C. Kimo Alameda, Ph.D.
Mayor

William V. Brilhante, Jr.
Managing Director

West Hawai‘i Office
74-5044 Ane Keohokālole Hwy
Kailua-Kona, Hawai‘i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai‘i
PLANNING DEPARTMENT

Jeffrey W. Darrow
Acting Director

Michelle S. Ahn
Acting Deputy Director

East Hawai‘i Office
101 Pauahi Street, Suite 3
Hilo, Hawai‘i 96720
Phone (808) 961-8288
Fax (808) 961-8742

December 30, 2024

Mary Alice Evans, Director
State of Hawai‘i
Office of Planning and Sustainable Development
Environmental Review Program
235 South Beretania Street, Suite 702
Honolulu, Hawai‘i 96813

Dear Mary Alice Evans:

Subject:	**Final Environmental Assessment (FEA) and Finding of No Significant Impact (FONSI) (PL-ENV-2024-000025)**
Applicant:	**Hilo Benioff Medical Center (HBMC)-Hawai‘i Health Systems Corporation**
Project:	**Hilo Benioff Medical Center Kea‘au Outpatient Center**
TMK:	**(3) 1-6-003:081 & :129 (por.), Kea‘au, Puna District, Island of Hawai‘i**

With this letter, the County of Hawai‘i Planning Department (Accepting Authority) hereby transmits the Final Environmental Assessment and Finding of No Significant Impact (FEA-FONSI) for the Hilo Benioff Medical Center Kea‘au Outpatient Center for publication in the next available edition of the Environmental Notice.

The applicant proposes to develop a new outpatient medical and behavioral health clinic on approximately seven to nine acres of land in Kea‘au (inclusive of parcel 81 consisting of 7.013 acres of land and the option to purchase and develop an additional two acres of land within the adjacent parcel 129). The clinic will be a 36,000-square-foot, single-story complex with a clinical wing, a behavioral health wing, and imaging and laboratory services. The complex will include onsite wastewater treatment works to conform to State Department of Health secondary treatment wastewater treatment facility standards, 201 parking spaces, onsite stormwater retention basins, an access driveway, and utilities.

The Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) was published in the Environmental Review Program’s November 8, 2024, issue of the Environmental Notice. The FEA includes copies of comments received and the

corresponding responses from the applicant that were received during the public comment period on the DEA-AFONSI.

Based on our review of the FEA and findings from Part 5 (Determination, Findings, and Reasons), the Planning Department has determined that this project will not have a "significant effect" or "significant impact" on the quality of the environment and have therefore issued a FONSI. **This FONSI does not constitute approval of the project or of any project components or proposed uses.**

In addition to this letter, we have submitted the electronic version of the Environmental Review Program Publication Form and a searchable PDF-formatted copy of the FEA-FONSI through the online submission platform.

If there are any questions regarding the Department's determination, please call Christian Kay at (808) 961-8136.

Sincerely,

Jeffrey W. Darrow
Jeffrey W. Darrow (Dec 30, 2024 13:33 MST)
JEFFREY W. DARROW
Acting Planning Director

CRK:rms
P\wpwin60\ch343\2024\pl-env-2024-000025 hbmc keaau outpatient\lhbmc_pd_coh_to_erp_feafonsi.doc

cc via email: John Pipan, Land Planning Hawai'i LLC

From: webmaster@hawaii.gov
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice
Date: Monday, December 30, 2024 3:32:50 PM

Action Name

Hilo Benioff Medical Center Keaʻau Outpatient Center

Type of Document/Determination

Final environmental assessment and finding of no significant impact (FEA-FONSI)

HRS §343-5(a) Trigger(s)

- (1) Propose the use of state or county lands or the use of state or county funds

Judicial district

Puna, Hawaiʻi

Tax Map Key(s) (TMK(s))

(3) 1-6-003:081; (3) 1-6-003:129 (Portion)

Action type

Applicant

Other required permits and approvals

See Section 4.5 Required Permits and Approvals of the FEA

Discretionary consent required

Special Permit

Agency jurisdiction

County of Hawaiʻi

Approving agency

Planning Department

Agency contact name

Christian Kay

Agency contact email (for info about the action)

christian.kay@hawaiicounty.gov

Email address for receiving comments

christian.kay@hawaiicounty.gov

Agency contact phone

(808) 961-8136

Agency address

101 Pauahi Street

Suite 3
Hilo, HI 96720
United States
Map It

Applicant

Hilo Benioff Medical Center (HBMC)-Hawai'i Health Systems Corporation

Applicant contact name

John Pipan

Applicant contact email

john@landplanninghawaii.com

Applicant contact phone

(808) 333-3393

Applicant address

194 Wiwo'ole Street
Hilo, HI 96720
United States
Map It

Is there a consultant for this action?

Yes

Consultant

Land Planning Hawai'i LLC

Consultant contact name

John Pipan

Consultant contact email

john@landplanninghawaii.com

Consultant contact phone

(808) 333-3393

Consultant address

194 Wiwo'ole Street
Hilo, HI 96720
United States
Map It

Action summary

Development of a new outpatient medical and behavioral health clinic on approximately seven to nine acres of land in Kea'au (inclusive of parcel 81 consisting of 7.013 acres of land and the option to purchase and develop an additional two acres of land within the adjacent parcel 129). The clinic will be a 36,000-square-foot, single-story complex with a clinical wing, a behavioral health wing, and imaging and laboratory services. The complex will include onsite wastewater treatment works to conform to State Department of Health secondary treatment wastewater treatment facility standards, 201 parking spaces, onsite stormwater retention basins, an access driveway, and utilities.

Reasons supporting determination

See Part 5 (Determination, Findings, and Reasons) in the FEA.

Attached documents (signed agency letter & EA/EIS)

- 2024-12-27_HMC-Keaau_FINAL-Environmental-Assessment_v1.pdf
- RUSH-Letter-for-Mary-Alice-Evans-Regarding-FEA-FONSI-for-Hilo-Benioff-Med.-Center-Kea'au-PL-ENV-2024-000025.pdf

Shapefile

- The location map for this Final EA is the same as the location map for the associated Draft EA.

Action location map

- HBMC.zip

Authorized individual

Christian Kay

Authorization

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

HILO BENIOFF MEDICAL CENTER
KEA‘AU OUTPATIENT CENTER

FINAL ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL ASSESSMENT FOR
HILO BENIOFF MEDICAL CENTER (HBMC)
CONSTRUCTION OF MEDICAL OFFICES
KEA‘AU, PUNA, ISLAND OF HAWAI‘I
TMK (3) 1-6-003: 081

DECEMBER 2024

Prepared by
Land Planning Hawai‘i LLC
194 Wiwo‘ole Street
Hilo, Hawai‘i 96720

This document is prepared pursuant to:
The Hawai‘i Environmental Policy Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200.1, Hawai‘i Department of Health Administrative Rules (HAR)

Page left blank intentionally

TABLE OF CONTENTS

FIGURES

APPENDICES

ABBREVIATIONS

HMC	Hilo Medical Center
HBMC	Hilo Benioff Medical Center
KOC	Kea‘au Outpatient Center
DWS	Department of Water Supply
BMPs	Best Management Practices
TIAR	Traffic Impact Analysis Report
HDOT	Hawai‘i Department of Transportation
SHPD	State Historic Preservation Division
GP	Hawai‘i County General Plan
PCDP	Puna Community Development Plan
SPP	Special Permit
EA	Environmental Assessment
DEA	Draft Environmental Assessment
FEA	Final Environmental Assessment
HEPA	Hawai‘i Environmental Policy Act
HRS	Hawai‘i Revised Statutes
HAR	Hawai‘i Administrative Rules
FONSI	Finding of No Significant Impact
EIS	Environmental Impact Statement
DOH	Department of Health
USGS	United States Geological Survey
USDA	United States Department of Agriculture
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
SMA	Special Management Area
HWMO	Hawai‘i Wildfire Management Organization
UIC	Underground Injection Control
DOFAW	Division of Forestry and Wildlife
DLNR	Department of Land and Natural Resources
ROD	Rapid ‘Ōhi‘a Death
CAA	Clean Air Act
ESA	Environmental Site Assessment
ASTM	American Society for Testing and Materials
REC	Recognized Environmental Condition
MSDS	Material Safety Data Sheets
PPE	Personal Protective Equipment
WWTW	Wastewater Treatment Works
LUPAG	Land Use Pattern Allocation Guide

CDP	Community Development Plan
NPDES	National Pollutant Discharge Elimination System
SWPPP	Storm Water Pollution Prevention Plan
SWMP	Solid Waste Management Plan
DEM	Department of Environmental Management
ALICE	Asset Limited, Income Constrained, Employed
LCA	Land Commission Award
IPCC	Intergovernmental Panel on Climate Change

SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES

Hilo Medical Center (HMC), recently renamed Hilo Benioff Medical Center (HBMC) has served as the largest hospital and primary healthcare provider on the Island of Hawai‘i since 1897. They have also played a vital role in expanding healthcare access to rural areas of the island by establishing primary and specialty care clincs throughout Puna. The Puna District faces many healthcare challenges including increasing demand, overcrowding, and accessibility issues. Therefore, HMC is proposing to construct a new medical facility in Kea‘au known as the Kea’au Outpatient Center (KOC) to help address these issues.

The subject property is located to the west of Highway 130 at 16-790 Kea‘au Pahoa Road, approximately 780 feet south from its convergence with Kea‘au-Pāhoa Bypass Road (**Figure 1**). The site is 7.013 acres of land zoned *Agricultural 20-acres* (A-20a). The property was subdivided in February 2024 from the larger 26.76-acre parent parcel by subdivision 2023-000216. HBMC has retained an option to purchase and develop an additional contiguous 2 acres should the project require additional land area. The current extent of the proposed project includes 7-acre lot and the optional additional 2 acres (hereinafter referred to as “property”).

Plans include construction of a single-story medical office building complex consisting of a clinical wing and a behavioral health wing, totaling approximately 36,000 square feet. Sufficient paved parking stalls and loading zones are proposed meeting zoning code requirements. The total disturbance area for the project is proposed to be approximately 7-9 acres (**Figure 2).**

On-site infrastructure is expected in the form of driveways, parking, electrical, water supply, storm water management, and wastewater disposal facilities. Electricity is available to the site via existing overhead transmission and distribution poles along Kea‘au-Pāhoa Road. The subject property is fronted by a Department of Water Supply (DWS) 8- inch water main which is looped back into the existing 12-inch water main on Kea‘au-Pāhoa Road. Consultation with DWS indicates that adequate water is available for the proposed use and for fire suppression. Water calculations will be developed in consultation with DWS to determine appropriate water supply lateral size for the proposed development. There is no county sewer line in the area. Wastewater will be handled through a wastewater treatment facility that provides secondary treatment required per Department of Health rules.

Minor and short-term construction phase impacts to noise, air and water quality will be mitigated by Best Management Practices (BMPs) associated with County Special Permits, Department of Health regulations, Grubbing and Grading Permits, a National Pollutant Discharge Elimination System (NPDES) permit and Storm Water Pollution Prevention Plan (SWPPP).

Access to the subject property is proposed via a driveway off Old Pahoa Government Road near the intersection of Old Kea‘au-Pāhoa Road and Mamaka Street. An alternative to connect the project driveway to Old Kea‘au-Pāhoa Road is also evaluated (**Figure 3**). A sliver parcel identified as TMK (3) 1-6-003: 080 is State land located between the subject property and the

Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, US Census Bureau, USDA, USFWS, Esri, NASA, NGA, USGS, Sources: Esri, USGS

FIGURE 1 LOCATION MAP

ArcGIS Web AppBuilder

Sources: Esri, USGS | Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, US Census Bureau,

PROJECT DESCRIPTION
36,000 SQUARE FOOT 1-STORY BUILDING TO HOUSE URGENT CARE, PRIMARY CARE, IMAGING CENTER, LABORATORY SERVICES, AND WELLNESS AND BEHAVIORAL HEALTH CARE.

PARKING
PROPOSED= 201 SPACES

ADA
PROPOSED = 9 SPACES

VEHICLE CHARGING
PROPOSED = 24 SPACES

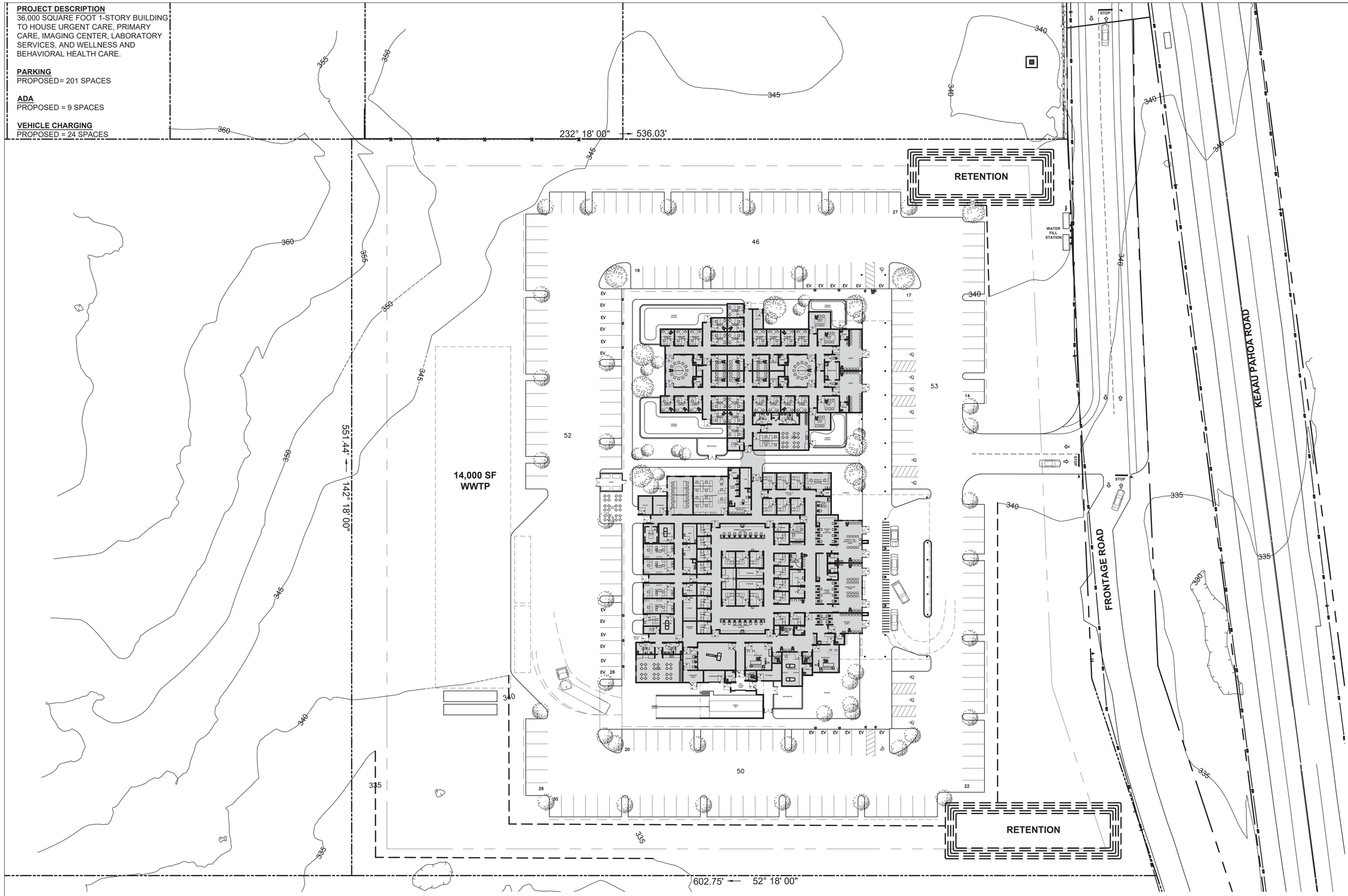


FIGURE 2 CONCEPTUAL SITE PLAN

1 **SITE PLAN**
SCALE: 1/32" = 1'-0"

NORTH

FLEMING & Associates, LLC
557 MANONO STREET
HILO, HAWAII

SCOTT E. FLEMING
LICENSED PROFESSIONAL ARCHITECT
No. 11441
HAWAII, U.S.A.

EXP. DATE: 04/30/2026

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. OBSERVATION AS DETAILED IN SECTION 16-115-5 HAWAII ADMINISTRATIVE RULES, DEPT. OF COMMERCE AND CONSUMER AFFAIRS, ENTITLED PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.

THE KEA'AU BENIOFF HEALTH CENTER WELLNESS AND BEHAVIORAL HEALTH SCHEMATIC DESIGN

OLD PAHOA GOVERMENT ROAD
HILO, HAWAII, 96749
TAX MAP KEY: (3) 1-6-003-0081: LOT 1-A

CONSULTANT:

REVISIONS

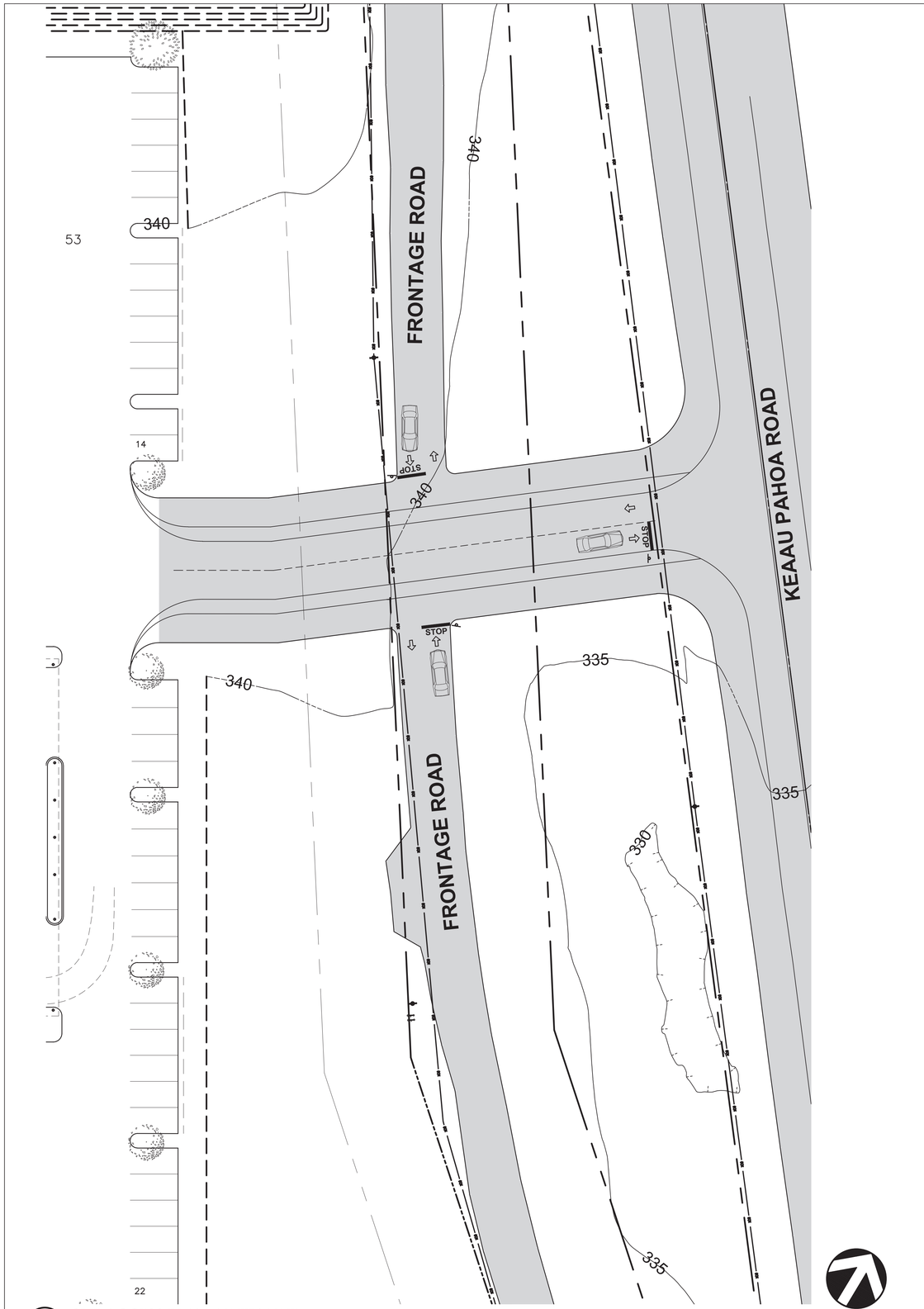
Rev	Description	Date

PROJECT NO.: 24007.00
PROJECT ARCH.: SF
PROJECT PLANS:

SHEET CONTENTS:
SITE PLAN

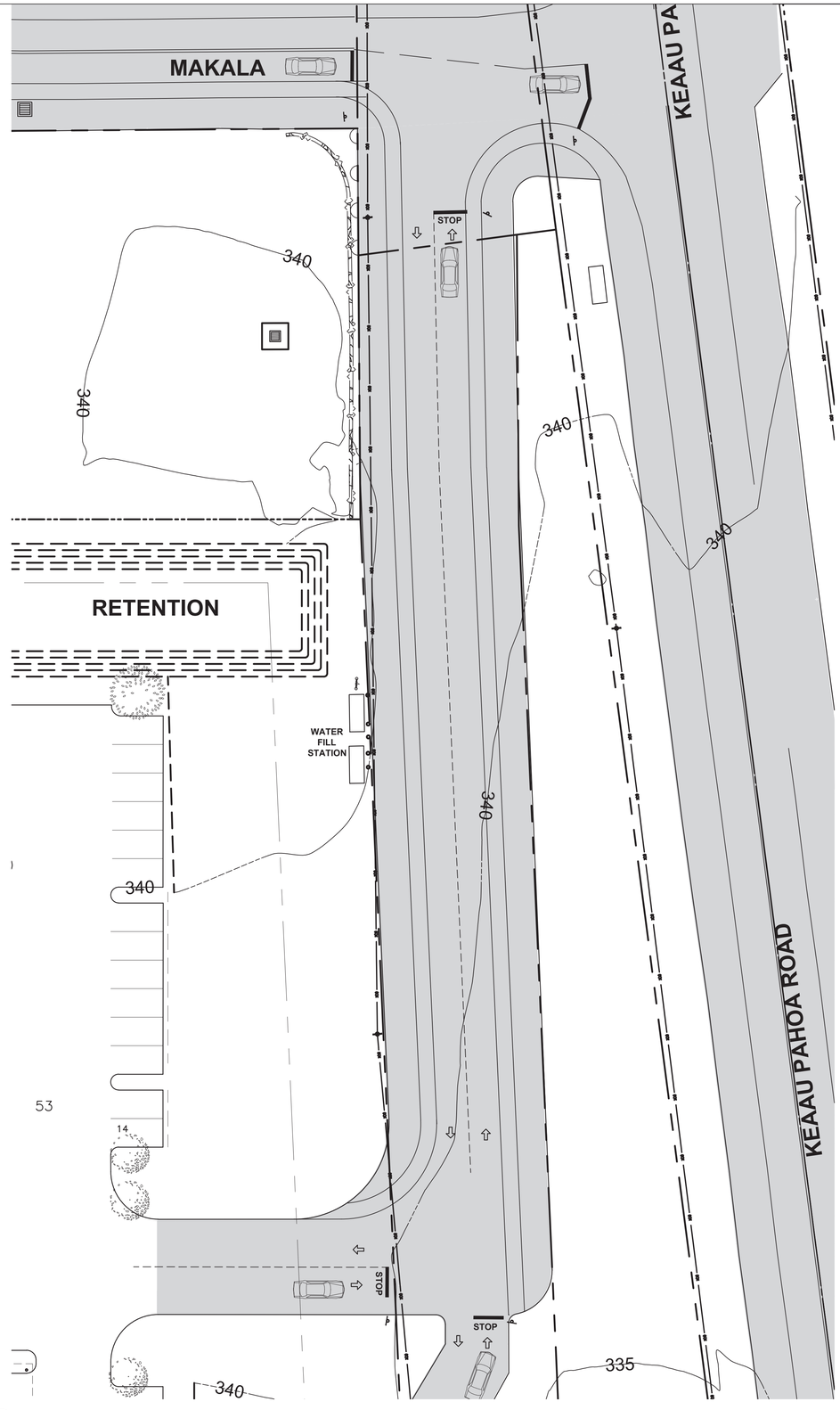
DATE: SEPTEMBER 2024

SHEET:
A01



2 **SITE ACCESS PLAN ALTERNATE 2**
SCALE: NO SCALE

NORTH



1 **SITE ACCESS PLAN ALTERNATE 1**
SCALE: NO SCALE

NORTH

FIGURE 3 PROPOSED ACCESS ALTERNATIVES

FLEMING &
Associates, LLC
557 MANONO STREET
HILO, HAWAII

SCOTT E. FLEMING
LICENSED PROFESSIONAL ARCHITECT
No. 11441
HAWAII, U.S.A.

EXP. DATE: 04/30/2026

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. OBSERVATION AS DETAILED IN SECTION 16-115-5 HAWAII ADMINISTRATIVE RULES, DEPT. OF COMMERCE AND CONSUMER AFFAIRS, ENTITLED PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.

THE KEA'AU BENIOFF HEALTH CENTER
WELLNESS AND BEHAVIORAL HEALTH
SCHEMATIC DESIGN
OLD PAHOA GOVERMENT ROAD
HILO, HAWAII, 96749
TAX MAP KEY: (3) 1-6-003-0081: LOT 1-A

CONSULTANT:

REVISIONS

Rev	Description	Date

PROJECT NO.: 24007.00
PROJECT ARCH.: SF
PROJECT PLANS:

SHEET CONTENTS:
SITE ACCESS PLAN
ALTERNATE 1 & 2

DATE: SEPTEMBER 2024

SHEET:
A04

Kea‘au-Pāhoa Road Right-of-Way (ROW). Therefore, roadway improvements within the ROW will require State of Hawai‘i Department of Transportation (HDOT) review and approval. A Traffic Impact Analysis Report (TIAR) was completed by SSFM in October 2024. The TIAR is summarized in Section 3.3.1 and the full report can be found in **Appendix A**. All traffic and access improvements will be completed in consultation with HDOT.

Surveys have determined that no threatened or endangered flora or fauna species are present on the property. Vegetation mainly consists of foxtail palm (*Wodyetia bifurcate*), bismark palm (*Bismarckia nobilis*), Mexican fan palm (*Washingtonia robusta*), ironwood (*Casuarina equisetifolia*), areca palm (*Dypsis lutescens*), guinea grass (*Megathyrsus maximus*), gunpowder tree (*Trema orientale*), avocado (*Persea* americana), and albizia (*Falcataria Moluccana*).

The subject site has been previously cleared and used for agricultural purposes since at least the early 1950’s. In the unlikely event that undocumented archaeological resources, including shells, bones, midden deposits, lava tubes, or similar finds, are encountered during construction, work in the immediate area of the discovery will be halted, and the State Historic Preservation Division (SHPD) will be contacted to determine the appropriate actions.

A Phase I Environmental Site Assessment (ESA)(**Appendix C**) was conducted in September 2023 and subsequent Hazardous Materials survey and soil screen (**Appendix D**) on the subject Property from June 20-21, 2024, by Lehua Environmental Inc. The survey determined that the grey mastic located throughout the metal corrugated roof of the warehouse was a category I non-friable asbestos-containing material (ACM). The applicant will strictly follow the recommendations of the survey and have the material removed and disposed of by a qualified asbestos abatement contractor prior to disturbance. Additionally, the services of a qualified consultant will be obtained to conduct air monitoring and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of ACM.

Additionally, the survey also identified lead-containing paint (LCP) in poor to fair conditions on various interior and exterior painted surfaces within the planned areas of disturbance. The recommendations of the survey will be followed to ensure property handling and disposal of LCPs.

Arsenic-impacted soils with concentrations that exceed the arsenic Hawaii Department of Health Tier 1 Environmental Action Level for unrestricted land use was detected in the northern corner of the lot 0” – 6” below ground surface. The requirements and recommendations listed in the report and concurred by the Department of Health will be strictly followed.

The proposed action does not conflict with the Hawai‘i County General Plan (GP) or the Puna Community Development Plan (PCDP). A Special Permit (SPP) will be submitted to the Hawai‘i County Planning Department in conjunction with this EA to justify unusual and reasonable use according to State Land Use Regulations. The Special Permit petition area does not exceed 15 acres in land area; therefore, the County Winward Planning Department has the authority to review and grant the Special Permit. Establishment of the proposed use will not be contrary to the objectives sought to be accomplished by State Land Use Laws and Regulations.

PART 1: PROJECT DESCRIPTION AND ENVIRONMENTAL ASSESSMENT PROCESS

1.1 Purpose and Need

Hilo Benioff Medical Center is tasked with serving not only the residents of Hilo but also those from surrounding areas including Puna, Volcano, and the Hāmākua Coast. Puna is the fastest growing region in the state. According to census data, it has seen a population increase from about 31,000 people in 2000 to nearly 52,000 people in 2020 and is expected to top 75,000 residents within the next 6 years. Its rapid population growth has created increased demand on the existing healthcare services, which are currently insufficient to serve the growing population, especially with regard to urgent health care and specialty services. The entire Puna District currently contains only two small emergency health clinics – the East Hawaii Health Clinic in Kea‘au and the East Hawaii Health Clinic in Pahoa. Urgent care services are only provided by these clinics between 7:00 a.m. and 7:00 p.m. and 7:00 a.m. and 5:00 p.m., respectively. Additionally, access to specialty care, EKG and imaging services are also very limited in Puna and currently only offered at the Kea‘au East Hawaii Health Clinic. Insufficient access to health services in Puna requires many Puna residents to seek care in Hilo. As a result, Hilo Medical Center has strained to accommodate the influx of patients, resulting in long wait times, overcrowding, and compromised quality of care at times. Development of the new Hilo Medical Center facilities in Kea‘au will help to fill in existing gaps in availability of urgent care, specialty care and imaging services for Puna residents.

The Hawai‘i County General Plan discusses the importance of social services including:

Social services include not only programs to provide assistance to special needs populations, but also health and medical facilities to serve the entire community. “Medical facilities”, in this instance, does not apply to County emergency paramedical services, which are covered in the following Section 3.4. With a growing population, Puna clearly needs more social and health care services within the district. Yet, there are two major challenges to making them accessible to residents:

- *As a rural area with a rudimentary transportation system and dispersed population, it is difficult for residents in need to reach the services; and*
- *Puna’s high percentage of low-income residents tends to increase the need for social services, yet discourages private health care providers from locating in Puna due to insurance issues.*

1.2 Project Description and Location

The subject property is located to the west of Highway 130 at 16-790 Kea‘au Pahoa Road, approximately 780 feet south from its convergence with Kea‘au-Pāhoa Bypass Road.

Plans include construction of a single-story medical office building complex consisting of a clinical wing and a behavioral health wing and totaling approximately 36,000 square feet. Sufficient paved parking stalls and loading zones are proposed meeting zoning code

requirements. The total disturbance area for the project is proposed to be approximately 7-9 acres. The potential additional 2 acres may be utilized if additional flexibility in the site layout is required under Project Alternative 2.2 Alternative Site Layout. For example, greater buffers to neighboring properties may result from the Special Permit process. This would require shifting some of the parking areas and landscaping areas. The overall development scope and scale would not change in any such case and would not affect the overall project impact.

The proposed facilities will provide urgent care services seven (7) days per week, including holidays, from 8:00 a.m. to 8:00 p.m. Primary care services, specialty clinic services (e.g. cardiology), imaging services (e.g. X-rays, CT scans, ultrasounds), laboratory services, and behavioral health and counseling services will be available Monday – Friday from 8:00 a.m. – 4:00 p.m. The facilities will serve the general public, but primarily residents of Puna and South Hilo. It is anticipated that the facility will serve over 100 patients per day.

The facility will provide outpatient care only and will not be an emergency room, will not receive ambulances, and will not provide drug rehabilitation services.

1.3 Cost and Schedule

Total project construction costs are roughly $60 million, completion is estimated by the end of 2027.

1.4 Environmental Assessment Process

In 1974 the Hawai‘i State Legislature enacted the Hawai‘i Environmental Policy Act (HEPA), which requires State and County agencies to conduct an environmental impact analysis prior to making decisions on actions that may impact the environment.

This Environmental Assessment (EA) is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS), along with the implementing regulations, Title 11, Chapter 200.1, of the Hawai‘i Administrative Rules (HAR). This law is the basis for the environmental impact assessment process in the State of Hawai‘i. An EA is necessary for the proposed project since the project involves the use of State of Hawai‘i funds and land. Improvements within the State Right-Of-Way are anticipated for the proposed access to the project, and as mitigation for traffic impacts to nearby intersections. Additionally, the project will utilize public funding sources for its completion. Since discretionary approval is required for the project in the form of a Special Permit, HRS 343-5.5 requires the EA to be completed.

According to Chapter 343, an EA is prepared to determine impacts associated with a proposed action, develop mitigation measures for any discovered adverse impacts, and determine whether the impacts are significant (according to the thirteen specific criteria). If a study concludes that no significant impacts would occur from implementation of the proposed action, a Finding of No Significant Impact (FONSI) is prepared. If a study finds that significant impacts are expected to occur because of a proposed action, then an Environmental Impact Statement (EIS) is prepared to allow deeper investigation of impacts and allow more extensive public involvement.

The following EA discusses alternatives to the proposed action, existing environment and impacts associated with the proposed action, the anticipated determination and the findings made by the applicant in consultation with the County of Hawai‘i Planning Department and the expert consultants who prepared supporting studies for this EA.

The Draft EA was published in the November 08, 2024 Environmental Notice. **Appendix G** contains written comments on the Draft EA and the responses to those comments. This FEA has been modified to reflect the input received. Additional or modified content is denoted by double underlines.

1.5 Public Involvement and Agency Coordination

Agency coordination and public involvement are crucial components of the environmental assessment process to understand the impacts caused by the proposed action. The agencies, organizations, and individuals below have been consulted as part of the environmental assessment process. Copies of correspondence during the early consultation period can be found in **Appendix B.**

State of Hawai‘i

- Department of Land and Natural Resources, Land Division
- Department of Land and Natural Resources, Division of Aquatic Resources
- Department of Land and Natural Resources, Division of Forestry and Wildlife
- Department of Land and Natural Resources, Office of Conservation & Coastal Lands
- Department of Land and Natural Resources, Engineering
- Department of Land and Natural Resources, Historic Preservation
- Hawai‘i Department of Transportation
- Office of Hawaiian Affairs
- State Department of Health
- State Office of Planning and Sustainable Development
- Department of Education

County of Hawai‘i:

- Planning Department
- Fire Department
- Police Department
- Department of Environmental Management
- Department of Public Works
- Department of Water Supply
- Civil Defense

Private

- Ke Kula ‘o Nāwahīokalani‘ōpu‘u Iki Lab Public Charter School
- Surrounding Property Owners within 300 feet of the Property outline

PART 2: ALTERNATIVES

2.1 Alternate Location

During early phases of project planning HBMC evaluated alternate locations for the project in the general area. After full consideration the property was selected as it provides the best overall location for the proposed facility. The property is centrally located and of sufficient size for the full buildout. Necessary utilities and infrastructure also exist at the project site.

There do not appear to be any significant environmental or other factors relating to the proposed use of the site. As such no alternative sites have been identified for study in the Environmental Assessment.

2.2 Alternate Site Layout, Phasing, Access & Building Design

Aside from the proposed action, two alternative site designs were evaluated for the project. The first included constructing three (3) two-story 20,000 square foot buildings over two (2) construction phases. The second alternatve design proposed constructing two (2) single-story 20,000 square foot buildings over two (2) construction phases. These alternative designs or other similar designs would entail similar overall impacts to the proposed action. The phasing alternaives similarly, do not affect the overall impact of the project.

Access Alternatives

There are two potential driveway alignments being considered for the development. Alternative 1 proposes direct access via a driveway off Old Pahoa Government Road, that would be proposed for improvement, located just off of the intersection of Old Kea‘au Pāhoa Road and Mamaka Street. Alternative 2 proposes driveway access to extend from the site as a newly improved road, crossing the existing Old Pahoa Government Road, and connecting to Old Kea‘au Pāhoa Road. Alternative 2 is the preferred alternative.

2.3 No Action

Under a No Action alternative, the medical facility would not be built, and no improvements would be made to the land. The lot would remain in agricultural use and primarily undeveloped. The potential for economic development and positive community impact would largely be lost. This EA considers the No Action alternative as the baseline for this project and all environmental effects will be based off this alternative.

PART 3: ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

3.1 Physical Environment

3.1.1 Geology, Geologic Hazards, and Soils

Environmental Settings

Volcanic Activity

Geological hazards are frequent island wide, but particularly so in the Puna area. According to the Puna Community Development Plan, all of Puna lies within the three most hazardous geological risk zones, Lava Zone 1, 2 and 3, on a scale ranging from 9 to 1, ranking least hazardous to most. The subject property lies within Lava Zone 3 (**Figure 4a**), approximately 1-5 percent of which has been covered by lava flows since 1800, and 15-75 percent within the past 750 years (Thomas et al., 1992).

The subject property sits close to the boundary between Mauna Loa and Kīlauea volcanoes. Nonetheless, according to most geological maps, the site falls just within the boundaries of Mauna Loa.

Mauna Loa is the largest active volcano on earth, rising over 13,500 feet above sea level and extending to a depth of 16,400 feet below sea level. The sea floor is depressed another 26,250 feet due to the volcano's enormous mass. Therefore, from the base to the summit, Mauna Loa is more than 56,000 feet high (HVO, 2022). Since 1843, Mauna Loa has erupted 33 times with an average of one eruption every five years. Exceptions to this pattern occurred during a 25-year hiatus between 1950 and 1975 and a 38-year hiatus from 1984 to 2022. On Sunday November 27, 2022, an eruption began in the summit caldera, Mokuʻāweoweo. After some hours, new fissures opened along the Northeast Rift Zone. By December 2, the eruption was limited to one fissure, which advanced less than 2 miles from Saddle Road. On December 13, 2022, the eruption ceased.

It's probable that the subject property hasn't experienced a lava flow for thousands of years because of its considerable distance from Mauna Loa's most active rift zones. A USGS geological map of the northeast flank of Mauna Loa suggests the subject property is located near the puʻu makaʻala picrite flow identified as *p6e1*, which was a pahoehoe flow that occurred between 5,000 and 6,000 years ago (**Figure 4b**) (Trusdell and Lockwood, 2017). Furthermore, Moore and Trusdell (1991), suggest only eleven lava flows have traveled northeast from Kilauea's East Rift Zone over the past 1,500 years.

Volcanic Hazard Zones

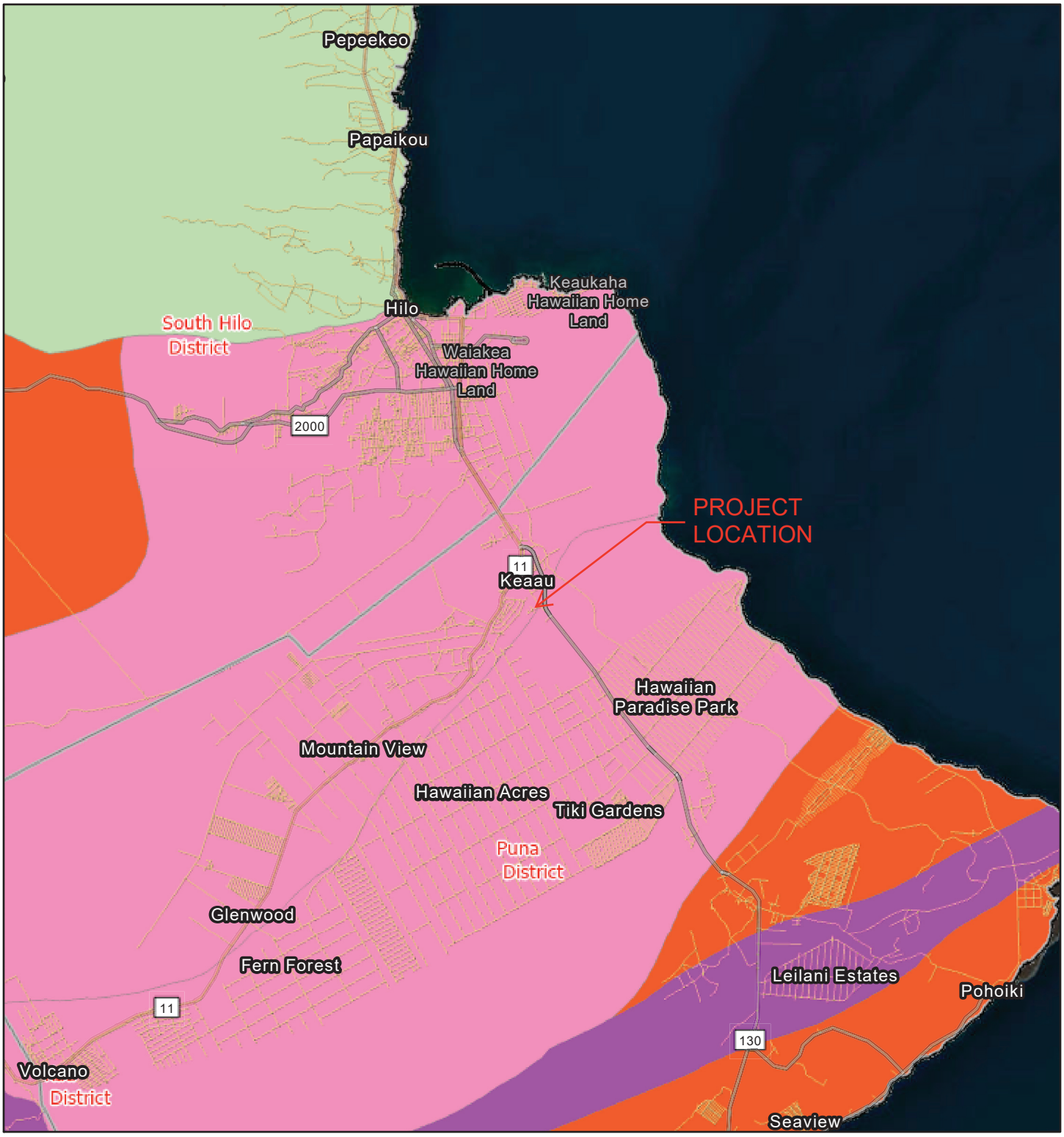


Figure 4a

Volcano Hazard Zones
- 1
- 2
- 3
- 8
- Street Centerlines
- Hawaii County District Boundary
- Coastline

1:256,796

0 2 4 8 mi

0 3.25 6.5 13 km

Earthstar Geographics, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, USDA, USFWS, County of Hawaii IT Department

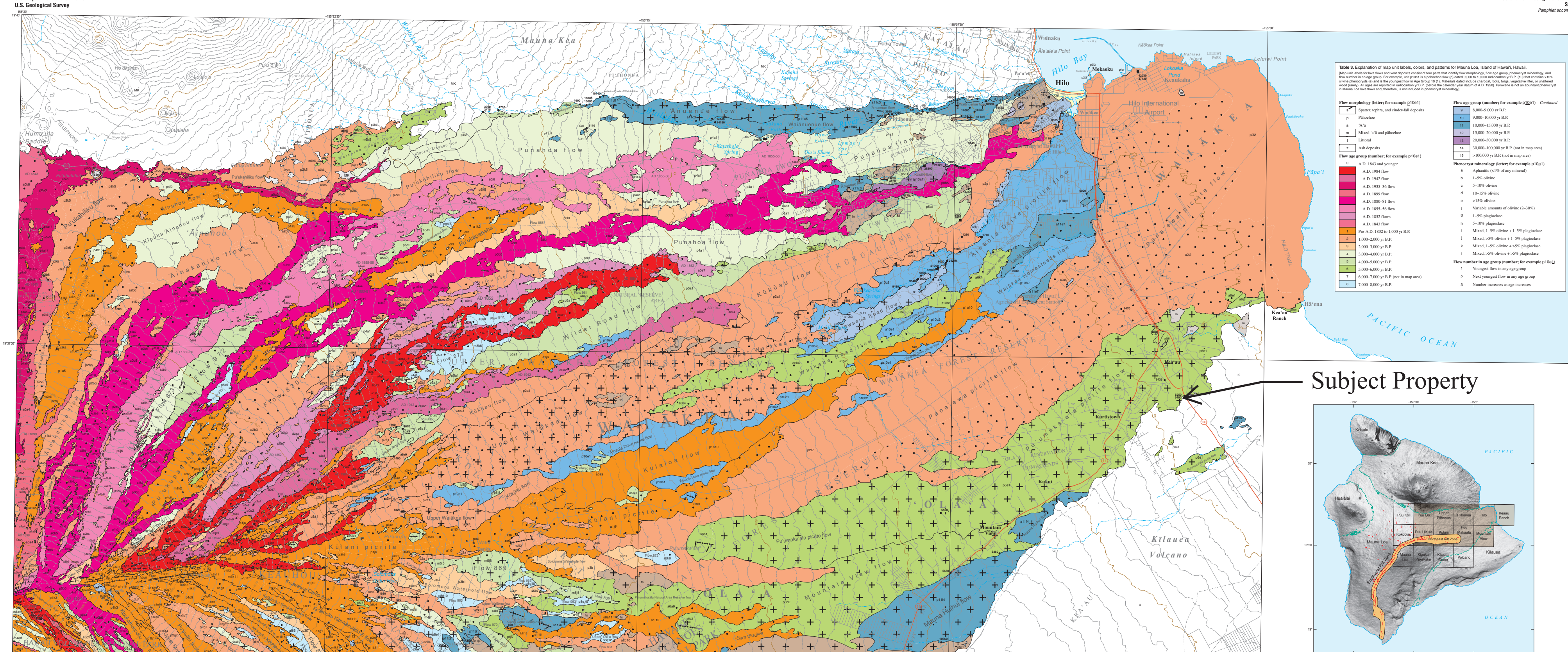


Figure 1. Map showing subaerial volcanoes (green boundary) forming Island of Hawaiʻi, fissures (red lines) on Mauna Loa, and 7.5-minute topographic quadrangles in (tan) and adjacent to map area.

Original U.S. Geological Survey topographic maps:
1:24,000: Hilo, 1981; Keaau Ranch, 1980, Kulani, 1982; Mountain View, 1981; Piihonua, 1981; Puu Makaala, 1981; Puu Oo, 1982; Puu Ulaula, 1982; Upper Piihonua, 1981
1:100,000: Historical Map of Hawaii, 1980

U.S. Geological Survey, 1:24,000, digital elevation models (DEMs) and digital line graphs (DLGs) (https://store.usgs.gov/b2c_usgs/b2c/display/%28xcm=r3standardpitrex_prd&layout=6_1_61_50_2&uiarea=2&ctype=areaDetails&carea=0000000582%29/.do):
Contours (100 ft) interpolated from (DEMs)
Roads from DLGs, combined with TIGER/line data. Roads updated 2001 by Hawaii Department of Land and Natural Resources and Division of Forestry and Wildlife
Administrative boundaries (historic land divisions, ca. 1850 ahupuaʻa boundaries and ca. 1900 coastlines) from DLGs
Hydrology polyline geodatabase extracted from DLGs

U.S. Geological Survey, 1:100,000, Historical Map of Hawaii, GEOPDF (https://store.usgs.gov/b2c_usgs/usgs/z_lat_lon_matnr_list.do?b2cb2b=b2c&G_SEARCH_TYPE=GPDD&b2cb2b=b2c&g_search_shop_shops=16&&ZCOORD_DEC_DEG-LONGITUDE=-155.0625&ZCOORD_DEC_DEG-LATITUDE=19.63333335):
Geographic names verified December 2015 (https://geonames.usgs.gov/)
Universal Transverse Mercator projection

APPROXIMATE MEAN DECLINATION AT CENTER OF MAP, 2017

SCALE 1:50 000

CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL

MAP LOCATION

Geology mapped by J.P. Lockwood (1975–1995) and F.A. Trusdell (1987–1995)
GIS database by F.A. Trusdell
Edited by J.L. Zigler; digital cartographic production by Kathryn Nimz
Manuscript approved for publication June 30, 2006

FIGURE 4b GEOLOGY

Geologic Map of the Northeast Flank of Mauna Loa Volcano, Island of Hawaiʻi, Hawaii

By
Frank A. Trusdell and John P. Lockwood
2017

THIS MAP IS NOT INTENDED FOR NAVIGATION

For sale by U.S. Geological Survey, Information Services, Box 25286, Federal Center, Denver, CO 80225, 1–888–ASK–USGS
Digital files available at https://doi.org/10.3133/sim2932A
Suggested citation: Trusdell, F.A., and Lockwood, J.P., 2017, Geologic map of the northeast flank of Mauna Loa volcano, Island of Hawaiʻi, Hawaii: U.S. Geological Survey Scientific Investigations Map 2932–A, pamphlet 25 p., 2 sheets, scale 1:50,000, https://doi.org/10.3133/sim2932A.
ISSN 2329-1311 (print)
ISSN 2329-132X (online)
https://doi.org/10.3133/sim2932A

Earthquake Activity

Aside from lava, the Island of Hawai‘i is also susceptible to earthquakes. The USGS recently came out with a model of earthquake probability for the Hawaiian Islands, which better estimates hazard probability compared to previous models. The ground shaking model indicates that Hawai‘i Island has a greater than 90 percent chance of experiencing an earthquake with slight (or greater) damage during the next 100 years (**Figure 5**).

The Kea‘au area is susceptible to ground shaking from earthquakes originating from both Mauna Loa and Kīlauea volcanoes. It is not uncommon to experience frequent slight tremors in Kea‘au as a result. Larger events, however, occur much less frequently and are more difficult to predict.

Notable earthquakes that have impacted the area have occurred in 1973, 1975, and 2018. In 1973, a magnitude-6.2 earthquake struck 29 miles beneath the town of Honomu, just north of Hilo. The depth of the earthquake is what caused such widespread and severe damage. Eleven people were reported injured in Hilo, four of which were hospitalized. An unknown number of injuries were also reported in Waimea. Approximately $5.6 million dollars of structural damage was recorded across the island (~$40 million today). In 1975, a magnitude-7.2 earthquake struck the southern flank of Kīlauea volcano near the town of Kalapana and caused significant shaking throughout the entire island. This earthquake event also caused significant subsidence along southeastern shores of the island. Most recently, the 2018 Kīlauea eruption proved to be historic in many ways, including the magnitude-6.9 earthquake that rattled the entire island. This earthquake caused significant shaking throughout Puna and Hilo. There were even some reports of shaking as far as O‘ahu.

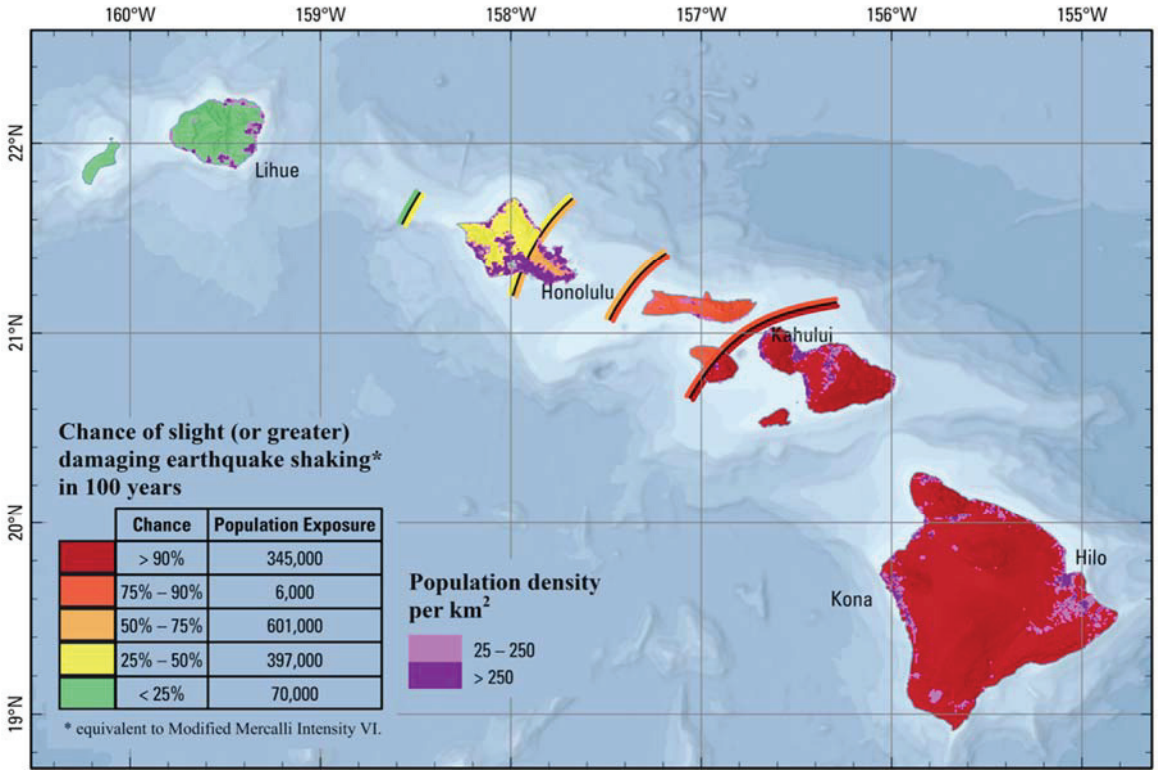


Figure 5: 2021 USGS Model of Earthquake Probability for the Hawaiian Islands

Topography and Soil

The topography of the property directs surface flow from the back southwest end at 400 feet in elevation, to the front northeast end, roughly 330 feet above sea level.

The United States Department of Agriculture (USDA) Natural Resources Conservation Service, Soils Survey Report classifies approximately 30 percent of the soil in this area as Ola‘a Series (OID) cobbly hydrous loam with 2 to 10 percent slopes (*2kllk*). This series is basic volcanic ash over a‘a lava, which is well-drained and has a low runoff class. The other 70 percent of soil on the property is designated as Panaewa very cobbly hydrous loam with 2 to 10 percent slopes (*2klkz*). This series is basic volcanic ash over pahoehoe lava and is moderately well drained with a high runoff class. Neither soil type is considered prime farmland. **Figure 6** shows the Ola‘a series on the northern half of the property identified as 660 and the Panaewa series lies on the southern half, labeled 629.

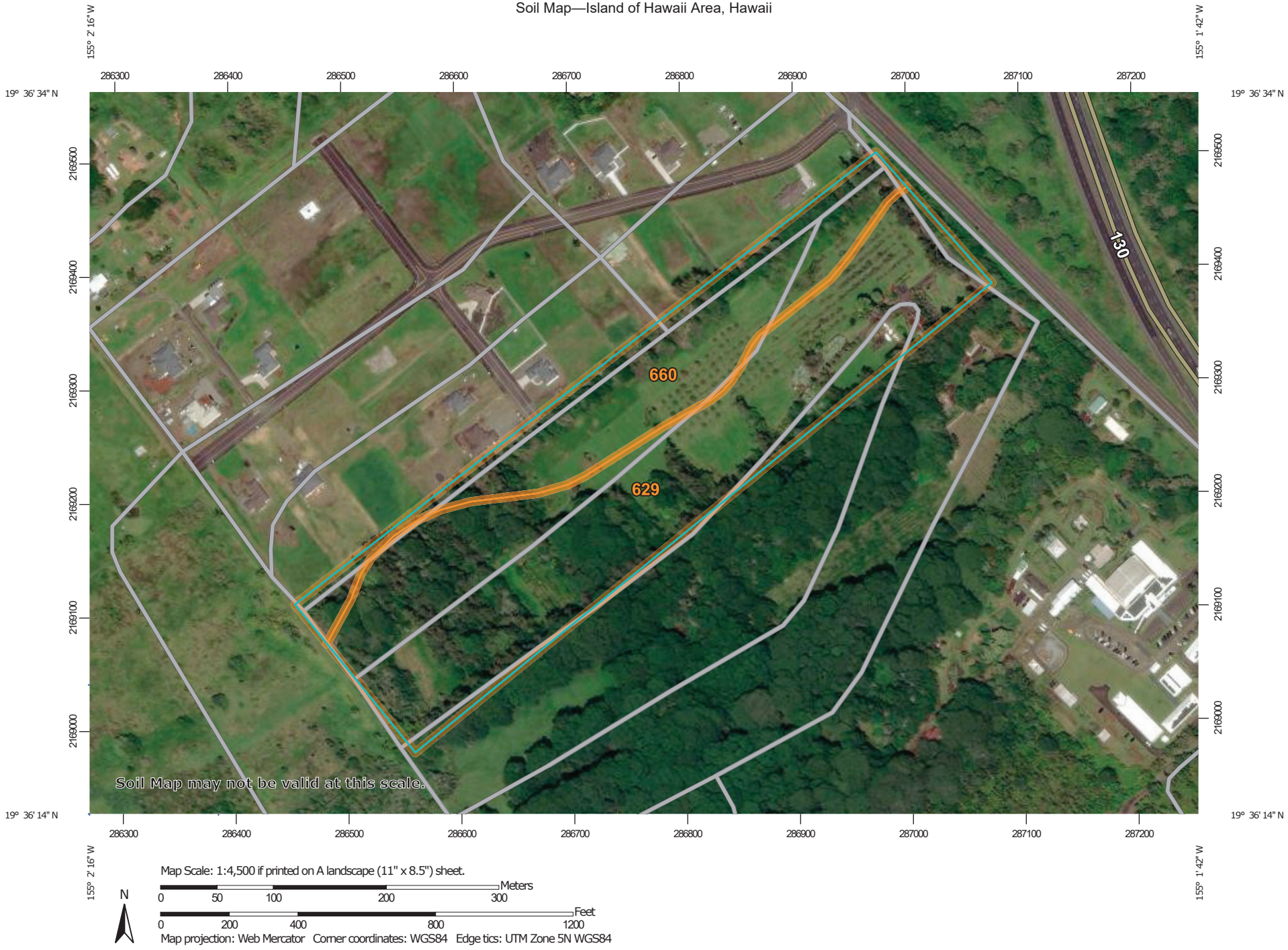
Potential Environmental Impact from Proposed Action

The proposed action is not anticipated to increase the likelihood of volcanic activity or earthquakes, and potential impacts from such events is expected to be minimal. Potential impacts from geological hazards and soils will not change appreciably under any alternative action, except a no action alternative. In the event of an earthquake, there may be some ground shaking, particularly during a significant seismic event. However, all structures will be designed and engineered to withstand seismic activity, adhering to the standards outlined in Hawai‘i County Code.

Should a lava flow pose a threat to Kea‘au, there would likely be adequate time to evacuate to a secure location. Located just west of Highway 130, the subject property offers a strategic position for swift and efficient evacuation. However, considering the intended use of the project as a medical facility, an emergency response plan is anticipated to be required. As such, HBMC will ensure the development and implementation of a comprehensive evacuation strategy to safeguard the safety and well-being of all occupants.

Mitigating Measures Geology, Geological Hazards, and Soils

Considering and implementing appropriate safety measures and protocols associated with geological hazards is essential in the development of any public facility. All buildings intended for the proposed development will be engineered and designed to endure seismic hazards, in compliance with the Hawai‘i County Code. If required, an Emergency Preparedness and Response Plan will be submitted to the Hawai‘i County Civil Defense Agency for review and approval.


155° 2' 16" W
155° 1' 42" W
19° 36' 34" N
19° 36' 14" N
286300
286400
286500
286600
286700
286800
286900
287000
287100
287200
2169500
2169400
2169300
2169200
2169100
2169000
660
629
130
Soil Map may not be valid at this scale.
Map Scale: 1:4,500 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 50 100 200 300
Feet
0 200 400 800 1200
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 5N WGS84

Best Management Practices for construction activities will be strictly followed to prevent adverse impacts to soil. Hawai‘i Administrative Rules Chapter 11-55, Appendix C, under Special Conditions for Land Disturbances, describes the following construction management techniques to protect soil:

a. Clearing and grubbing shall be held to the minimum necessary for grading and equipment operation.
b. Construction shall be sequenced to minimize the exposure time of the cleared surface area.
c. Construction shall be staged or phased for large projects. Areas of one phase shall be stabilized before another phase is initiated. Stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff.
d. Erosion and sediment control measures shall be in place and functional before earth moving operations begin. These measures shall be properly constructed and maintained throughout the construction period.
e. All control measures shall be checked and repaired as necessary, for example, weekly in dry periods and within twenty-four hours after any rainfall of 0.5 inches or greater within a 24-hour period. During prolonged rainfall, daily checking is necessary. Record of checks and repairs must be maintained.
f. Records of the duration and estimated volume of storm water discharge must be maintained.
g. A specific individual shall be designated to be responsible for erosion and sediment controls on the project site.

3.1.2 Flood Zones

Environmental Setting

According to the Federal Emergency Management Agency (FEMA), the subject property is located within Flood Zone X, which is outside the 500-year floodplain (**Figure 7**). It is also located 4 miles from the coast and is not within the County Special Management Area (SMA) or the County Tsunami Evacuation Zone. The proposed project will not be impacted by any coastal hazards or affect erosion, coastal ecosystems, or marine resources. There are no naturally occurring wetlands, ponds, or lakes in the area. However, USGS Stream Stats indicate the presence on an unnamed drainage path that runs parallel to the southern property line and also transects the southwest corners of the site. The drainage basin extends to cover over half the site on the southwest end. The drainage basin appears to extend from the slopes of Mauna Loa and is calculated to generate 3,220 cubic feet per second (cfs) of runoff in a 100-year storm event (USGS, 2024).

Potential Environmental Impact from Proposed Action

Since the property is outside of the 500-year floodplain, overall flooding risk for the site is low. During a storm event there is potential for localized flooding from overwhelmed drainage systems. The drainage path on site exacerbates this risk.

National Flood Hazard Layer FIRMette

FEMA

155°2'12"W 19°36'47"N

FIGURE 7 FLOOD ZONE MAP

155°1'34"W 19°36'13"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/4/2023 at 6:50 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Potential impacts from flooding will not change appreciably under any alternative action, except a no action alternative. However, a no-action alternative lacks significant justification since appropriate measures will properly mitigate risks.

Impacts and Mitigating Measures

Consideration should be given to allowing offsite drainage to flow through the project site using a properly sized natural or man-made channel. Depending on the existing drainage structures (culverts) along the highway, there may be instances of overtopping of this drainage. The design of the building pad should account for the impact of backwater conditions.

Improvements to onsite drainage must adhere to the Drainage Standards of the Hawai‘i County Department of Public Works. The drainage design will undergo review and approval by DPW-Engineering before plan submission for approval. The design for storm drainage will be based on a 10-year, one-hour storm event, with all post-development increases required to be retained on-site.

As indicated, in the NRCS soil survey, surface runoff infiltration is expected to be rapid. Consequently, shallow drainage sumps are deemed appropriate for the site.

3.1.3 Climate and Climate Change

Environmental Settings

Climate

The climate in the subject area is warm and moist, with an average annual rainfall of 142 inches and a mean annual temperature of 75 degrees Fahrenheit (Giambelluca et al., 2013).

Climate Change

The Hawai‘i Revised Statues §226-109 and Hawai‘i Administrative Rules §11-200.1 strongly encourages a climate change perspective be incorporated into the environmental assessment process. This entails evaluating how the outcomes of the analysis may be influenced by foreseeable future conditions impacted by climate change. Given the widespread impact of climate change on U.S. communities, it is imperative to assess the vulnerability of each factor under review to present and anticipate climate change effects. Additionally, careful consideration should be given to ensuring that the project and its occupants are adequately safeguarded from the potential impacts of climate change. This proactive approach aligns with the commitment to environmental responsibility and resilience in the face of evolving climatic conditions.

Human activities, particularly the emissions of greenhouse gases, have undeniably caused global warming, resulting in a 1.1°C increase in global surface temperature from 2011 to 2020 compared to 1850-1900 levels. The rise in greenhouse gas emissions stems from unsustainable practices in energy use, land use, lifestyle, and consumption patterns, contributing to an uneven global impact. This has triggered widespread and rapid change across the atmosphere, ocean,

cryosphere, and biosphere, influencing various weather and climate extremes globally. These changes have led to adverse impacts on nature and people, causing significant losses and damage. Regional effects include heightened tropical cyclones, extratropical storms, increased aridity, and elevated fire weather. Continued emissions are projected to further raise global temperatures, potentially reaching 1.5°C in the near term, intensifying multiple concurrent hazards with each incremental warming (IPCC, 2023).

The University of Hawai‘i’s Sea Grant College Program confirms that Hawai‘i is getting warmer. Data shows an increase in air temperature over the last 30 years of roughly 0.3°F per decade. For Hawai‘i this not only means rising sea levels, but also more contrast in the wet and dry season, which may lead to more frequent and intense precipitation and flooding (Tetra Tech, 2020).

In general, rainfall in Hawai‘i has been variable in the recent past with some drier years and some wetter years on average. El Niño provides periodic variation in winds and sea surface temperatures in the Pacific contributing to warming phases, while La Niña contributes to cooling phases. Increases in air temperature related to climate change will lead to more evaporation and more moisture in the air, which will contribute to variability in El Niño and La Niña events.

The 2019 Intergovernmental Panel on Climate Change (IPCC) Special Report on the Ocean and Cryosphere in a Changing Climate explicitly highlights a rise in the frequency of Category 4 and 5 tropical cyclones, commonly referred to as ‘hurricanes’ in the central Pacific.

> The average intensity of tropical cyclones, the proportion of Category 4 and 5 tropical cyclones and the associated average precipitation rates are projected to increase for a 2^{o}C global temperature rise above any baseline period (*medium confidence*). Rising mean sea levels will contribute to higher extreme sea levels associated with tropical cyclones (*very high confidence*). Coastal hazards will be exacerbated by an increase in the average intensity, magnitude of storm surge and precipitation rates of tropical cyclones (Collins et al., 2019).

In addition, according to the AR6 Synthesis Report produced by the IPCC in 2023, “It is *likely* that the global proportion of major (Category 3–5) tropical cyclone occurrence has increased over the last four decades”.

Historically, the Island of Hawai‘i has been viewed as largely protected from experiencing storms of this magnitude due to the presence of Mauna Loa and Mauna Kea. However, recent years have shown that storms such as Iselle (2014) and Lane (2018) can have very damaging effects to the island.

On August 8, 2014, Hurricane Iselle made landfall in the Puna District of Hawai‘i County as a moderate tropical storm with sustained wind speeds of 70 miles per hour. Significant damage was felt in the southeastern portions of the Big Island, especially in the Wai‘ōpae area, which is a coastal stretch dotted with anchialine ponds and tidepools, known as Kapoho Tide Pools. Many homes were heavily damaged in this area. This was the most heavily damaged area, which is approximately 23 miles southeast of the subject site. Most of the southeastern portion of the Big

Island experienced high winds, heavy rain, downed trees, and powerlines, cutting thousands of people off from electricity, water, and transportation for several days (Kimberlain et al., 2018).

Hurricane Lane occurred in late August 2018 and brought significant damage to the Hawaiian Islands from flash flooding and mudslides. Over a four-day period, Hawai‘i Island received an average of 17 inches of rain. Up to 159 structures were damaged, making it the wettest tropical storm to impact the Island. Although most of the flooding impacts were concentrated to Hilo, much of the southern windward side, including southern Puna, experienced impacts (Beven, 2019).

Wildfires are becoming more frequent and intense due to rising temperatures, change in rainfall patterns and the growth of non-native, fire prone grasses and shrubs. According to the Pacific Fire Exchange (PFE) (2021), “Fire risk is closely tied to wet and dry cycles where grasslands and savannas grow and then dry out”. Up to 25% of land in Hawai‘i is at fire-prone risk. According to the Hawai‘i Wildfire Management Organization (HWMO), about 0.5% of Hawai‘i’s total land area burns every year. Climate change is beginning to play a very serious role in the frequency and intensity of fires seen across the state. “Human ignitions coupled with an increasing amount of non-native, fire-prone grasses and shrubs and a warming, drying climate have greatly increased the wildfire problem” (HWMO, 2018). Further, expanding non-native, fire-prone grasses are less likely to recover from wildfires. Wildfires were once limited to active volcanic eruptions and infrequent lightning strikes. The increase in wildfire prevalence poses threats to safety, agricultural production, natural and cultural resources (PFE, 2014).

In early August 2021, a vegetation fire ignited near Mana Road and traveled throughout Waimea and South Kohala. Approximately 40,000 acres were burned according to estimates from fire officials. It was the largest wildfire every recorded in Hawai‘i County. Thousands of people were forced to evacuate from Waiki‘i Ranch and Pu‘u Kapu Hawaiian Homesteads, where two homes were destroyed. Govenor David Ige declared a state of emergency on August 4, 2021, to protect the health, safety, and welfare of Hawai‘i (West Hawai‘i Today, 2021). **Figure 8** is a map of wildfires in Hawai‘i between 1999 and 2022, including the Mana Road Fire depicted in dark red.

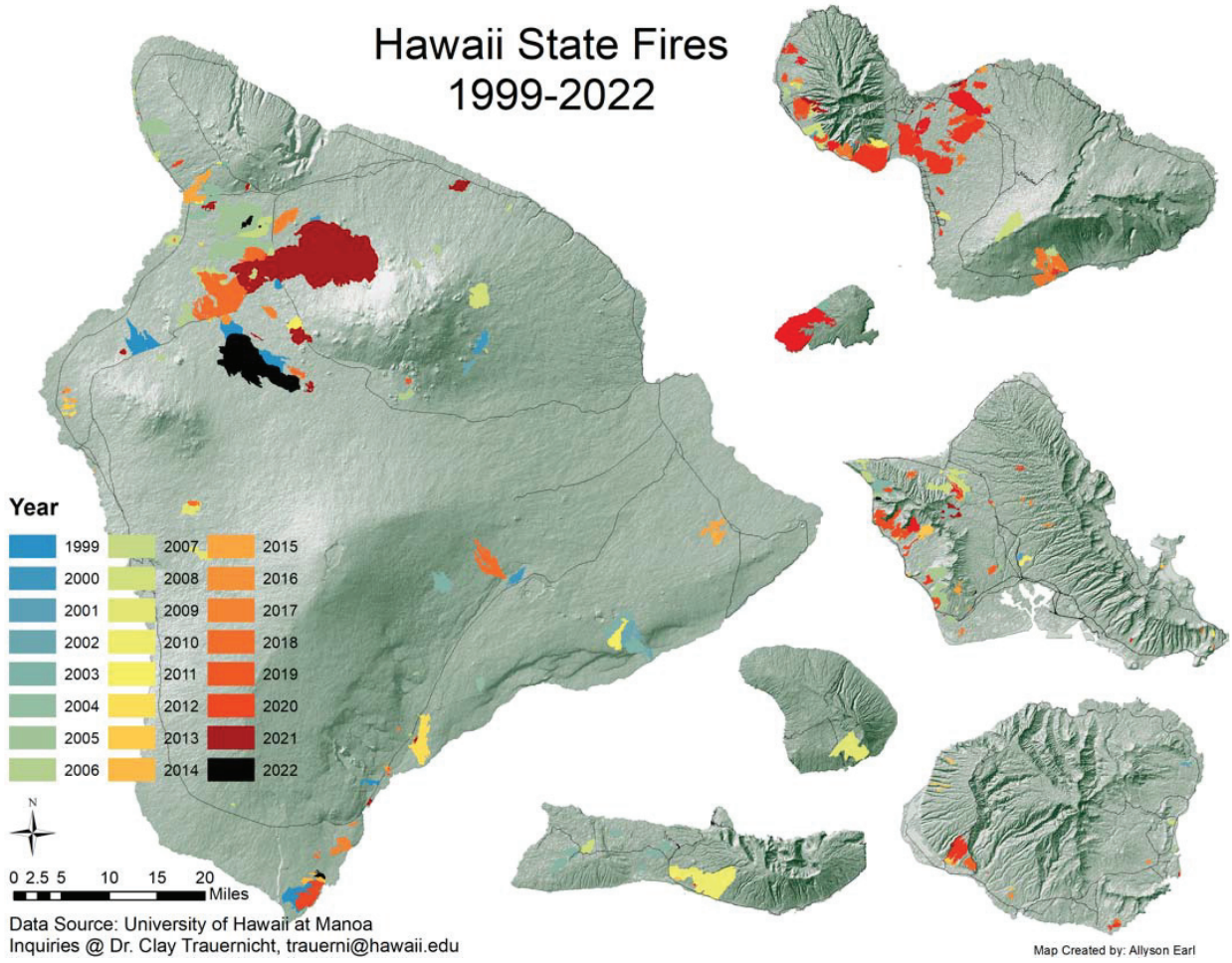


Figure 8: Hawai‘i State Fires Between 1999 and 2022

Not depicted on the above map are the devastating wildfires that occurred in August 2023. Hurricane Dora, moving south of the Island of Hawai‘i, interacted with a robust anticyclone north of the Hawaiian Islands. This interaction resulted in a sharp pressure gradient, generating powerful winds. Coupled with prevailing drought conditions, it led to wildfires on both Maui and Hawai‘i Island.

Early on August 8, 2023, several brush fires fueled by strong winds ignited on Maui. A Lahaina fire flareup prompted evacuations, road closures, and shelter-in-place advisories on western Maui. However, little warning, few escape routes, and interruption to cell phone service created a perfect storm of disastrous conditions. The Lahaina wildfire has since become the largest natural disaster in Hawai‘i’s state history and one of the deadliest wildfires in recorded U.S. history. More than 100 lives were lost, and over 2,200 buildings destroyed in Lahaina alone.

On the same day, wildfires ignited in the Kohala District on Hawai‘i Island, prompting evacuations for several nearby subdivisions and beach resorts. Roughly 1,000 acres of land burned with no loss of life.

Communities on the leeward side of the Hawaiian Islands are generally characterized by drier

conditions and are therefore particularly vulnerable to wildfires. However, those on the windward side are progressively at greater risk due to the islands undergoing more frequent episodes of drought.

Potential Environmental Impact on the Proposed Action

While the proposed action will not exacerbate the adverse effects of climate change, it may be at risk of experiencing impacts from climate events. Coastal flooding and sea level rise do not currently pose a threat to the subject parcel due to its distance from the shoreline, however, hurricanes have the potential to extend their impact several miles inland. Potential impacts from hurricanes could include high winds, heavy rainfall, and localized flooding from mountain regions and overwhelmed drainage systems. Additionally, wildfires in the vicinity have the potential to produce poor air quality, disruptions to power, and property damage in extreme cases. Any potential impacts relating to climate change will not change appreciably under any alternative action.

Impacts and Mitigating Measures for Climate and Climate Change

It is imperative the development of any public facility implements appropriate safety measures and protocols in case of an adverse climate event. All buildings will be designed and engineered to withstand wind hazards according to the Hawai‘i County Building Codes.

The proposed action will comply with all required codes and regulations regarding drainage and runoff mitigation. These protections will prevent any adverse impacts relating to flooding potential in a storm event.

The proposed action will not contribute to adverse impacts resulting from climate change. The development will not promote any fire prone vegetation.

As these protective regulations apply equally to each alternative, there are no appreciable differences in potential impacts between project alternatives. If required, an emergency response plan will be drafted for the proposed development in the case of potential adverse impacts from a storm event.

3.1.4 Water Quality

Environmental Setting

According to the State Department of Health, the Underground Injection Control (UIC) line was established to protect ground water resources with drinking water potential. Areas *mauka* of the line are considered potential drinking water sources from the Hilo Aquifer. This is where most municipal water comes from. In contrast, areas *makai* of the line are considered non-potable. The subject property lies above the UIC line, however, a UIC permit may be required at the time of engineering site design, depending on whether deep or shallow drywells are used.

The proposed action will not take place near any naturally occurring body of water. The rapid permeability of young lava flows along with the geologic youth of the landscape makes surface

streams rare. Water is typically conveyed from *mauka* areas underground either through lava tubes or more permeable layers and fractures in the underlying basalt. During periods of intense and prolonged rainfall these subsurface groundwater flows will occasionally reach the surface in low-lying areas. Surface sheet flow of storm water is also possible during intense rainfall.

Potential Environmental Impact from the Proposed Action

The proposed action is not expected to pose a significant adverse risk to water quality, aquatic, or marine habitats due to the establishment of mitigating measures and BMPs. The primary activities with potential to affect storm water are grading and grubbing. Grading plans will be developed with the mitigating measures and BMPs discussed below. Additionally, the proposed action would control stormwater runoff from the site with appropriate drywells or similar drainage features. Furthermore, current construction plans do not anticipate encountering groundwater at the site.

No jurisdictional water bodies are present on site per Section 404 of the Clean Water Act, and a jurisdictional determination from the U.S. Army Corps of Engineers will not be necessary.

The implementation of mitigating measures means potential impacts to water quality won't change appreciably under any alternative action.

Impacts and Mitigating Measures

To safeguard near-shore waters and marine ecosystems, Best Management Practices will be implemented before and after construction to effectively contain soil and sediment and prevent potential harm. HBMC will ensure all earthwork and grading will be conducted in compliance with:

(a) "Storm Drainage Standards," County of Hawai'i, 1970 and as revised
(b) "Flood Control," Chapter 27 of the Hawai'i County Code
(c) Standards and regulations of the Federal Emergency Agency (FEMA)
(d) "Erosion and Sedimentation Control," Chapter 10 of the Hawai'i County Code
(e) Conditions of an NPDES permit, if required, and any additional Best Management Practices required by the Department of Health Clean Water Branch

Construction activities may occur in an area greater than one acre and thus may require a National Pollutant Discharge Elimination System (NPDES) permit and a Storm Water Pollution Prevention Plan (SWPPP). A list of Best Management Practices (BMPs) will be established to properly manage storm water runoff. These BMPs may include, but are not limited to:

- Minimizing soil loss and erosion by revegetating and stabilizing slopes and disturbed areas of soil.
- Minimizing sediment loss by placing structural controls including silt fences, gravel bags, sediment ponds, check dams, and other barriers.
- Applying sediment wattles and protective covers to soil and material stockpiles.
- Gravel check dams in gutters.

- Constructing and using a stabilized construction vehicle entrance, with a designated vehicle wash area that discharges to a sediment pond.
- Washing of all vehicles in the designated wash area before leaving the project site.
- Use of drip pans beneath vehicles to trap vehicle fluid.
- Performing routine inspection and maintenance of structural BMPs by trained personnel.
- Properly cleaning significant leaks or spills and disposing at an approved site.

Impermeable surfaces can increase the volume and rate of stormwater runoff. However, per Hawai‘i County Code, Chapter 27, the volume of stormwater leaving the site will not increase. It is expected that shallow drainage sumps or similar drainage features will be adequate to address site drainage requirements. The stormwater management practices incorporated in compliance with County Codes will mitigate the volume and quality of stormwater runoff on site. Additionally, wastewater will be managed by a wastewater treatment plant on site, with permitting through the State Department of Heath to effectively mitigate any potential impacts to water quality from wastewater.

3.1.5 Flora and Fauna

Environmental Settings

Flora

Section 7(c) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*), requires an official species list from the United States Fish and Wildlife Service (USFWS) of identified threatened and endangered species, as well as critical habitat, that may occur within the boundary of the project area.

According to the USFWS, it would be possible for the following seven (7) endangered flowering plants and one (1) endangered fern to possibly exist in the area, although no critical habitat exists on or near the property:

1. `Aku`aku (*Cyanea platyphylla*)
2. Alani (*Melicope zahlbruckneri*)
3. Haiwale (*Cyrtandra nanawaleensis*)
4. Hau Kuahiwi (*Hibiscadelphus giffardianus*)
5. Holei (*Ochrosia haleakalae*)
6. Holei (*Ochrosia kilaueaensis*)
7. Nanu (*Gardenia remyi*)

A biotic survey conducted on May 30, 2024, found no threatened, or endangered flora species on the property aside from one cultivated specimen of Mao hau hele (*Hibiscus brackenridgei)*. Plant species identified on the property are listed below.

Table 1. Flora Species Found on Property – Under Status: A = Alien or Non-native species, I = Indigenous species, PI = Polynesian Introduced species, E = Endemic, En = Endangered

Latin Name	**Common Name**	**Family**	**Status**
Falcataria moluccana	Albizia	Fabaceae	A
Commelina diffusa	Honohono grass	Commelinaceae	A
Brachiara mutica	California grass	Poaceae	A
Clusia rosea	Autograph tree	Clusiaceae	A
Polystichum munitum	Sword fern	Dryopteridaceae	A
Macaranga	Bingabing	Euphorbiaceae	A
Casuarina equisetifolia	Ironwood	Casuarinaceae	A
Clidemia hirta	Koster's curse	Melastomataceae	A
Cecropia obtusifolia	Trumpet tree	Moraceae	A
Mimosa pudica	Sensitive Grass	Fabaceae	A
Chamaecrista fasciculata	Partridge Pea	Fabaceae	A
Dypsis lutescens	Areca Palm	Arecaceae	A
Bismarckia nobilis	Bismarck Palm	Arecaceae	A
Wodyetia bifurcata	Foxtail Palm	Arecaceae	A
Eugenia brasiliensis	Brazilian Cherry	Myrtaceae	A
Cassia fistula	Golden Shower Tree	Fabaceae	A
Megathyrsus maximus	Guinea Grass	Poaceae	A
Euphorbia hirta	Hairy Spurge	Euphorbiaceae	A
Abutilon grandifolium	Hairy Abutilon	Malvaceae	A
Syzygium malaccense	Mountain Apple	Myrtceae	PI
Ricinus communis	Castor Bean	Euphorbiaceae	A
Trema orientale	Gunpowder Tree	Cannabaceae	A
Cycas sp.	Cycad	Cycadaceae	A
Washingtonia fillifera	Californian Fan Palm	Arecaceae	A
Washingtonia robusta	Mexican Falm Palm	Arecaceae	A
Crotalaria sp.	Rattlepod	Fabaceae	A
Sphagneticola trilobata	Bay Biscayne	Asteraceae	A
Tibouchina Herbacea	Cane Tibouchina	Melastomataceae	A
Fagraea berteroana	Puakenikeni	Gentianaceae	A
Paspalum dilatatum	Dallis Grass	Poaceae	A
Paederia foetida	Stinkvine	Rubiaceae	A
Polygala polygama	Racemed milkwort	Polygalaceae	A
Indigofera suffruticosa	Anil de Pasto	Fabaceae	A
Canavalia rosea	Baybean	Fabaceae	A
Vigna luteola	Hairypod Cowpea	Fabaceae	A
Cestrum nocturnum	Night-blooming Jasmine	Solanaceae	A

Fraxinus uhdei	Tropical Ash	Oleaceae	A
Desmodium incanum	Creeping Beggarweed	Fabaceae	A
Dracaena reflexa	Song of India	Asparagaceae	A
Codiaeum variegatum	Croton	Euphorbiaceae	A
Cyperus rotundus	Nutgrass	Cyperaceae	A
Phymatosorus grossus	Lauae	Polypodiaceae	A
Solanum nigrum	Popolo	Solanaceae	I
Andropogon virginicus	Broomsedge	Poaceae	A
Zomia furfuracea	Cardboard zamia	Zamiaceae	A
Psidium guajava	Guava	Myrtaceae	A
Pandanus tectorius	Hala	Pandanaceae	I
Cocos nucifera	Coconut Palm	Arecaceae	PI
Cordyline fruticosa	Ti	Liliaceae	PI
Hibiscus brackenridgei	Mao hau hele	Malvaceae	E, En
Hibiscus tiliaceus	Hau	Malvaceae	I
Aleurites moluccana	Kukui Nut Tree	Euphorbiaceae	PI

Fauna

No native fauna were observed during the biotic survey, although common non-native birds were observed including common myna (*Acridotheres* Trista), saffron finch (*Sicalis flaveola*), house sparrow, Chinese hwamei (*Garrulax canorus*), spotted dove (*Streptopelia chinensis*), and feral chickens (*Gallus domesticus*). It would be possible for one (1) mammal and seven (7) federally listed bird species to fly over, roost, or utilize resources near the subject property. While not on the federal list, it may also be possible for one (1) state listed mammal to frequent the area. These include the following:

Federally Listed:

1. Hawaiian Hoary Bat (‘Ope‘ape‘a) (*Lasiurus cinereus semotus*)
2. Hawaiian Coot (Alae ke‘oke‘o) (*Fulica alai*)
3. Hawaiian Duck (*Anas wyvilliana*)
4. Hawaiian Stilt (*Himantopus mexicanus knudseni*)
5. Band-rumped Storm-petrel (*Hydrobates castro*)
6. Hawaiian Goose (Nēnē) (*Brunta (=Nesochen) sandvicensis*)
7. Hawaiian Petrel (*Pterodroma sandwichensis*)
8. Newell’s Shearwater (*Puffinus newelli*)

State Listed:

9. Hawaiian Hawk (I‘o) (*Buteo solitarius*)

This Environmental Assessment will focus on the nine (9) State and Federally listed mammal and bird species that may fly over, roost, or otherwise utilize resources near the subject property, as they are the most likely to be potentially impacted by the proposed project. The following provides a description of each species, their range, and preferred habitat.

1. Hawaiian Hoary Bat (‘Ope‘ape‘a) (*Lasiurus cinereus semotus*)

   Federally Listed Endangered

   The Hawaiian Hoary Bat prefers roosting within the foliage of both native and non-native trees. Their foraging grounds encompass a diverse range of habitats, such as forest gaps, clearings, areas above the forest canopy, and alongside roads. Notably, on the Big Island, the Ōpe‘ape‘a engage in seasonal migration, with summers spent in the lowlands and overwintering occurring in higher altitude regions.

2. Hawaiian Coot (Alae ke‘oke‘o) (*Fulica alai*)

   Federally Listed Endangered

   The Hawaiian Coot typically inhabits lowland wetland environments, generally below 1,300 feet in elevation, such as the Waiaka-Loko Waka ponds located on Hawaii Island. However, instances of their presence have been documented at altitudes as high as 6,600 feet on the island. These birds display a preference for wetland habitats characterized by the presence of appropriate emergent plant species amidst open water, particularly favoring freshwater wetlands and reservoirs.

3. Hawaiian Duck (*Anas wyvilliana*)

   Federally Listed Endangered

   The Hawaiian duck is found in various habitats such as low wetlands, river valleys, coastal ponds, lakes, swamps, flooded grasslands, and mountain streams, ranging from sea level to elevations of 3,300 meters. Social interactions may occur more frequently in managed wetlands for waterbirds compared to wetlands cultivated with taro, while resting was observed more often in taro cultivated wetlands. This suggests that both managed and cultivated wetlands are crucial for meeting the basic daily and seasonal needs of this species. However, the wider array of activities and foraging techniques observed in managed wetlands may indicate a greater diversity of habitats in these areas.

4. Hawaiian Stilt (*Himantopus mexicanus knudseni*)

   Federally Listed Endangered
   Hawaiian stilts make use of diverse aquatic environments, mostly in lower-altitude areas, yet their presence is influenced by water depth and the density of vegetation. These birds depend on early-stage marshlands with water depths below 24 centimeters (9 inches), and they frequent regions with scant, short perennial plants or open tidal flats. Hawaiian stilts

seem to prefer nesting sites with minimal or no surrounding vegetation, likely to maintain visibility and better detect potential predators.

5. Band-rumped Storm-petrel (*Hydrobates castro*)

   Federally Listed Endangered

   The Band-rumped Storm-petrel is a seabird known to nest in remote cliff locations on, in steep open to vegetated cliffs, and in little vegetated, high-elevation lava fields. These birds are regularly seen in and around coastal waters of Kauaʻi, Niihau, and Hawaiʻi Island.

6. Hawaiian Goose (Nēnē) (*Brunta (=Nesochen) sandvicensis*)

   Federally Listed Threatened

   Historically, The Hawaiian Goose (Nēnē) (*Branta sandvicensis*) were found in lowland dry forests, shrublands, grasslands, and montane dry forests. Their current habitat preferences may be influenced by the release locations of captive-bred birds. Presently, they inhabit a diverse array of environments, such as coastal dune vegetation and non-native grasslands (like golf courses, pastures, and rural areas), sparsely vegetated low- and high-elevation lava flows, mid-elevation native and non-native shrublands, early successional cinderfall, cinder deserts, native alpine grasslands and shrublands, and open interfaces between native and non-native alpine shrubland-woodland communities. Nēnē nest in various habitats, including beach strands, shrublands, grasslands, lava rocks, and across different elevations.

7. Hawaiian Petrel (*Pterodroma sandwichensis*)

   Federally Listed Endangered

   The Hawaiian Petrel is found in remote and high elevation areas on the island of HawaiʻI, Maui, Molokaʻi, Lanai, and Kauaʻi.

8. Newell's Shearwater (*Puffinus newelli*)

   Federally Listed Threatened

   The Newell's Shearwater nest on the slopes and cliffs of Kauaʻi. Small colonies also exist on Molokaʻi, Maui, and Hawaiʻi Island.

9. Hawaiian Hawk (Iʻo) (*Buteo solitarius*)

   Formerly State Listed Endangered

   The Hawaiian Hawk (Iʻo) (*Buteo solitarius*) inhabits lowland non-native forests, urban

locales, agricultural fields, pasturelands, and high-elevation native forests. Primarily, nesting takes place within native 'ōhi'a trees, though instances also occur in non-native tree species such as eucalyptus, ironwood, mango, coconut palm, and macadamia. During winter, sightings have been recorded in subalpine māmane-naio forests, indicating potential seasonal migrations. Their habitat can range between near sea level and 8,000 feet above sea level.

Potential Environmental Impact from the Proposed Action

The Hawaiian Hoary Bat roosts in both exotic and native woody vegetation across all islands and will leave young unattended in trees and shrubs when they forage. During the pupping season, clearing trees or shrubs taller than 15 feet poses a danger, as the young bats, unable to fly and still very vulnerable, may inadvertently suffer harm or death if they are unable to move away. Furthermore, these bats search for insects anywhere from as low as 3 feet to heights exceeding 500 feet above ground level, putting them at risk of becoming tangled in barbed wire typically used for fencing.

Hawaiian waterbirds, such as the Hawaiian stilt, coot, and duck listed by the USFWS, inhabit fresh and brackish-water marshes as well as natural or man-made ponds. Hawaiian stilts can also be seen in areas with temporary or permanent standing water. These species face challenges from non-native predators, loss of habitat, and habitat deterioration. Additionally, Hawaiian ducks are at risk due to hybridization with introduced mallards. The creation of standing or open water may result in the attraction of Hawaiian waterbirds to a site. In particular, the Hawaiian stilt is known to nest in sub-optimal locations (e.g. ponding water), if water is present. Hawaiian waterbirds attracted to sub-optimal habitat may suffer adverse impacts, such as predation and reduced reproductive success, and thus the project may create an attractive nuisance.

Hawaiian seabirds might pass through the project area during the nighttime breeding, nesting, and fledging seasons, spanning from March 1st to December 15th. The presence of outdoor lighting could lead to disorientation, fallout, and potential injury or death for these seabirds. These birds are naturally drawn to lights, and after circling them, they may become fatigued and collide with nearby structures such as wires, buildings, or other objects, or they may even land on the ground. Seabirds that have landed are at a higher risk of mortality due to collisions with vehicles, starvation, and attacks by predators such as dogs, cats, and other wildlife. Young birds, particularly fledglings, traversing the project area between September 15th and December 15th, during their first flights from mountain nests to the sea, are especially susceptible to being attracted to lights. Permanent lighting also poses a risk of seabird attraction, and as such should be minimized or eliminated to protect seabird flyways and preserve the night sky. Additionally, seabirds have been known to collide with fences, powerlines, and other structures near nesting colonies.

Soil and plant material may contain detrimental fungal pathogens (e.g., Rapid ‘Ōhi‘a Death), vertebrate and invertebrate pests (e.g., Little Fire Ants and Coqui Frogs), or invasive plant parts (e.g., African Tulip, Octopus Tree, Trumpet Tree, etc.) that could harm native species and ecosystems. Additionally, the invasive Coconut Rhinoceros Beetle (CRB) scientifically known as *Oryctes rhinoceros,* is an invasive species present on the islands of O‘ahu, Hawai‘i Island,

Maui, and Kaua‘i. On July 1, 2022, the Hawai‘i Department of Agriculture implemented Plant Quarantine Interim Rule 22-1. This regulation imposes restrictions on the transportation of CRB-host material within or to and from O‘ahu, which is defined as the Quarantine Area. Items considered regulated materials (such as host plants or materials) pose a potential risk for CRB infestation.

Specifically, CRB-host materials include:

a. Entire dead trees;
b. Mulch, compost, trimmings, fruit, and vegetative scraps;
c. Decaying stumps.

CRB host plants encompass live palm plants from the following genera:

- Washingtonia, Livistona, and Pritchardia (all commonly known as fan palms)
- Cocos (coconut palms)
- Phoenix (date palms)
- Roystonea (royal palms)

The movement of such materials or these specified plants carries the risk of CRB spread, as they could harbor CRB at any stage of their life cycle. Mitigating measures will be implemented to avoid or minimize all potential impacts from plant material.

HBMC will adhere to all mitigating measures to protect listed mammals and birds as outlined in the section below.

Impacts and Mitigating Measures

Table 2 outlines mitigating measures for all listed species that may be potentially impacted by the proposed project.

In addition, the Hawai‘i Division of Forestry and Wildlife (DOFAW) recommends minimizing the movement of plant or soil material between worksites to avoid or reduce potential impacts from fungal pathogens. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

Native plant species that are appropriate for the area will be used for landscaping. No detrimental invasive species will be planted on site. DOFAW recommends consulting with the Big Island Invasive Species Committee (BIISC) to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. The Plant Pono guide found at www.plantpono.org can also be used for guidance on the selection and evaluation of landscaping plants and to determine the potential invasiveness of plants to be used on site.

Cats are natural predators of native birds, including State-listed endangered waterbirds, seabirds, and forest birds. Their hunting instincts mean that even well-fed cats will actively hunt and prey on wildlife. As a result, DOFAW advises that no feeding of feral cats takes place on the property. With the mitigating measures outlined below impacts to native flora and fauna will not change appreciably under any alternative action, except a no action alternative.

Table 2: Mitigating Mesures for Federal and State Listed Mammals and Birds

Category	Common Name	Scientific Name	Status	Project Mitigating Measures
FEDERALLY LISTED				
Mammals	Hawaiian Hoary Bat	*Lasiurus cinereus semotus*	Endangered	**To avoid and minimize impacts to the endangered Hawaiian hoary bat, HBMC will follow these applicable measures:** - Do not disturb, remove, or trim woody plants greater than 15 feet during the bat birthing and pup rearing season between June 1 and September 15. - Do not use barbed wire for fencing.
Waterbirds	Hawaiian Coot	*Fulica alai*	Endangered	**To avoid and minimize potential project impacts to Hawaiian waterbirds, the following applicable measures will be incorporated:** - In areas where waterbirds are known to be present, post and enforce reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site. - Incorporate Best Management Practices for Work in Aquatic Environments into the project design. - Have a biological monitor that is familiar with the species' biology conduct Hawaiian waterbird nest surveys, where appropriate habitat occurs within the vicinity of the proposed project site, prior to project initiation. Repeat surveys again within 3 days of project initiation and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). - If a nest or active brood is found: 1. Contact USFWS within 48 hours for further guidance. 2. Establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks/ducklings have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer. 3. Have a biological monitor that is familiar with the species' biology present on the project site during all construction or earth moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.
	Hawaiian Duck	*Anas wyvilliana*	Endangered	
	Hawaiian Stilt	*Himantopus mexicanus knudseni*	Endangered	
Seabirds	Band-rumped Storm-petrel	*Hydrobates castro*	Endangered	**To avoid and minimize potential project impacts to seabirds, HBMC will incorporate the following measures:** - Any outdoor lighting must conform to the standards established by the Hawai'i County Outdoor Lighting Ordinance (Hawai'i County Code Chapter 14, Article 9: "Outdoor Lighting"). - The minimum possible amount of outdoor/exterior lighting should be used and should be turned off when not needed. Motion sensor activated lighting will be used wherever feasible. - All exterior lighting should be fully shielded. This means that all lighting fixtures must emit zero light above the horizontal plane. - Conformity to the Outdoor Lighting Ordinance also requires the use of blue-deficient exterior lighting. This means that exterior LED lighting must emit less than 2% of its total energy at wavelengths less than 500 nm. The best choice for this is either filtered LED lights, or amber LED lights. - White light should be avoided. Any white light used should have Correlated Color Temperature of 2700 K or below. - Rig lights during construction and operation of the proposed water well must be shielded to minimize stray lighting. - Avoid nighttime constructin during the seabird fledging period between September 15th and December 15th. If nighttime construction is required during the seabird fledging season (September 15 to December 15), a qualified biologst will be present at the project site to monitor and assess the risk of seabirds being attracted or grounded due to the lighting. If seabirds are seen
	Hawaiian Petrel	*Pterodroma sandwichensis*	Endangered	

Table 2: Mitigating Mesures for Federal and State Listed Mammals and Birds

	Newell's Shearwater	*Puffinus newelli*	Threatened	circling the area, lights will be turned off. If a downed seabird is detected, the State Division of Forestry and Wildlife (DOFAW) will be contacted and their response protocol will be followed. **To avoid and minimize the likelihood of collision with fences, powerlines, and other structures, YWCA will incorporate the following:** - Where fences extend above vegetation, three strands of polytape will be integrated into the fence to increase visibility. - For powerlines, guywires, and other cables, minimize exposure above vegetation height and vertical profile.
Birds	Hawaiian Goose	*Branta (=Nesochen) sandvicensis*	Threatened	**To avoid and minimize potentail project impacts to nēnē HBMC will incorporate the following measures:** - Do not approach, feed, or disturb nēnē. - If nēnē are observed loafing or foraging within the project area during the breeding season (September through April), have a biologist familiar with nēnē nesting behavior survey for nests in and around the project area prior to the resumption of any work. Repeat surveys after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). - Cease all work immediately and contact USFWS for further guidance if a nest is discovered within a radius of 150 feet of proposed project, or a previously undiscovered nest is found within the 150-foot radius after work begins. - In areas where nēnē are known to be present, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site. **Nēnē 4(d) rule:** A 4(d) rule was established at the time the nēnē was downlisted to threatned status. Under the 4(d) rule, the following actions are not prohibited under the Act, provided the additional measures described in the downlisting rule are adhered to: - Take by landowners, or their agents, conducting intentional harrassment in the form of hazing or other deterrent measures not likely to cause direct injury or mortality, or nēnē surveys. - Take that is incidental to conducting lawful control of introduced predators or habitat management activities for nēnē . - Take by authorized law enforcement officers for the purpose of aiding or euthanizing sick, injured, or orphaned nēnē; disposing of dead speciments; and salvaging a dead specimen that may be used for scientific study.
STATE LISTED				
Mammals	Hawaiian Hawk	(*Buteo solitarius*)	Endangered	**To avoid and minimize potentail project impacts to the Hawaiian hawk HBMC will incorporate the following measures:** DOFAW recommends that pre-construction surveys of the area be conducted by a qualified biologist following appropriate survey methods to ensure no Hawaiian Hawk nests are present, which may occur during the breeding season from March to September. The survey should be conducted at least 10 days prior to the start of construction. If a hawk nest is detected, a buffer zone of 100 meters (330 feet) should be established around it where no construction shall occur until the chick(s) have fledged, or the nest is abandoned and DOFAW stall should be immediately notified. If adult individuals are detected in the area during construction, all activities within 30 meters (100 feet) of the bird should cease. Work may continue when the bird has left the area on its own.

3.1.6 Air Quality

Environmental Setting

Air quality in this area is currently very good. In the past, volcanic emissions such as sulfur dioxide from the Kīlauea volcano, have resulted in "vog," which can impact air quality in the Puna District at times. Vog is created when sulfur dioxide reacts chemically with sunlight, oxygen, dust particles and water in the air. During eruptions, the trade winds generally keep the Kea'au area free from severe vog, however, weak winds particularly in the winter may result in worse conditions. In the future, during episodes of volcanic eruptions, HBMC would have no worse air quality conditions than the rest of the Puna District.

Vehicles are another source of minor air pollution, which is minimal on Hawai'i Island. Vehicle emissions in the area would mainly come from the Kea'au-Pāhoa Road, which is adjacent to the subject site and Highway 130. All Hawai'i Island meets the standards set by the Clean Air Act (CAA) and HRS §342B.

Potential Environmental Impact from the Proposed Action

Air pollutants during construction will be limited and temporary. The main sources of short-term air pollutants are construction equipment exhaust and dust. During operation, the main source of air pollution will be through regular vehicle trips including the movement of employees and patients. With the outlined mitigation measures, potential impacts to air quality will not change appreciably under any alternative action.

Mitigating Measures

Air pollutants during construction will be limited and temporary. The main sources of short-term air pollutants are construction equipment exhaust and dust. HAR §11-60 on Fugitive Dust prohibits visible emissions of dust from constriction activities. These regulations will be strictly followed to prevent dust impacts to Kea'au-Pāhoa Road. In addition, reasonable measures to control airborne and visible fugitive dust from road areas are outlined by the Department of Health's Clean Air Branch. These measures include, but are not limited to:

- Planning the different phases of construction, focusing on minimizing the amount of airborne, visible fugitive dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact.
- Providing adequate water sources at the site prior to start-up of construction activities; Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase.
- Minimizing airborne, visible fugitive dust from shoulders, and access roads.
- Providing reasonable dust control measures during weekends, after hours, and prior to daily start-up of construction activities.
- Controlling airborne, visible fugitive dust from debris being hauled away from the project site.

These mitigating measures will be used during all phases of construction to prevent significant impacts to the Kea‘au-Pāhoa Road, Highway 130, and surrounding areas.

3.1.7 Noise

Environmental Setting

Noise on the project site varies from low to moderate, with the main source being from vehicles on Kea‘au-Pāhoa Road and Highway 130.

Potential Environmental Impact from Proposed Action

Short-term noise impacts may occur during construction from excavation, grading, vehicle and equipment operation, and the construction of new infrastructure, which will be mitigated by BMPs.

Noise levels are expected to increase moderately during operation with higher levels of traffic to and from the proposed medical center, as well as more occupants and users from the community. However, hours of operation will be primarily Monday – Friday from 8:00 a.m. – 4:00 p.m., with urgent care services available seven (7) days per week from 8:00 a.m. to 8:00 p.m. The facility will not be an emergency room, will not receive ambulances, and will not provide drug rehabilitation services. Thus, noise impacts should be similar to those of other nearby commercial and community uses. Potential impacts relating to noise will not change appreciably under any alternative action, except a no action alternative.

Mitigating Measures

Rules and regulations outlined in Hawai‘i Administrative Rules Title 11, Chapter 46 “Community Noise Control,” will be followed during all construction and operation activities. If there is a potential for construction noise to exceed the State Department of Health’s maximum permissible noise levels, a noise permit will be sought. During operation, appropriate landscaping will be incorporated to screen the property and buffer noise to surrounding areas.

3.1.8 Scenic Resources

Environmental Setting

There are no scenic resources listed in the Hawai‘i County General Plan on or near the subject parcel.

Potential Environmental Impact from Proposed Action

No significant impacts are expected to scenic resources. The grounds and buildings will be aesthetically pleasing and screened by appropriate vegetation. While there is a risk of light pollution affecting scenic views, the night sky visibility, and potentially impacting seabirds utilizing nearby resources, these concerns will be effectively addressed through the implementation of BMPs discussed below. Views to and from the shoreline will not be impacted

by the project. Potential impacts to scenic resources will not change appreciably under any alternative action.

Mitigating Measures

Light pollution is another important aspect of maintaining scenic resources and the visibility of the night sky. Therefore, the following guidelines to minimize light pollution will be adhered to:

1. Any outdoor lighting must conform to the standards established by the Hawai‘i County Outdoor Lighting Ordinance (Hawai‘i County Code Chapter 14, Article 9: “Outdoor Lighting”).
2. The minimum possible amount of outdoor/exterior lighting should be used and should be turned off when not needed. Motion sensor activated lighting will be used wherever feasible.
3. All exterior lighting should be fully shielded. This means that all lighting fixtures must emit zero light above the horizontal plane.
4. Conformity to the Outdoor Lighting Ordinance also requires the use of blue-deficient exterior lighting. This means that exterior LED lighting must emit less than 2% of its total energy at wavelengths less than 500 nm. The best choice for this is either filtered LED lights, or amber LED lights.
5. White light should be avoided. Any white light used should have Correlated Color Temperature of 2700 K or below.
6. Rig lights during construction and operation of the proposed water well must be shielded to minimize stray lighting.

3.1.9 Hazardous Substances, Toxic Waste, and Hazardous Conditions

Environmental Settings

A Phase I Environmental Site Assessment (ESA) was conducted on the subject Property in September 2023 by Lehua Environmental Inc (**Appendix C).** in accordance with the Environmental Protection Agency (EPA) and American Society for Testing and Materials (ASTM) standards. The assessment was conducted to evaluate current conditions, investigate the environmental history, and identify the presence of Recognized Environmental Conditions (REC’s), Historic REC’s, and Controlled REC’s, defined as the following:

- REC: “(1) the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products, in, or, or at the subject property due to the release of likely release to the environment; or (3) the presence of hazardous substances or petroleum products in, on, or at the subject property that pose a material threat of a future release to the environment”.

- Historical REC: “a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable

regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the subject property to any controls".

- Controlled REC: "a recognized environmental conditions affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls" (ASTM, 2021).

The ESA assessment did not reveal any current, historical, or controlled RECs. However, the subject property has a history of being utilized for commercial agricultural purposes dating back to at least 1954. Previous studies on former commercial agricultural lands in Hawai'i have indicated higher concentrations of pesticides and metals in the soil. Additionally, there have been findings of increased levels of arsenic in the soil within the vicinity. Furthermore, during the site inspection, various kitchen appliances, construction materials, and a deteriorating pesticide sprayer were noted in proximity to the warehouse/caretaker residence on the premises. Thus, in conjunction with the proposed development, Lehua Environmental Inc. conducted a subsequent Hazardous Materials survey and soil screen of the property from June 20-21, 2024 (**Appendix D**).

The survey determined that the grey mastic located throughout the metal corrugated roof of the warehouse was a category I non-friable asbestos-containing material (ACM). The applicant will strictly follow the recommendations of the survey and have the material removed and disposed of by a qualified asbestos abatement contractor prior to disturbance. Additionally, the services of a qualified consultant will be obtained to conduct air monitoring and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of ACM.

Additionally, the survey also identified lead-containing paint (LCP) in poor to fair conditions on various interior and exterior painted surfaces within the planned areas of disturbance. The recommendations of the survey will be followed to ensure property handling and disposal of LCPs.

Finally, arsenic-impacted soils with concentrations that exceed the arsenic Hawaii Department of Health Tier 1 Environmental Action Level for unrestricted land use was detected in the northern corner of the lot 0" – 6" below ground surface. The requirements and recommendations listed in the report will be followed.

Potential Environmental Impact from Proposed Action

The soil contaminants found in the Hazardous Materials survey and soil screening pose potential environmental hazards should there be any direct exposure of construction workers, site personnel, and future users of the site to contaminated soil during project activities. Any potential impacts from the contaminants in the soil will be mitigated through strict adherence to the requirements and recommendations of the soil report.

Medical facilities generate a variety of hazardous waste, which requires specialized handling and disposal procedures. Effective waste management practices are vital to ensure the safety of staff, patients, and the environment.

Petroleum products may be used for landscaping equipment such as lawnmowers, weedwhackers, and other machinery for general maintenance. Petroleum products can be considered hazardous if not handled or stored properly.

Compliance with Department of Health mitigation and remediation procedures will ensure potential impacts relating to Hazardous Materials will not change appreciably under any alternative action, except a no action alternative.

Mitigating Measures

Appropriate mitigating measures outlined in the Hazardous Materials survey and soil screen report will be strictly adhered to. This will include the following:

- Asbestos-containing material (ACM) will be removed and disposed of by a qualified asbestos abatement contractor prior to disturbance. Additionally, the services of a qualified consultant will be obtained to conduct air monitoring and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of ACM.
- Spot remove and dispose of all Lead-containing paint (LCP) that may be disturbed or become dislodged during renovation activities in accordance with applicable local, state, and federal regulations.
- Spot remove and dispose of all loose and flaking (poor condition) LCP that may be disturbed or become dislodged during renovation activities in accordance with applicable local, state, and federal regulations.
- Workers performing disturbance of LCP must take appropriate measures to comply with applicable OSHA and HIOSJ regulations pertaining to the handling of lead containing materials, lead dust and worker protection. Note that OSHA and HIOSH regulate activities that disturb paint which contain any detectable concentration of lead. Note that detectable levels of lead in the paint were found throughout the Subject Site.
- A qualified consultant should be obtained to conduct air monitoring and inspection activities to ensure compliance with applicable state and federal regulations pertaining to the handling of lead paint.
- The owner/operator of the facility must immediately notify the Hawai'i State Emergency Response Commission and the appropriate Local Emergency Planning Committee via the appropriate channels if there is a release into the environment of a hazardous substance that is equal to or exceeds the minimum reporatble quantity in a 24-hour period as set forth in regulation.
- Use of good general hygiene practices for tenants, pubilic, employees and workers to avoid soil exposure.
- Limit exposure to the contaiminated soils to properly trained personnel by fencing or blocking off all bare soil or patchy grass areas so that children, site workers and the general public will not be able to access bare soil or patchy grass areas.

- Prior to construction activities that disturb the arsenic-impacted soils, prepare and submit for appropval to the Hawaii DOH Hazard Evaluation and Emergency Response (HEER) office a Construction-Envrionmental Hazard Management Plan (C-EHMP) which outlines the proper handling and management of soil and/or groundwater, sampling and analysis protocol for soil, the planned re-use/disposal locations for excavated soil, health and safety measures to be taken to protect workers, environment and the general public. The C-EHMP should be approved by the HEER office prior to the start of arsenic-impacted soils disturbance at the Subject Site.

  If applicable, develop a Removal Action Report presenting the results of the removal action, based on the Removal Action Work Plan.

- Assume all untested soils at the Subject Site are arsenic-contaminated until further testing determines otherwise.

If at any time, any additional hazardous substances or waste are discovered on the property during construction, all work will cease, and appropriate authorities will be contacted. A remediation specialist will be contacted to supervise the appropriate disposal and management of substances deemed necessary. HBMC will require all users and occupants of the proposed facilities to follow all government regulations pertaining to hazardous and toxic substances.

The solid waste items found on site including the kitchen appliances, construction materials, and a deteriorating pesticide sprayer will be properly recycled and/or disposed of in accordance with County and State rules.

All petroleum products used for landscaping purposes will be stored properly in a secure location. Personnel who have completed the proper education and training will be the only qualified individuals to handle such products, which will only be used according to the original label on the container. Material Safety Data Sheets (MSDS) must be made readily available and visible in an appropriate area. Personal Protective Equipment (PPE) will be used at all times and checked regularly.

Following the guidelines of State and County requirements, to minimize the possibility for spills and hazardous materials during construction, the applicant proposes the following:

- Unused materials and excess fill (if any) will be properly disposed of at an authorized waste disposal site.
- During construction, emergency spill treatment, storage, and disposal of all hazardous materials, will be explicitly required to meet all State and County requirements, and the contractor will adhere to “Good Housekeeping” for all appropriate substances, with the following instructions:
    - Onsite storage to minimum practical quantity of hazardous materials necessary to complete the job;
    - Fuel storage and use will be conducted to prevent leaks, spills or fires;
    - Products will be kept in their original containers unless non-resealable, and original labels and safety data will be retained

- Disposal of surplus will follow manufacturer's recommendation and all regulations;
- Manufacturers' instructions for proper use and disposal will be strictly followed;
- Regular inspection by contractor to ensure proper use and disposal;
- Onsite vehicles and machinery will be monitored for leaks and receive regular maintenance;
- Construction materials, petroleum products, wastes, debris, and landscaping substances (herbicides, pesticides, and fertilizers) will be prevented from blowing, falling, flowing, washing or leaching into the ocean; and
- All spills will be cleaned up and properly disposed of immediately after discovery.

3.1.10 Solid Waste

Environmental Setting

The Environmental Site Assessment noted that several discarded kitchen appliances, construction materials, and a pesticide sprayer in poor condition, near, and at the onsite warehouse/caretaker residence were observed during the site inspection. These solid waste items will be properly recycled and/or disposed of in accordance with County and State DOH rules.

Potential Environmental Impact from Proposed Action

The quantity of waste to be produced from the medical facility is not known. However, a solid waste management plan will be developed prior to any project activities to determine potential impacts and appropriate mitigating measures. Potential impacts relating to solid waste will not change appreciably under any alternative action, except a no action alternative.

Mitigating Measures

During operation, local waste management companies will be contracted to dispose of waste on site. HBMC will also plan for recycling stations throughout the facilities.

Additionally, HBMC will comply with the following regulations outlined by the Hawai‘i County Department of Environmental Management (DEM) Solid Waste Division:

- Commercial operations, State and Federal agencies, religious entities and non-profit organizations may not use transfer stations for disposal.
- Aggregates and any other construction/demolition waste should be responsibly reused to its fullest extent.
- Ample room should be provided for rubbish and recycling.
- Green waste may be transported to the green waste sites located at the West Hawai‘i Organics Facility and East Hawai‘i Organics Facility, or other suitable diversion programs.
- Construction and demolition waste is prohibited at all County Transfer Stations.

- All construction and demolition waste shall be transported to the West Hawai‘i Sanitary Landfill for disposal.

HBMC will also submit a Solid Waste Management Plan (SWMP) completed by a licensed engineer or architect in accordance with DEM guidelines. The SWMP will be used to:

1. Promote and implement recycling and recycling programs.
2. Predict the waste generated by the proposed development and anticipate the impacts on County Solid Waste Management Facilities.
3. Predict the additional vehicular traffic being generated because of waste and recycling transfers.

According to DEM guidelines, the SWMP will contain the following:

1. A description of the project and the potential waste that may be generated: e.g. analysis of anticipated waste volume and composition. This includes waste generated during the construction and operation or maintenance phases. Waste types shall include (but not be limited to):
    a. Organics (including food waste and green wastes);
    b. Construction and demolition materials;
    c. Paper (including cardboard);
    d. Metal (including ferrous and non-ferrous metals);
    e. Plastic;
    f. Special (including ash, sludge, treated medical waste, bulky items, tires);
    g. Hazardous (including paint, vehicle fluids, oil, batteries); and
    h. Glass.
2. Indicate onsite source separation by waste type, e.g. source separation bins for glass, metal, plastic, cardboard, aluminum, etc. Provide ample space for rubbish and recycling.
3. Identification and location of the proposed waste reduction, waste re-use, recycling facility or disposal site and associated transportation methods for the various components of the development’s waste management system, including the number of vehicle movements and associated routes that will be used to transport the waste and recycled materials.
4. The report will include identification of any impact to County-operated waste management facilities, and the appropriate mitigation measures that will be implemented by the development to minimize these impacts.
5. Analysis will be based on the highest potential use or zoning of the development.

3.2 Socioeconomic and Cultural

3.2.1 Land Use

Environmental Setting

Puna is desirable for its relatively inexpensive land, which typically ranges in size from 1 to 3 acres. Residents from the U.S. mainland and other parts of the State of Hawai‘i continue to seek

these affordable properties. The basis of the economy of Puna has evolved from cattle ranching and sugar to diversified agriculture and tourism stimulated by Kīlauea volcano. The Puna District is a significant socioeconomic area for Hawai‘i County. It is the leader in the agriculture industry on the Island of Hawai‘i. Some Puna subdivisions between Pāhoa and Hilo (including Hawaiian Paradise Park, Hawaiian Beaches, and Hawaiian Shores), are now primarily bedroom communities for Hilo’s workforce.

Kea‘au has become a convenient central hub for services within the Puna District including grocery and retail stores, restaurants, cafes, gas stations, and healthcare facilities.

The subject property and the adjacent parcels to the north, south, east and southwest are zoned Agricultural – 20 acres (A-20a). To the west is a cluster of land zoned Agricultural – 1 acre (A-1a). Kea‘au Village Center is located to the north with mixed commercial and residential zoning.

It is noted that a Change of Zone application to redesignate the subject parcel and the parcel immediately to the southwest, containing a combined area of 26.76 acres, from A-20a to Family Agricultural – 1 acre (FA-1a) is currently pending and has been forwarded to the Committee on Legislative Approvals and Acquisitions with a favorable recommendation from both the Planning Department and the Windward Planning Commission. The proposed FA-1a zoning would allow for a blend of small-scale agricultural operations associated with residential activities and which may be characterized by farm estates, small acreage farms or subsistence lots. If the requested change of zone is approved, the landowner intends to subdivide the property into 23 lots, with a minimum lot size of 1 acre. Should HBMC obtain the necessary approvals to proceed with the subject project, the landowner will revise the proposed 23-lot subdivision layout to exclude the HBMC project area. However, should the HBMC project not proceed, the landowner will proceed with the proposed 23-lot subdivision.

The Ke Kula ‘o Nāwahīokalani‘ōpu‘u Iki Lab Public Charter School, a Hawaiian language immersion charter school serving kindergarten through grade 12, is located 600 feet to the southeast. It is situated near Kea‘au High School, which is 650 feet to the north, and Kea‘au Elementary School, located 0.4 miles to the northwest. Residential and agricultural lots are found to the west and northwest.

Potential Environmental Impact from Proposed Action

The proposed development aligns with the existing and proposed land use patterns in the surrounding area, characterized by a mix of schools, businesses, housing, and community spaces. Potential impacts to land use will not change appreciably under any alternative.

Mitigating Measures

The proposed land use will require a Special Permit approved by the County Windward Planning Commission to ensure the proposed use is compatible and complies with all land use laws.

3.2.2 Socioeconomic Characteristics

Environmental Setting

According to the 2022 United State Census Bureau, the two most populated census county divisions (CCD) within the Puna District are the Kea‘au-Mountain View CCD, with a population of 41,210 and an average median household income of $65,750 and the Pahoa-Kalapana CCD, with a population of 10,494 and an average median houshold income of $38,162. These average median incomes are notably lower than the State median of $83,173. Furthermore, a significant 58% of families in State House District 4, which contains the majority of the Puna District, are classified as Asset Limited, Income Constrained, Employed (ALICE), a term used to describe households in the community earning more than the Federal Poverty Level, yet falling short of covering the basic cost of living in Hawai‘i County, often despite working multiple jobs (ALICE Threshold, 2022; American Community Survey, 2022). Even though these households are employed, they grapple with meeting essential expenses such as housing, childcare, food, transportation, and healthcare. By far, the largest employment industry in both CCDs is *educational services, and health care and social assistance*, which comprises approximately 25.9% of the Kea’au-Mountain View CCD workforce (Figure 9) and 33.1% of the Pahoa-Kalapana CCD workforce (Figure 10).

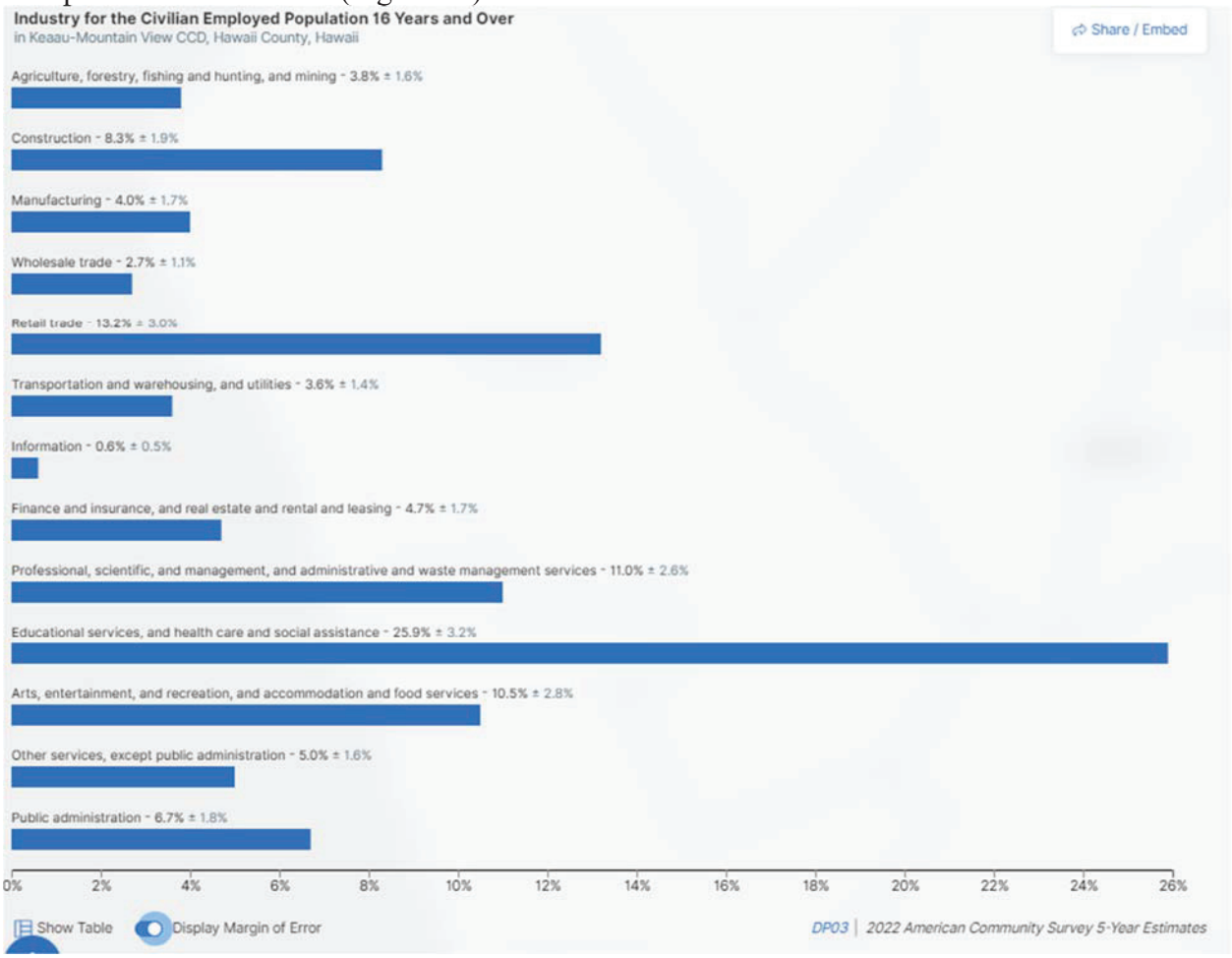


Figure 9. Employment Industries in Kea‘au-Mountain View CCD

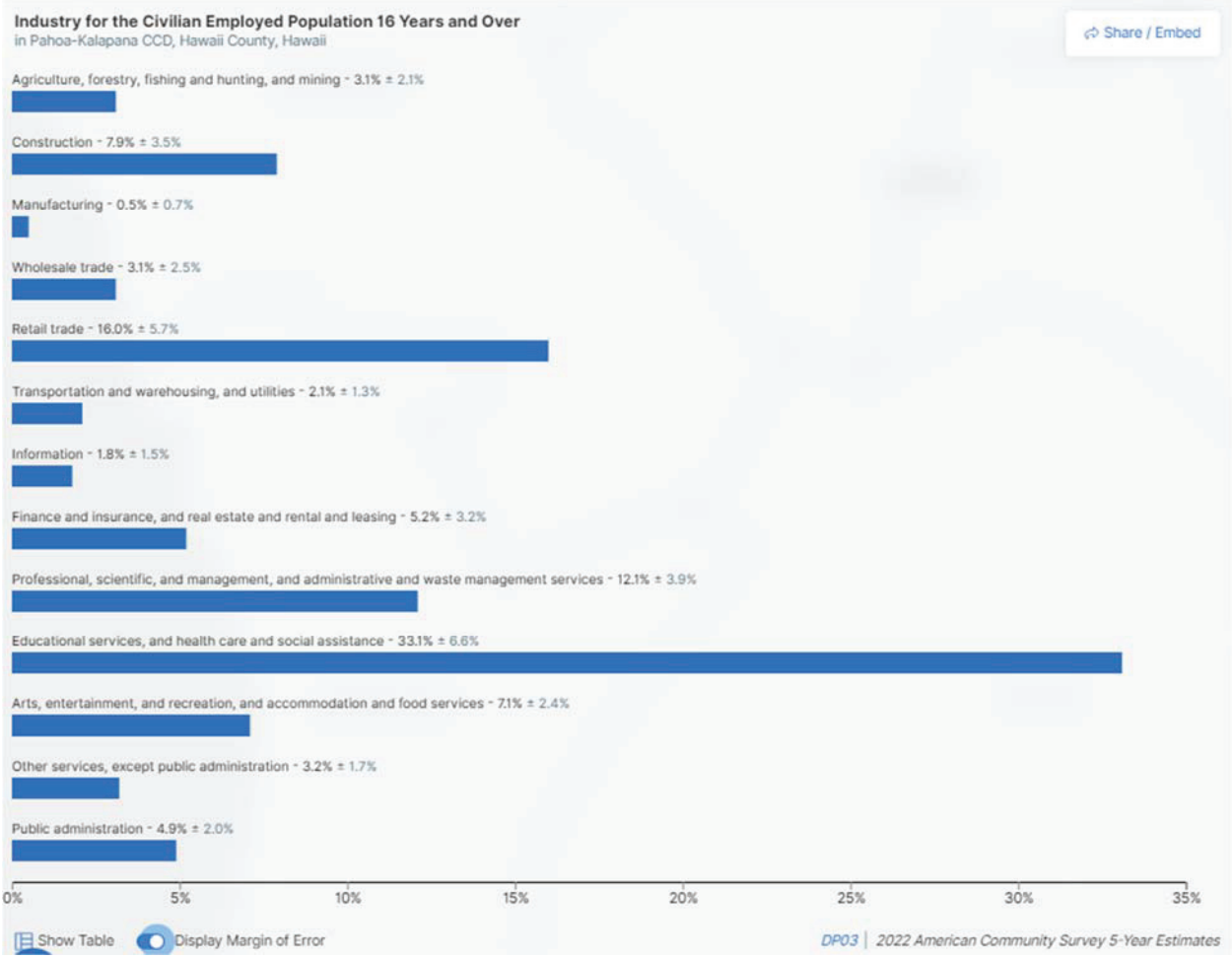


Figure 10. Employment Industries in Pahoa-Kalapana CCD

Potential Environmental Impact from Proposed Action

The proposed project will have a positive impact on socioeconomic characteristics in the Kea‘au area and larger Puna District by stimulating economic growth through job creation and increased access of essential healthcare services. In the short term, the project is estimated to create upwards of 50 full-time & temporary jobs related to the design and build-out phase of the project. These jobs will include professional services (i.e. architectural, engineering, etc.) as well as trade workers (i.e. contractors, builders, masons, electricians, plumbers, landscapers, etc.).

In the long term, the proposed medical facility is anticipated to create approximately 50 full-time positions. These positions would include medical professionals, administrators, therapists, social workers and maintenance and custodial workers. As noted above, the primary labor industry in the area is *educational services, and health care and social assistance.* Employees are anticipated to be primarily Puna and Hilo residents making the creation of additional health care and social assistance jobs appropriate for this area. Furthermore, in addition to alleviating travel

time for patients who would otherwise have to go to Hilo to receive health care services, the creation of additional health care related employment opportunities in Puna will decrease commute times for health care workers living in the Puna District.

Mitigating Measures

The project is expected to have a measurable positive impact on socioeconomic characteristics through the creation of over 100 short-term and long-term employment opportunities and increased access to healthcare services for Puna residents. Therefore no mitigating measures are required.

3.2.3 Parks and Recreation

Environmental Setting

There are no notable public parks or recreation areas within the vicinity of the subject parcel.

Potential Environmental Impact from Proposed Action

The proposed action will have negligible impact on nearby parks and recreation activities. Public access to the parks and ocean will not be impacted by the request. This will not change under any action alternative.

Mitigating Measures

No mitigating measures are expected to be necessary for parks and recreation.

3.2.4 Cultural and Historic Resources

Environmental Settings

Historic and Cultural Background

Hawai‘i is believed to be first inhabited by voyagers from the Marquesas around 1,000 A.D, however, recent studies have shown that initial Polynesian colonization of Hawai‘i Island occurred between 1220 and 1261 A.D. (Rieth et al. 2011). It is believed that Hilo is likely one of the first settlements on Hawai‘i Island. Hilo is known to have rich marine resources accessed at Hilo Bay and additional abundant resources from the forests that descend from Mauna Loa and Mauna Kea. Fresh water was available from Wailoa and Wailuku Rivers and Waiākea, Waiolama, Pukihae and ‘Alenaio Streams. The project area is approximately eight (8) miles southeast of Hilo.

Early Hawaiian settlements incorporated new strategies and structures to adapt to their new environment. Traditional Polynesian philosophies and ideals were used to form new societal standards and structures including the principle of genealogical seniority, observance of gods such as *Kāne, Ku, and Lono*, the *kapu* system of law and order, *ahupua‘a* land systems, and

various beliefs and values that determined day-to-day protocol and lifestyle such as *mana* and the *ʻaumakua*.

It is believed that Hilo is likely one of the first settlements on Hawaiʻi Island. Hilo is known to have rich marine resources accessed at Hilo Bay and additional abundant resources from the forests that descend from Mauna Loa and Mauna Kea. Ancient Hawaiians understood the critical importance of fresh water. Fresh water streams and springs were believed to be created by the gods Kāne and Kanaloa, which established a spiritual connection between people and water. In accordance with the native Hawaiians respect for water, land management units were organized around freshwater supplies in a traditional system known as the *ahupuaʻa* resource-management system (CWRM, 2019). According to the Water Resource Protection Plan, "water was viewed as such a critical resource to the health and well-bring of the people of ancient Hawaiʻi, that the concept of private ownership did not exist" (CWRM, 2019).

The *ahupuaʻa* system, divided near the end of the 16th century, or early 17th century, was designed to provide all the necessary resources to live including agricultural resources inland and ocean resources at the coast. The subject property is located within the Keaʻau Ahupuaʻa.

Puna District

The earliest documentation of Hilo is found in ʻUmi-a-Liloa's conquest of Hawaiʻi Island in the sixteenth century, which established Hilo as a royal center for the island. In the account, ʻUmi-a-Liloa began his conquest of the Island of Hawaiʻi by defeating chief Kulukuluʻā, who lived in Waiākea, and the other chiefs of Hilo. ʻUmi-a-Liloa's son Keawe-nui-a-ʻUmi ruled Hamākua, Hilo and Puna. After the death of Keawe-nui-a-ʻUmi, the ruling kingdom was divided into three parts and was established under warring chiefs (Kamakau, 1992).

In 1738 Kamehameha I was born. Chief Kalaniʻopuʻu was the high chief during Cook's arrival in 1779. After the chief's death in 1782, his son Kiwalaʻo, and his nephew, Kamehameha I began to compete for control of the west side of Hawaiʻi Island. Kamehameha won the battle of Mokuʻohai against Kiwalaʻo in Kona, officially controlling the western half of the island. In 1791, Kamehameha, having gained control of Hilo, fought, and won a battle against his cousin Keoua at Kawaihae for control of the entire Island of Hawaiʻi. In 1795, Kamehameha conquered Maui, Molokaʻi, Lanaʻi and Oʻahu. He also received Kauaʻi by cession in 1810 (Kamakau, 1992). Kamehameha's son Liholiho was born in Hilo in November 1797. Waiākea was inherited by Lihiliho after Kamehameha's death. The *ʻili kūpono* of Piʻopiʻo and its royal fishpond were given to his favorite wife, Kaʻahumanu (Escott and Dols, 2020).

The Puna District was originally one of six chiefdoms or *moku* of the island of Hawaiʻi. Puna was not a district that produced any great and powerful chiefs; the area was often controlled by chiefs and rulers from the Hilo District to the north, or the Kaʻu District to the south (Cordy, 2000). Puna is historically known for its rich soils, high rainfall, and frequent volcanic activity. Many parts of the district have been covered in lava over the past 1,000 years. The coastal areas are characterized by thin soil and steep volcanic cliffs, which are met by rough and wind-blown ocean. Historic settlement patterns reflected favorable agricultural activities, which were found inland from the coast. Villages were often spread out across large areas and abundant in population (Kelly et al. 1981).

The Puna District is known for its valuable products, such as hogs, gray *kapa* cloth (*ʻeleuli*), tapas made of *mamaki* bark, fine mats made of young pandanus blossoms (ʻ*ahuhinalo*), mats made of young pandanus (*Hala*) leaves (*ʻahuao*), and feathers of the *ʻoʻo* and *mamo* birds. Puna was also famous for its abundant *ulu* (breadfruit) (Ellis, 1963). Neighboring villages in the ʻOlaʻa Ahupuaʻa were known for their hand made products. These two Ahupuaʻa were important sources of forest and agricultural products for the ruling elite in Hilo.

In 1839, King Kamehameha III signed the Bill of Rights, which sought to ensure that the people's land would not be taken from them. In 1840, the first Constitution of Hawaiʻi was enacted. In 1845, the Land Commission was created by Kamehameha III to award land claims, although this could not be done under the current feudal system of land tenure as individuals did not hold title to the land. In 1848 The Great Māhele (Land Division) established a system of private land ownership, which divided all Hawaiʻi's land into three classifications: Crown Lands, Government Lands and Konohiki Lands. The Keauohana, Kehena Ahupuaʻa was deemed Government Lands. Crown, Government and Konohiki lands remained subject to the rights of the *kanaka* who were in possession and cultivating the lands. As land sales between the Crown, Government and Konohiki continued, the rights of the kanaka became an issue. In 1850, the Land Commission moved to award title of land to kanaka who remained in physical possession, cultivated, or improved any portion of Konohiki Lands. These became Kuleana Lands. Very few Kuleana Land claims were made during the Māhele for Puna (McGregor, 1999). Only 19 Land Commission awards were granted in the entire Puna District. Of these, 16 awards were made in large tracts to 10 chiefs who lived outside of Puna. The nearby ahupuaʻa of Keaʻau was granted to William C. Lunalilo as part of Land Commission Award (LCA) 8559-B.

In 1893, the Hawaiian Monarchy was over-thrown, and Queen Liliuokalani was imprisoned. The remaining Crown Lands were confiscated by the government and made a part of the public domain (Chinen, 1961).

Between 1845 and 1900 Hilo began to significantly change through the increased presence of foreign vessels, expansion and growth of tourism, the establishment of missions, private land ownership legalization, the presence of the whaling, cattle, and sugar industries, and the construction of Government roads and railroad lines (Kelly et al. 1981). The changes that occurred in the Hilo district began to dictate and impact surrounding districts such as the Puna district to the south. Changes and patterns of residential locations and growth of towns and villages in the Puna district were driven by the demand for agricultural products, thus prompting settlement near land suited to commercial crops and near newly constructed roads and transportation networks.

The Old Puna Trail and Puna Trail (Ala Hele Puna)/Old Government Road are historic trails that connected the Hilo district to and throughout the Puna district. The Old Puna Trail began at the modern-day Liliʻuokalani Gardens in Hilo and ended at Haʻena. It ran along the eastern coast of the island and ran through various coastal villages. An additional trail called the Puna Trail (Ala Hele Puna), also known as Old Government Road, continued from the south end of the Old Puna Trail, and continued south towards the district of Kaʻu. Lass (1997) also refers to the entire route from Hilo to Kaʻu as the Puna-Kaʻu Trail. These trails were first mapped by the Wilkes Expedition of 1804-41 (Escott and Dols, 2020). The Surveyor General of the Hawaiian

Government Survey provided a general description of the area between Old Government Road and the newer upper road from Hilo to Kea‘au to Pāhoa in 1889. The description suggested a depopulation along most of the Puna coastal area when compared to descriptions documented by William Ellis just sixty-six years earlier. Both accounts described people living somewhat inland between the coast and inland gardens. In 1889, people were cultivating *kalo, ‘awa*, coffee and sweet potato. By 1889, it appeared that very few people lived along the Old Government Road (Maly, 1999). Traditional settlements that were near coastal areas began to move inland near newer roads and transportation routes. Additionally, more people began to move inland due to the decaying condition of the coastal trails and to find paid work and to produce cash crops such as sugarcane in more fertile, inland areas.

In 1881, the entire Kea‘au Ahupua‘a was purchased by William H. Shipman who operated cattle ranches across the island in places such as Kapoho, Waiakea, and Kea‘au. Portions of Kea‘au Ahupua‘a were leased to the Ola‘a Sugar Company in 1899. The expansion and operation of the Ola‘a Sugar Company led to the construction of the sugar mill in Kea‘au, numerous sugar company camps, which created and influenced modern day Kea‘au as a small residential and commercial center in the district. Ola‘a Sugar Company became the largest sugar cane operation in the district. It was eventually sold to American Factors (AMFAC) in 1969, who expanded production to include a bagasse and trash burning power plant that produced 12.5KW of power for Hawaiian Electric Light Company (HELCO). By 1982, AMFAC closed Puna Sugar Company and sold it to Fiji Sugar Corporation in 1988.

Potential Environmental Impact from Proposed Action

Archaeological

Although an archaeological survey was not conducted on the site, it is highly unlikely any such resources exist due to the prior clearing of the property and its use for agriculture. Furthermore, an April 18, 2023 letter from the Department of Land and Natural Resources State Historic Preservation Division issued a determination of “no historic properties affected” in conjunction with a previous grubbing permit for the property (**Appendix E**).

Cultural

The Hawai‘i State Supreme Court’s PASH and Ka Pa‘akai O Ka ‘Aina decisions require decision-makers to consider a project’s impact to native Hawaiian practices and resources. Specifically, prior to making a decision, State and County agencies must identify the cultural, historical, and natural resources and associated traditional and customary practices of the subject site, the impacts of the proposed project to those resources and practices, and the feasible action (i.e. mitigating measures), if any, to protect such resources and practices.

It is not known whether the subject property or immediate surrounding area have ever been used for the gathering of plants by native Hawaiians in the past. However, it would appear very unlikely that the site would serve such a purpose today and/or in the recent past due to past commercial agricultural use. There are no identified trails crossing the property that connect to mauka forested areas for gathering or hunting. SHPD has reported that no historic resources were known to be present on the property nor would any likely be discovered due to the previous land

clearing and agricultural activities. As constructuon will be limited to areas that have been previously cleared and cultivated, archaelogical resources are not expected to be encountered. However, if needed, an archaeological monitoring plan can be prepared and implemented in conjunction with further land clearing activity. Therefore, it does not appear that the project would have any potential adverse impact relating to cultural practices in the area. These potential impacts will not change appreciably under any alternative.

Mitigating Measures

In the event any undocumented archaeological or cultural resources are found on site, all work will cease in the immediate area of the find, and the State Historic Preservation Division will be contacted for appropriate action.

3.3 Public Roads, Services, and Utilities

3.3.1 Roads and Access

Environmental Setting

The property is currently accessed via a driveway off Old Pahoa Government Road near the intersection of Old Kea‘au-Pāhoa Road and Mamaka Street. A sliver parcel identified as TMK (3) 1-6-003: 080 is State land located between the subject property and Route 139 Right-of-Way (ROW).

There are two potential driveway alignments being considered for the development. Alternative 1 proposes direct access via a driveway off an Old Pahoa Government Road, that would be proposed for improvement, located just offset of the intersection of Old Kea‘au Pāhoa Road and Mamaka Street. Alternative 2 proposes driveway access to extend from the site as a newly improved road, through the existing Old Pahoa Government Road, and connect to Old Kea‘au Pāhoa Road. Alternative 2 is the preferred alternative.

Old Pahoa Government Road is a State-owned access road consisting of pavement widths of approximately 15 to 20 feet. Improvements are anticipated to be required to Old Pahoa Government Road in both access alternatives. HBMC anticipates that improvements may include but are not limited to pavement widening, drainage improvements, and pedestrian safety improvements such as curb-gutter-sidewalk design standards.

A Traffic Impact Analysis Report (TIAR) was completed in October 2024, by SSFM International to evaluate potential traffic impacts from the proposed project based on Existing Conditions (2024), and Future Without Project and Future With Project Conditions in 2027 for both alternatives. The TIAR analyzed peak period turning movements at the following nine (9) intersections based on three (3) Hawai‘i Department of Transportation 24-hour traffic count locations (**Figure11**).

Study Intersections:

1. Route 11 at Route 139
2. Route 139 at Old Volcano Road
3. Route 139 at Kikania Street
4. Route 139 at Kukula Street
5. Route 139 at Kea‘au High School Driveway
6. Route 139 at Old Kea‘au-Pāhoa Road
7. Route 130 at Route 139
8. Old Kea‘au-Pāhoa Road at Mamaka Street
9. Old Kea‘au-Pāhoa Road at Future Alternative 2 Driveway

HDOT 24-Hour Traffic Count Locations

A. Route 9 between Route 130 and Route 139
B. Route 130 between Kukula Street and Route 139
C. Route 139 between Kukula Street and Route 130

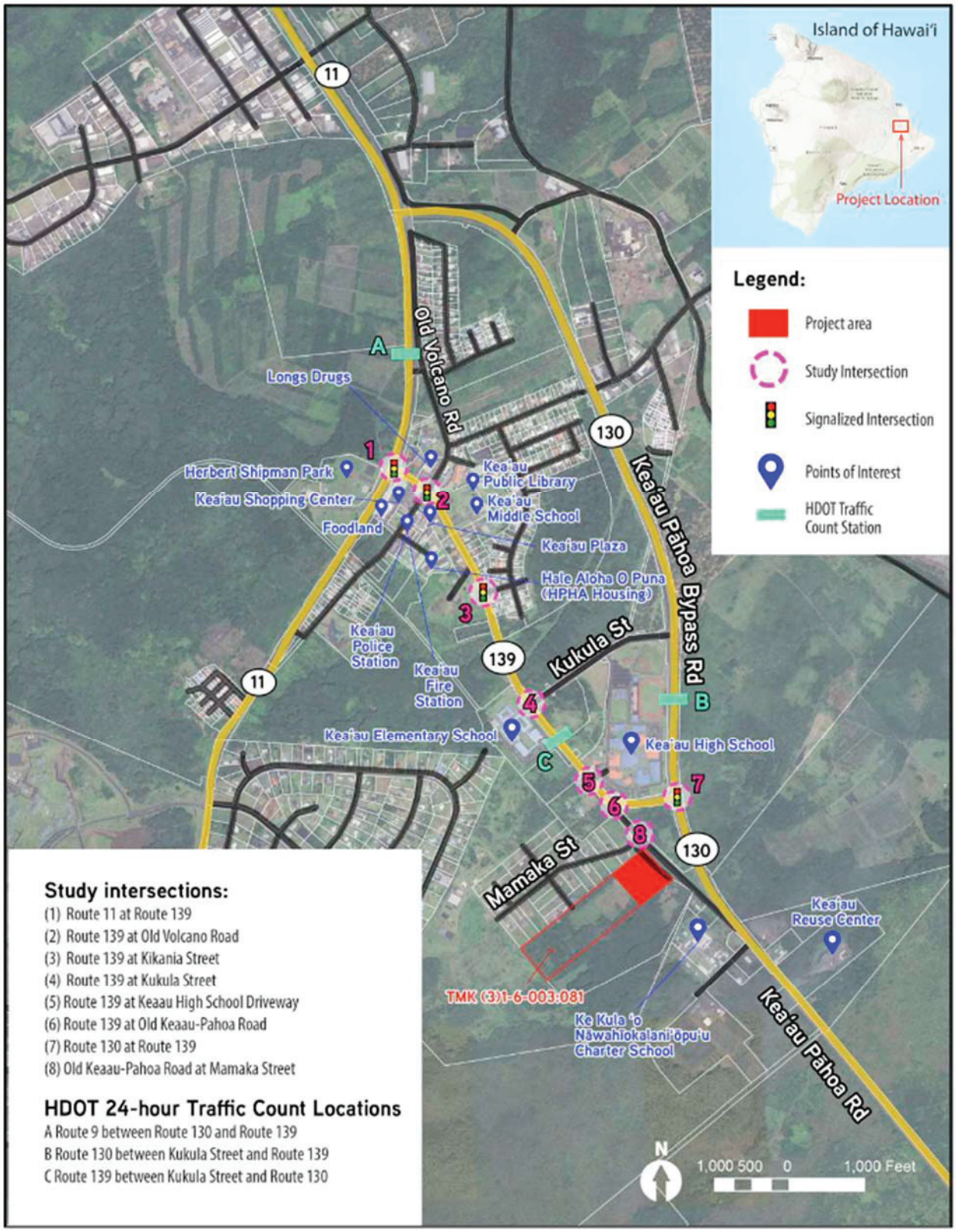


Figure 11: Map of Study Intersections and 24-Hour Traffic Count Locations

Peak traffic hours were found to be between 7:00 to 8:00 AM and 4:00 to 5:00 PM. Existing (2024) intersection Levels of Service for AM and PM peak hours were determined using *Synchro 11* traffic analysis software. Level of Service is a quantitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A, with little to no delays, to congested conditions at LOS F, where extreme delays exist. Guidelines state that LOS D or better is appropriate for the study intersection and movements.

Existing (2024) Intersection LOS Analysis

The following are the existing (2024) LOS at each study intersection. The four (4) intersections in bold had intersection movements that operated at LOS E during AM or PM peak hours. The remaining study intersections had all movements operate at LOS C or better (**Table 4**).

1. **Route 11 at Route 139**
    a. The Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hours, respectively.
2. Route 139 at Old Volcano Road
    a. All movements occurred at LOS C or better.
3. **Route 139 at Kikania Street**
    a. The Kikania Street southbound approach operates at LOS E (v/c of 0.26) during AM peak hour.
4. Route 139 at Kukula Street
    a. All movements occurred at LOS D or better.
5. Route 139 at Keaʻau High School Driveway
    a. All movements occurred at LOS B or better.
6. **Route 139 at Old Keaʻau-Pāhoa Road**
    a. The Old Keaʻau-Pāhoa Road northbound approach operates at LOS E (v/c of 0.47) during the AM peak.
7. **Route 130 at Route 139**
    a. The Route 130 northbound left turn operates at LOS E (v/c of 0.87) during the PM peak hour.
8. Old Keaʻau-Pāhoa Road at Mamaka Street
    a. All movements occurred at LOS B or better.

Table 4: Existing (2024) LOS

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**28.0**	**-**	**C**	**24.1**	**-**
Route 11 NB Left	E	61.2	0.44	F	84.4	0.41
Route 11 NB Through-Right	C	31.6	0.77	C	29.1	0.70
Route 11 SB Left	D	51.0	0.83	D	35.8	0.82
Route 11 SB Through-Right	C	20.5	0.39	C	20.1	0.53
Shipman Park EB Left-Through-Right	B	13.8	0.03	B	11.6	0.05
Route 139 WB Left-Through	C	21.1	0.53	B	13.6	0.26
Route 139 & Old Volcano Road	**B**	**14.1**	**-**	**B**	**14.5**	**-**
Old Volcano NB Left	B	16.2	0.15	C	25.0	0.33
Old Volcano NB Through-Right	B	18.0	0.61	C	22.4	0.48
Old Volcano SB left	C	24.6	0.45	C	27.6	0.39
Old Volcano SB Through-Right	B	14.3	0.22	C	21.0	0.32
Route 139 EB Left	B	15.0	0.31	A	6.2	0.07
Route 139 EB Through-Right	B	11.0	0.45	A	6.5	0.25
Route 139 WB Left	B	17.7	0.41	A	8.4	0.18
Route 139 WB Through	B	10.1	0.37	A	5.6	0.11
Route 139 WB Right	A	9.8	0.33	A	5.3	0.05
Route 139 & Kikania Street	**-**	**0.8**	**-**	**-**	**0.3**	**-**
Route 139 EB Left-Through	A	9.9	0.01	A	7.8	0.01
Kikania SB Left-Right	E	37.6	0.26	B	14.5	0.04
Route 139 & Kukula Street	**B**	**17.5**	**-**	**A**	**3.9**	**-**
Route 139 EB Left	A	9.1	0.36	A	2.6	0.04
Route 139 EB Through	A	7.1	0.46	A	2.6	0.34
Route 139 WB Through-Right	B	13.5	0.70	A	4.5	0.18
Kukula SB Left	D	54.8	0.88	C	26.7	0.46
Route 139 & Kea'au HS Driveway	**-**	**2.4**	**-**	**-**	**0.1**	**-**
Route 139 EB Left-Through	A	8.3	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.1	0.23	A	9.0	0.01
Route 139 & Old Kea'au-Pāhoa Road	**-**	**5.3**	**-**	**-**	**0.9**	**-**
Route 139 WB Left-Through	A	9.1	0.16	A	8.4	0.02
Old Kea'au-Pāhoa NB Left	E	41.9	0.47	B	13.5	0.02
Old Kea'au-Pāhoa NB Right	B	12.1	0.17	B	11.1	0.03
Route 130 & Route 139	**C**	**20.1**	**-**	**C**	**26.6**	**-**
Route 130 NB Left	D	52.0	0.93	E	64.3	0.87
Route 130 NB Through	A	8.8	0.69	A	7.3	0.30
Route 130 SB Through	C	24.0	0.31	C	24.7	0.74
Route 139 EB Left	D	44.7	0.35	C	33.4	0.07
Route 139 EB Right	C	21.9	0.45	D	43.5	0.85
Old Kea'au-Pāhoa Road & Mamaka Street	**-**	**0.5**	**-**	**-**	**1.1**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	7.9	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	12.0	0.04	A	8.9	0.01

Future Without Project Conditions

A. Background Growth Rate

The historical average annual daily traffic (AADT) data for Route 11, 130, and 139 within the study area between 2014 and 2021 demonstrated annual growth rates ranging from 2.20% to 3.89%. However, the overall trend indicates consistent AADT levels without notable growth during that period.

According to the Federal-Aid Highways 2035 Transportation Plan for the District of Hawai‘i, the forecast anticipates a compounded annual increase of 2.12% in traffic within the planning district of Puna from 2020 to 2035. A 2.12% compounded annual growth rate was therefore applied to through volumes on Route 11, 130, and 139, and for turns to/from Route 139 to/from Route 11 and Route 130.

B. Surrounding Projects

1. Kea‘au Village Master Plan Phase 1 and 2

The Kea‘au Village Master Plan was proposed to construct 590 single-family homes, 250 multi-family homes, 220,408 square feet of commercial space, 43,600 square feet of office space, and 100 hotel rooms. The project was expected to be completed over 2023, 2028, and 2038.

Construction has yet to commence for the project, and the timeline for its initiation remains uncertain. Moreover, even after construction begins, it will likely be a couple of years before the first units are completed and occupied, thereby generating traffic. Consequently, due to this uncertainty, the individual project-related trips resulting from the Kea‘au Villages MP TIAR were excluded from the future analysis. It is assumed that any forthcoming development within the next 13-16 years will be encompassed within the projected 2.12% annual background growth rate.

2. Kea‘au Mountain View Public Library

A 12,000 square foot public library is proposed northeast of the intersection of Route 139 and Old Volcano Road to replace the existing library at the Kea‘au Middle School and Mountain View Elementary School. The project is expected to be complete by 2027 and therefore was included in the subject project’s traffic analysis.

Additionally, the short-and medium-term improvements outlined in the Puna Community Development Plan and recommended by DOT, as well as the Statewide Pedestrian Master Plan, Bike Plan Hawai‘i, and ongoing roadwork in the area were evaluated with respect to the proposed project. These projects were determined to be unnecessary to include in the future analysis.

C. Future (2027) Without Project Traffic Volumes

Projected traffic volumes for Future (2027) Without Project were determined by combining Future (2027) Background volumes and a 2.12% annual growth rate over 3 years, with projected trips generated from the Kea‘au Mountain View Public Library project in 2027 (**Figure 12**).

The following are the Future (2027) Without Project LOS at each study intersection. The five (5) intersections in bold had intersection movements that operated at LOS E or F during AM or PM peak hours. The remaining study intersections had all movements operate at LOS C or better (**Table 5**).

1. **Route 11 at Route 139**
    a. The Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hours, respectively.
    b. The Route 11 southbound left turn is projected to operate at LOS E (v/c of 0/85) with a left turn volume of 170 vehicles per hour during the AM peak hour.
2. Route 139 at Old Volcano Road
    a. All movements operate at LOS C or better.
3. **Route 139 at Kikania Street**
    a. The Kikania Street southbound approach operates at LOS E (v/c of 0.30) during the AM peak hour.
4. **Route 139 at Kukula Street**
    a. The Kukula Street southbound left turn operates at LOS E (v/c of 0.89) during the AM peak hour.
5. Route 139 at Kea‘au High School Driveway
    a. All movements operate at LOS B or better.
6. **Route 139 at Old Kea‘au-Pāhoa Road**
    a. The Old Kea‘au-Pāhoa Road northbound approach operates at LOS E (v/c of 0.52) during the AM peak hour.
7. **Route 130 at Route 139**
    a. The Route 130 northbound left turn operates at LOS E (v/c of 0.83) during the PM peak hour.
8. Old Kea‘au-Pāhoa Road at Mamaka Street
    a. All movements operate at LOS B or better.

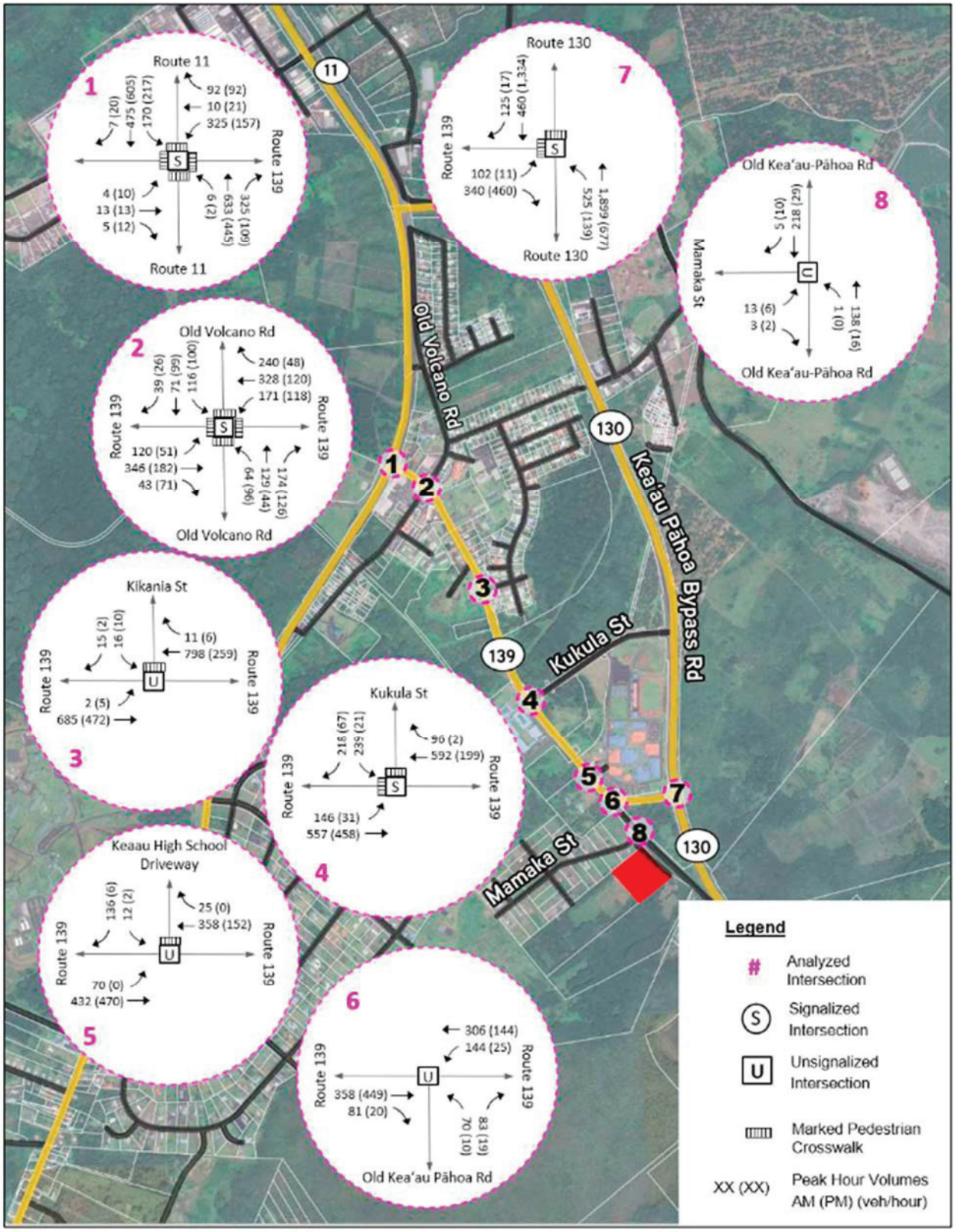


Figure 12: Future (2027) Without Project Intersection Peak Hour Volumes

Table 5: Future (2027) Without Project LOS

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**29.3**	-	**C**	**23.9**	-
Route 11 NB Left	E	62.6	0.44	F	84.8	0.41
Route 11 NB Through-Right	C	32.5	0.79	C	29.0	0.71
Route 11 SB Left	E	55.3	0.85	D	35.6	0.83
Route 11 SB Through-Right	C	20.1	0.40	B	19.3	0.54
Shipman Park EB Left-Through-Right	B	15.0	0.03	B	15.5	0.05
Route 139 WB Left-Through	C	24.0	0.58	B	14.9	0.29
Route 139 & Old Volcano Road	**B**	**14.6**	-	**B**	**14.6**	-
Old Volcano NB Left	B	16.6	0.16	C	25.5	0.33
Old Volcano NB Through-Right	B	18.9	0.62	C	22.8	0.48
Old Volcano SB left	C	25.5	0.47	C	28.3	0.41
Old Volcano SB Through-Right	B	14.6	0.22	C	21.4	0.32
Route 139 EB Left	B	16.0	0.33	A	6.4	0.07
Route 139 EB Through-Right	B	11.5	0.48	A	6.6	0.26
Route 139 WB Left	B	19.2	0.43	A	8.7	0.19
Route 139 WB Through	B	10.5	0.40	A	5.7	0.12
Route 139 WB Right	B	10.1	0.34	A	5.4	0.05
Route 139 & Kikania Street	-	**0.9**	-	-	**0.3**	-
Route 139 EB Left-Through	B	10.2	0.01	A	7.9	0.01
Kikania SB Left-Right	E	45.6	0.30	C	15.3	0.04
Route 139 & Kukula Street	**B**	**18.1**	-	**A**	**4.0**	-
Route 139 EB Left	B	10.0	0.38	A	2.7	0.04
Route 139 EB Through	A	7.4	0.49	A	2.7	0.36
Route 139 WB Through-Right	B	14.3	0.61	A	4.6	0.20
Kukula SB Left	E	57.3	0.89	C	26.7	0.46
Route 139 & Kea'au HS Driveway	-	**2.4**	-	-	**0.1**	-
Route 139 EB Left-Through	A	8.4	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.5	0.25	A	9.1	0.01
Route 139 & Old Kea'au-Pāhoa Road	-	**5.5**	-	-	**0.8**	-
Route 139 WB Left-Through	A	9.2	0.17	A	8.4	0.02
Old Kea'au-Pāhoa NB Left	E	48.6	0.52	B	14.1	0.03
Old Kea'au-Pāhoa NB Right	B	12.4	0.17	B	11.3	0.03
Route 130 & Route 139	**C**	**21.1**	-	**C**	**26.1**	-
Route 130 NB Left	D	52.2	0.93	E	66.3	0.83
Route 130 NB Through	B	10.0	0.73	A	8.1	0.30
Route 130 SB Through	C	26.7	0.35	C	23.3	0.74
Route 139 EB Left	D	44.7	0.36	C	31.5	0.03
Route 139 EB Right	C	20.2	0.45	D	48.6	0.87
Old Kea'au-Pāhoa Road & Mamaka Street	-	**0.5**	-	-	**1.1**	-
Old Kea'au-Pāhoa NB Left-Through	A	7.9	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	12.0	0.04	A	8.9	0.01

Future With Project Traffic Volumes

Future traffic volumes with the proposed project were analyzed using rates developed by the Institute of Transportation Engineers (ITE) and published in the Trip Generation Manual, 11th Edition.

A. Future (2027) With Project Traffic Volumes – Alternative 1 Driveway Alignment

These numbers are the sum of Future (2027) without volumes and the project generated volumes for Alternative 1 Driveway Alignment (**Figure 13**).

The following are the Future (2027) With Project LOS at each study intersection for the Alternative 1 driveway alignment. The five (5) intersections in bold had intersection movements that operated at LOS E or F during AM or PM peak hours. The remaining study intersections had all movements operate at LOS C or better (**Table 6**).

1. **Route 11 at Route 139**
    a. The Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hours, respectively.
    b. The Route 11 southbound left turn is projected to operate at LOS E (v/c of 0.85) with a left turn volume of 173 vehicles per hour during the AM peak hour.
2. Route 139 at Old Volcano Road
    a. All movements operate at LOS C or better.
3. **Route 139 at Kikania Street**
    a. The Kikania Street southbound approach operates at LOS F (v/c of 0.34) during the AM peak hour.
4. **Route 139 at Kukula Street**
    a. The Kukula Street southbound left turn operates at LOS E (v/c of 0.89) during the AM peak hour.
5. Route 139 at Kea‘au High School Driveway
    a. All movements operate at LOS B or better.
6. **Route 139 at Old Kea‘au-Pāhoa Road**
    a. The Old Kea‘au-Pāhoa Road northbound approach operates at LOS F (v/c of 0.76) during the AM peak hour.
7. **Route 130 at Route 139**
    a. Route 130 northbound left turn and eastbound right turn operates at LOS E (v/c of 0.84 and 0.95, respectively) during the PM peak hour.
8. Old Kea‘au-Pāhoa Road at Mamaka Street
    a. All movements operate at LOS B or better.

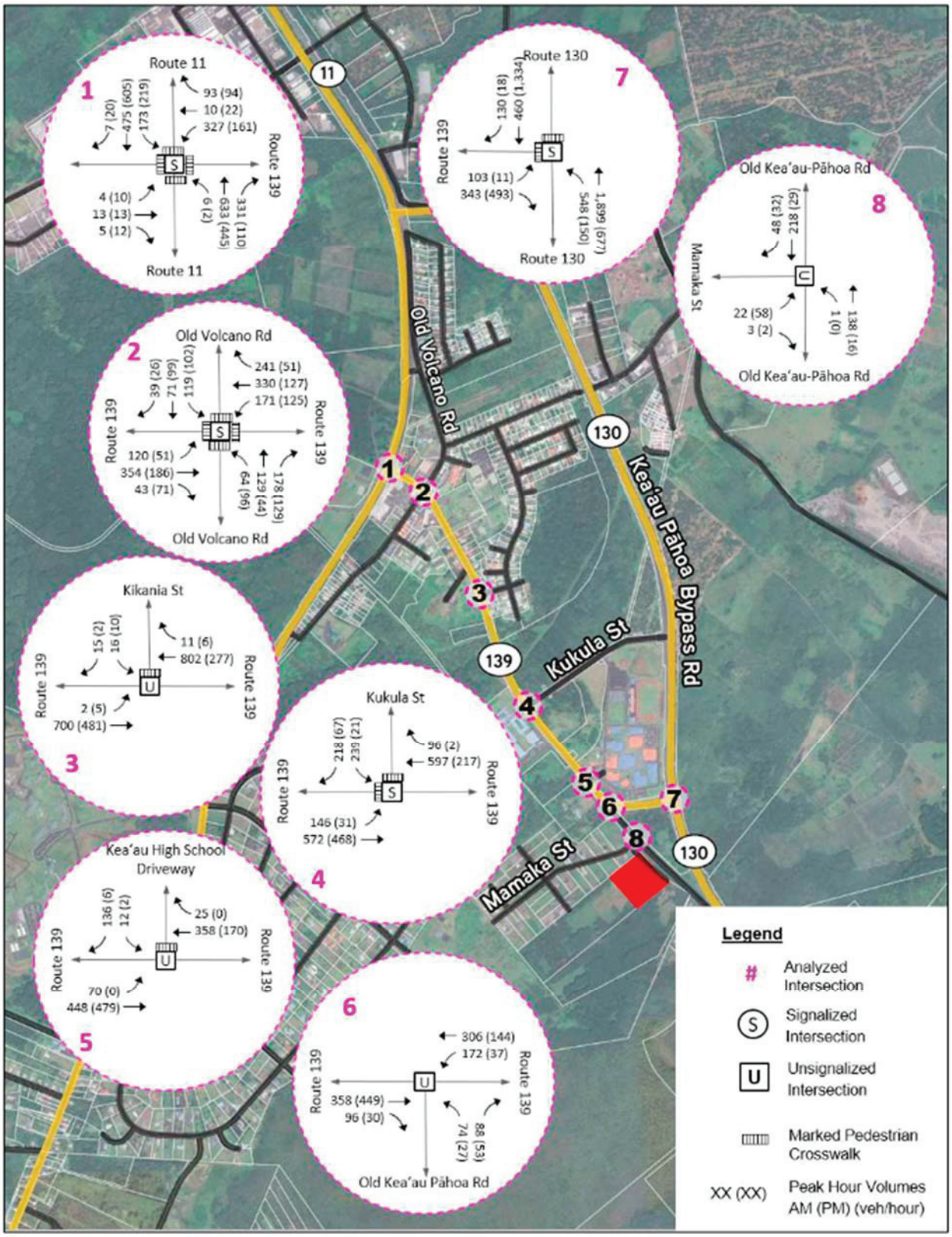


Figure 13: Alternative 1 Driveway Alignment - Future (2027) With Project Intersection Peak Hour Volumes

Table 6: Future (2027) With Project LOS – Alternative 1 Driveway Alignment

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**29.6**	-	**C**	**24.0**	-
Route 11 NB Left	E	62.8	0.44	F	84.9	0.41
Route 11 NB Through-Right	C	32.6	0.79	C	29.1	0.71
Route 11 SB Left	E	56.1	0.85	D	35.6	0.83
Route 11 SB Through-Right	B	20.0	0.40	B	19.3	0.53
Shipman Park EB Left-Through-Right	B	15.1	0.03	B	12.6	0.05
Route 139 WB Left-Through	C	24.2	0.59	B	15.1	0.29
Route 139 & Old Volcano Road	**B**	**14.7**	-	**B**	**14.8**	-
Old Volcano NB Left	B	16.1	0.15	C	26.0	0.33
Old Volcano NB Through-Right	B	18.0	0.62	C	23.3	0.49
Old Volcano SB left	C	24.8	0.46	C	29.1	0.42
Old Volcano SB Through-Right	B	14.1	0.21	C	21.8	0.32
Route 139 EB Left	B	16.5	0.33	A	6.5	0.07
Route 139 EB Through-Right	B	12.0	0.50	A	6.7	0.26
Route 139 WB Left	C	20.2	0.45	A	9.0	0.20
Route 139 WB Through	B	10.8	0.41	A	5.8	0.12
Route 139 WB Right	B	10.4	0.35	A	5.5	0.06
Route 139 & Kikania Street	-	**1.0**	-	-	**0.3**	-
Route 139 EB Left-Through	B	10.3	0.01	A	7.9	0.01
Kikania SB Left-Right	E	47.5	0.31	C	15.8	0.04
Route 139 & Kukula Street	**B**	**18.1**	-	**A**	**4.0**	-
Route 139 EB Left	B	10.2	0.39	A	2.7	0.04
Route 139 EB Through	A	7.5	0.51	A	2.8	0.37
Route 139 WB Through-Right	B	14.4	0.62	A	4.7	0.22
Kukula SB Left	E	57.3	0.89	C	26.7	0.46
Route 139 & Kea'au HS Driveway	-	**2.2**	-	-	**0.1**	-
Route 139 EB Left-Through	A	8.5	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.6	0.25	A	9.2	0.01
Route 139 & Old Kea'au-Pāhoa Road	-	**7.2**	-	-	**1.8**	-
Route 139 WB Left-Through	A	9.4	0.20	A	8.5	0.04
Old Kea'au-Pāhoa NB Left	F	69.5	0.65	C	15.2	0.08
Old Kea'au-Pāhoa NB Right	B	12.6	0.18	B	11.8	0.10
Route 130 & Route 139	**C**	**21.1**	-	**C**	**28.1**	-
Route 130 NB Left	D	51.3	0.94	E	66.0	0.84
Route 130 NB Through	A	9.9	0.73	A	8.1	0.30
Route 130 SB Through	C	27.8	0.36	C	24.1	0.75
Route 139 EB Left	D	44.8	0.36	C	31.5	0.03
Route 139 EB Right	B	19.3	0.44	D	54.7	0.92
Old Kea'au-Pāhoa Road & Mamaka Street	-	**0.8**	-	-	**4.2**	-
Old Kea'au-Pāhoa NB Left-Through	A	8.1	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	12.7	0.07	A	9.5	0.11

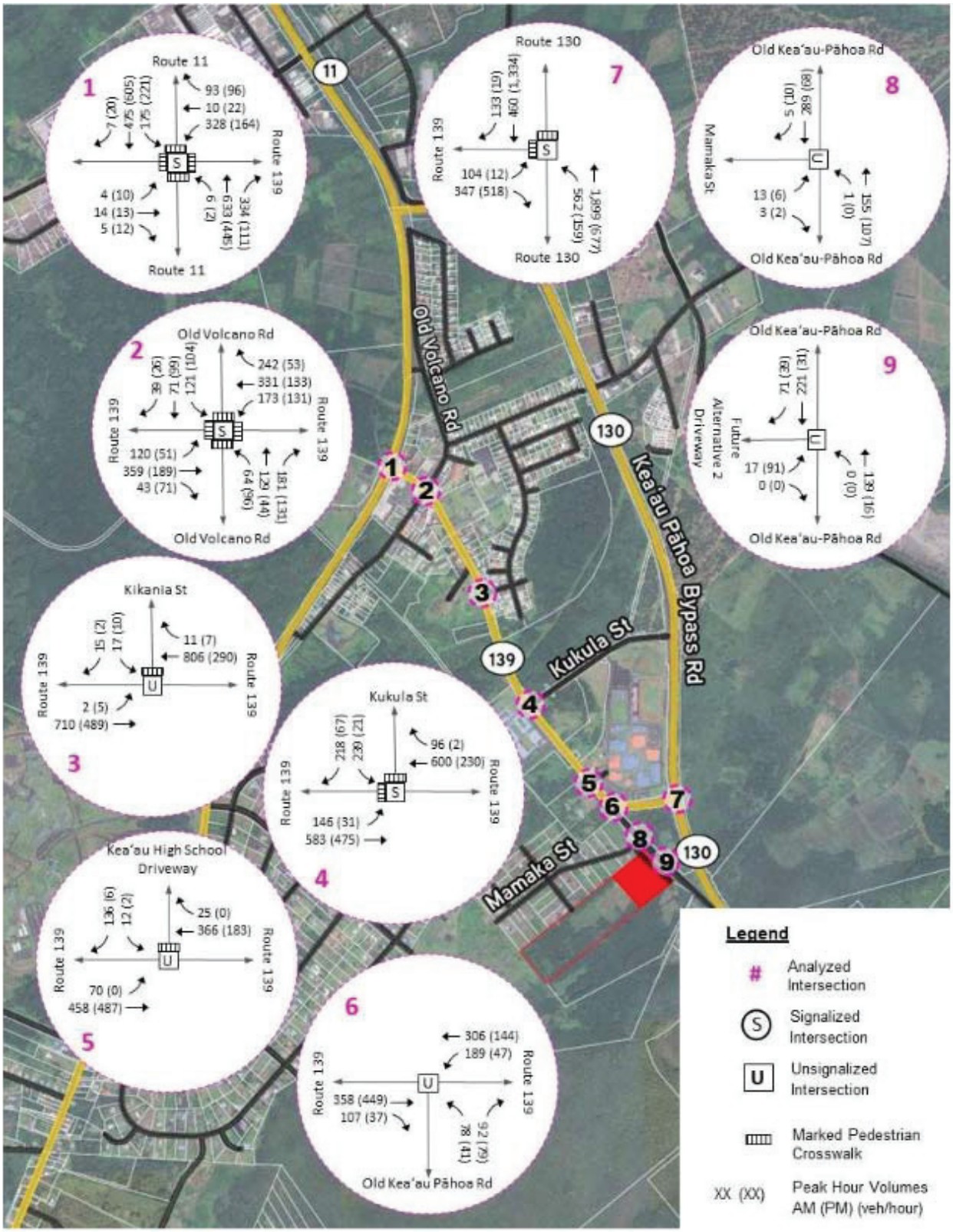


Figure 14: Alternative 2 Driveway Alignment - Future (2027) With Project Intersection Peak Hour Volumes.

B. Future (2027) With Project Traffic Volumes – Alternative 2 Driveway Alignment

These numbers are the sum of Future (2027) Without Project traffic volumes and the project generated volumes for Alternative 2 Driveway Alignment (**Figure 14**). For Alternative 2, the volumes at Old Kea'au-Pāhoa Road at Mamaka Street would be redistributed to Old Kea'au Pāhoa Road at the Alternative 2 Driveway. The traffic volumes at all other study intersections will remain the same. The results are shown in **Table 7**. All movements at both intersections operate a LOS B or better.

Table 7: Future (2027) With Project LOS – Alternative 2 Driveway Alignment

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Old Kea'au-Pāhoa Road & Mamaka Street	-	**0.5**	-	-	**0.4**	-
Old Kea'au-Pāhoa NB Left-Through	A	8.2	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	13.3	0.05	A	9.9	0.02
Old Kea'au-Pāhoa Road & Alternative 2 Driveway	-	**0.4**	-	-	**4.8**	-
Old Kea'au-Pāhoa NB Left-Through	A	0.0	0.00	A	0.0	0.00
Alternative 2 Driveway EB Left-Right	B	11.4	0.03	A	9.3	0.11

Summary and Recommended Mitigating Measures

Future (2027) Without Project analysis added 2.12% annual background growth for major movements, along with the project trips associated with the Kea'au Mountain View Public Library relocation. All signalized intersections are projected to operate at an acceptable LOS. Movements that are projected to operate at LOS E or worse are not significant and the TIAR did not recommend improvements for Future (2027) Without Project conditions.

Based on the *Trip Generation Manual 11th Edition*, the project is projected to generate up to 88 total trips during the AM peak hour and 130 total trips during the PM hour. At the intersection of Route 130 and Old Kea'au Pāhoa Road, the study projected that the northbound Old Kea'au Pāhoa Road left-turn at Route 139 will operate at LOS F during the AM peak hour in Future (2027) With Project for both alternatives. The study states that a refuge lane for the northbound left turn movement will allow vehicles to make the northbound left turn into the refuge lane without conflicting with the westbound through movement and the resulting northbound left turn will improve from LOS F to LOS D. The study recommends that future conditions be monitored and a northbound left turn refuge land be added if necessary.

Additionally, Future (2027) With Project conditions project that the eastbound Route 130 right turn at the signalized intersection with Route 130 will operate at LOS E during the PM peak hour. The TIAR reports that the eastbound right turn movement is projected to operate at LOS D in Future (2027) With Project with the signal timing adjusted to allocate green time from the northbound and southbound through movements to the eastbound approach. The report

recommends that future conditions be monitored, and for the signal timing to be adjusted as needed.

Additional Considerations

There is a Department of Water Supply standpipe at the end of the Old Pahoa Government Road near its intersection with Mamaka Street. In the Alternative 1 Driveway Alignment, this could create a conflict between water hauler trucks filling and medical facility traffic. Mitigations would include construction of adequate shoulder area for trucks to safely fill off of the road. However, it is noted that Alternative 2, which is the preferred alternative, would not interfere with the standpipe use.

If required by conditions of the required Special Permit, HBMC would complete reasonable mitigating measures as outlined above necessary for the project.

3.3.2 Public Utilities and Services

3.3.2.1 Water Supply

Environmental Setting

The subject property is fronted by a Department of Water Supply (DWS) 8- inch water main which is looped back into the existing 12-inch water main on Kea‘au-Pāhoa Road. Consultation with DWS indicates that adequate water is available for the proposed use and for fire suppression. Water calculations will be developed in consultation with DWS to determine appropriate water supply lateral size for the proposed development.

Potential Environmental Impact from the Proposed Action

Estimated maximum daily water usage calculations, prepared by a professional engineer, licensed in the State of Hawai‘i, will be submitted to DWS for review and approval. These calculations will include estimated peak flow in gallons per minute and the total estimated maximum daily water usage in gallons per day, including irrigation use. Based on the water demand calculations, the Department will determine the appropriate service lateral and meter size required to satisfy all water needs including fire suppression requirements.

Mitigating Measures

Water conservation measures will be implemented into the project design to minimize water use. Water efficient fixtures such as low flow systems and timed shut off in appropriate areas.

The Commission on Water Resource Management also recommends implementing appropriate landscaping irrigation conservation Best Management Practices endorsed by the Landscape Industry Council of Hawai‘i. These include the following installation and maintenance BMPs:

Installation Best Management Practices:

1. Irrigation system plans and specifications should include post-construction documentation, including drawing of record (as-built drawings), maintenance recommendations, design precipitation rates and manufacturer's operational guide.
2. Design irrigation system with sprinklers spaced with head-to-head coverage or better.
3. Irrigate with a precipitation rate not exceeding soil infiltration rate.
4. Design systems to irrigate similar hydrozones such as slope, sun exposure, soil conditions, and plant materials with similar water use.
5. Use smart controllers.
6. Encourage the use of drip irrigation for individual specimen plants, shrubs, and trees during establishment period.
7. Use flow sensors with smart controllers to detect leaks or drastic changes in water use.
8. Use an irrigation submeter that measures water use on large sites.
9. Use water conservation irrigation components, such as rotary nozzles, pressure regulated spray heads and valves, rain switches, and high efficiency nozzles.
10. Sprinklers in low-lying areas and slopes should be equipped with check valves.
11. Incorporate Low Impact Development (LID) storm water design methods, including rain gardens, infiltration beds, rain barrels, swales, and basins, that allow water to collect and soak into the ground on site.
12. Preserve existing native trees and non-invasive vegetation where feasible during development and do not install irrigation in these areas.
13. Incorporate compost into soils at planting.
14. Encourage xeriscaping practices to include native and non-invasive ornamental plants.
15. Encourage the use of non-potable water for irrigation.
16. Use a qualified irrigation designer, irrigation supplier, landscape architect and installation contractor.

Maintenance Best Management Practices:

1. If not using a climate-based controller, manually manage controller run times and days to water according to soil conditions and seasonal weather conditions.
2. Program irrigation controller to encourage deep watering by using longer, less frequent watering times to improve deep rooting and increase drought resistance.
3. To reduce the amount of water evaporating from the soil surface, schedule night or early morning (5 p.m. to 9 a.m.) start times for established plantings. In areas where ponding, compaction, or runoff occurs, set 2-3 short run time cycles.
4. Mulch with wood chips around base of trees and shrub beds and refresh as necessary to maintain a minimum of two inches.
5. Allow grass to grow taller in summer months to conserve water and encourage deep rooting.
6. Aerate lawns when compaction occurs.
7. At a minimum, conduct a monthly inspection to verify system operation and correct deficiencies.
8. Conduct a practical water audit once every 2 to 5 years by a qualified irrigation professional.

9. Attend water conservation seminars and webinars including Board of Water Supply, Landscape Architects, University of Hawai‘i, EPA Water Sense, and the Irrigation Association.
10. Use a licensed maintenance contractor with water conservation expertise.

3.3.3.2 Wastewater

Environmental Setting

There is no municipal sewer system available in the vicinity of the project and onsite wastewater treatment works (WWTW) will be required. Records from the Department of Health (DOH) indicate no existing Cesspool or Individual Wastewater System on the site, necessitating the assumption that any such system will require location and proper abandonment in accordance with DOH guidelines.

Potential Environmental Impact from Proposed Action

Improper management of wastewater has the potential to contaminate ground and surface waters and could pose a hazard to human health. With a properly designed and maintained WWTW the potential for environmental impacts from wastewater are minimized.

Mitigating Measures

The project is anticipated to generate wastewater at more than 1,000 gallons per day (gpd), mandating compliance with DOH regulations for a Wastewater Treatment Works (WWTW) providing secondary treatment. Acceptable treatment technologies include Activated Sludge, Sequential Batch Reactor, Fixed Bed Biofilm Reactor (FBBR), Moving Bed Biofilm Reactor (MBBR), Membrane Bioreactor (MBR), or other advanced methods ensuring effluent quality aligning with DOH’s Chapter 11-62 standards.

The treated effluent will be disposed of underground via an absorption bed or other types of drain field. A 100% backup of disposal system is required by DOH. Due to the potential fast percolation rate, soil replacement below the absorption bed may be required for septic effluent. However, the soil replacement requirement may be waived if it is used to receive WWTW effluent.

Efforts to minimize wastewater are reflected in the design of the project, including water efficient fixtures (e.g. low flow systems and timed shut off for appropriate devices in all bathroom and proposed kitchens) and landscaping practices as outlined above.

3.3.2.3 Electricity

Environmental Setting

Electricity is available to the site via existing overhead transmission and distribution poles along Kea‘au-Pāhoa Road, supplied by Hawai‘i Electric Light Company (HELCO).

Potential Environmental Impact from the Proposed Action

The project would impose only modest demands on utility services and would not require any mitigation or special planning.

Mitigating Measures

HBMC is proposing to install solar photovoltaic and solar hot water systems for non-critical patient care areas.

3.4 Secondary and Cumulative Impacts

The proposed project will not generate any long-term secondary impacts, such as population changes or effects on public facilities. Any effects on public facilities are negligible with proposed mitigation measures.

Cumulative impacts occur when the implementation of multiple separate projects with limited individual impacts combine to produce more severe impacts or conflicts. Impacts should be considered with respect to past and current impacts on area resources. Planned projects in the area that reasonably could affect area resources include:

Kea‘au Village Master Plan Phase 1 and Phase 2
The proposed Master plan was projected to be completed in three construction phases over years 2023, 2028, and 2038 and would include:

- 590 single-family homes,
- 350 multi-family homes,
- 220,408 SF of commercial space,
- 43,600 SF of office space, and
- 100 hotel rooms

Construction for the project has not begun and it is not known when it may begin. With this ambiguity it is difficult to predict when possible impacts from this development may occur. Therefore, it is assumed that should any portion of this development be completed in the next 13-16 years, it will be accounted for in the 2.12% annual background growth rate included in the TIAR calculations.

Kea‘au Mountain View Public Library
The Kea‘au Mountain View Public Library is proposed to be developed northeast of the intersection of Route 139 and Old Volcano Road. The proposed library will be 12,000 SF and will replace the existing library at the Kea‘au Middle School and Mountain View Elementary School. The project is anticipated to be completed in 2027 and anticipated traffic from the library has been incorporated into the TIAR calculations

Although there is the potential to increase traffic above future estimated levels without the project, the total traffic is expected to be within the capacity of the system to accommodate it

without significant effects. Nearly all long-term impacts from the proposed project are negligible, with no meaningful effects on ecosystems or protected species, water quality, erosion and sedimentation, historic properties, noise and air quality and other measures.

PART 4: CONSISTENCY WITH GOVERNMENT PLANS AND POLICIES

4.1 Hawai‘i County General Plan

4.1.1 2005 Hawai‘i County General Plan

The Hawai‘i County General Plan serves as a guiding document for decision-making and the implementation of goals for Hawai‘i Island. The plan was adopted in 1989 by ordinance and most recently revised in 2005.

The General Plan uses the Land Use Pattern Allocation Guide (LUPAG) Map to designate land on Hawai‘i Island for future developments. The LUPAG is a broad, flexible design tool to guide the direction and quality of future developments in a coordinated and manner. It indicates the general location of various land uses in relation to each other. Although the LUPAG map shows the project area as important agricultural land, the Planning Director determined that the area should be situated within the extensive agricultural designation given its similar agricultural characteristics to EA designated lands to the west (**Appendix F**). The extensive agricultural designation signifies lands that are not capable of producing sustained, high agricultural yields without the intensive application of modern farming methods and technologies due to certain physical constraints such as soil composition, slope, machine tillability and climate.

Due to the importance of the LUPAG designations in determining the suitability of land-use projects and developments, the following goals, policies, and standards that align with the proposed action are discussed below:

ECONOMIC GOALS

a. Provide residents with opportunities to improve their quality of life through economic development that enhances the County’s natural and social environments.
b. Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawai‘i.
c. Strive for diversity and stability in the economic system.
d. Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County’s cultural, natural, and social environment.
e. Strive for an economic climate that provides its residents an opportunity for choice of occupation.
f. Strive for diversification of the economy by strengthening existing industries and attracting new endeavors.
g. Strive for full employment.
h. Promote and develop the island of Hawai‘i into a unique scientific and cultural model, where economic gains are in balance with social and physical amenities. Development

should be reviewed on the basis of total impact on the residents of the County, not only in terms of immediate short run economic benefits.

ECONOMIC POLICIES

x. Encourage the health/wellness industry.

Discussion: The proposed project is set to advance economic development in the area by creating stable long-term employment opportunities, including roles such as doctors, nurses, medical technicians, office administrators, and grounds and maintenance workers.

ENVIRONMENTAL QUALITY GOALS

a. Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
b. Maintain and, if feasible improve the existing environmental quality of the island.
c. Control pollution.

ENVIRONMENTAL QUALITY POLICIES

a. Take positive action to further maintain the quality of the environment.

ENVIRONMENTAL QUALITY STANDARDS

a. Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well-being, through the enforcement of appropriate Federal, State and County standards.
b. Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
c. Federal and State environmental regulations shall be adhered to.

Discussion: HBMC will adhere to all environmental quality goals, policies, and standards. The subject site will be serviced by a Wastewater Treatment Works and control potential stormwater runoff.

FLOODING AND OTHER NATURAL HAZARDS 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.

FLOODING AND OTHER NATURAL HAZARDS POLICIES

d. Any development within the Federal Emergency Management Agency designated floodplain must be in compliance with Chapter 27.
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.
r. Discourage intensive development in areas of high volcanic hazard.

FLOODING AND OTHER NATURAL HAZARDS STANDARDS

a. "Storm Drainage Standards," County of Hawai'i, October 1970, and as revised.
b. Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawai'i County Code.
c. Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
d. Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawai'i County Code.
e. Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

Discussion: The Flood Insurance Rate Map (FIRM) designates the subject site to be in Flood Zone X (areas outside of the 500-year floodplain). There are no identified drainage ways, naturally occurring wetlands, ponds, lakes, or rivers on the parcel. The site has been previously cleared and has been in agricultural use for decades. Accordingly, the site has not been and should not be subject to flooding, coastal hazards, or erosion. The property is outside the Tsunami Evacuation Zone and Special Management Area.

HISTORIC SITES GOALS

a. Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawai'i.
b. Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.

HISTORIC SITES POLICIES

a. Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.
b. Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings, and objects.
c. Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
d. Public access to significant historic sites and objects shall be acquired, where appropriate.

Discussion: There are also no known archaeological or cultural resources on the property as it has been cleared and used for agricultural purposes for decades. In the event any inadvertent historic, archaeological, or cultural discoveries are made, all work will cease, and the applicant will immediately notify the Hawai‘i County Planning Department and the State DLNR and secure their clearances before proceeding further.

NATURAL BEAUTY GOALS

a. Protect, preserve, and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
b. Protect scenic vistas and view planes from becoming obstructed.
c. Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

NATURAL BEAUTY POLICIES

h. Protect the views of areas endowed with natural beauty by carefully considering the effects of proposed construction during all land use reviews.

Discussion: There are no notable areas of natural beauty that would be impacted by the proposed action. The proposed improvements will be aesthetically pleasing and may improve the overall visual appeal and functionality of the site of the site. Appropriate landscaping will be incorporated to beautify the property.

NATURAL RESOURCES AND SHORELINES GOALS

a. Protect and conserve the natural resources from undue exploitation, encroachment, and damage.
b. Provide opportunities for recreation, economic, and educational needs without despoiling or endangering natural resources.
c. Protect and promote the prudent use of Hawai‘i’s unique, fragile, and significant environmental and natural resources.
d. Protect rare or endangered species and habitats native to Hawai‘i.
e. Protect and effectively manage Hawai‘i’s open space, watersheds, shoreline, and natural areas.
f. Ensure that alterations to existing landforms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

NATURAL RESOURCES AND SHORELINES POLICIES

a. Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.

p. Encourage the use of native plants for screening and landscaping.
r. Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.
u. Ensure that activities authorized or funded by the County do not damage important natural resources.

Discussion: The proposed project will adhere to strict environmental standards and will not encroach on any open spaces or areas of natural beauty. Wastewater will be handled by an on site WWTW. Contractors will follow all County and State laws to manage stormwater runoff during construction. Plantings will screen the property. The site is not adjacent to the ocean and does not have any access to shoreline areas, public trails, or hunting areas. It is roughly 4 miles inland at an elevation of approximately 300-400 feet above sea level. It is also outside the County Tsunami Evacuation Zone. As such, the proposed project should not have any adverse impacts on the area's coastal zone or shoreline resources.

PUBLIC FACILITIES GOALS

a. Encourage the provision of public facilities that effectively service community and visitor needs and seek ways of improving public service through better and more functional facilities in keeping with the environmental and aesthetic concerns of the community.

PUBLIC FACILITIES: HEALTH AND SANITATION POLICIES

e. Encourage the establishment or expansion of community health centers and rural health clinics.

PUBLIC FACILITIES: HEALTH AND SANITATION STANDARDS

c. Hospitals shall be served by a public sewage system or have self-contained sewage systems.
d. Hospital solid waste shall be disposed of in accordance with all Federal, State, and County laws and regulations.

PUBLIC FACILITIES: HEALTH AND SANITATION COURSES OF ACTION

a. Improvement and expansion of hospital facilities shall be undertaken as the need arises

Discussion: The proposed project would significantly increase access to health care services in a traditionally underserved and quickly growing area. Should the project not proceed the improvements to health care would not be realized.

LAND USE GOALS

a. Designate and allocate land uses in appropriate proportions and mix and in keeping with the social, cultural, and physical environments of the County.
b. Protect and preserve forest, water, and natural and scientific reserves and open areas.

LAND USE POLICIES

f. Encourage the development and maintenance of communities meeting the needs of its residents in balance with the physical and social environment.

Discussion: There are no significant adverse land use concerns since the proposed action will be limited in extent and will fulfill a community need.

4.2 Puna Community Development Plan

The Puna Community Development Plan (PCDP) was developed through the implementation of the 2005 County of Hawai‘i General Plan. CDP’s are designed to translate and implement the goals, policies, and standards of the General Plan as they apply to specific communities and districts. Additionally, they serve as important framework for a community’s intended outcome and vision and are often used as forum for community input in terms of land-use, availability of public resources, and overall development. The vision of the Puna CDP is for “residents of Puna live in harmony with the land, while promoting a sustainable vibrant local economy, healthy community, and a viable transportation system that is accessible, friendly and safe for now and future generations.” The following goals and objectives outlined in the PCDP apply to the project area and proposed development:

2.1.1 Goals

a. Structures and cultural sites that are significant to Puna’s history and cultural traditions are preserved.
b. The design character and natural setting of older communities that are representative of Puna’s historic development are perpetuated.
c. Areas of scenic and cultural interest are accessible to the public in a manner that does not detract from their aesthetic, natural and cultural value.
d. Awareness and appreciation of the host culture is expanded.

3.1.1 Goals

a. Puna retains a rural character while it protects its native natural and cultural resources.
b. The quality of life improves, and economic opportunity expands for Puna’s residents.
c. Services and community facilities are more accessible in village/town centers that are distributed throughout the region, including the underserved subdivisions that have been experiencing higher levels of development growth.
d. Exposure to high risk from natural hazards situations is reduced.

3.3.1 Goals

a. Puna residents have improved access to emergency and primary medical care and preventative public health programs.

3.3.3 Actions

a. Develop a centrally-located, 24-hour, full-service medical facility, with trauma care, in Puna.

3.4.1 Goals

a. All residents have an equitable level of service access to police, fire, and paramedical services.

3.4.2 Objectives

a. Provide additional locations for emergency services to reduce the response time to a larger percentage of residents.

4.1.1 Goals

b. The percentage of residents who commute to employment or travel for services outside of Puna is reduced.

4.1.2 Objectives

b. Provide more services and employment within Puna's village and town centers.
c. Create new employment opportunities in Puna to reduce long commuting.

Discussion: The proposed project would significantly increase access to health care services in a traditionally underserved and quickly growing area. Should the project not proceed the improvements to health care would not be realized.

4.3 County Zoning and Special Management Area

The County Zoning of the property is currently A-20a. Although the property and surrounding areas are designated for agricultural uses by both State and County land use laws, through the issuance of a Special Permit, various "non-agricultural" services and uses may be allowed. HBMC will prepare and submit a Special Permit application for review and approval by the County Windward Planning Commission.

It is noted that a Change of Zone application to redesignate the project area from A-20a to FA-1a is currently pending and has been forwarded to the Committee on Legislative Approvals and Acquisitions with a favorable recommendation from both the Planning Department and the

Windward Planning Commission. Should the change of zone be approved, the property will retain its agricultural status and agricultural State land use designation and the Special Permit requirement and application process will remain the same.

The property does not lie within the Special Management Area. The subject property is located approximately 4 miles from the nearest shoreline and will not be impacted by coastal hazards or beach erosion. There is no designated public access to the mountain or shoreline areas over the property. As such, the proposed project will not adversely affect any recreational resources, including access to and along the shoreline, scenic and open space or visual resources, coastal ecosystems, and marine and coastal resources Therefore, the proposed use is not contrary to the objectives of Chapter 205 A, HRS relating to coastal zone management.

4.4 Hawai‘i State Land Use Law

All land in the State of Hawai‘i is classified into one of four categories for land use – Agricultural, Conservation, Rural, or Urban. These districts have been established by the State Land Use Commission pursuant to Chapter 205 HRS. The property is designated State Land Use Agricultural. Although the property and surrounding areas are designated for agricultural uses by both State and County land use laws, through the issuance of a Special Permit, various “non-agricultural” services and uses may be allowed. HBMC will prepare and submit a Special Permit application for review and approval by the County Windward Planning Commission.

4.5 Required Permits and Approvals

The following permits and approvals are required for the proposed construction of a medical office and emergency room:

County of Hawai‘i

Special Permit
Building Code/Structural Permits
Grubbing/Grading Permits
Electrical Review
Mechanical/Plumbing Review
Fire Review
Engineering Review
Sanitation Review
Potential Noise Permit
Solid Waste Management Plan

State of Hawai‘i

Permit to Perform Work Upon State Highways
Permit for the Occupancy and Use of State Highways
Permit to Operate of Transport Oversize and/or Overweight Vehicles and Loads Over State Highways

National Pollutant Discharge Elimination System (NPDES) Permit
Storm Water Pollution Prevention Plan (SWPPP)
Department of Health Individual Wastewater Treatment Works (WWTW)
Department of Health Construction-Environmental Hazard Management Plan (C-EHMP)
& if necessary a Removal Action Work Plan (RAWP) and Removal Action Report (RAR)

PART 5: DETERMINATION, FINDINGS, AND REASONS

5.1 Determination

The applicant expects that the County of Hawai‘i Planning Department will determine that the proposed action will not significantly alter the environment and will accordingly issue a Finding of No Significant Impact (FONSI). This determination will be based on comments to the Draft Environmental Assessment (DEA). This Final Environmental Assessment (FEA) outlines the final determination.

5.2 Findings and Supporting Reasons

Agencies must consider several factors to determine whether an Action has significant effects, as outlined in HAR Chapter 11-200.1. The following factors evaluate the sum of effects of the proposed action on the quality of the environment by considering every phase of a proposed action, the expected impacts, and the proposed mitigation measures:

1. ***The proposed project will not involve an irrevocable commitment or loss or destruction of any natural, cultural, or historic resource.***

   No valuable natural or cultural resources would be affected or lost due to construction of the proposed project. The property has been previously cleared and used agriculturally for many years, thus it is unlikely that the project would involve an irrevocable commitment or loss or destruction of any natural, cultural or historic resource. The proposed project would however commit the site for use as a medical clinic for the foreseeable future.

2. ***The proposed project will not curtail the range of beneficial uses of the environment.***

   No restriction of beneficial uses would occur under the proposed action. It is not known whether the Properties have been used for cultural practices in the past, however, it is very unlikely it is used in such a capacity today due to current and historic land use.

3. ***The proposed project will not conflict with the State’s environmental policies or long-term environmental goals established by law.***

   The State’s long-term environmental policies are set forth in HRS Chapter 344. The broad goals of this policy are to conserve natural resources and enhance quality of life. The

requested action will have no significant impact to environmental processes, nor will it negatively impact quality of life.

The proposed project would improve the quality of life for the community by providing access to required health care services. With the proposed mitigation measures, no significant impacts to natural resources will occur. It is therefore consistent with all elements of the State's long-term environmental policies.

4. ***The proposed project will not have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State.***

The proposed action will create positive impacts on the economic and social welfare of the region by providing employment opportunities and vital health care options.

5. ***The proposed project will not have a substantial adverse effect on public health.***

The proposed action would have a positive effect on public health by providing expanded, improved and more convenient health care services for the community. Minor and short-term impacts to air quality and noise levels may occur during construction but will be mitigated by using Best Management Practices and appropriate permitting such as noise permits. With the proposed mitigation measures no substantial adverse effects on public health would occur as a result of the proposed project. Public health is anticipated to improve with the proposed action by providing essential healthcare and emergency services to an underserved area.

6. ***The proposed project will not involve adverse secondary impacts, such as population changes or effects on public facilities.***

The proposed action does not include new residential units and thus will not involve adverse impacts to population changes. The project aims to help manage the current upward trend in population growth by meeting the rising demand for healthcare services, enhancing accessibility, alleviating overcrowding, customizing healthcare services to fit community requirements, and strengthening emergency readiness in the area. The project will aid in retaining residents by providing accessible healthcare services, reducing the need for travel.

7. ***The proposed project will not involve a substantial degradation of environmental quality.***

The proposed action is relatively minor and environmentally benign and thus would not contribute to environmental degradation. The property has been previously cleared and used extensively for agricultural purposes. With the proposed mitigation measures the proposed project will not involve a substantial degradation of environmental quality.

8. ***The proposed project is not one which is individually limited and will not have substantial adverse effect upon the environment or involve a commitment for larger actions.***

   The proposed action will not have substantial adverse effect upon the environment or involve a commitment for larger actions. Nearly all long-term impacts from the proposed project are negligible, with no measurable effects on sensitive ecosystems or rare species, water quality, erosion and sedimentation, historic properties, noise and air quality, and other measures. Potential cumulative impacts on area traffic conditions has been detailed in the included traffic study which found that the total anticipated traffic is expected to be within the capacity of the system to absorb it and only modest mitigations are expected for traffic.

9. ***The proposed project will not have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat.***

   A biotic survey of the Properties found no naturally occurring rare, threatened, or endangered species. With the proposed mitigation measures, impacts to rare, threatened or endangered species will not occur.

10. ***The proposed project will not have a substantial adverse effect on air or water quality or ambient noise levels.***

    The proposed action would have minimal and short-term effects on air quality and ambient noise levels during construction. Mitigating measures will be strictly followed to reduce impacts to both air quality and noise during construction. If maximum permissible levels are exceeded during any stage, the contractor will consult with the Department of Health and determine whether permits are necessary.

    The facility will provide outpatient care only and will not be an emergency room and will not receive ambulances. Thus, the long-term noise impacts of the proposed project will be on par with other commercial-type uses in the area.

11. ***The proposed project will not have a substantial adverse effect on or be 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.***

    The subject property is located 4 miles inland from the shoreline and will not be impacted by any coastal hazards such as tsunamis, sea level rise, or erosion. The property is also in an area of minimal flood hazard. The property is located in an area subject to volcanic and seismic hazards, however much of the island shares these hazards. Such volcanic hazards would not likely have a substantial adverse effect on the proposed project. All buildings

would be designed according to County building codes to withstand an acceptable level of seismic activity and wind resistance.

12. ***The proposed project will not have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies.***

    The proposed construction will not impose on views to or from any listed resource in the General Plan. After construction, landscaping will be incorporated to beautify the site.

13. ***The proposed project will not require substantial energy consumption or emit substantial greenhouse gases.***

    The proposed action will not emit substantial greenhouse gases. The main source of greenhouse gas emissions will be from vehicles. Energy consumption will be mitigated through energy and water conserving practices. Such methods include energy efficient appliances and lights, low flow systems in bathrooms for toilets and sinks with timed shut off for appropriate devices and landscaping vegetation that requires minimal watering.

REFERENCES

Beven, J. and Wroe, D. 2019. Hurricane Lane (EP142018). National Hurricane Center, Central Pacific Hurricane Center, Tropical Cyclone Report.

Collins M. et al., 2019: Extremes, Abrupt Changes and Managing Risk. In: *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* [H.-O. Partner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegr□a, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]. In press.

Commission on Water Resource Management (CWRM). 2019a. Water Resource Protection Plan Update (WRPP) Appendix F. *Hawai'i Water Plan*, State of Hawai'i.

Department of Land and Natural Resources. 2024. Division of Forestry and Wildlife: Wildlife Program. Native Birds of Hawai'i. Hawaii.gov.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2013: Online Rainfall Atlas of Hawai'i. *Bull. Amer. Meteor. Soc.* 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.

Hawai'i County Civil Defense Agency. 2023. Hawai'i County Volcano Hazards: know your indundation zone. Retrieved from: https://hawaiicountygis.maps.arcgis.com/apps/instant /lookup/index.html?appid=1ddc852f98854f3685ddacf62d5b2b10

Hawai'i County Planning Department. 2008. *Puna Community Development Plan*. Hilo.

Hawai'i County Planning Department. 2005. *General Plan, County of Hawai'i*. Hilo.

Hawai'i State Department of Land and Natural Resources (DLNR). 2017. *Rapid 'Ōhi'a Death: Part I: Strategic Response Plan for Hawai'i, 2017-2019*. Prep. by Division of Forestry & Wildlife. Honolulu.

Hawaiian Volcano Observatory (HVO). 2022. Frequently Asked Questions about Mauna Loa Volcano. United States Geological Survey (USGS). Retrieved from: https://www.usgs.gov /observatories/hawaiian-volcano-observatory/frequently-asked-questions-about-mauna-loa-volcano.

Hoopes, Stephanie, Ph.D. 2024. ALICE in the Crosscurrents: An Update on Financial Hardship in the United States. United For ALICE.

Hoover, J. 2023. 2022 Hawai'i County Comprehensive Economic Development Strategy. Hawai'i Island Economic Development Board.

IPCC, 2023: Summary for Policymakers. In: *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the*

Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi: 10.59327/IPCC/AR6-9789291691647.001

Kamakau, S.M. 1992. Ruling Chiefs of Hawaii. Kamehameha Schools Press, Honolulu.

Kelly, M., B. Nakamura, and D. Barrere. 1981 Hilo Bay: A Chronological History, Land and Water Use in the Hilo Bay Area, Island of Hawai‘i. Department of Anthropology, Bernice P. Bishop Museum.

Kimberlain, T., Brennan, M., and Wroe, D. 2018. Hurricane Iselle (EP092014). National Hurricane Center, Central Pacific Hurricane Center, Tropical Cyclone Report.

Tetra Tech. 2020. County of Hawai‘i Multi-Hazard Mitigation Plan. Prepared for County of Hawai‘i Civil Defense Agency.

Thomas, W. et al., 1992. Map Showing Lava-Flow Hazard Zones, Island of Hawai‘i.

Trusdell, F.A., and Lockwood, J.P., 2017, Geologic map of the northeast flank of Mauna Loa volcano, Island of Hawai‘i, Hawaii: U.S. Geological Survey Scientific Investigations Map 2932-A, pamphlet 25 p., 2 sheets, scale 1:50,000, https//doi.org/10.3133/sim2932A.

United States Geological Survey (USGS). 2024. Stream Stats. Web Application Retrieved from: https://streamstats.usgs.gov/ss/

U.S. Census Bureau. (n.d.) *Industry for Civilian Employed Population 16 Years and Over in Pahoa-Kalapana CCD, Hawaii County, Hawaii*. U.S. Department of Commerce. Retrieved September 18, 2024, from https://data.census.gov/

U.S. Census Bureau. (n.d.) *Industry for Civilian Employed Population 16 Years and Over in Keaau-Mountain View CCD, Hawaii County, Hawaii*. U.S. Department of Commerce. Retrieved September 18, 2024, from https://data.census.gov/

West Hawai‘i Today. 2021. Brush fire burns 40,000 acres on Hawai‘i’s Big Island. Retrieved from: https://wildfiretoday.com/2021/08/03/brush-fire-burns-40000-acres-on-hawaiis-big-island/

APPENDIX A - TRAFFIC IMPACT ANALYSIS REPORT

Kea‘au Medical Office
(Hilo Medical Center – Kea‘au Parcel)
Traffic Impact Analysis Report

TMK (3) 1-6-003:081
Kea‘au, Hawai‘i
October 2024

Prepared for:
Fleming & Associates, LLC

Prepared by:
SSFM International

Table of Contents

List of Figures

List of Tables

List of Appendices

I. PROJECT DESCRIPTION

Hilo Medical Center is proposing to develop a new medical office in Kea'au, on the Island of Hawai'i. The project location is shown in Figure 1. The project is located on Tax Map Key (TMK) (3) 1-6-003:081 on the northeast side of an existing 26.762-acre site.

Current plans are for the development of a 36,000 square foot (SF) medical office building, along with a 201-stall off-street parking lot. The conceptual site plan is shown in Figure 2. There are two potential driveway alignments being considered for the development. Alternative 1 Driveway Alignment (see Figure 3) proposes direct access via a driveway off an unnamed frontage road, that would be proposed for improvement, located just offset of the intersection of Old Kea'au-Pāhoa Road and Mamaka Street. Alternative 2 Driveway Alignment (see Figure 4) proposes driveway access to extend from the site as a newly improved road, through the existing unnamed frontage road, and connect to Old Kea'au-Pāhoa Road. The driveway layout shown in Alternative 2 Driveway Alignment is the preferred alternative.

Full construction is expected to be completed by 2027.

This traffic impact analysis report (TIAR) is being prepared to support a Special Permit for the proposed development and will analyze traffic operations and impacts for the AM and PM peak hours. This project will not include a zoning change and, and thus will not require 5-, 10-, and 20-year analysis to satisfy the Hawai'i County Code Chapter 25 zoning concurrency requirements. Analysis will be completed for Existing (2024) Conditions, as well as for the Future Without Project and Future With Project Conditions in 2027 for both alternatives.

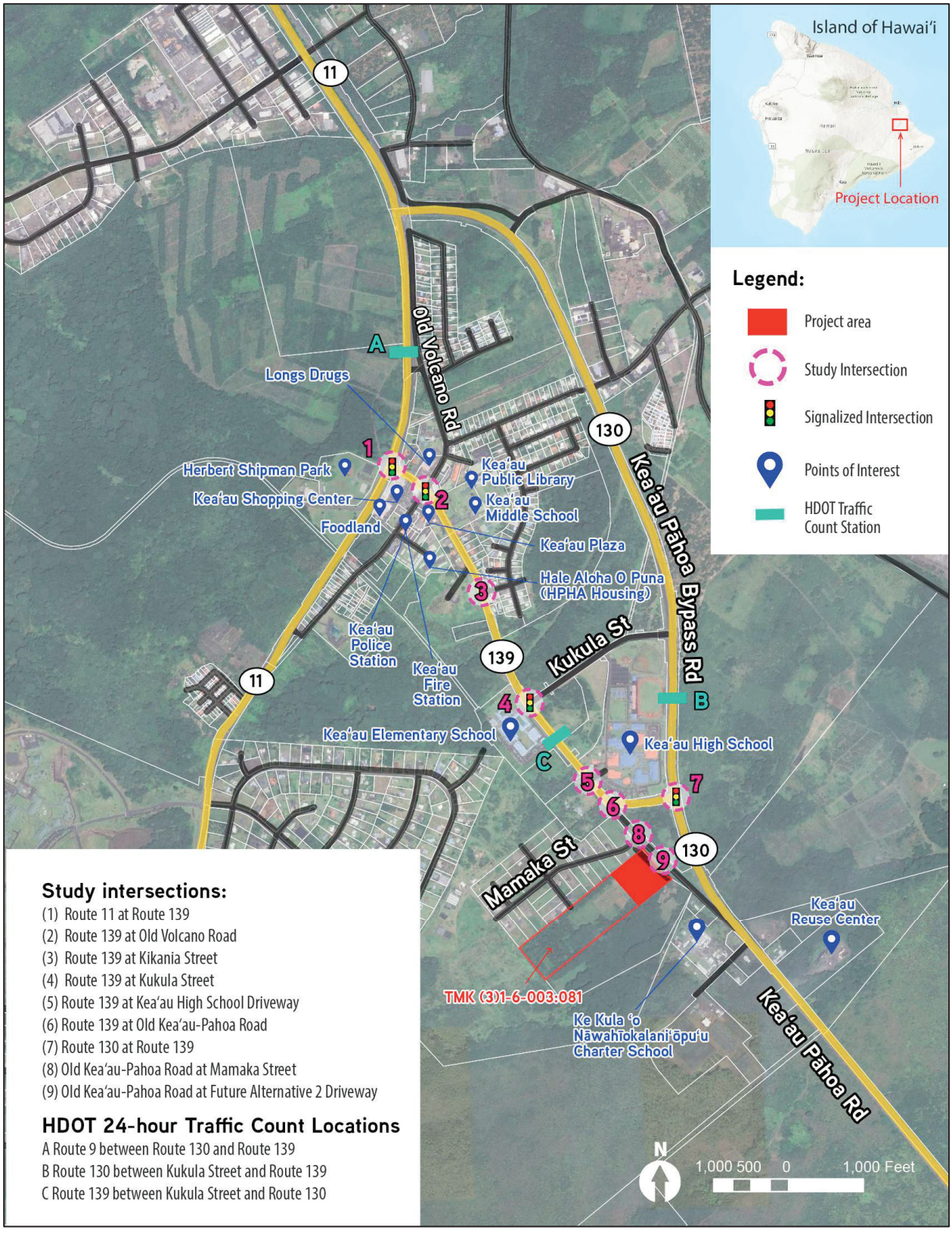


Figure 1: Project Location Map

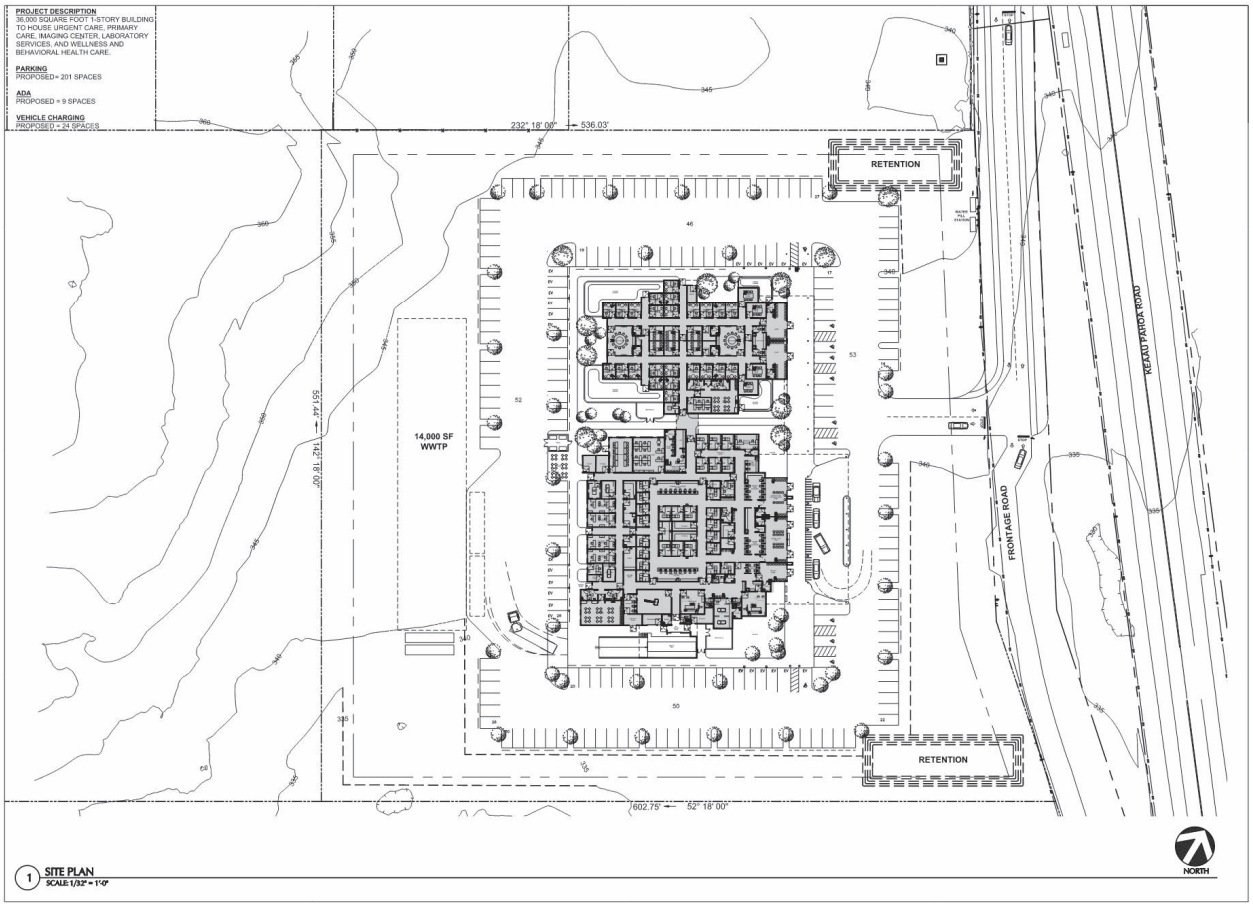


Figure 2: Conceptual Site Plan with Alternative 1 Driveway Alignment

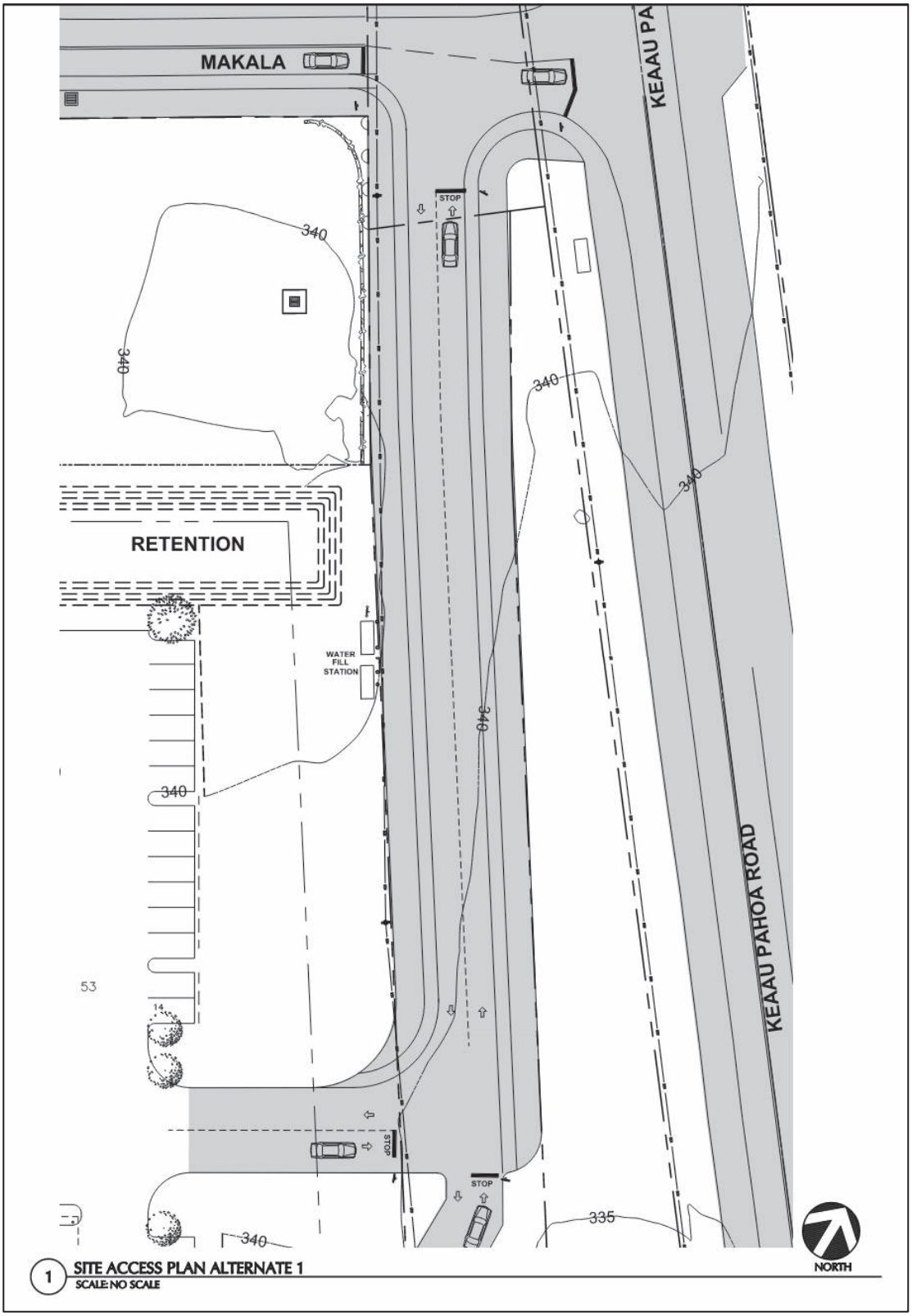


Figure 3: Alternative 1 Driveway Alignment with Connection to Frontage Road

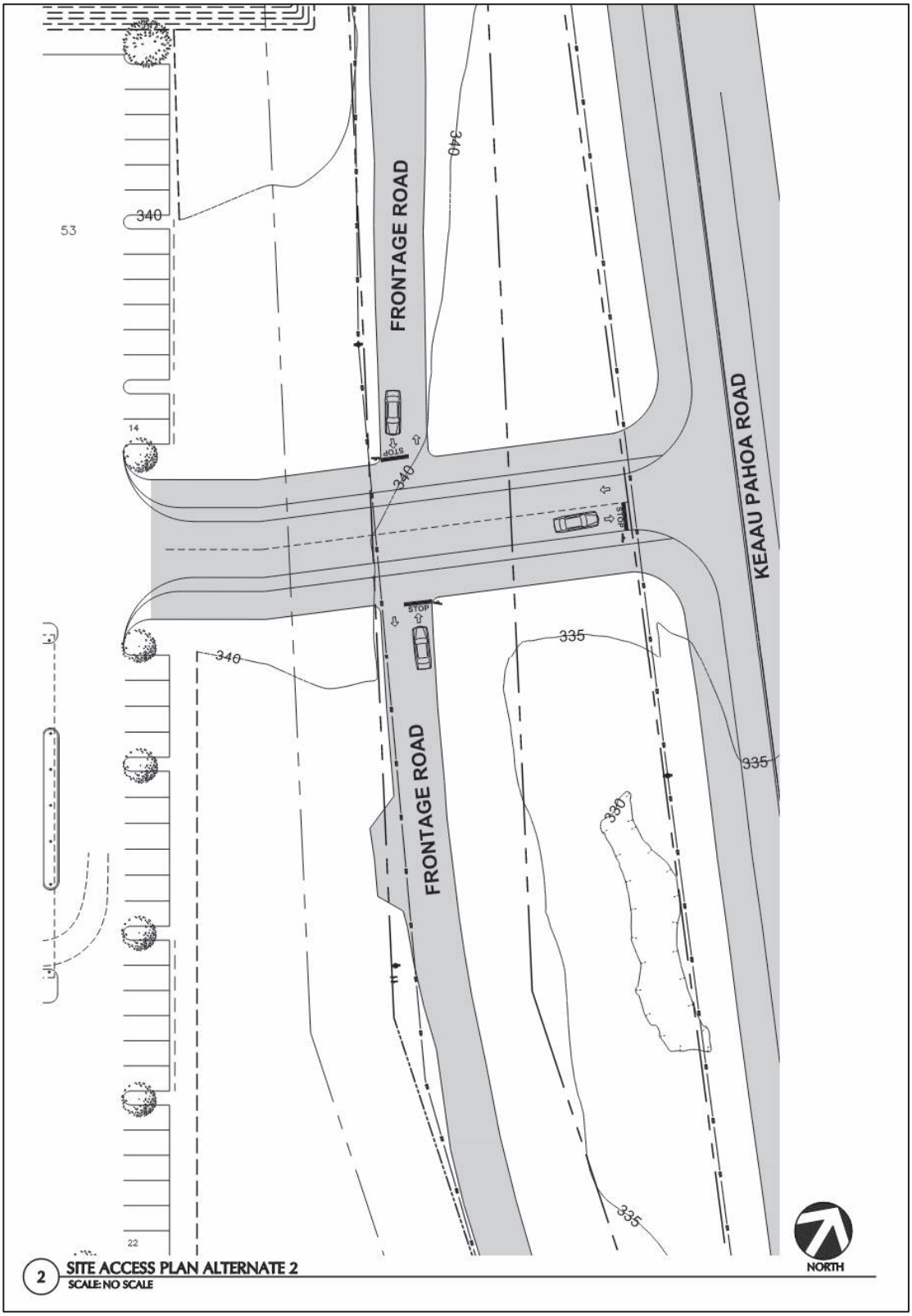


Figure 4: Alternative 2 Driveway Alignment with Connection to Old Kea'au-Pāhoa Road

II. EXISTING CONDITIONS

A. Geometric Configuration

1. Māmalahoa Highway, Hawai'i Belt Road, Volcano Road (State Route 11)

Route 11 goes by numerous names including Māmalahoa Highway, Hawai'i Belt Road, and Volcano Road. For consistency, the name Route 11 will be used throughout this report. Within the project area, Route 11 is oriented in the north-south direction. Route 11 spans between Hilo in the north and circumnavigates the island towards Kailua-Kona in the west. The entirety of Route 11 is state-owned.

In the study area, Route 11 is classified as a small urban principal arterial north of Route 139, and a rural minor arterial south of Route 139. Route 11 is a two-way divided arterial with four-travel lanes in each direction. There are no paved sidewalks, curb and gutter, or bike facilities along the corridor within the study area. Variable width paved and marked shoulders exist along both sides of the corridor. The posted speed limit near Route 139 is 35 MPH and transitions to 45 MPH further from Route 139.

2. Kea'au-Pāhoa Bypass Road, Kea'au-Pāhoa Road, Pāhoa-Kalapana Road, Kaimu-Chain of Craters Road (State Route 130)

Route 130 goes by numerous names including Kea'au-Pāhoa Bypass Road, Kea'au-Pāhoa Road, Pāhoa-Kalapana Road, and Kaimu-Chain of Craters Road. For consistency, the name Route 130 will be used throughout this report. Route 130 extends from its intersection with Route 11 to its terminus near the northeast boundary of Hawai'i Volcano National Park on Kaimu-Chain of Craters Road. In the study area, Route 130 is oriented in the north-south direction, and provides access to Hilo in the north, and to Pāhoa in the south. The entirety of Route 130 is state-owned.

In the study area, Route 130 is classified as a small urban minor arterial. Route 130 is a two-way divided arterial with four-travel lanes in each approach until just south of its intersection with Shower Drive. Between Shower Drive and Kaloli Drive, Route 130 is predominantly a three-lane roadway. South of Kaloli Drive, Route 130 is a two-lane roadway. There are no paved sidewalks, curb and gutter, or bike facilities along the corridor within the study area. Paved and marked shoulders exist along both sides of the corridor. The posted speed limit near the study area is 45 MPH.

3. Kea'au-Pāhoa Road, Old Kea'au-Pāhoa Road (State Route 139)

Route 139 goes by numerous names including Kea'au-Pāhoa Road and Old Kea'au Pāhoa Road. For consistency, the name Route 139 will be used throughout this report. Route 139 is a rural major collector extending between its intersection with Route 11 in the west and Route 130 in the east. Route 139 is oriented in the northwest-southeast direction. For simplicity and

consistency, an east-west orientation will be used to describe the direction and various movements on Route 139. The entirety of Route 139 is state-owned.

Route 139 a two-way roadway with one-travel lane in each direction. Dedicated turn lanes exist at major intersections. Paved sidewalks exist adjacent to the westbound lanes while are absent adjacent to the eastbound lanes of the corridor, with the exception of discontinuous segments fronting Kea'au Elementary School, as well as a portion in the commercial section near the intersection with Route 11. Bike lanes exist in the westbound direction between Kea'au High School and east of the intersection with Old Volcano Road. Additionally, bike lanes exist in the eastbound direction between Route 11 and Kea'au Elementary School. Paved and marked shoulders are present in the eastbound direction from Kea'au Elementary School to Route 139. The posted speed limit is 25 MPH.

4. Old Kea'au-Pāhoa Road

Old Kea'au-Pāhoa Road is a state-owned roadway that extends from its intersection with Route 139 in the north to Opukahaia Street in the south. Old Kea'au-Pāhoa Road provides access to the Ke Kula'o Nāwahiokalani'ōpu'u Charter School and to 35 residential lots in the Ola House Estates subdivision, accessed via Mamaka Street. Old Kea'au-Pāhoa Road is not listed on the Hawai'i Department of Transportation's (HDOT) State Route System Straight Line Diagrams from 2022, however HDOT confirmed that the corridor is state-owned, but may be turned over to the County of Hawai'i (COH) at a later date. Old Kea'au-Pāhoa Road is a two-way roadway with one-travel lane in each direction. There are no paved sidewalks, curb and gutter, or bike facilities along the corridor. Paved and marked shoulders exist along both sides of the corridor. The posted speed limit is 25 MPH.

5. Old Volcano Road

In the project area, Old Volcano Road is a COH-owned local roadway that runs parallel and to the east of Route 11. Old Volcano Road includes transit stops used by COH buses which provide access to Kea'au. Sidewalks exist near the commercial area near Route 139. There are no other pedestrian or bike facilities along Old Volcano Road. The posted speed limit is 25 MPH.

6. Mamaka Street

Mamaka Street is a two lane, undivided, COH-owned, local roadway that extends between Old Kea'au-Pāhoa Road in the east to a dead-end terminus in the west. The construction of Mamaka Street to Old Kea'au-Pāhoa Road was completed in 2018. Mamaka Street provides access to 35 residential lots in the Ola House Estates subdivision. There are no paved sidewalks, curb and gutter, or bike facilities along the corridor. There is no posted speed limit sign on Mamaka Street. The posted speed limit is assumed to be 25 MPH.

7. Kukula Street

Kukula Street is a two-lane, COH-owned, local roadway extending from its intersection with Route 139 in the west to its intersection with Route 130 in the east. Kukula Street is signalized at its intersections with Route 139 and Route 130. Dedicated turn lanes exist at all intersections. The only access on Kukula Street between the two main intersections is at Kea'au High School. Paved and marked shoulders exist along both sides of the corridor. A raised sidewalk exists adjacent to the eastbound lanes of Kukula Street, adjacent to Kea'au High School. Bike lanes exist in both directions along the corridor. The posted speed limit is 25 MPH.

8. Kikania Street

Kikania Street is a two-way, undivided, COH-owned, local roadway extending from Route 130 in the south to a dead-end terminus in the north. There are future plans to extend Kikania Street as part of the Kea'au Village Masterplan. There are no pedestrian or bike facilities along Kikania Street. The posted speed limit is 25 MPH.

9. Kea'au High School West Driveway

The Kea'au High School west driveway extends internally within the school's off-street parking lot between Kukula Street to Route 139. This driveway provides access to the Kea'au High School and athletic fields. Speed humps exist at specific locations on within the school's off-street parking lot to slow down vehicle speeds. There are no pedestrian or bike facilities.

B. Lane Configuration

The existing lane configuration at the eight study intersections are shown in Figure 5.

1. Route 139/Shipman Park Driveway at Route 11

Route 139 at Route 11 is a four-way, signalized intersection. Route 11 northbound and southbound left turns have protected traffic signal phasing, while U-turns are prohibited. The Route 139 eastbound and Shipman Park Driveway westbound approaches operate with concurrent permitted phasing. The Route 11 northbound and southbound approaches have dedicated left turn lanes, a through lane, and a shared through-right lane. Channelized right turns exist for the northbound and westbound approaches. The westbound approach from Route 139 has a shared left-through lane and a right turn lane. The eastbound approach from Shipman Park is a shared left-through-right lane. Crosswalks exist across all approaches.

2. Route 139 at Old Volcano Road

Route 139 at Old Volcano Road is a four-way, signalized intersection. All approaches have permissive phasing. All approaches have dedicated left turn lanes. The westbound approach has dedicated left turn, through, and right turn lanes. All other approaches have shared through-right turn lanes. Crosswalks exist across all approaches, with curb ramps existing at each corner.

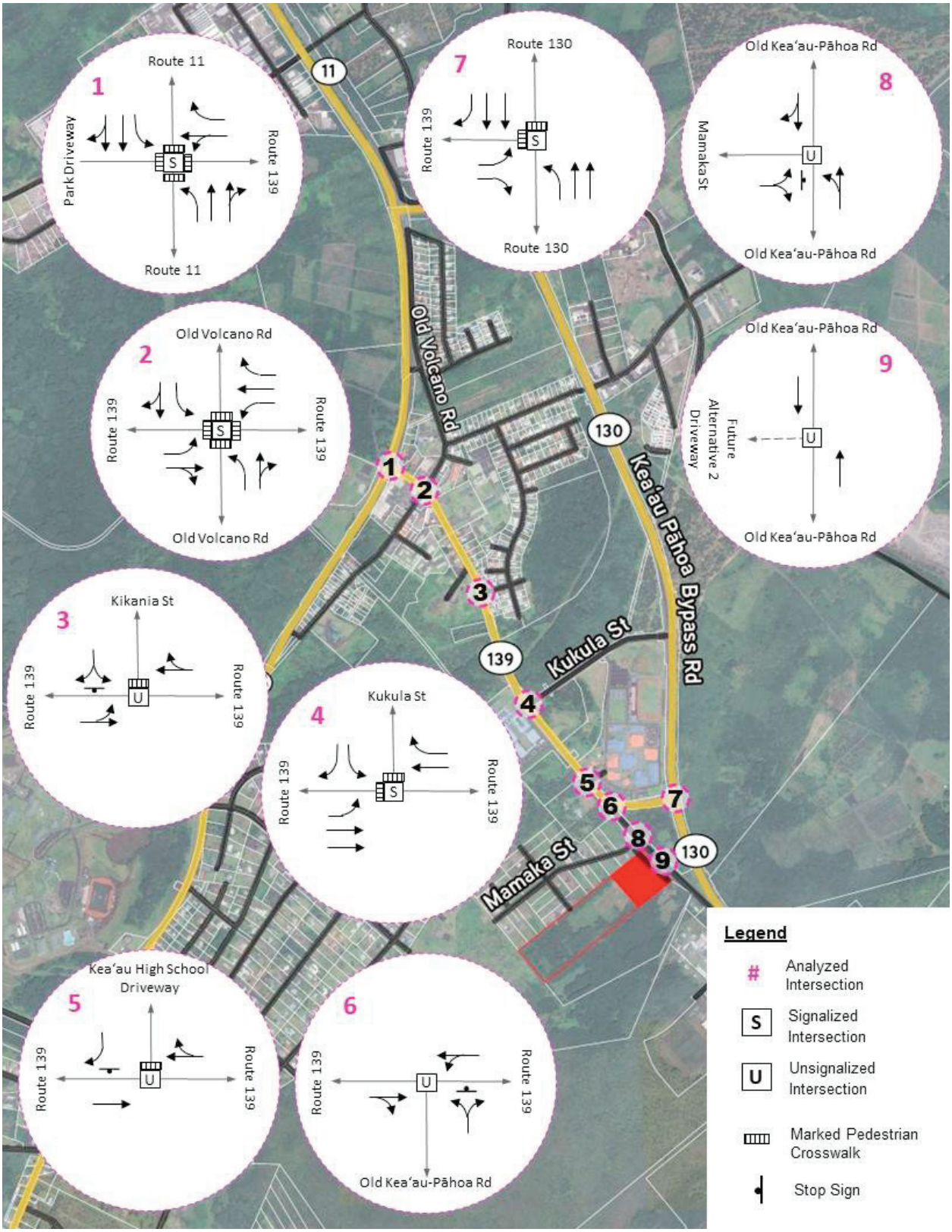


Figure 5: Existing (2024) Lane Configuration

3. Route 139 at Kikania Street

Route 139 is a two-way stop-controlled (TWSC) T-intersection with stop control on the Kikania Street approach. All approach lanes are single shared-movement lanes. A crosswalk with curb ramps exists across the northern leg of the intersection. Vehicles were observed using the wide eastbound Route 139 shoulder to maneuver around eastbound left-turning vehicles.

4. Route 139 at Kukula Street

Route 139 is a signalized T-intersection with protected-permitted left turns for the southbound Kukula Street approach. Dedicated left turn lanes exist for the southbound Kukula Street and eastbound Route 139 approaches. Channelized right turns exist for the westbound Route 139 and southbound Kukula Street approaches. Marked crosswalks with curb ramps exist across the northern and western legs of the intersection. A marked bike lane crosses the north leg of the intersection. There is a crossing guard stationed at the Kukula Street right turn island beginning around 30 minutes prior to school starting in the AM peak to help students cross Route 139 to Kea'au Elementary School. The Kea'au Elementary School entrance is a right-in only in the eastbound direction, and is located along Route 139, 500-feet east of this intersection. All vehicles entering Kea'au Elementary School pass through Route 139 and Kukula Street.

5. Route 139 at Kea'au High School Driveway

The Kea'au High School (KHS) west driveway intersects Kea'au-Pāhoa Road about 450 feet west of Old-Kea'au-Pāhoa Road. Access is limited to right-in right-out (RIRO) only, although vehicles were observed making left turns out. All approach lanes are single shared-movement lanes. A marked crosswalk with curb ramps and a marked bike lane exists on the north leg of the intersection, across the KHS driveway.

6. Route 139 and Old Kea'au-Pāhoa Road

Route 139 and Old Kea'au-Pāhoa Road is a TWSC, T-intersection with stop control on the northbound Old Kea'au-Pāhoa Road approach. There are no marked crosswalks at the intersection. The northbound Old Kea'au-Pāhoa Road approach is striped as a single lane however, vehicles use this approach as if dedicated left turn and right turn lanes exist. All eastbound and westbound approach lanes are single shared-movement lanes. Vehicles were observed using the westbound Old Kea'au-Pāhoa Road shoulder to bypass left-turning vehicles at the intersection. There is a marked bike lane on the north side of the intersection across from Old Kea'au-Pāhoa Road, traveling in the westbound direction. This intersection provides access to 35 residential houses in the Ola House Estates subdivision and to the Ke Kula'o Nāwahiokalani'ōpu'u Charter School. The traffic generated by parents dropping off students in the AM peak hour accounts for most of the traffic volume exiting Old Kea'au-Pāhoa Road onto Route 139.

7. Route 130 and Route 139

Route 130 and Route 139 is a signalized, T-intersection. The northbound Route 130 left turn has protected traffic signal phasing. The eastbound Route 139 right turn is also protected and overlaps with the northbound Route 130 left turn phase. Eastbound right turns on red are prohibited. Two through lanes and dedicated turn lanes exist for the northbound and southbound approaches along Route 130. A dedicated left and a dedicated, channelized right lane exist in the eastbound Route 139 direction. Paved sidewalks and curbs and gutters exist on the north side of Route 139. Signalized crosswalks exist across the northern and western legs of the intersection.

8. Old Kea'au-Pāhoa Road at Mamaka Street

Old Kea'au-Pāhoa Road at Mamaka Street is a TWSC T-intersection with stop control on the Mamaka Street approach. There are no marked crosswalks, marked shoulders, sidewalks, or bike lanes at this intersection. All approach lanes are single shared-movement lanes.

C. Study Intersection Cycle Lengths

Field observations were used to confirm that each of the traffic signals were actuated and uncoordinated. Traffic operations were analyzed in this manner.

D. Multimodal Facilities

Existing pedestrian, bike, and transit facilities are shown in Figure 6.

1. Transit – Hele-On Bus

The COH operates the *Hele-On Bus (COH Bus)* throughout the island, of which three routes operate within Kea'au:

- Route 10 (Hilo to Ocean View)
  - Service provided Mondays through Saturdays, except holidays.
  - Service runs along Route 11.
  - One AM route starting in Ocean View heading northbound to Hilo, scheduled to pass Kea'au at 8:35 AM.
  - One PM route starting in Hilo heading southbound to Ocean View, scheduled to pass Kea'au at 3:56 PM.
- Route 11 (Red Line Hilo to Volcano)
  - Service provided Mondays through Sundays.
  - Service runs along Route 11.
  - Five round trip routes per day are provided, the first of which passes through Kea'au at 5:27 AM headed towards Volcano, and the last which passes through Kea'au at 6:49 PM headed towards Hilo.

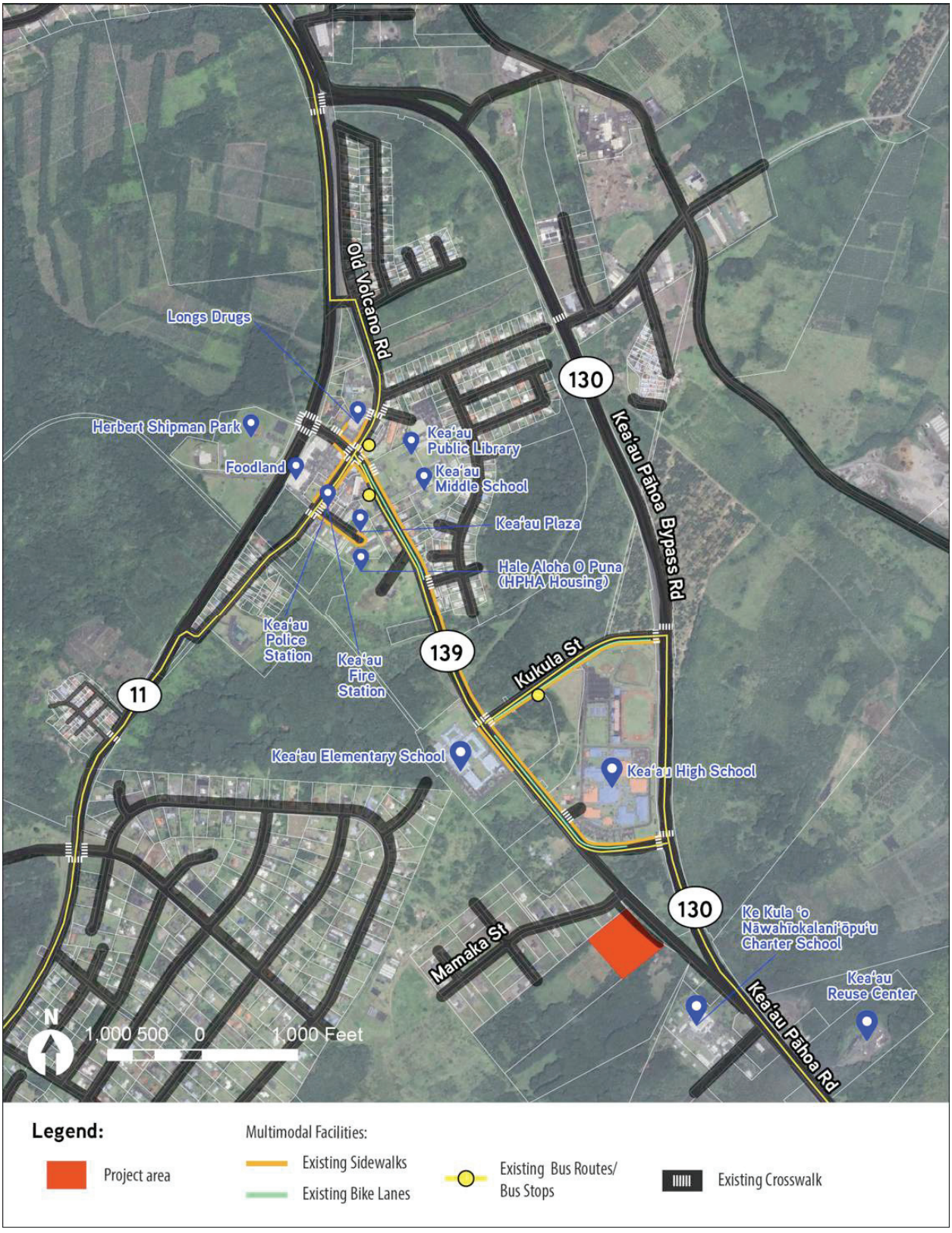


Figure 6: Existing (2024) Multimodal Facilities

- Route 40 (Hilo – Pāhoa)
    - Service provided Mondays through Sundays, with some stops only operating during weekdays.
    - Up to seventeen trips per day run northbound towards Hilo, passing through Kea'au between 5:50 AM and 9:50 PM. Up to fifteen trips per day run southbound towards Pāhoa, passing through Kea'au between 6:52 AM and 8:52 PM.
    - Service runs along Route 11 and Route 130.
- Route 402 (Hawaiian Paradise Park/Orchidland/Hawaiian Acres/Ainaloa)
    - Service provided Mondays through Saturdays, except holidays.
    - Eight round trip routes per day are provided, the first of which passes through Kea'au at 4:35 AM headed towards Pāhoa, and the last which passes through Kea'au at 6:35 PM headed towards Pāhoa.
- Route 403 (Fern Acres/Fern Forest/Eden Roc)
    - Flex Route – this route can flex up to one mile off route with reservations at least one hour in advance.
    - Five round trip routes per day are provided, the first of which begins in Kea'au at 9:00 AM headed towards Fern Forest, and the last which passes through Kea'au at 5:10 PM headed towards Fern Forest.

More detailed bus routes and timetables are included in Appendix A. COH Bus routes and bus stops in the project area are shown in Figure 6. Bus drivers will stop for users that flag down the buses if there is a safe place to pull over. Throughout the entire bus network, riders can transfer to numerous other routes connecting to the rest of the island. Effective February 27th, 2022, COH Bus fares are free through December 31st, 2025.

E. Nearby Attractions and Destinations

1. HDOE Schools

There are three State of Hawai'i Department of Education (HDOE) public schools in the area: Kea'au Elementary School, Kea'au Middle School, and Kea'au High School. Kea'au Elementary School is located just west of the project along Route 139 near the intersection of Kukula Street. Kea'au Middle School is located near the Old Volcano Road and Route 139 intersection. Kea'au High School is located along Route 139 near the intersection of Old Kea'au-Pāhoa Road. Each school has a slightly different bell schedule end-of-day bell schedule. The AM traffic count captures the morning school peak hour. The PM traffic count occurs later in the day and does not capture the after school peak hour.

2. Kea'au Public Library

Kea'au Public Library is located on the northeast corner of the intersection of Old Volcano Road and Route 139, just west of Kea'au Middle School. The current library will be replaced by a 12,000 SF public library and 42-stall parking lot located in the currently empty grassy field closer to Kea'au-Pāhoa Road. The new library is scheduled to be completed by 2027.

3. Kea'au Shopping Center

Kea'au Shopping Center is the main commercial area in Kea'au, located on the southeast corner of the intersection of Route 11 and Route 139.

4. Herbert Shipman Park

Herbert Shipman Park is located west of the intersection of Route 11 and Route 139. The park includes two tennis courts, a baseball field, a basketball court, a playground, a public restroom, and approximately 50 parking stalls.

F. Vehicle Volumes

1. Historic HDOT Volume

Historic Hawai'i Department of Transportation (HDOT) Annual Average Daily Traffic (AADT) counts on Route 11 between Route 130 and Route 139, Route 130 between Kukula Street and Route 139, and Route 139 between Kukula Street and Route 130 were available from 2014 to 2021, except for 2017. The historic HDOT AADT and annual growth rates calculated from 2014-2021 for the three roads range from 2.20-3.89% (see Table 1). The historic HDOT counts and resulting linear trendlines are shown in Figure 7. Despite the calculated growth, the trendlines reflect consistent (no growth) AADT when accounting for annual fluctuations.

The 2021 two-day 24-hour directional average traffic volumes are shown in Figures 8-10. Each figure is graphed with the same scale on the y-axis to show the difference in magnitude between each roadway. Route 11 and Route 139 show similar peak hour times and peak hour directional patterns, with the AM directional peak in the northbound direction at about 6:30-7:30 AM and the PM directional peak in the southbound direction at about 4:45-5:45 PM. Volumes along Route 139 are significantly lower than the volumes on Route 11 and Route 130, and do not show significant directional deviation throughout the day.

2. Intersection Peak Turning Movement Counts

Peak period turning movements counts were taken at the eight study intersections on Thursday, March 7, 2024 based on the peak hours noted for the 24-hour counts. It was found that the AM and PM intersection peak hours occurred between 7:00 to 8:00 AM and 4:00 to 5:00 PM, respectively. Peak hour traffic volumes are shown in Figure 11. The through traffic volumes on Old Kea'au-Pāhoa Road at the future Alternative 2 Driveway were deduced from

the intersection counts at Old Kea'au-Pāhoa Road at Mamaka Street. Intersection turning movement counts can be found in Appendix B.

Table 1: Historic HDOT 2014-2021 AADT

Station	Location	Year	AADT	Growth Rate 2014-2021
B71001100664	Route 11 between Route 130 and Route 139	2014	17,000	2.28%
		2015	23,100	
		2016	19,200	
		2017	-	
		2018	18,200	
		2019	23,600	
		2020	17,100	
		2021	19,900	
B71013000138	Route 130 between Kukula Street and Route 139	2014	20,700	2.20%
		2015	29,600	
		2016	23,400	
		2017	-	
		2018	23,900	
		2019	-	
		2020	21,600	
		2021	24,100	
B71013900070	Route 139 between Kukula Street and Route 130	2014	6,200	3.89%
		2015	8,700	
		2016	7,600	
		2017	-	
		2018	8,600	
		2019	8,600	
		2020	7,000	
		2021	8,100	

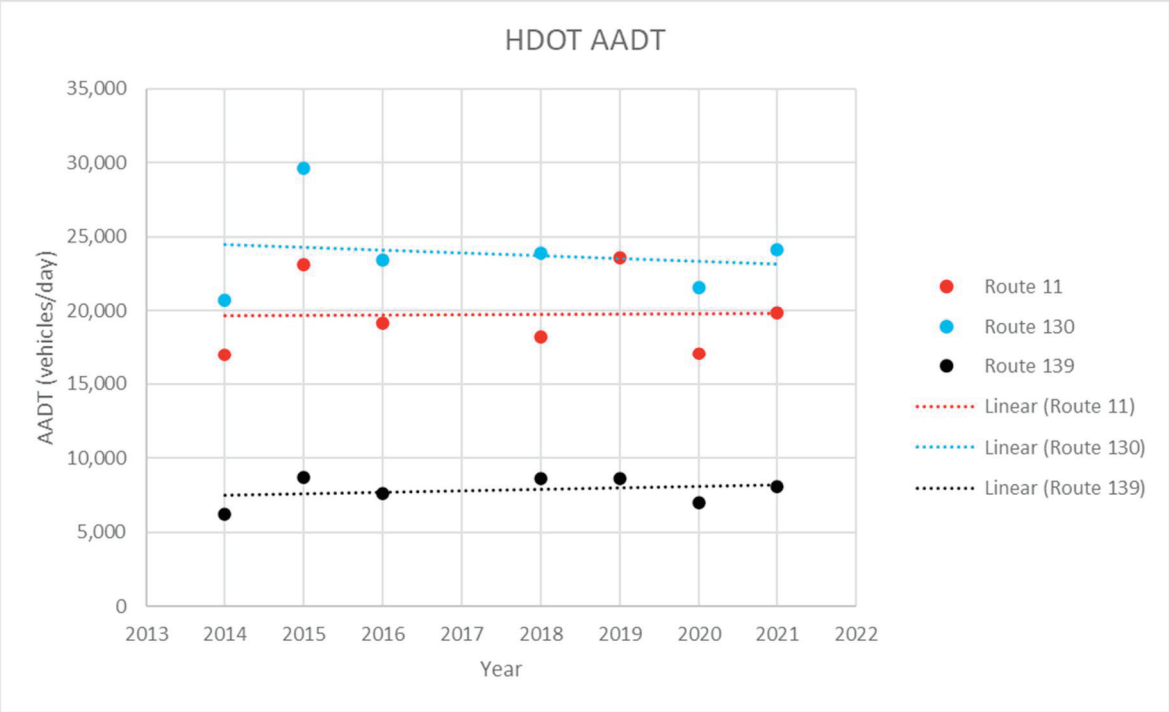


Figure 7: 2014-2021 HDOT Historic AADT and Trendline

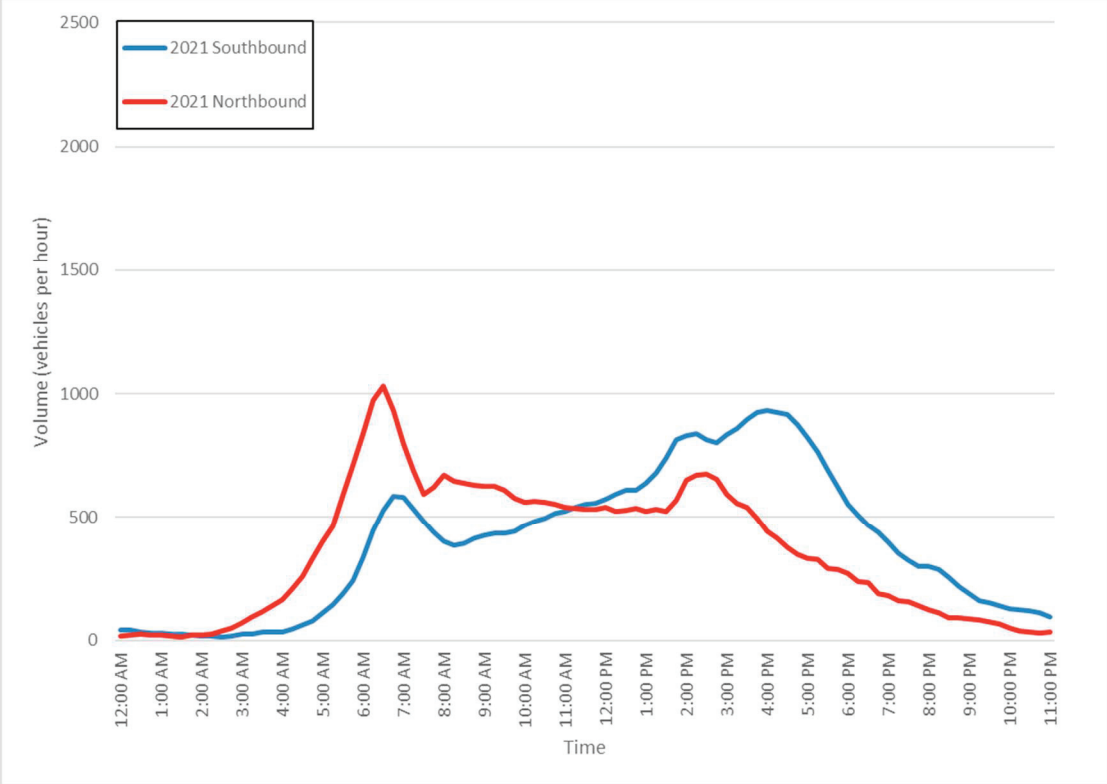


Figure 8: 2021 HDOT 24-Hour Distribution – Route 11 between Route 130 and Route 139

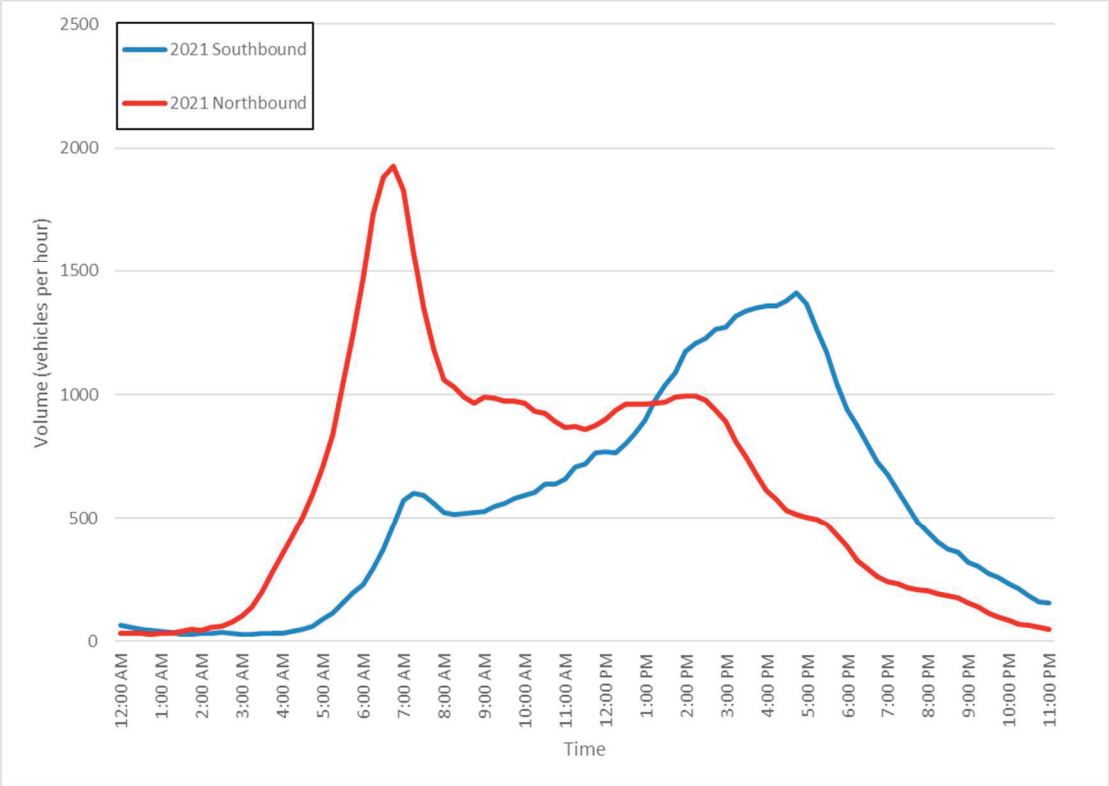


Figure 9: 2021 HDOT 24-Hour Distribution – Route 130 between Kukula Street and Route 139

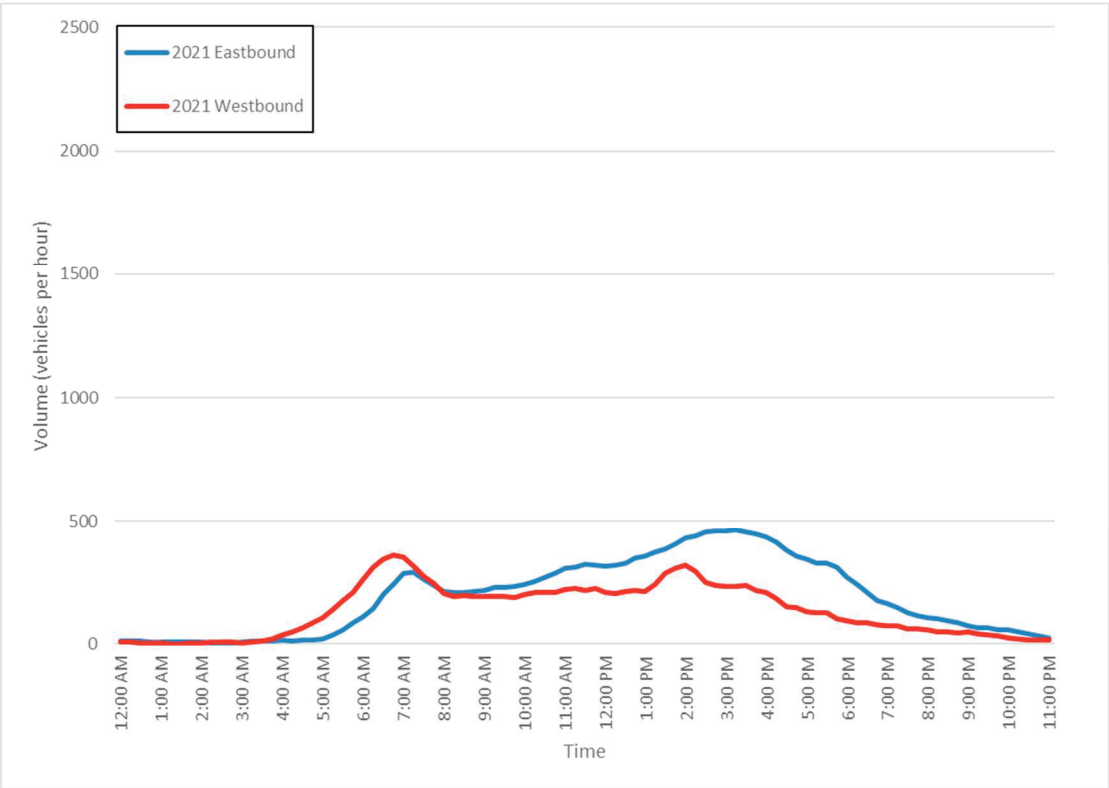


Figure 10: 2021 HDOT 24-Hour Distribution – Route 139 between Kukula Street and Route 130

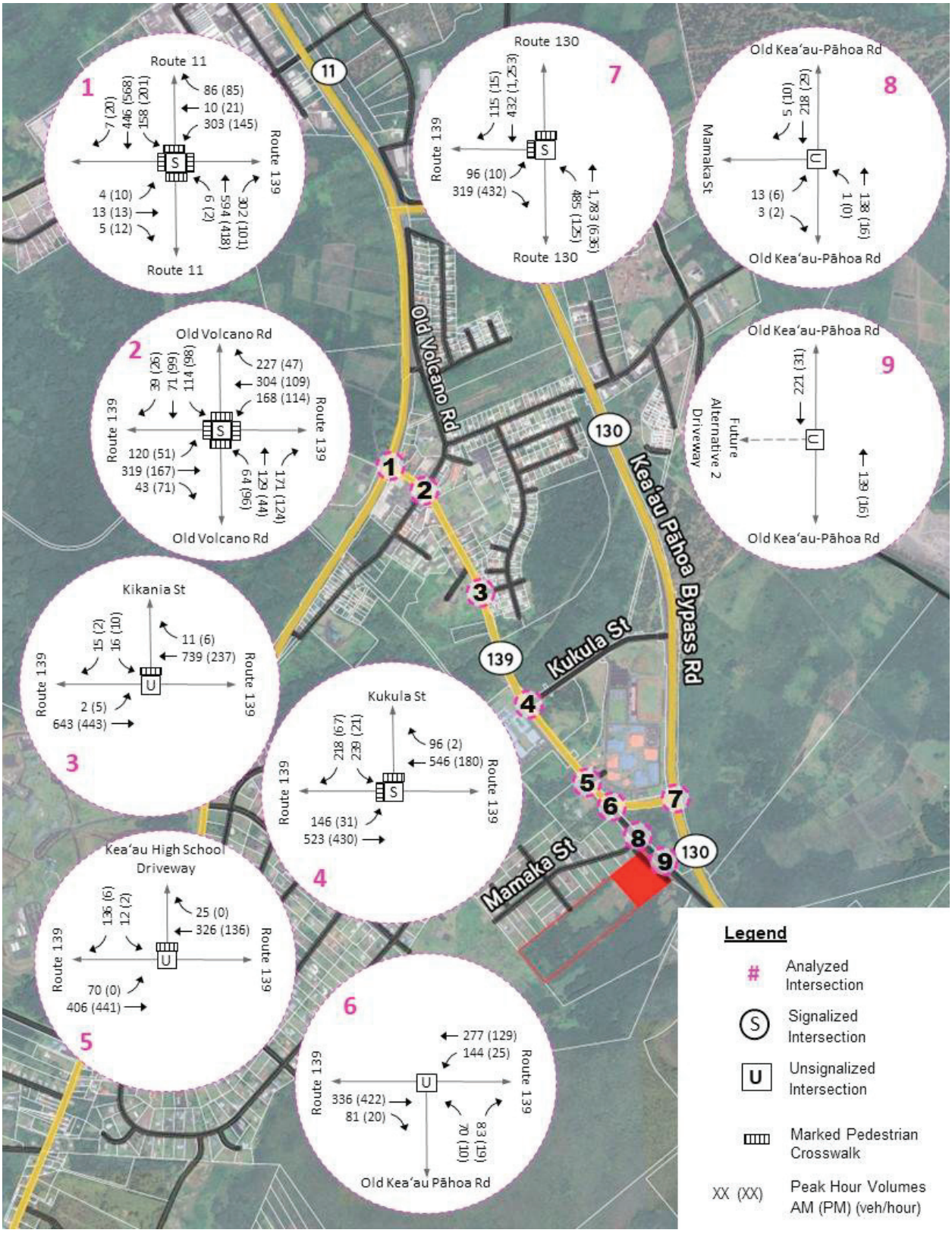


Figure 11: Existing (2024) Intersection Peak Hour Volumes

3. Pedestrian and Bicycle Volumes

Peak hour intersection pedestrian and bicycle volumes were taken at the existing study intersections on Thursday, March 7, 2024. Peak hour intersection multimodal volumes during the AM and PM peak hours are shown in Tables 2 and 3, respectively. During the AM Peak hour, pedestrian activity was highest at the intersection of Route 139 and Kukula Street when students were observed walking to school. During the PM peak hour, pedestrian activity was highest on Route 139 near the intersections with Route 11 and Old Volcano Road, both near the commercial areas. Bike activity was negligible throughout the study area throughout the day.

Table 2: Existing (2024) Peak Hour Pedestrian Volumes

Intersection	AM Peak Hour					PM Peak Hour				
	North Leg	East Leg	South Leg	West Leg	Total	North Leg	East Leg	South Leg	West Leg	Total
Route 11 at Route 139	0	0	0	0	0	0	0	6	0	6
Route 139 at Old Volcano Road	0	7	0	3	10	2	8	4	1	15
Route 139 at Kikania Street	1	0	0	0	1	0	0	1	0	1
Route 139 at Kukula Street	2	0	11	10	23	0	0	1	0	1
Route 139 at Kea'au HS Driveway	0	0	0	0	0	0	0	0	0	0
Route 139 at Old Kea'au-Pāhoa Road	0	0	0	0	0	0	0	0	0	0
Route 130 at Route 139	0	0	0	0	0	0	0	0	0	0
Old Kea'au-Pāhoa Road at Mamaka Street	0	0	0	0	0	0	0	0	0	0

Table 3: Existing (2024) Peak Hour Bicycle Volumes

Intersection	AM Peak Hour					PM Peak Hour				
	NB	SB	EB	WB	Total	NB	SB	EB	WB	Total
Route 11 at Route 139	0	0	0	0	0	0	1	0	0	1
Route 139 at Old Volcano Road	0	0	0	0	0	0	0	0	0	0
Route 139 at Kikania Street	0	0	0	0	0	0	0	0	0	0
Route 139 at Kukula Street	0	0	0	0	0	0	0	0	0	0
Route 139 at Kea'au HS Driveway	0	0	0	0	0	0	0	0	0	0
Route 139 at Old Kea'au-Pāhoa Road	0	0	0	0	0	0	0	0	0	0
Route 130 at Route 139	0	0	0	0	0	0	0	0	0	0
Old Kea'au-Pāhoa Road at Mamaka Street	0	0	0	0	0	0	0	0	0	0

G. Existing Automobile LOS

1. Methodology

Level of service (LOS) is a rating system used in traffic engineering to measure the effectiveness of roadway operating conditions. There are six LOS ranging from A to F. LOS A is defined as being the least interrupted flow conditions with little or no delays, whereas LOS F is defined as conditions where extreme delays exist. Guidelines state that LOS D or better is appropriate for the study intersection and movements. Intersection LOS and delay was determined for the AM and PM peak hours using *Synchro Version 11* traffic analysis software.

As stated in the *HCM6* (TRB, 2016), LOS for a TWSC intersection is determined by the measured control delay (see Table 4). Delay at a TWSC intersection is defined by each minor movement and not for the intersection as a whole. Vehicles traveling along the major, free-flow road of a TWSC intersection, proceed through with minimal delay. Those vehicles approaching the intersection along the minor movement (side-street) are controlled by a stop sign and thus experience delay attributable to the volume of vehicles passing along the free-flow road and the gaps available.

Table 4: LOS Criteria for Unsignalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
≤ 10.0	A	F
> 10.0 and ≤ 15.0	B	F
> 15.0 and ≤ 25.0	C	F
> 25.0 and ≤ 35.0	D	F
> 35.0 and ≤ 50.0	E	F
> 50.0	F	F

The LOS analysis for signalized intersections is determined by average total vehicle delay based on the methodologies of the *HCM6* (TRB, 2016), shown in Table 5. High numbers of vehicles passing through the intersection, long cycle lengths, inappropriate signal phasing, or poor signal progression can result in long delays, and consequently poor LOS.

Table 5: LOS Criteria for Signalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
≤ 10.0	A	F
> 10.0 and ≤ 20.0	B	F
> 20.0 and ≤ 35.0	C	F
> 35.0 and ≤ 55.0	D	F
> 55.0 and ≤ 80.0	E	F
> 80.0	F	F

Another measure of intersection operation is the volume to capacity (v/c) ratio. The v/c ratio compares to the maximum volume of vehicles that can be accommodated by the intersection during a specific period of time. Any v/c ratio greater than or equal to 1.0 indicates that the intersection is operating at or above capacity which results in a LOS F per the *HCM*. A traffic movement can have a poor LOS but low v/c which suggests that the traffic volumes along that movement are low but have to wait a long time to make the movement. This is common for low volume protected turn movements or side streets that have to wait through a long cycle length for their phase to come up.

2. Existing (2024) Intersection LOS Results

Existing (2024) intersection and movement LOS and delay (seconds/vehicle) were determined for the AM and PM peak hours using *Synchro 11* traffic analysis software. Results are shown in Table 6 and Appendix C. Movements that operate at LOS E or worse or v/c greater than 1.0 are highlighted in yellow and discussed below.

(a) Route 139/Shipman Park Driveway at Route 11

At the intersection of Route 11 and Route 139/Shipman Park Driveway, the Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hour, respectively. The Route 11 northbound left turn volume during the AM and PM peak hours is six vehicles and two vehicles per hour, respectively. The delay is due to the cycle length. This minimal volume of vehicles was observed to clear the intersection during each cycle when present. Mitigation for this movement is not recommended.

(b) Route 139 at Kikiana Street

At the intersection of Route 139 and Kikania Street, the Kikania Street southbound approach operates at LOS E (v/c of 0.26) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Kikania Street. The delay is not a result of capacity along the Kikania Street southbound approach. Kikania Street southbound right turn vehicles were observed driving in the shoulder and were less impacted by the volume on Route 139. The Kikania Street southbound left turn volume during the AM peak hour is 16 vehicles per hour. The southbound left turn volume will not satisfy traffic signal warrant thresholds, and therefore, a signal is not recommended. The actual delay observed during the AM peak hour was less than the calculated delay.

(c) Route 139 and Old Kea'au-Pāhoa Road

At the intersection of Route 139 and Old Kea'au-Pāhoa Road, the Old Kea'au-Pāhoa Road northbound approach operates at LOS E (v/c of 0.47) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Old Kea'au-Pāhoa Road. The v/c ratio suggests there is sufficient capacity for this movement. The Old Kea'au-Pāhoa Road northbound left turn volume during the AM peak hour is 70 vehicles per hour. The northbound left turn volume is less than 12 vehicles per hour during the other three hours of traffic counts collected on Thursday, March 7, 2024, including the hour before the AM peak hour and the two PM commuter peak hours. The Old Kea'au-Pāhoa Road northbound left turn volume will not satisfy 8-Hour or 4-Hour traffic signal warrant thresholds, and therefore, a signal is not recommended. The actual delay observed during the AM peak hour was less than the calculated delay.

(d) Route 130 and Route 139

At the intersection of Route 130 and Route 139, the Route 130 northbound left turn operates at LOS E (v/c of 0.87) during the PM peak hour. The Route 130 northbound left turn volume is 125 vehicles per hour, or approximately two vehicles per minute. There were no observed issues with this movement clearing every cycle. Mitigation for this movement is not recommended.

Table 6: Existing (2024) LOS

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**28.0**	**-**	**C**	**24.1**	**-**
Route 11 NB Left	E	61.2	0.44	F	84.4	0.41
Route 11 NB Through-Right	C	31.6	0.77	C	29.1	0.70
Route 11 SB Left	D	51.0	0.83	D	35.8	0.82
Route 11 SB Through-Right	C	20.5	0.39	C	20.1	0.53
Shipman Park EB Left-Through-Right	B	13.8	0.03	B	11.6	0.05
Route 139 WB Left-Through	C	21.1	0.53	B	13.6	0.26
Route 139 & Old Volcano Road	**B**	**14.1**	**-**	**B**	**14.5**	**-**
Old Volcano NB Left	B	16.2	0.15	C	25.0	0.33
Old Volcano NB Through-Right	B	18.0	0.61	C	22.4	0.48
Old Volcano SB left	C	24.6	0.45	C	27.6	0.39
Old Volcano SB Through-Right	B	14.3	0.22	C	21.0	0.32
Route 139 EB Left	B	15.0	0.31	A	6.2	0.07
Route 139 EB Through-Right	B	11.0	0.45	A	6.5	0.25
Route 139 WB Left	B	17.7	0.41	A	8.4	0.18
Route 139 WB Through	B	10.1	0.37	A	5.6	0.11
Route 139 WB Right	A	9.8	0.33	A	5.3	0.05
Route 139 & Kikania Street	**-**	**0.8**	**-**	**-**	**0.3**	**-**
Route 139 EB Left-Through	A	9.9	0.01	A	7.8	0.01
Kikania SB Left-Right	E	37.6	0.26	B	14.5	0.04
Route 139 & Kukula Street	**B**	**17.5**	**-**	**A**	**3.9**	**-**
Route 139 EB Left	A	9.1	0.36	A	2.6	0.04
Route 139 EB Through	A	7.1	0.46	A	2.6	0.34
Route 139 WB Through-Right	B	13.5	0.70	A	4.5	0.18
Kukula SB Left	D	54.8	0.88	C	26.7	0.46
Route 139 & Kea'au HS Driveway	**-**	**2.4**	**-**	**-**	**0.1**	**-**
Route 139 EB Left-Through	A	8.3	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.1	0.23	A	9.0	0.01
Route 139 & Old Kea'au-Pāhoa Road	**-**	**5.3**	**-**	**-**	**0.9**	**-**
Route 139 WB Left-Through	A	9.1	0.16	A	8.4	0.02
Old Kea'au-Pāhoa NB Left	E	41.9	0.47	B	13.5	0.02
Old Kea'au-Pāhoa NB Right	B	12.1	0.17	B	11.1	0.03
Route 130 & Route 139	**C**	**20.1**	**-**	**C**	**26.6**	**-**
Route 130 NB Left	D	52.0	0.93	E	64.3	0.87
Route 130 NB Through	A	8.8	0.69	A	7.3	0.30
Route 130 SB Through	C	24.0	0.31	C	24.7	0.74
Route 139 EB Left	D	44.7	0.35	C	33.4	0.07
Route 139 EB Right	C	21.9	0.45	D	43.5	0.85
Old Kea'au-Pāhoa Road & Mamaka Street	**-**	**0.5**	**-**	**-**	**1.1**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	7.9	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	12.0	0.04	A	8.9	0.01

III. Future Without Project Conditions

Regional traffic growth, trip generation from any upcoming planned projects, and future surrounding area development's traffic were added to the roadway network and analyzed for a 2027 future analysis year.

A. Background Growth Rate

Historic HDOT AADT on Route 11, Route 130, and Route 139 in the study area from 2014-2021 resulted in annual growth rates between 2.20-3.89%, while the overall trendlines showed consistent (no growth) AADT over that time.

The *Federal-Aid Highways 2035 Transportation Plan for the District of Hawai'i* (CH2M Hill, 2014) forecasts a compounded annual increase of 2.12% in the planning district of Puna between 2020 to 2035 (see Table 7).

Table 7: Traffic Volume Future Forecast – Daily Vehicle Trips in Puna

Year	Daily Vehicle Trops	Growth Rate
2020	92,180	2.12%
2035	126,290	

In the surrounding area, both the *Kea'au Villages Master Plan* (MP) *Phase 1 and Phase 2 TIAR* and the *Kea'au Mountain View Public Library TIAR* used a growth rate of 0.50%, reflective of the consistent linear trendline. For this project, it was determined to use the 2.12% forecasted growth rate when calculating future volumes to account for anticipated future growth and potential developments that are completed but not individually added. Therefore, a 2.12% compounded annual growth rate was applied to the through volumes on Route 11, Route 130, and Route 139, and for turns to/from Route 139 to/from Route 11 and Route 130.

B. Surrounding Projects

Research was completed on the State of Hawaii *Environmental Review Program* (ERP) website, The ERP website provides Environmental Impact Statements (EIS) and Environmental Assessments (EA) available to the public.

The *Kea'au Village Master Plan TIAR* (Wilson Okamoto, Revised July 2017) and *Kea'au Mountain View Public Library* (ATA, 2023) are the latest applicable projects surrounding the project site.

1. Kea'au Villages Master Plan Phase 1 and Phase 2

The *Kea'au Villages Master Plan Phase 1 and Phase 2 TIAR* was written in support of the *Kea'au Village Master Plan Environmental Assessment* (PBR Hawai'i, 2020). The proposed MP was projected to be completed in three construction phases over years 2023, 2028, and 2038 to include:

- 590 single family homes,
- 350 multi-family homes,
- 220,408 SF GFA of commercial space,
- 43,600 SF GFA of office space, and
- 100 hotel rooms.

Construction for the project has not started, and it is unknown when it may commence. However, once it does get under construction, it will take another couple of years before the first units are occupied and generating trips. Therefore, with this ambiguity, individual project-related trips resulting from the *Kea'au Villages MP TIAR* were not included in future analysis. It is assumed that any development that does come online by 2027 will be captured in the 2.12% annual background growth rate.

2. Kea'au Mountain View Public Library

The *Kea'au Mountain View Public Library TIAR* analyzed a proposed 12,000 SF public library northeast of the intersection of Route 139 and Old Volcano Road. The proposed library will replace the existing library at the Kea'au Middle School and Mountain View Elementary School. The project is anticipated to be completed in 2027 and therefore will be included in this project's future year analysis. The peak hour project generated traffic is shown in Figure 12.

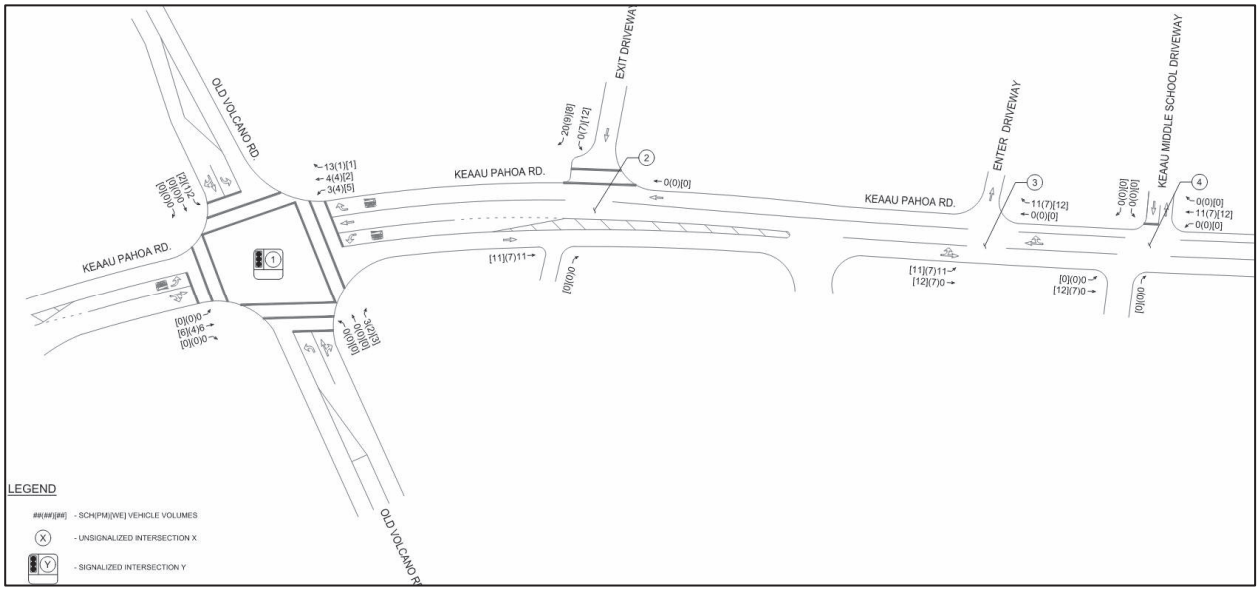


Figure 12: Kea'au Mountain View Public Library TIAR – 2027 Project Generated Trips

C. Master Plans

1. Puna Community Development Plan

The *Puna Community Development Plan* (Puna CDP) (September 2008) includes short-term (2008-2012) and medium-term (2013-2017) improvements recommended to DOT. All short-

term improvements have been implemented. Medium-term transportation improvements include constructing a right exit lane on Route 11 to Kea'au Village using the Old Volcano Road.

2. Statewide Pedestrian Master Plan

The *HDOT Statewide Pedestrian Master Plan* (HDOT, May 2013) does not include any projects in the study area.

3. Bike Plan Hawai'i

The *Bike Plan Hawai'i* (HDOT, September 2003) documents bike projects on state roadways that were planned for completion (see Figure 13). The following projects in the study area include:

- Project 30a: *Railroad Avenue Bikeway Connection to Kea'au Schools Complex*
  - Priority I Project
  - Proposed a 0.5-mile shared use path between the proposed Railroad Avenue shared use path and Route 130.
- Project 30b: *Various local roads and off-road paths*
  - Priority II Project
  - Proposed 2.0 miles of shared use paths.
- Project 31a: *Old Kea'au-Pāhoa Road (Route 139)*
  - Priority II Project
  - Proposed 1.1 miles of signed shared lanes along Route 139.
    - Currently, marked and striped bike lanes exist in the westbound direction between Kea'au High School and east of the intersection with Old Volcano Road. Additionally, bike lanes exist in the eastbound direction between Route 11 and Kea'au Elementary School.
- Project 31b: *Old Kea'au-Pāhoa Road Remnant*
  - Priority II Project
  - Proposed a 0.5-mile signed shared road along the Old Kea'au-Pāhoa Road.
- Project 47: *Volcano Highway*
  - Priority II Project
  - Proposed 23.2-miles of signed shared roadway along Route 11 between Kea'au and Hawai'i Volcanoes National Park.

There are no known construction dates for any of these projects that have yet to be implemented. These projects were not included in the future analysis.

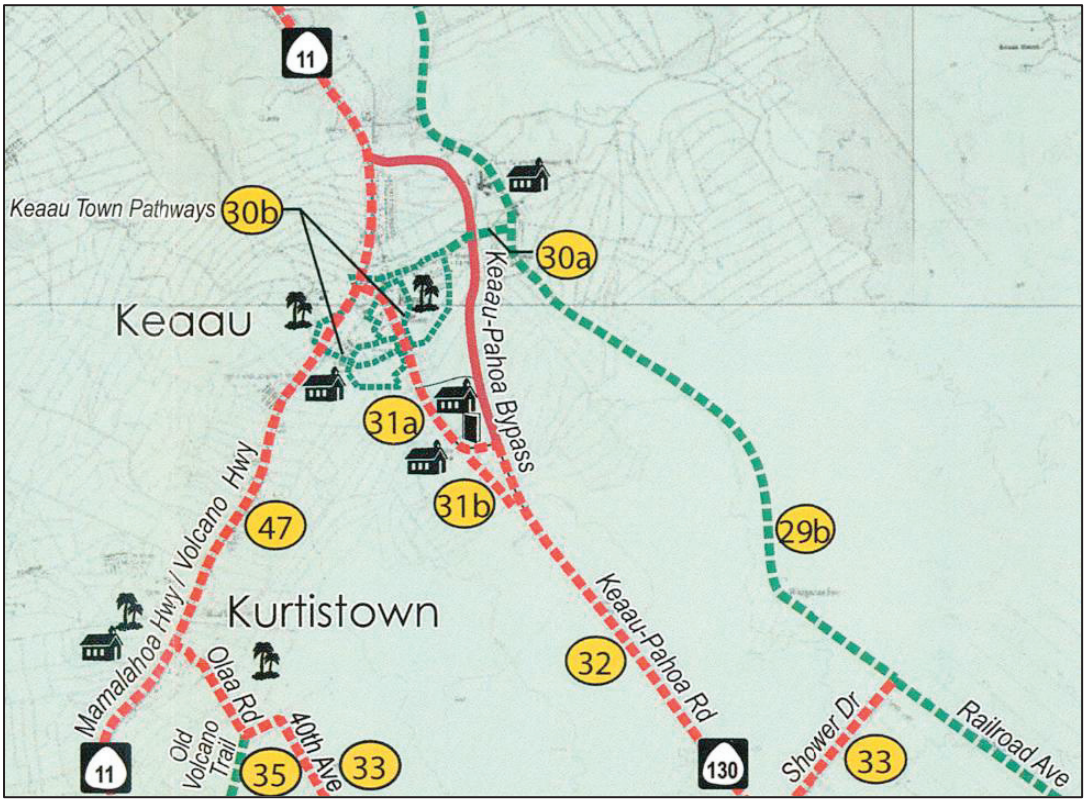


Figure 13: Bike Plan Hawai'i Proposed Improvements

D. 2022-2025 STIP

Research was completed on September 25, 2024, at the State of Hawai'i Office Environmental Review Program (ERP) website. The latest STIP for FY 2022-2025 was revised on August 27, 2024. No significant planned projects are listed in the study area.

E. Hawai'i Island 2025-2028 STIP

Solicitation of comments for the Fiscally Unconstrained 2025-2028 STIP ended in June 2024. Solicitation of comments for the Fiscally Constrained 2025-2028 STIP ended in August 2024. The latest DRAFT Fiscally Constrained 2025-2028 STIP was revised on July 2, 2024. No significant planned projects are listed in the study area. Ongoing Roadwork

1. Route 11 and Route 130

The HDOT Highways Program Status website lists the following three ongoing projects on Route 11 and Route 130:

- Project STP-0100(087)R
    - Asphalt pavement preservation, resurfacing, and reconstruction at various locations, raised crosswalks, Route 11 and Route 130, Hawai'i, WO2.
        - Scope: Pavement preservations, resurfacing, and reconstruction.
- Project HSIP-100(074)

  - Route 11 – Installation and replacement of signs at various locations, Island of Hawai'i (CON) WO1.
    - Scope: Installation and replacement of signs.
- Project HSIP-0100(088)
  - Installation of enhanced pavement marking and new milled rumble strip at various locations on Route 130 from MP 0.00 to MP 2.20, Striping, WO3.
    - Scope: Installation of pavement preservation strategies and surface treatments.

None of these projects are expected to impact or later the study intersections.

F. Future (2027) Without Project Traffic Volumes

Future (2027) Without Project traffic volumes (see Figure 14) were calculated by adding Future (2027) Background volumes and the Kea'au Mountain View Public Library 2027 project generated trips.

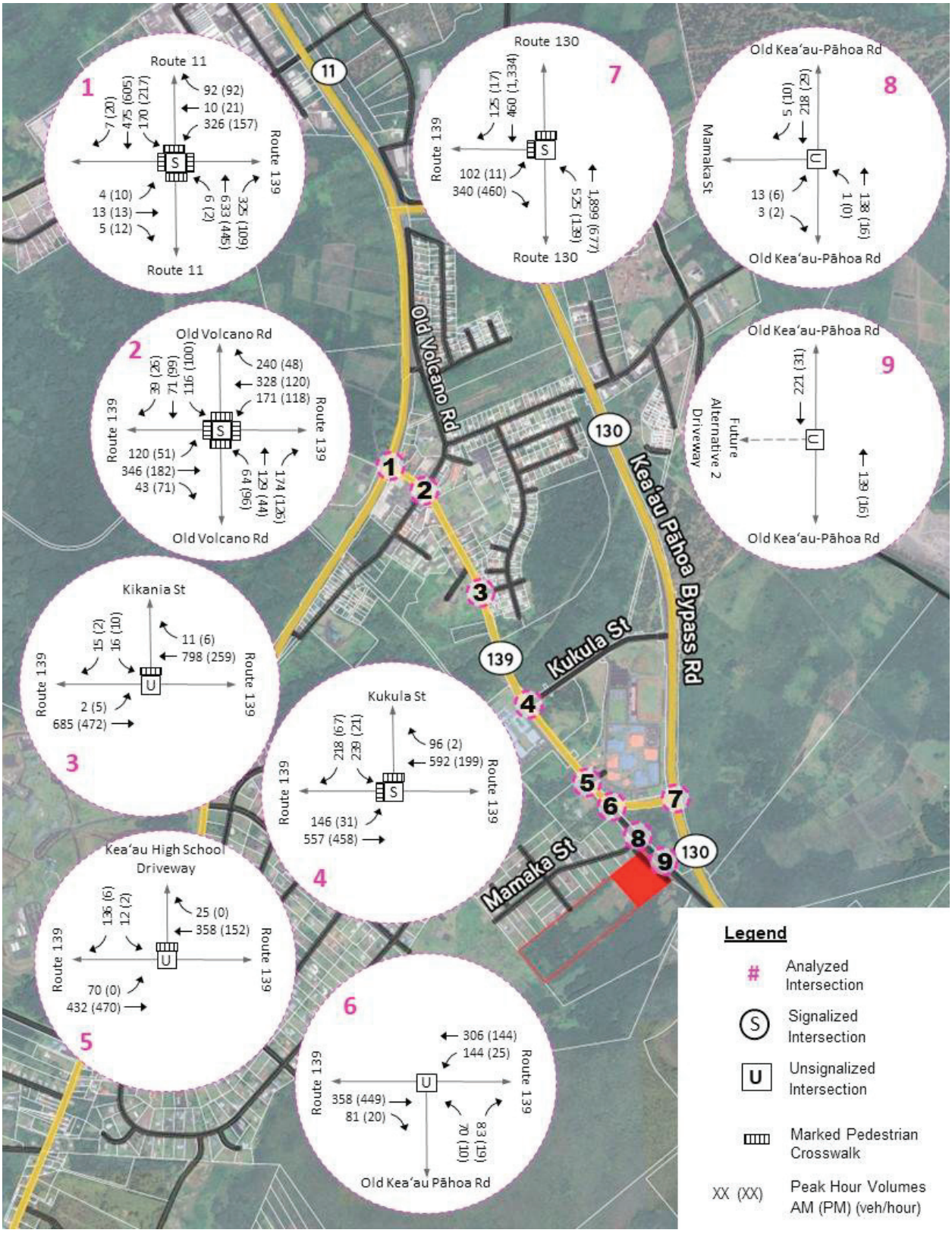


Figure 14: Future (2027) Without Project Intersection Peak Hour Volumes

G. Future Without Project LOS

1. Future (2027) Without Project Conditions

Future (2027) Without Project intersection and movement LOS and delay (seconds/vehicle) were determined for the AM and PM peak hours using *Synchro 11* traffic analysis software. Results are shown in Table 8 and Appendix D. Movements that operate at LOS E or worse are highlighted in yellow and discussed below.

(a) Route 139/Shipman Park Driveway at Route 11

At the intersection of Route 11 and Route 139/Shipman Park Driveway, the Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hour, respectively. The Route 11 northbound left turn volume during the AM and PM peak hours was six vehicles and two vehicles per hour, respectively. The delay is due to the cycle length. The overall intersection is projected to operate at LOS C during both the AM and PM peak hours.

At the intersection of Route 11 and Route 139/Shipman Park Driveway, the Route 11 southbound left turn is projected to operate at LOS E (v/c of 0.85) with a left turn volume of 170 vehicles per hour during the AM peak hour. The signal timing is actuated, and Route 11 southbound left turns are protected only. All other movements are projected to operate at LOS C or better during the AM peak hour. The overall intersection is projected to operate at LOS C during both the AM and PM peak hours. Mitigation for this intersection is not recommended.

(b) Route 139 at Kikania Street

At the intersection of Route 139 and Kikania Street, the Kikania Street southbound approach operates at LOS E (v/c of 0.30) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Kikania Street. The Kikania Street southbound left turn volume during the AM peak hour is 16 vehicles, which will not satisfy traffic signal warrant thresholds. Therefore, a signal is not recommended. Other mitigation such as control type and lane configuration changes will not greatly improve southbound delay. Mitigation for this intersection is not recommended.

(c) Route 139 at Kukula Street

At the intersection of Route 139 and Kukula Street, the Kukula Street southbound left turn operates at LOS E (v/c of 0.89) during the AM peak hour. The delay is due to the cycle length and 239 vehicles projected to make the southbound left turn during the AM peak hour. The signal timing is actuated, and the signal is expected to provide sufficient green time to allow for all southbound left turning vehicles to clear the intersection every cycle. Mitigation for this intersection is not recommended.

Table 8: Future (2027) Without Project LOS

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**29.3**	**-**	**C**	**23.9**	**-**
Route 11 NB Left	E	62.6	0.44	F	84.8	0.41
Route 11 NB Through-Right	C	32.5	0.79	C	29.0	0.71
Route 11 SB Left	E	55.3	0.85	D	35.6	0.83
Route 11 SB Through-Right	C	20.1	0.40	B	19.3	0.54
Shipman Park EB Left-Through-Right	B	15.0	0.03	B	15.5	0.05
Route 139 WB Left-Through	C	24.0	0.58	B	14.9	0.29
Route 139 & Old Volcano Road	**B**	**14.6**	**-**	**B**	**14.6**	**-**
Old Volcano NB Left	B	16.6	0.16	C	25.5	0.33
Old Volcano NB Through-Right	B	18.9	0.62	C	22.8	0.48
Old Volcano SB left	C	25.5	0.47	C	28.3	0.41
Old Volcano SB Through-Right	B	14.6	0.22	C	21.4	0.32
Route 139 EB Left	B	16.0	0.33	A	6.4	0.07
Route 139 EB Through-Right	B	11.5	0.48	A	6.6	0.26
Route 139 WB Left	B	19.2	0.43	A	8.7	0.19
Route 139 WB Through	B	10.5	0.40	A	5.7	0.12
Route 139 WB Right	B	10.1	0.34	A	5.4	0.05
Route 139 & Kikania Street	**-**	**0.9**	**-**	**-**	**0.3**	**-**
Route 139 EB Left-Through	B	10.2	0.01	A	7.9	0.01
Kikania SB Left-Right	E	45.6	0.30	C	15.3	0.04
Route 139 & Kukula Street	**B**	**18.1**	**-**	**A**	**4.0**	**-**
Route 139 EB Left	B	10.0	0.38	A	2.7	0.04
Route 139 EB Through	A	7.4	0.49	A	2.7	0.36
Route 139 WB Through-Right	B	14.3	0.61	A	4.6	0.20
Kukula SB Left	E	57.3	0.89	C	26.7	0.46
Route 139 & Kea'au HS Driveway	**-**	**2.4**	**-**	**-**	**0.1**	**-**
Route 139 EB Left-Through	A	8.4	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.5	0.25	A	9.1	0.01
Route 139 & Old Kea'au-Pāhoa Road	**-**	**5.5**	**-**	**-**	**0.8**	**-**
Route 139 WB Left-Through	A	9.2	0.17	A	8.4	0.02
Old Kea'au-Pāhoa NB Left	E	48.6	0.52	B	14.1	0.03
Old Kea'au-Pāhoa NB Right	B	12.4	0.17	B	11.3	0.03
Route 130 & Route 139	**C**	**21.1**	**-**	**C**	**26.1**	**-**
Route 130 NB Left	D	52.2	0.93	E	66.3	0.83
Route 130 NB Through	B	10.0	0.73	A	8.1	0.30
Route 130 SB Through	C	26.7	0.35	C	23.3	0.74
Route 139 EB Left	D	44.7	0.36	C	31.5	0.03
Route 139 EB Right	C	20.2	0.45	D	48.6	0.87
Old Kea'au-Pāhoa Road & Mamaka Street	**-**	**0.5**	**-**	**-**	**1.1**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	7.9	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	12.0	0.04	A	8.9	0.01

(d) Route 139 and Old Kea'au-Pāhoa Road

At the intersection of Route 139 and Old Kea'au-Pāhoa Road, the Old Kea'au-Pāhoa Road northbound approach operates at LOS E (v/c of 0.52) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Old Kea'au-Pāhoa Road. The v/c ratio suggests there is sufficient capacity for this movement. The Old Kea'au-Pāhoa Road northbound left turn volume during the AM peak hour is 70 vehicles, which will not satisfy 8-Hour or 4-Hour traffic signal warrant thresholds. Therefore, a signal is not recommended. Mitigation for this intersection is not recommended.

(e) Route 130 and Route 139

At the intersection of Route 130 and Route 139, the Route 130 northbound left turn operates at LOS E (v/c of 0.83) during the PM peak hour. The traffic signal is fully actuated, with existing cycle lengths varying from 65 seconds to 110 seconds during the 15-minute PM peak. The northbound left turn volume is 139 vehicles during the PM peak hour, or approximately 2.5 vehicles per minute. The traffic signal is expected to provide sufficient green time to allow for all northbound left turning vehicles to clear the intersection every cycle. Mitigation for this movement is not recommended.

IV. Future With Project Conditions

Current plans are for the development of a 36,000 SF medical office building with an associated 201-stall off-street parking lot. There are two alternates being analyzed for accessing the proposed development: one to an unnamed frontage road connecting to Mamaka Street just west of Old Kea'au-Pāhoa Road (Alternative 1 Driveway Alignment), and another through the unnamed frontage road connecting to Old Kea'au-Pāhoa Road (Alternative 2 Driveway Alignment). Trip distribution and traffic analysis will be done for both alternatives. Clinic hours have not been determined at this time. Most of the clinics in the surrounding region, including Hilo, are in operation during the AM peak hour, so it is assumed the project will be open during the AM peak hour.

A. Future With Project Generated Volumes

1. Project Related Volumes

(a) Trip Generation

The trip generation methodology is typically based upon rates developed by the Institute of Transportation Engineers (ITE) and published in the *Trip Generation Manual, 11th Edition* (ITE, 2021). The ITE trip rates are developed by correlating the total vehicle trip generation data with various activity/land use characteristics. Trip generation rates and resulting project generated volumes are shown in Tables 9 and 10, respectively.

Table 9: ITE Trip Generation – Equation and Rates for Medical Clinics

Time Period	ITE Land Use - 630 Clinic		
	Equation	IN %	OUT %
AM Peak Hour of Adjacent Street (7 - 9 AM)	T=2.19(X)+8.68	81	19
PM Peak Hour of Adjacent Street (4 - 6 PM)	T=3.53(X)+2.98	30	70

Table 10: ITE Trip Generation – Project Related Trips

Phase	AM Peak Hour of Adjacent Street			PM Peak Hour of Adjacent Street		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Phase 1 (2027) - 36,000 SF GFA	71	17	88	39	91	130

(b) Trip Distribution/Assignment

Project related trips were distributed using existing volume traffic patterns.

(c) Modal Choice

All project-related external trips were assumed to be by private vehicle. This reflects the worst-case traffic condition with all trips occurring by private vehicle. Trip reduction was not considered for this analysis. The project generated volumes and distribution for Future (2027) Alternative 1 Driveway Alignment and Future (2027) Alternative 2 Driveway Alignment are shown in Figures 15 and 16, respectively.

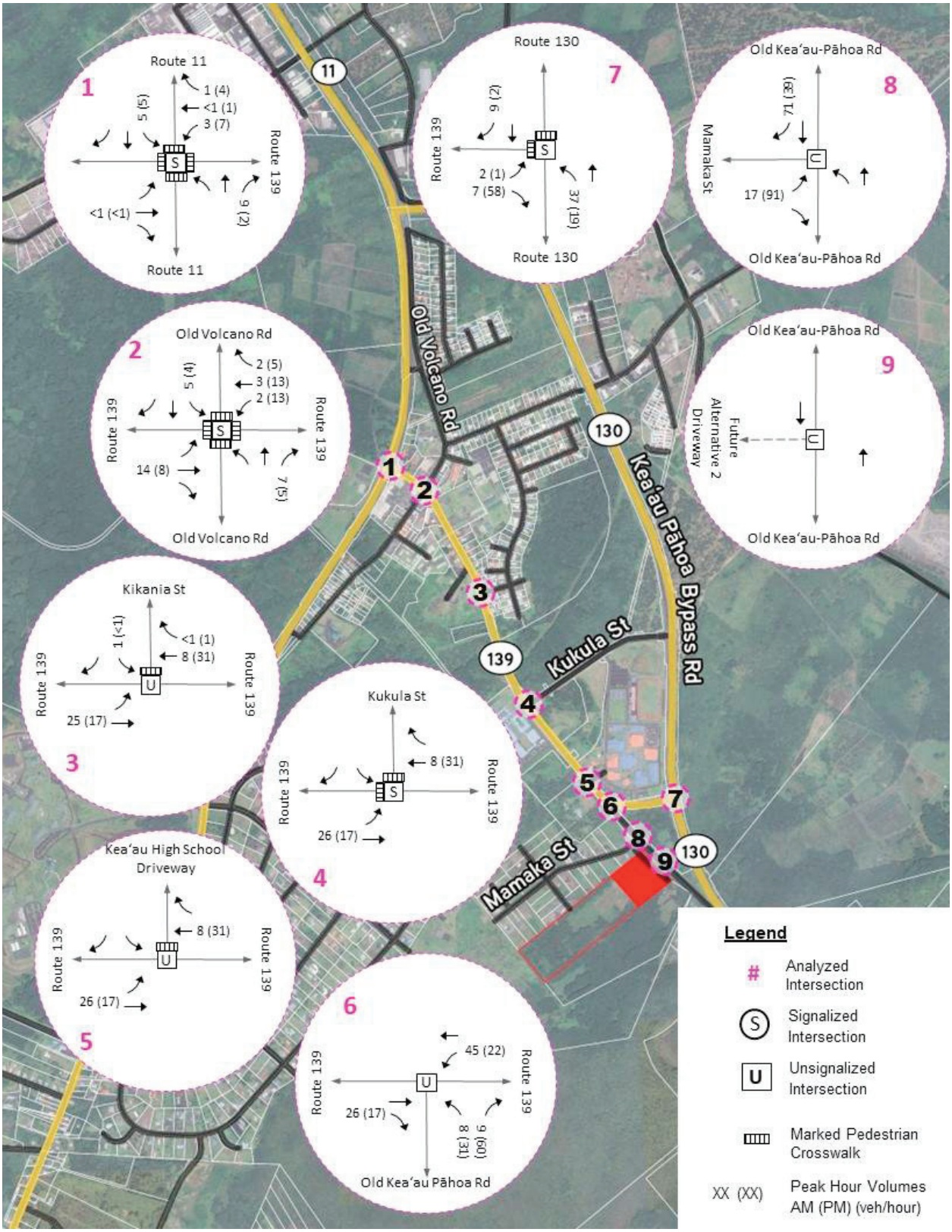


Figure 15: Alternative 1 Driveway Alignment – Project Generated Vehicle Trips and Vehicle Trip Distribution

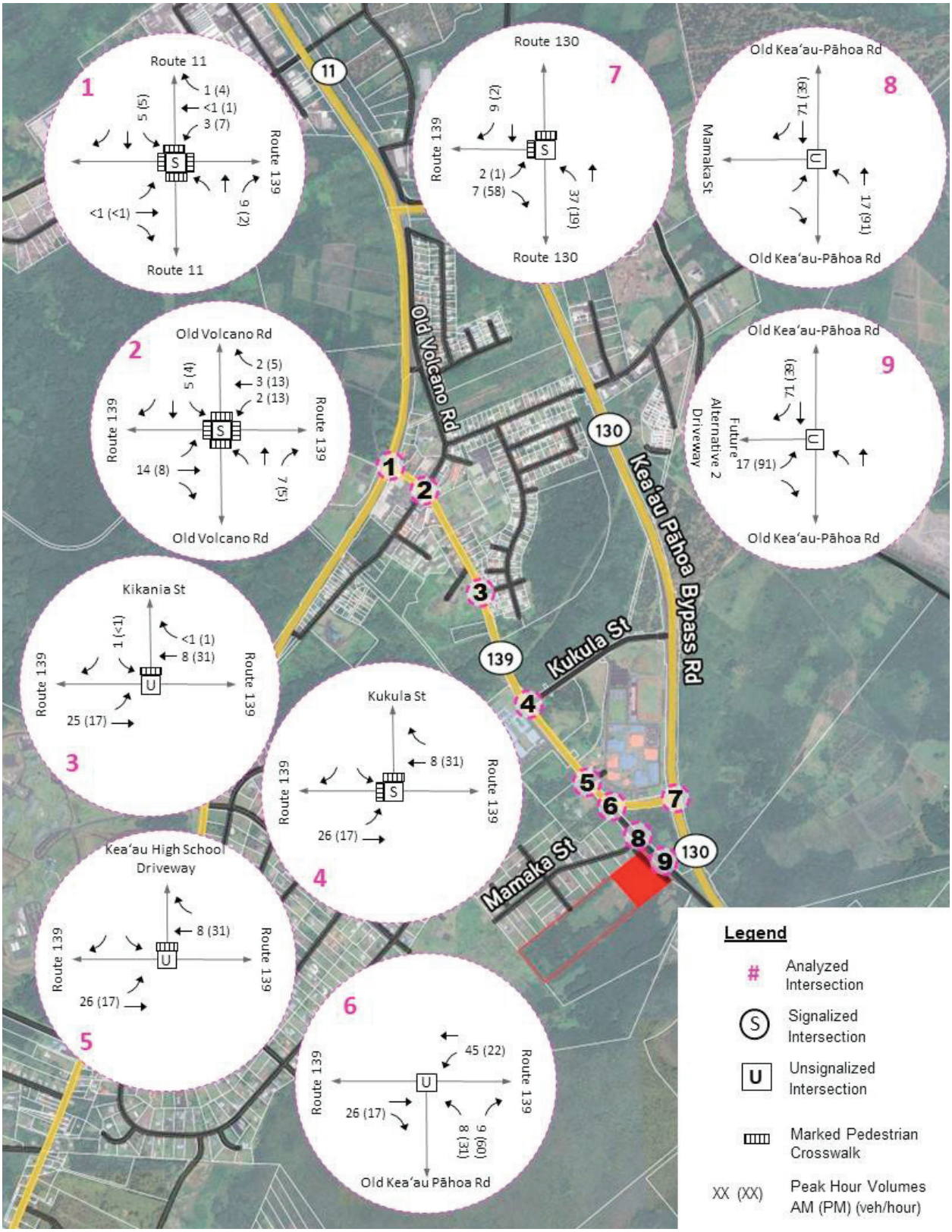


Figure 16: Alternative 2 Driveway Alignment – Project Generated Vehicle Trips and Vehicle Trip Distribution

B. Future With Project Volumes

The Future (2027) With Project Alternative 1 Driveway Alignment (see Figure 17) and Future (2027) With Project Alternative 2 Driveway Alignment volumes (see Figure 18) are a sum of the Future (2027) Without Project volumes (see Figure 14) and the project generated volumes for Alternative 1 Driveway Alignment and Alternative 2 Driveway Alignment (see Figures 15 and 16, respectively).

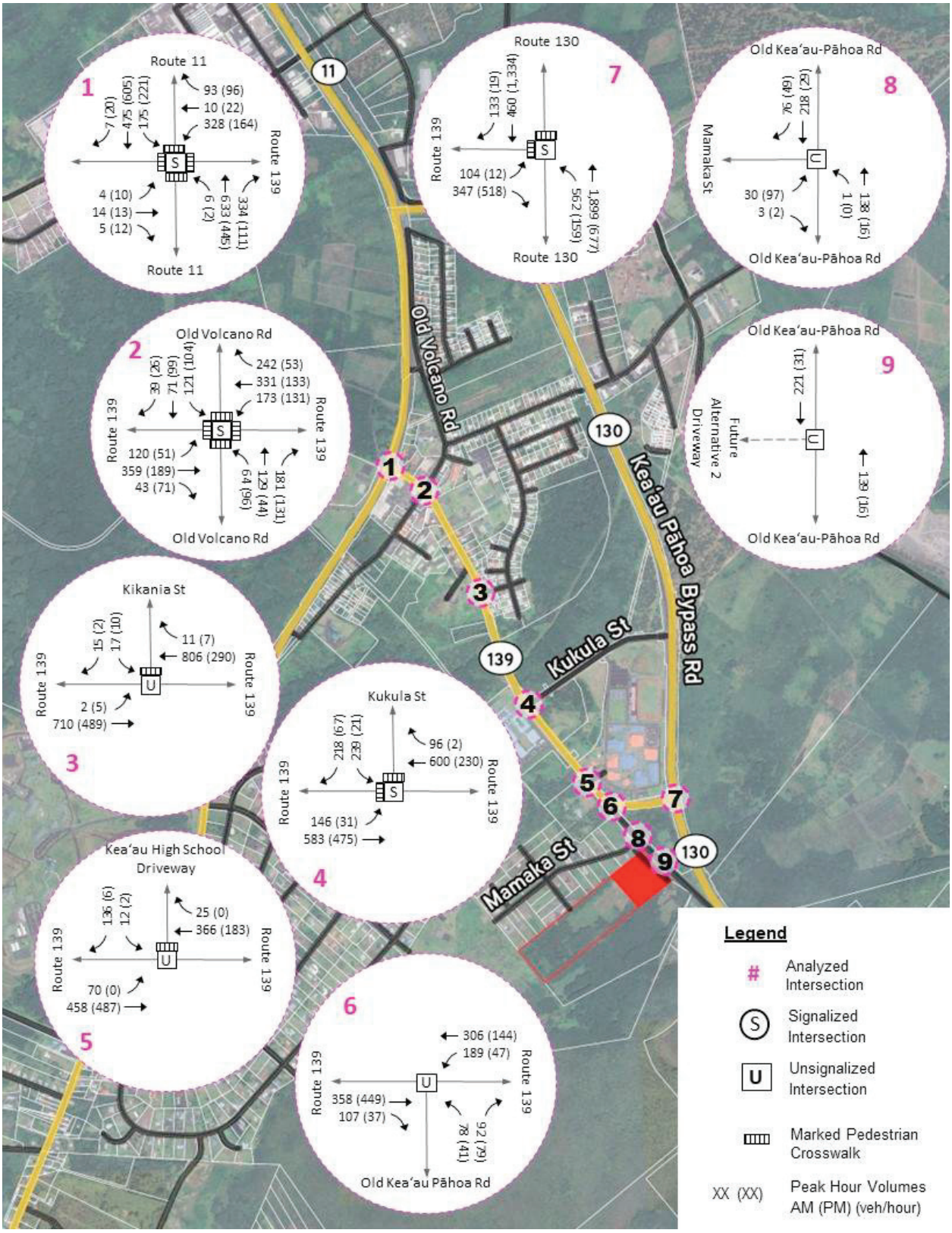


Figure 17: Alternative 1 Driveway Alignment – Future (2027) With Project Intersection Peak Hour Volumes

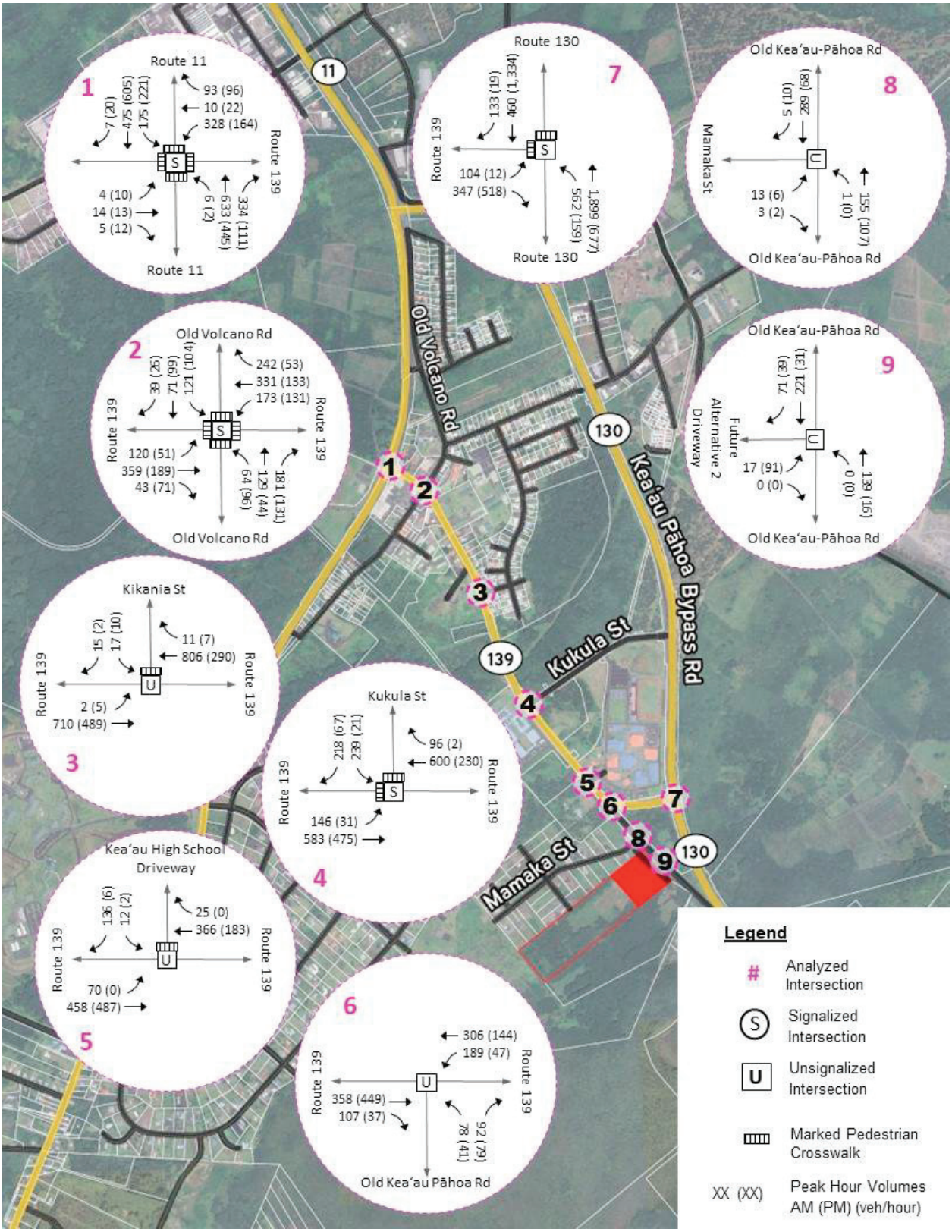


Figure 18: Alternative 2 Driveway Alignment – Future (2027) With Project Intersection Peak Hour Volumes

C. Future With Project LOS

1. Future (2027) With Project Conditions – Alternative 1 Driveway Alignment

Future (2027) With Project intersection and movement LOS and delay (seconds/vehicle) for Alternative 1 Driveway Alignment were determined for the AM and PM peak hours using *Synchro 11* traffic analysis software. Results are shown in Table 11 and Appendix E. Movements that operate at LOS E or worse are highlighted in yellow and discussed below.

(a) Route 139/Shipman Park Driveway at Route 11

At the intersection of Route 11 and Route 139/Shipman Park Driveway, the Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hour, respectively. The Route 11 northbound left turn volume during the AM and PM peak hours was six vehicles and two vehicles per hour, respectively. The delay is due to the cycle length. The overall intersection is projected to operate at LOS C during both the AM and PM peak hours. Mitigation for this intersection is not recommended.

At the intersection of Route 11 and Route 139/Shipman Park Driveway, the Route 11 southbound left turn is projected to operate at LOS E (v/c of 0.85) with a left turn volume of 173 vehicles per hour during the AM peak hour. The signal timing is actuated, and Route 11 southbound left turns are protected only. All other movements are projected to operate at LOS C or better during the AM peak hour. The overall intersection is projected to operate at LOS C during both the AM and PM peak hours. Mitigation for this intersection is not recommended.

(b) Route 139 at Kikania Street

At the intersection of Route 139 and Kikania Street, the Kikania Street southbound approach operates at LOS F (v/c of 0.34) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Kikania Street. The Kikania Street southbound left turn volume during the AM peak hour is 16 vehicles per hour, which will not satisfy traffic signal warrant thresholds. Therefore, a signal is not recommended. Other mitigation such as control type and lane configuration changes will not greatly improve southbound delay. Mitigation for this intersection is not recommended.

(c) Route 139 at Kukula Street

At the intersection of Route 139 and Kukula Street, the Kukula Street southbound left turn operates at LOS E (v/c of 0.89) during the AM peak hour. The delay is due to the cycle length and 239 vehicles per hour projected to make the southbound left turn during the AM peak hour. The signal timing is actuated, and the signal is expected to provide sufficient green time to allow for all southbound left turning vehicles to clear the intersection every cycle. Mitigation for this intersection is not recommended.

Table 11: Future (2027) With Project LOS – Alternative 1 Driveway Alignment

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**29.7**	**-**	**C**	**24.0**	**-**
Route 11 NB Left	E	62.9	0.44	F	84.9	0.41
Route 11 NB Through-Right	C	32.7	0.79	C	29.2	0.71
Route 11 SB Left	E	56.5	0.85	D	35.7	0.83
Route 11 SB Through-Right	B	20.0	0.40	B	19.2	0.53
Shipman Park EB Left-Through-Right	B	15.2	0.03	B	12.6	0.05
Route 139 WB Left-Through	C	24.4	0.59	B	15.2	0.30
Route 139 & Old Volcano Road	**B**	**14.9**	**-**	**B**	**14.8**	**-**
Old Volcano NB Left	B	16.0	0.15	C	25.8	0.33
Old Volcano NB Through-Right	B	18.1	0.62	C	23.2	0.49
Old Volcano SB left	C	25.0	0.47	C	29.2	0.43
Old Volcano SB Through-Right	B	14.0	0.21	C	21.7	0.32
Route 139 EB Left	B	16.8	0.34	A	6.7	0.07
Route 139 EB Through-Right	B	12.3	0.51	A	6.9	0.27
Route 139 WB Left	C	21.0	0.47	A	9.3	0.21
Route 139 WB Through	B	11.0	0.41	A	5.9	0.13
Route 139 WB Right	B	10.6	0.35	A	5.6	0.06
Route 139 & Kikania Street	**-**	**1.0**	**-**	**-**	**0.3**	**-**
Route 139 EB Left-Through	B	10.3	0.01	A	8.0	0.01
Kikania SB Left-Right	F	50.1	0.34	C	16.1	0.04
Route 139 & Kukula Street	**B**	**18.1**	**-**	**A**	**4.1**	**-**
Route 139 EB Left	B	10.2	0.39	A	2.7	0.04
Route 139 EB Through	A	7.7	0.52	A	2.8	0.37
Route 139 WB Through-Right	B	14.5	0.62	A	4.8	0.23
Kukula SB Left	E	57.3	0.89	C	26.7	0.46
Route 139 & Kea'au HS Driveway	**-**	**2.3**	**-**	**-**	**0.1**	**-**
Route 139 EB Left-Through	A	8.5	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.6	0.25	A	9.3	0.01
Route 139 & Old Kea'au-Pāhoa Road	**-**	**9.1**	**-**	**-**	**2.5**	**-**
Route 139 WB Left-Through	A	9.6	0.23	A	8.6	0.05
Old Kea'au-Pāhoa NB Left	F	93.0	0.76	C	16.1	0.12
Old Kea'au-Pāhoa NB Right	B	12.8	0.19	B	12.2	0.14
Route 130 & Route 139	**C**	**21.4**	**-**	**C**	**29.8**	**-**
Route 130 NB Left	D	52.3	0.94	E	65.2	0.84
Route 130 NB Through	A	9.6	0.73	A	8.1	0.30
Route 130 SB Through	C	28.2	0.36	C	24.7	0.76
Route 139 EB Left	D	46.1	0.38	C	31.6	0.03
Route 139 EB Right	B	19.4	0.45	E	60.6	0.95
Old Kea'au-Pāhoa Road & Mamaka Street	**-**	**1.0**	**-**	**-**	**5.1**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	8.2	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	13.2	0.10	B	10.0	0.18

(d) Route 139 and Old Kea'au-Pāhoa Road

At the intersection of Route 139 and Old Kea'au-Pāhoa Road, the Old Kea'au-Pāhoa Road northbound approach operates at LOS F (v/c of 0.76) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Old Kea'au-Pāhoa Road. Mitigation will be analyzed.

(e) Route 130 and Route 139

At the intersection of Route 130 and Route 139, the Route 130 northbound left turn and eastbound right turn operates at LOS E (v/c of 0.84 and 0.95, respectively) during the PM peak hour. The traffic signal is fully actuated, with existing cycle lengths varying from 65 seconds to 110 seconds during the 15-minute PM peak. The Route 130 northbound left turn volume is 159 vehicles per hour during the PM peak hour, or approximately 2.5 vehicles per minute. The traffic signal is expected to provide sufficient green time to allow for all northbound left turning vehicles to clear the intersection every cycle. The eastbound right turn volume is 518 vehicles per hour. The delay is due to the combination of the high vehicle volume and the green time provided for this movement. Mitigation for this movement will be analyzed.

2. Future (2027) With Project Conditions – Alternative 2 Driveway Alignment

Future (2027) With Project intersection and movement LOS and delay (seconds/vehicle) for Alternative 2 Driveway Alignment were determined for the AM and PM peak hours using *Synchro 11* traffic analysis software. For Alternative 2 Driveway Alignment, the volumes at Old Kea'au-Pāhoa Road at Mamaka Street would be redistributed to Old Kea'au-Pāhoa Road at the Alternative 2 Driveway. The traffic volumes at all other study intersections will remain the same and therefore were not included in this section. Results are shown in Table 12 and Appendix E. All movements at both intersections operate at LOS B or better.

Table 12: Future (2027) With Project LOS – Alternative 2 Driveway Alignment

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Old Kea'au-Pāhoa Road & Mamaka Street	**-**	**0.5**	**-**	**-**	**0.4**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	8.2	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	13.3	0.05	A	9.9	0.02
Old Kea'au-Pāhoa Road & Alternative 2 Driveway	**-**	**0.4**	**-**	**-**	**4.8**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	0.0	0.00	A	0.0	0.00
Alternative 2 Driveway EB Left-Right	B	11.4	0.03	A	9.3	0.11

3. Future (2027) With Project Mitigation

(a) Route 139 and Old Kea'au-Pāhoa Road

At the intersection of Route 139 and Old Kea'au-Pāhoa Road, the Old Kea'au-Pāhoa Road northbound approach operates at LOS F with a v/c of 0.76 in the AM peak hour for both alternatives. The Old Kea'au-Pāhoa Road northbound left turn volume during the AM peak hour is projected to increase to 78 vehicles per hour, which will not satisfy 8-Hour or 4-Hour traffic signal warrant thresholds. Therefore, a signal is not recommended. A northbound left turn refuge lane from Old Kea'au-Pāhoa Road onto Route 139 was added and analyzed (see Table 13 and Appendix E). The eastbound approach is a free movement and will not experience delay.

Table 13: Future (2027) With Project Mitigation at Route 139 and Old Kea'au-Pāhoa Road

Existing Lane Configuration	AM Peak		
	LOS	Delay (sec/veh)	v/c
Route 139 & Old Kea'au-Pāhoa Road	**-**	**9.1**	**-**
Route 139 WB Left-Through	A	9.6	0.23
Old Kea'au-Pāhoa NB Left	F	93.0	0.76
Old Kea'au-Pāhoa NB Right	B	12.8	0.19
Northbound Left Turn Refuge Lane	**AM Peak**		
	LOS	**Delay (sec/veh)**	**v/c**
Route 139 & Old Kea'au-Pāhoa Road	**-**	**4.8**	**-**
Route 139 WB Left-Through	A	9.6	0.23
Old Kea'au-Pāhoa NB Left	D	30.2	0.40
Old Kea'au-Pāhoa NB Right	B	12.8	0.19

The northbound left turn delay improves from LOS F (v/c of 0.76) to LOS D (v/c of 0.40). As stated earlier, the northbound left turn volume is only significant during the AM peak hour due to the vehicles leaving after dropping off students at the Ke Kula'o Nāwahiokalani'ōpu'u Charter School. The proposed clinic generated trips is projected to increase the northbound left turn volume by 8 vehicles per hour. A northbound left turn refuge lane will require restriping the intersection.

(b) Route 130 and Route 139

At the intersection of Route 130 and Route 139, the Route 130 northbound left turn and eastbound right turn operates at LOS E during the PM peak hour for both alternatives. Data collected during the busiest 15-minute interval during the PM peak hour recorded cycle length of 65 seconds to 110 seconds, which suggests this intersection is actuated. The northbound through and southbound through movements operate at LOS A and LOS C, respectively. Signal timing adjustments were analyzed determine if the eastbound right turn movement could

operate at LOS D or better, while still maintaining acceptable LOS for the Route 130 northbound and southbound through movements (see Table 14 and Appendix E).

Table 14: Future (2027) With Project Mitigation at Route 130 and Route 139

110-Second Cycle Length, Optimized Phasing	PM Peak		
	LOS	Delay (sec/veh)	v/c
Route 130 & Route 139	**C**	**29.8**	**-**
Route 130 NB Left	E	65.2	0.84
Route 130 NB Through	A	8.1	0.30
Route 130 SB Through	C	24.7	0.76
Route 139 EB Left	C	31.6	0.03
Route 139 EB Right	E	60.6	0.95
110-Second Cycle Length, Green Time Distributed to Eastbound Approach	**PM Peak**		
	LOS	**Delay (sec/veh)**	**v/c**
Route 130 & Route 139	**C**	**28.6**	**-**
Route 130 NB Left	E	57.5	0.84
Route 130 NB Through	A	9.4	0.31
Route 130 SB Through	C	28.3	0.80
Route 139 EB Left	C	29.3	0.02
Route 139 EB Right	D	45.7	0.88

The eastbound right turn improves from LOS E (LOS of 0.95) to LOS D (v/c of 0.88), while the northbound and southbound through experience slightly more delay, but still operate at an acceptable LOS. The northbound left turn will continue to operate at LOS E with a traffic volume of about 159 vehicles per hour, or about 2.5 vehicles per minute. This movement is expected to clear the intersection every cycle.

V. Summary and Recommendations

Hilo Medical Center is proposing to develop a new medical office in Kea'au, on the Island of Hawai'i. The project is located on TMK (3) 1-6-003:081 on the northeast side of an existing 26.762-acre site. Current plans are for the development of a 36,000 SF medical office building, along with a 201-stall off-street parking lot. There are two proposed accesses for the project. Alternative 1 Driveway Alignment will have proposed access via a driveway off an unnamed frontage road just off of the intersection of Old Kea'au-Pāhoa Road and Mamaka Street. Alternative 2 Driveway Alignment, the preferred alternative, will pass through the unnamed frontage road and with a connection directly to Old Kea'au-Pāhoa Road. Construction is anticipated to be completed by 2027.

Future (2027) Without Project analysis added a 2.12% annual background growth for major movements, along with projected trips associated with the Kea'au Mountain View Public Library relocation. All signalized intersections are projected to operate at an acceptable LOS. Movements that are projected to operate at LOS E or worse are not significant. There are no recommended improvements for Future (2027) Without Project conditions.

This project is projected to generate up to 88 total trips during the AM peak hour and 130 total trips during the PM peak hour. Project generated trips are based on trip generation rates from the *Trip Generation Manual, 11th Edition* for a clinic. Trips were distributed based on existing traffic distributions.

At the intersection of Route 139 and Old Kea'au-Pāhoa Road, it is projected that the northbound Old Kea'au-Pāhoa Road left-turn at Route 139 will operate at LOS F with a v/c of 0.76 during the AM peak hour in Future (2027) With Project for both alternatives. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Old Kea'au-Pāhoa Road. A refuge lane for the northbound left turn movement will allow vehicles to make the northbound left turn into the refuge lane without conflicting with the westbound through movement. The resulting northbound left turn will improve from LOS F to LOS D (v/c of 0.76 to 0.40). It is recommended that future conditions be monitored, and a northbound left turn refuge lane be added if necessary.

Future (2027) With Project conditions project that the eastbound Route 139 right turn at the signalized intersection with Route 130 will operate at LOS E and be approaching a v/c ratio of 0.95 during the PM peak hour. The signal timing at this intersection was adjusted to allocate green time from the northbound and southbound through movements to the eastbound approach. The eastbound right turn movement is projected to operate at LOS D (v/c of 0.88) in Future (2027) With Project with the signal timing adjustment. It is recommended that future conditions be monitored, and for the signal timing to be adjusted as needed.

VI. References

ATA, Inc. *Kea'au-Mountain View Public Library TIAR*, July 2023.

County of Hawai'i. *Hawaii Island Hele-On Bus*, <http://heleonbus.org>.

FHWA. *Manual on Uniform Traffic Control Devices*, 2023 Edition.

Office of Environmental Review Program (ERP). EA and EIS Online Library, Accessed 2023, <https://planning.hawaii.gov/erp/>.

State of Hawai'i, Department of Transportation. *Bike Plan Hawaii*, September 2003.

State of Hawai'i, Department of Transportation. *Federal-Aid Highways 2035 Transportation Plan for the District of Hawaii*, July 2014.

State of Hawai'i, Department of Transportation. FY 2022-2025 Statewide Transportation Improvements Program (STIP), <http://hawaii.gov/dot/highways/STIP>

State of Hawai'i, Department of Transportation. Historical Traffic Station Maps 2013-2021.

State of Hawai'i, Department of Transportation. *Statewide Pedestrian Master Plan*, May 2013.

Transportation Research Board, National Research Council. *Highway Capacity Manual*, Washington, D.C., 2016 Edition.

Wilson Okamoto Corporation. *Kea'au Villages Master Plan Phase 1 & 2 TIR*, July 2017.

Appendix A
Bus Routes and Maps

Route 10: Hilo / Ocean View

Effective April 4, 2022

Southbound to Oceanview Park and Ride Lot

	Hilo							Kea'au	Kurtistown	Fern Acres	Mountain View	Glenwood	Volcano Village	Hawai'i Volcanoes National Park	Pahala	Punalulu	Naalehu	Waiohinu	Ocean View
	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R	S	T
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawai'i-Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ Hawaii Community College	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Old Volcano Road @ Kea'au Pahoa Rd (US Post Office)	Highway 11 @ Kurtistown Park (across bus shelter)	Highway 11 @ farside of N. Kulani Road	Highway 11 @ farside of Lauko Rd (Frankie's Pizza/Gas Station)	Highway 11 @ nearside of N. Glenwood Rd (Hirano Store)	Old Volcano Road @ across Volcano General Store	Crater Rim Drive @ Visitor Center	Kamani St @ Pahala Shopping Center	Punaluu Road @ Punaluu Beach Park	Hwy 11 @ nearside of Ohai Road (across Naalehu Elementary)	Hwy 11 @ farside of Kamaoa Road (across Wong Yuen Store)	Ocean View Park & Ride @ Prince Kuhio Blvd
Bus Stop ID#	100	101	103	105	106	107	110	901	903	TBA	911	912	918	809	808	807	812	814	802
	3:30 PM	3:34 PM	3:36 PM	3:39 PM	3:40 PM	3:41 PM	3:46 PM	3:56 PM	4:01 PM	4:06 PM	4:11 PM	4:21 PM	4:28 PM	4:39 PM	5:14 PM	5:24 PM	5:39 PM	5:44 PM	6:04 PM

Route 10: Hilo / Ocean View

Effective April 4, 2022

Northbound to Hilo

	Ocean View	Waiohinu	Naalehu	Punalulu	Pahala	Hawai'i Volcanoes National Park	Volcano Village	Glenwood	Mountain View	Fern Acres	Kurtistown	Kea'au	Hilo						
	T	S	R	Q	P	O	M	L	K	J	I	H	G	F	E	D	C	B	A
	Ocean View Park & Ride @ Prince Kuhio Blvd	Hwy 11 @ Kamaoa Road (in front Wong Yuen Store)	Hwy 11 @ Ohai Road (Naalehu Elementary School)	Punaluu Road @ Punaluu Beach Park	Kamani St @ Pahala Shopping Center	Crater Rim Drive @ Visitor Center	Old Volcano Road @ across Volcano General Store	Highway 11 @ Glenwood Park (across Hirono Store)	Highway 11 @ St. Theresa's Church	Highway 11 @ S Kulani Road	Highway 11 @ Across from Kurtistown Park	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Kawili Street @ across Hawaii Community College	W. Kawili St @ across from Waiakea High School	Kapiolani St @ Lanikaula St - Across from University of Hawai'i-Hilo	Kilauea Avenue @ Kohala Street (Hilo Shopping Center)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Mo'oheau Bus Terminal (329 Kamemehameha Ave)
Bus Stop ID#	802	803	805	807	808	809	918	919	920	TBA	921	924	110	175	TBA	TBA	180	101	100
	6:40 AM	7:00 AM	7:05 AM	7:07 AM	7:30 AM	8:10 AM	8:12 AM	8:16 AM	8:25 AM	8:27 AM	8:30 AM	8:35 AM	8:45 AM	8:50 AM	8:55 AM	8:56 AM	9:00 AM	9:03 AM	9:08 AM

No Cash. No Cards. No Contact.

Use Token Transit to buy bus passes and board with your phone.

Get the **Token Transit** app, click here for a download link

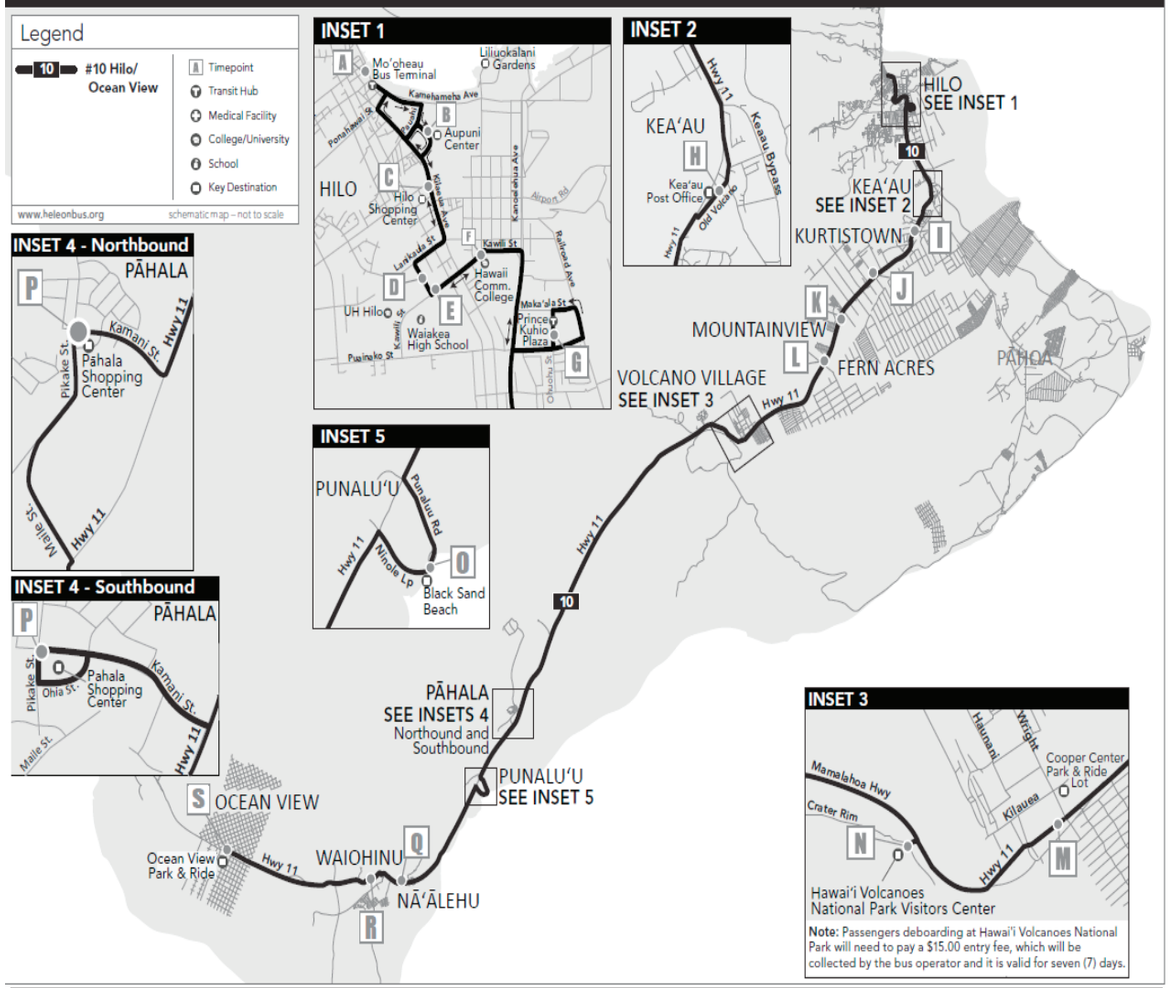
Hele-On Token Transit

Download on the App Store GET IT ON Google Play

Please recycle. Share this bus schedule with someone else if you do not need it.

Admission to Hawai'i Volcanoes National Park is $15.00 for a seven day pass and is payable to the bus operator.

Hele-On Bus Route - #10 Hilo to Ocean View



To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

AM times are shown in lightface type. **PM times are in boldface type.**

No Sunday or holiday service.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a bus shelter, a Kona Trolley Stop sign, a Hele-On Bus Stop or a red/white or blue Bus Stop sign.

- - - means timepoint is not served.

Route 11: Red Line - Hilo / Volcano

Effective April 3, 2022

Southbound to Hawai'i Volcanoes National Park

	Hilo							Kea'au	Kurtistown	Fern Acres	Mountain View	Glenwood	Volcano Village		Hawai'i Volcanoes National Park
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawai-Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ UH-Hawaii Community College	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Old Volcano Road @ Kea'au Pahoa Rd (US Post Office)	Highway 11 @ Kurtistown Park (across bus shelter)	Highway 11 @ farside of N. Kulani Road	Highway 11 @ farside of Lauko Rd (Frankie's Pizza/Gas Station)	Highway 11 @ nearside of N. Glenwood Rd (Hirano Store)	Old Volcano Road @ Volcano General Store	Cooper Center Park & Ride Lot	Crater Rim Drive @ Visitor Center
Bus Stop ID#	100	101	103	105	106	107	110	901	903	TBA	911	912	914	TBA	809
	5:00 AM	5:04 AM	5:06 AM	5:08 AM	5:11 AM	5:12 AM	5:17 AM	5:27 AM	5:32 AM	5:37 AM	5:42 AM	5:52 AM	5:59 AM	---	6:10 AM
	7:40 AM	7:44 AM	7:46 AM	7:48 AM	7:51 AM	7:52 AM	7:57 AM	8:07 AM	8:12 AM	8:17 AM	8:22 AM	8:32 AM	8:39 AM	---	8:50 AM
	10:40 AM	10:44 AM	10:46 AM	10:48 AM	10:51 AM	10:52 AM	10:57 AM	11:07 AM	11:12 AM	11:17 AM	11:22 AM	11:32 AM	11:39 AM	---	11:50 AM
	1:40 PM	**1:44 PM**	**1:46 PM**	**1:48 PM**	**1:51 PM**	**1:52 PM**	**1:57 PM**	**2:07 PM**	**2:12 PM**	**2:17 PM**	**2:22 PM**	**2:32 PM**	**2:39 PM**	---	2:50 PM
	4:40 PM	**4:44 PM**	**4:46 PM**	**4:48 PM**	**4:51 PM**	**4:52 PM**	**4:57 PM**	**5:07 PM**	**5:12 PM**	**5:17 PM**	**5:22 PM**	**5:32 PM**	---	**5:40 PM**	**5:50 PM**

Monday through Friday only

Everyday service

--- = bus does not serve timepoint.

Route 11: Red Line - Hilo / Volcano

Effective April 3, 2022

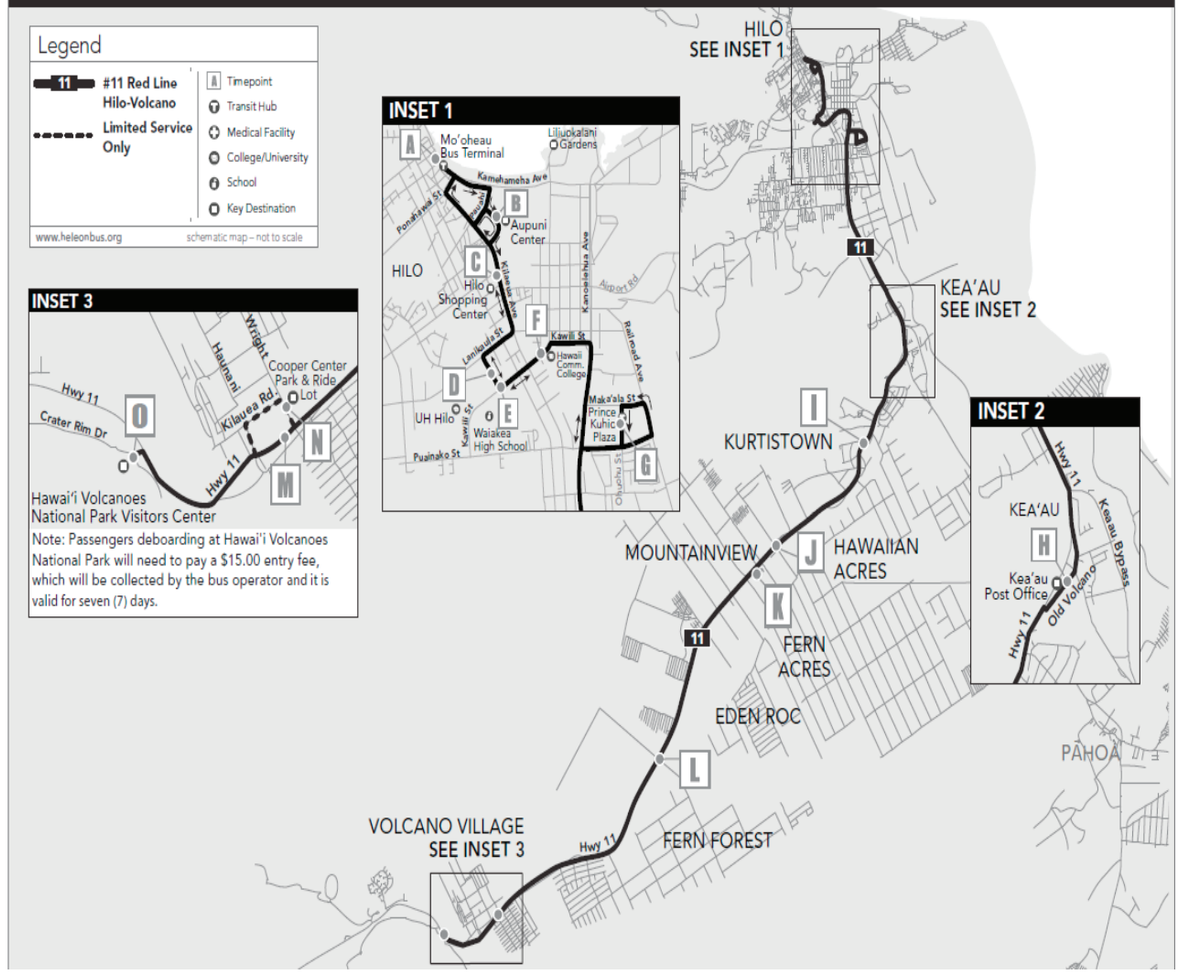
Northbound to Hilo

	Hawai'i Volcanoes National Park	Volcano Village		Glenwood	Mountain View	Fern Acres	Kurtistown	Kea'au	Hilo						
	O	M	N	L	K	J	I	H	G	F	E	D	C	B	A
	Crater Rim Drive @ Visitor Center	Old Volcano Road @ across Volcano General Store	Cooper Center Park & Ride Lot	Highway 11 @ Glenwood Park (across Hirono Store)	Highway 11 @ St. Theresa's Church	Highway 11 @ S Kulani Road	Highway 11 @ Across from Kurtistown Park	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Kawili Street @ across Hawaii Community College	W. Kawili St @ across from Waiakea High School	Kapiolani St @ Lanikaula St - Across from University of Hawai-Hilo	Kilauea Avenue @ Kohala Street (Hilo Shopping Center)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Mo'oheau Bus Terminal (329 Kamemehameha Ave)
Bus Stop ID#	809	918	TBA	919	920	TBA	921	924	110	175	TBA	TBA	180	101	100
	6:15 AM	6:20 AM	6:21 AM	6:27 AM	6:33 AM	6:38 AM	6:43 AM	6:49 AM	7:02 AM	7:07 AM	7:08 AM	7:11 AM	7:15 AM	7:18 AM	7:22 AM
	9:15 AM	9:20 AM	---	9:27 AM	9:33 AM	9:38 AM	9:43 AM	9:49 AM	10:02 AM	10:07 AM	10:08 AM	10:11 AM	10:15 AM	10:18 AM	10:22 AM
	12:15 PM	**12:20 PM**	---	**12:27 PM**	**12:33 PM**	**12:38 PM**	**12:43 PM**	**12:49 PM**	**1:02 PM**	**1:07 PM**	**1:08 PM**	**1:11 PM**	**1:15 PM**	**1:18 PM**	**1:22 PM**
	3:15 PM	**3:20 PM**	---	**3:27 PM**	**3:33 PM**	**3:38 PM**	**3:43 PM**	**3:49 PM**	**4:02 PM**	**4:07 PM**	**4:08 PM**	**4:11 PM**	**4:15 PM**	**4:18 PM**	**4:22 PM**
	6:15 PM	**6:20 PM**	---	**6:27 PM**	**6:33 PM**	**6:38 PM**	**6:43 PM**	**6:49 PM**	**7:02 PM**	**7:07 PM**	**7:08 PM**	**7:11 PM**	**7:15 PM**	**7:18 PM**	**7:22 PM**

Admission to Hawai'i Volcanoes National Park is $15.00 for a seven day pass and is payable to the bus operator.

Please recycle. Share this bus schedule with someone else if you do not need it.

Hele-On Bus Route - #11 Red Line Hilo to Volcano



To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

AM times are shown in lightface type. **PM times are in boldface type.**

No Cash. No Cards. No Contact.

Use Token Transit to buy bus passes and board with your phone.

Text "TOKEN" to 41411 for a download link

Download on the App Store · GET IT ON Google Play · Hele-On · Token Transit

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a bus shelter, a Kona Trolley Stop sign, a Hele-On Bus Stop or a red/white or blue Bus Stop sign.

Route 40: Hilo / Pahoa

Effective August 28, 2022

Southbound to Pahoa

	Hilo		Kea'au			Maku'u/ Ainaloa	Pahoa
	A	B	C	D	E	F	G
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Kea'au Pahoa Rd @ Kea'au Plaza (across Kea'au Middle school)	Kukula Street @ Kea'au Pahoa Rd (3rd lamp post)	Kukula Street @ Keaau High School (back entrance)	Highway 130 @ Ainaloa Boulevard (bus turnout)	Kea'au Pahoa Road @ Kahakai Blvd (Puna Kai Shopping Center)
Bus Stop ID#	100	110	925	TBA	TBA	TBA	968
	6:30 AM	6:42 AM	6:52 AM	6:53 AM	6:54 AM	7:07 AM	7:22 AM
	7:30 AM	7:42 AM	7:52 AM	7:53 AM	7:54 AM	8:07 AM	8:22 AM
	8:30 AM	8:42 AM	8:52 AM	8:53 AM	8:54 AM	9:07 AM	9:22 AM
	9:30 AM	9:42 AM	9:52 AM	9:53 AM	9:54 AM	10:07 AM	10:22 AM
	10:30 AM	10:42 AM	10:52 AM	10:53 AM	10:54 AM	11:07 AM	11:22 AM
	11:30 AM	11:42 AM	11:52 AM	11:53 AM	11:54 AM	**12:07 PM**	**12:22 PM**
	12:30 PM	**12:42 PM**	**12:52 PM**	**12:53 PM**	**12:54 PM**	**1:07 PM**	**1:22 PM**
	1:30 PM	**1:42 PM**	**1:52 PM**	**1:53 PM**	**1:54 PM**	**2:07 PM**	**2:22 PM**
	2:30 PM	**2:42 PM**	**2:52 PM**	**2:53 PM**	**2:54 PM**	**3:07 PM**	**3:22 PM**
	3:30 PM	**3:42 PM**	**3:52 PM**	**3:53 PM**	**3:54 PM**	**4:07 PM**	**4:22 PM**
	4:30 PM	**4:42 PM**	**4:52 PM**	**4:53 PM**	**4:54 PM**	**5:07 PM**	**5:22 PM**
	5:30 PM	**5:42 PM**	**5:52 PM**	**5:53 PM**	**5:54 PM**	**6:07 PM**	**6:22 PM**
	6:30 PM	**6:42 PM**	**6:52 PM**	**6:53 PM**	**6:54 PM**	**7:07 PM**	**7:22 PM**
	7:30 PM	**7:42 PM**	**7:52 PM**	**7:53 PM**	**7:54 PM**	**8:07 PM**	**8:22 PM**
	8:30 PM	**8:42 PM**	**8:52 PM**	**8:53 PM**	**8:54 PM**	**9:07 PM**	**9:22 PM**

Monday through Friday only — Everyday service

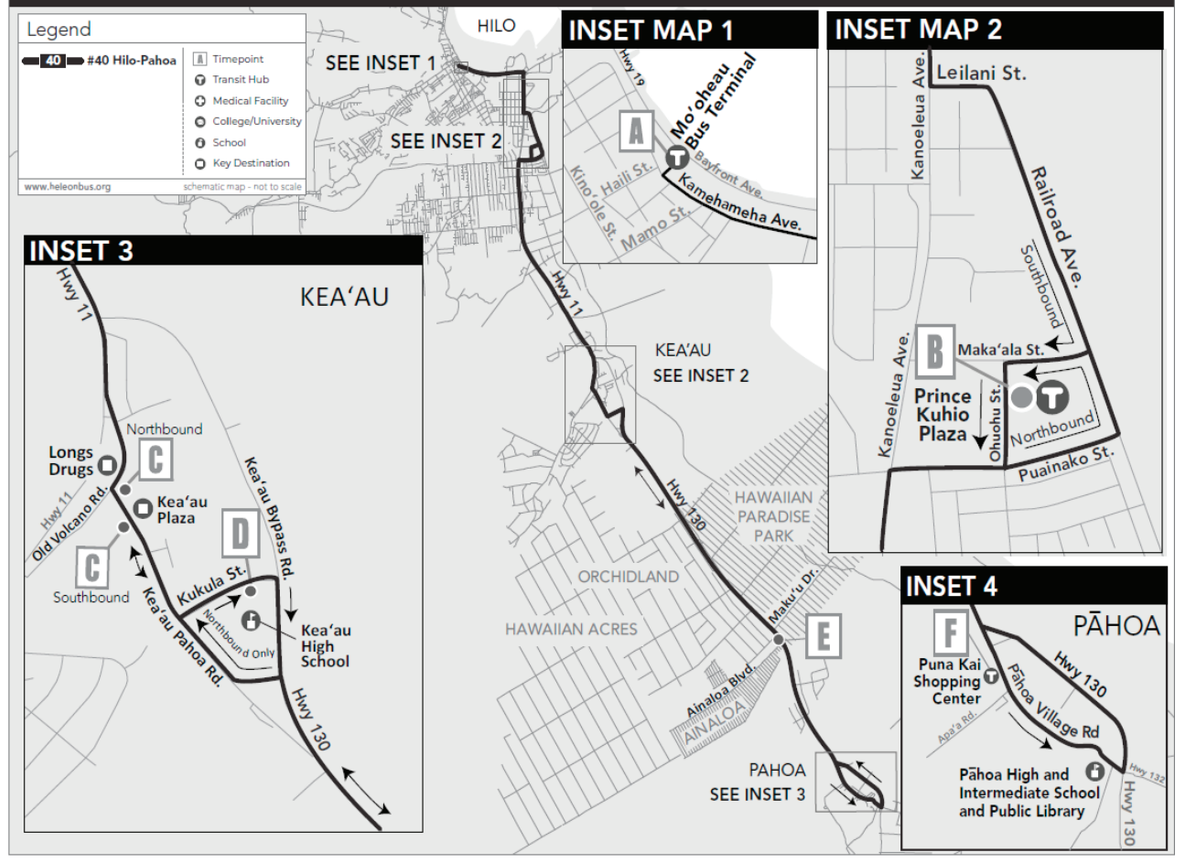
Route 40: Hilo / Pahoa

Effective August 28, 2022

Northbound to Hilo

	Pahoa	Maku'u/ Ainaloa	Kea'au	Hilo	
	G	F	C	B	A
	Kea'au Pahoa Road @ Kahakai Blvd (Puna Kai Shopping Center)	Highway 130 @ Ainaloa Boulevard (bus turnout)	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Mo'oheau Bus Terminal (329 Kamemehameha Ave)
Bus Stop ID#	968	TBA	924	110	100
	5:30 AM	5:35 AM	5:50 AM	6:05 AM	6:17 AM
	6:30 AM	6:35 AM	6:50 AM	7:05 AM	7:17 AM
	7:30 AM	7:35 AM	7:50 AM	8:05 AM	8:17 AM
	8:30 AM	8:35 AM	8:50 AM	9:05 AM	9:17 AM
	9:30 AM	9:35 AM	9:50 AM	10:05 AM	10:17 AM
	10:30 AM	10:35 AM	10:50 AM	11:05 AM	11:17 AM
	11:30 AM	11:35 AM	11:50 AM	**12:05 PM**	**12:17 PM**
	12:30 PM	**12:35 PM**	**12:50 PM**	**1:05 PM**	**1:17 PM**
	1:30 PM	**1:35 PM**	**1:50 PM**	**2:05 PM**	**2:17 PM**
	2:30 PM	**2:35 PM**	**2:50 PM**	**3:05 PM**	**3:17 PM**
	3:30 PM	**3:35 PM**	**3:50 PM**	**4:05 PM**	**4:17 PM**
	4:30 PM	**4:35 PM**	**4:50 PM**	**5:05 PM**	**5:17 PM**
	5:30 PM	**5:35 PM**	**5:50 PM**	**6:05 PM**	**6:17 PM**
	6:30 PM	**6:35 PM**	**6:50 PM**	**7:05 PM**	**7:17 PM**
	7:30 PM	**7:35 PM**	**7:50 PM**	**8:05 PM**	**8:17 PM**
	8:30 PM	**8:35 PM**	**8:50 PM**	**9:05 PM**	---
	9:30 PM	**9:35 PM**	**9:50 PM**	**10:05 PM**	---

Hele-On Bus Route - #40 Hilo to Pahoa via Kea'au



Please recycle. Share this bus schedule with someone else if you do not need it.

To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

AM times are shown in lightface type. **PM times are in boldface type.**

- - - Bus does not serve timepoint.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a bus shelter, a Kona Trolley Stop sign, a Hele-On Bus Stop or a red/white or blue Bus Stop sign.

Route 402: Hawaiian Paradise Park/ Orchidland/Hawaiian Acres/Ainaloa

Effective April 4, 2022

Northbound to Kea'au

	Pahoa		Hawaiian Paradise Park			Orchidland Estates	Kea'au
	A	B	C	D	E	F	G
	Kea'au Pahoa Road @ Kahakai Blvd (Puna Kai Shopping Center)	Pahoa Village Road @ Pahoa Elementary School	Makuu Dr @ 1st Avenue	Paradise Dr @ 31st Ave	Showers Dr @ Hwy 130	Pohaku Drive @ 40th Ave	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)
Bus Stop ID#	968	970	TBA	931	927	TBA	TBA
	---	---	---	---	---	---	---
	5:30 AM	5:35 AM	5:50 AM	6:00 AM	6:10 AM	6:15 AM	6:30 AM
	7:30 AM	7:35 AM	7:50 AM	8:00 AM	8:10 AM	8:15 AM	8:30 AM
	9:30 AM	9:35 AM	9:50 AM	10:00 AM	10:10 AM	10:15 AM	10:30 AM
	11:30 AM	11:35 AM	11:50 AM	**12:00 PM**	**12:10 PM**	**12:15 PM**	**12:30 PM**
	1:30 PM	**1:35 PM**	**1:50 PM**	**2:00 PM**	**2:10 PM**	**2:15 PM**	**2:30 PM**
	3:30 PM	**3:35 PM**	**3:50 PM**	**4:00 PM**	**4:10 PM**	**4:15 PM**	**4:30 PM**
	5:30 PM	**5:35 PM**	**5:50 PM**	**6:00 PM**	**6:10 PM**	**6:15 PM**	**6:30 PM**
	7:30 PM	**7:35 PM**	**7:50 PM**	**8:00 PM**	**8:10 PM**	**8:15 PM**	**8:30 PM**

This route operates Monday-Saturday only. There is no Sunday or holiday service.

--- = bus does not serve timepoint.

Monday-Friday only

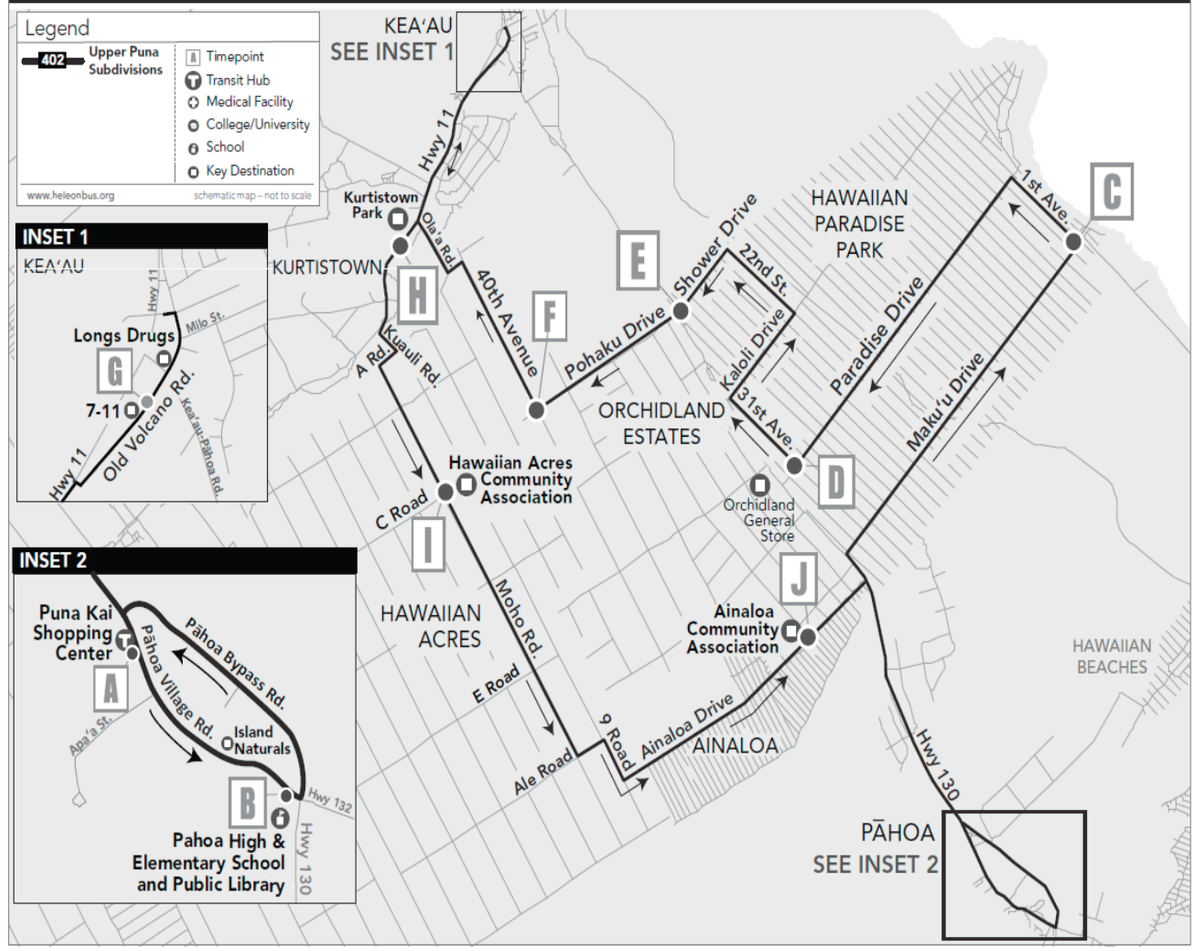
Route 402: Hawaiian Paradise Park/ Orchidland/Hawaiian Acres/Ainaloa

Effective April 4, 2022

Southbound to Pahoa

	Kea'au	Kurtistown	Hawaiian Acres	Ainaloa	Pahoa
	G	H	I	J	A
	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Highway 11 @ Across from Kurtistown Park	Moho Rd @ C Rd - Hawaiian Acres Community Center	Ainaloa Blvd @ Ainaloa Community Center	Kea'au Pahoa Road @ Kahakai Blvd (Puna Kai Shopping Center)
Bus Stop ID#	TBA	921	TBA	941	968
	4:35 AM	4:40 AM	4:50 AM	5:05 AM	5:20 AM
	6:35 AM	6:40 AM	6:50 AM	7:05 AM	7:20 AM
	8:35 AM	8:40 AM	8:50 AM	9:05 AM	9:20 AM
	10:35 AM	10:40 AM	10:50 AM	11:05 AM	11:20 AM
	12:35 PM	**12:40 PM**	**12:50 PM**	**1:05 PM**	**1:20 PM**
	2:35 PM	**2:40 PM**	**2:50 PM**	**3:05 PM**	**3:20 PM**
	4:35 PM	**4:40 PM**	**4:50 PM**	**5:05 PM**	**5:20 PM**
	6:35 PM	**6:40 PM**	**6:50 PM**	**7:05 PM**	**7:20 PM**
	---	---	---	---	---

Hele-On Bus Route - #402 Upper Puna Subdivisions



To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

AM times are shown in lightface type. **PM times are in boldface type.**

No Sunday or holiday service.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a bus shelter, a Kona Trolley Stop sign, a Hele-On Bus Stop or a red/white or blue Bus Stop sign.

- - - means timepoint is not served.

Route 403: Fern Acres

Effective September 5, 2021 (Rev)

Southbound to Fern Forest

	Kea'au	Hilo	Kurtistown	Fern Acres	Eden Roc	Fern Forest
	A	B	C	D	E	F
	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Panaewa Rainforest Zoo @ Stainback Hwy	Highway 11 @ Kurtistown Park (across bus shelter)	Highway 11 @ Kulani Road	Highway 11 @ Kopua Road	Glenwood Dr @ Kaleponi Rd
Bus Stop ID#	TBA	TBA	903	909	TBA	TBA
	9:00 AM	9:10 AM	9:20 AM	9:29 AM	9:34 AM	9:45 AM
	11:00 AM	11:10 AM	11:20 AM	11:29 AM	11:34 AM	11:45 AM
	1:00 PM	**1:10 PM**	**1:20 PM**	**1:29 PM**	**1:34 PM**	**1:45 PM**
	3:00 PM	**3:10 PM**	**3:20 PM**	**3:29 PM**	**3:34 PM**	**3:45 PM**
	5:10 PM	**---**	**5:20 PM**	**5:29 PM**	**5:34 PM**	**5:45 PM**

Route 403: Fern Acres

Effective September 5, 2021 (Rev)

Northbound to Kea'au

	Fern Forest	Eden Roc	Fern Acres	Kurtistown	Kea'au
	F	H	I	C	A
	Glenwood Dr @ Kaleponi Rd	Kopua Rd @ Ohia Ave	Puhala St @ Lehua St	Highway 11 @ Across from Kurtistown Park	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)
Bus Stop ID#	TBA	TBA	TBA	921	TBA
	9:45 AM	10:05 AM	10:27 AM	10:37 AM	10:45 AM
	11:45 AM	**12:05 PM**	**12:27 PM**	**12:37 PM**	**12:45 PM**
	1:45 PM	**2:05 PM**	**2:27 PM**	**2:37 PM**	**2:45 PM**
	3:45 PM	**4:05 PM**	**4:27 PM**	**4:37 PM**	**4:45 PM**
	5:45 PM	**6:05 PM**	**6:27 PM**	**6:37 PM**	**6:45 PM**

To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

Flex Service

Hele-On offers flex route service on Route 403 for everyone! This flexible type services combine ADA paratransit and general public transit into one service providing additional mobility in the Fern Acres/Fern Forest/Eden Roc/Kea'au and South Hilo area if you cannot get to the bus route. The bus can flex up to 1 mile off route and you are required to make a reservation at least one hour in advance. To schedule a flex trip, call (808) 961-8744, option 1. TDD/TTY: 711 through the Relay Service.

The fare for flex service is free for all passengers until December 31, 2025.

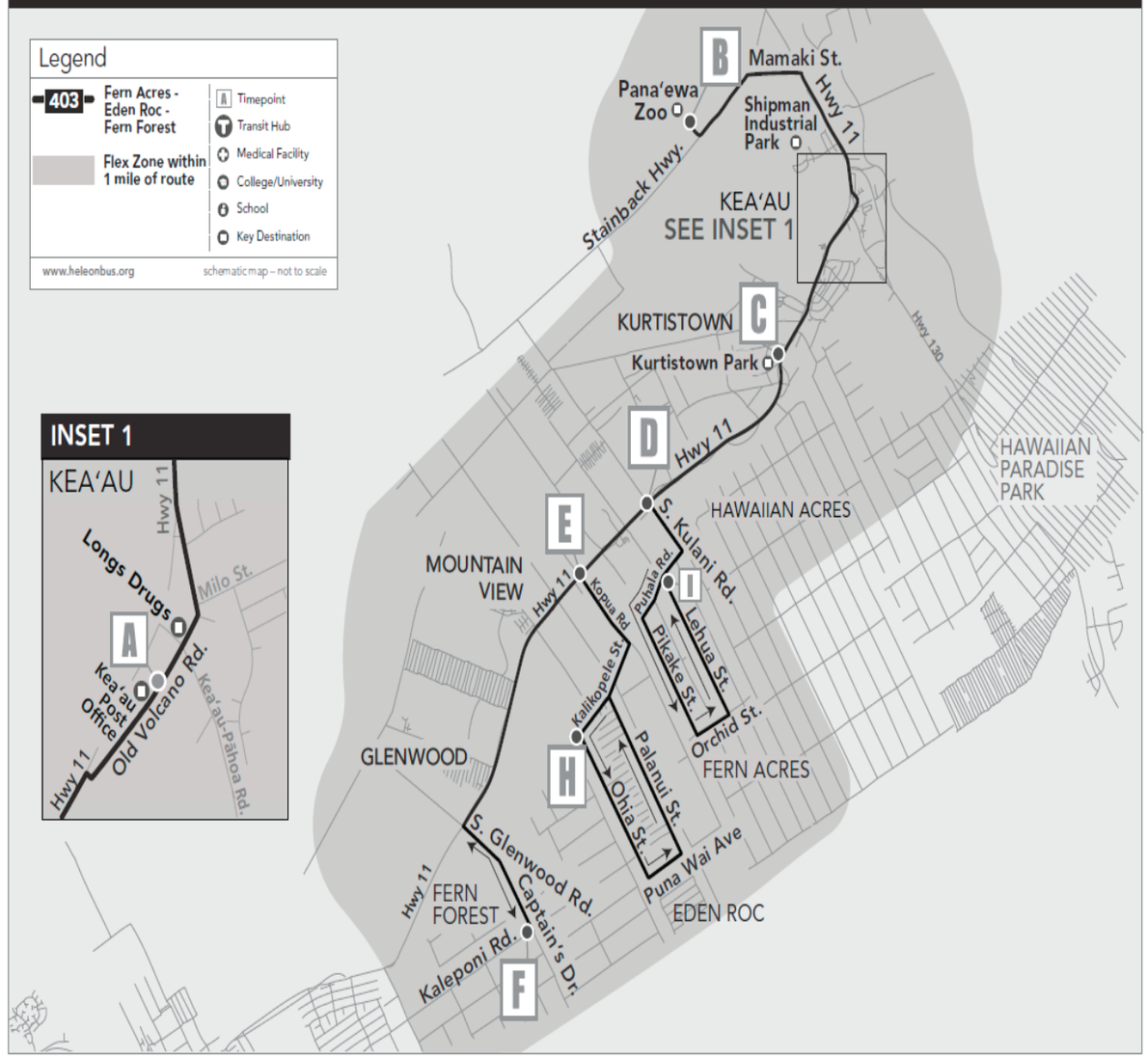
Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a bus shelter, a Kona Trolley Stop sign, a Hele-On Bus Stop or a red/white or blue Bus Stop sign.

- - - means timepoint is not served.

AM times are shown in lightface type. **PM times are in boldface type.**

Please recycle. Share this bus schedule with someone else if you do not need it.

Hele-On Bus Route - #403 Fern Acres - Eden Roc - Fern Forest



Route 403 will take you to the Panaewa Rainforest Zoo & Gardens! Zoo hours are 10 a.m. to 3 p.m., daily and it is free to enter!