrease the amount of impervious surfaces in the Project Site and improve existing drainage conditions through LID BMPs with infiltration basins to help improve water quality and decrease stormwater discharge. According to the FIRM, the majority of the Project Site is designated Zone AE (an area with a 1% annual chance of flooding and base flood elevations). Portions of the Project Site on the north end and southeastern portion along Bayfront Highway are designated Zone VE (an area with a 1% or greater chance of flooding annually and base flood elevations). Areas designated as Zone VE are susceptible to coastal flooding and additional hazards associated with storm waves. These areas have a 26% chance of flooding over a 30-year period. See Figure 17.

5.2.1.2 Roadways

Section 13.2.2 GOALS

- a) Provide a system of roadways for the safe, efficient and comfortable movement of people and goods.*
- b) Provide an integrated State and County transportation system so that new major routes will complement and encourage proposed land policies.*

Section 13.2.3 POLICIES

- d) Support the development of programs to identify and improve hazardous and substandard sections of roadway and drainage problems.*
- e) Coordinate with appropriate Federal and State agencies for the funding of transportation projects for areas of anticipated growth.*
- f) Consider the development of alternative means of transportation, such as mass transit, bicycle and pedestrian systems, as a means to increase arterial capacity.*
- h) Provisions for on-street parking shall be incorporated into the design of street systems.*
- i) Encourage the State Department of Transportation to establish special scenic routes within and between communities.*
- j) Transportation and drainage systems shall be integrated where feasible.*
- k) Adopt street design standards that accommodate, where appropriate, flexibility in the design of streets to preserve the rural character of an area and encourage a pedestrian-friendly design, including landscaping and planted medians.*
- n) Encourage the development of walkways, jogging, and bicycle paths within designated areas of the community.*
- o) Explore means and opportunities to enhance the shared use of the island's roadways by pedestrians and bicyclists, in coordination with appropriate government agencies and organizations.*
- o) Explore means and opportunities to enhance the shared use of the island's roadways by pedestrians and bicyclists, in coordination with appropriate government agencies and organizations.*

Discussion: The proposed project includes improvements to reconfigure the intersection of Bayfront Highway (Route 19) and Waianuenue Avenue (Route 1950) to enhance multimodal connectivity and address ongoing concerns involving poor vehicular maneuverability, restricted access to the downtown Hilo area, pedestrian safety concerns, and overall congestion of roadways in the vicinity.

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The roundabout design will result in an immediate improvement to vehicular access for the intersections within the Project Site by allowing vehicular turning movements in all directions. Under the projected future conditions, roadway operations will function at an acceptable LOS during the AM and PM peak hours. Traffic congestion will be improved throughout the vicinity of the Site and will also improve traffic flow during periods of closure due to tidal flooding along the southern portion of Bayfront Highway.

The project will also enhance pedestrian safety and multimodal access throughout the Site, especially for Kaipalaoa Landing Park and connectivity across Bayfront Highway. The proposed project will also contribute to a reduction in overall vehicular speeds through the Project Site, further reducing potential conflicts between pedestrians and vehicles.

5.2.2 County of Hawaii Zoning

The County zoning code (HCC Chapter 25) regulates the type and intensity of uses in the State Land Use Urban District and can specify in more detail the permissible uses and intensity in the State Land Use Agricultural and Rural Districts consistent with the State Land Use law (HRS Chapter 205). Most of the Project Site is not zoned with a portion zoned Open District (O) (see Figure 6). The proposed project is consistent with the permissible uses in this zone and maintains existing land use.

5.2.3 Special Management Area

The Project Site is located within the Special Management Area (SMA) (see Figure 7). An SMA Use Permit is being sought in conjunction with other approval processes.

5.3 APPROVALS AND PERMITS

A listing of anticipated State and County permits and approvals required for the Proposed Project is presented below. Additionally, the project is anticipated to be federally funded, thus compliance with NEPA and related federal authorities will also need to be documented.

Table 5-4: Anticipated Approvals and Permits

Permit/Approval	Responsible Agency
Special Management Area Permit	County Planning Department
Shoreline Setback Variance	County Planning Department
Grading/Building Permits	County Department of Public Works
HRS Chapter 6E Historic Preservation Review	State Historic Preservation Division
National Historic Preservation Act - Section 106 Compliance	State Historic Preservation Division
Coastal Zone Management (CZM) Federal Consistency Review (Exemption)	State Office of Planning and Sustainable Development

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Permit/Approval	Responsible Agency
HRS Chapter 195D	Department of Natural Resources Division of Forestry and Wildlife (DOFAW); Division of Aquatic Resources (DAR)
National Pollutant Discharge Elimination System (NPDES) Permit	State Department of Health
Noise Permit	State Department of Health
Noise Variance	State Department of Health
Disability and Communication Access Board (DCAB) Document Review (ADA Compliance)	State Department of Health
Endangered Species Act (ESA) Section 7 Review	US Fish and Wildlife Service, National Oceanic Atmospheric Administration - National Marine Fisheries Service
National Environmental Policy Act (NEPA) Review	US Department of Transportation - Federal Highway Administration
Jurisdictional Determination	US Army Corps of Engineers
US Department of Transportation Act – Section 4(f) Review	US Department of Transportation - Federal Highway Administration
Essential Fish Habitat (EFH) Review	National Oceanic Atmospheric Administration - National Marine Fisheries Service
US Department of Transportation (FHWA) – Section Categorical Exclusion List D	US Department of Transportation - Federal Highway Administration

6 ALTERNATIVES

This section identifies and analyzes reasonable alternatives that could attain the objectives of the proposed action.

6.1 ALTERNATIVE #1: NO ACTION

This alternative involves making no intersection changes. The purpose of this project to address traffic congestion during highway closures would therefore be unmet. Projected traffic volumes with the current traffic configuration will produce increased congestion for the intersection and a decreased level of service as shown in the table below for the project area and other adjacent roadways in the vicinity. In addition, pedestrian and bicycle safety in the project area would continue to be a significant concern, especially as it relates to accessibility for Kaipalaoa Landing Park and other pedestrian and bicycle routes along Hilo Bay.

6.2 ALTERNATIVE #2: TYPICAL INTERSECTION IMPROVEMENTS, INCLUDING RE-STRIPING AND NEW TRAFFIC SIGNALS

This alternative involves conventional improvements including an all-pedestrian traffic phase at the Kamehameha Highway and Waianuenue Avenue intersection and an alignment shift along Bayfront Highway of approximately 5 feet to account for new pedestrian enhancements on the northbound leg of Bayfront Highway. The footprint for this alternative is markedly smaller since the adjustments are built off the existing configuration. The vehicular patterns would remain the same but would be compromised due to accommodations for signal timing for new pedestrian crossings. Considered changes were modeled and found that benefits were limited to pedestrian safety and access and did not achieve the primary purpose of reducing congestion. When future traffic projections were applied to a highway closure condition the LOS did not perform as well as the roundabout condition. See Table 6-1 below.

Table 6-1: Future Year 2042 Intersection Operations Level of Service Comparison in Highway Closure Condition

Intersections	No Action	Conventional Improvements	Roundabout
Morning Peak Hours			
Kamehameha Ave/ Waianuenue Ave	F	F	C
Bayfront Hwy / Waianuenue Ave	D	D	C
PM Peak Hour			
Kamehameha Ave/ Waianuenue Ave	E	F	C
Bayfront Hwy / Waianuenue Ave	C	D	C

Bayfront Highway and Waianuenue Avenue Intersection Improvements
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Secondarily, this alternative does not achieve a vision that the Hilo community has set for this intersection in the Downtown Hilo Multimodal Master Plan, which calls for a roundabout as a solution to congestion problems.

Based on the LOS during highway closures the roundabout provided the greatest opportunity to relieve projected traffic congestion. By reconfiguring the intersection other needs could be accommodated such as new and improved pedestrian access and safety and would enable to continuous flow of vehicles, pedestrian, and bikes through the intersection.

7 FINDINGS AND ANTICIPATED DETERMINATION

To determine whether development of the Proposed Project could be expected to have a significant impact on the physical and human environment, all alternatives and expected consequences of the Proposed Project have been evaluated, including potential primary, secondary, short-range, long-range, and cumulative impacts. Based on this evaluation, the HDOT anticipates issuing a FONSI. The supporting rationale for this finding is presented in this chapter.

7.1 SIGNIFICANCE CRITERIA

Based upon the previous information presented in this document the proposed permitting and construction of the Project will likely have no significant environmental impacts. This determination is based upon the 13 Significance Criteria outlined in Chapter 343, HRS, as amended and Title 11 Chapter 200.1-13 HAR 1996, discussed below.

(1) Involves an irrevocable commitment of any natural, cultural, or historical resource;

Discussion: The project does not irrevocably commit any natural, cultural, or historic resources. A consultative process and evaluation of historic and cultural resources was conducted to evaluate potential impacts and is still ongoing to ensure the proposed design elements will preserve historic resources. Adverse impacts to the streetscape, right of way, and/or historic resources with the Project Site will be mitigated as appropriate through the HRS 6E-8 (Historic Preservation) process in continued consultation with SHPD. The drainage improvements are expected to help mitigate stormwater runoff pollution and sediment discharge into Hilo Bay with new infiltration basins under Bayfront Highway. New catch basin drains along the makai portion of Bayfront Highway will assist in reducing localized flooding during severe storm events on the roadway.

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

Discussion: The proposed project does not curtail beneficial uses of the environment. The proposed project is intended to have beneficial impact on the environment by mitigating traffic congestion and encouraging multimodal transportation modes in downtown Hilo. Vehicle idling should be reduced with conversion of the intersection from one that is signal controlled to a roundabout. Additionally, the proposed project attributes providing new and improved pedestrian and bicycle facilities will encourage alternative transportation modes in the area, which could reduce air pollutants associated with vehicular emissions. The proposed project will contribute to broader goals by the County to advance multi-modal transportation in downtown Hilo.

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

Discussion: Compliance with Chapter 344, HRS is documented at length in Chapter 5.1.5 of this document. The investment in infrastructure improvements for the intersection is intended to support the local economy by addressing concerns related to vehicular maneuverability and traffic congestion that negatively impact efficient travel means through downtown Hilo. The improvements also enhance pedestrian safety and the design of the roundabout will provide an aesthetically pleasing urban open space for the community that could support commercial activity, sustain the historic character of downtown Hilo and mitigate impacts to the environment.

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

Discussion: The improvements proposed for the intersection are directly supportive of the economy and social life by increasing multimodal connectivity that will make the community a more vibrant area for commerce, cultural practices, and recreational uses in the surrounding area.

(5) Substantially affects public health;

Discussion: This project is planned to provide opportunity for beneficial impacts to public health by making multimodal transportation choices more attractive to residents in the Hilo area.

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

Discussion: Secondary impacts are expected to be beneficial, including reduced non-point stormwater pollution in Hilo Bay and more efficient vehicular travel in the broader region that may connect through this intersection.

(7) Involves a substantial degradation of environmental quality;

Discussion: Environmental quality will not be degraded by the project. Beneficial environmental impacts of the proposed project include reduced localized flooding, reduced non-point source pollution, and improved air quality from reduced vehicular idling. Furthermore, the project is expected to enhance pedestrian safety and support alternative non-automobile transportation modes that negatively impact the environment through carbon emissions. Impacts from construction are temporary and mitigatable with best management practices.

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

Discussion: Individually and cumulatively, this project is expected to have net beneficial impacts to the environment as discussed throughout this document. Localized direct beneficial impacts are anticipated to be mitigation of flooding along the roadways. Secondary beneficial impacts include a contribution to reducing non-point source pollution through stormwater system improvements and improved air quality from reduced vehicular idling caused by traffic

congestion. Long term cumulative effects are also expected to be beneficial in that aging infrastructure is improved and the multimodal transportation network is enhanced. Adverse effects to historic streetscape are mitigatable and shall be mitigated through the HRS 6E-8 (Historic Resources) review process in consultation with SHPD.

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

Discussion: The project area does not contain habitat for threatened or endangered species. Recommended best practices for avoidance of impacts to seabirds and the Hawaiian hoary bat will be incorporated into the project. Stormwater improvements will reduce non-point source pollution from the project area which will make a marginal contribution toward improved water quality in Hilo Bay.

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

Discussion: The project is expected to have secondary beneficial impacts to air and water quality through non-point source pollution reduction with the drainage improvements, enhancements to the multimodal transportation network, and facilitating transportation choices other than carbon-emitting automobiles. There may be short-term direct and indirect impacts related to air quality that could potentially occur during construction. However, these construction-related impacts will be minimized and confined to the immediate vicinity of the site and BMPs will be implemented to limit localized impacts.

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

Discussion: It is expected that climate change will cause sea level rise, thus, the need for increased water management is expected. The proposed project has focused on sustainable design that takes flood frequency into consideration. Currently the project area experiences flooding during heavy rain events as current storm water infrastructure is inadequate to handle rain volumes. To address this issue, the project proposes to create new catch basin drains and drainage inlets to convey stormwater collected on impervious surfaces. Under a 3.2 feet SLR scenario, most of the proposed project is not expected to become routinely flooded from anticipated static sea level rise or flooding due to tidal influences (Hawaii Green Growth, 2022). However, there are small portions along the makai side of Bayfront Highway that may be impacted under this scenario.

(12) *Substantially affects scenic vistas and view planes, during day or night, identified in County or State plans or studies; or,*

Discussion: The impact on scenic vistas and view planes after completion of the project are considered to be marginal. The site will generally maintain the same view planes consistent with existing conditions. The addition of the roundabout traffic design will offer a less obstructed makai view of Hilo Bay from the vantage point of Waianuenue Avenue.

(13) *Requires substantial energy consumption or emits substantial greenhouse gases.*

Discussion: The intersection improvements proposed do not require substantial energy consumption, nor do they emit substantial greenhouse gasses. The project is intended to make a contribution toward County goals for reducing fossil fuel energy consumption and carbon production by advancing the multimodal transportation network in downtown Hilo.

7.2 ANTICIPATED DETERMINATION

On the basis of impacts and mitigation measures examined in this document and analyzed under the above criteria, it is determined that the Project will not have a significant effect on the physical or human environments. HDOT anticipates a FONSI, pursuant to Chapter 343, HRS and Title 11, Chapter 200.1, HAR.

8 CONSULTATION

8.1 EARLY CONSULTATION

A pre-assessment consultation was conducted from January 2022 through April 2023 prior to preparation of the Draft EA. The purpose of the pre-assessment consultation was to consult with agencies, organizations and individuals with technical expertise, or an interest that might be affected by the proposed Project. This process is part of the scoping process for the Draft EA. Comments and input received during this period were used to identify environmental issues and concerns to be addressed in the Draft EA, which in turn will undergo a 30-day public comment period.

Please see Table 8-1 below for a list of meetings conducted as part of the Early Consultation process.

Table 8-1: Pre-Assessment Consultation Meetings

Parties Consulted	Date	Notes
Various County Departments	1/19/22	Introduction to project
County Department of Planning	4/13/22	Discussion on Downtown Hilo Multimodal Plan
Various County Departments	8/3/22	Overview of conceptual design

Appendix F includes the meeting notes and minutes from the pre-assessment consultation listed above in Table 8-1.

In addition, the following agencies, organizations, and individuals were sent pre-assessment consultation letters. Those that provided written comments (either by hardcopy or email) are highlighted in **bold** and *italics*. Copies of the written comments and responses are reproduced in Appendix G.

8.1.1 State of Hawaii

- Department of Agriculture
- Department of Business, Economic Development & Tourism
- DBEDT - Hawaii State Energy Office / Strategic Industries Division
- DBEDT - Land Use Commission
- DBEDT - Office of Planning & Sustainable Development
- DBEDT - Office of Planning & Sustainable Development
- ***Department of Defense - Engineering Office***
- ***Department of Education***
- ***Department of Hawaiian Home Lands***
- Department of Health
- Department of Health - Hilo Office

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- Department of Health, Environmental Health Administration
- Department of Health - Clean Air Branch
- Department of Health - Clean Water Branch
- Department of Health - Environmental Management Division
- Department of Health - Wastewater Branch
- Department of Health - Safe Drinking Water Branch
- Department of Health - Solid & Hazardous Waste Branch
- Department of Health - Hazard Evaluation & Emergency Response Office
- Department of Health - Environmental Health Services Division
- Department of Health - Indoor and Radiological Health Branch
- Department of Health - Sanitation Branch
- Department of Health - Hawaii District Health Office
- Department of Health Public Health Nursing
- ***Department of Human Services***
- ***Department of Labor and Industrial Relations***
- Department of Land and Natural Resources
- DLNR - State Historic Preservation Division
- DLNR - Land Division
- ***DLNR - Land Division, Hawaii District Office***
- ***DLNR Commission on Water Resource Management***
- ***DLNR Division of Aquatic Resources***
- DLNR Division of Boating & Ocean Recreation
- ***DLNR DOFAW***
- DLNR DOFAW Na Ala Hele
- ***DLNR Engineering Division***
- DLNR Office of Conservation & Coastal Lands
- Department of Public Safety
- Department of Transportation
- ***Department of Transportation, Airports Division - Engineering Branch***
- Department of Transportation - Harbors
- Department of Transportation - Highways
- Department of Transportation, Highways Division, Planning Branch
- Department of Transportation, Statewide Transportation Planning Office
- Department of Transportation, Highways Division, Hawaii District Office
- Department of Transportation, Airports Division, Hawaii District
- Hawaii Housing Finance and Development Corporation
- Hawaii Public Housing Authority
- Hawaii Tourism Authority
- Hawaii State Judiciary
- Office of Hawaiian Affairs

8.1.2 County of Hawaii

- ***Department of Environmental Management***
- Department of Parks and Recreation
- Department of Planning
- Department of Public Works
- Department of Research and Development
- ***Department of Water Supply***
- Hawaii County Culture & Arts
- Office of Housing and Community Development
- ***Fire Department***
- ***Mass Transit Agency***
- ***Police Department***
- Prosecuting Attorney
- Hawaii County Cultural Resources Commission
- Office of Aging

8.1.3 Elected Officials

- Mayor Mitch Roth
- State Senator Laura Acasio
- State Representative Mark Nakashima
- State Representative Richard Onishi
- State Representative Greggor Ilagan
- State Representative Chris Todd
- Council Member Heather Kimball
- Council Member Aaron Chung
- Council Member Susan Lee Loy
- Council Member Ashley Kierkiewicz

8.1.4 Community Groups and Neighboring Properties

- Akaka Falls Trading Post
- Anela's Jade
- Bernie's Barbershop
- Big Island BookBuyers
- Bob's Jewelers, Inc.
- Body Harmony Massage Therapy
- Catholic Charities Hawaii - Hilo
- ***Connections Public Charter School***
- Cronies Bar & Grill
- East Hawaii Cacao Association
- Ekela's Healing Spa
- Going Home Hawaii

Bayfront Highway and Waianuenue Avenue Intersection Improvements
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- Kathmandu Trading Company
- Hana Hou
- Hawaii Community Foundation
- Hawaii Island Community Development Corporation
- Hawaii Island United Way
- Hawaiian Force
- Hilo Drug Company Building
- HOPE Services Hawaii, Inc.
- Law Office of Ramon J. Ferrer
- The Locavore Store
- Louis P. Mendonca Attorney At Law
- McCully Works, Inc.
- Mental Health Kōkua
- Miracle-Ear Hearing Aid Center
- Mokupapapa Discovery Center
- The Mystic Closet
- Native Flesh Tattoo
- ONE GALLERY
- Pacific Tsunami Museum
- PACT Head Start
- PAPAJACS
- PATCH Hilo Office
- Paul J. Sulla - Real Estate, Estate Planning Law
- Restorative Massage Clinic
- The Salvation Army Family Store & Donation Center
- Sig Zane Designs
- Speakeazy Hawaii
- Tina's Garden Café
- Yoga Centered
- Malama Kaipalaoa
- Hilo Downtown Improvement Association
- Hawaii Island Chamber of Commerce

9 REFERENCES

- County of Hawaii. (2005). *County of Hawaii General Plan*. Retrieved from <https://www.planning.hawaiicounty.gov/home/showpublisheddocument/301643/637204664141830000>
- County of Hawaii. (2018). *Downtown Hilo Multimodal Master Plan*.
- County of Hawaii. (Current). *County of Hawaii Data Book*.
- County of Hawaii Solid Waste Facilities*. (n.d.). Retrieved January 22, 2023, from County of Hawai'i Department of Environmental Management: <https://www.hawaii Zerowaste.org/facilities-2/>
- DBEDT. (2021). *County Economic Conditions*. Retrieved from Reserach & Economic Analysis: <https://dbedt.hawaii.gov/economic/qser/county/>
- FEMA. (2020, August 3). *Earthquake Hazard Maps*. Retrieved 2022, from Earthquake Risk: <https://www.fema.gov/emergency-managers/risk-management/earthquake/hazard-maps>
- Giambelluca, T., Chen, Q., Frazier, A., Price, J., Chen, Y.-L., Chu, P.-S., . . . Delparte, D. (2013). *Online Rainfall Atlas of Hawai'i*. Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.
- Giambelluca, T., Shuai, X., Barnes, M., Alliss, R., Longman, R., Miura, T., . . . Businger, A. (2014). *Evapotranspiration of Hawai'i*. U.S. Army Corps of Engineers—Honolulu District, and the Commission on Water Resource Management, State of Hawaii. doi:10.1175/BAMS-D-11-00228.1
- Handy, E., & Handy, E. (1972). *Native Planters in Old Hawaii: Their Life, Lore and Environment*. Bernice Pauahi Bishop Museum Bulletin 223.
- Hawaii Climate Change Mitigation and Adaptation Commission. (n.d.). Retrieved from https://climate.hawaii.gov/wp-content/uploads/2019/02/SLR-Report_Dec2017-with-updated-disclaimer.pdf
- Hawaii Green Growth. (2022). *Aloha+ Challenge*. Retrieved from <https://aloha-challenge.hawaiigreengrowth.org/>
- Kamakau, S. (1961). *Ruling Chiefs of Hawaii*. Honolulu, Hawai'i: The Kamehameha Schools Press.
- McEldowney, H. (1979). Archaeological and historical literature search and research design: Lava flow control study, Hilo, Hawai'i. Prepared for U.S. Army Engineering Division, Pacific Ocean, Honolulu, Hawai'i.
- Office of Environmental Quality Control. (1997). *Guidelines for Assessing Cultural Impacts*. State of Hawai'i.

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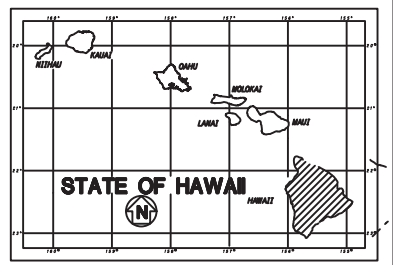
- Pacific Island Ocean Observing System (PacIOOS). (2022). *Sea Level Rise: Hawaii Sea Level Rise Viewer*. Retrieved from <https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/>
- State of Hawaii, Department of Health. (2012). *2008/2010 State of Hawaii Water Quality Monitoring and Assessment Report*. Department of Health, Clean Water Branch, Honolulu.
- State of Hawaii, Department of Labor and Industrial Relations. (2018). *Hawaii's unemployment rate at 2.2 percent in September*. Honolulu, HI: DLIR.
- State of Hawaii, Department of Transportation - Highways Division. (2014). *Statewide Federal-Aid Highways 2035 Transportation Plan*.
- State of Hawaii, Department of Transportation - Highways Division. (2021). *Hawaii Highways Climate Adaptation Action Plan*.
- State of Hawaii, Department of Transportation. (2003). *Bike Plan Hawaii Master Plan*.
- USDA Natural Resources Conservation Service. (2007). *Biology Technical Note No. 17: Hawaiian Hawk Habitat Enhancement and Management*.
- USDA Soil Conservation Service. (1973, January 2). *Soil Survey of the Island of Hawai'i, State of Hawai'i*. Retrieved from Natural Resources Conservation Service, United States Department of Agriculture.
- USGS. (1997, July 18). *Volcanic and Seismic Hazards on the Island of Hawaii: Volcanic Hazards*. Retrieved January 5, 2011, from U.S. Geological Survey: <http://pubs.usgs.gov/gip/hazards.html>

APPENDIX A

Detailed Site Plans



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	1	33

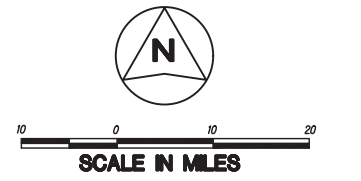
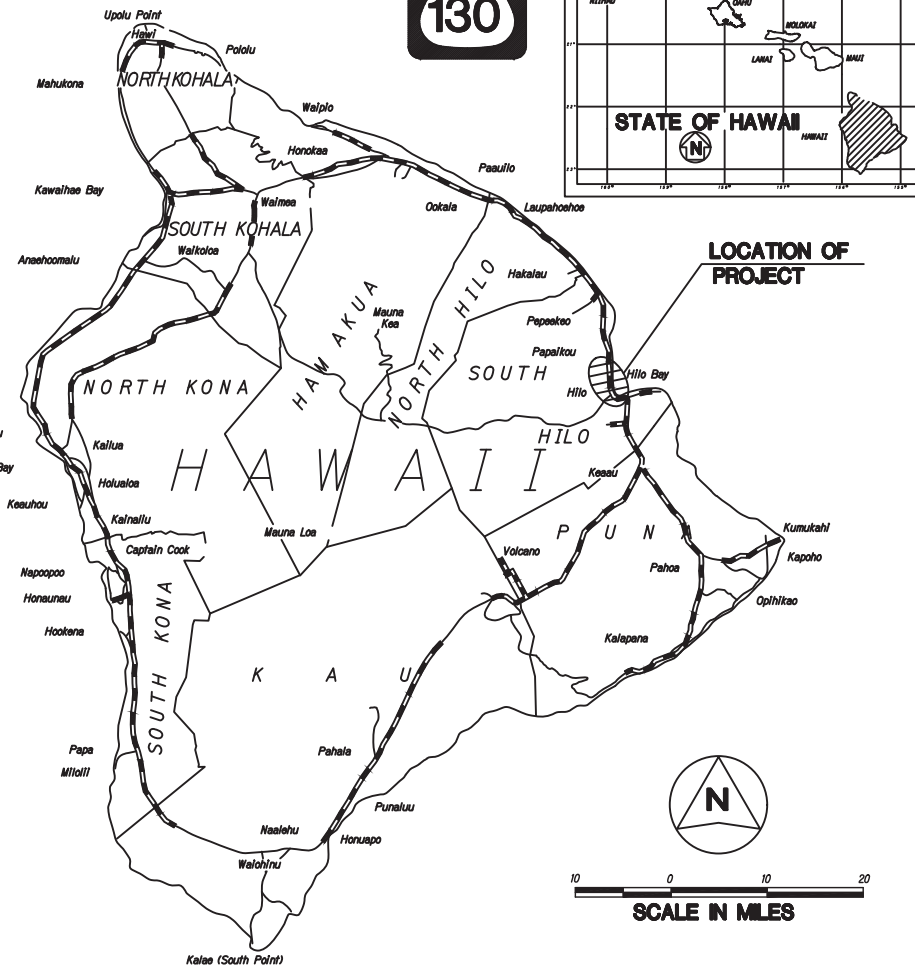


INDEX TO DRAWINGS	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	STANDARD PLANS SUMMARY
3-4	GENERAL NOTES AND LEGEND
5	OVERALL SITE PLAN
6-7	EXISTING CONDITIONS
8-9	DEMOLITION PLANS
10-12	TYPICAL SECTIONS
13-14	ROADWAY PLANS
15	UTILITY PLANS
16-17	PAVEMENT MARKING AND SIGNAGE
18-23	CONSTRUCTION SEQUENCING PLANS
24-33	ELECTRICAL PLANS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HONOLULU, HAWAII

**PLANS FOR
HILO BAYFRONT HIGHWAY
INTERSECTION IMPROVEMENTS
KAMEHAMEHA AVENUE
VICINITY OF HILO BAYFRONT
FEDERAL-AID PROJECT NO.
NH-019-2(076)**

DISTRICT OF HILO
ISLAND OF HAWAII

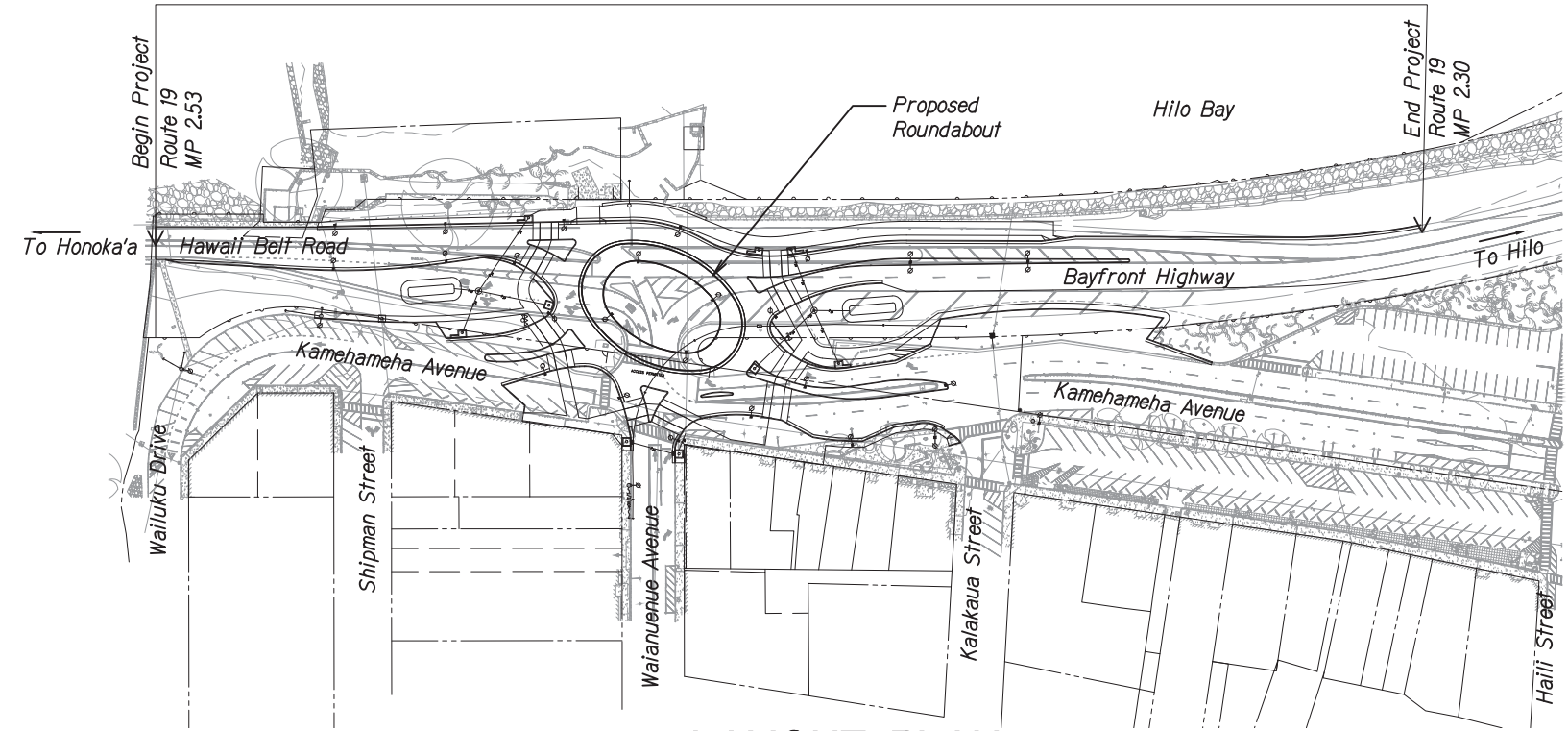


— FEDERAL AID PROJECTS PREVIOUSLY CONSTRUCTED OR UNDER CONSTRUCTION

MILE POST 230 TO MILE POST 253

DESIGN DESIGNATION

	Bayfront Highway (Route 19)	Hawaii Belt Road (Route 19)
ADT (2022) ...	12,000	18,600
ADT (2042) ...	15,000	23,200
2042 DHV	1,280	1,970
K _{pm}	8.5%	8.5
D _{pm}	55/45	55/45
T _{pm}	4.0	4.0
T ₂₄	5.0	3.7%



LAYOUT PLAN
LENGTH OF PROJECT . . . 0.23 MILES
SCALE: 1"=80'

APPROVED:

DIRECTOR OF PUBLIC WORKS
COUNTY OF HAWAII
(FOR WORK WITHIN COUNTY R/W ONLY)

DATE

DEPARTMENT OF TRANSPORTATION STATE OF HAWAII	
APPROVED:	
_____ DIR. OF TRANSPORTATION	_____ DATE

LAST UPDATE: September 30, 2022 @ 10:04:13 am
PLOT DATE: September 30, 2022 @ 10:50:44 am

AECOM HWY-DD 692-7678 SEPT 2022
DESIGNED BY MANAGED BY PHONE DATE

GENERAL NOTES:

1. The Scope of Work for this project consists of converting the existing intersection into a single-lane roundabout (center island, truck apron, circular path and splitter islands); pavement reconstruction; landscaping improvements; electrical conduits and highway lighting; drainage improvements; installing ADA compliant sidewalks and roadway crossings; installing chain link fences; installing signage and pavement marking; workzone traffic control and/or detour roads; and adjusting and relocation of various utilities, as necessary.
2. The Contractor is reminded of the requirements of Subsection 105.16 - Subletting of Contract, which requires him to perform work amounting to not less than 30 percent of the total contract cost less deductible items. Non-compliance with this Subsection may be grounds for rejection of bid.
3. The Contractor's attention is directed to the following Sections of the Standard Specifications and Special Provisions: Subsection 104.11 - Utilities and Services; Subsection 107.06 - Contractor Duty Regarding Public Convenience; Subsection 107.11 - Safety: Accident Prevention; Subsection 107.12 - Protection of Persons and Property; and Section 645 - Work Zone Traffic Control.
4. At the end of each day's work, the Contractor shall remove all equipment and other obstructions to permit free and safe passage of public traffic.
5. The existence and location of underground utilities, manholes, monuments and structures as shown on the plans are from the latest available data but the accuracy is not guaranteed. The encountering of other obstacles during the course of work is possible. The Contractor shall be held liable for any damages incurred to the existing facilities and/or improvements as a result of his operations.
6. The existing drainage system will be functional at all times during construction. The Contractor is to furnish materials, equipment, labor, tools and incidentals necessary to maintain flow. This work shall be considered incidental to the various contract items.
7. Earth swales shall be graded to drain. This work shall be considered incidental to the various contract items.
8. All saw cutting work shall be considered incidental to the various contract items.
9. The Contractor shall provide for free and safe access to and from existing side streets. See Phasing Plans.
10. The Contractor shall provide for access to and from all existing driveways at all times. The Contractor shall coordinate with the owner if driveway closure is required.
11. Where pedestrian walkways exist, they shall be maintained in a safe and passable condition, or other facilities for pedestrians shall be provided. Passages between walkways at intersections shall likewise be provided at all times.
12. This Project will affect bus routes, bus stops, and/or paratransit operations; therefore, the Contractor shall notify the Mass Transit Agency at 961-8343, and Hele-On Bus at 808-961-8744 of the scope of work, location, proposed closure of any street, traffic lane, sidewalk, or bus stop and duration of the project at least two weeks prior to construction.
13. The Contractor shall follow the requirements of various permits and Best Management Practices (BMP) during the construction.
14. No work or equipment shall be located or take place within 10' of any overhead wires or any HELCo utility pole. No excavation shall take place within 5' of any HELCo utility pole.
15. The Contractor will immediately report to the Engineer and utility companies damage discovered or caused by his work to any utilities.
16. The Contractor is advised that in addition to other Contractors working in the same areas, various utility companies (or their contractors) including Hawaii Electric Light Company, Hawaiian Telcom, Oceanic Time Warner Cable, The Gas Company, and the Department of Water Supply may be performing work within the project area.
17. The Contractor shall coordinate all work with other Contractors in the areas. In case of unresolved conflict among contractors regarding access or work sites, the Engineer will make the final determination of priorities.
18. All holes, depressions and wheel ruts shall be filled and compacted with Asphalt Concrete Pavement, Mix No. V prior to resurfacing. This work shall be incidental to Asphalt Concrete Pavement.
19. Smooth riding connections shall be constructed at all limits of the project, including the beginning and end of project, connecting approaches, side streets and driveways as shown on the plans and/or as directed by the Engineer.
20. All guardrail spacer blocks shall be recycled plastic blockouts or polyethylene offset blocks approved by DOT.
21. The Contractor shall clean and remove any accumulation of aggregates along the roadside within 15 feet of the edge of pavement. This work shall be considered incidental to the various contract items.
22. Demolishing, removing and disposing of existing drainage structures shall be considered incidental to the various contract items.
23. All necessary permits shall be obtained by the Contractor at his own cost.
24. The Contractor shall comply with the directives of the State of Hawaii Occupational Safety and Health Law (DOSH). Any citation (fine) received by the State for noncompliance by the Contractor shall be deducted from the progress payment.
25. All lanes shall be opened to traffic during the morning peak hours from 6:30 a.m. to 8:30 a.m., during the afternoon peak hours from 3:00 p.m. to 6:00 p.m. and off work hours or as directed by the Engineer. Only one lane of highway shall be closed during work hours.
26. The Contractor shall maintain at least one paved shoulder free and clear of debris for pedestrian and bicycle traffic at the end of each work day.
27. Material from cold planing operations shall remain the property of the State and all excess shall be stock piled within 2 miles of the project limits.
28. All new and existing sign posts within the project limits shall be painted with yellow traffic paint. This work shall be considered incidental to various pavement marking items.
29. The Contractor is reminded to call the Hawaii One Call Center at (866) 423-7287 prior to starting any excavation work.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	3	33

ORIGINAL PLAN	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
No.	

LAST UPDATE: Sep 08, 2022 @ 09:05 pm
 PLOT DATE: Sep 08, 2022 @ 10:57 pm
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LICENSE EXPIRES 4/30/24
 THIS WORK WAS PREPARED BY
 ME OR UNDER MY SUPERVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

GENERAL NOTES AND LEGEND

HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiuanuenue Avenue

Scale: As Noted Date: Sept 2022

SHEET No. 1 OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	4	33

ABBREVIATIONS

Ah.	Ahead	Max	Maximum
ARV	Air Relief Valve	ML	Matchline
AC	Asphaltic Concrete	Min	Minimum
Bk.	Back	Mauka	Mountainside
BL	Baseline	NTS	Not to Scale
BB	Bottom of Bank	No.	Number
CL	Centerline	Makai	Oceanside
Conc	Concrete	O/S	Offset
CP	Construction Parcel	Pvmt	Pavement
CY	Cubic Yard	PC	Point of Curvature
DOT	Department of Transportation	PI	Point of Intersection
Det	Detail	PRC	Point of Reverse Curvature
Div	Diversion	PT	Point of Tangency
DMH	Storm Drain Manhole	RPM	Reflective Pavement Marker
Ea	Each	Rt	Right
Esmt	Easement	ROW	Right-of-Way
EP	Edge of Pavement	Sht	Sheet
ES	Edge of Shoulder	SF	Square Feet
EL	Elevation	Std	Standard
EMB	Embankment	Sta	Station
EXC	Excavation	Struct	Structural
Exist	Existing	SE	Superelevation
Hwy	Highway	TB	Top of Bank
Lt	Left	Typ	Typical
Lc	Length of Curve	VC	Vertical Curve
LF	Linear Feet	WL	Waterline

LEGEND

	New Pavement/Reconstruction		Existing Water Valve Box
	Transitional Cold Planing Areas		Adjusted Water Valve Box
	Resurfacing Limits		New Water Valve Box
	Existing Electrical Line		Existing Water Air Valve
	New Electrical Line		Adjusted Water Air Valve
	Existing Joint Pole		New Water Air Valve
	Existing Power Pole		Existing Water Meter
	Existing Electric Manhole		Adjusted Water Meter
	Adjusted Elec. MH Frame/Cover		New Water Meter
	New Electric Manhole		Existing Fire Hydrant
	Existing Sewer Line		New Underdrain
	Existing Telephone Line		Existing Monument
	New Telephone Line		Adjusted Monument
	Existing Telephone Pole		New Monument
	Existing Telephone Manhole		Existing Traffic Sign
	Adjusted Tele. MH Frame/Cover		Existing Highway Lighting Standard
	New Telephone Manhole		New Highway Lighting Standard
	Existing Water Line		
	Existing Water Manhole		
	Adjusted Water MH Frame/Cover		
	New Water Manhole		

ORIGINAL PLAN NO. _____ DATE _____
 SURVEY PLOTTED BY _____
 DRAWN BY _____
 TRACED BY _____
 DESIGNED BY _____
 QUANTITIES BY _____
 CHECKED BY _____

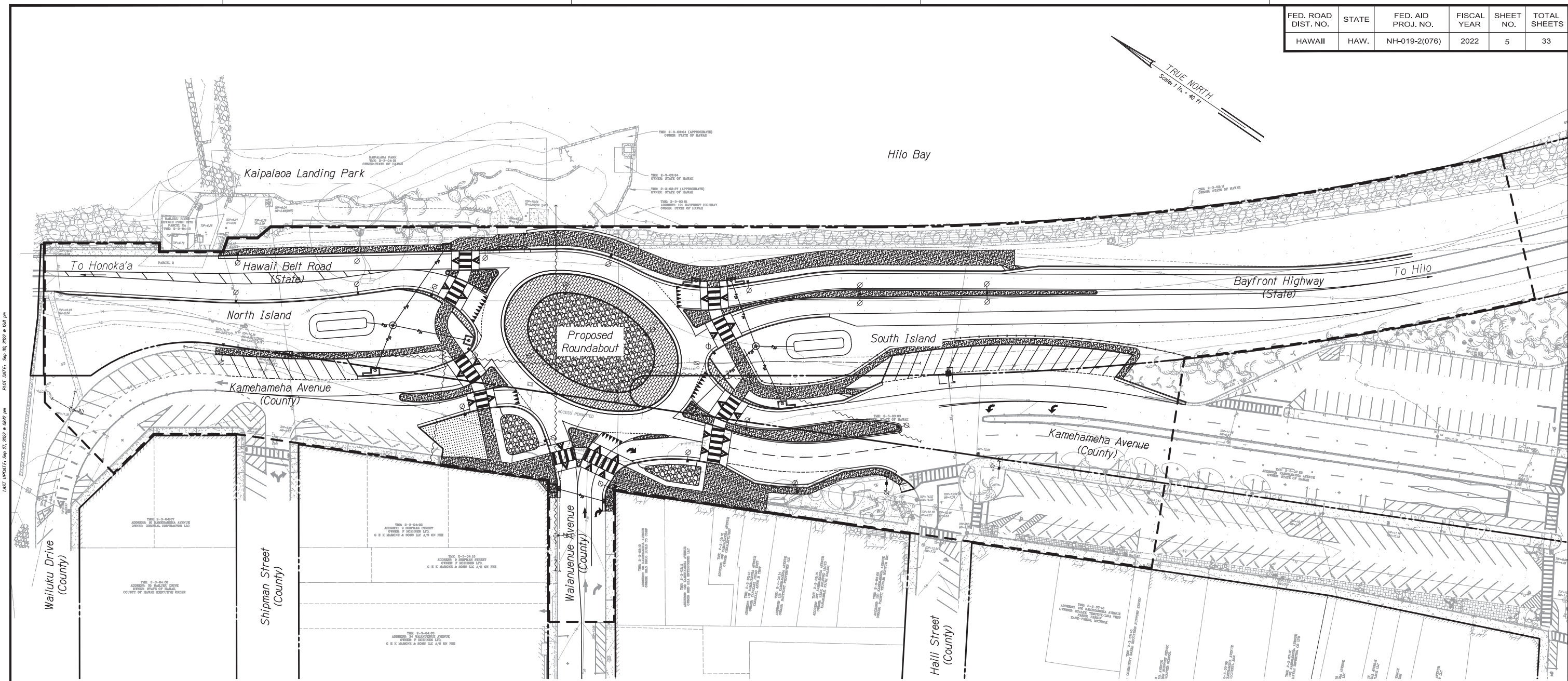
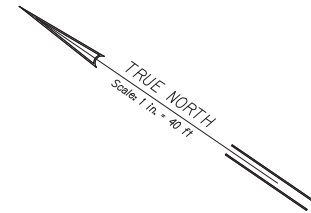
PART FILE NAME: C:\Users\jshindler\OneDrive - AECOM\Documents\200-2005000\200-2005000-04\2020 SHEET 500-04-General Note and Legend.dwg
 LAST UPDATE: Sep 28, 2022 @ 09:50 pm
 PLOT DATE: Sep 30, 2022 @ 12:51 pm

LICENSE EXPIRES 4/30/24

THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
GENERAL NOTES AND LEGEND
 HILO BAYFRONT HIGHWAY
 Intersection Improvements at Waiuanue Avenue
 Scale: As Noted Date: Sept 2022
 SHEET No. 2 OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	5	33

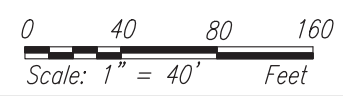


- Legend**
- Right-of-Way (ROW)
 - Project Limits
 - Existing to Remain

ORIGINAL PLAN	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
No.	

Overall Site Plan

Scale: 1"=40'



LICENSE EXPIRES 4/30/24
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

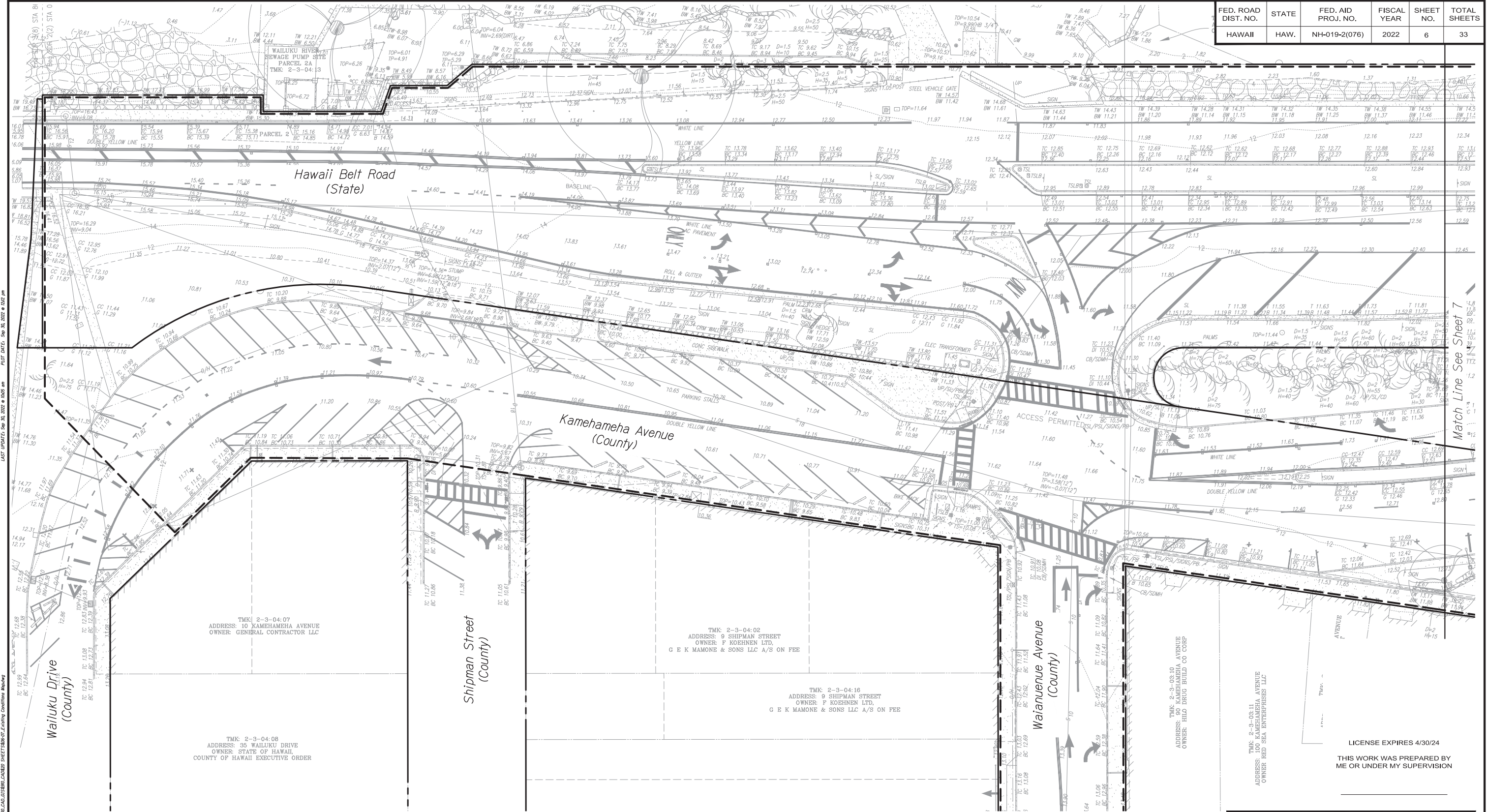
OVERALL SITE PLAN

HILO BAYFRONT HIGHWAY
Intersection Improvements at Wai'anue Avenue

Scale: As Noted Date: Sept 2022

SHEET No. 1 OF 1 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	6	33



LAST UPDATE: Sep 30, 2022 @ 06:05 am
 PLOT DATE: Sep 30, 2022 @ 06:02 am

DATE: _____
 SURVEY PLOTTED BY: _____
 ORIGINAL PLAN DRAWN BY: _____
 TRACED BY: _____
 NOTE BOOK DESIGNED BY: _____
 QUANTITIES BY: _____
 CHECKED BY: _____

TMK 2-3-04-08
 ADDRESS: 35 WAILUKU DRIVE
 OWNER: STATE OF HAWAII
 COUNTY OF HAWAII EXECUTIVE ORDER

TMK 2-3-04-07
 ADDRESS: 10 KAMEHAMEHA AVENUE
 OWNER: GENERAL CONTRACTOR LLC

Shipman Street
 (County)

TMK 2-3-04-02
 ADDRESS: 9 SHIPMAN STREET
 OWNER: F KOEHNEN LTD,
 G E K MAMONE & SONS LLC A/S ON FEE

TMK 2-3-04-16
 ADDRESS: 9 SHIPMAN STREET
 OWNER: F KOEHNEN LTD,
 G E K MAMONE & SONS LLC A/S ON FEE

Waiuanue Avenue
 (County)

TMK 2-3-03-10
 ADDRESS: 100 KAMEHAMEHA AVENUE
 OWNER: HILD DRUG BUILD CO CORP

TMK 2-3-03-11
 ADDRESS: 100 KAMEHAMEHA AVENUE
 OWNER: RED SEA ENTERPRISES LLC

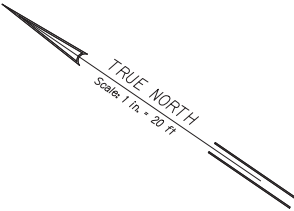
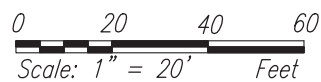
LICENSE EXPIRES 4/30/24
 THIS WORK WAS PREPARED BY
 ME OR UNDER MY SUPERVISION

Legend

- Right-of-Way (ROW)
- Project Limits
- Guard Rail
- Chain Link Fence
- Wood Fence / Railing
- Metal Railing
- Rock Wall (CRM)
- Hollow Tile Wall (CMU)
- Concrete Surface or Pavement
- Building Footprint
- Street Light

Existing Conditions Map

Scale: 1"=20'



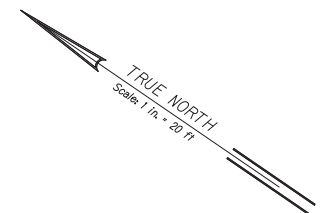
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

EXISTING CONDITIONS MAP

HILO BAYFRONT HIGHWAY
 Intersection Improvements at Waiuanue Avenue

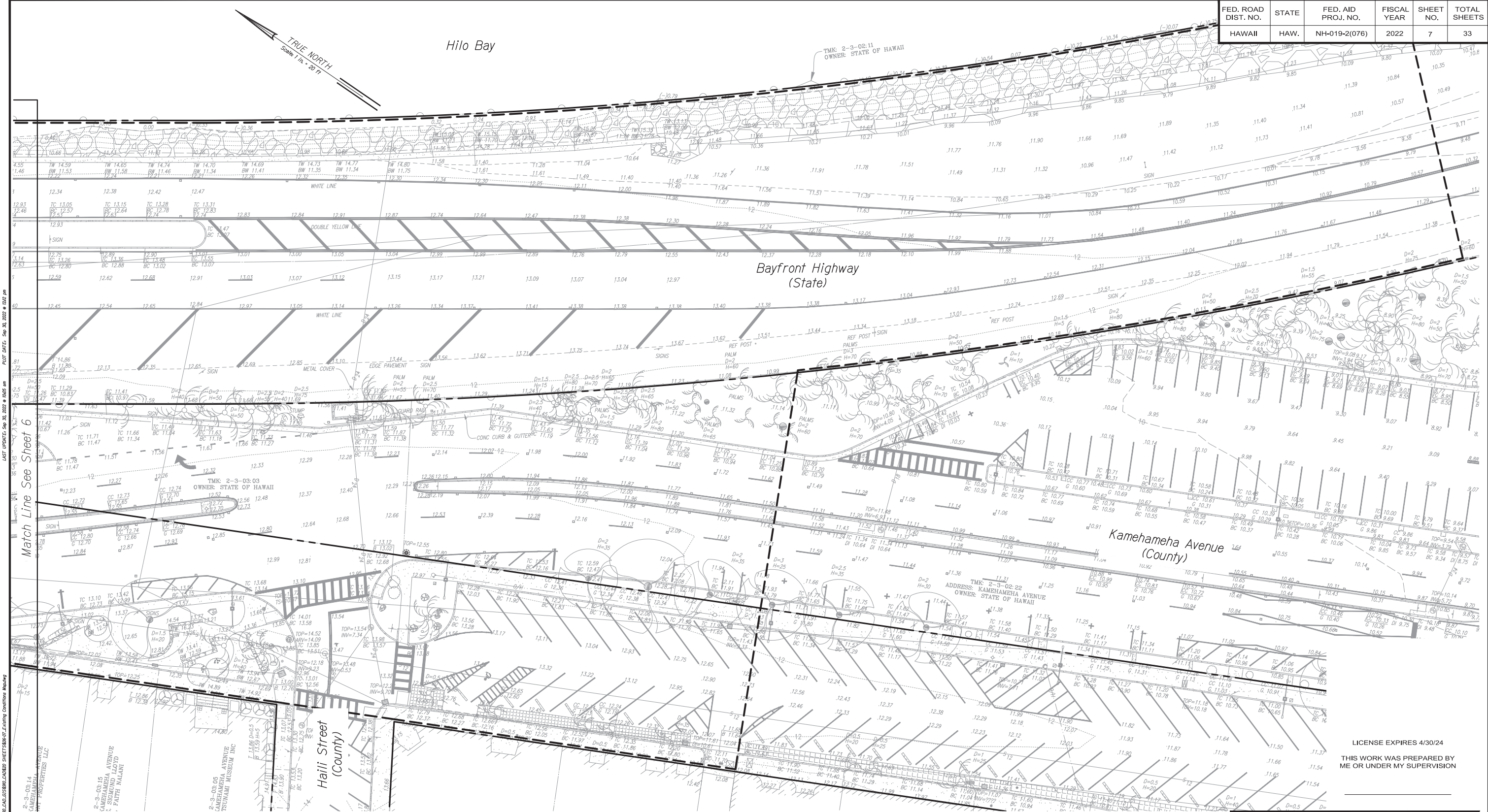
Scale: As Noted Date: Sept 2022
 SHEET No. 1 OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	7	33



Hilo Bay

TMK: 2-3-02-11
OWNER: STATE OF HAWAII



LAST UPDATE: Sep 20, 2022 @ 10:05 AM
PLOT DATE: Sep 20, 2022 @ 10:02 AM

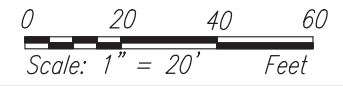
DATE: _____
DRAWN BY: _____
DESIGNED BY: _____
CHECKED BY: _____

Legend

- | | | | |
|--|----------------------|--|------------------------------|
| | Right-of-Way (ROW) | | Rock Wall (CRM) |
| | Project Limits | | Hollow Tile Wall (CMU) |
| | Guard Rail | | Concrete Surface or Pavement |
| | Chain Link Fence | | Building Footprint |
| | Wood Fence / Railing | | Street Light |
| | Metal Railing | | |

Existing Conditions Map

Scale: 1"=20'



LICENSE EXPIRES 4/30/24
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

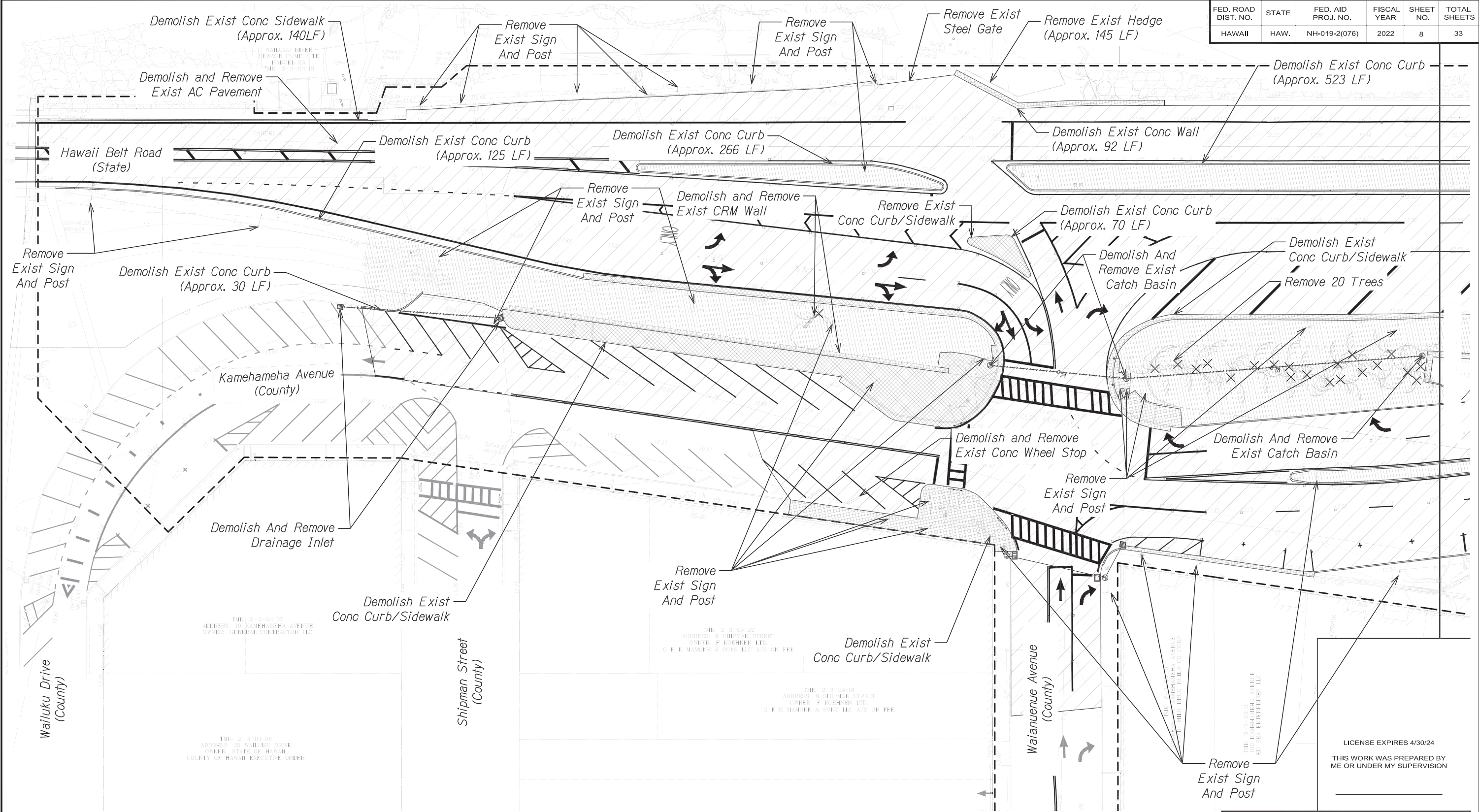
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING CONDITIONS MAP

HILO BAYFRONT HIGHWAY
Intersection Improvements at Wai'anue Avenue

Scale: As Noted Date: Sept 2022
SHEET No. 2 OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	8	33



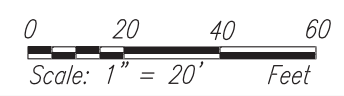
DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
IN CHARGE	

Legend

- Right-of-Way (ROW)
- Project Limits
- Existing to be Demolished
- Existing to Remain
- Remove Tree
- Removal of AC Pavement
- Removal of Concrete
- Clear and Grub
- Utility Line to be Demolished

Demolition Plan

Scale: 1"=20'



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DEMOLITION PLAN

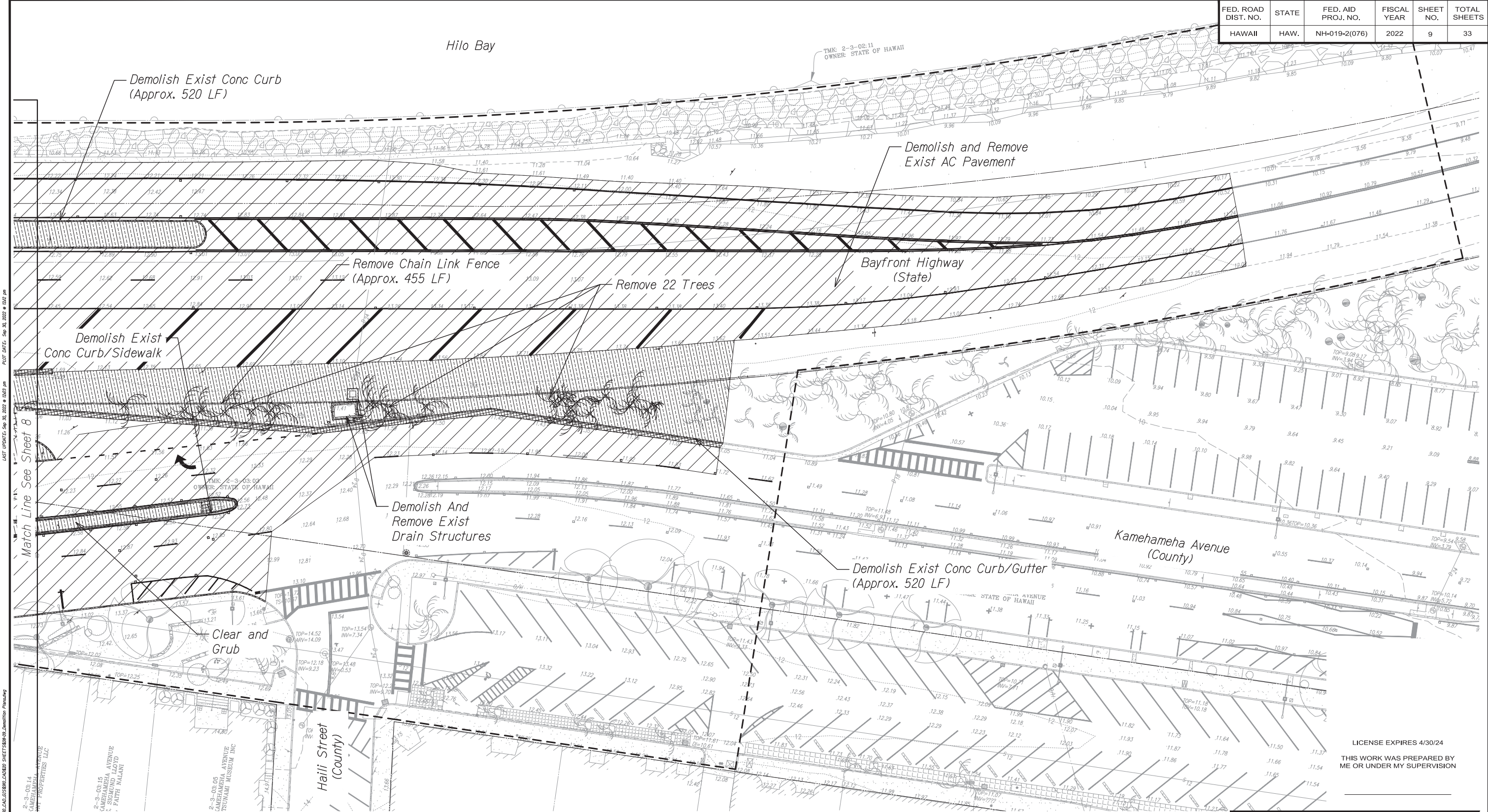
HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiānuenu Avenue

Scale: As Noted Date: Sept 2022

SHEET No. 1 OF 2 SHEETS

LICENSE EXPIRES 4/30/24
THIS WORK WAS PREPARED BY
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	9	33



LAST UPDATE: Sep 30, 2022 @ 10:03 am
 PLOT DATE: Sep 30, 2022 @ 10:02 am
 MATCH LINE: See Sheet 8
 PART/FIELDWORK: Callaway/John/DeVine - AECOM/Comm/250-5958800.CAD/JAS/250-5958800 SHEET 9 OF 33 - Demolition Plan/Rev

ORIGINAL SURVEY PROVIDED BY	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
No.	

Legend	
	Right-of-Way (ROW)
	Project Limits
	Existing to be Demolished
	Existing to Remain
	Remove Tree
	Removal of AC Pavement
	Removal of Concrete
	Clear and Grub

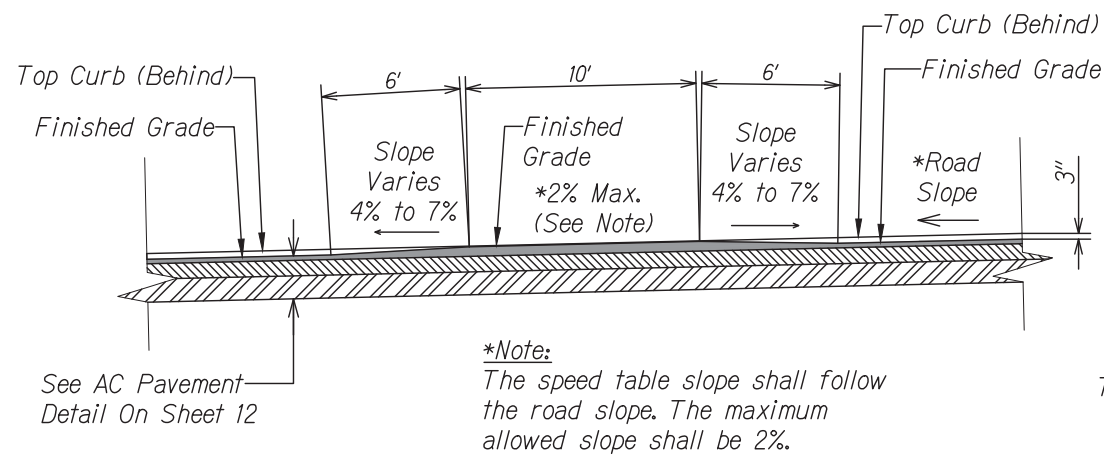
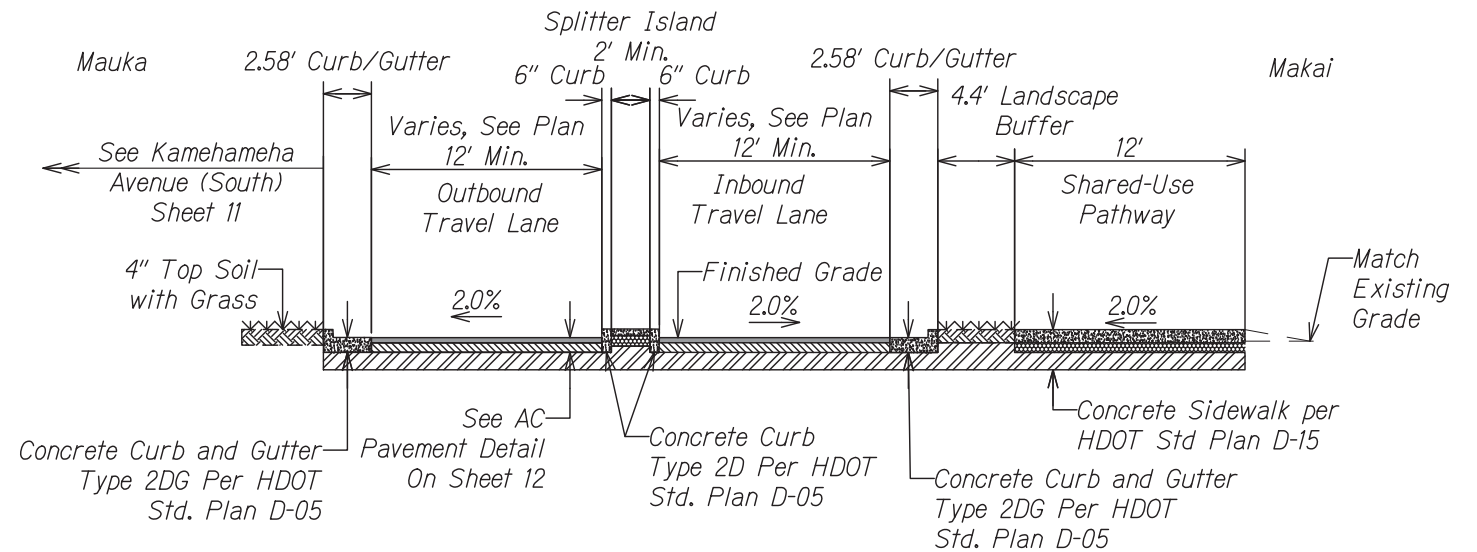
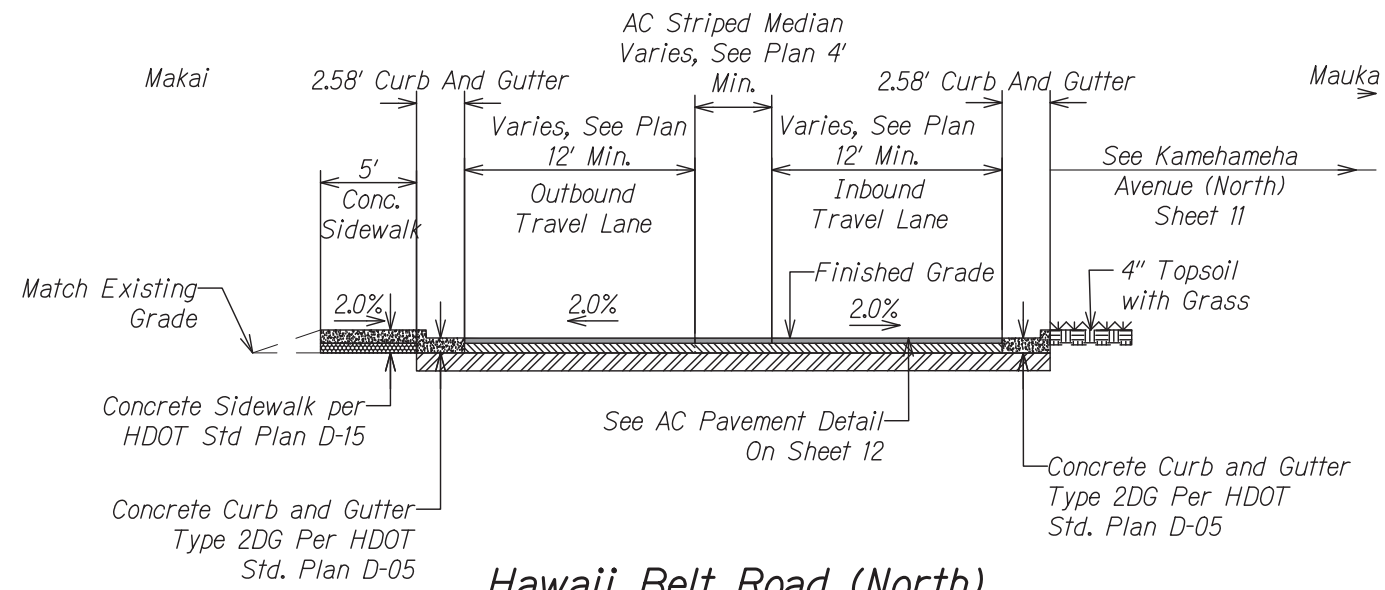
Demolition Plan
 Scale: 1"=20'

 Scale: 1" = 20' Feet

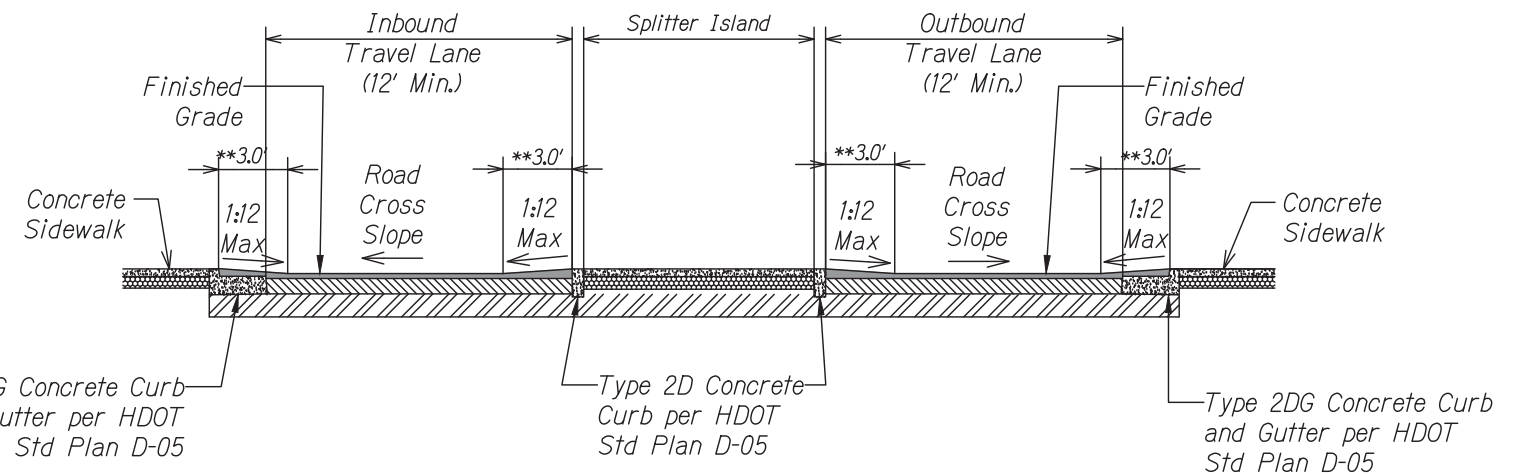
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
DEMOLITION PLAN
HILO BAYFRONT HIGHWAY
Intersection Improvements at Wai'anue Avenue
 Scale: As Noted Date: Sept 2022
 SHEET No. 2 OF 2 SHEETS

LICENSE EXPIRES 4/30/24
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	10	33



Cross Section



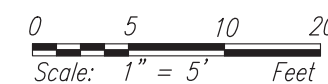
Longitudinal Section

HMA Raised Crosswalk
Not To Scale

****Note:**
The speed table transition shall enter the travel lane. The transition slope shall not exceed 1:12 slope.

LICENSE EXPIRES 4/30/24
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- Notes:
- All sections are drawn facing the proposed roundabout.
 - All slopes are approximate. Final slopes will be provided during Final Design.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

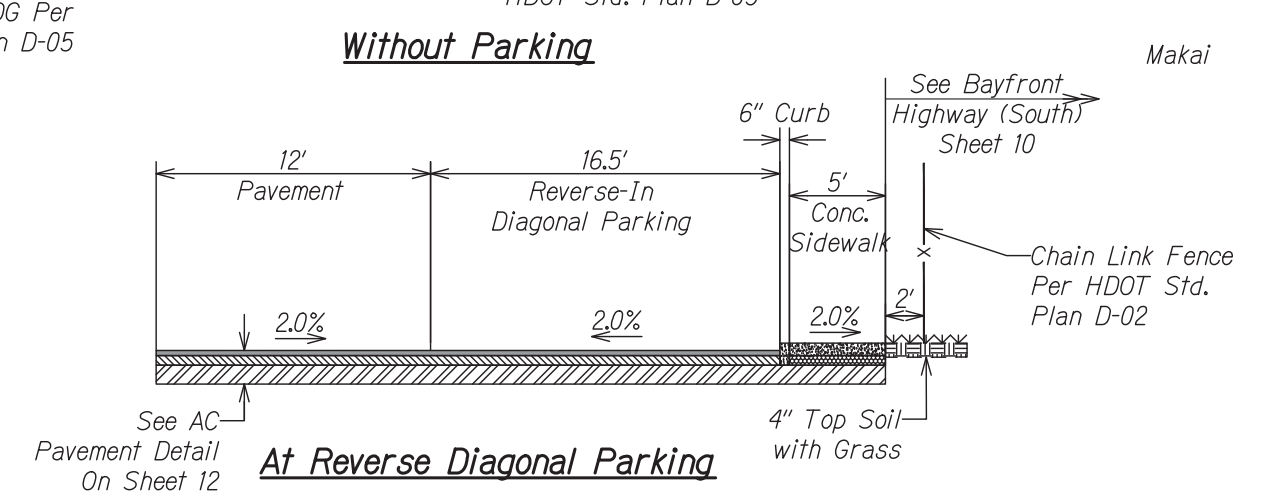
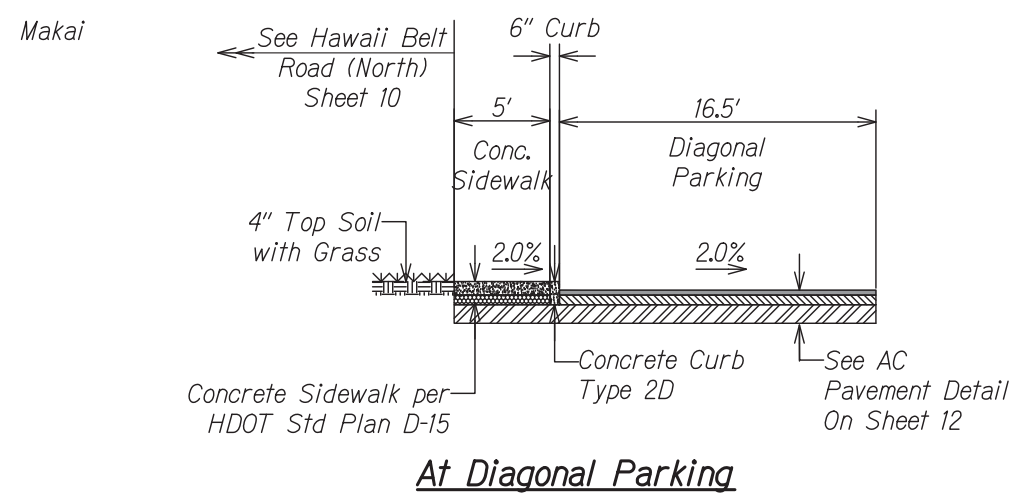
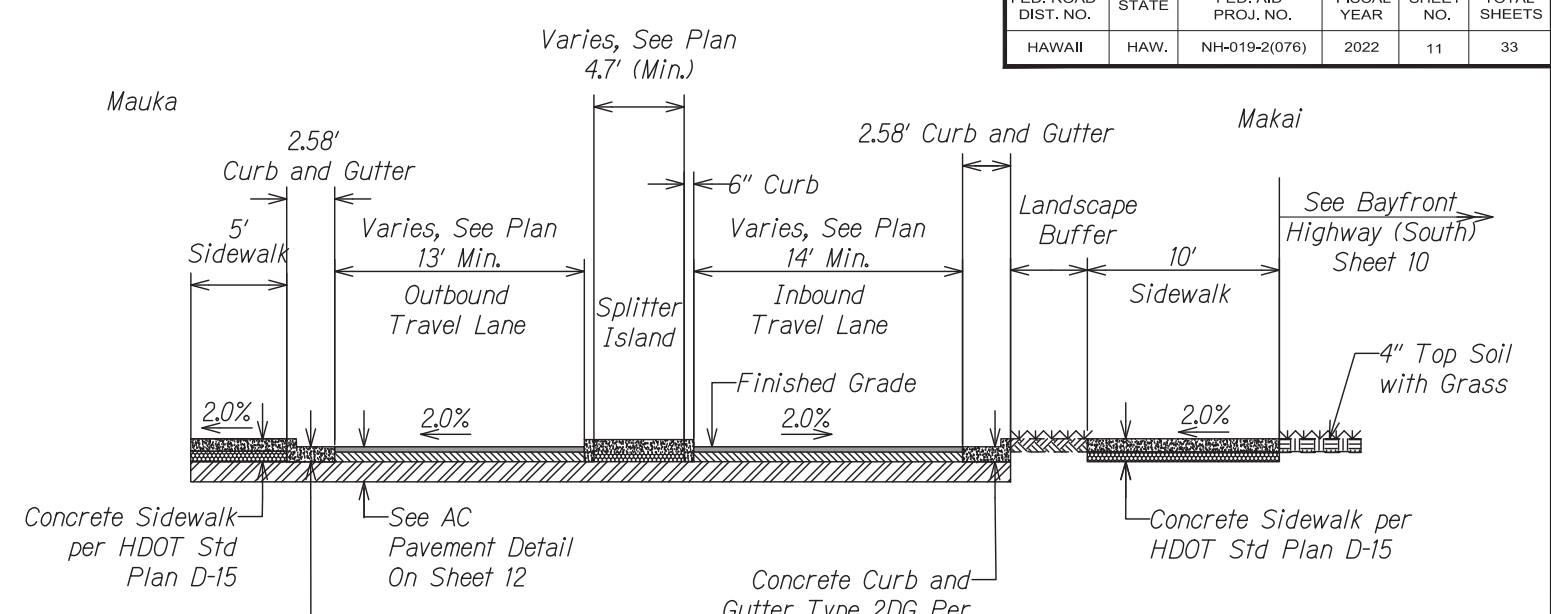
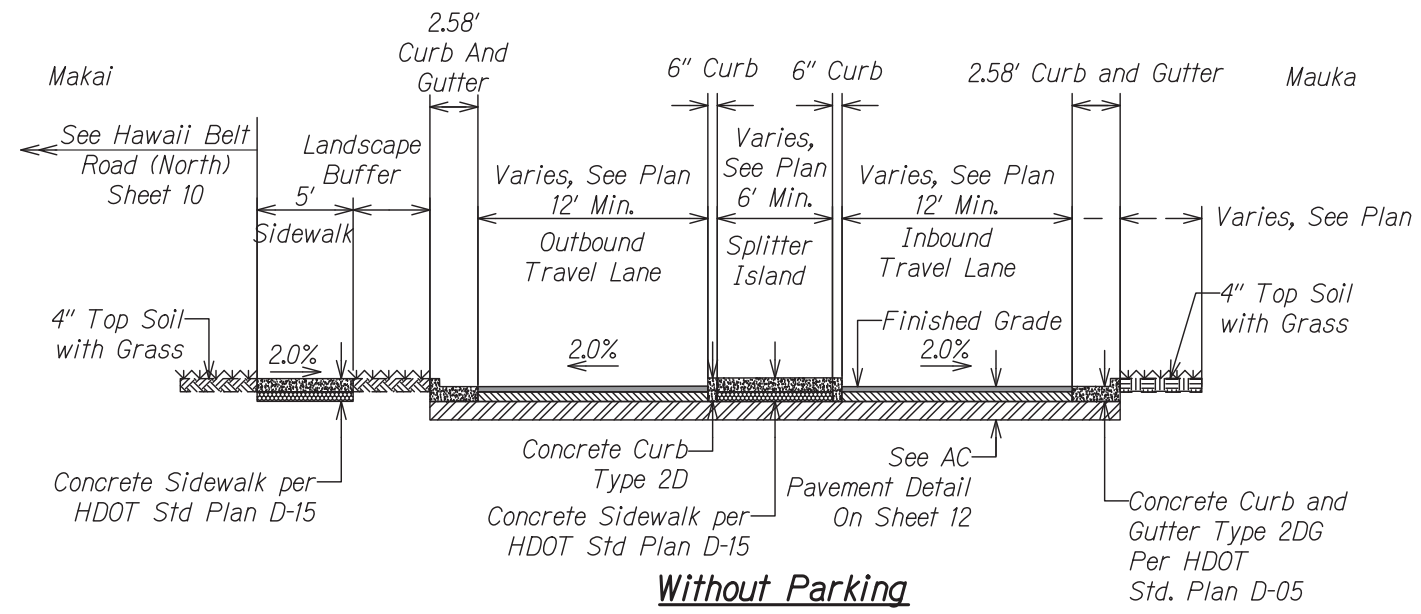
TYPICAL SECTIONS

HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiianuenu Avenue

Scale: As Noted Date: Sept 2022

SHEET No. 1 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	11	33

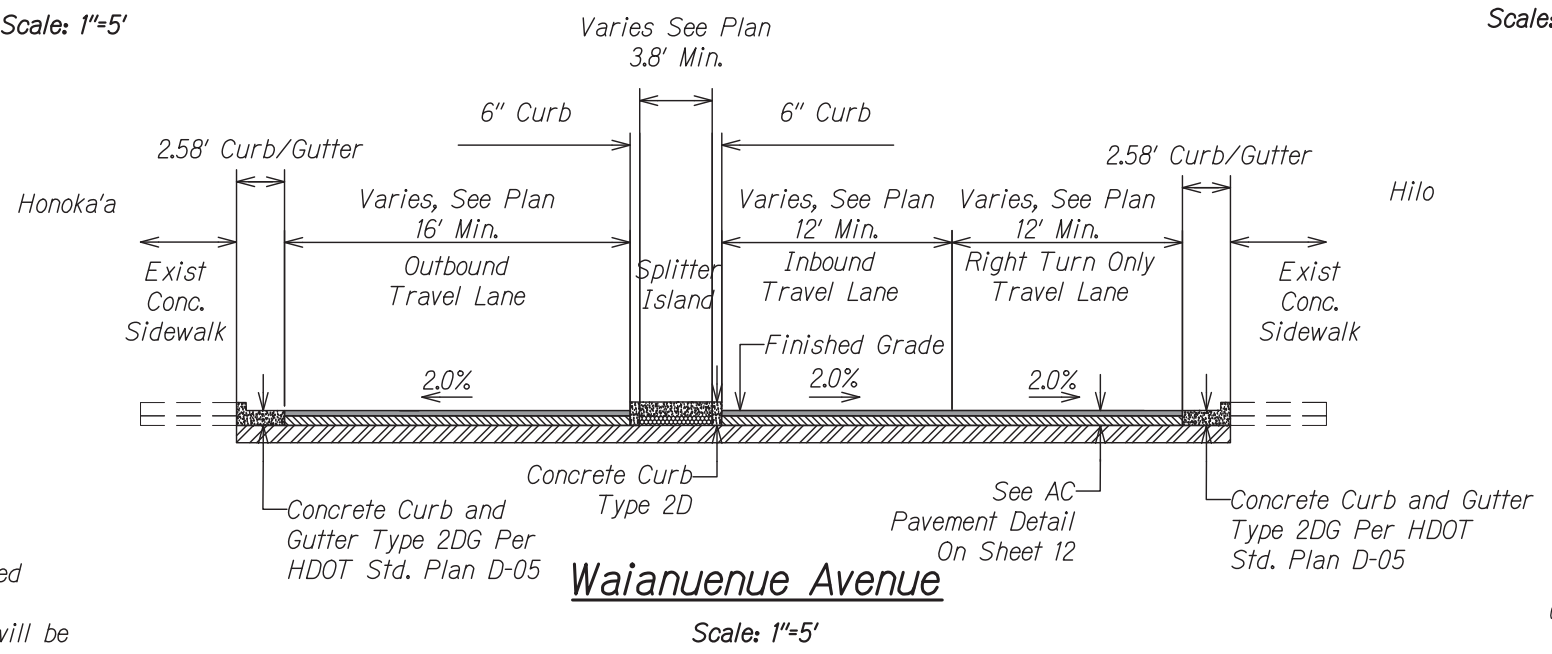


Kamehameha Avenue (North)

Kamehameha Avenue (South)

Scale: 1"=5'

Scale: 1"=5'



Waiānuenue Avenue

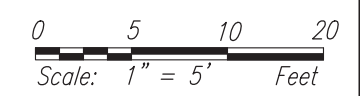
Scale: 1"=5'

- Notes:
1. All sections are drawn facing the proposed roundabout.
 2. All slopes are approximate. Final slopes will be provided during Final Design.

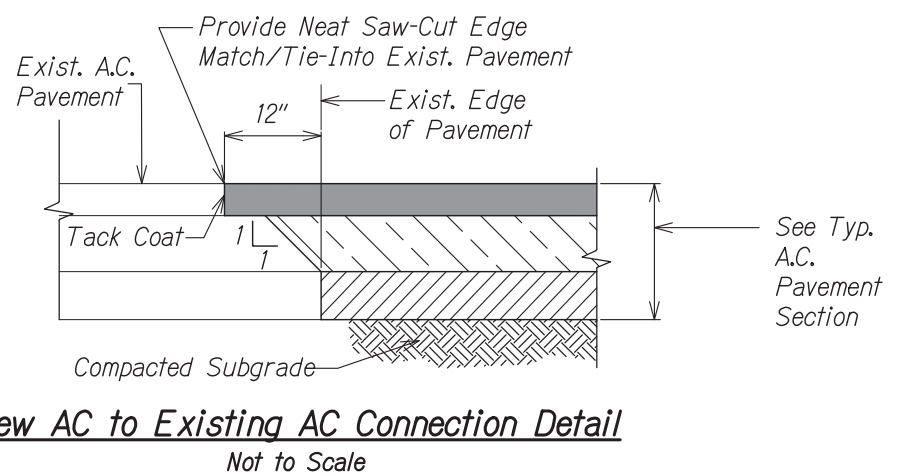
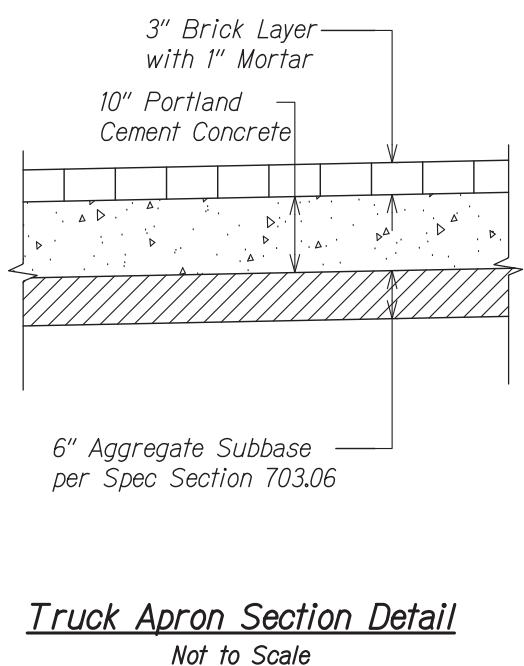
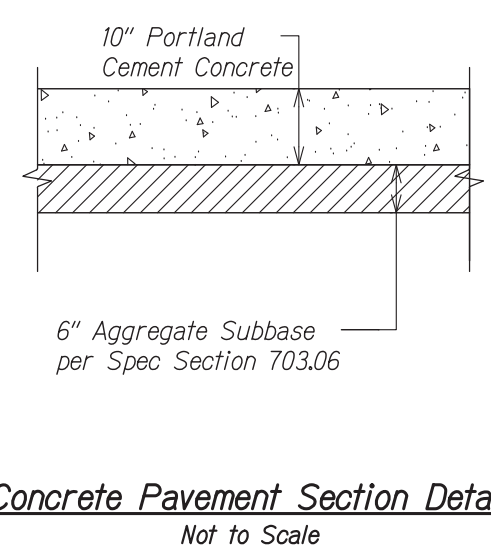
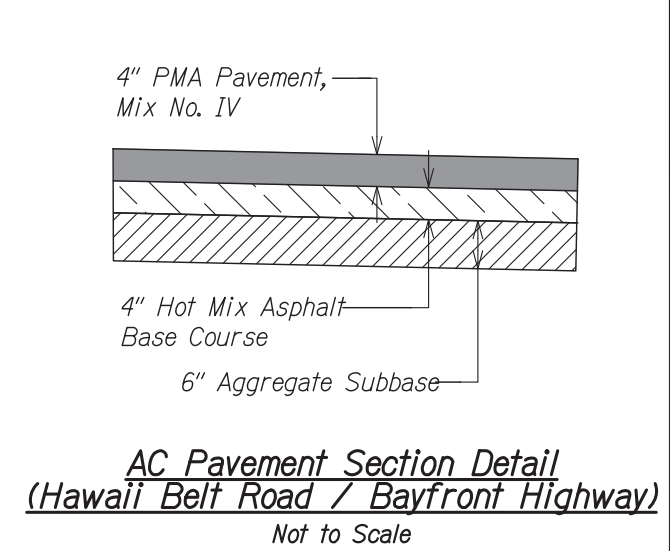
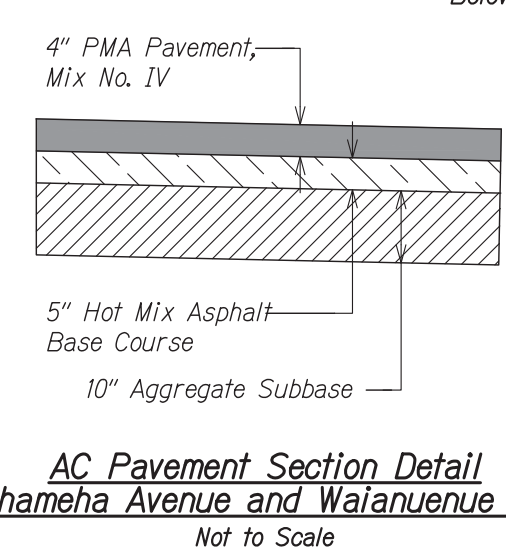
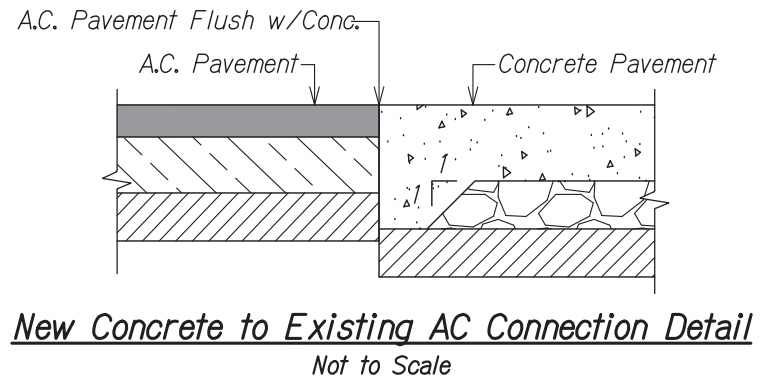
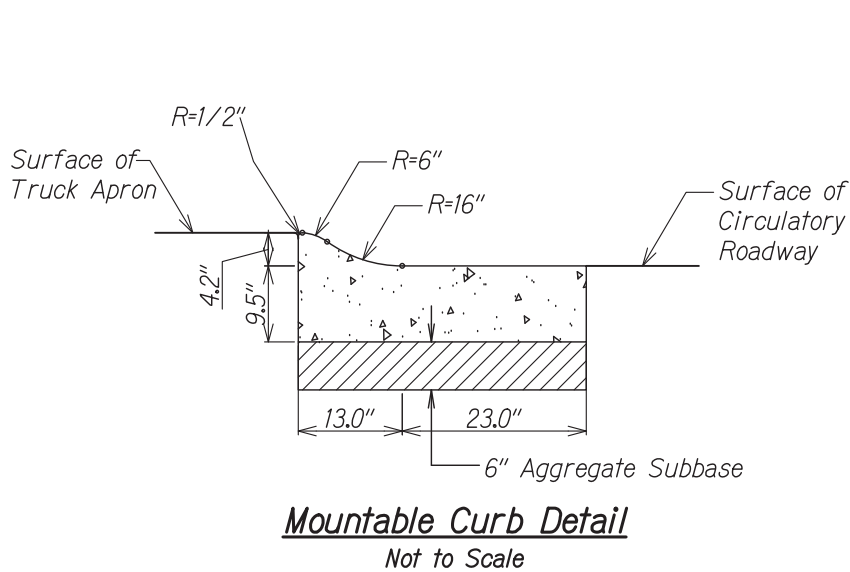
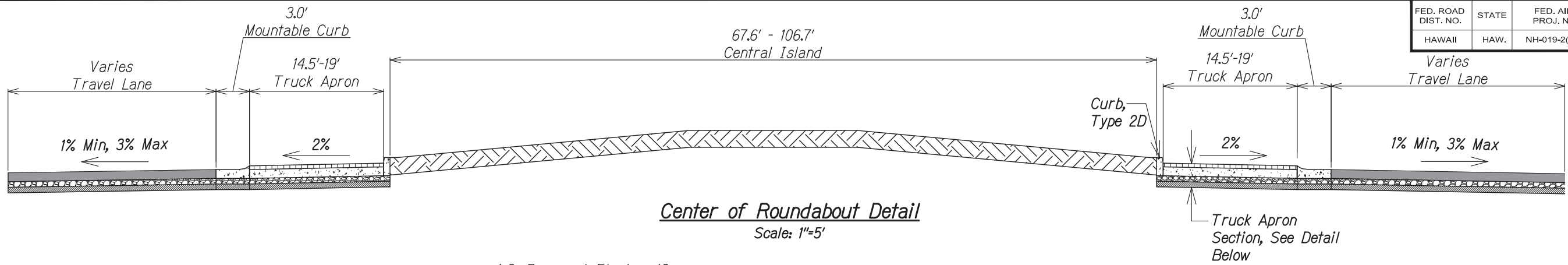
DATE	BY

LICENSE EXPIRES 4/30/24
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
TYPICAL SECTIONS
HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiānuenue Avenue
Scale: As Noted Date: Sept 2022
SHEET No. 2 OF 3 SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	12	33



- Notes:**
1. New Construction Shall Be Equal Or Better Than Existing In Thickness and In Quality.
 2. Pavement Slope Shall Match Existing Pavement Slope So As To Provide Smooth Riding Connection.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTIONS

HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiuanue Avenue

Scale: As Noted Date: Sept 2022

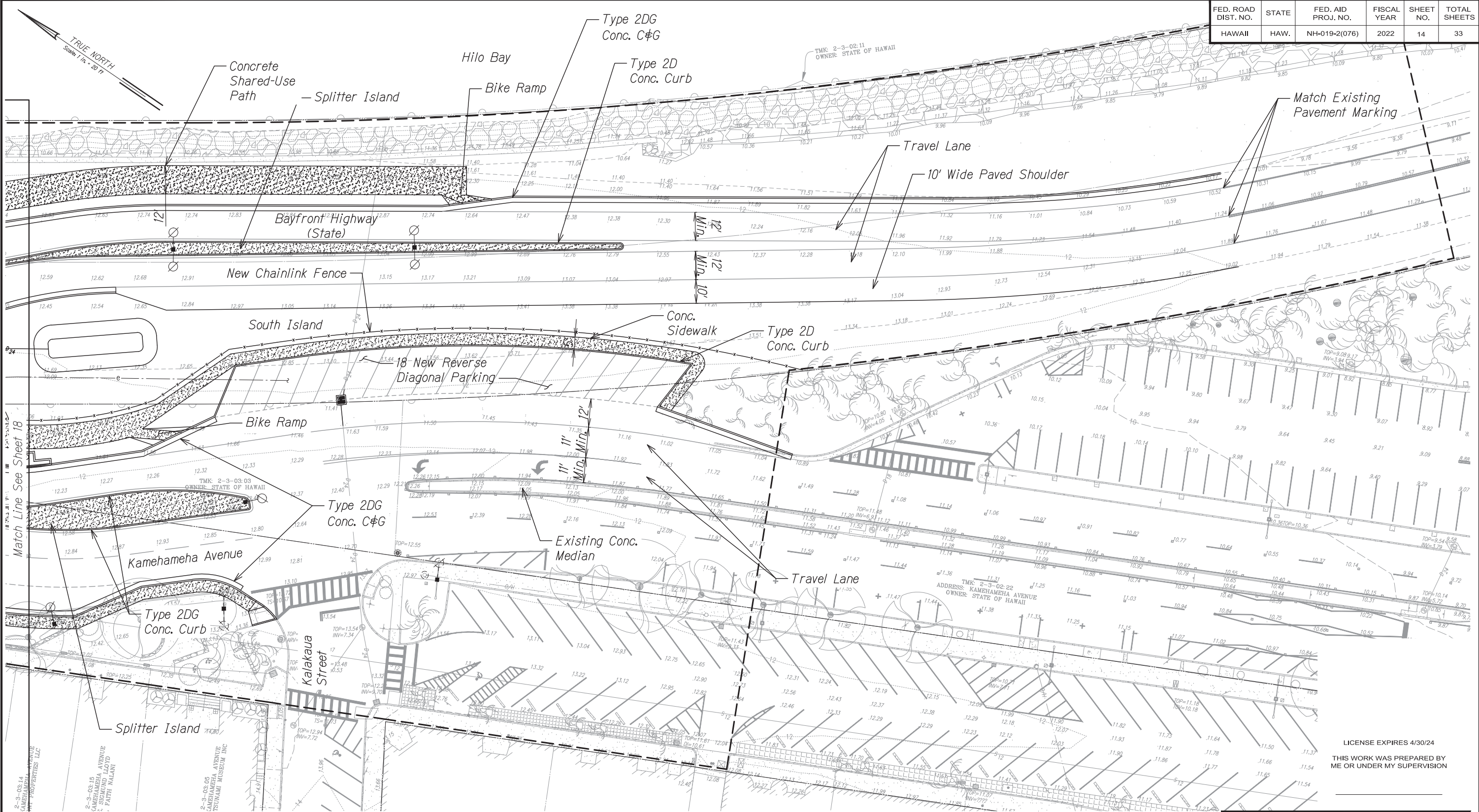
SHEET No. 3 OF 3 SHEETS

DATE	BY

LAST UPDATE: Sep 10, 2022 @ 10:00 am PLOT DATE: Sep 30, 2022 @ 09:45 pm

PATH: F:\E\HW\GIS\Drawings\2022\01901\Drawings - 42318\Documents - 16878461.rvt Bayfront Intersection Improvements - 2022\01901\Drawings - 01901\DWG\01901-01-01-01.dwg SHEET 50 OF 52 Typical Sectioning

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	14	33



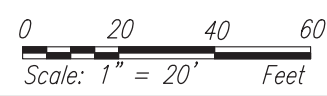
LAST UPDATE: Sep 20, 2022 @ 0:09 pm
 PLOT DATE: Sep 20, 2022 @ 0:08 pm
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 PLOT ORIGIN: 0,0
 PLOT WIDTH: 11.00
 PLOT HEIGHT: 11.00
 PLOT AREA: 121.00
 PLOT PERIMETER: 44.00
 PLOT CENTER: 5.50, 5.50
 PLOT OFFSET: 0.00
 PLOT TOLERANCE: 0.01
 PLOT STATUS: OK
 PLOT MESSAGE:

DATE	BY	REVISION

- Legend**
- Right-of-Way (ROW)
 - Project Limits
 - Existing to Remain
 - New Concrete Sidewalk
 - Truck Apron

Roadway Plan

Scale: 1"=20'



LICENSE EXPIRES 4/30/24
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

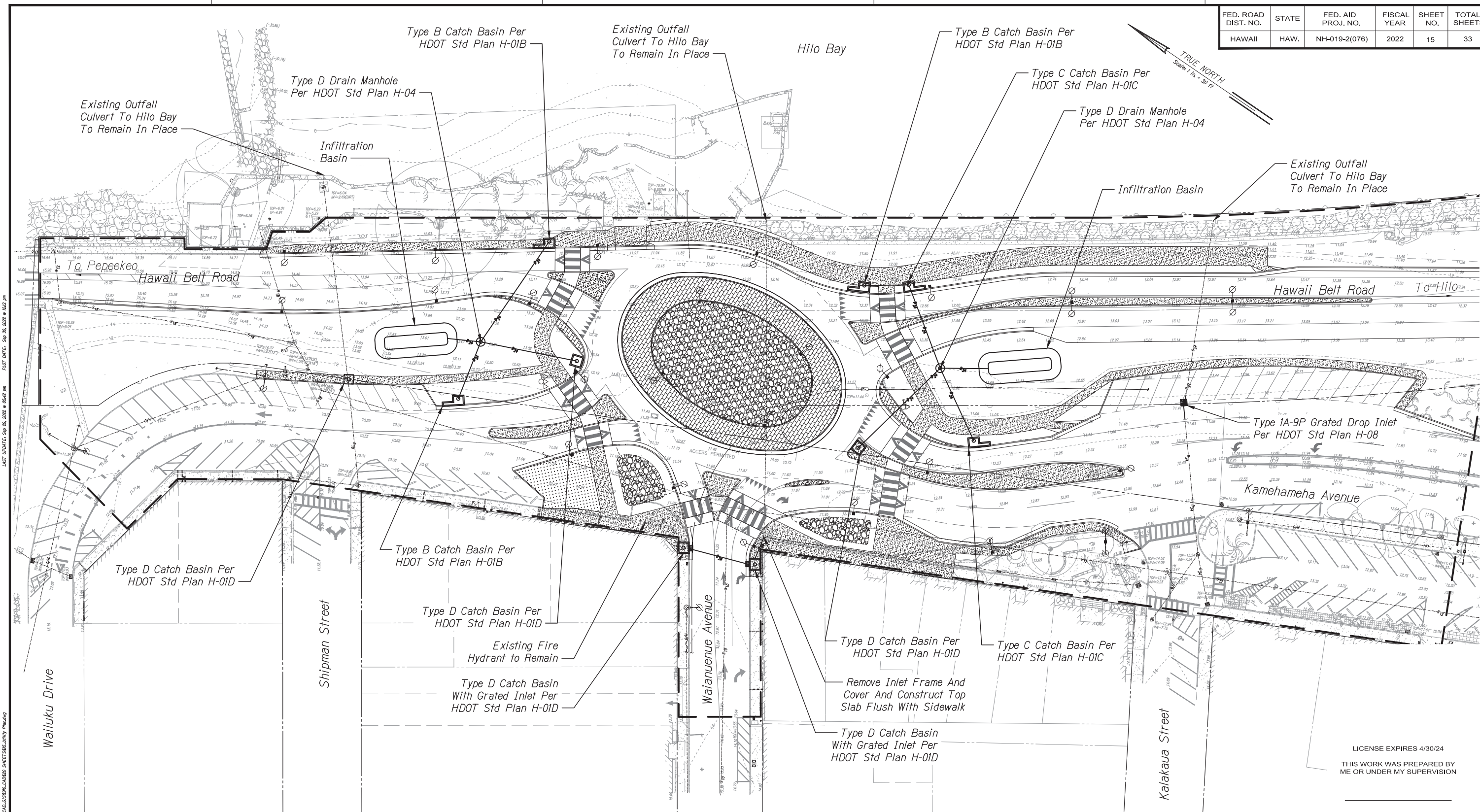
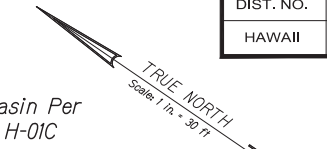
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiianu Avenue

Scale: As Noted Date: Sept 2022
SHEET No. 2 OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	15	33

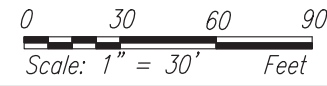


LAST UPDATE: Sep 29, 2022 @ 09:42 am
PLOT DATE: Sep 30, 2022 @ 10:22 am

ORIGINAL PLAN	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
No.	

Legend	
	Right-of-Way (ROW)
	Project Limits
	Existing to Remain
	Existing Utilities
	New Concrete Sidewalk
	Truck Apron
	Grassing
	Permeable Aggregate
	Light Pole
	Swale

Utility Plan
Scale: 1"=30'



LICENSE EXPIRES 4/30/24
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

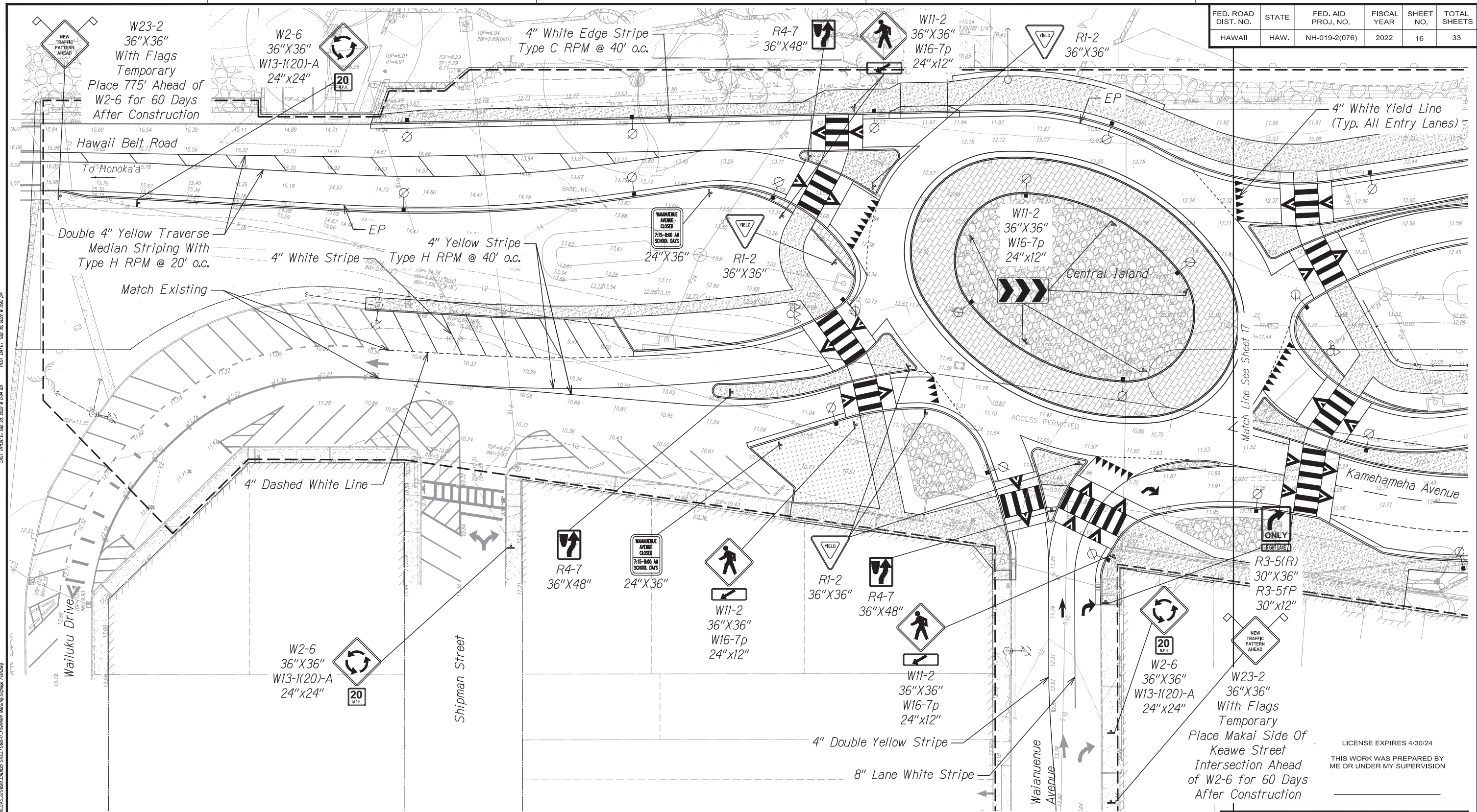
UTILITY PLAN

HILO BAYFRONT HIGHWAY
Intersection Improvements at Wai'anue Avenue

Scale: As Noted Date: Sept 2022

SHEET No. 1 OF 1 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	16	33

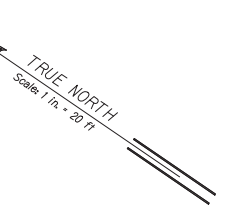
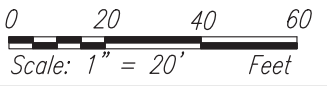


DATE	BY

Legend

- Right-of-Way (ROW)
- - - Project Limits
- Existing to Remain
- ⊙ Sign
- ⊙ Light Pole

Pavement Marking & Signage Plan
Scale: 1"=20'

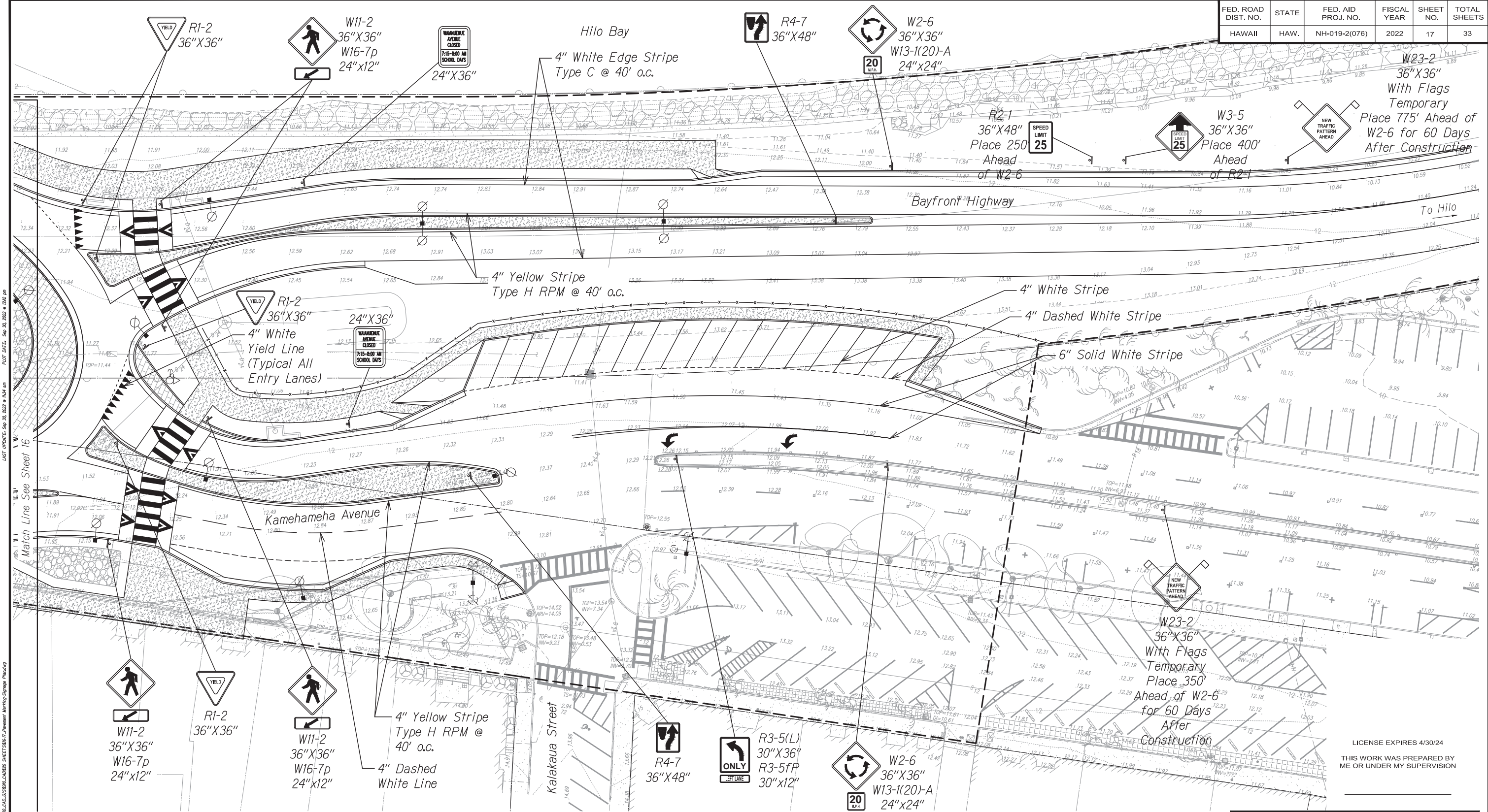


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PAVEMENT MARKING & SIGNAGE PLAN
HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiianu Avenue

Scale: As Noted Date: Sept 2022
SHEET No. 1 OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	17	33

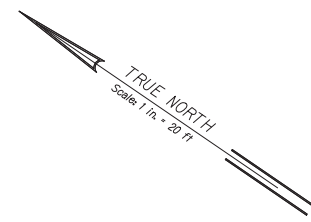
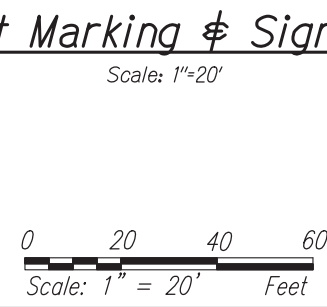


LAST UPDATE: Sep 30, 2022 @ 10:58 am
 PLOT DATE: Sep 30, 2022 @ 10:58 am
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ORIGINAL SURVEY PROVIDED BY	DATE

Legend

- Right-of-Way (ROW)
- Project Limits
- Existing to Remain
- ▲ Sign
- Light Pole



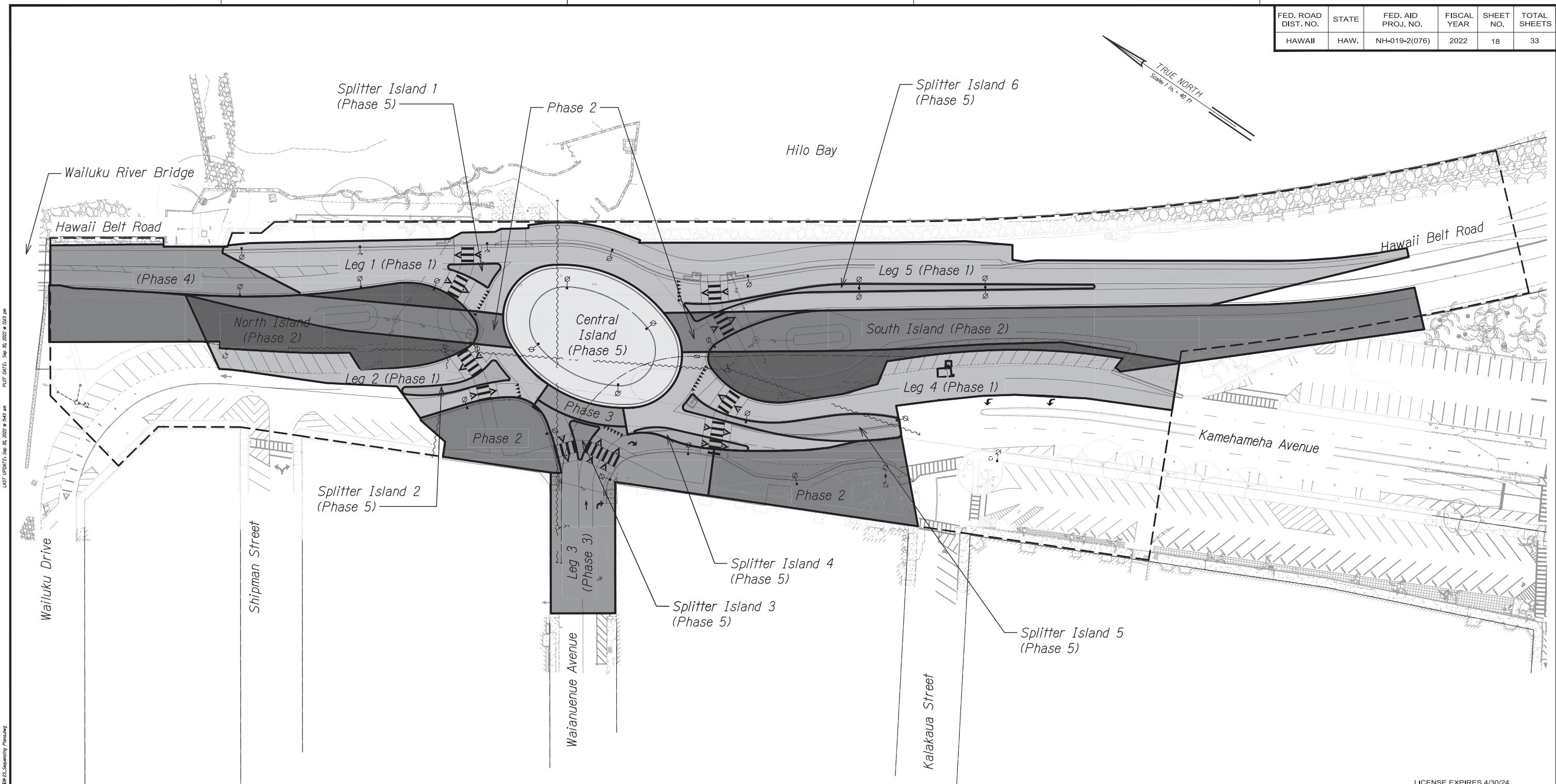
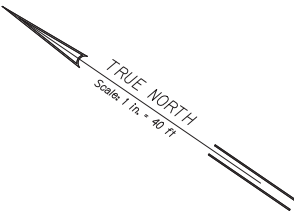
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

**PAVEMENT MARKING &
 SIGNAGE PLAN**
 HILO BAYFRONT HIGHWAY
 Intersection Improvements at Waiianu Avenue

Scale: As Noted Date: Sept 2022
 SHEET No. 2 OF 2 SHEETS

LICENSE EXPIRES 4/30/24
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	18	33



LAST UPDATE: Sep 20, 2022 @ 11:45 am
 PLOT DATE: Sep 20, 2022 @ 12:55 pm

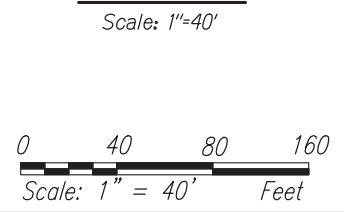
ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	_____
DRAWN BY	_____
TRACED BY	_____
DESIGNED BY	_____
QUANTITIES BY	_____
CHECKED BY	_____
No.	_____

Legend

- Project Limits
- Existing to Remain
- Work Area
- Right-of-Way (ROW)

Phase	Notes
1	-Build Leg 1/2/4/5
2	-Build North and South Islands
3	-Build Leg 3, Waianuenue Avenue is Closed.
4	-Build Leg 1 Approach, Bridge is Closed to Southbound Traffic
5	-Build Splitter Islands and Central Island

Construction Sequencing Overview



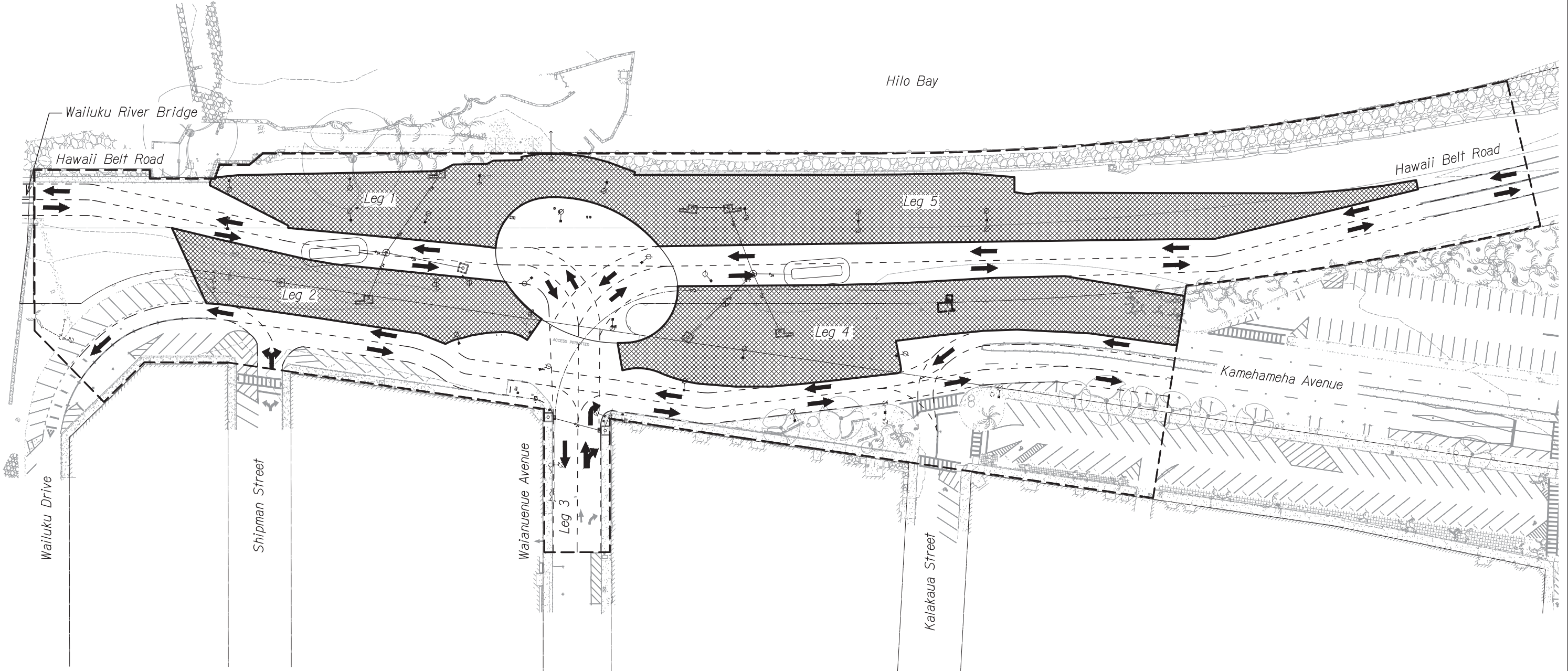
LICENSE EXPIRES 4/30/24
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STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
CONSTRUCTION SEQUENCING OVERVIEW
 HILO BAYFRONT HIGHWAY
 Intersection Improvements at Waianuenue Avenue

Scale: As Noted Date: Sept 2022
 SHEET No. 1 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	19	33

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 LAST UPDATE: Sep 30, 2022 @ 10:50 am
 PLOT DATE: Sep 30, 2022 @ 10:54 am



- Legend
- Project Limits
 - Existing to Remain
 - ▨ Work Area
 - Right-of-Way (ROW)

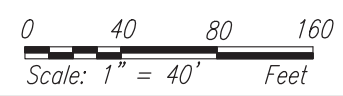
Phase 1

Construction Activity	Maintenance of Traffic
-Build Legs 1,2,4,5	-All existing traffic movements undisturbed
	-All approaches reduced to single lanes
	-Access requirement to park during construction

Construction Sequencing Plan

Phase 1 of 5

Scale: 1"=40'



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 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

CONSTRUCTION SEQUENCING PLAN

PHASE 1 OF 5

HILO BAYFRONT HIGHWAY

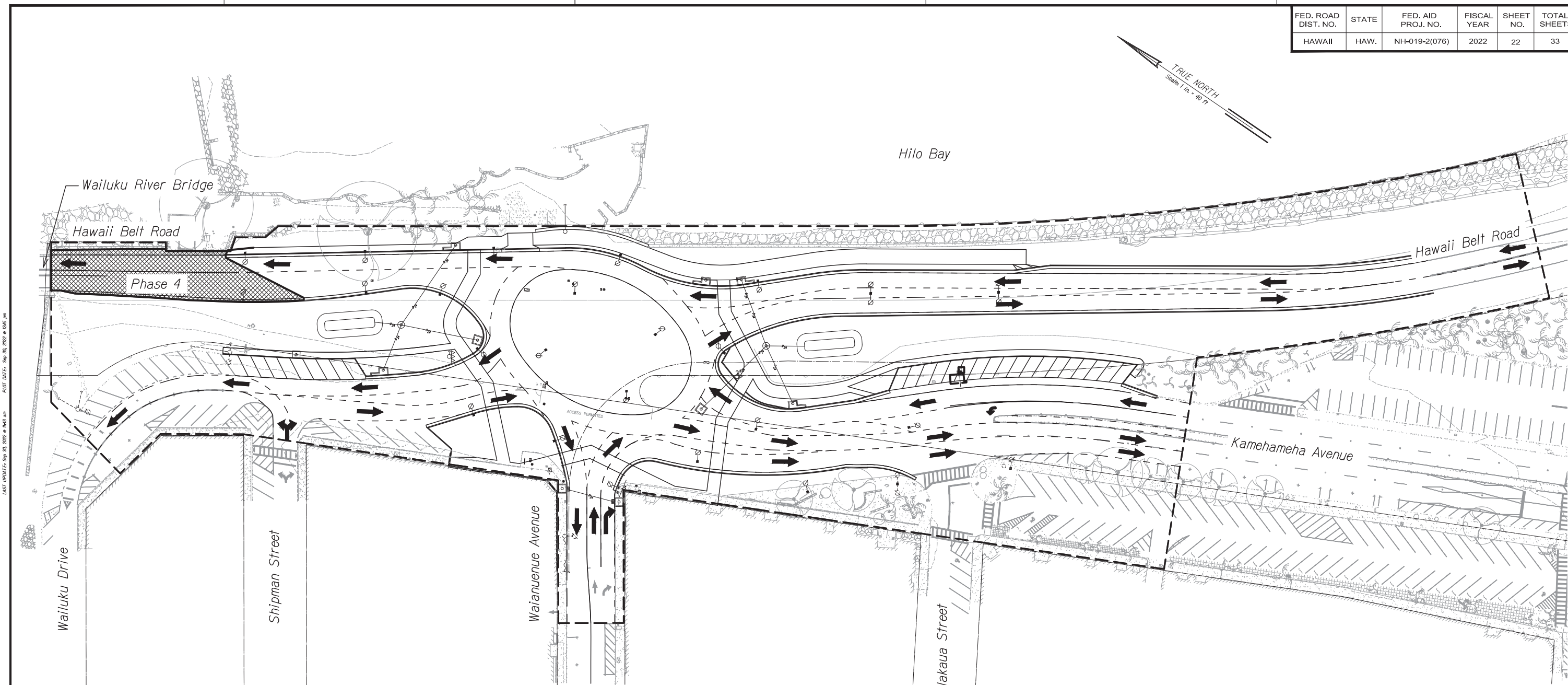
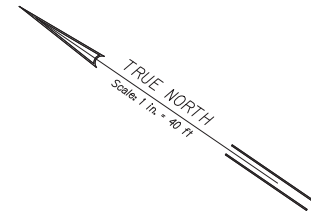
Intersection Improvements at Waianuenue Avenue

Scale: As Noted Date: Sept 2022

SHEET No. 2 OF 6 SHEETS

ORIGINAL PLAN	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	22	33



- Legend**
- Project Limits
 - Existing to Remain
 - Work Area
 - Right-of-Way (ROW)

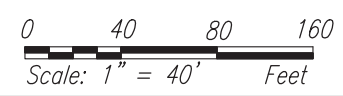
Phase 4

Construction Activity	Maintenance of Traffic
-Build Leg 1 approach (Bayfront Highway Northern Tie-in)	-Bridge is closed to southbound traffic
	-Detour Bayfront southbound traffic to Wainaku Avenue/Waianuenue Avenue Route
	-Open roundabout Legs 2, 3, 4, 5

Construction Sequencing Plan

Phase 4 of 5

Scale: 1"=40'



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONSTRUCTION SEQUENCING PLAN

PHASE 4 OF 5

HILO BAYFRONT HIGHWAY

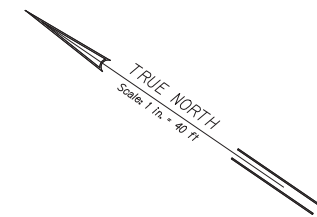
Intersection Improvements at Waianuenue Avenue

Scale: As Noted Date: Sept 2022

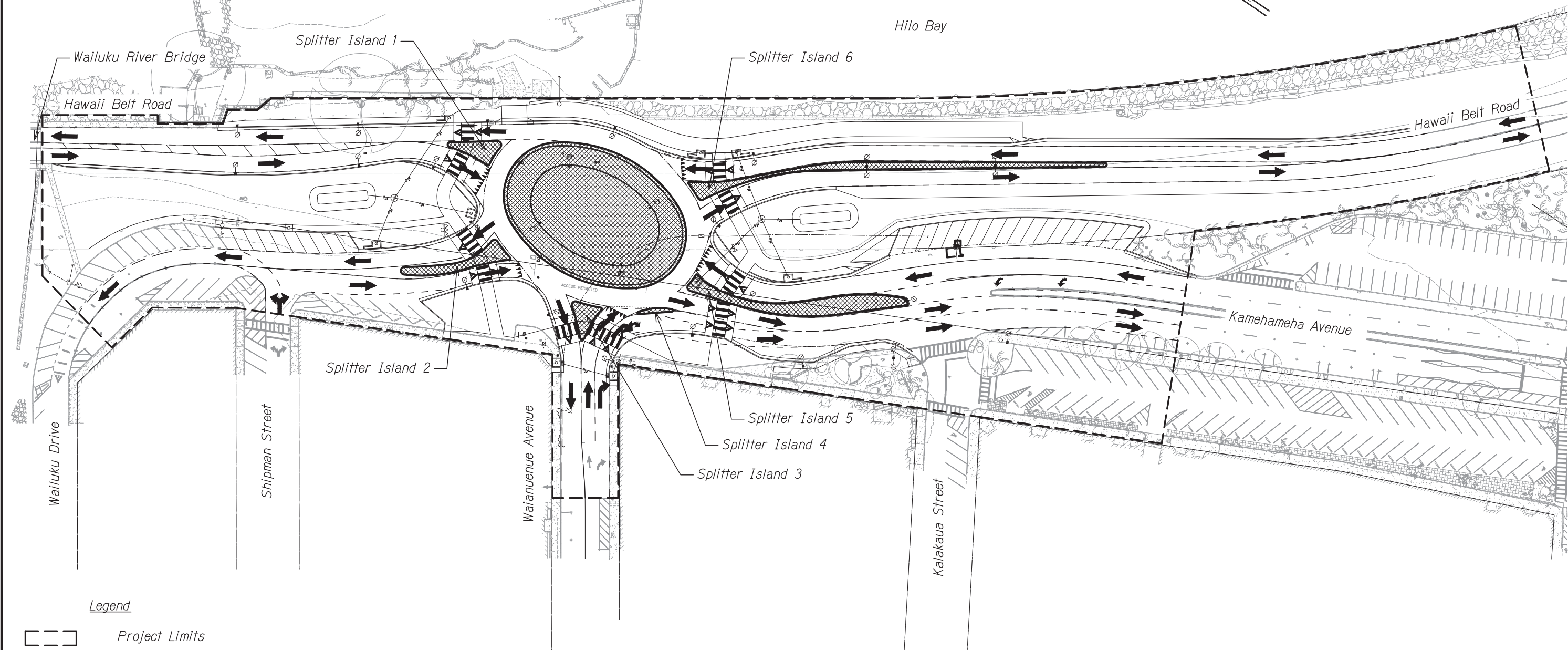
SHEET No. 5 OF 6 SHEETS

ORIGINAL SURVEY PLOTTED BY _____ DATE _____	
DRAWN BY _____	
TRACED BY _____	
DESIGNED BY _____	
QUANTITIES BY _____	
CHECKED BY _____	
No. _____	

PART/FIELD/DATE: 08/24/2022 @ 11:40 am LAST UPDATE: Sep 20, 2022 @ 1:05 pm PLOT DATE: Sep 20, 2022 @ 1:05 pm



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 PLOT DATE: Sep 20, 2022 @ 1:56 pm
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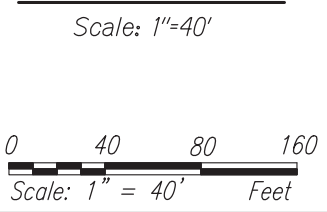
Legend

- Project Limits
- Existing to Remain
- Work Area
- Right-of-Way (ROW)

Phase 5

Construction Activity	Maintenance of Traffic
-Build splitter islands and central island	-All roundabout legs are open
	-No closures

**Construction Sequencing Plan
Phase 5 of 5**



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STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
CONSTRUCTION SEQUENCING PLAN
PHASE 5 OF 5
HILO BAYFRONT HIGHWAY
Intersection Improvements at Waianuenue Avenue

Scale: As Noted Date: Sept 2022

SHEET No. 6 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	24	33

ABBREVIATIONS LIST:

A	Ampere(s)
AFF	Above finished floor
AFG	Above finished ground
BTM	Bottom
CKT	Circuit
CTR	Center
EM	Emergency
EXST	Existing
HPF	High Power Factor
L	Long
MIN	Minimum
MTD	Mounted
MTG	Mounting
OC	Overcurrent
PNL	Panel
REQD	Required
SW	Switch
TYP	Typical
UON	Unless otherwise noted
V	Volt(s)
W	Watt(s)
XFMR	Transformer

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Electrical Engineers

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APRIL 30, 2024
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL
NOTES & SYMBOLS
HILO BAYFRONT HIGHWAY
Intersection Improvements at Wai'anuenue Avenue

Scale: AS NOTED Date: September 2022

SHEET No. 24 OF 33 SHEETS

GENERAL NOTES:

1. Visit site and become familiar with existing conditions, and extent of demolition and new work prior to start of work. resolve all discrepancies and questions prior to start of work.
2. Minimize all outages. Schedule and obtain approvals, for all outages with the State, County of Hawaii, HELCO, Hawaiian Telcom, and Spectrum. Work may be required during non-business hours to minimize disruptions during outages.
3. Patch, grout, and paint all openings exposed by removal work. The new patch, grout, and paint shall match the texture and color of the existing surface.
4. Saw-cut, trench, core-drill, patch, and paint existing floors, ceiling, walls, AC pavement as necessary. Provide fireproofing seals (fire stops) at all conduit penetrations to maintain existing fire rating integrity of floors, ceilings and walls.
5. All work shall conform to the latest adopted building codes of the State of Hawaii.
6. Test all electrical equipment and systems, and demonstrate system operation to the satisfaction of the State.
7. Provide shop drawings for approval by the State.
8. Provide As-Built drawings after completion of the project.
9. Maintain electrical connection (power, lighting and signal) to unaffected areas.
10. Provide dedicated neutrals for all circuits.
11. Coordinate with HELCO, Hawaiian Telcom, and Spectrum for any questions related to electrical equipment installation for their systems.

GENERAL DEMOLITION NOTES:

1. Field verify existing installations and modify as necessary to complete all work to the design intent of drawings and specifications at no additional cost to the State.
2. Remove all unused and abandoned telecom cables and power conductors. Coordinate with the each respective utility company.
3. Verify all existing circuiting. Make sure all circuits are de-energized before proceeding with demolition work.

EXTERIOR ELECTRICAL SYMBOLS

SYMBOL	DESCRIPTION
	ELECTRICAL HANDHOLE, SIZE AS INDICATED
	TELECOM HANDHOLE, SIZE AS INDICATED
	CATV HANDHOLE, SIZE AS INDICATED
	TELECOM MANHOLE, SIZE AS INDICATED
	HECO MANHOLE
	TRAFFIC SIGNAL HANDHOLE, SIZE AS INDICATED
	STREET LIGHT HANDHOLE, SIZE AS INDICATED
	PAD-MOUNTED TRANSFORMER AND CONCRETE TRANSFORMER PAD, SEE STRUCTURAL DWGS FOR PAD DETAIL
	ELECTRICAL EQUIPMENT, TYPE AS INDICATED
	CONDUIT WITH WIRES, CONCEALED BELOW FINISH FLOOR OR GRADE, ALL OTHER SIMILARS, 1" MINIMUM
	OVERHEAD ELECTRICAL (E), TELECOM (T)
	EXISTING ELECTRICAL
	UTILITY POLE / UTILITY POLE WITH RISER / UTILITY POLE WITH TRANSFORMER
	GUY WIRE
	STREET LIGHT STANDARD BASE, POLE AND LUMINAIRE
	STREET LIGHT LUMINAIRE - BRACKET ON UTILITY POLE
	TRAFFIC SIGNAL
	STAINLESS STEEL EQUIPMENT SUPPORT
	STANCHION
	DUCT SECTION TYPE "A" DUCT INDICATED, ALL OTHERS SIMILAR, SEE DUCT SECTION DETAIL
	NOTE INDICATOR, NOTE NUMBER 1 REFERENCED, ALL OTHER SIMILAR, SEE NOTES ON RESPECTIVE SHEETS
	ITEMS WITH "X" THROUGH SYMBOL, INDICATES REMOVAL/DEMOLITION OF THAT ITEM

SYMBOL NOTES:

1. All items shall be new unless otherwise noted.
2. Existing items indicated as dashed, existing circuiting indicated with an "e".
3. "X" thru symbol denotes existing item to be demolished / removed or as noted.

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

EXTERIOR ELECTRICAL SYMBOLS

SYMBOL	DESCRIPTION
	GROUND
	SERVICE WEATHERHEAD
	GROUND BUS
	NEUTRAL BUS
	MOLDED CASE CIRCUIT BREAKER
	TRANSFORMER, TYPE AS INDICATED
	CURRENT TRANSFORMERS, ONE PER PHASE
	SWITCH
	METER
	ITEMS WITH "X" THROUGH SYMBOL, INDICATES REMOVAL/DEMOLITION OF THAT ITEM

HAWAII ELECTRIC LIGHT COMPANY (HELCO) NOTES

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	25	33

1. Location of HELCO Facilities

The location of HELCO's overhead and underground facilities shown on the plans are from existing records with varying degrees of accuracy and are not guaranteed as shown. The contractor shall verify in the field the locations of the facilities and shall exercise proper care in excavating and working in the area. Wherever connections of new utilities to existing utilities and utility crossings are shown, the contractor shall expose the existing lines at the proposed connections and crossing to verify the depths prior to excavation for the new lines. The contractor shall be responsible for any damages to HELCO's facilities whether shown or not shown on the plans.

2. Compliance with Hawaii Occupational Safety and Health Laws

The contractor shall comply with the State of Hawaii's occupational safety and health laws and regulations, including without limitation, those related to working on or near exposed or energized electrical lines and equipment.

3. Excavation Permit

The contractor shall obtain an excavation permit from the County of Hawai'i two weeks prior to starting construction. Please refer to our request number at that time.

4. CAUTION!!! ELECTRICAL HAZARD!!!

Existing HELCO overhead and underground lines are energized and will remain energized during construction unless prior special arrangements have been made with HELCO. Only HELCO personnel are to handle these energized lines and erect temporary guards to protect these lines from damage. The contractor shall work cautiously at all times to avoid accidents and damage to existing HELCO facilities, which can result in electrocution.

5. Overhead Lines

State law requires that a worker and the longest object he or she may contact cannot come closer than a minimum radial clearance of 10 feet when working close to or under any overhead lines rated 50KV and below. For each additional 1KV above 50KV, an additional 0.4 inch shall be added to the 10-foot clearance requirement. The preceding information on line clearance requirements is provided as a convenience and it is the contractor's responsibility to be informed of and comply with any revisions or amendments to the law.

Should the contractor anticipate that his work will result in the need to encroach within the minimum required clearance at any time, the contractor shall notify HELCO at least four (4) weeks prior to the planned encroachment so that, if feasible, the necessary protections (e.g. relocate, de-energize, or blanket HELCO lines) can be put in place. HELCO's cost or safeguarding its lines will be charged to the contractor.

Contact HELCO's customer installations department at 969-6666 for assistance in identifying and safeguarding overhead power lines.

Refer to Section X of HELCO's Electric Service Installation Manual for additional guidelines when working around

HELCO's facilities. A copy may be obtained from HELCO's customer installations department.

6. Pole Bracing

A minimum clearance of 10 feet must be maintained when excavating around utility poles and/or their anchor system to prevent weakening or pole support failure. Should work require excavating within 10 feet of a pole and/or its anchor system, the contractor is responsible for all associated costs to brace, repair, or straighten poles. All means of structural support for the pole proposed by the contractor shall first be reviewed by HELCO before implementation. For pole bracing instructions, the contractor shall call the HELCO construction and maintenance department superintendent a minimum of two (2) weeks in advance.

7. Underground Lines

The contractor shall exercise extreme caution whenever construction crosses or is in close proximity of underground lines. HELCO's existing electrical cables are energized and will remain energized during construction. Only HELCO personnel are to break into existing HELCO facilities, handle these cables, and erect temporary guards to protect these cables from damage. The cost of HELCO's assistance in providing proper support and protection of its underground lines will be charged to the contractor. Special precautions are required when excavating near HELCO's 62KV underground lines (see HELCO instructions to consultants/contractors on "Excavation near HELCO's Underground 62KV Lines" for detailed requirements).

For verification of underground lines, the contractor shall call ONE-CALL a minimum of 72 hours in advance.

For assistance in providing proper support and protection of these lines, the contractor shall call HELCO's construction & maintenance department superintendent, a minimum of two (2) weeks in advance.

8. Underground Fuel Pipelines

The contractor shall exercise extreme caution whenever construction crosses or is in close proximity of HELCO's underground fuel oil pipelines. Special precautions are required when excavating near HELCO's underground fuel oil pipelines (see HELCO instructions to consultants/contractors on "Excavation near HELCO's underground fuel pipelines" for detailed requirements).

9. Excavations

When trench excavation is adjacent to or beneath HELCO's existing structures or facilities, the contractor is responsible for:

Sheeting and bracing the excavation and stabilizing the existing ground to render it safe and secure and to prevent possible slides, cave-ins and settlements. Properly supporting existing structures or facilities with beams, struts, under-pinnings to fully protect it from damage.

Backfilling with proper backfill material including special thermal backfill where existing (refer to Engineering

Department for Thermal Backfill Specifications).

10. Relocation of HELCO Facilities

Any work required to relocate or modify HELCO facilities shall be done by HELCO, or by the contractor under HELCO's supervision. The contractor shall be responsible for all coordination, and shall provide necessary supports for HELCO's work, which may include, but not be limited to, excavation and backfill, permits and traffic control, barricading, and restoration of pavement, sidewalks, and other facilities.

All costs associated with any relocation or modification (either temporary or permanent) for the convenience of the contractor, or to enable the contractor to perform his work in a safe and expeditious manner in fulfilling his contract obligations shall be borne by the contractor.

11. Conflicts

Any redesign or relocation of HELCO's facilities not shown on the plans may be cause for lengthy delays. The contractor acknowledges that HELCO is not responsible for any delay or damage that may arise as a result of any conflicts discovered or identified with respect to the location or construction of HELCO's electrical facilities in the field, regardless of whether the contractor has met the requested minimum advance notices. In order to minimize any delay or impact arising from such conflicts, HELCO should be notified immediately upon discovery or identification of such conflict.

12. Damage to HELCO Facilities

The contractor shall be responsible for the protection of all HELCO surface and subsurface utilities and shall be responsible for any damages to HELCO's facilities as a result of his operations. The contractor shall immediately report such damages to HELCO's trouble dispatcher. Repair work shall be done by HELCO or by the contractor under HELCO's supervision. All costs for damages to HELCO's facilities shall be borne by the contractor.

In case of damage of suspected damage to HELCO's fuel pipeline, the contractor shall immediately notify HELCO's trouble desk (969-6666) (a 24-hour number) so HELCO personnel can secure the damaged section and report any oil spills to proper authorities. All costs associated with the damage, repair, oil spill cleanup shall be borne by the contractor.

13. HELCO Stand-by Personnel

The contractor may request HELCO to provide an inspector to stand-by during construction near HELCO's facilities. The cost of such inspection will be charged to the contractor. The contractor shall call HELCO construction and maintenance department superintendent a minimum of 5 working days in advance to arrange for HELCO stand-by personnel.

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Electrical Engineers

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APRIL 30, 2024
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HELCO NOTES

HILO BAYFRONT HIGHWAY
Intersection Improvements at Wai'anuenue Avenue

Scale: AS NOTED Date: September 2022

SHEET No. 25 OF 33 SHEETS

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY CAD	
DRAWN BY	
TRACED BY	
DESIGNED BY MP	
QUANTITIES BY JS	
CHECKED BY	
NOTE BOOK No.	

HAWAII ELECTRIC LIGHT COMPANY (HELCO) NOTES, continued.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	26	33

14. Clearances

The following clearances shall be maintained between HELCO's ductline and all adjacent structures (charted and uncharted) in the trench:

Structure Type	Minimum Clearances (inches)
Waterlines, parallel	36 (A)
Waterlines, crossings	12 (B)
Sewer lines, parallel	36 (C)
Sewer lines, crossings	24 (D)
Drain lines, parallel	12
Drain lines, crossings	6 (E)
Electrical and Gas lines, parallel	12
Electrical and Gas lines, crossings	12
Telephone lines, parallel	6 (E)
Telephone lines, crossings	6 (E)
Chevron oil lines, parallel	36
Chevron oil lines, crossings	48 below oil line (F)

- A. The minimum horizontal clearances to water lines parallel to electrical ductlines must be increased to 60 inches if the water line is greater than 16 inches in diameter.
- B. The minimum vertical clearances to water lines crossing electrical ductlines can be reduced to 6 inches if the electrical ductline structure is concrete encased and is below the water line and the water line is less than 16 inches in diameter.
- C. A minimum horizontal clearance of 36 inches is required between new handholes and existing sewer laterals.
- D. The minimum vertical clearances to sewer pipes crossing electrical ductlines can be reduced to 12 inches if the sewer pipe is jacketed in concrete.
- E. The minimum clearances shall be increased to 12 inches if the electrical ductline is direct buried.
- F. The minimum vertical clearances to oil lines crossing electrical ductlines can be reduced to 24 inches below oil lines if the crossings are encased in 6 inches of concrete.
- G. The contractor shall notify the construction manager ϕ HELCO of any heat sources (power cable duct bank, steamline, etc.) encountered that are not properly identified on the drawing.

The following clearance shall be maintained between HELCO's fuel oil pipelines and all adjacent structures: 24-inches, parallel or crossing. The minimum clearance can be reduced to 12 inches (parallel and below only) if the structure is jacketed in concrete.

15. Indemnity

The contractor shall indemnify, defend and hold harmless HELCO from and against all losses, damages, claims, and actions, including but not limited to reasonable attorney's fees and costs based upon or limited to reasonable attorney's fees and costs based upon or arising out of

damage to property or injuries to persons, or other tortious acts caused or contributed to by contractor or anyone acting under its direction or control or on its behalf; provided contractor's indemnity shall not be applicable to any liability based upon the sole negligence of HELCO.

16. Schedule

Contractor shall furnish his construction schedule 22 working days prior to starting work on HELCO facilities. Contractor shall give HELCO, in writing 30 working days notice to proceed with HELCO's portion of work.

17. Authority

All construction, restoration work, and inspection shall be subject to whichever governmental agency has authority over the work.

18. Specifications

Construction of HELCO's underground facilities shall be constructed in accordance with the latest revision of HELCO specifications CS7001, CS7003, CS7202, CS9301, AND CS9401 AND APPLICABLE HELCO STANDARDS.

19. Construction

Contractor shall furnish all labor, materials, equipment, and services to properly perform and fully complete all work shown on the contract, drawings, and specifications. All materials shall be new and manufactured in the United States of America. All manhole, handhole, and ductlin installations shall be inspected and approved by HELCO prior to excavation and prior to placing concrete.

Contractor shall notify HELCO's inspection division at 935-1171 at least 48 hours prior to placing concrete. Contractor to coordinate work to break in HELCO's existing electrical facilities with HELCO's underground division at 935-1171 at least 10 working days in advance.

20. Stakeout

The contractor shall arrange for toneouts of all underground facilities and shall stakeout all proposed HELCO facilities within the project area so as to not conflict with any utility (existing or proposed) and any proposed construction or improvement work for verification by HELCO before proceeding with HELCO work.

21. Ductlines

All ductline installations shall be PVC schedule 40 encased in concrete, unless otherwise noted. All completed ductlines shall be mandrel tested by contractor in the presence of HELCO's inspector using HELCO's standard practice. The contractor shall install a 1/8" polyolefin pull line in all completed ductlines after mandrel testing is complete.

22. Joint Pole Removal

The last joint pole occupant off the poles shall remove the poles.

23. As-Built Plans

The contractor shall provide HELCO with two sets of As-Built reproducible tracings showing the offsets, stationing, and vertical elevation of duct line(s) constructed.

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

RONALD N. S. HO & ASSOC., INC.
Electrical Engineers

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APRIL 30, 2024
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HELCO NOTES, CONTINUED

HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiuanuenue Avenue

Scale: AS NOTED Date: September 2022

SHEET No. 26 OF 33 SHEETS

SPECTRUM OCEANIC (CATV) NOTES:

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	27	33

1. The contractor shall procure and pay for all licenses and permits and shall give all notices necessary and incident to the due and lawful prosecution of the work.
2. The locations of existing utilities are approximate only. The contractor shall verify their locations and shall be responsible for any damages to these utilities as a result of his operations. Adjustments to the new ductline alignment, if required, shall be made to provide the required clearances.
3. The contractor shall brace all poles or light standards near the new ductline, manhole, or handhole during its operations.
4. The contractor shall saw-cut A.C. pavement, concrete gutter, and concrete sidewalk wherever new manholes, handholes, pullboxes or ductlines are to be placed and shall restore to existing condition or better.
5. The underground pipes, cables, or ductlines known to exist by the engineer from his search of records are indicated on the plans. The contractor shall verify the locations and depths of the facilities and exercise proper care in excavating in the areas. Wherever connections of new utilities to existing utilities are shown on the plans, the contractor shall expose the existing lines at the proposed connections to verify their locations and depths prior to excavation for the new lines.
6. The contractor, at his own expense, shall keep the project and surrounding area free from dust nuisance. The cost for supplementary measures, which will be required by the County, shall be borne by the contractor.
7. Prior to excavation of the ductline, the contractor shall request Spectrum Oceanic to locate existing ductline wherever required.
8. The contractor shall take necessary precaution not to damage existing cables or ducts. Any work involving existing cables or ducts shall be done in the presence of the Spectrum Oceanic's inspector or his representative. Temporary cable and duct support shall be provided wherever necessary.
9. The contractor shall notify the Spectrum Oceanic's inspector 72 hours prior to the start of work on CATV infrastructure, pouring concrete, or backfilling. Spectrum Oceanic's Inspector(s): Robert Moeller at 331-4925.
10. Wherever connections to existing utilities are shown on the plans, the contractor shall expose the existing lines prior to excavation of the main trenches to verify their locations and depths.
11. Contractor shall provide all materials and furnish all labor and equipment necessary to install the ductline in place complete.
12. The contractor shall be responsible for laying out all required lines and grades and shall preserve all bench marks and working points necessary to lay out the work correctly. The new ductline shall be adjusted by the contractor to suit the existing conditions and details as described in the plans.
13. The contractor, at his own expense, shall keep the project area free from dust nuisance. The work shall be in conformance with the air pollution control standards and regulations of the State of Hawaii, Department of Health.
14. The location of CATV facilities shown on plans are from existing records with varying degrees of accuracy as to its actual fixed location. The contractor shall use extreme caution when working in close proximity of CATV facilities.
15. The contractor shall obtain excavation permit clearance from Spectrum Oceanic's engineering section located at 200 Akamainui ST, Mililani Tech Park.
16. For any field assistance or vegetation of CATV facilities, the contractor shall call the technical operations center at 625-8378.
17. Any work required to relocate CATV facilities shall be done by Spectrum Oceanic and the contractor shall be responsible for all coordination requirements and associated costs.
18. Any damage to Spectrum Oceanic's facilities shall be reported to Spectrum Oceanic's repair dispatch department at 625-8185.
19. The contractor shall tunnel under existing concrete curb and gutter as necessary to extend conduit into existing CATV pullbox and into the proposed power supply pullbox.
20. All existing improvements that are disturbed during the construction phase shall be restored to its original or better condition at no cost to the County in accordance with the County's standards.
21. At locations where existing CATV pullbox replacement is proposed, the contractor shall take all necessary precaution not to damage the existing cables in the pullbox. All damages to existing cables shall be repaired by Spectrum Oceanic and paid for by the contractor.
22. Coordinate all penetration of telephone pullboxes with Hawaiian Telcom inspector.
23. Smooth finish inside wall of existing pullboxes and handholes to its original condition of better.
24. All new concrete encased conduit shall be PVC pipe schedule 40. All new direct-buried conduit shall be PVC pipe-schedule 80. Use of any other material type (GTS, ETC) shall be limited to matching existing facilities. Connection of dissimilar materials to require approval from Spectrum Oceanic's inspector and engineering department.
25. The contractor shall place poly cord throughout project, and secure in manholes, handholes, and pullboxes.
26. For 3" conduits or larger, the contractor shall install NEPTCO WPI800 muletape or approved equal in all ductlines, leave muletape in place for future use as a pull or fish line, unless otherwise noted. Reference GTE material code no. 571154. All ducts shall be capped to prevent entry of foreign material during construction and at completion of installation. Endbells are required for conduits 2" and larger.
27. Penetration into pullboxes if necessary to be from factory installed openings or from bricks position. Penetration from pullbox walls is not acceptable.
28. Bends in the duct alignment, due to changes in grade shall have a minimum radius of 20-feet. All 90-degree C-bends at a pole or at the building floor slab penetration, shall have a bend radius of 10 times the diameter of the duct or greater.
29. Minimum length of conduit used shall not be less than 5-feet in length. Use of partial conduit sections allowable is at Spectrum Oceanic's inspector(s) discretion.
30. All conduits shall enter through the end "short wall" of the pullbox. Entry shall be at 90 degrees (perpendicular) to the wall face with bends no less than 12" from exterior wall.
31. A minimum of (2) precast riser sections must be used on all 2'x4' or 2'x6' pullboxes.
32. All new construction shall utilize concrete precast base unless otherwise approved or specified by Spectrum Oceanic's inspector(s).
33. When three (3) or more 4" conduits enter one end wall of any pullbox, only brick bases will be allowed unless otherwise instructed/approved by Spectrum Oceanic's inspector(s).
34. Two minimum layers of bricks to be used lower than the lowest duct entering the pullbox. Top layer of brick to be flush with top of conduit or higher.
35. For upgrade/repairs to existing pullboxes, bricks may be used and shall always be at least two layers lower than the lowest duct entering the pullbox.
36. At no time shall cement mortar, wood, or any other material be used between precast sections.

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SPECTRUM NOTES

HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiianuenue Avenue

Scale: AS NOTED Date: September 2022

SHEET No. 27 OF 33 SHEETS

SPECTRUM OCEANIC (CATV) NOTES, continued:

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	28	33

- 37. Leveling or raising of boxes to grade must be done:
 - A. Pre-cast base(s) - Using gravel layer under base (Type 3B or equivalent approved by Spectrum Oceanic's Inspector)
 - B. Brick base(s) - Adjustments to brickwork section. The permanent installation of wooden wedges to accomplish this purpose will not be accepted.
- 38. 5/8" copper ground rods shall be placed in all pullboxes unless otherwise directed by Spectrum Oceanic. Ground rods will be placed in the corner 3" to 4" from the wall and away from any conduit with no more than 8" sticking up above ground.
- 39. Trenching to be by hand digging near and across existing utility lines.
- 40. Minimum clearance between street light stand and fire hydrants shall be three feet.
- 41. Underground utilities shown hereon is for information only. No guarantee is made on the accuracy or completeness of said installation.
- 42. For underground cable locating and marking, five working days advance notice is required. Three working days advance notice is required for any inspection by a designated representative. Contractor shall take necessary precaution not to damage any existing cables or ducts. Spectrum Oceanic's inspector or designated representative is required to be at any job site wherever there will be a breakage into or entry into any structure that contain Spectrum Oceanic's facilities.
- 43. Concrete strength shall be 3000 psi in 28 days.
- 44. Curing and backfilling. Maintain concrete in a moist condition for 24 hours minimum for 3,000 psi and 48 hours minimum for 2,500 psi before compacted backfilling; 72 hours minimum before permitting motor traffic load on ductline curing method shall meet Spectrum Oceanic's inspector's approval.
- 45. Install 4-mil. thick orange color warning tape 3-inch wide, entire length of trench when placing CATV conduits. Tape entire length of trench when placing CATV conduits. Tape should read "CAUTION BURIED CABLE LINE BELOW". Manufactured by Harris Industries, Inc., catalog number UT-43 or approved equal. Tape to be installed 12-inches below grade.
- 46. After ductline has been completed, a mandrel with a square front not less than 12-inch long and having a diameter of 1/4-inch less than the inside diameter of duct, shall be pulled through each duct after which a brush with stiff bristles shall be pulled through to make certain that no particles of earth, sand, or gravel have been left inside. Ducts shall be completely dry and clean.
- 47. Metallic entrance conduits shall be grounded.
- 48. All conduits within a building shall:
 - A. Be installed in the shortest and straightest possible run.
 - B. Have no section longer than 100-feet nor contain more than two 90-degree bends. An approved sized junction box or gutter box shall be placed if this is exceeded.
 - C. All bends shall be long sweep-radius bends but the inside radius of the bend must never be less than ten times the diameter of the conduit.
- 49. All construction must be inspected and approved by Spectrum Oceanic prior to the installation of any of its facilities and the energizing of its system.
- 50. Contractor and/or Customer shall provide Spectrum Oceanic with sufficient installation time in their occupancy time table.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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HIGHWAYS DIVISION

*SPECTRUM NOTES,
CONTINUED*

HILO BAYFRONT HIGHWAY

Intersection Improvements at Waiuanuenue Avenue

Scale: AS NOTED Date: September 2022

SHEET No. 28 OF 33 SHEETS

HAWAIIAN TELCOM (HTCO) NOTES:

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	29	33

1. The contractor shall procure and pay for all licenses and permits and shall give all notices necessary and incident to the due and lawful prosecution of the work.
2. The contractor shall obtain an excavation permit and toning request from Hawaiian Telecom's excavation permit section, located at 1177 Bishop Street, two weeks prior to the start of construction. Hours of business are 8:00A.M. to 11:00A.M. and 12:00P.M. to 3:00P.M. Monday through Friday, except holidays.
3. Prior to excavation of the ductline, the contractor shall request Hawaiian Telecom to locate existing ductline wherever required. For underground cable locating and marking, five (5) working days advance notice is required. Three (3) working days advance notice is required for any inspection by a designated representative.
4. The locations of existing utilities are approximate only. The contractor shall exercise extreme caution and shall maintain proper clearances whenever construction crosses or is in close proximity of Hawaiian Telcom facilities. The contractor shall verify their locations and shall be liable for any damages to Hawaiian Telcom facilities. Any damages shall be reported immediately to Hawaiian Telcom's repair section at #611 (24 hours) or to the excavation permit section at 546-7746 (normal working hours, Monday through Friday, except holidays). As a result of his operations, adjustments to the new ductline alignment, if required, shall be made to provide the required clearances.
5. The contractor shall take necessary precaution not to damage existing cables or ducts. A Hawaiian Telcom inspector or designated representative is required to be at any job site whenever there will be a breakage into or entry into any structure that contain Hawaiian Telcom Facilities. Temporary cable and duct supports shall be provided wherever necessary.
6. The contractor shall notify Hawaiian Telcom's inspector or designated representative a minimum of 72 hours prior to excavation, bracing, or backfilling of Hawaiian Telcom's structures or facilities. Samuel Kamakau - 329-4756.
7. All applicable construction work shall be done in accordance with the "Hawaiian Telcom Standard Specifications for Placing Telephone Systems" dated January 2007, all subsequent amendments and additions, and all other pertinent standards for telephone construction. contractor shall familiarize his personnel by obtaining applicable specifications.
8. When excavation is adjacent to or beneath Hawaiian Telcom's existing structures or facilities, the contractor shall:
 - a. Sheet and/or brace the excavation to prevent slides, cave-ins, or settlements to ensure no movement to Hawaiian Telcom's structures or facilities.
 - b. Protect existing structures and/or facilities with beams, struts, or underpinning while excavating beneath them to ensure no movement to Hawaiian Telcom's structures or facilities.
9. The contractor shall brace all poles or light standards near the new ductline, manhole, or handhole during his operations.
10. The contractor shall saw-cut A.C. pavement and concrete gutter wherever new manholes, handholes, or ductlines are to be placed and shall restore to existing condition or better.
11. The contractor shall comply with the policy adopted by the County of Hawai'i Planning Department, concerning the replacement of concrete sidewalks after excavation work.
12. The underground pipes, cables, or ductlines known to exist by the engineer from his search of records are indicated on the plans. The contractor shall verify the locations and depths of the facilities and exercise proper care in excavating in the area. Wherever connections of new utilities to existing utilities are shown on the plans, the contractor shall expose the existing lines at the proposed connections to verify their locations and depths prior to excavation for the new lines.
13. Wherever connections to existing utilities are shown on the plans, the contractor shall expose the existing line prior to excavation of the main trenches to verify their locations and depths.
14. The contractor, at his own expense, shall keep the project and surrounding area free from dust nuisance. The cost for supplementary measures, which will be required by the County, shall be borne by the contractor.
15. The contractor shall pump all manholes dry during final inspection.
16. The contractor shall notify Hawaiian Telcom inspector 24 hours prior to the pouring of concrete or backfilling.
17. Whenn connecting to manhole walls, all existing reinforcing bars shall be left intact. Ducts shall be adjusted in the field order to clear reinforcing.
18. The contractor shall be responsible for laying out all required lines andgrades and shall preserve all bench marks and working points necessary to layout the work correctly. The ductline shall be adjusted by the contractor to suit the existing conditions and details as described in the plans.
19. Marks and working points necessary to lay out the work correctly. The new ductline shall be adjusted by the contractor to suit the existing conditions and the details as described in the plans.
20. Minimum concrete strength shall be:
 - For ductline, 2500 psi at 28 days
 - For manhole, 3000 psi at 28 days or as specified in design notes.
21. Bends in the duct alignment, due to changes in grade shall have a minimum radius of 25 feet. All 90 degree C-bends at a pole or at the building floor slab penetration, shall have a bend radius of ten times the diameter of the duct or greater.
22. After ductline has been completed, a mandrel with a square front not less that 12" long and having a diameter of 1/4" less than the inside diameter of the duct, shall be pulled through each duct after which a brush with the stiff bristles shall be pull through to make certain that no particles or earth, sand or gravel have been left inside. Ducts shall be completely dry and clean.
23. All ducts and conduits shall have an 1800# polyester mule-tape (NEPTCO, WPI800P, Hawaiian Telcom material code no. 571154) installed throughout its entire length. All ducts shall be capped to prevent entry of foreign material during construction and at the completion of installation.
24. All 2" and 4" HTCO ducts shall be PVC meeting specifications GTS 8342. Conduits placed under the building slab can be schedule 40.
25. Conduits placed in handholes/manholes shall start at the lowest positions and work up. Conduits in opposite ends of the box shall be in alignment both vertically and horizontally.

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HAWAIIAN TELCOM
NOTES
HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiianuenue Avenue

Scale: AS NOTED Date: September 2022

SHEET No. 29 OF 33 SHEETS

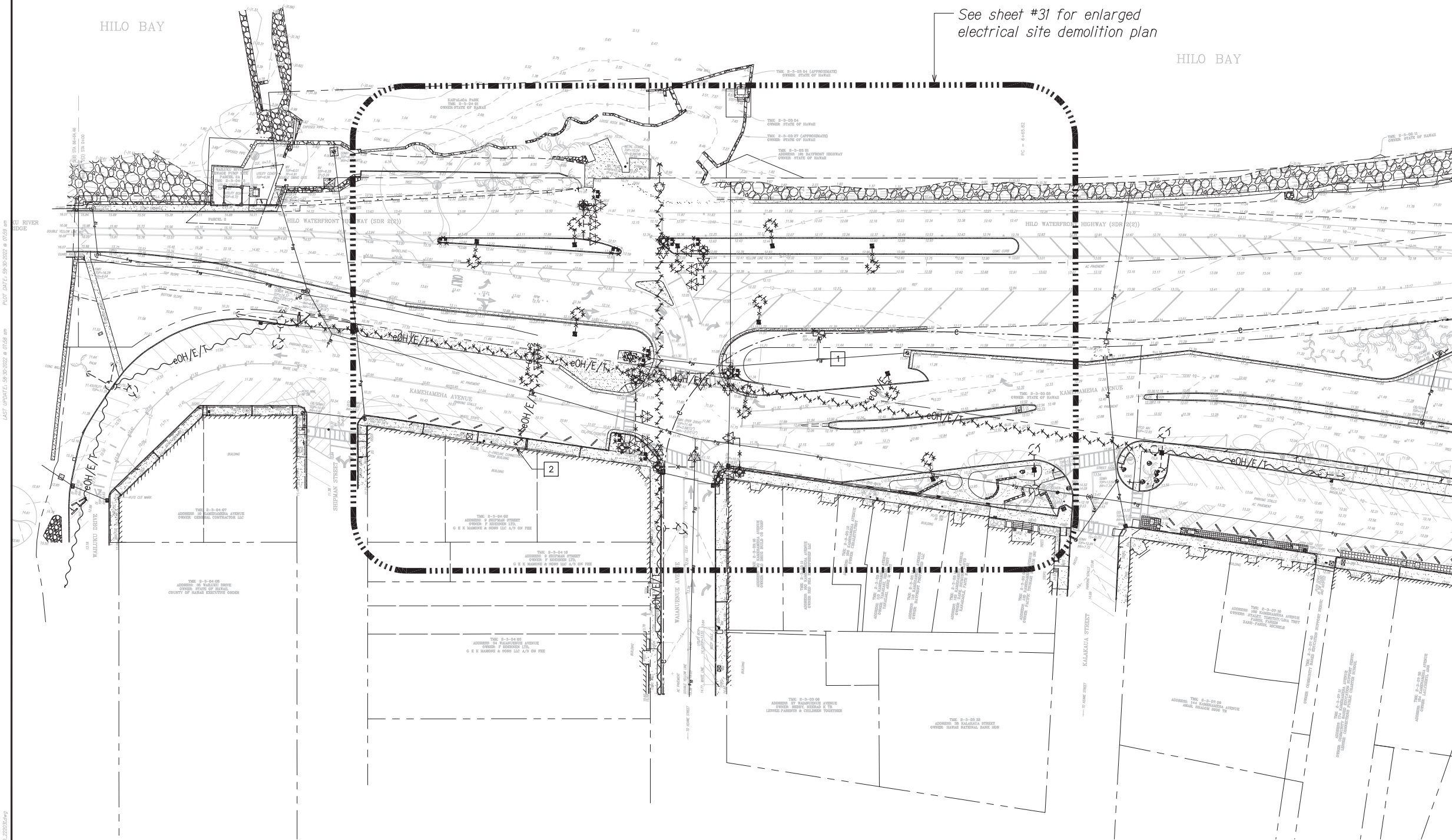
ORIGINAL PLAN No. _____	SURVEY PLOTTED BY CAD	DATE _____
NOTE BOOK No. _____	DESIGNED BY MP	DATE _____
	CHECKED BY JS	DATE _____

LAST UPDATE: 09/27/2022 @ 10:58 pm PLOT DATE: 09/27/2022 @ 10:58 pm

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	30	33

Note(s):

- 1 Existing Hawaiian Telecom handhole to be replaced.
- 2 Existing service entrance conductors to be removed, work by HELCO.

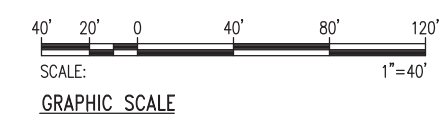


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Overall Electrical Site Demolition Plan

SCALE: 1" = 40'



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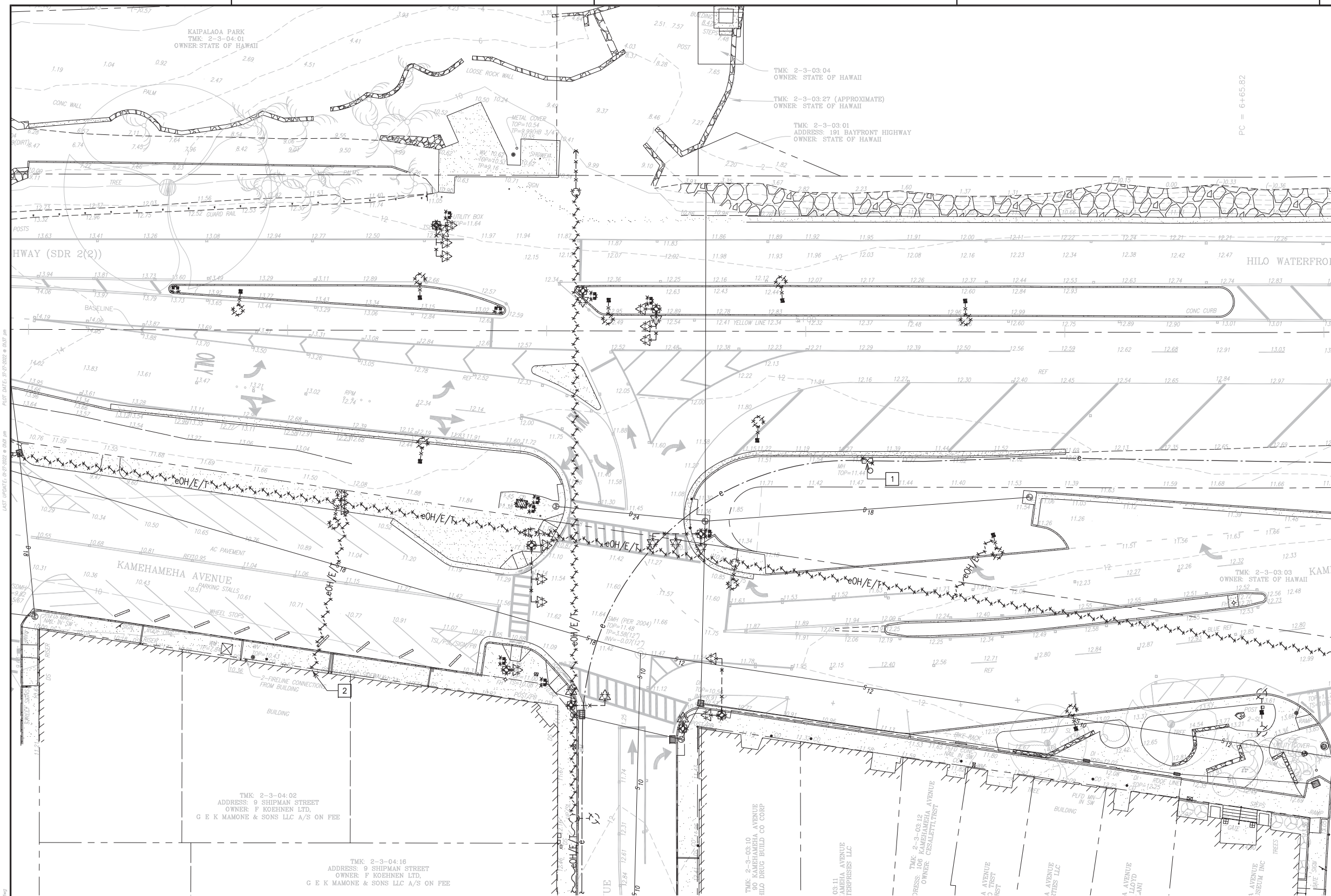
**OVERALL ELECTRICAL SITE
DEMOLITION PLAN**
HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiānuenu Avenue

Scale: AS NOTED Date: September 2022
SHEET No. 30 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	31	33

Note(s):

- 1 Existing Hawaiian Telecom handhole to be replaced.
- 2 Existing service entrance conductors to be removed, work by HELCO.



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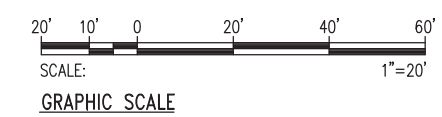
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Enlarged Electrical Site Demolition Plan

SCALE: 1" = 20'



STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
**ENLARGED ELECTRICAL SITE
 DEMOLITION PLAN**
 HILO BAYFRONT HIGHWAY
 Intersection Improvements at Wai'anue Avenue

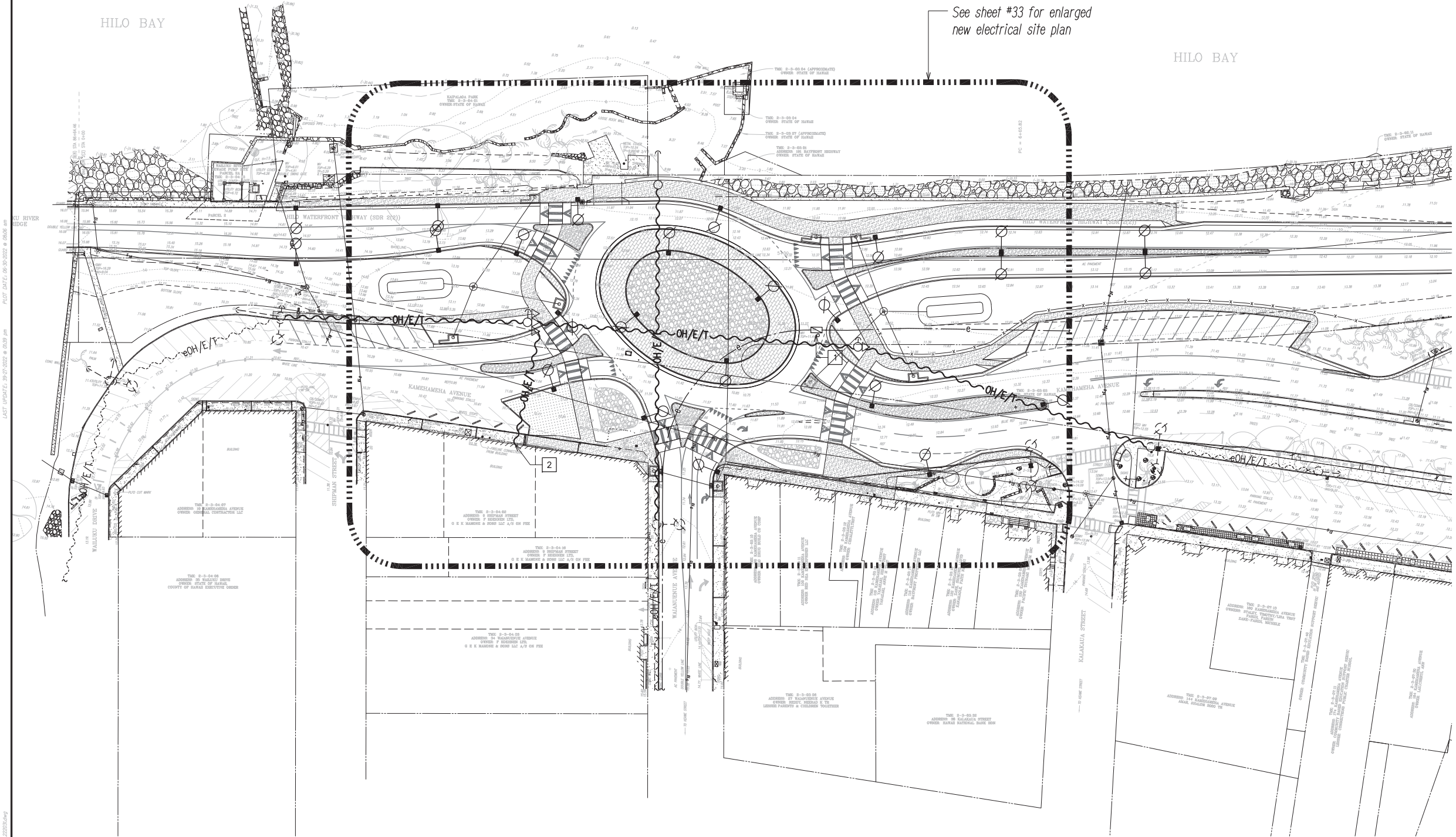
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 SHEET No. 31 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(076)	2022	32	33

Note(s):

- 1 New Hawaiian Telecom handhole. Traffic rated.
- 2 New service entrance conductors, work by HELCO.

See sheet #33 for enlarged new electrical site plan

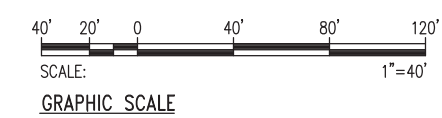


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Overall New Electrical Site Plan

SCALE: 1" = 40'



STATE OF HAWAII
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**OVERALL NEW ELECTRICAL
SITE PLAN**

HILO BAYFRONT HIGHWAY
Intersection Improvements at Wai'anue Avenue

Scale: AS NOTED Date: September 2022
SHEET No. 32 OF 33 SHEETS

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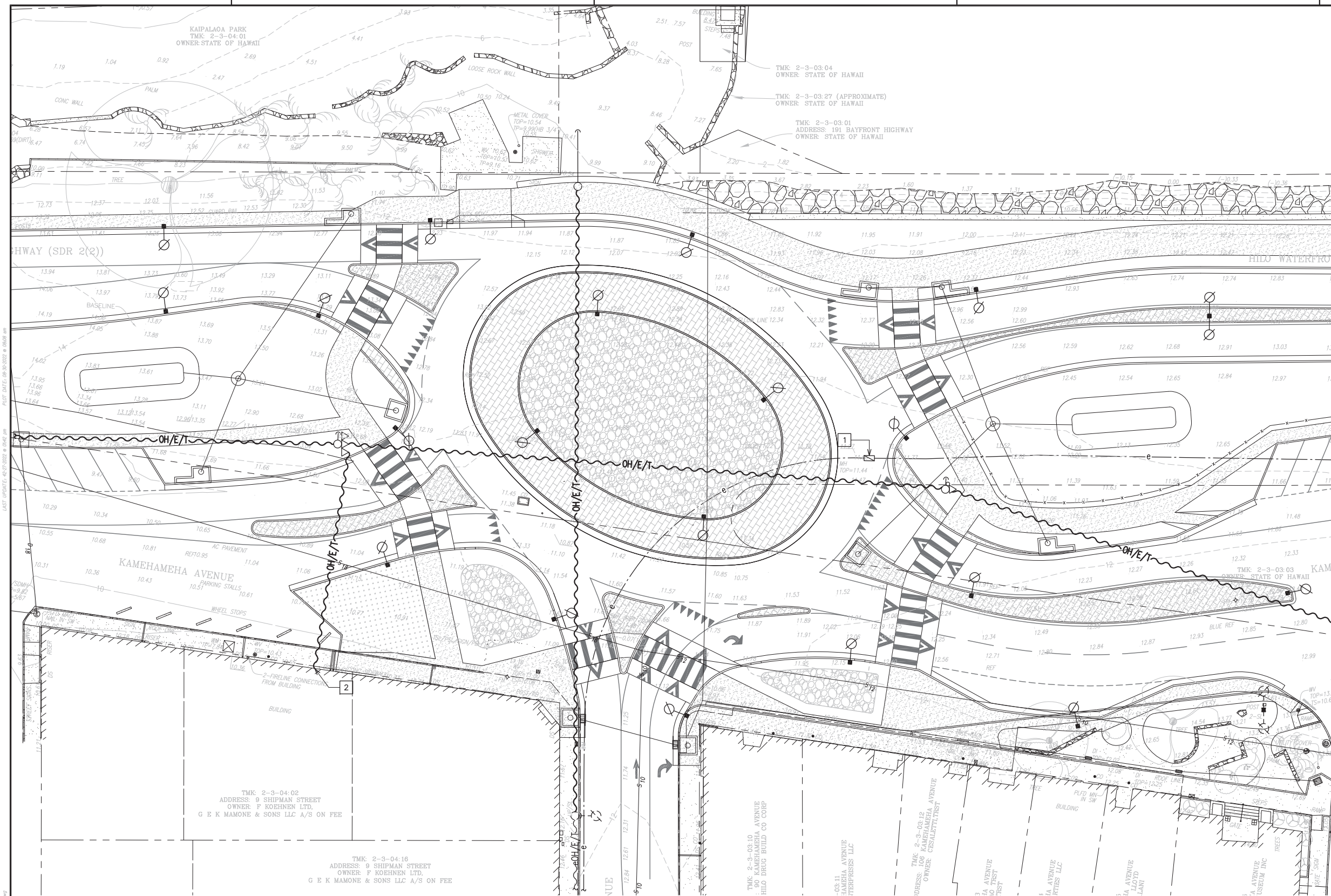
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HAWAII	HAW.	NH-019-2(076)	2022	33	33

Note(s):

- 1 New Hawaiian Telecom handhole. Traffic rated.
- 2 New service entrance conductors, work by HELCO.



ORIGINAL PLAN	DATE
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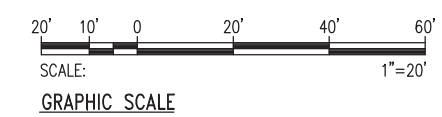
TMK 2-3-04-02
ADDRESS: 9 SHIPMAN STREET
OWNER: P KOEHNEN LTD.
G E K MAMONE & SONS LLC A/S ON FEE

TMK 2-3-04-16
ADDRESS: 9 SHIPMAN STREET
OWNER: F KOEHNEN LTD.
G E K MAMONE & SONS LLC A/S ON FEE



Enlarged New Electrical Site Plan

SCALE: 1" = 20'



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**ENLARGED NEW ELECTRICAL
SITE PLAN**
HILO BAYFRONT HIGHWAY
Intersection Improvements at Waiuanue Avenue

Scale: AS NOTED Date: September 2022
SHEET No. 33 OF 33 SHEETS

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APRIL 30, 2024
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APPENDIX B

Archaeological Review and Field Investigation



DRAFT FOR SHPD REVIEW

**Literature Review and Field Inspection
For the Proposed Facility for Bayfront Highway and
Waiānuenue Avenue Intersection Improvements
Pi‘ihonua & Punahoa 2 Ahupua‘a, South Hilo District,
Hawai‘i Island**

**TMKs [3] 2-3-002:022 (portion); [3] 2-3-002-999 (portion);
[3] 2-3-003:003; [3] 2-3-003:999 (portion); and [3] 2-3-
005:999 (portion) Road Rights-of-Way (ROW)**

**Prepared for
AECOM**

**Prepared by
Christopher M. Monahan, Ph.D., and
Trisha Kehaulani Watson, J.D., Ph.D.**



March 2023

Management Summary

This archaeological literature review and field inspection (ALRFI) was completed for AECOM in support of the Hawai‘i Department of Transportation’s (HDOT) proposed improvements to the intersection of Bayfront Highway (Hawai‘i Belt Road Route 19) and Waiānue Avenue (State Route 200) in Hilo, Hawai‘i Island (TMK: [3] 2-3-002:022 (portion); [3] 2-3-002-999 (portion); [3] 2-3-003:003; [3] 2-3-003:999 (portion); and [3] 2-3-005:999 (portion) Road Rights-of-Way [ROW]), Pi‘ihonua and Punahoa 2 Ahupua‘a, South Hilo District, Island of Hawai‘i. The project area includes portions of several roads—some of which have multiple names (i.e., Hawai‘i Belt Rd./Bayfront Highway/Waterfront Highway, Kamehameha Ave/Front St., and Waianue Avenue.)—owned by both the State of Hawai‘i (State) and County of Hawai‘i (County). The Project Site is mostly situated on dedicated roadway parcels: Bayfront Highway [State - portion of TMK [3] 2-3-002-999], Waiānue Avenue [State - portion of TMK [3] 2-3-005-999], and Kamehameha Avenue [County - portion of TMK [3] 2-3-003-999]. The improvements will also require a reconfiguration of medians and landings next to the roadway shoulders, and therefore the Project Site includes State and County lands within the right of way and parcels of State land identified as Tax Map Key (TMK) parcel number [3] 2-3-003:003 and a portion of TMK [3] 2-3-002:022. The cumulative area described is hereafter referred to as the “Project Site” or “Site.” The use of State (and County) lands or funds triggers the requirement to assess the environmental impacts of the proposed action pursuant to Hawai‘i Revised Statutes (HRS) Chapter 343.

The objectives of this report are: (1) documentation and description of the parcel’s land-use history in the context of both its traditional Hawaiian character as well as its historic-period changes; (2) identification of any historic properties or component features in the project area; and (3) providing information relevant to the likelihood of encountering historically-significant cultural deposits in subsurface context during future construction. This ALRFI is not an archaeological inventory survey (AIS), and it is not intended for formal review by the State Historic Preservation Division (SHPD). It may be used, however, to support the project proponent’s consultation with the SHPD in compliance with HRS Chapter 6E, Chapter 343 or other environmental laws.

Fieldwork resulted in the following main findings: (1) With one possible exception (see below), there were no potentially historically-significant materials or features in the project area; (2) One rock wall (see Photos 15 and Photo 16 in the Appendix) in the northwestern portion of the project area may qualify as a historic property (i.e., it may predate 1973); (3) Other than the potential historic property (rock wall), no other historic properties, or potential historic properties, were observed in the project area.

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Section 1 Introduction

1.1 Project Background

At the request of AECOM, on behalf of the State of Hawaii Department of Transportation (HDOT), Honua Consulting, LLC, conducted this archaeological literature review and field inspection (ALRFI) in support of proposed improvements to the intersection of Bayfront Highway (Hawai'i Belt Road Route 19) and Waiānuenue Avenue (State Route 200). The project site includes lands owned by both the State of Hawai'i (State) and County of Hawai'i (County). The Project Site is mostly situated on dedicated roadway parcels: Bayfront Highway [State - portion of TMK (3) 2-3-002-999], Waiānuenue Avenue [State - portion of TMK (3) 2-3-005-999], and Kamehameha Avenue [County - portion of TMK (3) 2-3-003-999]. The improvements will also require a reconfiguration of medians and land next to the roadway shoulders, and therefore the Project Site includes State and County lands within the right of way and parcels of State land identified as Tax Map Key (TMK) parcel number (3) 2-3-003:003 and a portion of TMK (3) 2-3-002:022.

1.1.1 Regulatory Context

The subject ALRFI may be used by AECOM and HDOT as part of their overall assessment process. The objectives of this ALRFI are: (1) documentation and description of the parcel's land-use history in the context of both its traditional Hawaiian character as well as its historic-period changes; (2) identification of any historic properties or component features in the project area; and (3) providing information relevant to the likelihood of encountering historically-significant cultural deposits in subsurface context during future construction.

This ALRFI is not an archaeological inventory survey (AIS), and it is not intended for formal review by the State Historic Preservation Division (SHPD). It may be used, however, to support the project proponent's consultation with the SHPD in compliance with Hawai'i Revised Statutes (HRS) Chapter 6E, Chapter 343 or other environmental laws.

1.2 Environmental Setting

The project area lies at ~10 feet (~3 meters) above sea level on the western side of Hilo Bay mauka (inland) of Kaipalaoa Landing Park (maintained by the County) and the historic Coconut Point lighthouse. As discussed in Section 2, this area known traditionally as Kaipalaoa is considered to be a wahi pana (legendary place) in Hawaiian traditions. The project area lies on the south side of the mouth of the Wailuku River, just south of the bridge (known to locals as the "singing bridge") at Mokupane Point. The Banyon Drive peninsula is about one mile to the east. Hilo town center is a short distance to the southeast.

According to the United States Department of Agricultural-Natural Resource Conservation Service (USDA-NRCS),¹ soil data show the project area is underlain by Hilo hydrous silty clay loam (Figure 5). Hard rock geological data (Wolfe and Morris 1996) show the project area is at the confluence of three main lithofacies: "ac," which refers to coralline sand (beach sediments)

¹ Accessed in April 2022 at <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.

along the bay front; “pha,” Pahala ash (i.e., Pleistocene sediments that have weathered into Hilo hydrous silty clay loam, and “k,” Kau basalt in and near the river drainage banks (Figure 6).

The project area, itself, is completely urbanized/hardscaped with asphaltic-concrete and other infrastructures typical of roadways in urban Hilo. Accordingly, there is no through-flowing surface water in the project area. Hilo is a relatively rainy place: mean annual rainfall in the project-area environs is approximately 3500–4400 millimeters (137.8–173.2 inches).



Figure 1. Portion of 2013 U.S. Geological Survey (USGS) topographic map showing project area (base map source: USGS online at <http://ngmdb.usgs.gov/topoview>)



Figure 2. Aerial photograph showing the location of the project area

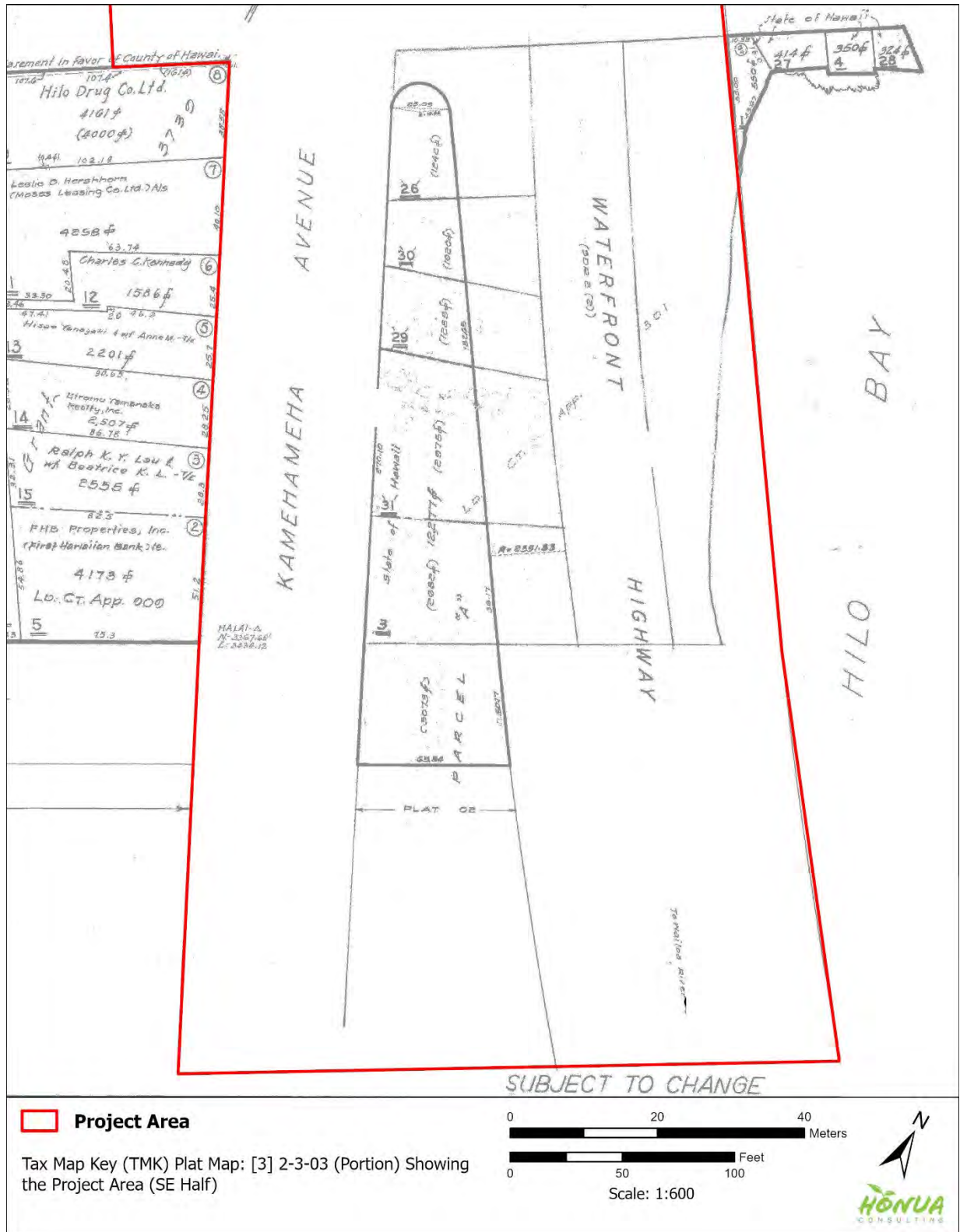


Figure 3. Portion of Tax Map Key map (3) 2-3-003 showing location of SE half of project area

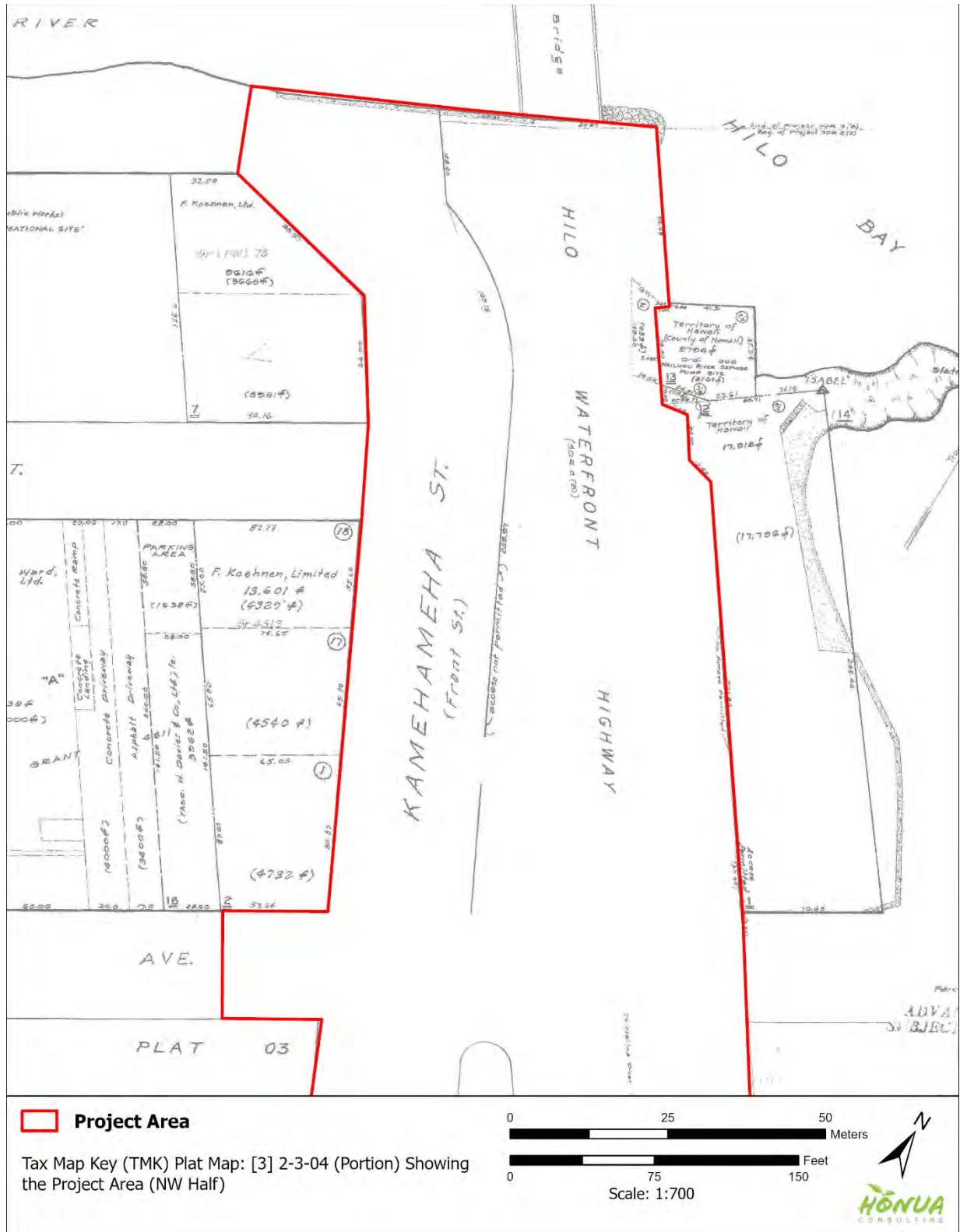


Figure 4. Portion of Tax Map Key map (3) 2-3-004 showing location of NW half of project area

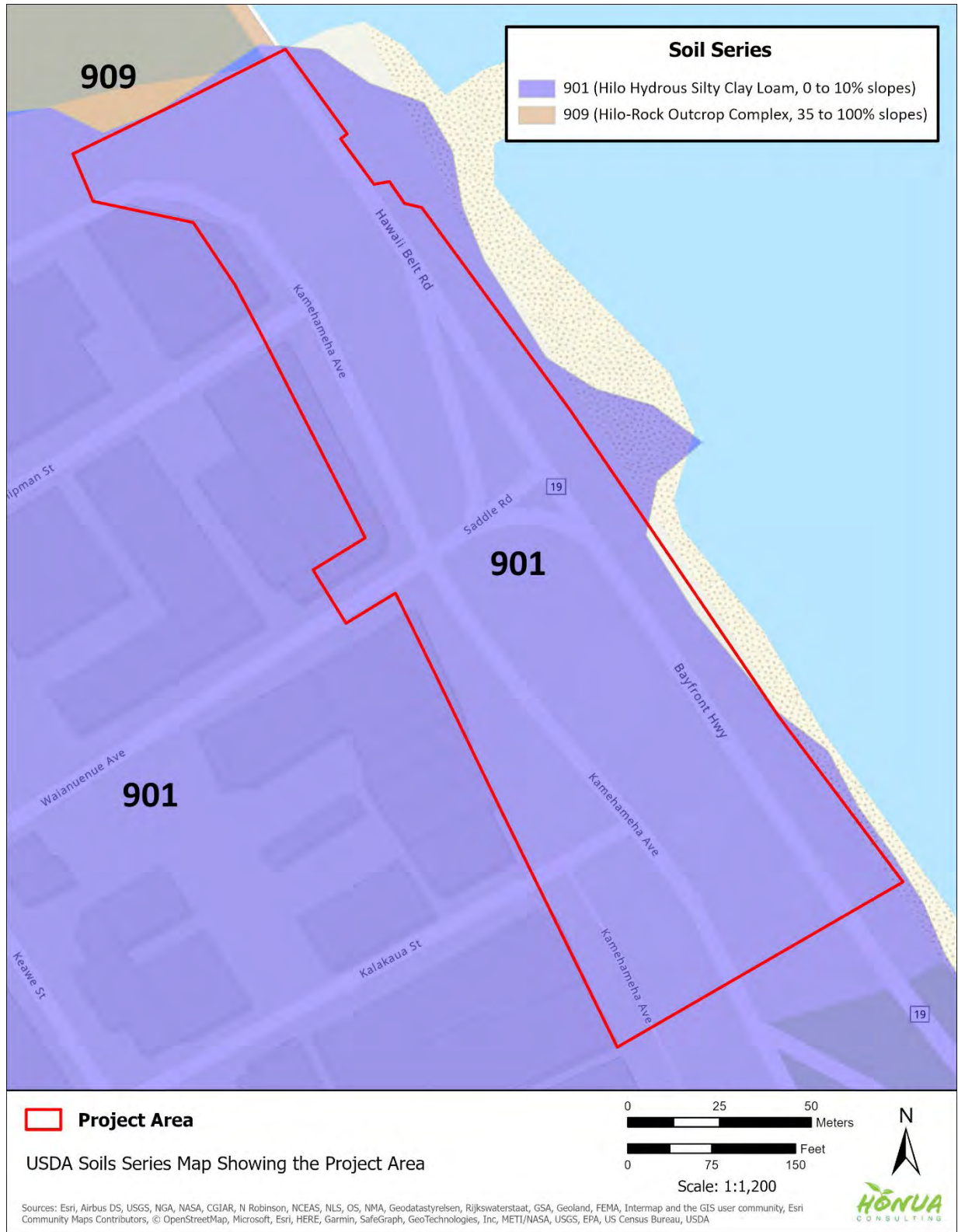


Figure 5. Soils in and near project area (base data source: USDA-NRCS Soil Survey - <https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/>, accessed April 2022)



Figure 6. Hard rock geology in and near project area (source: Wolfe and Morris 1996; accessed April 2022 at <http://pubs.er.usgs.gov/publication/ds144>)

Section 2 Cultural and Historical Background

This section includes a brief synthesis of relevant cultural and historical information related to the types of land uses in and around the project area from pre-Contact, traditional Hawaiian times into the historic period. Note that this section may be expanded if an archaeological inventory survey (AIS) is required.

The main objective here, primarily through the analysis of historical documents, maps and aerial images, is to provide a project area-specific picture of land use and modification over time. Portions of this section are based on Kelly et al.'s (1981) cultural history of Hilo Bay, which provide a chronological framework for major changes in the area from pre-Contact to late historic-period times. Other recent reports (e.g., Tam Sing et al. 2017) also provide useful information.

In addition to conducting a records search at the SHPD's library in Kapolei as well as the on-line database of the Environmental Review Program (ERP), within the Office of Planning and Sustainable Development, which publishes EIS and EA documents, and referencing Honua's proprietary database, we also utilized these on-line sources to obtain cultural, historical and archaeological data:

- OHA's Papakilo database (<http://papakilodatabase.com/main/main.php>)
- OHA's Kipuka database (<http://kipukadatabase.com/kipuka/>)
- Bernice P. Bishop Museum archaeological site database (<http://has.bishopmuseum.org/index.asp>)
- Bishop's Hawaii Ethnological Notes (<http://data.bishopmuseum.org/HEN/browse.php?stype=3>)
- University of Hawai'i-Mānoa's digital maps (<http://magis.manoa.hawaii.edu/maps/index.html>)
- DAGS' State Land Survey (<http://ags.hawaii.gov/survey/map-search/>)
- Waihona 'Aina website (www.waihona.com)
- Digital newspaper archive "Chronicling America, Historic American Newspapers" (<http://chroniclingamerica.loc.gov/lccn/sn82014681/>)
- Hawai'i State Archives digital collections (<http://archives1.dags.hawaii.gov/>)
- U.S. Library of Congress digital map collections (<https://www.loc.gov/maps/>)
- USGS Information Service, including digital map collections (<https://nationalmap.gov/historical/index.html>)
- AVA Konohiki's website (<http://www.avakonohiki.org/>)

2.1 Hawaiian Cultural Landscape

The Bishop Museum's *Hilo Bay: A Chronological History, Land and Water Use in the Hilo Bay Area, Island of Hawai'i* (Kelly et al. 1981) and other well-known sources (e.g., Handy 1940; Handy and Handy 1972; Pukui et al. 1974; Kamakau 1992) document an unusually rich and diverse cultural landscape that is full of wahi pana (legendary places), named locations, natural resources, and other landscape modifications such as archaeological sites that are of interest and value to Hawaiians. Many of these places and resources are associated with mo'olelo, or oral-historical references, related to Hilo's storied past.

In general, Hilo Bay is widely recognized as one of the initial favored places where the first Hawaiians would have settled. Handy and Handy (1972:268) noted "In Hilo there was the bay and the mouth of the Wailuku River" when listing some of the earliest favored locations for the first settlers around the archipelago. At the same time, given the bay's shape/orientation and exposure to the northeast-facing trade winds, it has likely been susceptible to tsunamis and other tidal surges

since the earliest Hawaiian settlement. Handy and Handy (ibid.:538) write that “. . . it is also subject to violent oceanic storms and has many times in its history suffered semidevastation from tidal waves unleashed by earthquake action in the Aleutian area of the Pacific.”

A map depiction of the project-area environs from 1825 (Figure 7) provides the best general overview of what traditional (pre-Contact) Hawaiian land use once looked like in and around the project area. The map shows the entire bayfront—between the outlet of the Wailuku River at Pi‘ihonua Ahupua‘a (i.e., northwestern end of the project area) and the outlet of the Wailoa River/Waiākea Pond and Stream at Waiākea Ahupua‘a—was full of garden plots that were in a relatively wet area among the “Royal Fish Pond” at Waiākea (sometimes labeled the “King’s Fish Pond” on other historic maps) and other inland ponds and waterways closer to the project area. This area of loko pu‘uone (inland fishponds) was apparently spring-fed (Kelly et al. 1981:11). It is difficult to see on this 1825 map, but there also appear to be scattered house sites along portions of the bayfront (note, the symbols at what is today the area of Mokupane Point—at the south side of the mouth of the Wailuku River—appear to signify shallow water [not house sites]). The far end of the bayfront—where it meets the peninsula at Banyon Drive (Waiākea)—is labeled as a “good landing place.”

It is worth noting the relatively high number of named ahupua‘a between the Wailuku River and Waiākea—at least seven (from the north, Pi‘ihonua, Punahoa 2, Punahoa 1, Ponahawai, Kūkūau 2, Kūkūau 1 and Waiākea), over about a mile of shoreline (see, e.g., Kelly et al. 1981:Figure 1, p.2). Such densely-packed ahupua‘a directly reflect the relatively high value of this area’s food resources—including its access to marine resources at Hilo Bay, varieties of limu (seaweed), abundant fresh-water, spring-fed fishponds, waterfowl and other, mauka resources.²

The project area was once part of an area known as Kaipalaoa (literally, “whale sea,” according to Pukui et al. (1974:70).³ The shoreline at Kaipalaoa was known as a traditional canoe-landing spot as well as a surfing area (ibid., citing others). John Papa ‘Ī‘ī (1959:134) stated the surf spots at Pi‘ihonua was known as Huia. Kamehameha I was known to have frequented this place as well and used it both to land his canoe and to surf (ibid.). Kamakau (1992:188, 220, 386) mentioned a battle that took place at Kaipalaoa, as well as a nearby heiau of the same name where Liholiho’s (son of Kamehameha I and second king of the unified Hawaiian Islands) piko (umbilical cord) was cut. Kaipalaoa was also famous for its niu (coconut palms) as memorialized by the ‘ōlelo no‘eau (poetical saying):

Ka niu pe‘ahi kanaka o Kaipalaoa
The man-beckoning coco palms of Kaipalaoa

This saying is explained by Pukui (1983:162) as “The swaying palms that once grew at Kaipalaoa, Hilo, seemed to wave an invitation.”

Nearby Waiākea (literally, “broad [or expansive] water,” Pukui et al. 1974:220 [brackets added]) is associated with mo‘olelo about the famous ‘Umi-a-Liloa (son of Liloa), the sixteenth-century supreme chief of Hawai‘i Island (Kamakau 1992:15–17). This area was known as an early

² Given the scope and location of the subject archaeological monitoring plan, we do not go into detail discussing the mauka (inland) portions of the project-area ahupua‘a of Pi‘ihonua and Punahoa 2, but this topic may be expanded in the archaeological monitoring report if significant finds are made during monitoring.

³ According to Pukui and Elbert’s (1986) *Hawaiian Dictionary*, palaoa specifically means sperm whale whose large conical-shaped teeth were prized by Hawaiians for shaping into lei palaoa (carved “ivory”-type pendants).

residence of the Hilo chiefs who would gather with their people on the bayfront beaches to amuse and entertain themselves (Kelly et al. 1981:1). When Captain George Vancouver arrived in the early 1790s, Kamehameha I was living at Waiākea (ibid.:8), apparently preparing for (i.e., gathering provisions and materials to) set out to capture Maui, Moloka‘i and O‘ahu in 1795.

The British missionary William Ellis in 1823 estimated the population of the Hilo Bay area was about 2,000 people living in 400 houses, which Kelly et al. (1981:19) believe is “probably close to the permanent population twenty years earlier” [i.e., around the turn of the century].

An 1841 map depiction of Hilo Bay (Figure 8) produced by the famous Wilkes scientific and surveying expedition that included the Hawaiian Islands shows much less detail inland of the depth-charting of the bay (which would have been the primary survey objective); however, it does show that the several structures of the “Town of Hilo”—and others going over to the King’s Pond—are set back some distance from the bayfront. This set up, no doubt, reflects the fact that the bayfront in its natural state, and lacking the hardscape (boulder) reinforcement it currently has, was always susceptible to flooding (tidal surges, tsunamis, etc.). A coconut grove is depicted in the current project area with others elsewhere along the bayfront.

Handy and Handy (1972:538–9) discuss variation in Hilo’s value to Hawaiians for practicing their cultivation/planting traditions in pre-Contact and early historic times:

The population of Hilo was anciently as now concentrated mostly around and out from Hilo Bay . . . The Hilo Bay region is one of lush tropical verdure and beauty, owing to the prevalence of nightly showers and moist warmth which prevail under the northeasterly trade winds into which it faces . . .

In lava-strewn South Hilo there were no streams whose valleys or banks were capable of being developed in terraces, but cuttings were stuck into the ground on the shores and inlets for many miles along the course of the Wailuku River far up into the forest zone. In the marshes surrounding Waiakea Bay, east of Hilo [town], taro was planted in a unique way known as *kanu kipi*. Long mounds were built on the marshy bottom with their surface two or three feet above water level. Upon the top and along the sides of these mounds taro was planted. Flood waters which occasionally submerged the entire mound are said to have done no harm, as the flow was imperceptible . . .

On the lava-strewn plain of Waiakea and on the slopes between Waiakea and the Wailuku River, dry taro was formerly planted wherever there was enough soil.

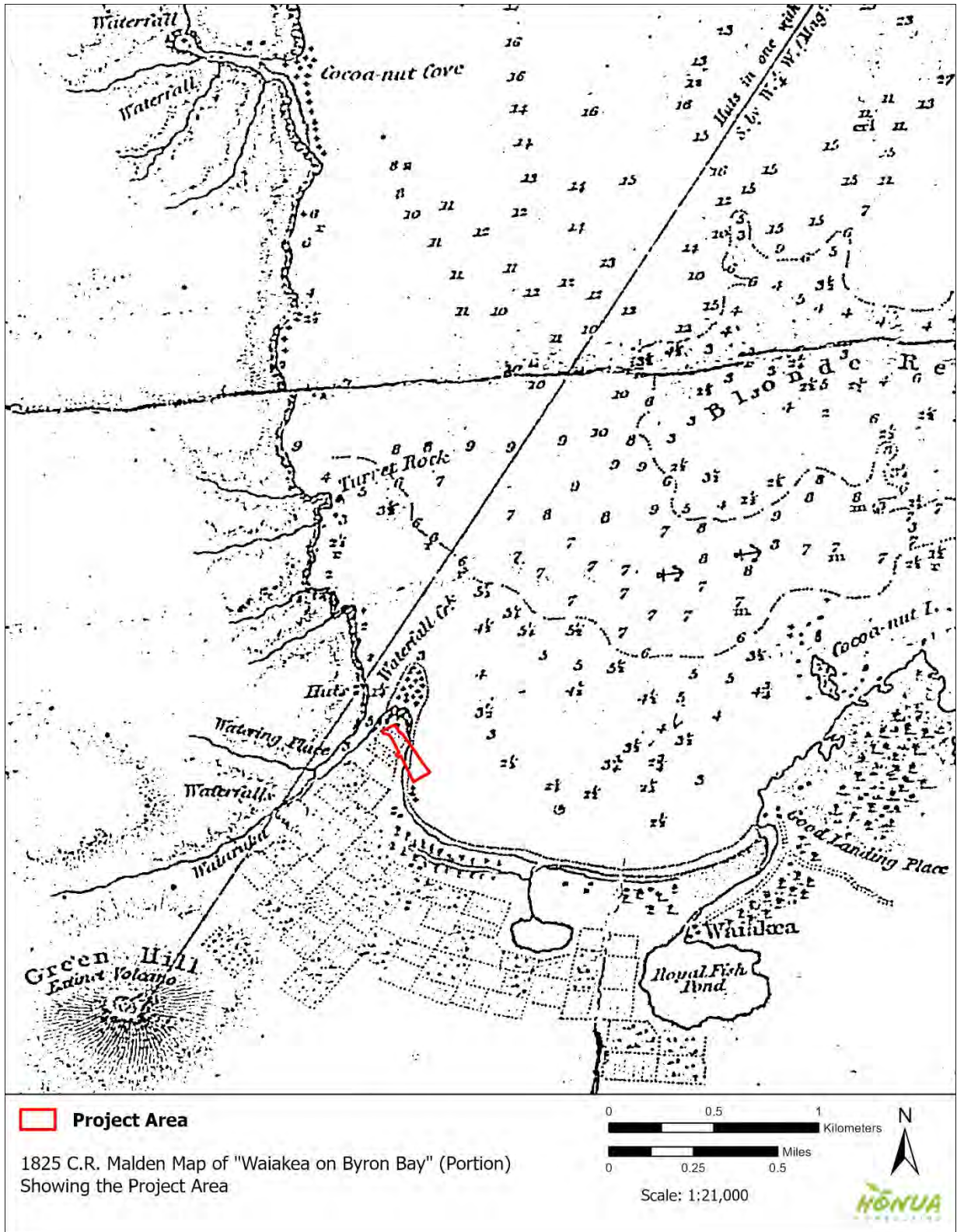


Figure 7. Portion of 1825 map (Registered Map 833) showing approximate location of project area (base map source: DAGS Land Survey Map Search, <http://ags.hawaii.gov/map-search/>)

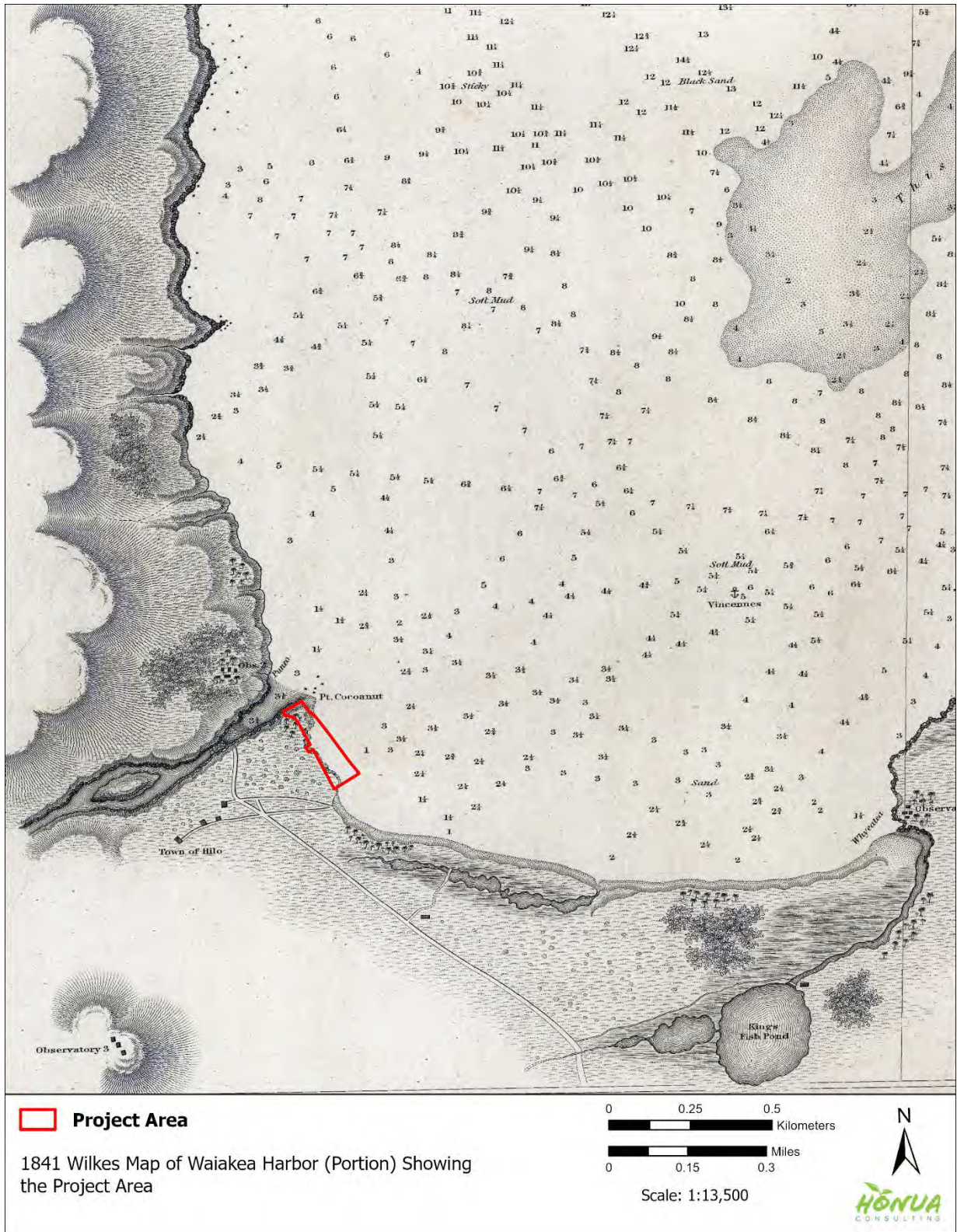


Figure 8. Portion of 1841 map showing approximate location of project area (base map source: Fitzpatrick 1987)

2.2 Historic Period

This section does not explain all of major changes in Hilo that occurred in the historic period (see Kelly et al. 1981 for more details). Rather, it focuses on the current project area and immediate environs, since this information is directly relevant to the types of archaeological resources that may be found under the ground surface at this place.

Starting as early as 1822, missionaries came to the Hilo area to initiate their work, which was supported by Ka‘ahumanu, Liholiho (Kamehameha II), and Kaumali‘i (the former supreme chief of Kaua‘i); and, by 1825, a meeting house and missionary school began operating in the area (Kelly et al. 1981:26–29). Ka‘ahumanu gifted the land of Punahoa 2 to the missionaries Goodrich and Ruggles, who built missionary homes, meeting houses and churches as well as the Hilo Boarding School and Girls’ Seminary (ibid.:36).

Regarding information that can be gleaned from Land Commission records documenting the middle nineteenth century process of land reform from a traditional Hawaiian to western legal system (i.e., the Māhele), it appears that Pi‘ihonua Ahupua‘a, once considered among the personal lands of Kamehameha I,

was perhaps given to Ka-lae-o-ke-koi by Kauikeaouli [Kamehameha III] or Boki in 1828. It was surrendered by that chief at the Māhele, and reverted to the king. It appears as a Crown Land in the *Indices of Awards*. . . (1929:25) (ibid.:40) (brackets added)

Regarding the other ahupua‘a within which the current project area is partially located, Kelly et al.’s (1981:39–40) research yielded the following about Punahoa 2:

Punahoa 2, as we have mentioned, was given to the American Board of Commissioners for Foreign Missions . . . in 1825 by Ka‘ahumanu, and its 5,000-plus acres were confirmed as Missionary property in the Māhele . . . Judging from the testimony of several landholders it appears that both of the Punahoa *ahupua‘a* may have originally been given to the chiefess Pi‘opi‘o by either Kamehameha II or Kamehameha III . . .

A major tsunami that struck Hilo in 1837 “caused some loss of life and severe damage to fishponds and taro patches” (ibid.:44). As recounted by the missionary Rev. Titus Coan, “everything not more than fifteen or twenty feet above high-water mark [was swept] into indiscriminate ruin” . . .and, “only thirteen were drowned.” Despite this, the population of greater Hilo apparently had grown by the 1840s to about 10,000 people (ibid.).⁴

Kelly et al. (1981:51) refer to the years between 1840 and 1898 as the period of Americanization of Hilo—a time when U.S. businessmen’s economic interests came to dominate the windward side of Hawai‘i Island—in particular, the advent of commercial sugar cane operations. Quoting Commander Charles Wilkes, whose scientific and mapping expedition visited Hilo in 1840–1841, Hilo by this time was a:

⁴ Numerous other tsunamis and damaging tidal surges have hit Hilo over the years, including one in 1868, 1877 and 1892 (Kelly et al. 1981:71), in addition to the cataclysmic one in 1946.

. . . straggling village, and is rendered almost invisible by the luxuriant growth of the sugarcane, which the natives plant around their houses. . . The whole settlement forms a pretty cluster; the paths and roadsides are planted with pine-apples; the soil is deep and fertile, and through an excess of moisture, yields a rank vegetation. . . Many of the native houses are surrounded with bread-fruit and cocoa-nut trees, and have a fine view of the bay. (ibid.:53)

From the middle 1800s, and continuing into modern times, much of the greater Hilo Bay area was part of a series of vast commercial sugar cane operations that extended all the way up the Hāmākua coast and down to Puna. A state GIS database of the historic extent of commercial sugar cane shows the project area was once immediately adjacent to commercial sugar cane fields, but probably was not actually farmed given its location right at the shoreline.⁵ As discussed and illustrated below, starting in the early 1900s, a railroad line once crossed right through the current project area, which also had a depot (railroad station).

Given the bayfront’s exposure and susceptibility to tidal waves, surges and storm events that frequently transformed the beach—sometimes removing sand and sometimes depositing it well inland, the shoreline was eventually hardened with boulder retaining walls starting around 1920 (this was also related to the need to support the railroad tracks, which were built on sand). In 1877, yet another tsunami caused extensive damage in Hilo between the Wailuku side of the bay (12.25 foot surge) and Waiākea (16 foot surge):

All houses within a hundred yards of the water at Waiākea were destroyed, along with the steamboat wharf and the stone houses, Spencer’s storehouse, and the bridge across the stream. . . Five lives were lost. On the Wailuku side, the water washed into the stores and washed away the stone wall *makai* of the wharf. (ibid.:72)

In 1889, the “Road Board” began work on canals and roads around and through the various wetlands just mauka of the bayfront, most especially over to Waiākea, in order to facilitate development (i.e., improve the drainage) of this area into an expanded Hilo town. By 1895, the road from the original town of Hilo to Waiākea was commissioned to be macadamized. Other modern conveniences, such as piped fresh water, were first introduced to Hilo in 1890 (ibid.:66).

Historic maps dating from 1819 (Figure 9), 1914 (Figure 10), 1917 (Figure 11) and 1921 (Figure 12) depict the project area in the context of its portion of Hilo town at the height of the influence and success of the various commercial sugar cane operations along the windward coast. These maps show the old wharf and post office (see Figure 9), and the Hawaii Consolidated Railway, Ltd. (originally the Hilo Railroad Co.) railroad line and depot (railroad station) through the center of the current project area (see Figure 10). The 1914 map is the most detailed of these three; and it depicts—in addition to the series of rail lines and the railroad depot, and dense and busy area of light industrial businesses, warehouses, and a variety of service shops and markets. The 1914 map also shows the location of the still-extant lighthouse, known today as the “Coconut Point” Lighthouse (on the map labeled “US Light Ho.”).

Figure 13, a portion of 1928 map, shows the project area in the context of sugar cane mills, camps and fields to the southeast (Waiākea), west (Amauulu), and north (Hilo and Papaikou).

⁵ See “Historic Sugarcane Lands Map Viewer” at <http://health.hawaii.gov/epo/egis/sugarcane/>; accessed April 2022

The great tsunami of 1946 changed Hilo's bayfront, including the types of land use and structures that were built (and remain today) following this major disaster. A series of aerial photographs from 1954 (Figure 14), 1965 (Figure 15) and 1977 (Figure 16) show that the dense collection of light industrial businesses, warehouses, and a variety of service shops and markets were never rebuilt in this area, which, today is home to roadways, parks and retaining walls built against the ocean.

The 1946 tsunami also destroyed the railroad lines that once traversed the current project area, as well as the railroad station (depot) and all other structures that were once in this near-coastal portion of the bay.

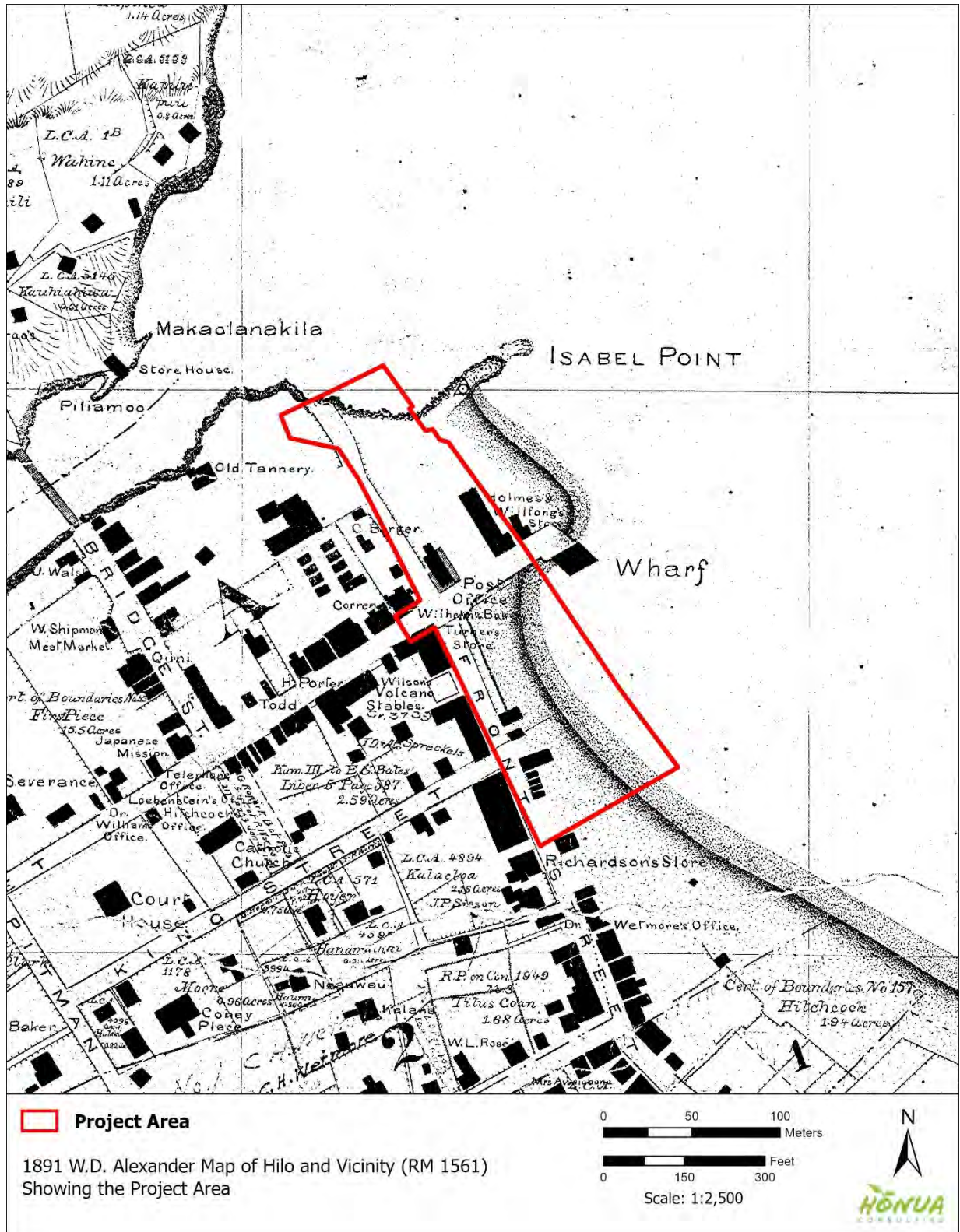


Figure 9. Portion of 1891 map (Registered Map 1561) showing project area location (base map source: DAGS Land Survey Map Search, <http://ags.hawaii.gov/survey/map-search/>)

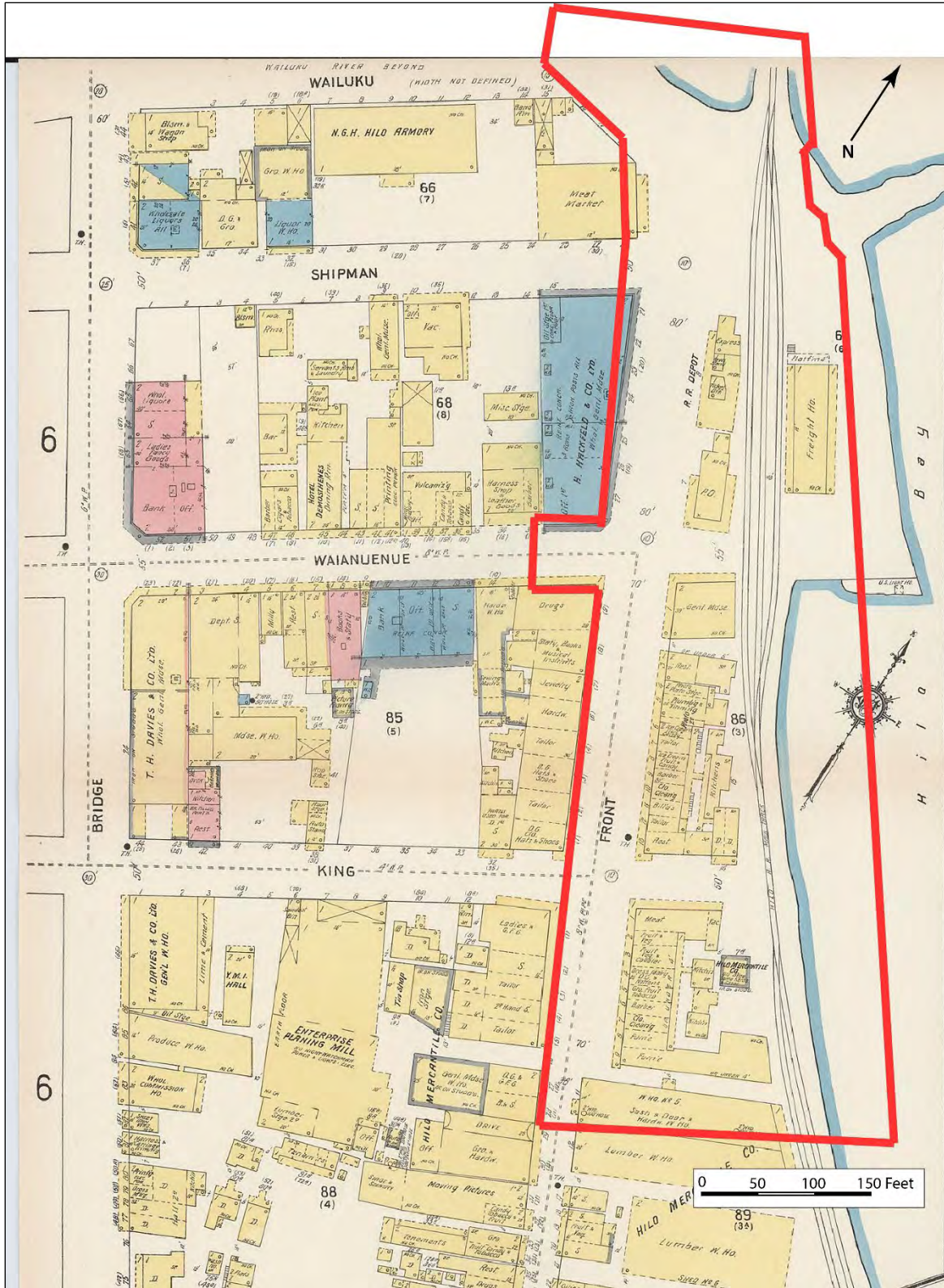


Figure 10. Portion of 1914 Sanborn Fire Insurance map showing approximate location of project area (base map source: University of Hawai‘i-Mānoa’s digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)

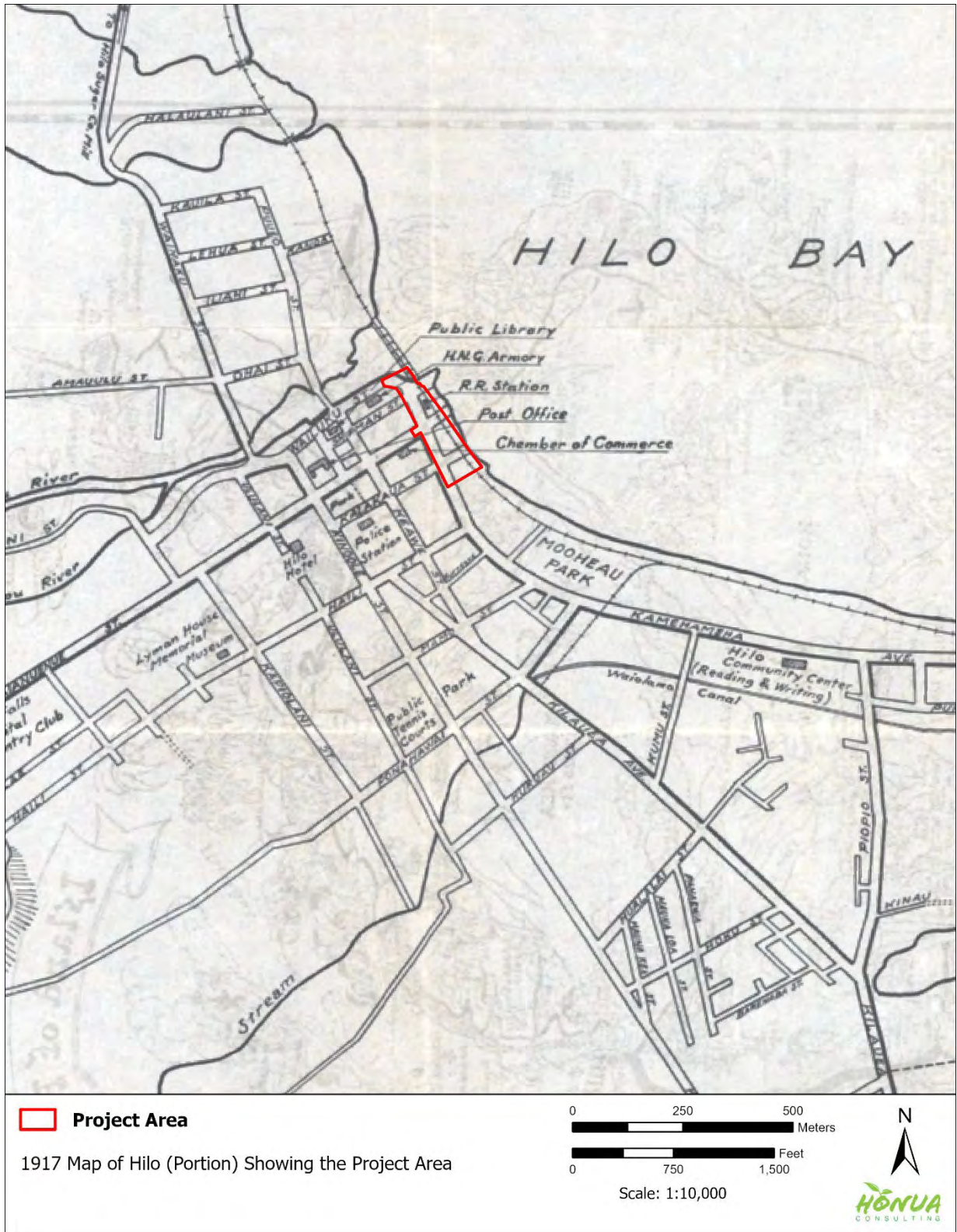


Figure 11. Portion of 1917 map showing approximate location of project area (base map source: DAGS Land Survey Map Search, <http://ags.hawaii.gov/survey/map-search/>)



Figure 12. Portion of 1921 Sanford Fire Insurance map showing approximate location of project area (base map source: University of Hawai‘i-Mānoa’s digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)

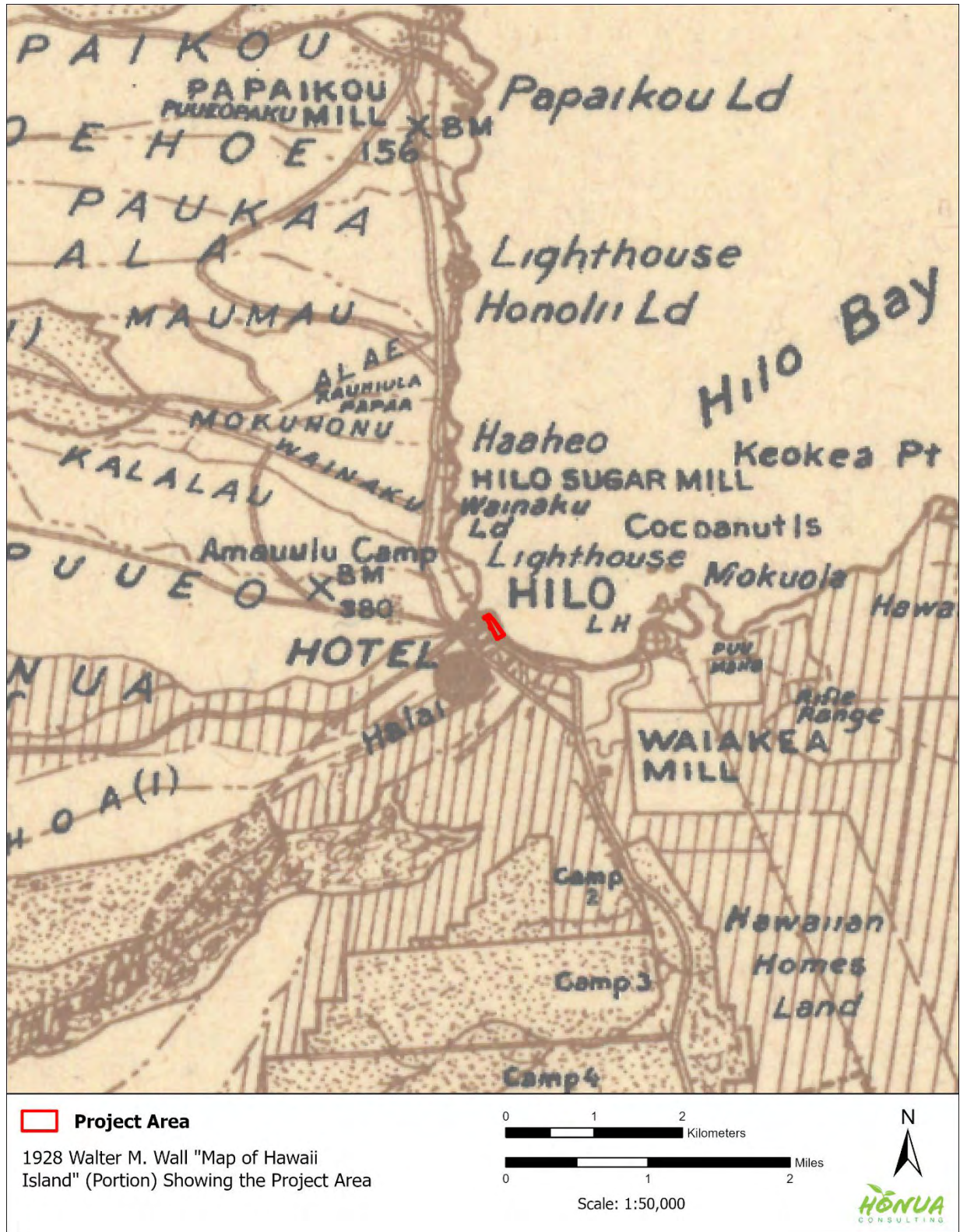


Figure 13. Portion of 1928 Wall map showing project area location (base map source: University of Hawai'i-Mānoa's digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)



Figure 14. Portion of 1954 aerial image including project area location (base image source: University of Hawai‘i-Mānoa’s digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)



Figure 15. Portion of 1965 aerial image including project area location (base image source: University of Hawai‘i-Mānoa’s digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)



Figure 16. Portion of 1977 aerial image including project area location (base image source: University of Hawai‘i-Mānoa’s digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)

Section 3 Archaeological Context

This section summarizes relevant previous archaeological studies in order to reconstruct human use and modification of the land in and near the project area.

The main purpose of presenting this information is to develop predictive data about the types and distribution of historic properties and their component features we expected to encounter in the project area; and to assist interpretation of any new findings that result from the field inspection.

Previous archaeological studies and results near the project area are shown in Table 1 and Figure 17.

3.1 Overview

To the best of our knowledge, no previous archaeological testing (i.e., subsurface excavation) has been conducted in the current project area.

As summarized in the previous section (“Cultural and Historical Context”), although the Hilo bayfront is unusually blessed with a wide variety of wahi pana (legendary places), and other natural and cultural resources, two factors have combined to erase any above-ground traditional Hawaiian (i.e., pre-Contact or early historic period) archaeological sites from the project area:

1. Historic use of the project area—including railroad construction and buildings (e.g., railroad depot and other light-industrial and commercial structures), and also the numerous roads that have been built—removed any earlier structures; and,
2. The numerous tidal waves Hilo has endured—including the historically-devastating one in 1946—have likewise wiped out any remnant structures dating from pre-Contact or early historic times.

Furthermore, as evidenced by aerial photographs dating from 1954 (see Figure 13), 1965 (see Figure 14) and 1977 (see Figure 15), the dense collection of light industrial businesses, warehouses, and a variety of service shops and markets were never rebuilt in this area, which, today is home to roadways, parks and retaining walls built against the ocean.

As noted by Rechtman’s (2009) archaeological assessment of the bayfront (see Table 1), however, none of these observations necessarily preclude the discovery of historic properties or their component features in subsurface context. Such evidence could date from as early as the pre-Contact period into late historic times.

3.2 Previous Results in the Vicinity of the Project Area

Results from previous archaeological studies within one-half mile of the current project area have yielded the following:

1. Working on the north side banks of the Wailuku River in Pu‘u‘eo Ahupua‘a, Rosendahl (1980) and Goodfellow (1991) documented an extensive subsurface cultural layer (State Inventory of Historic Places [SIHP] # 50-10-35-15415), which contained abundant pre-Contact (traditional) Hawaiian features and artifacts, as well

- as historic period material; the early component of this site was radiocarbon-dated to AD 1400-1670;
2. Independent studies by Rosendahl (1988) and Wilkinson and Hammatt (2009) on the campus of Hilo High School in Pi‘ihonua Ahupua‘a resulted in the identification of several above-ground architectural features designated part of SIHP # 50-10-35-7522 (the historic high school), as well as a ditch and rock alignment (above-ground resources) that were assigned temporary site numbers only;
 3. Kennedy (1992), working in the uplands of Pu‘u‘eo Ahupua‘a, identified SIHP # 50-10-35-18074, a low rock mound interpreted as a possible historic-period burial, mauka and north of Rainbow Falls;
 4. Other nearby investigations (Rechtman 2009; O‘Hare et al. 2013; Tam Sing et al. 2017) did not result in any new findings.

Table 1. Previous Archaeological Studies and Results near the Project Area

Reference	Type	Location	Results & Comments ¹
Rosendahl 1980	Reconnaissance survey		SIHP # 50-10-35-15415 identified in subsurface context along north bank of Wailuku River; site contained abundant pre-Contact (traditional) Hawaiian features and artifacts, as well as historic period material; early component radiocarbon dated to AD 1400-1670
Goodfellow 1991	Inventory survey	Pu‘u‘eo; along north side of Wailuku River	
Rosendahl 1988	Reconnaissance survey		No sites identified in the parcel located in Pi‘ihonua
Wilkinson & Hammatt 2009	Field inspection – Hilo High School campus	Pi‘ihonua; about ½-mile mauka (west) of project area	Several structures comprising the Hilo High School (SIHP # 50-10-35-7522) were identified; also, a ditch and rock alignment (above-ground resources) were assigned temporary site numbers
Kennedy 1992	Inventory survey	Pu‘u‘eo; lowermost portions about ½ mile northwest of project area	SIHP # 50-10-35-18074 identified (a low rock mound interpreted as a possible historic-period burial) mauka and north of Rainbow Falls
Rechtman 2009	Assessment / reconnaissance survey	Hilo bayfront – including project area and Waiākea	No sites identified – but archaeological monitoring recommended for subsurface digging along the bayfront
O‘Hare et al. 2013	Field inspection / subsurface testing	Pu‘u‘eo; along north side of Wailuku River	No sites identified
Tam Sing et al. 2017	Cultural impact assessment w. summary of previous archaeology	Wailuku River drainage	Reviewed previous archaeological findings in and around the Wailuku River

¹ Sites are formally State Inventory of Historic Places (SIHP) historic properties.

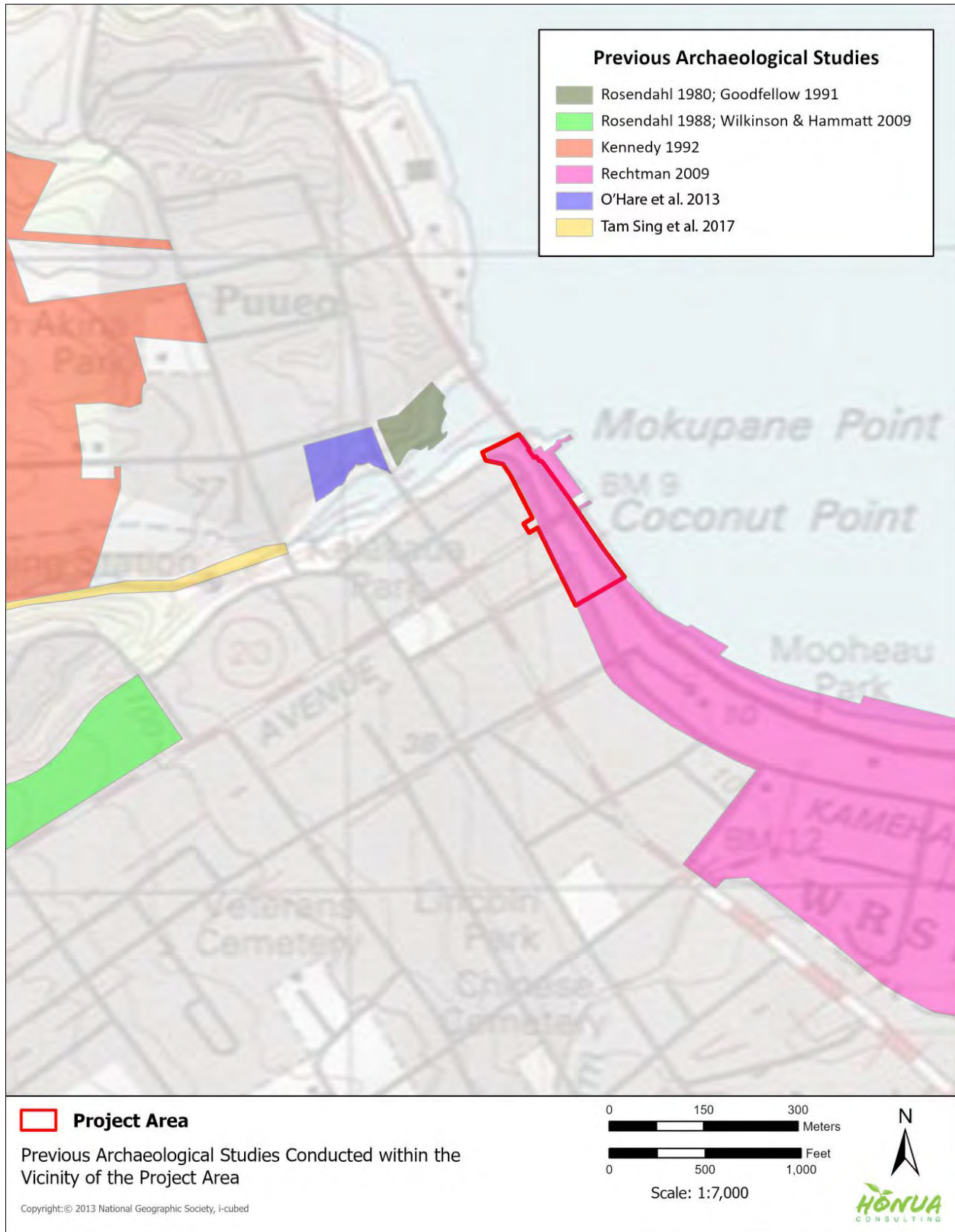


Figure 17. Previous archaeological studies near the project area

Section 4 Results of Field Inspection

Fieldwork for this project was conducted on January 28, 2022, by Frederick LaChance IV, B.A., under the supervision of Christopher M. Monahan, Ph.D. (principal investigator). Fieldwork required approximately 6.0 hours to complete. Fieldwork for this project was performed under the archaeological permit number 22-26 issued to Honua Consulting by the SHPD/DLNR in accordance with HAR Chapter 13-282.

4.1 Methodology

The field inspection consisted of a pedestrian survey of the project area to the safest extent possible. The main objective was to identify any potential historic properties (or their component features) such as rock walls, foundations or footings, other rock work, or other historic-age features typically found in Hilo.

Because the project area consists of a well-defined road ROW in downtown Hilo, we did not formally walk pedestrian transects, nor did we record our pedestrian survey using a GPS device. We did, however, record field notes and take photographs of the entire project area (see Appendix). A detailed photo log (captions) was also created. The Appendix includes a figure that depicts the location of all project-area photographs. All data are stored and backed-up in Honua's database.

4.2 Survey Results

Fieldwork resulted in the following main findings:

1. With one possible exception (see below), there were no potentially historically-significant materials or features in the project area.
2. One rock wall (see Photos 15 and Photo 16 in the Appendix) in the northwestern portion of the project area may qualify as a historic property (i.e., it may predate 1973).
3. Other than the potential historic property (rock wall), no other historic properties, or potential historic properties, were observed in the project area.

Section 5 References Cited

- Fitzpatrick, G.L. (1987). *The Early Mapping of Hawai‘i, vol. 1*. Routledge, London.
- Goodfellow, S. (1991). *Archaeological Inventory Survey Noelani Gardens Project, Land of Puueo, South Hilo District, Island of Hawaii (TMK:3-2-6-2:1,2)*. PHRI Report 1046-090491. Prepared for Daniel Livingston, Honolulu.
- Handy, E.S.C. (1940). *The Hawaiian Planter – Volume 1*. B.P. Bishop Museum Bulletin 161, Honolulu.
- Handy, E.S.C., and E.G. Handy (1972). *Native Planters in Old Hawaii, Their Life, Lore, and Environment*. Bishop Museum Press, Honolulu.
- ‘Ī‘Ī, J.P. (1959). *Fragments of Hawaiian History*. Bishop Museum Press, Honolulu.
- Kamakau, S.M. (multiple translators). (1992) *Ruling Chiefs of Hawaii* (Revised edition). Kamehameha Schools Press, Honolulu.
- Kelly, M., B. Nakamura, and D. Barrère (1981). *Hilo Bay: A Chronological History*. Department of Anthropology, B.P. Bishop Museum, Honolulu. Prepared for U.S. Army Corps of Engineers, Honolulu District.
- Kennedy, J. (1992). *Archaeological Inventory Final Report for TMK:2-6-08:26, 27, 28 . . . Located at Puueo on the Island of Hawaii*. Archaeological Consultants of Hawaii, Inc., Hale‘iwa, HI.
- O‘Hare, C., D. Shideler, and H. Hammatt (2013). *Archaeological Field Inspection and Literature Review with Subsurface Testing for the Stream Bank Bluff Protection and Stabilization, Second Slope Scarp at the Riverside Apartments, Puueo Ahupua‘a, South Hilo District, Hawaii Island. (3) 2-6-003:009*. Cultural Surveys Hawai‘i, Kailua, HI.
- Pukui, M.K., and S.H. Elbert (1986). *Hawaiian Dictionary*. University of Hawaii Press, Honolulu.
- Pukui, M.K., S.H. Elbert, and E.T. Mookini (1974). *Place Names of Hawaii*. University of Hawaii Press, Honolulu.
- Rechtman, R. (2009). “Archaeological Assessment Survey for Hilo Bayfront Trails Project,” Rechtman Consulting, Hilo, HI.
- Rosendahl, P. (1980). *Archaeological Reconnaissance of the Kuuipo I Resort Condominium Site, Hilo, Island of Hawaii, (TMK:3-2-6-02:1,2,3,4)*. PHRI, Inc., Hilo, HI.
- Rosendahl, P. (1988). *Archaeological Reconnaissance Survey for Environmental Impact Statement (EIS) Hilo Judiciary Complex Sites, Hilo, District of South Hilo, Island of Hawai‘i (TMK: 2-2-33:11, 12, 13, 14, 19, 20 [Site 1]; 2-2-13:3, 18 and 2-2-14:72 [Site 2]; 2-2-9:1, 54, 55, 56, 62 and 2-2-10:16 [Site 3]; 2-3-15:1 [site 4]; 2-3-44:9 [Site 5]*. PHRI, Inc., Hilo, HI.
- Tam Sing, L., T. Gotay, L. Brandt, and R. Rechtman (2017). *A Cultural Impact Assessment for the Renewal of Hawai‘i Electric Light’s Wailuku River Water Lease, TMK (3) 2-6-009 (por.)*. ASM Affiliates, Hilo, HI.

- Wilkinson, S., and H.H. Hammatt (2009). *Archaeological Field Inspection and Literature Review Report for the DOE Hilo High School Gymnasium Project, Pi'ihonua Ahupua'a, South Hilo District, Island of Hawai'i, TMK: (3) 2-3-015:001*. Cultural Surveys Hawai'i, Kailua, HI.
- Wolfe, E., and J. Morris (1996). *Geological Map of the Island of Hawaii* (Sheet 2 of 3 for Hawai'i Island). United States Geological Service (USGS), accessed April 2022 at <http://pubs.er.usgs.gov/publication/ds144>.

Appendix Project Area Photographs



Photo Number	Comments
1	Northwest Extent, Center point of highway facing NW



Photo Number	Comments
2	Northwest Extent, Center point of highway facing SE



Photo Number	Comments
3	Center median of highway facing NW



Photo Number	Comments
4	Center median of highway facing SE



Photo Number	Comments
5	East median of highway facing SE



Photo Number	Comments
6	East median of highway facing NW



Photo Number	Comments
7	Southeast extent, Center of highway facing SE



Photo Number	Comments
8	Southeast extent, Center of highway facing NW



Photo Number	Comments
9	Overview of Southeast Kamehameha Ave facing SE



Photo Number	Comments
11	Overview of Southeast Kamehameha Ave facing NW



Photo Number	Comments
11	Overview on Kamehameha Ave facing NW



Photo Number	Comments
12	Overview on Kamehameha Ave facing SE



Photo Number	Comments
13	Overview on Kamehameha Ave facing NW.



Photo Number	Comments
14	Overview on Kamehameha Ave facing SE



Photo Number	Comments
15	Southeast extent, Sidewalk area facing NW. Potential historic wall



Photo Number	Comments
16	Southeast extent, Sidewalk area facing SE. Potential historic wall



APPENDIX C

Cultural Impact Assessment





**Cultural Impact Assessment for the proposed facility for Bayfront Highway and Waiāanuenue
Avenue Intersection Improvements**

**TMKs (3) 2-3-002:022 (portion); (3) 2-3-002-999 (portion); (3) 2-3-003:003; (3) 2-3-
003:999 (portion); and (3) 2-3-005:999 (portion)**

Pi'ihonua and Punahoa 2 Ahupua'a, South Hilo District, Island of Hawai'i

Prepared by



September 2023

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Note on Hawaiian Language Use

In keeping with other Hawaiian scholars, we do not italicize Hawaiian words. Hawaiian is both the native language of the pae‘āina of Hawai‘i and an official language of the State of Hawai‘i. Some authors will leave Hawaiian words italicized if part of a quote; we do not. In the narrative, we use diacritical markings to assist our readers, except in direct quotes, in which we keep the markings used in the original text. We provide translations contextually when appropriate. Unless otherwise noted, all translations are by Honua Consulting authors.

Front Cover Credit

Kaipalaoa Landing Park in Hilo, on Hawai‘i Island in the US state of Hawaii.

Executive Summary

At the request of AECOM, on behalf of the State of Hawaii Department of Transportation (HDOT), Honua Consulting, LLC and Kumu Pono Associates (Kepā and Onaona Maly) prepared a Cultural Impact Assessment (CIA) for the proposed project. The State of Hawai'i Department of Transportation (HDOT) is proposing improvements to the intersection of Bayfront Highway (Hawai'i Belt Road Route 19) and Waiānuenuenu Avenue (State Route 200). The project site includes lands owned by both the State of Hawai'i (State) and County of Hawai'i (County). The Project Site is mostly situated on dedicated roadway parcels: Bayfront Highway [State - portion of TMK (3) 2-3-002-999], Waiānuenuenu Avenue [State - portion of TMK (3) 2-3-005-999], and Kamehameha Avenue [County - portion of TMK (3) 2-3-003-999]. The improvements will also require a reconfiguration of medians and land next to the roadway shoulders, and therefore the Project Site includes State and County lands within the right of way and parcels of State land identified as Tax Map Key (TMK) parcel number (3) 2-3-003:003 and a portion of TMK (3) 2-3-002:022. The cumulative area described is hereinafter referred to as the "Project Site" or "Site." The use of State (and County) lands or funds triggers the requirement to assess the environmental impacts of the proposed action pursuant to Hawai'i Revised Statutes (HRS) Chapter 343. This CIA is being prepared to support the HRS 343 compliance.

This ethnohistorical study provides readers with an overview of the rich history of the South Hilo District, Island of Hawai'i. While preparing this study, the authors reviewed and collected a wide range of archival-historical records that describe the biocultural environment of South Hilo. This study is comprised of several primary sections—generally presented in chronological sequence—which cover various periods of history ranging from native traditions to modern land use.

The traditional land use designations in this area are interesting, as they include a number of smaller ahupua'a within the vicinity of two large ahupua'a: Pi'ihonua and Waiākea. As such, the history of the area is such that it cannot be discussed without also including aspects of the history of neighboring districts, the island of Hawai'i, and at times, all of the islands. A review of this small collection of native traditions and accounts penned by, or in which native witnesses spoke about the history of Waiākea, they demonstrated extensive and intimate knowledge of their living environment (honua ola), from the ocean to mountain. In their words, we find descriptions of land use, features, and resource collection occurring across the landscape.

This study incorporates a wide range of cultural-historical resources, including Hawaiian language resource documents and some of the earliest records from the area. The table of contents is not only meant to identify pages and locations of specific topics or figures, but it is also meant to serve as a guide to specific topics in which readers may be more interested. The authors' style of report presentation relies heavily on the original accounts written by

those who lived the history, or who were among the earliest writers to document it. Thus, we cite large sections of quoted material and link these primary resources together with introductory narratives. In some cases, we provide additional cultural context to help present-day readers understand the period of time or events being discussed.

The significance of South Hilo in the history of the rise and fall of ali'i (rulers), and its being coveted by ali'i of Hawai'i island, even to being designated as an 'Āina Lei Ali'i (Land which Adorns the King), a Crown Land during the "Kālai 'Āina (Carving out and Settling of Lands) between the Kamehameha ali'i and other ali'i, informs us about the importance of this 'āina (see accounts cited later in this study). In the first 70 years after western contact in 1778, western diseases and the "colonization" of the Hawaiian kingdom, led to a rapid decline in the native population, and radical changes in land use and residency. By 1848, the native Hawaiian population had drastically decreased, and when the Māhele 'Āina (Land Division) set in place the opportunity for ho'a'āina (native tenants) to acquire fee-simple interest in lands they reside upon and worked for their sustenance, many of the areas formerly used for agriculture and residency had already been abandoned.

In the post-contact historic era, the project area was severely impacted by modern development, and most significantly, by tsunami. Therefore, based on these historic events, this assessment shows that while there may have traditionally been a lot of activity and resources in the area, much of this has been diminished by modernization and the tsunami that hit the project area. There are no known culturally significant plants, resources, or sites in the project area, although one interviewee noted that 'io (the Hawaiian hawk) has been returning to the area. The ethnographic data collected also illustrated the cultural importance of the region's coastal resources and Wailuku River, which is outside the project area but nearby.

Based on the information gathered and the ethnographic data, the proposed project has the minimal potential to adversely impact cultural resources and traditional or customary practices in the area, as there is no evidence that there are resources in the area or that the area is contemporaneously used as access for cultural practices. It is likely that fishing, paddling, surfing, and other practices may occur in the surrounding area though and access through the project area may be utilized to conduct practices, like surfing, in the adjacent areas.

As there are no resources in the immediate project area, the project does not have the potential to directly impact traditional or customary practices. It is likely that fishing, paddling, surfing, and other practices may occur in the surrounding area though and access through the project area may be utilized to conduct practices, like surfing, in the adjacent areas, and surfers may use Kaipalaoa Landing for surf access.

It is noted that many practitioners' businesses are located in the Hilo Bayfront area. Many of these businesses rely heavily on the Merrie Monarch Festival. To avoid impacting the practitioners' businesses, work should not occur the week of the Merrie Monarch Festival and all parking spaces should be opened and available for use during this week. A construction outreach plan should be developed to have open communication with the community regarding other potential events adjacent to the project area, as the ethnographic data showed that cultural events take place in the neighboring business district.

The project should also adhere strictly to all construction best management practices (BMPs) to ensure no water resources are impacted by construction activities. Additionally, the construction outreach plan should also help to ensure the community is aware of any project activities, especially traffic control plans that may be implemented during construction.

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Abbreviations and Acronyms

AIS: Archaeological Inventory Survey

BMP: Best Management Practice

CIA: Cultural Impact Assessment

EA: Environmental Assessment

ESP: Environmental Review Project, Office of Planning and Sustainable Development

HAR: Hawaii Administrative Rules

Honua: Honua Consulting, LLC

HRS: Hawaii Revised Statutes

ILK: Indigenous Local Knowledge

Ka Pa‘akai: Ka Pa‘akai O Ka ‘Āina v. Land Use Commission, 94 Haw. 31 (2000)

LRFI: Literature Review and Field Investigation

NRHP: National Register of Historic Places

OEQC: Office of Environmental Quality and Control

ROI: Range of Influence

SHPD: State Historic Preservation Division

SIHP: State Inventory of Historic Places

SLH: Session Laws of Hawaii

TEK: Traditional Ecological Knowledge

TMK: Tax Map Key

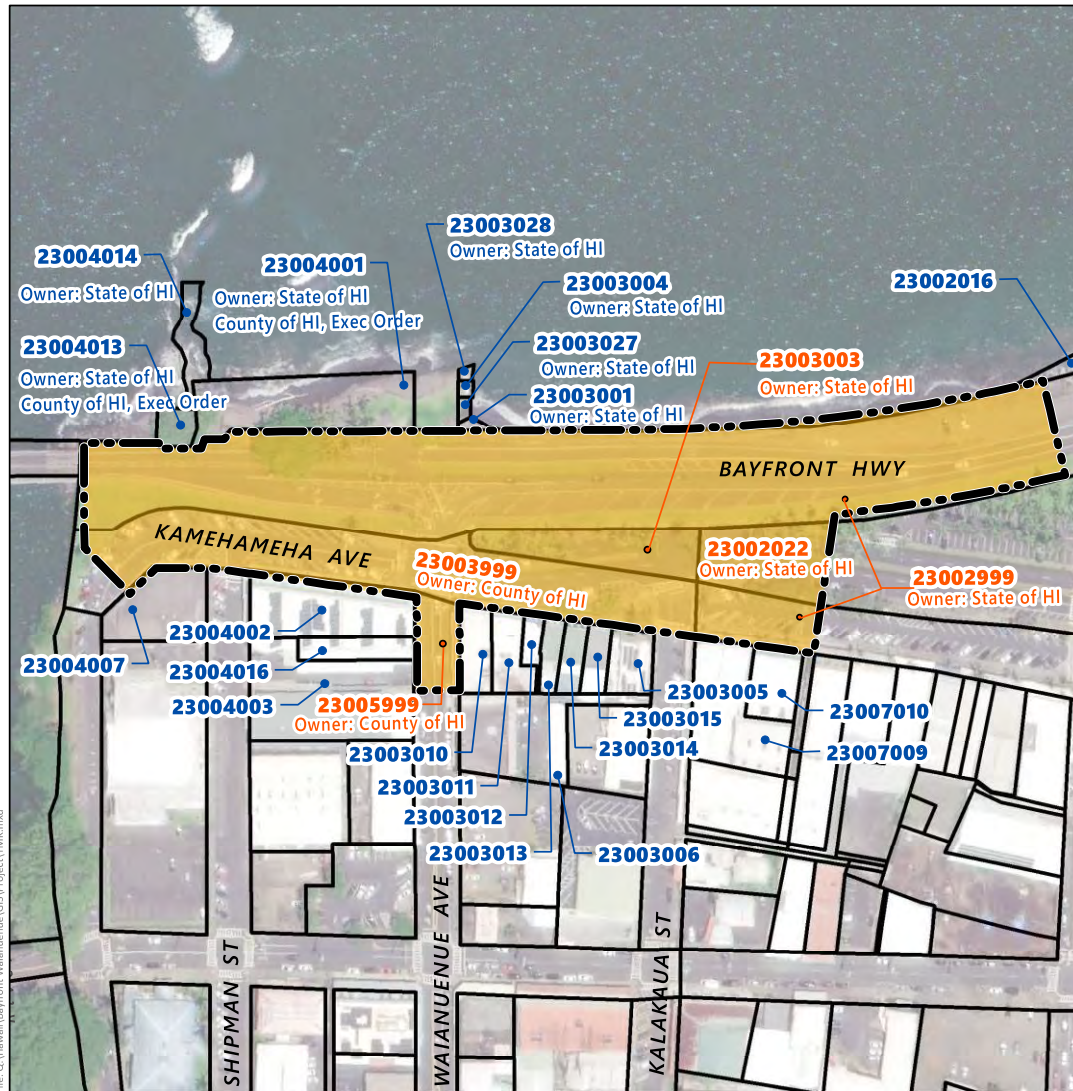
UH: University of Hawaii

USGS: U.S. Geological Survey

1.0 Project Description and Compliance

At the request of AECOM, on behalf of the State of Hawaii Department of Transportation (HDOT), Honua Consulting, LLC and Kumu Pono Associates (Kepā and Onaona Maly) prepared a Cultural Impact Assessment (CIA) for the proposed project. The State of Hawai'i Department of Transportation (HDOT) is proposing improvements to the intersection of Bayfront Highway (Hawai'i Belt Road Route 19) and Waiānuenu Avenue (State Route 200). The project site includes lands owned by both the State of Hawai'i (State) and County of Hawai'i (County). The Project Site is mostly situated on dedicated roadway parcels: Bayfront Highway [State - portion of TMK (3) 2-3-002-999], Waiānuenu Avenue [State - portion of TMK (3) 2-3-005-999], and Kamehameha Avenue [County - portion of TMK (3) 2-3-003-999]. The improvements will also require a reconfiguration of medians and land next to the roadway shoulders, and therefore the Project Site includes State and County lands within the right of way and parcels of State land identified as Tax Map Key (TMK) parcel number (3) 2-3-003:003 and a portion of TMK (3) 2-3-002:022. The cumulative area described is hereinafter referred to as the "Project Site" or "Site." The use of State (and County) lands or funds triggers the requirement to assess the environmental impacts of the proposed action pursuant to Hawai'i Revised Statutes (HRS) Chapter 343. This CIA is being prepared to support the HRS 343 compliance.

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LEGEND

- Project Area
- TMK Parcels

Figure 3:
Tax Map Key

Bayfront Hwy and Waiānuenue Ave Intersection Improvements

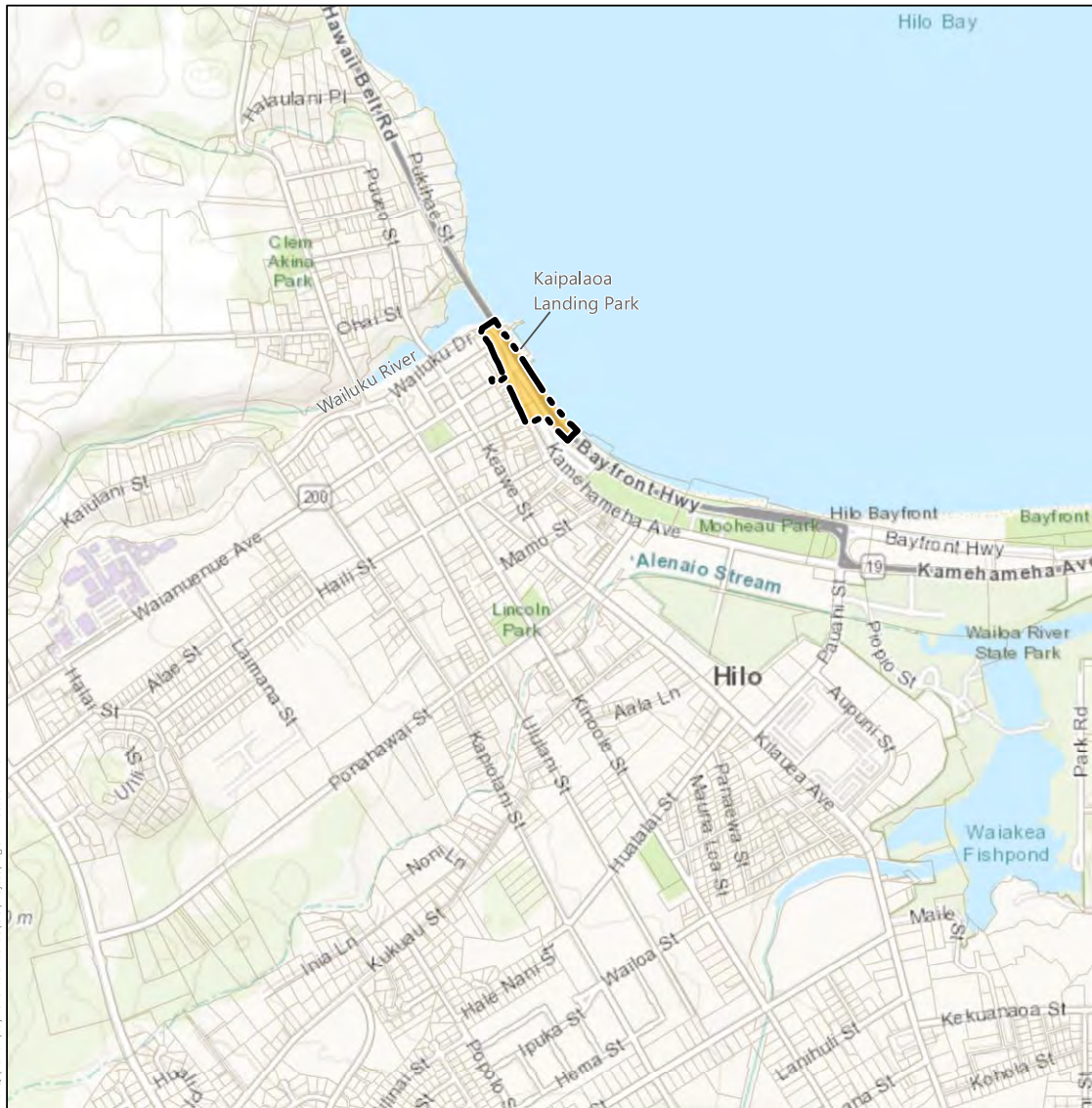
Hawai'i Department of Transportation Island of Hawai'i

North Linear Scale (Feet)

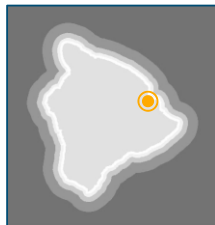
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Source: County of Hawai'i, 2021. USDA Aerial Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only.

Figure 1. TMK map of the proposed APE



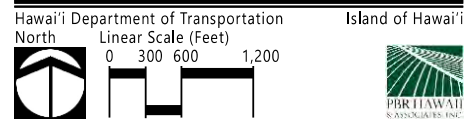
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LEGEND
 Project Area
 TMK Parcels

Figure 1:
Regional Location Map

Bayfront Hwy and Waiānuenue Ave Intersection Improvements



Source: County of Hawai'i, 2021. ESRI Basemap.
 Disclaimer: This graphic has been prepared for general planning purposes only.

Figure 2. Regional map of the proposed APE

1.1 Project Description and Proposed Action

The Project Site is located on Hawai'i Island in Downtown Hilo abutting Kaipalaoa Landing Park and Hilo Bay to the northeast, Wailuku River to the northwest and the Downtown Hilo commercial district to the west and south. The Site consists of 5.27 acres of land owned by the State of Hawai'i and County of Hawai'i and falls within the South Hilo District and the ahupua'a of Pi'ihonua and Punahoa 2 (**Error! Reference source not found.** and **Error! Reference source not found.**). The Project Site is mostly situated on dedicated roadway parcels: Bayfront Highway [State - TMK (3) 2-3-002-999 (portion)], Waiānuenue Avenue [State - TMK (3) 2-3-005-999 (portion)], and Kamehameha Avenue [County - TMK (3) 2-3-003-999 (portion) and State - TMK (3) 2-3-002-999 (portion)], as well as Tax Map Key (TMK) parcel number (3) 2-3-003: 003 and a portion of TMK (3) 2-3-002-022 collectively referred to hereinafter as the "Project Site" or "Site."

All of the lands have been graded and are currently used for roadways and associated transportation and infrastructure uses, such as sidewalks, bike paths, parking, landscaped medians, as well as below grade infrastructure, including drainage, wastewater, waterlines, and utilities for electrical and telecommunication. The Site is an urban setting featuring a series of signalized intersections with multiple traffic signals, turn lanes and connections to various roadways.

The proposed project includes improvements to the intersection of Bayfront Highway (Hawai'i Belt Road Route 19) and Waiānuenue Avenue (State Route 200) to enhance multimodal connectivity and address ongoing concerns involving poor vehicular maneuverability, restricted access to the downtown Hilo area, pedestrian safety concerns, and overall congestion of roadways in the vicinity. A preferred alternative has been identified which includes reconstruction of roadways to allow for construction of an intersection roundabout, Americans with Disabilities Act (ADA) compliant sidewalks and roadway crossings, drainage improvements, reconfiguration of parking, and other roadway improvements including new highway lighting, electrical infrastructure relocations, signage, pavement markings, pedestrian signals, crosswalks, landscape, and traffic management devices, and other utility adjustments as required. To minimize traffic impacts during construction, the project will include both day and night work.

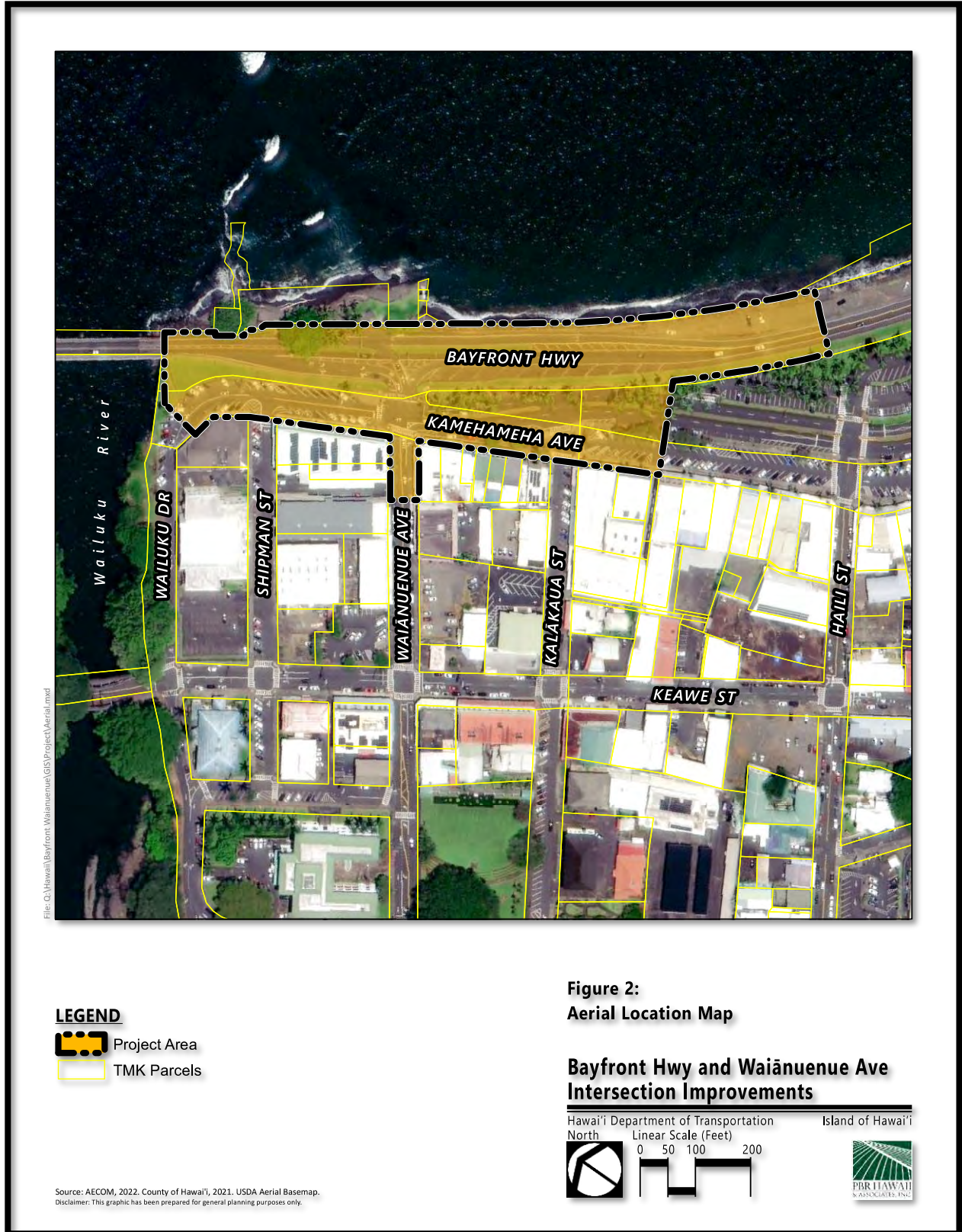


Figure 3. Aerial View of Site

1.2 Background

Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to protect and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups. To assist decision makers in the protection of cultural resources, Chapter 343, HRS and Hawai'i Administrative Rules (HAR) § 11-200 rules for the environmental impact assessment process require project proponents to assess proposed actions for their potential impacts to cultural properties, practices, and beliefs.

This process was clarified by the Act 50, Session Laws of Hawai'i (SLH) 2000. Act 50 recognized the importance of protecting Native Hawaiian cultural resources and required some environmental review documents include the disclosure of the effects of a proposed action on the cultural practices of the community and state, and the Native Hawaiian community in particular. Specifically, the Environmental Council suggested the CIAs should include information relating to practices and beliefs of a particular cultural or ethnic group or groups. Such information may be obtained through public scoping, community meetings, ethnographic interviews, and oral histories.

It is important to note that while similar in their areas of studies, archaeological surveys and CIAs are concerned with distinct and different foci. Archaeological studies are primarily concerned with historic properties and tangible heritage, whereas CIAs look at cultural practices and beliefs, which can be associated with a specific location, but also often intangible in nature.

The State and its agencies have an affirmative obligation to preserve and protect Native Hawaiians' customarily and traditionally exercised rights to the extent feasible.¹ State law further recognizes that the cultural landscapes provide living and valuable cultural resources where Native Hawaiians have and continue to exercise traditional and customary practices, including hunting, fishing, gathering, and religious practices. In *Ka Pa'akai*, the Hawai'i Supreme Court provided government agencies an analytical framework to ensure the protection and preservation of traditional and customary Native Hawaiian rights while reasonably accommodating competing private development interests. This is accomplished through:

- 1) The identification of valued cultural, historical, or natural resources in the project area, including the extent to which traditional and customary Native Hawaiian rights are exercised in the project area;

¹ Article XII, Section 7 of the Hawai'i State Constitution, *Ka Pa'akai O Ka 'Āina v. Land Use Commission*, 94 Haw. 31 [2000] (*Ka Pa'akai*), Act 50 SLH 2000.

- 2) The extent to which those resources—including traditional and customary Native Hawaiian rights—will be affected or impaired by the proposed action; and
- 3) The feasible action, if any, to be taken to reasonably protect Native Hawaiian rights if they are found to exist.

The appropriate information concerning the South Hilo District has been collected, focusing on areas near or adjacent to the project area. A thorough analysis of this project and potential impacts to cultural resources, historical resources, and archaeological sites is included in this assessment.

The CIA provides an overview of cultural and historic resources in the project area using thorough literature review, community and cultural practitioner consultation, and high-level, project-specific surveys. The CIA will focus on identifying areas in which disturbance should be avoided or minimized to reduce impacts to historic properties or culturally important features. The paramount goal is to prevent impacts through avoidance of sensitive areas and mitigating for impacts only if avoidance is not possible.

1.3 Geographic Extent

The geographic extent for impacts to cultural resources and historic properties includes the project area and localized surroundings. This CIA also reviews some of the resources primarily covered by the regulatory review. It primarily researches and reviews the range of biocultural resources identified through historical documents, traditional knowledge, information found in the Hawaiian language historical cache, and oral histories and knowledge collected from cultural practitioners and experts.

There is clear guidance from the Office of Environmental Quality and Control (OEQC), now known as the Environmental Review Program (ERP), within the Office of Planning and Sustainable Development (ESP), that recommends a geographic extent beyond the identified or typical boundaries of the geographic project area. The recommended area is typically the size of the traditional land area (ahupua'a) or region (moku), but this can be larger or smaller depending on what best helps to identify the resources appropriately.

The geographic extent of the CIA is based on the position that the “Project Area” is part of a cultural landscape or cultural landscapes that therefore it is most appropriate to set and study the proposed alternatives within that cultural context.

1.4 Goal of Cultural Impact Assessment

This cultural impact assessment looks to partially fulfill the requirement of taking into account the Project’s potential impacts on historic and cultural resources and, at a minimum, describe:

a) any valued cultural, historic, or natural resources in the area in questions, including the extent to which traditional and customary native Hawaiian rights are exercised in the area, b) the extent to which those resources – including traditional and customary native Hawaiians rights – will be affected or impaired by the Project; and c) the feasible action, if any, to be taken to reasonably protect native Hawaiian rights if they are found to exist.

1.5 Regulatory Background

Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to protect and preserve cultural beliefs, practices, and resources of Kānaka 'Ōiwi (Native Hawaiians) and other ethnic groups. To assist decision makers in the protection of cultural resources, Chapter 343, HRS and Hawai'i Administrative Rules (HAR) § 11-200.1 rules for the environmental impact assessment process require project proponents to assess proposed actions for their potential impacts to cultural properties, practices, and beliefs.

This process was clarified by the Act 50, Session Laws of Hawai'i (SLH) 2000. Act 50 recognized the importance of protecting Native Hawaiian cultural resources and required that EAs include the disclosure of the effects of a proposed action on the cultural practices of the community and state, and the Native Hawaiian community in particular. Specifically, the Environmental Council suggested the CIAs should include information relating to practices and beliefs of a particular cultural or ethnic group or groups. Such information may be obtained through public scoping, community meetings, ethnographic interviews, and oral histories.

It is important to note that while similar in their areas of studies, archaeological surveys and CIAs are concerned with distinct and different foci. Archaeological studies are primarily concerned with historic properties and tangible heritage, whereas CIAs look at cultural practices and beliefs, which can be associated with a specific location, but also often intangible in nature.

1.6 Compliance

The State and its agencies have an affirmative obligation to preserve and protect Native Hawaiians' customarily and traditionally exercised rights to the extent feasible.² State law further recognizes that the cultural landscapes provide living and valuable cultural resources where Native Hawaiians have and continue to exercise traditional and customary practices, including hunting, fishing, gathering, and religious practices. In *Ka Pa'akai*, the Hawai'i Supreme Court provided government agencies an analytical framework to ensure the

² Article XII, Section 7 of the Hawai'i State Constitution, *Ka Pa'akai O Ka 'Āina v. Land Use Commission*, 94 Haw. 31 [2000] (*Ka Pa'akai*), Act 50 SLH 2000.

protection and preservation of traditional and customary Native Hawaiian rights while reasonably accommodating competing private development interests. This is accomplished through:

- 1) The identification of valued cultural, historical, or natural resources in the project area, including the extent to which traditional and customary Native Hawaiian rights are exercised in the project area;
- 2) The extent to which those resources—including traditional and customary Native Hawaiian rights—will be affected or impaired by the proposed action; and
- 3) The feasible action, if any, to be taken to reasonably protect Native Hawaiian rights if they are found to exist.

While not attached to a HRS Chapter 343 action, this CIA was prepared under HRS Chapter 343 and Act 50 SLH 2000 as those are the prevailing standards and best practices for CIAs. The appropriate information concerning the South Hilo District has been collected, focusing on areas near or adjacent to the project area. A thorough analysis of this project and potential impacts to cultural resources, historical resources, and archaeological sites is included in this assessment.

The present analyses of archival documents, oral traditions (oli or chants, mele or songs, and/or hula or dance texts), and Hawaiian language sources including books, manuscripts, and newspaper articles, are focused on identifying recorded cultural and archaeological resources present on the landscape, including: Hawaiian and non-Hawaiian place names; landscape features (ridges, gulches, cinder cones); archaeological features (kuleana parcel walls, house platforms, shrines, heiau or places of worship, etc.); culturally significant areas (viewsheds, unmodified areas where gathering practices and/or rituals were performed); and significant biocultural resources. The information gathered through research helped to focus interview questions on specific features and elements within the project area.

Interviews with lineal and cultural descendants are instrumental in procuring information about the project area's transformation through time and changing uses. Interviews were conducted with recognized cultural experts and summaries of those interviews are included herein.

2.0 Methodology

The approach to developing the CIA is as follows:

- 1) Gather Best Information Available
 - a) Gather historic cultural information from stories and other oral histories about the affected area to provide cultural foundation for the report;
 - b) Inventory as much information as can be identified about as many known cultural, historic, and natural resources, including previous archaeological inventory surveys, CIAs, etc. that may have been completed for the possible range of areas; and
 - c) Update the information with interviews with cultural or lineal descendants or other knowledgeable cultural practitioners.
- 2) Identify Potential Impacts to Cultural Resources
- 3) Develop Reasonable Mitigation Measures to Reduce Potential Impacts
 - a) Involve the community and cultural experts in developing culturally appropriate mitigation measures; and
 - b) Develop specific Best Management Practices (BMPs), if any are required, for conducting the project in a culturally appropriate and/or sensitive manner as to mitigation and/or reduce any impacts to cultural practices and/or resources.

While numerous studies have been conducted on this area, very few have effectively utilized Hawaiian language resources and Hawaiian knowledge. This appears to have impacted modern understanding of this location, as many of the relevant documents are native testimonies given by Kanaka Hawai'i (Hawaiians) who lived on this land.

While hundreds of place names and primary source historical accounts (from both Hawaiian and English language narratives) are cited on the following pages, it is impossible to tell the whole story of these lands in any given manuscript. A range of history, spanning the generations, has been covered. Importantly, the resources herein are a means of connecting people with the history of their communities—that they are part of that history. Knowledge of place will, in turn, promote appreciation for place and encourage acts of stewardship for the valued resources that we pass on to the future.

Background research for the literature review was conducted using materials obtained from the State Historic Preservation Division (SHPD) library in Kapolei and the Honua Consulting LLC. report library. On-line materials consulted included the Ulukau Electronic Hawaiian Database (www.ulukau.com), Papakilo Database (www.papakilodatabase.com), the State Library on-line (<http://www.librarieshawaii.org/Serials/databases.html>), and Waihona 'Āina Māhele database (<http://www.waihona.com>). Hawaiian terms and place names were translated using the on-line Hawaiian dictionaries (Nā Puke Wehewehe 'Ōlelo Hawai'i)

(www.wehewehe.com), *Place Names of Hawai'i* (Pukui et al. 1974), and *Hawai'i Place Names* (Clark 2002). Historic maps were obtained from the State Archives, State of Hawai'i Land Survey Division website (<http://ags.hawaii.gov/survey/map-search/>), UH-Mānoa Maps, Aerial Photographs, and GIS (MAGIS) website (<http://guides.library.manoa.hawaii.edu/magis>). Maps were geo-referenced for this report using ArcGIS 10.3. GIS is not 100% precise and historic maps were created with inherent flaws; therefore, geo-referenced maps should be understood to have some built-in inaccuracy.

While conducting the research, primary references included, but were not limited to: land use records, including the Hawaiian L.C.A. records from the Māhele 'Āina (Land Division) of 1848; the Boundary Commission Testimonies and Survey records of the Kingdom and Territory of Hawai'i; and historical texts authored or compiled by: David Malo (1987); Samuel M. Kamakau (1964, 1991, 1992); records of the American Board of Commissioners of Foreign Missions (A.B.C.F.M.) (1820–1860); Charles Wilkes (1845); Alexander & Preston (1892–1894); Abraham Fornander (1916–1919); and many other native and foreign writers. The study also includes several native accounts from Hawaiian language newspapers (primarily compiled and translated from Hawaiian to English by K. Maly), and historical records authored by nineteenth century visitors, and residents of the region.

Historical and archival resources were located in the collections of the Hawai'i State Archives, Survey Division, Land Management Division, Survey Division, and Bureau of Conveyances; the Bishop Museum Library and Archives; the Hawaiian Historical Society and the Hawaiian Mission Children's Society Library; University of Hawai'i-Hilo Mo'okini Library; the National Archives and Records Administration (NARA), Maryland; the Library of Congress, Washington D.C.; the National Oceanic and Atmospheric Administration National Library, Maryland; the Smithsonian Institution Natural History and National Anthropological Archives libraries, Washington, D.C.; the Houghton Library at Harvard; the United States Geological Survey (USGS) Library, Denver; the Paniolo Preservation Society and Parker Ranch collections; private family collections; and in the collection of Kumu Pono Associates LLC. This information is generally cited in categories by chronological order of the period depicted in the narratives.

M. P. Nogelmeier (2010) discusses the adverse impacts of methodology that fails to properly research and consider Hawaiian language resources. He strongly cautions against a mono-rhetorical approach that marginalizes important native voices and evidence from consideration, specifically in the field of archaeology. For this reason, Honua Consulting consciously employs a poly-rhetorical approach, whereby all data, regardless of language, is researched and considered. To fail to access these millions of pages of information within the Hawaiian language cache could arguably be a violation of Act 50, as such an approach would fundamentally fail to gather the best information available, especially considering the

voluminous amounts of historical accounts available for native tenants in the Hawaiian language.

Hawaiian culture views natural and cultural resources as largely being one and the same: without the resources provided by nature, cultural resources could and would not be procured. From a Hawaiian perspective, all natural and cultural resources are interrelated, and all natural and cultural resources are culturally significant. Kepā Maly (2001), ethnographer and Hawaiian language scholar, points out, “In any culturally sensitive discussion on land use in Hawai‘i, one must understand that Hawaiian culture evolved in close partnership with its natural environment. Thus, Hawaiian culture does not have a clear dividing line of where culture ends and nature begins” (Maly 2001:1). As a leading researcher and scholars on Hawaiian culture, Maly, along with his wife, Onaona, have conducted numerous groundbreaking studies on cultural histories throughout Hawai‘i. A substantial part of the archival research utilized in this study was previously compiled and published by Kepā and Onaona Maly, who have granted their permission to use this important work and are identified properly as associated authors and researchers to this study.

This study also specifically looks to identify intangible resources. Tangible and intangible heritage are inextricably linked (Bouchenaki 2003). Intangible cultural resources, also identified as intangible cultural heritage (ICH), are critical to the perpetuation of cultures globally. International and human rights law professor Federico Lenzerini notes that, “At present, we are aware on a daily basis of the definitive loss—throughout the world—of language, knowledge, knowhow, customs, and ideas, leading to the progressive impoverishment of human society” (Lenzerini 2011:12). He goes on to warn that:

the rich cultural variety of humanity is progressively and dangerously tending towards uniformity. In cultural terms, uniformity means not only loss of cultural heritage—conceived as the totality of perceptible manifestations of the different human groups and communities that are exteriorized and put at the others’ disposal—but also standardization of the different peoples of the world and of their social and cultural identity into a few stereotyped ways of life, of thinking, and of perceiving the world. Diversity of cultures reflects diversity of peoples; this is particularly linked to ICH, because such a heritage represents the living expression of the idiosyncratic traits of the different communities. Preservation of cultural diversity, as emphasized by Article 1 of the UNESCO Universal Declaration on Cultural Diversity, ‘is embodied in the uniqueness and plurality of the identities of the groups and societies making up humankind’. Being a ‘source of exchange, innovation and creativity’, cultural diversity is vital to humanity and is inextricably linked to the safeguarding of ICH. Mutual recognition and respect for cultural diversity—and, *a fortiori*, appropriate safeguarding of the ICH of the diverse peoples making up the world—is essential for promoting

harmony in intercultural relations, through fostering better appreciation and understanding of the differences between human communities. (Lenzarini 2011:103)

Therefore, tradition and practice, as elements of Hawaiian ICH, are essential to the protection of Hawaiian rights and the perpetuation of the Hawaiian culture.

2.1 Identifying Traditional or Customary Practices

It is within this context that traditional or customary practices are studied. The concept of traditional or customary practices can often be a challenging one for people to grasp. Traditional or customary practices can be defined as follows:



Figure 4. Diagram of elements that contribute to traditional or customary practices (Honua Consulting)

The first element is knowledge. This has been referred to as traditional ecological knowledge (TEK), Indigenous local knowledge (ILK), or ethnoscience. In the context of this study, it is the information, data, knowledge, or expertise Native Hawaiians or local communities possessed or possess about an area's environment. In a traditional context, this would have included information Hawaiians possessed in order to have the skills to utilize the area's resources for a range of purposes, including, but not limited to, travel, food, worship or habitation. This element is largely intangible.

The second element are the resources themselves. These are primarily tangible resources, either archaeological resources (i.e., habitation structures, walls, etc.) or natural resources (i.e., plants, animals, etc.). These can also be places, such as a sacred or culturally important sites or wahi pana. Sometimes these wahi pana are general locations, this does not diminish their importance or value. Nonetheless, it is important to recognize that potential eligibility as a "historic site" on the National Register of Historic Places (NRHP) would require identifiable boundaries of a site.

The third element is access. The first two elements alone are not enough to allow for traditional or customary practices to take place. The practitioners must have access to the resource in order to be able to practice their traditional customs. Access does not just mean the ability to physically access a location, but it also means access to resources. For example,

if a particular plant is used for medicinal purposes, there needs to be a sufficient amount of that plant available to practitioners for use. Therefore, an action that would adversely impact the population of a particular plant with cultural properties would impact practitioners' ability to access that plant. By extension, it would adversely impact the traditional or customary practice.

Traditional or customary practices are, therefore, the combination of knowledge(s), resource(s) and access. Each of these individual elements should be researched and identified in assessing any potential practices or impacts to said practices.

2.2 Traditional Knowledge, or Ethnoscience, and the Identification of Cultural Resources

The concept of ethnoscience was first established in the 1960s and has been defined “the field of inquiry concerned with the identification of the conceptual schemata that indigenous peoples use to organize their experience of the environment” (Roth 2019). Ethnoscience includes a wide range of subfields, includes, but is not limited to, ethnoecology, ethnobotany, ethnozoology, ethnoclimatology, ethnomedicine and ethnopedology. All of these fields are important to properly identify traditional knowledge within a certain area.

Traditional Native Hawaiian practitioners were scientists and expert natural resource managers by necessity. Without modern technological conveniences to rely on, Hawaiians developed and maintained prosperous and symbiotic relationships with their natural environment for thousands of years. Their environments were their families, their homes, and their laboratories. They knew the names of every wind and every rain. The elements taught and inspired. The ability of Indigenous people to combine spirituality and science led to the formation of unique land-based methodologies that spurred unsurpassed innovation. Therefore, identifying significant places requires a baseline understanding of what made places significant for Hawaiians.

Hawaiians were both settlers and explorers. In *Plants in Hawaiian Culture*, B. Krauss explains: “Exploration of the forests revealed trees, the timber of which was valuable for building houses and making canoes. The forests also yielded plants that could be used for making and dying tapa, for medicine, and for a variety of other artifacts” (Krauss 1993). Analysis of native plants and resource management practices reveals the depth to which Hawaiians excelled in their environmental science practices:

[Hawaiians] demonstrated great ability in systematic differentiation, identification, and naming of the plants they cultivated and gathered for use. Their knowledge of the gross morphology of plants, their habits of growth, and the requirements for greatest yields is not excelled by expert agriculturists of more complicated cultures. They worked out the procedures of cultivation for every locality, for all altitudes, for different

weather conditions and exposures, and for soils of all types. In their close observations of the plants they grew, they noted and selected mutants (spores) and natural hybrids, and so created varieties of the plants they already had. Thus over the years after their arrival in the Islands, the Hawaiians added hundreds of named varieties of taro, sweet potatoes, sugarcane, and other cultivated plants to those they had brought with them from the central Pacific (Krauss 1993).

Thus, Native Hawaiians reinforced the biodiversity that continues to exist in Hawai'i today through their customary traditional natural resource management practices.

The present analyses of archival documents, oral traditions (oli or chants, mele or songs, and/or hula dances and ha'i mo'olelo or storytelling performances), and Hawaiian language sources including books, manuscripts, and newspaper articles, are focused on identifying recorded cultural resources present on the landscape, including: Hawaiian and non-Hawaiian place names; landscape features (ridges, gulches, cinder cones); archaeological features (kuleana parcel walls, house platforms, shrines, heiau [places of worship], etc.); culturally significant areas (viewsheds, unmodified areas where gathering practices and/or rituals were performed); and significant biological, physiological, or natural resources. This research also looks to document the wide range of Hawaiian science that existed within the geographic extent.

2.3 Mo'olelo 'Āina: Native Traditions of the Land

Among the most significant sources of native mo'olelo are the Hawaiian language newspapers which were printed between 1838 and 1948, and the early writings of foreign visitors and residents. Most of the accounts that were submitted to the papers were penned by native residents of areas being described and noted native historians. Over the last 30 years, Kepā Maly has reviewed and compiled an extensive index of articles published in the Hawaiian language newspapers, with particular emphasis on those narratives pertaining to lands, customs, and traditions. Many traditions naming places around Hawai'i are found in these early writings. Many of these accounts describe native practices, the nature of land use at specific locations, and native mo'olelo (history, narrative, story). Thus, we are given a means of understanding how people related to their environment and sustained themselves on the land.

2.4 Historic Maps

There are also numerous, informative historic maps for the region. Surveyors of the eighteenth and nineteenth centuries were skilled in traversing land areas and capturing important features and resources throughout Hawai'i's rich islands. Historic maps were carefully studied, and the features detailed therein were aggregated and categorized to help identify

specific places, names, features, and resources throughout the study area. From these, among other documents, new maps were created that more thoroughly capture the range of resources in the area.

2.5 Archaeological Studies

A literature and field inspection has been completed by Honua Consulting. There are numerous previously identified historic sites in the Project Area. None are considered significant.

2.6 Ethnographic Methodology

Information from lineal and cultural descendants is instrumental in procuring information about the project area's transformation over time and its changing uses. The present analyses of archival documents, oral traditions (including oli or chants, mele or songs), and/or hula dance), and Hawaiian language sources including books, manuscripts, and newspaper articles, are focused on identifying recorded cultural and archaeological resources present on the landscape, including: Hawaiian and non-Hawaiian place names; landscape features (ridges, gulches, cinder cones); archaeological features (kuleana parcel walls, house platforms, shrines, heiau or places of worship, etc.); culturally significant areas (viewsheds, unmodified areas where gathering practices and/or rituals were performed); and significant biocultural resources. The information gathered through research helped to focus interview questions on specific features and elements within the project area.

3. Historic Background

Hilo, traditionally divided into three sub-districts, is one of six major moku o loko (districts) of land on the island of Hawai'i. The district adjoins Hāmākua on the north and west, Puna, on the east, and Ka'ū to the west. At least 77 ancient ahupua'a (mauka to makai land management units) were defined in the district of Hilo.

The documentation cited in this study was collected from both public and private collections and includes Hawaiian language accounts translated from primary sources; records of Kingdom and Government agencies dating from the 1840s to 1960s; journals of historic visitors; and excerpts of oral history interviews with elder kama'āina (loosely translated as those being of, or familiar with place). Several native accounts from historic Hawaiian language documents and newspapers were also translated for this study by Maly. Additionally, numerous articles published in newspapers, now available through several online repositories are cited.

Following this introductory overview of the cultural–historical context, this report begins with the history of the native Hawaiians from antiquity to the present-day, then integrate the layers of history following western contact. The information has been organized the information by several categories, cited in chronological order of the period depicted in history. It is the overarching goal of this study to provide users with a foundation for development of interpretative themes and programs such as wayside exhibits and displays, a route app, color brochures, audio guides, place-based/cultural literacy curricula for students and communities who may visit the USGS complex, and to provide opportunities for enrichment of member experience.

3.1 Cultural Context

It is important to observe that this study, covers the larger cultural-historical context of the regional landscape—setting the foundation for interpreting place, land use, residency, customs and practices, and transitions over time. This approach allows us to piece facets of history together and provides a better understanding of the relationship shared between regional environment and the people of the land. Such an approach also helps us understand how the landscape has changed over time.

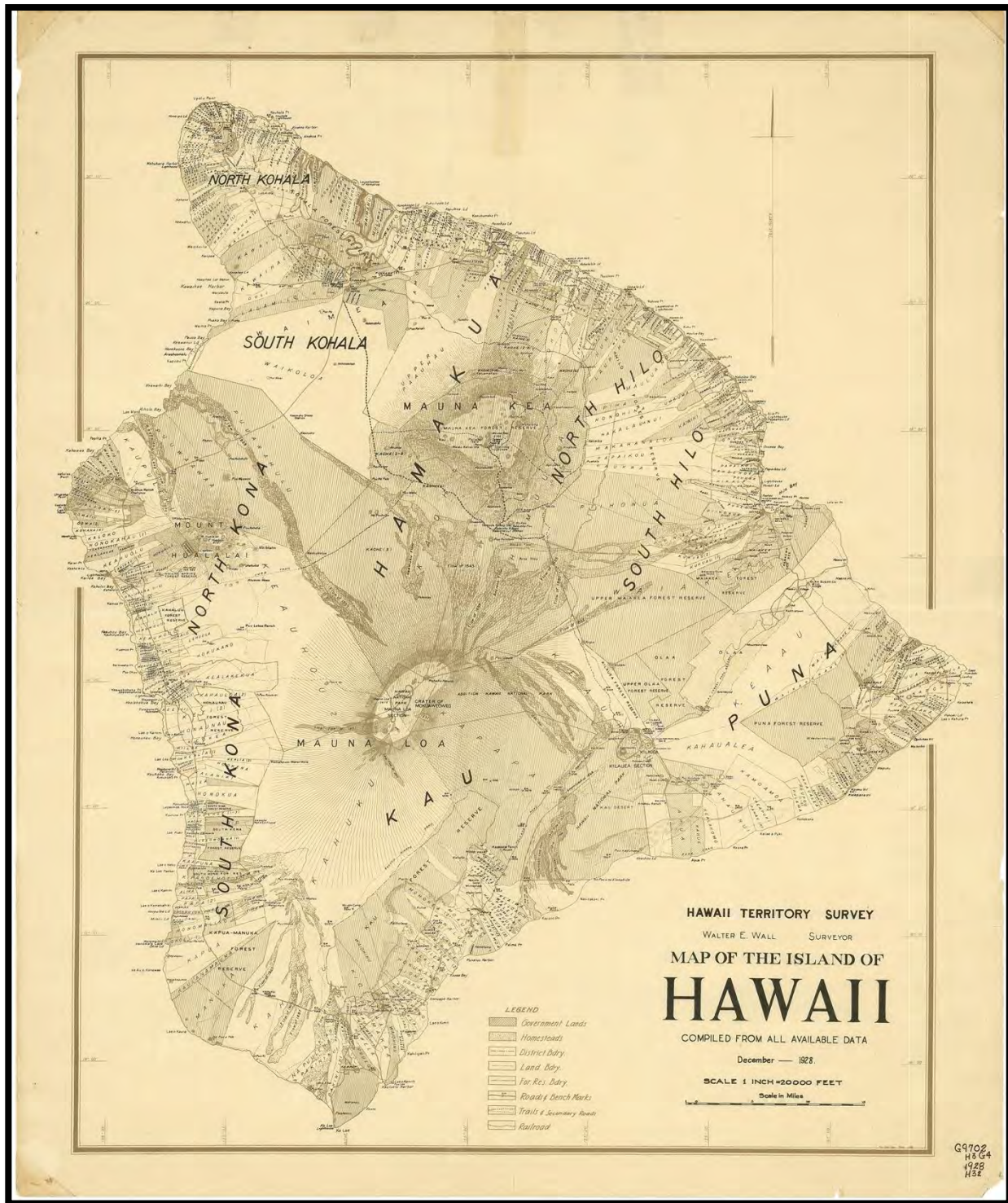


Figure 5. At least 77 ancient ahupua'a (mauka to makai land management units) were defined in the district of Hilo.

3.2 Traditional Period

In this section, “Mo’olelo ‘Āina” we have selected a few of the native traditions the larger Hilo District (some translated from the original Hawaiian language narratives as a part of this study). Many other better-known mo’olelo may be easily found in various sources, and we leave those to further research on the part of the readers.

It is important to remember that following the arrival of westerners on island shores in 1778, unprecedented change began in the islands. In 1804-1805, an introduced disease, called “ma’i ‘ōku’u” by the Hawaiians, killed nearly 200,000 natives in one year. Between 1805 to 1893, the native population dropped down to approximately 40,000 from an estimated 400,000-plus in 1778. Losses like this had multiple impacts on the people, landscape, and in the preservation of traditional Hawaiian knowledge. While some traditions, origins of place names, customs and practices survived the passing of time—largely through the efforts of a few native scholars and small isolated pockets of the population who perpetuated their way of life—vast knowledge was lost. We have strived to provide you with selections of the knowledge that have been passed on but acknowledge here that much more has yet to researched and brought forward.

In mo’olelo, we find a rich narrative describing traditions, beliefs and practices, and spiritual and familial relationships that Hawaiians share with one another and their natural environment. Every aspect of nature from the stars in the heavens, to the winds, clouds, rains, growth of the forests and life therein, and everything on the land and in the ocean, was (and is) believed to be alive. Tradition also tells us that the gods and goddesses of old were very protective of the natural environment. In olden times, travel on land and sea, through the forests and beyond was accompanied by prayer and care. Traditions reveal that many a careless traveler, or collector of resources, found themselves lost in a maze of overgrowth, dense mists, and dropped into deep chasms as a result of disrespectful and careless actions.

In the Hawaiian mind, care for each aspect of nature, the kino lau (myriad body-forms) of the elder life forms, was a way of life. This concept is still expressed by Hawaiian kūpuna (elders) through the present day and passed on in many native families. Also, in this cultural context, anything which damages the native nature of the land, ocean and forest (and the kino lau or myriad body-forms of the deity therein) damages the integrity of the whole. Thus, caring for, and protecting the land and ocean resources, is a way of life. In this traditional context we find that the intangible aspects of our living environment are also part of a sacred Hawaiian landscape. Thus, the landscape itself is a highly valued cultural property. It’s protection, and the continued exercise of traditional and customary practices, in a traditional and customary manner, are mandated by native custom.

The selections below are generally presented in a chronological order by period in history to which they are associated. They include accounts that are connected with neighboring ahupua'a, the larger Hilo district, island or even beyond the shores of Hawai'i island. Several native Hawaiian narratives, as originally written in Hawaiian, are included as they may serve as educational resources for those who are learning Hawaiian and for those who will pass the history of place on to future generations.

3.2.1 Hi'iaka-i-ka-poli-o-Pele Travels through Pana'ewa and to Waiākea Bay

The traditions of Pele and her large family are significant in Hawaiian history, crossing not only all of the Hawaiian Island but also reaching back to Kahiki (the ancestral homeland of the Hawaiian gods and people). Of these traditions, the story of Hi'iaka-i-ka-poli-o-Pele, the youngest and most beloved of Pele's siblings, is perhaps most famous. The earliest formal retelling of the traditions was published in 1861-1862. In her spirit form Pele traveled to Kaua'i and engaged in a relationship with a chief by the name of Lohi'au. After a time, she returned to her home, Halema'uma'u, at Kīlauea, Hawai'i. After a while, she felt a longing for Lohi'au, so she asked her sister, which one of them might go to Kaua'i to fetch Lohi'au and bring him to her. Hi'iaka-i-ka-poli-o-Pele (Hi'iaka), agreed to make the trip, and traveled with her companions Wahine-ōma'o and Pā'ū-o-Pala'e/Pala'ā. On the journey, Hi'iaka and her party visited numerous locations across the islands. Descending from Kīlauea into Puna, they traveled to Hā'ena, on the shore of Kea'au, and then entered Waiākea where they encountered Pana'ewa (a mo'o – water-form deity) and her companions who were in the habit of killing travelers along the trail. Hi'iaka confronted and killed Pana'ewa, then continued on into Waiākea, and beyond. Among the narratives published between 1861 to the 1920s, we find references to Lelewi, Pana'ewa and other lands within Waiākea. A synthesis of selected narratives and mele (chants), translated by Maly, follows below—

He Mooolelo No Hiiakaikapoliopole

[Ka Hoku o ka Pakipika, Ianuari 2, 1862:1]

...He ua kui lehua ko Panaewa,	At Panaewa are the rains that join the lehua blossoms together,
He ua ma kai kui hala o Puna – e,	In Puna re the rains that join the pandanus leaves together,
Aloha – e...	Beloved...
...A Waiakea i ka Hilo Hanakahi	At Waiakea of Hilo Hanakahi,
Ala i ka po iki,	The path is in darkness,
Ka lehua lei o Hilo – e – o – Hilo,	The lehua garland of Hilo – o Hilo,
He hala i pakuia me ka lehua...	Pandanus is woven together with the lehua...

...Descending through 'Ōla'a, Hi'iaka's presence was made known to Pana'ewa, who

determined that she would kill Hi'iaka and her companions. Discerning Pana'ewa intentions, Hi'iaka offered a chant that poetically chastised Pana'ewa, whose pettiness was as tiring as cross the many streams of varied landscape Hilo—

[Ka Hoku o ka Pakipika, Ianuari 16, 1862:1]

Pau ke aho i ke kahawai lau o Hilo,	Exhausting are the many steams of Hilo,
He lau ka puu,	The many hills,
He mano kaihona,	The many descents,
He mano na kahawai o Kulaipo...	The many streams of Kulaipo [Kulaimano]...
A ka wai i Panaewa,	The bogs at Panaewa,
O Panaewa nui moku lehua,	O great Panaewa of the lehua grove,
Ohia kupu ha-o-e-o-e,	Ohia of the scraggly sprouts,
I ka ua lehua ula,	In rain of red lehua [the falling bristles],
I ka wi ia e ka manu,	In the trill of the birds,
A ua po – e,	Rain of darkness,
Po Hilo i ka uahi o kuu aina,	Hilo is darkened by the smoke of my land,
Ola ia kini,	The multitudes have life,
Ke – a ma la ke ahi...	By the lighting of the fire...

In 1915, Nathaniel Emerson published an account of Pele and Hi'iaka, collected from various sources, here we include a synthesis of his account of Hi'iaka's encounter with Pana'ewa—

Their journey still lay through Puna. They were at Kalalau, not far from Hā'ena (at the place where, centuries afterwards, Kamehameha was struck with that well-nigh fatal blow by an outraged fisherman). Some fishermen were hauling in their nets full of fish. The sight was too much for Pā-pūlehu. "I hunger for fish," she exclaimed. "These fish belong to my father. Oh, if only I were home! How I would eat until I was satisfied!"

Hi'iaka thought it best to indulge the appetite of this novice in her service. From a little knoll overlooking the ocean, she saw the canoe of the fisherman named Pahulu out at the fishing ground, already well stocked with fish. Hi'iaka used her power and drove away the school of fish that would have come to his net. Pahulu was so busy with his fishing that he did not notice the women on the shore, but his assistant called out, "Look at the beautiful woman standing on the shore and watching us!" When the two fishermen came ashore, they willingly shared some of their catch with Hi'iaka mā... Pā-pūlehu cooked and ate the fish, but because of her poor manners in preparing and cleaning up after herself, she was later consumed by Pele...

Now from Puna, there were two trails which might be taken into Waiākea, one went makai, below the forest, and the other went directly through the forest of Pana'ewa. While the

makai trail was longer, it was the one most often traveled by those who went to and from Puna. The trail through Pana’ewa was a treacherous one, for the mo’o-god Pana’ewa lived there and was in the habit of waylaying travelers and eating them... Hi’iaka entered into battle with Pana’ewa and won, thus the trail through Pana’ewa became safe to travel... [Emerson 1915:30-46].

Later in the 1862 account, the author includes a mele documenting the journey of Pele and her family from Kahiki, making reference to passing the shore of Leleiwi—

He Mooolelo No Hiiakaikapoliopole. Helu 9.
[Ka Hoku o ka Pakipika, Helu 9. Maraki 7, 1862:4]

Holo mai Pele mai Kahikina...	Pele traveled from the East, [from where the sun arises],
Kai a huakai mai Pele,	Pele’s procession moved on,
A ka lae i Leleiwi,	At the point of Leleiwi,
Honi i ke ala o ka hala,	Was borne the fragrance of the pandanus,
O ka lehua o Mokaulele,	The lehua of Mokaulele,
Oia ka Pele a kui la...	That is what Pele made into a lei...

Other early traditions, like that of Kū-a-Pāka’a and Ka Ipu Makani a La’amaomao (The wind gourd of La’amaomao), make passing reference to Waiākea and Leleiwi, naming the familiar winds that blow on the land. Published by the native newspaper Ka Hae Hawaii, under the title “He Wahi Mooolelo, the May 8, 1861 segment named some of the winds in Hilo—

...He Awa ko Leleiwi,	...The Awa is of Leleiwi,
He Puulena ko Waiakea,	The Puulena is of Waiakea,
He Uluau ko Hilo paliku...	The Uluau is of Hiloplikū, (the region beyond Wailuku River)... [Maly, translator]

3.2.2 “He Mooolelo Kaa No Kepakailiula,” A Tradition about Kepaka’ili’ula

This mo’olelo is set around the 1500s during the time of Lono-i-ka-makahiki and begins at the land area on the shore of Waiākea known as Makaokū (Figure 6). It was a scared lands and home of heiau luakini (temple state worship, at which human sacrifices were once offered). The earliest published accounts of Kepaka’ili’ula date back to ca.1863, and this version of the tradition is attributed to David Malo (Ka Hoku o Hawaii, March 13 and 20, 1919). The mo’olelo cited below was published in Ka Hoku o Hawaii (March 20, 1919 - December 9, 1920), and it differs substantially from the versions published in the Fornander Collection of Hawaiian Antiquities and Folklore (1917, IV-III:498-517 and 1919, V-II:384-405). The following narratives translated and paraphrased from the original Hawaiian texts by Maly,

focus on the opening of the tradition on the shore of Waiākea at Ka-maka-o-Kū.

Kepaka‘ili‘ula was born at Kamakaokū in an ‘e‘epa (premature or mysterious) form and was given up for dead by his parents. Kepaka‘ili‘ula's father was Maka-o-Kū (for whom the land area was named), and his mother was Hina-ai-ka-malama, both of whom were descended from Kū and Hina the akua - ali‘i (god-chiefs) who came from Kahiki and established the highest chiefly bloodlines of Hawai‘i. At the time of Kepaka‘ili‘ula’s birth, Makaokū and Hina dwelt near Moku-ola and ruled the district of Hilo.

Kepaka‘ili‘ula’s birth was accompanied by numerous displays of natural phenomena including fragmented rainbows that rested upon the ocean, rains that poured upon the land, and rivers that overflowed upon the land. His maternal uncles, Ki‘inoho and Ki‘ihele, took these signs as omens of Kepaka‘ili‘ula's supernatural nature. Without the knowledge of Makaokū or Hina, Ki‘inoho and Ki‘ihele rescued Kepaka‘ili‘ula and raised him while instructing him in all manner of fighting techniques, and in the use of his supernatural powers. When Kepaka‘ili‘ula came of age, his uncle Ki‘ihele went in search of a suitably beautiful and highly ranked chiefess to whom Kepaka‘ili‘ula could be married.

Ki‘ihele departed from Hilo and traveled swiftly on the ala loa (ancient trail that encircled the island) along coastal Waiākea into the forest of Leleiwi, and to the shore of Puna until he reached the place called Kea‘au. At Kea‘au, there lived a beautiful woman named Hōpoe. Arriving at the hale ali‘i (royal compound) of this chiefess, Ki‘ihele heard Hōpoe calling him to enter her house and rest, and explain why his journey had him traveling so early in the morning. Ki‘ihele told Hōpoe that he could not enter her house, as he was on a journey to seek out a wife for his royal ward. “I have heard of the beauty of Hōpoe, the beautiful woman of Kea‘au, thus I have come to visit you.”

Hōpoe then asked, “So what do you think, am I the woman for your ward, and are his features comparable to mine?” Ki‘ihele answered, “Listen to me oh beauty of Kea‘au, there is perhaps no beauty comparable to yours, but I must continue my journey to find if there is anyone else for my royal ward.”

Before Hōpoe could answer, Ki‘ihele moved swiftly on along the trail and he arrived at Kula (near Kumukahi, Puna), where dwelt the chiefess Waiwelawela... [May 5, 1919]

After completing his journey, Ki‘ihele found that the chiefess Mākole‘ā of Kahalu‘u, Kona was the most beautiful, and it was to her that Kepaka‘ili‘ula was wed.

The gods Ku and Hina are recurring figures in traditions of Waiākea as the early rulers of the region. The mo'olelo of "Kapuaokaolehloi"³ describes Waiākea as their royal residence—

Ku was the father and Hina⁴ was the mother. They had two children, Hoo-kaa-kaa-i-ka-paka-ua⁵ a son, and Kapuaokaoheloai⁶ a daughter. Waiakea in Hilo is the country where these people lived. The brother was the first born and the sister the last. These people were of high chief rank of Hilo. These two children were brought up without knowing that they were brother and sister. They never saw each other although they lived in the same house. The brother had a male attendant and the sister a female attendant... This manner of living was maintained for twenty years, without their seeing one another. One day the attendants as was their custom went to the uplands of Kaumana, directly above Punahoa to do farm work. After the departure of the attendants in the early morning, Kapuaokaoheloai arose and walked out of doors. Upon looking back at the house she saw a bright light within; so she again entered the house and began a search and found a door, which she opened. As she walked in she saw a red object lying on a bed. She removed the tapa from the face and saw a very handsome young man... [Fornander 1916 IV:540]

³ Fornander Volume IV, 1916

⁴ Another Ku and Hina contribution; the favorites of story writers.

⁵ Hoo-kaa-kaa-i-ka-paka-ua, literally "to roll, or rolling in the rain drops."

⁶ Ka-pua-o-ka-ohelo-ai, literally "the blossom of the eatable ohelo" (berry). (*Vaccinium reticulatum*.)

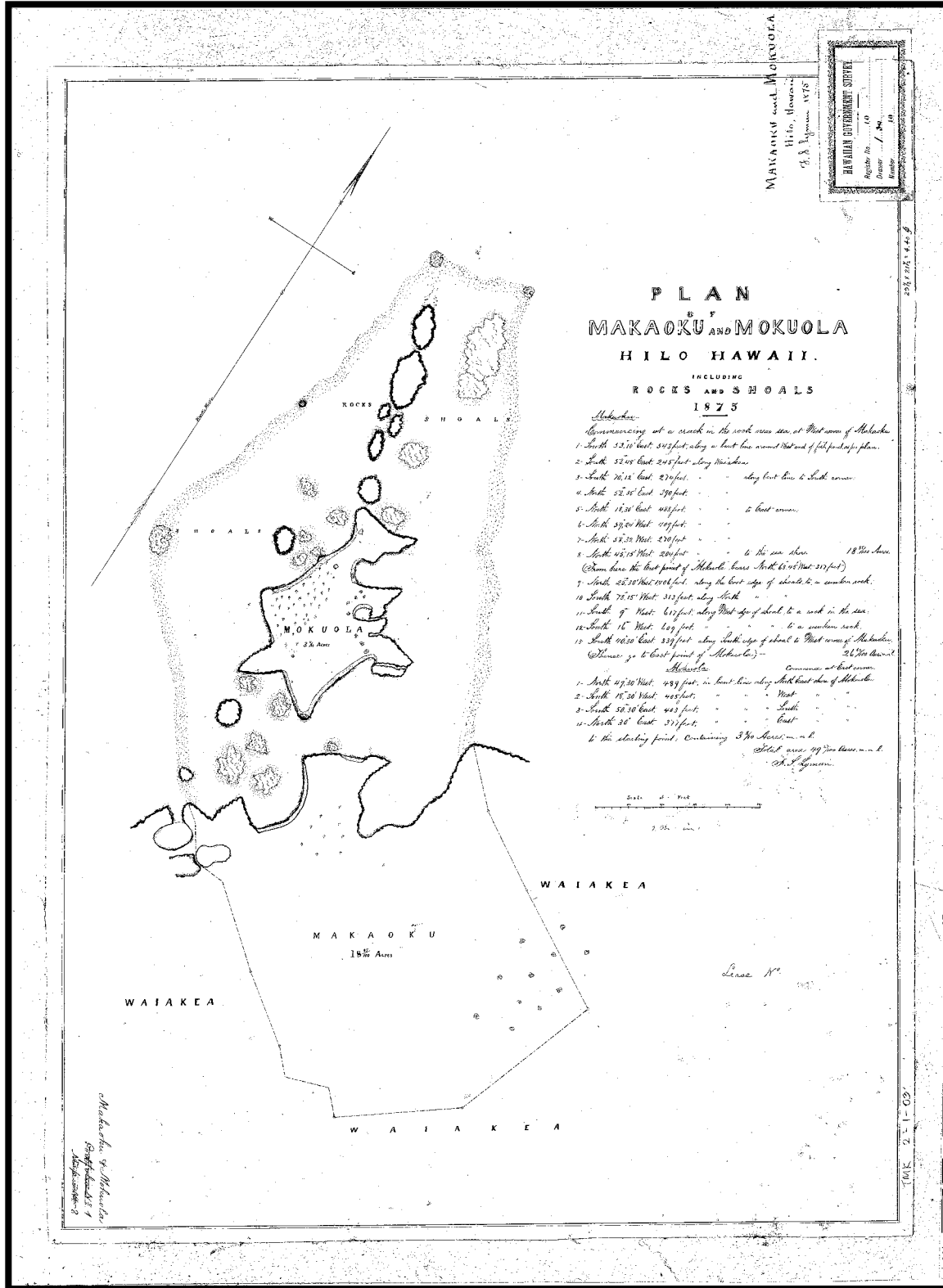


Figure 6. Register Map No. 10. Plan of Makaoku and Mokuola, Hilo Hawaii.

3.2.3 “He Kaa no Pikoikaalala, ke Keiki Akamai i ka Pana,” (The Tradition of Pikoikaalala—Describing Canoe Making and Bird Hunting in the Uplands of Waiākea and ‘Ōla‘a)

The tradition of Pikoikaalala (Pikoikaalala), printed in the Hawaiian language newspaper, *Ku Okoa*, in 1865-1866, is one of the earliest written accounts, that provides detailed narratives of the traditional and customary practices associated with the upland forests of Waiākea and neighboring lands. The tradition was submitted to the paper by S.M. Kauai, and ran from December 16th, 1865, to March 10th, 1866.

Pikoikaalala was born to ‘Alalā and Koukou on the island of Kaua‘i, and his family were kūpua (beings with supernatural powers and multiple body-forms). Pikoikaalala possessed exceptional sight and excelled in the Hawaiian art of pana pua (shooting with bow and arrow). Through the tradition of Pikoikaalala, readers learn that many localities throughout the islands are named for places where he competed in matches with archers, shooting ‘iole (rats) and birds from great distances. The tradition is set in the late 1500s when Keawe-nui-a-‘Umi, the king of Hawai‘i Island, was in need of an expert to shoot some supernatural ‘elepaio birds that continually interrupted the work of his canoe makers in the uplands of Hilo and ‘Ōla‘a.

Keawe-nui-a-‘Umi learned of Mainele, a champion in the sport of pana pua, who resided on O‘ahu, and promised him that if he could rid the forest of the enemy ‘elepaio, he could wed his daughter, the beautiful Keakalaulani. As the story unfolds below, we learn that Mainele boasted of his great skills, but he was unable to kill the two birds. In the meantime, Waiākea (for whom the land of Waiākea was named), one of the stewards of Keawe-nui-a-‘Umi, befriended Pikoikaalala, and learned that he was an expert in the art of pana pua.

Prior to his arrival in Hilo, Pikoikaalala made Waiākea promise that he would not tell anyone who he was, for he had heard of the boastful nature of Mainele, and he wished to teach him a lesson. The narratives below (translated by Maly), focus on events in the uplands of Waiākea and ‘Ōla‘a. In this part of the tradition, we learn about the make-up of the upland forests, named localities, and some of the practices of ancient Hawaiians in the forest region. Arriving in the Hilo District Pikoikaalala asked Waiākea—

HELU 5.

“...Aia i hea kahi o ua mau manu hanaino waa nei?” “Aia no ma waho aku o Panaewa,” “e pii hoi ha kua i ike au,” wahi a Pikoikaalala.

O ka hele aku la no ia o laua a hiki, a ike aku la o Pikoikaalala i kahi i kau ai na manu

Part 5.

“...Where are those birds who make trouble for the canoes found?” “They are there, outside of Pana‘ewa.” Pikoikaalala then said, “Let us go up there so that I may see.”

The two traveled till they reached the place, and Pikoikaalala saw where the

hanaino waa, a me ke kahua kahi hoi e kalai ai na kahuna a Keawenuiaumi, o ka inoa o ia wahi, o Kalehuapueo, aia no kela wahi ma kai ae o Kaluaopele, mauka ae o Olaa, iwaena konu o ka ululaau, he ahua nae, ina e hiki ilaila, e hiki ia oe ke nana mai ia kai o Hilo, me kou ike maopopo no nae ia kai, he loihi no nae, ua ane hiki paha i ka 27 mile ka loa; a hoi aku la no laua i kai o Hilo, e like no me ka mea mau i ke kaumaha i ka manu i na la a pau a laua e hele ai; a he mea mau no hoi ia laua ka lawe pinepine aku i manu na ke alii Keawenuiaumi, a o ka ke alii mea hoohuoi mau no hoi ia, no ka nui launa ole o ka manu, a he mea mau no hoi ia Keawenuiaumi ka ninaninau mau ia Waiakea kona kahu, i ka mea nana i hoomake ina manu he nui, ike kela ano manu i keia ano manu.

Eia na inoa pakahi o na manu a Pikoikaalala i pana ai i mea ai no ka wa maka pehu o Hilo. O ka Oo, ka liwi, ka Ou, ka Akakane, ka Amakihi, a me ka Mamo, o na manu ai-lehua no a pau o ka uka i Olaa a me ka nahele laau loloa o Panaewa; oia mau manu ka ke keiki Pikoikaalala i panai, a o ka Waiakea hoi ia e haawi aku ai i ke alii nui me na lii malalo iho, na kaukaualii, na puali, me na koa a me na kanaka hoi o ke alii.

A no ka ninau mau o Keawenuiaumi i ka mea nana i pana kela mau manu—i hoike iae la maluna—alaila, hai aku la o Waiakea penei: “He wahi aikane no nau.” “No hea?” wahi a ke alii, “no Oahu mai no,” alaila ninau mai la o Keawenuiaumi, “O wai ka inoa oia aikane au?” “O wai la, aole i hai mai

birds who made trouble for the canoes were perched. He also saw the grounds where the canoe making priest of Keawenui-a-‘Umi worked. The name of this place was Kalehuapueo, it is there below Kaluaopele (the Volcano), in the uplands of ‘Ōla‘a, in the middle of the forest. There is a small hill there, and if you go there, you will be able to look to the sea of Hilo. By the sight of the sea, you will know that it is a great distance off, perhaps 27 miles away. The two then returned to Hilo, and as was the custom, they were weighted down by birds on all the days they went to the mountains. They frequently went and took birds for the chief Keawenui-a-‘Umi, who grew suspicious because so many birds were brought down. Keawenui-a-‘Umi regularly asked Waiākea, who was killing these birds, for many different kinds were brought down.

Here are the names of the birds which Pikoikaalala shot during his time in Hilo; the ‘Ō‘ō, ‘I‘iwi, ‘Ō‘ū, ‘Akakane, ‘Amakihi, and the Mamo, the birds which eat of the lehua blossoms in the uplands of ‘Ōla‘a, and the long-treed forest of Pana‘ewa. Those were the birds shot by Pikoikaalala, and given by Waiākea to the king, the chiefs below him, the attendant chiefs, the warriors and the men of the chief.

Because Keawenui-a-‘Umi continually asked questions about the one who shot the birds—as described above—Waiākea answered thus: It is a friend of mine.” “Where from?” Asked the chief. “From O‘ahu.” Keawenui-a-‘Umi then asked, “What is the name of your friend?” “What

i kona inoa iau,” wahi a Waiakea, he oiaio no hoi paha ia, no ka mea hoi, aole no i ike na mea a pau o Pikoiakaalala keia, aole no hoi i hai i kona inoa ia Waiakea; aka nae, o na hana akamai a pau a Pikoiakaalala kana i ike ai, mai ko laua holo ana mai o Oahu aku a hiki i keia wahi i olelo iae nei, a ua hoopaa loa o Waiakea i kana mea i ike ai, no ke akamai lua ole o ua aikane nei ana, (Pikoiakaalala) oia hoi na pana ana i na iole mai Oahu mai a hiki ma Kohala i Hawaii.

(E waiho iki iho kakou i ka hoonioniolo ana no Pikoiakaalala ke keiki o Kauai o Manokalanipo, a me Waiakea hoi kahi kanaka o Kauakanilehua o Hilo Hanakahi, a e kuehu ae kakou i ka lehu o kapuahi no Mainele a me na hoe waa.)

Ia Mainele ma i noho ai iuka o Kohala i ke kalai hoe, a hala hookahi malama, a loa ka hoe, alaila, makaukau na waa e holo aku i Hilo, kahi hoi o ke alii nana i hoouna aku e kii ia Mainele. A hiki o Mainele ma i Hilo, ua makaukau mua hoi ka ai, ka puua, me na mea no hoi a pau e lawa ai ka malihini; a o ke o no hoi ia i pii ai e pana i ko Keawenuiaumi enemi mau.

O ka hoomaka iho la no ia o ka pii o Mainele me ke alii, a me na kanaka a pau he nui, a o ka poe makaikai no hoi o kela wahi keia wahi o Hilo a me Puna. A hiki no hoi o Mainele i ke kahua kahi kalai-waa, a ike iho la nae i ke kumu koa kahi e kau mau ai ua mau manu nei, aole nae he ikeiaku o na

indeed? He has not told me his name,” responded Waiākea. Now this is perhaps true, because very few people knew of Pikoi-a-ka-‘alalā, and he had not actually told his name to Waiākea. But because of all the amazing things that Pikoi-a-ka-‘alalā had done—that is the shooting of rats from O‘ahu to Kohala, Hawai‘i, Waiākea knew that his friend (Pikoi-a-ka-‘alalā) was second to none in the skill.

(Let us now leave the upright nature of Pikoi-a-ka-‘alalā, the youth of Kauai of Manokalanipō, and Waiākea, the man of the land of Hilo Hanakāhi, where the rains resonate on the leaves of the lehua; and let us stir up the ashes of the fireplace of Mainele and the canoe paddlers.)

While Mainele and folks were residing in the uplands of Kohala, cutting wood for paddles, there passed one cycle of the moon, and they then had the paddles made. Therefore the canoes were made ready to travel to Hilo, the place from which the king had sent for Mainele and his companions. The food was made ready, the pig and all the things to be brought for the visitor; and those things necessary for the journey to the uplands to shoot the enemies of Keawe-nui-a-‘Umi.

Mainele and the King, and many of the people, those who had traveled from one place or another in Hilo and Puna, began their journey to the uplands. When Mainele arrived at the canoe making grounds, he saw the koa trees where birds had perched, though the (bird) enemies of

enemi o ke alii, no ka mea hoi, aia no a koele ke koi i ka waa, alaila, o ka manawa iho la no ia e lele mai ai o ua mau manu nei a kau i ke kumu o kekahi koa nui. Hookoele no hoi na kahuna a ke alii i kekahi kaele waa kahiko no a lakou mamua i haalele ai, i mea hoi e lohe ai ua mau manu la, alaila lele mai, oiai o ka laua hana mau ia ke lohe i kekahi koi e koele ana.

O ka manawa no ia e hiki ai, me ko laua manao paha he kalai-waa, no ka mea, o ko laua enemi nui hoi ia o ke kalaiwaa. A he oi no hoi o na manu pololei nui wale i ke koho e mai no mamua i na olelo hooiloilo, e olelo mai ai penei: “E Keawenuiaumi e! haalele ia he waa ino, he waa puha, ua loli kaele.” Aole no hoi ma ko Keawenuiaumi waa wale no ka laua hana e hooiloilo ai, o ka waa o kela kanaka keia kanaka ka laua e hanai.

O ka lele mai la no ia o ua mau manu la a kau mai la iluna, ma ko laua wahi mau e kau ai. I ua mau manu la no a kau mai, ike aku la no hoi o Mainele, ke akamai kaulana; o kona manawa iho la no ia i haalele koke ae ai i kana mea make, me ka olelo kaena e anae mamua o kona hookuu ana i kana pua, penei no hoi: “Heaha la ke kumu o ke ku ole ana o keia mau manu i ka poe i hele mai ai e pana i keia mau manu, ma ke kua paha ka pana ana i ku ole ai? No ka mea, he nui na kino, a he kokoke loa no hoi laua e kau mai nei...”

A lohe ae la ke alii, a me ka aha kanaka e ku pu ana me ia, (Mainele) oliloli nui ae la lakou. O ke kuu aku la no ia o Mainele i kana pua, me kona manao hoi e ku aku na manu ia ia, he ole ka hoi ua mea he ku aku, mai

the king were not to be seen. But when the striking of the adzes was heard on the hulls of the canoes, the birds flew and perched atop a large koa tree. When the priest of the king, began to dig out one of the old canoe hulls, left by from an earlier time when they had fled; it was then, when the birds heard the chipping, that they began to fly about.

That was what they did, when they heard the digging, because their great enemy were the canoe makers. Now normally, these types of birds were foremost in stating whether worms were in the wood, but here, they called out always: “Say Keawe-nui-a-‘Umi! Leave it behind, it is a bad canoe, a canoe that will shatter, a rotted hull.” It was not only the canoes of Keawe-nui-a-‘Umi, but the canoes of other men as well, that the two birds did this to.

These birds flew and perched at their usual place above. When the birds perched there, Mainele saw them, he then began boasting about his fame and skill with the bow, and that he could kill them for which he released his arrow: “There is no tree that these birds can land on that the people cannot shoot them. They will be shot in the back perhaps, for their bodies are large, and they land nearby...”

Hearing this, the king and the people gathered there with him (Mainele), and were exceedingly happy. Then Mainele released his arrow, thinking that he would strike the birds, but he did not hit them.

ku no nae, o ka pololi ana o ka pua a ku no i ka mino kahiko o na manu, oia no ka mea i halai, o ka hoomau aku la no ia o Mainele i kana hana i kaulana ai o ka pana, oi pana wale a la aohe wahi mea ku aku o na manu, a po ia la, moe iho la no o Keawenuiaumi me Mainele, a me na kanaka a pau ilaila.

A i ke ao anae no, oia ka lua o ka la, i lawa no i ka maamaa anae, o ko Mainele manawa iho la no ia e panai, me ke ake nui e ku na enemi mau o ke alii, aole no hoi he komo wahi ai iki i kona opu, a no ke ku ole o na manu, olelo ae la ia i ke alii e hana i laau alanui nona e pii aku ai iluna o ke kumu koa, i kokoke i kahi o ua mau manu nei e kau ana, me kona manao a kokoke iki ae, alaila, ku ke panae. A paa ke alanui, pii ae la o Mainele alaila, pana ae la no ia i na manu, oi pana wale no ia la a ahiahi, aohe no he mea a ku iki, a moe hou no ilaila.

A ao ae la, o ke kolu ia o ka la, alua no hoi alapii, i mea hoi e kokoke ae ai o ka pana no hoi ka Mainele, o ka nana no hoi ka ke alii, a me na kanaka iluna, me ke ake nui e ku aku ana no ia Mainele na manu, hele no hoi a uakaha ka a-i o ke alii, a nalulu ka lae, me na kanaka a pau i ka ua mea o ke kali ana no ke ku o na manu i ke akamai kaulana o Mainele a po wale no ke kolu o ka la, aohe no he ku o na manu.

Moe no a ao ae, o ka ha ia o ka la, a akolu hoi alapii o ka hana ana, e like no me ka Mainele e olelo ai, pela no ke alii e olelo ai i kona poe kanaka e hana, a ane kokoke loa

He tried again and again, his arrows hungered for the birds, but all the shots of this famous person, missed. When darkness fell, Keawe-nui-a-Umi, Mainele, and all the people with them went to sleep.

With the light of day—this was the second day—Mainele practiced and when it was enough, he began again to shoot, with great desire for these enemies of the king. Because the birds did not land nearby, he told the king to have a wooden ladder made so that he could climb atop one of the koa trees, close to where the birds regularly perched. He thought that if he could get closer, he would be able to shoot them. The ladder was made secure, and Mainele climbed upon it. But again, his arrows missed, and with the coming of night, the people again slept there.

At day light, the third day, a second ladder was made so as to enable Mainele to shoot from a closer location. The king and all of the people looked on and saw the great desire of Mainele to get the birds. Looking up, the neck of the king was stiff, and his brow ached, it was so with all of the people who were awaiting the striking of the birds through the ingenuity of Mainele. But as the third night approached, the birds had not been struck.

They slept again, and arose at daylight, and had a third ladder made. Thus Mainele drew near to the place where the birds perched. He shot his best arrow, and

o Mainele ma kahi a na manu e kau ai, o kana no ka pana, oi pana wale no a aohe no he ku o ua mau manu la, he akamai no hoi o Mainele i ka pana, he akamai no hoi na manu i ka alo ana i ka Mainele mea make e lele aku ana he pua.

A po iho la ka ha o ka la, moe no ke alii, me na kanaka a pau, a ao ae la, o ka lima ia o ka la, aha no hoi alapii o ka hana ana, a ia hana ana o ke alapii, ua kokoke loa i kahi a na

enemi e kau mau ai, a e lalau ae no o Mainele i na manu me kona mau lima, e loaa no, aole no hoi i ike na manu i ke kokoke loa o ke alapii, kahi hoi a Mainele e noho ana, a haalele la hoi i ko laua wahi e kau mua ai, i loa no i ka po a ao ae no, o ka na kahuna hana mau no hoi ka hookoele me ke koi i na kaele-waa e waiho ana... Oiai ua hiki ae o Mainele iluna o kahi i hana ia nona, i na manu no a kau mai, o ko Mainele lalau ae la no ia me kona mau lima, alo ae la no na manu, oi lalau wale o Mainele me kona mau lima huluhulu a aole he loaa iki o na manu. Hele no hoi a uluhua o Mainele i na manu, me he hoa hakaka kanaka la. A o ke alii hoi o Keawenuiaumi, ua hele a uiha, a luhi, a uakaha ka a-i, a me kona poe kanaka pu kekahi, oi noke wale o Mainele i ka lalau lima a aohe he loaa iki o na manu, a po wale ka lima o ka la, moe no ilaila a ao ae o ke ono ia o ka la, ike ae la o Mainele ua ao, hoomaka ae la ia e pii iluna o kahi ana e hopu ai i na manu, alaila pane mai la o Keawenuiaumi, "Aole au i upu i kau kaikamahine maikai a na ke kanaka akamai i ka hopu lima i kuu mau enemi, i upu au i kau mea maikai a na ke kanaka akamai i ka pana, e like hoi me oe e Mainele, wahi a ka poe i ike ia oe; a no kou

it did not strike the birds. While Mainele was smart with the bow, the birds too were smart at dodging the deadly arrows of Mainele.

The fourth night settled in, and the king and all his people slept. At daylight on the fifth day, a fourth ladder was built, and Mainele was even

closer to the place where his enemy perched. Mainele then grasped for the birds with his hands, trying to catch them, but he could not, as the birds wouldn't come near the ladder, where Mainele was sitting. They left where they had originally perched through the days and nights that they had bothered the priest and the canoe carvers... Mainele was situated atop the place made for him, and the birds landed. Mainele then reached out to try and grab the birds, but he could in no way grab them. Mainele went after the birds, fighting as if they were a human enemy. The king, Keawe-nui-a-'Umi became wearied, and the necks of all gathered there became stiff and sore. Again, Mainele was unable to secure the birds, and the fifth night fell. They all slept and at daylight the sixth day, Mainele again climbed the ladder and tried to grab the birds. Keawe-nui-a-'Umi called out to him, "I did not think that I was going to give my pleasing daughter to a man who was smart at grabbing my enemies with his hands. I thought that my daughter was going to go to a man who was skilled with the bow, like I thought you were, Mainele. Everyone who told me of you said that you

lohe ana hoi ia oe he akamai lua ole i ka pana, hoouna aku ai au i kou mau hoe waa pono, me kou mau waa kapu, nou wale iho no, aole no hai; a ka inoa he akamai io oe, aole ka, hoi iho ilalo.”

O ka hoi iho la no ia o Mainele me ka hilahila nui. [Ianuari 13, 1866]

HELU 6.

E ka poe e heluhelu ana, ua ike ae la hoi kakou i ko Mainele akamai ole, a me kana mau olelo kaena e ana mamua, a me kona ku ana i ka leo a ke alii (Keawenuiaumi). A e olelo ae hoi kakou no ke keiki Pikoikaalala, a me Waiakea hoi kona kuleana o ka ua Kanilehua a me ke one o Ohele i Kanukuokamanu.

Ia Keawenuiaumi ma i pii ai iuka me Mainele, e like me ka mea i kii iai nona, a o Waiakea pu no hoi kekahi i na la a Mainele e pana ana, ma ke ao wale no nae, a ahiahi no hoi no o Waiakea i kai, oiai o kana aikane (Pikoikaalala) wale no ko ka hale, no ka mea, aohe he lana nui o kona manao i ka pii iuka e ike i ko Mainele pana ana, no ka mea hoi, ua maopopo no iaia, aohe e ku ana na manu ia Mainele, nolaila no ke kumu o ko Pikoikaalala noho ana i kai, a no ka hoonanea ia hoi kekahi e ke ahehe makani he Malanai, a me ka hoholu maikai ia e ka lau o ka niu o Mokuola, a o kana mea loa ia e lealea loa ana; mai kona wa i hiki mai ai a hiki i ka manawa a kakou e lohe nei. A he mea mau no hoi i ke Kama Aliiwahine a ke Alii Kalani Keawenuiaumi i ka hele mau ana ma ko Waiakea hale, no ka mea hoi, ua kaomi mau ia kona kania-i e na lawalu manu ai-lehua i ka uka i Olaa, a me ka

were second to none in your skill with the bow, thus I sent my paddlers and sacred canoes, reserved only for me, after you. But now I see that it is not so. Return down here.”

Thus, Mainele returned down with great shame. [January 13, 1866]

Part 6.

So my readers, we have seen that Mainele was not so smart, as was declared by his boastful words spoken earlier, and in his rising up to the voice of the king (Keawenui-a-Umi). Now let us speak again of our youth, Pikoikaalala and of Waiakea, and his place in the Kanilehua rains, and the sands of Ohele at Kanukuokamanu.

When Keawenui-a-Umi and his companions traveled to the uplands with Mainele, Waiakea, who had gone to fetch him was there as well. He stayed during certain days when Mainele was shooting at the birds, but in the evening, Waiakea returned to the shore where his friend (Pikoikaalala) remained at the house. This was because he had no great desire to travel to the uplands to see Mainele’s efforts at shooting. He knew that Mainele would have no luck in striking the birds, thus Pikoikaalala remained at the shore, relaxing in the soothing Malanai breeze which causes the fronds of the coconut trees of Mokuola to sway. This was his great pleasure, from the time of his arrival through that of which we have heard. The royal daughter of King Keawenui-a-Umi (named Keakalaulani), also regularly went to the house of Waiakea,

nahele o Panaewa. A na ia mea i kau-o holookoa mai i kona nui kino e hele mai i kahi o Waiakea, a no ka halawai ana o ke kiionohi o ke kaikamahine alii me ke akawailiula o Mana (Pikoiakaalala) a no laila, ua loaa i ke kaikamahine alii ka haawina kaumaha o kona puuwai palupalu no Pikoiakaalala...

A eono la o Keawenuiaumi iuka, a elima hoi po, a i ke ono hoi o ka la i olelo iae la, oia hoi ka la a Keawenuiaumi i pane aku ai ia Mainele a kakou i kuehu aku nei i kela Helu.

Pii hou aku la no o Waiakea e ike no i ka Mainele hana, a o kana hana mau iho la no ia o ka pii, a o ka Pikoiakaalala mea mau no hoi ka ninau, “Pehea mai la na manu?” O ka hoole no hoi ka Waiakea hana, “Aohe he ku o na manu.” A ia Waiakea i hiki aku ai iuka, ike aku la oia e kulou mai ana o Mainele, aohe he ekemu iki, aohe hoi he kau mai ma kona wahi mau, oiai ua hala iho la na enemi o ke alii ia Mainele.

Nolaila, ninau ae la o Waiakea i ke alii, “No keaha hoi ka mea e kulou nei o Mainele, aohe hoi he ekumu iki, aohe hoi he pana mai i na manu?” “No ke akamai ole,” wahi a Keawenuiaumi.

Alaila, pane aku la o Waiakea penei, oiai he wahi kahu iwikuamoo ponoia no ke alii; “E kuu Haku e; e aho paha e hoao hoi i kau wahi pana.” “Aia i hea kau pana?” wahi a Keawenuiaumi. “Aia no hoi i kai o Hilo, i kou hale no ia e noho la.” Ninau mai la o Keawenuiaumi, “Nohea ia kanaka?” “No Oahu mai no hoi,” wahi a Waiakea. “Oia no hoi ka mea nana e pana na haawe manu au i amo aku ai i na la maka pehu ai o kakou

where she frequently ate the broiled birds that eat the lehua blossoms in the uplands of ‘Ōla‘a and the forests of Pana‘ewa. Thus this fair chiefess met with the youth of the red glistening waters of Mānā (Pikoi-a-ka-‘alalā). The chiefess had grown heavy, with a softness in her heart for Pikoi-a-ka-‘alalā...

Now, for six days and five nights, Keawenui-a-‘Umi was in the uplands. It was on the sixth day the Keawe-nui-a-‘Umi told Mainele, that which we read above.

Waiākea went again to the uplands to see what Mainele was doing, and when he returned, Pikoi-a-ka-‘alalā would ask him, “How are the birds?” Waiākea would tell him, “The birds have not been struck.” When Waiākea had gone to the uplands last, he saw Mainele standing with his head bent down, he had no answer, and no place to go at all, thus the enemies of the king had passed on to Mainele.

Waiākea then asked the King, “Why is Mainele standing there with his head bent down, with the least bit to say, did he not shoot the birds?” “No, because he did not have the skill,” said Keawe-nui-a-‘Umi.

Waiākea then spoke as a true retainer of the king, “My lord; perhaps you will try my friend with the bow.” “Where is your bowman?” Asked Keawe-nui-a-‘Umi. “There at the shore of Hilo, at my house where I live.” Keawe-nui-a-‘Umi then asked, “Where is this man from?” “From O‘ahu,” said Waiākea. “He is the one who has shot the abundance of birds, which we ate until our eyes bulged. I will ask him,” said

la, au no hoi i ninau mai ai iau la,” wahi a Waiakea.

...Penei hoi o Waiakea i olelo ai, “He oi wale no kela keiki akamai nui wale, ia lakou nei i holo e mai ai (Mainele ma) ma na waa kaulua mai Oahu mai, hoi mai hoi au mai ka makaikai ana mai, a hiki mai au i kahi i kau ai na waa o makou, o kou wahi waa wale no ke kau ana, a e ku ana ua keiki la malaila, a iau e hoomakaukau ana i kuu wahi waa, ninau mai la ua keiki la, E holo ana kou waa a i hea? hai aku la au, “E hoi ana au i Hawaii, o makou hoi me ka waa kaulua, i kii mai nei ia Mainele, a eia ka hoi ua hala e aku nei.” Alaila, olelo mai la kela iau, “O kua hoi ha ke holo i ike au i kou aina o Hawaii.” ae aku la au, ae, o ko ia la ee mai la no ia, a o ka holo mai la no ia o maua.

...Alaila, kena koke mai la o Keawenuiaumi, “O kii hoi ha,” o ke kii mai la no ia o Waiakea a hiki ana, ia hiki anaku o Waiakea...olelo aku la o Waiakea, “I kii mai nei au ia oe e pii kua iuka e panai oe i na enemi o kuu alii Keawenuiaumi, no kou ike ana ia oe no kou akamai lua ole i ka pana, nolaila, ua hai aku nei au i ke alii i na mea a pau au i ike ai nou, a oia ka mea i hoouna mai nei o Keawenuiaumi iau e kii mai ia oe, no ka mea, ua huhu loa ia o Mainele, a ua uluhua loa no hoi ke alii no ke ku ole o kona mau enemi.”

Alaila, olelo mai la o Pikoiakaalala, “He punahele no nae paha oe ia Keawenuiaumi?” “Ae,” wahi a Waiakea. Alaila, i aku la o Pikoiakaalala, “A i na he punahele io oe ea, E pii oe a olelo aku i poi nui, e hoopiha a piha pono i ka wai, a e lawe

Waiakea.

Waiakea then said, “The knowledge and skill of this youth is above everyone else’s. When we went on our journey to O’ahu (for Mainele and companions), and the double-hulled canoes, landed on O’ahu, when we came back from our journey on land, I saw this youth standing next to my canoe. And as I prepared my canoe, the youth asked me, “Where is your canoe off to?” And I answered, “I am returning to Hawai’i, all of us and the double-hulled canoes. We have fetched Mainele, and he has gone.” He then said to me, “Let the two of us travel, so that I may see your land, Hawai’i.” I agreed and he boarded the canoe, and we two traveled together.

Keawe-nui-a-‘Umi then ordered, “Bring him here.” So Waiakea fetched him. When Waiakea came to stand before his friend (Pikoi-a-ka-‘alalā)... Waiakea said, “I have come to bring you to the uplands, that you may shoot the enemies of my king, Keawe-nui-a-‘Umi, for I have seen your unsurpassed skill with the bow. Thus I told the king all that I had seen you do, and so he is the one who sent me to get you. He is very angry with Mainele, the king is very troubled that he did not strike down his enemies.”

Pikoi-a-ka-‘alalā then spoke, “Perhaps you are a favorite of Keawe-nui-a-‘Umi?” “Yes,” answered Waiakea. Pikoi-a-ka-‘alalā then said, “If you are a true favorite, you must go up there and take a large container and fill it with water. Take it

ae a malalo pono o ke kumu o ke koa, kahi a na manu e kau ai,” he ae wale no ka Waiakea. “A eia hou, ina e ike oe ua hiki aku au, alaila, e paae oe me ka pauku laau i ko lima, a iau e ku ana ma kahi o ke poi wai a nanae iluna i kahi a na manu e kau mai ana.”

HELU 7.

“A pau auanei kuu nana ana iluna i na manu la ea, alaila, e hahau iho oe i kekahi kanaka o Mainele ma, oiai elima ko lakou nui mai Oahu mai. A iau auanei e kilo ana ilalo i ke poi wai la ea, alaila, hahau no oe i kekahi kanaka; pela no oe e hahau ai a pau i ka make eha kanaka, a o Mainele hoi, e waiho oe ia ia, aia a ike mai oe iau e lena ana au i kuu kikoo, a heluhelu au i ke mele, a pau ia, hookuu au i kuu pua, a make na manu, alaila, hahau iho no oe ia Mainele, i hookahi kona make ana me na enemī mau o ke Alii; pela auanei oe e hanai, e like me kau olelo ia oe, ke punahele io hoi oe na ke alii.”

O keia mau olelo a pau a Pikoikaalala i aoao ai ia Waiakea, he ae wale no ka Waiakea. A pau ko laua kamailio ana no keia mau mea i olelo ia; hoomaka koke iho la o Waiakea e kukini mama, e hai aku i kona Haku Alii i na mea a pau a kana pana akamai, ana i kaena e ai imua o ke alii nona ka enemī mau o na manu.

Ia Waiakea i pii ai, oia aku no mamua o ka pii ana, mahope wali aku no o Pikoikaalala, o kona kumu hoi i emi hope ai, no ka walea i ke kui lei lehua mamō ai a

below the koa tree where the birds perch.” Waiākea agreed to do so. “Here also, when you see that I have arrived, strike your hand with a piece of wood until I am standing at the place where the water container is set, and I am looking up to where the birds perch.” [January 20, 1866]

Part 7.

“When I am finished looking above at the birds, you must strike down one of the men with Mainele folks, for there are five of them who have come from O’ahu. And then when I gaze into the water container, you must again strike down one of the men; and so it must be that you strike and kill four men, you must only leave Mainele. You will then see me string my bow, and I shall recite a chant. When I release my arrow, the birds shall be killed. Then you will kill Mainele, thus his death shall come at the time of the death of the enemies of the King. These are the things that you must do, as I have instructed, then you will become the true favorite one of the king.”

All of the instructions given by Pikoikaalala to Waiākea, Waiākea agreed to. When they finished their conversation, Waiākea swiftly ran back to tell the King all about the skilled one with the bow, and what had been said about the one who had boasted before the king and the despised birds.

While Waiākea was going to the uplands, Pikoikaalala was slowly following behind. The reason being that he was enjoying himself, making garlands of the

ka manu, a me kona hoonau pu ana aku kekahi me ka ua i Hilo one, (Keakalaulani) ia Waiakea e ahai ana i na huaolelo i haiia iaia, aole no hoi oia i ike mai i ka Pikoikaalala ma hoonau ana mai mahope. A hiki e o Waiakea i kahi a ke alii Keawenuiaumi e noho ana, ma Kalehuapueo, a o Pikoikaalala ma aku no hoi a Makaulele, ike aku la o Pikoikaalala i ka popohe maikai mai a ka lehua ula me ka lehua kea, olelo ae la ia i ke Kama Alii Wahine, “Ina paha e ike au i ke kui ana o ka lei lehua, ina la wau ua hele e kui i lei no kua,” pane mai la ke Kama Alii Wahine opio, “Owau no kai ike, nau no e kui aku i lei nou, a paa ko lei, pii hoi oe, a hoi no hoi au a Alenoho, kakali o ka huikau o na manu i ka pua o ka lehua.”

akamai i ka pana, au i olelo iho nei iau, a o ka makou ia e kali aku nei?” Olelo aku la no hoi o Waiakea, “E i ae no mahope mai, i pii e mai nei au mamua nei e olelo aku ia oe, a ina oe e ae mai alaila, e olelo aku au?” “Pehea ia olelo au e ae aku ai au?” Alaila, hoopuka mai la o Keawenuiaumi i kona manao penei: “Ua ike no oukou a pau i kau mau mea i hooko ai no ka poe a pau i na mai e pio kou mau enemy manu; a ma ka lakou mau olelo wale no au e hooko aku ai; o kau mau olelo no hoi a pau au e olelo mai nei no kau akamai, pela no au e hooko aku ai.” A pau ka olelo ana a ke alii, hoomakaukau ia iho la na mea a pau i oleloia. Hoopiha ia iho la kekahi poi nui a piha i ka wai, hapaiia aku la a ke kumu o ke koa. A ike iho la o Waiakea ua hooko ia kona mau olelo a pau e kona Haku.

lehua mamoo blossoms, food of the mamoo birds, and traveling with Keakalaulani, who was like the rains of Hilo One. Waiākea followed the instructions given him, but he did not know that Pikoikaalala and Keawenuiaumi, who were following behind. When Waiākea arrived before the King, Keawenuiaumi, who was then dwelling at Kalehuapueo, Pikoikaalala and Keawenuiaumi were at Makaulele [Mokaulele], where they saw the perfect fullness of the lehua blossoms—red lehua and white lehua. He said to the Chiefess, “If only I knew how to string a lei of these lehua blossoms, I would make a lei for us two.” The Chiefess answered, “I am one who knows how, let me make a lei for you. And when you go to the uplands, I will return and wait at Alenoho, waiting with tumult of the birds on the lehua blossoms.

Keawenuiaumi asked, “Where is the youth that is skilled with the bow of whom you told me, and for whom we wait?” Waiākea answered, “He is following behind, I came to the uplands first to speak with you.” “What are the words that you wish to speak?” “What do you think of these words that I have spoken to you?” Keawenuiaumi spoke his thoughts, “All of you know the things that I have done for the one who would extinguish my enemies. And it was only by their saying it, that I fulfilled the needs. Now, all that you have said, from your skilled one, so I shall fulfill his instructions.” When the king finished speaking, all things that were instructed were prepared. A large container was filled with water and carried to the koa tree. Waiākea saw that all that he had spoken to his Lord had been accomplished.

Alaila, ua kii aku la o Waiakea ia Pikoiakaalala, a loa no iaia e pukukui ana no i ke anu a ka ua lililehua o Makaulele. “O oe mai la ia?” wahi a Pikoiakaalala. “Owau keia o Waiakea o kau aikane aloha, i kii hou mai nei au ia oe, ua ae mai nei kuu Haku i na mea a pau au i kena mai ai iau e pii e mamua, a o ia hoi au i holo hou mai nei ia oe.” “Ina kua,” wahi a Pikoiakaalala o ka pii aku la no ia o laua (Pikoiakaalala ma), a hoi no hoi o Keakalaulani ma me kona wahi kahu wahine i kai o Hilo.

Ia Pikoiakaalala ma i hiki aku ai ma kekahi oioina, o Mahinaakaaka ka inoa, aia no kela wahi ma ke alanui e pii ana i Olaa. Ilaila, ike aku la o Pikoiakaalala i kekahi iole nui, pane aku la ia ia Waiakea, “Ka iole nui hoi!,” “Aia i hea?” wahi a Waiakea, “Ei aku mamua o kua, ua hele ka nuku a paa i ka pulu hapuu.” O ka pana aku la no ia o Pikoiakaalala, ku no ua iole nei, o Akiakaiole, a ua pana ia no ia wahi o Akiakaiole, aia no ma Olaa. Mahope aku no hoi laua nei, a ike iho la o Waiakea i keia iole nui io e waiho ana. A pii aku la no laua nei a hiki i Kapueuhi, malaila no ko laua komo anaku, no ka mea, o ke alanui no ia e pii ai a hiki i kahua kalaiwaa o ke alii Keawenuiaumi, oia hoi o Kalehuapueo.

A hiki aku la laua nei i kahi i oleloia ae nei, pihoihoi nui mai la ka ahakanaka me na huaolelo ma ko lakou waha, “Eia ua pana akamai loa la! A pela mau ka ka aha olelo, a no ka hooho nui ana o na kanaka, oiai e noho ana no o Mainele ia Kepookulou, a i kee anae iluna, ike aku la ia ia Pikoiakaalala ma e pii mai ana, a i kona ike ana o ke keiki

Then Waiākea went to fetch Pikoi-a-ka-‘alalā, and found him there in the cold misty rains of Makaulele. “So it is you?” said Pikoi-a-ka-‘alalā. “It is I, your friend,” said Waiākea, “Come to fetch you, for my Lord had agreed to all that you said, before I went up. And now I have come for you.” Pikoi-a-ka-‘alalā said “It is for us.” So they two made preparations to go to the uplands. Keakalaulani and her female attendant returned to the shore of Hilo.

Pikoi-a-ka-‘alalā and his companion arrived at a trailside resting place known by the name of Mahina‘akaaka; that place is along the trail that ascends to ‘Ōla‘a. There, Pikoi-a-ka-‘alalā saw a very large ‘iole, he told Waiākea, “What a large ‘iole!” “Where?” “There in front of us. The snout is held fast in the pulu of the hāpu‘u.” Pikoi-a-ka-‘alalā then shot, and struck the iole named ‘Aki‘akia‘iole. ‘Aki‘akia‘iole is now one of the storied places in ‘Ōla‘a. Afterwards, Waiākea saw the great iole left there. They then continued upland till they reached Kapu‘euhi; they entered there because the trail rises up to the clearing of the canoe makers of the king, Keawe-nui-a-‘Umi, that is Kalehuapueo.

They then arrived at the place spoken of above, and the people were greatly excited, and the words from their mouths were “So here is the expert with the pana!” Such were the words and murmuring of the people. Meanwhile, Mainele was sitting with his head hung down, as Pikoi-a-ka-‘alalā and his

no a laua i pana ai i Kulaokahua, a i mua hoi o Kakuihewa, manao maopopo loa iho la ia, me ka olelo ae i kona mau hoa eha, “E make ana paha kakou,” “I ke aha hoi?” wahi a kona mau hoa. O ke keiki no hoi keia a maua i pana ai iloko o ka hale o Kakuihewa i Oahu.” Kai no paha he keiki e keia i olelo iae nei...

A ma ia wa i hooili ia iho ai ko Mainele naau e ka ukana kaumaha he hilahila, me ka manao no nae hoi, o ka hilahila wale no ke loa iaia, aole la hoi o ka make pu kekahi e hana ia nona. A ku o Pikoikaalala ma ke kumu o ke koa, kahi hoi a ke poi wai e ku ana, ka laau hoi a na manu e kau mau ai, nanae la ia iluna, a ike ae la i na manu e kau ana i ka wekiu, oi ai ua hookoele e iaku mamua, i mea e lohe ole ai ka mea kaulana i ka pana; a ike lea ae la o Pikoikaalala i na manu, hoi iho la kona mau maka ilalo i ke poiwai hoomanao ae la o Waiakea i kona kauoha, hapai ae la i kana laau, a hahau iho la i kekahi kanaka o Mainele, a make loa, ka Pikoikaalala no ke kilo i ke poi wai, o ka Waiakea hana no hoi ka pepehi i kanaka o Mainele, a pau eha kanaka i ka make, a o Mainele aku no hoi ka hope, aia a heluhelu ae o Pikoikaalala i kana mele mau, alaila, o ko Mainele wa ia e make ai ia Waiakea. A ma ia wa no, hoomaka iho la o Pikoikaalala e lena i kana kikoo, me ka nana no nae o na maka ilalo i ke poiwai.

Heluhelu ae la ia i kana wahi mele mau.
Penei no ia:

“Aia la, aia la o Pikoikaalala,

companion drew near. Then he knew that this was the youth with whom he had competed in the sport of pana at Kulaokahu‘a (O‘ahu), before the king, Kakuihewa. He then knew, and told his four companions, “We are going to die.” Why?” they asked. “This is the youth that we competed with in the sport of pana at the house of Kakuihewa, at O‘ahu.” “Perhaps this is a different youth,” they said.

Then Mainele’s very core trembled with sadness and the burden of shame, knowing that only shame would be had by him; he did not know that death would be the result of his deeds. Pikoikaalala stood at the koa tree, where the water container had been set, and below the branch where the birds regularly perched. He looked up and saw the birds perched at the very top of the tree. He then caused the tapping of the wood to begin, so that the sound of the bow of this famous one would not be heard. Pikoikaalala rejoiced at seeing the birds, and then looked down into the water container. Waiakea then remembered what he had been instructed, and took up his club and struck and killed the first of the men who had accompanied Mainele; and so he killed all four of the men. Only Mainele remained. Then Pikoikaalala began his chant, and that was the time that Mainele was to die. At the same time, Pikoikaalala began to string his bow, while his eyes were looking down into the water container.

He recounted his mele, thus:

“Behold, there is Pikoikaalala,

O Alala no ka makuakane,
 O Koukou no ka makuahine,
 Hanau o Kikookalani,
 O Kikookahonua,
 O Kikookamauna,
 O Kikookamoana,
 O Kikookapo,
 O Kikoookeao,
 O Kapunanui,
 O Kapunaiki,
 O Ke-i,
 O Ke-hamau,
 Hamau - Aia ka hoi ua manu iluna,
 Eia hoi au ilalo nei,
 E lele ae oe e kuu pua,
 O ka a-i o kela manu,
 O ka a-i o keia manu,
 Huihui a kahi hookahi.”

‘Alalā is the father,
 Koukou is the mother,
 Born was Kīko‘okalani
 (Expanse of the heavens),
 Expanse of the earth,
 Expanse of the mountain,
 Expanse of the sea,
 Expanse of the night,
 Expanse of the light,
 Of the large spring,
 Of the little spring,
 That which is spoken,
 That which is silent,
 Silence, there are the birds above,
 And here I am below,
 Let you fly my arrow,
 The target is that bird,
 The target is that bird,
 Joined together as one.”

O ka hookuu aku la no ia o Pikoiakaalala i kana pua, oia kolili no a ku ana na a-i o a na manu a elua; i ka pua no ana a lele, o ka manawa koke iho la no ia o Pikoiakaalala i holo ai i kai, me kona ike ole aku i ke ku ana o na manu. Uwa nui ae la ka pihe kanaka, me ka hoohe ana; “a make ka manu e!” A pela mau aku no ka ikuwa hauwalaau ana o nalii me na kanaka.

Pikoi-a-ka-‘alalā then released his arrow, it twirled and struck the two birds; the moment the arrow flew, Pikoi-a-ka-‘alalā immediately departed for the lowlands, not knowing whether or not he had hit the birds. There was a great roar from the people there, calling out, “The birds are dead!” And such was the din of the voices of the chiefs and people.

A o Pikoiakaalala hoi, aia kela ke holo kiki la i kai, me kona manao no, aole e ku ana iaia na manu, no ka mea, he mau manu akamai loa i ka alo ana i ka pua. Eia ka auanei ua ku aku la no, a no ke ku ana ka ka mea e uwa nui ia mai nei mahope. A iaia i akakuu iki iho ai kona holo ana, ua komo aku la nae keia i ka nahele loloa o Panaewa; halulu ana hoi o Waiakea ma-hope ona, a alawa ae la ia, o Waiakea no; ninau ae la o Pikoiakaalala, “Pehea na manu, ua ku nae

Now Pikoi-a-ka-‘alalā had arrived at the shore, not knowing if he had killed the birds or not; for the two birds were extremely clever at dodging the arrows. But he had hit them, and that was the reason for the great cry rising behind him. So he slowed down his pace, and entered into the dense forest of Pana‘ewa. Waiākea was noisily following him and saw him. Pikoi-a-ka-‘alalā asked Waiākea, “How are the birds, were they hit?”

paha?” “Ae, ua ku,” wahi a Waiakea. “A heaha hoi kou mea i holo mai nei?” “No kou manao no aole i ku na manu...” “E hoi hou kaula,” wahi a Waiakea, o ka hoi hou aku la no o laua nei a hiki i kahi o ka luahi a kana pua, o na enemi mau hoi o Keawenuiaumi.”

Ku kohana iho la o Pikoikaalala imua o ke alii, nona na enemi e waiho ana i ka make. la wa, hoike ae la oia i kona inoa, a me kona akamai nui, penei no ia:

“O kuu mea i upu ai, o ka mea e make ai o kou mau enemi, alaila, e lilo kau kaikamahine i wahine hoao nana, a e hooili aku no hoi au i kou Noho Alii maluna ona, oiai hoi, o oe ae nei ke akamai lua ole, nana i pale ae nei i ka mea uluhua a kou naau, e enemi mau ai i ke Kau me ka Hooilo, o ka noho ana o nei aina, me ka lana nui o kou manao, e lilo i keiki oe nau, a owau hoi kou makua, a o Hawaii nei ka Moku noho ia, o luna, o lalo, o uka, o kai, o ke kanaka nui, o ke kanaka iki, a hale nui, a hale iki, ua pau a me oe. A o kuu Kama Lei aloha he kaikamahine, o ka mea ia nana e hoopumehana kou poli o na po ua lanipili o ua wahi nei” (Hilohanakahi).

A pau na olelo a ke alii, o ka hoi iho la no ia o ke alii me na makaainana a pau, a halihali pu ia o Mainele me na manu i kai o Hilo, a kau ia i ka Heiau i Poo, aia no kela wahi ma Hilo one, a malaila pu o Kanukuokamanu, o ka nuku no ia o ua mau manu la... [Januari 27, 1866]

Waiakea said, “Yes.” “And why have you followed me?” Because at first I thought that perhaps the birds had not been hit...” Waiakea then said, “Let us two return to the place where the arrow struck the enemies of Keawe-nui-a-Umi.”

Pikoikaalala stood alone before the king, and the dead enemies were there on the side. At the time he revealed his name to the king, his great skill was known, the king spoke thus:

“My desire was that my enemies be killed, and to the one who succeeded, would be wed to my daughter, and also inherit my kingdom. Therefore, because you have unsurpassed knowledge, and have protected me from my enemies—those who caused me grief summer and winter, in the dwelling upon this land—it is with great hope that you will become a son to me, and I will be your father. Hawai‘i will be the Island upon which you dwell—above, below, from the uplands to the sea; the great men, the little men; the great houses, the little houses, all are for you. And my cherished daughter, a beloved lei, is the one who will warm your breast on the rainy nights of this place here” (Hilo Hanakāhi).

When the king finished speaking, he, all the chiefs and people, and those carrying Mainele and the birds, returned to the shore of Hilo. Mainele was placed on the Temple at Po‘o; that place is there on Hilo One, at Kanukuokamanu; and it is named for the nuku (beaks) of those birds... [January 27, 1866]

3.2.4 “He Moolelo Kaa Hawaii no Laukaieie”

“He Moolelo Kaa Hawaii no Laukaieie...” (A Hawaiian Tradition of Laukaieie) was published in the native language newspaper, Nupepa Ka Oiaio, between January 5th 1894 to September 13th 1895, submitted to the paper by Moses Manu. The story is a rich and complex account with island-wide references to—places; descriptions of place name origins; history and mele; it is also interspersed with accounts from other traditions and references to nineteenth century events.

The following narratives (translated by Maly) have been excerpted from the mo’olelo and include an overview of the tradition and those narratives which recount the travels of Makanikeoe (one of the main figures in the mo’olelo. During his travels, Makanikeoe sought out caves, and tunnels that served as underground trails, and through the description of his travels, we learn about wahi pana in Waiākea and neighboring lands. Interestingly this is one of two substantial traditions that reference a shark god by the name of Kāneialehia (the second “He Moolelo Kaa Hawaii No Keliikau[a] O Kau,” published in Home Rula Republika). Kāne-ia-lehia was the guardian of the Waiākea ocean-front, from Makaokū, Keaukaha, and Leleiwi, and to the boundary of Puna, though his primary residence was at Waiuli.

Kaholokuaīwa [w] and Koa’ekea [k] lived at Ulu, in Waipi’o Valley on the island of Hawai’i. They were descended from the chiefly and godly lines of Kahiki and Hawai’i. Their first child was Lauka’ie’ie. But because she was born in an ‘e’epa (mysterious) form, looking more like a plant than a child, she was wrapped in līpoa seaweed and set in the stream. Without her parents knowledge, Lauka’ie’ie was retrieved by Hinaulu’ōhi’a, a mountain goddess and nurtured. Later, two other children, boys, were born to Kaholokuaīwa and Koa’ekea. One was named Hi’ilawe, and the other was Makanikeoe (who was also a wind deity).

Koa’ekea’s sister was Pōkāhi, and her husband was Kaukini. Though they had been married for a long time, they were childless, and because of their prayers and offerings, the forest goddess, Hinaulu’ōhi’a, approached Pōkāhi while she was gathering seaweed, and told her that she would have a girl child to raise as her own. The condition was, that no one, not even her brother and sister-in-law were to know about this child. Because Pōkāhi and Kaukini lived on the mountain ridges between Waipi’o and Waimanu, it was easy for her to keep the secret. It was in this way, that Lauka’ie’ie came to be raised by her own aunt and uncle.

As a youth, Lauka’ie’ie’s companions were the spirits of the plants and animals of the forest. When she matured, she was exceptionally beautiful, and thoughts of finding an acceptable mate for her began to grow. One night, when Lauka’ie’ie was sleeping, she dreamed of flying past the valley lands of Hawai’i, and across, Maui,

Moloka‘i, O‘ahu, Kaua‘i, Ni‘ihau, Ka‘ula, and on to Lehua⁷, where she saw a handsome young chief, named Kawelonaakalāilehua. It was this chief that was destined to become her husband... [January 5-19, 1894]

He Moolelo Kaaō Hawaii No Laukaieie

[Nupepa Ka Oiaio, Maraki 16, 1894:4]

...Ua hoi lakou ma Hamakua Hikina a me Hilo-paliku a hoea ma Hilo one. Ia lakou i hiki aku ai malaila, ua hookipa ia lakou e ko laila kamaaina o Kaneialehia, nona hoi ke kai maluhia mai ke kai o Makaoku ma Mokuola, a hiki i ka lae o Leleiwi ma Keaukaha, o ka lae uluhua keia a ka poe hula —

“Hookahi a‘u lae uluhua ea
O ka lae o Leleiwi ea
He ukali o Makahanaloa ea
Me ka ulili holo kahakai ea.”

A ua waiho aku lakou i kona lokomaikai, aole no hoi lakou iho malaila, a ua huli hoi aku lākou no Punapaiaala, a ua ukali pu aku hoi ke kamaaina a hiki ma kai o Papai me Paukupahu. Ua kuhikuhi ae ia o Kaneialehia i ka lua o ko laila wahi mano Kaulana i ka olelo ia, “Aia a Mano nana i kumu pali.”

Ina ua hele oe e ka mea heluhelu ma ke alanui mai Hilo aku no Puna, alaila, e ike no ‘oe i kahi i kapaia o “Ai a Mano, nana i kumupali⁸,” mawaena o Kumu me Haena ma Keaau. I ka hiki ana aku a ua huakai mano nei ma ke lae o Kalohi ma Hopoe i ka wai koo lihilihi...

He Moolelo Kaaō Hawaii No Laukaieie

[Nupepa Ka Oiaio, Maraki 16, 1894:4]

...[Makanikeoe and his traveling partners] Returned to Hamakua, and then Hilo-paliku, and reached Hilo one. When they arrived there, they were welcomed by Kaneialehia, a native of the area, it was he who maintained the peace (safety) of the

⁷ The lengthy narratives include site descriptions and traditional accounts for various locations on each of the named islands.

⁸ ‘Ōlelo No‘eau (M.K. Pukui, 1983:10 No. 64) provides another version of the saying “‘Ai a manō, ‘a‘ohe nānā i kumu pali” (When the shark eats, he never bothers to look toward the foot of the cliff), explaining “Said of person who eats voraciously with no thought of those who provided the food, shows no appreciation for what has been done for hm, nor has care for the morrow.

ocean waters from Makaoku at Mokuola to the point of Leleiwi at Keaukaha. It is this point that is remembered by the hula people —

“There is one point that perplexes me,
The point of Leleiwi,
Makahalanaloa is the attendant,
Also the ulili [wandering tattler] which
runs across the shore.”

They soon departed from his kind hospitality, not staying there long, turning towards Puna of the fragrant bowers, attended by their kama‘āina, reaching the sea of Pāpa‘i and Paukūpahu. Kaneialehia then pointed out Kaulana, the shark of that place, stating, “There is the Shark of the cliff base.”

If you, my readers, travel along the this path between Hilo and Puna, you shall see the place named “Ai a Mano, nana i kumupali” [also spoken as a warning people to be wary along the shore line.] between Kumu and Kaena at Keaau. The shark travelers then went as far as the point of Kalohi at Hopoe where the water props up the eyelashes [a poetic description of birds sipping the nectar of lehua blossoms]...

Later on in their journey, in the forests of ‘Ōla‘a, Makanikeoe called upon the goddess, Hinahelani (one of the body-forms of Hinaulu‘ōhi‘a). Describing the ‘ie‘ie, he called upon her in mele, and she revealed herself in her forest cover of ‘ōhi‘a. It was Hinahelani, who first grew as an ‘ōhi‘a tree at ‘Ōla‘a and then as the ‘ie‘ie plant which first grew near Pua‘aloa at the place known as Pā‘ie‘ie in Waiākea.

The party then traveled from ‘Ōla‘a into Waiākea, reaching Pana‘ewa—

[Nupepa Ka Oiaio, Okatoba 5, 1894:1]

...Ua nalowale koke aku la ka mea nona keia moolelo me kona ohana a pau a hiki ma loko o kanahale o Panaewa ma kahi i kapa ia Kahiolo; aia hoi he mau puka elua keia e hamana ala a hiki i keia wa.

Aole nae he hohonu o keia lua i ka honua, e like me kekahi mau lua e ae, aka, o kona mau puka nae e hili pono ana iluna, aole he wahi e hiki ai i ke kanaka ke iho a ilalo, no ka mea, he pali kona mau aoao a pau, aia ma ke kolu o ka puka e huli pano ana i kai o Keaukaha, aia malaila e hiki ai ke kono mai ke kanaka.

He ekolu mau mana o loko o keia lua, ua moe pololei aku ka mua a hoea maloko o ke kai ma Pui e pili pu ala me ke Poi Kohola o ka nalu o Milo. He mana keia e hele aku ai a loa ka wai e huai la ma na kahakai ma ia mau aina, o ka lua, ua moe aku ia a puka ma ka

loko o Waiakea... o ke kolu o ka mana o keia lua, ua moe aku ia iuka pono o ke kuahiwi i ke komohana akau, a hoea ka puka mauka o kanahale laau ma Olaa. O Kepuhi ka inoa. He lua nui hohonu keia. He hookuuku kaula ka mea e hiki ai ke kanaka ke iho ilalo o keia lua nei. Poepoe a hamama pono ana iluna o na laau me na lau nahelehele a pau e ulu ana maloko o ua lua nei...

Ia Mekanikeoe i konoai maloko o kela lua, aia o Hinauluohia ke hooulu ia i ka ieie ma ua mau nahele kaulana ala o Hilo, a liko i mea nui ma na wahi a pau

[Nupepa Ka Oiaio, Okatoba 5, 1894:1]

Mekanikeoe and family then disappeared, coming into the forest of Panaewa, at the place Kahiolo, where are found to large opening to this day.

The two openings are not deep in the earth like other pits, but the openings are joined together, and a person cannot enter to descend because they are cliffs on all sides. It one turns towards the makai side there is a third opening; and that is where a person may enter.

There are three branches in this pit. The first runs straight down to Puhī adjoining the place of waves at Milo. This is the branch that one travels to get the fresh water for these lands. The second branch comes out a the fishpond of Waiakea.... The third of the branches in this pit runs to the uplands of Olaa. Its name is Kepuhi. This is a deep pit. Its opening at the top is round, covered with forest, and the plants that grow within the pit...

Manu stops the traditional narrative here and calls the reader’s attention to the nature of ‘Ōla‘a. It is a land that separated Puna from Hilo, and it has no shoreline, though there are three “Mākāhā” as described by the people of old. “These are not like the true mākāhā of the Loko Kuapā (walled fishponds), but in the way that the people live on the land and exchanged things from inland with those people who lived in Hilo, Puna and Ka‘ū.”

Continuing his narrative, Manu adds further details about meeting Kānekoa in the upland forests and describing several places on the way to the shore of Waiākea.

[Nupepa Ka Oiaio, Okatoba 12, 1894:1]

...Aia keia lua ke hamama ‘la kona mau puka a hiki i keia wa, na ko Olaa poe kamaaina e hooia mai i keia lua a me ka poe o kai o Keaukaha. A o keia hoi ka lua mua loa i ike ia ma ka aina o Hilo, Hawaii... Ia Mekanikeoe i haalele aku ai la ia Kanekoa maloko o kanahale laau Olaa, ua huli hoi ma la oia a hiki ma kahi o kona kaikuahine Haku Lani e noho ana me na ohana a pau ma Lanipo.

Aia keia wahi ma kai ae o ke alanui aupuni e hele ana mai Hilo Taona aku no Puna ma kanahele o Panaewa, ua pili pu me kahi e pahoehoe o Kahiwakaa [Kawiakawa] pu a me Mawae, ka mokuna o Hilo a me Puna. Aia mawaena o keia wahi o Lanipo a ua kupono hoi keia wahi i kai o Papai, kahi i paa ai ka wawae o ka na'i aupuni kaulana a me kona lae i hauaia ai i ka hoe Kamehameha I.

Ia Mekanikeoe i hiki aku ai ma kela wahi a ka mea nona keia nanea e noho mai ana a ua nee ko lakou no kahi o kela lokowai o Lokowaka, a ua au ia wahi wai iho la lakou nei a pau malaila me ka hana poi [illegible] o ana i na mea a pau maloko o kela loko.

Ma keia makaikai mau o na poe malihini, aole he poe kamaaina nana lākou iki mai ma kela wahi, a mahope io o ko lākou hana ana, a ua hele aku ka huakai ma kai o Waiuli.

[Nupepa Ka Oiaio, Okatoba 12, 1894:1]

The opening of the pit [lava tube skylights] may be seen there to this day. Kamaaina of Oiaia will attest to it, as will the people who live shoreward at Keaukaha. This was indeed the very first of the holes seen on the lands of Hilo. Mekanikeoe left Kanekoa behind in the forest of Oiaia and turned to join his elder lord sister and was with the family down at Lanipo.

This place shoreward of the government trail that goes between Puna and Hilo Town, through the forest of Panaewa. It is near a place of pahoehoe lava, between Kahikawaa [Kawiakawa] and Mawae, which is the boundary of Hilo and Puna. There in between these places is Lanipo. It is very close to shoreward place of Papai, where the foot the famous conqueror of the nation was stuck, and his brow struck by the paddle, Kamehameha I.

When Mekanikeoe arrived at this place with the one for whom the story is told, was staying, they then went on to the ponds of Lokowaka. They all bathed in the water of this place, splashing with one another in the pond.

This is a regular practice of visitors who travel to that place. Afterwards, Mekanikeoe and companions traveled to the shore of Waiuli.

[Nupepa Ka Oiaio, Okatoba 19, 1894:1]

O kahi keia a Kaneialehia i olelo ai i kanaka oia wahi e hoala ana i kuapa, aole e paa i ke kai ke hoea mai, he mea oiaio ia, aole i paa ia wahi i manao ia'i i loko a hiki i keia wa.

A no ia wahi hoi o Waiuli ke kai halakika i haku ia'i i ke mele e kelii ka Moi Kalakaua i make, a mai keia wahi aku i hele aku ai ka ui nohea kaulana oia mau la o Waipio a hiki ma Leleiwi, ka lua o na Lae kaulana loa ma Hilo.

O ka lae o Leleiwi ma Waiakea kai o Hilo, ua kapaia kona inoa ma o Waiolama (k) me Punahoa kana wahine, a na laua mai o Leleiwi kane, me kona kaikuahine o Makahanaloa. E loa no ma ka moolelo o Keaomelemele.

A o Leleiwi nei keia i haina mai ai e Pele a make maloko o ke kai, aia kona Kino pohaku me he le Palaoa ‘ia ke ano e waiho la maloko o ke kai o ka lae mai ka aina aku nei. He pohaku ula keia, a o ka leho maikai—ula a me ke ahi la ke nana aku iloko o ke kai. He lele ke ike mai i ke kanaka, e loa no i ke kanaka lulu leho o Hilo ma keia pohaku o Leleiwi...

[Nupepa Ka Oiaio, Okatoba 19, 1894:1]

[Waiuli] This is the place of Kaneialehia who was previously mentioned. At one time a kuapa (pond wall) was being made, but it does not keep the ocean out. Truly it is not set firmly at this pond to this day.

It is for this place, Waiuli, with the ocean that slips and slides, that the mele was composed for the deceased chief, King Kalakaua. From this place the famous beauty of Waipi‘o [Lauka‘ie‘ie] went to Leleiwi the very famous point for Hilo.

About the point of Leleiwi at shore of Waiakea, Hilo. It name was given by Waiolama (k) and Punahoa his wife, he named their son Leleiwi, and his older sister was name Makahanaloa. This account is found in the tradition of Keaomelemele.

It is said that Leleiwi was killed by Pele in the sea. His stone body, which looks like a palaoa [whale tooth hook pendant], may be seen in the ocean fronting the point. One may still see this, and those who of Hilo dive for leho [cowrie shells for lures] know where the stone of Leleiwi is... [Maly, translator]

3.2.5 “Kaa Hooniua Puuwai no Ka-Miki,” The Heart Stirring Story of Ka-Miki

“Kaa Hooniua Puuwai no Ka-Miki” is a tradition about two supernatural brothers, Ka-Miki (The quick, or adept, one) and Maka‘iole (Rat [squinting] eyes), who traveled around the island of Hawai‘i along the ancient ala loa and ala hele (trails and paths) that encircled the island. During their journey, the brothers Ka-Miki and Maka‘iole competed against ‘ōlohe (experts skilled in fighting or in other competitions, such as running, fishing, debating, or solving riddles, that were practiced by the ancient Hawaiians) in famed kahua (contest arenas) and royal courts. They also challenged kahuna (priests) and ‘ōlohe whose dishonorable conduct offended the gods of ancient Hawai‘i. Ka-Miki and Maka‘iole were empowered by their ancestress Ka-uluhe-nui-hihi-kolo-i-uka (The great entangled growth of uluhe fern which spreads across the uplands), a body-form of the goddess Haumea (the creative force of nature—also called Papa and Hina—who was a goddess of priests and competitors).

The tradition was presented to the native newspaper, *Ka Hoku o Hawaii*, by noted Hawaiian historians, John Wise and J.W.H.I. Kihe, between 1914 to 1917. It is set in about the 1300s, at the time when Pili-a-Ka'aiea (Pili) was sovereign chief of all Kona. Along their journey, the brothers visited the royal court of the chief Waiākea-nui-kumu-honua, who was the brother of the chiefess Pana'ewa-nui-moku-lehua, and the chief Pi'ihonua-a-ka-lani. The traditions associate place names with people and events in history and describe a broad range of sites and travel across the Hilo landscape. The narratives also share with us the poetry and attachment that Hawaiians share with the forests, rains and streams which were such an integral part of the Hilo landscape.

...Ka-Miki, Maka'iole, and their companion, Keahi'ālaka, departed from the compound of Kapu'euhi and continued their journey, descending on the ala loa to Hilo. Reaching the Hilo Boundary, the travelers approached a large compound, where they saw a man coming towards them with a club. This man was Kūkulu-a-hāne'e-a-hina-pū [Kūkulu]. Kūkulu was a guardian of the chiefess and lands called Pana'ewa-nui-moku-lehua [Pana'ewa of the great lehua forest]. Pana'ewa was a sacred chiefess of Hilo and sister of the chiefs Waiākea-nui-kumu-honua and Pi'ihonua-a-ka-lani. The compound of the chiefess and surrounding community were forbidden to strangers, and Kūkulu regularly killed unaware travelers [thus the name Pana'ewa – “Unjust place”]. Kūkulu challenged Ka-Miki mā but he was quickly defeated...

The lands of Waiākea were named for the high chief Waiākea-nui-kumuhonua, the brother of the chief, Pi'ihonua-a-ka-lani, and chiefess Pana'ewa-nui-moku-lehua... [February 17, 1916]. When Ka-Miki arrived at the court of Waiākea, arrangements were made for him to compete with the 'ōlohe-experts of the land, at the kahua (contest site) of Kalepolepo (situated between Mohouli and Kāwili). 'Ūpēloa the champion, land administrator and war counselor of Waiākea, and an expert fighter with 'ōka'a lā'au [war clubs] was called to Kalepolepo... After much boasting, 'Ūpēloa and Ka-Miki met on the contest field, and in no time, 'Ūpēloa was defeated and completely bound up...

...Chief Waiākea heard that 'Ūpēloa had been defeated and was greatly surprised that his war counselor and war club fighting expert had fallen. Waiākea then called to his messenger Kapunakō to get Kaūmana, the foremost teacher of lua, ha'iha'i, kākā lā'au [bone breaking fighting, and spear fighting], and all manner of fighting and bring him to the kahua. Upon arriving before his chief, Kaūmana asked Waiākea to send his messenger Kapunakō, to bring Kalanakāma'a, Kaūmana's foremost student, to join him at the kahua of Kalepolepo.

The place called Kalanakāma'a, situated in Kukuau, was named for Kalana-kāma'a-o-uli, the foremost 'ōlohe student of Kaūmana, and champion of Waiākea. Kalanakāma'a was

the ward of Kīpuka ‘āhina [k], Hale-aloha [w] and Hale-loulu [k], who dwelt above Hilo on the mountain lands.

When Kapunakō arrived before Kīpuka ‘āhina, he spoke about the great rains and rivers of Hilo, a poetic reference to the many skilled ‘ōlohe for which Hilo was famed. It was in this way that Kapunakō described the overwhelming skills of Ka-Miki and his victory over ‘Ūpēloa. Kīpuka ‘āhina then asked:

Māmā Hilo i ka wai?

Is Hilo lightened of the waters?

Kapunakō responded:

‘Ae māmā Hilo i ka wai ‘ole, ua kau i ka lani ka holo [wa‘a] ua o Hilo, na ka Mālualua e ki‘i ala i pulu ka liko o ka lehua a me ka māmane! (Indeed, one can move swiftly through Hilo, for the streams are without water, the water trough [i.e., the clouds] of Hilo are set in the heavens. It is the Mālualua that fetches moisture for the budding lehua and māmane.)

Kīpuka ‘āhina then asked in amazement:

Nawai e nele o Hilo i ka wai?

**He lau ka pu‘u, mano ka ihona, he kini nā kahawai o Hilo,
e ‘au i ka wai o Hilo a pau ke aho!**

Who could possibly make Hilo destitute of water?
There are lau (400, poetically many) hills, mano (4,000, many)
places to descend, and kini (40,000, many) streams to cross,
indeed, one is worn out swimming through the waters of Hilo!

It was in this way that Kīpuka ‘āhina learned that a master ‘ōlohe had come to Hilo challenging its many ‘ōlohe. Using his ipu hōkiokio [gourd nose flute], Kīpuka ‘āhina awakened Kalanakāma‘a, for this was the only way in which Kalanakāma‘a could be safely awakened, or he would kill whoever dared to wake him. [February 24–March 2, 1916]

Kalanakāma‘a joined his teacher Kaūmana and met with the assembly at Kalepolepo. Carrying his club Pūpū-kani-oe-i-ka-ua-o-Hilo [Land-snail singing in the rain of Hilo], Kalanakāma‘a entered the kahua with Kaūmana and a great cry arose praising the abilities of these Hilo champions. Ka-Miki and Kalanakāma‘a exchanged taunts, Ka-Miki stated that Kalanakāma‘a would become the kāmā‘a lau-ī i hili kuanaka ‘ia [twined ti leaf sandals] that Ka-Miki wore upon his feet. Outraged, Kalanakāma‘a leapt to attack Ka-Miki

with his club Pūpū-kani-oe-i-ka-ua-o-Hilo, Ka-Miki leapt out of the way, and took ‘Ūpēloa’s club from Maka-‘iole. Seeing his student miss, Kaūmana called out to Kalanakāma’a telling him how to strike Ka-Miki— ‘ōlelo no’eau:

**Kau i ka lani ka holoua o Hilo, hilo ‘ia i ke aho a ka ua he ‘lo ka hauna lā’au e
ki’i ai, a’ohe wahi pā ‘ole, pā ma ke po’o a hō’ea i nā wāwae, pā no pau ka ‘oni,
‘oni no he aīwaiwa ia, he hialōloa no ka naele, alaila ho’i hou ka hauna lā’au
a ke koa kua makani.**

Placed in the heavens is the water trough of Hilo, entwined in the cordage of the rains, ‘lo [Hawk] is the war club strike to use, for there is no place that can’t be hit. Strike at the head and reach to the feet, for once struck, there will be no movement. If there is any movement, he is indeed a skilled expert of the depths [deepest knowledge], then return and strike again in the manner of the windswept koa tree [March 9, 1916].

Ka-Miki then attacked Kalanakāma’a and quickly overcame him. Kaūmana then leapt to the kahua and was beaten as well. After Ka-Miki defeated Kaūmana, word spread throughout the region, and Pi’ihonua called his council together, wondering how they might help regain the honor of Hilo from this stranger.

Hanakahi told Pi’ihonua that it would be best not to fight. Pi’ihonua then said that perhaps it had been a mistake to honor Hanakahi with his title as champion, and marriage to ‘Ohele [March 16, 1916]. Hanakahi told Pi’ihonua all of the things that Nā-Mau’u-a-Pā’ao had told Pi’ikea about Ka-Miki, and said it would be unwise to compete and thus leave all of the champions of Hilo in disgrace.

Hanakahi himself was a master ‘ōlohe trained by Maulua, of Hilo-Palikū. He was skilled in kākālā’au [spear fencing], pololū [long spear fighting], ihe laumeki [barbed spear fighting], and all manner of knowledge. Hanakahi told his chief, “It is my desire to go before Ka-Miki, not in the manner of a competitor, but in the spirit of friendship, and to learn from them the things that they have been taught by their teachers. If I succeed, I will be the foremost ‘ōlohe of all Hilo, and I will serve as their guide as they journey from one border of Hilo to the next border of Hilo.” Hanakahi then asked his chief, “Do you agree?” Pi’ihonua told Hanakahi to go and compete first, and then if he was securely bound, to surrender and ask for friendship.

Hanakahi approached Kalepolepo, and the contest between Ka-Miki and himself was announced. ‘Ōka’a lā’au [club-spear fighting] was selected as the method of fighting, and when Hanakahi asked Ka-Miki, “How shall the victory be determined?” Ka-Miki said, “By the breaking of one’s spear.”

Ka-Miki greatly admired the nature of Hilo-Hanakahi, and as they competed, Ka-Miki dodged each of the thrusts. To those gathered at the kahua, it was as if Ka-Miki was the teacher and Hilo-Hanakahi was the student. Hilo-Hanakahi tried each technique he had learned from his teacher, but was unable to score against Ka-Miki. Worn out, Hilo-Hanakahi collapsed and was taken off of the kahua borne in a net. Hilo-Hanakahi acknowledged the nature and skills of Ka-Miki and surrendered to him, thus ke 'ahi kananā [the fierce tuna] of Hilo befriended Ka-Miki mā upon the kahua.

Hilo-Hanakahi returned to the chief Pi'ihonua, and they spoke of the events which had taken place at Kalepolepo. Pi'ihonua then sent his messenger to invite Ka-Miki and companions to his compound, in the manner of aikāne [companions] [March 23, 1916]. Ka-Miki mā were well hosted by Pi'ihonua, and Ka-Miki asked Hilo-Hanakahi to accompany them to the border of Hilo and Hāmākua, at Ka'ula. Pi'ihonua agreed, and the group then departed for Wailuku... [March 30, 1916].

3.2.6 Kāwili and Bird Catching Techniques of the Ancient Hawaiians

There are a number of traditional accounts describing the arts of the class of people who caught native birds in order to collect their feathers. Several methods of bird catching were widely practiced by native Hawaiians. As described below, the place name Kāwili, in Waiākea commemorates one of the practices employed by the po'e 'āhele manu (bird catchers).

Nearly all of the accounts recorded in the 1800s about bird catching customs tell us that traditionally, the rarer birds, whose feathers were sought for ornamental purposes were not killed by the bird catchers. One account from the later period in the life of Kamehameha I, reported that as a result of growing commercial activities in the islands, traditional methods of harvesting resources and catching birds, were changing. Regarding these changes, and the response of Kamehameha I to careless collection of bird feathers, Kamakau (1961) wrote in the 1860s:

Troubles that arose were not of his making, and those that had to do with disputes about religion came after his time. He ordered the sandalwood cutters to spare the young trees and, not to let the felled trees fall on the saplings. "Who are to have the young trees now that you are getting old?" he was asked and he answered, "When I die my chief and my children will inherit them." He gave similar orders to bird catchers, canoe makers, weavers of feather capes, wood carvers, and fishermen. These are the acts of a wise and Christian king who has regard for the future of his children, but the old rulers of Hawaii did the same. [Kamakau, 1961:209-210]

While researching various ethnographic records of the Bernice Pauahi Bishop Museum

(BPBM), the author reviewed Hawaiian language papers (handwritten and typed) collected by island historian, Theodore Kelsey. Kelsey was born in Hilo in the late 1800s and spent his entire life speaking with elderly Hawaiian people, collecting their stories, and translating their writings. Among his papers curated at the Bishop Museum (BPBM Archives–SC Kelsey; Box 1.5), are notes on various aspects of Hawaiian culture including bird catching. Kelsey’s informant was the elder Reverend Nālimu (born in 1835), who shared his account of note places—including Kāwili and Mokaulele which cross the UH-H complex—and through the uplands of the Hilo District and ‘Ōla‘a. Bird catching, both as a means of providing feathers used for making Hawaiian emblems of royalty, and other birds as a food source was practiced across the mountain region.

The following Hawaiian texts are presented verbatim as recorded by Kelsey in c. 1921 (including his use of diacritical marks). The English translation of the Hawaiian narratives was prepared by the author of this study and reflects the basic tenor of the Hawaiian narratives. It should be noted here, that in the Hawaiian language, occurrences of certain words naturally imply a specific action or statement, which is reflected in the translation below:

“AHELE MANU”

by H.B. Nalimu

Po‘e kia manu o Laa, oia ka po‘e ahele manu, kekahi me ka laau a kekahi me ka lehua. O ka mea ahele manu ma ka lehua malaila ka puka e hanai kokoke i ka lehua, he puka paa ke-ia. Kekahi piko o ke kaula ma ka la-la o ka ‘ohi‘a e paa ai. Elima, eono paha anana ka lo-ihi o ke aho mai ka puka mai a hiki i ka lima o ke kanaka e paa nei i ka piko o ke aho. A o ka puka aia ma kahi kokoke i ka lehua e kiko aku ai ka manu i ka lehua. I ka wa e lele mai ai ka manu lele no a ku maluna o ke-ia puka e kiko aku i ka lehua. A ia manawa e huki ai ke kanaka i ka piko o ke kaula a paa ka wawae o ka manu. Pii ke kanaka iluna a lawe i ka manu a hana hou aku i kela puka malaila. O ka akakane a me ka ‘iwi, a me ka ‘o-o‘ iluna o ka pua lehua. Ahele me ke aho olona‘ makalii. Maluna o ka mai‘a pala e ahele i‘ ai ka manu o-u'.

“KĀWILI KĒPAU.”

O ke kepau oia ke kohu o ka ‘ulu. E ‘oki-oki ai i ka ‘ulu a kahe mai ke kohu ke‘oke‘o, a i ka wa e maloo ai ua kohu ‘la i ke ahiahi alaila ua paa a‘e ua kohu la.

Hele oe e ho-ulu-ulu ke-ia kohu a pau. Ho-ulu-ulu a nui, alaila lilo a‘e‘la ua‘ kohu nei i kepau. Alaila hele oe e ‘ohi i hookahi kukui maka a hemo kona iwi ‘a ‘o kona ‘i‘o malama ‘oe kela‘. Hele hou oe i ka' pa-ihi ku-kepau (kind of clover) he pa-ihi ‘ele-ele ia, a hoohui me ke kukui maka, alaila nau a wali ke kukui maka me ka pa-ihi. Hookomo iloko o ke kapa wauke (he mea uaua ia), alaila ‘uwi‘ i ka wai o ke kukui a me ka pa-ihi iloko o ka ‘opihī, oia ka “ipuhao” e kupa ‘ai iluna o ke kapuahi. I ka wa e hoomaka ai e paila alaila

‘oki-oki i ke kepau a liilii a hookomo iloko o ke-ia wai kukui me ka pa-ihi i paila ia. Kii elua ni-au ai ‘ole ia, mau laau liilii paha e koali ai iloko o ke-ia wai paila.

Pela e hanai a pau kela’ wai a mo’a kela’ kepau. Hookomo iloko o ke poho ‘opihi a i ‘ole he la-i’ a wahi i ka la-i’. Kāwili ‘iuka a’e nei o Mokau-lele. Neenee ke pulu ‘ohi’a o ia wahi ilalo o ka pahoehoe.

Ilalo no oe e ku ai o ka pahoehoe a hana oe i ke kepau iluna o ka pua lehua. Ina ekolu, eha’ pua lehua au i kāwili ai i ke kēpau alaila i ka wa e pili ai kekahi pua lehua i ka manu alaila alualu a loaa. Pee hou oe iloko o ka pulu ‘ohi’a (kāhi o ka lau ‘ohi’a e luhe ana ilalo, oia ka pulu ‘ohi’a) a pili hou kekahi manu. Opa’ ke poo o ka manu a make. Hookomo iloko o kekahi eke. Hala ekolu paha alaila ho’i, nui ka manu, i hookahi kaau, iwakalua, kanakolu paha. A kela manu makalii; ua momona—kuhikuhi kona i’o, momona. Oia ke kāwili kēpau.

“LAAU KIA MANU.”

Ekolu, eha’ paha anana ka lo-ihi o ka laau. Kau ia ka pua lehua iluna o ia laau nei mai kekahi ‘ao-ao o ka laau a hiki i kekahi poo o ka laau. Hana elua kanaka, kekahi ma kekahi laau a kekahi ma kekahi. Kepau maluna o ka laau a he mau pua lehua mawaena o ke-ia mau kēpau—he laau kia manu ia | _____ |. Olaa ka aina kia manu a me Piihonua. Nui ka manu o-o’ ma Puu O-o’. Malaila ka po’e kia manu e hele ai a loaa na lei hulu no na lii. O Pana-‘ewa kekahi wahi kia manu.

Huki ka laau kia manu iluna mawaena o na ‘ohi’a elua. Hana me ka ‘upena kekahi. Huki ia iluna ka ‘upena, hookahi laau maluna, hookahi laau malalo. He ‘upena ‘olona’ maka hakahaka, a he kaula ‘olona’ ma na poo. ‘Elima, eha’, ekolu paha anana kela’ ‘upena palupalu. Lele no ka manu, paa ka wawae, paa ka pekekeu. Ina’ hookahi, elua manu, waiho no pela’, oia na manu e kahea ana i na manu e a’e. Nui ka manu, hookuu ilalo ka ‘upena a huki hou iluna. He ulu ‘ohi’a ma kekahi ‘ao-ao a me kekahi ‘ao-ao. Oia ka hana ana o ka po’e lawai’a manu. Ho’i i ka hale e wehe ai ka hulu o ka manu ‘o-o’. Piha ke po’i i ka hulu a haku lei. Malalo o ka po-ae-ae o ka o-o’ oia ka hulu a-a’, a maluna o ka piapia oia me pue.

[Translation]

Bird Snaring (or Trapping)

Bird catchers (kia manu) of ‘Ōla’a were people who snared (‘āhele) birds. Some with branches and others with lehua blossoms. The individual who snared birds among the lehua made a snare (lasso) close to the lehua flower, the snare was secured there.

One end of the line was securely fastened on the branch of the ‘ōhi‘a. The cord of perhaps five or six fathoms long, extended from the lasso (on the branch) to the man’s hand where the end of the line was held tightly. The snare was placed close to a lehua blossom, where the bird would step (kīko‘o) to the lehua. At that time, the man would then pull the end of the cordage and secure the feet of the bird. The man then climbed the tree, took the bird, and he would make the snare there again. The ‘akakane (‘apapane), the ‘i‘iwi, and the ‘ō‘ō were caught up in the lehua, snared with fine olonā cordage. The ‘ō‘ū bird was snared while it was on the ripe banana fruit.

Preparing Bird Lime to Kāwili, or Ensnare Birds.

The bird lime (kēpau) is made from the sap of the breadfruit. Cut the breadfruit bark and the white sap flows, and when the sap is dry, say in the evening, the sap is hardened. You go and gather the sap. When enough has been gathered, the sap can be made into bird lime. Then you go and gather some raw kukui, removing the shell, you keep its meat. You then get the “clover” for making bird lime (‘ihi-ku-kapu, the *Nasturtium samentosum*), it is a black pā‘ihi, and you mix it with the raw kukui. Then you chew it, and the kukui and pā‘ihi become slimy. This is put into a wauke bark cloth (it is a tough piece), then the juice of the kukui and pā‘ihi are squeezed into the ‘ōpihi (shell), it is the “pot” for cooking the broth over the fire. When it starts to boil, the (‘ulu) gum is cut into small pieces and put in the juice of the kukui and pā‘ihi so it can boil. Then get two coconut mid-ribs or perhaps little sticks to stir this boiling juice. This is how it is done until the juice is cooked and becomes the birdlime. It is then placed into the empty ‘ōpihi or a ti leaf, wrapped up in ti leaves. Kāwili is in the uplands adjoining Mokaulele. Then go to where there is low branching ‘ōhi‘a (pulu ‘ōhi‘a), where the pāhoehoe is below.

You are below on the pāhoehoe, and you apply the bird lime above around the lehua flowers. Now you kāwili (twist, i.e. apply) this bird lime in among three or four lehua flowers, then when a bird is stuck by one of the lehua that blossoms, you free it and it is caught. You then hide again among the low ‘ōhi‘a branches (a place where the ‘ōhi‘a tops droop down, that is the pulu ‘ōhi‘a), and catch another bird. You squeeze the birds head and it is killed. It is placed into a bag. Returning (home) perhaps around three ‘o clock, there are many birds, perhaps forty, twenty, or thirty. Those small birds; when fat—the meat is tasty and sweet. That’s how one prepares kāwili kēpau, or bird lime to ensnare birds.

Snaring Birds on Branches.

The (decoy) branch is perhaps three or four fathoms long. Lehua blossoms are placed on this branch, from one side of the branch up to the tip of the branch. Two

men do this job, one at one (end of the) branch and one at the other. Bird lime is placed on top of the branch along with many lehua blossoms in between this bird lime—this is a bird catchers (kia manu) branch [drawn] | _____|. ‘Ōla‘a and Pi‘ihonua are lands of bird catchers. There are many ‘ō‘ō birds at Pu‘u ‘Ō‘ō. It is there that the bird catchers go to get the feathers for adornments (lei) of the chiefs. Pana‘ewa is also a place of the bird catchers.

The bird catchers (decoy) branch is pulled in between the ‘ōhi‘a lehua trees. One (person) uses the net. The net is pulled up, one branch is above, one branch is below. It is an open (wide) meshed olonā net (‘upena olonā maka hakahaka), and olonā cordage at the tip. It is a soft (pliable) net perhaps five, four, or three fathoms long. As the birds fly their feet are caught, or their wings caught. Now if there are one or two birds, they are left, these are the birds that call out to the other birds. When there are many birds the net is let down (the birds taken), then the net is pulled up again. ‘Ōhi‘a growth is all around. So this is the work of the “bird-fishers,” or lawai‘a manu. They return to the house and then remove the feathers of the manu ‘ō‘ō. When the container is filled with feathers, a lei is made. Below the wing-pit is where the male ‘ō‘ō bird feathers are, and above on the back by the tail, are the pale yellow feathers. [Nalimu in Kelsey; Bishop Museum, Archives–SC Kelsey; Box 1.5; Maly, translator]

3.2.7 Waiākea and Lands of Hilo Bay: In The Path Of Warring Chiefs

In the early to mid-1800s, several Hawaiian historians began collecting and writing about Hawai‘i’s history. Among the prominent native writers cited in this study are John Papa Ii (1959), and Samuel Mānaiakalani Kamakau (1961). Additionally, several foreigners, either visiting or having taken up residency (e.g., Ellis 1963 and Fornander 1917-1919 and 1969), added to the efforts of recording history. Ii (1959) and Kamakau (1961) record events that occurred in the Hilo region early in the life of Kamehameha, and places in the ahupua‘a of Waiākea are included, though not specifically the current study area.

...Alapai, ruler of Hawaii [from c. 1730-1754] and great uncle of Kamehameha, and his wife Keaka took charge of him [Kamehameha]. Some years later, Alapai and his chiefs went to Waiolama in Hilo, where Keoua Kupuapaikalani, the father of Kamehameha, was taken sick and died. Before Keoua died he sent for Kalaniopuu, his older half-brother and the chief of Kau, to come and see him. Keoua told Kalaniopuu that he would prosper through Kamehameha’s great strength and asked him to take care of the youth, who would have no father to care for him. Keoua warned Kalaniopuu, saying, “Take heed, for Alapai has no regard for you or me, whom he has reared.” After this conversation, Keoua allowed his brother to go, and Kalaniopuu left that night for Puaaloa [situated in the ahupua‘a of Waiākea, in the area called Pana‘ewa].

As Kalaniopuu neared Kalanakamaa [in Waiākea], he heard the death wails for Keoua and hastened on toward Kalepolepo [between Mohouli and Kāwili] where he had left his warriors. There they were attacked by Alapai's men, who had followed Kalaniopuu from Hilo. First the warriors from the lowland gained, then those from the upland... Kalaniopuu continued his journey, and at midnight reached Puaaloa, where he arranged for the coming battle. The next day all went as he had planned, his forward armies led the enemy into the forest of Paieie, where there was only a narrow trail, branchy on either side and full of undergrowth. There his men in ambush arose up against the enemy warriors, and his rear armies closed in behind them... When news reached Alapai that his warriors had been destroyed, he sent another company of warriors to meet Kalaniopuu at Mokaulele on the outer road, which was an ancient road, known from the time of remote antiquity... (Ii 1959:3-4).

Kamakau further elaborated on the events and stating:

...Keoua (called Ka-lani-kupu-a-pa-i-ka-lani-nui), fell ill of a lingering sickness at Pi'opi'o adjoining Wailoa in Waiakea and died there in 1752... His older brother Ka-lani-opuu was with his kahu, [guardian-attendant] Puna, above Kalepolepo at the time (Kamakau 1961:75).

Kamakau's narratives follow a similar line as Ii's regarding the death of Kamehameha I's father, and the subsequent battles between Alapa'i and Kalani'ōpu'u (Kamakau 1961:75-76, 125). During this time of turmoil between the ali'i of Hawai'i, Kamakau (1961) wrote about the chief Kahekili of Maui, saying that he came to Hawai'i, in search of feather adornments. The feathers were collected in the lands above Hilo, and speak of a chief by the name of Keawehano, and the customs associated with catching birds—

...Ka-pohu and Ka-'akakai went to Hawaii after feather capes and bird feathers in order to gain admission to 'Umi-hale. They landed in Kohala and Ka-'akakai went by way of Hamakua to Hilo and became friendly with Keawe-hano, the chief of Hilo. As for Ka-pohu, he went around by Kona, Ka-'u, Puna, and finally reached Hilo and there heard in some native villages that a man from Maui had become a friend of Keawe-hano and had obtained a feather cape from him. Keawe-hano's houses were situated on the beach at Punahoa, close to Pi'ihonua and facing the waves of Huia and Hikanui. Ka-pohu went along outside the fence of Keawe-hano's place and saw Ka-'akakai sitting with Keawe-hano at the threshold of the house, both wearing feather capes on their shoulders, feather necklaces about their necks, and helmets on their heads. Now when Ka-'akakai saw Ka-pohu standing outside the fence, he scowled, took up as much room as possible, and left no room in the doorway. Ka-pohu, observing their splendid apparel, chanted these words:

Po Ka'ula i ka hulu o ka manu, Ka'ula is darkened by the feathers

Ke nonoi a'e la ka hulu o ka manu I komo iloko ua i Poli - e.	of the birds, The feathered birds are appealing to the rain to fall at Poli.
--	--

As soon as Keawe-hano heard these words chanted, he brushed Ka-'akakai aside and looked out. Then Ka-pohu went on boldly chanting:

Ku pololei ka 'opua ua malie A ka luna aku i Maunalahilahi, Eia la! O ka i'a a ke akua la Ua lahilahi wale.	The hanging clouds stand erect; it is calm On the upland of Maunalahilahi, Lo, here it is! The fish of the god Is thin.
---	--

Keawe-hano heard the words and called out to Ka-pohu, "Come into the house! There is food and fish in here." As Ka-pohu entered he chanted:

A Kahuku i Ola'a, Ka uka i Pana'ewa, Ka uka o Haili, Kapili manu e, Kawili manu e, Kololio manu e, Wiliwili manu e, O ka hulu o ka manu. 'Ahu'ula mai no, Mahiole mai no. Hulikua mai no.	From Kahuku to Ola'a [I have traveled], To the uplands of Pana'ewa, To the uplands of Haili, To catch birds with lime, To catch birds with snares, To catch birds with lines, To twist the necks of birds, For their feathers. [Give me] a feather cape, [Give me] a feather helmet, [Give me] a feather necklace.
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To these words Keawe-hano responded, "Here is your feather necklace, here is your feather helmet, but the cape you two shall share!" No sooner had he uttered the word share (mahele) than Ka-pohu reached for a corner of the feather cape that Ka-'akakai was wearing and drew it over his own shoulders, leaving Ka-'akakai without any. In that short space of time Ka-pohu had gained the friendship of Keawe-hano. He turned to Keawe-hano and said, "I have two masters, Ka-hekili and Ka-hahana. If your lord goes to war against my two lords, should my lords be victorious over yours I will preserve your life that day" (o 'oe ka'u ola nui ia la). Keawe-hano made the same promise to Ka-pohu, and both agreed to abide by their vow... [Kamakau 1961:130-131]

Following the death of Kalani'ōpu'u, in 1782, the island of Hawai'i was to have been ruled by Kīwala'ō, Kalani'ōpu'u's son, while the gods and heiau were to be cared for by Kamehameha

I. Disagreements arose over the division and redistribution of lands. In the Hilo district, Waiākea and Pōnahawai were among the contested lands (Kamakau 1961:120). Shortly after this division (Kālai ‘Āina), Kīwala‘ō was killed at Moku‘ōhai, South Kona. Ii records that while the division of land was being discussed, Waiākea was likened to a food container (Ii 1959:14); a symbolic reference to the agricultural and fishpond resources of the land. Ii provided details of the division to be made by Kīwala‘ō was being discussed, his half-brother, Keōua, was told by one of his advisers:

... “Perhaps you should go to the chief and ask that these lands be given to us. Let Waiakea and Keaau be the container from whence our food is to come and Olaa the lid⁹.” Keoua did so, but the other Kau chiefs objected to this and spoke disparagingly to him. When Keoua returned, his advisor asked, “How was your venture?” When Keoua told him all that had been said, the man remarked seriously, “A break in a gourd container can be mended by patching, but a break in the land cannot be mended that way.” (Ii 1959:14)

Kīwala‘ō died in a subsequent battle, and Hawai‘i Island came under the control of three individuals, two cousins and their uncle. Keawemauhili the sacred half-brother of Kalani‘ōpu‘u, resided in Hilo and controlled Hilo and Hāmākua. Keōua-kū‘ahu‘ula (son of Kalani‘ōpu‘u) resided in Ka‘ū, while Kamehameha I, also a nephew of Keawemauhili’s and cousin of Keōua’s, controlled Kohala and Kona.

Around 1790, a dispute arose between Keawemauhili and his nephew Keōua, and Keōua attacked and killed Keawemauhili. Kamakau reports that Keōua divided the lands of Hilo District between his chiefs and warriors, and “the fat Mullet of Waiakea and Pi‘opi‘o became theirs” (Kamakau 1969:152). In 1791, Keōua was killed, and Kamehameha I retained Pi‘ihonua, Punahoa, and Waiākea as his personal land holdings in Hilo. Liholiho, or Kamehameha II, was born in Hilo in 1797 (Kamakau 1961:260), and because of the value of Waiākea, Liholiho retained Waiākea until his death in 1824. For a time, a granddaughter of Keawemauhili’s, Kaunuohua, held Waiākea, but in the Māhele, or Land Division of 1848, Kauikeaouli (Kamehameha III), assumed the rights to Waiākea (Board of Commissioners 1929:26). Kauikeaouli retained Waiākea until his death in 1854. The ahupua‘a was among the Crown Lands, which under the monarchy, came to be held in perpetuity by the rulers of Hawai‘i.

⁹ The reference to ‘Ōla‘a as the “lid,” may be taken to imply that the fine resources of bird feathers, olonā fiber for cordage, and the famous kapa (bark cloth) called ‘ō‘ū-holo-wai-o-La‘a were the wealth which covered the needs of the chiefs.

3.2.8 Kānāwai Māmalahoe (Māmalahoa)

Perhaps one of the best remembered events in the history of Kamehameha I as it related to the Waiākea-Hilo and Kea'au lands took place in ca. 1784. Keawemauhili of Hilo and Keoua of Ka'ū, joined forces in Hilo, and there was no place for Kamehameha I to encamp along Hilo Bay. Writing in the Hawaiian newspaper *Kuokoa*, Kamakau told readers how the famous Kānāwai Māmalahoa (Law of the Splintered Paddle) came to be proclaimed (see. also “Ka Moololo o Mamalahoe Kanawai” *Nupepa Ka Makaainana*, Dec 6- 30, 1895) While spying on events around Hilo, Kamehameha and his companion Kahakui secretly paddled from Laupāhoehoe to Kea'au:

Maraki 16, 1867

Nupepa Kuokoa

...Holo akula o ia ma Papai, ma Keaau i Puna, e lawaia ana kekahi poe kanaka a me kekahi mau wahine, a he wahi keiki uuku i ke kua o kekahi kanaka. A ike o Kamehameha i ua poe lawaia nei e makaukau ana e hoi, o kona lele akula no ia mai luna aku o kona waa, me ka manao e kii i kela poe kanaka e pepehi, aka, ua holo kekahi poe me na wahine, a koe iho elua kanaka i hakaka me Kamehameha, aka, ua luuluu kekahi kanaka i ke keiki ma ke kua. O ka hakaka ihola no ia, e poholo iho ana ka wawae o Kamehameha i ka mawae pohaku, a paa loa ihola, no laila, hahau ia ihola kona poo i ka hoe a ka poe lawaia. A no ka luuluu o ua kanaka lawaia nei i ke keiki, a no ka ike ole ia no hoi kekahi o Kamehameha keia e hakaka pu nei, ina ua make loa o Kamehameha i ia la. Ua kapa ia ka inoa o ia hakaka ana o Kaleleiki. O ka pa ana hoi o ke poo o Kamehameha i ka hoe, ua lilo ia i Kanawai Mamalahoa no Kamehameha... [Ku Okoa March 16, 1867]

...Ua kau o Kamehameha i ke kanawai, “E hele ka elemakule a me ka luaheine a me ke keiki a moe i ke alanui...” [Ku Okoa November 23, 1867]

He [Kamehameha] went to Papa'i, at Kea'au, Puna, and he came upon some men and women who were fishing, and a little child rested on the back of one of the men. Seeing the fishermen preparing to go away, he leaped from his canoe intending to catch and kill them, but, some of the men and the women fled, two of the men stayed to fight with Kamehameha, but one man was burdened with the child on his back. During the fight, Kamehameha slipped and caught his foot in a crevice of the rock and was securely held, the fishermen then struck him over the head with a paddle. It is only because one of the men was hampered with the child, and that they did not know that it was Kamehameha that they were fighting with, that Kamehameha was not killed that day. This fight was named Ka-lele-iki. And from the striking of Kamehameha's head with a paddle, the law of Māmala-hoe (Broken Paddle)

was made for Kamehameha... [Ku Okoa March 16, 1867; see Kamakau 1961:126]

...Kamehameha issued the law, “Let the old men and women and children go in peace and sleep [in safety] on the trails...” [Ku Okoa November 23, 1867]

In regard to this law that governed travel along the ala hele of Hawai‘i, Kamakau (1968) also observed:

This became the law over the whole Hawaiian group in the time when Kamehameha ruled over the kingdom. He gave the name of Mamalahoa to the law for his escape from death when he was beaten by the fishermen at Papa‘i in Kea‘au... And because he escaped from death, he named the kanawai Mamalahoa; it was the great lifesaving law... [Kamakau 1968:15]

This significant native Hawaiian law and practice—directly tied to travel along the ala loa between Puna and Hilo—was documented in other accounts as well. Two additional variations of the narratives are included here. One account was recorded by a native Hawaiian who lived in the time of Kamehameha I, the other was recorded by Eben Low, as told to him by an elderly Hilo native in 1932:

Eia ka‘u ike ana i ko Kamehameha au. Eia ka noho ana o ko Kamehameha au, a‘u i ike ai me ke kanawai o kona aupuni... Eia keia, ua hookapu ia, eia ka luahine a me ka elemakule e hele no ka luahine a moe i ke alanui a me ka elemakule...

Here is what I saw in the time of Kamehameha. Here is how the people lived in the time of Kamehameha as I know it, and the laws of his kingdom... Here is this, he placed a restriction on the old women and old men, that the elderly women and elderly men were able to go and sleep along the trail sides and not be molested... (Interior Department Document No. 139, Box 401-1-12 — “Customs and Practices;” narrator unknown, ca. 1848).

Kanawai Mamalahoa

E na kanaka e malama oukou i ke Akua a e malama hoi i kanaka nui, a me kanaka iki, e hele ka elemakule, ka luahine, a me ke kama, a moe i ke ala, aohe mea nana e hoopilikia. Hewa no, make!

O people, respect the Gods, respect also the important man and the little man, and the aged men and aged women, and the children sleep along the trailside, and not be bothered by

anyone. Failure to do so is death! (As told to Eben P. Low by an aged Hawaiian from Hilo – recorded June 9, 1932.)

3.2.9 Fishponds of Waiākea Valued by Kamehameha I

June 8, 1922 (aoao 2)

Nupepa Kuokoa

He Kupanaha Keia Mea o ka Ono a ka Puu

Aole e ono ana ka puu i na mea ai kokoke mai, aia ka ono i na mea mamao i kahi e.

E nana ae kākou i ka moololo o Kamehameha I... Ma ka mokuna aina o Hilo na loko i'a ono a kaulana, oia o Waiakea, Mohouli, Kalepolepo a me Waiahole; a ku kaawale mai o Hoakimau. Aia no keia mau loko apau ma Waiakea...

Eia aku ka i'a o na aina o Panaewa me Keaukaha. Ku ae ka ono i ka anae, e loa ana ke kii ana mai i na i'a o Waiakea...

The throat does not desire the to eat that which is close, but instead desires that which is far away at another place.

When we look to the tradition of Kamehameha I... In the district of Hilo there are fishponds famed for their delicious fish. They are Waiakea, Mohouli, Kalepolepo, and Waiahole; there is also Hoakimau some distance off. All of these fishponds are at Waiākea.

Here is the fish of the lands of Panaewa and Keaukaha. The desire is for the anae, that is what is fetched from Waiakea... [Maly, translator]

3.3 Historic Period

In pre-western contact Hawai'i, all land and natural resources were held in trust by the high chiefs (ali'i 'ai ahupua'a or ali'i 'ai moku). W.D. Alexander, Surveyor General of the Hawaiian Kingdom wrote:

“...It is admitted that under the ancient feudal system, the allodium of all land belonged to the King, not, however, as an individual, but “as the head of the nation or in his corporate right...” (Alexander; Survey Letter Book No. 9, September 30, 1891:107. Hawaii State Archives)

The use of lands and resources were given to the hoa'āina (native tenants), at the prerogative of the ali'i and their representatives or land agents (konohiki), who were generally lesser chiefs

as well. In 1848, the Hawaiian system of land tenure was radically altered by the Māhele ‘Āina (Land Division) which in some ways was an expanded practice of the ancient Kālai ‘Āina. This change in land tenure was aggressively called for by the growing Western population and business interests in the island kingdom—generally individuals were hesitant to enter business deals on lease-hold land.

3.3.1 Māhele ‘Āina – The Land Division

In the present-day, all land tenure in Hawai‘i is based on events that were promulgated in 1848, as a part of the Māhele ‘Āina. As a result of the Māhele ‘Āina, all land in the Kingdom of Hawai‘i came to be placed in one of three categories: (1) Crown Lands (for the occupant of the throne), (2) Government Lands, and (3) Konohiki Lands (see Penal Code, 1850).

Hawaiians view the natural and cultural resources as one integrated system. Settlement and residency on the ‘āina (land, that which feeds you) was determined by the nature of the landscape and the availability of resources necessary to sustain the population. While there was a sophisticated system of land and resource management in place, the system was place-based. The environment was not only physical, but also spiritual.

Laws from the period of the Māhele record that ownership rights to all lands in the kingdom were “subject to the rights of the native tenants,” those individuals who lived on the land and worked it for their subsistence and the welfare of the chiefs (Kanawai Hoopai Karaima... {Penal Code} 1850:22). The 1850 resolutions in “Kanawai Hoopai Karaima no ko Hawaii Pae Aina,” authorized the newly formed Land Commission to award fee-simple title to all native tenants who occupied and improved any portion of Crown, Government, or Konohiki lands. These awards were to be free of commutation except for house lots located in the districts of Honolulu, Lahainā, and Hilo (see Penal Code, 1850:123-124). After native Hawaiian commoners were granted the opportunity to acquire their own parcels of land through the Māhele, foreigners were also granted the right to own land, provided they had sworn an oath of loyalty to the Hawaiian Monarch (Kame‘eleihiwa 1992:300).

In order to receive their awards from the Land Commission, the *hoā‘āina* were required to prove that they cultivated the land for a living. They were not permitted to acquire “wastelands” (e.g., fishponds) or lands which they cultivated “with the seeming intention of enlarging their lots.” Once a claim was confirmed, a survey was required before the Land Commission was authorized to issue any award. The lands awarded to the *hoā‘āina* became known as “Kuleana Lands.” All of the claims and awards (the Land Commission Awards or L.C.A.) were numbered, and the L.C.A. numbers remain in use today to identify the original owners of lands in Hawai‘i.

By the time of its closure on March 31, 1855, the Land Commission issued only 8,421 kuleana

claims, equaling only 28,658 acres of land of nearly 4-million acres, to the native tenants (Kame‘eleihiwa 1992:295).

Buke Mahele 1848 – Division with the King

Ianuari 1848

Buke Kakau Paa no ka Mahele Aina

i hooholo ia iwaena o Kamehameha 3 a me Na Lii a me na Konohiki ana.

Hale Alii Honolulu

Page 5

Ko Kamehameha 3

Na Aina	Ahupuaa	Kalana
Popoki	Ahupuaa	Puna
Humuula	Ahupuaa	Hilo
Kulaimano	Ahupuaa	Hilo Hawaii

Ianuari 27, 1848

Page 6

Ko Victoria Kamamalu

Mokupuni	Na Aina	Ahupuaa	Kalana	Mokupuni
Hawaii	Piopia Ili i Waiakea		Hilo	Hawaii
Hawaii	Kalalau	Ahupuaa	Hilo	Hawaii
Hilo	Hawaii Honohononui		Ili i Waiakea	

Page 27

Ko Kamehameha 3

Na Aina	Ahupuaa	Kalana
Makaoku Ili no Waiakea		Hilo

Ianuari 28, 1848

Page 28

Ko Mikahela Kekauonohi

Mokupuni	Na Aina	Ahupuaa	Kalana	Mokupuni
Hawaii	Honokohau	Ahupuaa	Kona	Hawaii

Page 91

Ko Kamehameha 3

Na Aina	Ahupuaa	Kalana
Waiakea	Ahupuaa	Hilo

...Feberuari 4, 1848

Page 92

Ko Kaunuohua

Mokupuni	Na Aina	Ahupuaa	Kalana
Hawaii	—		

Feberuari 4, 1848

Page 186

Ko Kamehameha 3

Inoa o na Aina	Ahupuaa	Kalana	Mokupuni
Waiakea	Ahupuaa	Hilo	Hawaii
		Makaoku Ili no Waiakea	

Maraki 8, 1848

Page 187

No Ke Aupuni

Inoa o na Aina	Ahupuaa	Kalana	Mokupuni
Waiakea	Ahupuaa	Hilo	Hawaii
		Hilo	Hawaii

‘Ili Within the Ahupua‘a Waiākea

Countless and unknown place names were found within ahupuaa and 'ili—sadly, many have been lost with the passing of time and changing patterns of residence and land use. The occurrence of place names of smaller areas, sites, features, points on land, and on the sea provide important insight into the depth of cultural attachment shared between Hawaiians and their Honua ola (living environment).

3.3.2 Native Tenant and Foreign Claims for Land

Some 250,000 pages were recorded as a part of the process of settling claims made by tenants of the lands across the Hawaiian Kingdom. In 2000-2002, Kumu Pono Associates LLC digitized the entire collection of the Mahele (six distinct record categories), from the original microfilm collection in the Hawaii State Archives. We subsequently reviewed every record and created an updated index, allowing us to identify better the “who,” “where,” “what” and “when” of claims (awarded or not) across the islands. The documents were primarily recorded in Hawaiian. Translations that accompany the Hawaiian language accounts below were translated by Kepā Maly. It will be noted that both the original Hawaiian and English language texts include a number of transposed spellings, and in some cases, personal- or place- names were changed. Because the use of the older names has not survived the passing of time, it is impossible to state with certainty which names were correct, or if both may have had localized use at one time.

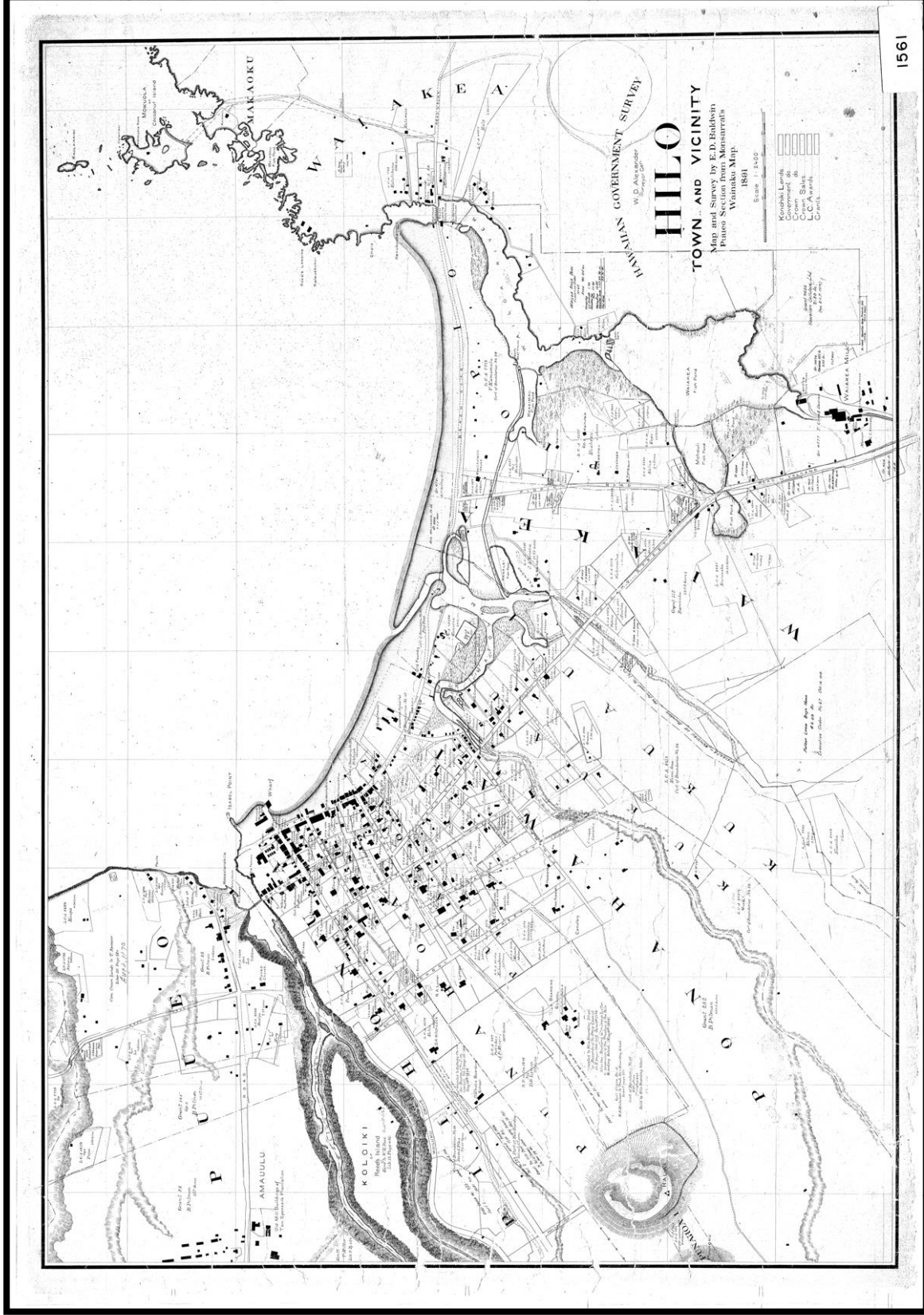


Figure 7. Portion of Hilo Town and Vicinity with Kuleana Parcels and Other Features

Kai Lawai'a (Fisheries)

Hawaiian history leaves no doubt that Hawaiians have always been a people of the ocean. Their knowledge as navigators (crossing wide open seas when their western counterparts were afraid to go beyond sight of the shore), sustainable fishers of deep sea and nearshore fisheries, as builders of fishponds, and their skill as surfers and swimmers is widely known and well documented. It is staggering today, to contemplate that in ancient times, nearly every member of the Hawaiian population regularly participated in some form of fishing—and population figures in the islands, range from some 400,000 to 1,000,000 people in 1778. Native lore and early historical accounts tell us that through those traditional generations, the fisheries were resilient and healthy. These accounts are a reflection of the relationship between people and nature, and the management system that evolved through ancient times. Today, only a very small percentage of the population of the Hawaiian Islands fishes, yet, as the methods of fishing and management systems have evolved away from the traditional system, the fisheries themselves have diminished at alarming rates.

One unique method of aquaculture practiced by ancient Hawaiians occurred in the ponds of Waiākea, where both fish and kalo flourished and provide food year-round for the residents. During the Māhele some native tenants of Waiākea claimed “kipi” planting areas in the fishpond. Handy, Handy and Pukui (1972) described the practice in the following narrative:

In the marshes surrounding Waiakea Bay, east of Hilo, taro was planted in a unique way, known as kanu kipi. Long mounds were built on the marshy bottom with their surface two or three feet above water level. Upon the top and along the sides of these mounds taro was planted. Flood waters which occasionally submerged the entire mound are said to have done no harm, as the flow was imperceptible. This swampy land is now abandoned to rank grass. Kipi (mounds) were also formerly made along Alenaio Stream above Hilo...¹⁰

As Hawai'i was driven to Annexation in 1898, followed by becoming a Territory of the United States in 1900, the federal government sought to identify all resources of economic value in the island. Among these resources were the kai lawai'a (fisheries). In 1901, the “Preliminary Report On An Investigation Of The Fishes And Fisheries Of The Hawaiian Islands” prepared by David Starr Jordan and Barton Warren Evermann, included a section on fishponds and identified the notable ponds of Waiākea for which they could gather information. Under the heading of “Commercial Fisheries Of The Hawaiian Islands” “Fish Ponds,” they discussed types of loko i'a (fishponds) that had been developed and managed sustainably over the generations—

¹⁰ Handy, Handy and Pukui 1972:538-539.

Historic Background

...The most interesting of the fishery resources of the islands are the fishponds. This is the only place within the limits of the United States where they are found on such an immense scale and put to such general and beneficent use. The time of the building of many of these ponds goes back into the age of fable, the Hawaiians, for instance, attributing the construction of one of the most ancient, the deep-water fish-pond wall at the Huleia River on Kauai, to the Menehunes... Many of the very old ponds are still in practical use and look as though they would last for centuries yet. As the ponds were originally owned by the kings and chiefs, it is very probable that most of them were built by the forced labor of the common people...

...The ponds are found principally in the bays indenting the shores of the islands, the common method of construction having been to build a wall of lava rocks the narrowest part of the entrance to a small bay or bight of land and use the enclosed space for the pond. They were also built on the seashore itself, the wall in this case being run out from two points on the shore, some distance apart, in the shape of a half-circle... A few were constructed somewhat interior and these are filled by the fresh-water streams from the mountains or by tidal water from the sea carried to them by means of ditches... ...In the sea ponds the walls are about 5 feet in width and are built somewhat loosely in order that the water can percolate freely. The interior ponds have dirt sides generally, although a few have rock walls covered with dirt, while others have rock walls backed with dirt. The sea ponds generally have sluice gates which can be raised or lowered, or else which open and close like a door. In the interior ponds there are usually two small bulkheads with a space about 8 feet square between them. Each of these has a small door which usually slides up or down. When the tide is coming in both doors are opened and the fish are allowed to go in freely. When the tide turns the doors are closed. When the owner wishes to remove any of the fish he generally opens the inner door when the tide is ebbing. The fish rush [page 427] into the narrow space between the bulkheads, from which they are dipped out by means of hand dip nets. In the sea ponds the gate is opened when the tide is coming in and when it turns it is closed.

There is usually a small runway, built of two parallel rows of loosely piled stones from the gate to about 10 feet into the pond. As the fish congregate in this runway when the tide is going out, it is very easy to dip out the supply needed for market. Seines and gill nets are also swept around the inside of the ponds at times in taking fish from them, and as they are quite shallow this is done easily.

The sea ponds usually contain only the amaama, or mullet, and the awa. In the fresh and the brackish water ponds gold-fish, china-fish, oopu, opai [‘ōpae], carp, aholehole, and okuhekuhe are kept. Practically no attempt at fish-culture is made with these ponds. Besides the fish which come in through the open gates, the owner usually has men engaged at certain seasons of the year in catching young amaama and awa in the open

Historic Background

sea and bays, and transporting them alive to the fishponds. They are kept in the ponds until they attain a marketable size, and longer frequently if the prices quoted in the market are not satisfactory. They cost almost nothing to keep as the fish find their own food in the sea ponds. It is supposed that they eat a fine moss which is quite common in the ponds... [page 428]

...Island of Hawaii:

In Hilo:	Acres
Nameless pond, in lower part of Kukuau	.5
Waiolama Pond, in lower part of Kukuau	.10
Nameless pond, in lower part of Kukuau, filled water hyacinth.	
Hoakimau, in Waiakea	1.9
Waiakea, in Waiakea	25.5
Mohouli, in Waiakea	4.5
Kalepolepo, in Waiakea	1.5
Waihole [Waiāhole], in Waiakea	.5
Kanakea, in Waiakea, sea pond	2
** Lokowaka, in Waiakea, sea pond, almost as large as Waiakea...	

[page 430]

3.3.3 1823 to 1913: Glimpses into Historical Events – Notes Describing Community, Land Use, and Families

After western contact in 1778, visitors to the islands initially remained infrequent, until 1800. The visitors were usually sailors, looking for safe wintering harbors, resources to resupply, opportunities to acquire items that might bring them economic gain, and eventually control over island assets. In 1820, shortly after the death of Kamehameha I American Protestant missionaries arrived, and the political-religious scene in Hawai'i was primed for their settlement, and efforts in colonizing and “civilizing” the native population. Their action accompanied an irrevocable decline of the Hawaiian race, and radical changes in all aspects of Hawaiian life, economics and land use. Historical events in Hilo Town have been extensively covered in various publications and manuscripts, as a result, the selected narratives below provide some early examples of the history, and then include a few notable events in, and neighboring Waiākea.

Historic Background

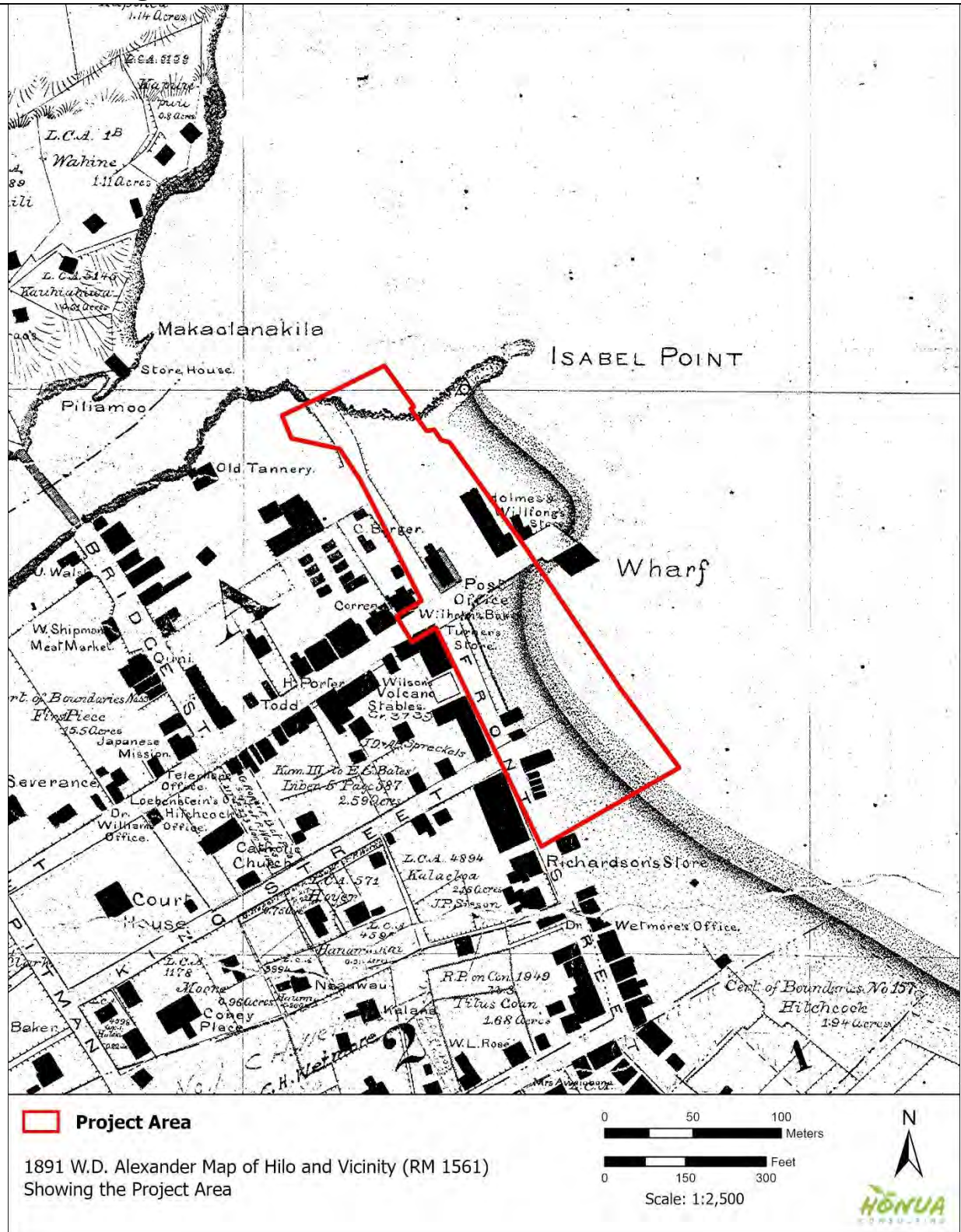


Figure 8. Portion of 1891 map (Registered Map 1561) showing project area location (base map source: DAGS Land Survey Map Search, <http://ags.hawaii.gov/survey/map-search/>)

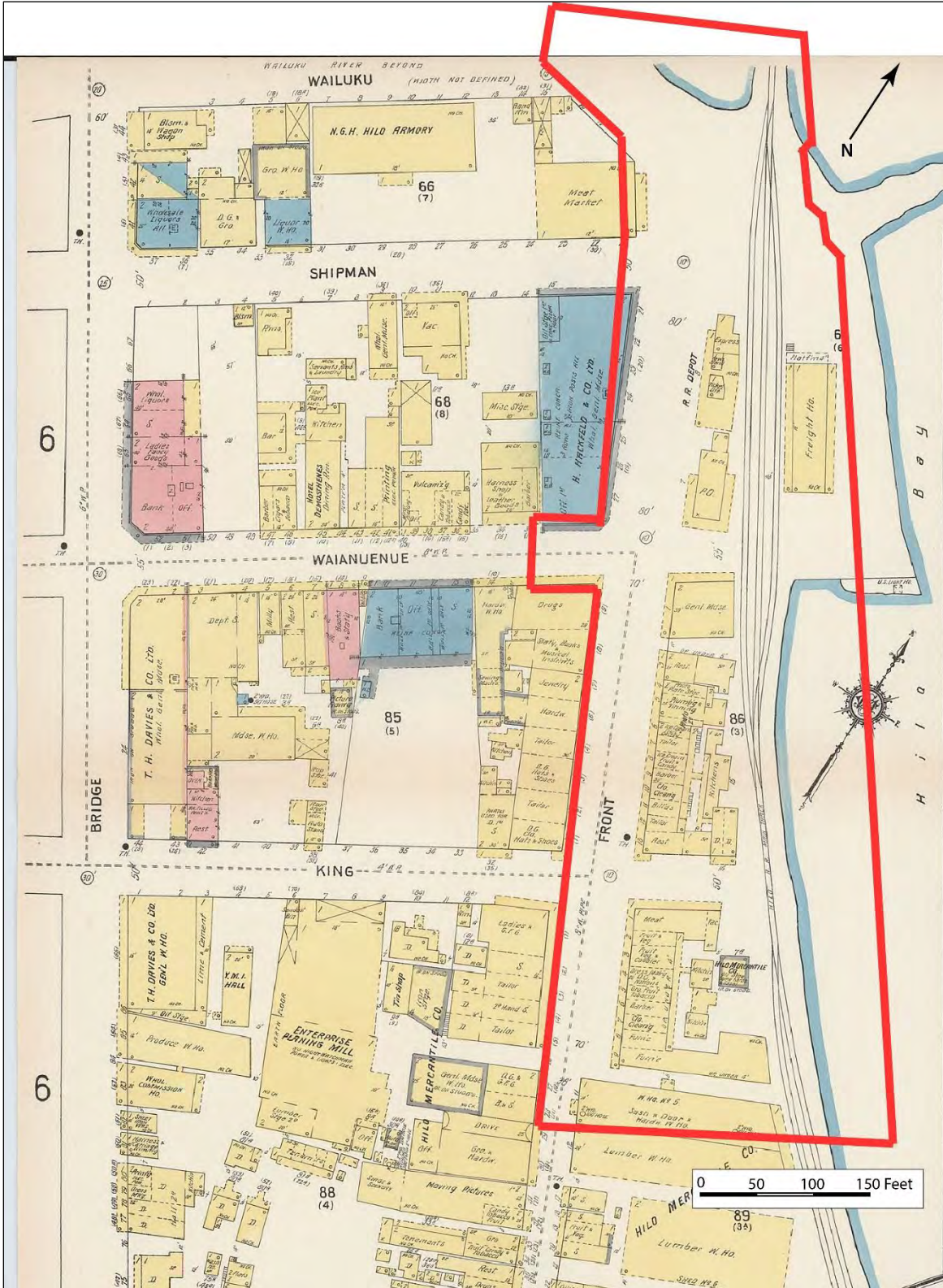


Figure 9. Portion of 1914 Sanborn Fire Insurance map showing approximate location of project area (base map source: University of Hawai‘i-Mānoa’s digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)



Figure 10. Portion of 1917 map showing approximate location of project area (base map source: DAGS Land Survey Map Search, <http://ags.hawaii.gov/survey/map-search/>)



Figure 11. Portion of 1921 Sanford Fire Insurance map showing approximate location of project area (base map source: University of Hawai'i-Mānoa's digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)



Figure 12. Portion of 1928 Wall map showing project area location (base map source: University of Hawai'i-Mānoa's digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)



Figure 13. Portion of 1954 aerial image including project area location (base image source: University of Hawai'i-Mānoa's digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)



Figure 14. Portion of 1965 aerial image including project area location (base image source: University of Hawai'i-Mānoa's digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)



Figure 15. Portion of 1977 aerial image including project area location (base image source: University of Hawai'i-Mānoa's digital maps, <http://magis.manoa.hawaii.edu/maps/index.html>)

The narratives are found in the form of the historical journals, articles, and archival documents, and are presented in chronological order—some with introductory texts, others as documentation recorded at the time.

3.3.3.1 1823: A Visit to Waiākea and the Region that Became Hilo Town

In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawai'i seeking out community centers in which to establish church centers for the growing Calvinist mission. The writings of Ellis and his companions (Ellis 1825, ver. 1963) are one of the earliest such descriptions of the 1820s and provide us with a glimpse into the nature of communities, agricultural fields, and natural landscape around the island. In 1823, Ellis estimated that around 2,000 people lived in 400 houses or huts along Hilo Bay. The village was a complex of kauhale residential compounds and planted fields among groves of trees: notably, 'ulu (breadfruit) and niu (coconut). The kīhāpai and māla (planted fields) were of kalo (taro) 'uala (sweet potato), and other small crops, bordered by mai'a (banana), kō (sugarcane), and wauke (paper mulberry). Spread across the landscape at various places, were also found hala (pandanus), milo and hau (tree-forms of the hibiscus), kukui (candlenut trees) and 'ōhi'a 'ai. Traveling out of Kea'au, Puna towards Waiākea, Ellis and party passed through —

...about two miles through a wood of pretty large timber, came to open country in the vicinity of Waiakea. At one p.m. we reached the house of the chief Maaro... (1963:213)
...Dense fogs and heavy rains are more frequent at Waiakea, and over the whole division of Hiro, than in any other part of the island... (ibid:215).

The houses of the natives who we had visited today, like most in this part of the island, where the pandanus is abundant, were covered with the leaves of this plant, which, though it requires more labour in thatching, makes the most durable dwellings. The inhabitants of Waiakea are peculiarly favoured in having woods producing timber, such as they use for building within three or four miles of their settlement, while the natives in most parts of the islands have to fetch it from much greater distance... (ibid.:224). ...The river of Wairuku was also distinguished by the markets or fairs held at stated periods on its banks. At those times the people of Puna and the desolate shores of Kau, even from the south point of the island, brought mats, and mamake [māmaki] tapa... (ibid.:229-230)

...There are three streams of fresh water, which empty themselves into the bay. One on the western angle is called Wairuku. It rises near the summit of Mouna-Kea, and, after taking a circuitous course for several miles, runs rapidly into the seas.

Two others, called Wairama and Waiakea, rise in springs, boiling up through the hollows of the lava, at a short distance from the shore, fill several large fish-ponds, and afterwards empty themselves into the sea. Waiakea, on the eastern side of the bay is tolerably deep, and is navigated by canoes and boats some distance inland.

The face of the country in the vicinity of Waiakea is the most beautiful we have yet seen, which is probably occasioned by the humidity of the atmosphere, the frequent rains that fall here, and the long repose which the district has experienced from volcanic eruptions.

The light fertile soil is formed by decomposed lava, with a considerable portion of vegetable mould. The whole is covered with luxuriant vegetation, and the greater part of it formed into plantations, where plantains, bananas, sugar-cane, taro, potatoes, and melons, grow to the greatest perfection.

Groves of Cocoa-nut and breadfruit trees are seen in every direction loaded with fruit, or clothed with umbrageous foliage. The houses are mostly larger and better built than those of many districts through which we had passed. We thought the people generally industrious; for in several of the less fertile parts of the district we saw small pieces of lava thrown into heaps, and potato vines growing very well in the midst of them, though we could scarcely perceive a particle of soil. [1963:239]

Ducks and Fish in the Ponds

There are plenty of ducks in the ponds and streams, at a short distance from the sea, and several large ponds or lakes literally swarm with fish, principally of the mullet kind. The fish in these ponds belong to the king and chiefs and are tabued to the common people.

Along the stone walls which partly encircle these ponds, we saw a number of small huts, where the persons reside who have the care of the fish and are obliged frequently to feed them with a small kind of mussel, which they procure in the sands round the bay.

The district of Waiakea, though it does not include more than half the bay, is yet extensive. Kukuwau in the middle of the bay is its western boundary, from which, passing along the eastern side, it extends ten or twelve miles towards Kaau [Kea'au], the last district in the division of Puna.

Recommended as a Mission Station

Taking every circumstance into consideration, this appears a most eligible spot for a missionary station. The fertility of the soil, the abundance of fresh water, the convenience of the harbour, the dense population, and the favourable reception we have met with, all

combine to give it a stronger claim to immediate attention than any other place we have yet seen, except Kairua.

There are 400 houses in the bay, and probably not less than 2000 inhabitants, who would be immediately in the operations of a missionary station here, besides the populous places to the north and south, that might be occasionally visited by itinerant preachers from Waiakea... (1963:240).

By 1825, representatives of the American Board of Christian Foreign Missions (ABCFM) were at work establishing a church and school in what would become Hilo Town. The facilities, situated on lower lands of Pōnahawai and Punahoa, were being attended by growing numbers of native students. This complex evolved into the Hilo Boarding School, which operated for nearly 100 years. This was a period of dramatic change in the Hawaiian Kingdom as well. Liholiho (Kamehameha II) and his wife Kamāmalu died while in England in 1824. Their bodies were returned to Hawai'i in May 1825 by Lord Byron (Kamakau 1961:257). While preparing for the return voyage to England, Lord Byron had the H.M.S. Blonde port in Hilo Bay for refitting. Several journals were recorded pertaining to this visit. One, by the American missionary, C.S. Stewart (1970), who accompanied Byron in Hawai'i, provides additional details on the nature of the land—dwellings, plantations, and population—shoreward and mauka of Waiākea. Upon departing from the ship, Stewart reports:

Mission House, Hido, Monday, June 13. Yesterday morning, at the break of day, we were farther from the harbour of Waiakea than we had the evening before expected to be... [Stewart 1970:360] ...As we approached the land after church, we were greatly delighted with the verdure, luxuriance, and beauty of the landscape opening to us, in the neighbourhood of the bay of Hido. The shore had lost in a great measure the abrupt and precipitous character of the coast along which we had been sailing on Saturday, and was only edged by a low cliff, richly mantled with shrubbery and creeping plants, and ornamented with several beautiful cascades. These in connection with the breakers which ran high upon the rocks, often dashing their spray many feet in the air, gave the cliff an uncommonly picturesque appearance. The land rose gradually from the cliff to the distance of ten or fifteen miles, to a heavy wood encircling the base of Mounakea.

Though in a state of nature, this large district had the appearance of cultivation, being an open country covered with grass, and beautifully studded and sprinkled with clumps, and groves, and single trees, in the manner of park scenery, with a cottage here and there peeping from beneath their rich foliage. The mountains were entirely covered with clouds, or the prospect would have been rendered more delightful from their sublimity. Such was the scene on our right, as [Stewart 1970:361] we sailed close along the breakers to the narrow channel forming the entrance to the harbour, the gentlemen of the Blonde exclaiming "This is more like English scenery than anything we have yet seen!" and we

equally ready to say, “This looks something like America, it has some of the features of a civilized land...!”

...The beach is covered with varied vegetation and ornamented by clumps and single trees of lofty cocoa-nut, among which the habitations of the natives are seen, not in a village, but scattered everywhere among the plantations, like farm-houses in a thickly inhabited country. The Mission Houses were pointed out to us, pleasantly situated near the water, about the middle of the curvature forming the head of the bay.

At a very short distance from the beach, the bread-fruit trees were seen in heavy groves, in every direction, intersected with the pandanus and tutui, or candle-tree, the hibiscus and the acacia, &c. The tops [Stewart 1970:362] of these rising gradually one above another, as the country gently ascended towards the mountains in the interior, presented for twenty or thirty miles in the south-east, a delightful forest scene, totally different in extent from any thing I had before witnessed on the Islands... ...After rowing half a mile, we entered a beautiful fresh-water creek [Waiolama], which winds its way close to the Missionary enclosure, and in a few minutes were welcomed to the cottage of Mr. Ruggles, where Mrs. Goodrich had resided during her husband’s absence...

Tuesday, 14. ...This afternoon I joined Lord Byron and party in a [Stewart 1970:364] visit to a large fish-pond [Waiākea and Wailoa], of which the creek or river is the outlet. It is a pretty sheet of water in its natural state, excepting strong stone dams, to prevent the escape of the fish. These are tabu to all but high chiefs; and no one of rank having lived here lately, the whole pond is literally alive with the finest of mullet; the surface of the water is almost in a constant ripple from their motions; and hundreds can be taken at any time by a single cast of a small net. Expressing our astonishment at the sight, Sir Joseph Banks*, who, from understanding and speaking some English, has been appointed by her majesty interpreter, caterer, gentleman in waiting, &c. to Lord Byron, very seriously says, “O dis noting, sir—noting—I see him before now;—he so full fish, I see one man, he fall backwards in him, he no sink at all!”

After satisfying our curiosity here, we rowed down the creek and across the bay, to another stream on the western side of the harbour, called Wairuku—river of destruction—where the ships get their water... [Stewart 1970:365] The inhabitants of Hido are in a state of much greater simplicity than those in many other parts of the Islands, owing to the infrequency of the visits of ships, and a less degree of the corrupting influence of foreign example in vice... We passed near the chapel on our return. It stands almost midway between the Mission House and the watering place, close to the beach, and although small, is well built, and neatly thatched. The thatching of the houses in general, here, is altogether more neat

* A native so called.

and beautiful than at the leeward islands. It is made from the leaves of the pandanus, and so put on as to conceal [Stewart 1970:366] all the rudeness of the timber and sticks on the inside; while on the outside, a deep edging of fern, along the peak and ends of the roof, and down the corners of the house; having something of the effect of the cornice and pilaster, give a finished and ornamental appearance, not seen in the common grass huts. The ease with which stout timber can be procured here, enables them also to build their dwellings much larger than at Lahaina and Oahu, where the wood most accessible is small and crooked... [Stewart 1970:367]

One additional brief comment from Stewart is offered here, in his description of passing through Waiākea on Lord Byron's journey to Kīlauea. We find that Ma'alo, the district chief mentioned by Ellis above is still alive and has been charged by Ka'ahumanu with providing for the needs of Byron's party (Stewart 1970:368). Stewart reports that the group marched in "single file along the narrow winding path which formed our only road," out of Waiākea (Stewart 1970:369). Today, Kīlauea Avenue follows the same basic path as that of the main ancient trail out of Hilo to Puna and on up to the volcano at Kīlauea. Stewart noted:

For the first four miles the country was open and uneven, and beautifully sprinkled with clumps, groves, and single trees of the bread-fruit, pandanus, and candle tree (Stewart 1970:369).

Another visitor in that year was Robert Dampier, a member of Byron's crew. He too penned his observations of Hilo and environs, and again noted the important resource of the fishponds, and verdure of the land (Dampier 1971). The fishponds, villages and planting fields between Waiākea and Wailuku River, up to Hāla'i were depicted on a map during the visit, by C.R. Malden (1825). A portion of that map is reproduced below as Figure 17. Dampier wrote:

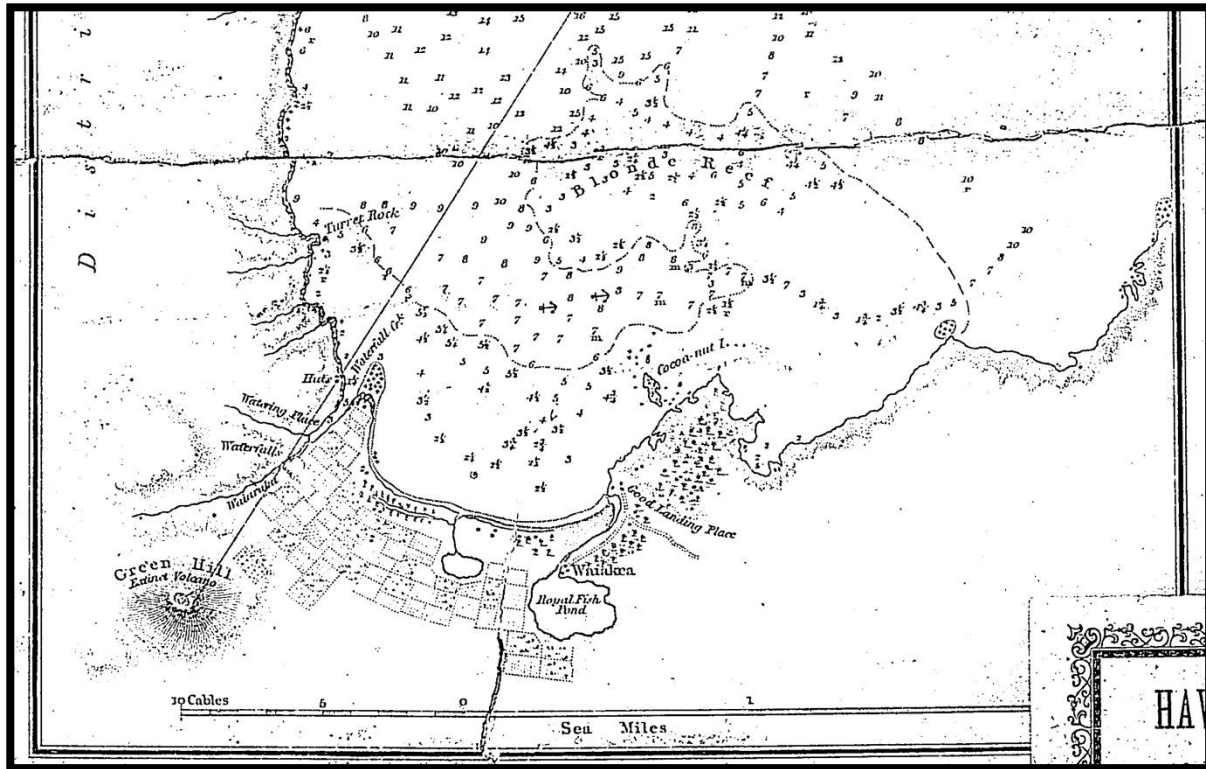


Figure 16. Portion of “Waiakea or Byron Bay” from original by Lt. C.R. Malden, 1825
 Depicting Settlement and Land Use Across Waiākea, Kukuau, Ponahawai, Punahoa and
 Pi'ihonua (Register Map No. 524)

...Hido (sic) may most appropriately be termed the Valparaiso of the Sandwich Islands. The view from the ship, a panoramic drawing of which I have taken, is peculiarly striking. On all sides the most lively verdure prevails, luxuriant breadfruit trees flourish to the water's edge; these are thickly intermingled with towering cocoanut trees; amongst these are scattered the neat looking huts of the natives. In the distance the gigantic forms of Mowna Kaah (sic), and Mowna Roa (sic), rear their towering crests to the clouds; the summits of the former are continually veiled in snow, and the eye, wandering from the sunny landscape below, enjoys a fine contrast when resting on the bleak and snow capt peaks of the neighbouring mountains.

At five on the following morning, I rose to go on shore. A sunrise at this place, is the most beautiful thing in nature I ever beheld: the tops of Mowna Kaah (sic), Mowna Roa (sic), become a complete mass of the liveliest crimson, their tints rendered more vivid & brilliant by the cold grey morning mists in which the woods and country at their base are thickly enveloped. I hastened on shore and was much gratified with my morning's excursion and amusement. We landed at the mouth of a beautiful freshwater stream, which empties itself into the sea, and along whose meandering banks, shaded by cocoanut and breadfruit trees, we pursued our walk until we came to a large reservoir, which had been formed for

the purpose of rearing and keeping fish. As we went further into the country, we saw several of these ponds, which we afterwards understood belonged to Kahumanu [Kaahumanu], who indeed possesses a vast extent of land at Hido (sic).

All these lakes are most plenteously stocked with very fine fish, resembling mullet, which, taken from the neighbouring streams, are (Dampier 1971:53) fed and fattened here, and flourish so abundantly, that a native assured me, (I am not prepared to back his veracity by ocular demonstration) that he once tumbled into one of these ponds, and was literally buoyed up by the immense quantity of fish immediately beneath him. Still no Kanaka is allowed to touch them, indeed before our arrival, the two missionaries who are stationed here, could scarcely ever procure any. For us however, to whom in point of furnishing provisions, they have been at all times abundantly liberal, orders were immediately issued to draw the ponds, and during our stay here we had a constant supply of these excellent fish, daily furnished for our tables.

Owing to the woods being uncommonly thick, together with the rugged stratas (sic) of Lava, which everywhere abound in this neighbourhood, we were unable to extend our walk very far; we were however altogether amazingly pleased with the appearance of the country, and congratulated ourselves in having so snug a place to refit the ship in. Her rigging underwent in a very short time a thorough overhauling. In the meantime, Lord Byron having expressed a wish to Kahumanu that he should like to live on shore, she accordingly assigned to him a large and commodious habitation which had just been built for one of the chiefs.

This house was most agreeably situated on the banks of the stream, I before mentioned: the floor which was strew'd with small pebbles was carefully covered with mats. It had two doors and several windows and when stocked with a few chairs and a table, presented to us a very original and comfortable dwelling place.

I was again kindly invited to live with his Lordship, as well as the surgeon, naturalist & chaplain. We all brought our cots on shore and suspended them from the corners of the house; in this as in all their dwellings there was no partition. His Lordship had therefore apart skreened (sic) off with Tapa for his bedroom.

Everything being thus arranged, we entirely deserted the ship and I do not know when I have spent my time so delightfully, as during the three weeks we sojourned at this place.

Kahumanu ordered several houses to be erected for herself and suite, immediately in the neighbourhood of our own. Her commands were most promptly executed and in the course of four and twenty hours three or four huts reared their pigmy heads. These notwithstanding the dispatch were well and firmly built. They were roofed and lined with

banana and the broad thick leaf of the tea [ti] plant, and thus rendered completely impenetrable from rain for at least two months. After that time the leaves become devoured by insects which breed in them, and the hut then requires a new covering. Our habitation was roofed and lined with the leaf of the Pandanus tree, which will last, and completely defy the inclemency of the weather, for six or seven years... ..All our supplies at this place, which consisted of fish, Poultry, yams, Pigs, Taro, plantains, etc., were furnished gratis, and without any difficulty whatever. Our indefatigable purveyor, backed with the all-powerful name of Kahumanu, provided for our wants at a moment's notice.

I amused myself during the time I remained here, in making as [Dampier 1971:54] many sketches as I possibly could: altho the scenery was beautiful, still it possessed little variety, and owing to the very difficult walking, sharp lava rocks springing up in all directions, it was tedious and fatiguing to advance into the country, added to which Hido (sic) is a notorious place for rain, which sometimes proved uncomfortable and inconvenient... (Dampier 1971:54)

1828-1829

Excerpts from a "Journal at Byron's Bay" Joseph Goodrich; to Jeremiah Evarts

[Joseph Goodrich was stationed at Hilo as a member of the A.B.C.F.M. Sandwich Islands Mission Station. The excerpts from his journal include observations on the populations in the Waiākea Bay region, , early work in planting and processing of sugar cane molasses, and the uplands slopes behind the bay, and reports that upland agricultural fields extended several miles inland of the bay]:

...Dec. 22, 1828

We had the pleasure of witnessing the arrival of Kekauonohe [Kekauonohi], & her husband. They have taken a bold & divided stand on the side of virtue & religion. Their principle (sic) reason for coming here at this time is to cheer our hearts & strengthen our hand in propagating the gospel of peace among their people. A few days after their arrival they sent out word for all the people of Hilo to come together & hear what they had to say, on the day 3000 or 5000 assembled together to receive their instructions. [page 4] The meeting was opened by prayer. Kealiiahonui then made a spirited address to them...

January 9, 1829.

Finished making a year's supply of sugar & molasses, & probably more than I shall need for my own family; the mill being one of my own construction, consisting of 3 upright wooden cylinders about 14 inches in diameter; made I suppose similar to sugar mills in general; mine however is turned by hand. [page 5]

I generally used to grind out about 80 or 90 gallons in about 2 hours & a half or 3 hours & boil it the same day, making about 10 or 12 gallons of syrup some days it would nearly all grind to sugar, & others there would be but very little sugar. The difference I was unable to explain. The luxuriance of the cane here exceeding anything that I have read or heard of, as produce in other places where cane is cultivated. I had the curiosity to measure one of the largest of the canes, the length when broke off at the top fit for grinding was 12 feet; length of the joints 8 inches; diameter 3 inches; circumference 8 ½ inches; juice expressed measured in a pint measured a little exceeded 7 pints. I have counted 22 canes sprung from one cutting they would average 1 ½ inch in diameter, and 7 feet long. The natives take but very little pains in the cultivation of the cane, the land in many places is full of it, but it does not come to perfection, however, with very little attention to cultivation it yields a great abundance. Since writing the above I have taken 39 canes that had sprung from one cutting another of 37, another of 36, 39, 29 &c., all growing in a row; it was planted about 14 months since the former of 39 I ground by itself & it measured 14 galls 1 qt. & 1 & gill of juice the production of a simple cutting in the cane ill or cutting there remained 22 ratoons or suckers that will come in to maturity a year hence...

...May 12th, 1829

By the request of the Gov together with a desire to ascend the mountain directly from the bay at this place... ..Set out about day light to ascend to the higher regions, course about west, the distance from the shore to the woody region is about 5 miles the region that is principally used for the cultivation of talo, potatoes, sugar canes, bananas &c. About 3 miles in the woods is one of the highest cataracts in this part of the island. I judge it to be 100 & 90 or 50 feet high in the heavy rains an immense body of water rushes down with tremendous violence at other times the stream of water is quite small, a little farther up the whole bed of the river underground for about 40 or 50 rods about midway of which is a dark & dismal hole 30 or 40 feet to the water called by the natives Puka o Maui the door, hole or entrance of Maui one of their former gods, the oven of this deity according to the natives is about a mile from the south west shore of the bay it is an old crater 60 or 70 feet deep & about 1/3 of mile in circumference, I now occupy it as pasture for my cows there are 3 craters that are directly back of me another in a right line the lower one is the oven, here he used to cook his food as the natives say. The road or path more properly lay along the river Wailuku, sometimes it led into the woods, then to the margin again into the woods & back...

	Males	Females	Total
Hilo	1522	1672	3194
Olaa	64	52	116
Puna	827	827	1654
	2413	2551	4964...

(A.B.C.F.M. Collection, Houghton Library, Harvard)

The June 8th 1836 issue of the newspaper, Kumu Hawaii provided statistics on the adult-student population of the Hilo District. Four school in Waiākea were identified, with a student count of 87 student—

Piopio [Waiākea]	27
Ohele [Wailoa vicinity]	42
Keokea [Keaukaha]	6
Lokouaka [Keaukaha-Leleiwi]	12

1837: Hilo Tidal Wave

Missionary Titus Coan arrived in Hawai'i in 1835 and became the head of the Hilo Mission. His rule was firm-fisted and relentless. Two years into his residency, a significant natural event in the form of a tidal wave (tsunami), washed through the Waiākea villages, destroying homes, agricultural fields and fishponds, and killing at least 62 people. Describing the event, Coan wrote that around 7:00 p.m. on November 7th, 1837—

God visited the people in judgment as well as in mercy. On the 7th of November, 1837, at the hour of evening prayers, we were startled by a heavy thud, and a sudden jar of the earth. The sound was like the fall of some vast body upon the beach, and in a few seconds a noise of mingled voices rising for a mile along the shore thrilled us like the wail of doom. Instantly this was followed by a like wail from all the native houses around us. I immediately ran down to the sea, where a scene of wild ruin was spread out before me. The sea, moved by an unseen hand, had all on a sudden risen in a gigantic wave, and this wave, rushing in with the speed of a race-horse, had fallen upon the shore, sweeping everything not more than fifteen or twenty feet above high-water mark into indiscriminate ruin. Houses, furniture, calabashes, fuel, timber, canoes, food, clothing, everything floated wild upon the flood. The water rushed up valleys, carried away fishponds, and swept over many low plantations of food. About two hundred people, from the old man and woman of threescore years and ten, to the new-born infant, stripped of their earthly all, were struggling in the tumultuous waves. So sudden and unexpected was the catastrophe, that the people along the shore were literally “eating and drinking,” and they “knew not, until the flood came and swept them all away.” The harbor was full of strugglers calling for help, while frantic parents and children, wives and husbands ran to and fro along the beach, calling for their lost ones. As wave after wave came in and retired, the strugglers were brought near the shore, where the more vigorous landed with desperate efforts and the weaker and exhausted were carried back upon the retreating wave, some to sink and rise no more till the noise of judgment wakes them. Twelve individuals were picked up while drifting out of the bay by the boats of the Admiral Cockburn, an English whaler then in port. For a time the captain of the ship feared the loss of his vessel, but as the oscillating waves

grew weaker and weaker, he lowered all his boats and went in search of those who were floating off upon the current. Had this catastrophe occurred at midnight when all were asleep, hundreds of lives would undoubtedly have been lost. Through the great mercy of God, only thirteen were drowned.

This event, falling as it did like a bolt of thunder from a clear sky, greatly impressed the people. It was as the voice of God speaking to them out of heaven, "Be ye also ready."

Day after day we buried the dead, as they were found washed up upon the beach, or thrown upon the rocky shores far from the harbor. We fed, comforted, and clothed the living, and God brought light out of darkness, joy out of grief, and life out of death. Our meetings were more and more crowded, and hopeful converts were multiplied...(see Missionary Herald, December 1838:477, and <http://www.soest.hawaii.edu/GG/HCV/COAN/IV.html>)

Waiākea Described in 1841

In 1841, members of the United States Exploring Expedition, under the command of Charles Wilkes, accompanied by a party of native Hawaiians and foreign residents (numbering nearly three hundred individuals) traveled to Waiākea, or Byron Bay, and from there, visited Kīlauea, Mauna Kea and Mauna Loa. Excerpts from Wilkes' report (1845) include the following description of Waiākea and the emerging Hilo Town—

[Arriving at Hilo Bay]

...The scene which the island presents as viewed from the anchorage in Hilo Bay, is both novel and splendid; the shores are studded with extensive groves of cocoa-nut and bread-fruit trees, interspersed with plantations of sugar-cane; through these, numerous streams are seen hurrying to the ocean; to this succeeds a belt of some miles in width, free from woods, but clothed in verdure ; beyond is a wider belt of forest, whose trees, as they rise higher and higher from the sea, change their characters from the vegetation of the tropics to that of polar regions; and above all tower the snow-capped summits of the mountains.

From this point of view, Mauna Kea, distant about thirty-five miles, has the appearance of being by much the highest mountain on the island; while Mauna Loa, distant sixty miles, and rounded at its summit to the shape of a regular dome, requires an effort of reason to satisfy the observer that it really has as great an elevation. A conviction that this is the case may be reached by tracing with the eye the edge of the forest that encircles both mountains, and noting how large a portion of the dome of Mauna Loa rises above the woody region... [Wilkes, 1845:114]

... Hilo is a straggling of the village, and is rendered almost invisible by the luxuriant growth of the sugar cane, which the natives plant around their houses. A good road has been made through it for the extent of a mile, at one end of which the mission establishment is situated. This consists of several houses, most of which are of modern style, covered with zinc and shingles. One of them, however, the residence of the Rev. Mr. Coan, was very differently built, and derived importance in our eyes, from its recalling the associations of home. It was an old-fashioned, prim, red Yankee house, with white sills and casements, and double rows of small windows... ..The whole settlement forms a pretty cluster; the paths and roadsides are planted with pine-apples; the soil is deep and fertile, and through an excess of moisture, yields a rank vegetation... [Wilkes, 1845:115]

In 1848, the report to the Minister of Public Instruction reported that Barenaba was the teacher, and 79 students were in attendance (Hawaii State Archives, 1848 Public Instruction).

July 2, 1857:1

Pacific Commercial Advertiser

Sketches of Life in the Hawaiian Island – No. 3. Hilo, Hawaii

(From Jarves' Scenes and Scenery.)

...The population of the district of Hilo is nearly eight thousand. Stores have been established at the village, much to the benefit of the natives, in affording them a market for their produce, and foreign goods in return. A spirit of enterprise has been developing, which, no doubt, will soon make this place the garden of Hawaii; but it is here as elsewhere, through the influence of foreigners, that a better day appears to be dawning upon these islands. Seven miles inland there is a saw-mill¹¹, which, when water is abundant, can saw from six to eight hundred feet of boards [primarily koa] per day. Two sugar mills, by water power, capable of grinding from four hundred to six hundred pounds each, per day, have been erected...

Jarves continues his short narrative, and like so many of his counterparts describing the native population and their condition in derogatory comments. His notes on the demise of the population fail to acknowledge the rapid decline since establishment of the mission station thirty-four years earlier. We repeat his statement as they do describe the remains of the physical landscape of former native residency—

From the traces of cultivation, the numerous stone pavements, and terraces partially overgrown with vines and trees, and the care bestowed in the erection of their habitations, now old and out of repair, this evidently was once a populous and

¹¹ Situated at Pi'ihonua uka; and operated by the Hitchcock brothers.

flourishing district The wars of Kamehameha drained it of its able-bodied men, and a series of oppressive governors have consummated its desolation...

Nowemapa 16, 1878 (aoao 4)

Nupepa Kuokoa

Na Hiohiona o Hilo.

E ka Nupepa Kuokoa e; Aloha oe:— E oluolu mai oe i ka'u wahi ukana e hoouka iho maluna o kou kino lahilahi; i ike mai hoi ka poe i ike ole i keia aina. Ua Kaulana; mai ka la oili i ka ili kai a ka la komo i Lehua.

No Ke Taona o Hilo.

Aia keia taona, ke waiho nei ma ka Hema o Hilo, a mamua pono o kona alo ke Kai o Paikaka, a me ka lae o Leleiwi; ke huli pono aku oe i ka Hikina, e ike oe i ka Ohia o Panaewa, a hala loa ae ma ka Hema, huli ae hoi ma ke Komohana; ike i na puu o Halai; i na makemake oe e hele ma Puna, e ike ia no ka Muliwai o Wailoa, a me ke Onewali o Ohele.

A ina oe e makemake e pii i Kalua o Pele ; alaila, e ike ana oe ia Olaa kia manu...

James Holls.

Papaikou, Oct. 10, A. D. 1878

[Translation]

Hail to the Independent Newspaper; Aloha to you: – Please accept the little items and place it upon your columns, that the of various places might know about this land. It is famous, from where the sun spreads across the ocean's surface to where it sets at Lehua.

About the Town of Hilo [Places of Waiākea].

This town is set there at southern Hilo, with its features open to the Ocean of Paikaka, and the point of Leleiwi, when you turn to the East. Then you will see the 'Ōhi'a trees of Panaewa, passing far to the South. Then turn to the Wests, the hills of Halai are to be seen. Should you desire to go to Puna, you will see the estuary of Wailoa, and the fine sands of Ohele.

And if you desire to ascend to Kalua o Pele (The volcano), you shall then see Olaa of the bird catchers... James Holls... [Maly, translator]

Visitor's Guide of 1880

In 1880, the major statistical and tourists' guide compiled by Geo. Bowser provides a reference indicating that by that time, some tourists were venturing out to Keōkea Point and across Keaukaha to Leleiwi. He also provided an interesting account about Mokuola (historically known as “Cocoanut Island.”

1880

The Hawaiian Kingdom Statistical and Commercial Directory and Tourist's Guide

There are several short excursions which the tourist may make from Hilo before attempting the longer journey to the volcano or an expe [page 530] dition through the country. One of the pleasantest is to Cocoanut Island, which is quite close to the shore of the bay on its south side, a mile or a mile and a half from the town. As the place for a picnic nothing can be more enjoyable than this island. The natives have a tradition about this place, which is, I expect, founded on some mythical story, although I was unable to ascertain its origin. There is a large rock here which the natives call Mokuola. They believe that if anyone be ill (or as the Americans say, sick), no matter what the ailment he is suffering from, if he swim out around the rock Mokuola and back again, he will get better. Not a week passes but someone comes to this new pool of Siloam to be healed; but what the result are, I am not prepared to say. In my own opinion, anyone who is robust enough to undertake the swim, even in these tropical waters, has no ailment which a good sea-bath and the strength of his own constitution will not throw off very quickly.

Further on than Cocoanut Island, still on the south side of the bay, is Keokea Point. The ride to this point can be made in about half an hour, and no one visiting Hilo should omit to visit it. Here you get a panoramic view of the town of Hilo and its surroundings... To vary the scene the visitor has only to go a couple of miles further to Leleiwi Point, from which he will see everything under a new aspect, and get at the same time a view of the southeast coast of the island [page 531]

Mauna Loa of 1880-1881 Endangers Hilo

One of the significant aspects of history around Hilo Town focuses on the eruptive events of Mauna Loa. In 1855-1856, an eruption occurred, and came within six miles of Hilo Bay. In 1880, Mauna Loa erupted and the flows steadily moved in the direction of Hilo Bay. By the time the 1881 eruption ended, the head of the flow was little more than one-half above the Waiākea fishponds and one mile above the Hilo Court House. It had crossed the lands of Kaūmana, Ponahawai, and Kūkūau, covering an area that extends below the present-day Komohana Street, in the vicinity of Mohouli Street (Figure 7).

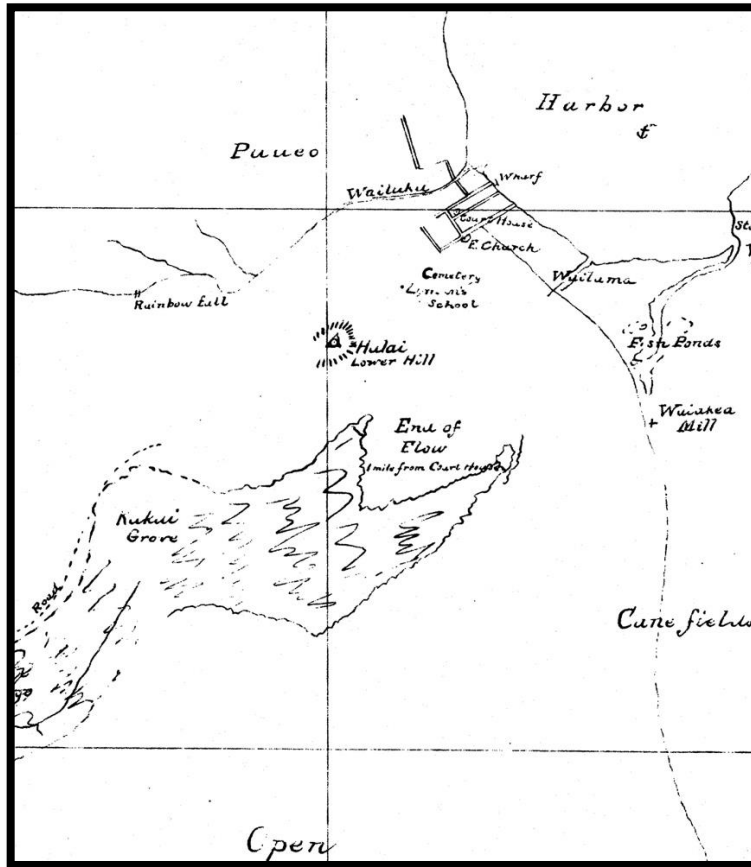


Figure 17. Portion of Register Map No. 892; C.J. Lyons, 1882. Sketch showing Lava Flow of 1881. Points fixed by previous survey flow, by information from F.S. Lyman, C. Furneaux, and others.

In 1942, and again in 1984, lava flows from Mauna Loa, moved to within four miles of Hilo Town. At the time of this writing, the latest eruption took place between March 25th to April 1st, 1984, following similar routes, causing Hilo residents to again be on watch.

The 1880-81 eruption received much attention in the local papers and drew both traditional Hawaiian religious beliefs and Christianity into the same field. By August 1881, the flow had descended into Kūkūau and came very close to the land area that now makes up UH complex (Figure 19). Below, are examples of articles published in both Hawaiian and English newspapers, which describe the flow and responses to its progress. Of particular interest will be discussions on native land use in the uplands, the visit by Chiefess Keelikolani and her appeal to Pele, asking that she spare Hilo Town.

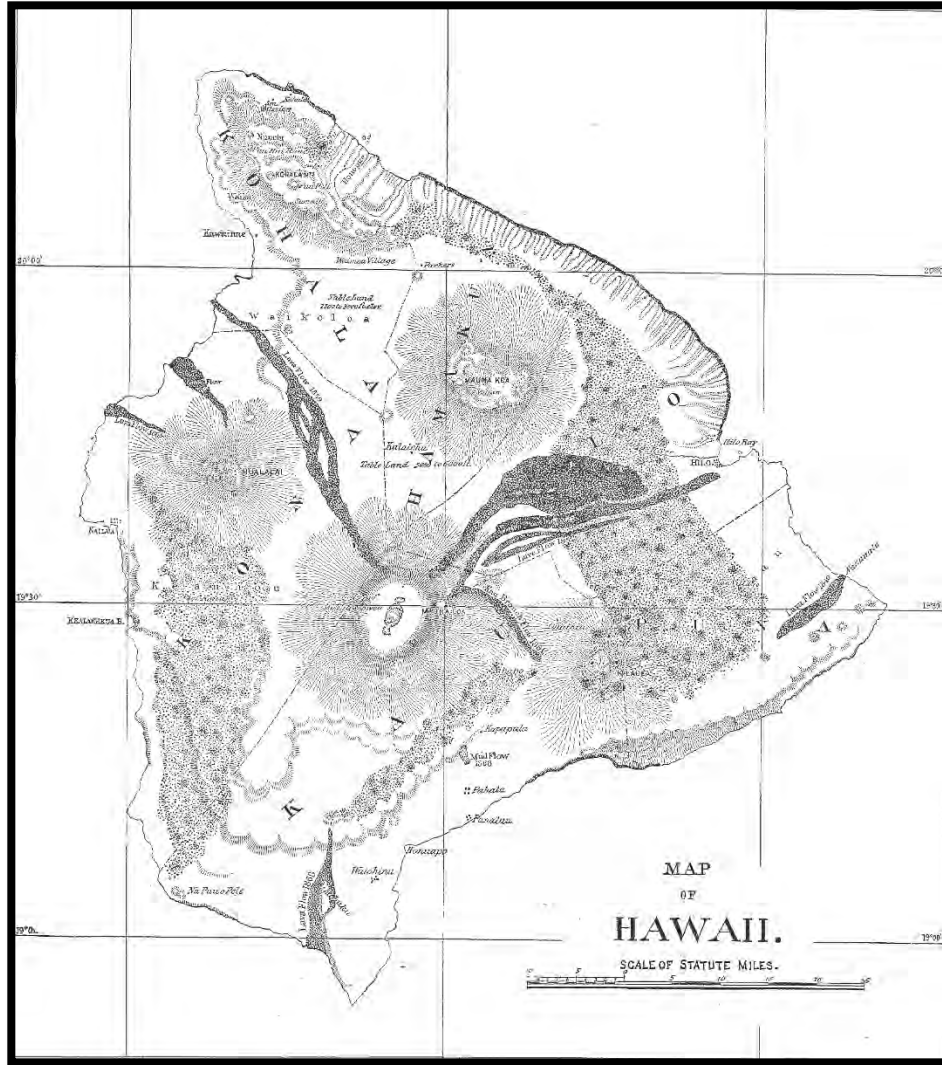


Figure 18. Map of Hawaii. USGS Annual Report 1883, Plate IV (C.E. Dutton, 1883:93)

Iulai 27, 1881 (aoao4-5)

Ka Elele Poakolu

No Ka Pele

Ke Ahi Weli A Ka Wahine.

Haalulu naka na Papakole o Waiakea-a me Waiolama,
 I ka hoohanuu hooake mai a ke Ahi a ka Wahine,
 I Enaena ka papa, wela ka pahoehoe,
 Owela ka nahele, kani ka hoe. a ka manu Oo o Haili,
 I ka minamina i na Lehua o Mokaulele.

E ka Elele. Poakolu; Aloha oe: —

Ka Uwe aolelo iwaena o keia mau mokupuni, e wiki oe e telegarapa aku ma na kapa kahakai o keia mau Paemoku, i ike mai na kini makamaka o kaua, a puana ae i keia mau mapuna leo, "e pau ana ka nani o Hanakahi i ka ai nomenome a ke Ahi Pele Ai Honua."

Ma ka Poakolu, lulai 20, owau a me E. K. W., ua haalele maua i ke taona o Hilo no ka makaikai pele, a pela no me kekahi poe makaikai e ae he lehulehu wale.

Ia maua e pii nei, he ahua ia wahi, e hiki aku ai i Kukuinui, hoomaha iki ma ia wahi, huli nana i ke taona o Hilo, o ka waiho kahelahela mai a Hanakahi, o ae la ko'u hoa i keia wahi lalani mele,

Maemae Puna i ka hala me ka lehua,

A olelo aku la au i ke hoa, no Puna aku la ia wahi mele, mapu hou ae la no ko'u hoa.

Maemae Hanakahi kuhao i ka malie,
Me he kiahaha puaniki la ke one o Punahoa,
A he hoa kaunu oe no Ka nuku o ka manu.

Haalele maua ia wahi, i ko maua hiki ana aku, e kahe a wai mai ana ke ahi pele, me he kahe ana la a ka wai o na kahawai e hoopaha ana i kekahi lua nui, aole no i liuliu ke kahe ana mai, piha ae la. Ma ia manawa no a ke ahi e hooahanini nei, hoea ana ka Hon. J. Nawahi a me ka makai nui, a me kekahi mau haole e ae, a me na haole paikii a puka mai la a lehulehu wale na mea a pau no ka makaikai i na hana ku i ka weliweli. A ma ia piha ana o ka lua mua, kahe mai la no ke ahi pele me ka ikaika a loa hou mai he lua nui hou, hoopaha ia iho la no a i piha, kahe mai la no.

Ma keia wahi e kahe nei ke ahi pele he kahawai, oia ke kahawai mawaena o Kaumana a me Kaunuunumoa, oia kahawai o Waiola [Waiolama?], a ma ia la no a po, hiki mai la ke ahi pele i ka mana ana o na kahawai e iho ai a hiki i ka Uwapo o Elenaio [Alenaio], e puka loa i Waiolama, a o kekahi mana hoi ma ke kahawai o Kulanakamaa [Kalanakamaa], e iho ai a loa ka uwapo a puka aku no i Waiolama.

Aia ke ahi pele i ka ulu kukui o Kukuinui i keia wa kahi i hookahekahe ai i ke ahi wela a ka wahine, kupono ma ka aoao hema o na puu o Halai, o ka makamua keia o ke ahi e kahe nei, e kau nui aku ana o ka ai i ka anae o Waiolama a me Waiakea, a o ke ahi pele hoi mahope mai, ke nee mai la no ia me ka ikaika, oia paha ke ahi e pau loa ai ke taona o Hilo, no ka mea, me ka ikaika no ia ahi e nee mai la, me ka ai nomenome i ka ululaau, a ua neo.

Aloha ino ka waiwai o ka aina, aloha ino ke taona o Hilo, wahi a ka manao o kanaka.

Aole paha i manao no lehova ka honua a me na mea e piha ai. E mahalo aku ko ka honua i ka mea nana i hana. Owau no me ka haahaa.

D. B. Wahine.

[Translation]

Quaking and trembling are the bones of Waiākea and Waiolama,
The fire of the Woman [Pele] is spurting and filling out,
The flat lands are burning in the heat of the pāhoehoe,
The forest is burned, the song of the ‘ō‘ō birds of Haili rings out,
Lamenting for the Lehua blossoms of Mokaulele.

O Wednesday Messenger, Aloha to you:

On the telegraph between these islands, send a telegraph to the shores of the archipelago, that our many friends may here and know that “the beautiful of Hanakahi is being eaten by the Volcanic Fires of Pele who Eats the Earth.”

On the 20th of July, E.K.W. and I departed for the town of Hilo to visit the eruptions, along with many other visitors.

We ascended a rise, and arrived at Kukuinui [situated on the boundary between Waiākea and Kūkūau]. We rested at that place, looking to the Town of Hilo, and Hanakahi spread out before us. My companion then spoke these lines of the mele,

Puna is perfect with the hala and lehua,

I then said to my companion, that section of the mele is for Puna, and then my companion spoke,

Perfect is Hanakahi, wonderous in the calm,
Like a cup of sand at Punahoa,
You are my companion who frequents Kanukuokamanu.

We then departed from that place, and then arrives where the fires flowed like water; like the flowing of stream filling a large pit, and in no time it was filled and flowing again. At the time that the fires overflowed, Hon. J. Nawahi and the high sheriff arrives, with some foreigners, also some foreigners who were taking photos, that the multitudes could see this fearsome work. Upon filling the first pit, the lava flowed with increased strength, and reached a second large pit, and after filling it, flowed on.

At this place where the lava flowed like a stream, it was at the gulch between Kaumana and Kaunuunumoa, that is the stream gulch of Waiola [Waiolama?]. That day and night the flow reached the fork of the stream that runs down to the Wharf at Elenaio [Alenaio], exiting at Waiolama, a branch of the stream of Kulanakamaa [Kalanakāma'a] that descend to the wharf, existing at Waiolama.

The lava at the kukui grove of Kukuinui flowed with the fire of the woman just to the south of the hills of Halai. The front of the flowing lava, seemingly set to eat the mullet of Waiolama and Waiakea. After that, if the flow moves with strength, it might consume the town of Hilo, for the fires moving with force, eating the forest, leaving it bare.

“Aloha ‘ino” (Shameful loss) for the wealth of the land and the town of Hilo, are the thoughts of the people.

They do not remember that they earth and all therein is Jehovah's. Appreciate the earth and the one who made it. I am with humbleness.

D.B. Wahine. [Maly, translator]

July 30, 1881 (page 3)

Pacific Commercial Advertiser

The Great Volcano Threatens to Destroy a City and Harbor.

Superstition of the People

The Goddess Pele—Kilauea in Action

The great eruption of Mauna Loa, or the Lofty Mountain, has been flowing for about eight months. The mighty mountain has poured forth from its upper vent, near Mokuaweoweo, the summit crater, a river of lava, about fifty miles long, and varying from half a mile to four miles in width, which is now distant a few miles from Hilo, threatening to destroy the town, to fill up the harbor, and probably, as on a former occasion of eruption, invade the Pacific ocean and add many thousand acres to the area of the Archipelago. Whilst seeking for compensation in the view of a possible great misfortune, it may be interesting to note, that whilst King Kalakaua¹² is making the tour of the world, in order to bring more people

¹² Between January to October 1881, King Kalākaua was away from his kingdom, on a journey around the world, through which he sought to learn about the people and customs in various nations, and also to build alliances with other nations. He was the first ruler of any county to make such a journey. The journey has been commemorated in many mele (chants), and descendants of L. Kaina (who played an important role in the history of east Hawai'i), have carried the name “Ke-li'i-ka'apuni-honua” (The King who traveled around the world), in honor of King Kalākaua's journey (Oral History Interview with John Keli'ika'apunihoua Kaina, born at 'Ōla'a in 1923. August 7, 2003).

under his beneficent sway, the goddess Pele may be adding a new appanage to His Majesty's dominions.

The latest reports from the eruption inform us, that the great lava flow that had reached within two miles of Hilo, had then broadened its stream to a width of about four miles; and banked it up in places to a height of over one hundred feet; and there halted, like a beleaguering force, before making a final assault, and storming the doomed city. Already it had sent off a skirmishing stream, the narrow flow running down the gulch of Kukuau; and should the great lava embankment burst forth along its front, the destruction of Hilo would be swift and overwhelming; with not a vestige upon the corrugated, and wavy surface of black glass and clinker, to show that over the spot, the aspirations and spires of a Christian community once pointed to heaven. But let us draw a more hopeful picture, that the capricious and changeful fire deity, whose sex was wisely determined by the ancient and observant Hawaiian mind, will find vent for the lava flow, down the ravines of Kukuau to the sea; or better still, simmer down the seething subterranean lake that feeds this flow, and allow beautiful Hilo to rejoice over the passing away of a great scare, and have her hilltops ringing with the rejoicings of a grateful people.

The Christian people of Hilo recently implored, in public prayer, the Almighty Ruler of the Universe to stay the devastating march of the lava flow, but a large portion of native minds still incline to the ancient superstition, and recognize in the upheavals and outpourings of the great Fire Mountain the operations of the mighty Fire Goddess, Pele; and we have before us, in the letter of a native correspondent, (E.K.W.) published in the native paper Ka Elele Poakolu a curious illustration of native superstition. The devastating lava had been for some time threatening the home stead of one Keoni Holo [John Hall], an old native, who had lived for thirty years on a pleasant kuleana of about twelve acres, flourishing with well irrigated taro patches, potato patches, and choice fruit trees, within a short distance of Hilo. Keoni had faith that, although great Pele might not heed the prayers of foreigners, she would be touched by the offerings of a true keiki (son) of the soil. He offered his choicest pig to the advancing flood of fire, crying out:

Aloha o Pele. Mohai ia oe e Pele.

Hail to thee, O, Pele. Receive my gift, O, Pele.

And the dread goddess responded, with a puff of steam and a crackling flow of blood red fire, that smothered the squeak of the poor porker. Again Keoni stood before the advancing tide of fire; and offered chickens, ohia fruits, ohelo berries, and a lock of his hair; but Pele was not to be coaxed by Keoni. Her cohorts of red wrath moved onward, licked up with a moment's fizzle the flowing taro patches, crackled through the orchard, and with a flash and a flicker rolled over the old man's once smiling homestead; leaving overspread above its site, the burning floor of an inferno, a surface of twisted, serpentine

folds, and coils of glassy black lava. Then our correspondent in company with Hon. D. B. Wahine witnessed the leap of the river of fire, into a small lake, or pond and contemplated with awe the terrific explosion and roaring vents of steam, as the death embracing fire, sent the spirit of the lakelet screaming away to the upper air.

We learn from recent visitors to the Halemaumau of Kilauea; or the Everlasting Home of Pele, many interesting particulars in regard to the present state of the great active crater which is distant about 30 miles from Hilo. Tourists to the volcano, for many years past, all remember certain active pools of lava, the North and South Lakes; which ordinarily bubbled and tossed a fiery flood at a depth of about 120 feet below the floor of the great crater; now these lakes have all been filled up, and there have arisen peaks and cones of hard lava, that rise over one hundred feet above the south bank of the great crater which is about one thousand feet high. But there has burst forth a new opening in the great crater floor, not far distant from the old lakes; and a new lake, almost round in form, about 600 feet across, and some 70 feet in depth in ordinary stages, below the surrounding brink. Here the great Hawaiian volcano presents the most varied fantastic play of liquid lava. The recent observers of the new lake find ordinary language insufficient to convey their emotion, and seek expression in fervent poetic effusion. But such has been the effect on all observers of the lively play of Pele in times past. And they have labored with overstrained description to describe the indescribable. Of course that which changes its form, feature and action, every minute of its existence since it has been observed, and evidently has done so in ages past, cannot well be described. There are certain displays of the action of our great volcano, that startle our sense of wonder, yet may be daguerreotyped by description.

Here are some of the phases of the play of a fire lake, as recently observed in the great crater of Kilauea. Sometimes it almost seems to sleep; and the disappointed visitor looks down into a black valley, and observes a smoking pit, giving no more evidence of combustion than a tar kiln. But the observer stands on the brink of the pit, or great pool, or lake, as now appears, about 600 feet across, and whose surface is about 70 feet below him. And what is this surface? It presents a dark silver grey hue, with a satiny shine. This is a crust of quiescent lava; and the observer, who has expected to have his sense of wonder strained to speechlessness, says: "Is this all?" No! look! the frozen glassy lake is alive. What a heave in the centre—some mighty beast lifting up that floor. Now a wave of undulation runs round the encrusted marge. And there is an outburst, a blood red fount, gushing and bubbling from one of earth's arteries. The broad disc of the lake heaves and trembles. Fitful gaseous flashes flit across. And now the moving floor cracks, and a serrated fissure like the suture of a skull, runs from margin to margin. And quick darting streaks, sudden cracks of the crust, shoot across in all directions. These serrated streaks are, at first, rosy lines on the grey surface; then they widen like crimson ribbons, broadening to the view. They undulate with the billowy motion of the whole upheaving

surface. Another crimson fount springs up along the now fretting and roaring rim of the lake. And another, and another of now wildly upleaping fountains of fire toss high their gory crests; even casting gouts and clots of the red spray, that fall and harden near the observer's feet. By this time, the spirit of our inferno is aroused. The whole fierce red lake is all boil and leap and roar. It is more than the roar of loud sea surfs beating bold bluffs. The surging tide of the molten earth, sounds a deeper, bellowing bass than any note of the sounding sea. And now the heaved up crust broken into fragments, is churned up and dissolved in the boiling flood. The roaring gulf is now indeed a vortex of in describable glories and terrors. Caves open on the sides of the surrounding wall, and man sees more of a hell than he ever imagined. A thousand demons are now holding high carnival in this bottomless pit: — and the leap and play of a fiery flood, the dance and swell of a red surging tide, and the roar and shriek of the dread forces issuing from the red hot pulsating heart of the planet, make a thoughtful observer hold his hand to his own heart and say: "This is enough; the Almighty is here."

And then, the wild lake settles down to calm again; or to a milder display by and by; or perhaps simply upheaves, and overflows its bounds, and spreads abroad in the great crater. But at all times, it is wonderful; and is ready to satisfy the curious observer, that here in mid Pacific, in our Hawaiian islands, is the grandest, most varied and most momentous volcanic action to be seen on the surface of the globe.

The facilities for reaching this ever active volcanic display at Kilauea, about 30 miles distant from Hilo, are greater now than in former years. No doubt for some time to come, the curious traveller may satisfy his desire in respect to volcanic display in the vicinity of Hilo. The present eruption somewhat resembles that of 1859, which continued to flow for thirteen months. It will to all appearances flow for some months more, and may add a new promontory to the geography of Hawaii.

Chiefess Ke'elikōlani Offers Supplications to Pele

One of the significant events associated with the 1880-81 eruption focuses on the Chiefess Ruth Keelikolani, a great granddaughter of Kamehameha I, who in August, traveled to Hawai'i and ascended the slopes behind Hilo, and encamped atop Pu'u Honu. While there, she recalled the history of her own grandfather, Kamehameha I and his appeals to Pele, made during the eruption of Hualālai 1800-1801¹³. Though most papers chose not to report on it, Keelikolani made a personal appeal and offerings to Pele, asking her to cease the flow and spare the valued lowlands of Waiākea and Hilo Town.¹⁴

¹³ Kamakau in *Nupepa Ku Okoa*, July 13-20, 1867 and 1961:184-186.

¹⁴ Additional coverage on the eruption, Keelikolani's visit and appeal, and prayer meetings in Hilo may be found in other articles, including, but not limited to: *Ko Hawaii Pae Aina*, "Ka Pele Ai Honua ma Hilo" (Augate 13, 1881:3); *Ka Elele Poakalu*, "Ke Ahi a ka

Augate 10, 1881 (aoao 4 & 5)

Ka Elele Poakolu

Ka Huakai Alii.

Ua pae maalahi aku ka huakai a ke alii a Kahu Aupuni me alii e ae a me na ukali i Hilo, aohe me nana i hooinoino i ka huakai moana. A ua uluwehiwehi o Hilo o ka nui o na maka malihini. Ua halawai pu aku la ke alii me na hookipa aloha ana o ko Laila poe. I ka haalele ana aku o ka moku, he maikai no kona ola kino.

Ke luakaha ala ke Alii R. Keelikolani i kahi o ka Pele, ke ku haaheo ala kona mau hale lole ma kae o ka muliawai ahi. [aoao 4]

Ke Ahi a ka Wahine! Kau ka lia i ko Hilo!

300 Kapuai i ka Hora!

Ma ka lono hope loa mai ke kahua o ke ahi, ua loa mai na mamala olelo mai kekahi mau makamaka; e hoike mai ana, ua hoomaka hou ke ahi a ka Wahine kupua o ka lua e oni, a ua hoea ae ka halialia o kahi poe no ko lakou mau home. Aloha wale. Eia na leta malalo nei:

Ua kokoke loa ka Pele mahope a ma aoao hema o ke kulanakauhale nei, ma ka manawa i hoomaka ai ka auwai pele e kahe ma ke kahawai o Kalanakamaa iloko o ka hora hookahi, ua ana ia ka loihi o ke kahe ana, 300 a oi kapuai; ina pela mau aku iloko o keia mau la, me he mea la, ke ku hou mai ka Likelike, ua au ka Pele i ke kai, a ua lewa aku paha makou ma kahi kaawale.

Aloha ka aina, aloha na home .kahi i noho loihi ai me na makua, aka, o ke Akua wale no kai ike i na hopena o Hilo Hanakahi. Ma keia pule ae e hai hou aku au ia oe.

Owau no, G.W.A. Hapai.

Ua kokoke loa ke ahi Pele i ke kaona nei o Hilo, o ka mana ma Kukuau, ua like loihi mai ka uapo a hiki i ka Wai Piula o ua o Maemae ma Honolulu. O ka mana ma Waiakea, ua like mai ka uapo a hiki i Peleula ma Honolulu, oia ka'u koho ma ka hoohalike ana; aka, eia ka mea kupanaha, o na haole mahiko o Waiakea, aia ma ka hapalua oia wahi a'u i hai ae nei maluna.

Wahine” & “Ke Kahu Aupuni” (Augate 17, 1881:1 & 5); *Nupepa Kuokoa*, “He Ahaaina Pele,” (Augate 19, 1882:3); *Ko Hawaii Pae Aina* “Ka Hoomana i Ka Pele o 1881, He Ahaaina Nui Ma Hilo!” (Augate 19, 1882:2); And *Nupepa Kuokoa*, “Ka Weli o Hilo” (Augate 20, 1881:1).

Ma keia wahi kekahi pa pohaku e pa ia nei e na kanaka a me na haole no ke pale ana aku i ke kahe ana mai a ka Pele e hiki i Waiakea, me ko lakou manao i hanini ma Kukuau ka muliwai ahi; aka, aole pela ko Pele manao, o Waiakea kona pahu hopu hope loa. A i kona wa e hoi ai, pulumi mua ae oia i kau wahi o Hilo nei.

O na kanaka a me na haole o Hilo nei, aole makau a pihoihoi ae, aka, ua piha mau ka auwaha Pele i ka makaikai ia e na kanaka a me na haole i ke ao a me ka po.

Ke ku nei na hale lole elua o ke 'Ili Keelikolani iluna o Puuhonua [Puuhonu], no ka makaikai ana i ke ahi Pele. O ke, kulana o ka iho ana o ka Pele, ua hala o Halai iuka, ua umi anana ka laula o ka iho ana ka Pele ma kau wahi a oi aku a emi mai no hoi ma kekahi wahi, oia ko'u ike maka a oia ka'u e hai pololei aku nei i ka poe i ike maka pololei aku ne ii ka poe i ike maka ole.

Ua koho au, ina e like me keia la a ka Pele e nee nei, alaila, ua helu ia na la i koe a halii ka waikahe ula a ke ahi ia kai o Hilo me ka haalele ana o na kamaaina o keia wahi i na home.

J.H. Makole.

Puueo, Hilo, Aug. 4, 1881

[Translation – Synthesis]

The royal procession of the Guardian of the nation and those attending her, arrived peaceably at Hilo. There were no troubles in crossing the ocean. Hilo was adorned for the eyes of the visitors...

Chiefess R. Keelikolani had a pleasant path to the place of the eruption, where her tents stood proudly along the edge of the lava lake. [page 4]

The fires of the Woman! A String Desire for Hilo! (Moving) 300 Feet an Hour!

Latest news from the eruption site, received in bits and pieces from some of our friends reveal that the fires of the supernatural Woman of the volcano is moving and it is thought that it will reach the homes of some of the people. Such sorrow. Here are the letters below:

The Pele (Eruption) is very close to the south side of the town. When the lava stream began to flow in the stream of Kalanakāma'a it moved 300 feet or more in one hour.

In cast that continues in the coming days, the *Likelike* has anchored, waiting to take us on to another place.

Love for the land, love for the homes, the place where the elders have long resided, but only Gid knows the end of Hilo Hanakahi. Next week I shall again speak to you.

I am G.W.A. Hapai.

The eruptions if very close to the town of Hilo. The branch at Kūkūau is like the distance from the wharf to Wai Piula at Ma'ema'e in Honolulu. The branch at Waiākea is like from the wharf to Pele'ula in Honolulu. That is what I estimate it is by measurement. But here is the surprising thing, the foreign sugar growers, are there on about half of the place I spoke of above.

At this place are some stone walls that have been made by the kānaka (Hawaiians) and foreigners to try and ward off the flow of the lava from Waiākea. It is their thought that it will pour into the Kūkūau fire lace; but that is not Pele's thought, Waiākea is the place of her desire at the end. At the time she returns, she will first sweep through Hilo.

The kānaka (Hawaiians) and the foreigners of Hilo are not afraid or disturbed, but there are mutterings day and night by those kānaka and haole who visit.

Two tents of the chiefess Keelikolani are on top of Pu'uhonua (Pu'uhonu), for the visitors to the Eruption. The flow of Pele is past upper Hāla'i, it is ten fathoms wide where it descends in one area, ad less in another area. That is what I have seen, and what I accurately describe to you, and those who have not seen it.

I suppose that if the Pele continues moving thus, the days are numbered before the red fire flow is at the shore of Hilo, and the natives of that place must leave their homes.

J.H. Makole

Puueo, Hilo, Aug. 4, 1881 [Maly, translator]

Augate 20, 1881 (aoao 1)

Nupepa Kuokoa

Ka Weli o Hilo

- Ai hamuhamu ke ahi Pele i na lehua a me ka papa pahoehoe o Mokaulele
- U-uina paapaaina ka leo o Pele i ka uluhala o Upeloa
- Ohuohu Puuhonu a me Kanahele o Upeloa i na makaikai

- Hoohahana o Pele i ke Taona
- Kokoke o Pele e Iuu i ka wai o Waiolama a e holapu hoi in a anae o Waiakea
- Hoao kanaka e keakea i ke alahahele o Pele
- Haiolelo ke Kahu Aupuni ma ka Luakini o Haili...

...E oluolu mai kou e hoai ai ae au in a hana a Pele, ka wahine ai honua e hoohahana mai la ma ke kua o ke taona nani Hilo ke kula manu la i Haili i ike mai ai kou mau kini makamaka e noho mai la mai ka la puka i Haehae a ka welona i Lehua.

Ma ke ahiahi o ka Poalua, la 2 o Augate, i kau aku ai au ma ka oneki o Likelike no Kauakanilehua o Hilo, a no ka makaikai ana ike kahua Ahi Pele. A oiai hoi au e hiaai ana no ka ike aku ia Pele, ua laki loa ia hoi au no ko'u komo ana aku ma ka huakai a ke Kahu Aupuni no ia alahahele hookahi, a no ka ike hoi i na makaainana o Hawaii; a ua hoopihia ia ka manawa ma ka Likelike me na himeni hoonanea o na keiki o ka Puali Puhī Ohe o ke Aupuni, a me na leo hone o na ohe keleawe, ua paholaia na kapakai me na mele hooni puuwai a ua puali, me ia wale no ka ukali ana a hehi wale na wawae i ke one o Hanakahi...
...Hoi mai nae au no Honolulu, ua maalili iki ke ahi, a pehea aku la i keia wa?

Na hana a ke kanaka imua o ka Pele. Iloko o keia au malamalama. he nui na kanaka i kapa aku ia Pele he Akua, a no ia mea ua hele aku kekahi poe me na makana ia Pele, me ka i aku”

“Eia ka makana la, a e hoi no hoi oukou iuka; a haipule iho la hoi kahi mau kana imua o Pele me ka awa, omole rama, puaa maluna o kekahi punawai me ka mohai aku ia Pele, me mohai ana akua ia Pele e hoopakele i ka punawai, a e hoihoi i kona wahi i hele mai ai.
“

Eia ka mea i hanaia mai e Pele, pau ka puaa i ke ahi a Pele, ka awa, ia, hoopihia ia iho la ka punawai me na ahua pohaku he nui. Aole no hoi he hoi o Pele iuka, ke neehale loa mai la o Pele i kai a he hapalua mile wale no ka mana oi koe. Ua ike maka au i kekahi o keia mau hana a kanaka...

David Keaweamahi (Honolulu, Aug. 15, 1881)

[Translation – synthesis]

The Terror in Hilo

- The fires of Pele consume the lehua and the pāhoehoe flats of Mokaulele
- The voice of Pele crackles and bursts forth in the pandanus grove of Ūpēloa
- Pu'uhonu and the forest of Ūpēloa are adorned with sightseers

- Pele warms the Town
- Pele is close to diving into the stream of Waiolama and disturbing the mullet of Waiākea
- People are trying to block the path of Pele
- Speech of the Guardian of the Kingdom at Haili Church...

...Please allow me to describe the doings of Pele, the woman who consumes the earth and who is warming the back of the beautiful town of Hilo, the plain of the birds at Haili, that your many friends from Ha'eha'e where the sun arises, to its fluttering light at Lehua, may know.

On the evening of Tuesday, August 2nd, I boarded the Likelike on my way to the Resonating Rains on the Lehua of Hilo, and to visit Pele's eruption. I was fortunate enough to go see Pele, and on the way travel with the party of the Guardian of the Kingdom and people of Hawai'i. The Likelike was filled with music of the members of the Royal Band, the sweet voices and heart stirring songs of those who were traveling to tread upon the sands of Hanakahi... [the author describes various experiences and observations]

...I returned to Honolulu, and the fires had cooled off some, so what is it at this time?

The deed of the kānaka (Hawaiian) before the Eruption. In this enlightened time, there are still many kānaka who call Pele a God, and for this reason some people went to give offerings to Pele, saying:

"Here is the offering, you and yours return to the uplands;" some offered prayers before Pele, along with 'awa, bottles of rum, a pig before a spring offering to Pele, that she accept the offering and safe the spring, returning to the place from which she had come.

Here is what Pele did. The pig was consumed, along with the 'awa, and the spring was filled, becoming a large hillock. Pele did not return to the uplands. Pele traveled further towards the ocean, now a half mile remains. I witness some of these thing being done by the kānaka...

David Keaweamahi
Honolulu, Aug. 15, 1881

Kepakemaba 10, 1881 (aoao 4)

Nupepa Kuokoa

Ka Pele Ma Hilo

Mai ka la 7 mai o Augate iho nei, ka ike ia ana aku o ke ahi pele ma Hilo nei ma ka emi ana mai o ka a ana, aole i nee ae makai, a ua ike no na kamahela malihini ma ka pa nui i hana ia e na haole mahiko oia no ka palena ma keia wahi.

O ka hapa nui o ka pahoehe, ua maalili e hiki no i ka mea kamaa ole ke hele maluna me ka wela ole a ma kau wahi aole i pio ke ahi ikaika no ka a ana, aia maloko o ka lua, aia na Kukuinui a mauka aku olaila, he lua nui ua piha i ka pele, a maloko o ia lua ua ike ia aku he mau mea kupanaha ua like ke ano me he pahu kupapau ula me na pihipihi maluna o ke pani, a me ke kii ma ke poo o ka pahu, a elua keia mau pahu kupapau iloko o ka lua ahi pele. Kupanaha ka ke Akua mau hana ma o ka pele aia.

Ka noho ana o ko Hilo nei i keia manawa, me he ala ua hala ka hooilo, ua pau ka ua, ua pau ke kupilikii ana o ka manao no ke kaumaha no ka hana a ke ahi pele ai honua.

Ekolu mau mea nui ma ka olelo a kanaka no ka emi ana o ka pele.

1. No ka hiki ana mai o Keelikolani ke lili a ma kahi o ka pele, a olelo kaukau aku la imua o Pele a me kooa wahi makana me ka hiki pu ana mai no hoi o ke Alii ke Kahu Aupuni a me ke alii Pauahi, pela na olelo.

2. No na mohai hoomanamana a kekahi poe, maloo ka puua iluna o ka pahoehe, me ka manao e pau ana ia Pele, aole mae, ahua wale na hana o ka pouli, ike ia ka niu, a me ka awa ke ahua mai iluna o ka pahoehe pau ole ka epa ia Hawaii, e aho ka paeaina o Kilibati.

3. O ka pule a na haipule mai Hawaii nei a Kauai i Mano, a hala aku i na aina Kristiano o ka honua, e hoi ana imua o ke akua e malama ia keia kulanakauhale ma ka lokomaikai o ke Akua a me Kona aloha, ma ko ke Akua poe ia olelo.

A e hoolilo ia ana paha kekahi la ma keia mua aku i la hoomaikai i ke Akua no Kona lokomaikai pau ole, Oia ka Oiaio.

O ka a ana mae a ke ahi pele i keia manawa, aole i pio loa ke a nei no maloko o na lua...

Me ke aloha i ka Lunahooponopono a me na Keiki ulele hua Pai o ka Nupepa.

J S Kalana.

Hilo, Sept 1 1881.

[Translation – synthesis]

The Eruption at Hilo

On the 7th day of August inst., it was seen that the eruption at Hilo was slowing down, it had not moved further shoreward. Travelers also went to see the great wall made by the foreign sugar growers which is the boundary of this place.

More than half of the pāhoehoe has cooled and even those who have no shoes can travel on it without being burned. In other places the fire has not gone out, and is filled with fire below. In that pit an amazing thing has been seen, it looks like a red coffin, with something like buttons where it closes and an image at the top of the coffin. There are two of these coffins in the fire pit. Mysterious are the works of God in this eruption.

The dwelling in Hilo at this time is as if winter has passed, the rains are finished, and the distress and worries of whether the eruption will consume the earth are ended.

There are three primary things spoken of by the kānaka regarding the decreasing eruption.

1. The arrival of Keelikolani to the place of the eruption, her offering prayers before Pele, and her gifts when the Guardian of the Kingdom (Princess Lili'uokalani) and Chiefess Pauahi arrived. So it is said.
2. The religious offerings made by some people, the offering of a pig on the pāhoehoe, with the belief that the eruptions would end. This work of darkness has not disappeared. There were also seen coconuts and 'awa mounded on the pāhoehoe. There is no end to this deceit in Hawai'i, and as in the Gilbertese islands.
3. The prayers of the saints from Hawai'i to Kaua'i of Mano, and to the Christian lands of the earth that this town be preserved, through the grace of God by His love, and God's word to his people.

The fires of the eruption are fading at this time. They have not entirely gone out from in the pit...

...With aloha to the Editor and the Youth who set each of the letter to publish the Newspaper...

J S Kalana.
Hilo, Sept 1 1881.

August 27, 1882 (page 3)

Pacific Commercial Advertiser

The State of the Lava Flow. Hilo Saved—Disappointed Tourists.

Hilo has not been engulfed and overflowed with lava—to provide a Pompeii or an Herculaneum for Hawaiian exhumers of A.D. 3881.

However, there would not have been much of Hilo for the observation of future excavators if Madame Pele had taken the matter seriously in hand. There would not probably have been a splinter found to mark the site of temple of Christian faith, or of Justice ; or the mansions of a Coan, a Severance, a Lyman, or a genial Captain Tom Spencer; or of any other relic of the fair tropic city, seated on its hill-side of beauty, had the lava continued down in earnest.

The great fire mountain, after belching forth red hot molten lava, that amounted in volume to an area ten miles square, and several hundred feet high or about the extent of Kahoolawe—after running over sixty miles in its course, and after flowing to a point where it had not flowed Before—perhaps in a thousand years—stopped short within eight hundred yards of Hilo.

Why it stopped cannot be answered by any science, or observation of man. Some will believe in the efficacy of prayer in this instance;—and let not anyone, who knows no more than the believing, endeavor to unsettle the assurances of faith. However, the wonderful flow has stopped, much to the inexpressible relief and delight of Hiloites, and of all the country, with the exception of some tourists who missed the conflagration they went to see. To witness a city overwhelmed by a volcano has not been observed since the first century ; and it must have been rather disappointing, when in the nineteenth century a city was imminently threatened with being overwhelmed, and the overwhelming did not come off. However, recent tourists to the lava flow have been compensated by the witnessing of a great many volcanic sights and demonstrations, and, like nearly all visitors to volcanic phenomena, have to relate a series of hair-breadth escapes, evidences of their daring, hardihood and endurance such a looking into hell-like blow holes with lava jets dropping around the person like a fiery hail on a burning plain; or springing from a ledge just as it crumbled down into a seething cauldron of incandescence...

...The most of the surface of grand volcanic Hawaii—especially that of Puna, Kau, and Kona presents a variety of curiously-contrived grots, caves, channels and interstices produced by volcanic action. There are no doubt many subterranean caves, miles in extent, yet to be discovered; and in some certain arcana of Hawaiian history may be revealed to a great historic and ethnic student, and zealous exhumers, like Schliemann.

1882

Hawaiian Almanac and Annual for 1882
Thos. G. Thrum
(Mauna Loa Eruption Nov. 5, 1880 to Aug. 10, 1881)

On the evening of November 5, 1880, an eruption broke out near the summit of Mauna Loa, to which a brief allusion was made in the Annual for 1881, and in connection therewith it was stated that the indications were that the flow of lava would soon cease. This outbreak however proved to be one of the grandest efforts of the goddess Pele in her home in that old volcanic mountain, and continued with varying activity for a period of nine months.

The new crater is some twelve miles south-east of, and below the summit crater of Mokuaweoweo, and the point from which the lava stream issued. was six miles distant from the crater. For a few days after the outbreak there were three streams of lava. One flowed northward toward Mauna Kea, but lasted only a few days. The Kau stream flowed toward Kilauea, and during its short life of less than a week traveled, a torrent of liquid fire; a distance of twenty-five miles. The main body of the lava discharge then continued eastward towards the sea, and was known as the Hilo flow.

In January there was a great diminution in the activity at the crater, and the flow progressed very slowly until during the month of May, when the eruption broke out with renewed vigor and the river of lava began to move more rapidly. The heavy timber back of Hilo retarded its progress for a time, but at last this barrier was broken through, and the fiery fluid pursued its way over the undulating stretch of country overgrown with ferns and grasses, towards the town of Hilo, which for a time seemed fated.

The first, and happily the only damage done to personal property, was the destruction of the grass house and taro patches of John Hall [Keoni Holo], a half-caste, about four and a half miles from Hilo, on the night of the 11th of June. The branch of the flow known as the Waiakea stream was making directly for the Waiakea Mill, situated on the bay near the town of Hilo; and on the 9th of August, when the flow died out, it was nearly three-quarters of a mile distant. This was the largest and longest continued discharge of lava from Mauna Loa in recent years, and had it continued a few days longer and reached the sea, would have been the most destructive. Not only Hilo, but its harbor, were thus saved, as it were, by a miracle at the last moment.

This eruption will be of more interest historically than any previous one from the fact that Mr. Charles Furneaux, an artist, arrived here, from Boston just before the outbreak and made volcanic action a close study during a sojourn of several months on Hawaii while the flow continued. :A series of over forty sketches, faithfully portraying the appearance of the

flow at different times and at various stages of its progress, will be invaluable to students of volcanic phenomena. A number of excellent photographic views were also obtained by our local photographers.

Sites of Waiākea Described to Visitors in 1913

1913

Town of Hilo

H. M. Whitney

Mokuola (Coconut Island), Makaoku and Keaukaha Vicinity Excerpts

...When the demigod Maui with his magic hook fished the island of Maui up from the seas, one of his brothers, who was in the canoe with him, disregarded his command not to look back, and consequently Maui's plan to connect Maui with Hawaii failed. The island of Maui slipped back to its present position, and only a small piece thereof, Coconut Island, remained on the hook. The mark of the hook is shown near the springboard.

Mokuola and Makaoku¹⁵, the piece of the mainland opposite the island, formed a place of refuge, where warriors and others retired in times of defeat and had safety. It contained about 36 acres, a lava crack marking the boundary. Where the Kennedy house stands, east of the Island, human sacrifices were made and the remains fed to the sharks. The Island is now Hilo's famous bathing place. There are several public bath houses, and Hawaiians ferry visitors across the channel for a small sum...

Beyond the breakwater, which is reached by a continuation of Front Street, the road runs on to a point four miles from the post office, Lokoaka, where there is a fine bay, with an island and a pretty lagoon, as well as several extensive fish ponds. Here the demi-goddess Waka and her granddaughter Laieikawai (famous on Oahu), hid in a cave under the water of the pond, when they were pursued by priests who wanted Waka to remain at their temple. From Lokoaka the deities wet to Paliuli, the Hawaiian paradise, which is supposed to still exist in the forests mauka, but which has been found only once by a mortal, and he could not find it again.

From Lokoaka it is possible to proceed by foot (or with care on horseback) over the fishpond dike and by trail to Waiuli, a small fishing village, and thence, by a still poorer trail, to Waiokawa, where there was a village with a heiau, of which nothing remains. A few miles further on is Paukupuahu, where there are a few grass houses, and a couple of miles

¹⁵ Maka-o-kū is described as the site of a heiau luakini (a temple of "state" worship), and Mokuola was the place of sanctuary and release from the kapu of Makaokū (see Thrum, 1908:40; and Hudson, Ms. 1932:236).

further on still is Papae [Papai]. Hence a trail which cannot be found without a guide, leads to the old Puna trail, which from this point south is in good condition. It leads into Puna to the Shipman ranch house. The lava country between the road to Lokoaka and Puna is crossed by many trails... [page 23-25]

3.3.4 Historic Land Use (1860s – 1960s)

Later historic development of the economic interests in Hilo Town also focused on this area thus, the most significant, early impacts on the biocultural landscape occurred in this area. While the area of primary traditional residency occurred fairly near the shore, early historical records recorded by both native Hawaiian and foreign visitors/residents reported on scattered residency and more extensive agriculture and resource management collections happening three to five mile mauka of the shore, and specialized use occurring up to the mountain tops.

Kō or sugar cane (*Saccharum officinarum*) is one of the important Hawaiian cultigens, brought with the ancestors when they settled this island group. The ancient mahi 'ai (farmers) developed hundreds of varieties of kō that were adapted to a wide range of environmental zones, and uses of selected kō included food, medicine, religious practices, sports and plaiting or adornments. As described earlier in this study, the first foreign visitors to the Hilo-Waiākea region observed the luxuriant growth of sugar cane around homes and scattered on the landscape to the uplands. By 1825, the early members of the Hilo mission station reported on their use of native kō and processing it into molasses for sugar.

The initial efforts at industrial agriculture in Hilo, in the form of sugar plantations were set in motion in the nearby lands of Pōnahawai and Punahoa. In 1839 Governor Kuakini ordered land to be cleared in Pōnahawai, and Hilo's largest sugar plantation at the time, was planted. Charles Wilkes, Commander of the United States Exploring Expedition, visited the Hawaiian Islands in 1840-1841, and reported on the cultivation of sugar cane in Pōnahawai—including the use of a “small stream of water led from Wailuku river (an 'auwai)—and other foreign crops in the region. Describing the Hilo bay lands, Wilkes observed:

I have before spoken of the fruitfulness of this side of the island of Hawaii; the sugar-cane grows here in abundance, and of a large size; coffee succeeds well, as do indigo and the taca, from which they make a quantity of arrow-root.

For the manufacture of sugar, Governor Adams owns a small mill, in charge of two or three Chinamen; but it is in a wretched condition. It is worked by a small stream of water led from the Wailuku river. The quantity of sugar made in the year 1840 was about thirty tons; but with a well-adapted mill, and under good management, a much larger quantity might be made, for much of the cane is now suffered to rot from want of facilities to grind it. The natives now understand its culture well, and each has a small patch... Mr. Goodrich, the

missionary who preceded Mr. Coan, was very desirous of introducing the culture of sugar-cane and coffee, became very active in promoting it. (Wilkes 1845:209)

Only a few years after Wilkes visit, land use in the larger Hilo Town vicinity was rapidly changing from the traditional subsistence system to one of industrialized agriculture. The lands extending mauka from the present-day Ululani Street to Hāla‘i—had been planted with sugar cane, with planting continuing towards Kaūmana. On July 15, 1861, the Crown Land of Waiākea was leased by Kamehameha IV to S. Kipi for grazing as a pasture lease, in the amount of \$600 per year, payable semiannually, for a period of five years (Bureau of Conveyances Liber 14:266). Subsequently, Rufus Lyman, applied to John Dominis, Agent of Crown Lands, requesting that he be issued a lease of all the available Crown Land at Waiākea. Lyman wrote:

Waiakea in Hilo, has been bringing in with ponds about \$700. The dams to fishponds have been broken down several times by tidal waves & freshets and the fish lost. With the privilege of cutting say 300 cords of fire wood a year for sale, included in the lease of land, ponds & fisheries, the land would be worth about \$1000. a year. There are two lands belonging to Est. [of] Kekuanaoa, and one to Govt. that come into the middle of Waiakea in three different places and cut it up somewhat. Ponahawai has a few town lots left, and quite a tract of land a short distance below the woods and a wood land... (Hawaii State Archives, Crown Lands: March 5, 1873).

Lyman replied to Dominis several days later, and made the following comments and offer for the land of Waiākea:

I wish to lease the land of Waiakea in Hilo, with all the fisheries, streams, & fish ponds belonging to it, for a term of 20 years. I would like to have all the privileges belonging to the land included in the lease, and a privilege of cutting for sale, 300 cords of wood a year. I am willing to pay \$1000. a year rent payable at the end of every six months. All improvements placed on the land, to revert to the Crown at the expiration of 20 years.

I have already fenced in with stone walls about 80 acres, and propose to enclose about 80 acres more for the natives living on the land to cultivate.

I would like to have the lease commence the 1st day of April next (Hawaii State Archives, Crown Lands: March 10, 1873).

Lyman's lease was made in September 1874, for a term of 25 years under General Lease 124-A¹⁶. Shortly after securing the Crown lease, Lyman exited the agreement, and in September 1877, it was reported that "The Waiakea Ranch near Hilo, comprising 80,000 acres of forest, pasture and rocky land, with 4,000 head of cattle, has been sold by the Hawaiian Agricultural Company, and purchased by .Mr. W. Shipman and Captain Elderts, for the sum of \$33,000" (Hawaiian Gazette, Sept. 12, 1877:3).

3.3.4.1 Summary of Land Tenure of the Waiākea Mill Company

At the end of the Waiakea Mill Company's independent operation in 1948, Jared Smith of the *Honolulu Advertiser* prepared an excellent summary of the history of land tenure. Further research on the details may be made at a later date, but the general specifics in the article describe the setting in which the proposed USGS complex is found.

June 19, 1948 (page 1)
Honolulu Advertiser
End of High Hopes
Sale of Waiakea Mill, Finale of 70-Year Saga
(by Jared G. Smith)

It is now 70 years since the original Honolulu owners of Waiakea Mill Company contracted in 1878 to build a 10-ton mill and Factory to process cane grown by Hilo planters. Now, in 1948, comes the end of high hopes and high endeavor through the sale to Senator William HB. Hill of all rights, title and interest in any land owned by Waiakea Mill Company.

The First Lessee of the Ahupuaa of Waiakea. an area supposed to be 95.000 acres more or less, appears to have been R. A. Lyman of Hilo, he agreeing to pay an annual rental of \$1,000 from 1868 to 1918.

King Kamehameha V had placed the control of all public land under an appointed board of three Commissioners of Crown Lands under authority of a law enacted by the Legislature: the Act of January 3, 1865, "To relieve the Royal Domain from Encumbrances and render the same inalienable."

A second, amended lease to R.A. Lyman under date of September 20, 1874 was more explicit, withdrawing certain areas of Waiakea for public purposes. The term, 50 years from 1868 and the annual rental, \$1,000, remaining unchanged.

¹⁶ At present, we do not have a copy of General Lease 124-A, which might offer some general background on the foundation of the leasehold interest. A review of Hawaii State Archives and Bureau of Conveyances records will provide useful background for this period of time.

At Some Date In the next four years after September. 1874, Mr. Lyman appeals to have sold his leasehold to the founders, of Waiakea Mill Company. According to Thurn's Annual this was in 1877.

I have just examined a time-yellowed document written with India ink on both sides of "legal cap" paper: the Indenture of Agreement.

Under this indenture of April 15, 1878 Theo H. Davies and Alexander Young of Honolulu agreed to build a mill with a daily capacity of 10 tons of sugar to be ready for grinding by December, 1879, provided Charles E. Richard and Benjamin B Macy of Hilo would grow the cane.

The Hilo Partners were to plant 100 acres each year from 1878 to 1888, and after four years the Honolulu partners could plant 50 acres annually. The contract provided that plant cane must be harvested before ratoons; and that the Hilo partners have the preference in harvesting the first 200 acres.

The Hilo partners were to plant the first 100 acres on the lowlands; the next 100 above, and so on until 1,000 acres were in cane by 1888. The Honolulu partners agreed to build a railroad from the mill to the top of the farthest cane field provide cars and pay the brakemen; but the planters were to load the cane on the cars and provide the mules to haul them.

The Planters were to supply not less than eight tons of cane per day at the mill. When the sugar came out of the factory a cost of containers, freight and marketing was to be borne 50-50; and profits were to be divided 50-50 between the mill and the planters.

Another old document shows that on February 20, 1879 the capital of the Waiakea Mill co-partnership was \$120,000, of which Alexander Young contributed half; Davies a quarter; with the other \$30,000 invested by the executors of the R. C. Janion estate.

The Hilo Partners had bitten off more than they could chew, so in December 1879 they sold their planting contract and all assets to the Waiakea Mill copartners for \$60,000 cash, Mr. Davies putting up \$45,000 of the purchase price, and Young, \$15,000.

This made the capital on Dec. 1, 1879 \$180,000, with Davies and Young each contributing \$75,000, and Mrs. Janion \$30,000.

Thurn's Annual for 1879 reports Waiakea's estimate for 1880, the first crop, was 800 tons of sugar. Waiakea was the 24th Big Island sugar mill. Naalehu, now Hutchinson, and

Haiku on Maui were the largest producers in the Kingdom of Hawaii, each estimating their 1880 crop at 2,000 tons.

The mill and headquarters were built on the lowland between the Volcano (Kīlauea) Road and Waiākea Fishpond (see Register Map No. 1561). The 1880 crop was produced from 350 acres of land, and by 1890, 2,240 acres of Waiākea land was under cultivation (Dorrance & Morgan 2000:105).

Describing early practices associated with clearing newly acquired plantation land for cultivation, J.M. Lydgate wrote:

Breaking in new land, in those primitive days, was the bugbear of the sugar business. To clear a few acres a year of guava, puhala, amau fern, uluhi [sic], etc., burn off the refuse, and then plow the virgin soil, in even the most superficial way was a great undertaking (Lydgate IN Thrum's Hawaiian Annual for the Year 1917:77).

Many of the fields had rocks scattered throughout them, which over the years had to be cleared as well. These stones were sometimes used for plantation-related construction projects, and others were simply set into mounds which may still be seen in abandoned fields (as recorded in oral history interviews with elder kama'āina in 1995-96).

3.3.4.2 Changes in Land Use and Residency in Waiākea

The following excerpts from selected articles provide readers with an overview of the plantation history, covering the initial planting efforts to the close of the plantation. The narratives include background on development of the cultivated lands, subsequent Waiākea Homestead program, Canec manufacture, and transportation of the sugar via narrow gage rail lines and barges over the fishponds to the mill and wharf for shipping. Some of the articles provide differing accounts of the plantation's history. One facet of the history that remains consistent is the land in the vicinity of proposed USGS UH-H complex, does not appear to have been dedicated to sugar cultivation. Considered marginal, these lands were used as pasturage until at least 1961.

Early Hawaiian papers are silent on actual establishment of the Waiākea plantation. The earliest Pacific Commercial Advertiser article we found for the operation was part of a shore summary of plantation operations on the island. In February 1880 it was reported:

February 28, 1880 (page 2)
Pacific Commercial Advertiser
Waiakea Mill Co.

Sugar mill 30 by 60 inches, with doubling gearing and cane carrier, driven by an 18 by 42 inch Putnam steam engine, juice heater, six clarifiers, four cleaning pans, one concentrator (copper), three 2,080 gal. supple tanks, one 8 by 9 feet vacuum pan on iron staging, four Weston's patent centrifugals, one 9 by 18 inch engine to drive same, cooler tanks, blow-up pan, etc.; also one 7 by 25 feet combined Galloway and tubular boiler, one ditto 6 by 23 feet, one tubular boiler 6 by 16, and one Galloway boiler 6 by 29 feet, with two iron smoke stacks.

As discussed earlier in this study, by the time of the 1800-1881 Mauna Loa eruption and its steady progress towards Hilo Bay, coming within approximately three-quarters of a mile of the Waiākea Mill, there were numerous references to the mill and planation operation. Later in 1881, it was reported that Waiākea Mill commenced grinding sugar cane on November 21st (Hawaiian Gazette, Nav. 30, 1881:3). It is not until May 22nd, 1889, the reference to the Waiākea Mill Company's board of directors is found in the newspaper record – T.H. Davies, President,, Alex Young, Vice President, F.M. Swanzy, Treasurer, E.W.,. Holdsworth, Secretary, and T.R. Keyworth, Auditor (Evening Bulletin, May 22, 1886:3).

November 30, 1901 (page 18)
Evening Bulletin Industrial Edition
Waiakea Mill Company.

Situated one mile from Hilo in a southerly direction lie the vast fields of sugar cane and mill of the Waiakea Mill Company, which controls 95,000 acres of land 5000 of which are now in cane, the product from same being converted into sugar at the mill of the company, which has a capacity of seventy tons in twenty-four hours...

...During the year 1900 the company cleared 700 acres of land, but this year, owing to the scarcity of labor, will not be able to clear any additional land and make it ready for planting. The cane as it comes to the mill in cars of large capacity looks well and will average right through about four and one-half tons of sugar to the acre the year around.

As is the case elsewhere in the Hilo district of Hawaii, no irrigation is required, at the rainfall is quite sufficient. Some thirty miles of railroad is maintained upon the plantation, and some 700 men find steady employment in the fields of cane and about the main works...

...As showing the life of the soil in the above district it may be stated that the first sugar cane was planted twenty-two years ago [1879], which was the time that Mr. Kennedy came to Hilo to erect the Waiakea mill and also to manage the property. He has made a careful study of the subject of cane culture in all its branches, and in his dally operations displays a practical knowledge of the subject in hand...

May 18, 1935 (page 9)
Honolulu Star Bulletin
No. 12, Waiakea, Island of Hawaii

One of the most progressive sugar mills of the early [18]80s in Hawaii, Waiakea Mill Co., in later years has been closely identified with government homestead enterprise.

Richardson and Shipman were the pioneer planters on the Waiakea lands, and when it was found that cane would grow advantageously, Alexander Young and Theo. H. Davies organized the milling company, erected a mill and began sugar production on a large scale.

C.C. Kennedy was manager of the Waiakea plantation for 35 years, succeeded in 1912 by David McHattie Forbes. W.L. Williams became the manager in 1924... ..Waiakea in 1885 was the first mill in the island to add the two roller mill with the automatic feed to the three roller mill... The maceration or application of hot water to the bagasse between rollers was also started at this time...

...Waiakea plantation occupied government land, 6,000 acres of it, under lease which expired in 1918. At that time the territory undertook its Hawaiian homestead project, surveying the land in home sites ranging from 10 to 50 acres. All but about 800 acres of the tillable land of the plantation was included in the homestead tract.

Homesteads Allotted [Figure 20]

The homesteads were allotted by Hawaiians through a system of drawing, and homesteaders entered a joint agreement and appointed trustees who obtained a milling contract with the Waiakea Milling Co. which allowed them 60 per cent of the sugar produced on their land, less milling expense.

Ensuing years were filled with litigation over the matter of contract; homesteaders became heavily involved in debt, the total obligation to the government abrogating more than a half million dollars...

...The present mill is equipped with an array of modern sugar milling machinery. A tunnel in the floor blows the bagasse direct to the factory of the Hawaiian Cane Products Co. where it is made into structural insulation material... ..No irrigation is necessary, the plantation having an average annual rainfall of 145 inches at 50 feet elevation and 50 inches more on its upper fields... ..The sugar output is shipped by means of barges across a fish pond and down the Wailoa river... (Honolulu Star Bulletin 1935:1).

July 2, 1941 (pages 1 & 15)
Honolulu Advertiser

Waiakea Mill Has Had Long, Stormy Career
(by Jared G. Smith)

Waiakea Mill company has had a stormy history for the last 30 years. Cane was grown here before the Civil War period and in 1865 or thereabouts a 50-year lease was negotiated from the reigning Monarch at a very low rental covering the entire government land of Waiakea from its frontage on Hilo harbor to the mountains. The advantage of nominal rentals and low taxes made Waiakea a gold mine.

Annexation [1898] brought land hunger and increasing demands for the breaking up of huge plantation holdings into smaller pieces. A movement which culminated in breaking up the Waiakea cane lands into homesteads. In 1916 the governor of Hawaii issues a proclamation cancelling an extension of a lease to the sugar company which it was charged, had been illegally secured from the Commissioner of Public Lands. This restored the title to the government. Waiakea was now in politics.

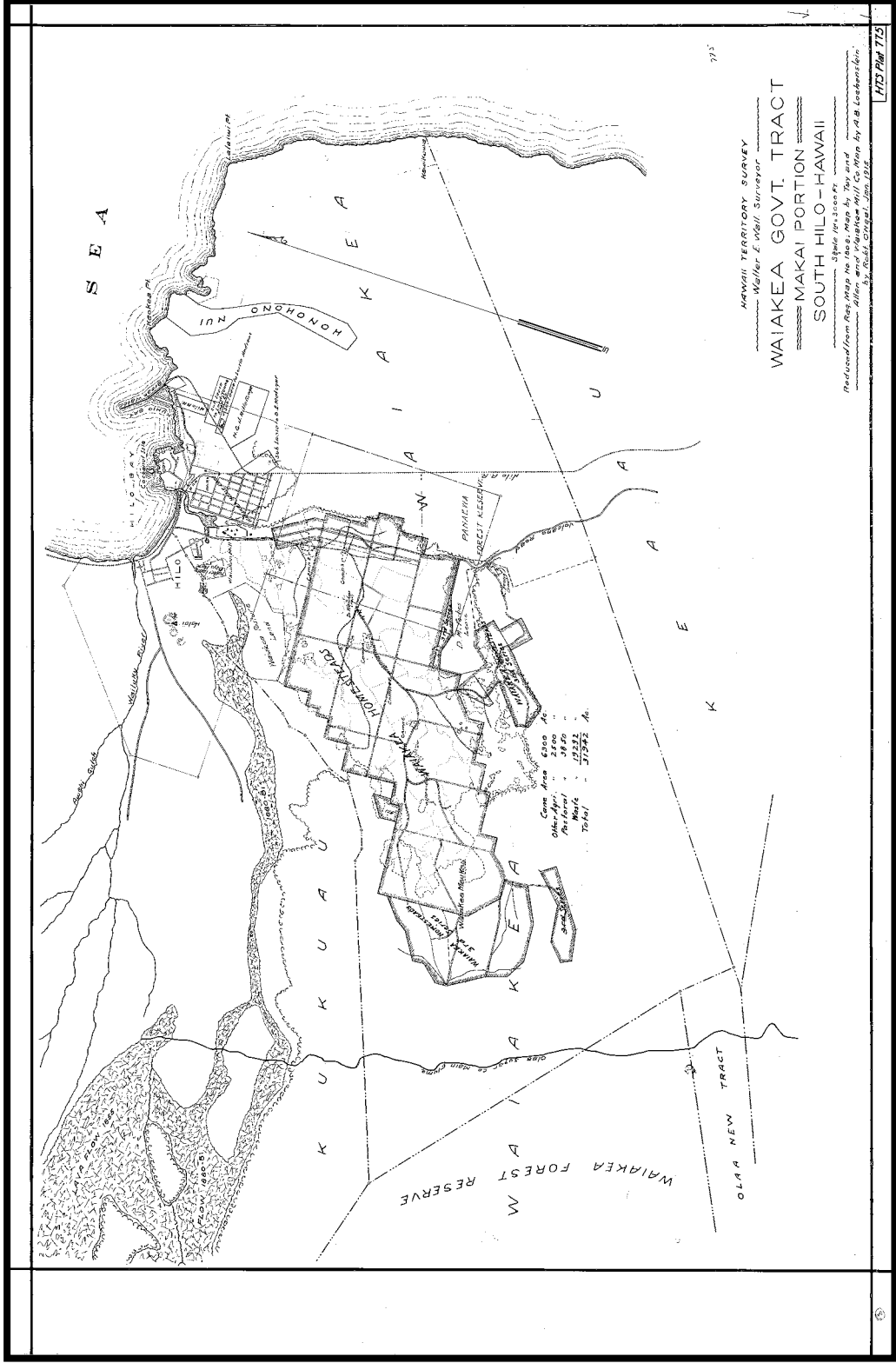


Figure 19. Waiākea Government Tract. Makai Portion, Hawaii Territorial Survey, January 1915. Locations of Planned Homestead and Agricultural Lots, the Waiākea Pasture Land, 1880-1881 Lava Flow, Existing Railroad and Other Features Depicted

The proposed homesteading venture smoldered during world War I, then flared after the armistice, the outcome being that the legislature of 1919 authorized the project and provided for a public drawing, or land lottery, open to all citizens. More than 5,000 applications were received and in due time the 250 or more cane farms were parceled by lot among as many holders of the lucky numbers.

The government set aside 800 acres for house lots, one to each successful drawee, and camp sites for the laborers... [Smith discusses sugar process, indebtedness of the homesteaders, government intervention, and initiatives of the homesteaders through 1938]

...Waiakea plantation extends into the suburbs of Hilo, or to put it another way, Hilo a rapidly growing city, must have room to expand. Already, homesteaders who have paid their debts, observed residence requirements and acquired title from the government, are subdividing their properties into city lots. The lower end of the plantation is slightly looking down on City and harbor, a panoramic view.

Owners are building streets into their subdivisions. City water is available and gas and electricity. Other homesteaders who have acquired title are raising poultry or pigs, and growing flowers and vegetables instead of cane. The plantation will lose more cane land as the Hilo grows...

June 5, 1948 (pages 1 & 4)

Honolulu Advertiser

Early Hardships at Waiakea Recalled

Died, June 5, 1948 at Hilo, Hawaii, the Waiakea Mill Company, aged 59 years and 41 days. The end came peacefully after a lingering illness dating from 1941.

(by Jared G. Smith)

Cane was first at Waiakea by Chinese, their names and the dates neither recovered nor remembered. In the 1860s two pioneers, Shipman and Richardson, are said to have started a sugar plantation to be called "Bide-a-Wee" but after planting a few acres the partners had a disagreement. The project was given up.

It is fairly well established the Theo. Ho. Davies, one of the founders of Waiakea plantation, with associates, took up where Shipman and Richardson left off. They leased all of Waiakea for 50-years from King Kamehameha V at an annual rental which then seemed generous for an area of 70,000 acres of virgin forest. When cane was planted, the rent was low.

The plantation really got started in 1874 after the election of David Kalakaua to succeed King Lunalilo. Trade reciprocity with the United States was in the air. Venture capital was plentiful. Men were arriving from the four quarters of the globe to pioneer the land... ..In 1889 it was decided to incorporate.

Waiakea Mill Co.'s charter, dated April 25, 1889, was signed by Lorrin A. Thurston, minister of the interior of the Hawaiian Islands, and attested by William L. Green, minister of finance, Jonathan Austin, minister of foreign affairs, and Clarence W. Ashford, attorney general.

The charter was granted to Theophilus H. Davies, Alexander Young and Domitila R. Janion, operating as the Waiakea Mill Co., giving them the right to maintain a plantation for the period of 50 years for "planting, raising and cutting cane and converting it to sugar."

The company was capitalized at \$300,000 in 3,000 shares, par \$100, with the privilege of expansion to \$600,000.

In the 59 years since Waiakea Mill Co. was incorporated the plantation had produced about 750,000 tons of sugar...

As early as May 1899, Waiākea Mill Company proposed to the Agent of Public Lands, that it be allowed to return 86,000 acres of its Waiākea lease "in consideration of a fee simple title to 9000 acres of land" in Waiākea (Hawaii State Archives; F.O. & Ex. file, Agent of Public Lands to President, May 4, 1899). On October 11, 1899, The application of Waiākea Mill Company to acquire in fee simple, 9000 acres of land in Waiākea was declined. Additionally, Waiākea Mill Company had applied "to retain the fisheries & fishing right of Waiakea under tenant-at-Will." No action was taken on this application (Hawaii State Archives; F.O. & Ex. file, Agent of Public Lands, May 15, 1899).

In 1911, Waiākea Mill Company applied to the Board of Public Lands for the lands upon which it's "Camp Sites in Waiakea" were situated (Hawaii State Archives; Ex. file, August 31, 1911). The request was submitted to a special committee, and on October 16, 1911, the Board of Public Lands reported that it was opposed to sale of the Waiākea camp and stable sites to the plantation (Hawaii State Archives; Ex. file, October 16, 1911).

As the terms of the General Lease with Waiākea Mill Company drew to a close, the government sought out innovative ways to employ people and get them on the land. In the Legislative Session of 1913, Act 167 was passed, Granting Waiākea Government lands for Homestead and Cane Lots Lease and Sale (Session Laws 1913:296-297). The homesteading laws required that the government lease land to homesteaders who would grow sugar cane and send it to Waiākea Mill which would be responsible for processing the sugar. By March 1914,

the Commissioner of Public Lands reported to the Governor that negotiation had been completed and that Waiākea Mill Company would surrender 230 acres of land in Waiākea, to be divided and sold into house lots (Hawaii State Archives; Ex. file, March, 9 1914). On November 16, 1915, Waiākea Mill Company applied to lease the ahupua‘a of Waiākea at the cost of \$35,050 per year (Hawaii State Archives; Ex. file). This application was denied, and by May 24, 1918, 110 individual applications were on file with the Commissioner of Public Lands to homestead (cultivate sugar) on more than 2,000 acres of land (Hawaii State Archives; Ex. file, May 24, 1918). The contract between the Territory of Hawai‘i and Waiākea Mill Company for processing of sugar from the Homestead Lots was submitted for approval on August 15, 1918 (Hawaii State Archives; Ex. (C.P.L.) files).

With the Waiākea Homestead and Cane Lots agreement in place, leases were confirmed to individual homesteaders. On June 20, 1919, the Commissioner of Public Lands submitted a list of 181 names with Cane Lot and House Lot numbers to Governor McCarthy. The total area of Waiākea Cane Lot acreage for lease and cultivation was approximately 5,300 acres, with lots ranging between 9.56 to 55.59 acres (State Archives; Ex. / C.P.L. files). Cane Lots 15, 16, 17, 18, 19, and 20, to the south and west side of UH-H complex, are the closest lots covered in the homestead agreement. These six lots are situated south and west of the study area parcel which is identified as a large open space on the 1930 “Railroad and Flume Right of Ways Through Waiakea Homestead Lots & Government Land” (Figure 21)¹⁷. All railroad and/or flume branches and spurs also stop prior to entering the vacant area of land.

¹⁷ Note the mid-right section of the map which identifies the location of L.C.A. properties to Keaniho (Helu 2402) and Kahue (Helu 2663).

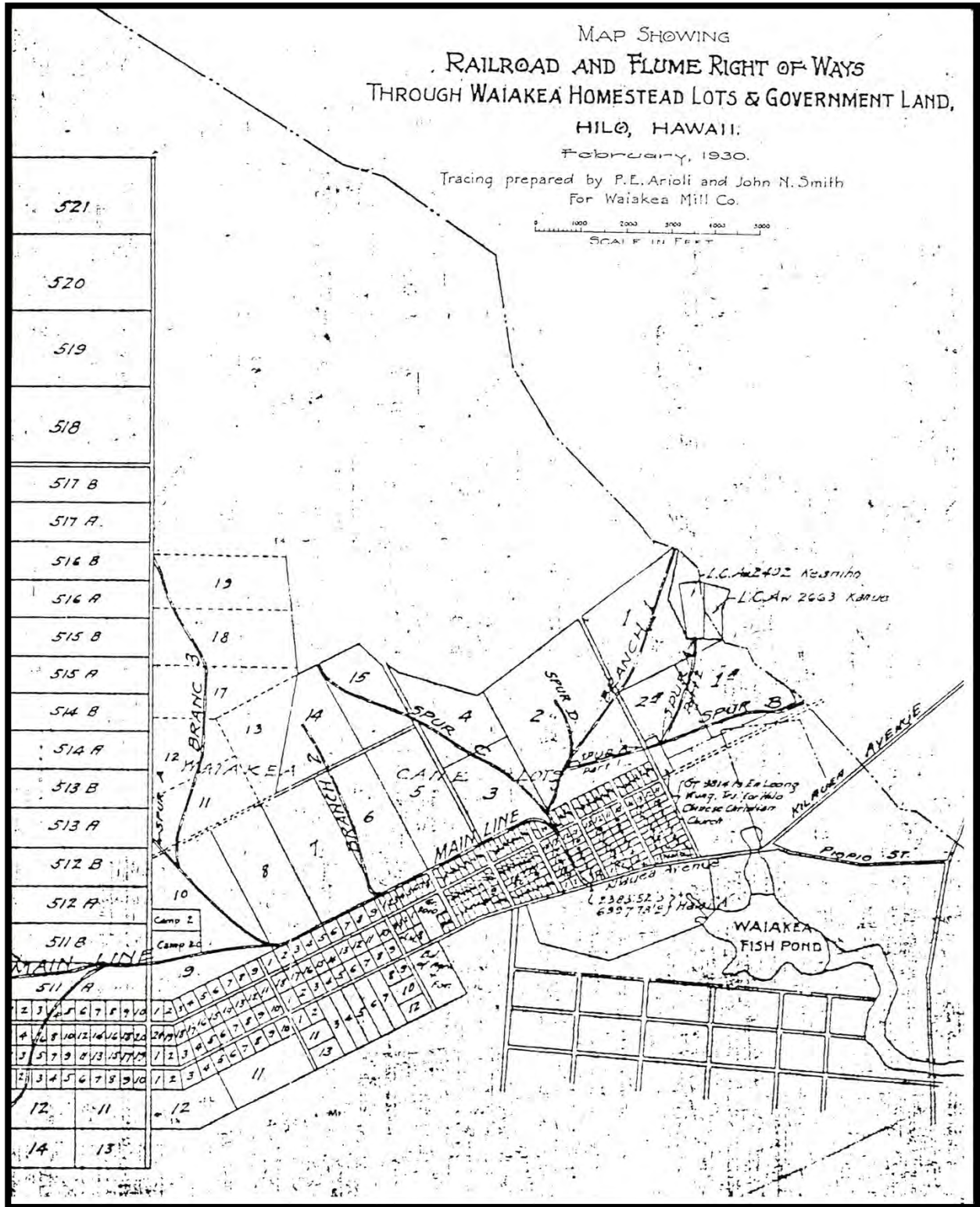


Figure 20. Portion of Railway and Flume Right of Ways, Through Waiākea Homestead Lots and Government Land; P.E. Arioli and J.N. Smith, February 1930 (Honolulu, Real Property Tax Office)

By 1920, grievances regarding failure of Waiākea Mill Company to fulfill the requirements of its contract with the Homesteaders were being raised. The special investigative commissions, the “Waiakea Homestead Commission” (WHC) was established. Matters brought before the commission by the homesteaders included:

...the cutting of cane, applying of fertilizer to the crop of 1920—the cost of which was absorbed by the Mill Company—discourtesy of the manager, failure of the Company to supply men and mules when needed, black list, etc... (WHC Chair, William Goodale to Governor Farrington, December 18, 1929).

While the Waiākea Mill Company failed to fulfill its contractual obligations to the homesteaders, the WHC also reported that substantial losses on the crops of 1920 and 1923 were due to:

Ignorance, negligence and inability of the Homesteaders to properly care for their cane to produce good yields after they took over their lands in 1919 and 1920 were also contributory causes of the losses on those crops... (WHC Chair, William Goodale to Governor Farrington, December 18, 1929).

As settlement was reached regarding the above matter, and pursuant to the Organic Act, Section 72, Revised laws of Hawaii 1925, the homesteaders were given clear title to the Homestead land they paid for. Waiākea Mill Company and a majority of the Homesteaders continued in cultivation and milling operations through c. 1946 (see Hawai‘i State Archives—letter: A. Lester Marks, Commissioner of Public Lands to Frank G. Serrao, Sub-Land Agent, Hilo; April 26, 1947).

3.3.4.3 Other Notable Economic Endeavors in Hilo-Waiākea

While sugar played the most significant role in the economic development of Hilo-Waiākea, and was the activity most responsible for modifications to the landscape, other business endeavors were also underway. One such agricultural activity was the cultivation of pineapples.

3.3.4.3.1 Overview: Hilo Railroad Company and Hawaii Consolidated Railway, Ltd. 1899-1946

It is reported that as early as c. 1880, Theo. H. Davies employed a railway and locomotive for transporting cane, laborers, and supplies of the Waiākea fields (Conde and Best 1973:14 & 117). These early operations led to the organization of the Hilo Railroad Company, which chartered in March 1899, operated until to 1916, and was the forerunner of the Hawaii Consolidated Railway, Ltd. The Hilo Railroad Company serviced plantation and transportation needs between the fields and communities of Waiākea and ‘Ōla’a Sugar Company and Puna

Sugar Company, with railroad lines extending towards Kapoho (Thurston IN Thrum 1914). Oral history interview with Mr. Kenneth Bell provides readers with additional information regarding use of the rail system in the fields.

3.3.4.3.2 Pineapple and Canec—Hawaiian Cane Products

The interview with Mr. Kenneth Bell, identifies the location of one of the areas in Waiākea-uka where cultivation was still occurring in the 1920s. The location is in the vicinity of the old Waiākea Mill, Camp 6. A cannery was also built in Hilo. Pineapple grown on the island was primarily cultivated in small patches, with Japanese farmers cultivating the largest percentage of the crop. The old Hilo Pineapple Cannery was situated near the Waiākea Mill, where the Hilo Iron Works building is now located.

In the late 1920s a group of local businessmen produced an innovative approach to using the sugar cane by-product called bagasse. Early mill operations had used the bagasse as fuel for the boilers and fertilizer, but as fuel oils became available and mills converted, use of bagasse declined even though the by-product continued to be manufactured. In 1929, Hawaiian Cellulose Ltd., of the Waiākea Mill Company applied for a patent to manufacture wallboard, which came to be called “canec.” Senator William H. “Doc” Hill, and Wm. Williams, manager of the Waiākea mill were among the officers of the company. The canec plant was opened in 1932, close to the site of the Waiākea Mill. The operation of Hawaiian Cane Products (HCP) experienced a series of difficulties relating to durability of the product, marketing, and labor, and in 1948, HCP was purchased by the Flintkote Company of New York. In order to address the issues with termites and other insects finding canec an easy to access food, they Flintkote operation began to use highly toxic chemicals, which stabilized the canec and made it resistant to termites. This served the company until 1960 when a factory fire destroyed most of the facility. Toxic residue — e.g., sodium aluminate, alum and ethyl silicate, calcium arsenic, and arsenic acid from canec production lurks just below the surface of the mud bottom of the Waiākea fishpond and Wailoa estuary (see Kelly et al. 1981:136-141).

4.0 Cultural Resources

This section characterizes archaeological studies and results in and around the project area environs, in order to identify resources that may be of significance to the community. The first subsection provides an overview of studies and results within about one-half mile of the current project area. This is followed by a project-area specific summary. The cultural resources in this section focus primarily on tangible resources and the built environment.

4.1 Ka Nohona: Cultural and Historic Sites as Evidenced by Settlement

Archaeologists and historians describe the settling of these islands as resulting from great seafaring voyages taken across the vast open ocean, with people coming from small, isolated island groups. For many years archaeologists have proposed that early Polynesian settlement voyages between Kahiki (the ancestral homelands of the Hawaiian gods and people) and Hawai'i were underway by A.D. 300, with long distance voyages occurring fairly regularly through at least the thirteenth century. It has been generally reported that the sources of the early Hawaiian population—the Hawaiian “Kahiki”—were the Marquesas and Society Islands (Emory in Tatar 1982:16-18).

For generations following initial settlement, it appears that communities were clustered along the watered, windward (ko'olau) shores of the main Hawaiian Islands. It was on the ko'olau shores, in areas such as Waiākea-Pi'ihonua, that streams flowed, rainfall could be relied upon, and agricultural production could become established. To a lesser extent, locations in Puna, such as in the Kea'au and Hā'ena vicinity, and in the Kapoho vicinity, early settlers also found the resources necessary for establishing community centers. Along these ko'olau shores, sheltered bays offered access to both deep sea and near shore fisheries. The latter were enriched by nutrients carried in the fresh water flowing from the mountain streams, and in underground lava tube systems, and became areas in which fishponds and estuarine systems could be developed. In these early times, the residents generally engaged in subsistence practices in the form of fishing, and in agriculture on lands extending towards the uplands from the bays (see Handy, Handy and Pukui 1972:287).

Over a period of several centuries, areas with the richest natural resources became populated and perhaps crowded, and by ca. 900 to 1100 AD, the population began expanding to the more remote sections of Puna and the larger Kona (leeward) side of the island (Cordy 2000:130).

As a general summary of lowland residency and cultivation of food resources in Waiākea, Handy, Handy and Pukui (1972) reported that:

Hilo as a major land division of Hawaii included the southeastern part of the windward coast...the northern portion, had many scattered settlements above streams running between high, forested kula lands, now planted with sugar cane. From Hilo Bay southeastward to Puna the shore and inland are rather barren and there were few settlements. The population of Hilo was anciently as now concentrated mostly around and out from Hilo Bay... The Hilo Bay region is one of lush tropical verdure and beauty, owing to the prevalence of nightly showers and moist warmth which prevail under the northeasterly trade winds into which it faces...

In lava-strewn South Hilo there were no streams whose valleys or banks were capable of being developed in terraces, but cuttings were stuck into the ground and on the shores and islets for many miles along the course of the Wailuku River far up into the forest zone. In the marshes surrounding Waiakea Bay, east of Hilo, taro was planted in a unique way, known as kanu kipi. Long mounds were built on the marshy bottom with their surface two or three feet above water level. Upon the top and along the sides of these mounds taro was planted. Flood waters which occasionally submerged the entire mound are said to have done no harm, as the flow was imperceptible. This swampy land is now abandoned to rank grass... [Handy, Handy and Pukui 1972:538-539]

4.1.1 Traditional Cultural Properties

Since western contact, the cultural landscape has undergone dramatic changes. The native “backyard” gardens, and the inland groves and natural areas described by native residents and early visitors rapidly disappeared. Vast tracts of the native field system, scattered dwellings and associated sites, were cleared and cane was planted in their place, while other areas were abandoned as a result of the rapid decline of the native population.

Earlier inventories of “archaeological” sites conducted in the Hilo area were of a general nature, usually related to the city of Hilo, and tended to focus on the largest the largest piles of stones and bones, such as heiau (temples). In *The Hawaiian Almanac and Annual for 1908*, T.G. Thrum, provided readers with background on his field trips and observations of noted places on the landscape in the preceding years. Thrum listed only three heiau in Waiākea, one in the area of Pana‘ewa, the other two near the Wailoa section of Waiākea. No doubt there were many more—like that reported in the Boundary Commission testimonies, as being a short distance inland from the coast near the Waiākea-Kūkūau boundary—and others destroyed by historic business development or kept secret and forgotten. The heiau in Waiākea included:

Kapaieie. Near Honokawailani, Waiakea, famed in the Hilo-Puna wards. In existence at time of Byron’s visit in the “Blonde.” Size and class uncertain. Its ruins may still be seen.

Makaoku. On the shore opposite Coconut Island [Mokuola], Hilo, of luakini class, connected with the noted Mokuola place of refuge; dimensions unknown, though it is said to have had a high pyramid of stone as if for a place of observation. The stones of this heiau were taken by Capt. Spencer in the [eighteen] sixties for a boat landing.

Ohele. Site above the old Pitman store, at Waiakea; a small heiau of luakini class, about 60 ft. square; destroyed before Pitman's time. [Thrum, 1908:40]

In 1906-1907, J. F. G. Stokes of the Bishop Museum, traveled the island of Hawai'i, documenting the location, background and condition of heiau on the island (1991, Stokes and Dye). Only one heiau was listed in all of Waiākea, being a heiau at 'Ohele, near the shore of Wailoa Stream.

In between 1930, 1931, and 1932, A. E. Hudson conducted an archaeological and historical literature research for the eastern portion of Hawai'i Island (Hudson ms.). Hudson's work provides a detailed description of various sites including heiau, residences, fishponds, burials, and trails within the Hilo area. As others had before him, Hudson noted that "There was an important village and trading center around Hilo bay" (Hudson n.d.:20). Citing Thrum, several journals of historic visitors and residents, and informants at the time of his study, Hudson's manuscript provides some background on the Waiākea area. He observed that house sites were often found in close proximity to those temples located elsewhere away from the chiefly centers of habitation. Most of the heiau were built close to the sea. The majority are within a hundred yards of the beach. Very few are more than two miles inland and these were probably of a specialized class, such as the bird catchers' heiau... (Hudson Ms. n.d.:38).

No archaeological remains are to be found in the city of Hilo itself except a few stones which are said to have been taken from heiaus [Hudson's Site 37, the heiau luakini of Maka-o-kū, the pu'uhonua (refuge) of Moku-ola, and Kaula'i-nā-iwi, a place where chief's bones were prepared for interment (Hudson Ms. n.d.:236)...

Also, in Waiākea, Hudson reported that at 'Ohele, Kalani'ōpu'u "took up residence...on the eve of his war with Imakakoloa of Puna" c. 1780 (Hudson Ms. n.d.:238). Hudson also reported that a heiau was located inland in Waiākea, along the old Hilo-'Ōla'a trail, not far from the route of modern-day Kīlauea Avenue:

There was a heiau named Kapaieie near Honokawailani [Kawailani] in Waiakea. Bloxam who passed the site on his way from Hilo to the volcano says that its center was marked by a single coconut tree. At the time of his visit nothing remained but ruined walls choked with weeds. He was told that the priests would lie in wait for passersby and dispatch them with clubs [see the narratives cited above from the legend of Ka-Miki]. Thrum [1908:40] states that the site was famed in the Hilo-Puna wars but its size and

class are unknown. No remains of any kind could be found and no Hawaiians with whom I talked had ever heard of it (Hudson Ms. n.d.:240).

4.1.2 The Hilo Forest Lands

In 1904, the territory developed the Hilo Forest Reserve in 1904, and in 1905 and 1913, added portions of the 'Ōla'a Tract to the reserve system. The territory also set aside the upland portions of Waiākea as a reserve. Thus, making a contiguous line of forest across the Hilo District, and adjoining the Puna District. A report by Ralph Hosmer dated June 6, 1913, provides us with background on why it was recommended that Waiākea be made a part of the reserve, and the potential for long-term benefits. Reading the communication below, reveals the sad reality that much has continued to be lost.

Honolulu, June 6, 1913.

The Upper Waiakea Forest Reserve.

Reports of the Superintendent of Forestry.

Gentlemen:—

I have the honor to submit as follows the recommendation that a forest reserve be created to cover the central forested portion of the government land of Waiakea, district of Hilo, island and county of Hawaii:

Location, Object and Area.

Waiakea is a large government land stretching from the sea at Hilo bay well up on the slopes of Mauna Loa. Much of the lower portion is in cane; the extreme upper part is more or less open grazing land, crossed by lava flows. Between is a section of heavy forest. The present recommendation is that the forested portion be set apart as a forest reserve, with the objects (1) of bringing the land under the management of the department of the Territory especially equipped to care for it, so that (2) it may be wisely administered in any way not inconsistent with its maintenance as a forest that may in the future be deemed best. [page 302]

Owing to the geological formation of the island of Hawaii there are no running streams south of the 1855 and 1881 lava flows that come down the side of Mauna Loa back of Hilo town on lands lying immediately to the north of Waiakea. It is quite possible that springs and water holes may later be discovered in the Waiakea forest; for at present almost nothing is known accurately about the interior of this tract; but there are no running streams coming from it.

The question of stream protection does not, therefore, figure on Waiakea, but there are other reasons why it is important that existing areas of forest should receive the care and protection of the government. Until many more scientific data than are now available have been collected, it is impossible to tell how far-reaching may be the influence exerted on the country immediately surrounding large bodies of continuous forest, but it is evident that such influence does exist and that it is beneficial. Particularly is this true in the tropics and sub-tropics.

Further, on Waiakea it may happen that in time the question may arise of devoting portions of this forest to commercial utilization. To safeguard the interests of the government in all these ways and to be ready for any sort of development that may come about, it is desirable that the Waiakea forest become the Waiakea forest reserve.

The area proposed to be set apart is 51,800 acres. Of this 600 acres is a part of the land of Piihonua, a remnant mainly covered with lava, between the boundaries of the Hilo forest reserve and Waiakea. Piihonua is now under lease No. 103 to Hon. John T. Baker, expiring on March 21, 1921.

At the present time all of the land of Waiakea is under an expiring 30-year lease to the Waiakea Mill Co. (No. 124) that runs out on June 1, 1918. No use is at present made of the forest. Beyond the general clause against waste, common to the leases of that time, the lessees are not obligated to protect the forest.

The forest on Waiakea is practically unexplored region. It is a dense stand of the rain-forest type. Ohia-lehua is the predominating tree. Along its lower side, where the forest is crossed by the Olaa flume, are numerous groups of loulu palms, growing in company with great tree ferns. And throughout, as far as the interior is known, there is a dense stand of the undergrowth characteristic of this type of Hawaiian forest.

Boundaries.

The upper and lower boundaries of the proposed Upper Waiakea forest reserve have been somewhat arbitrarily fixed by drawing lines across the land from known points on the outside boundaries, but it is believed that they serve the purpose at this time as well as if they had been run out on the ground. The makai line very nearly parallels the flume constructed to carry water [page 303] from upper Kaumana to the Olaa plantation. The upper line leaves out of the reserve the area suitable for grazing above the native forest.

The elevation of the makai boundary is approximately 1800 feet; that of the mauka line varies from 5000 feet at Puu Kulani to 4500 feet at the 1855 lava flow, where the proposed reserve joins and forms a continuation of the existing Hilo forest reserve.

Description.

A technical description of the boundary, prepared by the Government Survey Office as C.S.F. 2430, accompanies this report.

Recommendations.

For the reasons above set forth I do now recommend that the Board approve this project and call upon the governor of the Territory to set apart this government land as a forest reserve to be known as the Upper Waiakea forest reserve.

Very respectfully,

Ralph S. Hosmer

Superintendent of Forestry.

[Hawaiian Forester and Agriculturalist, 1913:304]

4.2 Historic Properties

Honua Consulting, LLC completed an archaeological literature review and field investigation (LRFI) for the project. The based on the extensive investigation into the area, the LRFI concluded there are no significant archaeological sites in the Project Area. In a consultation meeting with the State Historic Preservation Division (SHPD), SHPD staff noted the potential presence of remnants from the old railroad tracks below the road. Archaeological monitoring for identification purposes may be proposed during the HRS 6E review process.

AECOM conducted a review of historic architectural properties in the area. That information is included in the environmental assessment.

4.3 Natural Historic and Natural Resources with Cultural Significance

Hawaiians, like most indigenous and local communities, ascribe great cultural value to the natural resources in the environment around them.

The islands of the Hawaiian Archipelago are all volcanic in origin. Lava flows in the vicinity of the project area from as recent as 1881 to ca. 10,000 years before present.

The lava flows that form Waiākea-Leleiwi Point shape the shoreline, forming jagged headland points and small rocky islets such as Mokuola, Kaula'ināiwi, Mahaieka (Mahikea), and others towards Pāpa'i in Puna. Freshwater springs are common along this stretch of coast, often creating a cold freshwater lens near the surface and brackish conditions in the rocky pools behind the points. The region consists of shallow, well drained soils that formed in a thin mantle of organic material and small amounts of volcanic ash overlying pāhoehoe lava. Annual rainfall is about 154 inches, and the average annual temperature is 73 degrees

Fahrenheit. 'Ōhi'a lehua was the primary plant species of the ancient forest. Many other plant species, including, but not limited to 'ie'ie, maile, pū hala, loulou, and a number of ferns were also common.

Extensive development of the Hilo Bay region has significantly altered the shoreline and inland region between Wailuku River to the area where the Port of Hilo is situated. In earlier times, the coastline of Waiākea, extending from Kanukuokamanu/Wailoa Stream to beyond Leleiwi and the boundary between the Hilo and Puna districts, was noted for pockets of coral sand and pebble beaches. In addition to the region of Hilo One (Hilo of the sandy shore), other small bays and landing areas included, but were not limited to Kanakea (Reeds Bay), Puhi, Keōkea, Onakahakaha, Peue (Peiwe), Waiuli and other small coves along Leleiwi Point. The ethnographic data noted the importance of the Wailuku River as a cultural resource.

4.4 Intangible Cultural Resources

It is important to note that Honua Consulting's unique methodology divides cultural resources into two categories: biocultural resources and built environment resources. We define biocultural resources as elements that exist naturally in Hawai'i without human contact. These resources and their significance can be shown, proven, and observed through oral histories and literature. We define built environment resources as elements that exist through human interaction with biocultural resources whose existence and history can be defined, examined, and proven through anthropological and archaeological observation. Utilizing this methodology is critical in the preparation of a CIA as many resources, such as those related to akua, do not necessarily result in material evidence, but nonetheless are significant to members of the Native Hawaiian community.

Hawaiian culture views natural and cultural resources as being one and the same: without the resources provided by nature, cultural resources could and would not be procured. From a Hawaiian perspective, all natural and cultural resources are interrelated, and all natural and cultural resources are culturally significant. Kepā Maly, ethnographer and Hawaiian language scholar, points out, "In any culturally sensitive discussion on land use in Hawaii, one must understand that Hawaiian culture evolved in close partnership with its natural environment. Thus, Hawaiian culture does not have a clear dividing line of where culture ends and nature begins" (Maly 2001:1).

4.4.1 'Ōlelo a me nā Mele Ho'ohiwahiwa

Hawaiians have always commemorated their relationship with the honua ola (living environment) through 'ōlelo no'eau – 'ōlelo a'o (poetical and instructive sayings), mele (chants), and later through songs. The sayings and mele celebrate all facets of life and death, and everything in between, both the tangible and intangible. In such 'ōlelo (sayings) and mele

are found names of place, descriptions of resources, and events on the land or in people's lives. Among these 'ōlelo and mele which inform us about wahi pana (storied and sacred places) of Waiākea and neighboring lands, are the following lines.

Pele is Present in Hilo

One ancient mele from the Pele collection of Kupuna Hoohila Kawelo offers a beautiful description of Hilo, its relationship with Pele and the myriad natural forms of the goddess and her family. Mele like this recognize that Pele plays an important role in shaping the history of Hawai'i, particularly the island of Hawai'i and the districts of Hilo, Puna, Ka'ū and Kona. As recently as the 1980s, Pele's awakening on Mauna Loa stirred the populace of Hilo Town. Looking into recent history of the Mauna Loa eruption of 1880-81, we find numerous Hawaiian references to Pele and her creative forces of nature in the vicinity of the Waiākea project area. In fact, in August 1881, Chiefess Keelikolani ascended Pu'uhonu in the nearby land of Punahoa, and there, asked Pele to spare Hilo. Miraculously, the branch of the lava flow traveling through Kūkūau, along the boundary of Waiākea (adjoining the project area) slowed, and on August 9th stopped, thus saving the Waiākea ponds, mill site and the Hilo Town coastal lands.

Nani Hilo Noweo Ula ka Maka o ka Lehua¹⁸

Nani Hilo noweo ula ka maka o ka lehua o Kaliu Puapuai ula i ka uka o Malama	Beautiful is Hilo with the glowing centers of lehua at Kali'u The red glow pours forth to the uplands of Mālama
Ke okooko lehua a ka wahine i ka lua	Burning the lehua of the woman at the volcano
Ke okooko no ka lau ohia o Keaau Mau no ka nani, ka maikai, ke onaona noho no i Hilo I Hilo ka Puulena me ka moani	Burning the 'ōhi'a leaves of Kea'au Many are the attributes, fine qualities and fragrances which abound at Hilo At Hilo is the Pu'ulena wind which blows with its' light fragrance
Aole wahi hoohalahala a ka maka ke ike aku Ke alawa iho ma ka uka o Puna Puna	No place which the eye sees may be criticized As you glance towards the uplands of
Nani, hinu, maikai ka ili o ka laau bark	Beautiful, glistening and fine is the of the trees

¹⁸ Hoohila Kawelo Chant Collection (Maly, curator).

I ka mili ia e ka makani Puulena aala o ka lua volcano	Which is caressed by the Pu'ulena bearing its' light fragrance from the
Paoa punia aala no i ka nae a ka mauu	Surrounded by the fragrant essence of the grasses
I ka mapu hanu ala a ka Ulumano	A wafting fragrance born on the Ulumano wind
Mahea la hoi ka puka ana mai nei a ke aloha	From where shall love come
Aloha ka ua, ka la, me ka makani...	Aloha to the rains, the sun and the winds...

He makamaka ka ua no Hilo One¹⁹

He makamaka ka ua no Hilo One, I ka hele no a kipa i Hanakahi, Kipa aku 'oe na hala i Makakalo,	The rain is a companion of Hilo One, It travels and greets Hanakahi, You are greeted by the pandanus groves of Makakalo,
Ua hele no a na 'ale kekahi wai, E nana ana i ka hui kau o ka lehua,	Pouring like the rippling waters, Looking upon the profusion of lehua blossoms,
I ka luuluu o na pua i kanahale, Aia la i ke kai o Punahoa, He hoa ia la o ka nahunahu hewa ...	The flowers bear down on the forest, There at the sea of Punahoa, Is the companion do not be mistaken... [Maly, translator]

Many ali'i are celebrated through mele which describe the ali'i associating them with famous places, winds, rains, features and events in history. While Waiākea may not always be specifically named, much of Hilo is Waiākea and the mele are filled with the expressions of aloha for the 'āina—

A Hilo au e lā²⁰ (Traditional)

A Hilo au e la Hoolulu ka lehua la	I am at Hilo, In the shelter of the lehua groves
A Wailuku au la	I am at Wailuku

¹⁹ *Ka Hoku o Hawaii*, April 5, 1917, "He Mo'olelo Walohia no Keamalu, Kekahi o na Mo'olelo Hoonau Puuwai o ka Lahui Hawaii."

²⁰ Name chant for Liholiho, Kamehameha II, who was born in the Pi'opi'o vicinity of Waiākea in 1797.

I ka lua kanaka la	At the pit of men
A Haili au la I ke kula manu la	I am at Haili On the open flat land of the birds
A Panaewa au la I ka moku lehua la	I am at Pana'ewa In the lehua forest
A Leleiwi au la Auau i ke kai la...	I am at Leleiwi Swimming in the ocean... [Maly, translator]
He Lei no W. C. Lunalilo²¹	
Lei Hanakahi i ke ala me ke onaona, Puia okoa no Hilo i ka maikai, He luana ke kai o Huia na ka lehua, E hoomu ana i ka lau o ka ulu, Malama Punahoa ia Makakalo, He punalua Kapuulena na Kealahonua, He makani hoolawehala ua no ka nahele E hehi ana i ka liko o ka ohia, Moku ka polohinano o ka wai o Kanakea, I ka okia e Alanoho maka moani e -ilaila...	Hanakahi wears the sweet fragrance of the forest as a lei, Hilo is completely surround by goodness, The ocean of Huia is host to the lehua blossoms, Gathered together under the leaves of the breadfruit trees, Punahoa cares for Makakalo, The Puulena breeze is the companion of the Alahonua breeze of Hilo, Wind bearing rains that transgress upon the forest, Treading upon the budding leaves of the lehua Breaking the pandanus flowers upon the water of Kanakea The fragrance is cut off there at Alanoho [Alenoho]... [Maly, translator]
Manu 'Ō'ō (Traditional)	
...No Hilo i ka ua Kani-lehua, Popohe lehua ai Hanakahi...	The Kanilehua rain belongs to Hilo, And the round lehua blossoms at Hanakahi... [Maly, translator]

²¹ *Ko Hawaii Ponoī*, Iulai 9, 1873:1, "He Lei no W. C. Lunalilo" (King of Hawai'i).

'Ano 'ai Ku'u Wehi

(Traditional)

'Ano'ai ku'u wehi lā,
 I ka ua Kanilehua,
 Pua nani ka lehua lā,
 No Hilo Hanakahi,
 A'o ku'u ipo ia lā,
 I ke kai a'o Mokuola,
 Ho'onānā 'ana paha lā,
 I ka nani a 'o Hōpoe,
 Kui 'ia me ke 'ala lā,
 O nā hala a'o Puna,
 Ha'ina ku'u wehi lā,
 I ka ua Kanilehua.

Greetings my love,
 In the Kanilehua rains,
 The lehua blossoms beautifully,
 At Hilo of Hanakahi,
 My beloved is there,
 In the waters of Mokuola,
 One looks to perhaps see,
 The beauty of Hōpoe,
 Stung together in the fragrance,
 Of the pandanus of Puna,
 It is spoken of my adornment,
 In the Kanilehua rains.

[Maly, translator]

Hilo March²²

...Ike hou ana i ka nani a'o Hilo
 I ka uluwehiwehi o ka lehua
 Lei ho'ohihi
 Hi'i a ka malihini
 Mea 'ole i ke kono a ke aloha

...Behold again the beauty of Hilo
 Adorned by the lehua
 Cherished lei
 Born by visitors
 Nothing deters the invitation of love

E aloha a'e ana i ka makani
 Pu'ulena
 Ka makani kaulana o ka 'āina
 Home noho a na 'iwi pōlena
 Mea 'ole i ke kono a ke aloha

Greeting the Pu'ulena wind
 Famous wind of the land
 Home of scarlet honey-creepers
 Not indifferent to the call of love

Nani wale no Hilo
 I ka ua Kanilehua
 Me he mea ala e i mai ana
 Eia iho a hiki mai...

Hilo is so beautiful
 With the rustling of lehua in the rain
 As though saying
 Wait until the princess comes...

Hilo Hanakahi²³

²² Mele by Joseph Aea (1881), commemorating the visit of Princess Lili'uokalani to Hilo during the Mauna Loa Eruption.

²³ Mele by Keola Naumu.

Hilo Hanakahi
I ka ua Kanilehua...

Hilo of Hanakahi
In the Kanilehua rain...
[Maly, translator]

Kuhio Bay²⁴

Akahi hoi a ike kuu maka
I ka nani a o Waiakea
Aohe lua e like ai
Me ka nani a me ka nani
A o Kuhio Bay

I have just seen with my eyes
The Beauty of Waiākea
There is nothing else like it
Its own beauty and the beauty
Of Kūhiō Bay

Mahalo ae au i ka nani a o Hilo
Me ka ua a e hoopulu nei
Oni ana Mokuola au i ke kai
O ua aina e Kaulana nei

I greatly admire the beauty of Hilo
And the dampening rains
Mokuola moves there in the sea
Of that famous land

Hilo E²⁵

Aia e a i Hilo e
O ka nani e pua ka lehua e

There are Hilo,
Is the beautiful blossom of the lehua

I lei e no ka malihini e
Kipa aku ai e i ka aina e

Made at a lei for the visitor
Who visits this land

E ake au e a e ike e
I ka nani e o Waiakea e

I desire to see
The beauty of Waiākea

Kilohi au e o ka nani e
I ka ulu lehua e a o Panaewa e

Glancing to see the beauty
The growth of lehua at Panaewa

Haina e mai ka puana e
O ka nani e pua ka lehua e

So told is the story
Of the beautiful lehua blossom.

²⁴ Composed by Esther K. Bishaw. In ca. 1908, the bay fronting Hilo One and Waiākea Bay (also known as “Byron Bay”) was renamed “Kūhiō Bay” in honor of Prince Jonah Kalaniaʻole Kuhio who advocated for, and secured funding from the U.S. Congress to develop of the Hilo Breakwater.

²⁵ Mele by Mary Heanu.

5.0 Traditional or Customary Practices Historically in the Study Area and Surrounding Area

In Hawaiian culture, natural and cultural resources are one and the same. Native traditions describe the formation (literally the birth) of the Hawaiian Islands and the presence of life on, and around them, in the context of genealogical accounts. All forms of the natural environment, from the skies and mountain peaks to the watered valleys and lava plains, and to the shoreline and ocean depths are believed to be embodiments of Hawaiian gods and deities. Hawaiian genealogical accounts describe the formation of the islands in a genealogical context, where each island was born. Wākea (the expanse of the sky) was the father of Hawai'i Island, and Papa-hānau-moku (Papa, who gave birth to the islands)—also called Haumea-nui-hānau-wāwā (Great Haumea, born time and time again)—was the mother. As the genealogical account continues, other gods and creative forces of nature, gave birth to the islands. Hawai'i, the largest of the islands, was the first-born of these island children. These same god-beings, or creative forces of nature who gave birth to Hawai'i, were also the parents of the first man (Hāloa), and from this ancestor all Hawaiian people are descended (David Malo, 1951; Beckwith, 1970; Pukui and Korn, 1973). It was in this context of kinship, that the ancient Hawaiians addressed their environment—it is the basis of the Hawaiian relationship with their honua ola (living environment)—and the foundation of their system of land use.

Indeed, over the generations of residency, the ancient Hawaiians developed a sophisticated system of land- and resource-management. By the time 'Umi-a-Līloa rose to rule the island of Hawai'i in ca. 1525, the island (moku-puni) was divided into six districts or moku-o-loko (see Fornander 1973–Vol. II:100-102). The district of Hilo is one of six major moku-o-loko on the island of Hawai'i. The district of Hilo itself, extends from the shore up to the 9,000-foot level on Mauna Kea, and up to the summit of Mauna Loa, where it joins the districts of Ka'ū, Kona and Hāmākua. Towards the east, Hilo joins Puna at Māwae and Kawiakawa, and continues ma uka (towards the mountains), adjoining the land of 'Ōla'a; and on its northeastern boundary, Hilo joins Hāmākua at Ka'ula. The other islands in the Hawaiian group also went through a similar system of districting contemporaneously with Hawai'i.

Today, the Hilo District is simply identified as North and South Hilo. Though in ancient time, there were three major division of Hilo. The area from Waiākea, beyond Leleiwi to the Puna boundary was known as Hilo Hanakahi—Hilo, land of Hanakahi, one of the noted chiefs of Hilo, whose reign was noted for its peace. The middle section of Hilo, fronted by the sandy beach of Waiākea Bay, extending from Kanukuokamanu (at the mouth of Wailoa Stream) to Wailuku River was simply known as Hilo One—Hilo of the sandy shore. The remainder of Hilo, extending

from the cliffs on Wailuku River to Ka'ula at the Hāmākua boundary was called Hilo Palikū—Hilo of the upright cliffs.

The entire district of Hilo has been most famed for its rains and is commemorated in many traditional mele (chants) and 'ōlelo no'ea (poetical sayings) by reference to the rains. This may seem to some to be an undesirable epitaph, but in the Hawaiian mind, the rains were god given—manifestations of the gods Kāne and Lono, and also forms of lesser gods and goddess of the forests and expanse of the land. Rains gave life to, and healed the land, thus a land of water was a rich one.

Native tradition records those lands with “wai” (water) names were themselves associated with the god Lono (G.W. Kahiolo in *Ka Hae Hawaii*, July 10, 1861). Another level of cultural significance might be associated with the land of Waiākea, interpreted as meaning “Expansive-waters,” or the “Water of Ākea,” (Wākea) progenitor of the Hawaiian race). We also find that one of the famous sayings of Hilo describes the beauty of the life-giving rains that seem to resonate from the leaves of the 'ōhi'a lehua (*Metrosideros polymorpha*) trees which at one time grew luxuriantly from shore to mountains—

**No ka pehi mau o ka ua iluna o ka lihilihi o ka lehua
 i ka wā a nā manu e kani hone ana a mūkīkī i ka wai
 e kilihune iho la i ka liko o ka lehua...
 o ka ua kani lehua o Hilo ia!**

Because the frequent pattering of rains upon the lehua blossoms
 is accompanied by the sweet singing of the birds as they sip the nectar which drips
 upon the young budding lehua leaves...

the rain of Hilo is called the rain which resounds upon the lehua blossoms of Hilo!
 [Wise and Kihe in *Ka Hoku o Hawaii*; February 24, 1916 (Maly, translator)]

5.1 Mo'olelo

Mo'olelo is the practice of storytelling and developing oral histories for the purpose of transmitting knowledge information and values intergenerationally. Mo'olelo are particularly critical in protecting and preserving traditional culture in that they are the primary form through which information was transmitted over many generations in the Hawaiian Islands and particularly in the Native Hawaiian community.

Storytelling, oral histories, and oration are widely practiced throughout Polynesia and important in compiling the ethnohistory of the area. The Native Hawaiian newspapers were particularly valued for their regular publication of different mo'olelo about native Hawaiian history. Were it not for the newspapers having the foresight to allow for the printing and

publication of mo‘olelo, far less information about the cultural history of the Hawaiian people would be available today.

There are numerous mo‘olelo about Waiākea and the geographic extent. These mo‘olelo are provided in **Sections 3.1 (Traditional Period)** and in **Section 4.0 (Cultural Resources)**.

5.2 Habitation

Hawaiians lived extensively throughout the islands. Handy, Handy, and Pukui (1991) identify how different kānaka and their ‘ohana lived in accordance with what the authors termed “occupational contrasts” (286), meaning that based on occupation (i.e., planter or fisherman, for example), habitation systems differed. They describe, “The typical homestead or *kauhale*... consisted of the sleeping or common house, the men’s house, women’s eating house, and storehouse, and generally stood in relative isolation in dispersed communities. It was only when topography or the physical character of an area required close proximity of homes that villages exist. There was no term for village. *Kauhale* meant homestead, and when there were a number of *kauhale* close together the same term was used. The old Hawaiians, in other words, had no conception of village or town as a corporate social entity. The terrain and the subsistence economy natural created the dispersed community of scattered homesteads” (284).

5.3 Travel and Trail Usage

The ability to travel was essential to Hawaiians and enabled their sustainability. Travel, and the freedom to move throughout different areas, had different names, including huaka‘i, ka‘apuni, or ka‘ahele. Traveling by sea had distinct names as well, like ‘aumoana. Traveling through the mountains was sometimes referred to as hele mauna. Travel, and moving throughout various places and regions was an essential practice and way of life in traditional Hawai‘i.

The freedom to travel safely was so important that Kamehameha I would come to pass a well-known law protecting travelers, Ke Kānāwai Māmalahoe (The Law of the Splintered Paddle). It is explained by the William S. Richardson School of Law as follows:

As a young warrior chief, Kamehameha the Great came upon commoners fishing along the shoreline. He attacked the fishermen, but during the struggle caught his foot in a lava crevice. One of the fleeing fishermen turned and broke a canoe paddle over the young chief’s head. The fisherman’s act reminded Kamehameha that human life was precious and deserved respect, and that it is wrong for the powerful to mistreat those who may be weaker.

Years later when Kamehameha became ruler of Hawai‘i, he declared one of his first laws, *Ke Kānāwai Māmalahoe* (the Law of the Splintered Paddle), which guaranteed the safety of the highways to all. This royal edict was law over the entire Hawaiian kingdom during the reign of Kamehameha the Great. Considered one of the most important *kānāwai* (royal edict), the law gave the Hawaiian people an era of freedom from violent assault (William S. Richardson School of Law 2021).

The *kānāwai* (law) reads:

E nā kānaka	O my people
E mālama ‘oukou i ke akua	Honor thy god
A e mālama ho‘i	Respect alike, the rights of
Ke kānaka nui a me kānaka iki	All men great and humble
E hele ka ‘elemakule	See to it that our aged,
Ka luahine, a me ke kama	Our women, and children
A moe i ke ala	Lie down to sleep by the roadside
A‘ohe mea nana e ho‘opilikia	Without fear of harm
Hewa no, make	Disobey, and die

The law would have such long-lasting resonance that it would be expressly incorporated into the Hawai‘i State Constitution.²⁶

As traveling through traditional trails was the primary means by which people traveled on land throughout most of Hawaiian history, the traditional trail system is particularly important throughout the Hawaiian Islands. Throughout the islands, there were numerous trails that allowed for people to access different locations. This trail system was critical not only for maintaining a healthy population and managing this population, but it was also important for the traditional economic system of bartering. The trail system allowed for different localized communities to engage and interact. This also allowed for the trade of goods throughout island communities. A discussion of trail usage and the specifically linkage between the *Kānāwai Māmalahoe* and the Project Area is discussed in **Section 3.2.8**.

5.4 Loko I‘a (Fishponds)

Fishponds sites have always been highly valued features of the landscape. Writing about loko

²⁶ Article IX. Section 10 of the Hawaii State Constitution reads: “The law of the splintered paddle, mamala-hoe kanawai, decreed by Kamehameha I—Let every elderly person, woman and child lie by the roadside in safety—shall be a unique and living symbol of the State’s concern for public safety.”

i'a, Kamakau (1976) observed:

Fishponds, *loko i'a*, were things that beautified the land, and a land with many fishponds was called a "fat" land (*'aina momona*). They date from very ancient times. Some freshwater ponds, *loko wai*, were made when the earth was made, but most of the *loko i'a* and the shore ponds, *loko kuapa*, were made by *ka po'e kahiko*.²⁵ The making of the walls (*kuapa*) of the shore ponds was heavy work, and required the labor of more than ten thousand men. Some of these fishponds covered an area of sixty or seventy acres, more or less. Walls had to be made on the seaward side sometimes in deep water and sometimes in shallow, and many stones were needed.

Many *loko kuapa* were made on Oahu, Molokai, and Kauai, and a few on Hawaii and Maui. This shows how numerous the population must have been in the old days, and how they must have kept the peace, for how could they have worked together in unity and made these walls if they had been frequently at war and in opposition one against another? If they did not eat the fruit of their efforts how could they have let the *awa* fish grow to a fathom in length; the *'anae* to an *iwilei* (yard); the *ulua* to a meter or a *muku* (four and one half feet); the *aholehole* until its head was hard as coral (*ko'a ka lae*); and the *'o'opu* until their scales were like the *uhu*? Peace in the kingdom was the reason that the walls could be built, the fish could grow big, and there were enough people to do this heavy work... (Kamakau 1976:47)

While there are no fishponds in the Project Area, the ahupua'a is known for many fishponds as discussed in **Section 3.2.9**. The practice is not associated with the specific Project Area, but it would have been a practice in the larger region.

5.5 Farming and Land Management

Since poi was the staple food for Native Hawaiians, it was of the utmost priority for the first settlers to establish lo'i. Kalo's prominence in the Hawaiian diet derived from its nutritional value, but even more so from its mythological significance. According to Hawaiian traditions, the first human (male) was born from the taro plant:

The first born son of Wakea and Papa was of premature birth and was given the name Haloa-naka. The little thing died, however, and its body was buried in the ground at one end of the house. After a while, a taro plant shot up from the child's body, the leaf of which was named lau-kapa-lili, quivering leaf; but the steam was given the name Haloa.

After that another child was born to them, whom they called Haloa, from the stalk of the taro. He is the progenitor of all the peoples of the earth. (Malo 1951:244)

As discussed in **Section 3.2 (Traditional Period)** and **3.3 (Historic Period)**, the area has an extensive history of farming that extends well back into the pre-European contact era.

5.6 Haku Mele, Haku Oli, and Hula

This practice is related to the composition of song and chants. This is a practice that has existed for many centuries in the Hawaiian culture. When the Hawaiian culture primarily relied on an oral tradition to pass on knowledge and information, the ability to create songs and chants was essential to pass information from one generation to the next. As Donaghy (2013) notes, Hawaiians had hundreds of terms associated with this practice.

Songs and chants are largely influenced by the environment around them. As a pedagogical device it was important if not imperative that these songs or chants effectively captured data from the environment around the composer and passed on this information for others to utilize when managing natural resources. In a very real sense, the land and natural resources act as a muse for composers. The category of songs that provide information on or speak to natural resources are called mele 'āina (songs of the land). As shown in the previous section, there are numerous traditional chants and songs about the project area and its surrounding landscape.

Much like mele and oli, hula serves as a way of both honoring place and telling the story of place. Many hula, especially those based on mele 'āina, require intimate understanding of the place where the mele was composed, including the natural elements of that 'āina. Hula hālau will regularly take huaka'i, or journeys, to visit and honor the place a particular mele speaks of. The ability to visit the place and learn about it is important to the practice of hula.

Hula, as well as mele or oli, are also offered as gifts to kupuna or gods. This practice also requires access to traditional sites. Associated with hula would have been the practices of lei making and the use of plants to dye clothing. There are numerous mele created for the region that describes its history and resources. A selection of these mele are provided in **Section 4.3.1**.

5.7 Kilo

Kilo are observational traditions. Kilo are identified as those who examine, observe, or forecast. Kilo hōkū are traditional astronomers, or those who study the stars. A hale kilo or hale kilo hōkū were observatories or star observatories respectfully. Kilo makani were those who traditionally observed the winds. Kilo moana were traditionally oceanographers. Kilo 'uhane were those who observed and communicated with spirits.

Traditionally the practice of kilo or observation was critical to the management of traditional Hawaiian landscapes. This practice is very closely tied to traditional and customary access as observers would require access to specific vistas viewsheds or areas in order to observe environmental phenomenon.

As illustrated in the proceeding section, Native Hawaiians created a wide range of terms for the environment and understanding the ecosystems around them. These terms were often quite specific, and many were tied closely to a specific geographic area. This level of specificity illustrated the close kinship Hawaiians shared to their surrounding environment. The ability to observe and understand all elements of their ecosystem was essential to both the successful care of natural resources and the survival of the Hawaiian people.

The ability to effectively and accurately read weather phenomenon was essential to the ability of Hawaiian people who farm, fish, navigate, and conduct any number of practices in a sustainable and successful manner. The knowledge Hawaiians acquired about their environment around them, including weather phenomenon, were the result generations of observations that comprised an extensive body of information passed down intergenerationally through oral traditions. Below is a small sample of Hawaiians names and their descriptions of weather phenomenon, including some names for clouds, rains, and winds that are utilized by kilo to help guide activities and practices.

- ao akua – godly cloud, figurative representative of a rainbow
- ao loa – long cloud or high, distant cloud. Status cloud along the horizon.
- ao ‘ōnohi – cloud with rainbow, ‘ōnohi, colors contained within it
- ao pua‘a - cumulus clouds of various sizes piled together, like a mother pig with piglets clustered around her. The Kona coast is famous for ao pua‘a, a sign of good weather and no impending storms.
- ao pehupehu - continually growing cumulus typical of summer. Drifting with the tradewinds, these clouds pick up moisture and darken at their base, finally releasing their rain on the windward mountain cliffs.
- ho‘omalumalu - sheltering cloud
- ho‘oweliweli - threatening cloud
- ānuenuē - rainbow, a favorable omen
- ua loa - extended rainstorm
- ua poko - short rain spell

5.8 Navigation, Paddling, and Surfing

Hawaiians are deeply connected to their surrounding ocean environment. Navigation was a mastered traditional science that allowed for the settlement of the Hawaiian Islands by Polynesians and allowed Hawaiians to move frequently among the Hawaiian Island chain (Johnson et al. 2015).

Ka Ho'omana Kahiko
Helu 20

Nā 'oihana ho'omana a me ke kilokilo 'ana i ka ho'omākaukau 'ana e holo lō'ihī mai ka moana elike me ka holo 'ana mai Hawai'i a 'o O'ahu a Kaua'i paha.

He nui wale ke ano o nā 'oihana hoomana a me ke kilokilo 'ana a kō Hawaii nei po'e ho'oholo waa i ka wā kahiko; he oko'a no ka kekahi po'e, a he oko'a no ho'i ka nā [a]lī'i; a he oko'a no ho'i ka nā maka'āinana; e like me ka nui lehulehu wale o nā makua o lākau, pēlā no hoi nā 'oihana ho'omana e pili ana ilaila.

Akā ho'i, 'a'ole au i kauoha'ia mai e wehewehe pakahi aku i nā 'oihana ho'omana a me ke kilokilo 'ana o kēlā holo wa'a kēia holo wa'a. Me he mea 'la o ke ano nui o nā 'oihana ho'omana, a me ke kilokilo 'ana o ka po'e holo wa'a o Hawai'i nei, kai koi mai ho'i ia'u e hō'ike aku; A eia iho no ia. "Nā 'oihana ho'omana a me ke kilokilo 'ana i ka ho'omākaukau 'ana e holo lō'ihī ma ka moana, e like me ka holo 'ana mai Hawai'i a o O'ahu a Kaua'i paha."

Penei ka hana: i ka ho'omākaukau 'ana e holo lō'ihī ma ka moana, i O'ahu, a i Kaua'i paha; aia ma ke ahiahi ka hāpai 'ana i kēia hana. Penai ka hana 'ana, e mama ka 'awa, kalua ka pua'a, a wali ka 'awa, mo'a no ho'i ka pua'a, a pau i ka 'oki'okina a waiho ma nā pā la'a i ho'ohinuhinu'ia a kū no ho'inā 'apu 'awa.

Ancient Religion
No. 20

Religion rites and incantation in preparing for a length of sailing at sea as from Hawai'i and O'ahu to perhaps Kaua'i.

There were many forms of religious rites and incantations [practices] by Hawai'i's seafarers in ancient times. Some belonged to independent people; some belonged wholly to commoners, like the great many of their gods. [It] was that way with the religious rites concerned there.

On the other hand, I have not been entrusted to explain every religious rite and incantation of each canoe run. It is as though the great importance of the religious rites and incantations of Hawai'i's seafarers was to implore me to explain [them]; Here, below, then, is "The Religious rites and incantations in preparing for a length of sailing at sea from Hawai'i and O'ahu to perhaps Kaua'i."

The activity was like this: In preparing for a lengthy sail at sea from, perhaps O'ahu to Kaua'i, this activity was encouraged in the evening. This was the activity of chewing the 'awa [Piper methysticum]; [preparing] the pig for an underground oven; mixing the 'awa; baking the pig; and when the cutting into pieces was complete, [it] was left on wooden dishes to show off until [it] was ready to be drunk with 'awa.

A mākaukau kēia mau mea, alaila, o ka pule no 'ia o ke kahuna i ke akua o ka po'e holo wa'a, a pau ka pule'ana, 'ai no ho'i a pau ka 'ai 'ana, nana aku ke kahuna i ke aouli, inā i kū ke anuenua a i pi'o mamua o ka wa'a, a o ka pūnohu paha, alaila, 'ī aku ke kahuna, 'a'ole e pono ke holo o make auane'i ma ka moana; a inā ho'i i nana aku 'oiai ka 'opua, 'a'ole he kū maika'i mai, ua lele 'ino ke ao, ua lele 'ino ke ao, ua moku moku li'ili'i nā opu ai ka lewa; 'ōlelo hou no ke kahuna 'a'ole e holo o make no.

Akā ho'i, inā e nānā ke kahuna a i kū ka pūnohu mahope o ka wa'a, ne'e ho'i ka ua koko, pio ke anuenua, a maika'i ho'i ke kū 'ana mai o nā opua, alaila; 'ī aku ke kahuna, ae,ua maika'i, 'a'ole no he mea nāna e keakea mai; akā, ho'okahi mea i koe, inā e moe au a i loa'a ka moe maika'i, alaila, holo le'a loa ka holo'ana. Moe iho la ke kahuna a ala mai la me ka 'ī mai, Ua loa'a iho nei ia'u ka moe maika'i, nolaila, e holo 'oukou 'a'ole 'oukou e pilikia. A ma ia wahi, pau kā ke kahuna 'ōlelo, o kā ka ho'okele ka mea i koe a kākou e 'ōlelo hou ai.

Ka holo 'ana. —He 'elua manawā e holo ai ka po'e holo wa'a, i ka pō kekahi ai [sic; a i] ke ao no ho'i kekahi. Inā i ka pōe holo ai, alaila, o ka manawā holo, 'o ka wā e puka mai ai ka Hōkū-kau'ōpae, 'oia ho'i ka Hōkū-ho'okelewa'a e 'ōlelo'ia nei; a puka mai ia hōkū, alaila, e mākaukau 'ē no ka ho'okele, a me nā mea 'ē a'e ā pau maluna o ka ho'okele, a me nā mea 'ē a'e ā pau maluna o ka wa'a, a 'o ka holo aku la no 'ia. A ma

And when all these things were prepared, then [it was time] for the priest to pray to the god of the seafarers. When the prayer was completed, [they] ate until all was consumed. The priest observed the vault of heaven. If there was a rainbow that arched ahead of the canoe, and perhaps [if it was] misty, then, the priest said, "It is not good to sail lest you perish soon at sea." If he observed billowy closed [with] violent winds, [or] small fragmented cloud here and there in the sky, the priest said again, "Don't sail lest you perish."

However, if the priest observed that the mist rose aft of the canoe; a rainbow-hued rain moving along [with] an arched rainbow, and clouds rising well, then the priest said, "You, It's good. There is nothing that opposes, but one more thing remains. If I lay down to sleep and I have a good dream, then, the sail will be a happy trip. The priest lay down to sleep and when he woke up he said, " I have just received a good dream; consequently, you [should] sail; you will not have [any] problem[s]". The priest's utterances ended there, and the navigator was the one left of whom we will speak more.

Sailing. – There were two times when people who sail travel, one is at night and the other is during the day. If [they] sail at night, then the sailing is when Hōkū-kau'ōpae appear. This is when the navigators say, "When the canoe-guiding star appears, [we] must prepare everything, everything on board the canoe for sailing." It is the [time of] decision, and the time to decide the two important things the navigator must observe. One is the crest of the waves, and the other is the

is holo 'ana, he 'elua mea nui a ka ho'okele e nānā ai, 'o ka 'ale kekahi, a 'o nā hōkū ho'i ke kahi. I ka nānā 'ana ho'i o ka ho'okele i nā hōkū, he 'elua {ma}u hōkū anā e nānā nui ai, 'oia ho'i ka Hōkū-ho'okelewa'a, 'o ka (hope 'ia o ka) iha 'ia o ka wa'a, a 'o ka Hōkūpa'a 'Ākua, 'oia ka (hope ihu) o ka wa'a. Pēlā no e holo ai ā kāhi e pae aku ai.

Akā ho'i, inā i nānā aku ka ho'okele i nā hōkū ma ka 'Akau, 'ehiku ia po'e hōkū, a ua kapa'ia mai lākou 'o nā hiku, aia malaila kekahi wahi hōkū u'uku. Inā i nānā aku ka ho'okele, a e 'imo'imo pinepine ana is wahi hōkū, alaila, e 'i aku no 'oia i ka po'e hoe wa'a me ke kena aku. 'O ka pa 'o ka hoe, aia ka pono o ka pae i ka 'āina, no ka mea, he makani ka hope. Ua 'ike 'ē no ka ho'okele i ka 'ino.

K{a}[]lua, 'oia ho'i ka 'ale. 'O ka 'ale, o kekahi mea nana 'ia ā ka ho'okele. He 'elima no 'ale, a eia ho'i kō lākou mau inoa: 'Ale-kūloko, 'oia ke ale i 'ike ;ole 'ia a ke ho'okele, a ua kapa'ia mai 'oia he 'ōpu'u; 'Ale-'uweke, a 'oia ho'i ka 'ale e nahā ai ka wa'a; 'Ale-panui, 'oia ka 'ale mahope mai; 'Ale-mā'ali no ho'i, a 'oia no ho'i ka 'ale nui ma waho mai o ka wa'a.

A inā ho'i i ke ao e holo ai, alaila, 'a 'ohe ho'i he 'ōlelo ana no ia, akā, inā i pō'ele'ele i ka moana, e nana aku ka ho'okele i ka Hōkūahiahi, o ka ihu 'ia o ka wa'a, a ua kapa'ia mai is hōkū 'o Mānanalo, 'o ka ihu

stars. When the navigator observes the stars, there are two stars he often observes: the navigation star [Hōkū-ho'okelewa'a] at the bow of the canoe, and the fix north star [Hōkūpa'a 'Ākua] at the after end of the canoe. That was how they sailed to a place where [they] would land.

However, if the navigator observed several stars in a group in the north they called [them] Nā Hiku. There were few stars there. If the navigator observed that place with the stars twinkling often, then he would give a command to the paddlers, "The sails [and] paddlers [will] make landing on land successful because the wind is behind." The navigator already knew of the storm.

The second [thing to observe] is the waves. The wave was something that was observed by the navigator. There are five [kinds of] waves, [and] here are their names: the kūloko [local] is the wave not indicated by the navigator and was called an 'ōpu'a [a large swell]; the 'uweke [opening] is a wave that would smash a canoe in bits; the niau [a moving billow] is a wave that is immediately ahead of the canoe; the panui [large wall [of water]] is the wave that is behind [the canoe]; and the mā'ali [furrowed] is a large wave just beyond the canoe.

If they sailed in daylight, then they would make no statement. But if it were a dark night at sea, the navigator would observe the evening star [Hōkūahiahi], at the nose of the canoe which was called Mānanalo. [It] was kept on the nose until the canoe touched

no ia o ka wa'a ā pae wale i ka 'āina. 'Okahi mo'o'ōlelo iho la no ia o nā mea i loa'a mai ia'u.

J. Waiamau

land. It's a star [passed] down from people who obtained it from me.

J. Waiamau

As articulated in this text, the navigators' ability to read the waves and the stars was critical to traditional navigation techniques. Any obstructions to these natural features could impact the perpetuation of this important tradition.



Figure 21. Community members gather in Hilo Bay for a blessing before the Hōkūle'a World Wide Voyage launches from Hilo to Tahiti.

Hilo is an important location for Hawaiian navigation, even today. It is the location from where the Hōkūle'a launches to Tahiti. The Hōkūle'a follows a traditional submerged path known as Ala i Kahiki (the path to Kahiki, Kahiki being Tahiti).



Figure 22. Young crew members on the Hōkūle'a in Hilo Bay

Outrigger canoes were an important part of everyday life for Hawaiians. Canoes were used as fishing vessels, transportation, war craft and sport. David Malo documents that “the Hawaiian wa’a (canoe) was made of the wood of the koa tree... The building of a canoe was an affair of religion” (Malo 1951: 126-135). When a man found a fine koa tree, he went to the kahuna kalai wa’a (canoe builder) to determine if the tree would make a good canoe. Once it was determined the tree was not rotten, preparations were made accordingly to go into the mountains to hew the tree into a canoe. Following the kahuna’s instruction, craftsmen would hew the massive trees into a more manageable shape before the people came to haul the canoe to the hālau (“long house” where canoes were stored) by the ocean.

In the hālau, the fashioning of the canoe resumed over the course of many days. Upon completion, the canoe was blessed by the kahuna for safe voyage and the canoe would be furnished with carvings, paddles, seats and a bailer. There were many varieties of wa’a, and its use was determined by its size. If the canoe was a kialoa (a sharp and narrow canoe), it would be used expressly for racing. “The racing canoes would paddle far out to sea and then they would pull for the land” (Malo 1951:222). Whichever canoe touched the beach first was

the victor. Ancient Hawaiians were very fond of betting on canoe races based on whom they deemed the strongest crew.



Figure 23. Outrigger canoe paddlers in Hilo Bay

Surfing is another important traditional Hawaiian practice. Hawaiians have long participated in this cultural activity. While it is primarily seen as a recreational activity today, it is nonetheless a cultural practice with pre-foreign contact origins. Based on the ethnographic data, the project area was identified as one used by practitioners.

6.0 Ethnographic Data

As discussed previously in **Section 2.6 (Ethnographic Methodology)**, information was collected from a wide range of individuals and sources. The findings of those efforts are discussed in this section. Ethnographic data is utilized to supplement the other research methods utilized. It is one in a range of research tools employed to gather information about the project area.

Honua Consulting was tasked with gathering information from individuals with lineal and cultural ties to the area and its vicinity regarding regional biocultural resources, potential impacts to these biocultural resources, and mitigation measures to minimize and/or avoid these impacts.

The bulk of the information available from practitioners and kūpuna were drawn from native testimonies and Hawaiian language sources and integrated into the cultural and historic overview section of this assessment. Those sources, along with responses to this project, were considered when researching the traditional or customary practices discussed in a previous section. Multiple area business owners and practitioners were contacted for interviews. Only two responded and agreed to be interviewed. Interviews were conducted with two (2) individuals. This data helped to identify additional resources and practices in the area; this information also helped to confirm research conducted for this report.

Additionally, as the project will include the removal of historic properties, interviewees were specifically asked to share any concerns about this action.

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6.1 Interview with Cameron Mortensen

Interview with Cameron Mortensen

Interviewer: Mathew Sproat

Interviewee: Cameron Mortensen

Date: 11/28/2022

Location: via telephone

Biography

Mr. Mortensen was born and raised in Hawai'i. He grew up in Hilo, and currently lives in Kaimuki.

Overview

Mr. Mortensen is associated with the project area through growing up in Hilo. The area is used for public events often.

General Discussion

Mr. Mortensen shared that important historic sites in the area include the Hilo Armory, the Band Stand, and Boy Scout offices.

Cultural Resources

Mr. Mortensen notes that the area is culturally significant historically as a place to gather. Hilo has been a hub for the adjacent districts. The Wailuku river is also culturally significant. Mr. Mortensen also noted that 'io have been frequenting the area again.

Traditions and Customs

Mr. Mortensen explained that paddling, fishing, and surfing are common customary practices that occur in Hilo Bay.

Impacts

Mr. Mortensen noted that the area has been impacted for years now. As such, he does not believe the project would greatly negatively impact cultural resources, traditions, or customs.

Mitigation Measures and Recommendations

Mr. Mortensen shared that they have had shoreline issues for a long time. As such, he recommended that decision makers should make their best effort to improve the conditions of the area using best practices.

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6.2 Interview with Harold Kama, Jr.

Mr. Kama elected to provide responses in writing. They are provided verbatim below.

1. Please provide your name. *Harold Kama, Jr.*
2. What is your profession? *Production Entertainment, Cultural Practitioner, and Musician*
3. Where were you born and raised? *Born Honolulu, raised in Hilo*
4. Where do you live now? *Hilo*
5. What is your association, if any, with the Project Area? *I am very familiar with the project area. I surf at Kaipalaoa. I work on entertainment scheduling weekly with the owner of Cronies Bar and Grill, located on the corner of Kamehameha and Waianuenue.*
6. Are you aware of any cultural resources in the Project Area or near the Project Area? *Kai Palaoa, fronting the project area is teeming with sea life. Wailuku river is an abundant source of fresh water marine life. At the mouth of the Wailuku river, particular varieties of seaweed, limu can be found. These are the species that grow where both fresh water and ocean water mix together.*
7. Are you aware of any traditions or customs that may take place near the Project Area or are otherwise associated with the Project Area? *Surfing, Swimming, Fishing, net-throwing, relaxation, and Canoe paddling are performed from Wailuku river, across the project area and onward to the other end of Hilo Bay. Ample parking and access to the Kai by Kānaka Māoli, of all ages is critical to the continuation of cultural practice.*
8. Is there anything about the project area that's particularly significant you would like to share? *There are many historic buildings fronting the project area. Water is abundant in this area and floods the basements of these buildings. Water enters in from Wailuku overflowing, rains flowing down from Mauna Kea and Mauna Loa, water coming in from the ocean during high surf.*
9. Are there any stories associated with the project area we should be aware of? *Kaipalaoa Landing is a wahi pana, or legendary place in Hilo. Legends note that the site served as a campground for King Kamehameha, and the site where he declared the Law of the Splintered Paddle. Many surfers, including King Kamehameha would travel to Surf in Hilo, at Kaipalaoa, a favorite.*
10. The proposed project includes the building of a new Proposed Intersection Improvements at Waianuenue Avenue Project Pi'ihonua & Punahoa 2 Ahupua'a, South Hilo District, Hawai'i Island, TMK: [3] 2-3-003 & 004 Road Right-of-Way (ROW). Are you aware of any resources that may be impacted by such a project? *Just marine life that may be affected by the run off of construction debris.*

What might those impacts be? Can you think of ways in which any potential impacts can be minimized, mitigated, or avoided? *Proper clean up when using asphalt, cement and other chemicals. Avoid spills and run-offs into the ocean and drains, which lead into the ocean.*

11. Are you aware of any traditions or customs that may be impacted by such a project? What might that impacts be? Can you think of ways in which any potential impacts can be minimized, mitigated, or avoided? *Ocean Activities. Communication with the public, and signage.*

12. Do you have any recommendations for conditions or best management practices for the project, should it proceed? *Communicate early to allow time for adjustments.*

13. Is there anything else you would like to share? *The project's visual end product should be pleasing in aesthetics*

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7.0 Ka Pa‘akai Analysis

It has long been the law of the land that the State of Hawai‘i has an “obligation to protect the reasonable exercise of customary and traditionally exercised rights of Hawaiians to the extent feasible” *Public Access Shoreline Hawai‘i v. Hawai‘i County Planning Commission* (“PASH”) 79 Hawai‘i 425, 450 n. 43, 903 P.2d 1246, 1271 n. 43 (1995). In 2000, in the *Ka Pa‘akai* decision, the Court established a framework “to help ensure the enforcement of traditional and customary Native Hawaiian rights while reasonably accommodating competition private development interests.” 94 Hawai‘i 31, 35, 7 P.3d 1068, 1972 (2000). This analysis is used here to fulfill the goal of this CIA (**Section 1.4**).

It is also imperative to emphasize that the State may not delegate their obligations under the *Ka Pa‘akai* decision to another party, including but not limited to the federal government. While the *Ka Pa‘akai* decision was specific to a private developer, the facts of that case would be applicable to the situation at hand because the Court’s reasoning for this decision and applicable precedent apply – the issue being that another entity would not have the same public accountability as the State. That is the case herein, the public accountability of the federal government is not equal to that of the State of Hawai‘i. More specifically, the federal government is not bound to the obligations of the State as set forth under the Hawai‘i State Constitution, which is the document from which the rights protected under *Ka Pa‘akai* emanate.

Based on the guidelines set forth in *Ka Pa‘akai*, the Hawai‘i Supreme Court provided government agencies an analytical framework to ensure the protection and preservation of traditional and customary Native Hawaiian rights while reasonably accommodating competing private development, or other, interests. The Court has stated: “that in order to fulfill its duty to preserve and protect customary and traditional Native Hawaiian rights to the extent feasible, as required by Article XII, Section 7 of the Hawai‘i Constitution, an administrative agency must, at minimum, make specific findings of fact and conclusions of law as to the following:

- 1) The identification of valued cultural, historical, or natural resources in the project area, including the extent to which traditional and customary Native Hawaiian rights are exercised in the project area.
- 2) The extent to which those resources—including traditional and customary Native Hawaiian rights—will be affected or impaired by the proposed action; and
- 3) The feasible action, if any, to be taken to reasonably protect Native Hawaiian rights if they are found to exist. *Ka Pa‘akai*, 94, Hawaii at 47, 7 P.3d at 1084. Cited in *Matter of Contested Case Hearing Re Conservation District Use Application (CDUA) HA-3568 for the Thirty Meter Telescope at the Mauna Kea Science Reserve, Ka‘ohe Mauka, Hāmākua, Hawai‘i*, 143 Hawai‘i 379, 431 P.3d 752 (2018) (“*Mauna Kea II*”).

In order to complete a thorough CIA that complies with statutory and case law, it is necessary to fully consider information available from, and provided by, Native Hawaiian cultural practitioners and cultural descendants from the project area.

The *Ka Pa‘akai* analysis is largely a legal analysis, as the applicable tests are legal standards. Therefore, a strong analysis will be conducted by someone with sufficient legal training. Additionally, at the core of a thoughtful *Ka Pa‘akai* analysis is a comprehensive understanding of traditional and customary practices. In breaking down the Court’s tests, it is important to the different elements that contribute to each test.

The first test - “The identification of valued cultural, historical, or natural resources in the project area, including the extent to which traditional and customary Native Hawaiian rights are exercised in the project area” – actually consists of two separate elements. First, the simple identification and existence of valued cultural, historical, or natural resources. These resources are tangible in nature. They can include sacred places, culturally valuable plants, or a religious or historic site. This assessment how sought to exhaustively identified the great multitude of resources that may exist in the project area or adjacent areas.

As to this test, this assessment shows that while there may have traditionally been a lot of activity and resources in the area, much of this has been diminished by modernization and the tsunami that hit the project area. There are no known culturally significant plants, resources, or sites in the project area, although the ethnographic data collected illustrated the cultural importance of the region’s coastal resources and Wailuku River, which is outside the project area but nearby.

The second element of this first test is access. Access requires two things to occur. One is the existence of a resource. Whether a plant, an animal, a place, or site, the resource must exist in order a practitioner to access it. The second thing is physical access. This includes, but it is not limited to, the ability to physically access a plant, animal, site, or location associated with a particular practice. This can also include the traditional and customary route or path taken to access the resource. This can also include cultural protocols that existed in accessing a resource. These are often temporal, in that access protocols can be at a certain time of day or year. Makahiki would be a good example of a traditional custom that has specific cultural protocols associated with access. In the case of Makahiki, the custom takes place at a certain time of year.

Therefore, the first test under *Ka Pa‘akai* should include not only a listing of resources, but the identification of ways in which those resources are accessed and utilized in association with a traditional and customary practice.

There is no evidence that there are resources in the area or that the area is contemporaneously used as access for cultural practices. It is likely that fishing, paddling, surfing and other practices may occur in the surrounding area though and access through the project area may be utilized to conduct practices, like surfing, in the adjacent areas.

Therefore, the second test – “The extent to which those resources—including traditional and customary Native Hawaiian rights—will be affected or impaired by the proposed action” – also looks at two separate elements. The first, does the proposed action and its alternatives have an adverse impact on the existence of resources? This would include the alteration, destruction, modification, or harm of sites, including biological resources, sacred places, burial sites, etc. It also includes a loss of species. Any adverse impact or harm to resources is alone an affect or impairment caused by the proposed action.

As there are no resources in the immediate project area, the project does not have the potential to directly impact traditional or customary practices. Although it should be noted from the ethnographic data that cultural events take place in the neighboring business district and surfers may use Kaipalaoa Landing for surf access. The project should adhere strictly to all construction best management practices (BMPs) to ensure no water resources are impacted by construction activities. Additionally, a construction outreach plan should be developed to ensure the community is aware of any project activities, especially traffic control plans that may be implemented during construction.

Any recommendations regarding protection of any biological resources that may be in the area should also be followed. The interviewees identified the presence of important marine resources in the bay and the potential for ‘io (the Hawaiian hawk) in the project area.

The third part of the *Ka Pa‘akai* framework aims to identify “[t]he feasible action, if any, to be taken to reasonably protect Native Hawaiian rights if they are found to exist.” Determining whether or not action has been suitably “feasible” is a matter for the State. These feasible actions could include continued access to the project as needed to conduct cultural practices.

The third part of the test becomes moot in this case as there is minimal to no potential for impact to traditional or customary practices if the recommendations provided above are followed.

It is noted however, many practitioners’ businesses are located in the Hilo Bayfront area. Many of these businesses rely heavily on the Merrie Monarch Festival. To avoid impacting the practitioners’ businesses, work should not occur the week of the Merrie Monarch Festival and all parking spaces should be opened and available for use during this week. Recommendations from the interviewees should also be incorporated into the project.

8.0 Impact Assessment and Conclusion

Based on the information gathered and the ethnographic data, the proposed project has the minimal potential to adversely impact cultural resources and traditional or customary practices in the area.

Table 1. OEQC compliance requirements and their corresponding sections in this CIA

<p>OEQC notes that in addition to the content requirements for the Draft EIS, which are set out in HAR Chapter 11-200.1 et seq., the CIA should address, but not necessarily be limited to, the following matters:</p>	
<p>A. A discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained.</p>	<p>A detailed methodology section is provided in Section 2, Methodology.</p>
<p>B. A description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.</p>	<p>A discussion of the effort to gather into from persons familiar with the area or other stakeholders is provided in Section 2.6, Ethnographic Methodology.</p>
<p>C. Ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.</p>	<p>A discussion of procedures, including constraints or limitations, is provided in Section 2.6.</p>
<p>D. Biographical information concerning the individuals and organizations consulted, their expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical</p>	<p>Biographical information was provided in and through the interviews, which are included with the individual interview summaries in Section 6.0.</p>

<p>and genealogical relationship to the project area.</p>	
<p>E. A discussion concerning historical and cultural source materials consulted, the institutions and repositories searched and the level of effort undertaken. This discussion should include, if appropriate, the perspective of the authors, any opposing views, and any other relevant constraints, limitations or biases.</p>	<p>A discussion of the materials consulted is provided in Section 2. An extensive cultural and historical overview, which uses both Hawaiian and English language resources is also provided in Section 2.</p>
<p>F. A discussion concerning the cultural resources, practices and beliefs identified, and, for resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site.</p>	<p>In addition to the cultural and historical overview, an extensive discussion concerning cultural resources, practice and beliefs are provided throughout the document by subfield, specifically in Section 3 and Section 4.</p>
<p>G. A discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area affected directly or indirectly by the proposed project.</p>	<p>A thorough discussion concerning the nature of traditional or customary practices and the significance of the cultural resources affected directly or indirectly by the proposed alternatives are provided in Section 7.</p>
<p>H. An explanation of confidential information that has been withheld from public disclosure in the assessment.</p>	<p>There has no confidential information withheld from public disclosure, except for personal emails, addresses, or phone numbers.</p>
<p>I. A discussion concerning any conflicting information regarding identified cultural resources, practices and beliefs.</p>	<p>There was no conflicting information regarding cultural resources, practices, or beliefs.</p>
<p>J. An analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their</p>	<p>A thorough analysis is provided in Section 7.</p>

<p>setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.</p>	
<p>K. A bibliography of references and attached records of interviews which were allowed to be disclosed.</p>	<p>References are included in Section 9. Interview summaries are provided in Section 6.</p>

9.0 References

Akana C.L. and Gonzalez K.

2015 *Hānau Ka Ua: Hawaiian Rain Names*. Honolulu: Kamehameha Publishing.

Alexander, W.D.

1891 *A Brief History of Land Titles in the Hawaiian Kingdom*. Hawaiian Almanac and Annual for 1891. Honolulu. T.G. Thrum.

1902 *Hawaiian Geographic Names*. U.S. Coast and Geodetic Survey. Washington. Government Printing Office.

Beckwith, M.

1970 *Hawaiian Mythology*. Honolulu: University of Hawaii Press.

Boundary Commission Records

1873-1875 *Hawaii State Archives* (Digitized copy in collection of Kumu Pono Associates).

Bowser, G. (compiler)

1880 *The Hawaiian Kingdom Statistical and Commercial Directory and Tourists Guide*. Honolulu: Bowser and Co.

Buke Mahele

1848 “*Buke Kakau Paa no ka Mahele Aina*” (Land Division Book of 1848). Hawaii State Archives (Digitized copy in collection of Kumu Pono Associates).

Coan, Titus

1882 *Life in Hawaii*. New York: Anon Randolph & Co.

Ellis, Wm.

1963 *Journal of William Ellis*. Advertiser Publishing Co., Ltd. Honolulu, Hawaii.

Dutton, C. E. Capt.

1883 *Hawaiian Volcanoes*. United State Geological Survey Annual Report 1883.

Emerson, N.B.

1915 *Pele and Hiiaka: A Myth From Hawaii*. Honolulu. (Reprint 1993, ‘Ai Pōhaku Press. Honolulu).

Emory, K. P. in E. Tatar

1982 Nineteenth Century Hawaiian Chant. Pacific Anthropological Records No. 33, B.P. Bishop Mus. Honolulu.

Fornander, A.

1917- Fornander Collection of Hawaiian Antiquities and Folklore. (9 vols.). Honolulu:

1919 Bishop Museum Press.

1973 An Account of the Polynesian Race: Its Origin and Migrations. Tokyo: Charles E. Tuttle Co., Inc.

Handy, E.S.C., and E.G. Handy (with M. K. Pukui)

1972 Native Planters in Old Hawaii. B.P. Bishop Museum Bulletin 233. Bishop Museum Press, Honolulu.

Hudson, A.E.

(1932) Ms. Archaeology of East Hawaii. Manuscript on file. Dept. Anthro., B. P. Bishop Museum.

Ii, J.P.

1959 Fragments of Hawaiian History. Honolulu: Bishop Museum Press.

Jordan, D. S. and C. W. Everman

1901 Preliminary Report On An Investigation Of The Fishes And Fisheries Of The Hawaiian Islands.”

Kamakau, S.

1961 Ruling Chiefs of Hawaii. Honolulu: The Kamehameha Schools Press.

Kame‘eleihiwa, L.

1992 Native Land, and Foreign Desires. Bishop Museum Press.

Kelsey, Theo.

1922-25 Manuscripts in the collections of the Hawai‘i State Archived (Series M-445)

Kingdom of Hawai‘i

1850 Kanawai Hoopai Karaima no ko Hawaii Pae Aina [Penal Code].

Lyons, C.J.

1875 Land Matters in Hawaii. Islander, Honolulu.

Mahele Aina

1848- Records of the Claims for Kuleana in the Hawaiian Islands (Native & Foreign Register; 1855 Native & Foreign Testimony; Mahele Award Book Surveys; and Royal Patents Issued on Awards: “Buke Kakau Paa no ka Mahele Aina” (Land Division Book of 1848). Hawaii State Archives (Digitized records in collection of Kumu Pono Associates).

Malo, D.

1951 Hawaiian Antiquities. Honolulu, B.P. Bishop Museum.

Pukui, Mary Kawena

1983 ‘Ōlelo No‘eau: Hawaiian Proverbs & Poetical Sayings. Bishop Museum Press. Honolulu.

Pukui, M.K., and S. Elbert

1971 Hawaiian Dictionary. Honolulu: University of Hawaii Press.

State of Hawai‘i

Ms. Files cited in text from the collections of the:
Hawai‘i State Archives
Department of Land and Natural Resources — Bureau of Conveyances
Department of Land and Natural Resources — Land Management Division
Department of Land and Natural Resources — State Survey Division

Stewart, C.S.

1970 Journal of a Residence in the Sandwich Islands, During the Years 1823, 1824 and 1825.... University of Hawaii Press, Honolulu.

Stokes, J.F.G., and T. Dye

1991 Heiau of the Island of Hawai‘i. Bishop Museum Bulletin in Anthropology 2. Bishop Museum Press, Honolulu.

Thrum, Thos. G.

1908 “Tales from the Temples.” Hawaiian Almanac and Annual for 1907:48-78. Honolulu.

Whitney, H. M.

1913 The Hawaiian Guide Book for Travelers. Honolulu.

Appendix I: Glossary of Hawaiian Terms

The following list of terms were used frequently throughout this report. All definitions were compiled using Pukui and Elbert's *Hawaiian Dictionary* (1986).

Ahupua'a	Land division usually extending from the uplands to the sea, so called because the boundary was marked by a heap (ahu) of stones surmounted by an image of a pig (pua'a), or because a pig or other tribute was laid on the altar as tax to the chief.
'Āina	Land, earth. <i>Lit.</i> That which feeds.
Akua	1. God, goddess, spirit, ghost. 2. Divine, supernatural, godly.
Ala	Path, road, trail.
Ali'i	1. Chief, chiefess, ruler, monarch. 2. Royal, regal. 3. To act as chief, reign.
'Aumakua	Family or personal gods, deified ancestors who might assume the shape of sharks, owls, hawks, dogs, plants, etc. A symbiotic relationship existed; mortals did not harm or eat them, and the 'aumakua warned or reprimanded mortals in dreams, visions, and calls.
'Aumākua	Plural of 'aumakua.
'Auwai	Irrigation ditch, canal, waterway.
Hālau	1. Long house, as for canoes or hula instruction; meeting house. 2. Large, numerous; much.
Hale pili	House thatched with pili grass.
Heiau	Pre-Christian place of worship, shrine. Some heiau were elaborately constructed stone platforms, other simple earth terraces.
Ho'i	1. To leave, go or come back; to cause to come back. 2. To enter, as an institution or last resting place. 3. A parting chant to which hula dancers dance as they leave the audience. 4. Marriage of a chief with the daughter of a brother or sister; to do so (a means of increasing offspring).
Hula	A Hawaiian dance form accompanied by chant or song.
'Ili	Land section, next in importance to ahupua'a and usually a subdivision of an ahupua'a.
'Ili kū	Shorted form of 'ili kūpono.
'Ili kūpono	A nearly independent 'ili land division within an ahupua'a, paying tribute to the ruling chief and not to the chief of the ahupua'a. Transfer of the ahupua'a from one chief to another did not include the 'ili kūpono located within its boundaries. Sometimes shorted to 'ili kū.

References

Kanaka	Human being, person, individual, party, humankind, population; often used for man.
Kānaka	Plural of kanaka.
Kāne	Male, husband, male sweetheart, man; brother-in-law of a woman.
Kanikau	1. Dirge, lamentation, chant of mourning, lament. 2. To chant, wail, mourn.
Kapu	1. Taboo, prohibition. 2. Special privilege or exemption from ordinary taboo. 3. Sacredness, prohibited, forbidden, sacred, holy, consecrated. 4. No trespassing, keep out.
Kuleana	Right, privilege, concern, responsibility, title, business, property, estate, portion, jurisdiction, authority, liability, interest, claim, ownership, tenure, affair, province.
Kupuna	Grandparent, ancestor, relative or close friend of the grandparent's generation, grandaunt, granduncle.
Kūpuna	Plural of kupuna.
Limu	A general name for all kinds of plants living under water, both fresh and salt, also algae growing in any damp place in the air, as on the ground, on rocks, and on other plants; also mosses, liverworts, lichens.
Lo'i	Irrigated terrace, especially for taro, but also for rice and paddy.
Loko i'a	Traditional Hawaiian fishpond.
Makai	On the seaside, toward the sea, in the direction of the sea.
Mālama	To take care of, tend, attend, care for, preserve, protect, beware, save, maintain.
Mauka	Inland, upland, towards the mountain.
Mele	1. Song, anthem, or chant of any kind. 2. Poem, poetry. 3. To sing, chant.
Mele māka'ika'i	Travel chant.
Mō'i	King, sovereign, monarch, majesty, ruler, queen.
Moku	1. District, island, islet, section, forest, grove, clump, fragment. 2. To be cut, severed, amputated, broken in two.
Mo'o	Lizard, reptile of any kind, dragon, serpent.
Mo'olelo	Story, tale, myth, history, tradition, literature, legend, journal, log, yard, fable, essay, chronicle, record, article.
Mo'owahine	Female lizard deity.
Nī'aupi'o	Offspring of the marriage of a high-born brother and sister, or half-brother and half-sister.
'Ōlelo no'eau	Proverb, wise saying, traditional saying.
Oli	Chant that was not danced to, especially with prolonged phrases chanted in one breath, often with a trill at the end of each phrase; to chant thus.
Pi'o	Marriage of full brother and sister of nī'aupi'o rank, presumably the highest possible rank. Their offspring had the rank of naha, which is less

References

	than pi'o but probably more than nī'aupi'o. Later pi'o included marriage with half-sibling.
Pueo	Hawaiian short-eared owl (<i>Asio flammeus sandwichensis</i>), regarded often as a benevolent 'aumakua.
'Ūniki	Graduation exercises, as for hula, lua fighting, and other ancient arts (probably related to niki, to tie, as the knowledge was bound to the student).
Wahi pana	A legendary place; a place made special celebrated in stories associated with it. Often sacred.
Wahine	Woman, lady, wife; sister-in-law, female cousin-in-law of a man, female.
Wao	1. Realm. 2. A general term for inland region usually forested but not precipitous and often uninhabited.

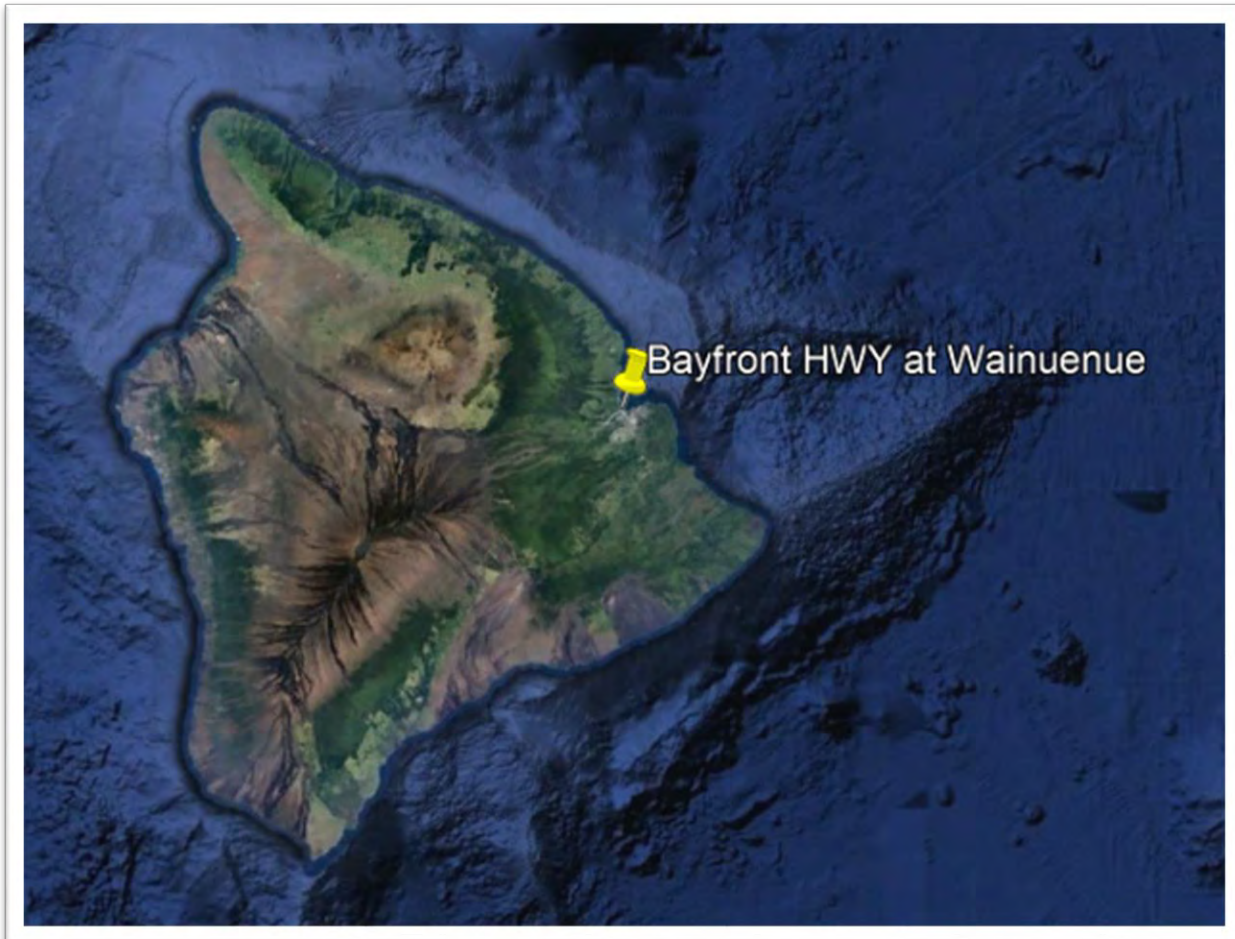
APPENDIX D

Traffic Impact Assessment Report



HILO BAYFRONT HIGHWAY INTERSECTION IMPROVEMENTS ALTERNATIVE ANALYSIS

Draft Transportation Impact Assessment Report



SEPTEMBER 2022



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Draft Transportation Impact Assessment Report

Hilo Bayfront Highway Intersection Improvements Alternative Analysis Hilo, Hawai'i, Hawai'i

September 2022

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1.0 INTRODUCTION

The Hawaii Department of Transportation (HDOT) is looking to enhance the intersection of Bayfront Highway (Hawai'i Belt Road Route 19) and Waiānuenu Avenue (State Route 200) located in Hilo on the island of Hawai'i. The Hilo Bayfront Highway Intersection Improvements Alternative Analysis project proposes to assess and compare several alternatives that serve to enhance the intersection.

The purpose of the project is to address operational issues at the Hilo Bayfront Highway intersection with Waiānuenu Avenue as well to provide pedestrian accessibility and safety improvements. This project is intended to improve overall maneuverability of vehicles, particularly for large trucks, through the intersection of Bayfront Highway and Waiānuenu Avenue and provide safer conditions for pedestrians and bicyclist in the intersection and immediate vicinity. In addition, the improvements are intended to mitigate existing vehicular congestion at the intersection and other roadways feeding into the intersection particularly during Highway closures due to flooding and address projected decreases in level of service for these roadways. The project will also contribute to achieving goals and objectives consistent with the Downtown Hilo Multimodal Master Plan and State of Hawai'i Bike Plan to provide a more walkable and bike-friendly community.

The need for the project is that Hilo Bayfront Highway is occasionally closed due to flooding and vehicles (including large trucks) use Kamehameha Avenue as a detour. The existing geometrics and close proximity of the Hilo Bayfront Highway/Waiānuenu Avenue and Waiānuenu Avenue/Kamehameha Avenue intersections are not conducive to large truck traffic. The other need for the project is that there is currently no pedestrian access crossing Hilo Bayfront Highway to connect Hilo Town with the nearby Kaipalaoa Landing Park. Projected traffic volumes with the current traffic configuration will produce increased congestion for the intersection and a decreased level of service for the project area and adjacent roadways. In addition, pedestrian and bicycle safety in the project area is a significant concern, especially as it relates to accessibility for Kaipalaoa Landing Park and other pedestrian and bicycle routes along Hilo Bay. Improvements to pedestrian and bicycle facilities are also needed to fulfill the County of Hawai'i's Downtown Hilo Multimodal Master Plan to accommodate future bicycle facilities identified in the State of Hawai'i Bike Plan and make downtown Hilo a more walkable community.

A preferred alternative has been identified which includes reconstruction of roadways to allow for construction of an intersection roundabout, Americans with Disabilities Act (ADA) compliant sidewalks and roadway crossings, drainage improvements, reconfiguration of parking, and other roadway improvements including new highway lighting, electrical infrastructure relocations, signage, pavement markings, pedestrian signals, crosswalks, landscape, and traffic management devices, and other utility adjustments as required. Construction is expected to commence in 2025 and take approximately 2 years to complete. To minimize traffic impacts the project will include both day and night work. A map of the project area is enclosed as Figure 1.

To help with these issues, this transportation impact assessment report (TIAR) was conducted to assess three alternatives: No Build, Conventional Improvements, and Roundabout alternatives. These three alternatives will be analyzed and compared to determine if the Roundabout alternative is the best option for this location.

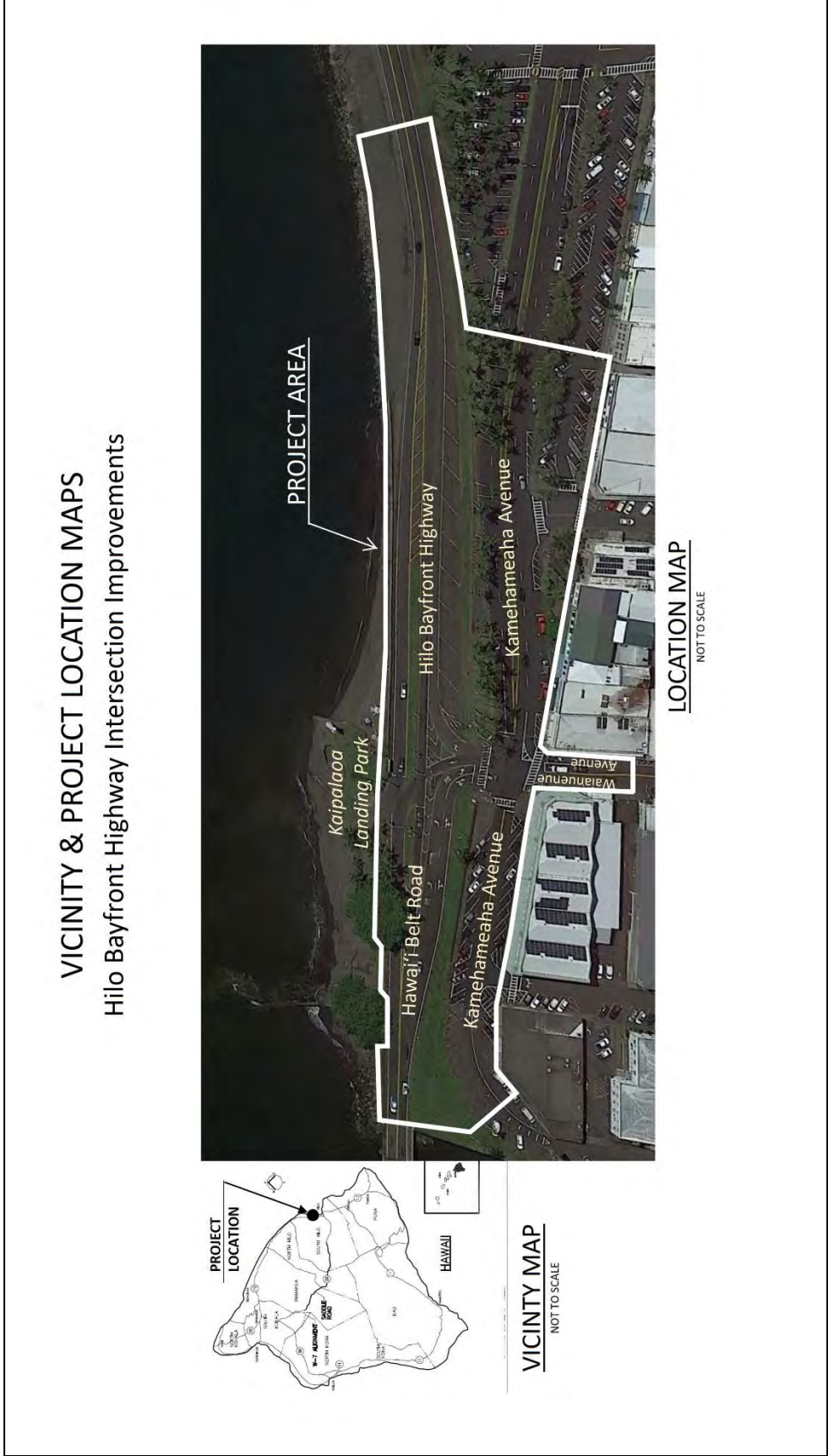
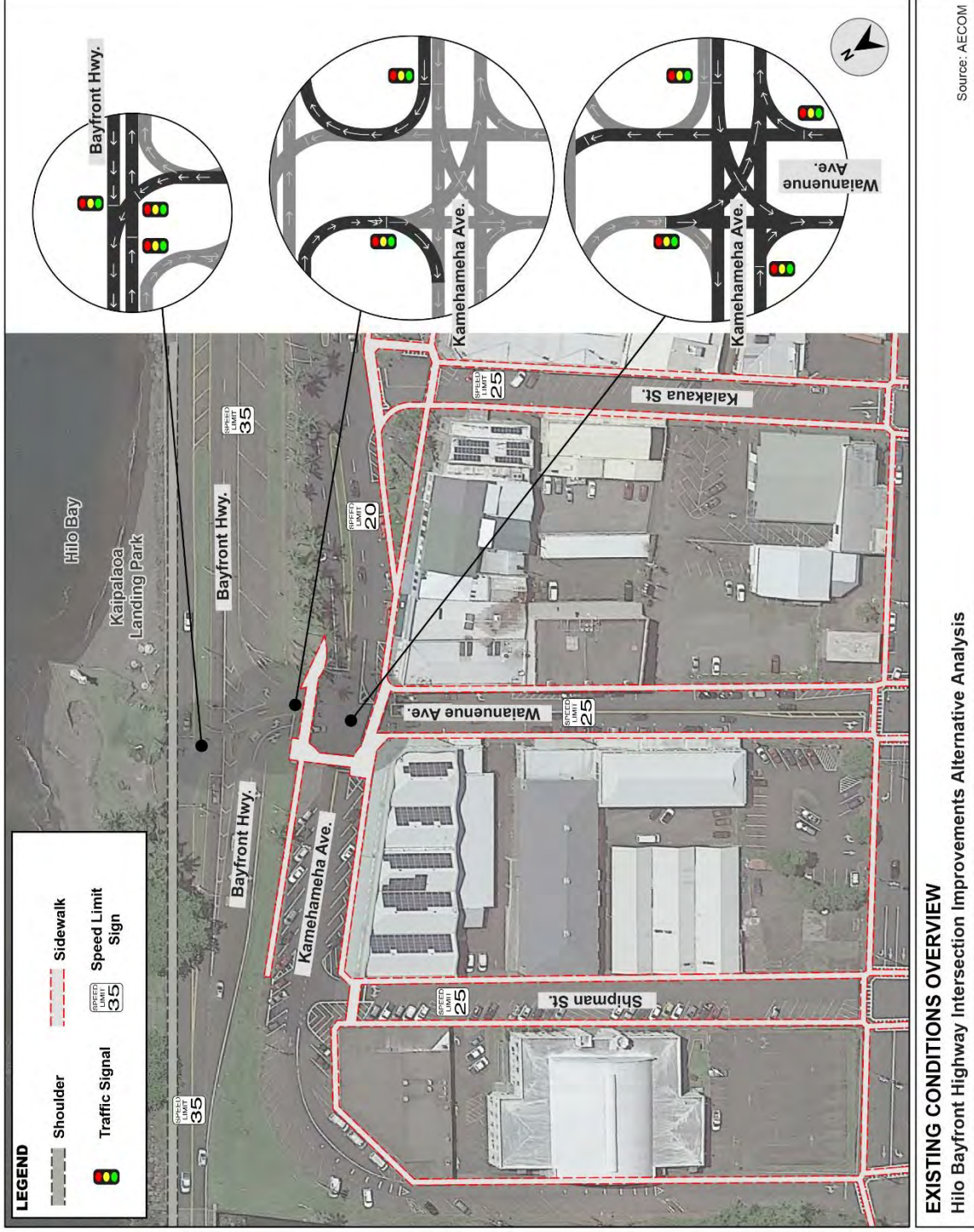


Figure 1 Vicinity and Project Location Map

2.0 EXISTING CONDITIONS

The project site for the Hilo Bayfront Highway Intersection Improvements Alternative Analysis is at the intersections of Bayfront Highway/Waiānuenu Avenue and Kamehameha Avenue/Waiānuenu Avenue. Both intersections are located within Hilo, Hawai'i. On the makai side of Bayfront Highway is Hilo Bay and in the vicinity of the project site is Kaipalaoa Landing Park. On the mauka side of Bayfront Highway is Kamehameha Avenue. Along Waiānuenu Avenue and the mauka side of Kamehameha Avenue are other shops and eateries. This part of Hilo includes destinations for both residents and visitors to the town. Figure 2 illustrates the existing roadway, intersection, and pedestrian facilities around the project site.



EXISTING CONDITIONS OVERVIEW
 Hilo Bayfront Highway Intersection Improvements Alternative Analysis

Figure 2 Existing Condition Overview

2.1 Roadway Conditions

The roadways in the vicinity of the Hilo Bayfront Highway Intersection Improvements Alternative Analysis include the following streets, as shown in Figure 2.

- Bayfront Highway/Hawai'i Belt Road;
- Kamehameha Avenue; and
- Waiānuenu Avenue.

2.1.1 Roadway Configuration

Hawai'i Belt Road, also known as Māmalahoa Highway or State Route 19, is a principal arterial roadway on the island of Hawai'i. In the vicinity of this project, it provides regional access to and from Hilo to Kailua-Kona, the Hilo International Airport, and the southern areas of Hawai'i island. It transitions to Bayfront Highway when entering the downtown Hilo area. South of the intersection with Waiānuenu Avenue, Hawai'i Belt Road is a four-lane roadway with a painted median (two-lanes in each direction) and paved shoulders along both sides of the road. Beyond the Wailuku River, Hawai'i Belt Road is a two-lane, undivided roadway (one-lane in each direction) with paved shoulders and guard rails along both sides of the road. The posted speed limit is 35 miles per hour (mph). Hawai'i Belt Road is under the jurisdiction of the HDOT.

In the vicinity of the project site, Bayfront Highway is a two-lane, divided roadway (one-lane in each direction) with a raised median. There are paved shoulders along both sides of the road. North and south of the intersection with Waiānuenu Avenue, the median on Bayfront Highway transitions to a painted median and then to a two-lane undivided road. There are several instances a year where Bayfront Highway is closed due to high tide flooding the roadway. During these instances, Kamehameha Avenue is the sole north-south arterial in the area. The posted speed limit is 35 mph. Bayfront Highway is under the jurisdiction of the HDOT. Figure 3 and Figure 4 show the existing state of Bayfront Highway.



Figure 3 Southbound View of Bayfront Highway



Figure 4 Northbound View of Bayfront Highway

Kamehameha Avenue is a minor arterial roadway located on the makai edge of downtown Hilo. It runs parallel with Bayfront Highway/Hawai'i Belt Road. In downtown Hilo, many of the mauka-makai roads intersect with Kamehameha Avenue. It also serves as the sole arterial roadway during the times where Bayfront Highway is closed due to the high tide. Between Pauahi Street and Mamo Street, it is a four-lane, undivided roadway (two-lanes in each direction). Between Mamo Street and Waiānuenu Avenue, it is a four-lane roadway (two-lane in each direction) with a raised median. In this area, there is also a one-way frontage road mauka of Kamehameha Avenue that has parking on both sides for the various stores and eateries in the area. Between Mamo Street and Haili Street, the traffic on the frontage road heads southbound

while north of Haili Street to Kalākaua Street, the traffic heads northbound. The posted speed limit is 20 mph. Kamehameha Avenue is under the jurisdiction of the County of Hawai'i. Figure 5 and Figure 6 illustrate the views of the existing Kamehameha Avenue.



Figure 5 Southbound View of Kamehameha Avenue



Figure 6 Northbound View of Kamehameha Avenue

Waiānuenue Avenue is a collector road that runs mauka-makai connecting Bayfront Highway/Hawai'i Belt Road with Hilo. It provides regional access to the west side of Hawai'i island via Saddle Road and Akumaa Drive. Between Kamehameha Avenue and Keawe Street, Waiānuenue Avenue is a two-lane, undivided roadway (one-lane in each direction). There are curbs and parked vehicles along both sides of the road. The posted speed limit is 25 mph.

Waiānuenue Avenue is under the jurisdiction of the County of Hawai'i. Figure 7 illustrates the existing condition of Waiānuenue Avenue.



Figure 7 Mauka-bound View of Waiānuenue Avenue

2.1.2 Intersection Configuration

The two intersections involved with this project include:

- Bayfront Highway/Waiānuenue Avenue; and
- Kamehameha Avenue/Waiānuenue Avenue.

Figure 2 summarizes the intersection lane configurations for both intersections. Figure 8 shows the existing view of both intersections in the mauka-bound direction.



Figure 8 Mauka-bound View of Study Intersection

The Bayfront Highway/Waiānue Avenue intersection is a signalized “T”-intersection. On Bayfront Highway/Hawai‘i Belt Road northbound approach, there is a single through lane approach. There is no lane for vehicles to turn left onto Waiānue Avenue. On the southbound approach, Bayfront Highway/Waiānue Avenue has a single through lane and two right-turn lanes. The two right-turn lanes immediately transition into the mauka-bound approach for the Kamehameha Avenue/Waiānue Avenue intersection. One transitions to a left-only lane and the other changes to a shared through/right-turn lane. The Waiānue Avenue approach has a left-turn lane and a channelized right-turn lane.

The Kamehameha Avenue and Waiānue Avenue intersection is a signalized, four-legged intersection. As previously mentioned, the mauka-bound approach for Waiānue Avenue at this intersection transitions immediately from the two right-turn lanes from Bayfront Highway/Hawai‘i Belt Road. The makai-bound approach for Waiānue Avenue contains a channelized right-turn lane and a through lane. For this approach, vehicles cannot make a left turn. On the northbound Kamehameha Avenue approach, there is right-turn lane and a shared through/left lane. On the southbound Kamehameha Avenue approach, there is a shared through/right-turn lane.

On this approach, vehicles also cannot make a left turn. Between 7:15 AM and 8:00 AM, vehicles at this intersection cannot enter the mauka-bound lane of Waiānue Avenue. This restriction prohibits the through movement on the mauka-bound approach of Waiānue Avenue, the left-turn movement on the northbound approach of Kamehameha Avenue, and the right-turn movement on the southbound approach of Kamehameha Avenue. The restriction to

this movement is to enhance the safety of the students that attend the various schools located further mauka along Waiānuenue Avenue.

2.2 Multimodal Conditions

2.2.1 Pedestrian Conditions

Figure 2 summarizes the existing pedestrian conditions in the vicinity of the project. Along Bayfront Highway/Hawai'i Belt Road, there are no sidewalks available for pedestrian use. On the makai side of the road, there is a paved shoulder area that pedestrians were observed using when traveling along Bayfront Highway.

Along Kamehameha Avenue in the vicinity of the project site, there are attached sidewalks located on the mauka side of the road. On the northbound approach, there are no sidewalk on the makai side of the road. Along this approach, there are several parallel parking stalls on the mauka side of the road and approximately enough space for four vehicles to park on the makai side of the road. On the southbound approach, there is a sidewalk on the makai side of the road adjacent to the parking stalls. The parking stalls are on both the mauka and makai side of the road.

In the vicinity of the project site, there are attached sidewalks along both sides of Waiānuenue Avenue. Approximately 100 feet mauka from the intersection of Kamehameha Avenue and Waiānuenue Avenue, there is street parking available along both sides of the road.

2.2.2 Bicycle Conditions

There are no existing bicycle facilities along Bayfront Highway/Hawai'i Belt Road, Kamehameha Avenue, and Waiānuenue Avenue. Any bicyclists observed during the data collection process were sharing the roadway or traveling along the sidewalks.

2.3 Traffic Conditions

2.3.1 Existing Vehicular Volume Counts

Manual transportation volume turning movement counts and observations were conducted on April 12, 2022 and April 13, 2022 during the AM and PM peak periods. These counts included vehicular, pedestrian, and bicycle counts for the Bayfront Highway/Waiānuenue Avenue and Kamehameha Avenue/Waiānuenue Avenue intersections. During the data collection in the PM peak period, it was discovered that a cruise ship was docked on that day, which is a regular occurrence in the area.

From these counts, the AM peak hour was determined to occur from 7:00 AM to 8:00 AM and the PM peak hour was determined to occur from 3:45 PM to 4:45 PM. The AM peak period includes a portion of the time where the vehicles cannot enter the mauka-bound lane of Waiānuenue Avenue and a 15-minute period where they can enter from 7:00 AM to 7:15 AM. The traffic count worksheets are included in Appendix A. Figure 9 summarizes the existing vehicular counts for the AM and PM peak hours.

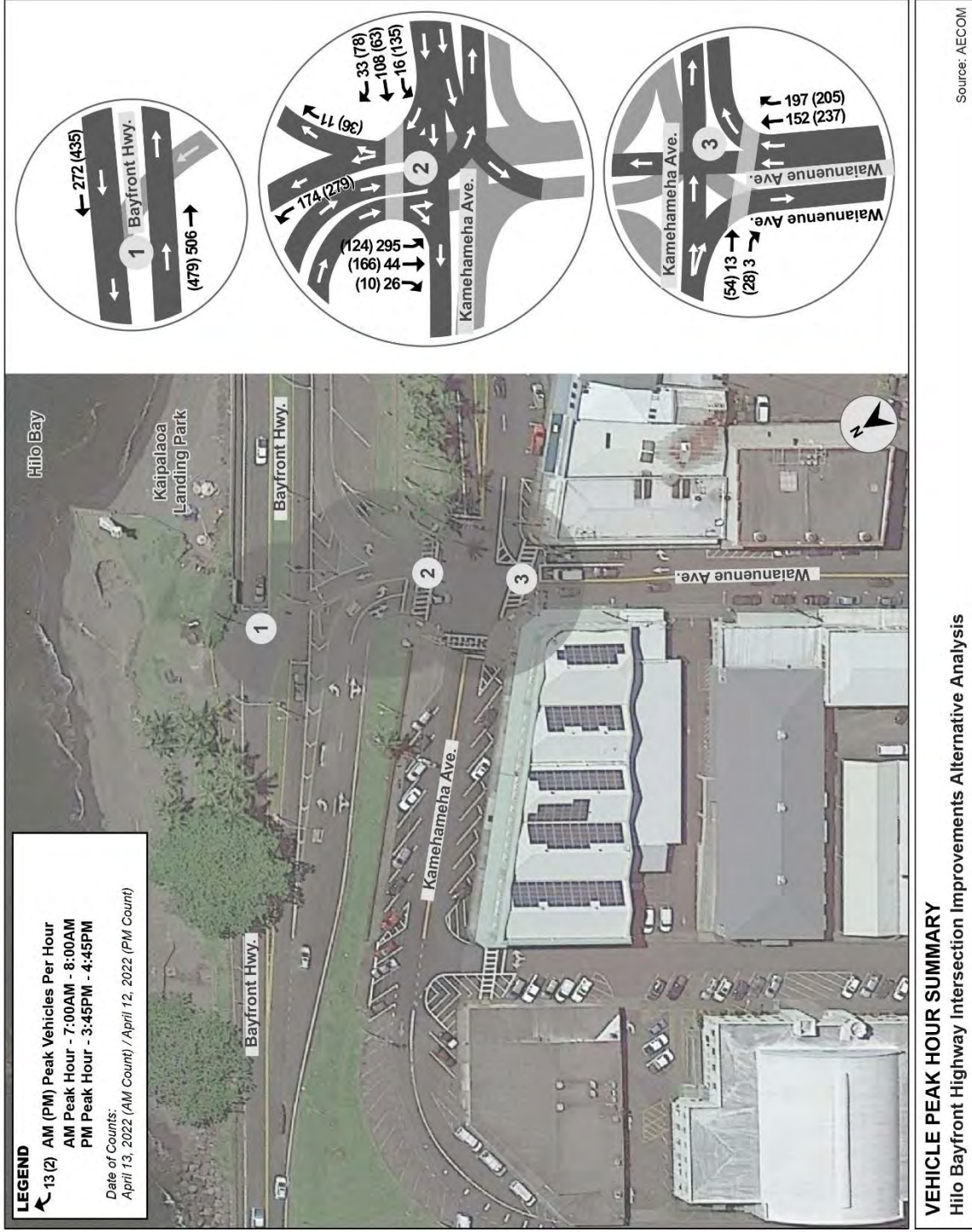


Figure 9 Existing Vehicular Volume Counts

2.3.2 Existing Multimodal Counts

In the data collection process, there were pedestrians and bicycle count volumes counted. Figure 10 and Figure 11 illustrate the observed pedestrian and bicycle volumes observed during the vehicular peak hours, respectively. The pedestrian and bicycle count worksheets are included in Appendix A.

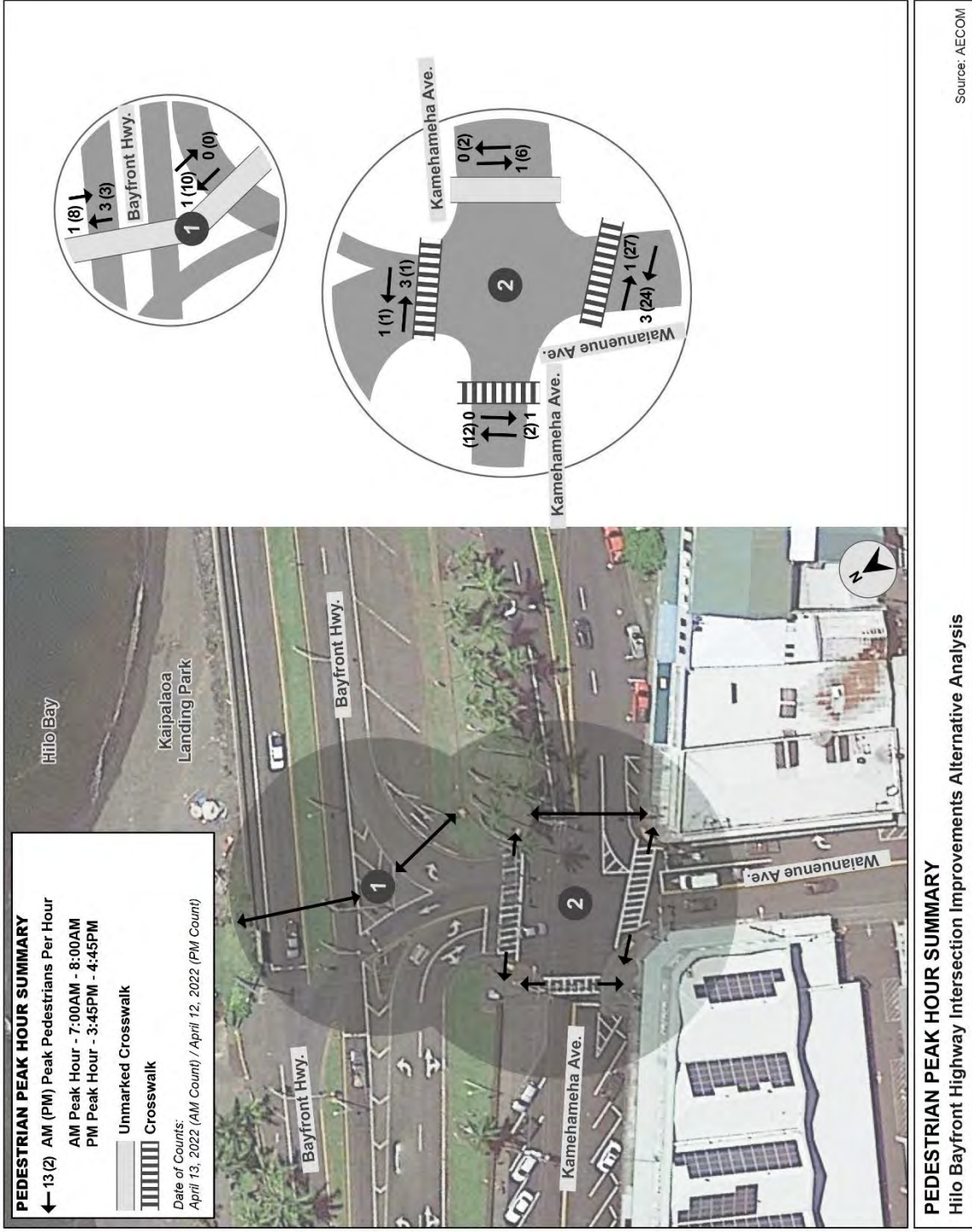


Figure 10 Existing Pedestrian Volumes

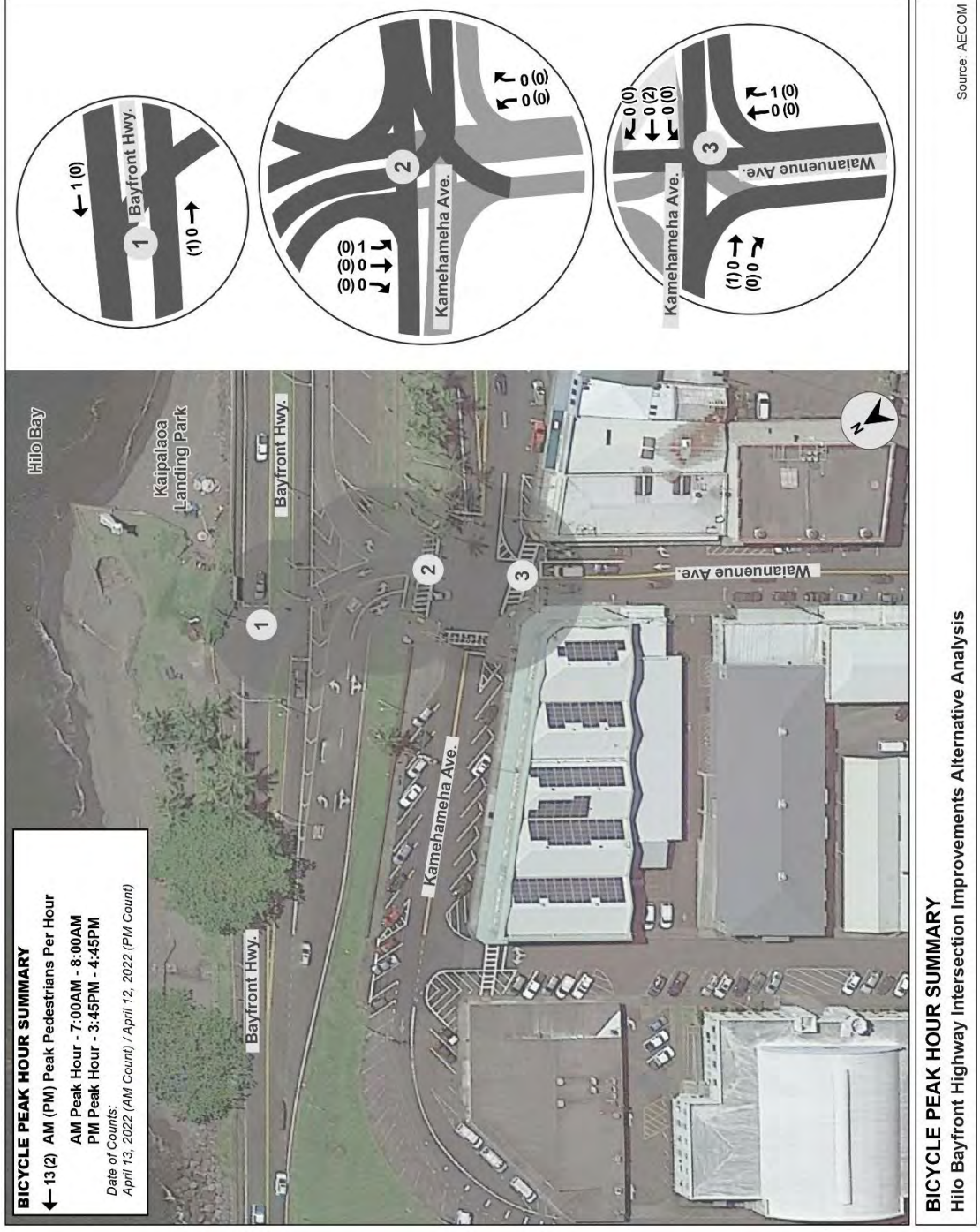


Figure 11 Existing Bicycle Volumes

As seen in Figure 10, there were more pedestrians observed during the PM peak hour. As previously mentioned, there was a cruise ship docked nearby on the day of the data collection, which resulted in more pedestrians walking around in the area. A cruise ship docked is a regular occurrence and can represent a typical scenario. It was observed that there were 51 pedestrians crossing the crosswalk across the makai-bound Waiānuenu Avenue approach during the PM peak hour. These pedestrians were walking to and from the various store fronts and eateries located on the mauka-side of Kamehameha Avenue. It was observed that several pedestrians crossed the roadways where there were no marked crosswalks. There were approximately 8 pedestrians that crossed the northbound Kamehameha Avenue approach during the PM peak hour. At the Bayfront Highway/Hawai'i Belt Road and Waiānuenu Avenue intersection, there are no marked crosswalks, but there were 11 pedestrians observed crossing Bayfront Highway during the PM peak. During the data collection effort, several pedestrians asked about how to cross Bayfront Highway since there was no marked crosswalk. These observations show that there is demand for more pedestrian access around the project site.

There were minimal bicyclists observed during the data collection period as shown in Figure 11. Along Bayfront Highway, there was 1 bicyclist observed during either the AM or PM peak hour. Along Waiānuenu Avenue, there was 1 bicyclist turning on the mauka- and makai-bound approaches during the AM peak hour. On Kamehameha Avenue, there were 2 bicyclists observed during the PM peak hour.

2.4 Intersection Operations

2.4.1 Methodology

In order to evaluate the feasibility of the roundabout control and for comparison purposes, signal control and roundabout control schemes were both considered for the intersections of Waiānuenu Avenue with Kamehameha Avenue and Bayfront Highway. The intersection of two intersections with Waiānuenu Avenue was assumed to maintain its existing vehicular lane configuration and traffic control signal operation in the Existing, No-Build, and Conventional Improvement alternatives.

2.4.1.1 Signalized Intersection Analysis Methodology

For the stop-controlled and signalized intersection concepts, traffic operational analyses of the study intersections were conducted using Synchro/SimTraffic 11.0 in accordance with procedures outlined in the Highway Capacity Manual (HCM). Table 1 shows the control delays and corresponding levels of service (LOS) established in the HCM for signalized and unsignalized intersections.

Table 1 Intersection Delay and Corresponding Levels-of-Service

Level-of-Service	Signal Control Delay (sec/veh)	Stop Control Delay (sec/veh)
A	< 10	< 10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	> 80	> 50

Source: HCM 6th Edition, Volume 3: pg. 19-16 and pg. 20-6

The goal of this analysis was to understand the operational sufficiency of the signalized intersection concept to serve the demand of traffic. The following assumptions/input parameters were used in the intersection analysis:

- Peak hour factor: 0.92
- Vehicle travel speed: the posted speed limit
- Lane widths: 12'
- Base saturation flow rate: 1,900 vehicles per hour per lane (vphpl) for all movements
- Right-turn on red movements: These traffic movements were included in the analysis and modeled in the software
- Signal cycle length: 107 seconds

2.4.1.2 Roundabout Analysis Methodology

Roundabout analyses were also conducted as a part of the evaluation at the Bayfront Highway and Kamehameha Avenue intersections with Waiānuenu Avenue. In order to estimate intersection capacity needs and to confirm that roundabout configurations will be adequate for these intersections, roundabout traffic flow worksheets were completed for each intersection. The traffic flow worksheets compiled the turning movements at each roundabout location into approach, departure, and circulating flows. The following guidelines were applied to estimate the initial number of approach/departure lanes:

- Maximum service volume for a single-lane roundabout: 900 vph to 1,200 vph
- Maximum exit flow (one lane): 900 vph to 1,200 vph
- Maximum entry flow + circulating flow (one lane): 1,400 vph to 1,800 vph
- Total approach volume (one lane): 900 vph to 1,200 vph

The SIDRA Intersection software was then utilized for analyzing traffic conditions under roundabout control at the Bayfront Highway and Kamehameha Avenue intersections with

Waiānuenue Avenue. The SIDRA Intersection software is an aid for design and evaluation of individual intersections and networks of intersections. It can be used to analyze a variety of intersections. It is an advanced micro-analytical traffic evaluation tool that employs lane-by-lane and vehicle path models coupled with an iterative approximation method to provide estimates of capacity and performance statistics (delay, queue length, stop rate, etc). All input and output data and modelling are based on origin-destination movements. The software uses the gap-acceptance methodology for roundabout capacity estimation where gap-acceptance parameters are estimated from the roundabout geometry. It employs a combined (hybrid) geometry and gap-acceptance modelling approach in order to take into account the effect of roundabout geometry on driver behavior directly through gap-acceptance modelling.

2.4.2 Intersection Conditions

Table 2 summarizes the existing (Year 2022) intersection LOS and delay results for the AM and PM peak hours. The corresponding SimTraffic worksheets are included in Appendix B.

Table 2 Existing Intersection Operations

Intersection	Existing Year 2022	
	LOS	Delay (sec/veh)
AM Peak Hour		
Kamehameha Ave/ Waiānuenue Ave	B	18.0
Bayfront Hwy/Hawaii Belt Rd/ Waiānuenue Ave	A	6.7
PM Peak Hour		
Kamehameha Ave/ Waiānuenue Ave	B	17.1
Bayfront Hwy/Hawaii Belt Rd/ Waiānuenue Ave	A	8.2
Notes: LOS = Level of Service, sec = seconds, veh = vehicle, Ave = Avenue, Hwy = Highway, Rd = Road		

The two signalized intersections operate at LOS B or better during the observed peak hour periods. The results from the analysis are consistent with what was observed during data collection. It was observed that the vehicles in Kamehameha Avenue northbound approach right-turning vehicles would make a left turn onto Bayfront Highway/Hawai'i Belt Road. This left turn lane on Waiānuenue Avenue is approximately 50 feet, which can prevent vehicles from turning into the lane and results in a queue as vehicles would need to wait for the green phase on the signal. This observation can be seen in Figure 12 below.



Figure 12 Vehicle Queue to Turn Left onto Bayfront Highway

It was also observed that due to the coordination of the two signals, vehicles approaching from the southbound Bayfront Highway/Hawai'i Belt Road often made the right turn into the left turn at the Kamehameha Avenue intersection quickly, when allowed to do so. The Waiānuenu Avenue makai-bound right-turn also has a free turn movement. Both movements can make it difficult for pedestrians to safely cross this segment.

3.0 FUTURE YEAR 2042 CONDITIONS

3.1 Description of Alternatives

3.1.1 No-Build Alternative

The No-Build alternative maintains the existing conditions around the project site. In the future, it would incorporate the planned improvements around the area. The Downtown Hilo Multimodal Master Plan (DHMMP) published in April 2018 notes several improvements in the vicinity of the project to enhance circulation, pedestrian, bicycles, parking, transit, and streetscape components in downtown Hilo.

In the DHMMP, it mentions that there will be a shoreline shared-use path on the makai side of the road along Bayfront Highway/Hawai'i Belt Road. This shared-use path would provide bicycle and pedestrians a path along Bayfront Highway. The plan includes adding in a pedestrian crossing at the intersection with Waiānuenue Avenue. This plan also included the addition of a roundabout at this intersection.

For Kamehameha Avenue, the DHMMP mentions that it will be a road diet to reduce the number of travel lanes. For the pedestrians, the plan includes widening of the sidewalk and addition of curb extensions. The plan includes the addition of bicycle lanes on both sides of the road. The associated frontage road will be converted from a one-way to a two-way roadway. The plans include converting it to a pedestrian promenade with curb extensions. The Hilo Bayfront Trails Master Plan includes plans to connect various paths in downtown Hilo with the surrounding parks, recreational areas, Hilo Bay, and Hilo Harbor and provide guidance signs.

On Waiānuenue Avenue, the DHMMP has considerations about removing the AM closure of the mauka-bound lanes. For the purposes of this plan, this AM closure is projected to remain. Similarly to Kamehameha Avenue and its frontage road, the plans incorporate plans detailed in the Trails Master Plan into consideration for its pedestrian improvements. The plans include the addition of bicycle lanes along Waiānuenue Avenue.

The plans described in the DHMMP have overlap with the DOT's Bike Master Plan. In the Bike Master Plan, there are proposed bicycle lanes along Bayfront Highway, Kamehameha Avenue, and Waiānuenue Avenue, in the vicinity of this project site. Both of the County of Hawai'i's planning documents remain consistent with the Bike Master Plan.

3.1.2 Conventional Improvements Alternative

Both the Conventional Improvements and Roundabout alternatives, which will be discussed in Section 3.1.3, will take the proposed plans mentioned in the DHMMP and the Hilo Bayfront Trails Master Plan into consideration and plan for their future implementation into the design.

The Conventional Improvements for the Bayfront Highway and Waiānuenue Avenue intersection involve more traditional intersection improvements to enhance the conditions for vehicles, pedestrians, and bicyclists.

Figure 13 shows an overview of the Conventional Improvements.



CONVENTIONAL IMPROVEMENTS ALTERNATIVE
Hilo Bayfront Highway Intersection Improvements Alternative Analysis
Source: AECOM

Figure 13 Conventional Improvements Overview

3.1.2.1 Roadway and Intersection Improvements

With the Conventional Improvements, the biggest improvement would be the addition of an all-pedestrian phase at the Kamehameha Highway and Waiānuenu Avenue intersection. As mentioned in Section 2.4.2, the vehicles can turn onto the south Kamehameha Avenue leg from either Bayfront Highway or Waiānuenu Avenue at a high speed or without much conflict. From that observation, it would make it difficult and unsafe for pedestrians to cross that leg of the intersection. To enhance pedestrian access and safety, an all-pedestrian phase for this intersection was recommended for the Conventional Improvements. This alternative proposes a protected right-turn phase for the makai-bound Waiānuenu Avenue traffic to further protect pedestrians crossing the southern leg of Kamehameha Avenue intersection.

An all-pedestrian phase and protected right-turn phase would provide pedestrians safer access to this intersection but reduce the intersection operations for vehicular traffic. This change also impacts the intersection with Bayfront Highway as the two traffic signals are coordinated with each other.

In addition to the all-pedestrian phase, the alignment for Bayfront Highway/Hawai'i Belt Road would need to be shifted approximately 5 feet to account for the pedestrian enhancements on the northbound leg of Bayfront Highway. These improvements also are not consistent with the existing planning documents, which propose a roundabout for these intersections.

3.1.2.2 Multimodal Improvements

The primary improvements from the Conventional Improvements are enhancements to pedestrian safety and access. The proposed bicycle improvements are consistent with what is proposed in the DOT's Bike Master Plan and DHMMP.

At the Kamehameha Avenue and Waiānuenu Avenue intersection, the proposed pedestrian improvements include providing a crosswalk across the northbound Kamehameha Avenue approach. To enhance the safety of the pedestrians, an all-pedestrian phase and a modification of the makai-bound Waiānuenu Avenue right turn are proposed for this alternative.

As mentioned in Section 2.2.1, there is no existing pedestrian access across Bayfront Highway. The Conventional Improvements proposes a pedestrian crossing across the northbound approach of Bayfront Highway. The proposed improvements include the addition of a new raised island as shown in Figure 13 at the intersection with Bayfront Highway. An expansion of a sidewalk area for pedestrians on the makai side of Bayfront Highway is also proposed. This sidewalk serves to provide a path for pedestrians that connects with Kaipalaoa Landing Park.

The additions for these proposed crosswalks would involve the installation of new pedestrian signal heads, poles, and curb ramps at both intersections.

The proposed bicycle improvements along Bayfront Highway include ensuring that there is approximately 6 feet width of pavement along both sides of the highway for future proposed bicycle lanes. The additional width could also be used as part of the shared-use path mentioned

in the DHMMP. This additional width is to ensure that this alternative will remain consistent with the existing planning documents that the HDOT and County of Hawai'i have for this area.

The Conventional Improvement proposes to install sharrows on Kamehameha Avenue between Waiānuenu Avenue and Kalākaua Street. This differs from the proposed plan from the existing planning documents, but with the parked vehicles along this segment of the road, it would be difficult to allow for bicycle lanes.

3.1.3 Roundabout Alternative

The Roundabout alternative combines the two intersections of Kamehameha Highway and Waiānuenu Avenue and Bayfront Highway/Hawai'i Belt Road and Waiānuenu Avenue into one intersection. The combination of the intersection is a result of the addition of a one lane roundabout, with five approaches and departures. Figure 14 illustrates the current design of the Roundabout alternative.



ROUNDABOUT ALTERNATIVE
Hilo Bayfront Highway Intersection Improvements Alternative Analysis

Source: AECOM

Figure 14 Roundabout Alternative

3.1.3.1 Roadway and Intersection Improvements

In the Roundabout alternative, the addition of a single-lane roundabout combines the two existing intersections into one intersection. As mentioned previously, there are five approach/departure lanes to the roundabout. Each approach and departure lane are a single lane except for the makai-bound approach on Waiānuenu Avenue, which has a right-turn bypass lane. These lanes are tied back into the existing lanes on both the approach and exit of the roundabout.

The roundabout alternative will require significant reconfiguration of the two intersections but allows for continuous flow throughout the intersection and allows for all movements. It remains consistent with the existing planning documents for these intersections. The DHMMP mentions the installation of a roundabout at this location.

3.1.3.2 Multimodal Improvements

The Roundabout alternative provides pedestrian connectivity with downtown Hilo and the makai side of Bayfront Highway, including pedestrian access to Kaipalaoa Landing Park. It includes the addition of pedestrian crossings across both sides of Kamehameha Avenue and across Bayfront Highway. It enhances the safety of the pedestrians as they only need to cross one lane of traffic at a time.

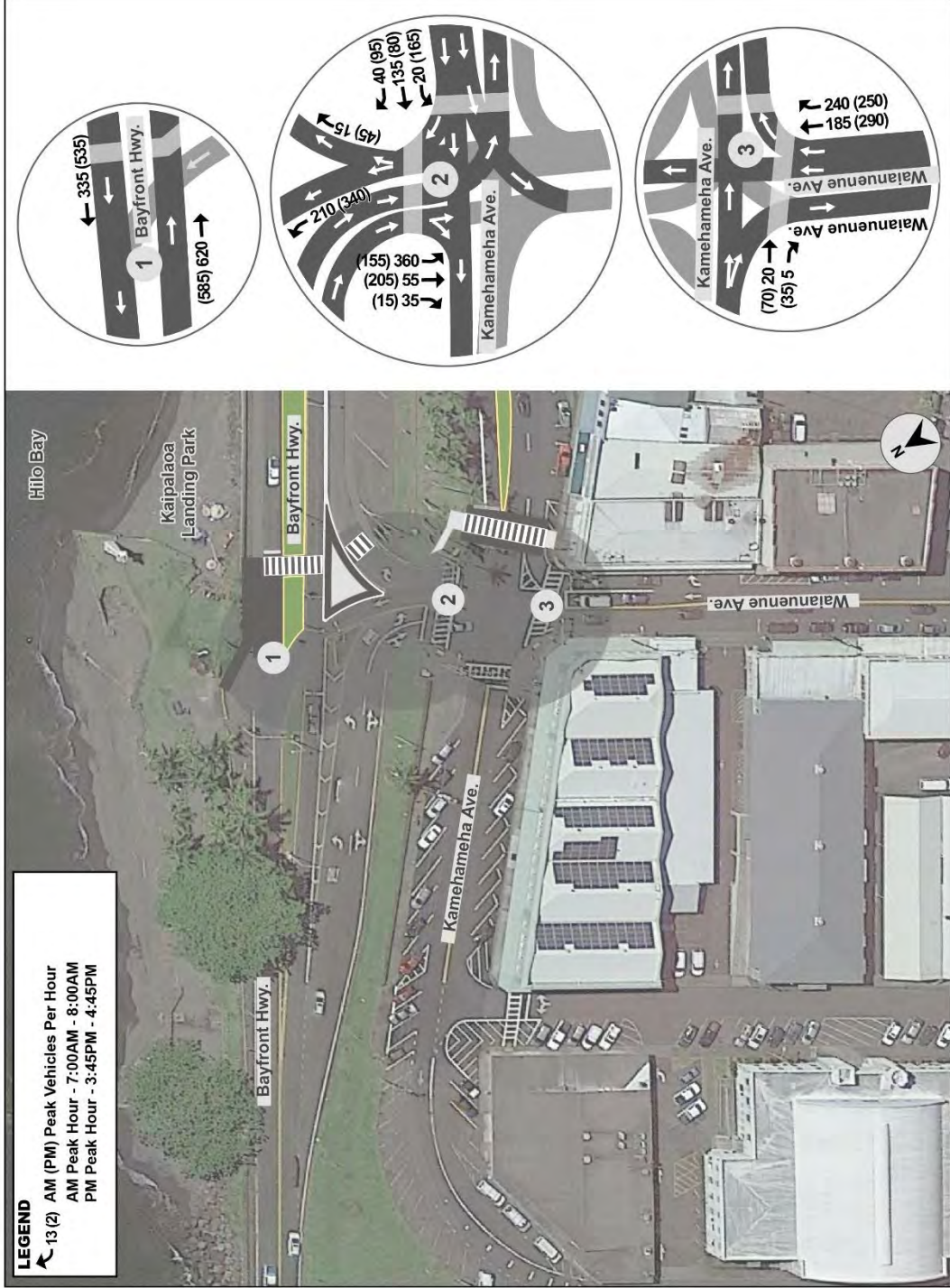
The bicycle improvements take into consideration the proposed bicycle plans in the area to allow the proposed facilities to tie into the roundabout design.

3.2 Projected Year 2042 Traffic Volumes

Background traffic accounts for growth in traffic in the area around the Bayfront Highway project area. For the future operations, it was determined that a 20-year forecast would be appropriate for this analysis. The area around downtown Hilo is mature. The trip generators within and around downtown Hilo have not changed, and regional growth has not occurred in the Hilo area.

Therefore, a minimal growth rate of one percent was applied globally to the traffic in the surrounding area.

Figure 15 illustrates the projected Year 2042 peak hour turning movement volumes for the background traffic under the No Build and Conventional Improvement alternatives. Figure 16 illustrates the projected Year 2042 peak hour volumes under the Roundabout alternative.



FUTURE YEAR 2042 VEHICLE PEAK HOUR SUMMARY
 Hilo Bayfront Highway Intersection Improvements Alternative Analysis

Source: AECOM

Figure 15 Projected Year 2042 AM and PM Peak Hour Traffic Volumes

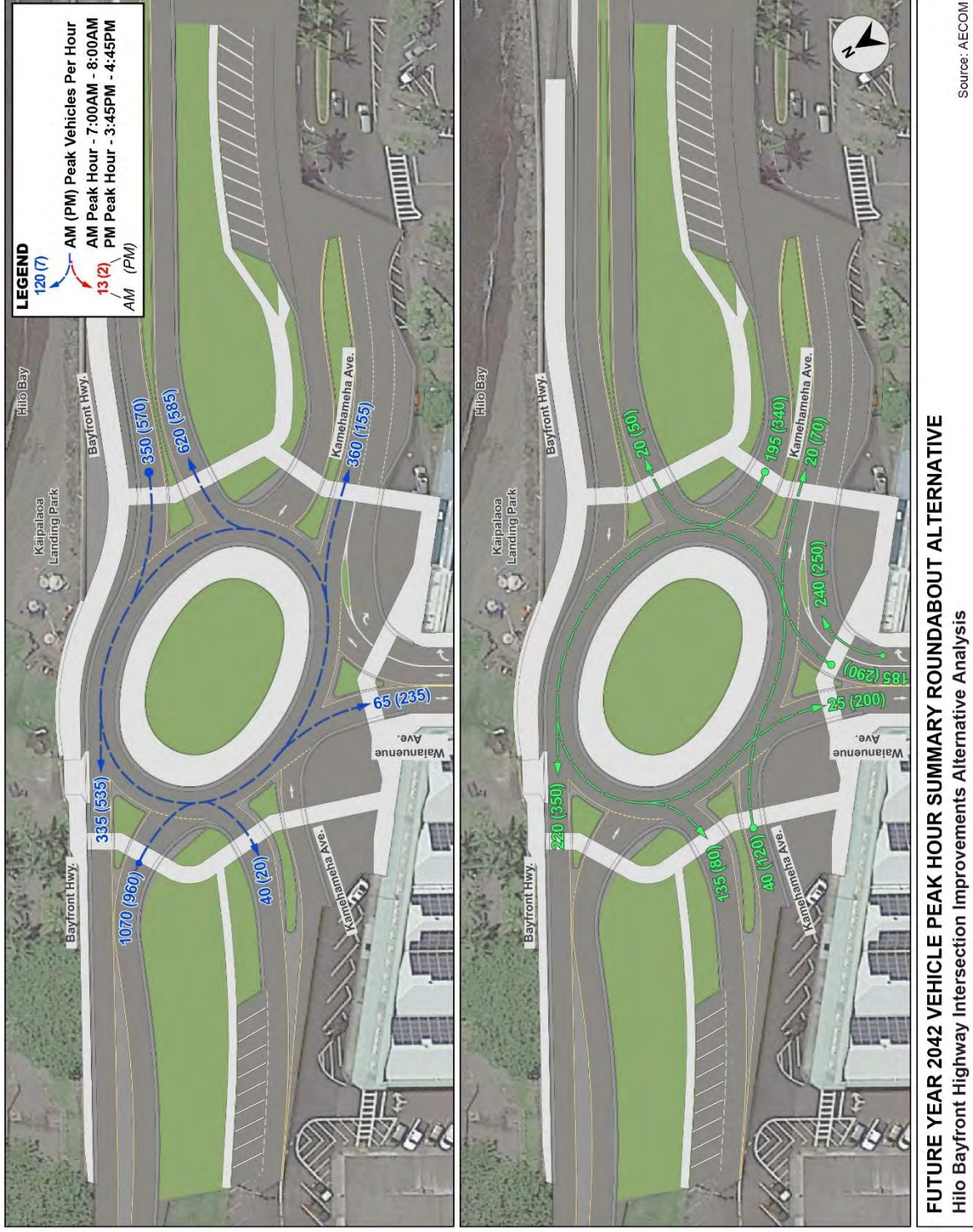


Figure 16 Projected Year 2042 Peak Hour Traffic Volumes Roundabout Alternative

4.0 FUTURE INTERSECTION OPERATIONS

The projected Year 2042 AM and PM peak hour traffic volumes were evaluated using the same methodology described in Section 2.4. For the future volumes, there are several scenarios that were analyzed, which are detailed below:

- No Build Alternative;
- Conventional Improvements Alternative;
- Roundabout Alternative;
- Bayfront Highway Closed Conventional Improvements Alternative; and
- Bayfront Highway Closed Roundabout Alternative.

These scenarios include the three alternatives as described in Section 3.0, under Future Year 2042 conditions. The last two scenarios include sensitivity analysis of the intersection to evaluate operations where the south leg of Bayfront Highway is closed due to the high tide flooding the highway. In these scenarios, the worst-case scenario is assumed where all the southbound traffic on Bayfront Highway is re-routed through Kamehameha Avenue and where all the northbound Bayfront Highway travels through Kamehameha Avenue to turn left back onto Bayfront Highway.

Table 3 below compares the results of the analysis between the No Build, Conventional Improvements, and Roundabout alternatives for both the AM and PM peak hour conditions under typical conditions. The SimTraffic worksheets are included in Appendix B and the SIDRA worksheets are included in Appendix C.

Table 3 Future Year 2042 Intersection Operations Comparison

Intersection	Projected Year 2042 - No Build		Projected Year 2042 - Conventional Improvements (CI)		Projected Year 2042 - Roundabout	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
AM Peak Hour						
Kamehameha Ave/ Waiānuenuenu Ave	B	18.4	C	22.7	C	23.2
Bayfront Hwy/Hawaii Belt Rd/ Waiānuenuenu Ave	A	7.2	A	9.1		
PM Peak Hour						
Kamehameha Ave/ Waiānuenuenu Ave	B	20.0	D	41.2	C	26.6
Bayfront Hwy/Hawaii Belt Rd/ Waiānuenuenu Ave	A	8.7	A	8.7		
Notes: LOS = Level of Service, sec = seconds, veh = vehicle, Ave = Avenue, Hwy = Highway, Rd = Road						

As shown in Table 3, both intersections appear to operate relatively well during both peak hour periods in all three alternatives. The Kamehameha Avenue/Waiānuenuenu Avenue intersection has an increased delay in the Conventional Improvements alternative due to the addition of an all-pedestrian phase. In comparison, the Roundabout alternative operates at a LOS C during both peak hours. The operations with LOS D during the PM peak hour indicate heavy but acceptable operations. Under typical conditions, all three alternatives operate at an acceptable level during the peak hours.

Table 4 summarizes the intersection operations when a portion of Bayfront Highway is closed when the road is flooded, and the traffic is re-routed through Kamehameha Avenue.

Table 4 Future Year 2042 Intersection Operations Bayfront Highway Closed

Intersection	Projected Year 2042 - CI Bayfront Hwy Closed		Projected Year 2042 - Roundabout Bayfront Hwy Closed	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
AM Peak Hour				
Kamehameha Ave/ Waiānuenuue Ave	F	93.5	C	22.5
Bayfront Hwy/Hawaii Belt Rd/ Waiānuenuue Ave	D	53.7		
PM Peak Hour				
Kamehameha Ave/ Waiānuenuue Ave	F	108.3	C	27.1
Bayfront Hwy/Hawaii Belt Rd/ Waiānuenuue Ave	D	42.7		
Notes: LOS = Level of Service, sec = seconds, veh = vehicle, Ave = Avenue, Hwy = Highway, Rd = Road				

As shown in Table 4, the Kamehameha Avenue and Waiānuenuue Avenue intersection operates at LOS F during both peak hours when Bayfront Highway is closed due to the flooding under the Conventional Improvements alternative. The roundabout alternative is shown to operate at a serviceable level even with a portion of Bayfront Highway is closed. The combined intersection operates with LOS C during the AM peak hour and LOS D in the PM peak hour. Comparing Table 3 and Table 4, the Roundabout alternative was shown to operate relatively well during both typical conditions and the Bayfront Highway closure scenario. In the Conventional Improvements alternative, the intersections were calculated to operate reasonably well during typical conditions, but the Kamehameha Avenue and Waiānuenuue Avenue was calculated to operate poorly when the southern portion of Bayfront Highway is closed.

5.0 SUMMARY AND RECOMMENDATIONS

The intersections of Bayfront Highway/Hawai'i Belt Road/Waiānuenu Avenue and Kamehameha Highway/Waiānuenu Avenue are being evaluated to determine the appropriate improvements to improve operations, enhance safety, and provide pedestrian accessibility. This TIAR documented the existing conditions and evaluated three alternatives for the improvements at these intersections:

- No Build alternative;
- Conventional Improvements alternative; and
- Roundabout alternative.

In the existing year 2022 conditions, both intersections were shown to operate well during the AM and PM peak hours with LOS B or better. Based on the current surrounding area in downtown Hilo in the vicinity of the project, it was determined that a growth rate of one (1) percent would be used to determine the future projections of traffic.

The No Build alternative proposes no additional changes to the intersections outside of the planned improvements detailed in the existing planning documents. The Conventional Improvements alternative proposes the addition of an all-pedestrian phase at the Kamehameha Avenue/Waiānuenu Avenue intersection along with additional pedestrian crossings to provide a pedestrian connection across Bayfront Highway. The Roundabout alternative proposes the addition of a roundabout, which combines the two intersections. It provides better vehicular access for the intersections while still enhancing pedestrian safety and access around the site.

Under the projected year 2042 typical conditions, the scenarios all operate at an acceptable LOS during the AM and PM peak hours. When a portion of Bayfront Highway is closed, the Kamehameha Avenue/Waiānuenu Avenue intersection operates at LOS F, which indicates congested conditions in the Conventional Improvements alternative. Under the Roundabout alternative, the combined intersection operates similarly in both scenarios.

From the results of the analysis, the recommendation for the Bayfront Highway intersection improvement would be the implementation of the roundabout. Below is a list of benefits that are associated with the Roundabout alternative.

- Consistent with the preferred alternative within existing planning documents.
- Improves pedestrian access and safety around the project site and to the Kaipalaoa Landing Park.
- Reduction of vehicular speeds and of pedestrian/vehicle conflict points.
- Allows for vehicular turning movements in all directions
- Improves traffic flow during southern leg of Bayfront Highway closure due to tide issues.

The results from this study align with the preferred alternative for the Bayfront Highway intersection. The information supports the proposed design for the site and will continue to inform the design.

6.0 REFERENCES

Helber Hastert & Fee, Planners. (2009). *Hilo Bayfront Trails Master Plan*. County of Hawai'i Department of Research and Development.

SSFM International, Inc. (2018). *Downtown Hilo Multimodal Master Plan*. County of Hawai'i Planning Department.

State of Hawaii Department of Transportation. "Bike Plan Hawaii Master Plan."

Transportation Research Board of the National Academics. 2016. "Urban Street." In *Highway Capacity Manual, 6th Edition*, Washington, DC: Transportation Research Board.

Appendix A Transportation Count Worksheets

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS VEHICLE TURNING MOVEMENT FORM

LOCATION: Bayfront Hwy & Waianuenu Ave
DATE: 4/13/2022 (Wednesday)
TIME: 6:30a-8:00a
WEATHER: Overcast
RECORDER: JY

2 →

1 ↘

Bayfront Hwy

←

↖

Bayfront Hwy

↖

5

Waianuenu Ave

↗

4

Bayfront Hwy

7

↓

6 ↘

↗

TIME PERIOD	MOVEMENT NUMBER							
	1	2	3	4	5	6	7	8
6:30-6:45a	56	81	55	1	4	24	32	0
6:45-7:00a	87	79	68	1	13	38	48	1
7:00-7:15a	90	119	60	0	11	43	47	0
7:15-7:30a	101	128	68	0	7	92	0	9
7:30-7:45a	91	123	71	1	6	85	0	6
7:45-8:00a	100	136	73	0	8	87	0	13
Peak Hour	382	506	272	1	32	307	47	28
7:00-8:00 AM								

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317

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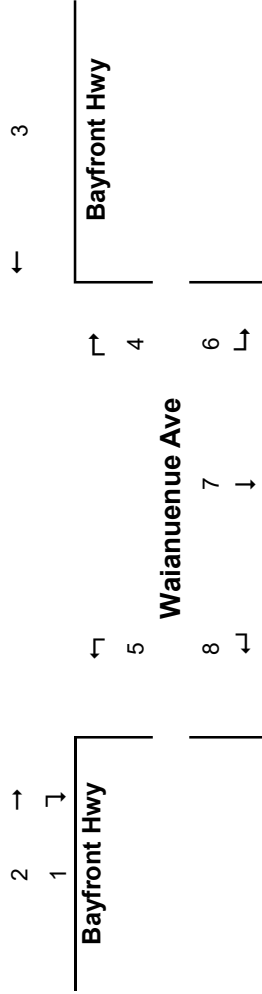
1124

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Notes:

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS VEHICLE TURNING MOVEMENT FORM

LOCATION: Bayfront Hwy & Waianuenu Ave
DATE: 4/12/2022 (Tuesday)
TIME: 3:00p-5:00p
WEATHER: Overcast
RECORDER: JY



TIME PERIOD	MOVEMENT NUMBER							
	1	2	3	4	5	6	7	8
2:45-3:00p	52	77	107	6	35	29	18	5
3:00-3:15p	40	83	86	1	28	19	18	3
3:15-3:30p	56	115	112	4	24	32	22	2
3:30-3:45p	44	123	103	2	24	22	21	1
3:45-4:00p	80	129	99	2	13	22	52	6
4:00-4:15p	73	118	106	1	21	34	39	0
4:15-4:30p	57	105	109	2	19	24	33	0
4:30-4:45p	83	127	121	5	15	41	39	3
4:45-5:00p	54	123	103	1	17	20	30	4
Peak Hour 3:45-4:45p	293	479	435	10	68	121	163	9

- 277
- 238
- 311
- 296
- 323
- 319
- 292
- 351
- 298
- 1122
- 1168
- 1249
- 1230
- 1285
- 1260

Notes:

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS VEHICLE TURNING MOVEMENT FORM

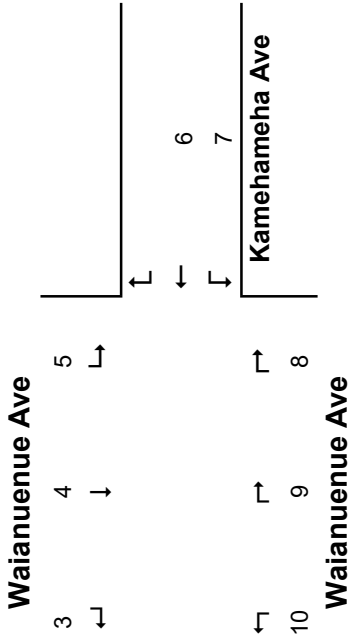
LOCATION: Kamehameha Ave & Waianuenue Ave

DATE: 4/13/2022 (Wednesday)

TIME: 6:30a-8:00a

WEATHER: Overcast

RECORDER: WYY



TIME PERIOD	MOVEMENT NUMBER									
	1	2	3	4	5	6	7	8	9	10
6:30-6:45a	1	2	0	33	23	6	11	17	0	24
6:45-7:00a	2	1	1	48	39	7	20	28	1	21
7:00-7:15a	3	2	0	44	42	12	16	31	1	27
7:15-7:30a	0	3	9	0	89	20	0	44	4	40
7:30-7:45a	0	5	4	0	81	29	0	57	2	37
7:45-8:00a	0	3	13	0	83	47	0	65	3	38
Peak Hour 7:00-8:00a	3	13	26	44	295	108	16	197	10	142

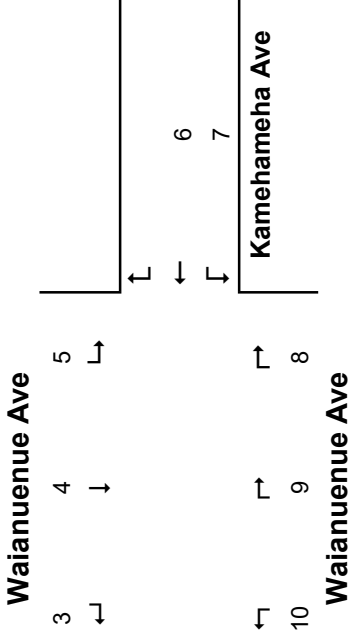
117
168
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215
252

672
770
854

Notes:

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS VEHICLE TURNING MOVEMENT FORM

LOCATION: Kamehameha Ave & Waianuenue Ave
DATE: 4/12/2022 (Tuesday)
TIME: 3:00p-5:00p
WEATHER: Overcast
RECORDER: WYY



TIME PERIOD	MOVEMENT NUMBER									
	1	2	3	4	5	6	7	8	9	10
2:45-3:00p	4	17	7	20	29	16	24	54	5	42
3:00-3:15p	6	20	3	18	19	19	30	61	8	52
3:15-3:30p	4	19	2	23	38	13	49	56	7	49
3:30-3:45p	5	13	2	24	22	22	31	46	1	70
3:45-4:00p	9	12	6	54	24	13	31	55	6	53
4:00-4:15p	7	13	0	38	36	10	31	47	4	52
4:15-4:30p	7	19	0	33	23	15	38	49	7	50
4:30-4:45p	5	10	4	41	41	25	35	54	9	56
4:45-5:00p	5	15	4	33	23	21	28	42	2	64
Peak Hour 3:45-4:45p	28	54	10	166	124	63	135	205	26	211

218
 236
 260
 236
 263
 238
 241
 280
 237

950
 995
 997
 978
 1022
 996

Notes:

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS PEDESTRIAN TURNING MOVEMENT FORM

LOCATION: Bayfront Hwy & Waianuenu Ave
DATE: 4/13/2022 (Wednesday)
TIME: 6:30a-8:00a
WEATHER: Overcast
RECORDER: JY



TIME PERIOD	MOVEMENT NUMBER			
	1	2	3	4
6:30-6:45a	0	0	0	0
6:45-7:00a	2	1	0	0
7:00-7:15a	1	0	0	0
7:15-7:30a	0	0	0	0
7:30-7:45a	0	1	0	0
7:45-8:00a	0	2	1	0
Peak Hour				
7:00-8:00 AM	1	3	1	0

Notes: There are no pedestrian facilities across Bayfront Highway or this portion of Waianuenu Ave.
 Did not capture true demand as pedestrians were observed wanting to cross Bayfront Hwy, but chose not to cross.

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS PEDESTRIAN TURNING MOVEMENT FORM

LOCATION: Bayfront Hwy & Waianuenu Ave
DATE: 4/12/2022 (Tuesday)
TIME: 3:00p-5:00p
WEATHER: Overcast
RECORDER: JY



TIME PERIOD	MOVEMENT NUMBER			
	1	2	3	4
2:45-3:00p	5	1	0	0
3:00-3:15p	1	1	0	0
3:15-3:30p	0	0	0	0
3:30-3:45p	4	1	0	0
3:45-4:00p	7	3	5	0
4:00-4:15p	0	0	5	0
4:15-4:30p	1	0	0	0
4:30-4:45p	0	0	0	0
4:45-5:00p	2	1	0	1
Peak Hour	8	3	10	0
3:45-4:45p				

Notes: There are no pedestrian facilities across Bayfront Highway or this portion of Waianuenu Ave.
 Did not capture true demand as pedestrians were observed wanting to cross Bayfront Hwy, but chose not to cross.

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS PEDESTRIAN TURNING MOVEMENT FORM

LOCATION: Kamehameha Ave & Waianuenue Ave

DATE: 4/13/2022 (Wednesday)

TIME: 6:30a-8:00a

WEATHER: Overcast

RECORDER: WYY



TIME PERIOD	MOVEMENT NUMBER							
	1	2	3	4	5	6	7	8
6:30-6:45a	0	2	0	0	0	0	0	2
6:45-7:00a	2	1	0	1	0	0	2	1
7:00-7:15a	0	0	0	1	0	0	0	1
7:15-7:30a	0	0	0	2	0	0	1	0
7:30-7:45a	0	0	0	0	0	0	0	0
7:45-8:00a	1	0	1	0	0	1	0	2
Peak Hour	1	0	1	3	0	1	1	3

Notes: There is no crosswalk for movements 5 & 6, but pedestrians were observed crossing that leg of the intersection.

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS PEDESTRIAN TURNING MOVEMENT FORM

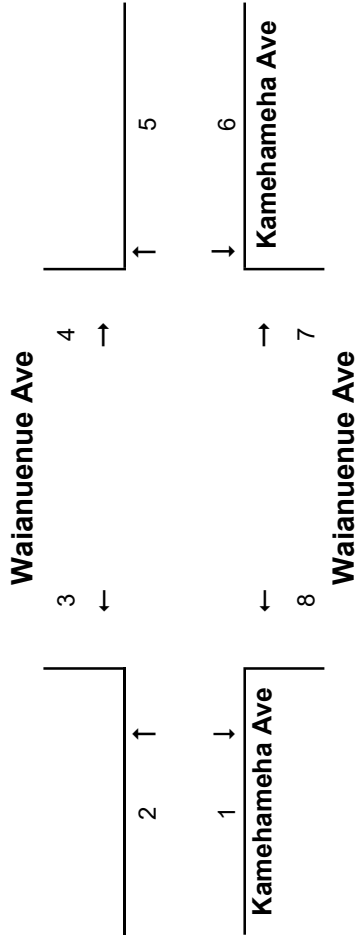
LOCATION: Kamehameha Ave & Waianuenue Ave

DATE: 4/12/2022 (Tuesday)

TIME: 3:00p-5:00p

WEATHER: Overcast

RECORDER: WYY



TIME PERIOD	MOVEMENT NUMBER							
	1	2	3	4	5	6	7	8
2:45-3:00p	0	0	0	0	0	1	11	7
3:00-3:15p	0	0	0	0	0	0	0	6
3:15-3:30p	1	0	0	2	0	0	15	20
3:30-3:45p	1	0	0	6	0	0	7	2
3:45-4:00p	2	10	0	0	2	1	15	8
4:00-4:15p	0	0	1	0	0	5	0	4
4:15-4:30p	0	2	0	1	0	0	2	5
4:30-4:45p	0	0	0	0	0	0	10	7
4:45-5:00p	0	1	0	0	0	0	0	3
Peak Hour 3:45-4:45p	2	12	1	1	2	6	27	24

Notes: Interisland cruise ship was on Hawaii island. A lot of the pedestrian activity was from the tourists, which is a normal occurrence. There is no crosswalk for movements 5 & 6, but pedestrians were observed crossing that leg of the intersection.

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS BICYCLE TURNING MOVEMENT FORM

LOCATION: Bayfront Hwy & Waianuenu Ave
DATE: 4/13/2022 (Wednesday)
TIME: 6:30a-8:00a
WEATHER: Overcast
RECORDER: JY



TIME PERIOD	MOVEMENT NUMBER							
	1	2	3	4	5	6	7	8
6:30-6:45a	0	0	0	0	0	0	0	0
6:45-7:00a	0	0	0	0	0	0	0	0
7:00-7:15a	1	0	0	0	0	1	0	0
7:15-7:30a	0	0	1	0	0	0	0	0
7:30-7:45a	0	0	0	0	0	0	0	0
7:45-8:00a	0	0	0	0	0	0	0	0
Peak Hour 7:00-8:00 AM	1	0	1	0	0	1	0	0

Notes:

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS BICYCLE TURNING MOVEMENT FORM

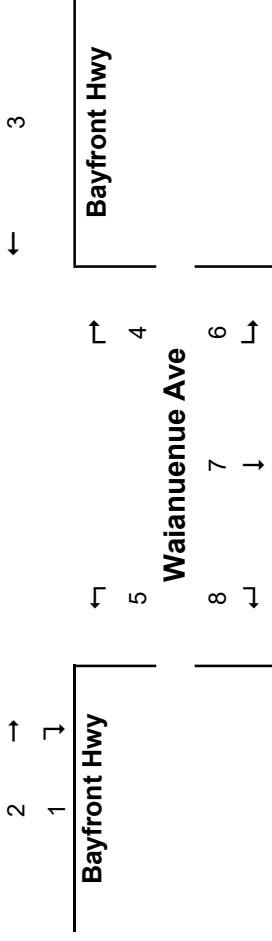
LOCATION: Bayfront Hwy & Waianuenu Ave

DATE: 4/12/2022 (Tuesday)

TIME: 3:00p-5:00p

WEATHER: Overcast

RECORDER: JY

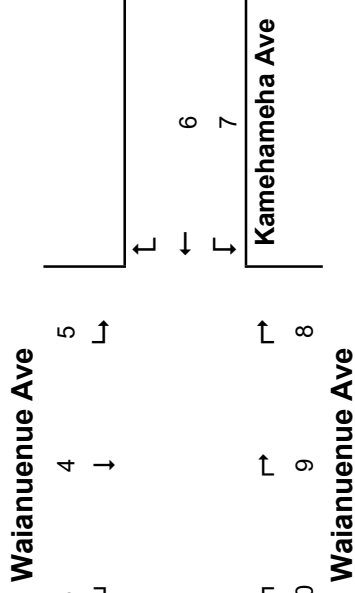


TIME PERIOD	MOVEMENT NUMBER							
	1	2	3	4	5	6	7	8
2:45-3:00p	0	2	1	0	0	0	0	0
3:00-3:15p	0	0	0	0	0	0	0	0
3:15-3:30p	0	0	0	0	0	0	0	0
3:30-3:45p	0	0	0	0	0	0	0	0
3:45-4:00p	0	0	0	0	0	0	0	0
4:00-4:15p	0	1	0	0	0	0	0	0
4:15-4:30p	0	0	0	0	0	0	0	0
4:30-4:45p	0	0	0	0	0	0	0	0
4:45-5:00p	1	0	0	0	0	0	1	0
Peak Hour	0	1	0	0	0	0	0	0
3:45-4:45p	0	1	0	0	0	0	0	0

Notes:

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS BICYCLE TURNING MOVEMENT FORM

LOCATION: Kamehameha Ave & Waianuenue Ave
DATE: 4/13/2022 (Wednesday)
TIME: 6:30a-8:00a
WEATHER: Overcast
RECORDER: WYY

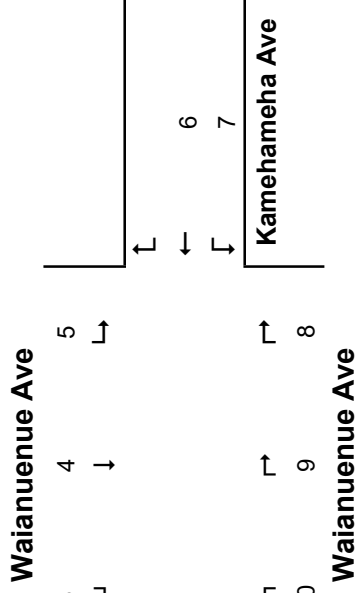


TIME PERIOD	MOVEMENT NUMBER									
	1	2	3	4	5	6	7	8	9	10
6:30-6:45a	0	0	0	0	0	0	0	0	0	0
6:45-7:00a	0	1	0	1	0	0	0	0	0	0
7:00-7:15a	0	0	0	0	1	0	0	1	0	0
7:15-7:30a	0	0	0	0	0	0	0	0	0	0
7:30-7:45a	0	0	0	0	0	0	0	0	0	0
7:45-8:00a	0	0	0	0	0	0	0	0	0	0
Peak Hour										
7:00-8:00a	0	0	0	0	1	0	0	1	0	0

Notes:

HILO BAYFRONT HWY INTERSECTION IMPROVEMENTS BICYCLE TURNING MOVEMENT FORM

LOCATION: Kamehameha Ave & Waianuenu Ave
DATE: 4/12/2022 (Tuesday)
TIME: 3:00p-5:00p
WEATHER: Overcast
RECORDER: WYY



TIME PERIOD	MOVEMENT NUMBER									
	1	2	3	4	5	6	7	8	9	10
2:45-3:00p	0	0	0	0	0	0	0	0	0	0
3:00-3:15p	1	0	0	0	0	0	0	0	0	0
3:15-3:30p	0	0	0	0	0	0	0	2	0	0
3:30-3:45p	0	0	0	0	0	0	0	0	0	0
3:45-4:00p	0	0	0	0	0	1	0	0	0	0
4:00-4:15p	0	1	0	0	0	0	0	0	0	0
4:15-4:30p	0	0	0	0	0	1	0	0	0	0
4:30-4:45p	0	0	0	0	0	0	0	0	0	0
4:45-5:00p	0	1	0	0	0	0	0	0	0	0
Peak Hour	0	1	0	0	0	2	0	0	0	0
3:45-4:45p	0	1	0	0	0	2	0	0	0	0

Notes:

Appendix B SimTraffic Analysis Worksheets

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	6:45	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	1661	1640	1629	1637	1622	1636	1750
Vehs Exited	1654	1647	1622	1627	1615	1623	1746
Starting Vehs	19	30	20	17	20	18	18
Ending Vehs	26	23	27	27	27	31	22
Travel Distance (mi)	382	382	376	380	378	381	401
Travel Time (hr)	23.8	23.1	23.3	24.1	23.4	23.5	26.8
Total Delay (hr)	9.8	9.2	9.5	10.1	9.5	9.7	12.0
Total Stops	820	793	773	832	814	810	907
Fuel Used (gal)	16.8	16.6	16.6	16.9	16.4	16.6	18.2

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	1674	1685	1653	1658
Vehs Exited	1667	1689	1645	1653
Starting Vehs	19	22	15	19
Ending Vehs	26	18	23	24
Travel Distance (mi)	387	390	381	384
Travel Time (hr)	25.9	24.7	24.3	24.3
Total Delay (hr)	11.7	10.3	10.2	10.2
Total Stops	874	853	834	830
Fuel Used (gal)	17.3	17.3	16.9	17.0

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	1661	1640	1629	1637	1622	1636	1750
Vehs Exited	1654	1647	1622	1627	1615	1623	1746
Starting Vehs	19	30	20	17	20	18	18
Ending Vehs	26	23	27	27	27	31	22
Travel Distance (mi)	382	382	376	380	378	381	401
Travel Time (hr)	23.8	23.1	23.3	24.1	23.4	23.5	26.8
Total Delay (hr)	9.8	9.2	9.5	10.1	9.5	9.7	12.0
Total Stops	820	793	773	832	814	810	907
Fuel Used (gal)	16.8	16.6	16.6	16.9	16.4	16.6	18.2

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	1674	1685	1653	1658
Vehs Exited	1667	1689	1645	1653
Starting Vehs	19	22	15	19
Ending Vehs	26	18	23	24
Travel Distance (mi)	387	390	381	384
Travel Time (hr)	25.9	24.7	24.3	24.3
Total Delay (hr)	11.7	10.3	10.2	10.2
Total Stops	874	853	834	830
Fuel Used (gal)	17.3	17.3	16.9	17.0

3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR	All
Stop Del/Veh (s)	29.8	2.9	19.9	18.1	5.4	32.0	1.4	22.0	29.4	10.8	18.0

4: Waianuenue Ave & Bayfront Hwy Performance by movement

Movement	EBT	EBR	WBT	NBL	NBT	NBR	All
Stop Del/Veh (s)	7.6	5.6	6.0	7.6	0.6	0.4	6.7

Total Network Performance

Stop Del/Veh (s)	14.9
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Queuing and Blocking Report
Baseline

05/12/2022

Intersection: 3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	TR	LT	R	T	R	L	TR
Maximum Queue (ft)	45	126	59	278	125	136	95
Average Queue (ft)	11	56	17	106	46	109	44
95th Queue (ft)	36	108	47	212	143	141	87
Link Distance (ft)	354	451	451	746		57	57
Upstream Blk Time (%)						47	11
Queuing Penalty (veh)						86	20
Storage Bay Dist (ft)					100		
Storage Blk Time (%)				12	0		
Queuing Penalty (veh)				24	0		

Intersection: 4: Waianuenue Ave & Bayfront Hwy

Movement	EB	EB	EB	WB	NB
Directions Served	T	R	R	T	L
Maximum Queue (ft)	297	264	72	180	69
Average Queue (ft)	146	94	4	72	28
95th Queue (ft)	272	235	47	145	65
Link Distance (ft)	288			488	57
Upstream Blk Time (%)	1	0			6
Queuing Penalty (veh)	0	0			6
Storage Bay Dist (ft)		250	250		
Storage Blk Time (%)	1	1	0		
Queuing Penalty (veh)	4	4	0		

Network Summary

Network wide Queuing Penalty: 144

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	3:30	3:30	3:30	3:30	3:30	3:30	3:30
End Time	4:45	4:45	4:45	4:45	4:45	4:45	4:45
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	1967	2033	2079	1945	1977	2083	2066
Vehs Exited	1976	2037	2077	1947	1991	2079	2053
Starting Vehs	38	39	28	30	46	27	31
Ending Vehs	29	35	30	28	32	31	44
Travel Distance (mi)	474	491	501	470	481	503	499
Travel Time (hr)	30.0	31.5	31.4	29.7	29.9	31.8	30.3
Total Delay (hr)	12.8	13.7	13.3	12.6	12.6	13.5	12.4
Total Stops	1091	1201	1157	1120	1117	1202	1116
Fuel Used (gal)	21.0	21.8	22.0	20.9	21.2	22.0	21.6

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	3:30	3:30	3:30	3:30
End Time	4:45	4:45	4:45	4:45
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2056	2010	1991	2021
Vehs Exited	2050	2014	1995	2023
Starting Vehs	14	34	30	31
Ending Vehs	20	30	26	30
Travel Distance (mi)	491	489	485	488
Travel Time (hr)	32.2	29.9	29.4	30.6
Total Delay (hr)	14.3	12.3	11.9	12.9
Total Stops	1209	1097	1074	1139
Fuel Used (gal)	22.1	21.2	20.9	21.5

Interval #0 Information Seeding

Start Time	3:30
End Time	3:45
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	3:45
End Time	4:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	1967	2033	2079	1945	1977	2083	2066
Vehs Exited	1976	2037	2077	1947	1991	2079	2053
Starting Vehs	38	39	28	30	46	27	31
Ending Vehs	29	35	30	28	32	31	44
Travel Distance (mi)	474	491	501	470	481	503	499
Travel Time (hr)	30.0	31.5	31.4	29.7	29.9	31.8	30.3
Total Delay (hr)	12.8	13.7	13.3	12.6	12.6	13.5	12.4
Total Stops	1091	1201	1157	1120	1117	1202	1116
Fuel Used (gal)	21.0	21.8	22.0	20.9	21.2	22.0	21.6

Interval #1 Information Recording

Start Time	3:45
End Time	4:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	2056	2010	1991	2021
Vehs Exited	2050	2014	1995	2023
Starting Vehs	14	34	30	31
Ending Vehs	20	30	26	30
Travel Distance (mi)	491	489	485	488
Travel Time (hr)	32.2	29.9	29.4	30.6
Total Delay (hr)	14.3	12.3	11.9	12.9
Total Stops	1209	1097	1074	1139
Fuel Used (gal)	22.1	21.2	20.9	21.5

3: Waianuenu Ave & Kamehameha Ave/Kamehameha Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR	All
Stop Del/Veh (s)	28.0	14.0	23.6	20.6	9.0	26.5	2.9	17.1	17.1	10.9	17.1

4: Waianuenu Ave & Bayfront Hwy Performance by movement

Movement	EBT	EBR	WBT	NBL	NBR	All
Stop Del/Veh (s)	11.4	1.3	10.2	7.7	0.3	8.2

Total Network Performance

Stop Del/Veh (s)	15.5
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Intersection: 3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	TR	LT	R	T	R	L	TR
Maximum Queue (ft)	111	200	82	361	125	120	112
Average Queue (ft)	44	95	32	153	60	62	76
95th Queue (ft)	90	173	68	292	161	111	115
Link Distance (ft)	354	451	451	746		57	57
Upstream Blk Time (%)						16	24
Queuing Penalty (veh)						25	37
Storage Bay Dist (ft)					100		
Storage Blk Time (%)				20	0		
Queuing Penalty (veh)				41	0		

Intersection: 4: Waianuenue Ave & Bayfront Hwy

Movement	EB	EB	EB	WB	NB
Directions Served	T	R	R	T	L
Maximum Queue (ft)	304	252	159	292	71
Average Queue (ft)	171	29	24	141	41
95th Queue (ft)	294	163	98	254	76
Link Distance (ft)	288			488	57
Upstream Blk Time (%)	1	0			13
Queuing Penalty (veh)	0	0			20
Storage Bay Dist (ft)		250	250		
Storage Blk Time (%)	2	0	0		
Queuing Penalty (veh)	7	0	0		

Network Summary

Network wide Queuing Penalty: 130

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	6:45	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	2035	2059	2095	2050	1954	2003	2008
Vehs Exited	2041	2065	2105	2046	1965	2014	2004
Starting Vehs	24	33	36	28	34	32	27
Ending Vehs	18	27	26	32	23	21	31
Travel Distance (mi)	474	480	488	478	453	468	465
Travel Time (hr)	30.0	31.0	32.0	31.0	30.5	29.8	30.9
Total Delay (hr)	12.7	13.4	14.2	13.6	13.8	12.7	13.9
Total Stops	1048	1116	1119	1062	1079	1059	1119
Fuel Used (gal)	21.0	21.4	21.8	21.3	20.4	20.6	21.1

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2030	2005	2107	2034
Vehs Exited	2021	1994	2117	2036
Starting Vehs	21	26	37	28
Ending Vehs	30	37	27	28
Travel Distance (mi)	470	462	492	473
Travel Time (hr)	30.0	31.4	31.4	30.8
Total Delay (hr)	12.8	14.4	13.4	13.5
Total Stops	1049	1140	1100	1090
Fuel Used (gal)	20.7	21.0	21.7	21.1

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	2035	2059	2095	2050	1954	2003	2008
Vehs Exited	2041	2065	2105	2046	1965	2014	2004
Starting Vehs	24	33	36	28	34	32	27
Ending Vehs	18	27	26	32	23	21	31
Travel Distance (mi)	474	480	488	478	453	468	465
Travel Time (hr)	30.0	31.0	32.0	31.0	30.5	29.8	30.9
Total Delay (hr)	12.7	13.4	14.2	13.6	13.8	12.7	13.9
Total Stops	1048	1116	1119	1062	1079	1059	1119
Fuel Used (gal)	21.0	21.4	21.8	21.3	20.4	20.6	21.1

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	2030	2005	2107	2034
Vehs Exited	2021	1994	2117	2036
Starting Vehs	21	26	37	28
Ending Vehs	30	37	27	28
Travel Distance (mi)	470	462	492	473
Travel Time (hr)	30.0	31.4	31.4	30.8
Total Delay (hr)	12.8	14.4	13.4	13.5
Total Stops	1049	1140	1100	1090
Fuel Used (gal)	20.7	21.0	21.7	21.1

3: Waianuenu Ave & Kamehameha Ave/Kamehameha Ave Performance by approach

Approach	EB	WB	NB	SB	All
Stop Del/Veh (s)	21.6	18.9	16.8	19.5	18.4

4: Waianuenu Ave & Bayfront Hwy Performance by approach

Approach	EB	WB	NB	All
Stop Del/Veh (s)	7.4	6.4	7.0	7.2

Total Network Performance

Stop Del/Veh (s)	15.4
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Intersection: 3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	TR	LT	R	T	R	L	TR
Maximum Queue (ft)	47	166	65	406	125	141	102
Average Queue (ft)	16	75	18	143	58	113	51
95th Queue (ft)	42	140	50	307	159	139	94
Link Distance (ft)	354	451	451	746		57	57
Upstream Blk Time (%)						48	13
Queuing Penalty (veh)						109	30
Storage Bay Dist (ft)					100		
Storage Blk Time (%)				19	0		
Queuing Penalty (veh)				45	0		

Intersection: 4: Waianuenue Ave & Bayfront Hwy

Movement	EB	EB	EB	WB	NB
Directions Served	T	R	R	T	L
Maximum Queue (ft)	317	275	171	209	67
Average Queue (ft)	181	135	11	89	30
95th Queue (ft)	313	294	82	169	66
Link Distance (ft)	288			488	57
Upstream Blk Time (%)	3	0			7
Queuing Penalty (veh)	0	0			8
Storage Bay Dist (ft)		250	250		
Storage Blk Time (%)	3	1	0		
Queuing Penalty (veh)	13	7	0		

Network Summary

Network wide Queuing Penalty: 212

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	3:30	3:30	3:30	3:30	3:30	3:30	3:30
End Time	4:45	4:45	4:45	4:45	4:45	4:45	4:45
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	2486	2501	2457	2441	2420	2516	2531
Vehs Exited	2490	2511	2467	2444	2417	2523	2534
Starting Vehs	40	45	49	36	41	43	41
Ending Vehs	36	35	39	33	44	36	38
Travel Distance (mi)	598	607	589	588	580	610	612
Travel Time (hr)	40.2	40.0	38.5	39.0	39.2	39.6	41.4
Total Delay (hr)	18.5	18.0	17.1	17.6	18.1	17.6	19.2
Total Stops	1538	1566	1499	1544	1494	1520	1605
Fuel Used (gal)	26.9	27.1	26.4	26.5	26.2	27.3	27.7

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	3:30	3:30	3:30	3:30
End Time	4:45	4:45	4:45	4:45
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2465	2391	2516	2472
Vehs Exited	2476	2395	2526	2478
Starting Vehs	37	36	48	42
Ending Vehs	26	32	38	35
Travel Distance (mi)	594	574	612	596
Travel Time (hr)	40.3	37.6	40.3	39.6
Total Delay (hr)	18.7	16.7	18.1	18.0
Total Stops	1539	1493	1540	1535
Fuel Used (gal)	26.9	25.7	27.3	26.8

Interval #0 Information Seeding

Start Time	3:30
End Time	3:45
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	3:45
End Time	4:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	2486	2501	2457	2441	2420	2516	2531
Vehs Exited	2490	2511	2467	2444	2417	2523	2534
Starting Vehs	40	45	49	36	41	43	41
Ending Vehs	36	35	39	33	44	36	38
Travel Distance (mi)	598	607	589	588	580	610	612
Travel Time (hr)	40.2	40.0	38.5	39.0	39.2	39.6	41.4
Total Delay (hr)	18.5	18.0	17.1	17.6	18.1	17.6	19.2
Total Stops	1538	1566	1499	1544	1494	1520	1605
Fuel Used (gal)	26.9	27.1	26.4	26.5	26.2	27.3	27.7

Interval #1 Information Recording

Start Time	3:45
End Time	4:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	2465	2391	2516	2472
Vehs Exited	2476	2395	2526	2478
Starting Vehs	37	36	48	42
Ending Vehs	26	32	38	35
Travel Distance (mi)	594	574	612	596
Travel Time (hr)	40.3	37.6	40.3	39.6
Total Delay (hr)	18.7	16.7	18.1	18.0
Total Stops	1539	1493	1540	1535
Fuel Used (gal)	26.9	25.7	27.3	26.8

3: Waianuenu Ave & Kamehameha Ave/Kamehameha Ave Performance by approach

Approach	EB	WB	NB	SB	All
Stop Del/Veh (s)	25.7	26.6	18.8	14.1	20.0

4: Waianuenu Ave & Bayfront Hwy Performance by approach

Approach	EB	WB	NB	All
Stop Del/Veh (s)	7.7	10.8	8.3	8.7

Total Network Performance

Stop Del/Veh (s)	17.5
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Intersection: 3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	TR	LT	R	T	R	L	TR
Maximum Queue (ft)	138	235	128	425	125	124	117
Average Queue (ft)	60	125	48	211	86	72	82
95th Queue (ft)	112	211	104	383	178	122	118
Link Distance (ft)	354	451	451	746		57	57
Upstream Blk Time (%)						19	25
Queuing Penalty (veh)						35	47
Storage Bay Dist (ft)					100		
Storage Blk Time (%)				30	0		
Queuing Penalty (veh)				75	1		

Intersection: 4: Waianuenue Ave & Bayfront Hwy

Movement	EB	EB	EB	WB	NB
Directions Served	T	R	R	T	L
Maximum Queue (ft)	312	275	162	384	74
Average Queue (ft)	204	75	31	178	53
95th Queue (ft)	331	265	111	310	81
Link Distance (ft)	288			488	57
Upstream Blk Time (%)	3	0		0	27
Queuing Penalty (veh)	0	0		0	51
Storage Bay Dist (ft)		250	250		
Storage Blk Time (%)	4	0	0		
Queuing Penalty (veh)	15	1	1		

Network Summary

Network wide Queuing Penalty: 227

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	6:45	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	2048	2118	2051	1990	1943	1989	2028
Vehs Exited	2058	2136	2036	1999	1939	1987	2015
Starting Vehs	27	41	36	30	25	33	23
Ending Vehs	17	23	51	21	29	35	36
Travel Distance (mi)	479	494	473	464	450	461	463
Travel Time (hr)	33.2	34.3	34.1	33.8	32.5	31.7	38.3
Total Delay (hr)	15.8	16.2	16.8	16.8	16.0	14.8	21.3
Total Stops	1105	1146	1180	1083	1145	1123	1170
Fuel Used (gal)	22.0	22.7	21.7	21.3	20.8	20.8	22.7

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	1978	2028	2028	2020
Vehs Exited	1972	2012	2030	2019
Starting Vehs	19	28	33	27
Ending Vehs	25	44	31	28
Travel Distance (mi)	457	466	474	468
Travel Time (hr)	37.1	31.0	31.0	33.7
Total Delay (hr)	20.3	13.8	13.7	16.5
Total Stops	1115	1058	987	1111
Fuel Used (gal)	22.1	20.9	20.9	21.6

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	2048	2118	2051	1990	1943	1989	2028
Vehs Exited	2058	2136	2036	1999	1939	1987	2015
Starting Vehs	27	41	36	30	25	33	23
Ending Vehs	17	23	51	21	29	35	36
Travel Distance (mi)	479	494	473	464	450	461	463
Travel Time (hr)	33.2	34.3	34.1	33.8	32.5	31.7	38.3
Total Delay (hr)	15.8	16.2	16.8	16.8	16.0	14.8	21.3
Total Stops	1105	1146	1180	1083	1145	1123	1170
Fuel Used (gal)	22.0	22.7	21.7	21.3	20.8	20.8	22.7

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	1978	2028	2028	2020
Vehs Exited	1972	2012	2030	2019
Starting Vehs	19	28	33	27
Ending Vehs	25	44	31	28
Travel Distance (mi)	457	466	474	468
Travel Time (hr)	37.1	31.0	31.0	33.7
Total Delay (hr)	20.3	13.8	13.7	16.5
Total Stops	1115	1058	987	1111
Fuel Used (gal)	22.1	20.9	20.9	21.6

3: Waianuenu Ave & Kamehameha Ave/Kamehameha Ave Performance by approach

Approach	EB	WB	NB	SB	All
Stop Del/Veh (s)	26.8	17.6	22.2	25.2	22.7

4: Waianuenu Ave & Bayfront Hwy Performance by approach

Approach	EB	WB	NB	All
Stop Del/Veh (s)	10.0	5.9	9.6	9.1

Total Network Performance

Stop Del/Veh (s)	19.3
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Queuing and Blocking Report
All Pedestrian Phase

08/16/2022

Intersection: 3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	TR	LT	R	T	R	L	TR
Maximum Queue (ft)	53	154	70	430	125	140	107
Average Queue (ft)	17	69	19	172	78	116	55
95th Queue (ft)	46	131	55	340	175	134	101
Link Distance (ft)	354	451	451	746		57	57
Upstream Blk Time (%)						57	16
Queuing Penalty (veh)						129	37
Storage Bay Dist (ft)					100		
Storage Blk Time (%)				26	0		
Queuing Penalty (veh)				63	1		

Intersection: 4: Waianuenue Ave & Bayfront Hwy

Movement	EB	EB	EB	WB	NB
Directions Served	T	R	R	T	L
Maximum Queue (ft)	313	275	194	193	68
Average Queue (ft)	195	174	19	85	35
95th Queue (ft)	337	316	116	160	68
Link Distance (ft)	288			488	57
Upstream Blk Time (%)	6	1			13
Queuing Penalty (veh)	0	0			14
Storage Bay Dist (ft)		250	250		
Storage Blk Time (%)	3	5	0		
Queuing Penalty (veh)	15	32	0		

Network Summary

Network wide Queuing Penalty: 291

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	3:30	3:30	3:30	3:30	3:30	3:30	3:30
End Time	4:45	4:45	4:45	4:45	4:45	4:45	4:45
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	2567	2439	2478	2447	2405	2477	2530
Vehs Exited	2587	2454	2473	2428	2384	2461	2521
Starting Vehs	60	57	38	30	33	41	45
Ending Vehs	40	42	43	49	54	57	54
Travel Distance (mi)	624	589	592	587	573	591	610
Travel Time (hr)	76.1	56.2	40.4	42.0	39.7	46.9	53.1
Total Delay (hr)	53.5	34.9	18.9	20.7	18.9	25.4	31.0
Total Stops	1849	1679	1438	1488	1410	1596	1732
Fuel Used (gal)	35.9	30.5	26.7	27.1	26.0	28.2	30.3

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	3:30	3:30	3:30	3:30
End Time	4:45	4:45	4:45	4:45
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2422	2454	2555	2476
Vehs Exited	2422	2454	2540	2471
Starting Vehs	35	36	46	42
Ending Vehs	35	36	61	46
Travel Distance (mi)	583	589	609	595
Travel Time (hr)	42.3	41.6	53.0	49.1
Total Delay (hr)	21.2	20.3	30.7	27.5
Total Stops	1464	1505	1847	1601
Fuel Used (gal)	27.1	27.1	30.5	28.9

Interval #0 Information Seeding

Start Time	3:30
End Time	3:45
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	3:45
End Time	4:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	2567	2439	2478	2447	2405	2477	2530
Vehs Exited	2587	2454	2473	2428	2384	2461	2521
Starting Vehs	60	57	38	30	33	41	45
Ending Vehs	40	42	43	49	54	57	54
Travel Distance (mi)	624	589	592	587	573	591	610
Travel Time (hr)	76.1	56.2	40.4	42.0	39.7	46.9	53.1
Total Delay (hr)	53.5	34.9	18.9	20.7	18.9	25.4	31.0
Total Stops	1849	1679	1438	1488	1410	1596	1732
Fuel Used (gal)	35.9	30.5	26.7	27.1	26.0	28.2	30.3

Interval #1 Information Recording

Start Time	3:45
End Time	4:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	2422	2454	2555	2476
Vehs Exited	2422	2454	2540	2471
Starting Vehs	35	36	46	42
Ending Vehs	35	36	61	46
Travel Distance (mi)	583	589	609	595
Travel Time (hr)	42.3	41.6	53.0	49.1
Total Delay (hr)	21.2	20.3	30.7	27.5
Total Stops	1464	1505	1847	1601
Fuel Used (gal)	27.1	27.1	30.5	28.9

3: Waianuenu Ave & Kamehameha Ave/Kamehameha Ave Performance by approach

Approach	EB	WB	NB	SB	All
Stop Del/Veh (s)	34.0	55.0	49.3	18.2	41.2

4: Waianuenu Ave & Bayfront Hwy Performance by approach

Approach	EB	WB	NB	All
Stop Del/Veh (s)	6.7	9.5	12.4	8.7

Total Network Performance

Stop Del/Veh (s)	29.3
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Intersection: 3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	TR	LT	R	T	R	L	TR
Maximum Queue (ft)	151	249	294	619	125	123	110
Average Queue (ft)	66	121	123	375	96	80	84
95th Queue (ft)	125	207	287	716	181	128	121
Link Distance (ft)	354	451	451	746		57	57
Upstream Blk Time (%)			0	8		26	29
Queuing Penalty (veh)			0	0		48	54
Storage Bay Dist (ft)					100		
Storage Blk Time (%)				50	0		
Queuing Penalty (veh)				124	1		

Intersection: 4: Waianuenue Ave & Bayfront Hwy

Movement	EB	EB	EB	WB	NB
Directions Served	T	R	R	T	L
Maximum Queue (ft)	319	275	164	359	76
Average Queue (ft)	186	59	41	173	60
95th Queue (ft)	314	229	128	301	80
Link Distance (ft)	288			488	57
Upstream Blk Time (%)	3	0		0	50
Queuing Penalty (veh)	0	0		0	97
Storage Bay Dist (ft)		250	250		
Storage Blk Time (%)	4	0			
Queuing Penalty (veh)	13	0			

Intersection: 8: Bend

Movement	EB
Directions Served	T
Maximum Queue (ft)	51
Average Queue (ft)	2
95th Queue (ft)	50
Link Distance (ft)	488
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 338

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	6:45	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	989	1040	1064	1065	1053	1065	1009
Vehs Exited	990	1037	1071	1073	1051	1063	1011
Starting Vehs	47	48	49	55	48	48	55
Ending Vehs	46	51	42	47	50	50	53
Travel Distance (mi)	189	199	204	204	199	202	194
Travel Time (hr)	786.9	797.6	821.4	725.3	703.8	750.7	797.8
Total Delay (hr)	778.7	788.9	812.5	716.3	695.0	741.9	789.3
Total Stops	567	566	615	624	568	593	575
Fuel Used (gal)	186.2	188.7	194.1	172.2	167.6	177.8	188.6

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	1076	1015	1112	1049
Vehs Exited	1082	1016	1110	1050
Starting Vehs	53	48	57	50
Ending Vehs	47	47	59	48
Travel Distance (mi)	204	194	212	200
Travel Time (hr)	783.8	835.7	748.4	775.1
Total Delay (hr)	774.9	827.2	739.1	766.4
Total Stops	626	537	573	583
Fuel Used (gal)	186.2	197.2	177.7	183.6

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	989	1040	1064	1065	1053	1065	1009
Vehs Exited	990	1037	1071	1073	1051	1063	1011
Starting Vehs	47	48	49	55	48	48	55
Ending Vehs	46	51	42	47	50	50	53
Travel Distance (mi)	189	199	204	204	199	202	194
Travel Time (hr)	786.9	797.6	821.4	725.3	703.8	750.7	797.8
Total Delay (hr)	778.7	788.9	812.5	716.3	695.0	741.9	789.3
Total Stops	567	566	615	624	568	593	575
Fuel Used (gal)	186.2	188.7	194.1	172.2	167.6	177.8	188.6

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	1076	1015	1112	1049
Vehs Exited	1082	1016	1110	1050
Starting Vehs	53	48	57	50
Ending Vehs	47	47	59	48
Travel Distance (mi)	204	194	212	200
Travel Time (hr)	783.8	835.7	748.4	775.1
Total Delay (hr)	774.9	827.2	739.1	766.4
Total Stops	626	537	573	583
Fuel Used (gal)	186.2	197.2	177.7	183.6

3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave Performance by approach

Approach	EB	WB	NB	SB	All
Stop Del/Veh (s)	14.2	421.6	20.5	32.5	93.5

4: Waianuenue Ave & Bayfront Hwy Performance by approach

Approach	EB	NB	All
Stop Del/Veh (s)	73.6	22.1	53.7

Total Network Performance

Stop Del/Veh (s)	128.4
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Queuing and Blocking Report
 All Pedestrian Phase Closed Bayfront Leg

08/16/2022

Intersection: 3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	TR	LT	R	T	R	L	TR
Maximum Queue (ft)	47	468	482	353	125	149	83
Average Queue (ft)	12	346	466	152	76	119	28
95th Queue (ft)	37	664	476	293	173	130	69
Link Distance (ft)	354	451	451	746		57	57
Upstream Blk Time (%)		37	99			76	8
Queuing Penalty (veh)		0	0			414	44
Storage Bay Dist (ft)					100		
Storage Blk Time (%)				25	0		
Queuing Penalty (veh)				62	1		

Intersection: 4: Waianuenue Ave & Bayfront Hwy

Movement	EB	EB	EB	NB
Directions Served	T	R	R	L
Maximum Queue (ft)	339	275	262	79
Average Queue (ft)	307	275	157	64
95th Queue (ft)	323	275	366	77
Link Distance (ft)	288			57
Upstream Blk Time (%)	81	15		71
Queuing Penalty (veh)	0	0		193
Storage Bay Dist (ft)		250	250	
Storage Blk Time (%)	0	82	1	
Queuing Penalty (veh)	0	0	0	

Network Summary

Network wide Queuing Penalty: 714

SimTraffic Simulation Summary
 All Pedestrian Phase Bayfront Hwy Closed

08/16/2022

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	3:30	3:30	3:30	3:30	3:30	3:30	3:30
End Time	4:45	4:45	4:45	4:45	4:45	4:45	4:45
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	1307	1372	1291	1248	1287	1317	1321
Vehs Exited	1299	1356	1284	1256	1264	1318	1296
Starting Vehs	48	52	64	74	57	67	47
Ending Vehs	56	68	71	66	80	66	72
Travel Distance (mi)	257	269	254	247	250	262	258
Travel Time (hr)	906.0	906.5	931.3	940.9	920.5	912.4	861.9
Total Delay (hr)	895.0	895.0	920.5	930.3	909.8	901.2	850.8
Total Stops	1201	1385	1384	1256	1245	1299	1246
Fuel Used (gal)	215.7	216.3	221.0	223.3	218.5	217.6	206.0

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	3:30	3:30	3:30	3:30
End Time	4:45	4:45	4:45	4:45
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	1360	1288	1342	1314
Vehs Exited	1346	1287	1329	1303
Starting Vehs	57	62	60	58
Ending Vehs	71	63	73	69
Travel Distance (mi)	264	256	263	258
Travel Time (hr)	896.2	914.8	884.1	907.5
Total Delay (hr)	884.9	903.8	872.8	896.4
Total Stops	1061	1355	1413	1282
Fuel Used (gal)	213.6	217.4	211.4	216.1

Interval #0 Information Seeding

Start Time	3:30
End Time	3:45
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

SimTraffic Simulation Summary
 All Pedestrian Phase Bayfront Hwy Closed

08/16/2022

Interval #1 Information Recording

Start Time	3:45
End Time	4:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	1307	1372	1291	1248	1287	1317	1321
Vehs Exited	1299	1356	1284	1256	1264	1318	1296
Starting Vehs	48	52	64	74	57	67	47
Ending Vehs	56	68	71	66	80	66	72
Travel Distance (mi)	257	269	254	247	250	262	258
Travel Time (hr)	906.0	906.5	931.3	940.9	920.5	912.4	861.9
Total Delay (hr)	895.0	895.0	920.5	930.3	909.8	901.2	850.8
Total Stops	1201	1385	1384	1256	1245	1299	1246
Fuel Used (gal)	215.7	216.3	221.0	223.3	218.5	217.6	206.0

Interval #1 Information Recording

Start Time	3:45
End Time	4:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	1360	1288	1342	1314
Vehs Exited	1346	1287	1329	1303
Starting Vehs	57	62	60	58
Ending Vehs	71	63	73	69
Travel Distance (mi)	264	256	263	258
Travel Time (hr)	896.2	914.8	884.1	907.5
Total Delay (hr)	884.9	903.8	872.8	896.4
Total Stops	1061	1355	1413	1282
Fuel Used (gal)	213.6	217.4	211.4	216.1

3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave Performance by approach

Approach	EB	WB	NB	SB	All
Stop Del/Veh (s)	15.7	667.6	91.5	28.8	108.3

4: Waianuenue Ave & Bayfront Hwy Performance by approach

Approach	EB	NB	All
Stop Del/Veh (s)	55.0	20.2	42.7

Total Network Performance

Stop Del/Veh (s)	135.1
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Queuing and Blocking Report
 All Pedestrian Phase Bayfront Hwy Closed

08/16/2022

Intersection: 3: Waianuenue Ave & Kamehameha Ave/Kamehameha Ave

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	TR	LT	R	T	R	L	TR
Maximum Queue (ft)	109	470	482	774	125	143	108
Average Queue (ft)	44	312	464	544	105	119	61
95th Queue (ft)	91	655	477	884	179	130	114
Link Distance (ft)	354	451	451	746		57	57
Upstream Blk Time (%)		43	99	20		75	27
Queuing Penalty (veh)		0	0	0		362	129
Storage Bay Dist (ft)					100		
Storage Blk Time (%)				65	0		
Queuing Penalty (veh)				184	1		

Intersection: 4: Waianuenue Ave & Bayfront Hwy

Movement	EB	EB	EB	NB
Directions Served	T	R	R	L
Maximum Queue (ft)	332	275	262	80
Average Queue (ft)	306	275	239	64
95th Queue (ft)	321	277	360	78
Link Distance (ft)	288			57
Upstream Blk Time (%)	73	14		72
Queuing Penalty (veh)	0	0		315
Storage Bay Dist (ft)		250	250	
Storage Blk Time (%)		73	2	
Queuing Penalty (veh)		0	0	

Network Summary

Network wide Queuing Penalty: 990

Appendix C SIDRA Analysis Worksheets

MOVEMENT SUMMARY

 Site: 101 [Hilo AM 2042 (Site Folder: General)]

Hilo Bayfront Hwy 2042 AM

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed	
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft					
South: Waianuenue Ave															
3	L2	10	3.0	11	3.0	0.465	22.4	LOS C	4.7	121.1	1.00	0.98	1.11	30.2	
3a	L1	175	3.0	190	3.0	0.465	21.2	LOS C	4.7	121.1	1.00	0.98	1.11	29.9	
18a	R1	10	3.0	11	3.0	0.465	15.5	LOS B	4.7	121.1	1.00	0.98	1.11	29.8	
18	R2	240	3.0	261	3.0	0.225	5.3	LOS A	1.6	41.4	0.64	0.62	0.64	35.6	
Approach		435	3.0	473	3.0	0.465	12.3	LOS B	4.7	121.1	0.80	0.78	0.85	32.7	
East: Kamehameha Ave															
1	L2	20	3.0	22	3.0	0.398	17.7	LOS B	3.1	80.2	0.96	0.96	1.00	34.3	
6	T1	135	3.0	147	3.0	0.398	11.1	LOS B	3.1	80.2	0.96	0.96	1.00	34.1	
16a	R1	35	3.0	38	3.0	0.398	10.8	LOS B	3.1	80.2	0.96	0.96	1.00	33.7	
16b	R3	5	3.0	5	3.0	0.398	11.5	LOS B	3.1	80.2	0.96	0.96	1.00	32.6	
Approach		195	3.0	212	3.0	0.398	11.7	LOS B	3.1	80.2	0.96	0.96	1.00	34.0	
NorthEast: Bayfront Hwy															
1bx	L3	5	3.0	5	3.0	0.392	14.0	LOS B	2.7	69.2	0.68	0.70	0.68	37.4	
1ax	L1	5	3.0	5	3.0	0.392	11.4	LOS B	2.7	69.2	0.68	0.70	0.68	36.3	
16ax	R1	5	3.0	5	3.0	0.392	5.8	LOS A	2.7	69.2	0.68	0.70	0.68	36.2	
16x	R2	335	3.0	364	3.0	0.392	6.4	LOS A	2.7	69.2	0.68	0.70	0.68	35.3	
Approach		350	3.0	380	3.0	0.392	6.5	LOS A	2.7	69.2	0.68	0.70	0.68	35.4	
NorthWest: Bayfront Hwy															
7x	L2	620	3.0	674	3.0	1.015	36.4	LOS F	45.6	1167.0	1.00	1.17	1.89	25.5	
7ax	L1	355	3.0	386	3.0	1.015	35.1	LOS F	45.6	1167.0	1.00	1.17	1.89	25.3	
14ax	R1	60	3.0	65	3.0	1.015	29.4	LOS F	45.6	1167.0	1.00	1.17	1.89	25.2	
14bx	R3	35	3.0	38	3.0	1.015	30.1	LOS F	45.6	1167.0	1.00	1.17	1.89	24.6	
Approach		1070	3.0	1163	3.0	1.015	35.3	LOS D	45.6	1167.0	1.00	1.17	1.89	25.4	
West: Kamehameha Ave															
5b	L3	5	3.0	5	3.0	0.143	24.1	LOS C	1.1	28.6	1.00	0.90	1.00	31.5	
5a	L1	10	3.0	11	3.0	0.143	21.5	LOS C	1.1	28.6	1.00	0.90	1.00	30.8	
2	T1	20	3.0	22	3.0	0.143	16.2	LOS B	1.1	28.6	1.00	0.90	1.00	31.0	
12	R2	5	3.0	5	3.0	0.143	16.4	LOS B	1.1	28.6	1.00	0.90	1.00	30.1	
Approach		40	3.0	43	3.0	0.143	18.5	LOS B	1.1	28.6	1.00	0.90	1.00	30.9	
All Vehicles		2090	3.0	2272	3.0	1.015	23.2	LOS C	45.6	1167.0	0.90	0.99	1.37	28.8	

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 101 [Hilo PM 2042 (Site Folder: General)]

Hilo Bayfront Hwy 2042 PM

Site Category: (None)

Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: Waianuenue Ave														
3	L2	5	3.0	5	3.0	0.483	17.3	LOS B	4.8	122.3	1.00	0.96	1.10	32.6
3a	L1	250	3.0	272	3.0	0.483	16.0	LOS B	4.8	122.3	1.00	0.96	1.10	32.2
18a	R1	40	3.0	43	3.0	0.483	10.3	LOS B	4.8	122.3	1.00	0.96	1.10	32.2
18	R2	250	3.0	272	3.0	0.210	4.5	LOS A	1.3	32.8	0.46	0.52	0.46	36.0
Approach		545	3.0	592	3.0	0.483	10.3	LOS B	4.8	122.3	0.75	0.76	0.81	33.8
East: Kamehameha Ave														
1	L2	165	3.0	179	3.0	0.736	32.4	LOS C	9.3	238.1	1.00	1.26	1.68	27.4
6	T1	80	3.0	87	3.0	0.736	25.8	LOS C	9.3	238.1	1.00	1.26	1.68	27.2
16a	R1	90	3.0	98	3.0	0.736	25.4	LOS C	9.3	238.1	1.00	1.26	1.68	27.0
16b	R3	5	3.0	5	3.0	0.736	26.1	LOS C	9.3	238.1	1.00	1.26	1.68	26.3
Approach		340	3.0	370	3.0	0.736	28.9	LOS C	9.3	238.1	1.00	1.26	1.68	27.2
NorthEast: Bayfront Hwy														
1bx	L3	10	3.0	11	3.0	0.806	26.2	LOS C	12.4	317.8	1.00	1.25	1.66	31.2
1ax	L1	15	3.0	16	3.0	0.806	23.7	LOS C	12.4	317.8	1.00	1.25	1.66	30.4
16ax	R1	10	3.0	11	3.0	0.806	18.0	LOS B	12.4	317.8	1.00	1.25	1.66	30.4
16x	R2	535	3.0	582	3.0	0.806	18.6	LOS B	12.4	317.8	1.00	1.25	1.66	29.7
Approach		570	3.0	620	3.0	0.806	18.8	LOS B	12.4	317.8	1.00	1.25	1.66	29.8
NorthWest: Bayfront Hwy														
7x	L2	585	3.0	636	3.0	1.017	41.8	LOS F	40.5	1037.6	1.00	1.52	2.39	24.2
7ax	L1	145	3.0	158	3.0	1.017	40.5	LOS F	40.5	1037.6	1.00	1.52	2.39	24.0
14ax	R1	220	3.0	239	3.0	1.017	34.9	LOS F	40.5	1037.6	1.00	1.52	2.39	24.0
14bx	R3	10	3.0	11	3.0	1.017	35.6	LOS F	40.5	1037.6	1.00	1.52	2.39	23.4
Approach		960	3.0	1043	3.0	1.017	40.0	LOS D	40.5	1037.6	1.00	1.52	2.39	24.1
West: Kamehameha Ave														
5b	L3	5	3.0	5	3.0	0.450	31.4	LOS C	3.9	100.7	1.00	1.06	1.18	29.1
5a	L1	10	3.0	11	3.0	0.450	28.9	LOS C	3.9	100.7	1.00	1.06	1.18	28.4
2	T1	70	3.0	76	3.0	0.450	23.5	LOS C	3.9	100.7	1.00	1.06	1.18	28.6
12	R2	35	3.0	38	3.0	0.450	23.8	LOS C	3.9	100.7	1.00	1.06	1.18	27.9
Approach		120	3.0	130	3.0	0.450	24.4	LOS C	3.9	100.7	1.00	1.06	1.18	28.4
All Vehicles		2535	3.0	2755	3.0	1.017	26.6	LOS C	40.5	1037.6	0.95	1.24	1.73	27.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 101 [Hilo AM 2042 - Leg Closed (Site Folder: General)]

Hilo Bayfront Hwy 2035 AM - Leg Closed

Site Category: (None)

Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: Waianuenue Ave														
3	L2	10	3.0	11	3.0	0.451	22.4	LOS C	4.6	116.6	1.00	0.97	1.09	30.1
3a	L1	175	3.0	190	3.0	0.451	21.1	LOS C	4.6	116.6	1.00	0.97	1.09	29.8
18	R2	250	3.0	272	3.0	0.602	22.5	LOS C	7.1	183.0	1.00	1.10	1.33	28.3
Approach		435	3.0	473	3.0	0.602	21.9	LOS C	7.1	183.0	1.00	1.05	1.23	29.0
East: Kamehameha Ave														
1	L2	30	3.0	33	3.0	0.524	11.7	LOS B	4.6	118.4	0.65	0.54	0.65	36.7
6	T1	140	3.0	152	3.0	0.524	5.1	LOS A	4.6	118.4	0.65	0.54	0.65	36.5
16a	R1	370	3.0	402	3.0	0.524	4.7	LOS A	4.6	118.4	0.65	0.54	0.65	36.1
Approach		540	3.0	587	3.0	0.524	5.2	LOS A	4.6	118.4	0.65	0.54	0.65	36.2
NorthWest: Bayfront Hwy														
7ax	L1	980	3.0	1065	3.0	1.003	32.0	LOS F	42.9	1098.9	1.00	1.12	1.79	26.3
14ax	R1	55	3.0	60	3.0	1.003	26.4	LOS F	42.9	1098.9	1.00	1.12	1.79	26.2
14bx	R3	35	3.0	38	3.0	1.003	27.1	LOS F	42.9	1098.9	1.00	1.12	1.79	25.5
Approach		1070	3.0	1163	3.0	1.003	31.6	LOS C	42.9	1098.9	1.00	1.12	1.79	26.2
West: Kamehameha Ave														
5b	L3	10	3.0	11	3.0	0.146	24.5	LOS C	1.1	29.4	1.00	0.90	1.00	31.5
2	T1	25	3.0	27	3.0	0.146	16.6	LOS B	1.1	29.4	1.00	0.90	1.00	30.9
12	R2	5	3.0	5	3.0	0.146	16.9	LOS B	1.1	29.4	1.00	0.90	1.00	30.1
Approach		40	3.0	43	3.0	0.146	18.6	LOS B	1.1	29.4	1.00	0.90	1.00	31.0
All Vehicles		2085	3.0	2266	3.0	1.003	22.5	LOS C	42.9	1098.9	0.91	0.95	1.36	28.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 101 [Hilo PM 2042 - Leg Closed (Site Folder: General)]

Hilo Bayfront Hwy 2042 PM - Leg Closed

Site Category: (None)

Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: Waianuenue Ave														
3	L2	5	3.0	5	3.0	0.423	15.8	LOS B	3.9	99.1	1.00	0.91	1.01	33.0
3a	L1	255	3.0	277	3.0	0.423	14.5	LOS B	3.9	99.1	1.00	0.91	1.01	32.5
18	R2	285	3.0	310	3.0	0.459	10.0	LOS B	4.4	112.6	1.00	0.94	1.06	33.7
Approach		545	3.0	592	3.0	0.459	12.2	LOS B	4.4	112.6	1.00	0.92	1.04	33.1
East: Kamehameha Ave														
1	L2	195	3.0	212	3.0	0.945	26.3	LOS C	26.7	683.7	1.00	1.16	1.69	30.1
6	T1	85	3.0	92	3.0	0.945	19.7	LOS B	26.7	683.7	1.00	1.16	1.69	30.0
16a	R1	620	3.0	674	3.0	0.945	19.3	LOS B	26.7	683.7	1.00	1.16	1.69	29.7
Approach		900	3.0	978	3.0	0.945	20.9	LOS C	26.7	683.7	1.00	1.16	1.69	29.8
NorthWest: Bayfront Hwy														
7ax	L1	740	3.0	804	3.0	1.027	43.1	LOS F	42.4	1086.4	1.00	1.56	2.48	23.5
14ax	R1	205	3.0	223	3.0	1.027	37.5	LOS F	42.4	1086.4	1.00	1.56	2.48	23.4
14bx	R3	15	3.0	16	3.0	1.027	38.2	LOS F	42.4	1086.4	1.00	1.56	2.48	22.9
Approach		960	3.0	1043	3.0	1.027	41.9	LOS D	42.4	1086.4	1.00	1.56	2.48	23.4
West: Kamehameha Ave														
5b	L3	10	3.0	11	3.0	0.440	30.4	LOS C	3.8	97.8	1.00	1.06	1.16	29.5
2	T1	75	3.0	82	3.0	0.440	22.5	LOS C	3.8	97.8	1.00	1.06	1.16	29.0
12	R2	35	3.0	38	3.0	0.440	22.7	LOS C	3.8	97.8	1.00	1.06	1.16	28.3
Approach		120	3.0	130	3.0	0.440	23.2	LOS C	3.8	97.8	1.00	1.06	1.16	28.8
All Vehicles		2525	3.0	2745	3.0	1.027	27.1	LOS C	42.4	1086.4	1.00	1.26	1.83	27.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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APPENDIX E

Conceptual Drainage Report



Hilo Bayfront Highway - Intersection Improvements at Waianuenue Avenue

Hilo, Hawaii

Conceptual Drainage Report

September 2022

Prepared for:

State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Prepared by:

AECOM
1001 Bishop Street
Suite 1600
Honolulu, HI 96813

Hilo Bayfront Highway Intersection Improvements at Waianuenue Avenue

Hilo, Hawaii

Conceptual Drainage Report

September 2022

(Expires April 30, 2024)

This work was prepared by me or under my direct supervision.

9/30/2022

Signature
AECOM

Date

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FIGURES	Figure 1: Vicinity & Location Map
	Figure 2: FEMA Flood Map
	Figure 3: Existing Drainage Map
	Figure 4: Proposed Storm Drain Infrastructure Improvements
	Figure 5: Post-Construction BMP Required Treatment Area Map

ATTACHMENT A	Existing Hydrologic Calculations
ATTACHMENT B	NOAA Precipitation Frequency Data Server
ATTACHMENT C	NRCS Web Soil Survey
ATTACHMENT D	EPA Waterbody Report

SECTION 1

INTRODUCTION

1.1 PURPOSE

The objective of this drainage report is to analyze and evaluate the effects of the proposed Hilo Bayfront Highway Intersection Improvements at Waianuenue Avenue project on existing drainage patterns, and to form a basis of design for a drainage system to manage flow within the site and convey water off-site in accordance with County of Hawaii drainage requirements for the area. A drainage report is required to obtain government approval for the proposed project. This report analyzes the conditions before and after the construction of the roadway improvements.

1.2.1 GENERAL INFORMATION

- A. Hilo Bayfront Highway (Route 19) is a State highway in Hilo and is subject to flooding during high surf conditions and severe weather events. The flooding results in the closure of the highway and subsequent detour of southbound traffic to Kamehameha Avenue via Waianuenue Avenue. The existing geometrics and proximity of the Hilo Bayfront Highway/Waianuenue Avenue and Waianuenue Avenue/Kamehameha Avenue intersection are not conducive to large truck traffic that must maneuver through the detour.

- B. Jurisdictions: Hilo Bayfront Highway (Route 19) - State of Hawaii
Hawaii Belt Road (Route 19) – State of Hawaii
Waianuenue Avenue – County of Hawaii
Kamehameha Avenue – County of Hawaii

- C. State Route System Functional Classification: Principal Arterial

- D. Vicinity & Location Map (See Figure 1)

SECTION 2

PHYSICAL ENVIRONMENT

2.1 LOCATION

The Hilo Bayfront Roundabout is located downtown Hilo, Hawaii. The project is at the intersection of Hawaii Belt Road, Kamehameha Avenue and Waianuenue Avenue. The project area is bordered on the northwest by the Wailuku River, on the northeast by Hilo Bay, on the southeast also by Hilo Bay, and on the southwest by Waianuenue Avenue. Refer to the Vicinity & Location Map (See Figure 1) for the project location.

2.2 TOPOGRAPHY

Based on the topographic map (Reference 4), the project area has an approximate ground elevation ranging approximately from 0 to 16 feet above Mean Sea Level (MSL). Hilo Bayfront Highway, Kamehameha Avenue and upper Keawe Street generally runs in a north-south direction, parallel to the shoreline. The Hilo Bayfront Highway and Kamehameha Avenue are relatively flat and has a ground elevation of approximately 12 feet above MSL. The side streets generally run in a west-east direction and connect the upper Keawe Street to Kamehameha Avenue. The side streets, listed in the north to south orientation, include Wailuku Drive, Shipman Street, Waianuenue Avenue, and Kalakaua Street and gently slope between 2%-4% from Keawe Street to Kamehameha Avenue.

2.3 SOILS

According to the Web Soil Survey (Reference 6) the project area has soil unit symbol of 901, Hilo hydrous silty clay loam. 901 soils typically slope between 0 and 10 percent, are well drained, and have a medium runoff class.

2.4 DRAINAGE/FLOODING

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM)

(Reference 2) classified the project area to be within a flood zone designation of VE. Flood Zone VE areas are determined to be a Coastal High Hazard Area – High Risk. An area along coasts subject to inundation by the 1-percent annual chance flood event (100-year flood) with additional hazards due to storm-induced velocity wave action. The FIRM map indicates the project area to have a Base Flood Elevation (BFE) between 15 feet and 16 feet. See Figure 2.

2.5 RAINFALL

According to the Web Soil Survey (Reference 6) the mean annual precipitation for the project area is 130 to 200 inches.

SECTION 3

HYDROLOGIC DESIGN

3.1 METHODOLOGY

The method utilized in this drainage report is the Rational Method. The State of Hawaii Department of Transportation (HDOT), Highways Division, *Design Criteria for Highway Drainage* (06/15/19, Reference 1), states that the Rational Method shall be used for drainage areas of 200 acres or less.

3.2 HYDROLOGIC CRITERIA

The hydrologic criteria used to obtain peak discharges are summarized as follows:

Criteria

Recurrence Interval:	For Arterial Roadways <ul style="list-style-type: none"> • $T_m = 25$ years (for sump conditions) • $T_m = 25$ years (for non-sump conditions)
Rainfall Duration:	1-hr Rainfall
Precipitation Intensity:	Interpolated from National Oceanic and Atmospheric Administration (NOAA) Precipitation Frequency Data Server <ul style="list-style-type: none"> • $I_{25\text{-yr}, 1\text{-hr}} = 3.62$ inches
Time of Concentration:	Plate 3, Overland Flow Chart from County of Hawaii, <i>Storm Drainage Standards</i> <ul style="list-style-type: none"> • Minimum time of concentration shall be 10 minutes per <i>Design Criteria for Highway Drainage</i>
Peak Discharges:	Rational Method for drainage areas up to 200 acres
Runoff Coefficient, C:	Weighted average for each drainage area using the following C values: <ul style="list-style-type: none"> • Impervious surface (AC pavement), $C = 0.90$ • Pervious surface, $C = 0.50$

3.3 EXISTING DRAINAGE CONDITIONS

The current intersection has three separate storm drain conveyance systems that run under Hawaii Belt Road / Hilo Bayfront with outfall discharges on the makai side of the highway into Hilo Bay. A network of grated inlets and catch basins capture storm water runoff from the roadways and flow to one of the three conveyance systems under the highway.

The “Existing Drainage Map” (Figure 3) shows the existing site conditions. The project site is divided into 25 drainage areas, X1, X2...X25. The existing drainage study area consists of a mixture of buildings, asphalt concrete pavement, concrete pavement, and islands with vegetation and is larger than the current project limits to allow for a comprehensive understanding of the drainage within and adjacent to the project area. The flow rate for each drainage area is shown in Table 1 and the direction of flow is shown in Figure 3. Drainage from the project site generates a total of 48.10 cubic feet per second (cfs) of runoff and is eventually discharged into Hilo Bay. Refer to Attachment A for drainage calculations.

Table 1 Existing Peak Flow Rates Summary

Drainage Area	Area (acres)	Q_{25} (cfs)
1	1.605	12.56
2	0.398	2.23
3	0.425	2.04
4	0.186	1.36
5	0.554	3.25
6	0.374	2.43
7	0.269	1.25
8	0.316	2.08
9	0.184	1.44
10	0.164	1.14
11	0.229	1.49
12	0.101	0.93

13	0.087	0.79
14	0.259	1.87
15	0.257	1.37
16	0.513	1.43
17	0.078	0.71
18	0.201	1.80
19	0.021	0.11
20	0.079	0.67
21	0.022	0.18
22	0.066	0.59
23	0.044	0.36
24	0.084	0.69
25	0.204	1.27
TOTAL	6.26	44.05

3.4 PROPOSED DRAINAGE CONDITIONS

Final grading and site design will need to be completed to calculate the proposed peak discharges from the project area. Table 2 shows a comparison of the pervious and impervious areas in the existing and proposed condition. The roundabout design will slightly decrease the amount of impervious area. Therefore, the proposed quantity runoff should be less than the existing quantity runoff.

Table 2 Pervious and Impervious Areas Summary

	Existing Condition		Proposed Condition	
Pervious	1.4 acres	29%	1.5 acres	31%
Impervious	3.4 acres	71%	3.3 acres	69%
Total	4.8 acres	100%	4.8 acres	100%

3.5 PROPOSED STORM DRAIN INFRASTRUCTURE IMPROVEMENTS

The reconfiguration of the intersection into a roundabout will require physical adjustments to the existing storm drain infrastructure. Nine existing grated inlets or catch basins will need to be removed due to the adjustment of the curb and flow lines.

Eleven (11) new grated inlets or catch basins are expected to be installed to collect storm water runoff from roadways within the project area. Final grading will need to be completed to verify the quantity, location and type of inlets required. Refer to Figure 4.

Within the project area are three main culverts crossing under the State Highway, discharging directly into Hilo Bay. These three outfalls into Hilo Bay will not be adjusted with this project. The project will protect in place these three culverts traversing under the State Highway and utilize their existing alignments to connect proposed drainage structures as necessary.

SECTION 4

POST-CONSTRUCTION BEST MANAGEMENT PRACTICES

4.1 METHODOLOGY

HDOT-Highways projects are required to comply with the HDOT-Highways, *Storm Water Post-Construction Best Management Practices Manual* (February 2022, Reference 4). All new and redevelopment projects must implement storm water quality controls to the maximum extent practicable.

4.2 CRITERIA

Type of Project:	New Development (ND) and Redevelopment (RD) areas <ul style="list-style-type: none"> • ND = 0.44 acres • RD = 3.00 acres
Funding Source:	Public Construction Project
Type of Discharge:	Non-MS4 Permit Area
Receiving Water Body:	Hilo Bay (Lighthouse) <ul style="list-style-type: none"> • State Waterbody ID = HIW00028 • Total Maximum Daily Load (TMDL) watershed = No • 303(d) Listed Water Body = Yes
Disturbed Area (DA):	Greater than 1 acre <ul style="list-style-type: none"> • DA = 4.8 acres

4.3 REQUIRED TREATMENT AREA

For New Development and/or Redevelopment projects, the Required Treatment Area is calculated using the equation below. See Figure 5.

$$A_T = ND + (F * RD) - A_{TE}$$

Where:

A_T = Required Treatment Area (acres)

ND = New Development resulting in new impervious area = 0.44 acres

RD = Redevelopment of existing impervious area = 3.00 acres

$F = \text{Redevelopment Treatment Fraction} = 0$

- 0.25 for MS4 Permit areas
- 0 for non-MS4 Permit areas

$A_{TE} = \text{Area Treated by Existing BMPs (acres)} = 0$

The required treatment area for this project is 0.44 acres.

4.4 TREATMENT CONTROL BMPS SIZING

The proposed project layout provides infiltration and/or retention opportunities for storm water runoff in the open areas within the north and south islands between Hilo Bayfront Highway/Hawaii Belt Road and Kamehameha Avenue. The potential proposed Low Impact Development (LID) BMPs for this project could implement infiltration basins, infiltration trenches and/or vegetated swales, all which use a volume-based approach.

The sizing of volume-based facilities is based on the required Water Quality Volume (WQV), calculated using the formula below.

$$WQV = P * C * A_T * 3630$$

Where:

WQV = Water Quality Volume (cubic feet)

P = Design Storm Runoff Depth (inches) = 1 inch

C = Volumetric Runoff Coefficient = 0.95

A_T = Treatment Area (acres) = 0.44 acres

3630 = Conversion Factor

The WQV uses a 1-inch Design Storm Runoff Depth (P), which HDOT-Highways has determined represents the 85th percentile, 24-hour storm for all counties in the State of Hawaii (*Storm Water Post-Construction Best Management Practices Manual*, Section 7.2). The manual also required a volumetric runoff coefficient (C) of 0.95 be used for volume-based water quality control measures since the focus is treatment of impervious surfaces.

The required WQV for this project is 1,520 cubic feet. The conceptual design plans for an infiltration basin in both the north and south islands of the proposed roundabout layout. The two basins shown on the plans each provides an effective treatment volume of approximately 800 cubic feet, assuming a 3-ft deep basin, inclusive of a 1-ft freeboard.

The final design will provide a detailed design of the infiltration basins. Final grading and infiltration test(s) are required to validate the feasibility of the infiltration basins in the locations shown. The infiltration basins will receive concentrated runoff directly from the roundabout pavement, so a sediment forebay for pretreatment is recommended for each infiltration basin to reduce the incoming velocities and amount of sediment.

SECTION 5

CONCLUSION

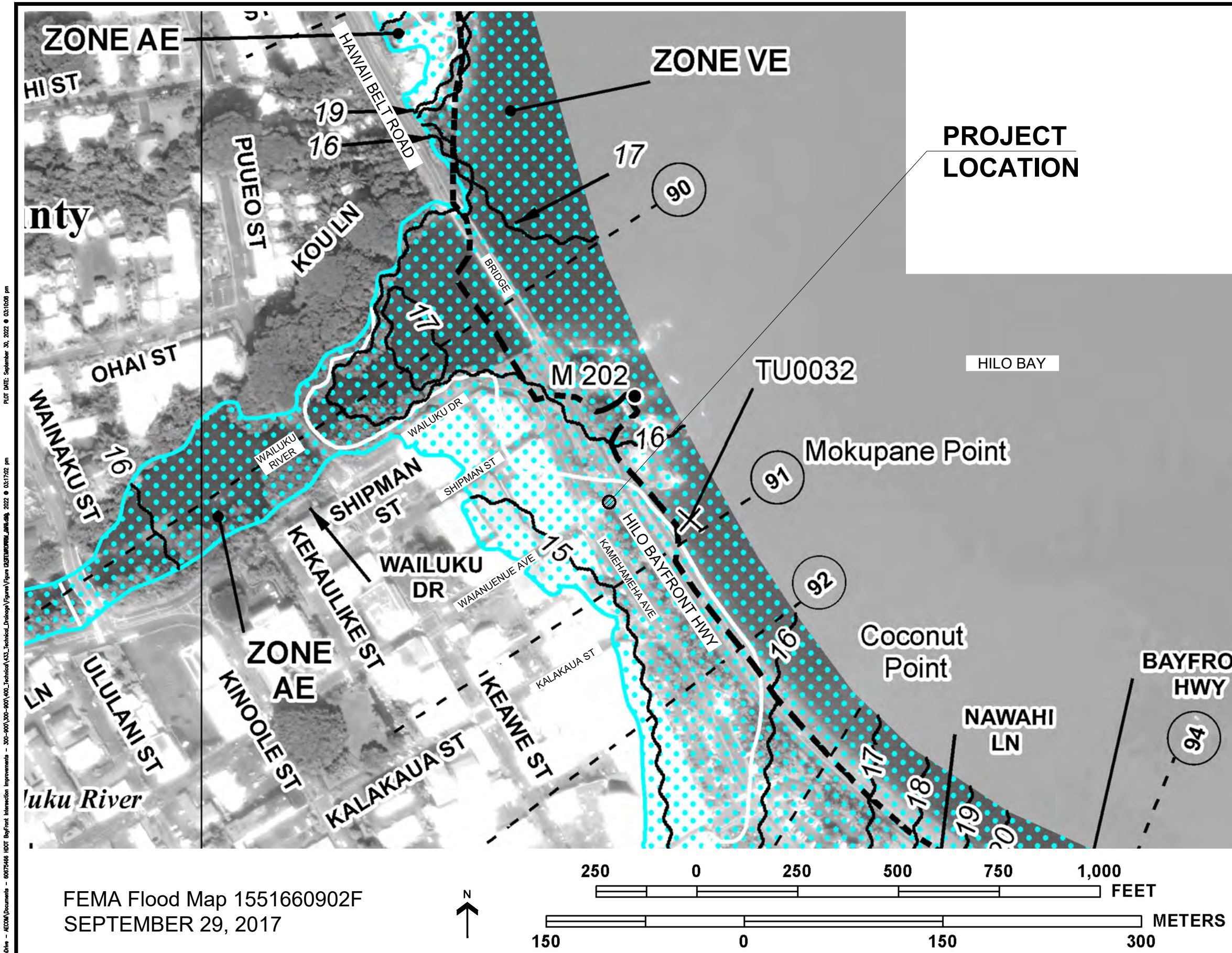
The reconfiguration of the intersection into a roundabout will require physical modifications to the existing storm drain infrastructure. The proposed roundabout will slightly decrease the amount of impervious area within the project limits. Therefore, the proposed condition runoff flow rate and volume should be less than existing condition.

The implementation of post-construction LID BMPs will be able to treat the required treatment area for water quality purposes. As practical, storm water entering the proposed inlets will be conveyed to two infiltration basins, which will further decrease the amount of runoff entering the existing storm drain system.

Together the decrease in impervious area and implementation of infiltration type post-construction LID BMPs will improve the existing drainage condition and therefore, inherently allowing for more capacity in the existing storm drain infrastructure, compared to the existing condition.

REFERENCES

1. *Design Criteria for Highway Drainage*, State of Hawaii, Department of Transportation, Highways Division, 6/15/19.
2. *Flood Insurance Rate Map*, Map Number 1551660902F, Federal Emergency Management Agency, US Department of Homeland Security, Revised September 29, 2017.
3. *Storm Drainage Standard*, County of Hawaii Public Works, October 1970.
4. *Storm Water Post-Construction Best Management Practices Manual*, State of Hawaii, Department of Transportation, Highways Division, February 2022.
5. Topographic Survey Map, Control Point Surveying, July 5, 2022.
6. United States Department of Agriculture, Natural Resources Conservation Service, *Web Soil Survey*, <<http://websoilsurvey.nrcs.usda.gov/app/>>, June 6, 2022.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- Base Flood Elevation line and value; elevation in feet* (EL 987)
- Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to LOCAL MEAN SEA LEVEL.

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4275000mE 1000-meter Universal Transverse Mercator grid values, zone 5
- 6000000 FT 5000-foot grid ticks: Hawaii State Plane coordinate system, Zone 1 (FIPSZONE = 5101), Transverse Mercator projection
- DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile

FEMA Flood Map 1551660902F
SEPTEMBER 29, 2017

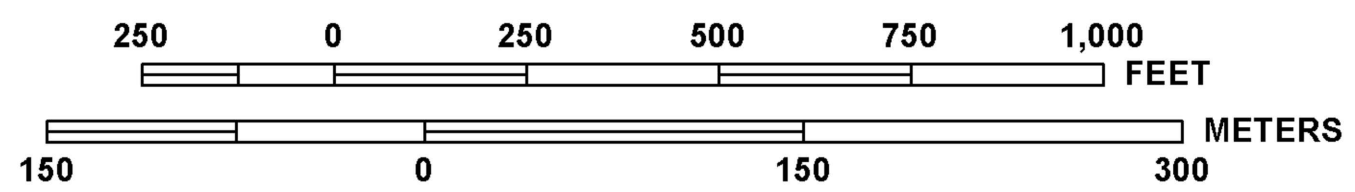


Figure 2, FEMA Flood Map
Drainage Report
Hilo Bayfront Highway, Intersection Improvements at Waiuanuenu Avenue
Hilo, Hawaii
SEPTEMBER 2022

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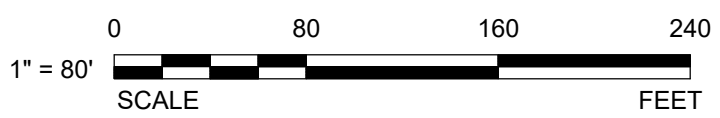
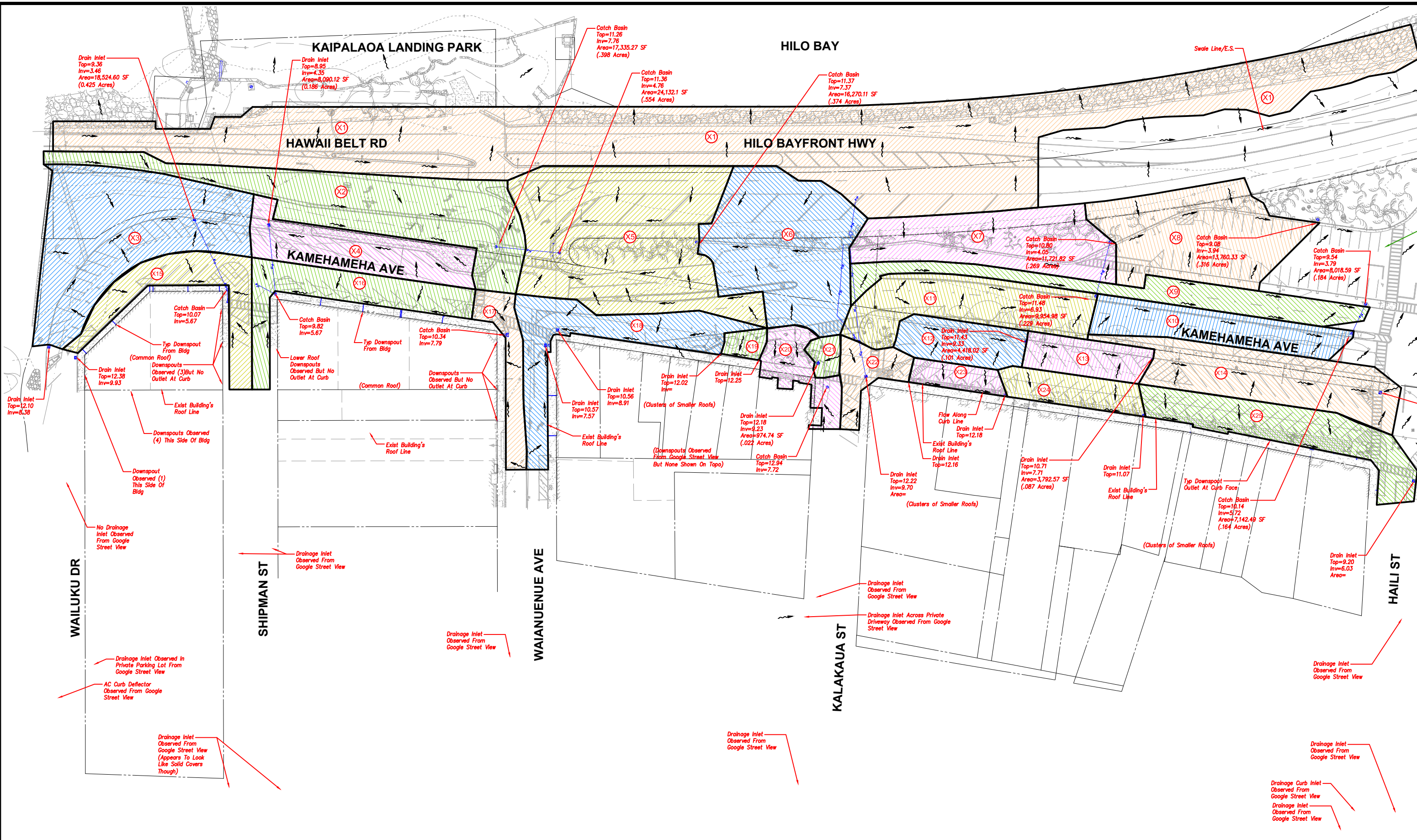
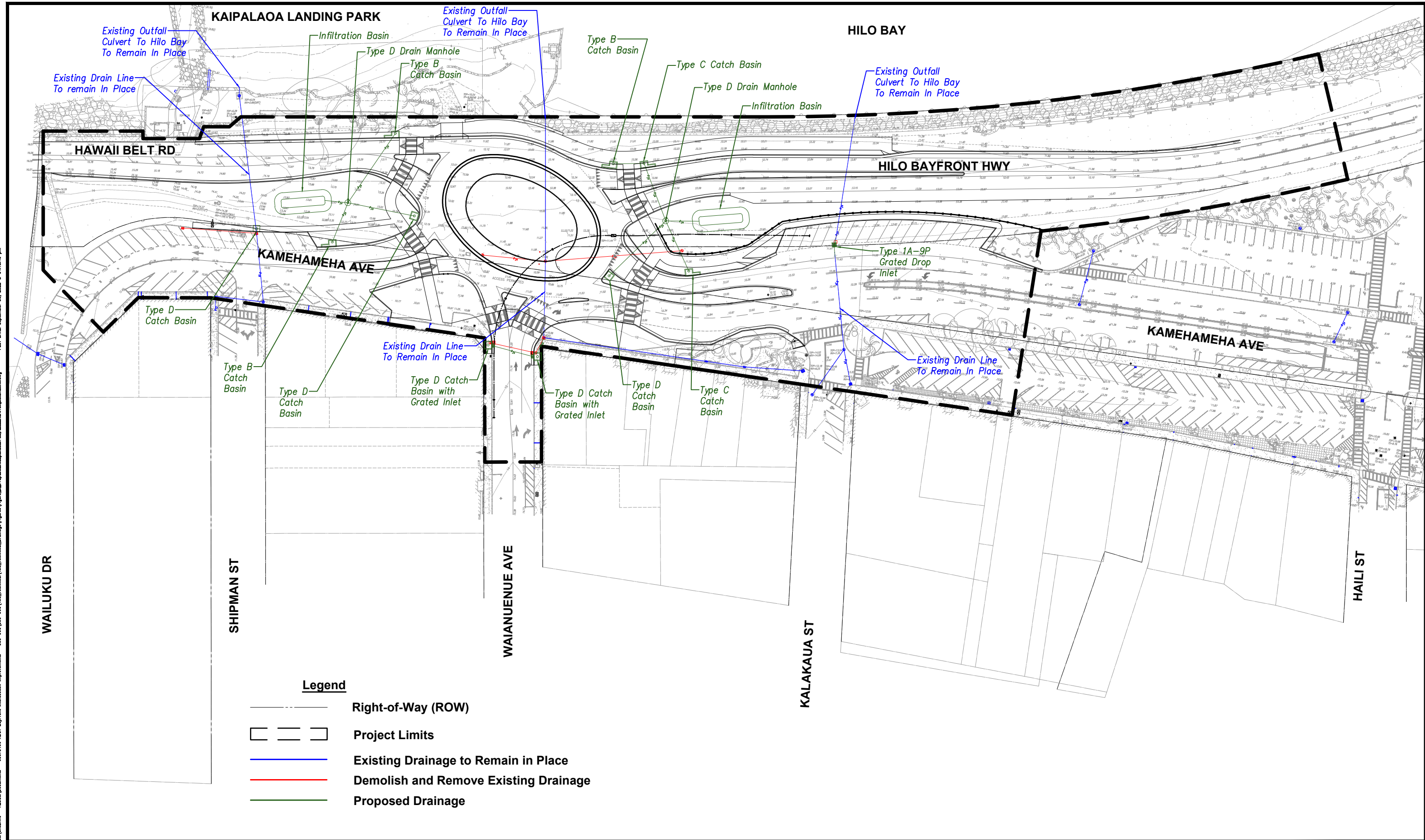

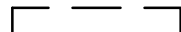





Figure 3, Existing Drainage Map
Drainage Report
Hilo Bayfront Highway, Intersection Improvements at Waianuenu Avenue
Hilo, Hawaii
SEPTEMBER 2022

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Legend

-  Right-of-Way (ROW)
-  Project Limits
-  Existing Drainage to Remain in Place
-  Demolish and Remove Existing Drainage
-  Proposed Drainage

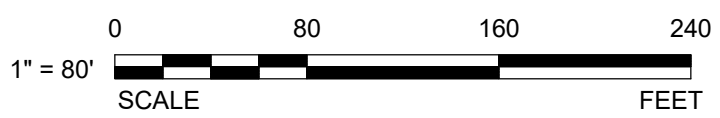
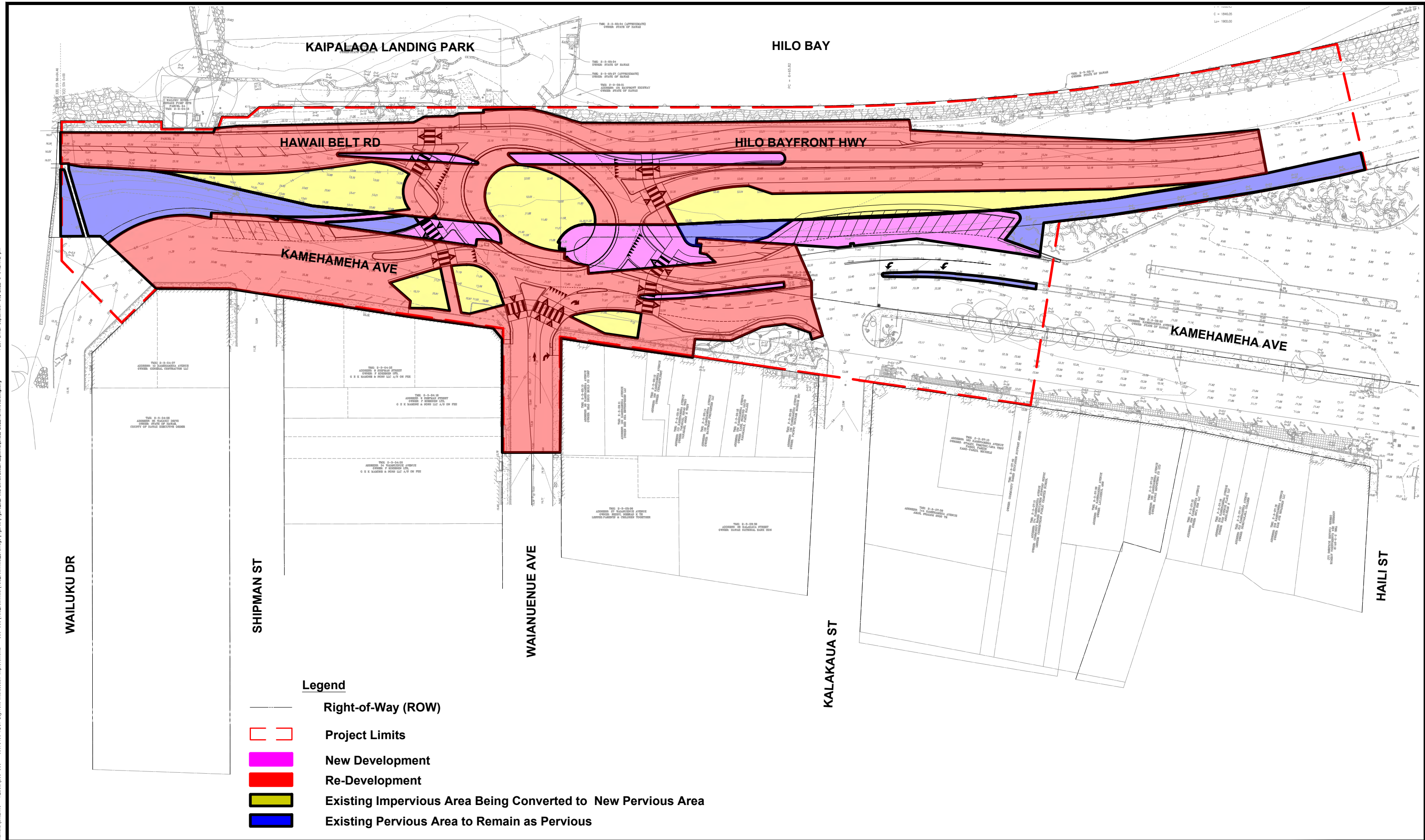








Figure 4, Proposed Storm Drain Infrastructure Improvements

Drainage Report
Hilo Bayfront Highway, Intersection Improvements at Waianuenu Avenue
Hilo, Hawaii
SEPTEMBER 2022

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Legend

-  Right-of-Way (ROW)
-  Project Limits
-  New Development
-  Re-Development
-  Existing Impervious Area Being Converted to New Pervious Area
-  Existing Pervious Area to Remain as Pervious

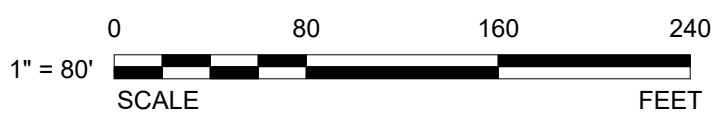


Figure 5, Post Construction BMP Required Treatment Map

Drainage Report
Hilo Bayfront Highway, Intersection Improvements at Waianuenu Avenue
Hilo, Hawaii
JUNE 2022

Drainage Flows (Drainage Areas < 100 Acres) Resulting from Rainfalls with 25-year Recurrence Intervals										
Inlet Struct.	DA	C	I (in./hr)	L (ft)	Slope (ft/ft)	Time of Concentration (minutes)	I Correction Factor	Corrected I (in./hr)	Area (acre)	Q _{design} (cfs)
Offsite So	X1	0.87	3.62	61	2.94%	8.0	2.5	9.05	1.605	12.56
Ex Curb In	X2	0.81	3.62	381	3.10%	18.0	1.9	6.88	0.398	2.23
Ex Curb In	X3	0.66	3.62	126	4.54%	14.5	2.0	7.24	0.425	2.04
Ex Curb In	X4	0.88	3.62	184	2.16%	10.0	2.3	8.33	0.186	1.36
Catch Bas	X5	0.81	3.62	169	0.99%	16.0	2.0	7.24	0.554	3.25
Catch Bas	X6	0.82	3.62	113	1.49%	12.0	2.2	7.96	0.374	2.43
Catch Bas	X7	0.64	3.62	119	2.82%	16.0	2.0	7.24	0.269	1.25
Catch Bas	X8	0.76	3.62	125	0.87%	9.5	2.4	8.69	0.316	2.08
Catch Bas	X9	0.90	3.62	489	0.80%	9.0	2.4	8.69	0.184	1.44
Catch Bas	X10	0.84	3.62	193	4.77%	10.0	2.3	8.33	0.164	1.14
Catch Bas	X11	0.82	3.62	208	1.76%	12.0	2.2	7.96	0.229	1.49
Ex Curb In	X12	0.90	3.62	115	0.40%	5.5	2.8	10.14	0.101	0.93
Ex Curb In	X13	0.90	3.62	113	0.60%	5.5	2.8	10.14	0.087	0.79
Ex Curb In	X14	0.87	3.62	190	0.46%	10.0	2.3	8.33	0.259	1.87
Ex Curb In	X15	0.90	3.62	168	1.15%	5.0	2.8	10.14	0.150	1.37
Catch Bas	X16	0.90	3.62	185	0.64%	6.0	2.7	9.77	0.163	1.43
Catch Bas	X17	0.90	3.62	121	3.06%	5.0	2.8	10.14	0.078	0.71
Ex Curb In	X18	0.89	3.62	102	3.23%	5.0	2.8	10.14	0.201	1.80
Ex Curb In	X19	0.70	3.62	23	3.73%	13.5	2.1	7.60	0.021	0.11
Ex Curb In	X20	0.83	3.62	28	2.46%	5.0	2.8	10.14	0.079	0.67
Ex Curb In	X21	0.79	3.62	19	1.87%	5.0	2.8	10.14	0.022	0.18
Ex Curb In	X22	0.88	3.62	47	3.52%	5.0	2.8	10.14	0.066	0.59
Ex Curb In	X23	0.81	3.62	68	0.66%	5.5	2.8	10.14	0.044	0.36
Ex Curb In	X24	0.85	3.62	114	0.33%	6.0	2.7	9.77	0.084	0.69
Ex Curb In	X25	0.82	3.62	200	1.26%	13.3	2.1	7.60	0.204	1.27

6.260 44.050

Drain Area	Area (AC)		Total Area	Percentages		Length		Weighted Length		Slope		Weighted Slope		Runoff Coef.		Time of Concentration		Tc
	Pavement	Roof		Grassed	Pavement	Roof	Pavement	Roof	Grassed	Pavement	Roof	Grassed	Pavement	Roof	Pavement	Roof	Grassed	
X1	1.465	0.000	1.465	91%	0%	65	0	16	61	0.026	0.000	0.065	2.94%	0.90	0.90	0.50	3.00	8.00
X2	0.311	0.000	0.398	78%	0%	436	0	182	381	0.029	0.000	0.038	3.10%	0.90	0.90	0.50	3.00	18.00
X3	0.173	0.000	0.425	41%	0%	194	0	80	126	0.011	0.000	0.069	4.54%	0.90	0.90	0.50	5.00	14.50
X4	0.176	0.000	0.186	95%	0%	193	0	20	184	0.012	0.000	0.200	2.16%	0.90	0.90	0.50	5.00	10.00
X5	0.430	0.000	0.554	78%	0%	226	0	43	169	0.009	0.000	0.013	0.99%	0.90	0.90	0.50	6.00	16.00
X6	0.297	0.000	0.374	79%	0%	135	0	26	113	0.004	0.000	0.057	1.49%	0.90	0.90	0.50	6.00	12.00
X7	0.096	0.000	0.269	36%	0%	243	0	50	119	0.005	0.000	0.041	2.82%	0.90	0.90	0.50	7.50	16.00
X8	0.205	0.000	0.111	65%	0%	189	0	6	125	0.008	0.000	0.010	0.87%	0.90	0.90	0.50	6.50	9.50
X9	0.184	0.000	0.184	100%	0%	489	0	0	489	0.008	0.000	0.000	0.80%	0.90	0.90	0.50	9.00	9.00
X10	0.139	0.000	0.164	84%	0%	227	0	5	193	0.050	0.000	0.035	4.77%	0.90	0.90	0.50	7.00	10.00
X11	0.183	0.000	0.229	80%	0%	253	0	27	208	0.010	0.000	0.048	1.76%	0.90	0.90	0.50	6.00	12.00
X12	0.101	0.000	0.101	100%	0%	115	0	0	115	0.004	0.000	0.000	0.40%	0.90	0.90	0.50	5.50	5.50
X13	0.087	0.000	0.087	100%	0%	113	0	0	113	0.006	0.000	0.000	0.60%	0.90	0.90	0.50	5.00	5.00
X14	0.237	0.000	0.259	91%	0%	207	0	5	190	0.005	0.000	0.000	0.46%	0.90	0.90	0.50	7.00	10.00
X15	0.150	0.000	0.150	100%	0%	168	0	0	168	0.011	0.000	0.000	1.15%	0.90	0.90	0.50	5.00	5.00
X16	0.163	0.000	0.163	100%	0%	185	0	0	185	0.006	0.000	0.000	0.64%	0.90	0.90	0.50	6.00	6.00
X17	0.078	0.000	0.078	100%	0%	121	0	0	121	0.031	0.000	0.000	3.06%	0.90	0.90	0.50	5.00	5.00
X18	0.194	0.000	0.201	97%	0%	105	0	0	102	0.033	0.000	0.000	3.23%	0.90	0.90	0.50	5.00	5.00
X19	0.011	0.000	0.021	51%	0%	28	0	18	23	0.036	0.000	0.039	3.73%	0.90	0.90	0.50	5.00	13.50
X20	0.066	0.000	0.079	84%	0%	34	0	0	28	0.029	0.000	0.000	2.46%	0.90	0.90	0.50	5.00	5.00
X21	0.016	0.000	0.022	72%	0%	27	0	0	19	0.026	0.000	0.000	1.87%	0.90	0.90	0.50	5.00	5.00
X22	0.063	0.000	0.066	96%	0%	49	0	0	47	0.037	0.000	0.000	3.52%	0.90	0.90	0.50	5.00	5.00
X23	0.034	0.000	0.044	77%	0%	88	0	0	68	0.009	0.000	0.000	0.66%	0.90	0.90	0.50	5.50	5.50
X24	0.072	0.000	0.084	86%	0%	132	0	0	114	0.004	0.000	0.000	0.33%	0.90	0.90	0.50	6.00	6.00
X25	0.162	0.000	0.204	80%	0%	247.14	0	13	200	0.010	0.000	0.022	1.26%	0.90	0.90	0.50	6.75	13.25



NOAA Atlas 14, Volume 4, Version 3
Location name: Hilo, Hawaii, USA*
Latitude: 19.7267°, Longitude: -155.0867°
Elevation: 9.15 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

S. Perica, D. Martin, B. Lin, T. Parzybok, D. Riley, M. Yekta, L. Hiner, L.-C. Chen, D. Brewer, F. Yan, K. Maitaria, C. Trypaluk, G. M. Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

PF tabular

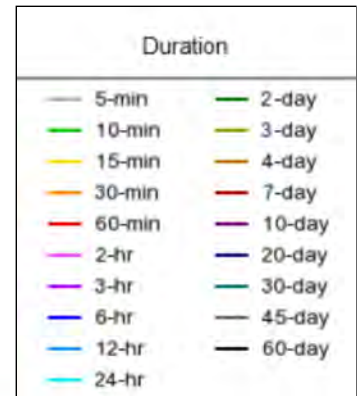
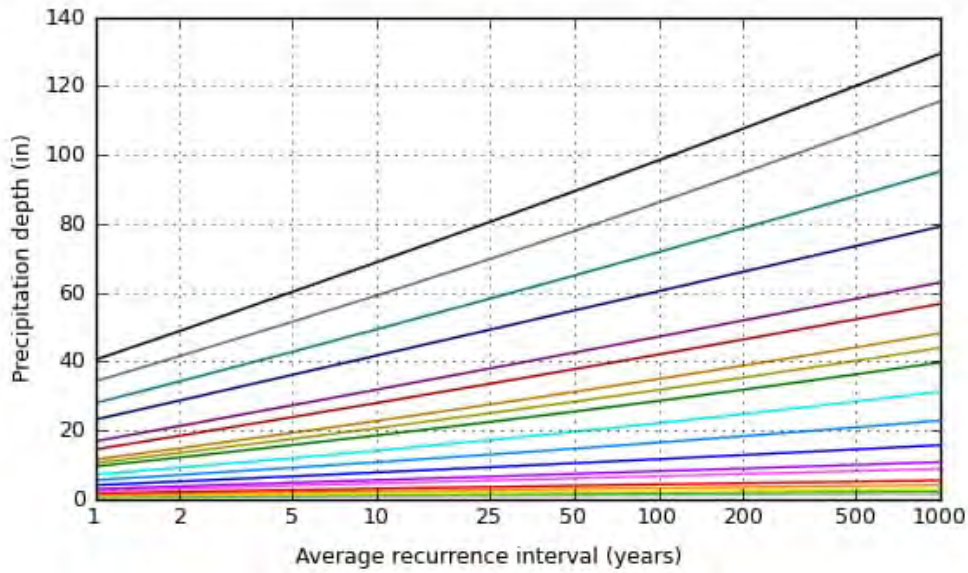
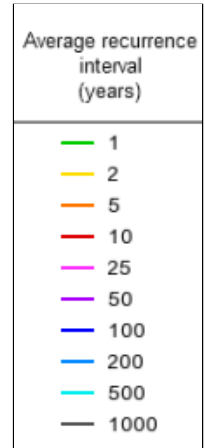
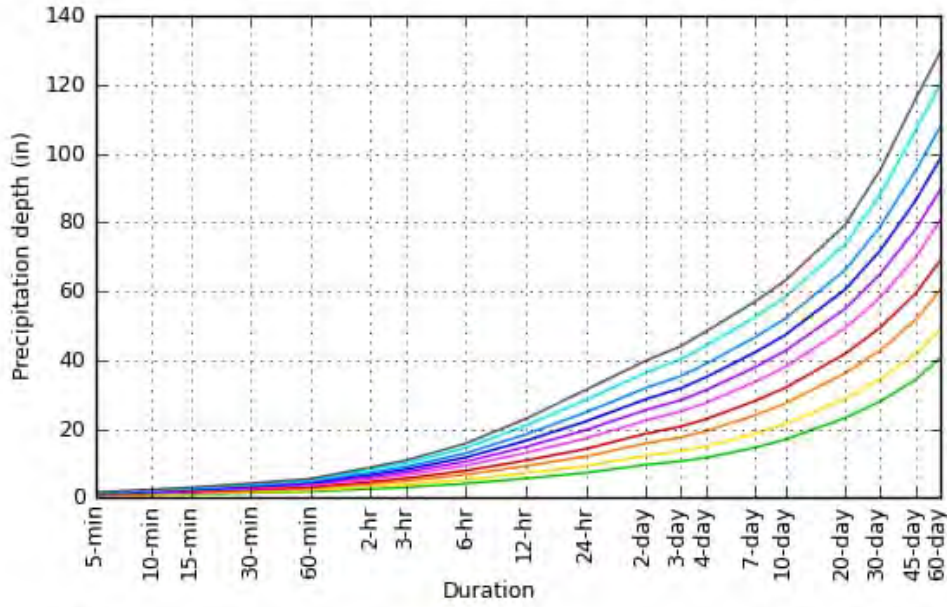
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.521 (0.484-0.580)	0.635 (0.588-0.728)	0.790 (0.733-0.904)	0.905 (0.833-1.04)	1.05 (0.957-1.21)	1.16 (1.05-1.35)	1.26 (1.12-1.49)	1.36 (1.20-1.63)	1.49 (1.28-1.81)	1.59 (1.33-1.96)
10-min	0.773 (0.717-0.860)	0.942 (0.872-1.08)	1.17 (1.09-1.34)	1.34 (1.24-1.54)	1.56 (1.42-1.80)	1.72 (1.55-2.00)	1.87 (1.67-2.20)	2.02 (1.77-2.41)	2.22 (1.90-2.69)	2.36 (1.98-2.91)
15-min	0.970 (0.901-1.08)	1.18 (1.10-1.36)	1.47 (1.37-1.68)	1.69 (1.55-1.93)	1.95 (1.78-2.26)	2.15 (1.95-2.51)	2.35 (2.09-2.77)	2.54 (2.23-3.03)	2.78 (2.38-3.37)	2.97 (2.48-3.65)
30-min	1.37 (1.27-1.52)	1.66 (1.54-1.91)	2.07 (1.92-2.37)	2.37 (2.18-2.71)	2.75 (2.51-3.18)	3.03 (2.74-3.54)	3.30 (2.94-3.89)	3.58 (3.13-4.26)	3.92 (3.35-4.75)	4.17 (3.50-5.13)
60-min	1.80 (1.67-2.00)	2.19 (2.03-2.51)	2.72 (2.53-3.12)	3.12 (2.87-3.57)	3.62 (3.30-4.19)	3.99 (3.60-4.65)	4.35 (3.87-5.12)	4.71 (4.12-5.61)	5.15 (4.41-6.25)	5.49 (4.60-6.76)
2-hr	2.53 (2.31-2.83)	3.19 (2.95-3.64)	4.02 (3.73-4.61)	4.66 (4.29-5.34)	5.48 (5.01-6.34)	6.12 (5.52-7.14)	6.75 (6.01-7.95)	7.38 (6.47-8.80)	8.22 (7.03-9.97)	8.86 (7.41-10.9)
3-hr	2.97 (2.71-3.31)	3.82 (3.53-4.37)	4.84 (4.48-5.54)	5.61 (5.18-6.45)	6.64 (6.05-7.69)	7.42 (6.69-8.67)	8.20 (7.28-9.66)	8.98 (7.85-10.7)	10.0 (8.56-12.2)	10.8 (9.04-13.3)
6-hr	4.12 (3.73-4.62)	5.22 (4.83-5.97)	6.69 (6.19-7.67)	7.83 (7.21-9.00)	9.34 (8.51-10.8)	10.5 (9.46-12.3)	11.7 (10.4-13.8)	12.9 (11.3-15.4)	14.5 (12.4-17.6)	15.8 (13.2-19.4)
12-hr	5.58 (5.06-6.28)	7.12 (6.59-8.17)	9.19 (8.50-10.5)	10.8 (9.95-12.4)	13.0 (11.8-15.1)	14.7 (13.3-17.2)	16.5 (14.6-19.5)	18.4 (16.0-21.9)	20.9 (17.8-25.3)	22.9 (19.0-28.1)
24-hr	7.21 (6.53-8.00)	9.21 (8.31-10.2)	12.0 (10.8-13.3)	14.2 (12.7-15.7)	17.2 (15.3-19.2)	19.6 (17.3-22.0)	22.1 (19.3-24.9)	24.8 (21.4-28.1)	28.4 (24.1-32.5)	31.3 (26.2-36.2)
2-day	9.59 (8.73-10.6)	12.2 (11.1-13.5)	15.8 (14.3-17.5)	18.6 (16.8-20.6)	22.4 (20.1-25.0)	25.5 (22.7-28.5)	28.6 (25.3-32.2)	31.9 (27.8-36.0)	36.3 (31.2-41.4)	39.8 (33.8-45.8)
3-day	10.6 (9.64-11.7)	13.5 (12.3-14.9)	17.5 (15.9-19.4)	20.7 (18.7-23.0)	25.0 (22.4-27.8)	28.3 (25.2-31.7)	31.8 (28.1-35.8)	35.4 (30.9-40.0)	40.2 (34.6-45.9)	44.0 (37.4-50.7)
4-day	11.6 (10.5-12.8)	14.8 (13.5-16.4)	19.3 (17.5-21.4)	22.8 (20.6-25.3)	27.5 (24.7-30.7)	31.2 (27.8-34.9)	35.0 (30.9-39.3)	38.9 (34.0-44.0)	44.1 (38.0-50.4)	48.2 (40.9-55.6)
7-day	14.5 (13.2-16.0)	18.5 (16.8-20.4)	23.9 (21.5-26.4)	28.0 (25.2-31.1)	33.5 (29.9-37.4)	37.8 (33.5-42.3)	42.1 (37.0-47.4)	46.4 (40.4-52.6)	52.3 (44.8-59.8)	56.8 (48.0-65.5)
10-day	16.9 (15.3-18.6)	21.3 (19.3-23.5)	27.3 (24.6-30.2)	31.9 (28.6-35.3)	38.0 (33.8-42.2)	42.6 (37.7-47.6)	47.2 (41.5-53.1)	52.0 (45.2-58.7)	58.2 (49.8-66.4)	63.0 (53.2-72.4)
20-day	23.2 (21.0-25.6)	28.7 (26.1-31.8)	36.1 (32.7-40.1)	41.8 (37.7-46.4)	49.2 (44.1-54.9)	54.8 (48.8-61.4)	60.4 (53.3-68.1)	66.1 (57.7-74.9)	73.6 (63.3-84.1)	79.2 (67.2-91.3)
30-day	28.0 (25.3-30.8)	34.3 (31.0-37.8)	42.8 (38.6-47.4)	49.4 (44.4-54.8)	58.2 (51.9-64.8)	65.0 (57.5-72.7)	71.8 (63.0-80.7)	78.8 (68.4-89.0)	88.1 (75.3-100)	95.2 (80.3-109)
45-day	34.2 (31.0-37.8)	41.6 (37.7-45.9)	51.5 (46.5-57.1)	59.2 (53.2-65.8)	69.7 (62.2-77.9)	77.9 (69.0-87.5)	86.2 (75.6-97.4)	94.9 (82.3-108)	107 (91.0-122)	116 (97.4-134)
60-day	40.5 (36.6-44.6)	48.9 (44.3-54.0)	60.2 (54.4-66.7)	68.9 (62.0-76.4)	80.5 (71.9-89.8)	89.4 (79.3-100)	98.5 (86.5-111)	108 (93.6-122)	120 (103-137)	129 (109-149)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

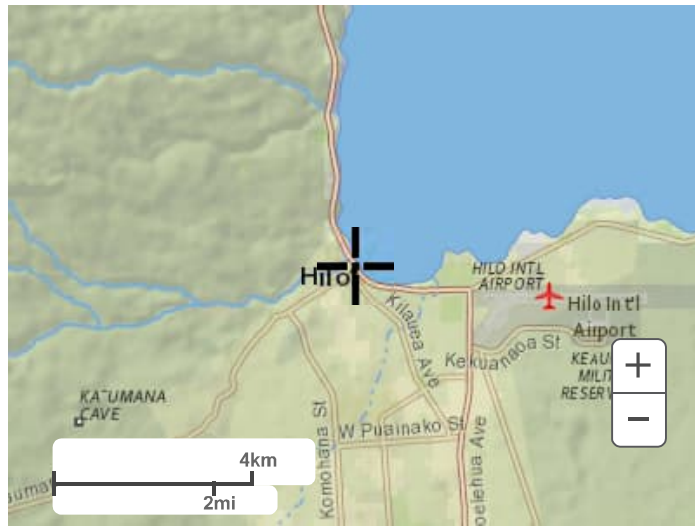
PDS-based depth-duration-frequency (DDF) curves
Latitude: 19.7267°, Longitude: -155.0867°



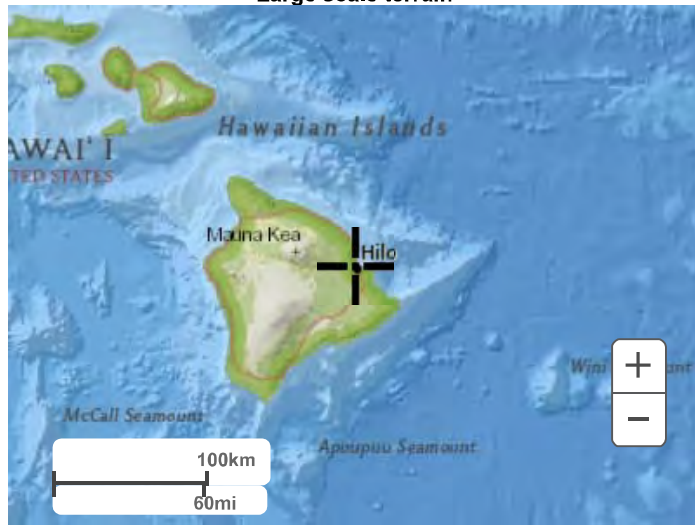
[Back to Top](#)

Maps & aerials

Small scale terrain



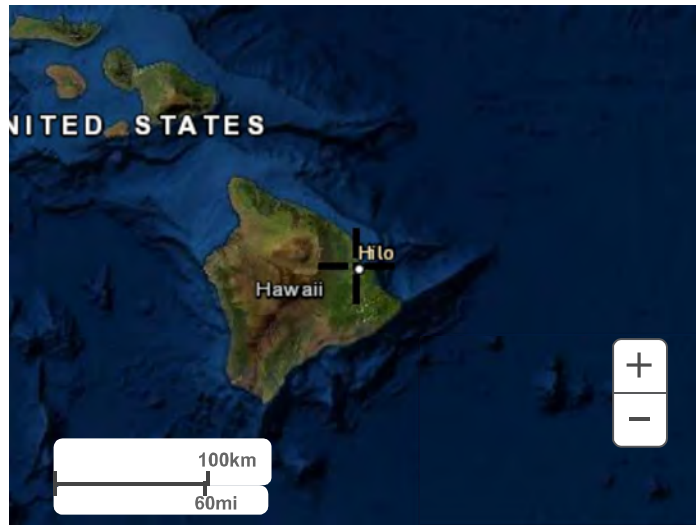
Large scale terrain



Large scale map



Large scale aerial



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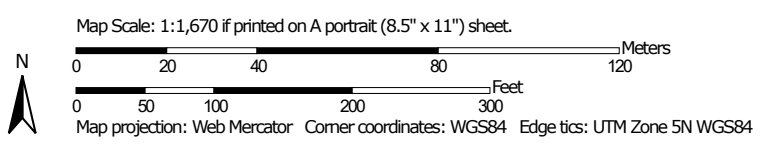
[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)

Soil Map—Island of Hawaii Area, Hawaii
(DOT Hwys Hilo Bayfront)



Soil Map may not be valid at this scale.



MAP LEGEND

- Area of Interest (AOI)
- Area of Interest (AOI)
- Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points
- Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features
- Water Features**
- Streams and Canals
- Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads
- Background**
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Island of Hawaii Area, Hawaii
Survey Area Data: Version 14, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 29, 2017—Oct 11, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
901	Hilo hydrous silty clay loam, 0 to 10 percent slopes	5.2	98.4%
Totals for Area of Interest		5.3	100.0%

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named, soils that are similar to the named components, and some minor components that differ in use and management from the major soils.

Most of the soils similar to the major components have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Some minor components, however, have properties and behavior characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Island of Hawaii Area, Hawaii

901—Hilo hydrous silty clay loam, 0 to 10 percent slopes

Map Unit Setting

National map unit symbol: 2mclv

Elevation: 0 to 1,100 feet

Mean annual precipitation: 130 to 200 inches

Mean annual air temperature: 72 to 77 degrees F

Frost-free period: 365 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Hilo and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hilo

Setting

Landform: Ash fields on lava flows

Landform position (two-dimensional): Summit, shoulder, toeslope, footslope, backslope

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Linear

Across-slope shape: Linear, convex

Parent material: Basic volcanic ash over basalt

Typical profile

Ap - 0 to 18 inches: hydrous silty clay loam

Bw - 18 to 60 inches: hydrous silty clay loam

Properties and qualities

Slope: 0 to 10 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water

(Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very high (about 18.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: F159AY500HI - Deep And Very Deep Volcanic Ash Forest

Hydric soil rating: No

Minor Components

Hilo, gullies

Percent of map unit: 10 percent

Landform: Ash fields, gullies

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Linear

Across-slope shape: Linear, concave, convex

Hydric soil rating: No

Hilo, very cobbly substrate

Percent of map unit: 5 percent

Landform: Ash fields on lava flows

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Linear

Across-slope shape: Linear, convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: Island of Hawaii Area, Hawaii

Survey Area Data: Version 14, Sep 15, 2021

How's My Waterway?

Informing the conversation about your waters.

Waterbody Report

● Hilo Bay (Lighthouse)

Assessment Unit ID: HIW00028

Waterbody Condition: Impaired (Issues Identified)

Existing Plans for Restoration: No

303(d) Listed: Yes

Year Reported: 2022

Organization Name (ID): Hawaii (21HI)

What type of water is this?

Bay (0.37 Square Miles)

Where is this water located?

Hawaii



Assessment Information from 2022

State or Tribal Nation specific designated uses:

Expand All

Aquatic Life

Impaired >

Recreation

Impaired >

Probable sources contributing to impairment from 2022:

No probable sources of impairment identified for this waterbody.

Assessment Documents

No documents are available

Plans to Restore Water Quality

What plans are in place to protect or restore water quality?

No plans specified for this waterbody.

How's My Waterway?

Informing the conversation about your waters.

Community

State

National

Let's get started! Select your state or territory from the drop down to begin exploring water quality.

Hawaii » Go

DISCLAIMER

State Water Quality Overview
Advanced Search

Use this page to find the condition of waterbodies in your state and whether there are plans in place to restore them. The filters below are to help narrow down your search. There are no required fields.

Parameter Groups:

Select... ▼

Watershed Names (HUC12):

Select... ▼

Integrated Reporting (IR) Category:

All Waters
 [303\(d\) Listed Impaired Waters \(Category 5\)](#)
 [Impaired \(Category 4 and 5\)](#)

Use Groups:

Select... ▼

Waterbody Names (IDs):

Hilo Bay (Lighthouse) (HIW00028) x ▼

Additional Filters:

[Has TMDL](#)

🔍 Search

Results: 1 items

Display Waterbodies by:

Overall Waterbody Condition ▼

🗺 Map
☰ List

- ☰
- 🏠
- +
-

🔍 Zoom to
📄

Hilo Bay (Lighthouse) (State Waterbody ID: HIW00028) 📄 ✕

303(d) Listed: Yes

TMDL: No

Year Last Reported: 2022

Waterbody Condition: ● Impaired (Issues Identified)

Organization Name (ID): Hawaii (21HI)

What is this water used for?	Condition
Aquatic Life	Impaired
Swimming and Boating	Impaired

Identified Issues:

- [Ammonia](#)
- [Bacteria and Other Microbes](#)
- [Murky Water](#)
- [Nitrogen and/or Phosphorus](#)

[View Waterbody Report](#) (opens new browser tab)



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303(d) List Status / Year Last Reported: EPA Final Action / 2022

APPENDIX F

Pre-Assessment Consultation Meeting Notes



Minutes

AECOM PN 60675466

HDOT Hilo Bayfront Highway Roundabout at Waianuenue Ave: Conceptual Design

Hawaii Department of Transportation – Highways Division

HWY-DS-CE19-02 / PAO 7

Wednesday, August 03, 2022; 1pm -2 pm (MS Teams)

Attendees: DOT-HWY: Robert Sun; Matthew Morioka; Harry Takiue
Count of Hawaii: Keone Thompson; Robyn Matsumoto; Natasha Soriano; Rizalino Mangaoang; April Surprenant
AECOM: Catherine Crawford; Jessica Samura; Kate Bondy; Joe Gillis

Attachment **Presentation**

Meeting notes/Follow-up /Action Items

County of Hawaii.

- Record drawing. Any available with utilities
- Latest County ROW in project vicinity
- Requirements for restoration of detour roads
- Waianuenue
 - o Traffic Phasing during Waianuenue construction. Select preferred option:
 - Full Closure with detour (est 2 month construction)
 - 1 lane open (est 6 month construction)
 - o Addition of Bike lanes = removal of street parking
- Kamehameha
 - o Tie-in striping for bike lane
- Park
 - o Access requirements during construction for DEM, DPR and general public

DOT-HWY

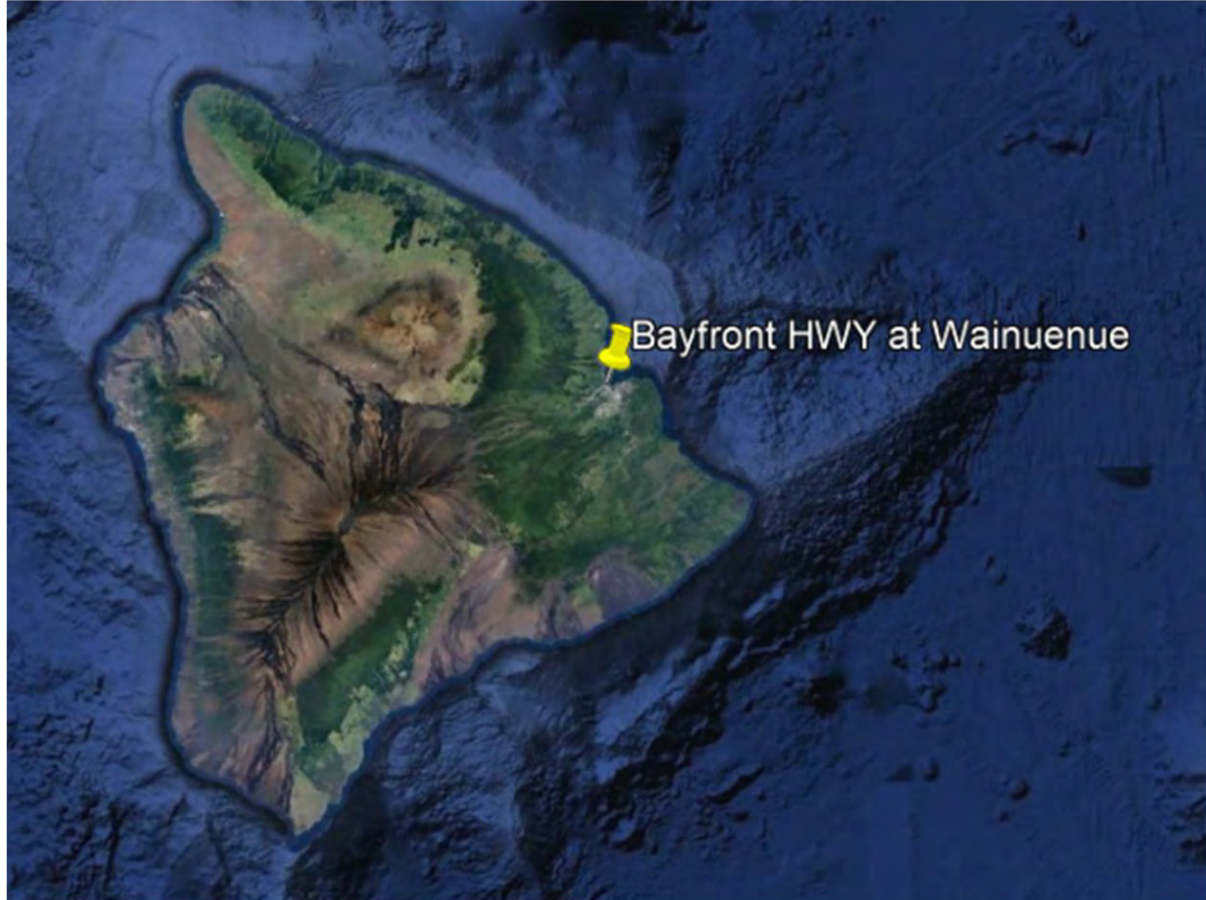
- Provide traffic data for all movements at Waianuenue/Bayfront/Kamehameha

AECOM

- Adjust new parking: angle to reverse in
- Develop estimated duration of construction (each phase)
- Prepare No Rise Certification
- Develop raised crosswalk detail; address accessibility, drainage, cyclists
- SMA and SSV
 - o File separately but concurrently
 - o Planning POCs: Alex Roy and Maija Jackson
- Primary POCs
 - o Planning
 - April Surprenant
 - Natasha Soriano
 - o Parks and Rec
 - Maurice Messina
 - o DEM
 - Ramzi Mansour
 - Dora Beck
 - Eric Takamura

Further discussion

- Hardscape/landscape options
- State/County Standards, i.e. gutter slope, curb ramps
- ROW Coordination (timeframe 2023)



COUNTY OF HAWAII
FIRST LOOK AT ROUNDABOUT
HILO BAYFRONT HIGHWAY
INTERSECTION IMPROVEMENTS
ALTERNATIVE ANALYSIS
AUGUST 3, 2022
(MS TEAMS)

Hawaii Department of Transportation
Highways Division

INTRODUCTIONS

- Department of Transportation - Highways Division
- County of Hawaii – Department of Public Works
- County of Hawaii – Planning Department
- AECOM

PROJECT OVERVIEW

Intersection Improvements to include

- Improved maneuverability by large trucks (WB-50 or WB-67)
- Pedestrian access to Kaipalaoa Landing Park



PREFERRED ALTERNATIVE : ROUNDABOUT

LEGEND
 ↖ 13 (2) AM (PM) Peak Vehicles Per Hour
 AM Peak Hour - 7:00AM - 8:00AM
 PM Peak Hour - 3:45PM - 4:45PM
 Date of Counts:
 April 13, 2022 (AM Count) / April 12, 2022 (PM Count)



FUTURE YEAR 2025 VEHICLE PEAK HOUR SUMMARY
 Hilo Bayfront Highway Intersection Improvements Alternative Analysis

FUTURE PEAK HOUR VOLUME

LEVEL OF SERVICE

Intersection	Existing Year 2022		Projected Year 2025 - No Build		Projected Year 2025 - Conventional Improvements (CI)		Projected Year 2025 - Roundabout		Projected Year 2025 - CI Bayfront Hwy Closed		Projected Year 2025 - Roundabout Bayfront Highway Closed	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
AM Peak Hour												
Kamehameha Ave/ Waiānuenu Ave	B	18.0	B	18.0	C	21.4	C	23.9	F	95.7	C	21.6
Bayfront Hwy/Hawaii Belt Rd/ Waiānuenu Ave	A	6.7	A	6.8	A	7.6			E	55.8		
PM Peak Hour												
Kamehameha Ave/ Waiānuenu Ave	B	17.1	B	17.6	D	22.4	C	21.5	F	85.6	C	22.4
Bayfront Hwy/Hawaii Belt Rd/ Waiānuenu Ave	A	8.2	A	8.2	A	8.2			D	41.1		

MEETING PURPOSE AND GOAL / ANTICIPATED OUTCOMES



3 of 5 roundabout legs are within COH jurisdiction

Purpose: provide the County of Hawaii an overview of proposed roundabout concept design and facilitate an over the shoulder cursory review of improvements along Kamehameha Ave and Waianuenue Ave

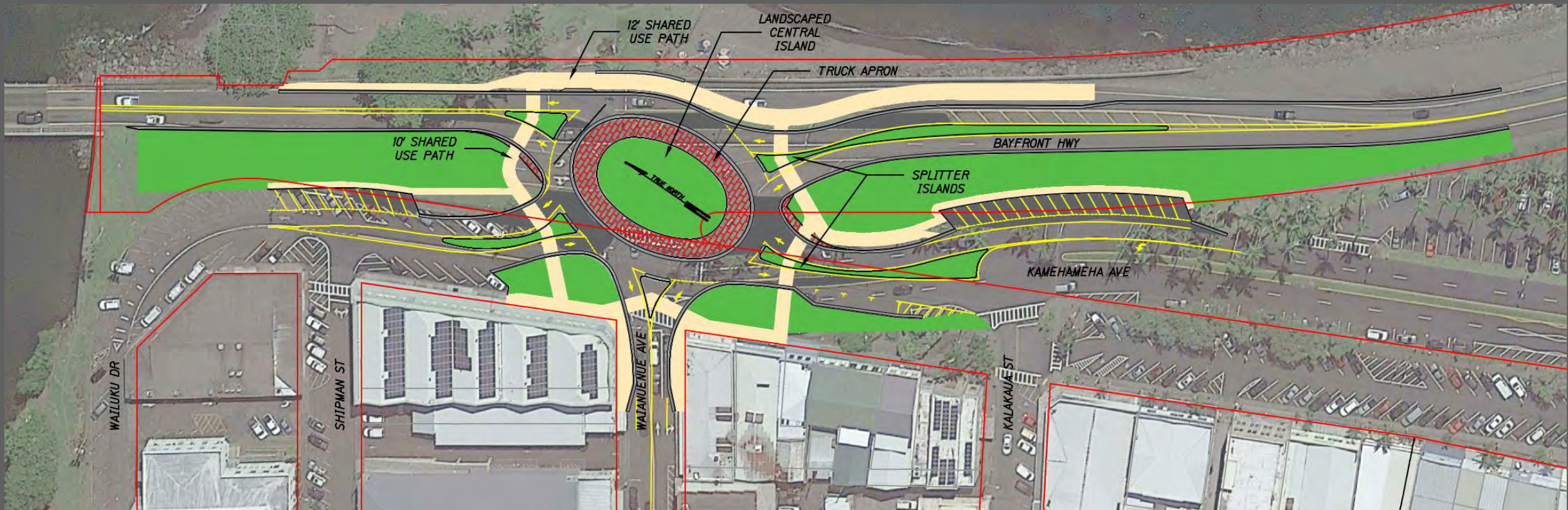
Goal: early identification of COH design constraints, requirements, comments

AGENDA

- Roundabout Overview
- County of Hawaii
 - Kamehameha Avenue
 - Waianuenu Avenue
 - Kaipalaoa Landing Park
 - Traffic Phasing
 - Permits
- Project Timeline
- Next Step

ROUNDAABOUT

DESIGN OVERVIEW ROUNDABOUT



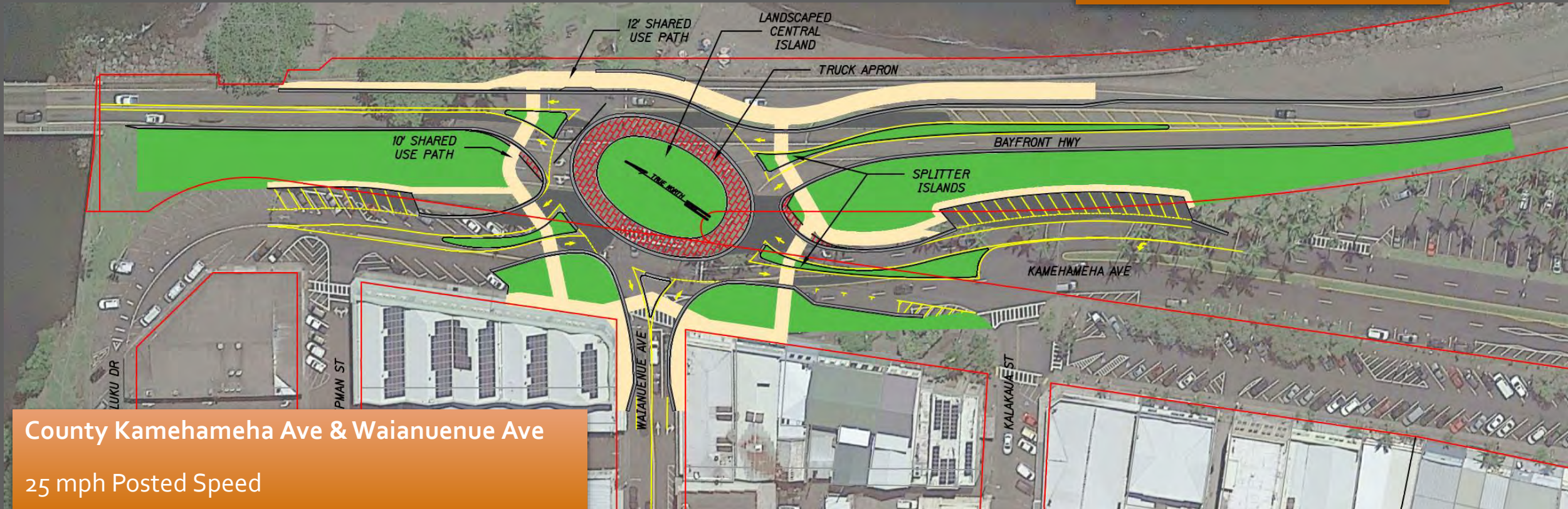
DESIGN OVERVIEW ROUNDABOUT

State Bayfront HWY

35 mph Posted Speed

45 mph Design Speed

Lane Widths: 12-ft min



County Kamehameha Ave & Waianuenu Ave

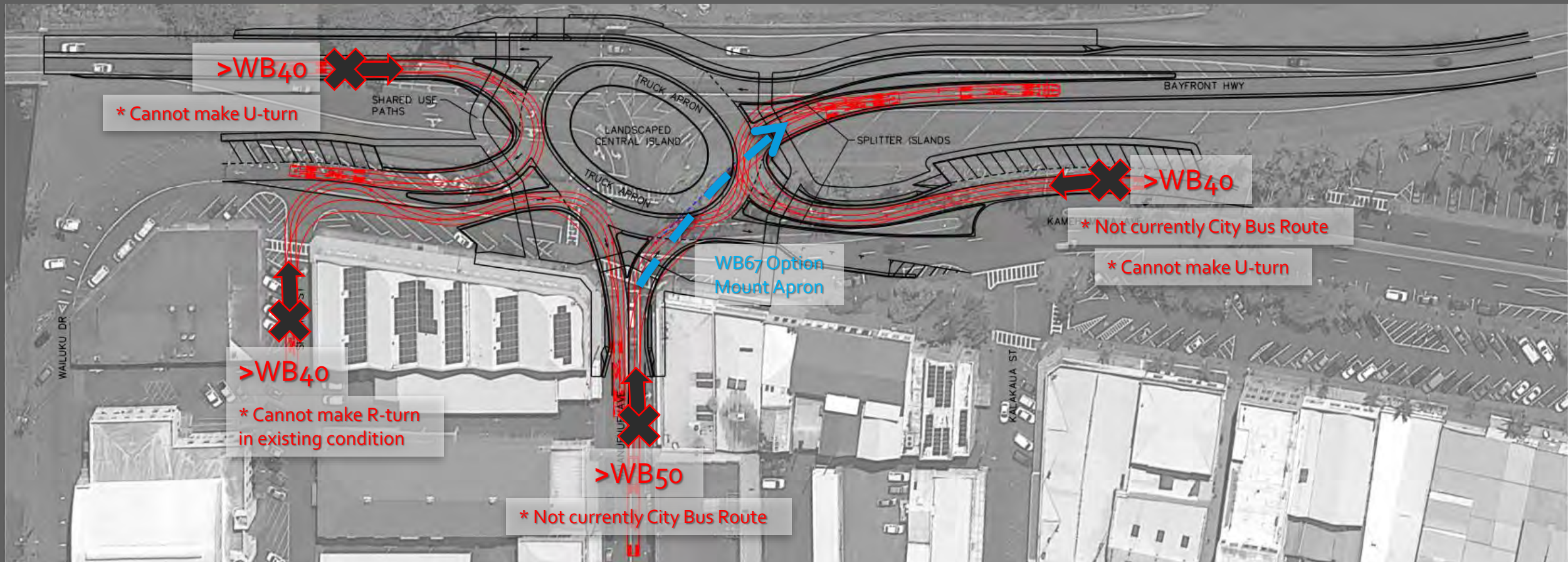
25 mph Posted Speed

35 mph Design Speed

Lane Widths: 12-ft min

TRAFFIC MOVEMENT

X Cannot complete the turning movement

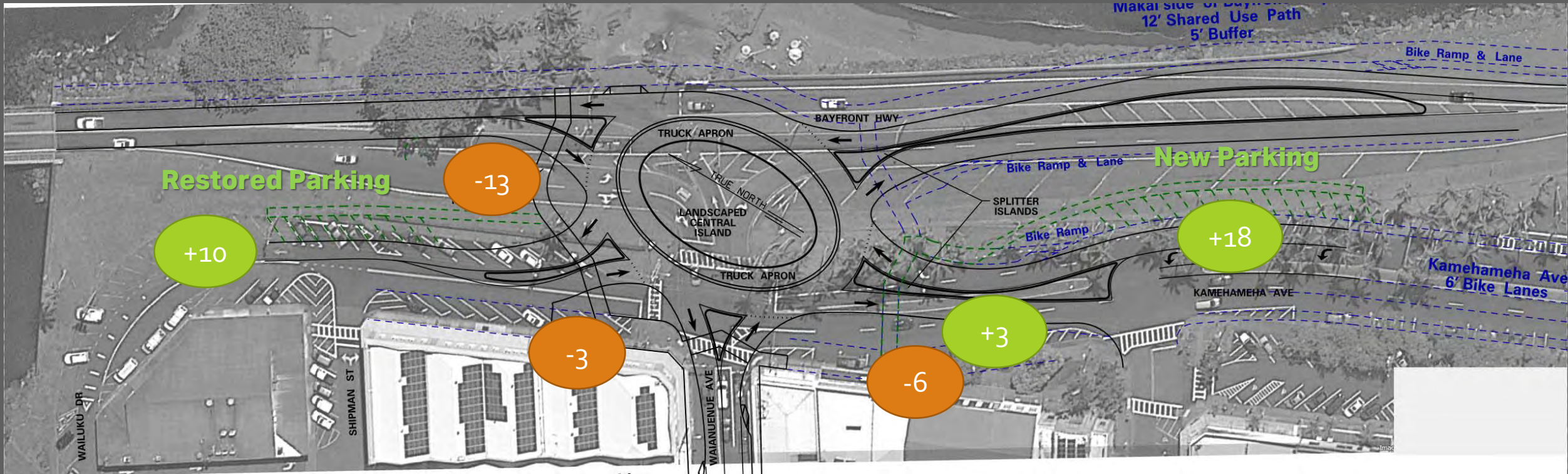


KAIPALAOA LANDING ACCESS

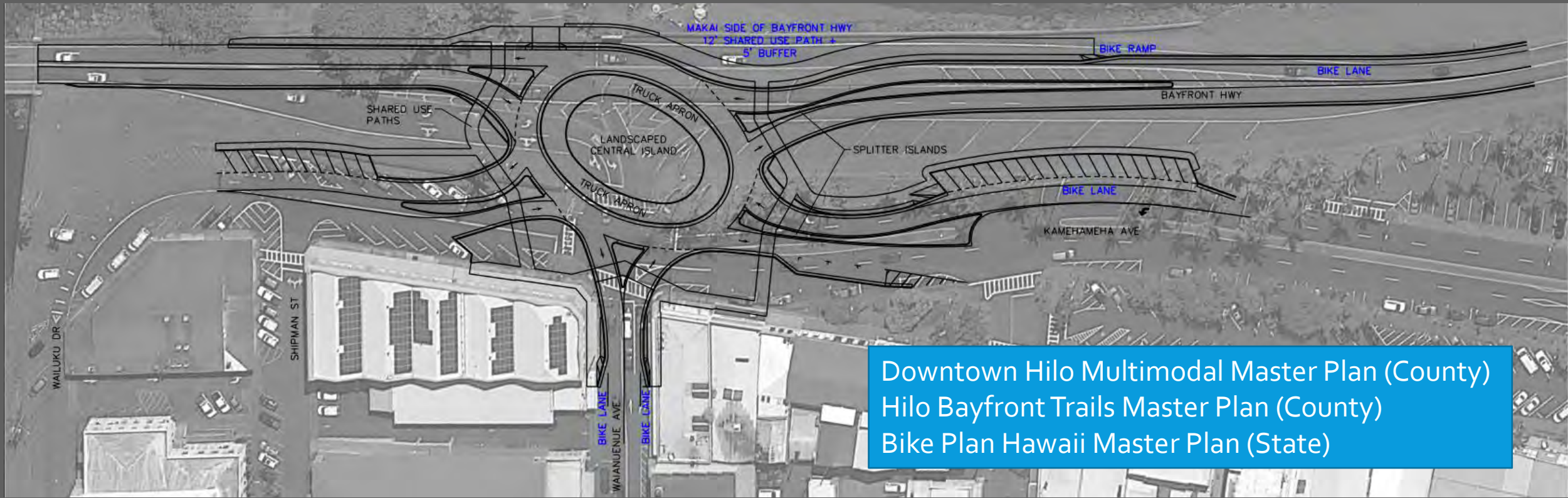


- Existing Movement: north bound ONLY
- Proposed Movement: north AND south bound
- Users (F-350) *ACCESS REQUIREMENTS* *also during construction*
 - COH-P&R: Parks Maintenance
 - COH-DEM: Access to Wailuku Pump Station

PARKING

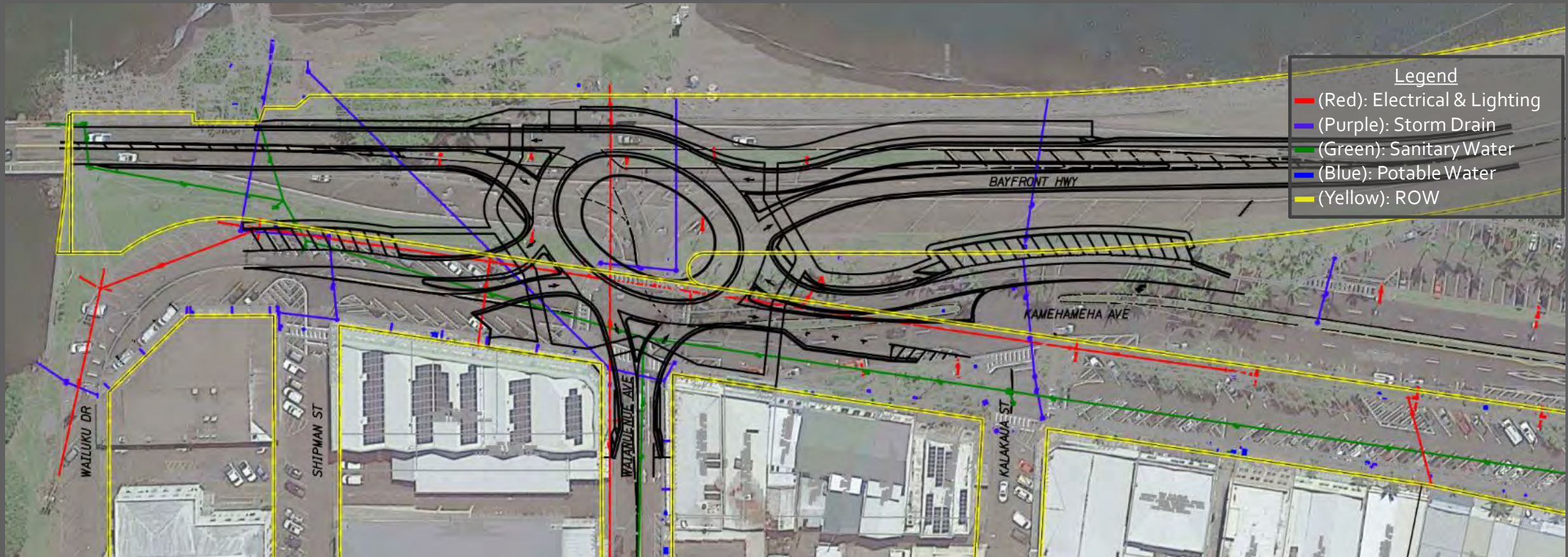


PEDESTRIAN ACCESS / BIKE LANES

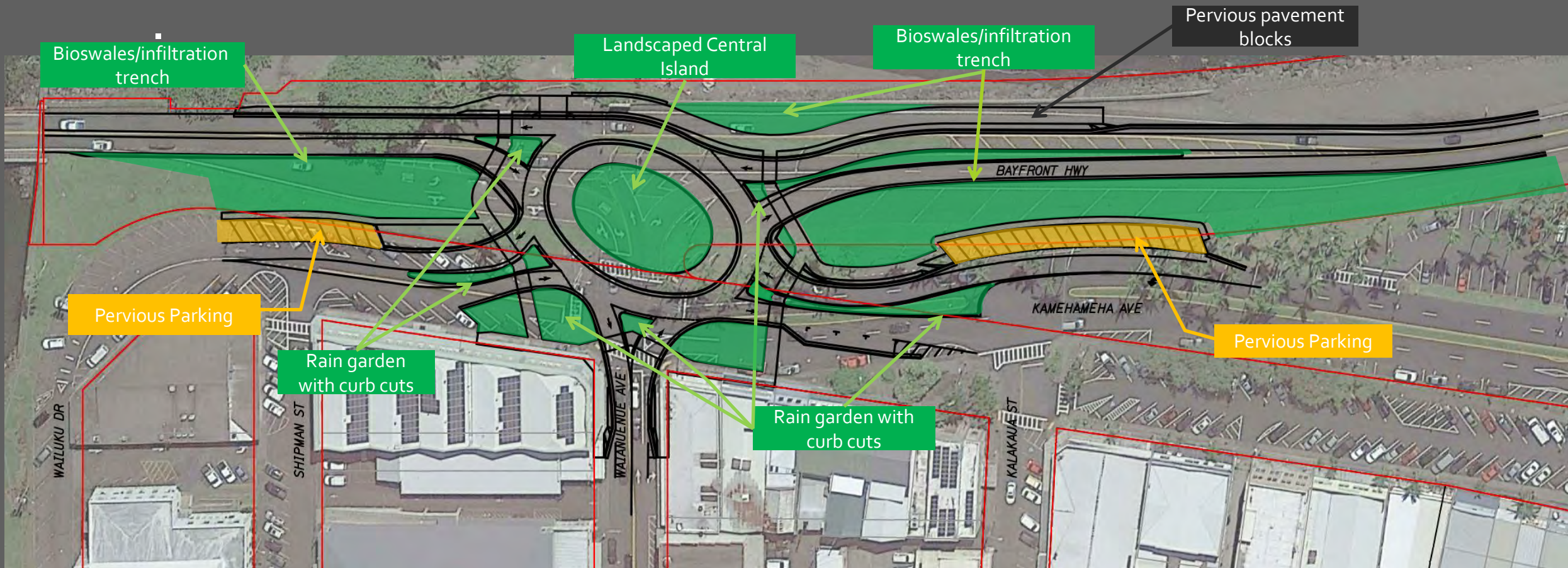


Downtown Hilo Multimodal Master Plan (County)
Hilo Bayfront Trails Master Plan (County)
Bike Plan Hawaii Master Plan (State)

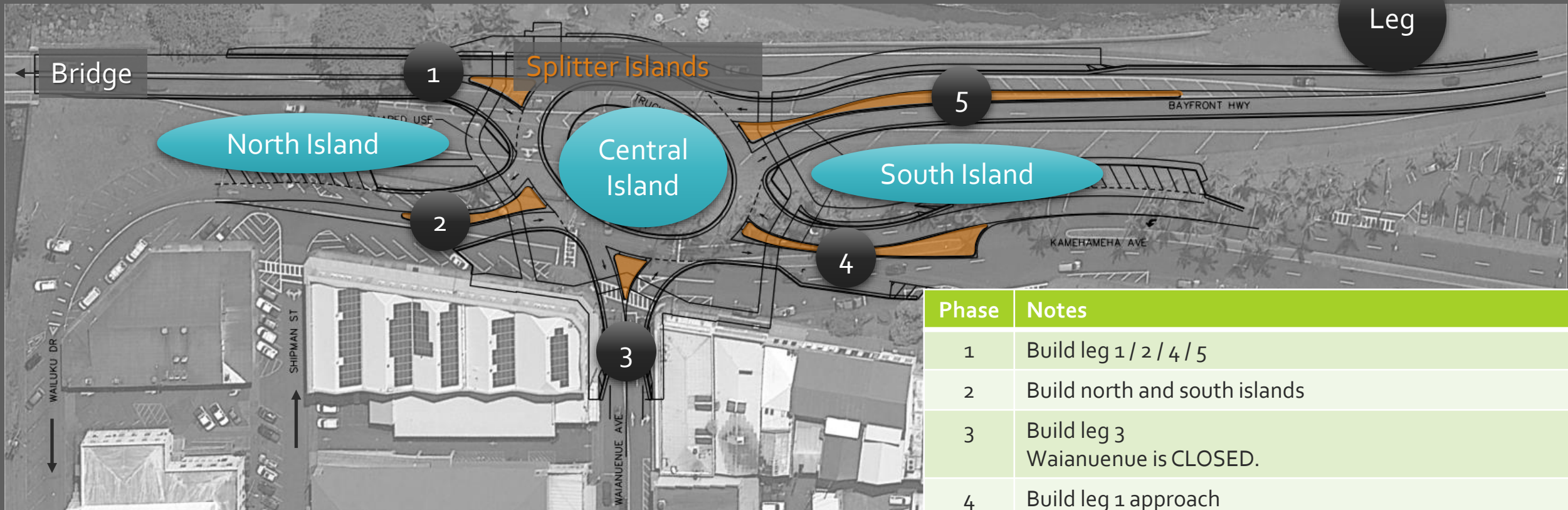
UTILITIES EXISTING CONDITION



DRAINAGE POTENTIAL LID DRAINAGE SOLUTIONS

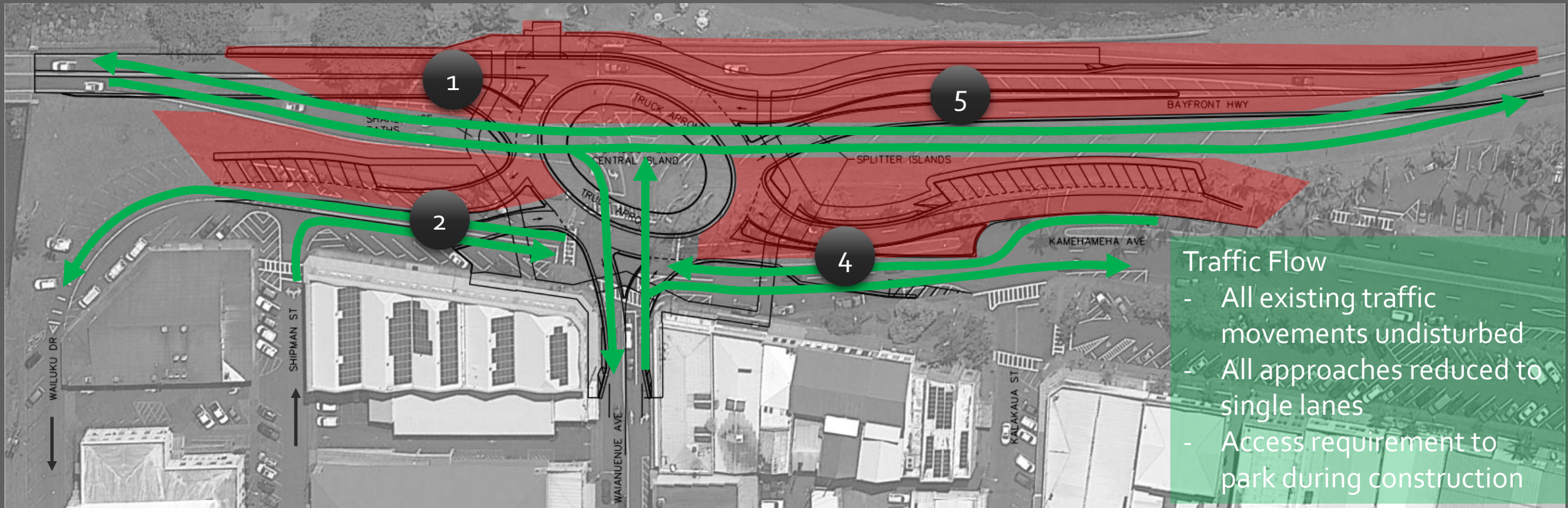


TRAFFIC PHASING OVERVIEW



Phase	Notes
1	Build leg 1 / 2 / 4 / 5
2	Build north and south islands
3	Build leg 3 Waienuenu is CLOSED.
4	Build leg 1 approach Bridge is CLOSED to southbound traffic
5	Build splitter islands and central island

PHASE 1



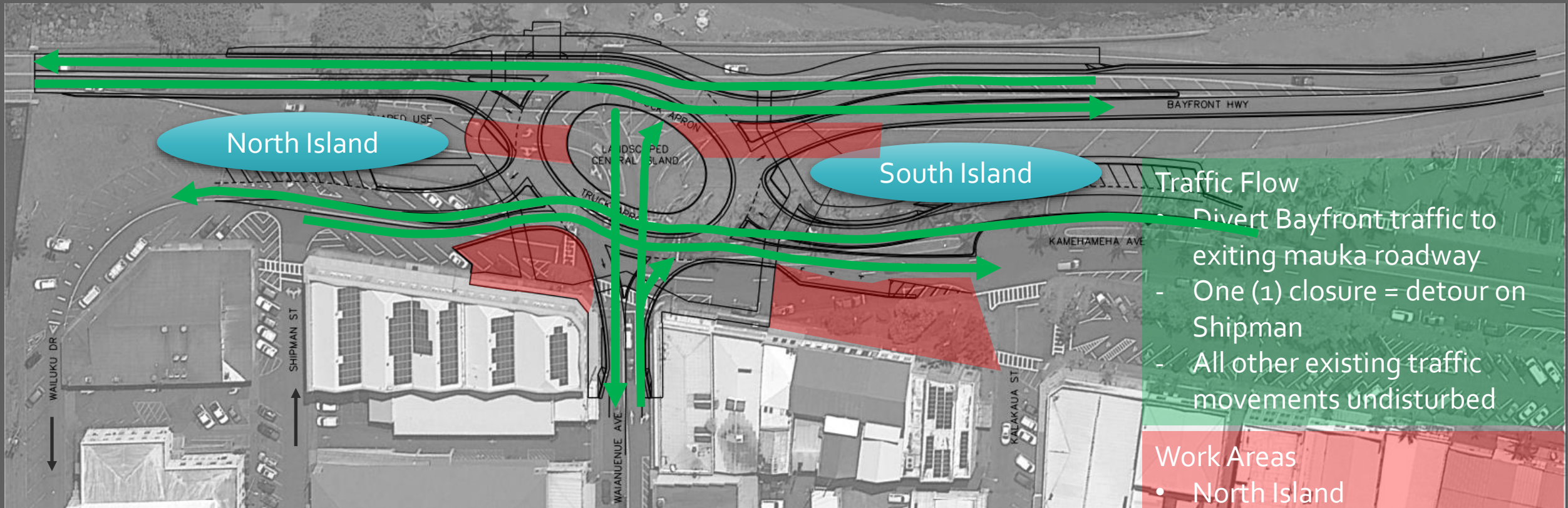
Traffic Flow

- All existing traffic movements undisturbed
- All approaches reduced to single lanes
- Access requirement to park during construction

Work Areas

- Leg 1 / 2 / 4 / 5

PHASE 2



North Island

South Island

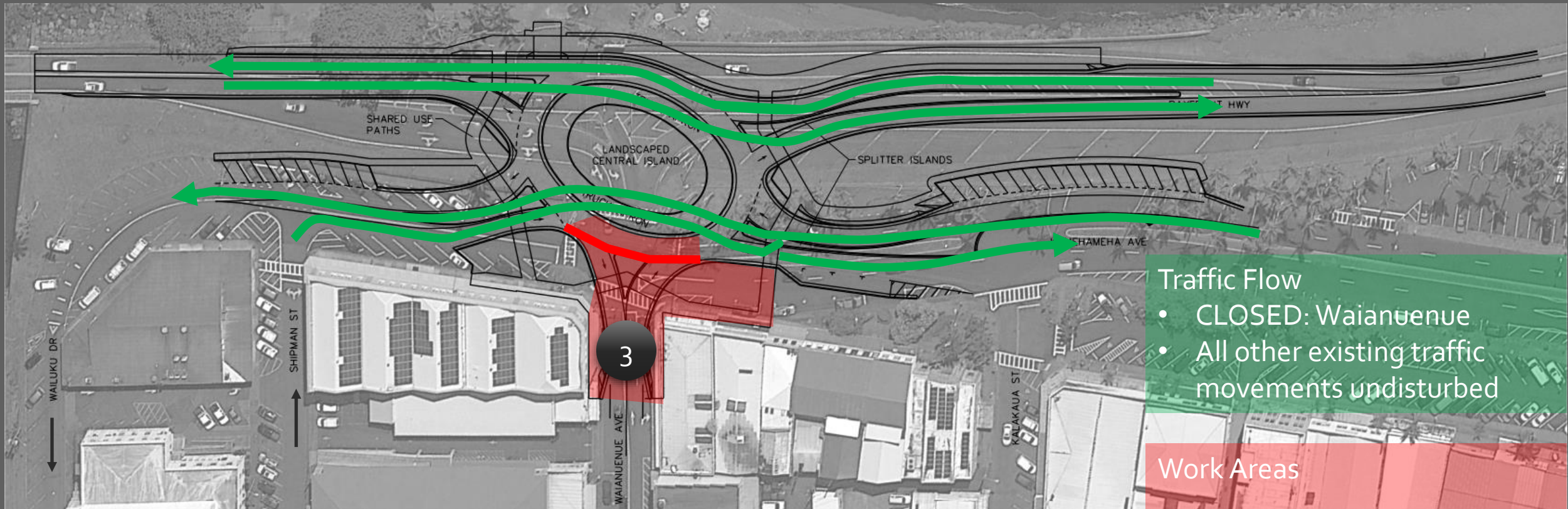
Traffic Flow

- Divert Bayfront traffic to exiting mauka roadway
- One (1) closure = detour on Shipman
- All other existing traffic movements undisturbed

Work Areas

- North Island
- South Island
- Mauka corners

PHASE 3 *CLOSURE*



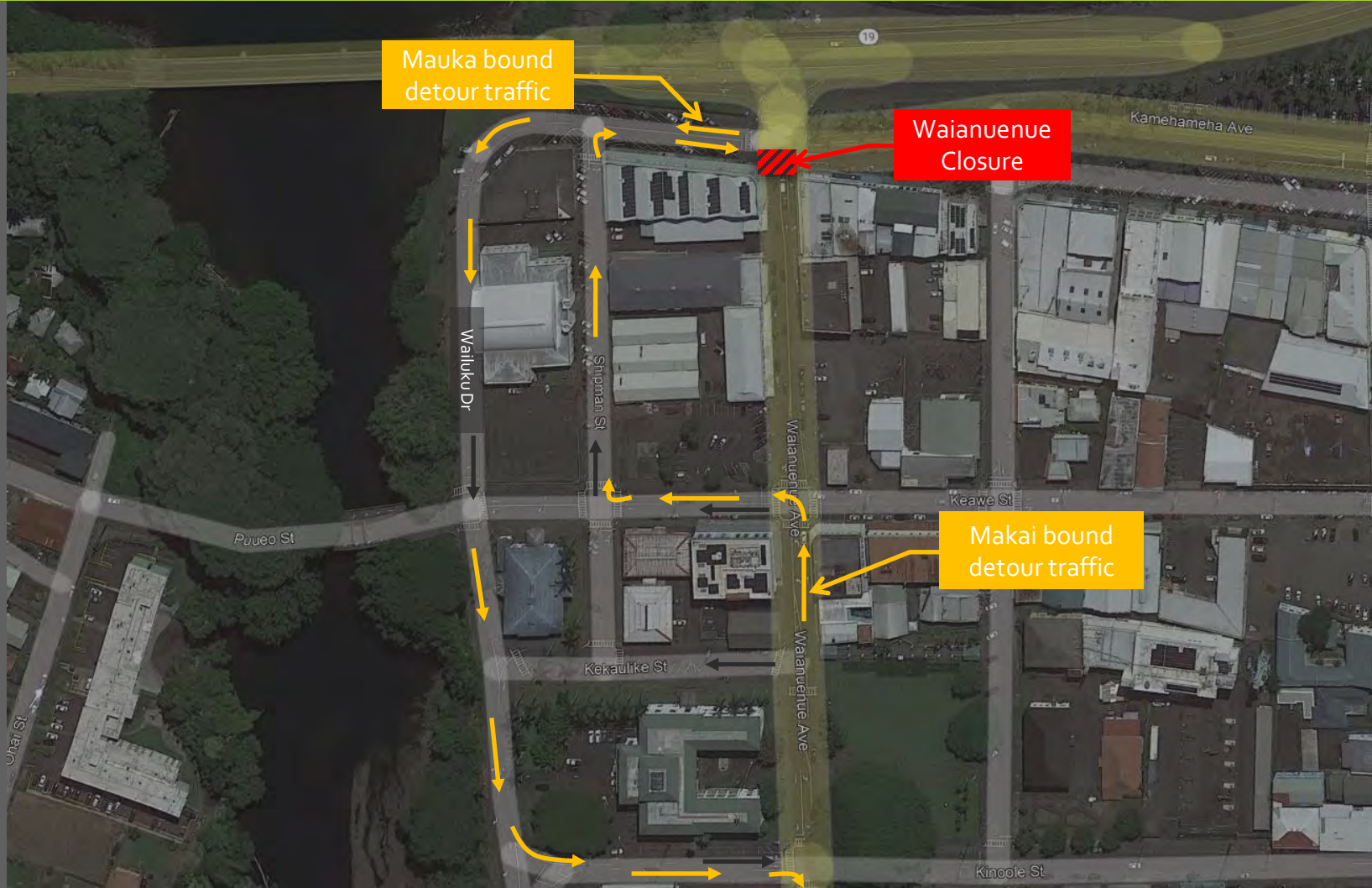
Traffic Flow

- CLOSED: Waianuenu
- All other existing traffic movements undisturbed

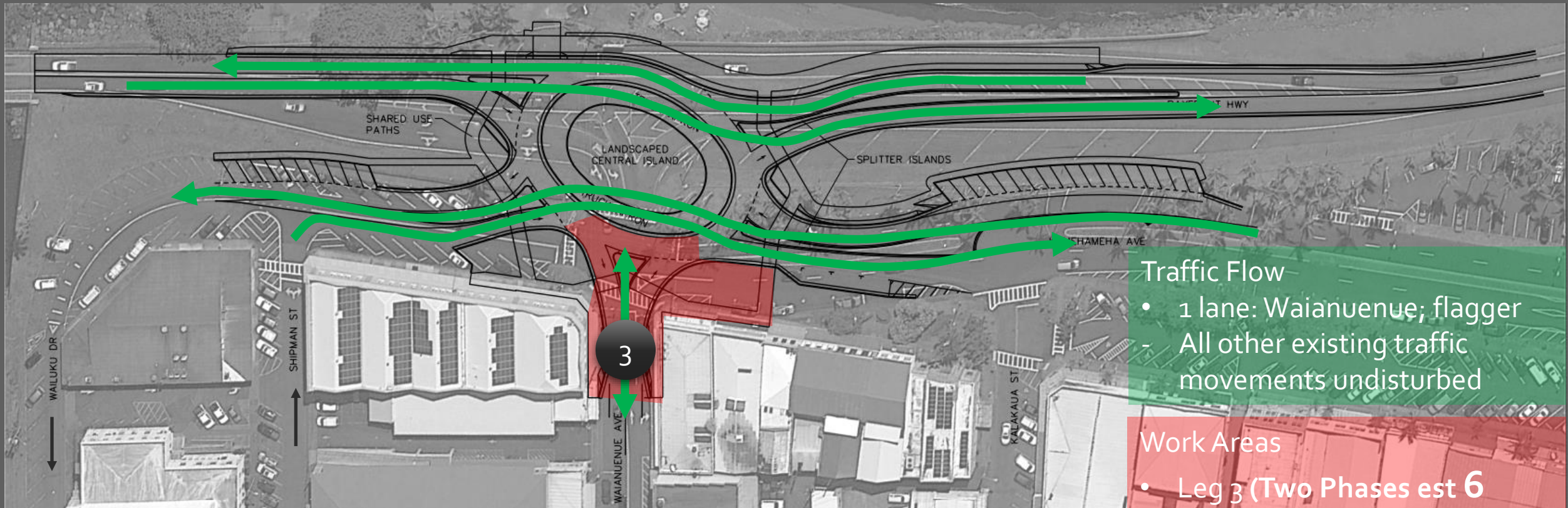
Work Areas

- Leg 3 (est **2** month closure)
- Sidewalk

POTENTIAL DETOUR WAIANUENUE CLOSURE



PHASE 3 *1-LANE*



Traffic Flow

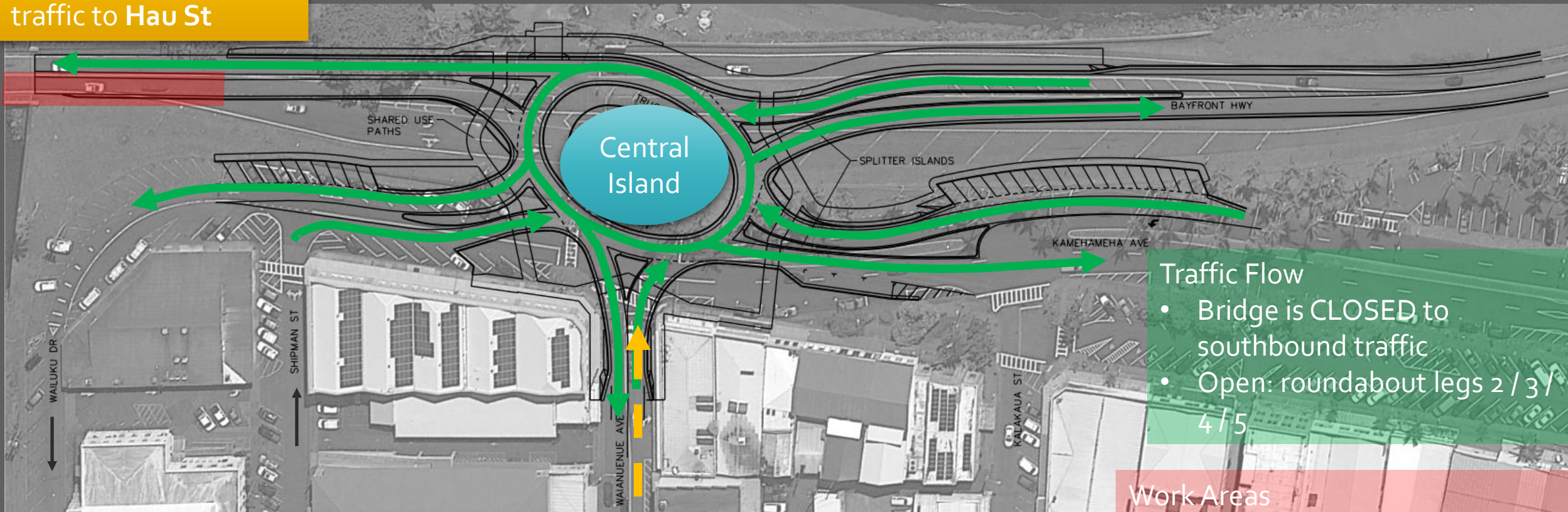
- 1 lane: Waianuenue; flagger
- All other existing traffic movements undisturbed

Work Areas

- Leg 3 (Two Phases est 6 month 1 lane only; +\$\$)
- Sidewalk

PHASE 4

Detour:
Bayfront Southbound
traffic to **Hau St**



Traffic Flow

- Bridge is **CLOSED** to southbound traffic
- Open: roundabout legs 2 / 3 / 4 / 5

Work Areas

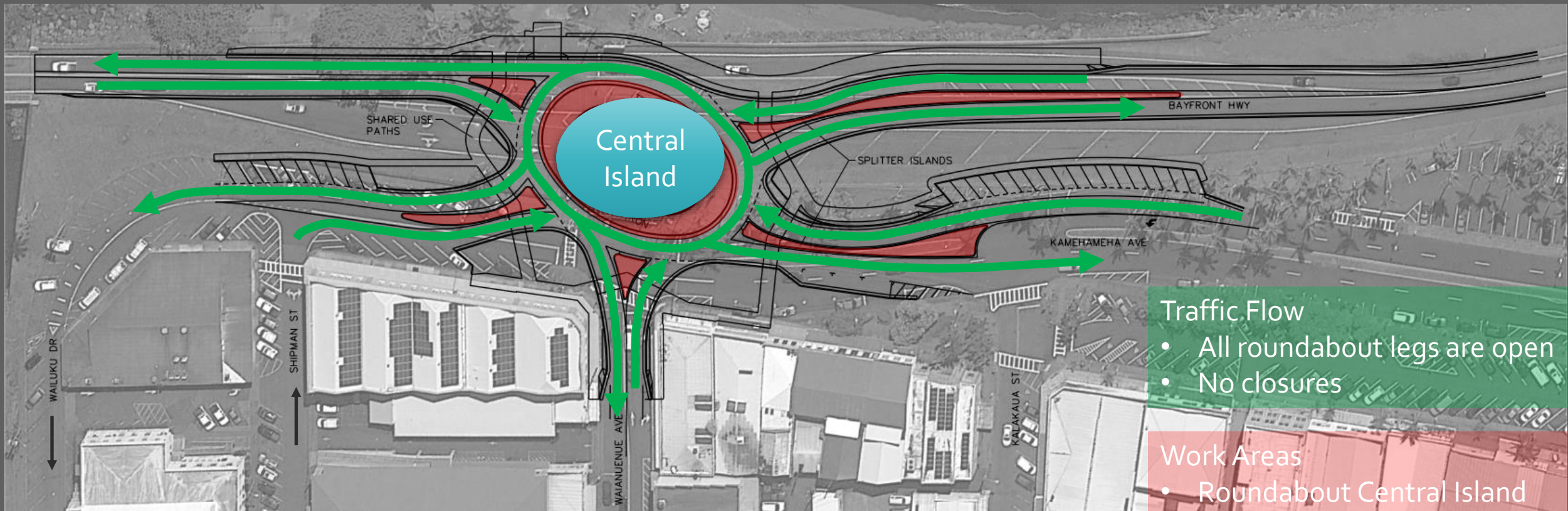
- Bayfront Hwy Northern Tie-in

Detour:
Bayfront Southbound
traffic to **Waianuenue**

POTENTIAL SOUTHBOUND DETOUR BRIDGE CLOSURE



PHASE 5



Traffic Flow

- All roundabout legs are open
- No closures

Work Areas

- Roundabout Central Island
- Splitter Islands

COUNTY OF HAWAII



Kamehameha	Notes
Roadway	<ul style="list-style-type: none"> • Shipman to Kalakaua • Two-way single lanes • Traffic Data and Design Criteria • STANDARD DETAILS – DOTHS VS COH <ul style="list-style-type: none"> *Federal funding = FHWA or State Standards • EXISTING UTILITIES RECORD DRAWINGS
Parking	<p>North: Removed 16 spaces / Restored 10 spaces South: Removed 6 spaces / Added 19 spaces</p>
Drainage/Landscaping	<ul style="list-style-type: none"> • Restored and added parking spaces potential for pervious pavement • Rain garden with curb cuts built into splitter islands and mauka curbs • Bioswales/infiltration trench in North and South islands • Maintenance
Pedestrian/Bike Access	<ul style="list-style-type: none"> • Raised Crosswalks (3-inch) • Mauka-Makai 10-ft Shared use path • 6-ft Bike Lane

Waiuanuenue	Notes
Roadway	<ul style="list-style-type: none"> • Kamehameha to Keawe • Traffic Data and Design Criteria
Parking	<ul style="list-style-type: none"> • If bike lanes are added street parking will be removed, if bike lanes are not added no change in parking
Pedestrian/Bike Access	<ul style="list-style-type: none"> • Raised Crosswalks (3-inch) • Mauka-Makai 10-foot shared use path • Option to add bike lanes



Kaipalaoa Landing Park

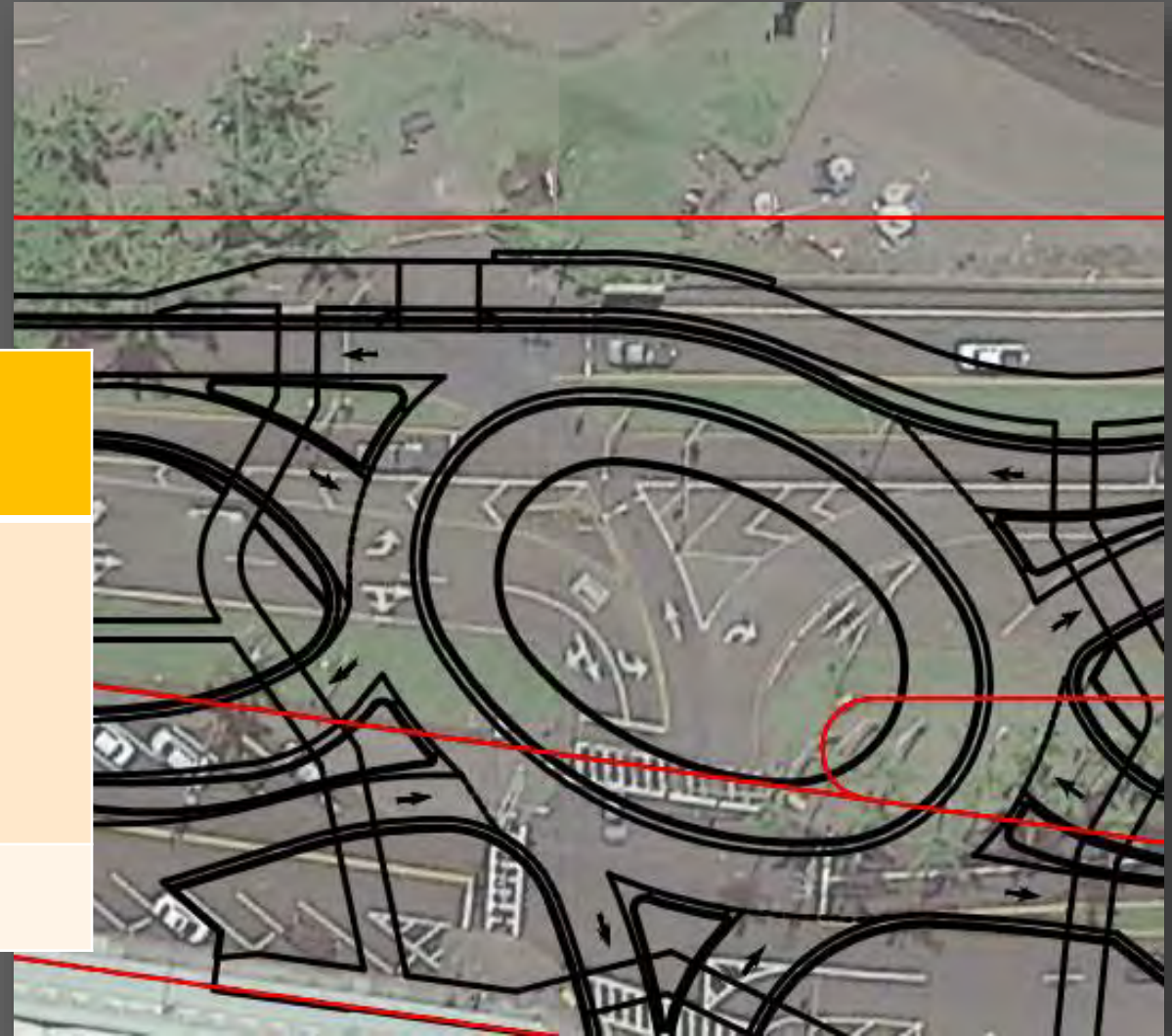
Notes

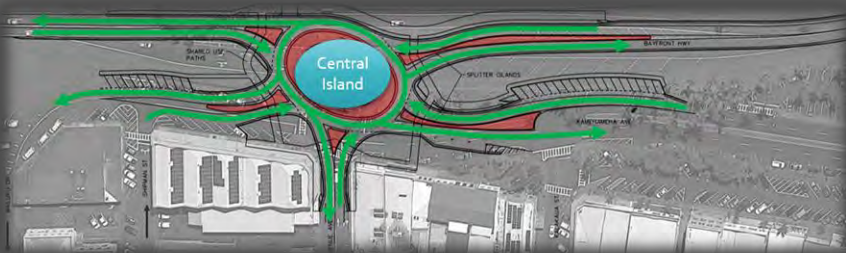
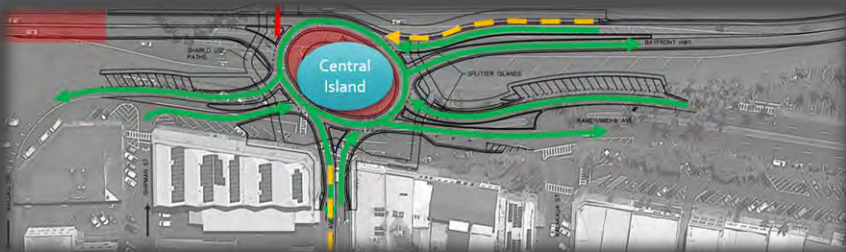
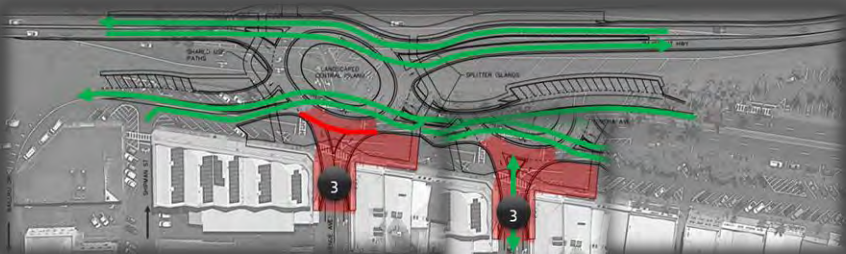
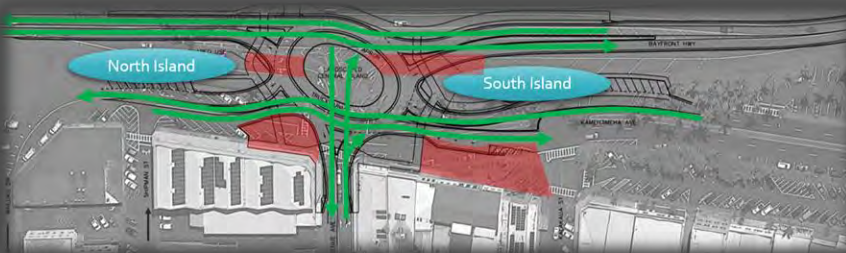
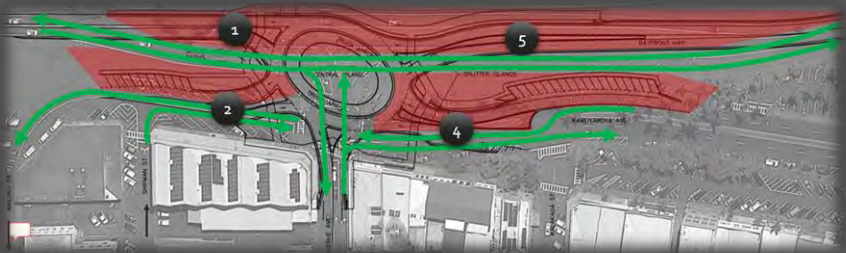
Roadway

- North/South bound access in/out of driveway
- ACCESS DURING CONSTRUCTION:
 - Public access
 - Park maintenance access
 - 24 hr access to pump station?

Pedestrian/Bike Access

- 12-ft shared use path





Phasing	Notes
1	Build leg 1 / 2 / 4 / 5 Bayfront and Kamehameha reduced to two-way traffic with single lanes
2	Build north and south islands
3	Build leg 3 Option 1 Waianuenu is CLOSED. DETOUR via Wailuku and Shipman Option 2 Waianuenu 2-way 1 lane DETOUR Requirements
4	Build leg 1 approach Bridge is CLOSED to inbound traffic. DETOUR via Hau St. Roundabout functional
5	Build splitter islands and central island

COH PLANNING PERMITS

- Special Management Area Use Permit - Major (SMP) Application
- Shoreline Setback Variance Application (Shoreline Survey)
- CDH, Downtown Hilo Commercial District (*confirm exempt from approval by COH Dept of Planning*) Historic Resources Evaluation

PROJECT TIMELINE

Environmental Clearances

- Chapter 343 DEA Winter 2022
- SMA submit Spring 2023
- SSV submit Spring 2023
- Chapter 6e completed Winter 2022
- Section 4f completed Winter 2022
- Section 7 completed Winter 2022
- NEPA CATEX completed Winter 2022

Design

- Conceptual Design Submittal Fall 2022

Construction

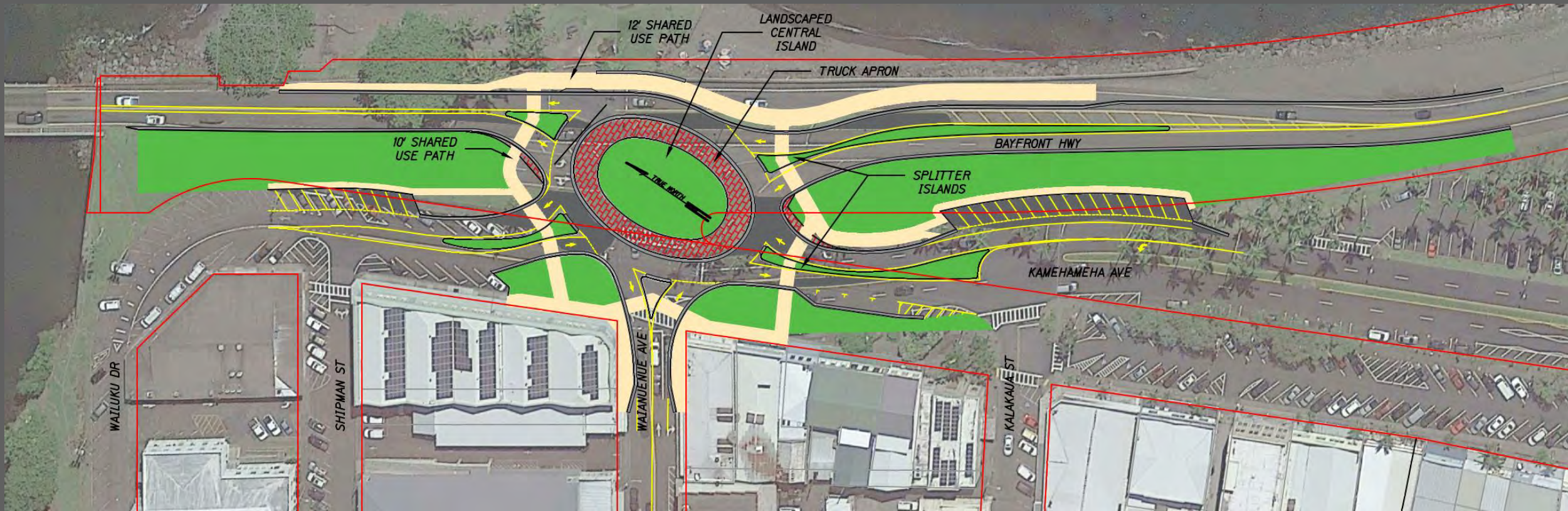
- Ready to Advertise 2025

NEXT STEPS

- Establish communication channels COH, i.e. central point or independent
 - Planning
 - DPW
 - Parks and Rec
 - Environmental Management

MAHALO

MAINTENANCE



APPENDIX G

Pre-Assessment Consultation Comments and Responses



JOSH GREEN, M.D.
GOVERNOR
KE KIA'ĀINA



KENNETH S. HARA
MAJOR GENERAL
ADJUTANT GENERAL
KA 'AKUKANA KENELALA

STEPHEN F. LOGAN
BRIGADIER GENERAL
DEPUTY ADJUTANT GENERAL
KA HOPE 'AKUKANA KENELALA

STATE OF HAWAI'I
KA MOKU'ĀINA O HAWAI'I
DEPARTMENT OF DEFENSE
KA 'OIHANA PILI KAUA
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAI'I 96816-4495

January 12, 2023

Mr. Dave Simpson
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

SUBJECT: Pre-Assessment Consultation for Bayfront Highway and Waianuenue Avenue Intersection
Improvements, South Hilo District, Hawaii Island, Hawaii

Dear Mr. Simpson:

Thank you for the opportunity to comment on the above project. The State of Hawaii Department of Defense has no comments to offer relative to the project at this time.

Should there be any questions, please contact Mr. Tad T. Nakayama at 808-369-3490 or tad.t.nakayama@hawaii.gov.

Sincerely,

Shao Yu L. Lee, R.A.
Captain, Hawaii National Guard
Chief Engineering Officer

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1098

May 15, 2023

**TO: SHAO YU L. LEE, CAPTAIN
DEPARTMENT OF DEFENSE**

**FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH**

**SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT
CONSULTATION FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII**

Thank you for your letter dated January 12, 2023, regarding the subject project. We acknowledge that the State of Hawaii Department of Defense has no comments on the proposed project.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.



STATE OF HAWAII
DEPARTMENT OF EDUCATION
KA 'OIHANA HO'ONA'AUAO
P.O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF FACILITIES AND OPERATIONS

January 27, 2023

Dave Simpson
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

Re: Hawaii Revised Statutes (HRS) Chapter 343 Pre-Assessment Consultation for
Bayfront Highway and Waiuanuenue Avenue Intersection Improvements, South Hilo
District, Hawaii Island, Hawaii

Dear Mr. Simpson:

Thank you for your letter dated December 16, 2022. Based on the information provided,
the proposed project will not impact Hawaii State Department of Education Facilities.

Thank you for the opportunity to comment. Should you have any questions, please contact
Cori China of the Facilities Development Branch, Planning Section, at (808) 784-5080 or
via email at cori.china@k12.hi.us

Sincerely,

A handwritten signature in black ink, appearing to read "Roy Ikeda".

Roy Ikeda
Interim Public Works Manager
Planning Section

RI:ctc

c: Facilities Development Branch

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1099

May 15, 2023

TO: ROY IKEDA
DEPARTMENT OF EDUCATION

FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT
CONSULTATION FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

Thank you for your letter dated January 27, 2023, regarding the subject project. We acknowledge your comment that the proposed project will not impact any State of Hawaii Department of Education facilities.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

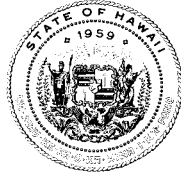
PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

JOSH GREEN, M.D.
GOVERNOR
STATE OF HAWAII
*Ke Kia'āina o ka Moku'āina 'o
Hawai'i*

SYLVIA J. LUKE
LT. GOVERNOR
STATE OF HAWAII
*Ka Hope Kia'āina o ka Moku'āina
'o Hawai'i*



IKAIKA ANDERSON
CHAIRMAN DESIGNATE, HHC
Ka Luna Ho'okele

KATIE L. DUCATT
DEPUTY DESIGNATE TO THE
CHAIRMAN
Ka Hope Luna Ho'okele

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
Ka 'Oihana 'Āina Ho'opulapula Hawai'i

P. O. BOX 1879
HONOLULU, HAWAII 96805

January 5, 2023

Refer: PO-23-004

sent electronically to: dsimpson@pbrhawaii.com
PBR Hawaii & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, #650
Honolulu, HI 96813-3484

Aloha Mr. Simpson:

Subject: HRS Chap. 343 Pre-Consultation for Bayfront Highway & Waianuenue Ave.
Intersection Improvements; So. Hilo, Hawaii Isle

The Department of Hawaiian Home Lands acknowledges receiving the request for comments on the above-cited project. After reviewing the materials submitted, due to its lack of proximity to Hawaiian Home Lands, we do not anticipate any impacts to our lands or beneficiaries from the project. However, DHHL recommends consultation with Hawaiian Homestead community associations located within the moku of Hilo and other (N)ative Hawaiian organizations, to better assess potential impacts to cultural and natural resources, and other rights of Native Hawaiians. A list of DHHL homestead associations can be found at <https://dhhl.hawaii.gov/homestead-associations/>

Mahalo for the opportunity to provide comments. If you have any questions, please call the Planning Office, at (808) 620-9480 or contact via email at dhhl.planning@hawaii.gov.

Aloha,

Andrew H. Choy
Planning Program Manager

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
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TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1091

May 15, 2023

TO: ANDREW CHOY
DEPARTMENT OF HAWAIIAN HOME LANDS

FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT
CONSULTATION FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

Thank you for your letter submitted electronically and dated January 5, 2023, (Ref # PO-23-004) regarding the subject project. We acknowledge your comment that the State of Hawaii Department of Hawaiian Home Lands (DHHL) does not anticipate any impacts to its lands or beneficiaries from the proposed project.

DHHL recommends consultation with Hawaiian Homestead community associations located within the moku of Hilo and other (N)ative Hawaiian organizations, to better assess potential impacts to cultural and natural resources, and other rights of Native Hawaiians.

We acknowledge your recommendation to consult with Hawaiian Homestead community associations and other Native Hawaiian organization. We also appreciate the list of DHHL homestead associations provided in your letter. The environmental review for the proposed project includes consultation with relevant native Hawaiian associations. In addition, we will comply with HRS Chapter 6E. As this project is also federally funded, the project is considered a federal action and undertaking as defined in 36 Code of Federal Regulations, Part §800.16(y). Consultation with Native Hawaiian organizations, Hawaiian Homestead community associations and State Historic Preservation Division will be done pursuant to Section 106 of the National Historic Preservation Act.

ANDREW CHOY
May 15, 2023
Page 2

HWY-DD 2.1091

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

JOSH GREEN, M.D.
GOVERNOR
KE KIA'ĀINA



CATHY BETTS
DIRECTOR
KA LUNA HO'OKELE

JOSEPH CAMPOS II
DEPUTY DIRECTOR
KA HOPE LUNA HO'OKELE

STATE OF HAWAII
KA MOKU'ĀINA O HAWAI'I
DEPARTMENT OF HUMAN SERVICES
KA 'OIHANA MĀLAMA LAWELAWE KANAKA
BENEFIT, EMPLOYMENT AND SUPPORT SERVICES DIVISION
1010 Richards Street, Suite 512
Honolulu, Hawaii 96813

Re: 22-0378

January 5, 2023

Mr. Dave Simpson
PBR HAWAII & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Simpson:

Subject: Hawaii Revised Statutes Chapter 343 Pre-Assessment consultation for Bayfront Highway and Waianuenue Avenue Intersection Improvements, South Hilo District, Hawaii Island, Hawaii

This is in response to letter dated December 16, 2022 requesting the Department of Human Services (DHS) to comment on the above-named project.

DHS has reviewed the Bayfront Highway and Waianuenue Avenue Intersection Improvements project and the map of the area. At this time, DHS has no comments.

If you should have any questions regarding this matter, please contact Ms. Lisa Galino, Child Care Program Specialist at (808) 586-5712.

Sincerely,

A handwritten signature in black ink that reads "Scott Nakasone".

Scott Nakasone
Assistant Division Administrator

c: Cathy Betts, Director

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1092

May 15, 2023

TO: SCOTT NAKASONE
DEPARTMENT OF HUMAN SERVICES

FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT
CONSULTATION FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

Thank you for your letter dated January 5, 2023, (Ref # 22-0378) regarding the subject project. We acknowledge that the State of Hawaii Department of Human Services has no comments on the proposed project.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

From: [Rodriguez, David J](#)
To: [Sun, Robert](#)
Cc: [Morioka, Matthew K](#); [Kennedy, Henry](#); [Crawford, Catherine](#)
Subject: RE: HWY-DD 2.9586 - Hilo Bayfront 343 EA letter
Date: Thursday, January 5, 2023 11:23:51 AM
Attachments: [image001.png](#)

Thanks Robert for the clarification and for being thorough in seeking community input. DLIR offers no comments on all EA matters which we defer to DAGS since they own most DLIR workforce facilities statewide.

Aloha,
David J. Rodriguez
State's Equal Opportunity Officer / Legislative Coordinator
Department of Labor and Industrial Relations
830 Punchbowl Street, Room 321
Honolulu, Hawaii 96813
(808) 586-8855

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1093

May 15, 2023

TO: DAVID RODRIGUEZ
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT
CONSULTATION FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

Thank you for your comments submitted electronically on January 5, 2023, regarding the subject project. We acknowledge that the State of Hawaii Department of Labor and Industrial Relations (DLIR) has no comments on the proposed project and that you will be deferring to the Department of Accounting and General Services (DAGS) on all Environmental Assessment matters.

We will direct future correspondence to DAGS for consultation on DLIR workforce facilities as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

Jan 5, 2023

MEMORANDUM

TO:

DLNR Agencies:

Div. of Aquatic Resources (glenn.r.higashi@hawaii.gov)

Div. of Boating & Ocean Recreation

Engineering Division (DLNR.ENGR@hawaii.gov)

Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)

Div. of State Parks

Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)

Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)

Land Division – Hawaii District (gordon.c.heit@hawaii.gov)

FROM:

Russell Y. Tsuji, Land Administrator *Russell Tsuji*

SUBJECT:

Pre-Assessment Consultation for **Bayfront Highway and Waianuenue Avenue Intersection Improvements**

LOCATION:

South Hilo District, Island of Hawaii; TMK: (3) 2-3-002:999

APPLICANT:

State of Hawaii Department of Transportation

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **January 16, 2023**.

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

() We have no objections.

() We have no comments.

() We have no additional comments.

() Comments are included/attached.

Signed:

Gordon C. Heit

Print Name:

Gordon C. Heit

Division:

Land Division

Date:

January 10, 2023

Attachments

cc: Central Files

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT



STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

75 Aupuni Street, Room 204
Hilo, Hawaii 96720
PHONE: (808) 961-9590
FAX: (808) 961-9599

January 10, 2023

MEMORANDUM

TO: Henry Kennedy, Engineering Program Manager
Design Branch, Highways Division

FROM: Gordon C. Heit, Hawaii District Land Agent *Gordon C. Heit*

SUBJECT: Pre-Assessment Consultation for an Environmental Assessment - Proposed
Property Acquisition for Waianuenue Avenue Intersection Improvements Project

LOCATION: Piihonua, South Hilo, Island of Hawaii,
TMK: (3) 2-3-002:022 portion, & (3) 2-3-003:003

APPLICANT: PBR HAWAII & Associates, Inc. for the State of Hawaii, Department of
Transportation (HDOT), Highways Division

The Hawaii District Land Office has reviewed the proposed project outline by HDOT Highways Division and has identified the two parcels (above) as having been approved by the Land Board to be set aside to the County of Hawaii.

The Land Division will provide further comments when the Draft Environmental Assessment is available for review.

Please contact me should you have any questions.

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1097

May 15, 2023

TO: GORDON HEIT
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION – HAWAII DISTRICT

FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT
CONSULTATION FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS,
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

Thank you for your memorandum dated January 10, 2023, regarding the subject project. We acknowledge that the State of Hawaii Department of Land and Natural Resources (DLNR) Hawaii District Land Office has identified that two parcels within the project area [TMK (3) 2-3-002:022 portion, & (3) 2-3-003:003] have been approved by the Land Board to be set aside to the County of Hawaii. Right-of-way adjustments between the State of Hawaii and County of Hawaii are anticipated to reflect the subsequent ongoing jurisdictional and maintenance limits associated with the roundabout. We also acknowledge that the DLNR Hawaii District Land Office will provide further comments after reviewing the forthcoming Draft Environmental Assessment.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

GORDON HEIT
May 15, 2023
Page 2

HWY-DD 2.1097

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.




STATE OF HAWAII | KA MOKU'ĀINA 'O HAWAII'
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT | KE KAHUWAI PONO
P.O. BOX 621
HONOLULU, HAWAII 96809

January 19, 2023

REF: RFD.5986.8

TO: Mr. Henry Kennedy, Engineering Program Manager
Department of Transportation

FROM: M. Kaleo Manuel, Deputy Director 
Commission on Water Resource Management

SUBJECT: Hawaii Revised Statutes (HRS) Chapter 343 Pre-Assessment Consultation for Bayfront Highway & Waianuenue Avenue Intersection Improvements, South Hilo District, Hawaii Island, Hawaii

FILE NO.: RFD.5986.8
TMK NO.:

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at <http://dlnr.hawaii.gov/cwrm>.

Our comments related to water resources are checked off below.

1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.
2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.
3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.
4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at <http://www.usgbc.org/leed>. A listing of fixtures certified by the EAP as having high water efficiency can be found at <http://www.epa.gov/watersense>.
5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at <http://planning.hawaii.gov/czm/initiatives/low-impact-development/>
6. We recommend the use of alternative water sources, wherever practicable.
7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at <http://energy.hawaii.gov/green-business-program>.
8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf.

9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.
10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.
11. The Hawaii Water Plan is directed toward the achievement of the utilization of reclaimed water for uses other than drinking and for potable water needs in one hundred per cent of State and County facilities by December 31, 2045 (§174C-31(g)(6), Hawaii Revised Statutes). We strongly recommend that this project consider using reclaimed water for its non-potable water needs, such as irrigation. Reclaimed water may include, but is not limited to, recycled wastewater, gray water, and captured rainwater/stormwater. Please contact the Hawai'i Department of Health, Wastewater Branch, for more information on their reuse guidelines and the availability of reclaimed water in the project area.
12. A Well Construction Permit(s) is (are) are required before the commencement of any well construction work.
13. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.
14. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.
15. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.
16. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a steam channel.
17. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.
18. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.
19. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.
- OTHER:

If you have any questions, please contact Katie Roth of the Commission staff at (808) 587-0218.

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
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HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1094

May 15, 2023

TO: M. KALEO MANUEL
COMMISSION ON WATER RESOURCE MANAGEMENT

FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT
CONSULTATION FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

Thank you for your memorandum dated January 19, 2023, regarding the subject project (RFD.5986.8). We acknowledge your comments below and provide the following responses.

We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at <http://planning.hawaii.gov/czm/initiatives/low-impact-development/>

The proposed project will consider post-construction best management practices per our State of Hawaii, Department of Transportation's Storm Water Post-Construction Best Management Practices Manual, February 2022. The proposed project includes vegetated swales and infiltration basins. During construction, best management practices for managing stormwater and erosion control will be employed to avoid temporary inputs of sediment and pollutants into surface water resources.

There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

M. KALEO MANUEL
May 15, 2023
Page 2

HWY-DD 2.1094

Prior to construction, the State of Hawaii, Department of Transportation will comply with requisite approvals needed, including consultation and review by the Department of Health to mitigate potential degradation to ground and/or surface water. Appropriate measures will be taken to adhere to any requirements for preserving water quality in the project area. We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

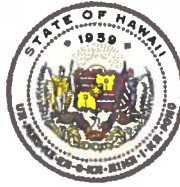
PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

JOSH GREEN, M.D.
GOVERNOR | KE KIA ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA ĀINA



DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII | KA MOKU'ĀINA 'O HAWAII'
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

Jan 5, 2023

MEMORANDUM

TO:

DLNR Agencies:

- Div. of Aquatic Resources** (glenn.r.higashi@hawaii.gov)
- Div. of Boating & Ocean Recreation
- Engineering Division (DLNR.ENGR@hawaii.gov)
- Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
- Div. of State Parks
- Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
- Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
- Land Division – Hawaii District (gordon.c.heit@hawaii.gov)

FROM:

Russell Y. Tsuji, Land Administrator *Russell Tsuji*

SUBJECT:

Pre-Assessment Consultation for **Bayfront Highway and Waianuenu Avenue Intersection Improvements**

LOCATION:

South Hilo District, Island of Hawaii; TMK: (3) 2-3-002:999

APPLICANT:

State of Hawaii Department of Transportation

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **January 16, 2023**.

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

- We have no objections.
- We have no comments.
- We have no additional comments.
- Comments are included/attached.

Signed:

Print Name:

Brian Neilson

Division:

Aquatic Resources

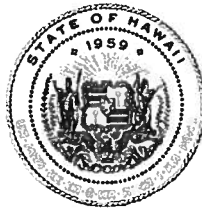
Date:

Jan 13, 2023

Attachments

cc: Central Files

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA
SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



STATE OF HAWAII | KA MOKU'ĀINA 'O HAWAII'
DEPARTMENT OF LAND AND NATURAL
RESOURCES DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

Date: 1/13/23
DAR # AR6333

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT
FIRST DEPUTY
M. KALEO MANUEL
DEPUTY DIRECTOR - WATER
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES
ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

MEMORANDUM

TO: Brian J. Neilson
DAR Administrator

FROM: Troy Sakihara *TSS TSS*, Aquatic Biologist

SUBJECT: Ch. 343 Pre-Assessment Consultation for Bayfront Hwy. and Waianuenue
Ave. Intersection Improvements, South Hilo, Hawaii Island

Request Submitted by: Henry Kennedy, Engineering Program Manager
Bayfront Highway, Waianuenue Ave, South Hilo, Hawaii Island

Location of Project: _____

Brief Description of Project:

The State of Hawaii Department of Transportation is proposing improvements to an intersection between Bayfront Highway and Waianuenue Avenue in Hilo, southeast of the mouth of Wailuku River and along the Hilo Bay shoreline. These improvements are to address issues with vehicular congestion, particularly during road closures due to flooding, and to improve pedestrian safety in the area. Proposed improvements include the construction of a roundabout with necessary roadway reconstruction to accommodate such, and inclusion of ADA compliant sidewalks, pedestrian safety improvements, drainage improvements, lighting, parking reconfigurations and other utility adjustments as needed. Construction is estimated for a duration of two years, beginning in 2025.

Comments:

No Comments Comments Attached

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plan, DAR requests the opportunity to review and comment on those changes.

Comments Approved: *Brian J. Neilson* Date: Jan 13, 2023
Brian J. Neilson
DAR Administrator

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1095

May 15, 2023

TO: BRIAN NEILSON
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES

FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT
CONSULTATION FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

Thank you for your letter dated January 13, 2023 (Ref # AR6333) regarding the subject project. We acknowledge that the State of Hawaii Department of Land and Natural Resources Division of Aquatic Resources has no comments on the proposed project.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

Jan 5, 2023

MEMORANDUM

FROM:

DLNR Agencies:

Div. of Aquatic Resources (glenn.r.higashi@hawaii.gov)

Div. of Boating & Ocean Recreation

Engineering Division (DLNR.ENGR@hawaii.gov)

Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)

Div. of State Parks

Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)

Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)

Land Division – Hawaii District (gordon.c.heit@hawaii.gov)

TO:

Russell Y. Tsuji, Land Administrator *Russell Tsuji*

SUBJECT:

Pre-Assessment Consultation for **Bayfront Highway and Waianuenue Avenue Intersection Improvements**

LOCATION:

South Hilo District, Island of Hawaii; TMK: (3) 2-3-002:999

APPLICANT:

State of Hawaii Department of Transportation

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **January 16, 2023**.

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

We have no objections.

We have no comments.

We have no additional comments.

Comments are included/attached.

Signed:

Lainie Berry

Print Name:

LAINIE BERRY, Wildlife Program Mgr.

Division:

Division of Forestry and Wildlife

Date:

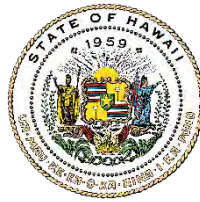
Jan 23, 2023

Attachments

cc: Central Files

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



STATE OF HAWAII | KA MOKU'ĀINA 'O HAWAII'
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

January 23, 2023

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT
FIRST DEPUTY
M. KALEO MANUEL
DEPUTY DIRECTOR - WATER
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES
ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND

MEMORANDUM

Log no. 3960

TO: HENRY KENNEDY, Engineering Program Manager
Design Branch, Highways Division

FROM: LAINIE BERRY, Wildlife Program Manager
Division of Forestry and Wildlife

SUBJECT: **Division of Forestry and Wildlife Comments for the Pre-Assessment Consultation for the Bayfront Highway and Waianuenue Avenue Intersection Improvements on Hawai'i Island**

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your pre-assessment consultation request for the Bayfront Highway (Hawai'i Belt Road Route 19) and Waianuenue Avenue (State Route 200) intersection improvements project on the island of Hawai'i; TMK: (3) 2-3-002:999. The proposed project consists of addressing vehicular operational issues at the intersection as well as providing pedestrian accessibility and safety improvements. The preferred alternative consists of reconstructing the roadways to allow for the construction of an intersection roundabout, ADA-compliant sidewalks and roadway crossings, drainage improvements, and reconfiguration of parking. Other roadway improvements include new highway lighting, electrical infrastructure relocations, signage, pavement markings, pedestrian signal, crosswalks, landscape, traffic management devices, and other utility adjustments.

The State listed Hawaiian Hoary Bat or 'Ōpe'ape'a (*Lasiurus cinereus semotus*) could potentially occur at or in the vicinity of the project and may roost in nearby trees. Any required site clearing should be timed to avoid disturbance to bats during their birthing and pup-rearing season (June 1 through September 15). During this period woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed. Barbed wire should also be avoided for any construction because bats can become ensnared and killed by such fencing material during flight.

Artificial lighting can adversely impact seabirds that may pass through the area at night by causing them to become disoriented. This disorientation can result in their collision with manmade structures or the grounding of birds. It is DOFAW's stance that **permanent lighting would pose a very high risk of seabird attraction on the proposed stretch of road**. New highway lights, therefore, should not be installed in this area to protect seabird flyways and preserve the night sky. For nighttime work that might be required, DOFAW recommends that all lights used be fully shielded to minimize the attraction of seabirds. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season from September 15 through December 15, the period when young seabirds make their maiden voyage to sea. For illustrations and guidance related to seabird-friendly light styles that also protect seabirds and the dark starry skies of Hawai'i, please visit <https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf>.

The State endangered Hawaiian Monk Seal or Ilio-holo-i-ka-uaua (*Monachus schauinslandi*) and threatened Green Sea Turtle or Honu (*Chelonia mydas*) could potentially occur or haul out onshore within the vicinity of the proposed project site. If either species is detected within 100 meters of the project area all nearby construction operations should cease and not continue until the focal animal has departed the area on its own accord.

The State listed Hawaiian Goose or Nēnē (*Branta sandvicensis*) could potentially occur in the vicinity of the proposed project site. It is against State law to harm or harass these species. If any are present during construction, all activities within 100 feet (30 meters) should cease and the bird or birds should not be approached. Work may continue after the bird or birds leave the area of their own accord. If a nest is discovered at any point, please contact the Hawai‘i Island Branch DOFAW Office at (808) 974-4221.

The State listed Hawaiian Hawk or ‘Io (*Buteo solitarius*) may occur in the project vicinity. DOFAW recommends surveys of the area be conducted by a qualified biologist to ensure no Hawaiian Hawk nests are present if trees are to be cut. ‘Io nests may be present during the breeding season from March to September.

DOFAW recommends using native plant species for landscaping appropriate for the area; i.e., plants for which climate conditions are suitable for them to thrive, plants that historically occurred there, etc. Please do not plant invasive species. DOFAW also recommends referring to www.plantpono.org for guidance on the selection and evaluation of landscaping plants and to determine the potential invasiveness of plants proposed for use in the project.

DOFAW recommends minimizing the movement of plant or soil material between worksites. Soil and plant material may contain detrimental fungal pathogens (e.g., Rapid ‘Ōhi‘a Death), vertebrate and invertebrate pests (e.g., Little Fire Ants, Coqui Frogs, etc.), or invasive plant parts (e.g., African Tulip, Octopus Tree, Trumpet Tree, etc.) that could harm our native species and ecosystems. We recommend consulting the Big Island Invasive Species Committee (BIISC) at (808) 933-3340 to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

DOFAW is concerned about attracting vulnerable birds to areas that may host nonnative predators such as cats, rodents, and mongooses. We recommend taking action to minimize predator presence; remove cats, place bait stations for rodents and mongoose, and provide covered trash receptacles.

We appreciate your efforts to work with our office for the conservation of our native species. These comments are general guidelines and should not be considered comprehensive for this site or project. It is the responsibility of the applicant to do their own due diligence to avoid any negative environmental impacts. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Myrna N. Girald Pérez, Protected Species Habitat Conservation Planning Associate at (808) 265-3276 or myrna.girald-perez@hawaii.gov.

Sincerely,

Lainie Berry

LAINIE BERRY
Wildlife Program Manager

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1096

May 15, 2023

TO: LAINIE BERRY
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE

FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT
CONSULTATION FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

Thank you for your memorandum dated January 23, 2023 (Log No. 3960) regarding the subject project. We will be seeking further input on the proposed intersection improvements throughout the environmental review process in compliance with HRS Chapter 343.

This project is federally funded and therefore will be a federal undertaking triggering federal requirements including Section 7 of the Endangered Species Act. Any prior consultation with United States Fish and Wildlife (USFAW) Section 7 and National Oceanic and Atmospheric Administration, National Marine Fisheries Service Endangered Fish Habitat will also be attached.

To avoid redundancies or inconsistencies between the two processes, any comments received from Division of Forestry and Wildlife (DOFAW) through the HRS Chapter 343 process will be addressed under the Chapter 195D process. Note that the Chapter 195D correspondence will become an attachment in the Final Environmental Assessment.

We acknowledge your comments below and provide the following responses.

*The State listed Hawaiian Hoary Bat or Opeapea (*Lasiurus cinereus semotus*) could potentially occur at or in the vicinity of the project and may roost in nearby trees. Any required site clearing should be timed to avoid disturbance to bats during their birthing and pup-rearing season (June 1 through September 15).*

During this period woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed. Barbed wire should also be avoided for any construction because bats can become ensnared and killed by such fencing material during flight.

To avoid and minimize potential project impacts to Hawaiian hoary bats, the following measures have been incorporated into the project:

- Woody plants greater than 15 feet in height shall not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15).
- No barbed wire for fencing shall be used.

If any bat species are discovered within the project area, the Department of Transportation or its contractors will consult with the State of Hawaii Department of Land and Natural Resources (DLNR) and USFAW to ensure compliance with §13-124-3, Hawaii Administrative Rules (HAR).

*Artificial lighting can adversely impact seabirds that may pass through the area at night by causing them to become disoriented. This disorientation can result in their collision with manmade structures or the grounding of birds. It is DOFAW's stance that **permanent lighting would pose a very high risk of seabird attraction on the proposed stretch of road.** New highway lights, therefore, should not be installed in this area to protect seabird flyways and preserve the night sky. For nighttime work that might be required, DOFAW recommends that all lights used be fully shielded to minimize the attraction of seabirds. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season from September 15 through December 15, the period when young seabirds make their maiden voyage to sea. For illustrations and guidance related to seabird-friendly light styles that also protect seabirds and the dark starry skies of Hawaii, please visit <https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf>.*

To avoid and minimize potential project impacts to Hawaiian seabirds, the following measures have been incorporated into the project:

- All outdoor lighting shall be shielded so the bulb can only be seen from below.
- Night construction shall be avoided during the seabird fledging season, September 15 through December 15. For night construction occurring during other times of the year, all lighting shall be fully shielded and directed towards the ground.
- All outdoor lighting, with the exception of streetlights, will have automatic motion sensor switches and controls.
- Powerline and other existing above ground cables will be relocated within the roadway right-of-way within five feet of the height of the existing cables.

Due to the urban location of the project area, the proposed improvements will require construction of new lighting. However, the highway lighting incorporated in the design of the intersection reconfiguration will retain comparable lighting to the existing conditions and will adhere to modern design standards to mitigate adverse impacts to Hawaiian seabirds.

If any indigenous bird nests, young birds, or eggs are discovered within the project area, the Department of Transportation or its contractors will consult with DLNR and USFAW to ensure compliance with §13-124-3, HAR.

The State endangered Hawaiian Monk Seal or Ilio-holo-i-ka-uaua (Monachus schauinslandi) and threatened Green Sea Turtle or Honu (Chelonia mydas) could potentially occur or haul out onshore within the vicinity of the proposed project site. If either species is detected within 100 meters of the project area all nearby construction operations should cease and not continue until the focal animal has departed the area on its own accord.

Construction on, or in the vicinity of, beaches can result in sand and sediment compaction, sea turtle nest destruction, beach erosion, contaminant and nutrient runoff, and an increase in direct and ambient light pollution which may disorient hatchlings or deter nesting females. Off-road vehicle traffic may result in direct impacts to sea turtles and nests, and also contributes to habitat degradation through erosion and compaction.

The proposed project does not involve any work on beaches. The entire project area is within roadway right-of-way. There is only a very narrow strip of black sand beach near the project area. This narrow strip of beach is regularly inundated and is not known to support turtle nesting. Therefore, green sea turtles are not anticipated to be present in the vicinity of the project area. The black sand beach area near the project area is also not known to be frequented by Hawaiian monk seals and they are not anticipated to be present.

However, appropriate measures will be taken to avoid and minimize potential impacts to the endangered Hawaiian monk seal or the threatened green sea turtle with the following measures:

- If either species is detected within 100 meters of the project area during construction of the proposed improvements, all nearby construction operations will cease until the animal has departed the area.

The State listed Hawaiian Goose or Nene (Branta sandvicensis) could potentially occur in the vicinity of the proposed project site. It is against State law to harm or harass these species. If any are present during construction, all activities within 100 feet (30 meters) should cease and the bird or birds should not be approached. Work may continue after the bird or birds leave the area of their own accord. If a nest is discovered at any point, please contact the Hawaii Island Branch DOFAW Office at (808) 974-4221

To avoid and minimize potential project impacts to Hawaiian geese the following measures have been incorporated into the project:

- Nene will not be approached, fed, or disturbed.

- If nene are observed loafing or foraging within the project area during the breeding season (September through April), a biologist familiar with nene nesting behavior will survey for nests in and around the project area prior to the resumption of work. Surveys will be repeated after any subsequent delay of work of three or more days (during which the birds may attempt to nest).
- If a nene nest is discovered within 150 feet of the work area all work will cease and the USFWS will be contacted for further guidance.
- If nene are observed in or near the project area the project personnel and contractor will be informed about the presence of nene at the site.

If any indigenous bird nests, young birds, or eggs are discovered within the project area, the Department of Transportation or its contractors will consult with DLNR and USFAW to ensure compliance with §13-124-3, HAR.

*The State listed Hawaiian Hawk or Io (*Buteo solitarius*) may occur in the project vicinity. DOFAW recommends surveys of the area be conducted by a qualified biologist to ensure no Hawaiian Hawk nests are present if trees are to be cut. Io nests may be present during the breeding season from March to September.*

While it is unlikely that the roadway project area along the developed shoreline of Downtown Hilo would be a suitable habitat for this forest bird, appropriate measures will be taken if large trees require to be cut during construction to ensure that no Hawaiian Hawk nests are present. Particular attention will be taken during the breeding season from March to September. If any Hawaiian hawks are discovered within the project area, the Department of Transportation or its contractors will consult with DLNR and USFAW to ensure compliance with §13-124-3, HAR.

DOFAW recommends using native plant species for landscaping appropriate for the area; i.e., plants for which climate conditions are suitable for them to thrive, plants that historically occurred there, etc. Please do not plant invasive species. DOFAW also recommends referring to www.plantpono.org for guidance on the selection and evaluation of landscaping plants and to determine the potential invasiveness of plants proposed for use in the project.

New landscaping is not planned for the project area and the center island will comprise a hardscape surface design. Any vegetated, landscaped areas that will be disturbed during construction will be revegetated where appropriate in the proposed design. The project will utilize landscape and a plant palette similar to the surrounding areas such as re-naturalized lava with native groundcover and shrub plants. In addition, listed Hawaiian plant species are not anticipated to be present in the Project Area and impacts are therefore not anticipated due to the previously disturbed urban setting. Appropriate measures will be taken during construction to reduce the potential transfer of plant or soil material between work sites that may contain detrimental fungal pathogens or invasive plant parts that could harm native species and ecosystems.

DOFAW recommends minimizing the movement of plant or soil material between worksites. Soil and plant material may contain detrimental fungal pathogens (e.g., Rapid Ohia Death), vertebrate and invertebrate pests (e.g., Little Fire Ants, Coqui Frogs, etc.), or invasive plant parts (e.g., African Tulip, Octopus Tree, Trumpet Tree, etc.) that could harm our native species and ecosystems. We recommend consulting the Big Island Invasive Species Committee (BIISC) at (808) 933-3340 to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

Appropriate measures will be taken during construction to reduce the potential transfer of plant or soil material between work sites that may contain detrimental fungal pathogens or invasive plant parts that could harm native species and ecosystems.

DOFAW is concerned about attracting vulnerable birds to areas that may host nonnative predators such as cats, rodents, and mongooses. We recommend taking action to minimize predator presence; remove cats, place bait stations for rodents and mongoose, and provide covered trash receptacles.

Appropriate measures will be taken during construction to deter undesirable conditions that might attract nonnative predators to the project area.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

Jan 5, 2023

MEMORANDUM

FROM: ~~TO:~~

DLNR Agencies:

- Div. of Aquatic Resources (glenn.r.higashi@hawaii.gov)
- Div. of Boating & Ocean Recreation
- Engineering Division (DLNR.ENGR@hawaii.gov)
- Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
- Div. of State Parks
- Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
- Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
- Land Division – Hawaii District (gordon.c.heit@hawaii.gov)

TO: ~~FROM:~~

Russell Y. Tsuji, Land Administrator *Russell Tsuji*

SUBJECT:

Pre-Assessment Consultation for **Bayfront Highway and Waianuenu Avenue Intersection Improvements**

LOCATION:

South Hilo District, Island of Hawaii; TMK: (3) 2-3-002:999

APPLICANT:

State of Hawaii Department of Transportation

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **January 16, 2023**.

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

- We have no objections.
- We have no comments.
- We have no additional comments.
- Comments are included/attached.

Signed:

Print Name:

Carty S. Chang, Chief Engineer

Division:

Engineering Division

Date:

Jan 13, 2023

Attachments

cc: Central Files

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

LD/Russell Y. Tsuji

**Ref: Pre-Assessment Consultation for Bayfront Highway and Waianuenu
Avenue Intersection Improvements**

Location: South Hilo District, Island of Hawaii

TMK(s): (3) 2-3-002:999

Applicant: State of Hawaii Department of Transportation

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR, Chapter 1, Subchapter B, part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (<http://gis.hawaiiinfip.org/FHAT>) could also be used to research flood hazard information.

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7139.
- Kauai: County of Kauai, Department of Public Works (808) 241-4896.

The applicant should include water demands and infrastructure required to meet project needs. Please note that all State projects requiring water service from their local Department/Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

The applicant is required to provide water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update projections.

Signed: 
CARTY S. CHANG, CHIEF ENGINEER

Date: Jan 13, 2023

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1122

May 15, 2023

TO: CARTY CHANG, P.E.
DEPARTMENT OF LAND AND NATURAL RESOURCES, ENGINEERING
DIVISION

FROM: HENRY KENNEDY *Henry Kennedy*
ENGINEERING PROGRAM MANAGER
HIGHWAYS DESIGN BRANCH

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343
PRE-ASSESSMENT CONSULTATION FOR BAYFRONT HIGHWAY AND
WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS
SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

Thank you for your letter dated January 13, 2023 regarding the subject project. We acknowledge your comments below and provide the following responses.

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR, Chapter 1, Subchapter B, part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (<http://gis.hawaiiinfip.org/FHAT>) could also be used to research flood hazard information

The Draft Environmental Assessment includes an evaluation of flood hazards based on FEMA's FIRM. According to the FIRM, the majority of the Project Site is designated Special Flood Hazard Area, Zone AE (an area with a 1 percent annual chance of flooding and base flood elevations). Portions of the Project Site on the north end and southeastern portion along Bayfront Highway are designated Special Flood Hazard Area, Zone VE (an area with a 1 percent or greater chance of flooding annually and base flood elevations). Areas designated as Zone VE are susceptible to coastal flooding and additional hazards associated with storm waves. These areas

have a 26 percent chance of flooding over a 30-year period. The proposed project will maintain similar elevations as existing conditions and will not impact the Base Flood Elevations within the project area. The proposed project will comply with all applicable rules, regulations and minimum standards set forth by the NFIP and County of Hawaii floodplain management ordinances.

The applicant should include water demands and infrastructure required to meet project needs. Please note that all State projects requiring water service from their local Department/Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

The project is not anticipated to require any proposed water service nor require water demands. The project may require infrastructure modifications to the water system to adjust to the new roadway conditions. The applicant will coordinate with County of Hawaii, Department of Water Supply for their requirements.

The applicant is required to provide water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update projections.

The project is not anticipated to require any proposed water service nor require water demands. The applicant will provide a memo with this statement to the Engineering Division.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION
400 RODGERS BOULEVARD, SUITE 700
HONOLULU, HAWAII 96819-1880

IN REPLY REFER TO:

AIR-EP 23.0003

January 13, 2023

VIA U.S. MAIL AND COPY VIA EMAIL: dsimpson@pbrhawaii.com

Mr. Dave Simpson
Planner
PBR HAWAII & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Simpson:

Subject: Hawaii Revised Statutes (HRS) Chapter 343 Pre-Assessment Consultation for Bayfront Highway and Waianuenue Avenue Intersection Improvements, South Hilo District, Hawaii Island, Hawaii

The State of Hawaii, Department of Transportation, Airports Division, has reviewed the subject project and has the following comments:

1. The proposed project is approximately 1.5 miles from Hilo International Airport. The project site is also approximately 1.86 miles from Runway 3 and 1.92 miles from Runway 8, respectively. All projects within 5 miles from Hawaii State airports are advised to read the Technical Assistance Memorandum (TAM) for guidance with development and activities that may require further review and permits. The TAM can be viewed at this link: http://files.hawaii.gov/dbedt/op/docs/TAM-FAA-DOT-Airports_08-01-2016.pdf.
2. Federal Aviation Administration (FAA) regulation requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or Alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9, if the construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. Construction equipment and staging area heights, including heights of temporary construction cranes, shall be included in the submittal. The form and criteria for submittal can be found at the following website: <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

Mr. Dave Simpson
January 13, 2023
Page 2

AIR-EP 23.0003

If you have any questions, please contact Mr. Herman Tuiolosega, Head Planner, at (808) 838-8810 or by email to herman.tuiolosega@hawaii.gov.

Sincerely,



JAMES KUNANE TOKIOKA
Deputy Director – Airports

c: Mr. Henry Kennedy, Engineer, Department of Transportation, Highways Division

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DESIGN BRANCH
MEMORANDUM

HWY-DD 2.1100
Date: May 15, 2023

TO: FORD N. FUCHIGAMI, DEP-AIR

FROM: HENRY KENNEDY, HWY-D *Henry Kennedy*

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT CONSULTATION FOR BAYFRONT HIGHWAY AND WAIANUENUE AVENUE INTERSECTION IMPROVEMENTS SOUTH HILO DISTRICT, HAWAII ISLAND, HAWAII

Thank you for your letter dated January 13, 2023 (AIR-EP 23.0003) regarding the subject project. We acknowledge your comments below and provide the following responses.

The proposed project is approximately 1.5 miles from Hilo International Airport. The project site is also approximately 1.86 miles from Runway 3 and 1.92 miles from Runway 8, respectively. All projects within 5 miles from Hawaii State airports are advised to read the Technical Assistance Memorandum (TAM) for guidance with development and activities that may require further review and permits. The TAM can be viewed at this link: http://files.hawaii.gov/dbedt/op/docs/TAM-FAA-DOTAirports_08-01-2016.pdf.

Federal Aviation Administration (FAA) regulation requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or Alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9, if the construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. Construction equipment and staging area heights, including heights of temporary construction cranes, shall be included in the submittal. The form and criteria for submittal can be found at the following website: <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

We acknowledge the proximity of the project site to Hilo International Airport and will review the relevant guidance on development activities and permitting and comply accordingly. As required by the Federal Aviation Administration (FAA), FAA Form 7460-1 will be submitted for approval prior to construction.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

MEMO TO DEP-AIR
May 15, 2023
Page 2

HWY-DD 2.1100

You may email or mail any additional comments to:

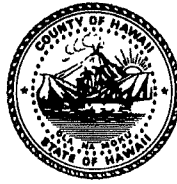
PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

Mitchell D. Roth
Mayor

Lee Lord
Managing Director



Ramzi I. Mansour
Director

Brenda Iokepa-Moses
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

345 Kekūanāo'a Street, Suite 41 · Hilo, Hawai'i 96720 · cohdem@hawaiiicounty.gov

Ph: (808) 961-8083 · Fax: (808) 961-8086

MEMORANDUM

TO: PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484
dsimpson@pbrhawaii.com

FROM: Ramzi I. Mansour, Director
Department of Environmental Management

DATE: January 11, 2023

SUBJECT: Hawai'i Revised Statutes (HRS) Chapter 343
Pre-Assessment Consultation for Bayfront Highway and
Wāianuenue Avenue Intersection Improvements,
South Hilo District, Hawai'i Island, Hawai'i

The County of Hawai'i Department of Environmental Management (COHDEM) appreciates the invitation to provide comment on this project.

The COHDEM-Wastewater Division owns and maintains a significant amount of public sewer infrastructure within and adjacent to project site, as shown in the attached map. Close coordination with Wastewater Division will be required to identify the exact location of the infrastructure to determine whether any of it will need to be moved, repaired, or replaced.

The Solid Waste Division conveys municipal solid waste daily from the Honomū Transfer Station and the Pāpa'ikou Transfer Station through the project site to the East Hawai'i Regional Sort Station, and replaces full bins with empty ones. Closure of the project site to traffic without an adequate detour for the hauling of solid waste may hamper the Division's ability to empty the bins at the transfer station and may result in the closure of a transfer station. If this were to be necessary, advance notice to the public of service interruptions would also be required.

Thank you again for the opportunity to comment.

Hawaii County Wastewater Map



Current Time: 12/28/2022 9:54 AM
Wastewater Staff

1 inch equals 0 miles
Scale: 1:2,257

Treatment Plants and Pump Stations Laterals

- Custom**
- County Pump Station
 - Non-County Pump Station
 - County Treatment Plant
 - Non-County Treatment Plant

- Custom**
- County Lateral
 - Non-County Lateral
- Mains**
- Custom**
- County Gravity Main
 - Non-County Gravity Main

- County Force Main
- Non-County Force Main
- County Outfall
- Non-County Outfall
- County Siphon
- County Stub
- Non-County Stub
- County Treatment
- Non-County Treatment

- Manholes**
- Custom**
- County Manhole
 - County Manhole Surveyed
 - Non-County Manhole
- Service Connections**
- Service Connections**
- Connected

- Assumed Connection
- Failed Inspection
- Permit Pending
- Proposed
- Connection Exemption
- Not Connected
- Not Connected - Additional Lateral
- Abandoned
- Unknown



Disclaimer: Data provided and maintained by the Hawaii County Wastewater Division are subject to change at any time. The County of Hawaii does not guarantee the positional or thematic accuracy of the GIS data.

© OpenStreetMap Contributors, © Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, MET/NASA, USGS, EPA, US Census Bureau, USDA

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.0869

May 15, 2023

Mr. Ramzi Mansour
County of Hawaii
Department of Environmental Management
345 Kekuanaoa Street, Suite 41
Hilo, Hawaii 96720

Dear Mr. Mansour:

Subject: Hawaii Revised Statutes (HRS) Chapter 343 Pre-Assessment Consultation for Bayfront Highway and Waianuenue Avenue Intersection Improvements South Hilo District, Hawaii Island, Hawaii

Thank you for your letter dated January 11, 2023, regarding the subject project. We acknowledge your comments below and provide the following responses.

The County of Hawaii, Department of Environmental Management (COHDEM) Wastewater Division owns and maintains a significant amount of public sewer infrastructure within and adjacent to project site, as shown in the attached map. Close coordination with Wastewater Division will be required to identify the exact location of the infrastructure to determine whether any of it will need to be moved, repaired, or replaced.

The design team will contact the COHDEM Wastewater Division to obtain available information on the existing infrastructure. Any infrastructure adjustments that are triggered by the project will be reflected in the proposed design accordingly.

The Solid Waste Divisions conveys municipal solid waste daily from the Honomu Transfer Station and the Papaikou Transfer Station through the project site to the East Hawaii Regional Sort Station, and replaces full bins with empty ones. Closure of the project site to traffic without an adequate detour for the hauling of solid waste may hamper the Division's ability to empty the bins at the transfer station and may result in the closure of a transfer station. If this were to be necessary, advance notice to the public of service interruptions would also be required.

If any temporary closure of the project site is deemed necessary during construction, the Department of Transportation will coordinate with the COHDEM Solid Waste Division with adequate notice to ensure that solid waste service is not impeded and will consult the division for sufficient detour options.

Mr. Ramzi Mansour
May 15, 2023
Page 2

HWY-DD 2.0869

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

Sincerely,

Henry Kennedy

HENRY KENNEDY
Engineering Program Manager
Highways Design Branch



DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I

345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

January 17, 2023

Mr. Dave Simpson
PBR HAWAII & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484

Dear Mr. Simpson:

**Subject: Pre-Environmental Assessment Consultation for Bayfront Highway and
Waiānuenuenu Avenue Intersection Improvements, South Hilo District,
Hawai'i Island, Hawai'i
Tax Map Key (3) 2-3-002:Various**

This is in response to your Pre-Environmental Assessment Consultation letter dated
December 16, 2022.

The Department requests that the construction plans be submitted to our Department for review and
approval.

We have no objection to the proposed project with the condition that the applicant/contractor will be
responsible for the cost of relocating or modifying any of our water system facilities within the project
area.

Should there be any questions, please contact Mr. Ryan Quitoriano of our Water Resources and
Planning Branch at (808) 961-8070, extension 256.

Sincerely yours,

Keith K. Okamoto, P.E.
Manager-Chief Engineer

RQ:dfg

copy – State of Hawai'i, Department of Transportation, Highways Division

... Water, Our Most Precious Resource ... Ka Wai A Kāne ...

The Department of Water Supply is an Equal Opportunity provider and employer.

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.0870

May 15, 2023

Mr. Keith Okamoto
County of Hawaii
Department of Water Supply
345 Kekuanaoa Street, Suite 20
Hilo, Hawaii 96720

Dear Mr. Okamoto:

Subject: Hawaii Revised Statutes (HRS) Chapter 343 Pre-Assessment Consultation for Bayfront Highway and Waianuenue Avenue Intersection Improvements South Hilo District, Hawaii Island, Hawaii

Thank you for your letter dated January 17, 2023, regarding the subject project. We acknowledge your comments below and provide the following responses.

The Department requests that the construction plans be submitted to our Department for review and approval.

We will provide your agency with the detailed construction plans for review and approval.

We have no objection to the proposed project with the condition that the applicant/contractor will be responsible for the cost of relocating or modifying any of our water system facilities within the project area.

We acknowledge that you have no objection to the proposed project on the condition suggested. If the final site plans require relocation/modification of the water system within the project boundaries, the Department of Transportation will be responsible for the cost incurred by these improvements and will consult with your agency for the logistics required to conduct the modifications/relocation, if necessary to construct the proposed improvements to the intersection.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

Mr. Keith Okamoto
May 15, 2023
Page 2

HWY-DD 2.0870

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

Sincerely,

Henry Kennedy

HENRY KENNEDY
Engineering Program Manager
Highways Design Branch

Mitchell D. Roth
Mayor

Lee E. Lord
Managing Director



Kazuo S. K. L. Todd
Fire Chief

Eric H. Moller
Deputy Fire Chief

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

January 6, 2023

PBR HAWAII & Associates
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484

Dear Mr. Kennedy:

SUBJECT: Hawaii Revised Statutes (HRS) Chapter 343 Pre-Assessment Consultation for Bayfront Highway and Waianuenue Avenue Intersection Improvements, South Hilo District, Hawaii Island, Hawaii

We are in receipt of your letter dated December 16, 2022 in regards to an Environmental Assessment and Anticipated finding of no significant Impact for the above listed subject.

The Hawai'i Fire Department has no comments.

If you should have any questions, please feel free to contact my office at (808) 932-2911.

Mahalo,

A handwritten signature in black ink, appearing to read "Kazuo S. K. L. Todd".

KAZUO S. K. L. TODD
Fire Chief



JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1088

May 15, 2023

Mr. Kazuo S.K.L. Todd, Fire Chief
County of Hawaii
Hawaii Fire Department
25 Aupuni Street
Hilo, Hawaii 96720

Dear Chief Todd:

Subject: Hawaii Revised Statutes (HRS) Chapter 343 Pre-Assessment Consultation for Bayfront Highway and Waiianuenue Avenue Intersection Improvements South Hilo District, Hawaii Island, Hawaii

Thank you for your letter dated January 6, 2023, regarding the subject project. We acknowledge that the County of Hawaii Fire Department has no comments on the proposed project. We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

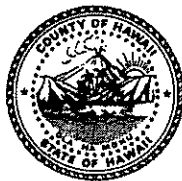
If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

Sincerely,

Henry Kennedy

HENRY KENNEDY
Engineering Program Manager
Highways Design Branch

Mitchell D. Roth
Mayor



John C. Andoh
Mass Transit
Administrator

County of Hawai'i
Mass Transit Agency

25 Aupuni Street • Hilo, Hawai'i 96720 • (808) 961-8744 • Fax (808) 961-8745
www.heleonbus.org • heleonbus@hawaiicounty.gov

January 18, 2023

Dave Simpson
PBR Hawaii & Associates, Inc
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484

Dear Whom Ever This May Concern,

Subject: Bayfront Highway and Waianuenue Avenue

The County of Hawai'i Mass Transit Agency (MTA) has reviewed the correspondence related to the Bayfront Highway and Waianuenue Avenue and would request consideration for transit improvements at this intersection as Routes 1, 2/Blue, 60, 80 and 103 travel through this intersection on a daily basis, multiple times throughout the day. The MTA would like to be made of aware of any construction plans and mitigation measures as the improvements may potentially impact these routes.

Should you have any questions regarding this letter, please feel free to call 808-961-8555 or email john.andoh@hawaiicounty.gov.

Mahalo,

John Andoh
Mass Transit Administrator & General Manager

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1089

May 15, 2023

Mr. John Andoh
Mass Transit Agency
County of Hawaii
25 Aupuni Street, Suite 41
Hilo, Hawaii 96720

Dear Mr. Andoh:

Subject: Hawaii Revised Statutes (HRS) Chapter 343 Pre-Assessment Consultation for Bayfront Highway and Waianuenue Avenue Intersection Improvements South Hilo District, Hawaii Island, Hawaii

Thank you for your letter dated January 18, 2023, regarding the subject project. We acknowledge your comments below and provide the following responses.

The County of Hawaii Mass Transit Agency (MTA) has reviewed the correspondence related to the Bayfront Highway and Waianuenue Avenue and would request consideration for transit improvements at this intersection as Routes 1, 2/Blue, 60, 80 and 103 travel through this intersection on a daily basis, multiple times throughout the day. The MTA would like to be made aware of any construction plans and mitigation measures as the improvements may potentially impact these routes.

We will provide your agency with opportunities to review and comment on the detailed construction plans which will include proposed detours. During construction, any temporary road closures that may impact the aforementioned bus routes and bus stops (Hilo Post Office) will be mitigated with alternative routes and temporary relocation of stops as needed. We will continue consulting with your agency on solutions to minimize the impacts during construction.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

Mr. John Andoh
May 15, 2023
Page 2

HWY-DD 2.1089

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

Sincerely,

Henry Kennedy

HENRY KENNEDY
Engineering Program Manager
Highways Design Branch

Mitchell D. Roth
Mayor



Kenneth Bugado Jr.
Acting Police Chief

County of Hawai'i

POLICE DEPARTMENT

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

December 28, 2022

PBR HAWAII & ASSOCIATES, INC.
Attention: Dave Simpson
dsimpson@pbrhawaii.com
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484

Dear Mr. Simpson:

SUBJECT: HAWAII REVISED STATUTES (HRS) CHAPTER 343 PRE-ASSESSMENT
CONSULTATION FOR BAYFRONT HIGHWAY AND WAIANUENUE AVENUE
INTERSECTION IMPROVEMENTS, SOUTH HILO DISTRICT

Staff, upon reviewing the provided documents, does not anticipate any significant public safety concerns.


There is a concern regarding traffic congestion and access if the intersection along with Bayfront Highway are both shut down at the same time.

Highway 19 feeds Hilo from the North for thousands of vehicles daily; and even though there is an alternate entry through the Wainaku area, these streets are much narrower. These streets would not be able to accommodate large trucks along with the increased traffic.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact Captain Sandor Finkey, South Hilo Patrol, at 961-2214.

Sincerely,


KENNETH A. K. QUIOCO
ASSISTANT POLICE CHIEF
AREA I OPERATIONS

SF III/22HQ1604

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
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TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.1090

May 15, 2023

Mr. Kenneth Quiocho, Assistant Police Chief
County of Hawaii
Police Department
349 Kapiolani Street
Hilo, Hawaii 96720

Dear Assistant Chief Quiocho:

Subject: Hawaii Revised Statutes (HRS) Chapter 343 Pre-Assessment Consultation for Bayfront Highway and Waianuenue Avenue Intersection Improvements South Hilo District, Hawaii Island, Hawaii

Thank you for your letter dated December 28, 2022, regarding the subject project. We acknowledge your comments below and provide the following responses.

Staff, upon reviewing the provided documents, does not anticipate any significant public safety concerns.

There is a concern regarding traffic congestion and access if the intersection along with Bayfront Highway are both shut down at the same time.

Highway 19 feeds Hilo from the North for thousands of vehicles daily; and even though there is an alternate entry through the Wainaku area, these streets are much narrower. These streets would not be able to accommodate large trucks along with the increased traffic.

We acknowledge your comment that you do not anticipate any public safety concerns related to the proposed improvements. We also acknowledge your concerns regarding traffic congestion and access during construction that may result from temporary road closures along Highway 19. While no vehicular access will be provided during the notified construction period where road access is blocked or closed, we will take into consideration your concern over the narrow roadways through the Wainaku area that may be considered for alternative routes during temporary road closures. The Police Department will be notified in writing when road access will be blocked or closed at least five days before the start of construction.

Mr. Kenneth Quioco, Assistant Police Chief
May 15, 2023
Page 2

HWY-DD 2.1090

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

You may email or mail any additional comments to:

PBR HAWAII & Associates, Inc.
Attn: Dave Simpson
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
dsimpson@pbrhawaii.com

We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

Sincerely,

Henry Kennedy

HENRY KENNEDY
Engineering Program Manager
Highways Design Branch

From: [John Woolverton](#)
To: [Dave Simpson](#); [Damon Murphy](#)
Subject: Input re: HILO Bayfront/Waianuenue Roundabout Project (from Connections Public Charter School)
Date: Thursday, January 26, 2023 3:08:34 PM

Aloha PBR Hawaii!

This message is from Connections Public Charter School (174 Kamehameha Ave., Hilo) and is in response to your solicitation for input regarding the prospective improvement project centered around the intersection of Hawaii Belt Road Route 19 and Waianuenue Ave.(State Route 200) in downtown Hilo. According to the project map provided, the "project area" as delineated touches the very northeast corner of our campus (a.k.a the "Kress" Building).

***Input/Concerns Regarding "Project Area" Zone**

1. The project area CUTS OFF the exit route of the parking lot directly in front of our main school entrance (which faces makai/east). This is a long (one-way northbound) single-lane parking lot, running north-south parallel to Kamehameha Ave. and Hwy.19. Our families utilize free access to this parking lot and its northbound lane TWICE a day for the drop off and pickup of their students. We at Connections PCS would need to be provided some type of alternative exit lane in order to properly access the front (east-facing) entrance of our school.
2. The project area CUTS OFF the parking stalls located on the west-side curb of Kamehameha Ave. for approximately 100 feet south of its Kalakaua St. intersection. This is exactly where we park our two school buses, and you will observe specifically designed bus parking slots painted into that very section of the west-side curb of Kamehameha Ave. for that expressed purpose. We at Connections PCS would need to be provided two alternative parking spots big enough for two full-sized school buses to park daily.
3. The project area also CUTS OFF access to our section of Kalakaua St (the secondary, and only other) entry/exit point of our Kress Building campus. Kalakaua St. is a one-way mauka/westbound street which therefore requires access at its intersection with Kamehameha Ave, which this project area shuts off completely. We at Connections PCS would need to be provided some type of alternative entry to access our secondary (north-facing) entrance to our school along Kalakaua St..

***Possible Solution**

Revise the "project area" so that the SOUTHWEST CORNER of the project area is on the NORTH SIDE OF KALAKAUA ST.(instead of between Kalakaua St. & Haili St.) With a southwest project corner on the north-side of Kalakaua and then the project area border extended in a straight line due east from there until it hits the EAST-MAKAI SIDE CURB OF KAMEHAMEHA AVE., all of the three concerns stated above would be alleviated all at once!

Thank you very much for your consideration!

And please feel free to reply to this message or to call us directly with any feedback, questions, or clarifications regarding our concerns and/or possible solution. Thanks again!

John B. Woolverton
Connections PCS Deputy Director
808-895-6857(cell)

JOSH GREEN, M.D.
GOVERNOR

HIGHWAY DESIGN BRANCH, ROOM 688A
BRIDGE DESIGN SECTION, ROOM 611
CADASTRAL DESIGN SECTION, ROOM 600
ENVIRONMENTAL DESIGN SECTION, ROOM 688A
HIGHWAY DESIGN SECTION, ROOM 609
HYDRAULIC DESIGN SECTION, ROOM 636
TECHNICAL DESIGN SECTION, ROOM 688



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY-DD 2.0867

May 15, 2023

Mr. John Woolverton, Deputy Director
Connections Public Charter School
174 Kamehameha Avenue
Hilo, Hawaii 96720

Dear Mr. Woolverton:

Subject: Hawaii Revised Statutes (HRS) Chapter 343 Pre-Assessment Consultation for Bayfront Highway and Waianuenue Avenue Intersection Improvements South Hilo District, Hawaii Island, Hawaii

Thank you for your memorandum dated January 26, 2023, regarding the subject project. We acknowledge your comments below and provide the following responses.

The project area CUTS OFF the exit route of the parking lot directly in front of our main school entrance (which faces makai/east). This is a long (one-way northbound) single-lane parking lot, running north-south parallel to Kamehameha Ave. and Hwy.19. Our families utilize free access to this parking lot and its northbound lane TWICE a day for the drop off and pickup of their students. We at Connections PCS would need to be provided some type of alternative exit lane in order to properly access the front (east-facing) entrance of our school.

While the project area does include the exit route and parking lot directly in front of the school entrance, the proposed design for the project will not impede the parking facilities and existing access described, see Figure 1 below. During construction, there may be temporary closures in the immediate vicinity, however, alternative routes will be provided, and adequate notice will be provided to allow time to adapt to temporary construction conditions. After completion of the proposed project, the parking lot and exit route to Kalakaua Street and Kamehameha Avenue will maintain similar conditions and the proposed project should not impact current usage by your school. Detailed plans for the proposed design will be provided with the Draft Environmental Assessment and you will have another opportunity to provide comments after reviewing the detailed information.



Figure 1: Site Plan

The project area CUTS OFF the parking stalls located on the west-side curb of Kamehameha Ave. for approximately 100 feet south of its Kalakaua St. intersection. This is exactly where we park our two school buses, and you will observe specifically designed bus parking slots painted into that very section of the west-side curb of Kamehameha Ave. for that expressed purpose. We at Connections PCS would need to be provided two alternative parking spots big enough for two full-sized school buses to park daily.

While the project area does include the section of Kamehameha Avenue and parking stalls described, the proposed design for the project will not significantly alter the existing conditions at this location, see Figure 1. During construction, there may be temporary closures in the immediate vicinity, however, adequate notice will be provided to allow time to adapt to temporary construction conditions.

After completion of the proposed project, the section of Kamehameha Avenue and parking stalls described will maintain similar conditions and the proposed project should not impact current usage by your school. Detailed plans for the proposed design will be provided with the Draft Environmental Assessment and you will have another opportunity to provide comments after reviewing the detailed information.

The project area also CUTS OFF access to our section of Kalakaua St (the secondary, and only other) entry/exit point of our Kress Building campus. Kalakaua St. is a one-way mauka/westbound street which therefore requires access at its intersection with Kamehameha Ave, which this project area shuts off completely. We at Connections PCS would need to be provided some type of alternative entry to access our secondary (north-facing) entrance to our school along Kalakaua St.

While the project area does include the intersection of Kamehameha Avenue and Kalakaua Street, the proposed design for the project will not alter the existing access through this intersection, see Figure 1. During construction, there may be temporary closures in the immediate vicinity, however, adequate notice will be provided to allow time to adapt to temporary construction conditions. After completion of the proposed project, the intersection of Kamehameha Avenue and Kalakaua Street will maintain similar conditions and the proposed project should not impact current usage by your school. Detailed plans for the proposed design will be provided with the Draft Environmental Assessment and you will have another opportunity to provide comments after reviewing the detailed information.

***Possible Solution**

Revise the "project area" so that the SOUTHWEST CORNER of the project area is on the NORTH SIDE OF KALAKAUA ST.(instead of between Kalakaua St. & Haili St.) With a southwest project corner on the north-side of Kalakaua and then the project area border extended in a straight line due east from there until it hits the EAST-MAKAI SIDE CURB OF KAMEHAMEHA AVE., all of the three concerns stated above would be alleviated all at once!

We acknowledge your suggested alternative solution. While the project area does include the intersection of Kamehameha Avenue and Kalakaua Street and parking lot fronting your school facilities, the proposed design for the project will not alter the existing access through this intersection and will maintain similar conditions for the parking lot described and therefore should not significantly impact usage by your school. Please review the proposed design provided with the Draft Environmental Assessment. You will have another opportunity to provide comments after reviewing the detailed information.

We will include you in future correspondence as we seek further input on the proposed improvements to the intersection throughout the environmental review process in compliance with HRS Chapter 343.

Mr. John Woolverton, Deputy Director
May 15, 2023
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You may email or mail any additional comments to:

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We value your participation in the environmental review process. Your letter and this response will be reproduced in the forthcoming Draft Environmental Assessment.

If you have any questions or concerns, please contact Project Manager Robert Sun of our Highways Design Branch, Design Section at (808) 692-7578 or by email at Robert.Sun@hawaii.gov.

Sincerely,

Henry Kennedy

HENRY KENNEDY
Engineering Program Manager
Highways Design Branch