Waimea Nui Regional Community Development Initiative Kīpuka o ke Ola Clinic Relocation

Draft Environmental Assessment
October 2022

Applicant:

State of Hawaii
Department of Hawaiian Home Lands
91-5420 Kapolei Parkway
Kapolei, Hawaii 96707

Prepared By:

SSFM International, Inc.
501 Sumner St., Suite 620
Honolulu, Hawaii 96817

Cover photo by Kīpuka o ke Ola (KOKO) Clinic

Table of Contents

List of Figures

List of Tables

List of Appendices

This page is intentionally blank…

Project Information Summary

Project Name	Waimea Nui Regional Community Development Initiative Kīpuka o ke Ola (KOKO) Clinic Relocation
Applicant	State of Hawai‘i, Department of Hawaiian Home Lands 91-5420 Kapolei Parkway Kapolei, Hawai‘i 96707 Contact: Andrew Choy Email: andrew.h.choy@hawaii.gov
Accepting Authority	Hawaiian Homes Commission Department of Hawaiian Home Lands Hale Kalaniana‘ole 91-5420 Kapolei Parkway Kapolei, Hawai‘i 96707
EA Preparer	SSFM International, Inc. 501 Sumner St., Suite 620 Honolulu, Hawai‘i 96817 Contact: Carah Kadota, Project Planner Email: ckadota@ssfm.com Phone: (808) 356-1233
Project Location	Pu‘ukapu, Waimea, Island of Hawai‘i
Tax Map Key	(3) 6-4-038:011 (por.)
Parcel Lot Area	191.71 acres
Project Area	Approximately 2 acres
Landowner	State of Hawai‘i, Department of Hawaiian Home Lands
Existing Use	Undeveloped land
State Land Use District	Agricultural District
DHHL Existing Land Use	General Agricultural (per the Waimea Nui Regional Plan)
County of Hawai‘i Zoning	A-40a
County of Hawai‘i Land Use Pattern Allocation Guide	Important Agricultural Lands
County of Hawai‘i Community Development Plan	South Kohala Community Development Plan
Special Management Area	Not in SMA
Flood Zone	Zone X
Chapter 343, HRS Trigger	Use of State funds and lands per HAR 11-200.1-8(1)
Proposed Uses	Independent rural health clinic

This page is intentionally blank…

1.0 BACKGROUND

1.1 Kīpuka o ke Ola (KOKO) Clinic

The Waimea Hawaiian Homesteaders' Association (WHHA) incorporated Kīpuka o ke Ola (KOKO) as the Association's Medical Division. KOKO was founded by Five Mountains Hawai'i Inc., a 501c3 non-profit organization that was inspired by Dr. Earl Bakken and Kenneth Brown. In January 2014, Five Mountains Hawai'i, Inc. elected a new Board of Directors, new Executive Management Team, and officially began doing business as KOKO. The KOKO Native Hawaiian Health Clinic ("KOKO Clinic") was established in response to a community needs assessment conducted by the WHHA, which called for a health clinic that could specifically address the health disparities endured by Native Hawaiians in North Hawai'i.

The clinic's mission statement is: "*KOKO provides cultural, spiritual, medical, and psychological services to all residents of North Hawai'i with a special emphasis for the Kānaka Maoli. This mission is our kuleana. KOKO provides culturally-informed direct services, actively collaborates with hawaiian agencies and associations in order to meet their members' needs, and is led by the community it serves."* KOKO is designed to provide a full range of bio-psycho-social services to the residents of North Hawai'i. It provides primary care services (including pediatric services), women's health services, individual, couple, and family psychotherapy services, acupuncture/lomilomi massage, and psycho-educational trainings for the community and organizations.

On March 28, 2017, the clinic received Federal Accreditation as the first independent Rural Health Clinic in the State of Hawai'i. An "independent" rural health clinic is one that is not owned by a hospital, nursing home, or home health agency. To be accredited as a rural health clinic, the following criteria must be met:

- Employ a Nurse Practitioner (NP) or Physician's Assistant (PA)
- Have a NP, PA, or Certified Nurse-Midwife (CNM) working at the clinic at least 50 percent of the time the RHC operates
- Directly furnish routine diagnostic and laboratory services
- Have arrangements with one or more hospitals to furnish medically necessary services that are not available at the rural health clinic
- Have available drugs and biologicals necessary for the treatment of emergencies
- Furnish all of these laboratory tests on site: chemical examination of urine by stick or tablet method or both; hemoglobin or hematocrit; blood sugar; examination of stool specimens for occult blood; pregnancy tests; primary culturing for transmittal to a certified laboratory

1.1.1 Ulu Laukahi Program

In 2022, the KOKO Clinic established the Ulu Laukahi Program, which is designed to recruit Native Hawaiian community members at-risk or struggling with chronic diseases (diabetes, hypertension, obesity, and mental health concerns) to provide prevention/intervention services to mitigate the factors that contribute to the need for emergency interventions. The goal of the program is to help Native Hawaiians achieve a longer and healthier lifestyle, and to educate, inspire, and assist participants to successfully integrate healthy habits to pass along to future generations. The program is a free year-long program for Native Hawaiians, and includes access to a personal fitness coach, yearlong membership to a fitness center, nutritional guidance from a licensed nutritionist, monthly educational workshops, quarterly medical care visits, psychotherapy intervention, and community support.

1.2 Waimea Nui Community Development Initiative

The WHHA and its subsidiary organization, the Waimea Nui Community Development Corporation (WNCDC) have been actively conceptualizing a community development project for over 40 years to address the cultural, economic, and social needs of the Waimea area and of Waimea Homestead families. The Waimea Nui Regional Community Development Initiative (WNR-CDI) was developed based upon the ideas and concepts articulated by the homestead community, and it incorporates the long-term visions of both WHHA and the Department of Hawaiian Home Lands (DHHL), as outlined in the DHHL Waimea Regional Plan (2012).

In 2015, a Final Environmental Assessment - Finding of No Significant Impact (FEA-FONSI) was prepared for the WNR-CDI, which proposed the following facilities and land uses to be located within approximately 114-acres of DHHL Homestead Land in a portion of Tax Map Key (TMK) (3) 6-4-038:011: a homestead cemetery/chapel which includes a columbarium; a community agriculture complex inclusive of a community agricultural park, a green waste biodigester with electric grid, a post-harvest facility, and commercial kitchen; an equestrian center; and a golf facility inclusive of playing greens, driving range, chip and putt, and a clubhouse. Following completion of the FEA-FONSI, the Hawaiian Homes Commission approved a 65-year General Lease to WNCDC that encompasses the 161-acres of land within TMK (3) 6-4-038:011 to develop the aforementioned facilities and land uses. The 161-acre property is inclusive of the 114-acres covered in the 2015 FEA-FONSI.

1.3 Purpose of Environmental Assessment

The WNR-CDI proposes to relocate the KOKO Clinic from its existing location at 64-1035 Māmalahoa Highway, to a 2-acre portion of the undeveloped 161-acre property leased by WNCDC. The clinic's proposed location would be within 2 acres of the area that was previously identified for the equestrian center in the 2015 WNR-CDI FEA-FONSI. The clinic is a new land use that is being considered for inclusion with the land uses proposed in the WNR-CDI's 2015 FEA-FONSI.

This Draft Environmental Assessment (Draft EA) has been prepared in accordance with the requirements of Hawai‘i Revised Statutes (HRS), Chapter 343 and Hawai‘i Administrative Rules (HAR), Title 11, Department of Health, Chapter 200.1, Environmental Impact Statement Rules. The proposed project will require the use of State lands, as it would be located on DHHL Homestead lands, and the use of State funds, thus triggering the preparation of an Environmental Assessment (EA) as prescribed by HAR 11-200.1-8(1) and HRS, Chapter 343-5(a)(1).

This page is intentionally blank…

2.0 PROJECT DESCRIPTION

2.1 Purpose and Need

The KOKO Clinic has outgrown their current facility resulting in a need for more space to 1) provide clinical space for rent, and 2) to serve more patients, as an increase in number of patients is anticipated to occur as DHHL awards more homestead lots in the Waimea region. Per the KOKO Clinic's 2019 Annual Report, the clinic saw a 20% increase in number of patients from 2018, for a total of 2,663 patients. In 2019 the clinic had 8,800 patient encounters amongst the seven healthcare providers and seven support staff at the facility. In addition, the clinic is focused on expanding their Ulu Laukahi Program, which is designed to address chronic care disease management. The expansion of the program's services would require a certified kitchen, workout facilities, and group meeting rooms for patient education.

The relocation of the KOKO Clinic to the WNR-CDI planned development aligns with the goals and vision of the initiative to build a vibrant and self-sufficient community, and to move towards the intent of the Hawaiian Homes Commission Act of 1921 to enable "native Hawaiians to return to their lands in order to fully support self-sufficiency for native Hawaiians and the self-determination of native Hawaiians…" In addition, the KOKO Clinic's relocation and upgrade in facility size and capacity would better prepare the Waimea region for anticipated growth as more homestead lots are awarded. The KOKO Clinic envisions serving up to 800 patients in anticipation of the future growth from awarded homestead lots.

The proposed project would support Hawaiian Homes Commission Act beneficiaries by creating jobs for current and future beneficiaries, as well as providing additional capacity to provide medical services to native Hawaiian beneficiaries and the larger region of North Hawai'i.

2.2 Project Location

The KOKO Clinic is currently located in Waimea at 64-1035 Māmalahoa Highway within the Uilani Plaza building, which contains other commercial units. The clinic proposes to develop its own facility on 2-acre portion of the 191.711-acre parcel identified as TMK (3) 6-4-038:011 ("project site"), which is owned by DHHL; approximately 161 acres of the parcel will be under lease to the WNCDC. The project site is located approximately 1.5 miles (or 2.5 driving miles) from the KOKO Clinic's current site (see Figure 1).

The project site is located in the South Kohala District on the island of Hawai'i, within the Pu'ukapu Tract of DHHL Homestead Lands (see Figure 1). The Waimea-Kohala Airport is located approximately 1.5 miles southwest of the site. Kanu O Ka 'Āina Charter School (KOKA Charter School) and residential farm lots are located north west of the site along Hi'iaka Street.

2.3 Proposed Action

The proposed action includes the development of an approximate 9,600 square feet (SF), one-story building for the KOKO Clinic within a 2-acre portion of TMK (3) 6-4-038:011 (see Figure 2). The new clinic would include treatment rooms to provide primary care, psychiatry, psychology, women's health, laʻau lapaʻau, lomilomi and acupuncture services. In addition, the clinic would expand its Ulu Laukahi Program that addresses chronic care disease management, which would require a certified kitchen, workout facilities, and meeting rooms.

The expansion of the KOKO Clinic would result in an additional five full-time positions to increase the clinic's treatment capacity to 800 additional patients. Operations at the clinic would remain the same; Monday through Friday from 8:00AM to 5:00PM.

2.4 Approvals and Permits

To implement the proposed action, the following Federal, State, and County permits and approvals listed in Table 1 are anticipated to be required.

Table 1: Potential Permits and Approvals Required

Federal Approvals/Permits	
Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction or Alteration Approval
U.S. Department of Agriculture (USDA), Rural Development Agency	Compliance with requirements per 7 Code of Federal Regulations (CFR) Part 1970 – Environmental Policies and Procedures
State Approvals/Permits	
State of Hawaiʻi, Department of Health (DOH), Clean Water Branch	• National Pollutant Discharge Elimination System (NPDES) General Permit • Approval of wastewater system construction documents

State of Hawai‘i, Department of Agriculture	• Application for Irrigation Water Service • Approval letter for use of agriculture water for potable use
State of Hawai‘i, Department of Health, Safe Drinking Water Branch	Approval of water treatment system construction documents
State of Hawai‘i, Department of Health, Wastewater Branch	Approval of wastewater system construction documents
State of Hawai‘i, Department of Health, Indoor and Radiological Health Branch	• Form 1 - Air Conditioning and Ventilation Application for Permit • Noise Permit Application
State of Hawai‘i, Department of Land and Natural Resources (DLNR), State Historic Preservation Division (SHPD)	HRS Chapter 6E-8 Review
County Approvals/Permits	
County of Hawai‘i (COH), Planning Department	Plan Approval
County of Hawai‘i, Department of Public Works (DPW), Building Division	• Building Permit (Non-Residential) • Electrical Permit (Non-Residential) • Plumbing Permit (Non-Residential) • Sign Permit • Outdoor Lighting Permit

County of Hawai‘i, Department of Public Works, Engineering Division	• Grading and Grubbing Permit • Driveway Connection Permit
County of Hawai‘i, Department of Water Supply (DWS)/Water Board	Water Development Agreement

Figure 1: Project Location

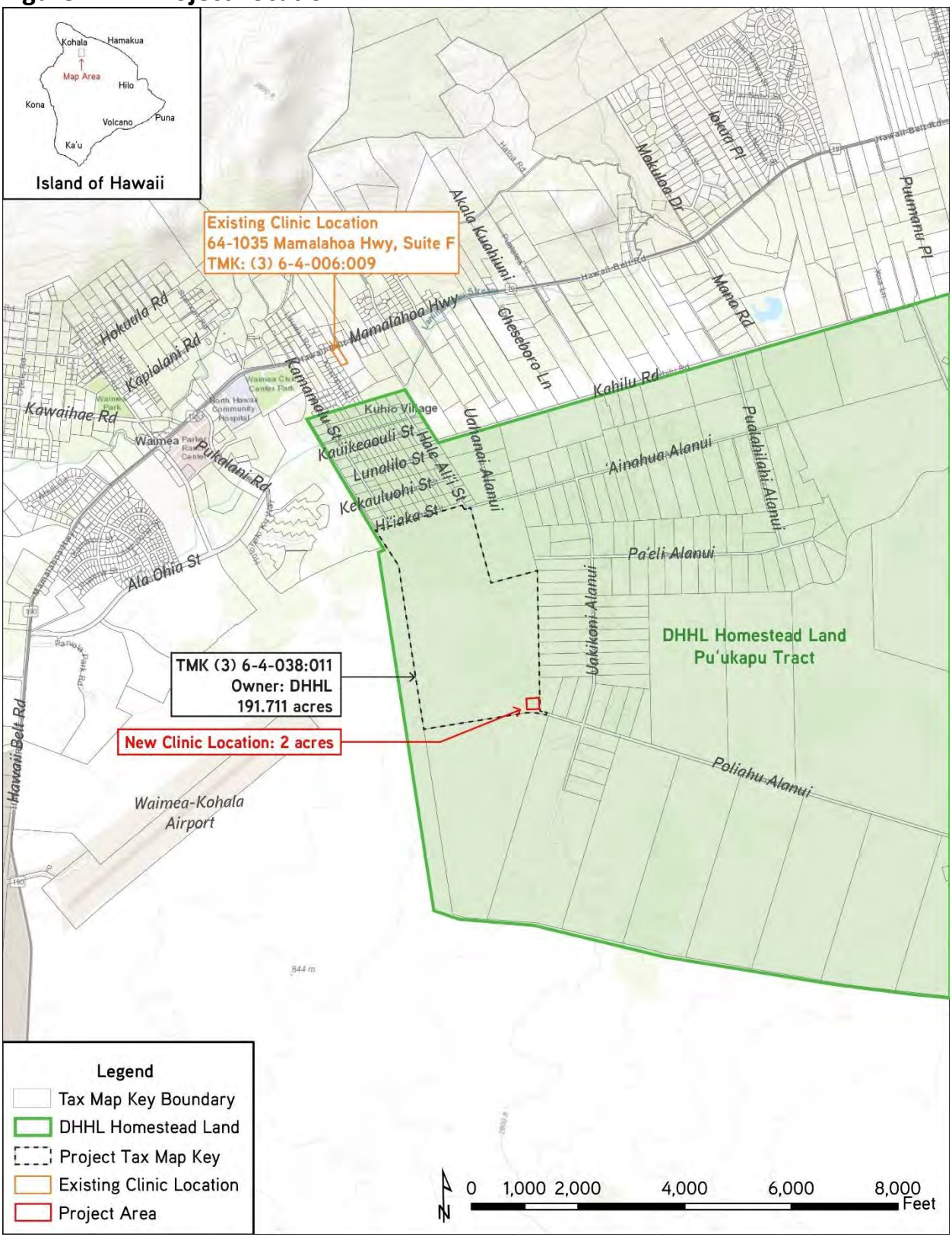
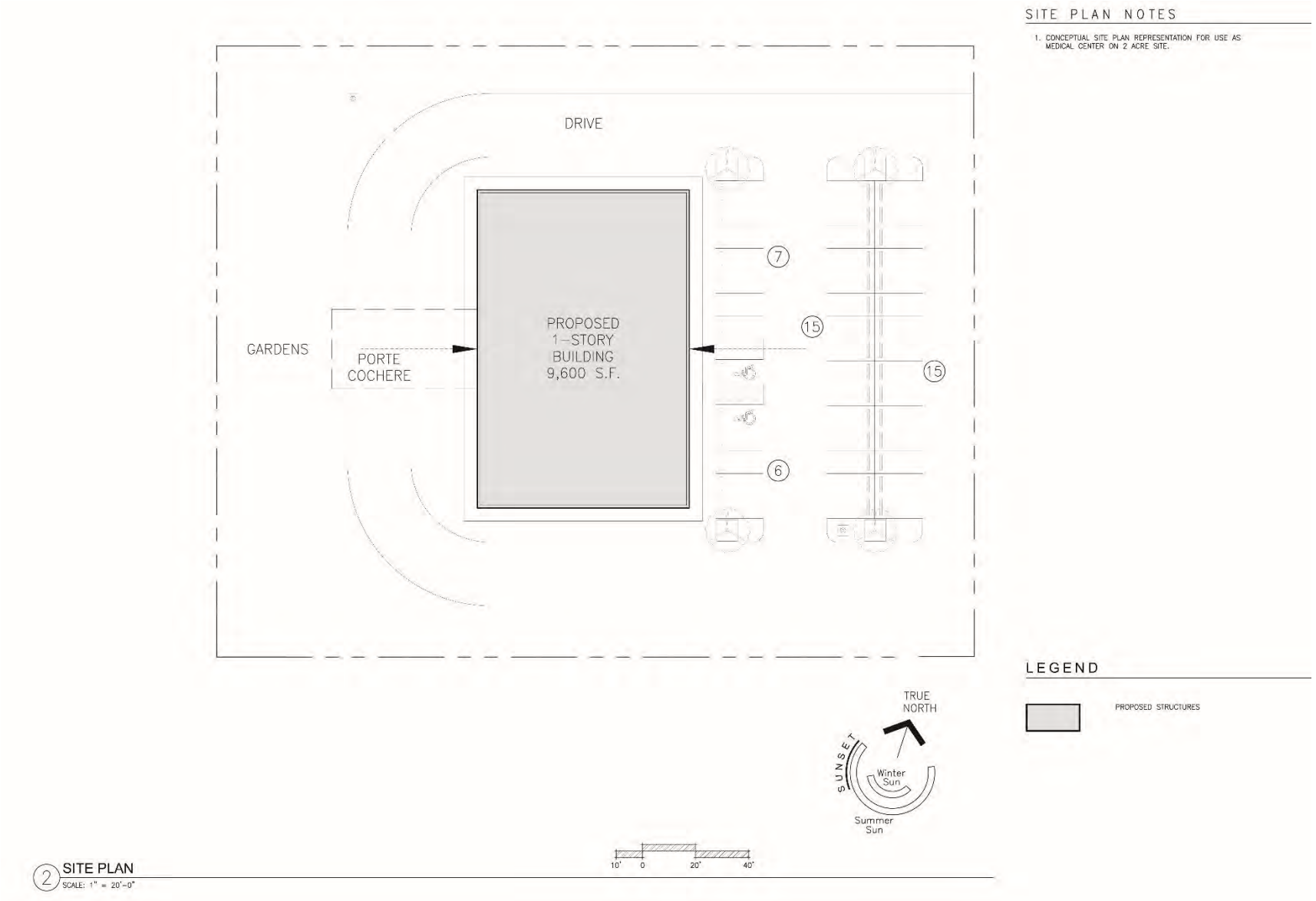


Figure 2: Site Plan



3.0 AFFECTED ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

3.1 Climate and Climate Change

The annual temperature in Waimea is relatively cool due to its high elevation; it averages at 65 degrees Fahrenheit (Giambelluca, et al., 2014). The annual rainfall in the project area is approximately 26 inches, with most rainfall occurring between November to April. Annual wind speed in this area averages at 10 miles per hour (mph).

The rapid build-up of greenhouse gases from human activity, particularly carbon dioxide but also methane, nitrous oxide, and fluorinated gases, is causing global warming and climate disruption (Hawai'i Climate Mitigation and Adaptation Commission, 2017). Global atmosphere and ocean warming is leading to glacier mass loss and ocean thermal expansion and is causing an acceleration in global mean sea level rise. The islands of Hawai‘i are uniquely exposed to the impacts of climate change and sea level rise. Many existing developments including hotels, houses, roads, beach parks, public facilities, and infrastructure have been located close to hazard prone and low-lying shorelines.

Sea level rise will multiply the impacts from coastal hazards, resulting in the acceleration of shoreline erosion, increase in chronic and event-based flooding along the shoreline and in low lying areas, and impediment of stormwater drainage. The Hawai‘i Sea Level Rise Vulnerability and Adaptation Report modeled exposure to chronic coastal flooding and erosion using projections from the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report (IPCC, 2013) where the high-end scenario was up to 3.2-ft of sea level rise by the end of the century (Courtney et al., 2020). The National Oceanic and Atmospheric Administration (NOAA) (Sweet et al., 2017) updated global and regional projections based on a review of the most up-to-date scientific literature on sea level rise (Courtney et al., 2020) and identified 3 ft. of sea level rise in this century as a mid-range scenario, and a “physically plausible” upper-end projection of 6 to 8 ft. of sea level rise by the end of this century.

Potential Impacts and Mitigation Measures

The proposed project is not anticipated to have an adverse effect on the climatic conditions of the Waimea region. The development of the KOKO Clinic would result in short-term release of greenhouse gas (GHG) emissions from construction activities, which is anticipated to be minor and temporary in nature.

The project site is located 10 miles away from the nearest shoreline, and thus is not anticipated to be subject to climate change and sea level rise impacts.

3.2 Geology and Topography

The project site is located at an elevation of approximately 2,760 feet in between Mauna Kea and the Kohala Mountains (see Figure 3). The site is relatively flat and slopes down towards the northwest side of the site. There are no significant landforms on the proposed site.

Potential Impacts and Mitigation Measures

The proposed project is not anticipated to have an adverse impact on the topography of the site. Development of the new KOKO Clinic will require excavation and grading for the clinic building, parking lot, and utilities; however it is not anticipated to adversely impact any significant landforms in the area. Grading of the project site would be done in conformance with Hawai'i County Code, Chapter 10 – Erosion and Sedimentation Control.

As the disturbed area would be greater than one acre, a NPDES Permit would be required. Grading activities would follow Best Management Practices (BMPs) in compliance with the NPDES Permit and the County's Grading Permit to mitigate any potential impacts of soil erosion and fugitive dust during grading or excavation.

3.3 Soils

Based on the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey, the soils within the surrounding project area are primarily Kikoni medial very fine sandy loam (map unit symbol 487), Waimea medial very fine sandy loam (map unit symbol 383), and Kikoni medial silt loam (map unit symbol 493) (see Figure 4). The Kikoni and Waimea series of soils are found on the northern side of Mauna Kea on the Waimea plains and consist of well-drained very fine sandy loams that formed in volcanic ash. Permeability is moderately rapid, runoff is slow, and the erosion hazard is slight. The project site consists of mainly the Waimea medial very fine sandy loam soil.

In Hawai'i, three classification systems are commonly used to rate soils: 1) Land Capability Grouping, 2) Agricultural Lands of Importance to the State of Hawai'i (ALISH), and 3) Overall Productivity Rating. The following is a description of the project site's soils' rating under each classification system.

Land Capability Grouping, U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Rating

The 1972 Land Capability Grouping by the NRCS groups soils primarily based on their capability to produce common cultivated crops and pasture plants without deteriorating over a long period of time. The capability class is the broadest category in the classification system and contains eight levels, ranging from the highest classification level "Class I", which indicates soils have slight limitations, to the lowest level "Class VIII", which are soils that have limitations that preclude their use for commercial plant production. The capability subclass is the second category in the land classification system that contains class codes "e", "w", "s", and "c".

Figure 3: Topography Map

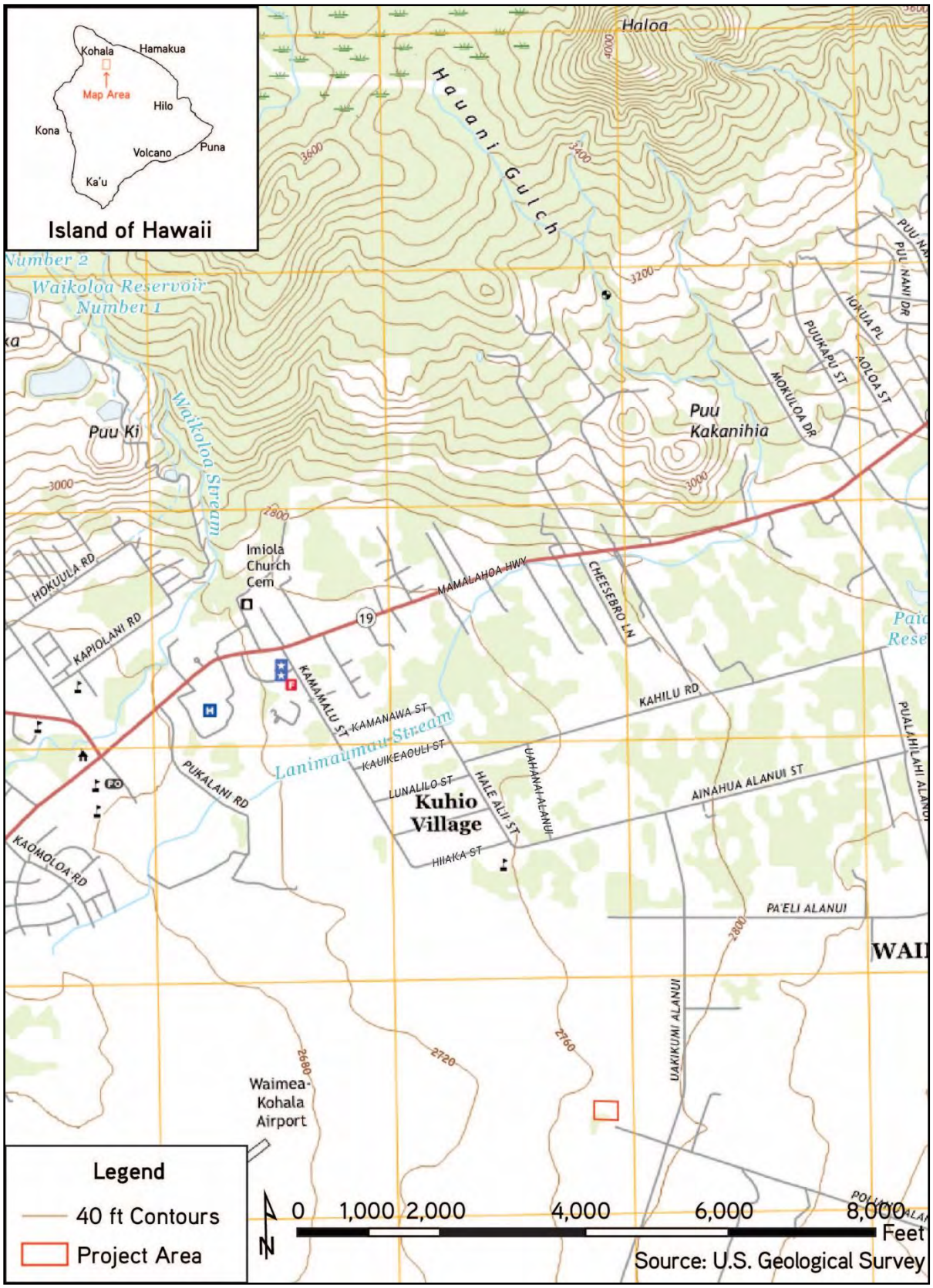
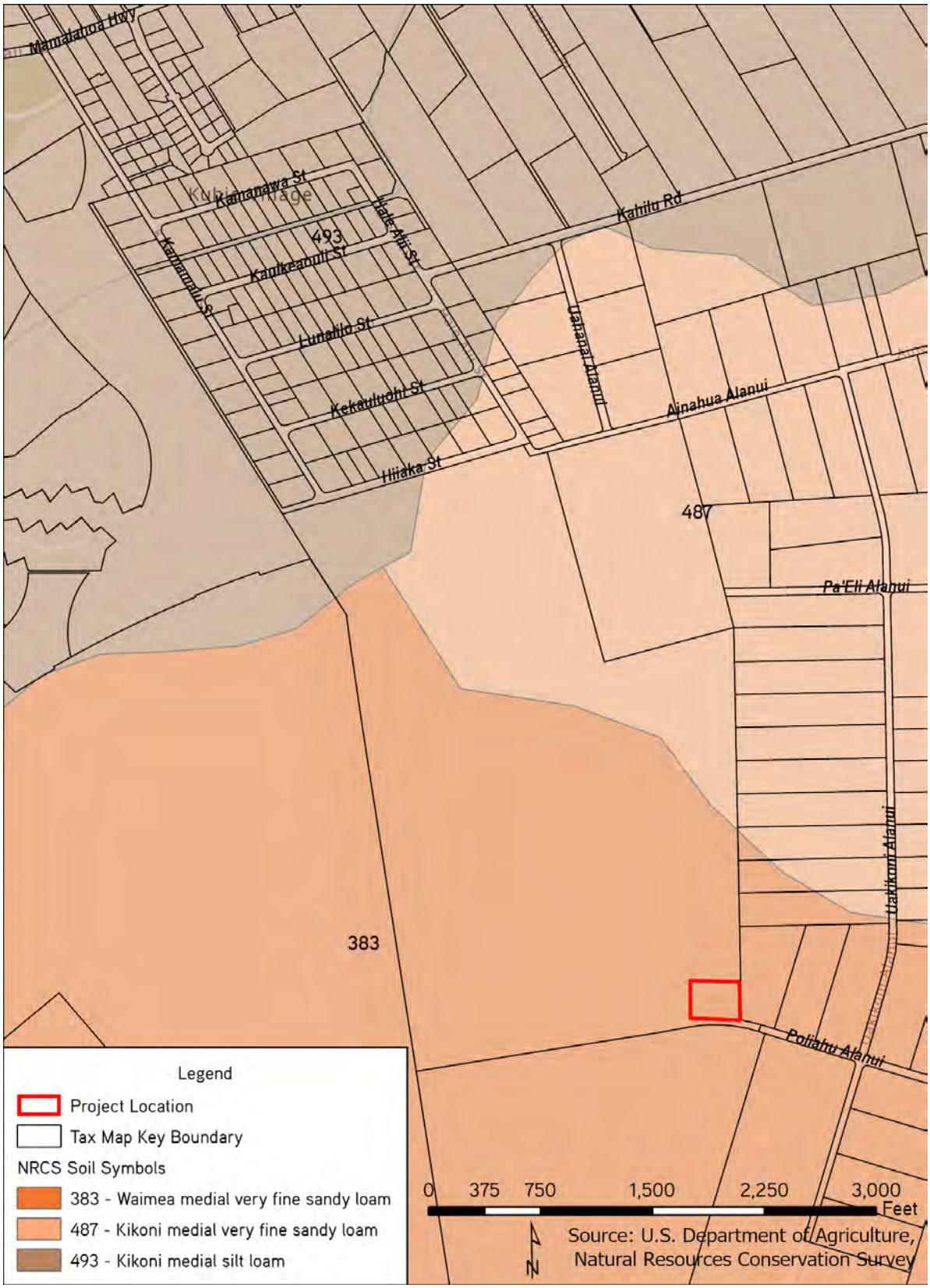


Figure 4: NRCS Soils



The Waimea medial very fine sandy loam and the Kikoni medial very fine sandy loam fall within Class IIe, while the Kikoni medial silt loam falls within Class I (when irrigated) and Class IIc (non-irrigated). Class I soils have few limitations that restrict their use, while Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices. Subclass "c" soils shows that the primary limitation is climate that is very cold or very dry.

Agricultural Lands of Importance in the State of Hawai'i (ALISH)

The State of Hawai'i, Department of Agriculture, with the assistance of the Soil Conservation Service, USDA, and the University of Hawai'i College of Tropical Agriculture and Human Resources, established a classification system to identify Agricultural Lands of Importance to the State of Hawai'i (ALISH) that is primarily, but not exclusively, based on soil characteristics in an effort to inventory important farmlands. The classification system identifies three classes of ALISH: "prime", "unique", and "other". The proposed project site would be located on land classified as ALISH "other", which is defined as land that is non-prime and non-unique agricultural land that is important to the production of crops (see Figure 5).

Overall Productivity Rating, University of Hawai'i Land Study Bureau (LSB)

The University of Hawai'i's Land Study Bureau (LSB) established a five-class soil productivity rating system from "A" to "E", with "A" representing the class of highest productivity and "E" as the lowest. The rating system is based on soil properties such as drainage, texture, stoniness, structure, slope, rainfall, material, and depth/penetration of roots. The project is located on land with soils classified as "C" (see Figure 6).

Potential Impacts and Mitigation Measures

Paving in the project area will minimally reduce permeability and increase runoff velocity in selected areas (i.e. parking lot). The proposed drainage improvements would be designed in compliance with the County's Storm Drainage Standard. Pre-development flow patterns and rates will generally remain in post-development conditions, with runoff remediated on-site.

All grading operations would be conducted in compliance with Hawai'i County Code, Chapter 10 – Erosion and Sedimentation Control. BMPs such as sediment basins, filter fences, diversion swales, and bio-filtration swales may be considered in the site design to minimize the amount of erosion and transport of sediment. Temporary impacts from construction activities would be mitigated by implementation of erosion and dust control measures.

Any landscape management on the project site would include proper management of fertilizers and pesticides. Increased surface runoff from newly paved parking and pedestrian areas would be minimized through these methods.

Figure 5: Agricultural Lands of Importance to the State of Hawai'i

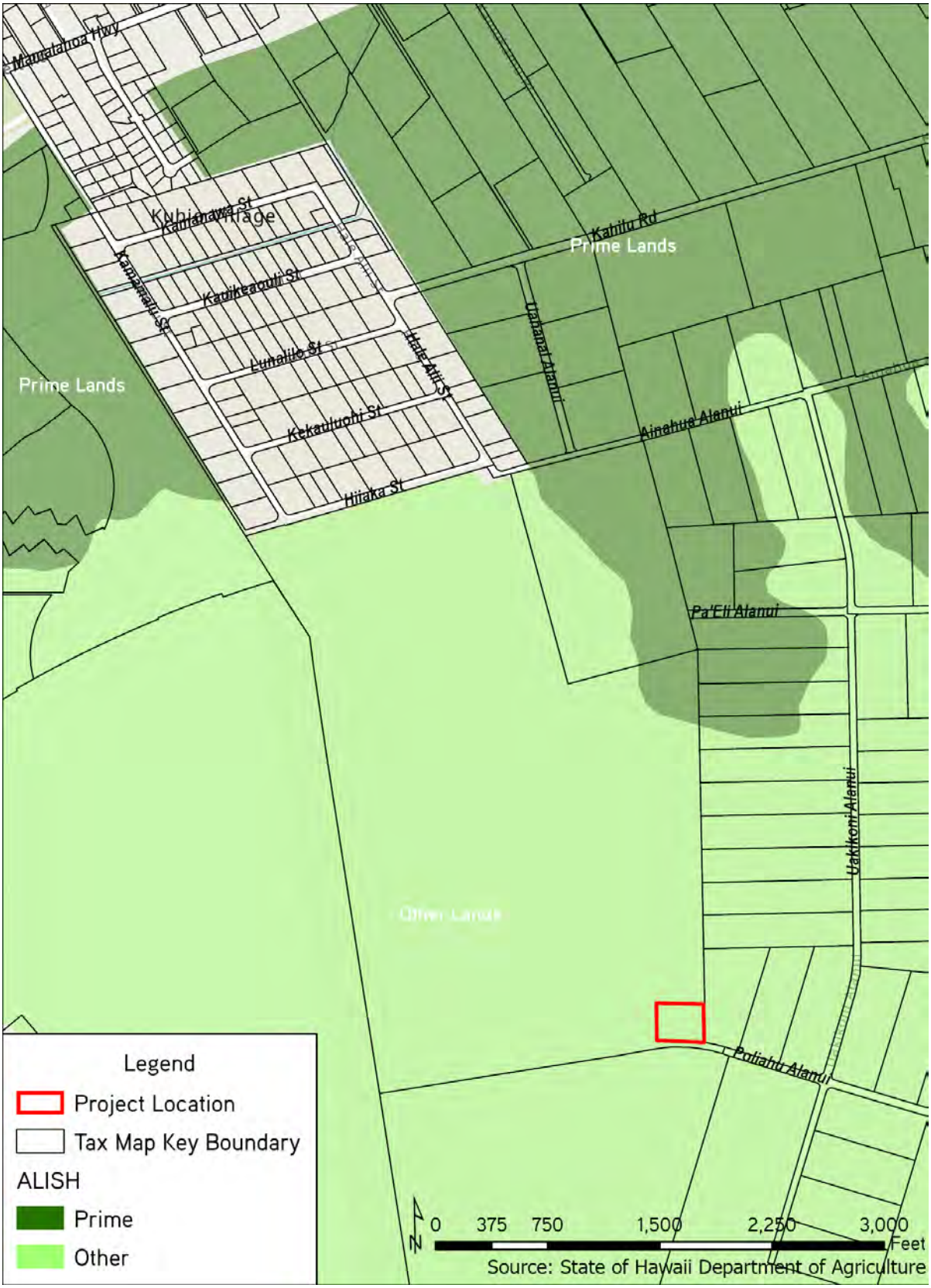
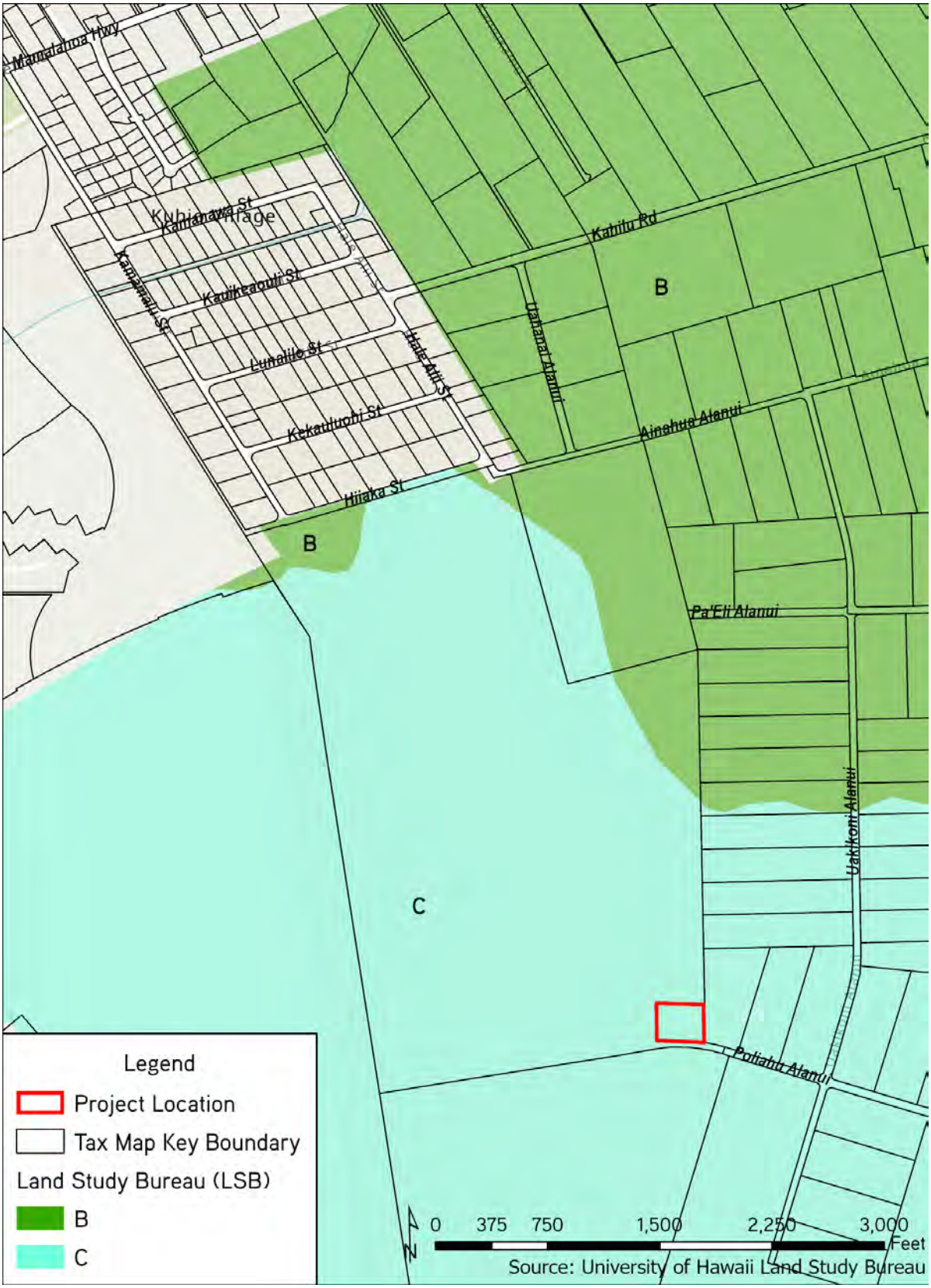


Figure 6: Land Study Bureau



Although the project site is located on agricultural land and is not considered an agricultural use, the project would be part of a larger community plan, as identified in the 2015 FEA-FONSI for the WNR-CDI, which includes agricultural uses. In addition, the use of agricultural land for the project site would not limit or substantially reduce the availability of land for agricultural uses in the Waimea region.

3.4 Surface and Marine Waters

There are no existing sources of surface water located on the project site. The nearest surface water source is the Lanimaumau Stream, which is located approximately a half mile northwest of the site. There is no existing drainage system on the site.

The project site is not within or in near proximity to any marine or coastal waters.

Potential Impacts and Mitigation Measures

Construction of the KOKO Clinic and parking areas may slightly alter the velocities, directions, and quantities of natural drainage patterns in the project area, however, the project will be designed to direct water flow to the proposed drainage system. The proposed drainage system will be designed in compliance with the County's Storm Drainage Standard. Pre-development flow patterns and rates will generally remain in post-development conditions with runoff remediated on-site.

3.5 Natural Hazards

The entire island of Hawai'i is subject to geologic hazards due to volcanic action. The project site is located near the boundary of the extinct Kohala volcano and the dormant Mauna Kea volcano, which results in a low risk level. The site is within the Lava Flow Hazard Zone 8, on a scale of ascending risk from Zone 9 to Zone 1 (see Figure 7). Zone 8 areas are within "the remaining part of Mauna Kea. Only a few percent of this area has been covered by lava in the last 10,000 years." (USGS, 1991).

The project site is within the Federal Emergency Management Agency's (FEMA) Flood Zone X according to FEMA's Flood Insurance Rate Map (see Figure 8). Flood Zone X corresponds to areas outside the 1-percent annual chance floodplain that are subject to minimal hazard from the principal source of flood in the area. Flood Zone X is not a special flood hazard zone, thus there are no regulations for development.

The proposed KOKO Clinic site is within the former Waikoloa Maneuver Area (WMA), which is a Formerly Used Defense Site (FUDS) as identified by the U.S. Army Corps of Engineers, Honolulu District (see Figure 9). The U.S. Marine Corps, through a verbal agreement with Richard Smart of Parker Ranch, acquired over 220,000 acres in South Kohala in December 1943 (USACE, 2019).

Figure 7: Lava Flow Hazard Zones

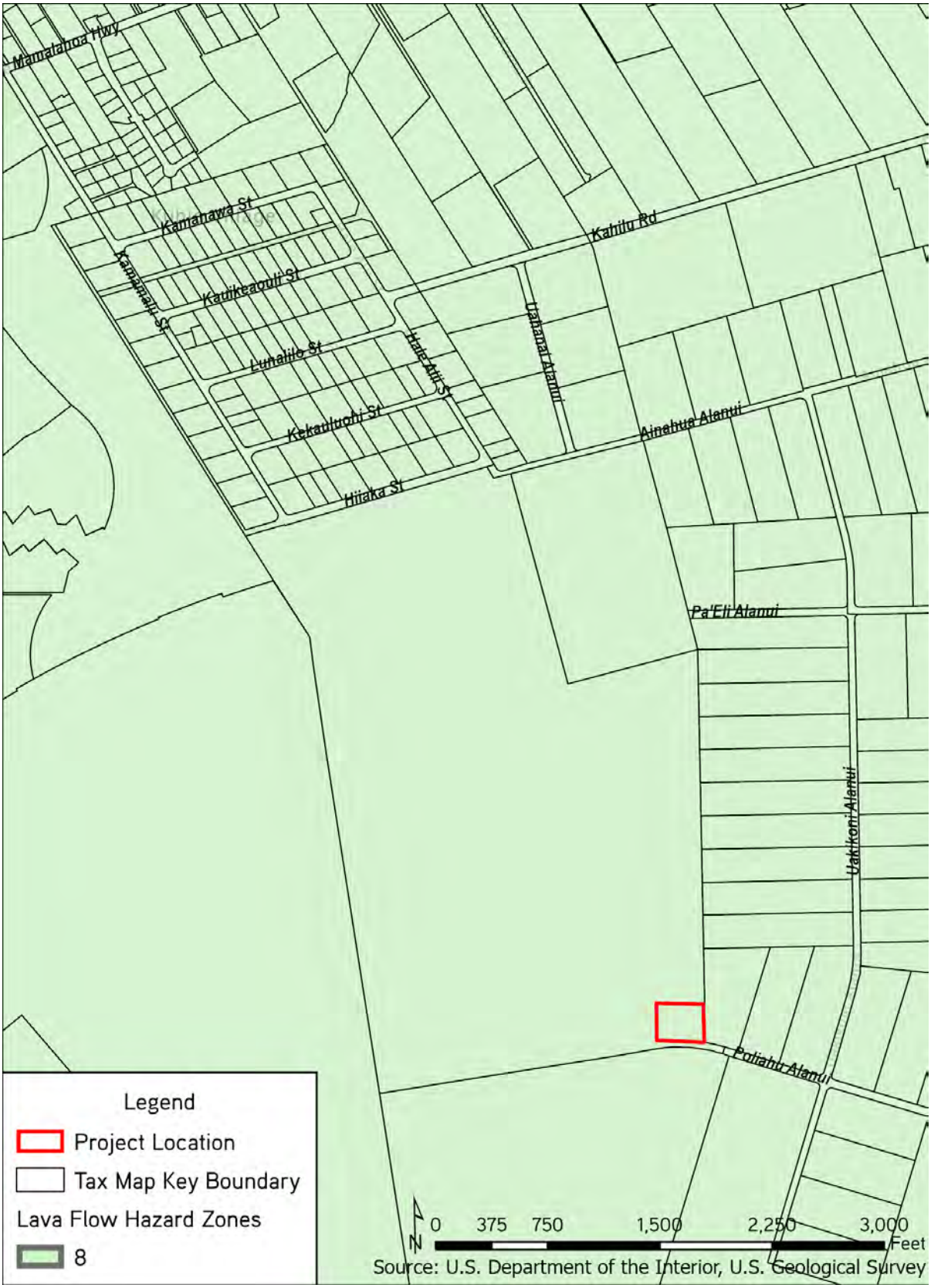


Figure 8: FEMA Flood Hazard Zones

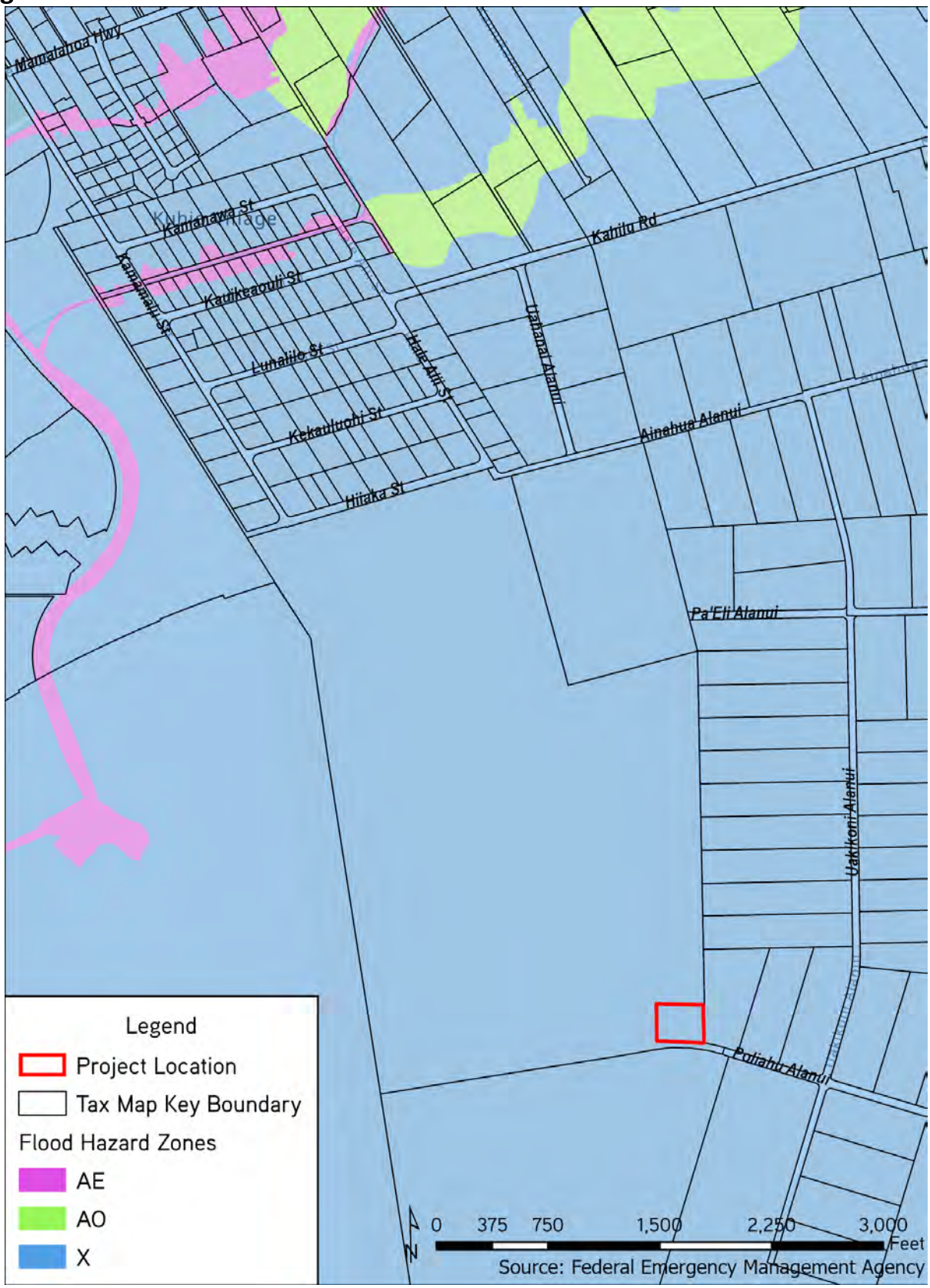
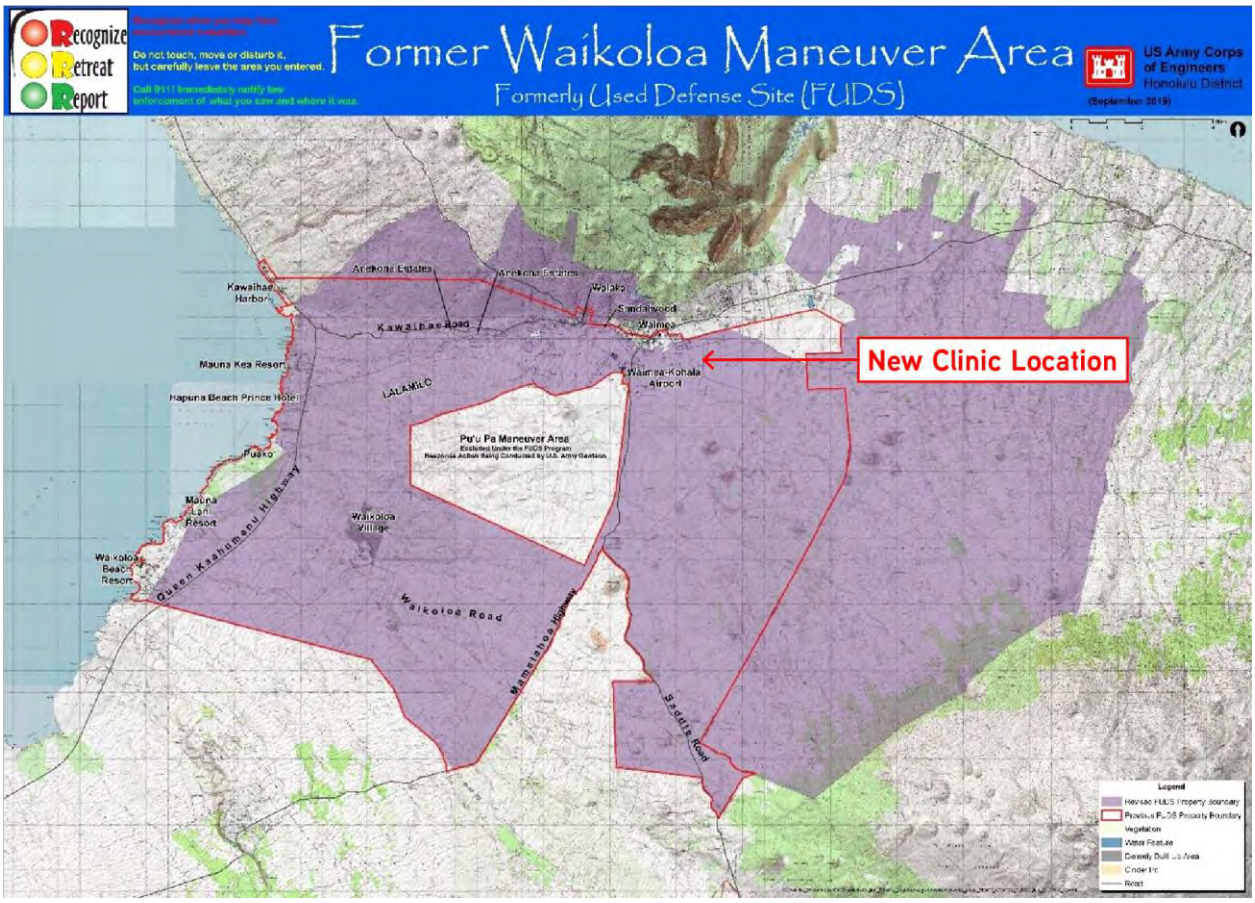


Figure 9: Waikoloa Maneuver Area



Source: USACE

Portions of the land were used as an artillery firing range on which live ammunition and other explosives were employed, while the remaining acreage was utilized for troop maneuvers and Camp Tarawa.

The military has conducted multiple munitions clearance efforts within the area, including in 1946 and 1954. Since 2009 to the present, focused Remedial Investigation/Feasibility Studies (RI/FS) have been conducted at individual munitions response sites within the WMA to identify the nature and extent of munitions and explosives of concern (MEC) (USACE, 2019). USACE, in conjunction with DHHL, have held community meetings in Pu‘ukapu to raise awareness regarding the potential for unexploded ordnance (UXO) contamination.

In the USACE’s Comprehensive Strategic Plan for Fiscal Year (FY) 2021 – FY 2022 for the Former Waikoloa Maneuver Area published in 2021, the WMA is divided into sectors based on type, quantity, location, and depth of UXO and munitions debris recovered; documented records of previous MEC finds; past, current and reasonably anticipated future land use; and input from local agencies, stakeholders, and the community. The project site is located within Sector 15 (see Figure 10). Based on the strategic plan, Sector 15 is classified as a “5” under Munitions

Response Site Prioritization Protocol and "3" under the State Management Action Plan Priority. Section 15 is one of eight sectors currently in the RI/FS stage.

Potential Impacts and Mitigation Measures

In general, geologic and flood conditions do not impost any major constraints on the project. The KOKO Clinic would be constructed in compliance with regulatory controls to meet County Building Code requirements.

Based on the 2015 FEA-FONSI for the WNR-CDI, project construction was proposed to follow safety procedures articulated by USACE, and a certified UXO removal technician was proposed to be utilized during project construction if it was deemed necessary after further consultation with USACE. As construction activities for the WNR-CDI have not been initiated at time of publication of this Draft EA, it is recommended that USACE be consulted prior to the development of the KOKO Clinic site.

3.6 Flora and Fauna

3.6.1 Flora

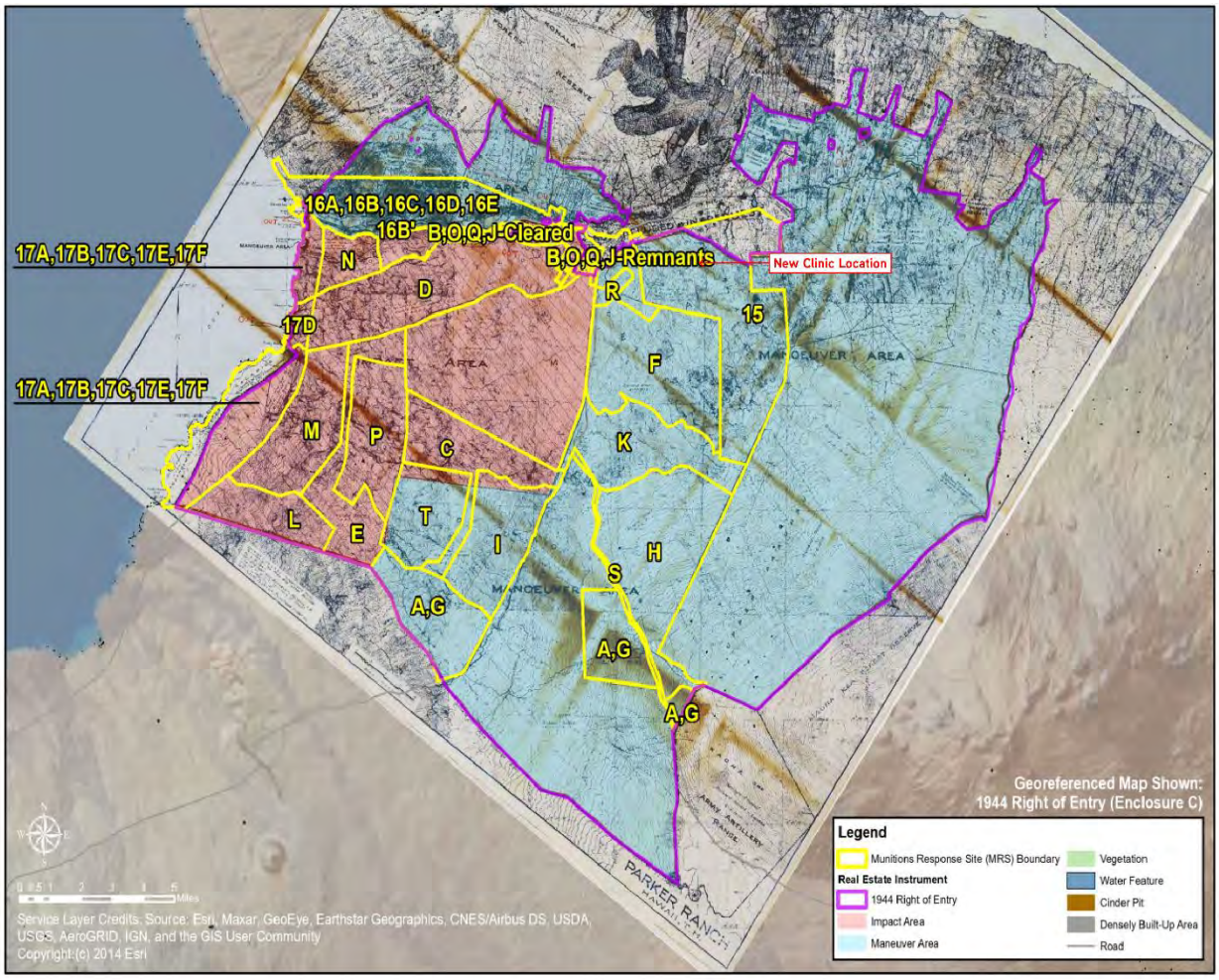
A Botanical Survey was conducted by AECOS in support of the 2015 FEA-FONSI for the WNR-CDI during November 2014; the project site is within the same boundary of the surveyed area for the 2015 FEA-FONSI. The survey found that the current vegetation of the site consists of pasture grasses and a limited number of herbaceous plants. All plants found during the site survey were non-native species, and no federally listed endangered or threatened species were found.

3.6.2 Fauna

Avian and mammalian surveys were conducted by AECOS in support of the 2015 FEA-FONSI for the WNR-CDI during November 2014; the project site is within the same boundary of the surveyed area for the 2015 FEA-FONSI. Based on the survey, the site is mainly vacant of mammalian species with the exception of domestic cattle (*Bos taurus)* found on the site and adjoining pastures, along with mice *(Mus musculus domesticus)* and wild pigs *(Sus scrofa)*. No Hawaiian hoary bats were detected during the survey given the lack of suitable roosting trees.

A total of 15 different bird species were recorded during station counts in 2014. One of the species detected, the Pacific Golden-Plover (*Pluvialis fulva),* is an indigenous migratory shorebird species that are found to return to Hawai'i and the Pacific during the fall and winter months. The remainder of avian species recorded were considered to be alien to Hawai'i; none of the species were listed as endangered, threatened or proposed for listing under the Federal or State endangered species programs. The list of bird species recorded during the survey are included in Table 1.

Figure 10: Waikoloa Maneuver Area Sectors



Source: USACE

Table 2: Faunal Species Observed Within and Surrounding the Project Site

Species	Common Name	Status
Francolinus pondicerianus	Gray francolin	Alien
Coturnix japonica	Japanese quail	Alien
Gallus sp.	Domestic chicken	Domesticated
Phasianus colchicus	Ring-necked pheasant	Alien

Bubulcus ibis	Cattle egret	Alien
Pluvialis fulva	Pacific golden-plover	Indigenous Migratory
Columba livia	Rock pigeon	Alien
Streptopelia chinensis	Spotted dove	Alien
Geopelia striata	Zebra dove	Alien
Zenaida macroura	Mourning dove	Alien
Alauda arvensis	Sky lark	Alien
Acridotheres tristis	Common myna	Alien
Passer domesticus	House sparrow	Alien
Euodice cantans	African silverbill	Alien
Lonchura oryzivora	Java sparrow	Alien

Although it was not detected during the 2014 survey, it is possible that the endangered endemic Hawaiian Petrel (*Pterodroma sandwichnesis*), and the threatened Newell's Shearwater *(Puffinus auricularis newelli)* may fly over the project area between the months of April to December. The Hawaiian goose (*branta sandvicensis*) may also be present in the vicinity of the proposed project area at any time of the year, although it was not observed during the survey.

U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC)

In an email dated July 13, 2022, the U.S. Fish and Wildlife Service (USFWS) provided a pre-assessment consultation comment for the project recommending the use of their online Information for Planning and Consultation (IPaC) system to obtain a species list and recommended avoidance and minimization measures to avoid adverse effects and take of federally listed species that may potentially be present within the project area (see Appendix A for a copy of the email). Based on the resource list generated for the project site, the following species listed in Table 3 are potentially affected by project activities in this location. It should be noted that this list is not an official species list from the USFWS and is only used as a resource per recommendation by the USFWS.

Table 3: USFWS IPaC Species List

Species	Common Name	Status
Bird Species		
Oceanodroma castro	Band-rumped Storm-petrel	Endangered
Loxops coccineus	Hawai'i Akepa	Endangered
Anas wyvilliana	Hawaiian Duck	Endangered
Fulica americana alai	Hawaiian Coot	Endangered
Branta sandvicensis	Hawaiian Goose	Threatened
Pterodrom sandwichensis	Hawaiian Petrel	Endangered
Himantopus mexicanus knudseni	Hawaiian Stilt	Endangered
Puffinus auricularis newelli	Newell's Townsend's Shearwater	Threatened
Insects		
Manduca blackburni	Blackburn's Sphinx Moth	Endangered
Flowering Plants		
Pleomele hawaiiensis	Hala Pepe	Endangered
Ochrosia haleakalae	Holei	Endangered
Ochrosia kilaueansis	Holei	Endangered

Haplostachys haplostachya	Honohono	Endangered
Portulaca villosa	Ihi	Endangered
Lipochaeta venosa	Nehe	Endangered
Portulaca sclerocarpa	Poe	Endangered
Solanum incompletum	Popolo Kū Mai	Endangered
Silene hawaiiensis		Threatened
Stenogyne angustifolia var. angustifolia		Endangered
Tetramolopium arenarium		Endangered
Mezoneuron kavaiense	Uhi Uhi	Endangered
Vigna o-wahuensis		Endangered
Ferns and Allies		
Microlepia strigose var. mauiensis		Endangered
Critical Habitats		
There are no critical habitats at this location.		

Potential Impacts and Mitigation Measures

The construction and operation of the KOKO Clinic is not anticipated to result in an adverse impact to native birds or the Hawaiian hoary bat. No plant, avian, or mammalian species that are protected or proposed for protection under the Federal or State of Hawai‘i endangered species programs were detected during the 2014 surveys.

Per the State Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) pre-assessment consultation letter dated July 27, 2022, it is recommended to use native plant species for landscaping that are appropriate for the area. In addition, DOFAW recommended consultation with the Big Island Invasive Species Committee during the design and construction of the project to help minimize the risk of spreading invasive species.

However, to minimize the potential for any impacts, construction activities would implement the following avoidance, minimization, and conservation measures, as provided by the USFWS IPaC system's General Project Design Guidelines (see Appendix B) and DOFAW:

Minimization Measures for Plant Species

- Minimizing disturbance outside of proposed development
- Use of native plants, as appropriate and whenever possible, for landscaping purposes.
- Ensure all construction equipment, personnel, and supplies are properly checked and are free of contamination (weed seeds, organic matter, or other contaminants) before entering the project area.

Minimization Measures for Hawaiian Waterbirds

- 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 the Service's Best Management Practices for Work in Aquatic Environments into the project design.
- If a nest or active brood is found:
    - Contact the Service within 48 hours for further guidance.
    - 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.
    - 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.

Minimization Measures for Hawaiian Goose or nene

- Do not approach, feed, or disturb nene.
- If nene are observed loafing or foraging within the project area during the breeding season (September through April), have a biologist familiar with nene 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 the Service 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 nene 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.

Minimization Measures for Hawaiian Petrel, Newell's Shearwater, and Hawai'i Distinct Population Segment of the Band-Rumped Storm-Petrel

- Fully shield all outdoor lights so the bulb can only be seen from below.
- Install automatic motion sensor switches and controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.
- Avoid nighttime construction during the seabird fledging period, September 15 through December 15.

Minimization Measures for Hawaiian Hoary Bat

- Do not disturb, remove, or trim woody plants greater than 15 feet tall during the bat birthing and pup rearing season (June 1 through September 15).
- Do not use barbed wire for fencing.

Minimization Measures for Blackburn's Sphinx Moth

- Consult with the DOFAW Hawai'i Island Branch for further information about where the blackburn's sphinx moth may be present and whether a vegetation survey should be conducted to determine the presence of plants preferred by the moth.
- Remove any tree tobacco less than 3 feet tall during the dry time of year to avoid harm to the moth.
- Monitor the site every 4-6 weeks for new tree tobacco growth before, during, and after the proposed ground-disturbing activity. This monitoring for can be completed by any staff, such as groundskeeper or regular maintenance crew, if they are provided with picture placards of tree tobacco at different life stages.

Minimization Measures for Hawaiian Hawk or 'Io (Buteo solitarius)

- Survey surrounding area to ensure no Hawaiian Hawk nests are present, if trees are to be cut

- Hawaiian Hawk nests may be present during the breeding season from March to September.

3.7 Air Quality

The State of Hawai'i, Department of Health (DOH) operates air quality monitoring stations around the state. The nearest air quality monitoring station to the project site is the Waikoloa Station, which is approximately 16 miles southwest of the site. The Waikoloa Station measures for volcanic emissions. In the State, both Federal and State environmental health standards pertaining to outdoor air quality are generally met due to prevalent trade winds and the absence of major stationary sources of pollutant emissions.

Volcanic emissions of sulfur dioxide from the Kīlauea Volcano convert into particulate sulfate forming a volcanic haze, locally called "vog". South Kohala receives small quantities of vog from winds blowing north from Kona, although in general it is kept away by dominant trade winds.

Potential Impacts and Mitigation Measures

The proposed project is not anticipated to have a long-term impact on air quality. There would be short-term impacts associated with construction activities, including exhaust from increased traffic and fugitive dust from construction.

A dust control management plan would be developed, which would identify and address activities that have a potential to generate fugitive dust. Fugitive dust control can be accomplished by the establishment of a frequent watering program to keep bare dirt surfaces in construction areas from becoming significant sources of dust. In dust prone or dust sensitive areas, other control measures such as limiting the area that can be disturbed at any given time, applying chemical soil stabilizers, mulching and/or using wind screens may be necessary. Onsite mobile and stationary construction equipment also would emit air pollutants from engine exhausts, but no sensitive receptors are present. The contractor will be required to prepare a dust control plan during construction compliant with provisions of HAR, Chapter 11-60.1 Air Pollution Control and Section 11-60.1-33 Fugitive Dust.

Operations at the KOKO Clinic are not anticipated to be a source of greenhouse gas or other air pollutant emissions that would adversely impact the air quality of the surrounding environment.

The proposed project would comply with the DOH Administrative Rules §11-39 Air Conditioning & Ventilating for the installation of the air conditioning system at the new KOKO Clinic, which would require a permit for installation and operation of an air conditioning or ventilating unit.

3.8 Historic and Archaeological Resources

An Archaeological Inventory Survey (AIS) was conducted in support of the 2015 FEA-FONSI for the WNR-CDI by Keala Pono Archaeological Consulting, LLC (KPAC). The AIS was conducted to determine the presence, nature, and extent of archaeological resources in the project area.

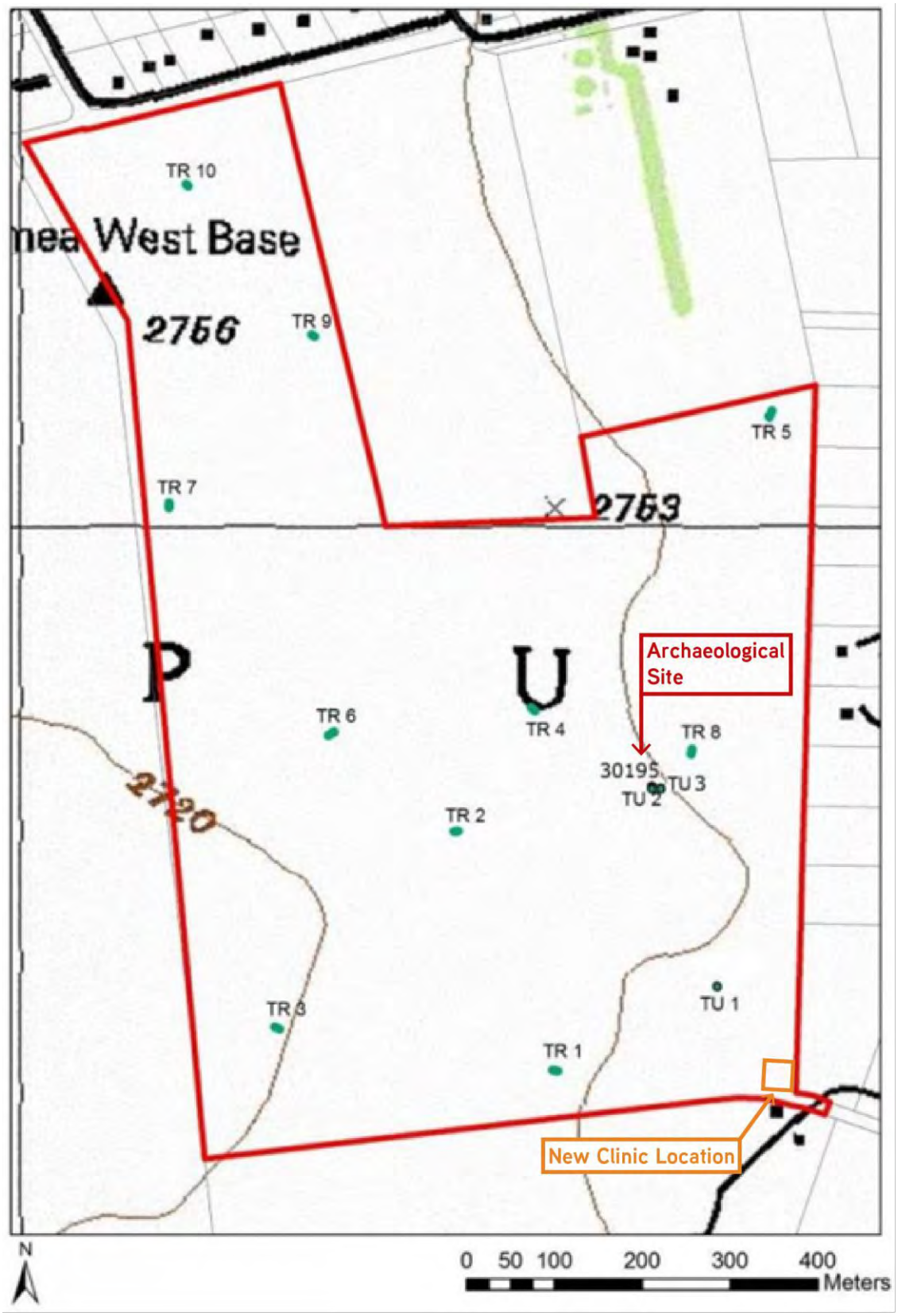
A surface survey was conducted by KPAC by walking 16 – 26 feet transects throughout the project area. Results of the surface survey revealed one archaeological site, which was then mapped, documented, and excavated. Controlled test units were excavated by hand at the site. A total of 10 trenches in arbitrary locations were mechanically excavated for the purpose of sampling the subsurface conditions (see Figure 11). No cultural remains, either prehistoric or historic, were encountered in any of the trenches. Stratigraphy consisted entirely of natural deposits with bedrock below.

The results of the AIS indicated that the WNR-CDI project area consisted of one site (Site 30195). This site is not within the KOKO Clinic project area.

Potential Impacts and Mitigation Measures

Based on the findings of the AIS conducted for the 2015 FEA-FONSI for the WNR-CDI, the proposed KOKO Clinic is not anticipated to adversely impact any known or found archaeological sites. Subsurface properties associated with former traditional Hawaiian activities, such as artifacts, cultural layers, and burials may be present despite the historical pasture use in the area. For this reason, personnel involved in the project should be informed of the possibility of inadvertent cultural finds and should be made aware of the appropriate notification measures to follow. If any previously unidentified sites or remains are encountered during site work and construction, work in the immediate area shall cease. An archaeologist from SHPD shall be notified and work in the area would be suspended until further recommendations are made.

Figure 11: Location of Trench Sites



3.9 Cultural Resources

A Cultural Impact Assessment (CIA) was conducted in support of the 2015 FEA-FONSI for the WNR-CDI by KPAC, which consisted of background research and oral interviews.

The project site is located in the ʻili (land section or subdivision of an ahupuaʻa) of Puʻukapu, in the ahupuaʻa of Waimea. Puʻukapu means "sacred hill", and Waimea means "reddish water". Through recent history, this area of Waimea has been a part of the grazing lands of Parker Ranch.

Traditional Hawaiian Background

Waimea is known to be a place where famous historical battles over the governance of land were fought. Prior to Western contact in the early 18th century, Aliʻinui Alapaʻinui ruled all of Hawaiʻi island. Internal conflicts led to the division of the island, leaving Alapaʻinui to rule the northern districts. Following his death, his son Keaweʻōpala inherited his seat, and was challenged by Kalaniʻōpuʻu, who ruled the southern lands, for control of the northern lands. Kalaniʻōpuʻu won and assumed control of all of Hawaiʻi island. After Kalaniʻōpuʻu's death, his son Kiwalao governed the land until he was challenged by and lost to Kamehameha. Following that battle, the governance of Hawaiʻi Island was divided into three parts; Kona, Hilo, and the districts of Kaʻu and Puna.

Traditional and Historic Land Tenure and Use

The Waimea environment was naturally suited for intensive upland farming, which supported a sizable village population. At the time of Captain Cook's arrival in 1778, there were an estimated 23,000 or more natives living in the Kohala district. The area is noted for having cultivated ʻuala and dryland taro.

After the arrival of foreigners to Hawaiʻi, Waimea underwent rapid transformation with the presence of ranchers, whalers, missionaries, sandalwood traders, and other agricultural businessmen. Waimea's rich ranching history stems from the late 18th century when Captain George Vancouver arrived on Hawaiʻi Island. Captain Vancouver brought gifts of cattle, goats, and sheep for Kamehameha I, who placed a restriction on the livestock; anyone caught harming the animals could be persecuted by death. As a result, the population of cattle, goats, and sheep multiplied across Waimea and the rest of Northern Hawaiʻi Island.

After the restriction on cattle was lifted in 1815, Kamehameha appointed John Palmer Parker to be his authorized cattle hunter. The hunting of animals and processing and production of beef products became a rising industry. In 1832, the first of numerous Mexican cowboys arrived in Hawaiʻi to lend their expertise and skills in handling cattle. In 1847, the Parker Ranch was established, with the lands in Waimea, Kawaihae, and South Kohala becoming centers of the cattle industry.

Overlapping with the arrival of foreign sailors, whalers, and cowboys were the arrival of Christian missionaries. One of the early missionaries was Lorenzo Lyons who arrived in the

islands in 1832, and later erected his church in Waimea. His description of the natural environment of Waimea match other oral accounts of the area, which describe Waimea has being filled with wind, rain, and running water. Reverend William Ellis offered another historical account of Waimea, documenting the agricultural abundance and the fertile characteristic of the soil and access to water.

The proposed project site is within the lands known as Puʻukapu, which are owned by DHHL. DHHL was established through the Hawaiian Homes Commission Act of 1920, championed by Prince Jonah Kūhiō Kalanianaʻole with the primary goal of providing for the rehabilitation of the Native Hawaiʻi people through a homestead program. The Puʻukapu Homestead tract is the largest subdivision on Hawaiʻi Island with over 11,000 acres.

By 1943, the U.S. military opened Camp Tarawa in Waimea through a lease from Parker Ranch. Approximately 91,000 acres was used for military training. The camp hosted 50,000 troops between 1943 to 1945, and was abandoned after the end of World War II in 1946. The infrastructure deteriorated and the lands were reabsorbed by Parker Ranch until the lease expired and the land was turned over to DHHL. Surface clearing of UXO was conducted in 1946 and 1954 for Camp Tarawa and other areas in the WMA.

Potential Impacts and Mitigation Measures

Based on research conducted by KPAC, no previously identified historic properties exist in the WNR-CDI project site, which also encompasses the KOKO Clinic site. Although the land was part of a contiguous landscape impacted by the historical land tenure transitions, there does not appear to be any specific or known cultural practices being actively conducted within or near vicinity to the project area. It is anticipated that the proposed project would not have an adverse impact on significant cultural resources.

3.10 Socio-Economic Conditions

According to the 2021 State of Hawaiʻi Data Book produced by the State Department of Business, Economic Development and Tourism (DBEDT), the population in South Kohala as of 2020 is 19,310. Within the census designated place of Waimea, the population is 10,969, and within the Puʻukapu Homestead the population is 936.

Businesses in the South Kohala district range from service industries, wholesale and retail trade, government, ranching, diversified agriculture, manufacturing, and construction. Waimea exhibits a higher proportion of service occupations, particularly within the food, accommodation, and entertainment industries, reflecting the importance of tourism for the area.

Potential Impacts and Mitigation Measures

The project would create short-term benefits as a result of design and construction employment and would create jobs for local construction personnel. Local material suppliers

and retail businesses may also be expected to benefit through the proposed project's construction activities.

The operations of the KOKO Clinic would expand to increase their patient capacity, which is anticipated to result in an additional five full-time positions. The clinic's increase in capacity would benefit the Pu'ukapu homestead community and the residents of Waimea by providing additional medical services. The KOKO Clinic's Ulu Laukahi Program would be a primary focus of expansion, which would focus on addressing chronic disease care management. The socio-economic impacts of the proposed project would be positive for the local community, homestead beneficiaries, as well as the County of Hawai'i and the State.

3.11 Viewplanes

The project site is located on the edge of a developed urban residential neighborhood on vacant and undeveloped agricultural land. Existing views from the site consist of the surrounding open space, the KOKA Charter School, the Kohala mountains, and the slopes of Mauna Kea.

Section 7.5.6 of the 2005 County of Hawai'i General Plan identifies sites and view planes of natural landforms, and describes the scenic views of the Waimea region: "The Kohala Mountains provide a backdrop of rolling hills and volcanic cones covered with pastures kept green by fog, fine mist, and rain. Mauna Kea provides a distant but dramatic mass as it rises steeply above the plateau. Viewed at a distance, Waimea town lies nestled at the base of the Kohala Mountains…The pastures and puu immediately above Waimea Town have been identified as a vista of exceptional natural beauty."

Potential Impacts and Mitigation Measures

The proposed project is not anticipated to significantly impact the views in the area. The views of the open pastoral landscape would be minimally affected by the new project elements, however, the new clinic would maintain the same character, mass and height as surrounding buildings in the area. Design details and landscaping would be utilized to maintain the visual character of the project site.

3.12 Infrastructure

In support of the 2015 FEA-FONSI for the WNR-CDI, a Preliminary Engineering Report was completed by Group 70 International which assessed the anticipated infrastructure needs for the development.

3.12.1 Water

There is currently no water system servicing the site. Potable water service in the general area is provided by the County Department of Water Supply's (DWS) 4.0 million gallons (MG) water reservoir at the water treatment plant with a spillway elevation of 3,052 feet above mean sea

level (msl). Based on the DWS' pre-assessment consultation letter dated July 13, 2022 (see Appendix A), the project parcel is currently serviced by a combination 8-inch by 4-inch meter, which is allocated 25 units of water, or 10,000 gallons per day. DWS indicated that additional water is unavailable at this time.

Potential Impacts and Mitigation Measures

DWS has indicated that the project parcel does not have additional water capacity at this time. To service the project site, extensive improvements and additions would be required, which may include, but not be limited to, source, storage, booster pumps, transmission, and distribution facilities. DWS also indicated that the project may enter into a Water Development Agreement with the Water Board, in accordance with Rule 5 of the Department's Rules and Regulations, to obtain a water commitment from the Department for the proposed development. The Agreement would establish, amongst other things, the scope of the necessary water system improvements, facilities charges to be paid, and a timeline for construction.

In the 2015 FEA-FONSI, it was proposed that the WNR-CDI development use agriculture water from the Waimea Irrigation System, which is managed by the State Department of Agriculture (DOA), to be treated and distributed on-site for potable use. The system would be certified through the DOH as a public water system. As the Waimea Irrigation System experiences low pressure during peak flows, a tank farm was proposed to be constructed so that water from the system would fill on-site tanks during off-peak hours to meet potable and non-potable water demands without adversely affecting the irrigation system. As the KOKO Clinic would be relocated to the WNR-CDI's site, it is anticipated that it would be serviced by the same water system. It should be noted that the water system and proposed developments indicated in the 2015 FEA-FONSI have not been developed as of the date of publication of this Draft EA.

Further coordination with the DWS and DOA is required to determine the best possible solution to provide potable water to the project site.

In addition to establishing a potable water system, the project would be required to comply with Chapter 18 of the 2018 Hawai'i State Fire Code and Chapter 26 of the Hawai'i County Code to provide for the COH Fire Department access and water. Water efficient fixtures would be installed, and water efficient practices implemented throughout the KOKO Clinic to reduce the increased demand on freshwater resources. Landscape irrigation conservation BMPs endorsed by the Landscape Industry Council of Hawai'i would also be used as applicable to the project.

3.12.2 Wastewater System

The majority of Waimea relies on Individual Wastewater Systems (IWS) or a Wastewater Treatment Works. There are no existing municipal sewer systems near the project site.

Potential Impacts and Mitigation Measures

As the KOKO Clinic would be relocated to the development proposed by the WNR-CDI, the wastewater system proposed in the 2015 FEA-FONSI is anticipated to service the project site. Wastewater flows produced from the WNR-CDI development would be handled through a Wastewater Treatment Works, as this would be considered to comply with the Federal Aviation Administration (FAA) Advisory Circular 150/5200-33B, which regulates developments within the proximity of airports. The project site is located near the Waimea-Kohala Area of Operations delineation where new wastewater facilities are typically not permissible due to concerns that such facilities could attract wildlife to the area. However, an enclosed underground system can be designed whereby treated effluent for reuse purposes such as irrigation could be distributed evenly through the project area as to not create ponding areas.

All wastewater collection and treatment components would be designed in compliance with HAR Section 11-62 relating to Wastewater Systems. Wastewater re-use is the most viable option for the proposed project, and can be utilized if designed in accordance with DOH Guidelines for the Treatment and Use of Recycled Water.

3.12.3 Drainage

The County's storm drainage system serving the Waimea area consists of a network of storm drainage pipes and culverts. Storm runoff collected by these pipes and culverts is either disposed of in sumps, drywells, or injection wells. The existing site is unoccupied and has no drainage system.

Potential Impacts and Mitigation Measures

Construction of the KOKO Clinic and parking lot would change the velocities, directions and quantities of the water drainage. The flow pattern of excess rain runoff would need to be controlled to prevent flood damage. The project would incorporate efficient design to moderate stormwater runoff such as increased pervious surfaces, use of pavers, and landscaping to absorb water runoff.

3.12.4 Electrical and Communications

Electrical power on Hawai'i Island is provided by Hawaiian Electric Light Company. Hawai'i Telecom and Sandwich Isles Communications, Inc. provide telephone and telecommunications services in the area.

Potential Impacts and Mitigation Measures

The 2015 FEA-FONSI for the WNR-CDI proposed that electricity would be provided on-site by the anaerobic biodigester. The biodigester will use waste from agricultural uses, municipal solid waste, and wastewater to fuel the anaerobic digestion process. During the process, a solid output, called digestate, can be produced and used in soil or as fertilizer. Anaerobic microbes used in the digestion process also produce large quantities of biogas, which contains methane

and carbon dioxide, that can be used as a renewable biofuel to produce electricity. It was estimated that the digester could provide sufficient fuel for 12 hours per day of 450 kilowatt-hour (kwh) generation and 12 hours per day of 225 kwh production, enabling the generation facility to provide 450 kwh during peak power demand periods. Energy produced by the biodigester would be fed and regulated at a distribution hub located in the central portion of the WNR-CDI development. In the event that the biodigester is out of service for an extended period of time, backup storage of propane as well as provisions to hook up to a propane truck would be available at the biodigester facility for continuous electricity generation. It is anticipated that the KOKO Clinic would connect to the same electrical system and service being provided by the WNR-CDI's biodigester.

3.12.5 Traffic

As part of the 2015 FEA-FONSI for the WNR-CDI, a Traffic Impact Analysis Report (TIAR) was completed by Traffic Management Consultant, Inc. in 2014. For this Draft EA, an update to the 2014 TIAR was conducted by SSFM International, Inc. to account for the addition of the KOKO Clinic (see Appendix C). The 2022 TIAR supplements the previous 2014 TIAR and assessed the impacts of the proposed KOKO Clinic relocation on Future With Project analysis; the "Future Without Project" analysis will include the project-related trips from the 2014 TIAR using updated background growth rates and intersection turning movement counts taken in September 2021. In compliance with Hawai'i County Code Chapter 25, Section 25-2-46 Concurrency Requirements, traffic impacts were analyzed for the years 2026, 2031 and 2041, which are future five, ten, and 20 year timelines from the existing year of analysis (2021).

The existing roadways analyzed in the 2022 TIAR include Māmalahoa Highway, Kamamalu Street, Hiiaka Street, Ainahua Lanaui Street, Mana Road, Uakikoni Alanui, and Poliahu Alanui. Four existing study intersections were identified and analyzed to consider the impacts from the proposed project (see Figure 12); Māmalahoa Highway at Kamamalu Street, Hiiaka Street at KOKA Charter School Main Driveway, Ainahua Alanui Street at KOKA Charter School Eastern Driveway, and Māmalahoa Highway at Mana Road.

Potential Impacts and Mitigation Measures

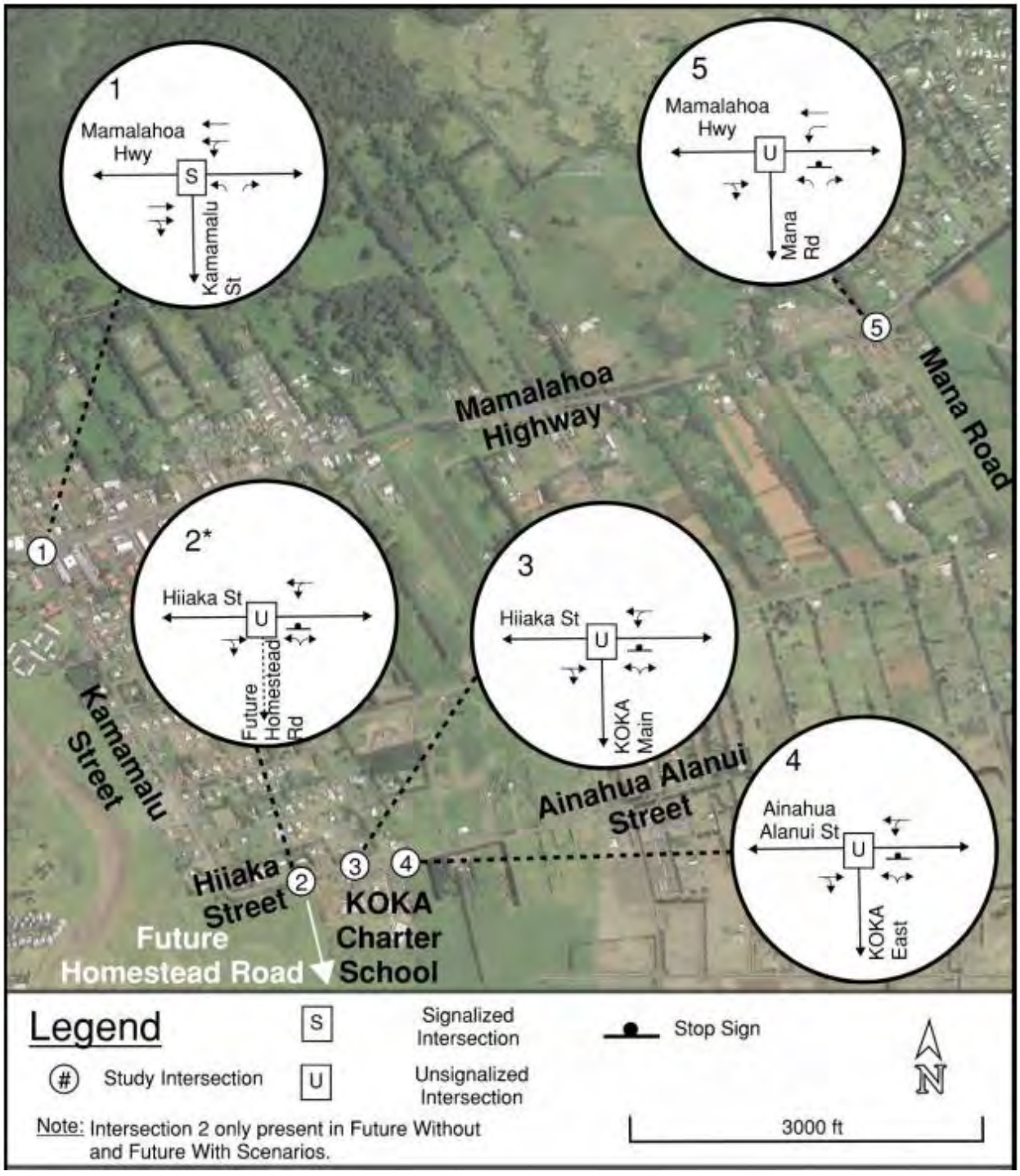
As proposed in the 2015 WNR-CDI TIAR, a new road would be constructed that branches south off of Hiiaka Street to serve as the primary access to the WNR-CDI development. The intersection of Hiiaka Street and the new road is proposed to be an unsignalized three-way intersection; the new road would have two lanes.

An access point through the west end of Poliahu Alanui road, west of the intersection with Uakikoni Alanui road, will be used in the interim as temporary access. When the new road is constructed, the temporary access point will become the secondary access point. The KOKO Clinic is anticipated to generate 30 to 37 trips in the AM and PM peak hours, respectively. The low number of trips are not expected to have a significant impact on the surrounding roadway network, therefore a separate analysis of the secondary access was not conducted.

The overall size and traffic impact of the KOKO Clinic is minimal compared to the other land uses proposed in the 2015 WNR-CDI TIAR. At the intersection of Māmalahoa Highway and Mana Road, the northbound right approach will worsen to level of service (LOS) E in the Future With Project analyzed year of 2026, and further to LOS F in Future With Project year 2041. The northbound left turn also operates at LOS E during the Future With Project year 2041. Due to the worsening LOS, this intersection satisfied the Peak Hour Traffic Signal Warrant to install a traffic signal by the Future With Project year 2026. However, even with the installation of a traffic signal, the eastbound approach in the PM peak hour operates near capacity in 2041 with or without the proposed project, which is likely due to the forecasted regional growth. It is therefore recommended that this intersection be studied in the future in collaboration with HDOT to assess the need for a traffic signal.

At the intersection of Māmalahoa Highway and Kamamalu Street, the northbound left turn worsens to LOS E during the PM peak hours in 2041 with or without the proposed project. Based on the future projected volumes, it is anticipated that up to nine vehicles per cycle would be queued at this approach to the intersection. It is recommended that the signal timing at the intersection be monitored and adjusted if needed.

Figure 12: Existing Study Intersections and Lane Configurations



Source: SSFM International

3.13 Airport Easement

Based on the 2015 FEA-FONSI for the WNR-CDI, the project site is not within the aviation easement for the Waimea-Kohala Airport (see Figure 13). Building height limitations in the aviation easement are dependent upon the site location in relation to the distance from the runway. Per HAR §19-12-7, building height limitations within the aviation easement would be limited to a range of 13 to 51 feet dependent on the specific area elevations and distance from the runway.

Potential Impacts and Mitigation Measures

The proposed KOKO Clinic will be one-story tall and would fall within the range for building height limitations. As identified in Table 1, a FAA Form 7460-1 Notice of Proposed Construction or Alteration would be required for the project.

3.14 Noise

Primary noise sources surrounding the project site are related to traffic and adjacent residential and airport activities. Noise primarily comes from the Māmalahoa Highway and the Waimea-Kohala airport. The project site is generally quiet due to the surrounding rural uses for residential and agricultural activities.

The primary noise receptors in the surrounding environment are farm dwellings and residences in DHHL's Pu'ukapu Tract, residences located north of the project site, and the KOKA Charter School. The KOKA Charter School is located closest to the site approximately 0.15 miles away.

Potential Impacts and Mitigation Measures

Short-term impacts to the ambient noise levels of the surrounding environment are anticipated from construction activities. However, these impacts would be temporary and would occur during the day. Mitigation measures and best management practices (BMPs) to minimize construction noise would include, but not be limited to, using mufflers on diesel and gasoline engines, using properly tuned and balanced machines, etc. A noise permit application would be submitted to DOH, and all construction activities would comply with HAR §11-46 Community Noise Control.

The KOKO Clinic is not anticipated to substantially increase the ambient noise levels within the surrounding environment. Noise anticipated to be generated by the clinic would be related to incoming/outgoing vehicular traffic and the building's mechanical equipment (i.e. air conditioning and ventilation equipment). These noise emissions are not anticipated to be readily perceptible by the nearby KOKA Charter School.

Figure 13: Aviation Easement

Source: Group 70 International

3.15 Public Facilities and Services

3.15.1 Hospitals, Clinics, and Urgent Care

The North Hawai'i Community Hospital operated by Queen's Health Systems is the only hospital in the Waimea region, and is one of six hospitals on the island of Hawai'i. Within proximity to the project site are two clinics and one urgent care facility; the Queen's Medical Center Primary Care Clinic, Kaiser Permanente Waimea Clinic, and the Waimea Urgent Care. Of the two clinics located within proximity to the project site, the Queen's Medical Center Primary Care Clinic is the only clinic that also offers Native Hawaiian Health services, which includes customized care for patients managing chronic diseases and individual and group therapy.

3.15.2 Police

The COH Police Department's Waimea Station is located approximately 0.7 miles away from the project site on Kamamalu Street. The Waimea Station services the South Kohala District, which is approximately 688 square miles, and is within the Police Department's Area II – West Hawai'i. During FY 2020 – 2021, the South Kohala Patrol Division were assigned a total of 2,491 criminal calls for service, and 5,652 non-criminal calls for service. As four major State highways and numerous County thoroughfares traverse the South Kohala District, the Waimea Station's primary task is traffic enforcement.

3.15.3 Fire

The COH Fire Department's Waimea Station is located near the Police Department's Waimea Station on Kamamalu Street, approximately 0.7 miles away from the project site.

3.15.4 Schools

The State of Hawai'i, Department of Education (DOE) operates the State's public school system. The proposed project is within the DOE's Hawai'i District, Honoka'a-Kealakehe-Kohala-Konawaena Complex Area, within the Honoka'a Complex specifically. The DOE's Waimea Elementary School is within proximity to the project site (see Figure 14).

The State Public Charter School Commission is the State's charter school authorizer. The Commission is made up of nine members that are appointed by the State's Board of Education (BOE). The Waimea Middle Public Conversion Charter School and the KOKA Charter School are within proximity to the project site (see Figure 14).

Two independent schools are also located near the project site. Parker School is a non-profit, independent, co-educational day school that serves grades kindergarten to 12th grade. The Waimea Country School is an independent elementary day school that serves children ages four to twelve.

3.15.5 Parks and Recreation

The Waimea Civic Center Park, located near the South Kohala District Court on Māmalahoa Highway, is the closest park/recreational facility to the project site. Other parks and recreational facilities within proximity to the project site are the Waimea District Park, Waimea Park and Community Center, Ulu La'au (Waimea Nature Park), Anuenue Playground, and the Waimea Skatepark.

Potential Impacts and Mitigation Measures

The proposed project is not anticipated to adversely impact public facilities and services in the area. The proposed KOKO Clinic is anticipated to have a positive impact for residents in the Waimea district as well as Pu'ukapu Homestead beneficiaries as it would provide an increase in medical service capacity. This benefit would result in added convenience and access to medical services for the beneficiaries of Hawaiian Home Lands and Waimea residents.

3.16 Potential Cumulative and Secondary Impacts

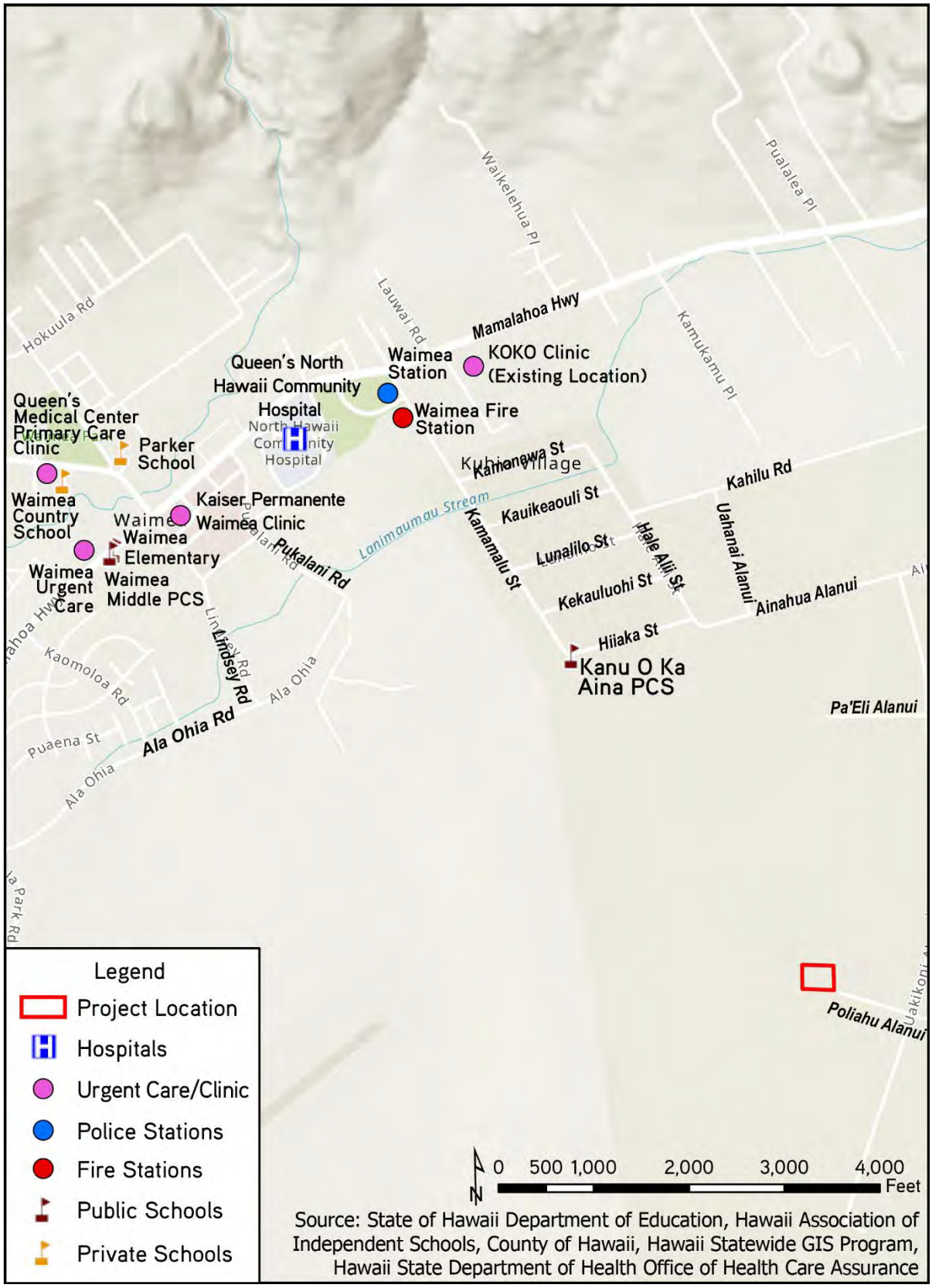
Cumulative impacts are impacts which result from the incremental effects of an activity when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertake such actions. The proposed KOKO Clinic is not anticipated to generate substantial cumulative impacts. The KOKO Clinic is proposed to be located in the planned development of the WNR-CDI; the land uses and potential impacts of the WNR-CDI have been assessed in the 2015 FEA, which declared a FONSI determination. In addition, the

proposed KOKO Clinic is not substantially greater in size or operations in comparison to the clinic's existing operations.

The KOKO Clinic's relocation and upgrade in facility size and capacity would better prepare the Waimea region for anticipated growth as more homestead lots are awarded. The KOKO Clinic envisions serving up to 800 patients in anticipation of the future growth from awarded homestead lots.

In addition, the proposed project would support Hawaiian Homes Commission Act beneficiaries by creating jobs for current and future beneficiaries, as well as providing additional capacity to provide medical services to the larger region of North Hawai'i. The relocation and upgrade of the KOKO Clinic would also allow for the expansion of the clinic's Ulu Laukahi Program, which was created to help Native Hawaiians achieve a longer and healthier lifestyle by providing the necessary tools and lifestyle changes needed to mitigate the factors that contribute to the need for emergency interventions. Expanding the Ulu Laukahi Program would allow the clinic to provide more services and treat more Native Hawaiians in the North Hawai'i region.

Figure 14: Public Facilities and Services



4.0 RELATIONSHIP TO PLANS AND POLICIES

4.1 Federal Aviation Administration

The Federal Aviation Administration (FAA) administers standards and criteria to ensure safe, efficient use and preservation of the navigable airspace surrounding airports. Any construction or alteration to a structure that is more than 200-ft above ground level, or "exceeds an imaginary surface extending outward and upward" at a slope of "50 to 1 for a horizontal distance of 10,000-ft from the nearest point of the nearest runway" of an airport, requires the filing and submittal of FAA Form 7460-1 Notice of Proposed Construction or Alteration. The project site is located approximately 4,500 ft. northeast of the Waimea-Kohala Airport runway. To ensure compliance with the FAA rules and regulations, the FAA Form 7460-1 will be filed for FAA review and determination.

In addition, the FAA has published criteria under 14 Code of Federal Regulations (CFR), Part 150 to assess land use compatibility in and around the vicinity of airports. The *Waimea-Kohala Airport (MUE) Noise Compatibility Program (NCP)*, describes current and future noncompatible land uses based upon the parameters established in Federal Aviation Regulation (FAR) Part 150*, Airport Noise Compatibility Planning (November 1998, rev. December 1999, August 2000)*. The NCP recommends a total of seven measures to prevent the introduction of additional noncompatible land uses and to reduce the effect of the noise generated at the airport. The following measures were identified to be applicable to the proposed project:

1. Comprehensive Planning and Zoning (Page 7-2, Sec. 7.2.2)

Description of element: *Use comprehensive planning and zoning to maintain compatible land use. Prohibit zoning changes which will change a compatible land use into an incompatible land use. However, if the community determines that there is a need for new housing in an area exposed to noise levels of 60 to 65 Yearly Day-Night Average Sound Levels (DNL), then the County of Hawai'i , and the State of Hawai'i-Land Use Commission, should require an avigation easement to State Department of Transportation, Airports Division (DOTA) and acoustical treatment to maintain an interior value of 45 DNL. DOTA should request that new residential developments have lesser densities (i.e. larger size lots), since visual flight rules (VFR) aircraft flight tracks can vary greatly and overflights may be more common. In addition, the DOTA should pursue an "Airport zone" within the airport environs to address height restrictions, noise and other DOTA and FAA concerns.*

FAA Action: APPROVED: *This measure is considered to be within the authority of the State of Hawai'i and the County of Hawai'i. FAA prefers that no noncompatible development take place within the noise exposure map contours. Remedial noise mitigation for new construction that takes place after October 1, 1998, would not be approved under Part 150.*

2. Avigation Easements (Page 7-3, Sec. 7.2.2)

Description of element: *Acquiring avigation easements from landowners that presently have compatible land but may become incompatible due to future development. The acquisition of avigation easements will maintain the operational characteristics of the Airport. The key areas are those lands directly under the aircraft flight tracks.*

FAA Action: APPROVED. *This approval does not constitute a commitment by the FAA to provide federal financial assistance for this project. FAA prefers that no noncompatible development take place within the noise exposure map contours.*

Discussion: The proposed project may fall within the 55 DNL Contour, as depicted in the 2015 FEA-FONSI for the WNR-CDI (see Figure 13). Per the NCP, the Comprehensive Planning and Zoning noise mitigation element is within the authority of the State and County. The proposed project will ensure compliance with State and County noise regulations that may apply to this project.

4.2 State of Hawai‘i Policies

4.2.1 Hawai‘i State Plan

The Hawai‘i State Plan was set forth by the Hawai‘i State Planning Act, which was signed into law in 1978 and codified under HRS Chapter 226. The plan is a long-range comprehensive plan that identifies goals, objectives, policies, and priorities for the State. The plan is divided into three parts, in which the first part identifies the overall theme, goals, objectives, and policies of the State. The listing in the following table identifies the objectives and policies that are met by the proposed project.

Table 4: Hawai‘i State Planning Act Objectives and Policies

HRS Chapter 226 Hawai‘i State Planning Act Part I. Overall Theme, Goals, Objectives and Policies	Applicability to Project
§226-5 Objective and policies for population	**Applicable**
§226-6 Objectives and policies for the economy--in general	Not applicable
§226-7 Objectives and policies for the economy-- agriculture	Not applicable
§226-8 Objective and policies for the economy--visitor industry	Not applicable
§226-9 Objective and policies for the economy--federal expenditures	Not applicable
§226-10 Objective and policies for the economy--potential growth and innovative activities	Not applicable
§226-10.5 Objectives and policies for the economy--information industry	Not applicable
§226-11 Objectives and policies for the physical environment--land-based, shoreline, and marine resources	Not applicable
§226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources	Not applicable
§226-13 Objectives and policies for the physical environment--land, air, and water quality	Not applicable

HRS Chapter 226 Hawai'i State Planning Act Part I. Overall Theme, Goals, Objectives and Policies	Applicability to Project
§226-14 Objective and policies for facility systems--in general	Not applicable
§226-15 Objectives and policies for facility systems--solid and liquid wastes	Not applicable
§226-16 Objective and policies for facility systems--water	Applicable
§226-17 Objectives and policies for facility systems--transportation	Not applicable
§226-18 Objectives and policies for facility systems--energy	Not applicable
§226-18.5 Objectives and policies for facility systems--telecommunications	Not applicable
§226-19 Objectives and policies for socio-cultural advancement--housing	Not applicable
§226-20 Objectives and policies for socio-cultural advancement--health	**Applicable**
§226-21 Objective and policies for socio-cultural advancement--education	Not applicable
§226-22 Objective and policies for socio-cultural advancement--social services	Not applicable
§226-23 Objective and policies for socio-cultural advancement--leisure	Not applicable
§226-24 Objective and policies for socio-cultural advancement--individual rights and personal well-being	Not applicable
§226-25 Objective and policies for socio-cultural advancement--culture	**Applicable**
§226-26 Objective and policies for socio-cultural advancement--public safety	Not applicable
§226-27 Objective and policies for socio-cultural advancement--government	Not applicable

*§**226-5 Objective and policies for population.** (a) It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter.*

(b) To achieve the population objective, it shall be the policy of this State to:

(1) Manage population growth statewide in a manner that provides increased opportunities for Hawaii's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.

(2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.

(3) Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.

(4) Encourage research activities and public awareness programs to foster an understanding of Hawaii's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawaii's population.

(5) Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate family members.

(6) Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population.

(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area. [L 1978, c 100, pt of §2; am L 1986, c 276, §4; am L 1988, c 70, §3; am L 1993, c 213, §3]

Discussion: The proposed project supports the State's objectives and policies in planning for population growth, as one of the purposes for the project is to support the anticipated growth of the Pu'ukapu Homestead. The KOKO Clinic's relocation and upgrade in facility size and capacity would better prepare the Waimea region for anticipated growth as more homestead lots are awarded. The KOKO Clinic envisions serving up to 800 patients in anticipation of the future growth from awarded homestead lots.

The proposed project would support Hawaiian Homes Commission Act beneficiaries by creating jobs for current and future beneficiaries, as well as providing additional capacity to provide medical services to the larger region of North Hawai'i.

§226-20 Objectives and policies for socio-cultural advancement--health. *(a) Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:*

(1) Fulfillment of basic individual health needs of the general public.

(2) Maintenance of sanitary and environmentally healthful conditions in Hawaii's communities.

(3) Elimination of health disparities by identifying and addressing social determinants of health.

(b) To achieve the health objectives, it shall be the policy of this State to:

(1) Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.

(2) Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.

(3) Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.

(4) Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.

(5) Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.

(6) Improve the State's capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement.

(7) Prioritize programs, services, interventions, and activities that address identified social determinants of health to improve native Hawaiian health and well-being consistent with the United States Congress' declaration of policy as codified in title 42 United States Code section 11702, and to reduce health disparities of disproportionately affected demographics, including native Hawaiians, other Pacific Islanders, and Filipinos. The prioritization of affected demographic groups other than native Hawaiians may be reviewed every ten years and revised based on the best available epidemiological and public health data. [L 1978, c 100, pt of §2; am L 1986, c 276, §19; am L 2014, c 155, §2]

Discussion: The proposed project supports the State's objectives and policies in planning for the socio-cultural advancement with regard to health. The KOKO Clinic provides broad services such as primary care services (including pediatric services), women's health services, individual, couple, and family psychotherapy services, acupuncture/lomilomi massage, and psycho-education trainings for community and organizations. In addition, the clinic created the Ulu Laukahi Program, which focuses on providing prevention/intervention services to treat chronic diseases such as diabetes, hypertension, obesity, and mental health concerns (i.e. depression and anxiety). The program is a free, year-long health program for Native Hawaiians that consists of quarterly health screenings, individualized health plans, nutrition and fitness support, and connection to community support and health coaches. The goal of this program is to help Native Hawaiians achieve a longer and healthier lifestyle by providing the necessary tools and lifestyle changes needed to mitigate the factors that contribute to the need for emergency interventions. The relocation and upgrade in facility size and capacity would better prepare the Waimea region for anticipated growth as more homestead lots are awarded, and would also allow the clinic to expand their Ulu Laukahi Program to provide more services and treat more Native Hawaiians.

§226-25 Objective and policies for socio-cultural advancement--culture. *(a) Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawaii's people.*

(b) To achieve the culture objective, it shall be the policy of this State to:

(1) Foster increased knowledge and understanding of Hawaii's ethnic and cultural heritages and the history of Hawaii.

(2) Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawaii's people and which are sensitive and responsive to family and community needs.

(3) Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawaii.

(4) Encourage the essence of the aloha spirit in people's daily activities to promote harmonious relationships among Hawaii's people and visitors. [L 1978, c 100, pt of §2; am L 1986, c 276, §24]

Discussion: The proposed project supports the State's objectives and policies in planning for socio-cultural advancement with regard to culture. The KOKO Clinic's mission and value statement is rooted in fostering Hawaiian cultural, spiritual, and medical practices to treat patients.

The KOKO Clinic Mission Statement reads as follows:

> **"***KOKO provides cultural, spiritual, medical, and psychological services to all residents of North Hawai'i with a special emphasis for the Kānaka Maoli. This mission is our kuleana.*
>
> *KOKO provides culturally-informed direct services, actively collaborates with hawaiian agencies and associations in order to meet their members' needs, and is led by the community it serves."*

The KOKO Clinic Values Statement reads as follows:

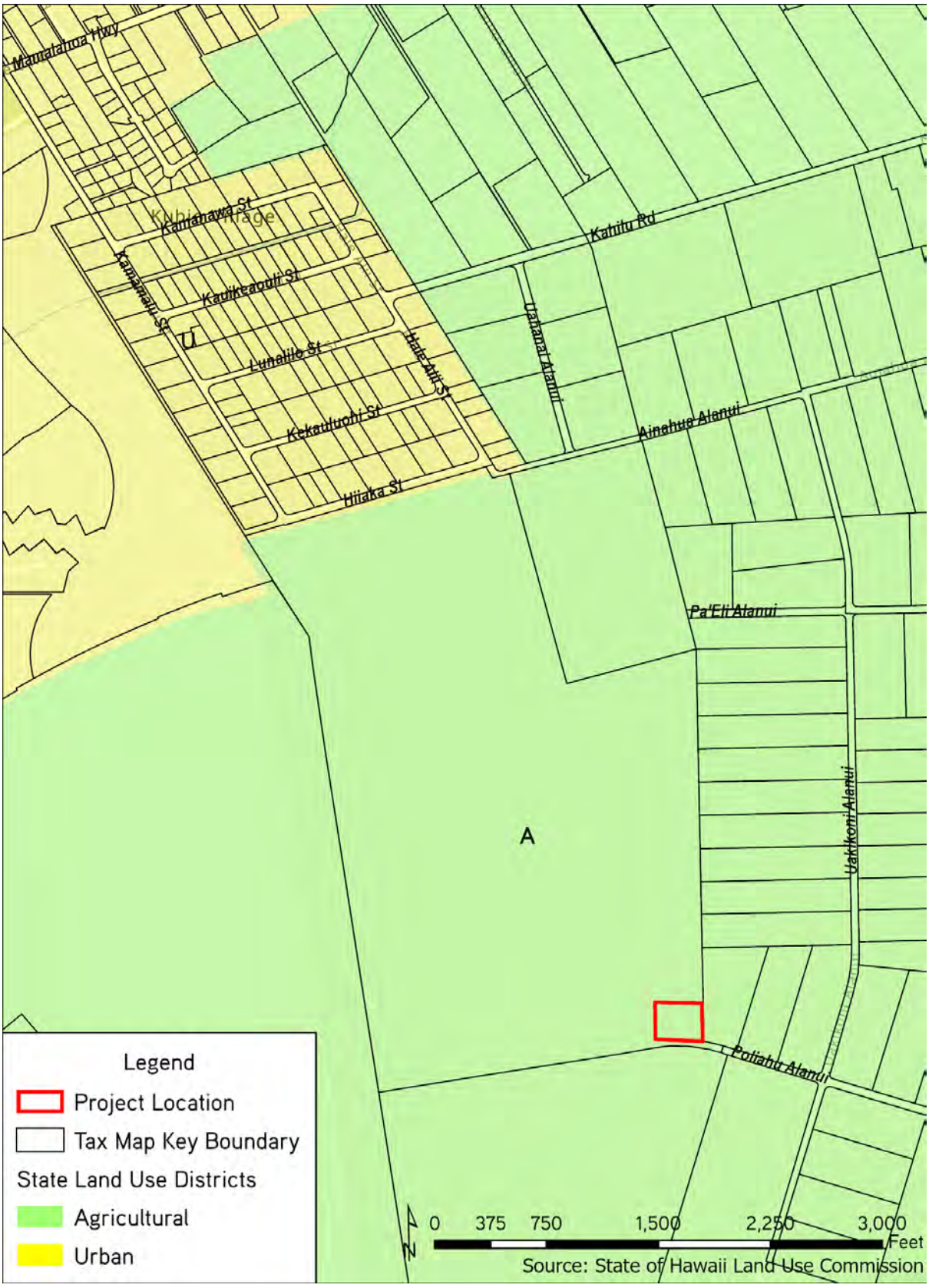
- ***ha'aha'a (humility)** - we will endeavor to be humble servants of the community we serve.*
- ***ho'omana** (to empower) - we will respect, honor, and give determination to the Kanaka Maoli host culture so that their aspirations for optimal wellness are realized.*
- ***lāhui** (united people) - we will build and honor local capacity by selecting staff & strategic partners from those who consider this 'aina (land/place) their home, who are culturally-fluent, and who have a deep resonance with the vision and mission of KOKO.*
- ***'ohana** (family) - we will conduct our organizational life as a family infused with Kanaka Maoli values and perspectives and will serve the 'ohana of North Hawai'i.*

4.2.2 State Land Use Classification

The Hawai'i State Land Use Law, HRS Chapter 205, State Land Use Commission (SLUC), was adopted in 1961. The purpose of the law is to establish a framework of land use management and regulation in which all lands in the State are classified into one of four state land use districts: Urban, Rural, Agricultural or Conservation.

The proposed project is located in the State Land Use Agricultural District (see Figure 15). As the project is within DHHL lands, it is not subject to statutes controlling land use, per Section 206 of the Hawai'i Homes Commission Act, which stipulates "*The powers and duties of the governor and the board of land and natural resources, in respect to lands of the State, shall not extend to lands having the status of Hawaiian home lands, except as specifically provided in this title."* Therefore, the Hawaiian Homes Commission is the authority that determines its land use designations and governs the allowable use and activities within the parcel.

Figure 15: State Land Use Districts



4.2.3 Coastal Zone Management Program, HRS Chapter 205A

The State Coastal Zone Management (CZM) Program, as formalized in HRS Chapter 205A, establishes objectives and policies to "provide for the effective management, beneficial use, protection, and development of the coastal zone." The following are the objectives and policies of the CZM, and the relationship of the proposed project to the applicable considerations:

1) Recreational Resources Objective: Provide coastal recreational opportunities accessible to the public.

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

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

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

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

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

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

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

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

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

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

Discussion: The proposed project site is not located near coastal areas, as the nearest coastline is approximately 10 miles away. Coastal recreational resources are not anticipated to be impacted by the project.

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

a) Identify and analyze significant archaeological resources

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

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

Discussion: Based on the findings of the AIS conducted for the 2015 FEA-FONSI for the WNR-CDI, the proposed KOKO Clinic is not anticipated to adversely impact any known or found archaeological sites. Personnel involved in the project would be informed of the possibility of inadvertent cultural finds and would be made aware of the appropriate notification measures to follow. If any previously unidentified sites or remains are encountered during site work and construction, work in the immediate area shall cease. An archaeologist from SHPD shall be notified and work in the area would be suspended until further recommendations are made.

3) Scenic and Open Space Resources Objective: Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.

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

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

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

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

Discussion: The project is not proposed to be located along the coastline and would not impact any shoreline open space and/or scenic resources. The project's inland location would support the CZM Program in preserving the shoreline open space and scenic resources.

4) Coastal Ecosystems Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

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

b) Improve the technical basis for natural resource management;

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

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

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

Discussion: The proposed project will not impact coastal ecosystems as it is not located along a coastal area.

5) Economic Uses Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

a) Concentrate coastal dependent development in appropriate areas;

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

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

i) Use of presently designated locations is not feasible;

ii) Adverse environmental effects are minimized; and

iii) The development is important to the State's economy.

Discussion: The proposed project will not be located near coastal areas and would not affect coastal development areas of importance to the State's economy or the County of Hawaii.

6) Coastal Hazards Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

a) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;

b) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;

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

d) Prevent coastal flooding from inland projects.

Discussion: The proposed project's inland location would support this objective, as it would be located away from coastal areas that are vulnerable to tsunamis, storm waves, stream flooding, erosion, subsidence, and pollution. The KOKO Clinic would be located approximately 10 miles away from the nearest shoreline, thus it would be outside the tsunami inundation zone and the 3.2 ft sea level rise exposure area. In addition, the project location is within FEMA's Flood Zone X, which is outside of the 1-percent annual chance floodplain.

7) Managing Development Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

a) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

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

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

Discussion: The proposed project would conform to all applicable State regulations; a list of potential permits and approvals required for the project is provided in Section 2.4. In addition, the project is not located within the coastal zone and would not impact any coastal resources.

8) Public Participation Objective: Stimulate public awareness, education, and participation in coastal management.

a) Promote public involvement in coastal zone management processes;

b) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

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

Discussion: The provision for public participation will be provided through the environmental review process as required in HRS, Chapter 343. Agencies and stakeholders consulted during the EA process for the 2015 FEA-FONSI WNR-CDI were contacted during the pre-assessment consultation for this Draft EA (see Section 7.0 and Appendix A).

9) Beach Protection Objective: Protect beaches for public use and recreation.

a) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

b) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to

erosion at the sites and do not interfere with existing recreational and waterline activities; and

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

Discussion: The proposed project would not affect any beaches, as the project site is located approximately 10 miles away from the nearest shoreline.

10) Marine Resources Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

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

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

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

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

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

Discussion: The proposed project does not involve the use or development of marine and coastal resources.

4.2.4 State Historic Preservation

The State Historic Preservation Program, codified by HRS Chapter 6E, is administered by the DLNR SHPD. The program and DLNR SHPD work to provide leadership in preserving, restoring, and maintaining historic and cultural property. Per HRS §6E-08, prior to the commencement of any State agency project that may affect historic property, the agency shall allow the SHPD an opportunity for review of the effect of the proposed project on historic properties, aviation artifacts, or burial sites, especially those listed on the HRHP.

An AIS was prepared for the WNR-CDI during the 2015 FEA-FONSI, which covered the proposed project site. The findings documented in the AIS indicate either no historic properties or a low likelihood that historic properties exist within the proposed KOKO clinic project site. Nonetheless, the project will be reviewed by SHPD in accordance with HRS Chapter 6E. The AIS will be provided as supporting documentation for this review.

4.3 County of Hawai‘i Plans and Polices

4.3.1 County of Hawai‘i General Plan

The COH General Plan was adopted by Ordinance in 1989 and most recently amended in 2012. The County is currently engaged in a comprehensive review of the draft General Plan 2040. The General Plan for the COH sets forth long-range objectives for the general welfare and prosperity of the people of Hawai‘i Island, and broad policies to attain those objectives. The General Plan provides policies and courses of action intended to guide and coordinate growth patterns through the designation and preservation of lands for specified uses.

The COH General Plan includes a Land Use Pattern Allocation Guide (LUPAG), which indicates the general location of various land uses in relation to each other. The LUPAG was created based on projections of future population based on economic and employment evaluations, existing land uses and zoned areas, determination of community facility needs, and transportation demands for the island of Hawai‘i. As shown in Figure 16, the project site is designated as Important Agricultural Land according to the LUPAG.

Per the General Plan, Important Agricultural Lands were designated as those with better potential for sustained high agricultural yields because of soil type, climate, topography, or other factors.

The proposed project advocates the following goals and policies of the COH General Plan:

Public Facilities

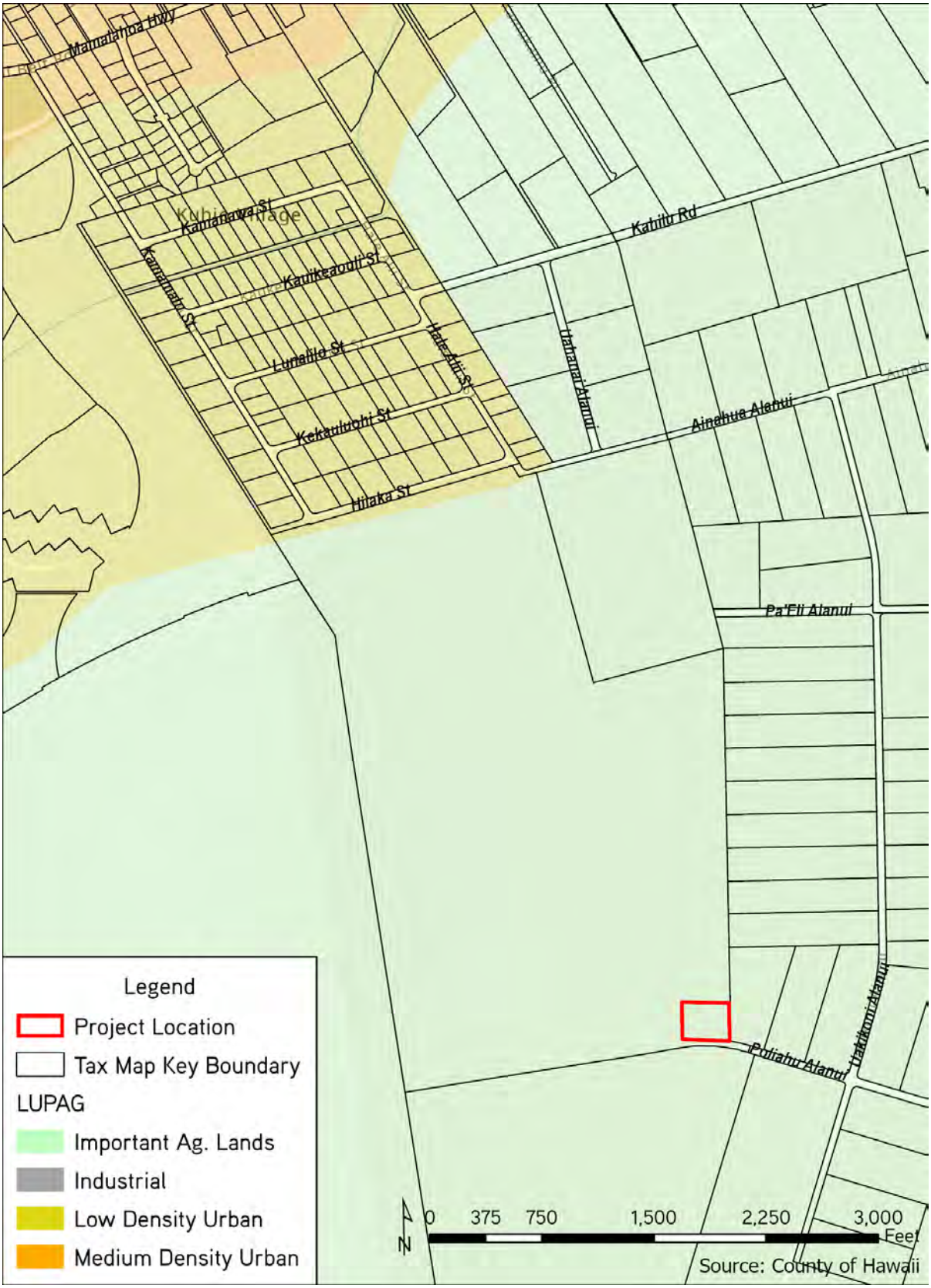
Goal: Encourage the provision of public facilities that effectively service community and visitor needs and seek ways of improving public service through better and more functional facilities in keeping with the environmental and aesthetic concerns of the community.

Policies for Public Facilities - Health and Sanitation:

a) *Encourage the development of new health care facilities or the improvement of existing health care facilities to serve the needs of Hamakua, North and South Kohala, and North and South Kona.*
d) *Encourage the establishment or expansion of community health centers and rural health clinics.*

Discussion: The proposed project would support the COH General Plan’s goal and policies for public facilities by providing additional capacity for medical services to serve the needs of the Pu‘ukapu Homestead beneficiaries, the South Kohala district, and the North Hawai‘i region. In addition, the KOKO Clinic is the first independent (not owned by a hospital, nursing home, or home health agency) rural health clinic in the State. The project proposes to expand the KOKO Clinic’s current operations and capacity and its continued functions as a rural health clinic.

Figure 16: Land Use Pattern Allocation Guide



Land Use

Goal: 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 encourage the intensive and extensive utilization of the County's important agricultural lands. (c) Protect and preserve forest, water, natural and scientific reserves and open areas.

Policies:

(c) Allocate appropriate requested zoning in accordance with the existing or projected needs of neighborhood, community, region and County.

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

(j) Encourage urban development within existing zoned areas already served by basic infrastructure, or close to such areas, instead of scattered development.

Discussion: The project would be relocated to the planned development for the WNR-CDI, which is proposed to be a mixed-use development. This would support the COH General Plan's goal and policies to serve the community's needs, while being cognizant of the balance between the physical and social environment. The WNR-CDI development, in addition to the KOKO Clinic, would address a wide range of agricultural, economic, recreational, health and well-being, and cultural needs.

4.3.2 South Kohala Community Development Plan

The South Kohala Community Development Plan (SK-CDP) was adopted in 2008 and is one of seven community development plans for the COH. The SK-CDP encompasses the towns of Kawaihae, Puakō, Waikoloa, and Waimea. The plan was intended to identify the community's priority issues and develop appropriate policies and actions to address the issues and guide future land use for the district.

Within the SK-CDP, five policies were identified for the Waimea Community, which are based on input received from community meetings, focus group meetings, the South Kohala Steering Committee meetings, and planning studies conducted during that time. The proposed project supports the following policies for the Waimea Community:

1. ***PRESERVATION OF WAIMEA'S SENSE OF PLACE*** *shall be the principal, overarching land use policy for Waimea. This policy shall be implemented through measures for responsible growth, and through the preservation and protection of important lands and resources, including important cultural and historic sites and structures, important agricultural lands, and visually and environmentally important open space areas in Waimea Town.*

Discussion: The proposed project supports the Waimea Community's policy to preserve Waimea's sense of place. The project would not impact any known cultural and/or historic sites that were found during the AIS for the 2015 FEA-FONSI for the WNR-CDI. The KOKO Clinic's expansion exhibits responsible growth as the clinic is preparing for the future growth in population as more homestead lots are awarded within Waimea.

3. ***ENVIRONMENTAL STEWARDSHIP*** *shall be an overarching land use policy for Waimea. Land use decisions shall be based on wise management practices for forests, watersheds, natural drainage ways and streams, native ecosystems, and important agricultural lands.*

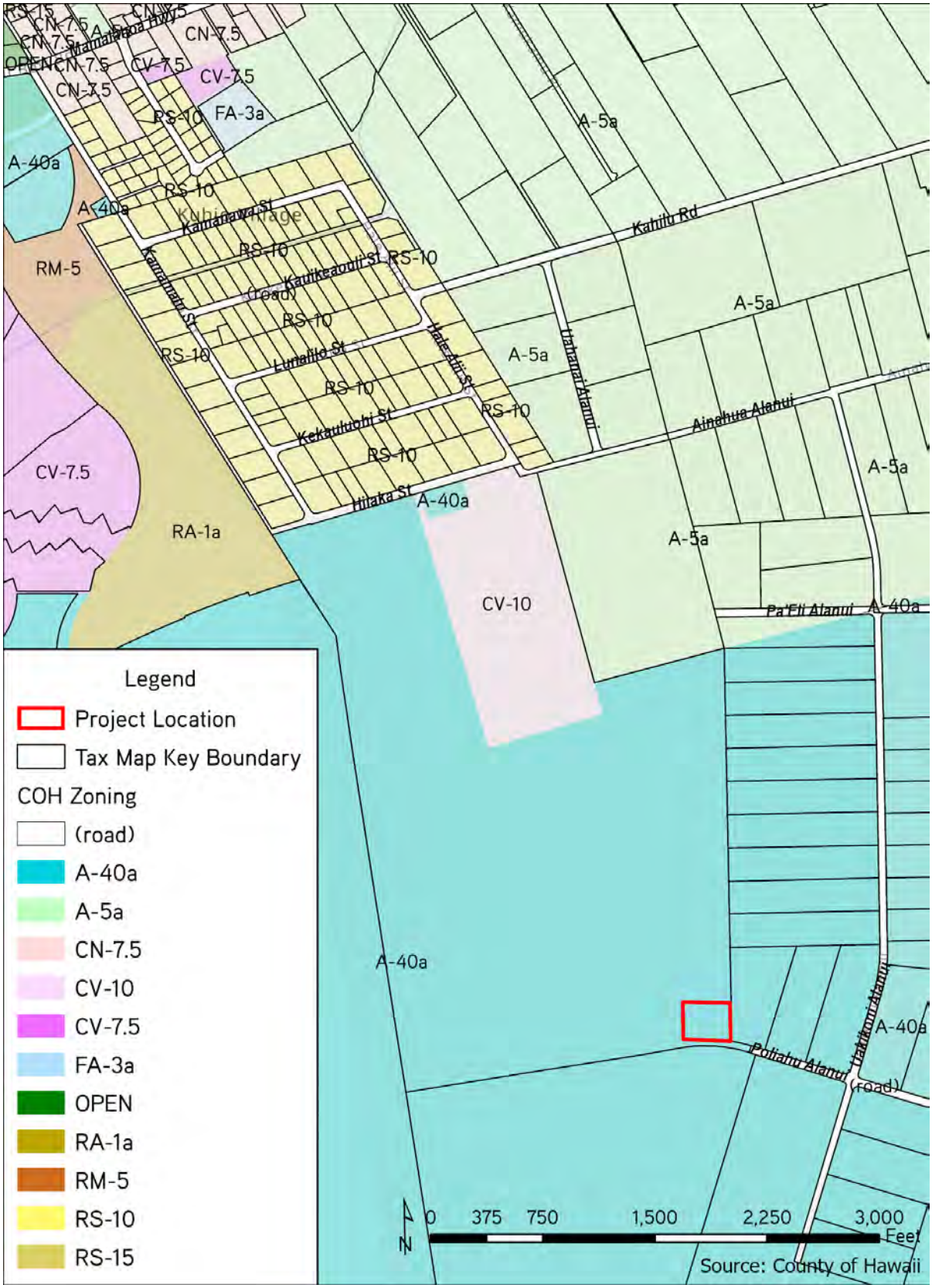
Discussion: The proposed project supports the Waimea Community's policy of environmental stewardship as the project would not impact any forests, watersheds, natural drainage ways and streams, native ecosystems, and/or important agricultural lands that are planned for future agricultural uses.

4.3.3 COH Comprehensive Zoning Ordinance

The COH's Zoning Code is codified under Hawai'i County Code, Chapter 25. The Zoning Code defines the permitted land uses within the State Land Use Urban and Agricultural Districts and provides the development standards and limitations for each zone. The proposed project is within the A-40a zone (see Figure 17), which is an agricultural zone that requires a minimum building site area of 40 acres. The project would be developed within a 2-acre portion of the TMK parcel lot, which is 191.71 acres in total.

In 2002, a Memorandum of Agreement (MOA) between DHHL and the COH was established to identify the respective roles, responsibilities, and obligations of the COH and DHHL relating to land use planning, infrastructure maintenance, enforcement of laws, and collection of taxes and other fees on Hawaiian home lands. As stated in the MOA, the Hawaiian Homes Commission is "responsible for determining land use on Hawaiian home lands. The County may not use its land use and zoning powers to prevent the Hawaiian Homes Commission from controlling the use of Hawaiian home lands." However, both the COH and DHHL share common goals in planning for the uses of Hawaiian home lands and are committed to the integration of planning by each entity. DHHL will work with the COH to ensure that the project is consistent with the surrounding land uses and environment.

Figure 17: County of Hawai'i Zoning



4.4 Department of Hawaiian Home Lands Plans

4.4.1 DHHL Hawai‘i Island Plan

The DHHL's 2002 Hawai‘i Island Plan evaluates the DHHL holdings on Hawai‘i island and identifies land use plans developed to meet beneficiary needs. Island Plans are part of the second tier in DHHL's planning process that focuses on island-specific land use projections. The proposed project is within the Pu‘ukapu Tract, which consists of primarily pastoral and supplemental agriculture DHHL land uses. Under the Hawai‘i Island Plan, the proposed project area is designated for General Agricultural under DHHL's land use categories due to the favorable climate, soil, and slope.

The Pu‘ukapu lots were identified as a non-priority site for development in the Hawai‘i Island Plan. Based on the 2015 FEA-FONSI for the WNR-CDI, the plans for the WNR-CDI were conceptualized and vetted by the Homestead community and was considered a priority project for DHHL. As the KOKO Clinic proposes to be relocated to the WNR-CDI development, the proposed project would follow the development schedule for the WNR-CDI.

The 2015 FEA-FONSI for the WNR-CDI also identified the requirement of a Land Use Designation Amendment approval to DHHL's Hawai‘i Island Plan from the Hawaiian Homes Commission after the FONSI determination. To ensure compliance with Department rules and regulations, the project would ensure that a Land Use Designation Amendment has been filed for the WNR-CDI and would seek to complete any other required amendments needed for the project to be included in the proposed WNR-CDI development.

4.4.2 DHHL Waimea Nui Regional Plan

DHHL regional plans and area development plans are part of the department's third tier in the departments planning system. These plans identify and address issues and opportunities relative to existing homestead communities and their future development. The proposed project is located within the Waimea Nui Regional Plan area. The Waimea Nui Regional Plan includes a list of proposed projects, including a proposed Community Complex in Pu‘ukapu.

The proposed project would support the Waimea Nui Regional Plan through the expansion of the clinic, which would provide health benefits to the Pu‘ukapu Homestead community and the general public. In addition, the relocation of the KOKO Clinic to the WNR-CDI planned development aligns with the goals and vision of the initiative to build a vibrant and self-sufficient community, and to move towards the intent of the Hawaiian Homes Commission Act of 1921 to enable "native Hawaiians to return to their lands in order to fully support self-sufficiency for native Hawaiians and the self-determination of native Hawaiians…"

5.0 ALTERNATIVE TO THE PROPOSED ACTION

The no action alternative would involve no effort to relocate and expand the KOKO Clinic's facility and operations. Under this alternative, environmental effects resulting from development activities would be averted and project costs would be spared. The existing land would instead be developed as an equestrian center complex as was previously planned.

However, the no action alternative would result in none of the community benefits mentioned that would be provided by the KOKO Clinic's relocation and expansion. The proposed project would service the existing and future homestead population that is anticipated to grow as more lots are awarded in the Pu'ukapu Tract. The KOKO Clinic anticipates that it's expansion could service up to 800 additional patients.

Through the no action alternative, the KOKO Clinic would not be able to expand its Ulu Laukahi Program, which provides free year-long health programs for Native Hawaiians. The no action alternative would not support the needs and goals of the homestead community, and would not provide the support services needed to combat the existing and future shortfalls facing the Native Hawaiian community in Waimea and the island of Hawai'i.

This page is intentionally blank…

6.0 FINDINGS AND DETERMINATION

6.1 Determination

The KOKO Clinic Relocation project is determined to not result in a significant impact based on the criteria set forth in HAR §11-200.1-13. This Draft EA includes the discussion of potential environmental effects, which includes the sum of effects on the quality of the environment along with cumulative long-term effects.

As set forth in HAR §11-200.1-13, a prescribed set of 13 Significance Criteria is used to determine the project's impact on the environment. The project's relationship to each criterion is discussed in this section.

6.2 Significance Criteria Findings

To determine whether a proposed action may have a significant effect on the environment under HAR §11-200.1, the Proposing Agency needs to consider every phase of the action, the expected primary and secondary consequences, cumulative effect, and the short- and long-term effects. The Proposing Agency's review and evaluation of the proposed action's effect on the environment would result in a determination whether: 1) the action would have a significant effect on the environment, and an Environmental Impact Statement Preparation Notice should be issued, or 2) the action would not have a significant effect warranting a FONSI.

1. ***Irrevocably commit a natural, cultural, or historic resource;***

   The proposed project would not adversely impact any known or existing natural or cultural resource. The project site is proposed to be on undeveloped agricultural lands with no significant natural resources. As discussed in Section 3.8, no significant archaeological or historical sites are known to exist within the project site. Should any cultural or archaeological resources be found during construction, the SHPD will be immediately notified and the necessary protection measures would be administered.

2. ***Curtail the range of beneficial uses of the environment;***

   The proposed project would be developed on a 2 acre portion of a 191.71 acre lot that is currently undeveloped and zoned for agricultural use. The proposed project is part of the WNR-CDI master plan which includes agricultural uses such as a community agriculture park, agriculture resource center, post-harvest and co-op facilities, and a farmers market building. The project would not curtail the range of beneficial or agricultural uses of the surrounding environment as it would be part of a larger development that includes agricultural uses. In addition, there is a generous supply of agricultural land within the surrounding environment and the Waimea region.

3. ***Conflict with the State's environmental policies or long-term environmental goals established by law;***

   The proposed project does not conflict with the State's long-term environmental policies or goals. The project supports the intention of the environmental policies and goals relative to creating opportunities for residents to improve their health, well-being, and quality of life through health care services that are economically viable.

4. ***Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State;***

   The proposed project would not have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State. Rather, the project would support the economic and social welfare, and cultural practices of the community and Native Hawaiians by providing affordable health services and programs that are rooted in traditional Hawaiian values and culture. In addition, the design, construction work, and expanded operations of the KOKO Clinic would provide employment opportunities for the surrounding community and island of Hawai'i.

5. ***Have a substantial adverse effect on public health;***

   The proposed project will not have a substantial adverse effect on public health. The project would provide long-term beneficial effects on public health through the expanded capacity of health services and programs that would be provided at the KOKO Clinic. Short-term effects to noise, air, and traffic that could result from construction activities would be limited to the construction phase and would be mitigated through BMPs and adherence to regulatory requirements.

6. ***Involve adverse secondary impacts, such as population changes or effects on public facilities;***

   The proposed project would not result in substantial secondary or cumulative impacts to the natural or built environment, or to the social and economic community. Future traffic conditions with or without the project would require traffic signal installation and/or improvements to improve the LOS at the intersections of Māmalahoa Highway and Mana Road and Māmalahoa Highway and Kamamalu Street. As proposed in the 2015 FEA-FONSI for the WNR-CDI, the impacts to water and wastewater generation would be mitigated through the use of available surface water that would be treated on-site as potable water. No impacts to the existing aviation easement restrictions are anticipated as the KOKO Clinic would be within the acceptable design parameters.

7. ***Involve a substantial degradation of environmental quality;***

   The proposed project will not involve substantial degradation of environmental quality. All project activities will be conducted in compliance with Federal, State, and COH rules and regulations governing environmental quality and public health.

8. ***Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions;***

   The proposed project would have a limited and negligible impact on the natural and cultural environment while providing an overall general improvement to the health and well-being of the Pu'ukapu Homestead beneficiaries and Waimea residents. While the project is proposed to be relocated within the WNR-CDI development, the environmental impacts for the WNR-CDI have been previously analyzed and resulted in a FONSI determination. The addition of the KOKO Clinic in the WNR-CDI is not considered to be substantial compared to the overall development planned for the parcel, and would not result in a commitment for larger actions than what has already been assessed in the WNR-CDI FEA-FONSI.

9. ***Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat;***

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

10. ***Have a substantial adverse effect on air or water quality or ambient noise levels;***

    The proposed project will not have a substantial adverse effect on air or water quality or ambient noise levels. Construction activities would result in short-term effects on air, water quality and ambient noise levels but would be mitigated by compliance with COH and DOH rules regulating construction-related activities.

    During operations, the impacts on air and water quality would be minimal. Noise levels would be minimally increased with the addition of the new clinic within the project area, however it is not anticipated to be perceptible by the surrounding land uses.

11. ***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 project site is not 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.

12. ***Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies; or***

    The project site is currently undeveloped, and the KOKO Clinic relocation would not deter from the overall appearance or aesthetics of the area. The KOKO Clinic is proposed to be one-story tall and would not constrain any view planes to Mauna Kea and the Kohala Mountains.

13. Require substantial energy consumption or emit substantial greenhouse gases.

The proposed project would not require substantial energy consumption. The KOKO Clinic's new facility would not require a substantially greater amount of energy consumption compared to the current consumption used for their existing operations.

7.0 AGENCIES AND ORGANIZATIONS CONSULTED

7.1 Consultation List

The following agencies and organizations listed in Table 5 were included in the pre-assessment consultation notification. The comment letters received by the participants were record and are included in Section 7.2; a copy of the comment letters are provided in Appendix A.

Table 5: Agency Consultation List

Distribution	Pre-Assessment Consultation Recipient	Pre-Assessment Comments Received
FEDERAL AGENCIES		
U.S. Fish and Wildlife Service	**X**	**X**
U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)	**X**	
U.S. Department of Agriculture, Hawai‘i County Farm Service Agency	**X**	
U.S. Department of Agriculture, Rural Development	**X**	**X**
U.S. Department of Transportation, Federal Aviation Administration, Flight Standards District Offices	**X**	
U.S. Environmental Protection Agency	**X**	
U.S. Army Corps of Engineers, Regulatory Office	**X**	
U.S. Geological Survey, Pacific Island Ecosystems Research Center	**X**	

Distribution	Pre-Assessment Consultation Recipient	Pre-Assessment Comments Received
STATE OF HAWAIʻI AGENCIES		
State of Hawaiʻi, Department of Land and Natural Resources, Commission on Water Resource Management	**X**	**X**
State of Hawaiʻi, Department of Land and Natural Resources, Division of Forestry and Wildlife	**X**	**X**
State of Hawaiʻi, Department of Land and Natural Resources, Division of Aquatic Resources	**X**	
State of Hawaiʻi, Department of Land and Natural Resources, Engineering Division	**X**	**X**
State of Hawaiʻi, Department of Land and Natural Resources, Land Division	**X**	**X**
State of Hawaiʻi, Department of Land and Natural Resources, State Historic Preservation Division	**X**	
State of Hawaiʻi, Department of Business, Economic Development & Tourism	**X**	
State of Hawaiʻi, Department of Health, Environmental Health Services Division	**X**	
State of Hawaiʻi, Department of Health, Indoor and Radiological Health Branch	**X**	**X**
State of Hawaiʻi, Department of Health, Clean Air Branch	**X**	

Distribution	Pre-Assessment Consultation Recipient	Pre-Assessment Comments Received
State of Hawai'i, Department of Health, Clean Water Branch	X	
State of Hawai'i, Department of Health, Wastewater Branch	X	
State of Hawai'i, Office of Planning and Sustainable Development	X	
State of Hawaii, Department of Education	X	X
State of Hawai'i, Department of Transportation	X	
State of Hawai'i, Department of Transportation, Airports Division	X	
State of Hawai'i, Department of Accounting and General Services	X	X
Hawai'i State Library, Hawai'i Documents Center	X	
Hawai'i, State Public Library, Thelma Parker Memorial Public Library	X	
Office of Hawaiian Affairs	X	
State of Hawai'i, Department of Hawaiian Home Lands, West Hawai'i District Office	X	

Distribution	Pre-Assessment Consultation Recipient	Pre-Assessment Comments Received
COUNTY OF HAWAIʻI		
County of Hawaiʻi, Department of Environmental Management	**X**	
County of Hawaiʻi, Department of Public Works	**X**	
County of Hawaiʻi, Department of Water Supply	**X**	**X**
County of Hawaiʻi, Planning Department	**X**	
County of Hawaiʻi, Department of Parks and Recreation	**X**	
County of Hawaiʻi Fire Department	**X**	**X**
County of Hawaiʻi Police Department	**X**	**X**
ELECTED OFFICIALS		
Office of the Mayor	**X**	
Senate District 4	**X**	
House District 7	**X**	
Hawaiʻi County Council District 9	**X**	
COMMUNITY GROUPS AND ASSOCIATIONS		
Waimea Hawaiian Homesteaders' Association	**X**	

Distribution	Pre-Assessment Consultation Recipient	Pre-Assessment Comments Received
Waimea Community Association	**X**	
Parker Ranch	**X**	
South Kohala Community Development Plan Action Committee	**X**	
Hawai'i Island Economic Development Board	**X**	
North Hawai'i Community Hospital	**X**	

7.2 Summary of Comments

Table 6 provides a summary of the comments received during the pre-assessment consultation period, along with the associated responses and referenced sections in the Draft EA. A copy of the comment letters received are provided in Appendix A.

Table 6: Pre-Assessment Consultation Comments and Responses

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
July 5, 2022	State of Hawai'i, Department of Health Indoor and Radiological Health Branch	Thomas Lileikis, Program Manager	Project activities shall comply with the following Administrative Rules of the Department of Health: - Chapter 11-39 Air Conditioning & Ventilating - Chapter 11-41 Lead-based Paint Activities - Chapter 11-45 Radiation Control - Chapter 11-46 Community Noise Control - Chapter 11-501 Asbestos Requirements - Chapter 11-504 Asbestos Abatement Certification Program Information pertaining to other health and environmental issues may be addressed by other programs within our department.	The DHHL acknowledges the comment provided by the DOH Indoor and Radiological Health Branch that project activities shall comply with the listed Administrative Rules of the DOH. The Draft EA includes references to the applicable Administrative Rules of the DOH, including Chapter 11-39 Air Conditioning & Ventilating and Chapter 11-46 Community Noise Control.	Sections 2.4 and 3.14
July 7, 2022	State of Hawai'i, Department of Accounting and General Services	Christine Kinimaka, Public Works Administrator	Thank you for the opportunity to comment on the subject project. We have no comments to offer at this time as the proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities. However, as we serve many of the agencies to be located in the facility, we would like to be kept informed of the progress and may offer comments at a later date.	The DHHL acknowledges that the State Department of Accounting and General Services has no comments to offer at this time.	N/A
July 13, 2022	United States Department of the Interior, Fish and Wildlife Service	Lindsey Asman, Island Team Manager for Hawai'i Island and Maui Nui	Thank you for reaching out to us for assistance. We received your request for preliminary comments on your preparation of a Draft EA and for our assistance identifying federally listed species that may be affected	The DHHL acknowledges the comment provided by the U.S. Fish and Wildlife Service regarding species list being available on the online Information for Planning and Consultation (IPaC) system.	Section 3.6.2

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			by the proposed project. Species lists are now only available through our online IPaC system. I have attached instructions on how to acquire a species list for your project. We highly recommend paying particular attention to the avoidance and minimization measures in the species list called "General project design guidelines". Implementing these avoidance and minimization measures would avoid adverse effects and take of federally listed species that may be present within the action area. We recommend including all the relevant avoidance and minimization measures into the Draft EA.	The species list for the proposed project area has been included in Section 3.6.2 of the Draft EA. The relevant minimization measures included in the "General project design guidelines" have also been included in Section 3.6.2.	
July 13, 2022	County of Hawai'i, Department of Water Supply	Keith Okamoto, P.E., Manager-Chief Engineer	Please be informed that the water availability in the area, which is subject to change without notice, allows for up to a maximum of 25 units of water per pre-existing lot of record. Each unit of water is equal to an average daily usage of 400 gallons. The subject parcel is currently serviced by a combination 8-inch x 4-inch meter, which is allocated 25 units of water or 10,000 gallons per day. Therefore, the Department cannot provide additional water at this time. Extensive improvements and additions, which may include, but not be limited to, source, storage, booster pumps, transmission, and distribution facilities, would be required. Currently, sufficient funding is not available	The DHHL acknowledges the comments provided by the County of Hawai'i, Department of Water Supply (DWS). Reference to the DWS' comment and the proposed water system included in the 2015 Final Environmental Assessment - Finding of No Significant Impact for the Waimea Nui Regional Community Development Initiative has been included in Section 3.12.1 of the Draft EA. The DHHL acknowledges that further consultation and coordination with the DWS and DOA is required to determine the best possible solution to provide potable water to the project site.	Section 3.12.1

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			from the Department for such improvements and no time schedule is set. The applicant of the subject parcel may proceed to enter into a Water Development Agreement with the Water Board, in accordance with Rule 5 of the Department's Rules and Regulations, to obtain a water commitment from the Department for the proposed development. The Agreement will establish, among other things, the scope of the necessary water system improvements, facilities charges to be paid, and a timeline for construction.		
July 14, 2022	United States Department of Agriculture, Rural Development	Lennie Okano-Kendrick, P.E., Engineer/Environmental Coordinator	This letter is in response to your pre-assessment consultation letter dated July 1, 2022, requesting comments, concerns, or regulatory requirements from the United States Department of Agricultural Rural Development (Agency). Shall the owner of the facility decide to apply for financial assistance from any of our Agency's programs, the applicant/owner and the project will need to comply with environmental requirements set forth in 7 CFR Part 1970 – Environmental Policies and Procedures.	The DHHL acknowledges the U.S. Department of Agriculture (USDA), Rural Development Agency's comment regarding compliance with environmental requirements set forth in 7 CFR Part 1970 - Environmental Policies and Procedures should financial assistance from any of USDA's agency programs be applied for. The KOKO Clinic has received a Rural Business Development planning grant from the USDA for the design of the new clinic. Compliance with 7 CFR Part 1970 - Environmental Policies and Procedures has been listed in Table 1 of the Draft EA.	Section 2.4
July 14, 2022	County of Hawai'i, Fire Department	Clinton Baybayan, Fire Captain	In regards to the above mentioned project, Fire Department Access and Water Supply shall comply with Chapter 18 of the 2018	The DHHL acknowledges the County of Hawai'i Fire Department's comment regarding compliance with Chapter 18 of	Section 3.12.1

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			Hawaii State Fire Code and Chapter 26 of the Hawaii County Code.	the 2018 Hawai'i State Fire Code and Chapter 26 of the Hawai'i County Code. The project's requirement to comply with these codes has been noted in Section 3.12.1 of the Draft EA.	
July 15, 2022	County of Hawai'i, Police Department	Paul Ferreira, Police Chief	In reference to your July 1, 2022 letter regarding the above subject, staff has reviewed your communication and reserves comment until completion and receipt of the Draft Environmental Assessment.	The DHHL acknowledges the comment provided by the County of Hawai'i Police Department to reserve comments until completion of the Draft EA.	N/A
July 22, 2022	State of Hawai'i, Department of Land and Natural Resources, Land Division	Russell Tsuji, Land Administrator	No comments	The DHHL acknowledges that the State Department of Land and Natural Resources, Land Division has no comments at this time.	N/A
July 25, 2022	State of Hawai'i, Department of Land and Natural Resources, Commission on Water Resource Management	M. Kaleo Manuel, Deputy Director	Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These	The DHHL acknowledges the State Commission on Water Resource Management's (CWRM) comments regarding water resources. The recommendations provided by the CWRM have been included in Section 3.12.1 of the Draft EA.	Section 3.12.1

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			documents are available via the Internet at http://dlnr.hawaii.gov/cwrm. Our comments related to water resources are checked off below. - We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EAP as having high water efficiency can be found at http://www.epa.gov/watersense. - We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/ - We recommend the use of alternative water sources, wherever practicable.		

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			- We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf. - The Commission strongly encourages the implementation of water conservation measures, best management practices to mitigate storm water runoff, and the reuse of storm water and the use of other alternative non-potable sources where practicable.		
July 27, 2022	State of Hawai'i, Department of Land and Natural Resources, Division of Forestry and Wildlife	Lainie Berry, Wildlife Program Manager	The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your pre-assessment consultation request for a DEA regarding Waimea Nui Regional Community Development Initiative to relocate KOKO Native Hawaiian Rural Health Clinic to the Department of Hawaiian Home Lands (DHHL) Homestead Lands located in Waimea, in the South Kola District, on the island of Hawai'i, TMK: (3) 6-4-038:011. The proposed project consists of relocating the KOKO Clinic to DHHL Homestead Lands on a 2.5-acre portion of the undeveloped 161-acre property leased by the Waimea Nui Community Development Corporation. The State listed Hawaiian Hoary Bat or 'Ōpe'ape'a (Lasiurus cinereus semotus) could	The DHHL acknowledges the State Department of Land and Natural Resources, Division of Forestry and Wildlife's (DOFAW) recommendations to minimize potential impacts to State listed Hawaiian Hoary Bat, Hawaiian Goose, Hawaiian Hawk, Blackburn's Sphinx Moth, and seabirds, as well as native plant species. The recommendations provided by DOFAW have been included in Section 3.6.2 of the Draft EA.	Section 3.6.2

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			potentially occur at or in the vicinity of the project and may roost in nearby trees. Any required site clearing should be timed to avoid disturbance to bats during their birthing and pup rearing season (June 1 through September 15). During this period woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed. Barbed wire should also be avoided for any construction because bats can become ensnared and killed by such fencing material during flight. Artificial lighting can adversely impact seabirds that may pass through the area at night by causing them to become disoriented. This disorientation can result in their collision with manmade structures or the grounding of birds. For nighttime work that might be required, DOFAW recommends that all lights used to be fully shielded to minimize the attraction of seabirds. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season, from September 15 through December 15. This is the period when young seabirds take their maiden voyage to the open sea. 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. For illustrations and guidance related to seabird-friendly light styles that also protect		

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			seabirds and the dark starry skies of Hawai'i please visit https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf. The State listed Hawaiian Goose or Nēnē (Branta sandvicensis) could potentially occur in the vicinity of the proposed project site. It is against State law to harm or harass these species. If any are present during construction, then all activities within 100 feet (30 meters) should cease, and the bird or birds should not be approached. Work may continue after the bird or birds leave the area of their own accord. If a nest is discovered at any point, please contact the Hawai'i Island Branch DOFAW Office at (808) 974-4221. The State listed Hawaiian Hawk or 'Io (Buteo solitarius) may occur in the project vicinity. DOFAW recommends surveying the area to ensure no Hawaiian Hawk nests are present if trees are to be cut. 'Io nests may be present during the breeding season from March to September. The project area is within the range of the State listed Blackburn's Sphinx Moth (Manduca blackburni) or BSM. Larvae of BSM feed on many nonnative hostplants that include tree tobacco (Nicotiana glauca), which grows in disturbed soil. We recommend contacting the Hawai'i Island Branch DOFAW office at (808) 974-4221 for further information about where BSM may be		

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			present and whether a vegetation survey should be conducted to determine the presence of plants preferred by BSM. DOFAW recommends removing plants less than one meter in height or during the dry time of the year to avoid harm to BSM. If you intend to either remove tree tobacco over one meter in height or to disturb the ground around or within several meters of these plants, they must be thoroughly inspected by a qualified biologist for the presence of BSM eggs and larvae. DOFAW recommends using native plant species for landscaping that are appropriate for the area (i.e., climate conditions are suitable for the plants to thrive, historically occurred there, etc.). Please do not plant invasive species. DOFAW also recommends consulting the Hawai'i-Pacific Weed Risk Assessment website to determine the potential invasiveness of plants proposed for use in the project (https://sites.google.com/site/weedriskassessment/home). Please refer to www.plantpono.org for guidance on the selection and evaluation of landscaping plants. DOFAW recommends minimizing the movement of plant or soil material between worksites. Soil and plant material may contain invasive fungal pathogens (e.g., Rapid 'Ōhi'a Death), vertebrate and invertebrate		

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			pests (e.g., Little Fire Ants, Coconut Rhinoceros Beetles), or invasive plant parts that could harm our native species and ecosystems. We recommend consulting the Big Island Invasive Species Committee (BIISC) at (808) 933-3340 to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species. We appreciate your efforts to work with our office for the conservation of our native species. These comments are general guidelines and should not be considered comprehensive for this site or project. It is the responsibility of the applicant to do their own due diligence to avoid any negative environmental impacts. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Paul Radley, Protected Species Habitat Conservation Planning Coordinator at (808) 295-1123 or paul.m.radley@hawaii.gov.		
July 27, 2022	State of Hawai'i, Department of Land and Natural Resources,	Carty Chang, Chief Engineer	The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a	The DHHL acknowledges the State Department of Land and Natural Resources, Engineering Division's comment regarding the rules and	Section 3.5

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
	Engineering Division		Special Flood Hazard Area (high-risk areas). Be advised that 44CFR, Chapter 1, Subchapter B, Part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards. The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood zones subject to NFIP requirements are identified on FEMA's Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT) could also be used to research flood hazard information.	regulations of the National Flood Insurance Program. The proposed project site is within the Federal Emergency Management Agency's Flood Zone X, which is not a Special Flood Hazard Zone and does not have any regulations for development This discussion is included in Section 3.5 of the Draft EA.	
July 28, 2022	State of Hawai'i, Department of Education	Roy Ikeda, Interim Public Works Manager, Planning Section	Thank you for your letter dated July 1, 2022. Based on the information provided, the proposed project will not impact Hawai'i State Department of Education facilities.	The DHHL acknowledges the State Department of Education's (DOE) comment that the proposed project will not impact any DOE facilities.	N/A
August 30, 2022	County of Hawai'i, Planning Department	Zendo Kern, Planning Director	Thank you for including us in early consultation for this draft environmental assessment. The State Land Use designation of the subject property is Agriculture. Hawai'i Revised Statutes (H.R.S.), Section 205-4.5 allows for "public institutions and buildings that are necessary for agricultural practices"	The DHHL acknowledges COH Planning Department's comment regarding the existing State Land Use designation, LUPAG designation, and the County zoning designation and the reference to the Memorandum of Agreement between the COH and the DHHL. The	Sections 4.2 and 4.3

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			to be permitted uses in Agriculture State Land Use districts. The Land Use Pattern Allocation Guide (LUPAG) Map from the 2005 General Plan designation is Important Agricultural Land. In the face of competition from urban uses, "the protection of important agricultural lands has long been a policy of the County". The County Zoning of the property is also agriculture and noted as A-40a, which provides for agricultural and very low density agriculturally based residential use, encompassing rural areas of good to marginal agricultural and grazing land, forest land, game habitats, and areas where urbanization is not found to be appropriate. The Planning Department herein references the Memorandum of Agreement between the County of Hawai'i and the Department of Hawaiian Homelands (dated January 7, 2003): "County zoning cannot override the authority of the Hawaiian Homes Commission to control the uses of its property". Please continue to inform the County of any changes in preferred zoning designation for the subject (DHHL) parcel; DHHL will choose from existing county zoning districts and the Planning Department will enter those on its maps. Moreover, the Planning Department herein references the November 13, 2019 Attorney General Opinion which opines that under the	DHHL will continue to inform the County of any changes in preferred zoning designation for the subject DHHL parcel.	

Date	Agency/ Organization	Sender	Comment	Response	Referenced Section
			Hawaiian Homes Commission Act, laws that would "significantly affect" DHHL's use of its lands cannot apply to Hawaiian Home Lands. You may reference the enclosed Attorney General's opinion in furtherance of resolving any State/County land use conflicts that may arise for the subject (DHHL) parcel. To wit: "To the extent that the LUC's classifications conflict with DHHL's uses of its lands for homesteading purposes, the HHCA will control and the LUC's classifications cannot be enforced".		

8.0 REFERENCES

Courtney, C.A; Romine, B.M.; Lander, M.; Hintzen, K.D.; Owens, T.M.; Pap, R.A. 2020. "Guidance for Addressing Sea Level Rise in Community Planning in Hawai'i." Prepared by Tetra Tech, Inc. for the University of Hawai'i Sea Grant College Program and State of Hawai'i Department of Land and Natural Resources and Office of Planning, with funding from National Oceanic and Atmospheric Administration Office for Coastal Management Award No. NA16NOS4730016.

County of Hawai'i. "County of Hawai'i General Plan." February 2005. https://www.planning.hawaiicounty.gov/home/showpublisheddocument/30164363720466414183000 0

Giambelluca, T.W., Q. Chen, A. G. Frazier, J. P. Price, Y.-L. Chen, P.-S. Chu, J. K Eischeid, and D.M. Delparte. Online rainfall atlas of Hawai'i. Bulletin of the American Meteorological Society. 2013. http://rainfall.geography.hawaii.edu

Group 70 International. "Waimea Nui Regional Community Development Initiative Final Environmental Assessment." 2015. https://files.hawaii.gov/dbedt/erp/EA_EIS_Library/2015-06-08-HA-FEA-Waimea-Nui-Regional-Community-Development-Initiative.pdf

Hawai'i Climate Mitigation and Adaptation Commission. "Hawai'i Sea Level Rise Vulnerability and Adaptation Report." 2017. https://climateadaptation.hawaii.gov/wpcontent/uploads/2017/12/SLR-Report_Dec2017.pdf

IPCC. "Climate Change 2013: The Physical Science Basis." 2013. http://www.ipcc.ch/report/ar5/wg1/

South Kohala Community, County of Hawai'i Planning Department, and Townscape, Inc. "South Kohala Community Development Plan." November 2008. https://www.planning.hawaiicounty.gov/home/showpublisheddocument/30424063779991988907000 0

State of Hawai'i, Department of Business, Economic Development, and Tourism. "The State of Hawai'i Data Book 2021." 2021. https://dbedt.hawaii.gov/economic/databook/db2021/

Sweet, W. V., Kopp, R. E., Weaver, C. P., Obeysekera, J., Horton, R. M., Thieler, E. R., & Zervas, C. "Global and Regional Sea Level Rise Scenarios for the United States." 2017. https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf

U.S Army Corps of Engineers, Honolulu District. "Waikoloa Maneuver Area Property No. H09HI0359 Comprehensive Strategic Plan for the Waikoloa Maneuver Area 22-MRSs to achieve Response Complete (RC)." June 2021. https://www.poh.usace.army.mil/Portals/10/docs/fuds/Waikoloa%20FUDS/Comprehensive%20Strategic%20Plan%20for%20the%20WMA%2022-MRSs%20to%20achieve%20RC.pdf?ver=9kdaGSFzyVPQdhD1tNjUhg%3d%3d&timestamp=1658342899276

Appendix A – Pre-assessment Consultation Comment Letters

DAVID Y. IGE
GOVERNOR OF HAWAII

ELIZABETH A. CHAR, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

July 5, 2022

Mr. Jared K. Chang, AICP
SSFM International
501 Sumner Street, Suite 620
Honolulu, HI 96817

Dear Mr. Chang:

Thank you for your submittal requesting comments to a Pre-Assessment Consultation for a Draft Environmental Assessment to relocate the Kipuka o ke Ola (KOKO) Native Hawaiian Rural Health Clinic to Department of Hawaiian Home Lands (DHHL) Homestead Lands located in Waimea, South Kohala District, Hawaii Island, Tax Map Key (3) 6-4-038:011.

Project activities shall comply with the following Administrative Rules of the Department of Health:

- Chapter 11-39 Air Conditioning & Ventilating
- Chapter 11-41 Lead-based Paint Activities
- Chapter 11-45 Radiation Control
- Chapter 11-46 Community Noise Control
- Chapter 11-501 Asbestos Requirements
- Chapter 11-504 Asbestos Abatement Certification Program

Information pertaining to other health and environmental issues may be addressed by other programs within our department.

Should you have any questions, please contact me at (808) 586-4700.

Sincerely,

Thomas G. Lileikis
Program Manager
Indoor and Radiological Health Branch

SSFM International
Innovate | Adapt | Sustain

October 3, 2022

SSFM 2021_043.000

TO: State of Hawai'i
Department of Health
Indoor and Radiological Health Branch
P.O. Box 3378
Honolulu, Hawai'i 96801

Attention: Mr. Thomas Lileikis, Program Manager

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation Comment Response Letter

Dear Mr. Lileikis,

Thank you for your July 5, 2022 letter commenting on the Pre-Assessment Consultation letter for the subject project. The State Department of Hawaiian Home Lands acknowledges the comment provided by the State Department of Health (DOH), Indoor and Radiological Health Branch that project activities shall comply with the listed Administrative Rules of the DOH. Sections 2.4 and 3.14 of the Draft Environmental Assessment (Draft EA) includes references to the applicable Administrative Rules of the DOH, including Chapter 11-39 Air Conditioning & Ventilating and Chapter 11-46 Community Noise Control.

A copy of your July 5, 2022 letter, as well as this response letter, will be included in the Draft EA. We appreciate your participation in the EA process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

Jared K. Chang, AICP
Manager, Strategic Services Group
Email: jchang@ssfm.com

DAVID Y. IGE
GOVERNOR

CURT T. OTAGURO
COMPTROLLER

AUDREY HIDANO
DEPUTY COMPTROLLER

SSFM INTERNATIONAL, INC.
RECEIVED
JUL 1 1 202
(P)22.XXX

FILE COPY

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

JUL - 7 2022

SSFM International, Inc.
Attn: Jared Chang
501 Sumner Street, Suite 620
Honolulu, HI 96817

Dear Mr. Chang:

Subject: Pre-Consultation Assessment for Draft Assessment for
Waimea Nui Regional Community Development Initiative
Kipuka o ke Ola (KOKO) Clinic Relocation
Waimea, S. Kohala, Hawaii Island, Hawaii
TMK: (3) 6-4-038: 011

Thank you for the opportunity to comment on the subject project. We have no comments to offer at this time as the proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities. However, as we serve many of the agencies to be located in the facility, we would like to be kept informed of the progress and may offer comments at a later date

If you have any questions, your staff may call Ms. Gayle Takasaki of the Planning Branch at (808) 586-0584.

Sincerely,

CHRISTINE L. KINIMAKA
Public Works Administrator

GT:mo
c: Mari Joy Angsioco, DAGS HDO

SSFM International
Innovate | Adapt | Sustain

October 3, 2022

SSFM 2021_043.000

TO: State of Hawai'i
Department of Accounting and General Services
P.O. Box 119
Honolulu, Hawai'i 96810

Attention: Ms. Christine Kinimaka, Public Works Administrator

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation Comment Response Letter

Dear Ms. Kinimaka,

Thank you for your July 7, 2022 letter commenting on the Pre-Assessment Consultation Letter for the subject project. The State Department of Hawaiian Home Lands acknowledges that the State Department of Accounting and General Services does not have any comments to offer at this time.

A copy of your July 7, 2022 letter, as well as this response letter, will be included in the Draft Environmental Assessment. We appreciate your participation in the Environmental Assessment process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

Jared K. Chang, AICP
Manager, Strategic Services Group
Email: jchang@ssfm.com

501 Sumner Street | Suite 620 | Honolulu, Hawaii 96817 | Tel 808.531.1308 | Fax 855.329.7736 | www.ssfm.com
Planning | Project & Construction Management | Structural, Civil & Traffic Engineering

DEPARTMENT OF WATER SUPPLY • COUNTY OF H
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

July 13, 2022

Mr. Jared K. Chang, AICP, Senior Planner
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, HI 96817

Dear Mr. Chang:

SUBJECT: Waimea Nui Regional Community Development Initiative
Kipuka o ke Ola (KOKO) Clinic Relocation
Pre-Assessment Consultation for Draft Environmental Assessment
Tax Map Key 6-4-038:011

We have reviewed the Pre-Assessment for the Draft Environmental Assessment and have the following comments.

Please be informed that the water availability in the area, which is subject to change without notice, allows for up to a maximum of 25 units of water per pre-existing lot of record. Each unit of water is equal to an average daily usage of 400 gallons. The subject parcel is currently serviced by a combination 8-inch x 4-inch meter, which is allocated 25 units of water or 10,000 gallons per day.

Therefore, the Department cannot provide additional water at this time. Extensive improvements and additions, which may include, but not be limited to, source, storage, booster pumps, transmission, and distribution facilities, would be required. Currently, sufficient funding is not available from the Department for such improvements and no time schedule is set.

The applicant of the subject parcel may proceed to enter into a Water Development Agreement with the Water Board, in accordance with Rule 5 of the Department's Rules and Regulations, to obtain a water commitment from the Department for the proposed development. The Agreement will establish, among other things, the scope of the necessary water system improvements, facilities charges to be paid, and a timeline for construction.

Should there be any questions, please contact Mr. Troy Samura of our Water Resources and Planning Branch at (808) 961-8070, extension 255.

Sincerely yours,

Keith K. Okamoto, P.E.
Manager-Chief Engineer

TS:dmj

. . . Water, Our Most Precious Resource . . . Ka Wai A Kāne . . .

SSFM International
Innovate | Adapt | Sustain

October 3, 2022 SSFM 2021_043.000

TO: County of Hawai'i
Department of Water Supply
345 Kekuanao'a St., Suite 20
Hilo, Hawai'i 96720

Attention: Mr. Keith Okamoto, P.E., Manager-Chief Engineer

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation Comment Response Letter

Dear Mr. Okamoto,

Thank you for your July 13, 2022 letter commenting on the Pre-Assessment Consultation letter for the subject project. The State Department of Hawaiian Home Lands (DHHL) acknowledges the comments provided by the County of Hawai'i, Department of Water Supply (DWS). The DHHL acknowledges that further consultation and coordination with the DWS and State Department of Agriculture is required to determine the best possible solution to provide potable water to the project site.

In addition, reference to the DWS' comment and the proposed water system described in the 2015 Final Environmental Assessment - Finding of No Significant Impact (FEA-FONSI) for the Waimea Nui Regional Community Development Initiative (WNR-CDI) has been included in Section 3.12.1 of the Draft Environmental Assessment (Draft EA). In the 2015 FEA-FONSI, it was proposed that the WNR-CDI development use agriculture water from the Waimea Irrigation System, which is managed by the State Department of Agriculture (DOA), to be treated and distributed on-site for potable use. The system would be certified through the DOH as a public water system. As the Waimea Irrigation System experiences low pressure during peak flows, a tank farm was proposed to be constructed so that water from the system would fill on-site tanks during off-peak hours to meet potable and non-potable water demands without adversely affecting the irrigation system. As the KOKO Clinic would be relocated to the WNR-CDI's site, it is anticipated that it would be serviced by the same water system. It should be noted that the water system and proposed developments indicated in the 2015 FEA-FONSI have not been developed as of the date of this letter.

A copy of your July 13, 2022 letter, as well as this response letter, will be included in the Draft EA. We appreciate your participation in the EA process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

Jared K. Chang, AICP
Manager, Strategic Services Group
Email: jchang@ssfm.com

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai'i 96850

Subject: IPaC generated official species list for the Pacific Islands Fish and Wildlife Office

Dear Action Agency or Applicant:

The Pacific Islands Fish and Wildlife Office (PIFWO) is transitioning to the Information for Planning and Consultation (IPaC) online portal, https://ipac.ecosphere.fws.gov/ for federal action agencies and non-federal agencies or individuals to obtain official species lists, including threatened and endangered species, designated critical habitat, and avoidance and minimization measures to consider in your general project design. IPaC has been used by continental USFWS offices to provide official species lists and avoidance and minimization guidance since 2017. Using IPaC expedites the process for species list distribution. Obtaining a species list in IPaC is relatively straightforward and takes minimal time to complete. Step by step instructions are included below.

Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of your species list should be verified after 90 days. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change the species list. Verification can be completed by visiting the IPaC website at regular intervals during project planning and implementation. An updated list may be requested through the IPaC system by completing the same process used to obtain the initial species list.

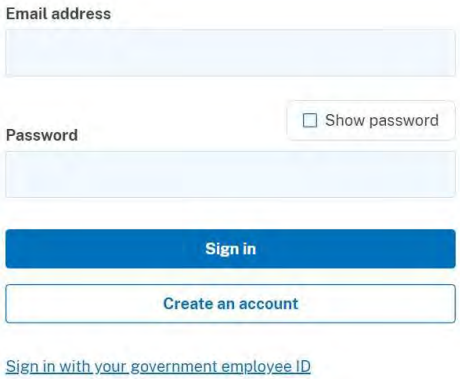
We hope this process provides efficiencies to our partners in obtaining a species list. For federal action agencies, it also opens additional IPaC functionality that the PIFWO office is still working on, such as the use of Determination Keys for informal section 7 programmatic consultations. We will let our agency partners know when that functionality becomes available.

If you have questions about a species list obtained through the IPaC system or need assistance in completing an IPaC species list request, please contact the Service at 808-792-9400 or via email at pifwo_admin@fws.gov. We appreciate your efforts to conserve listed species across the Pacific Islands.

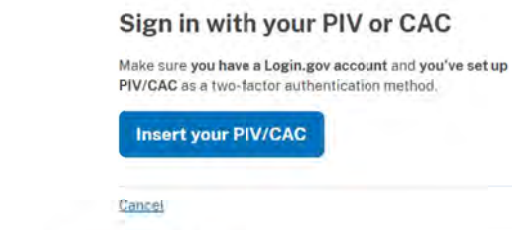
Instructions for Action Agencies and partners to obtain an official species list in IPaC

- Navigate to https://ipac.ecosphere.fws.gov/
- You can get an unofficial species list without logging in. However, if you want an official species list you will need to log in first using your Login.gov account. If you don't have an IPaC account, they are easy to create.

Select Log in with Login.gov and sign in using your email and password.

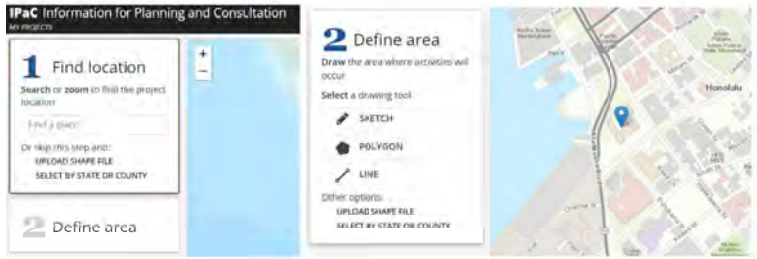


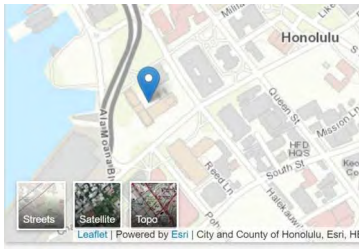
If you have a PIV or CAC card, you can sign in using that method as well.



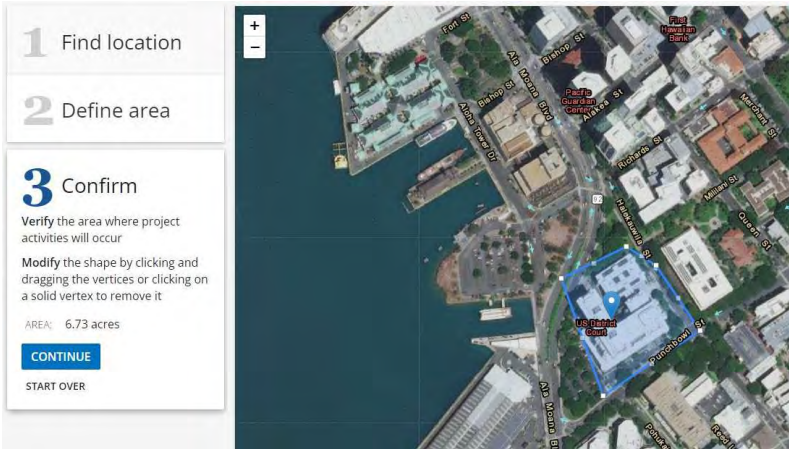
- Once you log in, select "Get Started".

- Define the action area: Identify the location of the proposed action by uploading an existing shapefile or by entering an address or coordinates of the action area. Once identified on the map, you can manually draw the action area using the drawing tools.



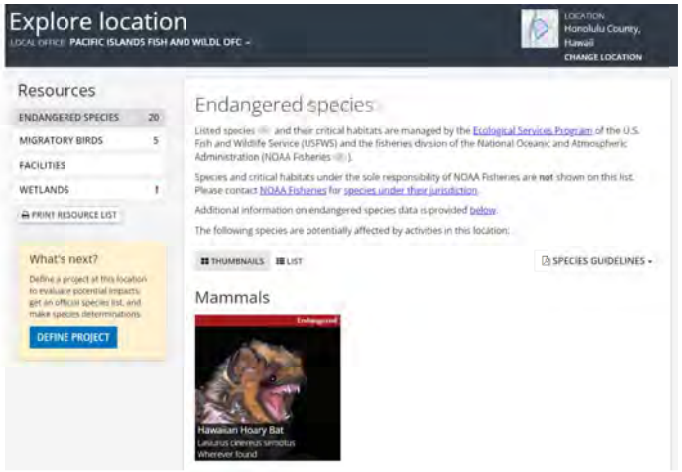


To help identify your action area you can choose between multiple base maps available.

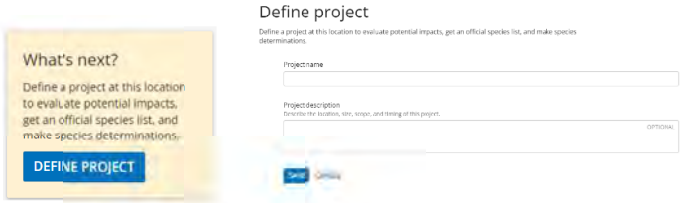


Press continue when you have finished drawing or uploading the action area location.

- The species information on the page that follows is not official. However, it identifies the project County, local Fish and Wildlife Field Office, species covered under NOAA Fisheries as well as Migratory Bird Treaty Act species. The list can be viewed in Thumbnail or List format.
- Once the species list populates you will see images of the species that may occur on, near, or transgress across your project. Click on SPECIES GUIDELINES on your top right to see Avoidance and Minimization measures to incorporate into your General Project Design Guidelines.

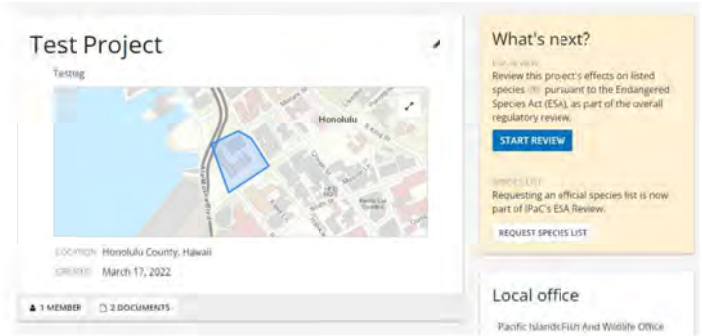


- Continue with the following steps to comply with the requirements of ESA section 7 to obtain an **official species list**.
- Select Define Project

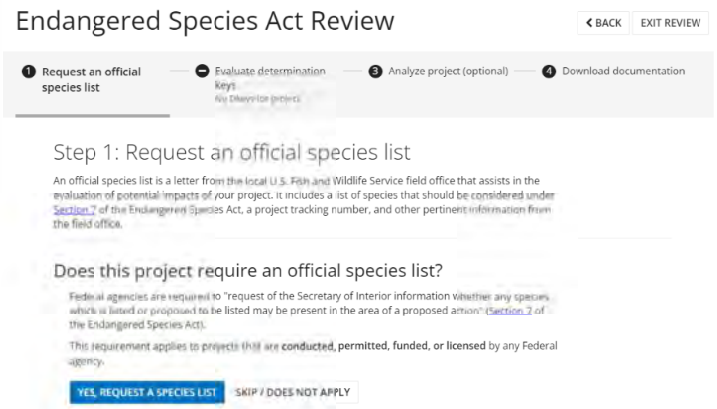


Enter the Project Name and a brief description of the project (a description is not mandatory, but recommended for future coordination with the Service). Click SAVE at bottom of page.

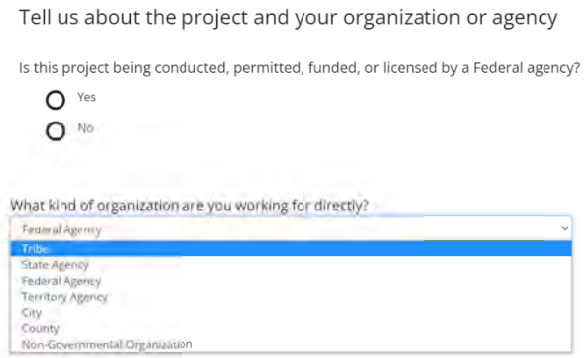
- At the bottom of the What's next box on the right, click Request Species List



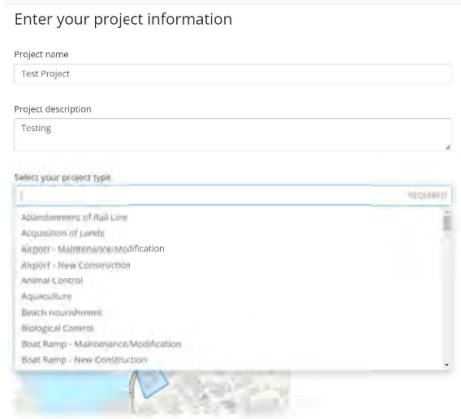
- on the following screen, click Yes, Request Species List



- Fill out the contact information for yourself or your agency. Contractors, state partners, and any other project proponents may request a species list and should be covered using the dropdown menus.



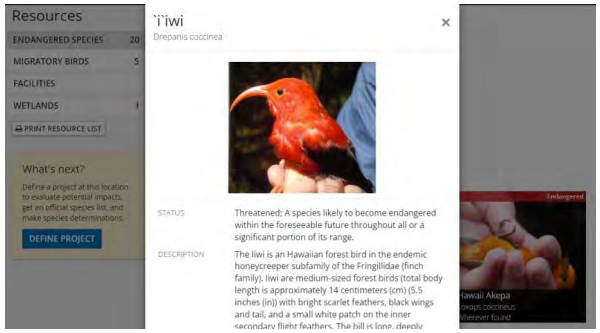
- From the pull-down menu for Classify Type of Project, select the project type that best fits the proposed action.



- Once all required sections are filled out, press SUBMIT OFFICIAL SPECIES LIST REQUEST

SUBMIT OFFICIAL SPECIES LIST REQUEST

- An Official Species List should be generated and available for download in a couple of seconds.
- If you need additional information on a species, click on their name that is hot-linked to their species information page. A brief overview of the species' status, description and critical habitat will appear as well as a link to their ECOS species profile.



SSFM International
Innovate | Adapt | Sustain

October 3, 2022 SSFM 2021_043.000

TO: U.S. Department of Interior
Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai'i 96850

Attention: Ms. Lindsy Asman, Island Team Manager

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation Comment Response Letter

Dear Ms. Asman,

Thank you for your July 13, 2022 email commenting on the Pre-Assessment Consultation letter for the subject project. The State Department of Hawaiian Home Lands (DHHL) acknowledges the comment provided by the U.S. Fish and Wildlife Service regarding species list being available on the online Information for Planning and Consultation (IPaC) system. The species list for the proposed project area has been included in Section 3.6.2 of the Draft Environmental Assessment (Draft EA). The relevant minimization measures included in the "General Project Design Guidelines" have also been included in Section 3.6.2, and are included as Appendix B of the Draft EA.

A copy of your July 13, 2022 email, as well as this response letter, will be included in the Draft EA. We appreciate your participation in the EA process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

Jared K. Chang, AICP
Manager, Strategic Services Group

501 Sumner Street | Suite 620 | Honolulu, Hawaii 96817 | Tel 808.531.1308 | Fax 855.329.7736 | www.ssfm.com
Planning | Project & Construction Management | Structural, Civil & Traffic Engineering

USDA
United States Department of Agriculture

July 14, 2022

VIA EMAIL ONLY: jchang@ssfm.com

Mr. Jared K. Chang, AICP
Senior Planner, SSFM International
501 Sumner Street
Honolulu, HI 96817

RE: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation for Draft Environmental Assessment

Aloha Mr. Chang,

This letter is in response to your pre-assessment consultation letter dated July 1, 2022, requesting comments, concerns, or regulatory requirements from the United States Department of Agricultural Rural Development (Agency). Shall the owner of the facility decide to apply for financial assistance from any of our Agency's programs, the applicant/owner and the project will need to comply with environmental requirements set forth in 7 CFR Part 1970 – Environmental Policies and Procedures.

Thank you for the opportunity to comment on your project. Please do not hesitate to contact me at (808) 933-8304 or Lennie.Okano-Kendrick@usda.gov if you have any questions or need further information.

Mahalo,

LENNIE OKANO-KENDRICK
Digitally signed by LENNIE OKANO-KENDRICK
Date: 2022.07.14 10:30:06 -10'00'

Lennie Okano-Kendrick, P.E.
Engineer / Environmental Coordinator
Hawai'i, Western Pacific and American Samoa

Rural Development
154 Waianuenue Avenue, Rm 311, Hilo, Hawaii 96720
Voice (808) 933-8380 • Fax 1-855-878-2460

USDA is an equal opportunity provider, employer, and lender.

SSFM International
Innovate | Adapt | Sustain

October 3, 2022

SSFM 2021_043.000

TO: U.S. Department of Agriculture
Rural Development Agency
154 Waianuenue Avenue, Rm 311
Hilo, Hawai'i 96720

Attention: Ms. Lennie Okano-Kendrick, P.E., Engineer/Environmental Coordinator

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation Comment Response Letter

Dear Ms. Okano-Kendrick,

Thank you for your July 14, 2022 letter commenting on the Pre-Assessment Consultation letter for the subject project. The State Department of Hawaiian Home Lands (DHHL) acknowledges the U.S. Department of Agriculture (USDA), Rural Development Agency's comment regarding compliance with environmental requirements set forth in 7 CFR Part 1970 - Environmental Policies and Procedures should financial assistance from any of USDA's agency programs be applied for. The KOKO Clinic has received a Rural Business Development planning grant from the USDA for the design of the new clinic. Compliance with 7 CFR Part 1970 - Environmental Policies and Procedures has been listed in Table 1 of the Draft Environmental Assessment (Draft EA).

A copy of your July 14, 2022 letter, as well as this response letter, will be included in the Draft EA. We appreciate your participation in the EA process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

Jared K. Chang, AICP
Manager, Strategic Services Group
Email: jchang@ssfm.com

Mitchell D. Roth
Mayor

Paul K. Ferreira
Police Chief

Kenneth Bugado Jr.
Deputy Police Chief

County of Hawai`i

POLICE DEPARTMENT

349 Kapi'olani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

July 15, 2022

SSFM International, Inc.
RECEIVED
7.21.2022

Mr. Jared K. Chang, AICP
Senior Planner
SSFM International, Inc.
99 Aupuni Street, Suite 202
Hilo, HI 96720

SUBJECT: WAIMEA NUI REGIONAL COMMUNITY DEVELOPMENT INITIATIVE
KĪPUKA O KE OLA (KOKO) CLINIC RELOCATION
TAX MAP KEY: (3) 6-4-038:011 POR.
WAIMEA, SOUTH KOHALA DISTRICT, ISLAND OF HAWAI'I
PRE-ASSESSMENT CONSULTATION FOR DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Chang:

In reference to your July 1, 2022 letter regarding the above subject, staff has reviewed your communication and reserves comment until completion and receipt of the Draft Environmental Assessment.

If you have any additional questions or concerns regarding this matter, please feel free to contact Captain Jeremie Evangelista, Commander of our South Kohala District, at (808) 887-3080 or via email at jeremie.evangelista@hawaiicounty.gov.

Sincerely,

PAUL K. FERREIRA
POLICE CHIEF

JCE/jaj
22HQ0782

"Hawai'i County is an Equal Opportunity Provider and Employer"

SSFM International
Innovate | Adapt | Sustain

October 3, 2022

SSFM 2021_043.000

TO: County of Hawai'i
Police Department
349 Kapi'olani St.
Hilo, Hawai'i 96720

Attention: Mr. Paul Ferreira, Police Chief

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation Comment Response Letter

Dear Mr. Ferreira,

Thank you for your July 15, 2022 letter commenting on the Pre-Assessment Consultation letter for the subject project. The State Department of Hawaiian Home Lands acknowledges the comment provided by the County of Hawai'i, Police Department to reserve comments until completion of the Draft Environmental Assessment (Draft EA).

A copy of your July 15, 2022 letter, as well as this response letter, will be included in the Draft EA. We appreciate your participation in the EA process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

Jared K. Chang, AICP
Manager, Strategic Services Group
Email: jchang@ssfm.com

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Jul 29, 2022

SSFM International, Inc.
Attn: Mr. Jared Chang, Senior Planner
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

via email: jchang@ssfm.com

Dear Mr. Chang:

SUBJECT: Pre-Assessment Consultation for DEA for **Kipuka o ke Ola** (KOKO) Clinic Relocation located at Waimea, South Kohala District, Island of Hawaii; TMK: (3) 6-4-038:011 por., on behalf of Waimea Nui Regional Community Development Initiative (WNR-CDI)

Thank you for the opportunity to review and comment on the subject matter. The Land Division of the Department of Land and Natural Resources (DLNR) distributed or made available a copy of your request pertaining to the subject matter to DLNR's Divisions for their review and comments.

At this time, enclosed are comments from the (a) Engineering Division, (b) Division of Forestry & Wildlife, and (c) Land Division-Hawaii District on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

7/22/22

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Jul 8, 2022

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
X Engineering Division (DLNR.ENGR@hawaii.gov)
X Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
___Office of Conservation & Coastal Lands
X Land Division – Hawaii District (gordon.c.heit@hawaii.gov)

FROM: Russell Y. Tsuji, Land Administrator Russell Tsuji
SUBJECT: Pre-Assessment Consultation for DEA for **Kipuka o ke Ola** (KOKO) Clinic Relocation
LOCATION: Waimea, South Kohala District, Island of Hawaii; TMK: (3) 6-4-038:011 por.
APPLICANT: SSFM International on behalf of Waimea Nui Regional Community Development Initiative (WNR-CDI)

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **July 29, 2022.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

( ) We have no objections.
(✓) We have no comments.
( ) We have no additional comments.
( ) Comments are included/attached.

Signed:
Print Name: GORDON C. HEIT
Division: Land Division
Date: 7/22/22

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON

MICHAEL G. BUCK
ELIZABETH A. CHAR, M.D.
NEIL J. HANNAHS
AURORA KAGAWA-VIVIANI, PH.D.
WAYNE K. KATAYAMA
PAUL J. MEYER

M. KALEO MANUEL
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

July 25, 2022

REF: RFD.4130.8

TO: Mr. Jared Chang, AICP, Senior Planner
SSFM International, Inc.

FROM: M. Kaleo Manuel, Deputy Director
Commission on Water Resource Management

SUBJECT: Waimea Nui Regional Community Development Initiative

FILE NO.: RFD.4130.8
TMK NO.: (3) 6-4-038:011 por.

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://dlnr.hawaii.gov/cwrm.

Our comments related to water resources are checked off below.

- [ ] 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.
- [ ] 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.
- [ ] 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.
- [X] 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EAP as having high water efficiency can be found at http://www.epa.gov/watersense.
- [X] 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/
- [X] 6. We recommend the use of alternative water sources, wherever practicable.
- [ ] 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program.
- [X] 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf.

- [ ] 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.
- [ ] 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.
- [ ] 11. The Hawaii Water Plan is directed toward the achievement of the utilization of reclaimed water for uses other than drinking and for potable water needs in one hundred per cent of State and County facilities by December 31, 2045 (§174C-31(g)(6), Hawaii Revised Statutes). We strongly recommend that this project consider using reclaimed water for its non-potable water needs, such as irrigation. Reclaimed water may include, but is not limited to, recycled wastewater, gray water, and captured rainwater/stormwater. Please contact the Hawai'i Department of Health, Wastewater Branch, for more information on their reuse guidelines and the availability of reclaimed water in the project area.
- [ ] 12. A Well Construction Permit(s) is (are) are required before the commencement of any well construction work.
- [ ] 13. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.
- [ ] 14. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.
- [ ] 15. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.
- [ ] 16. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a steam channel.
- [ ] 17. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.
- [ ] 18. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.
- [ ] 19. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

- [X] OTHER: Planning -

The Commission strongly encourages the implementation of water conservation measures, best management practices to mitigate storm water runoff, and the reuse of storm water and the use of other alternative non-potable sources where practicable.

If you have any questions, please contact Katie Roth of the Commission staff at (808) 587-0216.

SSFM International
Innovate | Adapt | Sustain

October 3, 2022 SSFM 2021_043.000

TO: State of Hawai'i
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, Hawai'i 96809

Attention: Mr. M. Kaleo Manuel, Deputy Director

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation Comment Response Letter

Dear Mr. Manuel,

Thank you for your July 25, 2022 letter commenting on the Pre-Assessment Consultation letter for the subject project. The State Department of Hawaiian Home Lands acknowledges the State Commission on Water Resource Management's (CWRM) comments regarding water resources. The recommendations provided by the CWRM have been included in Section 3.12.1 of the Draft Environmental Assessment (Draft EA).

A copy of your July 25, 2022 letter, as well as this response letter, will be included in the Draft EA. We appreciate your participation in the EA process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

Jared K. Chang, AICP
Manager, Strategic Services Group
Email: jchang@ssfm.com

501 Sumner Street | Suite 620 | Honolulu, Hawaii 96817 | Tel 808.531.1308 | Fax 855.329.7736 | www.ssfm.com
Planning | Project & Construction Management | Structural, Civil & Traffic Engineering

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Jul 8, 2022

MEMORANDUM

FROM: ~~TO:~~ **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
X Engineering Division (DLNR.ENGR@hawaii.gov)
X Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
___Office of Conservation & Coastal Lands
X Land Division – Hawaii District (gordon.c.heit@hawaii.gov)

TO: ~~FROM:~~ Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Pre-Assessment Consultation for DEA for **Kipuka o ke Ola** (KOKO) Clinic Relocation
LOCATION: Waimea, South Kohala District, Island of Hawaii; TMK: (3) 6-4-038:011 por.
APPLICANT: SSFM International on behalf of Waimea Nui Regional Community Development Initiative (WNR-CDI)

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **July 29, 2022.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:
( ) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
(✓) Comments are included/attached.

Signed:
Print Name: Carty S. Chang, Chief Engineer
Division: Engineering Division
Date: Jul 27, 2022

Attachments
cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Pre-Assessment Consultation for DEA for Kipuka o ke Ola (KOKO) Clinic Relocation
Location: Waimea, South Kohala District, Island of Hawaii
TMK(s): (3) 6-4-038:011 por.
Applicant: SSFM International on behalf of Waimea Nui Regional Community Development Initiative (WNR-CDI)

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). Be advised that 44CFR, Chapter 1, Subchapter B, Part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood zones subject to NFIP requirements are identified on FEMA's Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT) could also be used to research flood hazard information.

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7139.
- Kauai: County of Kauai, Department of Public Works (808) 241-4849.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: Jul 27, 2022

SSFM International
Innovate | Adapt | Sustain

October 3, 2022 SSFM 2021_043.000

TO: State of Hawai'i
Department of Land and Natural Resources
Engineering Division
1151 Punchbowl St., Room 221
Honolulu, Hawai'i 96813

Attention: Mr. Carty Chang, Chief Engineer

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation Comment Response Letter

Dear Mr. Chang,

Thank you for your July 27, 2022 letter commenting on the Pre-Assessment Consultation letter for the subject project. The State Department of Hawaiian Home Lands acknowledges the State Department of Land and Natural Resources, Engineering Division's comment regarding the rules and regulations of the National Flood Insurance Program. The proposed project site is within the Federal Emergency Management Agency's Flood Zone X, which is not a Special Flood Hazard Zone and does not have any regulations for development. This discussion is included in Section 3.5 of the Draft Environmental Assessment (Draft EA).

A copy of your July 27, 2022 letter, as well as this response letter, will be included in the Draft EA. We appreciate your participation in the EA process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

Jared K. Chang, AICP
Manager, Strategic Services Group
Email: jchang@ssfm.com

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Jul 8, 2022

MEMORANDUM

TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division (DLNR.ENGR@hawaii.gov)
X Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
__Div. of State Parks
X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
__Office of Conservation & Coastal Lands
X Land Division – Hawaii District (gordon.c.heit@hawaii.gov)

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Pre-Assessment Consultation for DEA for **Kipuka o ke Ola** (KOKO) Clinic Relocation
LOCATION: Waimea, South Kohala District, Island of Hawaii; TMK: (3) 6-4-038:011 por.
APPLICANT: SSFM International on behalf of Waimea Nui Regional Community Development Initiative (WNR-CDI)

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **July 29, 2022.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

( ) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
(☑) Comments are included/attached.

Signed: *Lainie Berry*
Print Name: LAINIE BERRY, Wildlife Program Mgr.
Division: Division of Forestry and Wildlife
Date: Jul 27, 2022

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

July 27, 2022

MEMORANDUM *Log no. 3742*

TO: RUSSELL Y. TSUJI, Land Administrator
Land Division

FROM: LAINIE BERRY, Wildlife Program Manager
Division of Forestry and Wildlife

SUBJECT: **Division of Forestry and Wildlife Comments for the Pre-Assessment Consultation for a Draft Environmental Assessment (DEA) for the Kīpuka o ke Ola (KOKO) Clinic Relocation on Hawai'i Island**

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your pre-assessment consultation request for a DEA regarding Waimea Nui Regional Community Development Initiative to relocate KOKO Native Hawaiian Rural Health Clinic to the Department of Hawaiian Home Lands (DHHL) Homestead Lands located in Waimea, in the South Kola District, on the island of Hawai'i, TMK: (3) 6-4-038:011. The proposed project consists of relocating the KOKO Clinic to DHHL Homestead Lands on a 2.5-acre portion of the undeveloped 161-acre property leased by the Waimea Nui Community Development Corporation.

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

Artificial lighting can adversely impact seabirds that may pass through the area at night by causing them to become disoriented. This disorientation can result in their collision with manmade structures or the grounding of birds. For nighttime work that might be required, DOFAW recommends that all lights used to be fully shielded to minimize the attraction of seabirds. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season, from September 15 through December 15. This is the period when young seabirds take their maiden voyage to the open sea. 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. For illustrations and guidance related to seabird-friendly light styles that also protect seabirds and

the dark starry skies of Hawai'i please visit https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf.

The State listed Hawaiian Goose or Nēnē (*Branta sandvicensis*) could potentially occur in the vicinity of the proposed project site. It is against State law to harm or harass these species. If any are present during construction, then all activities within 100 feet (30 meters) should cease, and the bird or birds should not be approached. Work may continue after the bird or birds leave the area of their own accord. If a nest is discovered at any point, please contact the Hawai'i Island Branch DOFAW Office at (808) 974-4221.

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

The project area is within the range of the State listed Blackburn's Sphinx Moth (*Manduca blackburni*) or BSM. Larvae of BSM feed on many nonnative hostplants that include tree tobacco (*Nicotiana glauca*), which grows in disturbed soil. We recommend contacting the Hawai'i Island Branch DOFAW office at (808) 974-4221 for further information about where BSM may be present and whether a vegetation survey should be conducted to determine the presence of plants preferred by BSM. DOFAW recommends removing plants less than one meter in height or during the dry time of the year to avoid harm to BSM. If you intend to either remove tree tobacco over one meter in height or to disturb the ground around or within several meters of these plants, they must be thoroughly inspected by a qualified biologist for the presence of BSM eggs and larvae.

DOFAW recommends using native plant species for landscaping that are appropriate for the area (i.e., climate conditions are suitable for the plants to thrive, historically occurred there, etc.). Please do not plant invasive species. DOFAW also recommends consulting the Hawai'i-Pacific Weed Risk Assessment website to determine the potential invasiveness of plants proposed for use in the project (https://sites.google.com/site/weedriskassessment/home). Please refer to www.plantpono.org for guidance on the selection and evaluation of landscaping plants.

DOFAW recommends minimizing the movement of plant or soil material between worksites. Soil and plant material may contain invasive fungal pathogens (e.g., Rapid 'Ōhi'a Death), vertebrate and invertebrate pests (e.g., Little Fire Ants, Coconut Rhinoceros Beetles), or invasive plant parts that could harm our native species and ecosystems. We recommend consulting the Big Island Invasive Species Committee (BIISC) at (808) 933-3340 to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

We appreciate your efforts to work with our office for the conservation of our native species. These comments are general guidelines and should not be considered comprehensive for this site or project. It is the responsability of the applicant to do their own due diligence to avoid any negative environmental impacts. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Paul Radley, Protected Species Habitat Conservation Planning Coordinator at (808) 295-1123 or paul.m.radley@hawaii.gov.

Sincerely,

Lainie Berry

LAINIE BERRY
Widlife Program Manager

SSFM International
Innovate | Adapt | Sustain

October 3, 2022

SSFM 2021_043.000

TO: State of Hawai'i
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl St., Room 325
Honolulu, Hawai'i 96813

Attention: Ms. Lainie Berry, Wildlife Program Manager

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation Comment Response Letter

Dear Ms. Berry,

Thank you for your July 27, 2022 letter commenting on the Pre-Assessment Consultation letter for the subject project. The State Department of Hawaiian Home Lands acknowledges the State Department of Land and Natural Resources, Division of Forestry and Wildlife's (DOFAW) recommendations to minimize potential impacts to State listed Hawaiian Hoary Bat, Hawaiian Goose, Hawaiian Hawk, Blackburn's Sphinx Moth, and seabirds, as well as native plant species. The recommendations provided by DOFAW have been included in Section 3.6.2 of the Draft Environmental Assessment (Draft EA).

A copy of your July 27, 2022 letter, as well as this response letter, will be included in the Draft EA. We appreciate your participation in the EA process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

Jared K. Chang, AICP
Manager, Strategic Services Group
Email: jchang@ssfm.com

DAVID Y. IGE
GOVERNOR

STATE OF HAWAI`I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI`I 96804

OFFICE OF FACILITIES AND OPERATIONS

July 28, 2022

Jared K. Chang, AICP
SSFM International
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Re: Pre-Assessment Consultation for Draft Environmental Assessment for the Waimea Nui Regional Community Development Initiative, Kipuka o ke Ola Clinic Relocation, Waimea, South Kohala District, TMK (3)6-4-038:011

Dear. Mr. Chang:

Thank you for your letter that dated, July 1, 2022. Based on the information provided, the proposed project will not impact Hawaii State Department of Education facilities.

Thank you for the opportunity to comment. Should you have any questions, please contact Cori China of the Facilities Development Branch, Planning Section, at (808) 784-5095.

Sincerely,

Roy Ikeda
Interim Public Works Manager
Planning Section

RI:ctc

c: Facilities Development Branch

SSFM International
Innovate | Adapt | Sustain

October 3, 2022

SSFM 2021_043.000

TO: State of Hawai‘i
Department of Land and Natural Resources
Engineering Division
1151 Punchbowl St., Room 221
Honolulu, Hawai‘i 96813

Attention: Mr. Roy Ikeda, Interim Public Works Manager

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai‘i
Pre-Assessment Consultation Comment Response Letter

Dear Mr. Ikeda,

Thank you for your July 28, 2022 letter commenting on the Pre-Assessment Consultation letter for the subject project. The State Department of Hawaiian Home Lands acknowledges the State Department of Education's (DOE) comment that the proposed project will not impact any DOE facilities.

A copy of your July 28, 2022 letter, as well as this response letter, will be included in the Draft EA. We appreciate your participation in the EA process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

Jared K. Chang, AICP
Manager, Strategic Services Group
Email: jchang@ssfm.com

Mitchell D. Roth
Mayor

Lee E. Lord
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 μi
PLANNING DEPARTMENT

Zendo Kern
Director

Jeffrey W. Darrow
Deputy Director

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

August 30, 2022

Jared K. Chang
SSFM International
501 Sumner Street
Honolulu, HI 96817

Dear Mr. Chang:

SUBJECT: Early Consultation for Draft Environmental Assessment (PL-INT-2022-003133)
Landowner: Department of Hawaiian Homelands (DHHL)
Project: Waimea Nui Regional Community Development Initiative . ¯puka o ke Ola (KOKO) Clinic Relocation
Location: (3)6-4-038:011 por. Waimea, South Kohala District, Island of + D Z D L ‰ L

Thank you for including us in early consultation for this draft environmental assessment.

The State Land Use designation of the subject property is Agriculture. Hawai‘i Revised Statutes (H.R.S.), Section 205-4.5 allows for "public institutions and buildings that are necessary for agricultural practices" to be permitted uses in Agriculture State Land Use districts[1]. The Land Use Pattern Allocation Guide (LUPAG) Map from the 2005 General Plan designation is Important Agricultural Land[2]. In the face of competition from urban uses, "the protection of important agricultural lands has long been a policy of the County"[3]. The County Zoning of the property is also agriculture and noted as A-40a, which provides for agricultural and very low density agriculturally based residential use, encompassing rural areas of good to marginal agricultural and grazing land, forest land, game habitats, and areas where urbanization is not found to be appropriate[4].

The Planning Department herein references the Memorandum of Agreement between the County of Hawai‘i and the Department of Hawaiian Homelands (dated January 7, 2003): "County zoning cannot override the authority of the Hawaiian Homes Commission to control the uses of its

[1] H.R.S. §205-4.5(a)(5)
[2] "Important Agricultural Land: Important agricultural lands are those with better potential for sustained high agricultural yields because of soil type, climate, topography, or other factors".
[3] 2005 General Plan 2.1 (Agriculture)
[4] HCC Sec. 25-5-70. Purpose and Applicability

property". Please continue to inform the County of any changes in preferred zoning designation for the subject (DHHL) parcel; DHHL will choose from existing county zoning districts and the Planning Department will enter those on its maps.

Moreover, the Planning Department herein references the November 13, 2019 Attorney General Opinion which opines that under the Hawaiian Homes Commission Act, laws that would "significantly affect" DHHL's use of its lands cannot apply to Hawaiian Home Lands. You may reference the enclosed Attorney General's opinion in furtherance of resolving any State/County land use conflicts that may arise for the subject (DHHL) parcel. To wit: "To the extent that the LUC's classifications conflict with DHHL's uses of its lands for homesteading purposes, the HHCA will control and the LUC's classifications cannot be enforced".

We look forward to reviewing the Draft Environmental Assessment when available. If you have any questions regarding this correspondence, please contact Kevin Sullivan of this office at (808) 961-8135 or via email at kevin.sullivan@hawaiicounty.gov.

Sincerely,

Zendo Kern
Zendo Kern (Aug 30, 2022 09:48 HST)

ZENDO KERN
Planning Director

Attachments:
January 7, 2003 Memorandum No. 03-2: MOA between County of Hawai'i and the DHHL
November 13, 2019 Attorney General Opinion (The Honorable William J. Aila, Jr.)

KS:cc
\\coh01\planning\public\wpwin60\CH343\2022\08.30.2022_PL-INT-2022-003133_PreConsultDEA_WaimeaNuiRegionalCommDev.docx

Harry Kim
Mayor

Christopher J. Yuen
Director

Roy R. Takemoto
Deputy Director

County of Hawaii

PLANNING DEPARTMENT
25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-8742

MEMORANDUM NO. 03-2

January 7, 2003

TO: STAFF

FROM: CHRISTOPHER J. YUEN
PLANNING DIRECTOR

SUBJECT: MEMORANDUM OF AGREEMENT BETWEEN THE COUNTY OF HAWAII AND THE DEPARTMENT OF HAWAIIAN HOME LANDS

The County of Hawaii and the Department of Hawaiian Home Lands have adopted a Memorandum of Agreement. A copy of the full MOA is attached to this memo. It covers various areas such as the payment of real property taxes and county maintenance of facilities on DHHL property. The purpose of this memo is to explain how the MOA affects our activities in the Planning Department.

The basic premise of the MOA is that County zoning cannot override the authority of the Hawaiian Homes Commission to control the uses of its property. However, County regulations that do not have the effect of controlling the ultimate use still apply. Much of what the Planning Department does—subdivision approval, plan approval, building permit review—happens after the determination of the basic use has been zoned. These Planning Department services are necessary for the orderly development of land in this county. They are a service both to the affected landowner and the general community.

Under the MOA, DHHL will determine the uses for its lands through its own planning system, and will follow land use plans adopted by the Hawaiian Homes Commission. Those plans are currently being formulated. The Planning Department will have input, but not any final authority. Generally speaking, DHHL must go through a Chap. 343 EIS process before beginning any new projects, because of the Hawaii Supreme Court's decision in Kepo'o v. Watson, 87 Haw. 91, 952 P.2d 379 (1998), so the public can comment on their plans during that process.

DHHL will let the County know its preferred zoning designation for its property and the Planning Department will enter those on its maps. DHHL will choose from the existing county zoning districts. For lands that are presently occupied, we will be writing to DHHL to suggest zoning designations that are consistent with the present uses. For example, the present Walmart Center site is zoned ML; the present uses would be more consistent with CG or possibly MCX.

We will have some formality in entering these zoning designations on the maps. I will be writing to DHHL to ask whether these zoning designations for existing uses should be decided by the Commission or by their staff. On our end, there will be a director's memo directing the change in the zoning maps after we get word from DHHL, and the map entry will reference the memo.

Thereafter, the Planning Department will administer permits and approvals on DHHL property in the same way as it would for other landowners (with slight differences as discussed in this memo.) The MOA says that "all normal land use controls will be applied by Hawaii County to DHHL property according to the zoning district selected by DHHL." This means that, for example, that if DHHL constructs a new residential subdivision in what they have designated as an RS-10 zone, they will apply for subdivision approval in the same manner as other subdividers, and will be held to the same standards for roads and other infrastructure (unless they obtain a variance or a PUD, again through normal procedures). DHHL lessees who wish to construct buildings in commercial districts will need Plan Approval. In reviewing building permits for homes on DHHL property, Planning Department staff will look for the same elements as in the applicable zoning district: setbacks, heights, etc. We will continue to waive subdivision fees for DHHL per prior agreement.

All permit applications will have to be accompanied by a written consent from DHHL. Unless you are instructed otherwise, a consent signed by a DHHL staff person will be adequate; this will not be done by the Commission. We will be writing DHHL to determine if there are categories of applications that will not need DHHL consent, such as building permits for minor home improvements.

Under the MOA, the county will also enforce land use violations on Hawaiian home lands. Because of some transitional issues, all complaints should be discussed with the director or deputy director before any action is taken. One of the main transitional issues is that some of the present zoning designations will have to be changed: we will not be citing Walmart and Borders as zoning code violations pending the change from ML. We

will also inform DHHL of any violation before we make a citation and give them the opportunity to correct it before we take any enforcement action. For the most part, zoning violations will also be violations of the DHHL lease. There are going to be some thorny issues with respect to violations because in some cases, people established businesses on DHHL property that are inconsistent with zoning after observing that the County was taking the position that it had no jurisdiction to control land uses on DHHL property.

DHHL lessees will have to apply (with DHHL consent) for special permits on ag land, and for use permits on residentially-zoned land, if they wish to commence uses that would need special permits or use permits in the zone in question. The MOA does contemplate that DHHL may implement its own special permit procedure at some point in the future.

For new developments, County zoning will not control the ultimate use; our only role will be to comment. The MOA does commit DHHL to build offsite infrastructure necessary for the new development (such as access roads to the property) to the same extent that would be expected of a private developer similarly situated.

This memo probably does not answer all questions that might arise in connection with DHHL property. Any questions should be brought to the director or deputy director. The MOA itself does not answer all questions. We are committed to working out unresolved issues with DHHL in a cooperative spirit. Staff should bring these issues to the director or deputy director so that we can discuss them with DHHL.

During the negotiation of the MOA we had questions about the overall legality of the agreement. There is definitely a legal "gray area" with respect to the county's authority over DHHL property. There is also a gray area with respect to state property in general. These jurisdictional disputes and gray areas have led to the government not doing its job of serving the public. "Roads in limbo" is a prime example. The DHHL MOA is the attempt of the County government and DHHL to get back on track in a positive way. The only ways to remove the legal ambiguities are (1) legislation enacted by the state legislature, and (2) litigation. Either of these routes often results in further ambiguity and uncertainty.

Turning to the legality of the present MOA, it is clear that, in general, the county has no zoning authority over DHHL property unless some state statute gives it that authority. It is also clear that the County has no authority to prohibit DHHL from taking the property

granted to it and leasing it to Native Hawaiians for residential, agricultural, and pastoral uses. The major gray area concerns the laws that permit DHHL to lease land for commercial and industrial uses. It is not clear whether these laws incorporate the same restriction as DLNR leases of commercial and industrial lands: that they be "consistent with county zoning requirements". See H.R.S. sec. 171-41(a) (which applies to DLNR leases), and which possibly applies to commercial and industrial leases on DHHL property because of sec. 204(a)(2) of the Hawaiian Homes Act.

From the County's point of view, we want our zoning control to cover all lands so that we can implement comprehensive planning. From DHHL's point of view, it could not accept county zoning control without clear legal authority, and the County had previously acceded to DHHL's position that its commercial leases were not subject to county zoning (most prominently in the case of Walmart Center.) We primarily based the ultimate compromise in the MOA on the Hawaii Supreme Court's statement in Kepo'o v. Watson that zoning restrictions would not apply on DHHL property because they had the ultimate effect of controlling the use. 87 Haw. at 101. Although this is not a binding statement of the law, because the case did not directly involve county zoning, it is the closest statement made by the court on the issue.

On the other hand, the court also said in Kepo'o that DHHL property could be subject to other governmental regulations enacted to promote the public health and safety, such as environmental laws, as long as they had only an incidental or indirect effect upon the use of the property. This, therefore, is the legal basis for applying other regulations such as the various standards of the zoning code (setbacks, required parking areas, etc.), the building code, the subdivision code, grading ordinance, flood control laws, etc.

We have a February 2002 corporation counsel opinion that says that the approach taken by the MOA is legal and superceding Corporation Counsel Opinion 98-02.

CJY:pak
Wpwin60\Chris\DHHL Staff on MOA.doc – No. 03-02

Attachment

cc: Mayor Harry Kim
Mr. Darrell C. Yagodich, DHHL via Planning Office

Memorandum of Agreement Between the County of Hawaii and the Department of Hawaiian Home Lands

I. Purpose

The purpose of this Memorandum of Agreement (MOA) is to clarify the respective roles, responsibilities, and obligations of the County of Hawaii (County) and the Department of Hawaiian Home Lands (DHHL) relating to land use planning, infrastructure maintenance, enforcement of laws, and collection of taxes and other fees on Hawaiian home lands.

II. Guiding Principles

The following general principles have guided the development of this MOA:

A. The Hawaiian Homes Commission is responsible for determining land use on Hawaiian home lands. The County may not use its land use and zoning powers to prevent the Hawaiian Homes Commission from controlling the use of Hawaiian home lands.

B. The County and DHHL share common goals in planning for the use of Hawaiian home lands: both support the orderly development of those lands for the benefit of native Hawaiians and both are committed to the integration of planning by DHHL and Hawaii County.

C. The County should manage and maintain all infrastructure built to County standards

D. The County is authorized to enforce criminal laws and applicable County ordinances and regulations on Hawaiian home lands.

E. Hawaiian homestead lessees are residents of the County of Hawaii and should be treated in a manner consistent with all other residents of the County.

F. Hawaiian homestead lessees should pay all taxes and fees required by law.

G. The County and DHHL acknowledge that there are areas where agreement will not be reached, and agree to continue to work together toward a mutually acceptable resolution of such issues.

III. Relating to Planning and Land Use

A. DHHL will implement its Planning System which includes plans with DHHL land use designations such as the Hawaii Island Plan, various Development and Subdivision Plans, and Homestead Community Plans. In the formulation, updating, and amendment of these plans, DHHL will consult with the relevant County departments, and shall give due consideration and weight to their

comments, and to the Hawaii County General Plan, and other officially adopted plans such as Community Development Plans. All land uses on DHHL property will be placed according to the applicable DHHL plans.

B. The County will consult with DHHL over the appropriate designations of DHHL property in the Hawaii County General Plan LUPAG maps, and shall give due weight and consideration to the comments of DHHL, and to officially adopted DHHL plans.

C. Based on its plans and DHHL land use designations, DHHL will determine the appropriate County zoning districts that shall apply to the property in question. DHHL will communicate these zoning districts to the County.

D. All normal land use controls will be applied by Hawaii County to DHHL property according to the zoning district selected by DHHL. Except as specifically provided in the Agreement, DHHL will follow all normal land use procedures, regulations, and standards applicable to the zoning district.

E. All land use permit applications on Hawaiian home lands must be accompanied by written consent from DHHL before the County can begin processing those applications.

F. The standards of the various zoning districts selected will apply to DHHL property. DHHL and its lessees will go through normal County administrative variance procedures if they seek exemptions from standards.

G. For uses allowed in the various zoning districts that require special permits or use permits, DHHL and its lessees will go through the applicable County permit procedures. At some time in the future, DHHL may implement its own use permit procedure for Hawaiian home lands. If DHHL grants use permits, it will be responsible for enforcing violations of those permits. The County will be notified when DHHL has formulated its use permit system.

H. The County will advise DHHL of all violations by its lessees. The County will enforce land use codes and regulations on Hawaiian home lands in the same manner as with other landowners. DHHL will cooperate with the County in enforcing the terms of its leases requiring conformity to applicable laws and regulations, if requested by the County. Ongoing violations and failure to comply will be referred to DHHL after the County has exhausted all remedies short of pursuing legal action to address the violation. DHHL may institute lease enforcement proceedings in advance of, or in lieu of, County enforcement actions.

IV. <u>Relating to Public Facilities and Infrastructure Serving Hawaiian Home Lands</u>

A. In the development of future projects, DHHL will construct public facilities in accordance with County standards. Where departures from County standards are desired, DHHL will pursue exemptions and other administrative variances from the appropriate County department, in accordance with procedures established for all property owners. Should DHHL choose not to construct infrastructure in accordance with County standards, the County may view such improvements as private facilities for repair and maintenance purposes.

B. The County will accept operation, repair, and maintenance of all future DHHL infrastructure constructed according to County standards.

C. Existing infrastructure shall be subject to County inspection prior to being accepted by the County for operation, repair, and maintenance. The County may require DHHL to repair any damage such as leaks, holes, sags, or deterioration affecting the operation of the existing infrastructure, identified as a result of the inspection.

D. In the case of existing infrastructure that is not constructed to County standards, the County and DHHL will work to establish minimum standards for residential, agricultural, and pastoral subdivisions. Existing projects will be evaluated based on these new standards. The County may require DHHL to upgrade the infrastructure to the minimum standard prior to being accepted by the County for operations, repair, and maintenance.

E. The County will maintain infrastructure according to its own standards, resources and schedules. Any decisions as to upgrades or rehabilitation will be at the County's discretion.

F. Should DHHL elect to convert its land to a more intensive land use, DHHL will be responsible for upgrading the onsite infrastructure to accommodate the new use, and will consult with the County regarding the need to upgrade offsite infrastructure. DHHL and the County shall negotiate the extent to which DHHL will be responsible for any such offsite improvements requested by the County. DHHL shall be responsible for project-related offsite improvements to the extent that these would be required of other developers with similar projects. If offsite improvements benefit other property, DHHL and the County shall cooperate so that DHHL bears only its fair share of these improvement costs.

G. The County will treat DHHL lessees in the same manner as other property owners with respect to conformity with laws, ordinances, and regulations. The County will advise DHHL of violations, and will refer cases of ongoing violation to DHHL after the County has exhausted all remedies short of pursuing legal action

to address the violation. DHHL reserves the right to institute lease enforcement proceedings in advance of, or in lieu of, County enforcement actions.

V. Relating to the Enforcement of Criminal Violations on Hawaiian Home Lands

A. The County is authorized to and will enforce violations of criminal law on Hawaiian home lands.

B. County law enforcement agencies and DHHL will work to establish procedures regarding sharing information and providing testimony relating to arrests made on Hawaiian home lands needed for contested case hearings and other administrative and/or judicial proceedings.

VI. Relating to Real Property Taxes

A. Homestead lessees on Hawaiian home lands are responsible for the payment of real property taxes in accordance with the Hawaiian Homes Commission Act, 1920, as amended, and applicable County ordinances.

B. The County agrees to waive the penalty and interest on all delinquent real property taxes owed by Hawaiian homestead lessees as of December 31, 2001. Such waiver will apply to payments made by February 20, 2002, or to payments advanced by DHHL pursuant to paragraph C.

C. For those homestead lessees with real property tax balances, excluding penalty and interest, of more than $500, if payment is not made by February 20, 2002, DHHL will advance full payment of all real property taxes, excluding penalty and interest, to bring those bills current, within 60 days of receipt of an updated real property tax listing. This date may be extended by mutual agreement of the parties.

D. It is understood that the County's waiver of interest and penalty charges on delinquent real property taxes owed by homestead lessees as of December 31, 2001, and DHHL's advance of full payment of real property taxes, excluding interest and penalty, in accordance with paragraph C, is a one-time only offer.

E. In order to alleviate or reduce further delinquencies, the County will notify DHHL on an annual basis of any delinquent property owners.

F. The parties will continue to meet on an annual basis to evaluate the extent of delinquencies by Hawaiian homestead lessees on the Island of Hawaii and take action, if necessary, to keep delinquencies from recurring.

G. The County and DHHL shall work to establish a customer trust fund by July 1, 2004 to collect real property tax payments as part of the mortgage/loan payments in order to make smaller, regular payments.

VII. Areas for Further Collaboration

The parties agree to work further on the following issues:

A. The creation of new County zoning districts for farming and pastoral activities.

B. The development of infrastructure standards for rural land uses such as agricultural and pastoral activities.

C. The establishment of procedures for sharing evidence, information, and testimony involving criminal violations on Hawaiian home lands.

D. The implementation of actions to prevent and/or address future real property tax delinquencies by Hawaiian homestead lessees.

VIII. Termination

To achieve the objectives of this MOA, either party may, by mutual agreement in writing, further clarify or waive any term or condition of this agreement, provided such action does not violate any statutes, ordinances, or binding rules or regulations. DHHL and the County reserve the right to terminate this MOA upon one hundred eighty (180) days notice in writing to the other party.

In agreement thereof, the parties have entered into this Memorandum of Agreement on this _____ day of _____, 2002.

COUNTY OF HAWAII

By _____
Harry Kim, Mayor

APPROVED AS TO FORM:

By _____
Corporation Counsel

DEPARTMENT OF HAWAIIAN HOME LANDS

By _____
Raynard C. Soon, Chairman
Hawaiian Homes Commission

By _____
Deputy Attorney General

DAVID Y. IGE
GOVERNOR

CLARE E. CONNORS
ATTORNEY GENERAL

DANA O. VIOLA
FIRST DEPUTY ATTORNEY GENERAL

STATE OF HAWAI'I
DEPARTMENT OF THE ATTORNEY GENERAL
425 QUEEN STREET
HONOLULU, HAWAI'I 96813
Tel: (808) 587-3080
Fax: (808) 586-1372

November 13, 2019

CONFIDENTIAL/
ATTORNEY-CLIENT PRIVILEGED

The Honorable William J. Aila, Jr.
Chairman, Hawaiian Homes Commission
Department of Hawaiian Home Lands
State of Hawai'i
91-5420 Kapolei Parkway
Kapolei, Hawai'i 96707

Dear Chairman Aila:

Re: Enforcement of Land Use Classifications
Over Certain Hawaiian Home Lands

This letter responds to your request for an opinion as to whether the land use classification powers of the Land Use Commission extend to lands controlled by the Department of Hawaiian Home Lands.

We understand that your request arises from an inquiry by the County of Hawai'i as to whether its zoning responsibilities under chapter 205, Hawaii Revised Statutes, are applicable to DHHL's proposed subsistence agricultural homestead development on its lands in Pana'ewa, Hawai'i.[1] [2]

[1] The terms "Hawaiian home lands," "DHHL lands," "lands controlled by DHHL," and "its lands" are used interchangeably throughout this opinion with the term "available lands," which consist of all the lands described in section 203 of the Hawaiian Homes Commission Act, 1920, Act of July 9, 1921, ch. 42, 42 Stat. 108, and all other lands later designated by statute to constitute "available lands." This includes lands acquired by DHHL after the enactment of the HHCA.

[2] Under chapter 205, HRS, the counties are responsible for zoning within the LUC's land classification districts and are tasked with enforcing the LUC's land classifications in most situations. See footnote 8 of this letter.

In addition to its concerns regarding DHHL's subsistence agriculture homestead development, the County also asked DHHL to address apparent conflicts between DHHL's existing homestead developments and County zoning, which is based on the LUC's land classifications. The following table summarizes the DHHL developments identified as problematic by the County:

DHHL Project	Zoning Change	LUC Classification
Pana'ewa Subsistence Agricultural Lots	A-5a/A-1a to RA-.5a	Agricultural
Kawaihae Residential Lots	A-40a to RS-22	Agricultural
Pana'ewa Residential Lots	RS-10/A-5a to RS-15	Agricultural
Pu'u Pulehu Residential Lots	A-40a to RS-10	Agricultural
Kauhale 'Ōiwi o Pu'ukapu Cultural and Community Educational Center	A-40a to CV-10	Agricultural, would require special use permit from LUC
Lālāmilo Residential Lots	A-5a to RS-10	Agricultural
Maku'u Farmers Market	A-5a to CV-38	Agricultural, would require special use permit from LUC

We address the issues raised by you and the County by answering the following question.

I. QUESTION PRESENTED

The only question presented by your request is whether the LUC's land classification powers, and the County's powers to enforce such classifications, extend to the developments identified by the County as conflicting with existing LUC classifications.[3]

II. SHORT ANSWER

No. Under the HHCA, laws that would "significantly affect" DHHL's use of its lands cannot apply to Hawaiian home lands. To the extent that the LUC's classifications conflict with DHHL's uses of its lands for homesteading purposes, the HHCA will control and the LUC's classifications cannot be enforced.[4]

[3] Because the land in question is being developed for homestead purposes under the HHCA, we do not answer whether the LUC's powers extend to Hawaiian home lands being leased to private entities for non-homestead development under chapter 171, HRS.

[4] Should the lands in question lose their status as Hawaiian home lands, such as through a

III. DISCUSSION

A. Laws Governing DHHL Lands And The LUC

1. Federal and State laws relating to DHHL lands

As a compact with the United States upon admission of Hawai'i as a state, Hawai'i accepted the responsibility to manage and dispose of the Hawaiian home lands under the terms of the HHCA, and adopted the HHCA as a provision of the Hawai'i Constitution.[5] See section 4 of the Admission Act.[6] The HHCA is made a part of the state constitution by article XII, sections 1 and 3, of the Hawai'i Constitution.

Section 204(a) of the HHCA provides that all "available lands" shall "immediately assume the status of Hawaiian home lands and be under the control of the department to be used and disposed of in accordance with the provisions of this Act. . . ."[7]

The HHCA contains several exceptions to DHHL's sole authority to manage Hawaiian home lands: (1) any available lands under a lease made by the Territory of Hawai'i are to be managed by the Board of Land and Natural Resources (BLNR) until the lease expires or the land is withdrawn from the lease by BLNR, at which time the lands will be returned to DHHL's control; (2) DHHL may return available lands to BLNR if they are not used for homesteading purposes, subject to DHHL's right to reclaim such lands if they are subsequently required for homesteading; and (3) available lands may be exchanged for other lands of equal value only with the approval of the Secretary of the Interior of the United States. See HHCA §§ 204(a)(1), (2), and (3), respectively; see also HHCA § 212.

---

land exchange under section 204 of the HHCA, the LUC's classifications can be enforced on those lands from that point forward.

[5] Generally, the HHCA requires DHHL to make its lands available to native Hawaiians for residential, agricultural, and pastoral homesteading. See HHCA § 207. Under the Act, "native Hawaiian" is defined as "any descendant of not less than one-half part of the blood of the races inhabiting the Hawaiian Islands previous to 1778." See HHCA § 201.

[6] Act of March 18, 1959, Pub. L. No. 86-3, § 4, 73 Stat. 4.

[7] The HHCA originally placed control of Hawaiian home lands with a body known as the Hawaiian Homes Commission. Shortly after statehood, the Legislature created DHHL as the state agency responsible for managing Hawaiian home lands. The Commission is now the executive body that controls DHHL. See HHCA § 202.

In addition, section 206 of the HHCA provides that the powers and duties of the Governor and the BLNR "in respect to the lands of the State, shall not extend to lands having the status of Hawaiian home lands" except as provided in the HHCA.

2. DHHL's authority to manage its lands is generally subject to the State's police power

Although the HHCA places control of Hawaiian home lands with DHHL, the Hawai'i Supreme Court has held that the State may exercise its general police power on DHHL lands. In State v. Jim, 80 Hawai'i 168, 907 P.2d 754 (1995), two individuals were convicted of criminal trespass on Hawaiian home lands. In upholding their convictions, the Hawai'i Supreme Court held that the government may enforce its criminal laws on Hawaiian home lands because the exercise of the State's inherent police power "does not necessarily conflict with the responsibility to manage and dispose of these trust lands." Id. at 171, 907 P.2d at 757.

Our office has also opined that the Hawai'i Endangered Species Act, codified as chapter 195D, HRS, applies to the taking of endangered species on Hawaiian home lands. See Attorney General Opinion No. 95-05. There, our office applied the reasoning of the Jim decision and opined that the criminal penalties imposed by chapter 195D, HRS, are an exercise of the State's inherent police power that "are not necessarily in conflict with the Commission's responsibility to manage and dispose of these trust lands." Id.

Following Jim, the Hawai'i Supreme Court placed a limitation on the State's exercise of its inherent police powers on Hawaiian home lands. In Kepo'o v. Watson, 87 Hawai'i 91, 100, 952 P.2d 379, 388 (1998), the Hawai'i Supreme Court held that the State's inherent police power cannot be exercised over Hawaiian home lands when such actions would "significantly affect" DHHL's use of the land. This limitation is discussed more fully in section III.B.2 of this letter.

3. Statutory provisions governing the LUC

Chapter 205, HRS, tasks the LUC with establishing and amending boundaries for four major types of land use districts: urban, rural, agricultural, and conservation. HRS §§ 205-2 and 205-3.1. The LUC must place "all lands in the State" into one of the four types of land use districts. HRS § 205-2.

Each land use district is limited to certain permissible uses. For example, section 205-2, HRS, limits uses in an agricultural district to activities commonly associated with farming, such as cultivation of crops, animal husbandry, and aquaculture. Permissible uses on lands in an agricultural district that have soil ratings of A or B are further limited by

section 205-4.5, HRS. Land uses in a district contrary to those permitted by chapter 205 are not allowed unless the LUC amends the relevant district boundary to reclassify the land in question. HRS §§ 205-3.1 and 205-17.

Section 205-12, HRS, provides that the counties have the authority to enforce the land use classification districts adopted by the LUC and punish violators.[8] [9] The initial penalty for violation of any provision of chapter 205 is no more than $1,000 (or no more than $5,000 for an initial violation of a provision relating to land in an agricultural district). HRS § 205-13. Subsequent violations may result in a fine of no more than $5,000. Id.

B. In the Event of a Conflict, The LUC's Land Use Designations and County Zoning Must Yield To DHHL's Authority to Manage Hawaiian Home Lands

In this case, there is an apparent conflict between section 204(a) of the HHCA, which provides that Hawaiian home lands are to "be under the control of [DHHL] to be used and disposed of in accordance with the provisions of this Act," and the land classifications designated by the LUC, as well as the zoning imposed by the County pursuant to those classifications. For the following reasons, we believe that the LUC's land classifications and County zoning must yield to DHHL's authority to determine the appropriate use of its lands in the event of a conflict.

1. The HHCA gives DHHL sole authority to manage its lands

Section 204(a) of the HHCA provides that all available lands are to be "under the control of [DHHL] to be used and disposed of in accordance with the provisions of this Act."

Other provisions of the HHCA support the position that DHHL is to be the sole entity authorized to manage Hawaiian home lands. For example, section 206 of the HHCA provides that the powers of the Governor and the BLNR, with respect to the lands of the State, shall not extend to Hawaiian home lands. Section 207 of the Act authorizes DHHL to issue residential, agricultural, and pastoral homestead leases to native Hawaiians, as well as

[8] The only exception to this is enforcement of violations within a conservation district. Enforcement of such violations rests with BLNR. See HRS § 205-15 and chapter 183C, HRS.

[9] The counties have other responsibilities under chapter 205. For example, section 205-3.1, HRS, authorizes counties to determine district boundary amendments when the land in question is less than 15 acres in size.

issue licenses for "railroads, telephone lines, electric power and light lines, and the like." Section 212 of the HHCA authorizes DHHL to return its lands to the BLNR is they are not needed for homesteading purposes, subject to DHHL's right to reclaim such lands if they are later needed for homesteads.

When a state constitutional provision conflicts with a state statute, the constitutional provision will control. See 16 C.J.S. Constitutional Law § 107 (2014). Here, to the extent that chapter 205, HRS, authorizes the LUC to regulate the permissible uses on the land on which the DHHL developments described herein are located, it conflicts with the HHCA's provision that requires all available lands to be "under the control of [DHHL] to be used and disposed of in accordance with the provisions of this Act." Since the HHCA is a constitutional provision under article XII, sections 1 and 3 of the Hawai'i Constitution, it will control over section 205, HRS.

This is consistent with the legislative history of the HHCA. On May 22, 1920, the following exchange occurred between Representatives Joseph Walsh of Massachusetts and Cassius Dowell of Iowa on the floor of the United States House of Representatives:

> Mr. Walsh. Will there be duties conflicting in any way, or has provision been made in this bill for any possible conflict between the duties to be performed by this commission and any other governmental agency either of the Territory of Hawaii or the government of the United States? As I understand, these are public lands, in a sense. Now, is there provision in the bill which will prevent any possibility of conflict?
>
> Mr. Dowell. I am very glad the gentleman has submitted that question. There is a public-land commissioner in Hawaii whose duty it is to have charge of the public lands. Under this bill certain specific lands are withdrawn from his jurisdiction and from the jurisdiction of every commission except the special one to have charge of these specific lands described in this bill, and these lands are exclusively by the terms of the bill under the control of this commission.
>
> Mr. Walsh. If the gentleman will permit, if I understand correctly, some of these lands are already under the jurisdiction of the existing land commissioner?
>
> Mr. Dowell. All of them are.
>
> Mr. Walsh. Now some of these restrictions end his jurisdiction, and power over them is vested in the new commission?

Mr. Dowell. That is correct.

59 Cong. Rec. 7,495 (1920) (emphasis added).

This exchange shows that Hawaiian home lands were placed under the jurisdiction of the Hawaiian Homes Commission "to prevent any possibility of conflict" that would prevent the Commission from performing its duties under the HHCA. Id.

Furthermore, in an act authorizing the Territory of Hawai'i to create a public authority to engage in "slum clearance," Congress provided that the "commissioner of public lands, the Hawaiian Homes Commissioners, and any other officers of the Territory having power to manage and dispose of its public lands" could choose to convey lands to the new public authority.[10] Congress's specific citation to the Commission shows that it was intended to be the sole entity charged with controlling Hawaiian home lands, to the exclusion of the public lands commissioner and other commissions authorized to manage public lands.

2. Laws that "significantly affect" DHHL's use of its lands do not apply to Hawaiian home lands

The authority of DHHL to manage and use its lands has been discussed by the Hawai'i Supreme Court in three cases since statehood.

In Ahuna v. Department of Hawaiian Home Lands, 64 Haw. 327, 640 P.2d 1161 (1982), the Hawai'i Supreme Court considered whether the Commission breached its duties to native Hawaiians when it withheld a 3.5-acre portion of an already-planned and established homestead lot from an eligible native Hawaiian for a "highly speculative" county highway extension.

In holding that the Commission owed fiduciary duties of loyalty and prudence to native Hawaiians, both collectively and individually, the Court considered the nature of the Act and DHHL's control over its lands:

> The Department of Hawaiian Home Lands, headed by the Hawaiian Homes Commission, received exclusive control of the Hawaiian home lands by section 204 of the HHCA. The HHCA further stated: "the powers and duties of the governor and the board of land and natural resources, in respect to the lands of the State, shall not extend to lands having the status of Hawaiian home lands, except as specifically provided in this title." We conclude from this history that the Hawaiian Homes Commission, which oversees the

[10] Act of July 10, 1937, Pub. L. No. 202, 50 Stat. 508.

> Department, is the specific state entity obliged to implement the fiduciary duty under the HHCA on behalf of eligible native Hawaiians.

Id. at 338, 640 P.2d at 1168 (internal citation omitted). The Court found that the Commission breached its duties in two ways. First, the Commission breached its duty of loyalty by valuing the interests of the citizens and taxpayers of the state in general over the interests of the beneficiaries, in deciding to withhold the 3.5 acres for the highway extension. Id. at 341-342, 640 P.2d at 1170-71. Second, the Commission failed to use reasonable skill and care in making trust property productive, by requiring nearly four acres of agricultural land to remain fallow for a "highly speculative" highway extension. Id. at 343, 640 P.2d at 1171. The Court thus held that DHHL was required to award the beneficiary a lease for the entire homestead lot. The lease could allow DHHL to withdraw a portion of the lot if needed for the highway, provided that DHHL relocate the lessee and pay him certain compensation. Id. at 343, 640 P.2d at 1171-72.

Building on Ahuna, the Court held in Jim, *supra*, that while "DHHL has had 'exclusive control' over the management and disposition of Hawaiian home lands since Hawai'i became a state," the State retains authority to exercise its "inherent police power" on DHHL lands. Id. at 171, 907 P.2d at 757. In Jim, the police power in question was State and county enforcement of criminal laws on Hawaiian home lands. The Hawai'i Supreme Court reasoned that the enforcement of criminal laws on Hawaiian home lands "does not necessarily conflict with the responsibility to manage and dispose of these trust lands." Id. at 172, 907 P.2d at 758.

Finally, in Kepo'o, *supra*, the Hawai'i Supreme Court considered whether chapter 343, HRS, Hawaii's environmental impact statement law, applies to Hawaiian home lands. In holding that chapter 343 applies to DHHL lands, the Court determined that requiring State agencies (including DHHL) to perform environmental assessments on its lands prior to development constitutes a valid exercise of the State's police powers:

> The present case, like Jim and Attorney General's Opinion No. 95-05, involves regulations enacted pursuant to the state's police power. The police power "extends to the public safety, health, and welfare." HRS ch. 343 involves EIS requirements and is therefore a type of environmental regulation. Clearly, environmental regulations are enacted for the purpose of protecting the public safety, health, and welfare. Consequently, the present case is similar to Jim in that HRS ch. 343, like the Hawai'i Penal Code, is a police power regulation.

Id. at 99, 952 P.2d at 387.

Although the Kepo'o Court ultimately held that chapter 343 applies to Hawaiian home lands, it distinguished between laws that "significantly affect" the land, and those that merely have an incidental effect on DHHL's use of Hawaiian home lands. In characterizing its previous decision in Jim, the Court stated that "under Jim, police powers apply to Hawaiian home lands....as long as these regulations do not significantly affect the land." Id. The Court went on to explain:

> Another aspect of this case that is similar to Jim is the fact that HRS ch. 343 does not significantly affect the land. HRS ch. 343 essentially requires decision makers to consider the potential impact of their projects on the environment and to prepare informational documents disclosing these effects....Thus, it is clear that HRS ch. 343 primarily establishes procedural and informational requirements.

Id. at 100, 952 P.2d at 388. The Court then discussed, in *dicta*, other laws that would fall within the inherent police powers of the State but would not apply to Hawaiian home lands because they significantly affect the land:

> The effect of HRS ch. 343 on the land is also incidental in that the statute does not affirmatively require DHHL to use the land for any particular purposes. Whereas application of other laws, such as zoning ordinances, would require DHHL to use Hawaiian home lands for specific purposes, HRS ch. 343 merely places a hold on particular DHHL projects until DHHL complies with the procedural and informational requirements of the statute.

Id. at 101, 952 P.2d at 389 (emphasis added). The Kepo'o Court also referred favorably to this office's past opinions regarding State and county powers over Hawaiian home lands:

> The incidental effect of HRS ch. 343 is even more obvious if the statute is compared to other government actions that have been the subject of Attorney General's opinions in the past. Attorney General's Opinion No. 75-3 dealt with the practice of setting aside lands for public use by executive order....Clearly, such set asides have a direct and significant effect on the land. Once set aside, the land cannot be used for homesteading purposes and is effectively removed from the Hawaiian home lands program. Similarly, Attorney General's Opinion No. 72-21 dealt with the applicability of county zoning ordinances to Hawaiian home lands. . . . Zoning laws affirmatively dictate how the land may be used and would therefore require DHHL to use Hawaiian home lands in a manner consistent with the relative zoning classification. This would also constitute a direct and significant effect on the land.

Id.

While the LUC's land classification authority is undoubtedly an exercise of the State's inherent police powers to protect public safety, health, and welfare, we must determine whether such authority significantly affects DHHL's lands.

Pursuant to Kepo'o and the line of cases that precede it, we believe that in this case, chapter 205, HRS, has more than incidental effect on DHHL's use of its lands. On the contrary, these land classification powers are akin to the county zoning ordinances discussed in Kepo'o. Such regulations "affirmatively dictate how the land may be used" and would require DHHL to use its lands in a manner consistent with the LUC's classifications and the zoning imposed by the County pursuant to those classifications. For example, the LUC's land classifications and County zoning over DHHL's Pana'ewa Subsistence Agricultural Lots development would not allow DHHL to create subsistence agricultural lots of 0.5 acres. Similarly, DHHL could not allow the Maku'u Farmers Market or the Kauhale 'Ōiwi o Pu'ukapu Cultural and Community Educational Center to operate on lands the LUC has designated as part of the Agricultural District without receiving a discretionary special use permit from the LUC.

These regulations give the LUC the authority to directly and significantly affect DHHL's management and use of its lands for homesteading and are inconsistent with section 204 of the HHCA. Under article XII, sections 1 and 3, of the Hawai'i Constitution, which make the HHCA a part of the state constitution, the LUC's land classifications, along with the County's zoning based on those classifications, must yield to DHHL's authority to determine the appropriate use of its lands.

IV. CONCLUSION

To the extent that DHHL's developments described in this letter conflict with the LUC's land classifications and County zoning, DHHL's authority to determine the appropriate use of its lands must control. Accordingly, neither the LUC nor the County may enforce its land use controls in those conflicting circumstances.

Very truly yours,

Matthew S. Dvonch
Deputy Attorney General

APPROVED:

Clare E. Connors
Attorney General

SSFM International
Innovate | Adapt | Sustain

October 3, 2022 SSFM 2021_043.000

TO: County of Hawai'i
Planning Department
West Hawai'i Office
74-5044 Ane Keohokalole Hwy
Kailua-Kona, Hawai'i 96740

Attention: Mr. Zendo Kern, Planning Director

SUBJECT: Waimea Nui Regional Community Development Initiative
Kīpuka o ke Ola (KOKO) Clinic Relocation
Tax Map Key: (3) 6-4-038:011 por.
Waimea, South Kohala District, Island of Hawai'i
Pre-Assessment Consultation Comment Response Letter

Dear Mr. Kern,

Thank you for your August 30, 2022 letter commenting on the Pre-Assessment Consultation letter for the subject project. The State Department of Hawaiian Home Lands (DHHL) acknowledges the County of Hawai'i, Planning Department's comments regarding the existing State Land Use designation, Land Use Pattern Allocation Guide designation, and the County Zoning designation and the reference to the Memorandum of Agreement between the County of Hawai'i and the DHHL. The DHHL will continue to inform the County of any changes in preferred zoning designation for the subject DHHL parcel.

A copy of your August 30, 2022 letter, as well as this response letter, will be included in the Draft EA. We appreciate your participation in the EA process. Should you have any additional comments or questions regarding the proposed project, please feel free to contact me at (808) 356-1242 or by email at jchang@ssfm.com.

SSFM INTERNATIONAL, INC.

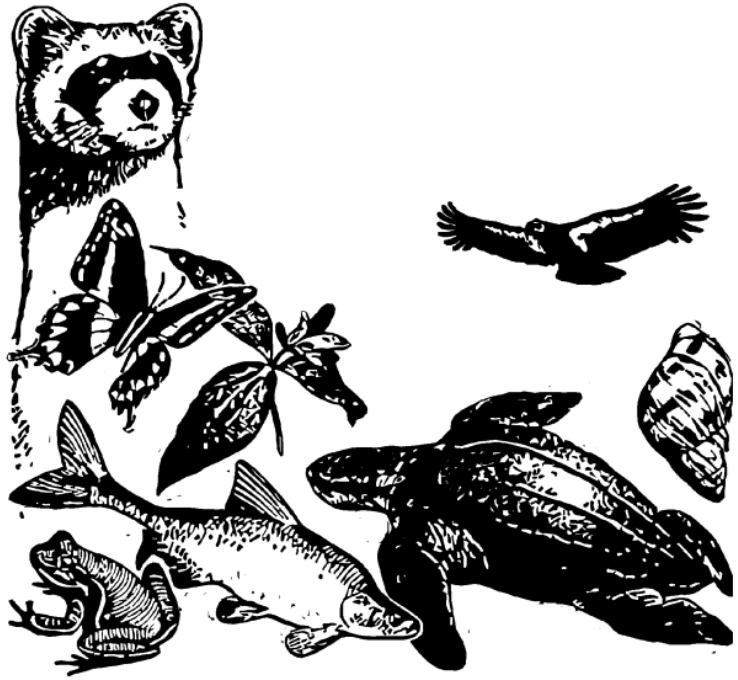
Jared K. Chang, AICP
Manager, Strategic Services Group
Email: jchang@ssfm.com

Appendix B – USFWS IPaC General Project Design Guidelines

U.S. Fish & Wildlife Service

General Project Design Guidelines (23 Species)

Generated August 18, 2022 01:33 AM UTC, IPaC v6.79.0-rc4



IPaC - Information for Planning and Consultation (https://ipac.ecosphere.fws.gov/): A project planning tool to help streamline the U.S. Fish and Wildlife Service environmental review process.

Table of Contents

Species Document Availability

Species with general design guidelines

- Band-rumped Storm-petrel Oceanodroma castro
- Blackburn's Sphinx Moth Manduca blackburni
- Green Sea Turtle Chelonia mydas
- Hala Pepe Pleomele hawaiiensis
- Hawaii Akepa Loxops coccineus
- Hawaiian (=koloa) Duck Anas wyvilliana
- Hawaiian Coot Fulica americana alai
- Hawaiian Goose Branta (=Nesochen) sandvicensis
- Hawaiian Hoary Bat Lasiurus cinereus semotus
- Hawaiian Petrel Pterodroma sandwichensis
- Hawaiian Stilt Himantopus mexicanus knudseni
- Holei Ochrosia kilaueaensis
- Holei Ochrosia haleakalae
- Honohono Haplostachys haplostachya
- Microlepia strigosa var. mauiensis
- Newell's Townsend's Shearwater Puffinus auricularis newelli
- Po`e Portulaca sclerocarpa
- Popolo Ku Mai Solanum incompletum
- Silene hawaiiensis
- Stenogyne angustifolia var. angustifolia
- Tetramolopium arenarium
- Uhi Uhi Mezoneuron kavaiense
- Vigna o-wahuensis

Species without general design guidelines available

- Ihi Portulaca villosa
- Nehe Lipochaeta venosa

General Project Design Guidelines - Popolo Ku Mai and 24 more species

Published by Pacific Islands Fish And Wildlife Office - Publication Date: April 1, 2022 for the following species included in your project

- Popolo Ku Mai Solanum incompletum
- Hawaii Akepa Loxops coccineus
- Holei Ochrosia kilaueaensis
- Hawaiian (=koloa) Duck Anas wyvilliana
- Uhi Uhi Mezoneuron kavaiense
- Po`e Portulaca sclerocarpa
- Stenogyne angustifolia var. angustifolia
- Hawaiian Stilt Himantopus mexicanus knudseni
- Hawaiian Goose Branta (=Nesochen) sandvicensis
- Silene hawaiiensis
- Band-rumped Storm-petrel Oceanodroma castro
- Ihi Portulaca villosa
- Hawaiian Coot Fulica americana alai
- Tetramolopium arenarium
- Hawaiian Hoary Bat Lasiurus cinereus semotus
- Microlepia strigosa var. mauiensis
- Hawaiian Petrel Pterodroma sandwichensis
- Newell's Townsend's Shearwater Puffinus auricularis newelli
- Honohono Haplostachys haplostachya
- Hala Pepe Pleomele hawaiiensis
- Green Sea Turtle Chelonia mydas
- Nehe Lipochaeta venosa
- Holei Ochrosia haleakalae
- Blackburn's Sphinx Moth Manduca blackburni
- Vigna o-wahuensis

Avoidance, Minimization, and Conservation Measures for listed plants in the Pacific Islands

Project activities may affect listed plant species by causing physical damage to plant parts (roots, stems, flowers, fruits, seeds, etc.) as well as impacts to other life requisite features of their habitat which may result in reduction of germination, growth and/or reproduction. Cutting and removal of vegetation surrounding listed plants has the potential to alter microsite conditions (e.g., light, moisture, temperature), damaging or destroying the listed plants and also increasing the risk of invasion by nonnative plants which can result in higher incidence or intensity of fire. Activities such as grazing, use of construction equipment and vehicles, and increased human traffic (i.e. trails, visitation, monitoring), can cause ground disturbance, erosion, and/or soil compaction which decrease absorption of water and nutrients and damage plant root systems and may result in reduced growth and/or mortality of listed plants. Soil disturbance or removal has the potential to negatively impact the soil seed bank of listed plant species if such species are present or historically occurred in the project area.

In order to avoid or minimize potential adverse effects to listed plants that may occur on the proposed project site, we recommend minimizing disturbance outside of existing developed or otherwise modified areas. When disturbance outside existing developed or modified sites is proposed, conduct a botanical survey for listed plant species within the project action area, defined as the area where direct and indirect effects are likely to occur. Surveys should be conducted by a knowledgeable botanist with documented experience in identifying native Hawaiian and Pacific Islands plants, including listed plant species. Botanical surveys should optimally be conducted during the wettest part of the year (typically October to April) when plants and identifying features are more likely to be visible, especially in drier areas. If surveys are conducted outside of the wet season, the Service may assume plant presence.

The boundary of the area occupied by listed plants should be marked with flagging by the surveyor. To avoid or minimize potential adverse effects to listed plants, we recommend adherence to buffer distances for the activities in the **Table below**. Where disturbed areas do not need to be maintained as an open area, restore disturbed areas using native plants as appropriate for the location. Whenever possible we recommend using native plants for landscaping purposes. The following websites are good resources to use when choosing landscaping plants: Landscape Industry Council of Hawai‘i Native Plant Poster (http://hawaiiscape.wpengine.com/publications/), Native Hawaiian Plants for Landscaping, Conservation, and Reforestation (https://www.ctahr.hawaii.edu/oc/freepubs/pdf/of-30.pdf), and Best Native Plants for Landscapes (https://www.ctahr.hawaii.edu/oc/freepubs/pdf/OF-40.pdf).

If listed plants occur in a project area, the avoidance buffers are recommended to reduce direct and indirect impacts to listed plants from project activities. However, where project activities will occur within the recommended buffer distances, additional consultation is required. The impacts to the plants of concern within the buffer area may be reduced by placing temporary fencing or other barriers at the boundary of the disturbance, as far from the affected plants as practicable.

The above guidelines apply to areas outside of designated critical habitat. If project activities occur within designated critical habitat unit boundaries, additional consultation is required.

All activities, including site surveys, risk introducing nonnative species into project areas. Specific attention needs to be made to ensure that all equipment, personnel and supplies are properly checked and are free of contamination (weed seeds, organic matter, or other contaminants) before entering project areas. Quarantines and or management activities occurring on specific priority invasive species proximal to project areas need to be considered or adequately addressed. This information can be acquired by contacting local experts such as those on local invasive species committees (Kauai: https://www.kauaiisc.org/; Oahu: https://www.oahuisc.org/; Maui Nui: https://mauiinvasive.org/; and Hawaii: https://www.biisc.org/

Table 1. Recommended buffer distances to minimize and avoid potential adverse impacts to listed plants from activities listed below.

Action	Buffer Distance (feet (meters)) - Keep Project Activity This Far Away from Listed Plant	
	Grasses/Herbs/Shrubs and Terrestrial Orchids	Trees and Arboreal Orchids
Walking, hiking, surveys	3 ft (1 m)	3 ft (1 m)
Cutting and Removing Vegetation By Hand or Hand Tools (e.g., weeding)	3 ft (1 m)	3 ft (1 m)
Mechanical Removal of Individual Plants or Woody Vegetation (e.g., chainsaw, weed eater)	3 ft up to height of removed vegetation (whichever greater)	3 ft up to height of removed vegetation (whichever greater)
Removal of Vegetation with Heavy Equipment (e.g., bulldozer, tractor, "bush hog")	2x width equipment + height of vegetation	820 ft (250 m)

Use of Approved Herbicides (following label)	**Ground-based Spray Application; hand application (no wand applicator; spot treatment)**	10 ft (3 m)	Crown diameter
	Ground-based Spray Application; manual pump with wand, backpack	50 ft (15 m)	Crown diameter
	Ground-based Spray Application; vehicle-mounted tank sprayer	50 ft (15 m)	Crown diameter
	Aerial Spray (ball applicator)	250 ft (76 m)	250 ft (76 m)
	Aerial Application – herbicide ballistic technology (individual plant treatment)	100 ft (30 m)	Crown diameter
	Aerial Spray (boom)	Further consultation required	Further consultation required
Use of Insecticides (pollinators, seed dispersers)		Further consultation required	Further consultation required
Ground/Soil Disturbance/Outplanting/Fencing (Hand tools, e.g. shovel, `ō`ō; Small mechanized tools, e.g., auger)		20 ft (6 m)	2x crown diameter
Ground/Soil Disturbance (Heavy Equipment)		328 ft (100 m)	820 ft (250 m)
Surface Hardening/Soil compaction	**Trails (e.g., human, ungulates)**	20 ft (6 m)	2x crown diameter
	Roads/Utility Corridors, Buildings/Structures	328 ft (100 m)	820 ft (250 m)
Prescribed Burns		Further consultation required	Further consultation required
Farming/Ranching/Silviculture		820 ft (250 m)	820 ft (250 m)

Definitions (Wagner *et al*. 1999)

Crown: The leafy top of a tree.
Herb: A plant, either annual, biennial, or perennial, with the non-woody stems dying back to the ground at the end of the growing season.
Shrub: A perennial woody plant with usually several to numerous primary stems arising from or relatively near the ground.
Tree: A woody perennial that usually has a single trunk

References Cited

USFWS. 2010. Endangered and threatened wildlife and plants; determination of endangered status for 48 species on Kauai and designation of critical habitat. Federal Register 75: 18960–19165.

. 2012. Endangered and threatened wildlife and plants; endangered status for 23 species on Oahu and designation of critical habitat for 124 species; final rule. Federal Register 77: 57648–57862.

. 2013a Endangered and threatened wildlife and plants; determination of endangered status for 38 species from Molokai, Lanai, and Maui. Federal Register 78: 32014–32065.

. 2013b. Endangered and threatened wildlife and plants; determination of endangered species status for 15 species on Hawaii Island. Federal Register 78: 64638–64690.

. 2016. Endangered and threatened wildlife and plants; determination of endangered status for 49 species from the Hawaiian Islands. Federal Register 81: 67786–67860.

. 2016. USFWS Rare plant database. Unpublished.

Wagner, W.L., Sohmer, S., and D.R. Herbst. 1999. Manual of the flowering plants of Hawaii, revised edition. Honolulu, Hawaii. University of Hawaii and Bishop Museum Press. 1,919 pp.

General Project Design Guidelines - Popolo Ku Mai and 24 more species

Published by Pacific Islands Fish And Wildlife Office - Publication Date: February 1, 2022 for the following species included in your project

Popolo Ku Mai Solanum incompletum
Hawaii Akepa Loxops coccineus
Holei Ochrosia kilaueaensis
Hawaiian (=koloa) Duck Anas wyvilliana
Uhi Uhi Mezoneuron kavaiense
Po`e Portulaca sclerocarpa
Stenogyne angustifolia var. angustifolia
Hawaiian Stilt Himantopus mexicanus knudseni
Hawaiian Goose Branta (=Nesochen) sandvicensis
Silene hawaiiensis
Band-rumped Storm-petrel Oceanodroma castro
Ihi Portulaca villosa
Hawaiian Coot Fulica americana alai
Tetramolopium arenarium
Hawaiian Hoary Bat Lasiurus cinereus semotus
Microlepia strigosa var. mauiensis
Hawaiian Petrel Pterodroma sandwichensis
Newell's Townsend's Shearwater Puffinus auricularis newelli
Honohono Haplostachys haplostachya
Hala Pepe Pleomele hawaiiensis
Green Sea Turtle Chelonia mydas
Nehe Lipochaeta venosa
Holei Ochrosia haleakalae
Blackburn's Sphinx Moth Manduca blackburni
Vigna o-wahuensis

Hawaiian forest birds (OAHU: Oahu elepaio, *Chasiempis ibidis*; Iiwi, *Drepanis coccinea*; KAUAI: Puaiohi, *Myadestes palmeri*; Akikiki, *Oreomystis bairdi*; Akekee, *Loxops caeruleirostris*; Iiwi, *Drepanis coccinea;* HAWAII: Akiapolaau, *Hemignathus wilsonsi*; Hawaii creeper, *Oreomystis mana*; Hawaii akepa, *Loxops coccineus*; Palila, *Loxioides bailleui*; Iiwi, *Drepanis coccinea;* MAUI: Maui parrotbill, *Pseudonestor xanthophrys*; Akohekohe, *Palmeria dolei*; Iiwi, *Drepanis coccinea;* MOLOKAI: Iiwi, *Drepanis coccinea*

Hawaiian forest birds' current ranges are predominately restricted to montane forests above 3,500 feet in elevation. Hawaiian forest bird habitat has been lost due to development, agriculture, grazing, wildfire, and spread of invasive habitat-altering species. Forest birds are also affected by mosquito-borne diseases. Mosquitoes are not native to Hawaii; their occurrence increases in areas where ungulate presence results in small pools of standing water. Actions such as road construction and development increase human access and result in increased wildfire and invasive species threats. Grazing results in reductions in woody vegetation and increased grass cover, which reduces forest habitat quality and results in increased wildfire risk on the landscape.

Recommended avoidance and minimization measures when conducting activities within forest bird habitat include:

- Preventing the spread or survival of non-native or invasive species.
- Decrease mosquito populations by removing or preventing stagnant water habitat.
- Reducing wildfire threat to montane forest habitats.
- Restrict the removal of tree cover during the peak breeding season between January 1 and June 30.

General Project Design Guidelines - Popolo Ku Mai and 24 more species

Published by Pacific Islands Fish And Wildlife Office - Publication Date: April 1, 2022 for the following species included in your project

- Popolo Ku Mai Solanum incompletum
- Hawaii Akepa Loxops coccineus
- Holei Ochrosia kilaueaensis
- Hawaiian (=koloa) Duck Anas wyvilliana
- Uhi Uhi Mezoneuron kavaiense
- Po`e Portulaca sclerocarpa
- Stenogyne angustifolia var. angustifolia
- Hawaiian Stilt Himantopus mexicanus knudseni
- Hawaiian Goose Branta (=Nesochen) sandvicensis
- Silene hawaiiensis
- Band-rumped Storm-petrel Oceanodroma castro
- Ihi Portulaca villosa
- Hawaiian Coot Fulica americana alai
- Tetramolopium arenarium
- Hawaiian Hoary Bat Lasiurus cinereus semotus
- Microlepia strigosa var. mauiensis
- Hawaiian Petrel Pterodroma sandwichensis
- Newell's Townsend's Shearwater Puffinus auricularis newelli
- Honohono Haplostachys haplostachya
- Hala Pepe Pleomele hawaiiensis
- Green Sea Turtle Chelonia mydas
- Nehe Lipochaeta venosa
- Holei Ochrosia haleakalae
- Blackburn's Sphinx Moth Manduca blackburni
- Vigna o-wahuensis

Avoidance, Minimization, and Conservation Measures for listed plants in the Pacific Islands

Project activities may affect listed plant species by causing physical damage to plant parts (roots, stems, flowers, fruits, seeds, etc.) as well as impacts to other life requisite features of their habitat which may result in reduction of germination, growth and/or reproduction. Cutting and removal of vegetation surrounding listed plants has the potential to alter microsite conditions (e.g., light, moisture, temperature), damaging or destroying the listed plants and also increasing the risk of invasion by nonnative plants which can result in higher incidence or intensity of fire. Activities such as grazing, use of construction equipment and vehicles, and increased human traffic (i.e. trails, visitation, monitoring), can cause ground disturbance, erosion, and/or soil compaction which decrease absorption of water and nutrients and damage plant root systems and may result in reduced growth and/or mortality of listed plants. Soil disturbance or removal has the potential to negatively impact the soil seed bank of listed plant species if such species are present or historically occurred in the project area.

In order to avoid or minimize potential adverse effects to listed plants that may occur on the proposed project site, we recommend minimizing disturbance outside of existing developed or otherwise modified areas. When disturbance outside existing developed or modified sites is proposed, conduct a botanical survey for listed plant species within the project action area, defined as the area where direct and indirect effects are likely to occur. Surveys should be conducted by a knowledgeable botanist with documented experience in identifying native Hawaiian and Pacific Islands plants, including listed plant species. Botanical surveys should optimally be conducted during the wettest part of the year (typically October to April) when plants and identifying features are more likely to be visible, especially in drier areas. If surveys are conducted outside of the wet season, the Service may assume plant presence.

The boundary of the area occupied by listed plants should be marked with flagging by the surveyor. To avoid or minimize potential adverse effects to listed plants, we recommend adherence to buffer distances for the activities in the **Table below**. Where disturbed areas do not need to be maintained as an open area, restore disturbed areas using native plants as appropriate for the location. Whenever possible we recommend using native plants for landscaping purposes. The following websites are good resources to use when choosing landscaping plants: Landscape Industry Council of Hawai‘i Native Plant Poster (http://hawaiiscape.wpengine.com/publications/), Native Hawaiian Plants for Landscaping, Conservation, and Reforestation (https://www.ctahr.hawaii.edu/oc/freepubs/pdf/of-30.pdf), and Best Native Plants for Landscapes (https://www.ctahr.hawaii.edu/oc/freepubs/pdf/OF-40.pdf).

If listed plants occur in a project area, the avoidance buffers are recommended to reduce direct and indirect impacts to listed plants from project activities. However, where project activities will occur within the recommended buffer distances, additional consultation is required. The impacts to the plants of concern within the buffer area may be reduced by placing temporary fencing or other barriers at the boundary of the disturbance, as far from the affected plants as practicable.

The above guidelines apply to areas outside of designated critical habitat. If project activities occur within designated critical habitat unit boundaries, additional consultation is required.

All activities, including site surveys, risk introducing nonnative species into project areas. Specific attention needs to be made to ensure that all equipment, personnel and supplies are properly checked and are free of contamination (weed seeds, organic matter, or other contaminants) before entering project areas. Quarantines and or management activities occurring on specific priority invasive species proximal to project areas need to be considered or adequately addressed. This information can be acquired by contacting local experts such as those on local invasive species committees (Kauai: https://www.kauaiisc.org/; Oahu: https://www.oahuisc.org/; Maui Nui: https://mauiinvasive.org/; and Hawaii: https://www.biisc.org/

Table 1. Recommended buffer distances to minimize and avoid potential adverse impacts to listed plants from activities listed below.

Action	Buffer Distance (feet (meters)) - Keep Project Activity This Far Away from Listed Plant	
	Grasses/Herbs/Shrubs and Terrestrial Orchids	Trees and Arboreal Orchids
Walking, hiking, surveys	3 ft (1 m)	3 ft (1 m)
Cutting and Removing Vegetation By Hand or Hand Tools (e.g., weeding)	3 ft (1 m)	3 ft (1 m)
Mechanical Removal of Individual Plants or Woody Vegetation (e.g., chainsaw, weed eater)	3 ft up to height of removed vegetation (whichever greater)	3 ft up to height of removed vegetation (whichever greater)
Removal of Vegetation with Heavy Equipment (e.g., bulldozer, tractor, "bush hog")	2x width equipment + height of vegetation	820 ft (250 m)

Use of Approved Herbicides (following label)	**Ground-based Spray Application; hand application (no wand applicator; spot treatment)**	10 ft (3 m)	Crown diameter
	Ground-based Spray Application; manual pump with wand, backpack	50 ft (15 m)	Crown diameter
	Ground-based Spray Application; vehicle-mounted tank sprayer	50 ft (15 m)	Crown diameter
	Aerial Spray (ball applicator)	250 ft (76 m)	250 ft (76 m)
	Aerial Application – herbicide ballistic technology (individual plant treatment)	100 ft (30 m)	Crown diameter
	Aerial Spray (boom)	Further consultation required	Further consultation required
Use of Insecticides (pollinators, seed dispersers)		Further consultation required	Further consultation required
Ground/Soil Disturbance/Outplanting/Fencing (Hand tools, e.g. shovel, `ō`ō; Small mechanized tools, e.g., auger)		20 ft (6 m)	2x crown diameter
Ground/Soil Disturbance (Heavy Equipment)		328 ft (100 m)	820 ft (250 m)
Surface Hardening/Soil compaction	**Trails (e.g., human, ungulates)**	20 ft (6 m)	2x crown diameter
	Roads/Utility Corridors, Buildings/Structures	328 ft (100 m)	820 ft (250 m)
Prescribed Burns		Further consultation required	Further consultation required
Farming/Ranching/Silviculture		820 ft (250 m)	820 ft (250 m)

Definitions (Wagner *et al*. 1999)

Crown: The leafy top of a tree.
Herb: A plant, either annual, biennial, or perennial, with the non-woody stems dying back to the ground at the end of the growing season.
Shrub: A perennial woody plant with usually several to numerous primary stems arising from or relatively near the ground.
Tree: A woody perennial that usually has a single trunk

References Cited

USFWS. 2010. Endangered and threatened wildlife and plants; determination of endangered status for 48 species on Kauai and designation of critical habitat. Federal Register 75: 18960–19165.

. 2012. Endangered and threatened wildlife and plants; endangered status for 23 species on Oahu and designation of critical habitat for 124 species; final rule. Federal Register 77: 57648–57862.

. 2013a Endangered and threatened wildlife and plants; determination of endangered status for 38 species from Molokai, Lanai, and Maui. Federal Register 78: 32014–32065.

. 2013b. Endangered and threatened wildlife and plants; determination of endangered species status for 15 species on Hawaii Island. Federal Register 78: 64638–64690.

. 2016. Endangered and threatened wildlife and plants; determination of endangered status for 49 species from the Hawaiian Islands. Federal Register 81: 67786–67860.

. 2016. USFWS Rare plant database. Unpublished.

Wagner, W.L., Sohmer, S., and D.R. Herbst. 1999. Manual of the flowering plants of Hawaii, revised edition. Honolulu, Hawaii. University of Hawaii and Bishop Museum Press. 1,919 pp.

General Project Design Guidelines - Popolo Ku Mai and 24 more species

Published by Pacific Islands Fish And Wildlife Office - Publication Date: February 1, 2022 for the following species included in your project

- Popolo Ku Mai Solanum incompletum
- Hawaii Akepa Loxops coccineus
- Holei Ochrosia kilaueaensis
- Hawaiian (=koloa) Duck Anas wyvilliana
- Uhi Uhi Mezoneuron kavaiense
- Po`e Portulaca sclerocarpa
- Stenogyne angustifolia var. angustifolia
- Hawaiian Stilt Himantopus mexicanus knudseni
- Hawaiian Goose Branta (=Nesochen) sandvicensis
- Silene hawaiiensis
- Band-rumped Storm-petrel Oceanodroma castro
- Ihi Portulaca villosa
- Hawaiian Coot Fulica americana alai
- Tetramolopium arenarium
- Hawaiian Hoary Bat Lasiurus cinereus semotus
- Microlepia strigosa var. mauiensis
- Hawaiian Petrel Pterodroma sandwichensis
- Newell's Townsend's Shearwater Puffinus auricularis newelli
- Honohono Haplostachys haplostachya
- Hala Pepe Pleomele hawaiiensis
- Green Sea Turtle Chelonia mydas
- Nehe Lipochaeta venosa
- Holei Ochrosia haleakalae
- Blackburn's Sphinx Moth Manduca blackburni
- Vigna o-wahuensis

Hawaiian waterbirds (Hawaiian stilt, *Himantopus mexicanus knudseni*; Hawaiian coot, *Fulica alai*; Hawaiian common gallinule, *Gallinula galeata sandvicensis*; Hawaiian duck, *Anas wyvilliana*):
Listed Hawaiian waterbirds are found in fresh and brackish-water marshes and natural or man-made ponds. Hawaiian stilts may also be found wherever ephemeral or persistent standing water may occur. Threats to these species include non-native predators, habitat loss, and habitat degradation. Hawaiian ducks are also subject to threats from hybridization with introduced mallards.

The creation of standing or open water may result in the attraction of Hawaiian waterbirds to a site (creative nuisance or habitat sink). In particular, the Hawaiian stilt is known to nest in sub-optimal locations (e.g. any ponding water), if water is present. 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. Therefore, we recommend you work with our office during project planning so that we may assist you in developing measures to avoid impacts to listed species (e.g., fencing, vegetation control, predator management).

To avoid and minimize potential project impacts to Hawaiian waterbirds we recommend you incorporate the following applicable measures into your project description:

- 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 the Service's 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:
    - Contact the Service within 48 hours for further guidance.
    - 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.
    - 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.

General Project Design Guidelines - Popolo Ku Mai and 24 more species

Published by Pacific Islands Fish And Wildlife Office - Publication Date: February 1, 2022 for the following species included in your project

Popolo Ku Mai Solanum incompletum
Hawaii Akepa Loxops coccineus
Holei Ochrosia kilaueaensis
Hawaiian (=koloa) Duck Anas wyvilliana
Uhi Uhi Mezoneuron kavaiense
Po`e Portulaca sclerocarpa
Stenogyne angustifolia var. angustifolia
Hawaiian Stilt Himantopus mexicanus knudseni
Hawaiian Goose Branta (=Nesochen) sandvicensis
Silene hawaiiensis
Band-rumped Storm-petrel Oceanodroma castro
Ihi Portulaca villosa
Hawaiian Coot Fulica americana alai
Tetramolopium arenarium
Hawaiian Hoary Bat Lasiurus cinereus semotus
Microlepia strigosa var. mauiensis
Hawaiian Petrel Pterodroma sandwichensis
Newell's Townsend's Shearwater Puffinus auricularis newelli
Honohono Haplostachys haplostachya
Hala Pepe Pleomele hawaiiensis
Green Sea Turtle Chelonia mydas
Nehe Lipochaeta venosa
Holei Ochrosia haleakalae
Blackburn's Sphinx Moth Manduca blackburni
Vigna o-wahuensis

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

To avoid and minimize potential project impacts to nene we recommend you incorporate the following measures into your project description:

- Do not approach, feed, or disturb nene.
- If nene are observed loafing or foraging within the project area during the breeding season (September through April), have a biologist familiar with nene 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 the Service 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 nene 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.

nene 4(d) rule: A 4(d) rule was established at the time the nene was downlisted to threatened 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 harassment in the form of hazing or other deterrent measures not likely to cause direct injury or mortality, or nene surveys.
- Take that is incidental to conducting lawful control of introduced predators or habitat management activities for nene.
- Take by authorized law enforcement officers for the purpose of aiding or euthanizing sick, injured, or orphaned nene; disposing of dead specimens; and salvaging a dead specimen that may be used for scientific study.

General Project Design Guidelines - Popolo Ku Mai and 24 more species

Published by Pacific Islands Fish And Wildlife Office - Publication Date: February 1, 2022 for the following species included in your project

Popolo Ku Mai Solanum incompletum
Hawaii Akepa Loxops coccineus
Holei Ochrosia kilaueaensis
Hawaiian (=koloa) Duck Anas wyvilliana
Uhi Uhi Mezoneuron kavaiense
Po`e Portulaca sclerocarpa
Stenogyne angustifolia var. angustifolia
Hawaiian Stilt Himantopus mexicanus knudseni
Hawaiian Goose Branta (=Nesochen) sandvicensis
Silene hawaiiensis
Band-rumped Storm-petrel Oceanodroma castro
Ihi Portulaca villosa
Hawaiian Coot Fulica americana alai
Tetramolopium arenarium
Hawaiian Hoary Bat Lasiurus cinereus semotus
Microlepia strigosa var. mauiensis
Hawaiian Petrel Pterodroma sandwichensis
Newell's Townsend's Shearwater Puffinus auricularis newelli
Honohono Haplostachys haplostachya
Hala Pepe Pleomele hawaiiensis
Green Sea Turtle Chelonia mydas
Nehe Lipochaeta venosa
Holei Ochrosia haleakalae
Blackburn's Sphinx Moth Manduca blackburni
Vigna o-wahuensis

Endangered Hawaiian petrel (*Pterodroma sandwichensis*), Threatened Newell's shearwater (*Puffinus auricularis newelli*), and Endangered Hawaii Distinct Population Segment of the band-rumped storm-petrel (*Oceanodroma castro*):
Hawaiian seabirds may traverse the project area at night during the breeding, nesting and fledging seasons (March 1 to December 15). Outdoor lighting could result in seabird disorientation, fallout, and injury or mortality. Seabirds are attracted to lights and after circling the lights they may become exhausted and collide with nearby wires, buildings, or other structures or they may land on the ground. Downed seabirds are subject to increased mortality due to collision with automobiles, starvation, and predation by dogs, cats, and other predators. Young birds (fledglings) traversing the project area between September 15 and December 15, in their first flights from their mountain nests to the sea, are particularly vulnerable to light attraction.

To avoid and minimize potential project impacts to seabirds we recommend you incorporate the following measures into your project description:

- Fully shield all outdoor lights so the bulb can only be seen from below.
- Install automatic motion sensor switches and controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.
- Avoid nighttime construction during the seabird fledging period, September 15 through December 15.

Listed seabirds have been documented colliding with communication towers, particularly in areas of high seabird passage rate. In general, self-supporting monopoles are the least likely to result in collisions, whereas lattice towers, particularly those that rely on guy-wires, have a greater risk.

To avoid and minimize the likelihood that towers will result in collisions by listed seabirds we recommend you incorporate the following measures into your project description:

- The profile of the tower should be as small as possible, minimize the extent of the tower that protrudes above the surrounding vegetation layer, and avoid the use of guywires.
- If the top of the tower must be lit to comply with Federal Aviation Administration regulations, use a flashing red light verses a steady-beam red or white light.
- If possible, co-locate with existing towers or facilities.

Seabirds have been known to collide with fences, powerlines, and other structures near nesting colonies. To avoid and minimize the likelihood of collision we recommend you incorporate the following measures into your project description:

- Where fences extend above vegetation, integrate three strands of polytape into the fence to increase visibility.
- For powerlines, guywires and other cables, minimize exposure above vegetation height and vertical profile.

General Project Design Guidelines - Popolo Ku Mai and 24 more species

Published by Pacific Islands Fish And Wildlife Office - Publication Date: March 1, 2020 for the following species included in your project

Popolo Ku Mai Solanum incompletum
Hawaii Akepa Loxops coccineus
Holei Ochrosia kilaueaensis
Hawaiian (=koloa) Duck Anas wyvilliana
Uhi Uhi Mezoneuron kavaiense
Po`e Portulaca sclerocarpa
Stenogyne angustifolia var. angustifolia
Hawaiian Stilt Himantopus mexicanus knudseni
Hawaiian Goose Branta (=Nesochen) sandvicensis
Silene hawaiiensis
Band-rumped Storm-petrel Oceanodroma castro
Ihi Portulaca villosa
Hawaiian Coot Fulica americana alai
Tetramolopium arenarium
Hawaiian Hoary Bat Lasiurus cinereus semotus
Microlepia strigosa var. mauiensis
Hawaiian Petrel Pterodroma sandwichensis
Newell's Townsend's Shearwater Puffinus auricularis newelli
Honohono Haplostachys haplostachya
Hala Pepe Pleomele hawaiiensis
Green Sea Turtle Chelonia mydas
Nehe Lipochaeta venosa
Holei Ochrosia haleakalae
Blackburn's Sphinx Moth Manduca blackburni
Vigna o-wahuensis

Hawaiian hoary bat (*Lasiurus cinereus semotus*): 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. If trees or shrubs 15 feet or taller are cleared during the pupping season, there is a risk that young bats could inadvertently be harmed or killed since they are too young to fly or may not move away. Additionally, Hawaiian hoary bats forage for insects from as low as 3 feet to higher than 500 feet above the ground and can become entangled in barbed wire used for fencing.

To avoid and minimize impacts to the endangered Hawaiian hoary bat we recommend you incorporate the following applicable measures into your project description:

- Do not disturb, remove, or trim woody plants greater than 15 feet tall during the bat birthing and pup rearing season (June 1 through September 15).
- Do not use barbed wire for fencing.

General Project Design Guidelines - Popolo Ku Mai and 24 more species

Published by Pacific Islands Fish And Wildlife Office - Publication Date: February 1, 2022 for the following species included in your project

Popolo Ku Mai Solanum incompletum
Hawaii Akepa Loxops coccineus
Holei Ochrosia kilaueaensis
Hawaiian (=koloa) Duck Anas wyvilliana
Uhi Uhi Mezoneuron kavaiense
Po`e Portulaca sclerocarpa
Stenogyne angustifolia var. angustifolia
Hawaiian Stilt Himantopus mexicanus knudseni
Hawaiian Goose Branta (=Nesochen) sandvicensis
Silene hawaiiensis
Band-rumped Storm-petrel Oceanodroma castro
Ihi Portulaca villosa
Hawaiian Coot Fulica americana alai
Tetramolopium arenarium
Hawaiian Hoary Bat Lasiurus cinereus semotus
Microlepia strigosa var. mauiensis
Hawaiian Petrel Pterodroma sandwichensis
Newell's Townsend's Shearwater Puffinus auricularis newelli
Honohono Haplostachys haplostachya
Hala Pepe Pleomele hawaiiensis
Green Sea Turtle Chelonia mydas
Nehe Lipochaeta venosa
Holei Ochrosia haleakalae
Blackburn's Sphinx Moth Manduca blackburni
Vigna o-wahuensis

Pacific sea turtles: Green sea turtles (*Chelonia mydas*) (Central North Pacific DPS - Hawaii and Johnston Atoll), (Central West Pacific DPS - Mariana Archipelago and Wake NWR) and (Central South Pacific DPS - American Samoa, Palmyra, Kingman, Howland, Baker and Jarvis NWR), and Hawksbill sea turtle (*Eretmochelys imbricata*):
The Service consults on sea turtles and their use of terrestrial habitats (beaches where nesting and/or basking is known to occur), whereas the National Marine Fisheries Service (NMFS) consults on sea turtles and their use of off-shore and open ocean habitats. We recommend that you consult with NMFS regarding the potential impacts from the proposed project to sea turtles in off-shore and open ocean habitats.

Green sea turtles may nest on any sandy beach area in the Pacific Islands. Hawksbill sea turtles exhibit a wide tolerance for nesting substrate (ranging from sandy beach to crushed coral) with nests typically placed under vegetation. Both species exhibit strong nesting site fidelity. Nesting occurs on Hawaiian beaches from May through September, peaking in June and July, with hatchlings emerging through November and December. Sea turtle nesting in the Western Pacific, Marianas, and South Pacific Islands can occur year-round; peaking in April and July. Nesting in American Samoa is from October to March).

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

Projects that alter the natural beach profile, such as nourishment and hardening, including the placement of seawalls, jetties, sandbags, and other structures, are known to reduce the suitability of on-shore habitat for sea turtles. These types of projects often result in sand compaction, erosion, and additional sedimentation in nearshore habitats, resulting in adverse effects to the ecological community and future sea turtle nests. The hardening of a shoreline increases the potential for erosion in adjacent areas, resulting in subsequent requests to install stabilization structures or conduct beach nourishment in adjacent areas. Given projected sea level rise estimates, the likelihood of increase in storm surge intensity, and other factors associated with climate change, we anticipate that beach erosion will continue and likely increase.

Whenever possible, projects should consider alternatives that avoid the modification or hardening of coastlines. Beach nourishment or beach hardening projects should evaluate the long-term effect to sea turtle nesting habitat and consider the cumulative effects.

To avoid and minimize project impacts to sea turtles and their nests we recommend you incorporate the following applicable measures into your project description:

- No vehicle use on, or modification of, the beach/dune environment during the sea turtle nesting or hatching season, or on beaches where sea turtles are known to bask.
- Do not remove or destroy native dune vegetation.
- Incorporate applicable Best Management Practices for Work in Aquatic Environments into the project design.

- Have a biologist familiar with sea turtles conduct a visual survey of the project site to ensure no basking sea turtles are present.
    - If a basking sea turtle is found within the project area, cease all mechanical or construction activities within 100 feet until the animal voluntarily leaves the area.
    - Cease all activities between the basking turtle and the ocean.
- Remove any project-related debris, trash, or equipment from the beach or dune if not actively being used.
- Do not stockpile project-related materials in the intertidal zone, reef flats, or stream channels.

Lighting: Optimal nesting habitat is a dark beach free of barriers that restrict sea turtle movement. Nesting turtles may be deterred from approaching or laying successful nests on lighted or disturbed beaches. They may become disoriented by artificial lighting, leading to exhaustion and placement of a nest in an inappropriate location (such as at or below the high tide line). Hatchlings that emerge from nests may also be disoriented by artificial lighting. Inland areas visible from the beach should be sufficiently dark to allow for successful navigation to the ocean.

To avoid and minimize project impacts to sea turtles from lighting we recommend incorporating the following applicable measures into your project description:

- Avoid nighttime work during the nesting and hatching season.
- Minimize the use of lighting and shield all project-related lights so the light is not visible from any beach.
    - If lights can't be fully shielded or if headlights must be used, fully enclose the light source with light filtering tape or filters.
- Incorporate design measures into the construction or operation of buildings adjacent to the beach to reduce ambient outdoor lighting such as:
    - tinting or using automatic window shades for exterior windows that face the beach;
    - reducing the height of exterior lighting to below 3 feet and pointed downward or away from the beach; and
    - minimize light intensity to the lowest level feasible and, when possible, include timers and motion sensors.

General Project Design Guidelines - Popolo Ku Mai and 24 more species

Published by Pacific Islands Fish And Wildlife Office - Publication Date: February 1, 2022 for the following species included in your project

- Popolo Ku Mai Solanum incompletum
- Hawaii Akepa Loxops coccineus
- Holei Ochrosia kilaueaensis
- Hawaiian (=koloa) Duck Anas wyvilliana
- Uhi Uhi Mezoneuron kavaiense
- Po`e Portulaca sclerocarpa
- Stenogyne angustifolia var. angustifolia
- Hawaiian Stilt Himantopus mexicanus knudseni
- Hawaiian Goose Branta (=Nesochen) sandvicensis
- Silene hawaiiensis
- Band-rumped Storm-petrel Oceanodroma castro
- Ihi Portulaca villosa
- Hawaiian Coot Fulica americana alai
- Tetramolopium arenarium
- Hawaiian Hoary Bat Lasiurus cinereus semotus
- Microlepia strigosa var. mauiensis
- Hawaiian Petrel Pterodroma sandwichensis
- Newell's Townsend's Shearwater Puffinus auricularis newelli
- Honohono Haplostachys haplostachya
- Hala Pepe Pleomele hawaiiensis
- Green Sea Turtle Chelonia mydas
- Nehe Lipochaeta venosa
- Holei Ochrosia haleakalae
- Blackburn's Sphinx Moth Manduca blackburni
- Vigna o-wahuensis

Blackburn's sphinx moth (*Manduca blackburni*):
Adult Blackburn's sphinx moths feed on nectar from native plants, including beach morning glory (*Ipomoea pes-caprae*), iliee (*Plumbago zeylanica*), and maiapilo (*Capparis sandwichiana*); larvae feed upon non-native tree tobacco (*Nicotiana glauca*) and native aiea (*Nothocestrum* sp.). To pupate, the larvae burrow into the soil and can remain in a state of torpor for a year or more before emerging from the soil. Soil disturbance can result in death of the pupae.

We offer the following survey recommendations to assess whether the Blackburn's sphinx moth is within the project area:

- A biologist familiar with the species should survey areas of proposed activities for Blackburn's sphinx moth and its larval host plants prior to work initiation.
    - Surveys should be conducted during the wettest portion of the year (usually November-April or several weeks after a significant rain) and within 4-6 weeks prior to construction.
    - Surveys should include searches for eggs, larvae, and signs of larval feeding (chewed stems, frass, or leaf damage).
    - If native aiea or tree tobacco over 3 feet tall, or adult Blackburn's sphinx moths are found during surveys, do not disturb them and contact the Service for additional guidance to avoid take.

If no Blackburn's sphinx moth, aiea, or tree tobacco are found during surveys, it is imperative that measures be taken to avoid attraction of Blackburn's sphinx moth to the project location and prohibit tree tobacco from entering the site. Tree tobacco can grow greater than 3 feet tall in approximately 6 weeks. If it grows over 3 feet after surveys have been completed, the plants may become a host plant for Blackburn's sphinx moth larvae. We therefore recommend that you:

- Remove any tree tobacco less than 3 feet tall.
- Monitor the site every 4-6 weeks for new tree tobacco growth before, during, and after the proposed ground-disturbing activity. This monitoring for can be completed by any staff, such as groundskeeper or regular maintenance crew, if they are provided with picture placards of tree tobacco at different life stages.

Appendix C – 2022 Traffic Impact Analysis Report

WAIMEA NUI – KOKO Health Clinic

TMK (3) 6-4-038:011 (PORTION)

Traffic Impact Analysis Report

WAIMEA, Island of Hawaii

September 2022

Prepared for

Waimea Nui Regional Community Development Corporation

Prepared by

SSFM INTERNATIONAL

Table of Contents

List of Figures

List of Tables

Appendices

I. PROJECT DESCRIPTION

The Waimea Hawaiian Homesteaders' Association subsidiary organization, Waimea Nui Community Development Corporation (WNCDC), previously proposed the development of the Waimea Nui Regional Community Development Initiative (WNR-CDI) in the *2015 WNR-CDI Traffic Impact Analysis Report* (TIAR) (Traffic Management Consultant, revised March 2015). In 2015, a Final Environmental Assessment - Finding of No Significant Impact (FEA-FONSI) was prepared for the WNR-CDI, located within approximately 114-acres of Department of Hawaiian Home Lands (DHHL) Homestead Land in a portion of Tax Map Key (TMK) (3) 6-4-038:011. Since then, no construction of WNR-CDI has started, and the proposed site remains vacant. The WNCDC is now pursuing the relocation and upgrade of the existing Kipuka O Ke Ola (KOKO) Health Clinic from its current site within Uilani Plaza on Mamalahoa Highway to within the WNR-CDI. Details and surrounding area context of the future WNR-CDI are shown in the project location map in Figure 1.

The *2015 WNR-CDI TIAR* studied the development that included a cemetery, agriculture park, golf facility, equestrian center, and farmers' market (see Figure 2). The proposed relocated KOKO Health Clinic will be 9,600 square feet (SF) gross floor area (GFA) and proposes to offer many of the same services that it currently offers, including primary care, psychiatry, psychology, women's health, laau lapaau, lomilomi, and acupuncture services. The KOKO Health Clinic site plan, including clinic and parking lot, is shown in Figure 3. The primary access to the relocated KOKO Health Clinic will be off of the future "New Road", originating at Hiiaka Street. The future "New Road", first proposed in the previous *2015 WNR-CDI TIAR*, has yet to be constructed, but is planned to provide primary access to all land uses proposed in Phase 1. Alternatively, a temporary access through Poliahu Alanui Road, west of the intersection with Uakikoni Alanui, will provide access to the relocated KOKO Health Clinic until the access from Hiiaka Street at future "New Road" is constructed. The temporary access will become the secondary access after the main access is built. The land uses included in the *2015 WNR-CDI TIAR*, in addition to the KOKO Health Clinic, constitute Phase 1 of the WNR-CDI. An additional Phase 2 of the WNR-CDI will include additional developments that are not yet planned, and therefore not analyzed as a part of this TIAR.

This TIAR will supplement the previous *2015 WNR-CDI TIAR* and only assess the impact of the proposed relocated KOKO Health Clinic on Future With Project analysis. As a part of this TIAR, the Future Without Project analysis will include the project-related trips from the previous *2015 WNR-CDI TIAR* using updated background growth rates and intersection turning movement counts taken in September 2021. Hawaii County Code Chapter 25, Section 25-2-46, "Concurrency Requirements," indicates that traffic impacts of projects be identified and analyzed within a future five-year, ten-year, and 20-year timeline from the existing year of analysis, which for this project is 2021, and thus future analysis will be completed for the years 2026, 2031, and 2041.

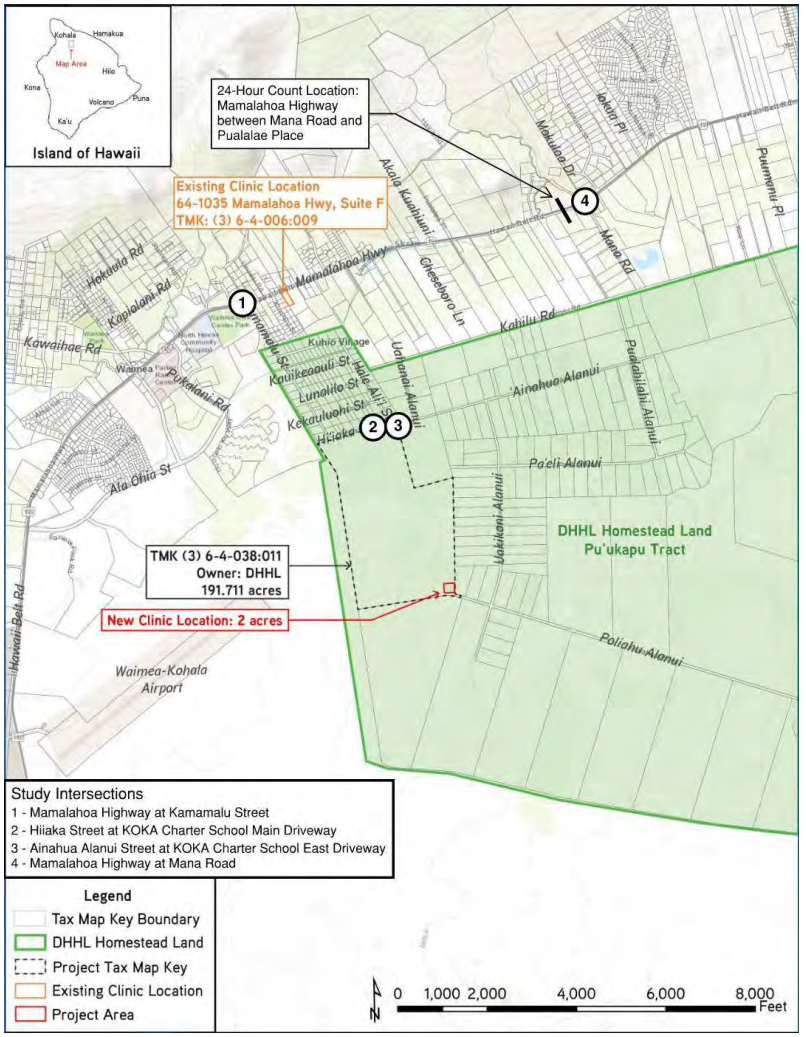


Figure 1: Project Location Map

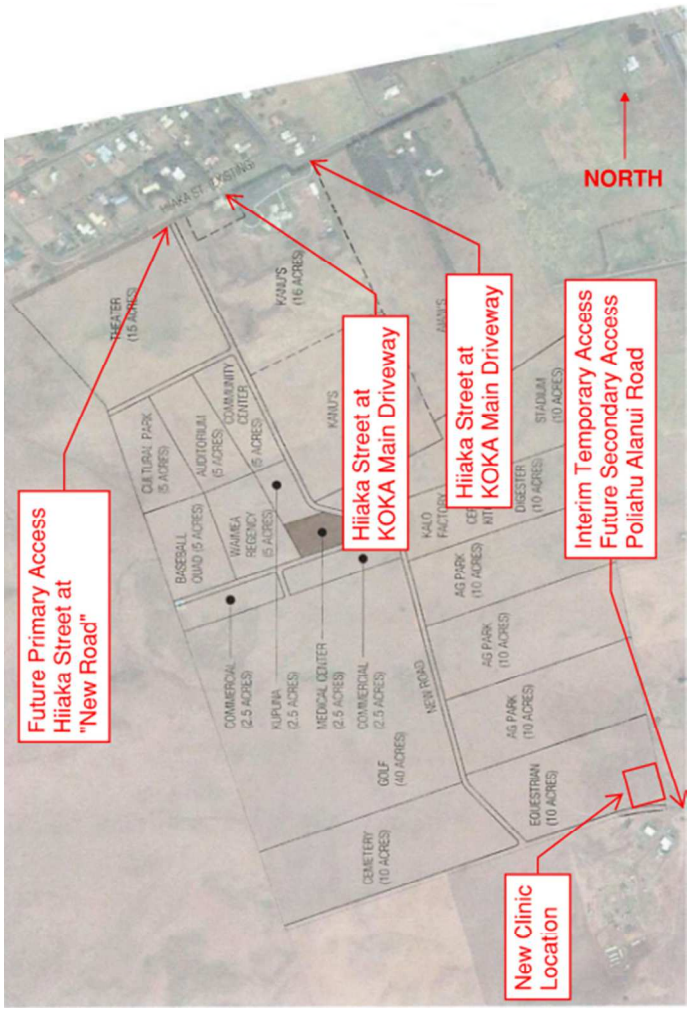


Figure 2: Phase I WNR-CDI Project Area

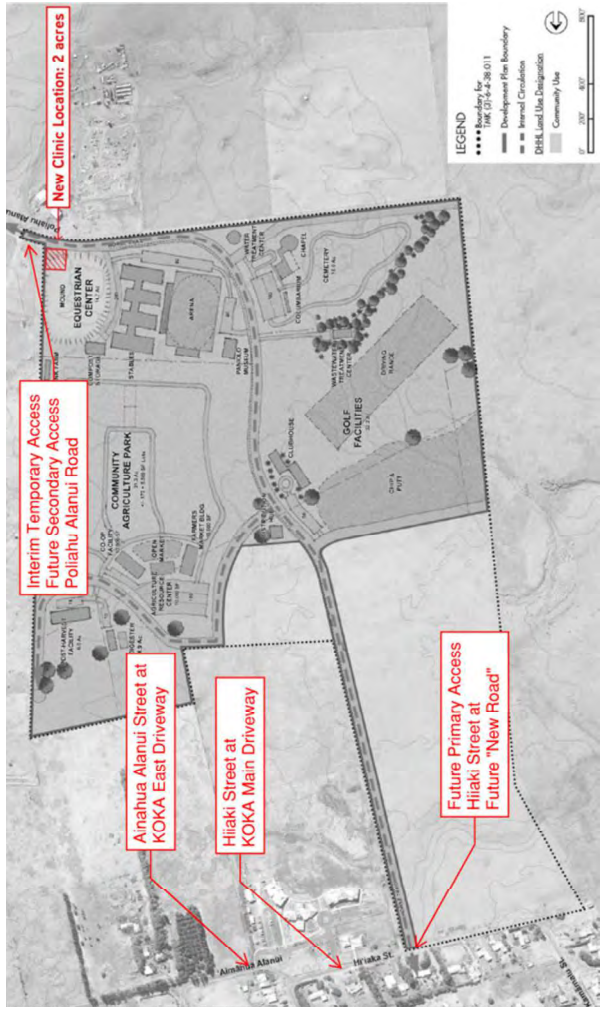


Figure 3: Phase I WNR-CDI, Conceptual KOKO Health Clinic Site Plan (Source: G70)

II. EXISTING CONDITIONS

The proposed relocated KOKO Health Clinic project site is a part of the WNR-CDI and located in Waimea in the South Kohala District of Hawaii (see Figure 1). The current land uses around the project area are primarily residential.

A. Study Roadways

1. Mamalahoa Highway

Mamalahoa Highway changes jurisdictions along its entirety, however, within the project vicinity between Kamamalu Street and Mana Road, it falls under County of Hawaii (COH) jurisdiction. The COH jurisdiction area falls between State segments starting from Kahawai Street, continuing west, and Kipuupuu Street, continuing east. Mamalahoa Highway has additional names in the study area, including Hawaii Belt Road and Hawaii Route 19. However, the name "Mamalahoa Highway" will be used throughout this report to avoid confusion.

In Waimea Town, from Iona Court to Lindsey Road, Mamalahoa Highway is a two-way, four-lane arterial highway. East of Waimea Town, where the study area is located, the highway transitions into a two-way, two-lane, undivided arterial highway. There are paved and unpaved shoulders of varying widths along the corridor. The majority of the study area along Mamalahoa Highway has no paved sidewalks or marked bike lanes. Access to numerous commercial, municipal, and healthcare buildings is provided through various paved and unpaved driveways along the corridor. The posted speed limit is 30 MPH in the study area.

2. Kamamalu Street

Kamamalu Street is a COH-owned, two-lane, two-way, minor collector in the study area. Sections of the road north of Kamanawa Street have shoulders of varying widths; however, no shoulders are provided south of this intersection. There are no paved sidewalks or marked bike lanes along the corridor. The roadway has a north-south orientation up until its southern terminus, at which point the roadway turns into Hiiaka Street and becomes an east-west roadway. The posted speed limit is 25 MPH.

3. Hiiaka Street

Hiiaka Street is a COH-owned, two-lane, two-way local street in the study area. There are no paved shoulders, sidewalks, or marked bike lanes along the corridor. At the Hale Alii Street intersection, Hiiaka Street turns into Ainahua Alanui Street. The posted speed limit is 25 MPH.

4. Ainahua Alanui Street

Ainahua Alanui Street is a COH-owned, two-lane, two-way local street in the study area. There are no paved shoulders, sidewalks, or marked bike lanes along the corridor. The posted speed limit is 25 MPH.

5. Mana Road

Mana Road is a COH-owned, two-lane, two-way minor collector in the study area. There are no paved shoulders, sidewalks, or marked bike lanes along the corridor. As previously noted, a dedicated westbound left-turn lane exists at the intersection of Mana Road and Mamalahoa Highway. Additionally, a median acceleration lane exists on the west leg of the intersection along Mamalahoa Highway to assist

left-turning movement from Mana Road. Mana Road is stop-controlled at Mamalahoa Highway. The posted speed limit is 35 MPH.

6. Uakikoni Alanui

Uakikoni Alanui is a DHHL-owned, two-lane, two-way, rural local street. There are no paved shoulders, sidewalks, or marked bike lanes along the corridor. The posted speed limit is 25 MPH. Uakikoni Alanui is stop-controlled at the intersection with Ainahua Alanui Street. Uakikoni Alanui runs in a north-south direction to the east of the project. The future secondary access will come off of Ainahua Alanui Road, west of the intersection with Uakikoni Alanui.

7. Poliahu Alanui Road

East of Uakikoni Alanui, Poliahu Alanui Road is a COH-maintained, two-lane, two-way local street. There are no paved shoulders, sidewalks, or marked bike lanes along the corridor. Poliahu Alanui Road is stop-controlled at the intersection with Uakikoni Alanui. The west end of Poliahu Alanui Road will serve as the temporary access point to the KOKO Health Clinic until the completion of "New Road", when the access off Poliahu Alanui Road will become the secondary access.

B. Study Intersections

Four existing study intersections were identified and analyzed to consider the impact resulting from the proposed development. The existing lane configurations and surrounding areas are shown in Figure 4.

1. Mamalahoa Highway at Kamamalu Street

Mamalahoa Highway at Kamamalu Street is a three-leg, signalized intersection. The eastbound direction has two through lanes, with the southern-most lane being a shared through-right lane. There is a shared left-through lane for the westbound lanes on Mamalahoa Highway, which operates with a leading protected-permitted phase. An additional right turn pocket opens up along Kamamalu Street for the northbound lanes, approximately 85-feet before the intersection. There is a private driveway to the north of the intersection that leads to single-family residences and Kamuela Medical Associates, but it is not controlled by the traffic signal. Although there are no curb ramps or sidewalks, marked crosswalks are provided at the eastern and southern legs.

2. Hiiaka Street at KOKA Charter School Main Driveway

Hiiaka Street at the Kanu O Kaaina (KOKA) Charter School Main Driveway is a three-leg, two-way stop-controlled (TWSC) intersection, with a stop sign for the KOKA Main Driveway approach. There are no marked crosswalks, curb ramps, or sidewalks at this intersection.

3. Ainahua Alanui Street at KOKA Charter School Eastern Driveway

The Ainahua Alanui Street and KOKA Charter School Eastern Driveway is a three-leg, TWSC intersection, with a stop sign for the KOKA Eastern Driveway approach. The driveway is a secondary access point to the KOKA Charter School. There are no marked crosswalks, curb ramps, or sidewalks at this intersection.

4. Mamalahoa Highway at Mana Road

Mamalahoa Highway and Mana Road is a three-leg, TWSC intersection, with a stop sign for the Mana Road approach. Mana Road is 23-feet wide, with 11.5-foot marked lanes in each direction. There are no marked

crosswalks, curb ramps, or sidewalks at this intersection. Intersection improvements that have been incorporated since the *2015 WNR-CDI TIAR*, include:

- Widening Mamalahoa Highway at Mana Road to provide an exclusive westbound left turn lane.
- Widening Mamalahoa Highway at Mana Road to provide an acceleration lane for northbound left turns from Mana Road onto Mamalahoa Highway.
- Widening Mana Road to provide separate left and right turn lanes at Mamalahoa Highway.

C. Vehicle Volumes

1. 24-Hour Volume

Historic Hawaii Department of Transportation (HDOT) Annual Average Daily Traffic (AADT) counts in the study area along Mamalahoa Highway between Mana Road and Pualalea Place were available from 2013 to 2020. 24-hour tube counts were also collected on Thursday, September 30, 2021, at the same location. The historic HDOT and recent 2021 counts are shown in Table 1. 2020 data was not used to analyze the growth rate due to the impacts of Covid-19. Discussion of the pandemic impacts will be discussed in a later section. Appendix A includes the raw historical HDOT traffic data and the 2021 24-hour hour counts.

Table 1. 2013 - 2021 AADT along Mamalahoa Highway between Mana Road and Pualalea Place

Year	AADT or 24-Hour Average
2013	15,500
2014	14,200
2015	14,700
2016	15,100
2017	16,000
2018	15,400
2019	16,100
2020 ~	13,100
2021*	15,143

~2020 counts may be impacted by Covid-19

*2021 counts represent a single-day 24-hour count

The 2021 AM and PM commuter peak hours along Mamalahoa Highway were found to occur between 7:15 to 8:15 AM and 4:15 to 5:15 PM, respectively (see Figure 5). As seen in Figure 5, westbound traffic is generally heavier in the AM peak hour, while eastbound traffic is generally heavier in the PM peak hour, with more balanced traffic during the off-peaks and midday. Figure 6 shows the daily 2018-2020 HDOT volumes and the 2021 24-hour volume on Mamalahoa Highway between Mana Road and Pualalea Place.

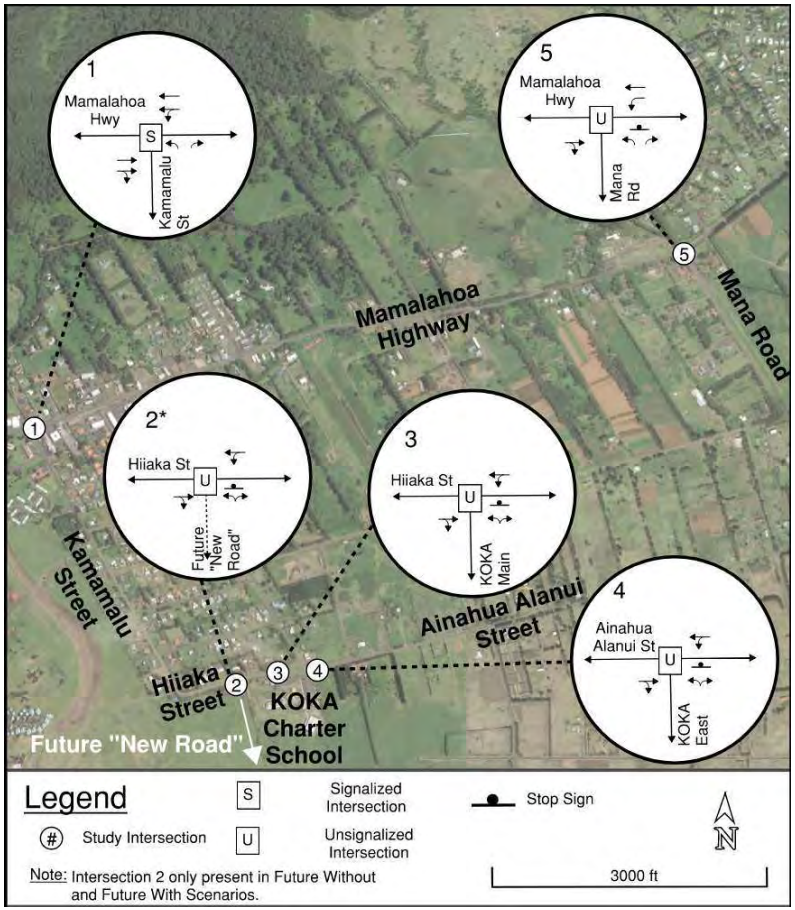


Figure 4: Existing Lane Configuration

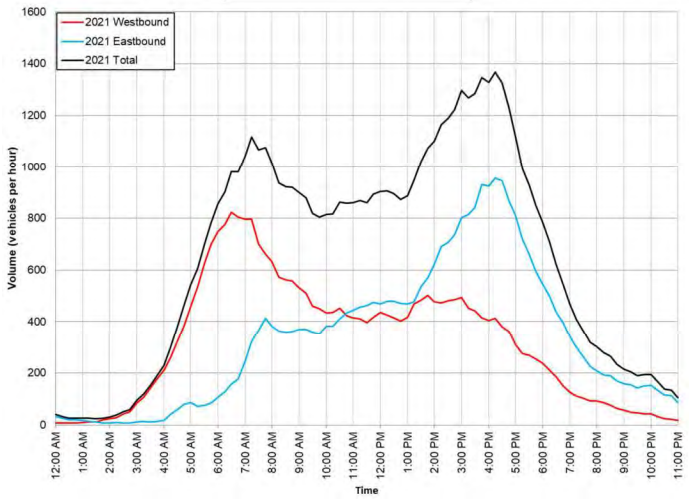


Figure 5: 2021 24-Hour Volumes along Mamalahoa Hwy. Between Mana Rd. and Pualalea Pl.

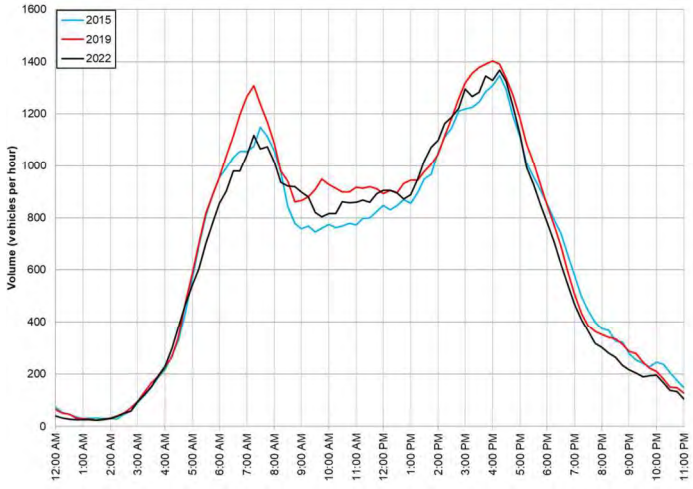


Figure 6: 24-Hour Volume Distribution on Mamalahoa Hwy. Between Mana Rd. and Pualalea Pl.

a) Covid-19 Traffic Impacts

The Covid-19 pandemic led to a mandatory 14-day quarantine for incoming travelers and the closure of non-essential businesses in the State of Hawaii beginning in March 2020. Covid-19 restrictions resulted in a significant drop in traffic volumes across most roadways. Near the end of 2020, businesses began reopening, and non-essential employees started going back to work. Additionally, tourism slowly began to return to Hawaii. Furthermore, at the beginning of the 2021-2022 school year, Hawaii public schools reinstated in-person learning.

HDOT periodically collected traffic counts throughout the pandemic at various stations to analyze traffic volumes and how they compared to pre-pandemic. This included counts at the station along Mamalahoa Highway, west of Mana Road. Since the 2021 24-hour count was comparable to the 2013-2019 HDOT historical counts (Table 1), the 2021 data was assumed to be representative of typical travel patterns. At the count station along Mamalahoa Highway, the 2019 AM peak hour was noted to be higher than 2015 and 2021. The PM peak hour volumes were comparable across the years 2015, 2019, and 2021. With this, no Covid-related adjustments are deemed necessary for applying to 2021 data.

Table 2. Covid Impact - Peak Hour Comparison on Mamalahoa Highway West of Mana Road

Peak Hour	Time	Eastbound			Westbound			Total		
		2015 HDOT	2019 HDOT	2021 Count	2015 HDOT	2019 HDOT	2021 Count	2015 HDOT	2019 HDOT	2021 Count
AM Peak	7:15-8:15AM	380	352	321	697	957	796	1,077	1,309	1,117
PM Peak	4:30-5:30PM	876	931	945	418	407	380	1,294	1,338	1,325

2. Intersection Peak Turning Movement Counts

Turning movement counts were taken at the four existing study intersections on Thursday, September 30, 2021, from 6:30 to 9:00 AM and 3:00 to 6:00 PM. The AM and PM peak hours on Mamalahoa Highway occurred between 7:15 to 8:15 AM and 4:15 to 5:15 PM, respectively. Figure 7 shows the AM and PM peak hour volumes at the study intersections. Appendix A includes traffic count data at the study intersections.

3. Transit Facilities

The Hawaii County transit system (Hele-On Bus) has one bus route in the project area. Bus route #301 is called "Waimea Circulator" and operates as a "flex route" along Mamalahoa Highway with no designated stops close to the project site. A "flex route" can serve up to 1 mile off route if reservations are made ahead of time. In addition, this route can be flagged by passengers along its route where a bus can safely pull over. The closest designated stops are approximately 0.8 miles north of KOKA Main Driveway, near the Waimea Civic Center on Kamamalu Street. See Figure 8 for the route within the WNR-CDI area. Appendix B includes the detailed bus route schedule and map for this route.

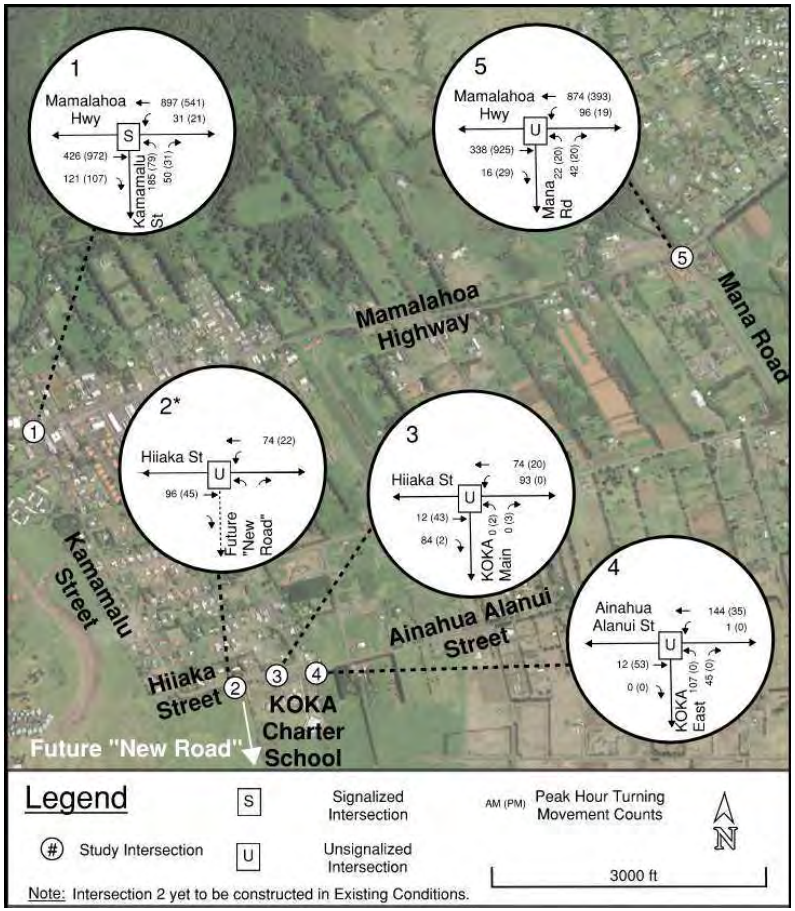


Figure 7: 2021 Peak Hour Volumes

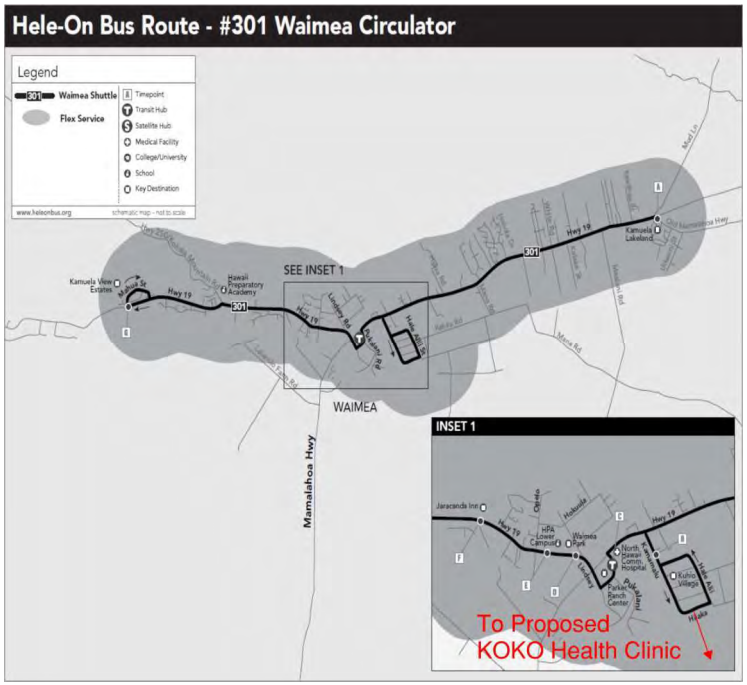


Figure 8: Hele-On Bus Route #301

4. Pedestrian and Bicycle Volumes

Peak hour intersection pedestrian and bicycle volumes were also collected at the existing study intersections on Thursday, September 30, 2021, from 6:30 to 9:00 AM and 3:00 to 6:00 PM. Bike volumes include those that travel through the intersection and pedestrian volumes include those that cross along any leg of the intersection. Pedestrian volumes were higher in the PM peak hour at the Mamalahoa Highway and Kamamalu Street intersection. Bicycle volumes were low or non-existent in the AM and PM peak hours. Table 3 summarizes the pedestrian and bicycle counts during the vehicular peak hours.

Table 3: Peak Hour Pedestrian and Bicycle Volumes

Intersection	Pedestrian		Bicycle	
	AM Peak	PM Peak	AM Peak	PM Peak
Mamalahoa Hwy at Kamamalu St	8	15	1	1
Hiiaka St at KOKA Main Dwy	2	0	0	0
Ainahua Alanui St at KOKA Eastern Dwy	0	2	0	0
Mamalahoa Hwy at Mana Rd	0	0	0	1

D. Existing Level of Service

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 studying intersections and movements. Intersection LOS and delay were determined for the AM and PM peak hours using Synchro Version 10.0 traffic analysis software.

As stated in the *Highway Capacity Manual 6th Edition* (*HCM6*) (TRB, 2016), LOS at 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 major movements or intersection. The delay is defined this way because vehicles traveling along the major, free-flow road of a TWSC intersection proceed through with minimal delay. The 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. As Synchro is unable to analyze the impacts of an acceleration lane, when analyzing the northbound left turning movements at Mamalahoa Highway and Mana Road, westbound through volumes were omitted, as to only analyze the ability for northbound left turning vehicles to find gaps in the eastbound traffic and westbound left turning movements. With an acceleration lane, turning vehicles can complete their turn without conflicting with the westbound through movement.

Table 4: LOS Criteria for Unsignalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
	<=1.0	>1.0
≤ 10.0	A	F
>10 and ≤15	B	F
>15 and ≤25	C	F
>25 and ≤35	D	F
>35 and ≤50	E	F
>50	F	F

Source: *HCM6* (TRB, 2016)

The LOS analysis for signalized intersections is determined by the average total vehicle delay based on the methodologies of the *HCM6* (TRB, 2016), shown in Table 5. *HCM6* doesn't support the protected-permitted phasing from a shared lane, which is the case at Mamalahoa Highway and Kamamalu Street for the westbound approach. For this intersection, methodologies from the *Highway Capacity Manual* (*HCM*) (TRB, 2000) are used. High numbers of vehicles passing through the intersection, long cycle lengths, inappropriate signal phasing, or poor signal progression can result in long delays and poor LOS.

Table 5: LOS Criteria for Signalized Intersections

Average Control Delay (s/veh)	LOS
≤ 10.0	A
>10 and ≤20	B
>20 and ≤35	C
>35 and ≤55	D
>55 and ≤80	E
>80	F

Source: *HCM* (TRB, 2000)

Another measure of intersection operation is the volume to capacity (v/c) ratio. The v/c is the ratio of the volume of traffic utilizing the intersection compared to the maximum volume of vehicles that the intersection can accommodate during a specific period. A v/c ratio under 0.85 means the intersection is operating under capacity, and excessive delays are not experienced. An intersection operates near its capacity when v/c ratios range from 0.85 to 0.95. Unstable flows are expected when the v/c ratio is between 0.95 and 1.0. LOS based on *HCM 2000* does not use v/c ratio as a traffic operation measure. 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 intended movement. Poor LOS and low v/c are common for low volume protected turn movements or minor street movements that have to wait through a long cycle length for their phase to come up.

2. Existing Intersections LOS Results

Existing intersection and movement LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using Synchro 10 traffic analysis software. All movements at this intersection were analyzed with volumes as shown in Figure 7. The results are shown in Table 6 and Appendix C.

Table 6: Existing (2021) Intersection LOS

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Kamamalu St	**11.4**	**0.69**	**B**	**7.9**	**0.66**	**A**
Mamalahoa EB Through-Right	12.9	0.57	B	8.6	0.66	A
Mamalahoa WB Left-Through	8.9	0.60	A	3.1	0.29	A
Kamamalu NB Left	17.9	0.60	B	23.6	0.60	C
Kamamalu NB Right	11.5	0.04	B	16.3	0.07	B
Hiiaka St at KOKA Main Dwy	**2.8**	**Unsignalized**		**0.7**	**Unsignalized**	
Hiiaka WB Left-Through	7.9	0.12	A	0.0	0.00	A
KOKA Main Dwy NB Left-Right	0.0	0.00	A	8.8	0.01	A
Ainahua Alanui St at KOKA East Dwy	**6.2**	**Unsignalized**		**0.0**	**Unsignalized**	
Ainahua Alanui WB Left-Through	7.3	1.00	A	0.0	0.00	A
KOKA East Dwy NB Left-Right	11.9	0.35	B	0.0	0.00	A
Mamalahoa Hwy at Mana Rd	**3.5**	**Unsignalized**		**1.1**	**Unsignalized**	
Mamalahoa WB Left	8.7	0.10	A	10.4	0.04	B
Mana NB Left	16.1	0.13	C	21.2	0.10	C
Mana NB Right	12.0	0.15	B	18.1	0.08	C

a) Mamalahoa Highway at Kamamalu Street

All movements at the intersection of Mamalahoa Highway at Kamamalu Street operate at a LOS C or better and v/c < 1.0 during both peak hours.

b) Hiiaka Street at KOKA Main Driveway

All movements at the intersection of Hiiaka Street at KOKA Main Driveway operate at a LOS A and v/c < 1.0 during both peak hours.

c) Ainahua Alanui Street at KOKA Eastern Driveway

All movements at the intersection of Ainahua Alanui Street at KOKA Eastern Driveway operate at a LOS B or better and v/c < 1.0 during both peak hours.

d) Mamalahoa Highway at Mana Road

All movements at the intersection of Mamalahoa Highway at Mana Road operate at a LOS C or better and v/c < 1.0 during both peak hours.

3. Recommendations for Existing Condition

All intersections and movements operate at an acceptable LOS and thus no traffic mitigation is recommended at this time.

III. FUTURE WITHOUT PROJECT CONDITIONS

Regional traffic growth, trip generation from any upcoming planned projects, and future surrounding area development's traffic, including the project-related trips from the *2015 WNR-CDI TIAR,* were added to the roadway network and analyzed for periods of five (5), ten (10), and twenty (20) years into the future corresponding to 2026, 2031, and 2041, respectively.

A. Upcoming Planned Projects

Surrounding area planned developments were researched to assess their potential impacts in adding additional traffic within the surrounding roadway network.

1. STIP

Information on future projects was compiled on August 26, 2021, at the *Statewide Transportation Improvements Program* (STIP) FY 2019-2022 website. The STIP is a four-year forecast identifying state and county transportation projects funded with Federal Highway and Federal Transit funds. There were no roadway construction or improvement projects listed in the STIP (2019-2022) that would impact the project area.

2. ERP

Information on future projects was compiled on August 26, 2021, using the State of Hawaii *Environmental Review Program* (ERP) website. The ERP website provides Environmental Impact Statement (EIS) and Environmental Assessments (EA) available to the public. Projects from the ERP website in the surrounding area from between 2016 and 2021 were reviewed.

a) Waimea Middle School New Eight Classroom Building

The *Waimea Middle School Eight Classroom Building EA* (Wilson Okamoto, 2015) proposes to replace existing science and computer classrooms with new modern laboratories. Waimea Middle School expects to accommodate the current and anticipated student enrollment with no increase from the new building. The construction of this project finished in 2016 and as such, any traffic impacts would have been captured by the September 30, 2021 traffic count.

b) Waimea Town Center Infrastructure Improvements

The *Waimea Town Center Infrastructure Improvements* (PBR, 2017) project includes the development of 761 residential units, 176,000 SF commercial use, and 100,000 SF of medical-related land use. Traffic projections for the development are:

- Residential traffic - projected to have 10% of trips coming east via Mamalahoa Highway.
- Commercial traffic - projected to have 19% coming east via Mamalahoa Highway and 6% from Kamamalu Street.
- Medical traffic - projected 16% coming east via Mamalahoa Highway and 5% from Kamamalu Street.

The full build-out of the improvements were estimated to be complete by 2035. Ala Ohia Road will be extended east from Pukalani Road to connect with Church Road during full build-out. This extension will be signalized and referred to as Ala Ohia Road East. The EA was withdrawn in 2018, and there are no immediate plans at the current time. As such, Project Generated traffic was not added to future background traffic for this analysis.

c) Waimea Roadway Improvement Project

The *Waimea Roadway Improvement Project EA* (SSFM, 2021) was anticipated to start in 2022, with no date of when all the improvements will be completed. These improvements included:

- Adding a roundabout at Kawaihae Road and Lindsey Road
- Adding mid-block left turn restrictions along Mamalahoa Highway between Lindsey Road and Pukalani Road
- Adding landscaped medians, crosswalks, sidewalks, and additional landscaping along Mamalahoa Highway between Kaomoloa Road and Lindsey Road.

As of this report, the project had not started, however it is not anticipated to add additional traffic.

3. 2015 WNR-CDI TIAR

The *2015 WNR-CDI TIAR* analyzed the traffic impact of constructing the WNR-CDI development in Waimea by 2024. The primary access to the development will be off Hiiaka Street through the future "New Road". The following land uses were included in the proposed development:

1. Cemetery
2. Agriculture Park
3. Golf Facility
4. Equestrian Center
5. Farmers' Market

The *2015 WNR-CDI TIAR* analyzed Existing (2014) conditions and Future (2024) With Project conditions that assumed a full buildout. The project generated trips are shown in Figure 9. As a part of Future (2024) With Project, the following traffic mitigation measures were recommended*:*

- Conducting a signal warrant at Mamalahoa Highway and Mana Road after the buildout of the proposed project.
- Widening Hiiaka Street, Ainahua Alanui, Pualahilahi Alanui, Kahilu Road, and Mana Road to provide a minimum 20-foot-wide paved travel way.

As of this report, the project had not started, however the project generated trips were added to Future Without Project volumes starting in 2026.

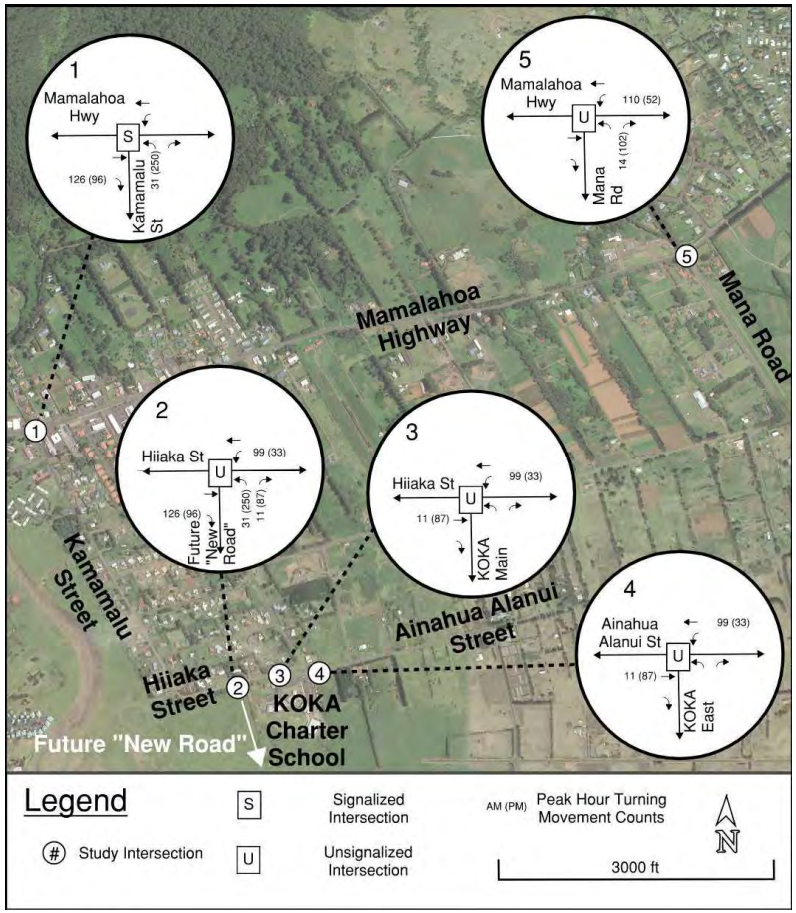


Figure 9. *2015 WNR-CDI TIAR* Project Related Trips

B. Volumes

1. Background Growth

Historical traffic volumes (see Table 1) along Mamalahoa Highway between Mana Street and Pualalea Place from 2013 (15,000 AADT) to 2019 (16,100 AADT) showed a 1.19% growth rate. However, AADT varied from year to year and the most recent 2021 volumes were lower than those taken in 2019.

The *Federal-Aid Highways 2035 Transportation Plan for the District of Hawaii* (CH2M Hill, 2014) forecasted a compounded annual increase of 1.73% in South Kohala from 2020 to 2035 (see Table 7).

Table 7: Traffic Forecast – Daily Vehicle Trips in South Kohala

Year	Daily Vehicle Trips	Growth Rate
2020	79,890	1.73%
2035	103,340	

Source: *Federal-Aid Highways 2035 Transportation Plan for the District of Hawaii* (CH2M Hill, 2014)

The 1.73% annual growth rate from the Long-Range Transportation Plan was greater than the 1.19% calculated growth. Therefore, the 1.73% growth was considered conservative and used in this analysis by applying to through movement traffic along Mamalahoa Highway. Other projects not identified in the STIP and ERP are assumed to be included in the 1.73% annual growth rate.

Future Without Project volumes, including background growth and WNR_CDI Phase 1 traffic volumes, forecasted for 2026, 2031, and 2041 are shown in Figures 10 through 12, respectively. The primary access at Hiiaka Street and "New Road" is expected to be completed.

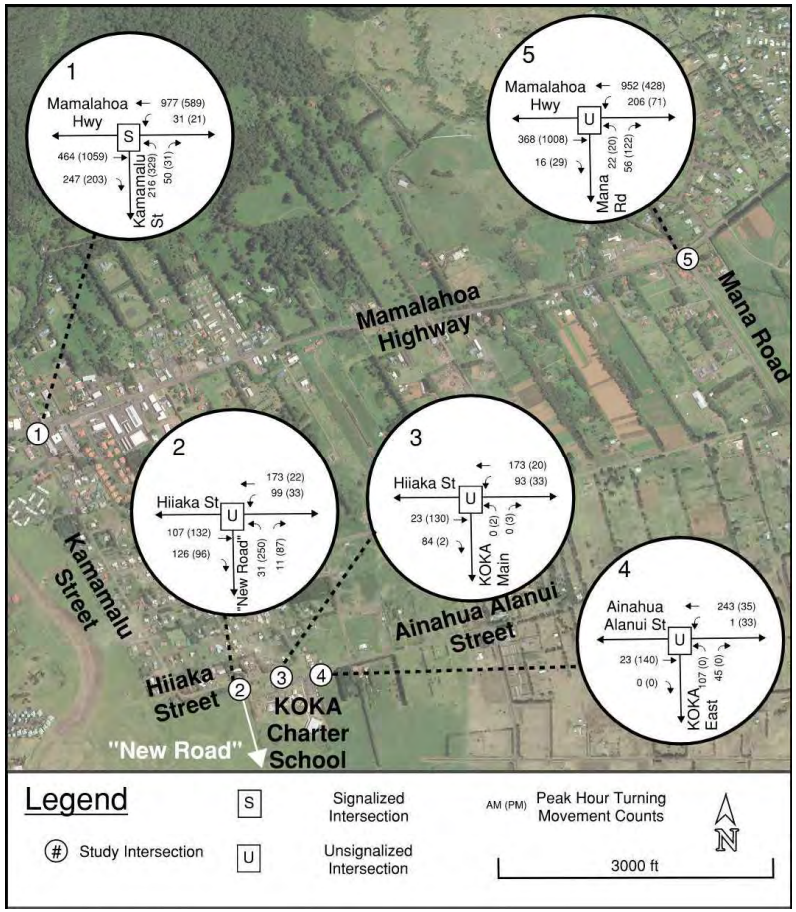


Figure 10. Future (2026) Without Project Peak Hour Volumes

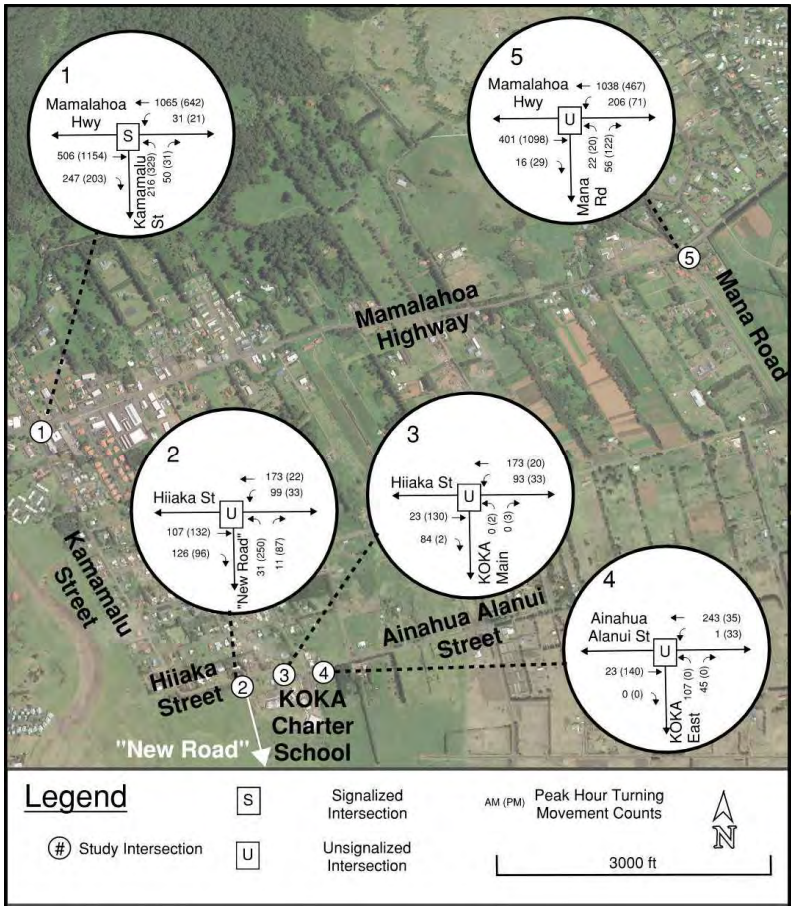


Figure 11. Future (2031) Without Project Peak Hour Volumes

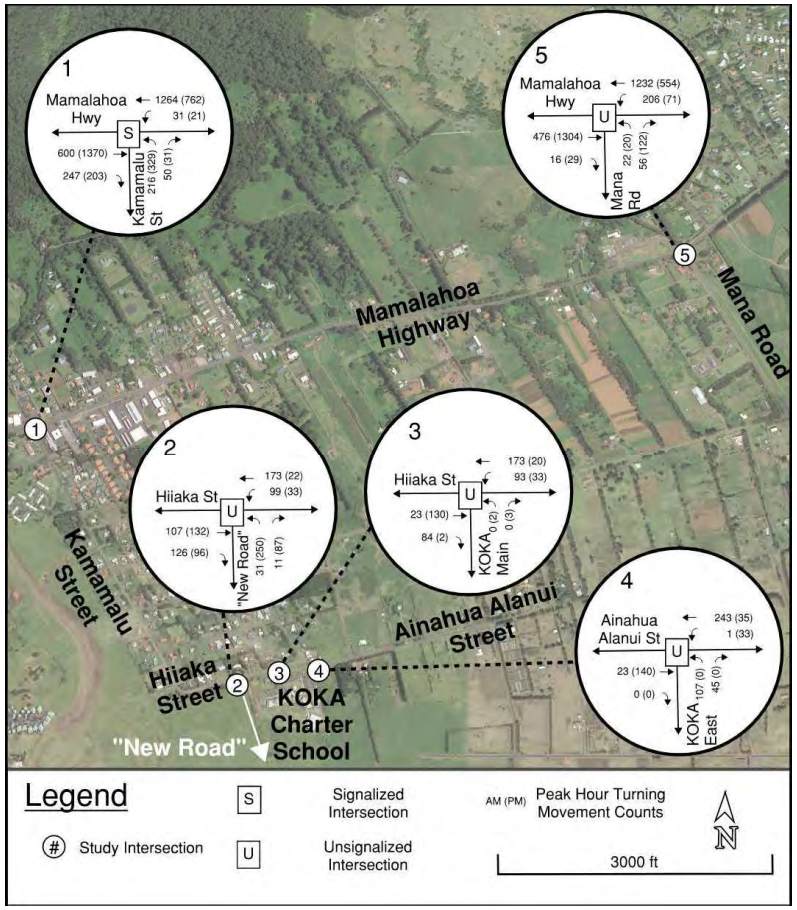


Figure 12. Future (2041) Without Project Peak Hour Volumes

C. Future (2026) Without Project Level of Service

1. Future (2026) Without Project Conditions

Future (2026) Without Project intersection and movement LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software and are shown in Table 8. Synchro reports are included in Appendix D. For analysis, the cycle length and splits at Mamalahoa Highway and Kamamalu Street were optimized.

Table 8. Future (2026) Without Project LOS

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Kamamalu St	**13.5**	**0.76**	**B**	**23.4**	**0.89**	**C**
Mamalahoa EB Through-Right	15.0	0.69	B	25.3	0.91	C
Mamalahoa WB Left-Through	10.1	0.68	B	8.6	0.42	A
Kamamalu NB Left	20.8	0.68	C	40.3	0.89	D
Kamamalu NB Right	12.1	0.04	B	15.1	0.04	B
Hiiaka St at "New Road"	**2.4**	**Unsignalized**		**8.7**	**Unsignalized**	
Hiiaka WB Left-Through	8.0	0.08	A	7.8	0.03	A
"New Road" NB Left-Right	13.0	0.09	B	15.2	0.51	C
Hiiaka St at KOKA Main Dwy	**2.0**	**Unsignalized**		**1.6**	**Unsignalized**	
Hiiaka WB Left-Through	7.9	0.12	A	7.7	0.03	A
KOKA Main Dwy NB Left-Right	0.0	0.00	A	9.7	0.01	A
Ainahua Alanui St at KOKA East Dwy	**5.5**	**Unsignalized**		**1.2**	**Unsignalized**	
Ainahua Alanui WB Left-Through	7.3	0.01	A	7.6	0.02	A
KOKA East Dwy NB Left-Right	14.4	0.42	B	0.0	0.00	A
Mamalahoa Hwy at Mana Rd	**9.1**	**Unsignalized**		**4.1**	**Unsignalized**	
Mamalahoa WB Left	9.4	0.23	A	11.6	0.14	B
Mana NB Left	26.6	0.22	D	31.3	0.15	D
Mana NB Right	12.9	0.21	B	34.1	0.55	D

a) Mamalahoa Highway at Kamamalu Street

All movements at the intersection of Mamalahoa Highway at Kamamalu Street operate at a LOS D or better and v/c < 1.0 during both peak hours.

b) Hiiaka Street at "New Road"

All movements at the intersection of Hiiaka Street at "New Road" operate at a LOS C or better and v/c < 1.0 during both peak hours.

c) Hiiaka Street at KOKA Main Driveway

All movements at the intersection of Hiiaka Street at KOKA Main Driveway operate at a LOS A and v/c < 1.0 during both peak hours.

d) Ainahua Alanui Street at KOKA Eastern Driveway

All movements at the intersection of Ainahua Alanui Street at KOKA Eastern Driveway operate at a LOS B or better and v/c < 1.0 during both peak hours.

e) Mamalahoa Highway at Mana Road

All movements at the intersection of Mamalahoa Highway at Mana Road operate at a LOS D or better and v/c < 1.0 during both peak hours.

D. Future (2031) Without Project Level of Service

1. Future (2031) Without Project Conditions

Future (2031) Without Project intersection and movement, LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software and are shown in Table 9 and the Synchro reports are included in Appendix D. For analysis, the cycle length and splits at Mamalahoa Highway and Kamamalu Street were optimized. Movements that operated at LOS E or worse or v/c > 1.0 are highlighted in yellow.

Table 9. Future (2031) Without Project LOS

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Kamamalu St	**14.1**	**0.80**	**B**	**24.3**	**0.90**	**C**
Mamalahoa EB Through-Right	15.5	0.72	B	25.6	0.90	C
Mamalahoa WB Left-Through	10.9	0.73	B	9.1	0.44	A
Kamamalu NB Left	22.2	0.69	C	45.0	0.90	D
Kamamalu NB Right	12.2	0.06	B	17.6	0.04	B
Hiiaka St at "New Road"	**2.4**	**Unsignalized**		**8.7**	**Unsignalized**	
Hiiaka WB Left-Through	8.0	0.08	A	7.8	0.03	A
"New Road" NB Left-Right	13.0	0.09	B	15.2	0.51	C
Hiiaka St at KOKA Main Dwy	**2.0**	**Unsignalized**		**1.6**	**Unsignalized**	
Hiiaka WB Left-Through	7.9	0.12	A	7.7	0.03	A
KOKA Main Dwy NB Left-Right	0.0	0.00	A	9.7	0.01	A
Ainahua Alanui St at KOKA East Dwy	**5.5**	**Unsignalized**		**1.2**	**Unsignalized**	
Ainahua Alanui WB Left-Through	7.3	0.01	A	7.6	0.02	A
KOKA East Dwy NB Left-Right	14.4	0.42	B	0.0	0.00	A
Mamalahoa Hwy at Mana Rd	**11.8**	**Unsignalized**		**4.8**	**Unsignalized**	
Mamalahoa WB Left	9.6	0.24	A	12.3	0.16	B
Mana NB Left	28.7	0.24	D	36.3	0.17	E
Mana NB Right	13.6	0.23	B	43.2	0.63	E

a) Mamalahoa Highway at Kamamalu Street

All movements at the intersection of Mamalahoa Highway at Kamamalu Street operate at a LOS D or better and v/c < 1.0 during both peak hours.

b) Hiiaka Street at "New Road"

All movements at the intersection of Hiiaka Street at "New Road" operate at a LOS C or better and v/c < 1.0 during both peak hours.

c) Hiiaka Street at KOKA Main Driveway

All movements at the intersection of Hiiaka Street at KOKA Main Driveway operate at a LOS A and v/c < 1.0 during both peak hours.

d) Ainahua Alanui Street at KOKA Eastern Driveway

All movements at the intersection of Ainahua Alanui Street at KOKA Eastern Driveway operate at a LOS B or better and v/c < 1.0 during both peak hours.

e) Mamalahoa Highway at Mana Road

During the PM Peak hour, the northbound Mana Road left turn lane will operate poorly at LOS E (v/c ratio of 0.17) during the PM Peak Hour, as will the northbound Mana Road right turn lane at LOS E (v/c ratio of 0.63). All other movements at the intersection of Mamalahoa Highway at Mana Road will operate at LOS D or better and v/c < 1.0 during both peak hours.

2. Future (2031) Without Project Mitigation

The northbound approaches at Mamalahoa Highway and Mana Road will operate at LOS E during the PM peak hour. Therefore, a traffic signal warrant analysis was done for Mamalahoa Highway at Mana Road. Traffic signal Warrant 3, Peak Hour Warrant, from the *MUTCD* (FHWA, 2009), was analyzed for the Future (2031) Without Project conditions. Table 10 shows the volumes used for the peak hour analysis. Figure 13 shows the Future (2031) Without Project conditions Peak Hour Warrant Analysis. The "2 or more Lanes & 1 Lane" curve was used for analysis.

Table 10: Future (2031) Without Project Volumes at Mamalahoa Highway and Mana Road

Movement	AM Peak	PM Peak
Mamalahoa Hwy. EBT	401	1,098
Mamalahoa Hwy. WBT	1,038	467
Mamalahoa Hwy. WBL	206	71
Mana St. NBL	22	20
Mana St. NBR	56	122
Major*	1,645	1,636
Minor	78	142

*Eastbound right turns were excluded from the major volume calculation

The Mamalahoa Highway at Mana Road intersection will pass the Peak Hour Warrant in the PM Peak hour. The signalization of a TWSC intersection can allow motorists approaching from the minor streets to make protected movements instead of waiting for a gap in the major street traffic, improving delay on the minor streets, but adding a delay to the major street.

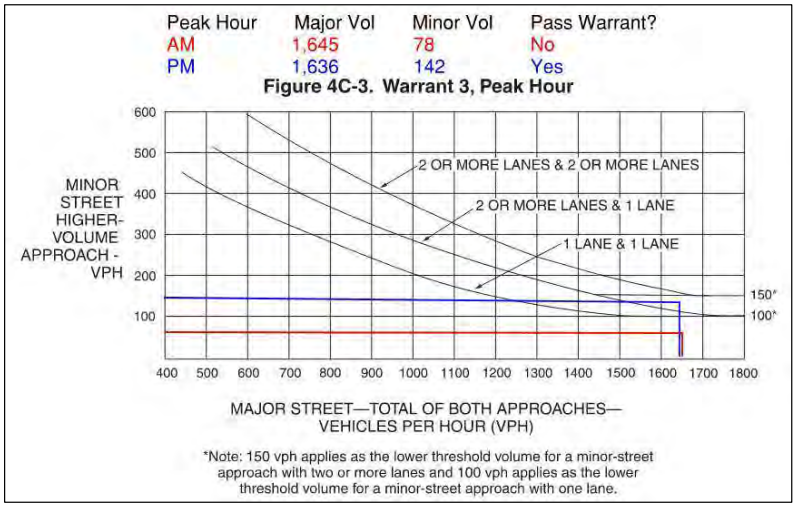


Figure 13: Future (2031) Without Project Peak Hour Warrant

Nearby signalized intersections have protected-permitted left turns from Mamalahoa Highway and permitted-overlap phasing for the minor street right turn. For consistency, the westbound left turn at this intersection was also analyzed with a leading protected-permitted left turn, and the northbound right turn was analyzed with a permitted-overlap phase. The cycle length and splits at the intersection were optimized. Table 11 shows an operational comparison of a TWSC intersection and a signalized intersection. Movements that operated at LOS E or worse or v/c > 1.0 are highlighted in yellow.

Table 11: Future (2031) Without Project Intersection Comparison – Mamalahoa Highway and Mana Road

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Mana Rd (TWSC)	**11.8**	**Unsignalized**		**4.8**	**Unsignalized**	
Mamalahoa WB Left	9.6	0.24	A	12.3	0.16	B
Mana NB Left	28.7	0.24	D	36.3	0.17	E
Mana NB Right	13.6	0.23	B	43.2	0.63	E
Mamalahoa Hwy at Mana Rd (signal)	**10.4**	**-**	**B**	**21.3**	**-**	**C**
Mamalahoa EB Through-Right	8.5	0.52	A	28.1	0.95	C
Mamalahoa WB Left	5.8	0.40	A	23.9	0.43	C
Mamalahoa WB Through	10.3	0.89	B	3.5	0.42	A
Mana NB Left	26.4	0.27	C	35.6	0.12	D
Mana NB Right	22.9	0.41	C	36.2	0.58	D

The signalization of the intersection will result in an acceptable overall LOS, and an improvement for the northbound approach; however, it will introduce added delay for mainline movements along Mamalahoa Highway that is currently not present in TWSC conditions. The eastbound approach will experience a significant increase in delay, with the eastbound approach nearing capacity (v/c = 1.00). A roundabout was not considered feasible at this location due to the limited right-of-way as a result of the concrete culvert located adjacent to the intersection.

E. Future (2041) Without Project Level of Service

1. Future (2041) Without Project Conditions

Future (2041) Without Project intersection and movement, LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software and are shown in Table 12 and the Synchro reports are included in Appendix D. For analysis, the cycle length and phasing at Mamalahoa Highway and Kamamalu Street were optimized. Movements that operate at LOS E or worse or v/c > 1.0 are highlighted in yellow.

Table 12. Future (2041) Without Project LOS

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Kamamalu St	**15.8**	**0.89**	**B**	**29.9**	**0.95**	**C**
Mamalahoa EB Through-Right	15.9	0.76	B	32.3	0.96	C
Mamalahoa WB Left-Through	13.3	0.82	B	10.0	0.53	A
Kamamalu NB Left	26.6	0.74	C	59.5	0.95	E
Kamamalu NB Right	14.6	0.07	B	21.6	0.05	B
Hiiaka St at "New Road"	**2.4**	**Unsignalized**		**8.7**	**Unsignalized**	
Hiiaka WB Left-Through	8.0	0.08	A	7.8	0.03	A
"New Road" NB Left-Right	13.0	0.09	B	15.2	0.51	C
Hiiaka St at KOKA Main Dwy	**2.0**	**Unsignalized**		**1.6**	**Unsignalized**	
Hiiaka WB Left-Through	7.9	0.12	A	7.7	0.03	A
KOKA Main Dwy NB Left-Right	0.0	0.00	A	9.7	0.01	A
Ainahua Alanui St at KOKA East Dwy	**5.5**	**Unsignalized**		**1.2**	**Unsignalized**	
Ainahua Alanui WB Left-Through	7.3	0.01	A	7.6	0.02	A
KOKA East Dwy NB Left-Right	14.4	0.42	B	0.0	0.00	A
Mamalahoa Hwy at Mana Rd	**19.1**	**Unsignalized**		**8.1**	**Unsignalized**	
Mamalahoa WB Left	10.2	0.26	A	14.1	0.19	B
Mana NB Left	34.5	0.28	D	53.3	0.25	F
Mana NB Right	15.1	0.26	C	84.8	0.84	F

a) Mamalahoa Highway at Kamamalu Street

The northbound left turn will operate at LOS E, with a v/c of 0.95 during the PM peak hour. All other movements will operate at a LOS C or better and v/c < 1.0 during both peak hours.

b) Hiiaka Street at "New Road"

All movements at the intersection of Hiiaka Street at "New Road" operate at a LOS C or better and v/c < 1.0 during both peak hours.

c) Hiiaka Street at KOKA Main Driveway

All movements at the intersection of Hiiaka Street at KOKA Main Driveway operate at a LOS A and v/c < 1.0 during both peak hours.

d) Ainahua Alanui Street at KOKA Eastern Driveway

All movements at the intersection of Ainahua Alanui Street at KOKA Eastern Driveway operate at a LOS B or better and v/c < 1.0 during both peak hours.

e) Mamalahoa Highway at Mana Road

During the PM Peak hour, the northbound Mana Road left turn and right turn lanes will operate at LOS F (v/c of 0.25 and 0.84, respectively). All other movements at the intersection of Mamalahoa Highway at Mana Road will operate at LOS D or better and v/c < 1.0 during both peak hours.

2. Future (2041) Without Project Mitigation

a) Mamalahoa Highway at Kamamalu Street

The northbound left turn at Mamalahoa Highway and Kamamalu Street will operate at LOS E during the PM peak hour, with a v/c of 0.95. The eastbound and westbound mainline approaches along Mamalahoa Highway operate at LOS C and LOS A in the PM peak hour, respectively. There is an opportunity at this intersection for the signal to provide more green time from the eastbound and westbound approaches to the northbound left turn if needed.

The northbound left turn volume in the PM peak hour is 329 vehicles per hour, or about 5.5 vehicles per minute. With an estimated cycle length of 90 seconds, the northbound left turn would need to process approximately nine vehicles per cycle. Field observations and video recordings confirmed that this signal is actuated, and green time is provided to approaches that have heavier traffic. It was observed that the northbound left turn was able to process more than nine vehicles in a traffic cycle. It is recommended that the phasing and actuated signal operation at this intersection remain as is.

b) Mamalahoa Highway at Mana Road

During the PM Peak hour, as a TCSC intersection the northbound Mana Road left and right turn lanes will worsen to LOS F (v/c of 0.25 and 0.84, respectively). Similar to the Future (2031) Without Project Traffic Signal Warrant Analysis, the Peak Hour Warrant will pass in the PM peak hour. Table 13 shows an operational comparison of a TWSC intersection and a signalized intersection. Movements that operated at LOS E or worse or v/c > 1.0 are highlighted in yellow.

Table 13: Future (2041) Without Project Intersection Comparison – Mamalahoa Highway and Mana Road

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Mana Rd (TWSC)	**19.1**	**Unsignalized**		**8.1**	**Unsignalized**	
Mamalahoa WB Left	10.2	0.26	A	14.1	0.19	B
Mana NB Left	34.5	0.28	D	53.3	0.25	F
Mana NB Right	15.1	0.26	C	84.8	0.84	F
Mamalahoa Hwy at Mana Rd (signal)	**17.3**	**-**	**B**	**31.2**	**-**	**C**
Mamalahoa EB Through-Right	7.1	0.49	A	38.6	0.99	D
Mamalahoa WB Left	5.6	0.40	A	70.9	0.77	E
Mamalahoa WB Through	20.6	0.95	C	3.7	0.46	A
Mana NB Left	45.3	0.29	D	59.7	0.13	E
Mana NB Right	42.8	0.52	D	65.9	0.68	E

With the addition of a signal and optimized signal timing, the northbound approaches will still operate at LOS E during the PM peak hour. However, with this, the WB left also operates at LOS E and the EB approach approaches capacity (v/c = 1.0). The delay is primarily due to the extremely high through volumes along Mamalahoa Highway which are a result of the forecasted regional growth in the area. A single-lane roundabout was analyzed, however it resulted in over-capacity conditions. For this scenario, assuming the widening of Mamalahoa Highway is not feasible, the TWSC intersection may be preferred as it prioritizes the highest volume approaches.

IV. FUTURE WITH PROJECT CONDITIONS

The proposed relocation of the KOKO Health Clinic will be part of the WNR-CDI Phase 1. The primary access at the future "New Road" is expected to be completed as a part of the WNR-CDI Phase 1 development, intersecting with Hiiaka Street as a TWSC intersection with a shared left-right turn exit lane controlled by a stop sign. Trips resulting from the proposed relocation of the KOKO Health Clinic were included in the Future (2026), (2031), and (2041) With Project analysis. "New Road" will extend to a secondary access, which exists through the west end of Poliahu Alanui Road, west of the intersection with Uakikoni Alanui. This will provide sole access to the KOKO Health Clinic until the construction of the future "New Road". These are mainly rural roads with low volumes and TWSC intersections.

A. Future With Project Generated Volumes

1. Project Related Volumes

The anticipated project-related trips from the proposed relocation of the KOKO Health Clinic were determined using the following four-step methodology: trip generation, trip distribution, modal choice, and route assignment.

a) Trip Generation

The trip generation methodology is based upon generally accepted techniques and 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 was calculated for the proposed 9,600 SF gross floor area (SF GFA) KOKO Health Clinic. Project-related trips for the peak hour of the adjacent street were calculated based on the associated ITE formulas (see Table 14) and are shown in Table 15.

Table 14: Project Related Trip Generation Rates

ITE Land Use	AM Peak Hour of Adjacent Street			PM Peak Hour of Adjacent Street		
	Equation	In%	Out %	Equation	In %	Out %
Clinic	T=2.19(X)+8.68	81	19	T=3.53(X)+2.98	30	70

Table 15: Project Related Development Phasing and Trips Generated

ITE Code	ITE Land Use	Independent Variable Value	AM Peak Hour (vph)			PM Peak Hour (vph)		
			Enter	Exit	Total	Enter	Exit	Total
630	Clinic	9,600 SF GFA	24	6	30	11	26	37

The KOKO Health Clinic is expected to generate 30 and 37 trips in the AM and PM peak hours, respectively. These low number of trips are not expected to have a significant impact on the surrounding roadway network. As a result, a separate analysis analyzing the secondary access was not done. Instead, the KOKO Health Clinic volumes were considered as a part of the other trips from Phase 1 through the future "New Road."

b) Trip Distribution/Assignment

The relocated KOKO Health Clinic related trips were distributed based on historical traffic data. Figure 14 shows the forecasted distribution of project-related trips at the study intersections during the AM and PM peak hours. The trips generated by the proposed KOKO Health Clinic were redistributed from the existing KOKO Health Clinic on Mamalahoa Highway (shown in red in Figure 14) to the new project site (shown in black in Figure 14).

c) Modal Choice

All project-related external trips were assumed to be by private vehicle only due to the surrounding land use, rural context, and lack of alternative transportation options. This reflects the worst-case traffic condition with all trips occurring by private vehicle.

d) Future With Project Volumes

Future with Project conditions was calculated through the following methods:

- Future (2026) With Project (see Figure 15) is a sum of the Future (2026) Without Project (Figure 10) and the KOKO Health Clinic Project Related Trips (Figure 14).
- Future (2031) With Project (see Figure 16) is a sum of the Future (2031) Without Project (Figure 11) and the KOKO Health Clinic Project Related Trips (Figure 14).
- Future (2041) With Project (see Figure 17) is a sum of the Future (2041) Without Project (Figure 12) and the KOKO Health Clinic Project Related Trips (Figure 14).

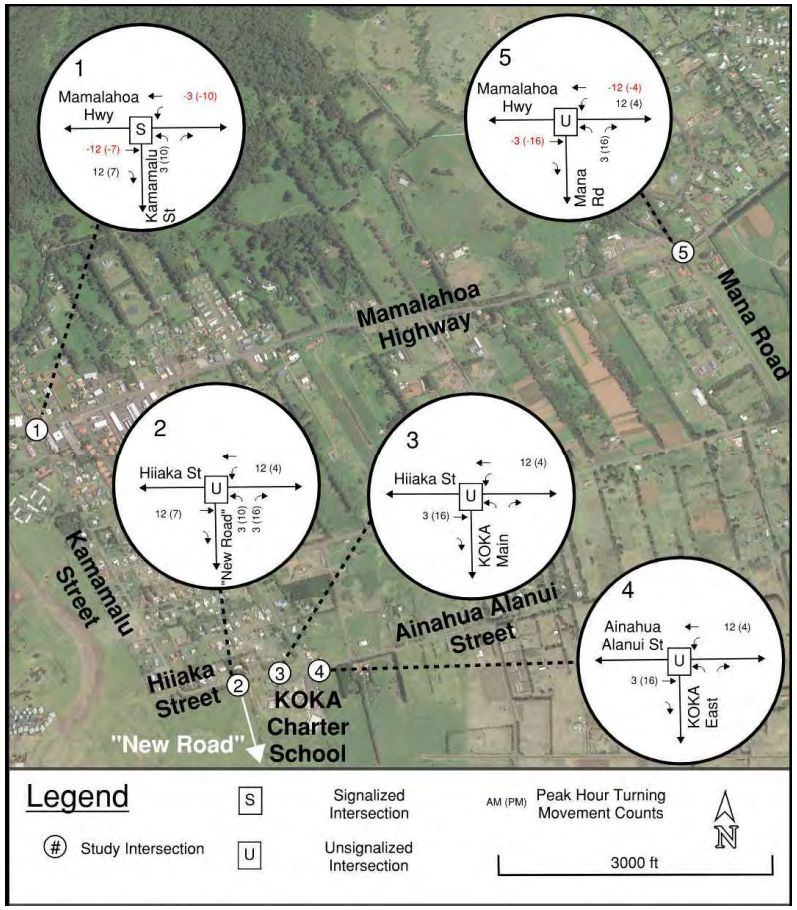


Figure 14. KOKO Health Clinic Project Related Trips

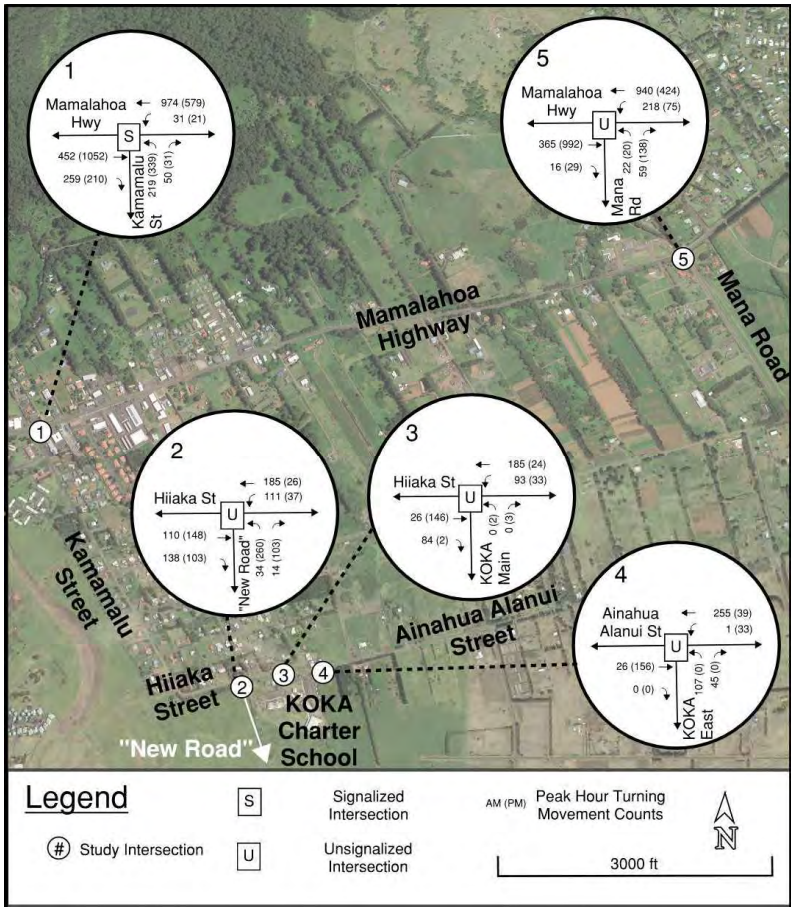


Figure 15. Future (2026) With Project Peak Hour Volumes

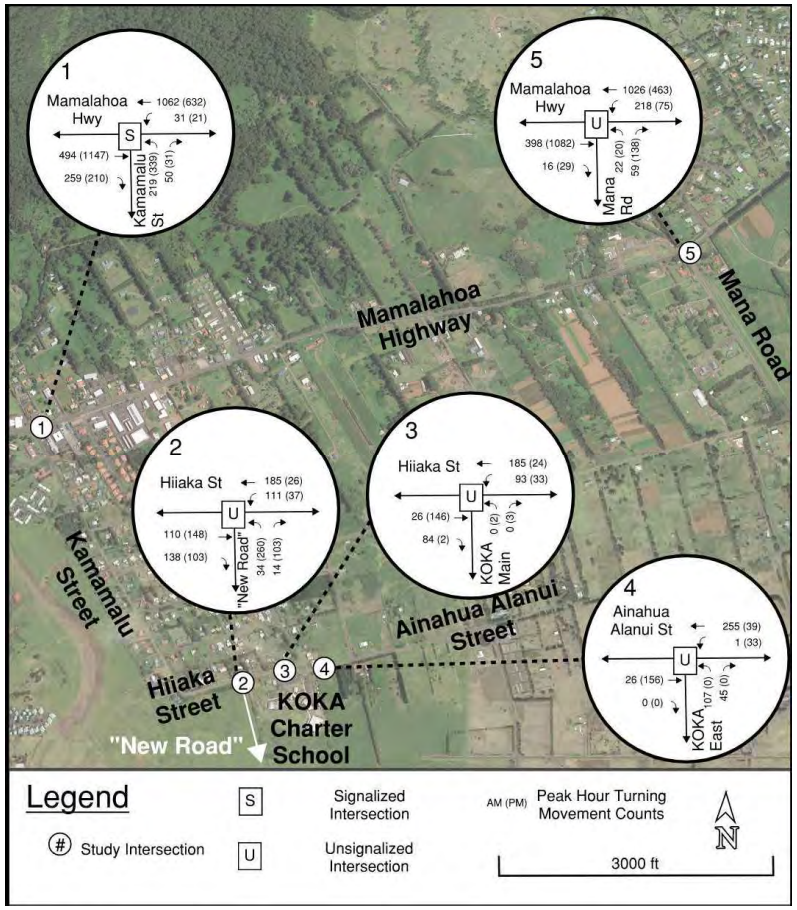


Figure 16. Future (2031) With Project Peak Hour Volumes

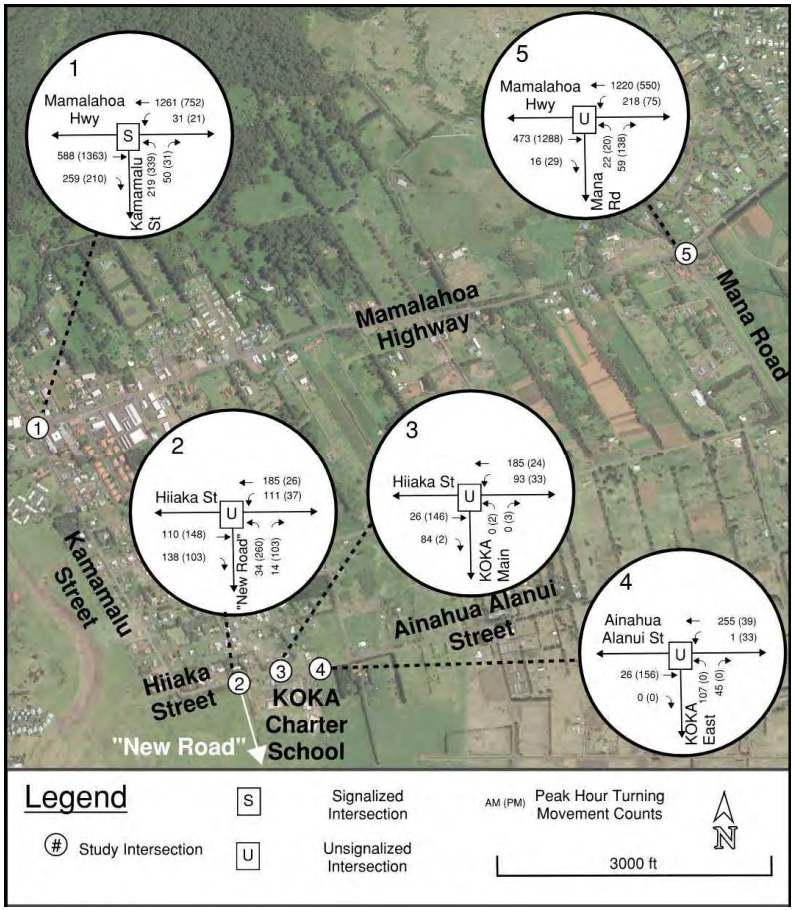


Figure 17. Future (2041) With Project Peak Hour Volumes

B. Future (2026) With Project Level of Service

1. Future (2026) With Project Conditions

Future (2026) With Project intersection and movement LOS and delay (in seconds per vehicle) was determined for the AM and PM peak hours using *Synchro 10* traffic analysis software and are shown in Table 16 and reports can be found in Appendix E. For analysis, the cycle length and phasing at Mamalahoa Highway and Kamamalu Street were optimized. Movements that operate at LOS E or worse or v/c > 1.0 are highlighted in yellow.

Table 16. Future (2026) With Project LOS

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Kamamalu St	**13.3**	**0.76**	**B**	**24.3**	**0.90**	**C**
Mamalahoa EB Through-Right	14.5	0.67	B	25.6	0.91	C
Mamalahoa WB Left-Through	9.9	0.67	A	8.7	0.41	A
Kamamalu NB Left	21.6	0.70	C	40.8	0.91	D
Kamamalu NB Right	12.3	0.04	B	15.1	0.04	B
Hiiaka St at "New Road"	**2.6**	**Unsignalized**		**9.5**	**Unsignalized**	
Hiiaka WB Left-Through	8.1	0.09	A	7.9	0.03	A
"New Road" NB Left-Right	13.7	0.11	B	17.0	0.57	C
Hiiaka St at KOKA Main Dwy	**2.0**	**Unsignalized**		**1.5**	**Unsignalized**	
Hiiaka WB Left-Through	7.9	0.12	A	7.7	0.03	A
KOKA Main Dwy NB Left-Right	0.0	0.00	A	9.7	0.01	A
Ainahua Alanui St at KOKA East Dwy	**5.5**	**Unsignalized**		**1.1**	**Unsignalized**	
Ainahua Alanui WB Left-Through	7.3	0.01	A	7.6	0.02	A
KOKA East Dwy NB Left-Right	14.9	0.43	B	0.0	0.00	A
Mamalahoa Hwy at Mana Rd	**9.5**	**Unsignalized**		**4.7**	**Unsignalized**	
Mamalahoa WB Left	9.5	0.24	A	11.5	0.15	B
Mana NB Left	28.1	0.24	D	31.1	0.15	D
Mana NB Right	13.0	0.22	B	37.0	0.61	E

a) Mamalahoa Highway at Kamamalu Street

All movements at the intersection of Mamalahoa Highway at Kamamalu Street operated at a LOS D or better and v/c < 1.0 during both peak hours.

b) Hiiaka Street at "New Road"

All movements at the intersection of Hiiaka Street at "New Road" operate at a LOS C or better and v/c < 1.0 during both peak hours.

c) Hiiaka Street at KOKA Main Driveway

All movements at the intersection of Hiiaka Street at KOKA Main Driveway operate at a LOS A and v/c < 1.0 during both peak hours.

d) Ainahua Alanui Street at KOKA Eastern Driveway

All movements at the intersection of Ainahua Alanui Street at KOKA Eastern Driveway operate at a LOS B or better and v/c < 1.0 during both peak hours.

e) Mamalahoa Highway at Mana Road

During the PM Peak hour, the northbound Mana Road right turn will worsen from LOS D in Future (2026) Without Project to LOS E (v/c of 0.61). All other movements at the intersection of Mamalahoa Highway at Mana Road will operate at LOS D or better and v/c < 1.0 during both peak hours.

2. Future (2026) With Project Mitigation

The northbound right turn at the intersection of Mamalahoa Highway and Mana Road will operate at LOS E during the PM peak hour.

MUTCD Traffic Signal Warrant 3, Peak Hour Warrant was analyzed for the Future (2026) With Project conditions. Table 17 shows the volumes used for the peak hour analysis. For this, the eastbound right turns were not included in the major volume calculation. Figure 18 shows the Future (2026) With Project Peak Hour Warrant Analysis. The Future (2026) With Project AM and PM peak hour volumes are shown as red and blue lines, respectively. The "2 or more Lanes & 1 Lane" curve was used for analysis.

Table 17: Future (2026) Volumes at Mamalahoa Highway and Mana Road

Movement	AM Peak	PM Peak
Mamalahoa Hwy EBT	365	992
Mamalahoa Hwy WBT	940	424
Mamalahoa Hwy WBL	218	75
Mana St NBL	22	20
Mana St NBR	59	138
Major*	1,523	1,491
Minor	81	158

*Eastbound right turns were excluded from the major volume calculation

The Mamalahoa Highway and Mana Road intersection satisfies the Peak Hour Warrant in the PM peak hour. The satisfaction of the Peak Hour Warrant does not indicate that a signal must be installed but can be considered. The v/c ratios for the northbound Mana Road movements indicate that they are not yet approaching capacity, and instead are a result of the difficulty a driver may have in finding a gap in within the mainline traffic. The TWSC condition was compared to the signalized intersection at Mamalahoa Highway and Mana Road for the AM and PM peak hours (see Table 18). The cycle length and splits at the intersection were optimized. Nearby signalized intersections have protected-permitted left turns from Mamalahoa Highway and permitted-overlap phasing for the minor street right turn. For consistency, the westbound left turn at this intersection was also analyzed with a leading protected-permitted left turn, and the northbound right turn was analyzed with a permitted-overlap phase.

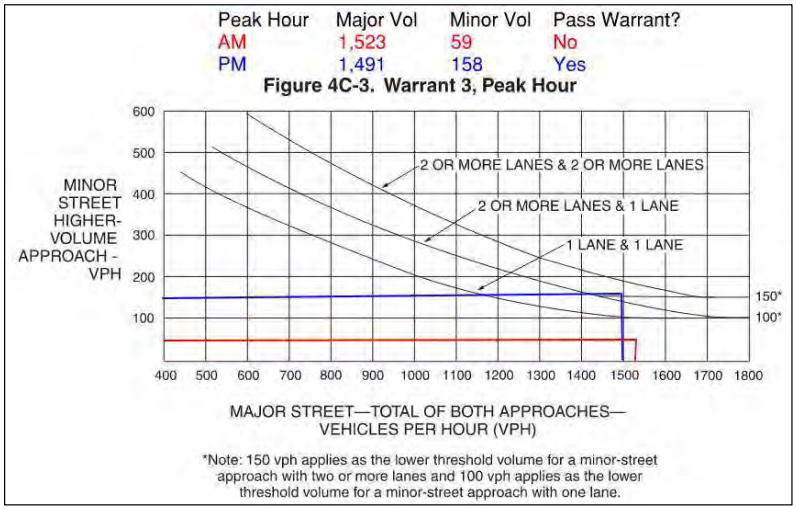


Figure 18: Future (2026) With Project Peak Hour Warrant

Table 18. Future (2026) Without Project Intersection Comparison – Mamalahoa Highway and Mana Road

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Mana Rd (TWSC)	**9.5**	**Unsignalized**		**4.7**	**Unsignalized**	
Mamalahoa WB Left	9.5	0.24	A	11.5	0.15	B
Mana NB Left	28.1	0.24	D	31.1	0.15	D
Mana NB Right	13.0	0.22	B	37.0	0.61	E
Mamalahoa Hwy at Mana Rd (signal)	**9.2**	**-**	**A**	**18.8**	**-**	**B**
Mamalahoa EB Through-Right	9.6	0.56	A	24.5	0.93	C
Mamalahoa WB Left	6.3	0.43	A	18.3	0.39	B
Mamalahoa WB Through	8.3	0.85	A	3.8	0.40	A
Mana NB Left	21.1	0.25	C	29.7	0.11	C
Mana NB Right	17.4	0.38	B	30.2	0.58	C

The addition of the traffic signal at Mamalahoa Highway and Mana Road improved the resulting delay of the northbound right turn; however, it will introduce added delay for mainline movements along Mamalahoa Highway that is currently not present in TWSC conditions, with the eastbound approach nearing a v/c of 1.00. It is recommended that this intersection be studied as a part of the future buildout in collaboration with HDOT to assess the need for a traffic signal.

C. Future (2031) With Project Level of Service

1. Future (2031) With Project Conditions

Future (2031) With Project intersection and movement, LOS and delay (in seconds per vehicle) was determined for the AM and PM peak hours using *Synchro 10* traffic analysis software and are shown in Table 19 and reports can be found in Appendix E. The cycle length and phasing at Mamalahoa Highway and Kamamalu Street was optimized. Movements that operate at LOS E or worse or v/c > 1.0 are highlighted in yellow.

Table 19. Future (2031) With Project LOS

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Kamamalu St	**14.2**	**0.80**	**B**	**25.2**	**0.90**	**C**
Mamalahoa EB Through-Right	15.5	0.72	B	26.4	0.91	C
Mamalahoa WB Left-Through	11.0	0.73	B	9.4	0.44	A
Kamamalu NB Left	22.2	0.70	C	46.6	0.91	D
Kamamalu NB Right	12.7	0.05	B	17.5	0.04	B
Hiiaka St at "New Road"	**2.6**	**Unsignalized**		**9.5**	**Unsignalized**	
Hiiaka WB Left-Through	8.1	0.09	A	7.9	0.03	A
"New Road" NB Left-Right	13.7	0.11	B	17.0	0.57	C
Hiiaka St at KOKA Main Dwy	**2.0**	**Unsignalized**		**1.5**	**Unsignalized**	
Hiiaka WB Left-Through	7.9	0.12	A	7.7	0.03	A
KOKA Main Dwy NB Left-Right	0.0	0.00	A	9.9	0.01	A
Ainahua Alanui St at KOKA East Dwy	**5.5**	**Unsignalized**		**1.1**	**Unsignalized**	
Ainahua Alanui WB Left-Through	7.3	0.01	A	7.6	0.02	A
KOKA East Dwy NB Left-Right	14.9	0.43	B	0.0	0.00	A
Mamalahoa Hwy at Mana Rd	**11.9**	**Unsignalized**		**5.7**	**Unsignalized**	
Mamalahoa WB Left	9.7	0.25	A	12.2	0.16	B
Mana NB Left	30.2	0.25	D	36.3	0.17	E
Mana NB Right	13.6	0.24	B	48.1	0.69	E

a) Mamalahoa Highway at Kamamalu Street

All movements at the intersection of Mamalahoa Highway at Kamamalu Street operate at a LOS D or better and v/c < 1.0 during both peak hours.

b) Hiiaka Street at "New Road"

All movements at the intersection of Hiiaka Street at "New Road" operate at a LOS C or better and v/c < 1.0 during both peak hours.

c) Hiiaka Street at KOKA Main Driveway

All movements at the intersection of Hiiaka Street at KOKA Main Driveway operate at a LOS A and v/c < 1.0 during both peak hours.

d) Ainahua Alanui Street at KOKA Eastern Driveway

All movements at the intersection of Ainahua Alanui Street at KOKA Eastern Driveway operate at a LOS B or better and v/c < 1.0 during both peak hours.

e) Mamalahoa Highway at Mana Road

During the PM peak hour, the northbound Mana Road left and right turn lanes will operate at LOS E (v/c of 0.17 and 0.69, respectively). All other movements at the intersection of Mamalahoa Highway at Mana Road will operate at a LOS D or better and v/c < 1.0 during both peak hours.

2. Future (2031) With Project Mitigation

During the PM peak hour, the northbound Mana Road left and right turn lanes will operate at LOS E (v/c of 0.17 and 0.69, respectively). Similar to the Future (2026) With Project Traffic Signal Warrant Analysis, the Peak Hour Warrant will pass in the PM peak hour. Table 20 shows a comparison of a TWSC intersection and a signalized intersection. Movements that operated at LOS E or worse or v/c > 1.0 are highlighted in yellow.

Table 20: Future (2031) With Project Intersection Comparison

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Mana Rd (TWSC)	**11.9**	**Unsignalized**		**5.7**	**Unsignalized**	
Mamalahoa WB Left	9.7	0.25	A	12.2	0.16	B
Mana NB Left	30.2	0.25	D	36.3	0.17	E
Mana NB Right	13.6	0.24	B	48.1	0.69	E
Mamalahoa Hwy at Mana Rd (signal)	**10.4**	**-**	**B**	**26.1**	**-**	**C**
Mamalahoa EB Through-Right	8.8	0.53	A	36.8	0.99	D
Mamalahoa WB Left	6.1	0.42	A	23.1	0.49	C
Mamalahoa WB Through	10.1	0.88	B	3.8	0.43	A
Mana NB Left	25.8	0.26	C	32.0	0.11	C
Mana NB Right	22.2	0.41	C	32.7	0.59	C

With the addition of a signal, the Mana Road approach and all other movements will operate at an acceptable LOS for both peak hours; however, it will introduce added delay for mainline movements along Mamalahoa Highway that is currently not present in TWSC conditions, with the eastbound approach nearing a v/c of 1.00. It is recommended that this intersection continue to be studied as a part of the future buildout in collaboration with HDOT to assess the need for a traffic signal or other appropriate mitigation.

D. Future (2041) With Project Level of Service

1. Future (2041) With Project Conditions

Future (2041) With Project intersection and movement, LOS and delay (in seconds per vehicle) was determined for the AM and PM peak hours using *Synchro 10* traffic analysis software and are shown in Table 21 and reports can be found in Appendix E. The cycle length and phasing at Mamalahoa Highway and Kamamalu Street was optimized. Movements that operate at LOS E or worse or v/c > 1.0 are highlighted in yellow.

Table 21. Future (2041) With Project LOS

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Kamamalu St	**15.9**	**0.89**	**B**	**31.2**	**0.96**	**C**
Mamalahoa EB Through-Right	16.0	0.76	B	32.5	0.96	C
Mamalahoa WB Left-Through	13.3	0.83	B	10.0	0.52	A
Kamamalu NB Left	27.0	0.75	C	66.0	0.98	E
Kamamalu NB Right	14.5	0.07	B	21.6	0.05	B
Hiiaka St at "New Road"	**2.6**	**Unsignalized**		**9.5**	**Unsignalized**	
Hiiaka WB Left-Through	8.1	0.09	A	7.9	0.03	A
"New Road" NB Left-Right	13.7	0.11	B	17.0	0.57	C
Hiiaka St at KOKA Main Dwy	**2.0**	**Unsignalized**		**1.5**	**Unsignalized**	
Hiiaka WB Left-Through	7.9	0.12	A	7.7	0.03	A
KOKA Main Dwy NB Left-Right	0.0	0.00	A	9.7	0.01	A
Ainahua Alanui St at KOKA East Dwy	**5.5**	**Unsignalized**		**1.1**	**Unsignalized**	
Ainahua Alanui WB Left-Through	7.3	0.01	A	7.6	0.02	A
KOKA East Dwy NB Left-Right	14.9	0.43	B	0.0	0.00	A
Mamalahoa Hwy at Mana Rd	**21.6**	**Unsignalized**		**10.0**	**Unsignalized**	
Mamalahoa WB Left	10.2	0.27	A	14.1	0.20	B
Mana NB Left	36.5	0.30	E	53.3	0.25	F
Mana NB Right	15.2	0.27	C	102.2	0.93	F

a) Mamalahoa Highway at Kamamalu Street

The northbound left turn will operate at LOS E, with a v/c of 0.98 during the PM peak hour. All other movements will operate at a LOS C or better and v/c < 1.0 during both peak hours.

b) Hiiaka Street at "New Road"

All movements at the intersection of Hiiaka Street at "New Road" operate at a LOS C or better and v/c < 1.0 during both peak hours.

c) Hiiaka Street at KOKA Main Driveway

All movements at the intersection of Hiiaka Street at KOKA Main Driveway operate at a LOS A and v/c < 1.0 during both peak hours.

d) Ainahua Alanui Street at KOKA Eastern Driveway

All movements at the intersection of Ainahua Alanui Street at KOKA Eastern Driveway operate at a LOS B or better and v/c < 1.0 during both peak hours.

e) Mamalahoa Highway at Mana Road

During the PM peak hour, the northbound Mana Road left and right turn lanes will operate at LOS E (v/c of 0.25 and 0.93, respectively). Additionally, the northbound Mana Road left turn lane will operate at LOS E (v/c ratio of 0.30) during the AM peak hour. All other movements at the intersection of Mamalahoa Highway at Mana Road will operate at a LOS C or better and v/c < 1.0 during both peak hours.

2. Future (2041) With Project Mitigation

a) Mamalahoa Highway at Kamamalu Street

The northbound left turn at the intersection of Mamalahoa Highway and Kamamalu Street will operate at LOS E, with a v/c of 0.98 during the PM peak hour. The eastbound and westbound approaches along Mamalahoa Highway operate at LOS C and LOS A, respectively. There is an opportunity at this intersection for the signal to provide more green time from the eastbound and westbound approaches to the northbound left turn if needed.

The northbound left turn volume in the PM peak hour is 339 vehicles per hour, or about 5.5 vehicles per minute. With an estimated cycle length of about 90 seconds, the northbound left turn would need to process approximately nine vehicles per cycle. Field observations and video recordings confirmed that this signal is actuated, and green time is provided to approaches that have heavier traffic. The northbound left turn was able to process more than nine vehicles in a traffic cycle. It is recommended that the phasing and actuated signal operation at this intersection remain as is.

b) Mamalahoa Highway at Mana Road

During the AM Peak hour, the northbound left turn lane operates at LOS E (v/c of 0.30). During the PM Peak hour, the northbound Mana Road left and right turn lanes will operate at LOS F (v/c of 0.25 and 0.93, respectively). Similar to the Future (2031) With Project Traffic Signal Warrant Analysis, the Peak Hour Warrant will pass in the PM peak hour. Table 22 shows a comparison of a TWSC intersection and a signalized intersection. Movements that operated at LOS E or worse or v/c > 1.0 are highlighted in yellow.

Table 22: Future (2041) With Project Intersection Comparison

Approach and Movement	AM Peak			PM Peak		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Mamalahoa Hwy at Mana Rd (TWSC)	**21.6**	**Unsignalized**		**10.0**	**Unsignalized**	
Mamalahoa WB Left	10.2	0.27	A	14.1	0.20	B
Mana NB Left	36.5	0.30	E	53.3	0.25	F
Mana NB Right	15.2	0.27	C	102.2	0.93	F
Mamalahoa Hwy at Mana Rd (signal)	**18.0**	**-**	**B**	**33.6**	**-**	**C**
Mamalahoa EB Through-Right	7.7	0.50	A	41.4	1.00	D
Mamalahoa WB Left	6.0	0.43	A	78.7	0.81	E
Mamalahoa WB Through	22.1	0.96	C	4.1	0.47	A
Mana NB Left	41.6	0.28	D	58.8	0.12	E
Mana NB Right	38.8	0.50	D	67.1	0.70	E

With the addition of a signal, the eastbound approach, northbound left turn, and northbound right turn will operate at LOS E (v/c of 0.81, 0.12, and 0.70, respectively) during the PM peak hour. The delay is due to the cycle length, and not due to the difficulty of northbound left turn vehicles to clear the intersection. The eastbound approach will experience a significant increase in delay, with the eastbound approach nearing a v/c of 1.00. It is recommended that this intersection continue to be studied as a part of the future buildout in collaboration with HDOT to assess the need for a traffic signal or other appropriate mitigation.

V. SUMMARY AND RECOMMENDATIONS

WNCDC plans to develop the WNR-CDI on an existing vacant lot (TMK (3) 6-4-038:011) in Waimea, on the Island of Hawaii. Previously, the *2015 WNR-CDI TIAR* analyzed the WNR-CDI with proposed land uses including a cemetery, agriculture park, golf facility, equestrian center, and farmers' market. These have yet to be constructed. The WNCDC is now pursuing the relocation and upgrade of the existing KOKO Health Clinic from its current site within Uilani Plaza on Mamalahoa Highway to within the WNR-CDI. The primary access to the relocated KOKO Health Clinic will be off of the future "New Road" at Hiiaka Street. An access exists through the west end of Poliahu Alanui Road, west of the intersection with Uakikoni Alanui and will be used in the interim as a temporary access. This will provide sole access to the KOKO Health Clinic until the construction of the future "New Road", when it will become the secondary access. The KOKO Health Clinic is expected to generate 30 and 37 trips in the AM and PM peak hours, respectively. These low number of trips are not expected to have a significant impact on the surrounding roadway network. As a result, a separate analysis of the secondary access was not done. Both the previously proposed land uses, and the additional relocation of the KOKO Health Clinic constitute Phase 1 of the WNR-CDI development. An additional Phase 2 of construction on the WNR-CDI will include other future developments that are not yet planned, and therefore was analyzed as a part of this TIAR.

This TIAR will supplement the previous *2015 WNR-CDI TIAR* and only assess the impact of the proposed relocated KOKO Health Clinic on Future With Project analysis. As a part of this TIAR, the Future Without Project analysis will include the project-related trips from the *2015 WNR-CDI TIAR* using updated background growth rates and intersection turning movement counts taken in September 2021. The overall size and traffic impact of the KOKO Health Clinic compared to the other land uses proposed in the *2015 WNR-CDI TIAR* Phase 1 is minimal.

At Mamalahoa Highway and Mana Road, the northbound right approach will worsen to LOS E in Future (2026) With Project and LOS F in Future (2041) With Project in the PM peak hour. The northbound left turn also operates at LOS E during the Future (2041) With Project in the AM peak hour, and LOS E during the Future (2021) With Project in the PM peak hour. This intersection satisfied the Peak Hour Traffic Signal Warrant for Future (2026) With Project. With a traffic signal, the eastbound approach in the PM peak hour nears capacity (v/c = 1.00) in 2041 for conditions with and without the project which is likely due to the large through volumes along Mamalahoa Highway resulting from the forecasted regional growth. It is recommended that this intersection be studied as a part of the future buildout in collaboration with HDOT to assess the need for a traffic signal.

The northbound left turn during the PM peak hour at Mamalahoa Highway and Kamamalu Street worsens to LOS E in Future (2041) Without Project and Future (2041) With Project conditions. Future project volumes suggest that up to nine vehicles per cycle would be queued at this approach to the intersection. Video recordings and field observations show that the northbound left turn will be able to process the queue every cycle. The signal timing at this intersection should be monitored and adjusted if needed.

VI. REFERENCES

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

Institute of Transportation Engineers. *Trip Generation, 11th Edition: An ITE Informational Report*, September 2022.

Office of Environmental Review Program (ERP). *EA and EIS Online Library*, Accessed 2021, <https://planning.hawaii.gov/erp/>.

State of Hawaii, Department of Transportation. *Historical Traffic Station Maps*.

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

State of Hawaii, Department of Transportation. *Statewide Transportation Improvements Program*, <http://hawaii.gov/dot/highways/STIP>.

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

Transportation Research Board, National Research Council. Highway Capacity Manual, Washington, D.C., 2000 Edition.

Traffic Management Consultant, *Traffic Impact Analysis Report for Waimea Nui Regional Community Development Initiative* (2015).

Wilson Okamoto, *Waimea Middle School New Eight Classroom Building EA* (2015).

PRB Hawaii & Associates, *Waimea Town Infrastructure Improvements EA* (2017).

SSFM, *Waimea Roadway Improvement Project EA* (2021).

Appendix A
Historical and 2021 Traffic Data

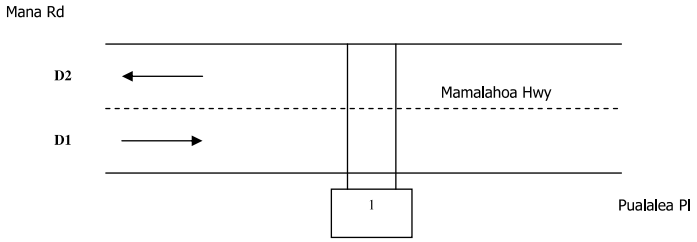
Traffic Data Service

Traffic Station Sketch

N

Island: Hawaii
Area: Waimea

Section ID/Station #: B71001905469



Meter #	File Name	GPS
1. bz92	D0807003_B71001905469 D0807004_B71001905469	20.02833, -155.6476

Station Description:

Mamalahoa Hwy: Mana Rd to Pualalea Pl

Survey Beginning Date/Time: 8/7/13 @ 0000		Survey Ending Date/Time: 8/8/13 @ 2400

Survey Method:	Road Tube	Data Type:	Class
Survey Crew:	LM		C1B
Sketch Updated:		By:	SR
Remarks:			

FACILITY NAME	JURI	FUNC CLASS	AREA TYPE	ROUTE NO.	ROUTE MILE
Mamalahoa Hwy		14		19	

D1= Direction to End
D2= Direction to Begin

D1: Pualalea Pl / Palani Rd (Rte 190)
D2: Mana Rd / entrance to Kuhio Wharf

Run Date: 2014/05/29

Hawaii Department of Transportation
Highways Division **Highways Planning Survey Section**
2013 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 15500
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 08/07/2013															
12:00-12:15	5	18	23	06:00-06:15	160	29	189	12:00-12:15	123	138	261	06:00-06:15	97	154	251
12:15-12:30	2	11	13	06:15-06:30	168	39	207	12:15-12:30	117	130	247	06:15-06:30	116	123	239
12:30-12:45	10	12	22	06:30-06:45	213	44	257	12:30-12:45	130	131	261	06:30-06:45	81	120	201
12:45-01:00	1	10	11	06:45-07:00	170	51	221	12:45-01:00	128	134	262	06:45-07:00	90	119	209
01:00-01:15	3	7	10	07:00-07:15	193	51	244	01:00-01:15	169	130	299	07:00-07:15	73	82	155
01:15-01:30	2	7	9	07:15-07:30	186	85	271	01:15-01:30	110	147	257	07:15-07:30	64	115	179
01:30-01:45	4	6	10	07:30-07:45	247	88	335	01:30-01:45	104	181	285	07:30-07:45	45	98	143
01:45-02:00	0	6	6	07:45-08:00	215	125	340	01:45-02:00	106	145	251	07:45-08:00	30	83	113
02:00-02:15	6	0	6	08:00-08:15	165	109	274	02:00-02:15	121	126	247	08:00-08:15	43	103	146
02:15-02:30	3	4	7	08:15-08:30	139	107	246	02:15-02:30	110	129	239	08:15-08:30	40	77	117
02:30-02:45	6	9	15	08:30-08:45	142	84	226	02:30-02:45	109	155	264	08:30-08:45	26	75	101
02:45-03:00	10	2	12	08:45-09:00	182	100	282	02:45-03:00	118	150	268	08:45-09:00	35	58	93
03:00-03:15	13	2	15	09:00-09:15	105	119	224	03:00-03:15	124	173	297	09:00-09:15	29	52	81
03:15-03:30	16	6	22	09:15-09:30	149	121	270	03:15-03:30	138	175	313	09:15-09:30	21	45	66
03:30-03:45	19	3	22	09:30-09:45	141	117	258	03:30-03:45	125	188	313	09:30-09:45	35	64	99
03:45-04:00	30	4	34	09:45-10:00	129	101	230	03:45-04:00	138	185	323	09:45-10:00	33	43	76
04:00-04:15	33	3	36	10:00-10:15	105	139	244	04:00-04:15	120	202	322	10:00-10:15	28	43	71
04:15-04:30	49	5	54	10:15-10:30	115	106	221	04:15-04:30	127	199	326	10:15-10:30	27	43	70
04:30-04:45	39	3	42	10:30-10:45	103	114	217	04:30-04:45	121	258	379	10:30-10:45	20	58	78
04:45-05:00	59	5	64	10:45-11:00	124	102	226	04:45-05:00	114	245	359	10:45-11:00	11	52	63
05:00-05:15	85	11	96	11:00-11:15	131	128	259	05:00-05:15	122	192	314	11:00-11:15	7	38	45
05:15-05:30	92	25	117	11:15-11:30	104	165	269	05:15-05:30	120	195	315	11:15-11:30	12	37	49
05:30-05:45	122	36	158	11:30-11:45	140	119	259	05:30-05:45	104	200	304	11:30-11:45	4	38	42
05:45-06:00	148	29	177	11:45-12:00	107	116	223	05:45-06:00	108	150	258	11:45-12:00	8	22	30

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
AM - PEAK HR VOLUME	813	407	1220	PM - PEAK HR VOLUME	482	904	1386
AM - K FACTOR (%)			7.33	PM - K FACTOR (%)			8.32
AM - D (%)	66.64	33.36	100.00	PM - D (%)	34.78	65.22	100.00
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	07:30 AM to 08:30 AM		PM - PEAK HR TIME	03:00 PM to 04:00 PM	04:00 PM to 05:00 PM	
AM - PEAK HR VOLUME	841	429		PM - PEAK HR VOLUME	525	904	

AM PERIOD (00:00-12:00)				PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
AM - PEAK HR VOLUME	813	407	1220	PM - PEAK HR VOLUME	482	904	1386
AM - K FACTOR (%)			7.33	PM - K FACTOR (%)			8.32
AM - D (%)	66.64	33.36	100.00	PM - D (%)	34.78	65.22	100.00

NON-COMMUTER PERIOD (09:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	3,633	2,359	5,992
PEAK HR TIME	12:45 PM to 01:45 PM			AM 12-HR PERIOD (00:00-12:00)	4,390	2,583	6,973
PEAK HR VOLUME	511	592	1103	PM 6-HR PERIOD (12:00-18:00)	2,906	4,058	6,964
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	3,881	5,800	9,681
PEAK HR TIME	12:15 PM to 01:15 PM	01:00 PM to 02:00 PM		24 HOUR PERIOD	8,271	8,383	16,654
PEAK HR VOLUME	544	603		D (%)	49.66	50.34	100.00

Run Date: 2014/05/29

Hawaii Department of Transportation
Highways Division **Highways Planning Survey Section**
2013 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 15500
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 08/08/2013															
12:00-12:15	7	33	40	06:00-06:15	142	29	171	12:00-12:15	97	117	214	06:00-06:15	103	160	263
12:15-12:30	3	14	17	06:15-06:30	214	32	246	12:15-12:30	116	125	241	06:15-06:30	91	129	220
12:30-12:45	5	14	19	06:30-06:45	170	56	226	12:30-12:45	112	123	235	06:30-06:45	86	126	212
12:45-01:00	1	11	12	06:45-07:00	205	43	248	12:45-01:00	102	116	218	06:45-07:00	71	127	198
01:00-01:15	1	6	7	07:00-07:15	209	58	267	01:00-01:15	124	119	243	07:00-07:15	66	120	186
01:15-01:30	1	10	11	07:15-07:30	198	100	298	01:15-01:30	115	125	240	07:15-07:30	48	103	151
01:30-01:45	4	6	10	07:30-07:45	249	94	343	01:30-01:45	128	123	251	07:30-07:45	58	83	141
01:45-02:00	2	2	4	07:45-08:00	207	108	315	01:45-02:00	130	137	267	07:45-08:00	64	85	149
02:00-02:15	3	3	6	08:00-08:15	172	105	277	02:00-02:15	155	132	287	08:00-08:15	39	98	137
02:15-02:30	3	4	7	08:15-08:30	157	101	258	02:15-02:30	120	146	266	08:15-08:30	28	77	105
02:30-02:45	2	5	7	08:30-08:45	116	79	195	02:30-02:45	110	170	280	08:30-08:45	30	62	92
02:45-03:00	12	0	12	08:45-09:00	151	108	259	02:45-03:00	136	158	294	08:45-09:00	32	62	94
03:00-03:15	13	5	18	09:00-09:15	108	90	198	03:00-03:15	131	173	304	09:00-09:15	31	55	86
03:15-03:30	14	3	17	09:15-09:30	125	83	208	03:15-03:30	117	187	304	09:15-09:30	22	58	80
03:30-03:45	20	2	22	09:30-09:45	136	92	228	03:30-03:45	137	212	349	09:30-09:45	25	47	72
03:45-04:00	30	3	33	09:45-10:00	125	96	221	03:45-04:00	135	191	326	09:45-10:00	16	52	68
04:00-04:15	38	5	43	10:00-10:15	129	92	221	04:00-04:15	114	228	342	10:00-10:15	19	47	66
04:15-04:30	42	7	49	10:15-10:30	102	95	197	04:15-04:30	111	209	320	10:15-10:30	15	46	61
04:30-04:45	42	3	45	10:30-10:45	105	104	209	04:30-04:45	99	235	334	10:30-10:45	7	63	70
04:45-05:00	62	4	66	10:45-11:00	112	99	211	04:45-05:00	141	209	350	10:45-11:00	10	42	52
05:00-05:15	69	11	80	11:00-11:15	103	102	205	05:00-05:15	128	211	339	11:00-11:15	9	43	52
05:15-05:30	95	31	126	11:15-11:30	109	129	238	05:15-05:30	76	215	291	11:15-11:30	8	48	56
05:30-05:45	139	33	172	11:30-11:45	90	98	188	05:30-05:45	81	180	261	11:30-11:45	7	47	54
05:45-06:00	143	20	163	11:45-12:00	93	115	208	05:45-06:00	107	178	285	11:45-12:00	5	18	23

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
AM - PEAK HR VOLUME	826	407	1233	PM - PEAK HR VOLUME	465	881	1346
AM - K FACTOR (%)			7.63	PM - K FACTOR (%)			8.33
AM - D (%)	66.99	33.01	100.00	PM - D (%)	34.55	65.45	100.00
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	07:30 AM to 08:30 AM		PM - PEAK HR TIME	03:00 PM to 04:00 PM	04:00 PM to 05:00 PM	
AM - PEAK HR VOLUME	863	408		PM - PEAK HR VOLUME	520	881	

AM PERIOD (00:00-12:00)				PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
AM - PEAK HR VOLUME	826	407	1233	PM - PEAK HR VOLUME	465	881	1346
AM - K FACTOR (%)			7.63	PM - K FACTOR (%)			8.33
AM - D (%)	66.99	33.01	100.00	PM - D (%)	34.55	65.45	100.00

NON-COMMUTER PERIOD (09:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	3,527	2,108	5,635
PEAK HR TIME	02:00 PM to 03:00 PM			AM 12-HR PERIOD (00:00-12:00)	4,278	2,343	6,621
PEAK HR VOLUME	521	606	1127	PM 6-HR PERIOD (12:00-18:00)	2,822	4,019	6,841
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	3,712	5,817	9,529
PEAK HR TIME	01:30 PM to 02:30 PM	02:00 PM to 03:00 PM		24 HOUR PERIOD	7,990	8,160	16,150
PEAK HR VOLUME	533	606		D (%)	49.47	50.53	100.00

Run Date: 2014/05/29

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section
Vehicle Classification Data Summary
2013

Site ID: B71001905469 **Route No:** 19 **Date From:** 2013/08/07 0:00

Town: Hawaii **Direction:** +MP **Date To:** 2013/08/08 23:45

Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

Functional Classification: 14 URBAN:PRINCIPAL ARTERIAL - OTHER

REPORT TOTALS - 48 HOURS RECORDED

VOLUME	%	NUMBER OF AXLES
Cycles 118	0.36%	236
PC 23208	70.75%	46416
2A-4T 8608	26.24%	17216
LIGHT VEHICLE TOTALS 31934	97.35%	63868

HEAVY VEHICLES

Bus	159	0.48%	398
SINGLE UNIT TRUCK			
2A-6T	163	0.50%	326
3A-SU	112	0.34%	336
4A-SU	4	0.01%	16
SINGLE-TRAILER TRUCKS			
4A-ST	45	0.14%	180
5A-ST	344	1.05%	1720
6A-ST	12	0.04%	72
MULTI-TRAILER TRUCKS			
5A-MT	9	0.03%	45
6A-MT	2	0.01%	12
7A-MT	21	0.06%	147
HEAVY VEHICLE TOTALS	871	2.66%	3252
CLASSIFIED VEHICLES TOTALS	32805 (A)	100.00%	67120 (B)
UNCLASSIFIED VEHICLES TOTALS	-1	-0.00%	

AXLE CORRECTION FACTOR (A/C) = 0.978

ROADTUBE EQUIVALENT(B/2) = 33560 (C)

	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
PEAK HOUR VOLUME : 1386						
2013/08/07 16:00						
SINGLE UNIT TRUCKS (TYPE 4-7)	20	(65A-1) 1.44%	219	15500	(65A-2) 1.41%	8.94%
COMBINATION (TYPE 8-13)	8	(65B-1) 0.58%	216		(65B-2) 1.39%	8.94%

Run Date: 2015/03/09

Hawaii Department of Transportation
Highways Division — Highways Planning Survey Section
2014 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 14200

Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19

Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 03/05/2014															
12:00-12:15	6	22	28	06:00-06:15	171	28	199	12:00-12:15	101	116	217	06:00-06:15	87	158	245
12:15-12:30	3	7	10	06:15-06:30	189	26	215	12:15-12:30	116	132	248	06:15-06:30	92	158	250
12:30-12:45	0	7	7	06:30-06:45	178	39	217	12:30-12:45	115	116	231	06:30-06:45	86	135	221
12:45-01:00	3	13	16	06:45-07:00	207	40	247	12:45-01:00	123	100	223	06:45-07:00	74	140	214
01:00-01:15	3	8	11	07:00-07:15	194	54	248	01:00-01:15	120	126	246	07:00-07:15	56	138	194
01:15-01:30	0	3	3	07:15-07:30	238	81	319	01:15-01:30	92	144	236	07:15-07:30	49	99	148
01:30-01:45	3	6	9	07:30-07:45	256	98	354	01:30-01:45	110	121	231	07:30-07:45	44	86	130
01:45-02:00	2	1	3	07:45-08:00	233	84	317	01:45-02:00	103	133	236	07:45-08:00	41	98	139
02:00-02:15	3	3	6	08:00-08:15	166	123	289	02:00-02:15	119	120	239	08:00-08:15	34	80	114
02:15-02:30	4	0	4	08:15-08:30	126	95	221	02:15-02:30	111	144	255	08:15-08:30	44	84	128
02:30-02:45	5	2	7	08:30-08:45	117	90	207	02:30-02:45	134	144	278	08:30-08:45	49	81	130
02:45-03:00	13	0	13	08:45-09:00	131	76	207	02:45-03:00	129	160	289	08:45-09:00	38	71	109
03:00-03:15	7	4	11	09:00-09:15	116	86	202	03:00-03:15	153	159	312	09:00-09:15	33	62	95
03:15-03:30	13	1	14	09:15-09:30	138	66	204	03:15-03:30	128	160	288	09:15-09:30	29	52	81
03:30-03:45	17	0	17	09:30-09:45	114	100	214	03:30-03:45	134	200	334	09:30-09:45	24	57	81
03:45-04:00	29	3	32	09:45-10:00	125	105	230	03:45-04:00	141	191	332	09:45-10:00	27	54	81
04:00-04:15	32	2	34	10:00-10:15	107	103	210	04:00-04:15	156	200	356	10:00-10:15	14	45	59
04:15-04:30	45	3	48	10:15-10:30	128	94	222	04:15-04:30	137	227	364	10:15-10:30	28	61	89
04:30-04:45	46	3	49	10:30-10:45	124	79	203	04:30-04:45	105	247	352	10:30-10:45	7	56	63
04:45-05:00	63	13	76	10:45-11:00	100	98	198	04:45-05:00	109	240	349	10:45-11:00	10	34	44
05:00-05:15	82	13	95	11:00-11:15	115	89	204	05:00-05:15	117	239	356	11:00-11:15	7	36	43
05:15-05:30	96	12	108	11:15-11:30	95	117	212	05:15-05:30	114	203	317	11:15-11:30	8	27	35
05:30-05:45	113	39	152	11:30-11:45	120	106	226	05:30-05:45	85	191	276	11:30-11:45	2	34	36
05:45-06:00	138	23	161	11:45-12:00	113	84	197	05:45-06:00	89	161	250	11:45-12:00	4	23	27

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	893	386	1279
AM - K FACTOR (%)			7.97
AM - D (%)	69.82	30.18	100.00
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	07:30 AM to 08:30 AM	
AM - PEAK HR VOLUME	921	400	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:00 PM to 05:00 PM		
PM - PEAK HR VOLUME	507	914	1421
PM - K FACTOR (%)			8.86
PM - D (%)	35.68	64.32	100.00
DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:30 PM to 04:30 PM	04:15 PM to 05:15 PM	
PM - PEAK HR VOLUME	568	953	

AM PERIOD (00:00-12:00)			
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	893	386	1279
AM - K FACTOR (%)			7.97
AM - D (%)	69.82	30.18	100.00

PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:00 PM to 05:00 PM		
PM - PEAK HR VOLUME	507	914	1421
PM - K FACTOR (%)			8.86
PM - D (%)	35.68	64.32	100.00

NON-COMMUTER PERIOD (09:00-15:00)			
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:00 PM to 03:00 PM		
PEAK HR VOLUME	493	568	1061
DIRECTIONAL PEAK			
PEAK HR TIME	09:00 AM to 10:00 AM	02:00 PM to 03:00 PM	
PEAK HR VOLUME	493	568	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
AM 6-HR PERIOD (06:00-12:00)	3,601	1,961	5,562
AM 12-HR PERIOD (00:00-12:00)	4,327	2,149	6,476
PM 6-HR PERIOD (12:00-18:00)	2,841	3,974	6,815
PM 12-HR PERIOD (12:00-24:00)	3,728	5,843	9,571
24 HOUR PERIOD	8,055	7,992	16,047
D (%)	50.20	49.80	100.00

Run Date: 2015/03/09

Hawaii Department of Transportation
Highways Division **Highways Planning Survey Section**
2014 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 14200
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 03/06/2014															
12:00-12:15	3	25	28	06:00-06:15	178	32	210	12:00-12:15	99	99	198	06:00-06:15	103	163	266
12:15-12:30	1	16	17	06:15-06:30	183	44	227	12:15-12:30	108	116	224	06:15-06:30	97	147	244
12:30-12:45	5	10	15	06:30-06:45	165	38	203	12:30-12:45	100	120	220	06:30-06:45	64	129	193
12:45-01:00	4	13	17	06:45-07:00	199	46	245	12:45-01:00	106	117	223	06:45-07:00	56	147	203
01:00-01:15	2	7	9	07:00-07:15	188	59	247	01:00-01:15	103	115	218	07:00-07:15	62	132	194
01:15-01:30	3	5	8	07:15-07:30	217	70	287	01:15-01:30	114	140	254	07:15-07:30	57	126	183
01:30-01:45	3	4	7	07:30-07:45	279	79	358	01:30-01:45	117	114	231	07:30-07:45	38	117	155
01:45-02:00	2	0	2	07:45-08:00	240	73	313	01:45-02:00	144	146	290	07:45-08:00	42	90	132
02:00-02:15	1	4	5	08:00-08:15	140	141	281	02:00-02:15	113	123	236	08:00-08:15	43	81	124
02:15-02:30	7	2	9	08:15-08:30	167	96	263	02:15-02:30	128	133	261	08:15-08:30	38	65	103
02:30-02:45	3	6	9	08:30-08:45	164	91	255	02:30-02:45	119	168	287	08:30-08:45	31	65	96
02:45-03:00	8	4	12	08:45-09:00	160	84	244	02:45-03:00	162	138	300	08:45-09:00	30	56	86
03:00-03:15	6	3	9	09:00-09:15	117	84	201	03:00-03:15	124	178	302	09:00-09:15	28	49	77
03:15-03:30	16	2	18	09:15-09:30	111	105	216	03:15-03:30	124	182	306	09:15-09:30	25	59	84
03:30-03:45	21	3	24	09:30-09:45	119	87	206	03:30-03:45	131	199	330	09:30-09:45	21	59	80
03:45-04:00	35	0	35	09:45-10:00	111	101	212	03:45-04:00	141	206	347	09:45-10:00	30	52	82
04:00-04:15	34	1	35	10:00-10:15	116	101	217	04:00-04:15	110	218	328	10:00-10:15	11	50	61
04:15-04:30	47	3	50	10:15-10:30	139	102	241	04:15-04:30	139	204	343	10:15-10:30	21	42	63
04:30-04:45	41	5	46	10:30-10:45	96	103	199	04:30-04:45	121	230	351	10:30-10:45	8	46	54
04:45-05:00	64	8	72	10:45-11:00	116	97	213	04:45-05:00	119	217	336	10:45-11:00	10	46	56
05:00-05:15	72	15	87	11:00-11:15	88	99	187	05:00-05:15	118	209	327	11:00-11:15	8	41	49
05:15-05:30	99	10	109	11:15-11:30	121	96	217	05:15-05:30	100	211	311	11:15-11:30	5	33	38
05:30-05:45	117	41	158	11:30-11:45	107	105	212	05:30-05:45	87	195	282	11:30-11:45	6	25	31
05:45-06:00	137	34	171	11:45-12:00	114	90	204	05:45-06:00	102	166	268	11:45-12:00	6	23	29

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	03:45 PM to 04:45 PM		
AM - PEAK HR VOLUME	876	363	1239	PM - PEAK HR VOLUME	511	858	1369
AM - K FACTOR (%)			7.71	PM - K FACTOR (%)			8.52
AM - D (%)	70.70	29.30	100.00	PM - D (%)	37.33	62.67	100.00
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	08:00 AM to 09:00 AM		PM - PEAK HR TIME	03:30 PM to 04:30 PM	04:00 PM to 05:00 PM	
AM - PEAK HR VOLUME	924	412		PM - PEAK HR VOLUME	521	869	

AM PERIOD (00:00-12:00)				PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	03:45 PM to 04:45 PM		
AM - PEAK HR VOLUME	876	363	1239	PM - PEAK HR VOLUME	511	858	1369
AM - K FACTOR (%)			7.71	PM - K FACTOR (%)			8.52
AM - D (%)	70.70	29.30	100.00	PM - D (%)	37.33	62.67	100.00

NON-COMMUTER PERIOD (09:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	3,635	2,023	5,658
PEAK HR TIME	02:00 PM to 03:00 PM			AM 12-HR PERIOD (00:00-12:00)	4,366	2,244	6,610
PEAK HR VOLUME	522	562	1084	PM 6-HR PERIOD (12:00-18:00)	2,829	3,944	6,773
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	3,669	5,787	9,456
PEAK HR TIME	02:00 PM to 03:00 PM	01:45 PM to 02:45 PM		24 HOUR PERIOD	8,035	8,031	16,066
PEAK HR VOLUME	522	570		D (%)	50.01	49.99	100.00

Run Date: 2015/03/19

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section
Vehicle Classification Data Summary
2014

Site ID: B71001905469 **Route No:** 19 **Date From:** 2014/03/05 0:00
Town: Hawaii **Direction:** +MP **Date To:** 2014/03/06 23:45
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl
Functional Classification: 14 URBAN:PRINCIPAL ARTERIAL - OTHER
REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES
Cycles	161	0.50%	321
PC	25721	80.10%	51442
2A-4T	5268	16.40%	10536
LIGHT VEHICLE TOTALS	31150	97.00%	62299
HEAVY VEHICLES			
Bus	117	0.36%	292
SINGLE UNIT TRUCK			
2A-6T	161	0.50%	322
3A-SU	152	0.47%	456
4A-SU	5	0.02%	20
SINGLE-TRAILER TRUCKS			
4A-ST	43	0.13%	172
5A-ST	423	1.32%	2115
6A-ST	20	0.06%	120
MULTI-TRAILER TRUCKS			
5A-MT	5	0.02%	25
6A-MT	1	0.00%	6
7A-MT	37	0.12%	259
HEAVY VEHICLE TOTALS	964	3.00%	3787
CLASSIFIED VEHICLES TOTALS	32114 (A)	100.00%	66087 (B)
UNCLASSIFIED VEHICLES TOTALS	-1	-0.00%	
AXLE CORRECTION FACTOR (A/C) = 0.972			ROADTUBE EQUIVALENT(B/2) = 33043 (C)

	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
PEAK HOUR VOLUME : 1421 2014/03/05 16:00	11	(65A-1) 0.77%	217	14200	(65A-2) 1.53%	10.01%
SINGLE UNIT TRUCKS (TYPE 4-7)	9	(65B-1) 0.63%	264		(65B-2) 1.86%	10.01%
COMBINATION (TYPE 8-13)						

Run Date: 2015/07/22

Hawaii Department of Transportation
Highways Division **Highways Planning Survey Section**
2014 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 14200
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 05/07/2014															
12:00-12:15	7	9	16	06:00-06:15	179	50	229	12:00-12:15	65	100	165	06:00-06:15	48	106	154
12:15-12:30	3	4	7	06:15-06:30	172	51	223	12:15-12:30	103	113	216	06:15-06:30	33	110	143
12:30-12:45	4	4	8	06:30-06:45	227	62	289	12:30-12:45	94	125	219	06:30-06:45	38	94	132
12:45-01:00	6	0	6	06:45-07:00	190	64	254	12:45-01:00	121	104	225	06:45-07:00	30	85	115
01:00-01:15	4	7	11	07:00-07:15	183	66	249	01:00-01:15	127	112	239	07:00-07:15	26	71	97
01:15-01:30	5	1	6	07:15-07:30	147	85	232	01:15-01:30	108	96	204	07:15-07:30	21	63	84
01:30-01:45	9	4	13	07:30-07:45	133	55	188	01:30-01:45	123	129	252	07:30-07:45	31	61	92
01:45-02:00	3	7	10	07:45-08:00	123	60	183	01:45-02:00	118	127	245	07:45-08:00	16	49	65
02:00-02:15	9	3	12	08:00-08:15	117	80	197	02:00-02:15	113	124	237	08:00-08:15	24	57	81
02:15-02:30	17	2	19	08:15-08:30	135	75	210	02:15-02:30	98	165	263	08:15-08:30	21	65	86
02:30-02:45	16	2	18	08:30-08:45	94	91	185	02:30-02:45	101	173	274	08:30-08:45	19	34	53
02:45-03:00	32	3	35	08:45-09:00	123	78	201	02:45-03:00	92	173	265	08:45-09:00	24	45	69
03:00-03:15	32	3	35	09:00-09:15	106	87	193	03:00-03:15	84	159	243	09:00-09:15	19	40	59
03:15-03:30	42	5	47	09:15-09:30	81	98	179	03:15-03:30	83	170	253	09:15-09:30	13	31	44
03:30-03:45	52	5	57	09:30-09:45	75	85	160	03:30-03:45	76	179	255	09:30-09:45	8	47	55
03:45-04:00	60	8	68	09:45-10:00	86	91	177	03:45-04:00	64	224	288	09:45-10:00	3	37	40
04:00-04:15	60	9	69	10:00-10:15	104	88	192	04:00-04:15	91	179	270	10:00-10:15	8	35	43
04:15-04:30	87	9	96	10:15-10:30	103	75	178	04:15-04:30	78	183	261	10:15-10:30	4	42	46
04:30-04:45	107	20	127	10:30-10:45	98	86	184	04:30-04:45	70	167	237	10:30-10:45	1	36	37
04:45-05:00	120	35	155	10:45-11:00	96	99	195	04:45-05:00	64	168	232	10:45-11:00	3	23	26
05:00-05:15	169	26	195	11:00-11:15	76	109	185	05:00-05:15	58	160	218	11:00-11:15	3	17	20
05:15-05:30	184	29	213	11:15-11:30	84	98	182	05:15-05:30	77	136	213	11:15-11:30	1	7	8
05:30-05:45	161	27	188	11:30-11:45	77	98	175	05:30-05:45	44	119	163	11:30-11:45	4	7	11
05:45-06:00	182	36	218	11:45-12:00	78	119	197	05:45-06:00	61	95	156	11:45-12:00	0	11	11

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:30 AM to 07:30 AM			PM - PEAK HR TIME	03:30 PM to 04:30 PM		
AM - PEAK HR VOLUME	747	277	1024	PM - PEAK HR VOLUME	309	765	1074
AM - K FACTOR (%)			7.51	PM - K FACTOR (%)			7.88
AM - D (%)	72.95	27.05	100.00	PM - D (%)	28.77	71.23	100.00
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:15 AM to 07:15 AM	08:00 AM to 09:00 AM		PM - PEAK HR TIME	03:15 PM to 04:15 PM	03:30 PM to 04:30 PM	
AM - PEAK HR VOLUME	772	324		PM - PEAK HR VOLUME	314	765	

AM PERIOD (00:00-12:00)				PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:30 AM to 07:30 AM			PM - PEAK HR TIME	03:30 PM to 04:30 PM		
AM - PEAK HR VOLUME	747	277	1024	PM - PEAK HR VOLUME	309	765	1074
AM - K FACTOR (%)			7.51	PM - K FACTOR (%)			7.88
AM - D (%)	72.95	27.05	100.00	PM - D (%)	28.77	71.23	100.00

NON-COMMUTER PERIOD (09:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	2,887	1,950	4,837
PEAK HR TIME	02:00 PM to 03:00 PM			AM 12-HR PERIOD (00:00-12:00)	4,258	2,208	6,466
PEAK HR VOLUME	404	635	1039	PM 6-HR PERIOD (12:00-18:00)	2,113	3,480	5,593
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	2,511	4,653	7,164
PEAK HR TIME	12:45 PM to 01:45 PM	02:00 PM to 03:00 PM		24 HOUR PERIOD	6,769	6,861	13,630
PEAK HR VOLUME	479	635		D (%)	49.66	50.34	100.00

Run Date: 2015/07/22

Hawaii Department of Transportation
Highways Division **Highways Planning Survey Section**
2014 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 14200
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 05/08/2014															
12:00-12:15	2	8	10	06:00-06:15	183	32	215	12:00-12:15	109	101	210	06:00-06:15	42	85	127
12:15-12:30	3	5	8	06:15-06:30	214	55	269	12:15-12:30	100	109	209	06:15-06:30	34	88	122
12:30-12:45	5	1	6	06:30-06:45	251	51	302	12:30-12:45	79	114	193	06:30-06:45	28	85	113
12:45-01:00	5	1	6	06:45-07:00	203	48	251	12:45-01:00	99	115	214	06:45-07:00	27	75	102
01:00-01:15	4	1	5	07:00-07:15	172	69	241	01:00-01:15	112	103	215	07:00-07:15	23	69	92
01:15-01:30	6	3	9	07:15-07:30	136	84	220	01:15-01:30	85	133	218	07:15-07:30	21	62	83
01:30-01:45	10	1	11	07:30-07:45	128	94	222	01:30-01:45	114	87	201	07:30-07:45	26	56	82
01:45-02:00	8	1	9	07:45-08:00	119	73	192	01:45-02:00	102	110	212	07:45-08:00	26	55	81
02:00-02:15	10	1	11	08:00-08:15	123	92	215	02:00-02:15	97	149	246	08:00-08:15	33	60	93
02:15-02:30	12	2	14	08:15-08:30	115	66	181	02:15-02:30	100	130	230	08:15-08:30	25	62	87
02:30-02:45	15	1	16	08:30-08:45	107	82	189	02:30-02:45	93	164	257	08:30-08:45	19	53	72
02:45-03:00	28	3	31	08:45-09:00	115	80	195	02:45-03:00	87	175	262	08:45-09:00	21	47	68
03:00-03:15	29	2	31	09:00-09:15	105	88	193	03:00-03:15	95	191	286	09:00-09:15	19	53	72
03:15-03:30	36	1	37	09:15-09:30	110	84	194	03:15-03:30	77	184	261	09:15-09:30	11	43	54
03:30-03:45	46	9	55	09:30-09:45	80	108	188	03:30-03:45	89	174	263	09:30-09:45	10	54	64
03:45-04:00	60	4	64	09:45-10:00	101	73	174	03:45-04:00	79	211	290	09:45-10:00	4	40	44
04:00-04:15	67	15	82	10:00-10:15	94	81	175	04:00-04:15	91	179	270	10:00-10:15	10	32	42
04:15-04:30	87	17	104	10:15-10:30	73	84	157	04:15-04:30	76	183	259	10:15-10:30	9	23	32
04:30-04:45	108	23	131	10:30-10:45	92	91	183	04:30-04:45	72	167	239	10:30-10:45	2	49	51
04:45-05:00	132	34	166	10:45-11:00	100	85	185	04:45-05:00	76	149	225	10:45-11:00	5	23	28
05:00-05:15	147	19	166	11:00-11:15	84	106	190	05:00-05:15	56	151	207	11:00-11:15	5	23	28
05:15-05:30	178	30	208	11:15-11:30	86	84	170	05:15-05:30	87	129	216	11:15-11:30	2	10	12
05:30-05:45	171	25	196	11:30-11:45	78	95	173	05:30-05:45	61	135	196	11:30-11:45	2	11	13
05:45-06:00	179	39	218	11:45-12:00	96	95	191	05:45-06:00	55	125	180	11:45-12:00	0	12	12

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:15 AM to 07:15 AM			PM - PEAK HR TIME	03:00 PM to 04:00 PM		
AM - PEAK HR VOLUME	840	223	1063	PM - PEAK HR VOLUME	340	760	1100
AM - K FACTOR (%)			7.82	PM - K FACTOR (%)			8.09
AM - D (%)	79.02	20.98	100.00	PM - D (%)	30.91	69.09	100.00
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:00 AM to 07:00 AM	07:15 AM to 08:15 AM		PM - PEAK HR TIME	03:00 PM to 04:00 PM	03:00 PM to 04:00 PM	
AM - PEAK HR VOLUME	851	343		PM - PEAK HR VOLUME	340	760	

AM PERIOD (00:00-12:00)				PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:15 AM to 07:15 AM			PM - PEAK HR TIME	03:00 PM to 04:00 PM		
AM - PEAK HR VOLUME	840	223	1063	PM - PEAK HR VOLUME	340	760	1100
AM - K FACTOR (%)			7.82	PM - K FACTOR (%)			8.09
AM - D (%)	79.02	20.98	100.00	PM - D (%)	30.91	69.09	100.00

NON-COMMUTER PERIOD (09:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	2,965	1,900	4,865
PEAK HR TIME	02:00 PM to 03:00 PM			AM 12-HR PERIOD (00:00-12:00)	4,313	2,146	6,459
PEAK HR VOLUME	377	618	995	PM 6-HR PERIOD (12:00-18:00)	2,091	3,468	5,559
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	2,495	4,638	7,133
PEAK HR TIME	01:00 PM to 02:00 PM	02:00 PM to 03:00 PM		24 HOUR PERIOD	6,808	6,784	13,592
PEAK HR VOLUME	413	618		D (%)	50.09	49.91	100.00

Run Date: 2015/07/22

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section
Vehicle Classification Data Summary
2014

Site ID: B71001905469 **Route No:** 19 **Date From:** 2014/05/07 0:00

Town: Hawaii **Direction:** +MP **Date To:** 2014/05/08 23:45

Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

Functional Classification: 14 URBAN:PRINCIPAL ARTERIAL - OTHER

REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES
Cycles	191	0.70%	381
PC	19157	70.37%	38314
2A-4T	4894	17.98%	9788
LIGHT VEHICLE TOTALS	24242	89.05%	48483
HEAVY VEHICLES			
Bus	843	3.10%	2108
SINGLE UNIT TRUCK			
2A-6T	1469	5.40%	2938
3A-SU	95	0.35%	285
4A-SU	1	0.00%	4
SINGLE-TRAILER TRUCKS			
4A-ST	250	0.92%	1000
5A-ST	276	1.01%	1380
6A-ST	4	0.01%	24
MULTI-TRAILER TRUCKS			
5A-MT	41	0.15%	205
6A-MT	1	0.00%	6
7A-MT	1	0.00%	7
HEAVY VEHICLE TOTALS	2981	10.95%	7957
CLASSIFIED VEHICLES TOTALS	27223 (A)	100.00%	56440 (B)
UNCLASSIFIED VEHICLES TOTALS	-1	-0.00%	
AXLE CORRECTION FACTOR (A/C) = 0.965		EQUIVALENT(B/2) =	28220 (C)

	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
PEAK HOUR VOLUME : 1100						
2014/05/08 15:00						
SINGLE UNIT TRUCKS (TYPE 4-7)	95	(65A-1) 8.64%	1204	14200	(65A-2) 8.48%	7.75%
COMBINATION (TYPE 8-13)	11	(65B-1) 1.00%	286		(65B-2) 2.01%	7.75%

ROADTUBE

Run Date: 2016/05/18

Hawaii Department of Transportation
Highways Division — Highways Planning Survey Section
2015 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 14700

Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19

Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 08/27/2015															
12:00-12:15	7	19	26	06:00-06:15	184	24	208	12:00-12:15	90	113	203	06:00-06:15	76	158	234
12:15-12:30	1	14	15	06:15-06:30	205	27	232	12:15-12:30	80	122	202	06:15-06:30	74	143	217
12:30-12:45	4	16	20	06:30-06:45	193	53	246	12:30-12:45	114	104	218	06:30-06:45	68	139	207
12:45-01:00	4	8	12	06:45-07:00	221	48	269	12:45-01:00	87	136	223	06:45-07:00	77	117	194
01:00-01:15	1	5	6	07:00-07:15	190	54	244	01:00-01:15	92	95	187	07:00-07:15	73	102	175
01:15-01:30	2	6	8	07:15-07:30	195	78	273	01:15-01:30	106	113	219	07:15-07:30	51	112	163
01:30-01:45	4	5	9	07:30-07:45	173	97	270	01:30-01:45	118	123	241	07:30-07:45	41	87	128
01:45-02:00	4	2	6	07:45-08:00	168	101	269	01:45-02:00	103	104	207	07:45-08:00	37	77	114
02:00-02:15	6	3	9	08:00-08:15	161	104	265	02:00-02:15	123	107	230	08:00-08:15	26	65	91
02:15-02:30	5	3	8	08:15-08:30	271	74	345	02:15-02:30	132	138	270	08:15-08:30	37	75	112
02:30-02:45	5	2	7	08:30-08:45	166	69	235	02:30-02:45	101	159	260	08:30-08:45	31	52	83
02:45-03:00	6	2	8	08:45-09:00	131	81	212	02:45-03:00	125	169	294	08:45-09:00	29	57	86
03:00-03:15	4	1	5	09:00-09:15	118	65	183	03:00-03:15	115	172	287	09:00-09:15	24	61	85
03:15-03:30	20	5	25	09:15-09:30	114	99	213	03:15-03:30	103	203	306	09:15-09:30	20	52	72
03:30-03:45	16	4	20	09:30-09:45	74	97	171	03:30-03:45	117	207	324	09:30-09:45	26	52	78
03:45-04:00	34	5	39	09:45-10:00	116	75	191	03:45-04:00	104	198	302	09:45-10:00	11	32	43
04:00-04:15	29	5	34	10:00-10:15	113	79	192	04:00-04:15	105	189	294	10:00-10:15	13	47	60
04:15-04:30	54	3	57	10:15-10:30	106	85	191	04:15-04:30	116	209	325	10:15-10:30	12	47	59
04:30-04:45	52	3	55	10:30-10:45	93	93	186	04:30-04:45	100	264	364	10:30-10:45	11	52	63
04:45-05:00	61	9	70	10:45-11:00	112	93	205	04:45-05:00	130	194	324	10:45-11:00	9	53	62
05:00-05:15	79	8	87	11:00-11:15	94	86	180	05:00-05:15	98	237	335	11:00-11:15	17	36	53
05:15-05:30	106	9	115	11:15-11:30	89	109	198	05:15-05:30	90	181	271	11:15-11:30	3	24	27
05:30-05:45	126	38	164	11:30-11:45	94	101	195	05:30-05:45	83	177	260	11:30-11:45	10	22	32
05:45-06:00	180	24	204	11:45-12:00	96	104	200	05:45-06:00	75	171	246	11:45-12:00	4	31	35

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:30 AM to 08:30 AM		
AM - PEAK HR VOLUME	773	376	1149
AM - K FACTOR (%)			7.54
AM - D (%)	67.28	32.72	100.00
DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:15 AM to 07:15 AM	07:15 AM to 08:15 AM	
AM - PEAK HR VOLUME	809	380	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:15 PM to 05:15 PM		
PM - PEAK HR VOLUME	444	904	1348
PM - K FACTOR (%)			8.84
PM - D (%)	32.94	67.06	100.00
DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:00 PM to 05:00 PM	04:15 PM to 05:15 PM	
PM - PEAK HR VOLUME	451	904	

AM PERIOD (00:00-12:00)			
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:30 AM to 08:30 AM		
AM - PEAK HR VOLUME	773	376	1149
AM - K FACTOR (%)			7.54
AM - D (%)	67.28	32.72	100.00

PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:15 PM to 05:15 PM		
PM - PEAK HR VOLUME	444	904	1348
PM - K FACTOR (%)			8.84
PM - D (%)	32.94	67.06	100.00

NON-COMMUTER PERIOD (09:00-15:00)			
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:00 PM to 03:00 PM		
PEAK HR VOLUME	481	573	1054
DIRECTIONAL PEAK			
PEAK HR TIME	02:00 PM to 03:00 PM	02:00 PM to 03:00 PM	
PEAK HR VOLUME	481	573	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
AM 6-HR PERIOD (06:00-12:00)	3,477	1,896	5,373
AM 12-HR PERIOD (00:00-12:00)	4,287	2,095	6,382
PM 6-HR PERIOD (12:00-18:00)	2,507	3,885	6,392
PM 12-HR PERIOD (12:00-24:00)	3,287	5,578	8,865
24 HOUR PERIOD	7,574	7,673	15,247
D (%)	49.68	50.32	100.00

Run Date: 2016/05/18

Hawaii Department of Transportation
Highways Division **Highways Planning Survey Section**
2015 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 14700
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 08/28/2015															
12:00-12:15	4	27	31	06:00-06:15	155	28	183	12:00-12:15	105	103	208	06:00-06:15	118	160	278
12:15-12:30	6	16	22	06:15-06:30	184	40	224	12:15-12:30	65	125	190	06:15-06:30	94	135	229
12:30-12:45	10	9	19	06:30-06:45	197	42	239	12:30-12:45	101	122	223	06:30-06:45	93	150	243
12:45-01:00	1	14	15	06:45-07:00	201	44	245	12:45-01:00	63	69	132	06:45-07:00	93	121	214
01:00-01:15	6	8	14	07:00-07:15	179	41	220	01:00-01:15	0	0	0	07:00-07:15	63	126	189
01:15-01:30	6	10	16	07:15-07:30	238	58	296	01:15-01:30	0	0	0	07:15-07:30	60	120	180
01:30-01:45	4	4	8	07:30-07:45	231	81	312	01:30-01:45	79	97	176	07:30-07:45	55	92	147
01:45-02:00	7	5	12	07:45-08:00	238	112	350	01:45-02:00	132	128	260	07:45-08:00	51	95	146
02:00-02:15	6	4	10	08:00-08:15	157	95	252	02:00-02:15	150	118	268	08:00-08:15	38	84	122
02:15-02:30	2	3	5	08:15-08:30	133	88	221	02:15-02:30	109	144	253	08:15-08:30	41	81	122
02:30-02:45	2	1	3	08:30-08:45	131	72	203	02:30-02:45	101	198	299	08:30-08:45	28	83	111
02:45-03:00	8	3	11	08:45-09:00	134	81	215	02:45-03:00	133	134	267	08:45-09:00	29	78	107
03:00-03:15	5	2	7	09:00-09:15	136	99	235	03:00-03:15	120	174	294	09:00-09:15	22	80	102
03:15-03:30	18	3	21	09:15-09:30	137	98	235	03:15-03:30	128	156	284	09:15-09:30	30	43	73
03:30-03:45	21	5	26	09:30-09:45	100	77	177	03:30-03:45	111	197	308	09:30-09:45	35	79	114
03:45-04:00	33	4	37	09:45-10:00	143	93	236	03:45-04:00	119	187	306	09:45-10:00	34	74	108
04:00-04:15	31	2	33	10:00-10:15	131	96	227	04:00-04:15	133	209	342	10:00-10:15	24	73	97
04:15-04:30	45	5	50	10:15-10:30	105	94	199	04:15-04:30	119	184	303	10:15-10:30	17	81	98
04:30-04:45	64	9	73	10:30-10:45	135	92	227	04:30-04:45	95	227	322	10:30-10:45	24	67	91
04:45-05:00	56	5	61	10:45-11:00	116	112	228	04:45-05:00	112	201	313	10:45-11:00	8	47	55
05:00-05:15	75	12	87	11:00-11:15	112	108	220	05:00-05:15	131	211	342	11:00-11:15	7	44	51
05:15-05:30	90	7	97	11:15-11:30	83	108	191	05:15-05:30	90	182	272	11:15-11:30	11	49	60
05:30-05:45	124	19	143	11:30-11:45	102	104	206	05:30-05:45	90	171	261	11:30-11:45	7	48	55
05:45-06:00	143	9	152	11:45-12:00	97	121	218	05:45-06:00	95	151	246	11:45-12:00	12	30	42

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
AM - PEAK HR VOLUME	864	346	1210	PM - PEAK HR VOLUME	459	821	1280
AM - K FACTOR (%)			7.85	PM - K FACTOR (%)			8.30
AM - D (%)	71.40	28.60	100.00	PM - D (%)	35.86	64.14	100.00
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	07:30 AM to 08:30 AM		PM - PEAK HR TIME	03:15 PM to 04:15 PM	04:15 PM to 05:15 PM	
AM - PEAK HR VOLUME	886	376		PM - PEAK HR VOLUME	491	823	

AM PERIOD (00:00-12:00)				PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
AM - PEAK HR VOLUME	864	346	1210	PM - PEAK HR VOLUME	459	821	1280
AM - K FACTOR (%)			7.85	PM - K FACTOR (%)			8.30
AM - D (%)	71.40	28.60	100.00	PM - D (%)	35.86	64.14	100.00

NON-COMMUTER PERIOD (09:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	3,575	1,984	5,559
PEAK HR TIME	02:00 PM to 03:00 PM			AM 12-HR PERIOD (00:00-12:00)	4,342	2,170	6,512
PEAK HR VOLUME	493	594	1087	PM 6-HR PERIOD (12:00-18:00)	2,381	3,488	5,869
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	3,375	5,528	8,903
PEAK HR TIME	09:00 AM to 10:00 AM	02:00 PM to 03:00 PM		24 HOUR PERIOD	7,717	7,698	15,415
PEAK HR VOLUME	516	594		D (%)	50.06	49.94	100.00

Run Date: 2016/05/19

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section
Vehicle Classification Data Summary
2015

Site ID: B71001905469 **Route No:** 19 **Date From:** 2015/08/27 0:00
Town: Hawaii **Direction:** +MP **Date To:** 2015/08/28 23:45
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl
Functional Classification: 14 URBAN:PRINCIPAL ARTERIAL - OTHER
REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES
Cycles	83	0.27%	166
PC	23257	75.85%	46514
2A-4T	6485	21.15%	12970
LIGHT VEHICLE TOTALS	29825	97.27%	59650
HEAVY VEHICLES			
Bus	150	0.49%	375
SINGLE UNIT TRUCK			
2A-6T	309	1.01%	618
3A-SU	113	0.37%	339
4A-SU	2	0.01%	8
SINGLE-TRAILER TRUCKS			
4A-ST	169	0.55%	676
5A-ST	57	0.19%	285
6A-ST	5	0.02%	30
MULTI-TRAILER TRUCKS			
5A-MT	21	0.07%	105
6A-MT	11	0.04%	66
7A-MT	1	0.00%	7
HEAVY VEHICLE TOTALS	838	2.73%	2509
CLASSIFIED VEHICLES TOTALS	30663 (A)	100.00%	62159 (B)
UNCLASSIFIED VEHICLES TOTALS	-1	-0.00%	
AXLE CORRECTION FACTOR (A/C) = 0.987		ROADTUBE EQUIVALENT(B/2) =	31079 (C)

	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
PEAK HOUR VOLUME : 1307 2015/08/27 16:00		(65A-1)			(65A-2)	
SINGLE UNIT TRUCKS (TYPE 4-7)	19	1.45%	287	14700	1.95%	8.89%
COMBINATION (TYPE 8-13)	3	(65B-1) 0.23%	132		(65B-2) 0.90%	8.89%

Run Date: 2017/07/26

Hawaii Department of Transportation
Highways Division **Highways Planning Survey Section**
2016 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 15100
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 04/19/2016															
12:00-12:15	3	21	24	06:00-06:15	186	21	207	12:00-12:15	114	124	238	06:00-06:15	72	170	242
12:15-12:30	5	10	15	06:15-06:30	215	25	240	12:15-12:30	125	124	249	06:15-06:30	79	131	210
12:30-12:45	2	10	12	06:30-06:45	185	53	238	12:30-12:45	118	113	231	06:30-06:45	71	121	192
12:45-01:00	2	7	9	06:45-07:00	217	40	257	12:45-01:00	98	97	195	06:45-07:00	67	107	174
01:00-01:15	5	3	8	07:00-07:15	201	56	257	01:00-01:15	116	111	227	07:00-07:15	59	121	180
01:15-01:30	0	7	7	07:15-07:30	232	58	290	01:15-01:30	98	109	207	07:15-07:30	45	108	153
01:30-01:45	6	6	12	07:30-07:45	286	76	362	01:30-01:45	113	108	221	07:30-07:45	35	101	136
01:45-02:00	2	2	4	07:45-08:00	238	88	326	01:45-02:00	124	128	252	07:45-08:00	29	56	85
02:00-02:15	5	4	9	08:00-08:15	149	123	272	02:00-02:15	132	143	275	08:00-08:15	33	56	89
02:15-02:30	10	1	11	08:15-08:30	145	92	237	02:15-02:30	143	150	293	08:15-08:30	27	75	102
02:30-02:45	4	2	6	08:30-08:45	150	78	228	02:30-02:45	105	173	278	08:30-08:45	24	57	81
02:45-03:00	4	2	6	08:45-09:00	159	91	250	02:45-03:00	110	163	273	08:45-09:00	25	69	94
03:00-03:15	9	4	13	09:00-09:15	127	80	207	03:00-03:15	121	186	307	09:00-09:15	19	49	68
03:15-03:30	13	2	15	09:15-09:30	148	87	235	03:15-03:30	126	161	287	09:15-09:30	14	55	69
03:30-03:45	22	2	24	09:30-09:45	111	91	202	03:30-03:45	102	216	318	09:30-09:45	14	62	76
03:45-04:00	34	1	35	09:45-10:00	128	106	234	03:45-04:00	122	217	339	09:45-10:00	15	48	63
04:00-04:15	42	5	47	10:00-10:15	109	102	211	04:00-04:15	100	259	359	10:00-10:15	17	47	64
04:15-04:30	70	4	74	10:15-10:30	108	81	189	04:15-04:30	107	247	354	10:15-10:30	13	39	52
04:30-04:45	53	2	55	10:30-10:45	118	105	223	04:30-04:45	118	264	382	10:30-10:45	10	49	59
04:45-05:00	59	4	63	10:45-11:00	115	105	220	04:45-05:00	98	264	362	10:45-11:00	10	34	44
05:00-05:15	89	6	95	11:00-11:15	90	113	203	05:00-05:15	95	241	336	11:00-11:15	6	33	39
05:15-05:30	104	16	120	11:15-11:30	112	104	216	05:15-05:30	89	238	327	11:15-11:30	4	24	28
05:30-05:45	151	27	178	11:30-11:45	107	101	208	05:30-05:45	85	232	317	11:30-11:45	2	32	34
05:45-06:00	165	33	198	11:45-12:00	98	99	197	05:45-06:00	84	165	249	11:45-12:00	9	21	30

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
AM - PEAK HR VOLUME	905	345	1250	PM - PEAK HR VOLUME	423	1034	1457
AM - K FACTOR (%)			7.82	PM - K FACTOR (%)			9.11
AM - D (%)	72.40	27.60	100.00	PM - D (%)	29.03	70.97	100.00
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	08:00 AM to 09:00 AM		PM - PEAK HR TIME	03:00 PM to 04:00 PM	04:00 PM to 05:00 PM	
AM - PEAK HR VOLUME	957	384		PM - PEAK HR VOLUME	471	1034	

AM PERIOD (00:00-12:00)				PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
AM - PEAK HR VOLUME	905	345	1250	PM - PEAK HR VOLUME	423	1034	1457
AM - K FACTOR (%)			7.82	PM - K FACTOR (%)			9.11
AM - D (%)	72.40	27.60	100.00	PM - D (%)	29.03	70.97	100.00

NON-COMMUTER PERIOD (09:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	3,734	1,975	5,709
PEAK HR TIME	02:00 PM to 03:00 PM			AM 12-HR PERIOD (00:00-12:00)	4,593	2,156	6,749
PEAK HR VOLUME	490	629	1119	PM 6-HR PERIOD (12:00-18:00)	2,643	4,233	6,876
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	3,342	5,898	9,240
PEAK HR TIME	09:00 AM to 10:00 AM	02:00 PM to 03:00 PM		24 HOUR PERIOD	7,935	8,054	15,989
PEAK HR VOLUME	514	629		D (%)	49.63	50.37	100.00

Run Date: 2017/07/26

Hawaii Department of Transportation
Highways Division **Highways Planning Survey Section**
2016 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 15100
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 04/20/2016															
12:00-12:15	4	14	18	06:00-06:15	178	28	206	12:00-12:15	96	139	235	06:00-06:15	64	146	210
12:15-12:30	3	12	15	06:15-06:30	208	37	245	12:15-12:30	106	117	223	06:15-06:30	90	113	203
12:30-12:45	0	8	8	06:30-06:45	192	34	226	12:30-12:45	109	111	220	06:30-06:45	78	176	254
12:45-01:00	1	7	8	06:45-07:00	188	52	240	12:45-01:00	121	109	230	06:45-07:00	79	137	216
01:00-01:15	1	1	2	07:00-07:15	222	59	281	01:00-01:15	117	96	213	07:00-07:15	53	115	168
01:15-01:30	1	7	8	07:15-07:30	243	62	305	01:15-01:30	104	127	231	07:15-07:30	40	101	141
01:30-01:45	1	3	4	07:30-07:45	259	81	340	01:30-01:45	111	160	271	07:30-07:45	41	85	126
01:45-02:00	4	1	5	07:45-08:00	259	81	340	01:45-02:00	121	146	267	07:45-08:00	46	75	121
02:00-02:15	4	5	9	08:00-08:15	177	123	300	02:00-02:15	140	119	259	08:00-08:15	28	70	98
02:15-02:30	7	3	10	08:15-08:30	177	87	264	02:15-02:30	126	129	255	08:15-08:30	34	79	113
02:30-02:45	7	3	10	08:30-08:45	149	76	225	02:30-02:45	129	146	275	08:30-08:45	42	81	123
02:45-03:00	8	0	8	08:45-09:00	161	82	243	02:45-03:00	113	146	259	08:45-09:00	25	69	94
03:00-03:15	13	0	13	09:00-09:15	122	77	199	03:00-03:15	129	170	299	09:00-09:15	15	69	84
03:15-03:30	13	2	15	09:15-09:30	152	109	261	03:15-03:30	124	177	301	09:15-09:30	15	61	76
03:30-03:45	25	1	26	09:30-09:45	113	116	229	03:30-03:45	133	207	340	09:30-09:45	12	51	63
03:45-04:00	30	4	34	09:45-10:00	120	93	213	03:45-04:00	118	215	333	09:45-10:00	20	45	65
04:00-04:15	38	4	42	10:00-10:15	111	105	216	04:00-04:15	89	222	311	10:00-10:15	13	49	62
04:15-04:30	54	5	59	10:15-10:30	124	90	214	04:15-04:30	144	214	358	10:15-10:30	10	40	50
04:30-04:45	43	1	44	10:30-10:45	109	105	214	04:30-04:45	104	293	397	10:30-10:45	12	62	74
04:45-05:00	58	4	62	10:45-11:00	106	90	196	04:45-05:00	138	253	391	10:45-11:00	6	44	50
05:00-05:15	102	15	117	11:00-11:15	117	124	241	05:00-05:15	95	237	332	11:00-11:15	4	30	34
05:15-05:30	91	14	105	11:15-11:30	89	117	206	05:15-05:30	104	200	304	11:15-11:30	6	29	35
05:30-05:45	141	25	166	11:30-11:45	95	121	216	05:30-05:45	84	196	280	11:30-11:45	8	35	43
05:45-06:00	187	34	221	11:45-12:00	116	123	239	05:45-06:00	80	149	229	11:45-12:00	8	26	34

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:15 PM to 05:15 PM		
AM - PEAK HR VOLUME	938	347	1285	PM - PEAK HR VOLUME	481	997	1478
AM - K FACTOR (%)			7.92	PM - K FACTOR (%)			9.11
AM - D (%)	73.00	27.00	100.00	PM - D (%)	32.54	67.46	100.00
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	07:30 AM to 08:30 AM		PM - PEAK HR TIME	03:00 PM to 04:00 PM	04:15 PM to 05:15 PM	
AM - PEAK HR VOLUME	983	372		PM - PEAK HR VOLUME	504	997	

AM PERIOD (00:00-12:00)				PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:15 PM to 05:15 PM		
AM - PEAK HR VOLUME	938	347	1285	PM - PEAK HR VOLUME	481	997	1478
AM - K FACTOR (%)			7.92	PM - K FACTOR (%)			9.11
AM - D (%)	73.00	27.00	100.00	PM - D (%)	32.54	67.46	100.00

NON-COMMUTER PERIOD (09:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	3,787	2,072	5,859
PEAK HR TIME	01:45 PM to 02:45 PM			AM 12-HR PERIOD (00:00-12:00)	4,623	2,245	6,868
PEAK HR VOLUME	516	540	1056	PM 6-HR PERIOD (12:00-18:00)	2,735	4,078	6,813
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	3,484	5,866	9,350
PEAK HR TIME	01:45 PM to 02:45 PM	01:30 PM to 02:30 PM		24 HOUR PERIOD	8,107	8,111	16,218
PEAK HR VOLUME	516	554		D (%)	49.99	50.01	100.00

Run Date: 2017/07/26

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section

Vehicle Classification Data Summary
2016

Site ID: B71001905469 **Route No:** 19 **Date From:** 2016/04/19 0:00
Town: Hawaii **Direction:** +MP **Date To:** 2016/04/20 23:45
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

Functional Classification: 14 URBAN:PRINCIPAL ARTERIAL - OTHER
REPORT TOTALS - 48 HOURS RECORDED

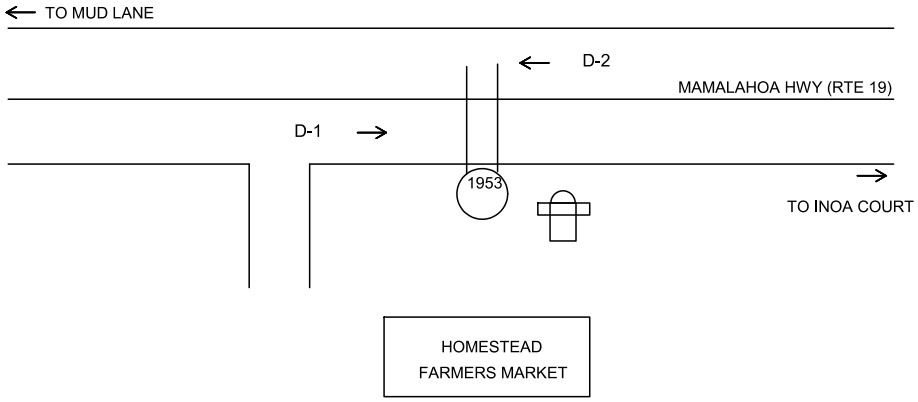
	VOLUME	%	NUMBER OF AXLES
Cycles	68	0.21%	135
PC	20876	64.82%	41752
2A-4T	10476	32.53%	20952
LIGHT VEHICLE TOTALS	31420	97.56%	62839
HEAVY VEHICLES			
Bus	149	0.46%	372
SINGLE UNIT TRUCK			
2A-6T	205	0.64%	410
3A-SU	97	0.30%	291
4A-SU	16	0.05%	64
SINGLE-TRAILER TRUCKS			
4A-ST	28	0.09%	112
5A-ST	255	0.79%	1275
6A-ST	13	0.04%	78
MULTI-TRAILER TRUCKS			
5A-MT	2	0.01%	10
6A-MT	1	0.00%	6
7A-MT	21	0.07%	147
HEAVY VEHICLE TOTALS	787	2.44%	2765
CLASSIFIED VEHICLES TOTALS	32207 (A)	100.00%	65605 (B)
UNCLASSIFIED VEHICLES TOTALS	0	0.00%	

AXLE CORRECTION FACTOR (A/C) = 0.982

ROADTUBE EQUIVALENT(B/2) = 32802 (C)

PEAK HOUR VOLUME : 1457 2016/04/20 16:00	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
		(65A-1)			(65A-2)	
SINGLE UNIT TRUCKS (TYPE 4-7)	11	0.75%	233	15100	1.54%	9.65%
		(65B-1)			(65B-2)	
COMBINATION (TYPE 8-13)	5	0.34%	160		1.06%	9.65%

ISLAND: HAWAII
AREA: WAIMEA



Station No:	B71 0019 05469

Station Location:			
Mamalahoa Highway between Mana Road and Pualalea Place			
Station Mileage:	55.25	GPS Coord (Latitude):	20.02833
		GPS Coord (Longitude):	155.64760
Begin Survey (Date/Time):	4-26-16 0000	End Survey (Date/Time):	4-29-16 0000
Survey Method: LOOP **HOSE** OTHER		Survey Type: VOL **CLASS** SPEED OTHER	
Survey Crew:	FIELD CREW	Module No.:	

HPMS DATA

Segment Description:

MAMALAHOA HIGHWAY - MUD LANE TO INOA COURT

Segment Begin LRS	54.69	Segment End LRS	55.27	Length	0.58

Facility Name	Juris	Func Class	Area Type	Route No.	Route Mile	D-1 = Direction to End of Route / D-2 = Direction to Beginning of Route	
MAMALAHOA HIGHWAY	S	14	2	19	55.25	D-1	TO PALANI ROAD
						D-2	TO KUHIO WHARF (HILO)

Sketch By: RG Date: 3/21/2016 SLD: 2003

Run Date: 2017/07/06

Hawaii Department of Transportation
Highways Division **Highways Planning Survey Section**
2016 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 15100
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 04/27/2016															
12:00-12:15	1	25	26	06:00-06:15	184	21	205	12:00-12:15	89	111	200	06:00-06:15	84	150	234
12:15-12:30	5	17	22	06:15-06:30	182	31	213	12:15-12:30	109	88	197	06:15-06:30	81	140	221
12:30-12:45	2	3	5	06:30-06:45	181	31	212	12:30-12:45	100	121	221	06:30-06:45	67	129	196
12:45-01:00	2	9	11	06:45-07:00	206	39	245	12:45-01:00	60	103	163	06:45-07:00	41	111	152
01:00-01:15	3	6	9	07:00-07:15	201	48	249	01:00-01:15	91	95	186	07:00-07:15	51	99	150
01:15-01:30	4	7	11	07:15-07:30	215	39	254	01:15-01:30	74	102	176	07:15-07:30	46	99	145
01:30-01:45	2	6	8	07:30-07:45	222	47	269	01:30-01:45	82	107	189	07:30-07:45	31	87	118
01:45-02:00	3	6	9	07:45-08:00	234	55	289	01:45-02:00	108	109	217	07:45-08:00	33	83	116
02:00-02:15	6	4	10	08:00-08:15	186	80	266	02:00-02:15	111	108	219	08:00-08:15	26	66	92
02:15-02:30	4	6	10	08:15-08:30	146	91	237	02:15-02:30	129	120	249	08:15-08:30	32	62	94
02:30-02:45	8	3	11	08:30-08:45	130	69	199	02:30-02:45	69	158	227	08:30-08:45	21	76	97
02:45-03:00	9	7	16	08:45-09:00	130	76	206	02:45-03:00	106	166	272	08:45-09:00	25	77	102
03:00-03:15	13	0	13	09:00-09:15	114	68	182	03:00-03:15	98	150	248	09:00-09:15	13	63	76
03:15-03:30	12	3	15	09:15-09:30	130	87	217	03:15-03:30	118	148	266	09:15-09:30	18	54	72
03:30-03:45	17	0	17	09:30-09:45	126	65	191	03:30-03:45	83	146	229	09:30-09:45	19	51	70
03:45-04:00	30	3	33	09:45-10:00	123	93	216	03:45-04:00	101	182	283	09:45-10:00	21	48	69
04:00-04:15	26	6	32	10:00-10:15	95	97	192	04:00-04:15	103	174	277	10:00-10:15	19	34	53
04:15-04:30	58	3	61	10:15-10:30	108	88	196	04:15-04:30	101	185	286	10:15-10:30	14	55	69
04:30-04:45	54	3	57	10:30-10:45	105	88	193	04:30-04:45	85	217	302	10:30-10:45	10	47	57
04:45-05:00	69	10	79	10:45-11:00	111	87	198	04:45-05:00	87	245	332	10:45-11:00	4	36	40
05:00-05:15	100	9	109	11:00-11:15	82	96	178	05:00-05:15	74	205	279	11:00-11:15	4	20	24
05:15-05:30	92	14	106	11:15-11:30	94	93	187	05:15-05:30	76	207	283	11:15-11:30	8	24	32
05:30-05:45	127	30	157	11:30-11:45	86	96	182	05:30-05:45	78	199	277	11:30-11:45	5	34	39
05:45-06:00	172	20	192	11:45-12:00	79	108	187	05:45-06:00	73	171	244	11:45-12:00	7	28	35

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:15 PM to 05:15 PM		
AM - PEAK HR VOLUME	857	221	1078	PM - PEAK HR VOLUME	347	852	1199
AM - K FACTOR (%)			7.51	PM - K FACTOR (%)			8.35
AM - D (%)	79.50	20.50	100.00	PM - D (%)	28.94	71.06	100.00
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	08:00 AM to 09:00 AM		PM - PEAK HR TIME	03:15 PM to 04:15 PM	04:30 PM to 05:30 PM	
AM - PEAK HR VOLUME	872	316		PM - PEAK HR VOLUME	405	874	

AM PERIOD (00:00-12:00)				PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:15 PM to 05:15 PM		
AM - PEAK HR VOLUME	857	221	1078	PM - PEAK HR VOLUME	347	852	1199
AM - K FACTOR (%)			7.51	PM - K FACTOR (%)			8.35
AM - D (%)	79.50	20.50	100.00	PM - D (%)	28.94	71.06	100.00

NON-COMMUTER PERIOD (09:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	3,470	1,693	5,163
PEAK HR TIME	02:00 PM to 03:00 PM			AM 12-HR PERIOD (00:00-12:00)	4,289	1,893	6,182
PEAK HR VOLUME	415	552	967	PM 6-HR PERIOD (12:00-18:00)	2,205	3,617	5,822
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	2,885	5,290	8,175
PEAK HR TIME	09:00 AM to 10:00 AM	02:00 PM to 03:00 PM		24 HOUR PERIOD	7,174	7,183	14,357
PEAK HR VOLUME	493	552		D (%)	49.97	50.03	100.00

Run Date: 2017/07/06

Hawaii Department of Transportation
Highways Division **Highways Planning Survey Section**
2016 Program Count - Summary

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 15100
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 04/28/2016															
12:00-12:15	3	15	18	06:00-06:15	169	25	194	12:00-12:15	95	106	201	06:00-06:15	74	138	212
12:15-12:30	6	19	25	06:15-06:30	185	18	203	12:15-12:30	100	111	211	06:15-06:30	76	129	205
12:30-12:45	1	16	17	06:30-06:45	201	38	239	12:30-12:45	83	101	184	06:30-06:45	66	123	189
12:45-01:00	3	6	9	06:45-07:00	203	41	244	12:45-01:00	99	108	207	06:45-07:00	55	98	153
01:00-01:15	2	11	13	07:00-07:15	188	40	228	01:00-01:15	91	87	178	07:00-07:15	37	107	144
01:15-01:30	6	5	11	07:15-07:30	244	49	293	01:15-01:30	98	96	194	07:15-07:30	59	91	150
01:30-01:45	3	5	8	07:30-07:45	245	65	310	01:30-01:45	83	139	222	07:30-07:45	47	91	138
01:45-02:00	3	2	5	07:45-08:00	209	66	275	01:45-02:00	96	121	217	07:45-08:00	49	77	126
02:00-02:15	5	3	8	08:00-08:15	158	90	248	02:00-02:15	111	109	220	08:00-08:15	22	86	108
02:15-02:30	2	3	5	08:15-08:30	127	101	228	02:15-02:30	74	138	212	08:15-08:30	25	86	111
02:30-02:45	8	1	9	08:30-08:45	113	69	182	02:30-02:45	78	134	212	08:30-08:45	31	82	113
02:45-03:00	7	9	16	08:45-09:00	138	80	218	02:45-03:00	122	131	253	08:45-09:00	27	56	83
03:00-03:15	14	2	16	09:00-09:15	122	73	195	03:00-03:15	92	142	234	09:00-09:15	25	67	92
03:15-03:30	14	1	15	09:15-09:30	109	83	192	03:15-03:30	99	153	252	09:15-09:30	24	59	83
03:30-03:45	20	3	23	09:30-09:45	105	83	188	03:30-03:45	106	165	271	09:30-09:45	18	58	76
03:45-04:00	30	2	32	09:45-10:00	111	93	204	03:45-04:00	109	191	300	09:45-10:00	20	48	68
04:00-04:15	26	2	28	10:00-10:15	109	85	194	04:00-04:15	94	215	309	10:00-10:15	24	44	68
04:15-04:30	68	5	73	10:15-10:30	90	89	179	04:15-04:30	93	203	296	10:15-10:30	12	52	64
04:30-04:45	47	5	52	10:30-10:45	87	116	203	04:30-04:45	71	217	288	10:30-10:45	17	49	66
04:45-05:00	65	7	72	10:45-11:00	109	80	189	04:45-05:00	73	203	276	10:45-11:00	7	37	44
05:00-05:15	93	4	97	11:00-11:15	103	96	199	05:00-05:15	67	221	288	11:00-11:15	6	21	27
05:15-05:30	110	16	126	11:15-11:30	105	83	188	05:15-05:30	62	180	242	11:15-11:30	7	34	41
05:30-05:45	144	27	171	11:30-11:45	88	102	190	05:30-05:45	82	182	264	11:30-11:45	8	37	45
05:45-06:00	165	25	190	11:45-12:00	97	104	201	05:45-06:00	95	152	247	11:45-12:00	5	24	29

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	03:45 PM to 04:45 PM		
AM - PEAK HR VOLUME	856	270	1126	PM - PEAK HR VOLUME	367	826	1193
AM - K FACTOR (%)			7.80	PM - K FACTOR (%)			8.26
AM - D (%)	76.02	23.98	100.00	PM - D (%)	30.76	69.24	100.00
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	08:00 AM to 09:00 AM		PM - PEAK HR TIME	03:15 PM to 04:15 PM	04:15 PM to 05:15 PM	
AM - PEAK HR VOLUME	886	340		PM - PEAK HR VOLUME	408	844	

AM PERIOD (00:00-12:00)				PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM			PM - PEAK HR TIME	03:45 PM to 04:45 PM		
AM - PEAK HR VOLUME	856	270	1126	PM - PEAK HR VOLUME	367	826	1193
AM - K FACTOR (%)			7.80	PM - K FACTOR (%)			8.26
AM - D (%)	76.02	23.98	100.00	PM - D (%)	30.76	69.24	100.00

NON-COMMUTER PERIOD (09:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	3,415	1,769	5,184
PEAK HR TIME	02:00 PM to 03:00 PM			AM 12-HR PERIOD (00:00-12:00)	4,260	1,963	6,223
PEAK HR VOLUME	385	512	897	PM 6-HR PERIOD (12:00-18:00)	2,173	3,605	5,778
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	2,914	5,299	8,213
PEAK HR TIME	09:00 AM to 10:00 AM	02:00 PM to 03:00 PM		24 HOUR PERIOD	7,174	7,262	14,436
PEAK HR VOLUME	447	512		D (%)	49.70	50.30	100.00

Run Date: 2017/07/06

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section

Vehicle Classification Data Summary
2016

Site ID: B71001905469 **Route No:** 19 **Date From:** 2016/04/27 0:00
Town: Hawaii **Direction:** +MP **Date To:** 2016/04/28 23:45
Location: Mamalahoa Hwy - Mana Rd to Pualalea Pl

Functional Classification: 14 URBAN:PRINCIPAL ARTERIAL - OTHER
REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES
Cycles	253	0.88%	507
PC	20615	71.60%	41230
2A-4T	5071	17.61%	10142
LIGHT VEHICLE TOTALS	25939	90.09%	51879
HEAVY VEHICLES			
Bus	1025	3.56%	2563
SINGLE UNIT TRUCK			
2A-6T	1115	3.87%	2230
3A-SU	125	0.43%	375
4A-SU	4	0.01%	16
SINGLE-TRAILER TRUCKS			
4A-ST	238	0.83%	952
5A-ST	277	0.96%	1385
6A-ST	5	0.02%	30
MULTI-TRAILER TRUCKS			
5A-MT	58	0.20%	290
6A-MT	3	0.01%	18
7A-MT	5	0.02%	35
HEAVY VEHICLE TOTALS	2855	9.92%	7894
CLASSIFIED VEHICLES TOTALS	28794 (A)	100.00%	59772 (B)
UNCLASSIFIED VEHICLES TOTALS	-1	-0.00%	

AXLE CORRECTION FACTOR (A/C) = 0.963

ROADTUBE EQUIVALENT(B/2) = 29886 (C)

PEAK HOUR VOLUME : 1197 2016/04/27 16:00	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
SINGLE UNIT TRUCKS (TYPE 4-7)	140	(65A-1) 11.70%	1134	15100	(65A-2) 7.51%	7.93%
COMBINATION (TYPE 8-13)	23	(65B-1) 1.92%	293		(65B-2) 1.94%	7.93%

12/1/21, 9:36 AM 15 Minute Report

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

State of Hawaii, Department of Transportation,
Highways Division
15 Minute Volume Report

Run Date: 01-DEC-21
Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 16000
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Route No:** 19
Location: **DATE:** 01-AUG-17

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM		
AM - PEAK HR VOLUME	818	248	1,066
AM - K FACTOR(%)			6.29
AM - D(%)	76.74	23.26	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM	08:00 AM to 09:00 AM	
AM - PEAK HR VOLUME	818	248	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:45 PM to 5:45 PM		
PM - PEAK HR VOLUME	516	926	1,442
PM - K FACTOR(%)			8.51
PM -D(%)	35.78	64.22	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:15 PM to 5:15 PM	4:45 PM to 5:45 PM	
PM - PEAK HR VOLUME	525	926	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:15 AM to 09:15 AM		
AM - PEAK HR VOLUME	818	818	1,087
AM - K FACTOR(%)			6.41
AM - D(%)	76.74	23.26	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:45 PM to 5:45 PM		
PM - PEAK HR VOLUME	516	525	1,442
PM - K FACTOR(%)			8.51
PM -D(%)	35.78	64.22	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	1:00 PM to 2:00 PM		
PEAK HR VOLUME	506	543	1,049
DIRECTIONAL PEAK			
PEAK HR TIME	09:00 AM to 10:00 AM	0:30 PM to 1:30 PM	
PEAK HR VOLUME	689	551	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	3,897	1,630	5,527
AM 12-HR PERIOD (00:00-12:00)	4,294	1,885	6,179
PM 6-HR PERIOD (12:00-18:00)	2,878	3,907	6,785
PM 12-HR PERIOD (12:00-24:00)	4,166	6,600	10,766
24-HR PERIOD (12:00-24:00)	8,460	8,485	16,945
D%	49.93	50.07	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	10	47	57

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	84	6	90

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	118	111	229

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	92	220	312

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

12:15 - 12:30	6	30	36	06:15 - 06:30	100	12	112	12:15 - 12:30	120	130	250	06:15 - 06:30	126	234	360
12:30 - 12:45	2	34	36	06:30 - 06:45	130	18	148	12:30 - 12:45	112	136	248	06:30 - 06:45	99	206	305
12:45 - 01:00	7	21	28	06:45 - 07:00	191	24	215	12:45 - 01:00	116	133	249	06:45 - 07:00	110	153	263
01:00 - 01:15	8	22	30	07:00 - 07:15	184	22	206	01:00 - 01:15	115	147	262	07:00 - 07:15	85	189	274
01:15 - 01:30	3	21	24	07:15 - 07:30	213	36	249	01:15 - 01:30	117	135	252	07:15 - 07:30	92	163	255
01:30 - 01:45	3	13	16	07:30 - 07:45	198	35	233	01:30 - 01:45	129	121	250	07:30 - 07:45	84	160	244
01:45 - 02:00	5	13	18	07:45 - 08:00	210	39	249	01:45 - 02:00	145	140	285	07:45 - 08:00	70	109	179
02:00 - 02:15	1	5	6	08:00 - 08:15	183	54	237	02:00 - 02:15	106	131	237	08:00 - 08:15	75	111	186
02:15 - 02:30	6	9	15	08:15 - 08:30	218	58	276	02:15 - 02:30	130	127	257	08:15 - 08:30	46	110	156
02:30 - 02:45	4	7	11	08:30 - 08:45	198	65	263	02:30 - 02:45	96	132	228	08:30 - 08:45	54	101	155
02:45 - 03:00	4	5	9	08:45 - 09:00	219	71	290	02:45 - 03:00	128	137	265	08:45 - 09:00	43	133	176
03:00 - 03:15	4	2	6	09:00 - 09:15	183	75	258	03:00 - 03:15	116	131	247	09:00 - 09:15	46	98	144
03:15 - 03:30	12	4	16	09:15 - 09:30	180	77	257	03:15 - 03:30	103	157	260	09:15 - 09:30	47	70	117
03:30 - 03:45	10	4	14	09:30 - 09:45	167	96	263	03:30 - 03:45	126	154	280	09:30 - 09:45	33	82	115

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

03:45 - 04:00	12	3	15	09:45 - 10:00	159	104	263	03:45 - 04:00	108	179	287	09:45 - 10:00	28	74	102
04:00 - 04:15	6	2	8	10:00 - 10:15	158	105	263	04:00 - 04:15	110	183	293	10:00 - 10:15	28	72	100
04:15 - 04:30	8	1	9	10:15 - 10:30	144	86	230	04:15 - 04:30	131	177	308	10:15 - 10:30	26	79	105
04:30 - 04:45	23	0	23	10:30 - 10:45	135	103	238	04:30 - 04:45	142	214	356	10:30 - 10:45	19	57	76
04:45 - 05:00	40	2	42	10:45 - 11:00	127	117	244	04:45 - 05:00	123	211	334	10:45 - 11:00	19	60	79
05:00 - 05:15	39	2	41	11:00 - 11:15	116	115	231	05:00 - 05:15	129	250	379	11:00 - 11:15	20	58	78
05:15 - 05:30	53	3	56	11:15 - 11:30	131	102	233	05:15 - 05:30	129	235	364	11:15 - 11:30	19	51	70
05:30 - 05:45	55	2	57	11:30 - 11:45	122	109	231	05:30 - 05:45	135	230	365	11:30 - 11:45	16	50	66
05:45 - 06:00	76	3	79	11:45 - 12:00	147	101	248	05:45 - 06:00	94	206	300	11:45 - 12:00	11	53	64

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

State of Hawaii, Department of Transportation,
Highways Division
15 Minute Volume Report

Run Date: 01-DEC-21

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 16000
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: **DATE: 02-AUG-17**

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM		
AM - PEAK HR VOLUME	797	244	1,041
AM - K FACTOR(%)			6.19
AM - D(%)	76.56	23.44	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	08:00 AM to 09:00 AM	
AM - PEAK HR VOLUME	835	244	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:00 PM to 6:00 PM		
PM - PEAK HR VOLUME	465	948	1,413
PM - K FACTOR(%)			8.4
PM -D(%)	32.91	67.09	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:00 PM to 5:00 PM	5:00 PM to 6:00 PM	
PM - PEAK HR VOLUME	543	948	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:30 AM to 09:30 AM		
AM - PEAK HR VOLUME	766	835	1,088
AM - K FACTOR(%)			6.47
AM - D(%)	76.56	23.44	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:00 PM to 6:00 PM		
PM - PEAK HR VOLUME	465	543	1,413
PM - K FACTOR(%)			8.4
PM -D(%)	32.91	67.09	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	09:15 AM to 10:15 AM		
PEAK HR VOLUME	646	398	1,044
DIRECTIONAL PEAK			
PEAK HR TIME	09:00 AM to 10:00 AM	2:00 PM to 3:00 PM	
PEAK HR VOLUME	657	565	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	3,813	1,737	5,550
AM 12-HR PERIOD (00:00-12:00)	4,187	2,040	6,227
PM 6-HR PERIOD (12:00-18:00)	2,915	3,879	6,794
PM 12-HR PERIOD (12:00-24:00)	4,154	6,443	10,597
24-HR PERIOD (12:00-24:00)	8,341	8,483	16,824
D%	49.58	50.42	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	3	59	62
06:00 - 06:15	76	6	82
12:00 - 12:15	129	112	241
06:00 - 06:15	108	237	345
12:15 - 12:30	7	36	43
06:15 - 06:30	94	12	106
12:15 - 12:30	127	108	235
06:15 - 06:30	88	200	288
12:30 - 12:45	10	43	53
06:30 - 06:45	136	17	153
12:30 - 12:45	113	113	226
06:30 - 06:45	114	176	290
12:45 - 01:00	7	24	31
06:45 - 07:00	172	23	195
12:45 - 01:00	128	150	278
06:45 - 07:00	89	164	253
01:00 - 01:15	3	20	23
07:00 - 07:15	201	32	233
01:00 - 01:15	116	123	239
07:00 - 07:15	94	152	246
01:15 - 01:30	3	24	27
07:15 - 07:30	197	34	231
01:15 - 01:30	99	154	253
07:15 - 07:30	87	169	256
01:30 - 01:45	7	17	24
07:30 - 07:45	212	41	253
01:30 - 01:45	125	122	247
07:30 - 07:45	84	142	226
01:45 - 02:00	4	13	17
07:45 - 08:00	225	35	260
01:45 - 02:00	120	128	248
07:45 - 08:00	87	133	220
02:00 - 02:15	0	10	10
08:00 - 08:15	176	43	219
02:00 - 02:15	113	123	236
08:00 - 08:15	71	118	189
02:15 - 02:30	3	9	12
08:15 - 08:30	193	63	256
02:15 - 02:30	116	116	232
08:15 - 08:30	50	121	171
02:30 - 02:45	2	4	6
08:30 - 08:45	227	62	289
02:30 - 02:45	118	168	286
08:30 - 08:45	68	83	151
02:45 - 03:00	5	3	8
08:45 - 09:00	201	76	277
02:45 - 03:00	108	158	266
08:45 - 09:00	50	106	156
03:00 - 03:15	10	5	15
09:00 - 09:15	171	82	253
03:00 - 03:15	109	141	250
09:00 - 09:15	31	89	120
03:15 - 03:30	7	5	12
09:15 - 09:30	167	102	269
03:15 - 03:30	127	139	266
09:15 - 09:30	37	85	122
03:30 - 03:45	3	2	5
09:30 - 09:45	142	97	239
03:30 - 03:45	124	156	280
09:30 - 09:45	29	69	98

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

TIME - AM	DIR1	DIR 2	TOTAL
03:45 - 04:00	7	2	9
04:00 - 04:15	6	5	11
04:15 - 04:30	13	3	16
04:30 - 04:45	20	3	23
04:45 - 05:00	35	0	35
05:00 - 05:15	46	4	50
05:15 - 05:30	45	4	49
05:30 - 05:45	64	2	66
05:45 - 06:00	64	6	70
09:45 - 10:00	177	98	275
10:00 - 10:15	160	101	261
10:15 - 10:30	114	105	219
10:30 - 10:45	137	101	238
10:45 - 11:00	125	114	239
11:00 - 11:15	132	123	255
11:15 - 11:30	134	128	262
11:30 - 11:45	129	126	255
11:45 - 12:00	115	116	231

TIME - PM	DIR1	DIR 2	TOTAL
03:45 - 04:00	135	143	278
04:00 - 04:15	153	181	334
04:15 - 04:30	115	190	305
04:30 - 04:45	134	199	333
04:45 - 05:00	141	207	348
05:00 - 05:15	111	253	364
05:15 - 05:30	120	227	347
05:30 - 05:45	106	234	340
05:45 - 06:00	128	234	362
09:45 - 10:00	22	75	97
10:00 - 10:15	20	64	84
10:15 - 10:30	18	67	85
10:30 - 10:45	22	54	76
10:45 - 11:00	19	53	72
11:00 - 11:15	17	51	68
11:15 - 11:30	17	51	68
11:30 - 11:45	10	59	69
11:45 - 12:00	7	46	53

Run Date: 01-DEC-21

State of Hawaii, Department of Transportation,
Highways Division
15 Minute Volume Report

Site ID: B71001905469
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER
Location:
Town: Hawaii
Count Type: CLASS
DATE: 02-OCT-18
DIR 1: +MP
Counter Type: Tube
DIR 2: -MP
Final AADT: 15400
Route No: 19

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	863	233	1,096
AM - K FACTOR(%)			7.42
AM - D(%)	78.74	21.26	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	08:00 AM to 09:00 AM	
AM - PEAK HR VOLUME	877	329	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:15 PM to 5:15 PM		
PM - PEAK HR VOLUME	352	859	1,211
PM - K FACTOR(%)			8.2
PM -D(%)	29.07	70.93	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	3:15 PM to 4:15 PM	4:30 PM to 5:30 PM	
PM - PEAK HR VOLUME	408	876	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	863	877	1,096
AM - K FACTOR(%)			7.42
AM - D(%)	78.74	21.26	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:15 PM to 5:15 PM		
PM - PEAK HR VOLUME	352	444	1,211
PM - K FACTOR(%)			8.2
PM -D(%)	29.07	70.93	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	2:00 PM to 3:00 PM		
PEAK HR VOLUME	428	557	985
DIRECTIONAL PEAK			
PEAK HR TIME	09:00 AM to 112:00 AM	2:00 PM to 3:00 PM	
PEAK HR VOLUME	510	557	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	3,533	1,780	5,313
AM 12-HR PERIOD (00:00-12:00)	4,391	2,016	6,407
PM 6-HR PERIOD (12:00-18:00)	2,265	3,663	5,928
PM 12-HR PERIOD (12:00-24:00)	2,993	5,368	8,361
24-HR PERIOD (12:00-24:00)	7,384	7,384	14,768
D%	50	50	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	3	26	29
06:00 - 06:15	187	22	209

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	94	112	206
06:00 - 06:15	84	150	234

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

12:15 - 12:30	6	19	25	06:15 - 06:30	184	33	217	12:15 - 12:30	112	90	202	06:15 - 06:30	82	140	222
12:30 - 12:45	3	5	8	06:30 - 06:45	182	33	215	12:30 - 12:45	104	123	227	06:30 - 06:45	70	130	200
12:45 - 01:00	3	11	14	06:45 - 07:00	207	41	248	12:45 - 01:00	62	105	167	06:45 - 07:00	43	115	158
01:00 - 01:15	5	7	12	07:00 - 07:15	202	51	253	01:00 - 01:15	93	101	194	07:00 - 07:15	54	99	153
01:15 - 01:30	6	8	14	07:15 - 07:30	217	45	262	01:15 - 01:30	80	106	186	07:15 - 07:30	48	102	150
01:30 - 01:45	3	7	10	07:30 - 07:45	223	50	273	01:30 - 01:45	88	108	196	07:30 - 07:45	37	87	124
01:45 - 02:00	4	7	11	07:45 - 08:00	235	56	291	01:45 - 02:00	113	111	224	07:45 - 08:00	36	85	121
02:00 - 02:15	7	5	12	08:00 - 08:15	188	82	270	02:00 - 02:15	113	110	223	08:00 - 08:15	29	68	97
02:15 - 02:30	5	6	11	08:15 - 08:30	148	93	241	02:15 - 02:30	130	121	251	08:15 - 08:30	33	63	96
02:30 - 02:45	9	4	13	08:30 - 08:45	135	72	207	02:30 - 02:45	78	159	237	08:30 - 08:45	25	76	101
02:45 - 03:00	10	8	18	08:45 - 09:00	131	82	213	02:45 - 03:00	107	167	274	08:45 - 09:00	28	78	106
03:00 - 03:15	14	1	15	09:00 - 09:15	119	72	191	03:00 - 03:15	100	149	249	09:00 - 09:15	14	63	77
03:15 - 03:30	14	4	18	09:15 - 09:30	132	91	223	03:15 - 03:30	118	151	269	09:15 - 09:30	18	56	74
03:30 - 03:45	18	1	19	09:30 - 09:45	130	76	206	03:30 - 03:45	84	153	237	09:30 - 09:45	21	52	73

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

03:45 - 04:00	31	5	36	09:45 - 10:00	129	95	224	03:45 - 04:00	103	185	288	09:45 - 10:00	24	49	73
04:00 - 04:15	28	8	36	10:00 - 10:15	100	106	206	04:00 - 04:15	103	174	277	10:00 - 10:15	20	37	57
04:15 - 04:30	59	4	63	10:15 - 10:30	109	91	200	04:15 - 04:30	105	190	295	10:15 - 10:30	15	56	71
04:30 - 04:45	55	5	60	10:30 - 10:45	108	93	201	04:30 - 04:45	85	217	302	10:30 - 10:45	12	51	63
04:45 - 05:00	70	11	81	10:45 - 11:00	114	89	203	04:45 - 05:00	88	247	335	10:45 - 11:00	5	38	43
05:00 - 05:15	102	12	114	11:00 - 11:15	84	99	183	05:00 - 05:15	74	205	279	11:00 - 11:15	5	21	26
05:15 - 05:30	94	17	111	11:15 - 11:30	99	99	198	05:15 - 05:30	77	207	284	11:15 - 11:30	9	25	34
05:30 - 05:45	136	33	169	11:30 - 11:45	90	100	190	05:30 - 05:45	80	200	280	11:30 - 11:45	6	35	41
05:45 - 06:00	173	22	195	11:45 - 12:00	80	109	189	05:45 - 06:00	74	172	246	11:45 - 12:00	10	29	39

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

State of Hawaii, Department of Transportation,
Highways Division
15 Minute Volume Report

Run Date: 01-DEC-21

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 15400
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: **DATE: 03-OCT-18**

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	861	277	1,138
AM - K FACTOR(%)			7.67
AM - D(%)	75.66	24.34	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	08:00 AM to 09:00 AM	
AM - PEAK HR VOLUME	891	351	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	3:45 PM to 4:45 PM		
PM - PEAK HR VOLUME	370	830	1,200
PM - K FACTOR(%)			8.09
PM -D(%)	30.83	69.17	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	3:00 PM to 4:00 PM	4:15 PM to 5:15 PM	
PM - PEAK HR VOLUME	418	845	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	861	891	1,138
AM - K FACTOR(%)			7.67
AM - D(%)	75.66	24.34	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	3:45 PM to 4:45 PM		
PM - PEAK HR VOLUME	370	432	1,200
PM - K FACTOR(%)			8.09
PM -D(%)	30.83	69.17	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	2:00 PM to 3:00 PM		
PEAK HR VOLUME	391	522	913
DIRECTIONAL PEAK			
PEAK HR TIME	09:00 AM to 112:00 AM	2:00 PM to 3:00 PM	
PEAK HR VOLUME	464	522	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	3,476	1,822	5,298
AM 12-HR PERIOD (00:00-12:00)	4,356	2,054	6,410
PM 6-HR PERIOD (12:00-18:00)	2,231	3,634	5,865
PM 12-HR PERIOD (12:00-24:00)	3,033	5,397	8,430
24-HR PERIOD (12:00-24:00)	7,389	7,451	14,840
D%	49.79	50.21	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	5	16	21

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	173	26	199

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	100	106	206

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	77	138	215

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

TIME - AM	DIR1	DIR 2	TOTAL
12:15 - 12:30	7	21	28
12:30 - 12:45	2	18	20
12:45 - 01:00	5	7	12
01:00 - 01:15	3	12	15
01:15 - 01:30	8	6	14
01:30 - 01:45	4	6	10
01:45 - 02:00	5	4	9
02:00 - 02:15	7	4	11
02:15 - 02:30	3	5	8
02:30 - 02:45	9	3	12
02:45 - 03:00	8	10	18
03:00 - 03:15	15	3	18
03:15 - 03:30	16	2	18
03:30 - 03:45	22	4	26

TIME - AM	DIR1	DIR 2	TOTAL
06:15 - 06:30	187	22	209
06:30 - 06:45	202	40	242
06:45 - 07:00	204	42	246
07:00 - 07:15	190	45	235
07:15 - 07:30	245	50	295
07:30 - 07:45	246	68	314
07:45 - 08:00	210	67	277
08:00 - 08:15	160	92	252
08:15 - 08:30	130	104	234
08:30 - 08:45	115	73	188
08:45 - 09:00	141	82	223
09:00 - 09:15	126	78	204
09:15 - 09:30	112	85	197
09:30 - 09:45	109	86	195

TIME - PM	DIR1	DIR 2	TOTAL
12:15 - 12:30	108	111	219
12:30 - 12:45	83	101	184
12:45 - 01:00	103	110	213
01:00 - 01:15	97	89	186
01:15 - 01:30	98	101	199
01:30 - 01:45	87	139	226
01:45 - 02:00	98	123	221
02:00 - 02:15	111	112	223
02:15 - 02:30	78	138	216
02:30 - 02:45	78	136	214
02:45 - 03:00	124	136	260
03:00 - 03:15	100	142	242
03:15 - 03:30	100	153	253
03:30 - 03:45	108	166	274

TIME - PM	DIR1	DIR 2	TOTAL
06:15 - 06:30	83	129	212
06:30 - 06:45	73	123	196
06:45 - 07:00	58	117	175
07:00 - 07:15	43	114	157
07:15 - 07:30	60	92	152
07:30 - 07:45	50	91	141
07:45 - 08:00	54	78	132
08:00 - 08:15	24	90	114
08:15 - 08:30	25	86	111
08:30 - 08:45	32	84	116
08:45 - 09:00	30	58	88
09:00 - 09:15	26	74	100
09:15 - 09:30	24	62	86
09:30 - 09:45	18	58	76

03:45 - 04:00	32	3	35	09:45 - 10:00	117	97	214	03:45 - 04:00	110	194	304	09:45 - 10:00	23	51	74
04:00 - 04:15	27	3	30	10:00 - 10:15	109	87	196	04:00 - 04:15	94	216	310	10:00 - 10:15	25	47	72
04:15 - 04:30	69	7	76	10:15 - 10:30	92	91	183	04:15 - 04:30	95	203	298	10:15 - 10:30	16	53	69
04:30 - 04:45	48	7	55	10:30 - 10:45	89	116	205	04:30 - 04:45	71	217	288	10:30 - 10:45	17	50	67
04:45 - 05:00	66	9	75	10:45 - 11:00	111	82	193	04:45 - 05:00	75	204	279	10:45 - 11:00	10	39	49
05:00 - 05:15	96	8	104	11:00 - 11:15	105	98	203	05:00 - 05:15	67	221	288	11:00 - 11:15	7	23	30
05:15 - 05:30	112	17	129	11:15 - 11:30	110	84	194	05:15 - 05:30	67	180	247	11:15 - 11:30	9	41	50
05:30 - 05:45	145	29	174	11:30 - 11:45	90	102	192	05:30 - 05:45	83	182	265	11:30 - 11:45	11	39	50
05:45 - 06:00	166	28	194	11:45 - 12:00	103	105	208	05:45 - 06:00	96	154	250	11:45 - 12:00	7	26	33

Run Date: 01-DEC-21

State of Hawaii, Department of Transportation,
Highways Division
15 Minute Volume Report

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 16100
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: **DATE: 22-OCT-19**

AM COMMUTER PERIOD (05:00-09:00)	**DIR 1**	**DIR 2**	**TOTAL**	**PM COMMUTER PERIOD (15:00-19:00)**	**DIR 1**	**DIR 2**	**TOTAL**
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM			PM - PEAK HR TIME	03:45 to 04:45 PM		
AM - PEAK HR VOLUME	940	370	1,310	PM - PEAK HR VOLUME	496	968	1,464
AM - K FACTOR(%)			8.16	PM - K FACTOR(%)			9.12
AM - D(%)	71.76	28.24	100	PM -D(%)	33.88	66.12	100
DIRECTIONAL PEAK				DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM	07:45 to 08:45 AM		PM - PEAK HR TIME	03:00 to 04:00 PM	04:00 to 05:00 PM	
AM - PEAK HR VOLUME	940	411		PM - PEAK HR VOLUME	541	980	

AM PERIOD (00:00-12:00)	**DIR 1**	**DIR 2**	**TOTAL**	**PM PERIOD (12:00-24:00)**	**DIR 1**	**DIR 2**	**TOTAL**
TWO DIRECTIONAL PEAK				TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM			PM - PEAK HR TIME	03:45 to 04:45 PM		
AM - PEAK HR VOLUME	940	940	1,310	PM - PEAK HR VOLUME	496	541	1,464
AM - K FACTOR(%)			8.16	PM - K FACTOR(%)			9.12
AM - D(%)	71.76	28.24	100	PM -D(%)	33.88	66.12	100

NON COMMUTER PERIOD (09:00-15:00)	**DIR 1**	**DIR 2**	**TOTAL**	**6-HR, 12-HR, 24-HR PERIODS**	**DIR 1**	**DIR 2**	**TOTAL**
TWO DIRECTIONAL PEAK				AM 6-HR PERIOD (06:00-12:00)	3,853	2,104	5,957
PEAK HR TIME	02:45 to 03:45 PM			AM 12-HR PERIOD (00:00-12:00)	4,685	2,281	6,966
PEAK HR VOLUME	525	709	1,234	PM 6-HR PERIOD (12:00-18:00)	2,666	4,075	6,741
DIRECTIONAL PEAK				PM 12-HR PERIOD (12:00-24:00)	3,310	5,774	9,084
PEAK HR TIME	02:45 to 03:45 PM	02:45 to 03:45 PM		24-HR PERIOD (12:00-24:00)	7,995	8,055	16,050
PEAK HR VOLUME	525	709		D%	49.81	50.19	100

TIME - AM	DIR1	DIR 2	TOTAL	TIME - AM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	2	21	23	06:00 - 06:15	179	29	208	12:00 - 12:15	107	123	230	06:00 - 06:15	78	150	228
12:15 - 12:30	2	14	16	06:15 - 06:30	216	27	243	12:15 - 12:30	113	108	221	06:15 - 06:30	64	162	226

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

12:30 - 12:45	5	9	14	06:30 - 06:45	189	54	243	12:30 - 12:45	93	110	203	06:30 - 06:45	77	136	213
12:45 - 01:00	1	3	4	06:45 - 07:00	214	41	255	12:45 - 01:00	104	119	223	06:45 - 07:00	55	127	182
01:00 - 01:15	2	4	6	07:00 - 07:15	244	49	293	01:00 - 01:15	99	107	206	07:00 - 07:15	31	112	143
01:15 - 01:30	3	8	11	07:15 - 07:30	228	74	302	01:15 - 01:30	98	116	214	07:15 - 07:30	34	97	131
01:30 - 01:45	1	6	7	07:30 - 07:45	251	89	340	01:30 - 01:45	129	104	233	07:30 - 07:45	28	88	116
01:45 - 02:00	5	1	6	07:45 - 08:00	215	93	308	01:45 - 02:00	112	127	239	07:45 - 08:00	34	75	109
02:00 - 02:15	4	1	5	08:00 - 08:15	246	114	360	02:00 - 02:15	102	121	223	08:00 - 08:15	23	59	82
02:15 - 02:30	3	5	8	08:15 - 08:30	171	108	279	02:15 - 02:30	107	134	241	08:15 - 08:30	24	74	98
02:30 - 02:45	9	0	9	08:30 - 08:45	160	96	256	02:30 - 02:45	122	163	285	08:30 - 08:45	25	65	90
02:45 - 03:00	6	4	10	08:45 - 09:00	136	90	226	02:45 - 03:00	117	169	286	08:45 - 09:00	32	51	83
03:00 - 03:15	14	4	18	09:00 - 09:15	131	89	220	03:00 - 03:15	115	158	273	09:00 - 09:15	17	54	71
03:15 - 03:30	13	2	15	09:15 - 09:30	123	95	218	03:15 - 03:30	153	167	320	09:15 - 09:30	26	73	99
03:30 - 03:45	24	2	26	09:30 - 09:45	106	74	180	03:30 - 03:45	140	215	355	09:30 - 09:45	19	66	85
03:45 - 04:00	35	4	39	09:45 - 10:00	141	104	245	03:45 - 04:00	133	224	357	09:45 - 10:00	20	34	54

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

04:00 - 04:15	46	5	51	10:00 - 10:15	134	104	238	04:00 - 04:15	109	236	345	10:00 - 10:15	11	47	58
04:15 - 04:30	45	4	49	10:15 - 10:30	115	105	220	04:15 - 04:30	121	261	382	10:15 - 10:30	17	41	58
04:30 - 04:45	43	3	46	10:30 - 10:45	99	119	218	04:30 - 04:45	133	247	380	10:30 - 10:45	7	46	53
04:45 - 05:00	64	2	66	10:45 - 11:00	106	92	198	04:45 - 05:00	105	236	341	10:45 - 11:00	6	39	45
05:00 - 05:15	78	6	84	11:00 - 11:15	122	93	215	05:00 - 05:15	82	234	316	11:00 - 11:15	5	25	30
05:15 - 05:30	111	18	129	11:15 - 11:30	115	112	227	05:15 - 05:30	79	216	295	11:15 - 11:30	4	19	23
05:30 - 05:45	146	30	176	11:30 - 11:45	109	115	224	05:30 - 05:45	108	190	298	11:30 - 11:45	5	41	46
05:45 - 06:00	170	21	191	11:45 - 12:00	103	138	241	05:45 - 06:00	85	190	275	11:45 - 12:00	2	18	20

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

Run Date: 01-DEC-21

State of Hawaii, Department of Transportation,
Highways Division
15 Minute Volume Report

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 16100
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: **DATE: 23-OCT-19**

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM		
AM - PEAK HR VOLUME	972	333	1,305
AM - K FACTOR(%)			8.04
AM - D(%)	74.48	25.52	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM	07:45 to 08:45 AM	
AM - PEAK HR VOLUME	1,007	386	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:15 to 05:15 PM		
PM - PEAK HR VOLUME	427	931	1,358
PM - K FACTOR(%)			8.37
PM -D(%)	31.44	68.56	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:15 to 04:15 PM	04:15 to 05:15 PM	
PM - PEAK HR VOLUME	511	931	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM		
AM - PEAK HR VOLUME	972	1,007	1,305
AM - K FACTOR(%)			8.04
AM - D(%)	74.48	25.52	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:15 to 05:15 PM		
PM - PEAK HR VOLUME	427	528	1,358
PM - K FACTOR(%)			8.37
PM -D(%)	31.44	68.56	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM		
PEAK HR VOLUME	521	759	1,280
DIRECTIONAL PEAK			
PEAK HR TIME	02:15 to 03:15 PM	02:45 to 03:45 PM	
PEAK HR VOLUME	528	759	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	3,915	2,152	6,067
AM 12-HR PERIOD (00:00-12:00)	4,767	2,345	7,112
PM 6-HR PERIOD (12:00-18:00)	2,718	4,098	6,816
PM 12-HR PERIOD (12:00-24:00)	3,343	5,771	9,114
24-HR PERIOD (12:00-24:00)	8,110	8,116	16,226
D%	49.98	50.02	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	4	16	20
12:15 - 12:30	2	9	11

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	167	36	203
06:15 - 06:30	209	40	249

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	90	117	207
12:15 - 12:30	123	126	249

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	83	149	232
06:15 - 06:30	72	148	220

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

TIME - AM	DIR1	DIR 2	TOTAL
12:30 - 12:45	4	22	26
12:45 - 01:00	4	7	11
01:00 - 01:15	3	6	9
01:15 - 01:30	1	8	9
01:30 - 01:45	3	2	5
01:45 - 02:00	3	3	6
02:00 - 02:15	4	3	7
02:15 - 02:30	1	2	3
02:30 - 02:45	5	0	5
02:45 - 03:00	12	1	13
03:00 - 03:15	8	3	11
03:15 - 03:30	15	3	18
03:30 - 03:45	24	2	26
03:45 - 04:00	28	3	31

TIME - AM	DIR1	DIR 2	TOTAL
06:30 - 06:45	211	47	258
06:45 - 07:00	198	48	246
07:00 - 07:15	243	45	288
07:15 - 07:30	281	62	343
07:30 - 07:45	249	75	324
07:45 - 08:00	234	100	334
08:00 - 08:15	208	96	304
08:15 - 08:30	135	90	225
08:30 - 08:45	172	100	272
08:45 - 09:00	153	97	250
09:00 - 09:15	140	90	230
09:15 - 09:30	122	85	207
09:30 - 09:45	99	90	189
09:45 - 10:00	133	106	239

TIME - PM	DIR1	DIR 2	TOTAL
12:30 - 12:45	104	123	227
12:45 - 01:00	111	114	225
01:00 - 01:15	136	120	256
01:15 - 01:30	115	123	238
01:30 - 01:45	106	160	266
01:45 - 02:00	106	126	232
02:00 - 02:15	105	135	240
02:15 - 02:30	144	131	275
02:30 - 02:45	129	143	272
02:45 - 03:00	128	138	266
03:00 - 03:15	127	204	331
03:15 - 03:30	126	205	331
03:30 - 03:45	140	212	352
03:45 - 04:00	114	200	314

TIME - PM	DIR1	DIR 2	TOTAL
06:30 - 06:45	65	145	210
06:45 - 07:00	64	121	185
07:00 - 07:15	39	123	162
07:15 - 07:30	34	117	151
07:30 - 07:45	26	93	119
07:45 - 08:00	21	60	81
08:00 - 08:15	21	52	73
08:15 - 08:30	25	66	91
08:30 - 08:45	22	77	99
08:45 - 09:00	25	55	80
09:00 - 09:15	14	49	63
09:15 - 09:30	27	51	78
09:30 - 09:45	17	45	62
09:45 - 10:00	11	47	58

TIME - AM	DIR1	DIR 2	TOTAL	TIME - AM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL
04:00 - 04:15	48	5	53	10:00 - 10:15	144	95	239	04:00 - 04:15	131	204	335	10:00 - 10:15	11	49	60
04:15 - 04:30	53	5	58	10:15 - 10:30	134	129	263	04:15 - 04:30	102	213	315	10:15 - 10:30	12	42	54
04:30 - 04:45	44	4	48	10:30 - 10:45	113	117	230	04:30 - 04:45	108	241	349	10:30 - 10:45	11	36	47
04:45 - 05:00	74	8	82	10:45 - 11:00	135	113	248	04:45 - 05:00	109	248	357	10:45 - 11:00	8	34	42
05:00 - 05:15	88	9	97	11:00 - 11:15	105	127	232	05:00 - 05:15	108	229	337	11:00 - 11:15	6	26	32
05:15 - 05:30	120	11	131	11:15 - 11:30	123	106	229	05:15 - 05:30	88	209	297	11:15 - 11:30	3	24	27
05:30 - 05:45	146	36	182	11:30 - 11:45	92	132	224	05:30 - 05:45	103	197	300	11:30 - 11:45	5	42	47
05:45 - 06:00	158	25	183	11:45 - 12:00	115	126	241	05:45 - 06:00	65	180	245	11:45 - 12:00	3	22	25

Run Date: 01-DEC-21

State of Hawaii, Department of Transportation,
Highways Division
15 Minute Volume Report

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 13100
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: **DATE: 14-DEC-20**

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM		
AM - PEAK HR VOLUME	788	275	1,063
AM - K FACTOR(%)			7.56
AM - D(%)	74.13	25.87	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM	07:45 to 08:45 AM	
AM - PEAK HR VOLUME	788	310	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:15 to 04:15 PM		
PM - PEAK HR VOLUME	445	886	1,331
PM - K FACTOR(%)			9.46
PM -D(%)	33.43	66.57	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:00 to 04:00 PM	04:00 to 05:00 PM	
PM - PEAK HR VOLUME	448	905	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM		
AM - PEAK HR VOLUME	788	275	1,063
AM - K FACTOR(%)			7.56
AM - D(%)	74.13	25.87	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:15 to 04:15 PM		
PM - PEAK HR VOLUME	445	886	1,331
PM - K FACTOR(%)			9.46
PM -D(%)	33.43	66.57	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM		
PEAK HR VOLUME	432	764	1,196
DIRECTIONAL PEAK			
PEAK HR TIME	09:00 to 10:00 AM	02:45 to 03:45 PM	
PEAK HR VOLUME	488	764	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	3,412	1,732	5,144
AM 12-HR PERIOD (00:00-12:00)	4,080	1,858	5,938
PM 6-HR PERIOD (12:00-18:00)	2,446	3,932	6,378
PM 12-HR PERIOD (12:00-24:00)	2,949	5,183	8,132
24-HR PERIOD (12:00-24:00)	7,029	7,041	14,070
D%	49.96	50.04	100

TIME - AM	DIR1	DIR 2	TOTAL	TIME - AM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	2	8	10	06:00 - 06:15	149	21	170	12:00 - 12:15	94	132	226	06:00 - 06:15	56	154	210
12:15 - 12:30	7	11	18	06:15 - 06:30	149	35	184	12:15 - 12:30	120	97	217	06:15 - 06:30	54	142	196

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

12:30 - 12:45	5	4	9	06:30 - 06:45	176	36	212	12:30 - 12:45	95	117	212	06:30 - 06:45	54	111	165
12:45 - 01:00	1	5	6	06:45 - 07:00	183	29	212	12:45 - 01:00	118	98	216	06:45 - 07:00	48	120	168
01:00 - 01:15	3	6	9	07:00 - 07:15	162	52	214	01:00 - 01:15	110	118	228	07:00 - 07:15	33	91	124
01:15 - 01:30	3	6	9	07:15 - 07:30	214	45	259	01:15 - 01:30	97	107	204	07:15 - 07:30	32	72	104
01:30 - 01:45	3	9	12	07:30 - 07:45	227	77	304	01:30 - 01:45	99	132	231	07:30 - 07:45	26	63	89
01:45 - 02:00	3	3	6	07:45 - 08:00	184	78	262	01:45 - 02:00	106	110	216	07:45 - 08:00	26	48	74
02:00 - 02:15	3	4	7	08:00 - 08:15	163	75	238	02:00 - 02:15	118	139	257	08:00 - 08:15	23	59	82
02:15 - 02:30	5	3	8	08:15 - 08:30	156	77	233	02:15 - 02:30	121	129	250	08:15 - 08:30	22	68	90
02:30 - 02:45	3	1	4	08:30 - 08:45	141	80	221	02:30 - 02:45	122	137	259	08:30 - 08:45	15	28	43
02:45 - 03:00	8	2	10	08:45 - 09:00	137	59	196	02:45 - 03:00	114	152	266	08:45 - 09:00	20	38	58
03:00 - 03:15	7	2	9	09:00 - 09:15	133	65	198	03:00 - 03:15	102	173	275	09:00 - 09:15	18	26	44
03:15 - 03:30	3	5	8	09:15 - 09:30	129	76	205	03:15 - 03:30	112	209	321	09:15 - 09:30	24	32	56
03:30 - 03:45	19	1	20	09:30 - 09:45	115	73	188	03:30 - 03:45	104	230	334	09:30 - 09:45	9	30	39
03:45 - 04:00	27	1	28	09:45 - 10:00	111	78	189	03:45 - 04:00	130	205	335	09:45 - 10:00	10	20	30

HDOT RIMS Traffic Station Analyzer (v47) Log Out Print RS

04:00 - 04:15	19	6	25	10:00 - 10:15	122	96	218	04:00 - 04:15	99	242	341	10:00 - 10:15	7	23	30
04:15 - 04:30	32	6	38	10:15 - 10:30	106	83	189	04:15 - 04:30	93	205	298	10:15 - 10:30	8	25	33
04:30 - 04:45	42	2	44	10:30 - 10:45	106	95	201	04:30 - 04:45	75	242	317	10:30 - 10:45	4	24	28
04:45 - 05:00	62	5	67	10:45 - 11:00	110	90	200	04:45 - 05:00	92	216	308	10:45 - 11:00	3	19	22
05:00 - 05:15	70	4	74	11:00 - 11:15	119	101	220	05:00 - 05:15	90	225	315	11:00 - 11:15	5	18	23
05:15 - 05:30	108	10	118	11:15 - 11:30	109	98	207	05:15 - 05:30	88	195	283	11:15 - 11:30	0	13	13
05:30 - 05:45	101	11	112	11:30 - 11:45	102	109	211	05:30 - 05:45	72	177	249	11:30 - 11:45	3	18	21
05:45 - 06:00	132	11	143	11:45 - 12:00	109	104	213	05:45 - 06:00	75	145	220	11:45 - 12:00	3	9	12

HDOT RIMS Traffic Station Analyzer (v47)

Log Out Print RS

Run Date: 01-DEC-21

State of Hawaii, Department of Transportation,
Highways Division
15 Minute Volume Report

Site ID: B71001905469 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 13100
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER **Count Type:** CLASS **Counter Type:** Tube **Route No:** 19
Location: **DATE: 15-DEC-20**

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM		
AM - PEAK HR VOLUME	816	265	1,081
AM - K FACTOR(%)			7.22
AM - D(%)	75.49	24.51	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:45 to 07:45 AM	08:00 to 09:00 AM	
AM - PEAK HR VOLUME	826	323	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:45 to 04:45 PM		
PM - PEAK HR VOLUME	382	919	1,301
PM - K FACTOR(%)			8.69
PM -D(%)	29.36	70.64	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:00 to 04:00 PM	03:45 to 04:45 PM	
PM - PEAK HR VOLUME	432	919	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM		
AM - PEAK HR VOLUME	816	265	1,081
AM - K FACTOR(%)			7.22
AM - D(%)	75.49	24.51	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:45 to 04:45 PM		
PM - PEAK HR VOLUME	382	919	1,301
PM - K FACTOR(%)			8.69
PM -D(%)	29.36	70.64	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM		
PEAK HR VOLUME	462	683	1,145
DIRECTIONAL PEAK			
PEAK HR TIME	11:45 to 12:45 PM	02:45 to 03:45 PM	
PEAK HR VOLUME	548	683	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	3,658	1,807	5,465
AM 12-HR PERIOD (00:00-12:00)	4,380	1,930	6,310
PM 6-HR PERIOD (12:00-18:00)	2,577	4,034	6,611
PM 12-HR PERIOD (12:00-24:00)	3,156	5,508	8,664
24-HR PERIOD (12:00-24:00)	7,536	7,438	14,974
D%	50.33	49.67	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	2	12	14
12:15 - 12:30	6	10	16

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	171	21	192
06:15 - 06:30	159	27	186

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	148	127	275
12:15 - 12:30	127	137	264

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	73	167	240
06:15 - 06:30	69	156	225

HDOT RIMS Traffic Station Analyzer (v47)

Log Out Print RS

TIME - AM	DIR1	DIR 2	TOTAL
12:30 - 12:45	3	3	6
12:45 - 01:00	3	0	3
01:00 - 01:15	3	6	9
01:15 - 01:30	2	3	5
01:30 - 01:45	1	4	5
01:45 - 02:00	5	7	12
02:00 - 02:15	3	2	5
02:15 - 02:30	4	1	5
02:30 - 02:45	3	1	4
02:45 - 03:00	8	2	10
03:00 - 03:15	14	4	18
03:15 - 03:30	7	0	7
03:30 - 03:45	14	3	17
03:45 - 04:00	32	0	32

TIME - AM	DIR1	DIR 2	TOTAL
06:30 - 06:45	159	38	197
06:45 - 07:00	229	45	274
07:00 - 07:15	173	34	207
07:15 - 07:30	199	44	243
07:30 - 07:45	225	56	281
07:45 - 08:00	216	69	285
08:00 - 08:15	176	96	272
08:15 - 08:30	147	85	232
08:30 - 08:45	165	70	235
08:45 - 09:00	153	72	225
09:00 - 09:15	146	89	235
09:15 - 09:30	96	74	170
09:30 - 09:45	143	86	229
09:45 - 10:00	137	96	233

TIME - PM	DIR1	DIR 2	TOTAL
12:30 - 12:45	131	114	245
12:45 - 01:00	112	115	227
01:00 - 01:15	109	125	234
01:15 - 01:30	116	138	254
01:30 - 01:45	91	113	204
01:45 - 02:00	118	148	266
02:00 - 02:15	97	153	250
02:15 - 02:30	112	157	269
02:30 - 02:45	106	166	272
02:45 - 03:00	120	160	280
03:00 - 03:15	124	176	300
03:15 - 03:30	107	157	264
03:30 - 03:45	111	190	301
03:45 - 04:00	90	213	303

TIME - PM	DIR1	DIR 2	TOTAL
06:30 - 06:45	53	128	181
06:45 - 07:00	45	106	151
07:00 - 07:15	47	102	149
07:15 - 07:30	42	86	128
07:30 - 07:45	29	85	114
07:45 - 08:00	29	61	90
08:00 - 08:15	25	68	93
08:15 - 08:30	22	54	76
08:30 - 08:45	24	51	75
08:45 - 09:00	21	46	67
09:00 - 09:15	20	40	60
09:15 - 09:30	18	33	51
09:30 - 09:45	4	40	44
09:45 - 10:00	10	30	40

HDOT RIMS Traffic Station Analyzer (v47)

Log Out | Print | RS

04:00 - 04:15	29	4	33	10:00 - 10:15	122	92	214	04:00 - 04:15	91	208	299	10:00 - 10:15	11	38	49
04:15 - 04:30	31	6	37	10:15 - 10:30	123	88	211	04:15 - 04:30	109	240	349	10:15 - 10:30	13	40	53
04:30 - 04:45	53	4	57	10:30 - 10:45	108	90	198	04:30 - 04:45	92	258	350	10:30 - 10:45	9	42	51
04:45 - 05:00	65	3	68	10:45 - 11:00	114	98	212	04:45 - 05:00	93	210	303	10:45 - 11:00	5	35	40
05:00 - 05:15	80	7	87	11:00 - 11:15	133	113	246	05:00 - 05:15	91	195	286	11:00 - 11:15	2	26	28
05:15 - 05:30	101	8	109	11:15 - 11:30	97	105	202	05:15 - 05:30	93	206	299	11:15 - 11:30	4	14	18
05:30 - 05:45	111	18	129	11:30 - 11:45	125	115	240	05:30 - 05:45	97	173	270	11:30 - 11:45	3	13	16
05:45 - 06:00	142	15	157	11:45 - 12:00	142	104	246	05:45 - 06:00	92	155	247	11:45 - 12:00	1	13	14

Type of peak hour being reported: System-wide Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Kamamalu St -- Mamalahoa Hwy
CITY/STATE: Waimea, HI

QC JOB #: 15566401
DATE: Thu, Sep 30 2021

15-Min Count Period Beginning At	Kamamalu St (Northbound)				Kamamalu St (Southbound)				Mamalahoa Hwy (Eastbound)				Mamalahoa Hwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	10	0	4	0	0	0	0	0	0	30	7	0	4	194	0	0	249	
6:45 AM	16	0	5	0	0	0	0	0	0	40	4	0	4	210	0	0	279	
7:00 AM	18	0	5	0	0	0	0	0	0	37	10	0	8	186	0	0	264	
7:15 AM	24	0	4	0	0	0	0	0	2	55	10	0	8	194	0	0	297	1089
7:30 AM	43	0	5	0	0	2	1	0	0	76	39	0	3	239	0	0	408	1248
7:45 AM	68	0	23	0	0	0	0	0	0	146	48	0	10	250	0	0	545	1514
8:00 AM	50	0	18	0	0	0	0	0	0	149	24	0	10	214	2	0	467	1717
8:15 AM	18	0	5	0	1	0	1	0	1	146	12	0	7	199	2	0	392	1812
8:30 AM	24	0	6	0	0	0	0	0	0	122	14	0	4	166	0	0	336	1740
8:45 AM	24	0	9	0	0	0	0	0	0	96	15	0	9	158	0	0	311	1506
9:00 AM	29	0	7	0	1	0	0	0	1	105	12	0	4	145	1	0	305	1344
9:15 AM	11	0	8	0	0	0	1	0	1	107	17	0	3	154	0	0	302	1254

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	272	0	92	0	0	0	0	0	0	584	192	0	40	1000	0	0	2180
Heavy Trucks	4	0	0		0	0	0		0	24	0		8	48	0		84
Buses																	
Pedestrians		4				8				0				4			16
Bicycles	4	0	0		0	0	0		0	0	0		0	0	0		4
Scooters																	

Comments:

Report generated on 10/6/2021 12:05 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

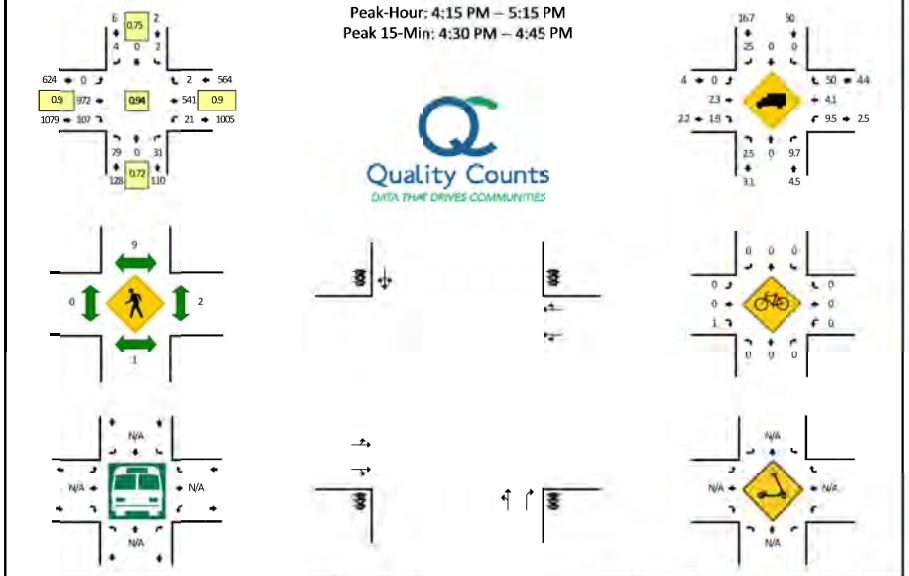
Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

LOCATION: Kamamalu St -- Mamalahoa Hwy
CITY/STATE: Waimea, HI

QC JOB #: 15566402
DATE: Thu, Sep 30 2021

Peak-Hour: 4:15 PM – 5:15 PM
Peak 15-Min: 4:30 PM – 4:45 PM



15-Min Count Period Beginning At	Kamamalu St (Northbound)				Kamamalu St (Southbound)				Mamalahoa Hwy (Eastbound)				Mamalahoa Hwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	46	1	28	0	0	0	0	0	0	195	28	0	11	154	0	0	463	
3:15 PM	54	3	10	0	0	0	1	0	0	225	17	1	6	152	0	0	469	
3:30 PM	26	0	9	0	0	0	1	0	1	211	26	0	4	140	1	0	419	
3:45 PM	18	0	10	0	0	0	2	0	0	248	36	0	9	149	0	0	472	1823
4:00 PM	24	0	7	0	0	0	2	0	1	239	34	0	4	152	0	0	463	1823
4:15 PM	13	0	9	0	0	0	1	0	0	238	27	0	3	147	0	0	438	1792
4:30 PM	26	0	12	0	1	0	1	0	0	263	38	0	3	126	0	0	470	1843
4:45 PM	23	0	4	0	0	0	1	0	0	244	26	0	7	122	0	0	427	1798
5:00 PM	17	0	6	0	1	0	1	0	0	227	16	0	8	146	2	0	424	1759
5:15 PM	10	0	8	0	0	0	1	0	2	224	23	0	10	111	0	0	389	1710
5:30 PM	14	0	12	0	0	0	0	0	1	202	23	0	7	106	0	0	365	1605
5:45 PM	5	0	5	0	0	0	0	0	0	182	16	0	4	86	0	0	298	1476

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	104	0	48	0	4	0	4	0	0	1052	152	0	12	504	0	0	1880
Heavy Trucks	4	0	4		0	0	0		0	12	4		0	28	0		52
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	4		0	0	0		4
Scooters																	

Comments:

Report generated on 6/20/2022 7:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

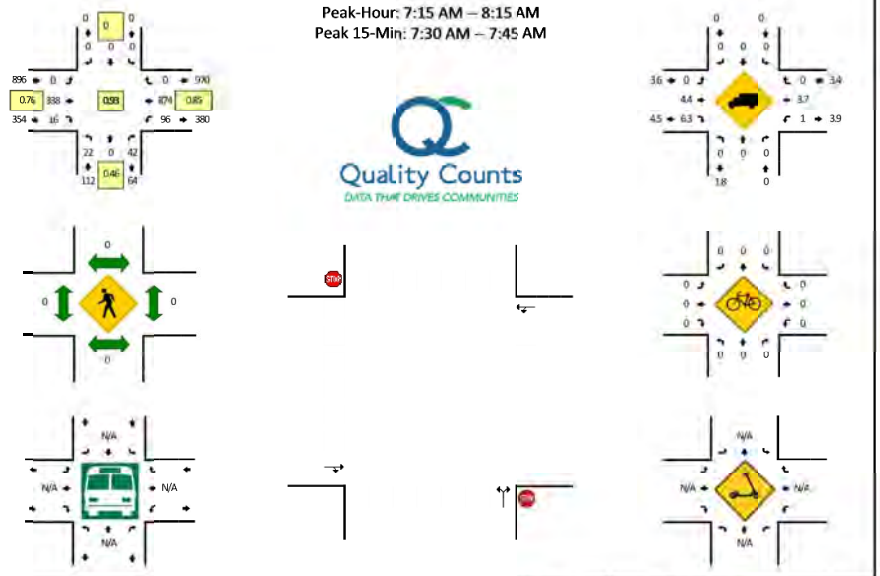
Type of peak hour being reported: System-wide Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Mana Rd -- Mamalahoa Hwy
CITY/STATE: Waimea, HI

QC JOB #: 15566403
DATE: Thu, Sep 30 2021

Peak-Hour: 7:15 AM – 8:15 AM
Peak 15-Min: 7:30 AM – 7:45 AM



15-Min Count Period Beginning At	Mana Rd (Northbound)				Mana Rd (Southbound)				Mamalahoa Hwy (Eastbound)				Mamalahoa Hwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	6	0	3	0	0	0	0	0	0	25	3	0	5	203	0	0	245	
6:45 AM	3	0	3	0	0	0	0	0	0	27	4	0	5	196	0	0	238	
7:00 AM	9	0	4	0	0	0	0	0	0	34	2	0	5	167	0	0	221	
7:15 AM	6	0	5	0	0	0	0	0	0	48	1	0	29	254	0	0	343	1047
7:30 AM	4	0	11	0	0	0	0	0	0	68	4	0	44	242	0	0	373	1175
7:45 AM	11	0	24	0	0	0	0	0	0	109	7	0	17	201	0	0	369	1306
8:00 AM	1	0	2	0	0	0	0	0	0	113	4	0	6	177	0	0	303	1388
8:15 AM	5	0	5	0	0	0	0	0	0	95	8	0	6	138	0	0	257	1302
8:30 AM	6	0	5	0	0	0	0	0	0	92	7	0	6	154	0	0	270	1199
8:45 AM	6	0	5	0	0	0	0	0	0	74	3	0	3	152	0	0	243	1073
9:00 AM	6	0	3	0	0	0	0	0	0	87	7	0	2	122	0	0	227	997
9:15 AM	6	0	1	0	0	0	0	0	0	87	5	0	5	141	0	0	245	985

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	0	44	0	0	0	0	0	0	272	16	0	176	968	0	0	1492
Heavy Trucks	0	0	0		0	0	0		0	12	0		4	24	0		40
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/6/2021 12:05 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

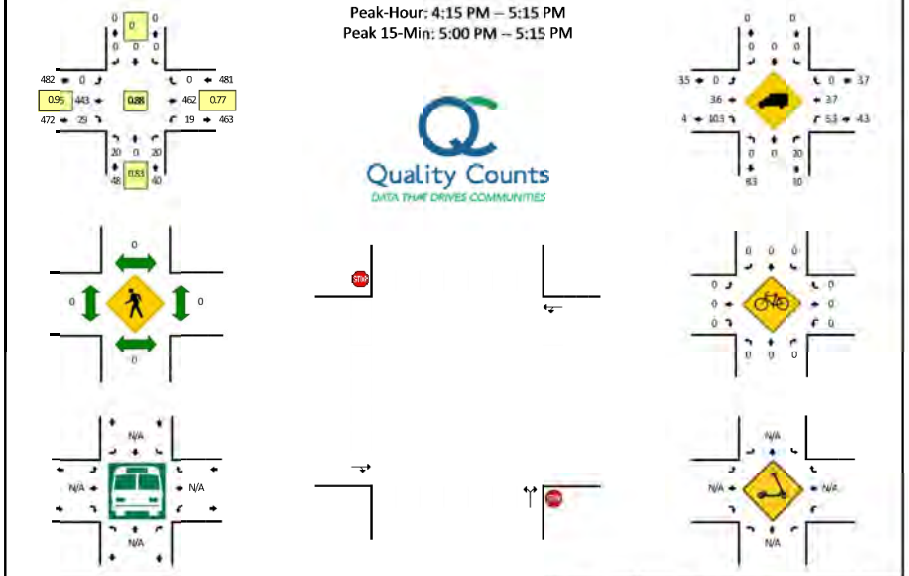
Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

LOCATION: Mana Rd -- Mamalahoa Hwy
CITY/STATE: Waimea, HI

QC JOB #: 15566404
DATE: Thu, Sep 30 2021

Peak-Hour: 4:15 PM – 5:15 PM
Peak 15-Min: 5:00 PM – 5:15 PM



15-Min Count Period Beginning At	Mana Rd (Northbound)				Mana Rd (Southbound)				Mamalahoa Hwy (Eastbound)				Mamalahoa Hwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	7	0	3	0	0	0	0	0	0	109	8	0	3	91	0	0	221	
3:15 PM	5	0	4	0	0	0	0	0	0	112	5	0	4	90	0	0	220	
3:30 PM	5	0	5	0	0	0	0	0	0	117	13	0	3	110	0	0	253	
3:45 PM	7	0	5	0	0	0	0	0	0	109	4	0	2	117	0	0	244	938
4:00 PM	4	0	12	0	0	0	0	0	0	113	5	0	5	85	0	0	224	941
4:15 PM	2	0	7	0	0	0	0	0	0	119	5	0	5	83	0	0	221	942
4:30 PM	6	0	6	0	0	0	0	0	0	108	4	0	2	95	0	0	221	910
4:45 PM	5	0	5	0	0	0	0	0	0	110	8	0	4	136	0	0	268	934
5:00 PM	7	0	2	0	0	0	0	0	0	106	12	0	8	148	0	0	283	993
5:15 PM	10	0	7	0	0	0	0	0	0	167	7	0	9	97	0	0	297	1069
5:30 PM	5	0	7	0	0	0	0	0	0	152	10	0	14	112	0	0	300	1148
5:45 PM	8	0	14	0	0	0	0	0	0	150	12	0	19	111	0	0	314	1194

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	0	8	0	0	0	0	0	0	424	48	0	32	592	0	0	1132
Heavy Trucks	0	0	0		0	0	0		0	8	4		4	40	0		56
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 6/20/2022 7:47 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

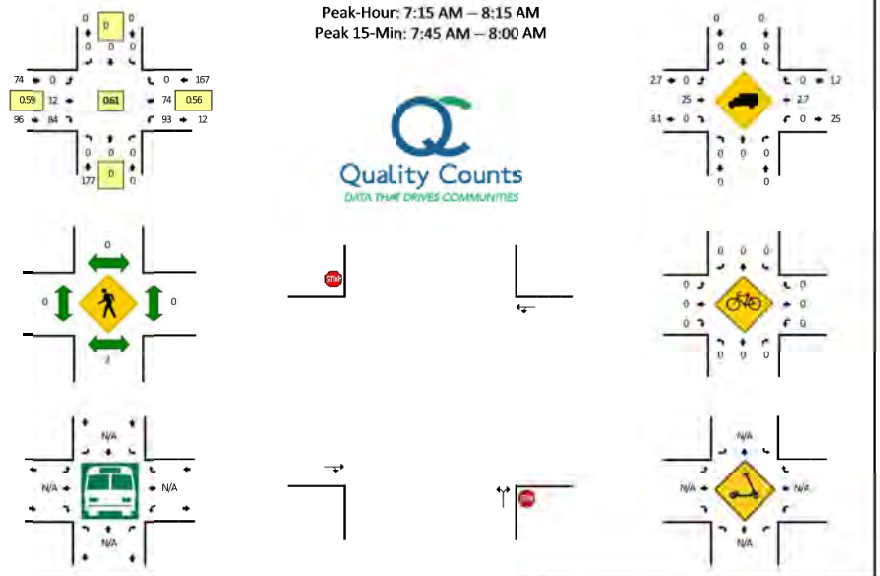
Type of peak hour being reported: System-wide Peak

Method for determining peak hour: Total Entering Volume

LOCATION: KOKA Main Dwy -- Hiiaka St
CITY/STATE: Waimea, HI

QC JOB #: 15566405
DATE: Thu, Sep 30 2021

Peak-Hour: 7:15 AM – 8:15 AM
Peak 15-Min: 7:45 AM – 8:00 AM



15-Min Count Period Beginning At	KOKA Main Dwy (Northbound)				KOKA Main Dwy (Southbound)				Hiiaka St (Eastbound)				Hiiaka St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3	
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	0	6	
7:00 AM	0	0	0	0	0	0	0	0	0	3	5	0	1	6	0	0	15	
7:15 AM	0	0	0	0	0	0	0	0	0	1	13	0	6	9	0	0	29	53
7:30 AM	0	0	0	0	0	0	0	0	0	1	40	0	39	23	0	0	103	153
7:45 AM	0	0	0	0	0	0	0	0	0	4	29	0	42	32	0	0	107	254
8:00 AM	0	0	0	0	0	0	0	0	0	6	2	0	6	10	0	0	24	263
8:15 AM	0	0	0	0	0	0	0	0	0	7	3	0	3	8	0	0	21	255
8:30 AM	1	0	1	0	0	0	0	0	0	6	1	0	1	9	0	0	19	171
8:45 AM	1	0	0	0	0	0	0	0	0	5	1	0	0	5	0	0	12	76
9:00 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	4	0	0	9	61
9:15 AM	1	0	0	0	0	0	0	0	0	7	0	0	1	4	0	0	13	53

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	16	116	0	168	128	0	0	428
Heavy Trucks	0	0	0		0	0	0		0	8	0		0	4	0		12
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/6/2021 12:05 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

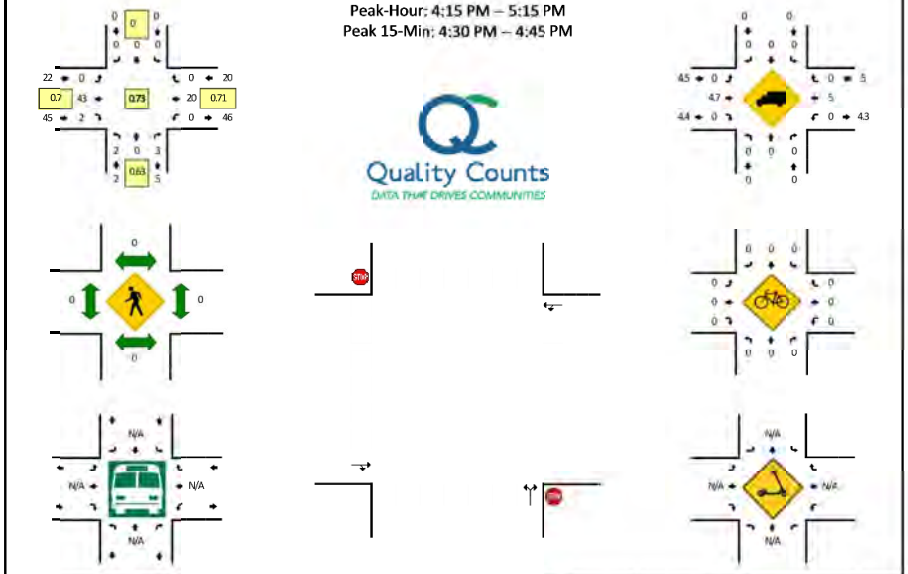
Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

LOCATION: KOKA Main Dwy -- Hiiaka St
CITY/STATE: Waimea, HI

QC JOB #: 15566406
DATE: Thu, Sep 30 2021

Peak-Hour: 4:15 PM – 5:15 PM
Peak 15-Min: 4:30 PM – 4:45 PM



15-Min Count Period Beginning At	KOKA Main Dwy (Northbound)				KOKA Main Dwy (Southbound)				Hiiaka St (Eastbound)				Hiiaka St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	1	0	0	0	0	0	0	0	0	6	19	0	13	35	0	0	74	
3:15 PM	3	0	0	0	0	0	0	0	0	2	3	0	1	5	0	0	14	
3:30 PM	4	0	1	0	0	0	0	0	0	4	9	0	0	2	0	0	20	
3:45 PM	0	0	1	0	0	0	0	0	0	8	0	0	1	3	0	0	13	121
4:00 PM	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	8	55
4:15 PM	0	0	1	0	0	0	0	0	0	9	1	0	0	4	0	0	15	56
4:30 PM	0	0	2	0	0	0	0	0	0	15	1	0	0	6	0	0	24	60
4:45 PM	1	0	0	0	0	0	0	0	0	11	0	0	0	7	0	0	19	66
5:00 PM	1	0	0	0	0	0	0	0	0	8	0	0	0	3	0	0	12	70
5:15 PM	1	0	2	0	0	0	0	0	0	14	1	0	0	2	0	0	20	75
5:30 PM	0	0	0	0	0	0	0	0	0	9	0	0	0	9	0	0	18	69
5:45 PM	0	0	0	0	0	0	0	0	0	11	0	0	0	3	0	0	14	64

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	8	0	0	0	0	0	0	60	4	0	0	24	0	0	96
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 6/20/2022 7:47 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

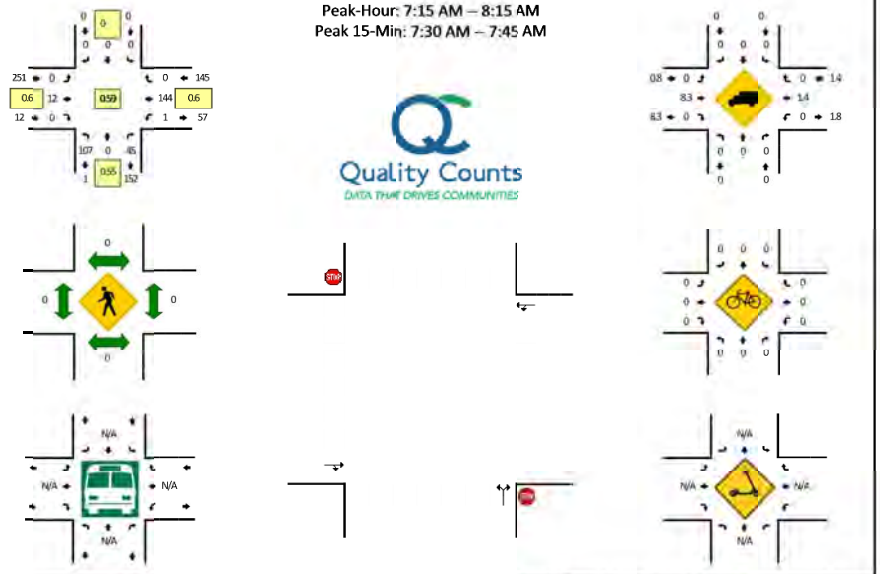
Type of peak hour being reported: System-wide Peak

Method for determining peak hour: Total Entering Volume

LOCATION: KOKA East Dwy -- Ainahua Alanui St
CITY/STATE: Waimea, HI

QC JOB #: 15566407
DATE: Thu, Sep 30 2021

Peak-Hour: 7:15 AM – 8:15 AM
Peak 15-Min: 7:30 AM – 7:45 AM



15-Min Count Period Beginning At	KOKA East Dwy (Northbound)				KOKA East Dwy (Southbound)				Ainahua Alanui St (Eastbound)				Ainahua Alanui St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	5	0	0	11	
6:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	5	0	0	7	
7:00 AM	0	0	0	0	0	0	0	0	0	3	0	0	1	7	0	0	11	
7:15 AM	9	0	3	0	0	0	0	0	0	1	0	0	0	24	0	0	37	66
7:30 AM	52	0	17	0	0	0	0	0	0	3	0	0	0	60	0	0	132	187
7:45 AM	42	0	24	0	0	0	0	0	0	3	0	0	0	42	0	0	111	291
8:00 AM	4	0	1	0	0	0	0	0	0	5	0	0	1	18	0	0	29	309
8:15 AM	4	0	1	0	0	0	0	0	0	9	0	0	0	11	0	0	25	297
8:30 AM	0	0	1	0	0	0	0	0	0	6	0	0	0	10	0	0	17	182
8:45 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	9	0	0	15	86
9:00 AM	0	0	0	0	0	0	0	0	0	4	0	0	1	5	0	0	10	67
9:15 AM	1	0	0	0	0	0	0	0	0	7	0	0	0	5	0	0	13	55

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	208	0	68	0	0	0	0	0	0	12	0	0	0	240	0	0	528
Heavy Trucks	0	0	0		0	0	0		0	4	0		0	0	0		4
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/6/2021 12:05 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

LOCATION: KOKA East Dwy -- Ainahua Alanui St
CITY/STATE: Waimea, HI

QC JOB #: 15566408
DATE: Thu, Sep 30 2021

15-Min Count Period Beginning At	KOKA East Dwy (Northbound)				KOKA East Dwy (Southbound)				Ainahua Alanui St (Eastbound)				Ainahua Alanui St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	45	0	24	0	0	0	0	0	0	7	0	0	0	10	0	0	86	
3:15 PM	5	0	2	0	0	0	0	0	0	5	0	0	0	4	0	0	16	
3:30 PM	0	0	6	0	0	0	0	0	0	16	0	0	1	5	0	0	28	
3:45 PM	1	0	1	0	0	0	0	0	0	11	0	0	0	4	0	0	17	147
4:00 PM	2	0	0	0	0	0	0	0	0	7	0	0	0	5	0	0	14	75
4:15 PM	0	0	0	0	0	0	0	0	0	13	0	0	0	9	0	0	22	81
4:30 PM	0	0	0	0	0	0	0	0	0	14	0	0	0	9	0	0	23	76
4:45 PM	0	0	0	0	0	0	0	0	0	13	0	0	0	9	0	0	22	81
5:00 PM	0	0	0	0	0	0	0	0	0	13	0	0	0	8	0	0	21	88
5:15 PM	0	0	0	0	0	0	0	0	0	16	0	0	0	6	0	0	22	88
5:30 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	8	0	0	14	79
5:45 PM	0	0	0	0	0	0	0	0	0	12	0	0	0	3	0	0	15	72

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	56	0	0	0	36	0	0	92
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 6/20/2022 7:47 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of report: Tube Count - Volume Data

LOCATION: Mamalahoa Hwy West of Mana Rd
SPECIFIC LOCATION:
CITY/STATE: Waimea, HI

QC JOB #: 15566409
DIRECTION: EB, WB
DATE: Sep 30 2021 - Sep 30 2021

Start Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average Weekday 15-min Traffic	Average Week 15-min Traffic	Average Week Profile
	30 Sep 21									
12:00 AM	14							14	14	
12:15 AM	14							14	14	
12:30 AM	7							7	7	
12:45 AM	5							5	5	
01:00 AM	6							6	6	
01:15 AM	9							9	9	
01:30 AM	6							6	6	
01:45 AM	5							5	5	
02:00 AM	6							6	6	
02:15 AM	7							7	7	
02:30 AM	9							9	9	
02:45 AM	8							8	8	
03:00 AM	14							14	14	
03:15 AM	20							20	20	
03:30 AM	17							17	17	
03:45 AM	43							43	43	
04:00 AM	40							40	40	
04:15 AM	51							51	51	
04:30 AM	56							56	56	
04:45 AM	81							81	81	
05:00 AM	109							109	109	
05:15 AM	134							134	134	
05:30 AM	143							143	143	
05:45 AM	157							157	157	
Day Total										
% Weekday Average										
% Week Average										
AM Peak										
15-min Vol										
PM Peak										
15-min Vol										

Comments:

Report generated on 10/6/2021 11:54 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Volume Data

LOCATION: Mamalahoa Hwy West of Mana Rd
SPECIFIC LOCATION:
CITY/STATE: Waimea, HI

QC JOB #: 15566409
DIRECTION: EB, WB
DATE: Sep 30 2021 - Sep 30 2021

Start Time	Mon	Tue	Wed	Thu 30 Sep 21	Fri	Average Weekday 15-min Traffic	Sat	Sun	Average Week 15-min Traffic	Average Week Profile
06:00 AM				171		171			171	
06:15 AM				230		230			230	
06:30 AM				224		224			224	
06:45 AM				230		230			230	
07:00 AM				218		218			218	
07:15 AM				**307**		**307**			**307**	
07:30 AM				225		225			225	
07:45 AM				292		292			292	
08:00 AM				293		293			293	
08:15 AM				256		256			256	
08:30 AM				233		233			233	
08:45 AM				232		232			232	
09:00 AM				215		215			215	
09:15 AM				241		241			241	
09:30 AM				231		231			231	
09:45 AM				212		212			212	
10:00 AM				195		195			195	
10:15 AM				181		181			181	
10:30 AM				216		216			216	
10:45 AM				223		223			223	
11:00 AM				196		196			196	
11:15 AM				227		227			227	
11:30 AM				211		211			211	
11:45 AM				225		225			225	
Day Total										
% Weekday Average										
% Week Average										
AM Peak 15-min Vol										
PM Peak 15-min Vol										

Comments:

Report generated on 10/6/2021 11:54 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Volume Data

LOCATION: Mamalahoa Hwy West of Mana Rd
SPECIFIC LOCATION:
CITY/STATE: Waimea, HI

QC JOB #: 15566409
DIRECTION: EB, WB
DATE: Sep 30 2021 - Sep 30 2021

Start Time	Mon	Tue	Wed	Thu 30 Sep 21	Fri	Average Weekday 15-min Traffic	Sat	Sun	Average Week 15-min Traffic	Average Week Profile
12:00 PM				205		205			205	
12:15 PM				218		218			218	
12:30 PM				244		244			244	
12:45 PM				237		237			237	
01:00 PM				206		206			206	
01:15 PM				207		207			207	
01:30 PM				222		222			222	
01:45 PM				252		252			252	
02:00 PM				266		266			266	
02:15 PM				279		279			279	
02:30 PM				275		275			275	
02:45 PM				280		280			280	
03:00 PM				329		329			329	
03:15 PM				305		305			305	
03:30 PM				307		307			307	
03:45 PM				355		355			355	
04:00 PM				300		300			300	
04:15 PM				322		322			322	
04:30 PM				**369**		**369**			**369**	
04:45 PM				337		337			337	
05:00 PM				339		339			339	
05:15 PM				280		280			280	
05:30 PM				272		272			272	
05:45 PM				228		228			228	
Day Total										
% Weekday Average										
% Week Average										
AM Peak 15-min Vol										
PM Peak 15-min Vol										

Comments:

Report generated on 10/6/2021 11:54 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Volume Data

LOCATION: Mamalahoa Hwy West of Mana Rd
QC JOB #: 15566409
SPECIFIC LOCATION:
DIRECTION: EB, WB
CITY/STATE: Waimea, HI
DATE: Sep 30 2021 - Sep 30 2021

Start Time	Mon	Tue	Wed	Thu 30 Sep 21	Fri	Average Weekday 15-min Traffic	Sat	Sun	Average Week 15-min Traffic	Average Week Profile
06:00 PM				213		213			213	
06:15 PM				214		214			214	
06:30 PM				194		194			194	
06:45 PM				162		162			162	
07:00 PM				137		137			137	
07:15 PM				129		129			129	
07:30 PM				118		118			118	
07:45 PM				83		83			83	
08:00 PM				79		79			79	
08:15 PM				84		84			84	
08:30 PM				71		71			71	
08:45 PM				67		67			67	
09:00 PM				57		57			57	
09:15 PM				69		69			69	
09:30 PM				39		39			39	
09:45 PM				50		50			50	
10:00 PM				45		45			45	
10:15 PM				55		55			55	
10:30 PM				43		43			43	
10:45 PM				51		51			51	
11:00 PM				18		18			18	
11:15 PM				26		26			26	
11:30 PM				38		38			38	
11:45 PM				22		22			22	
Day Total				15143		15143			15143	
% Weekday Average				100%						
% Week Average				100%		100%				
AM Peak 15-min Vol				7:15 AM 307		7:15 AM 307			7:15 AM 307	
PM Peak 15-min Vol				4:30 PM 369		4:30 PM 369			4:30 PM 369	

Comments:

Report generated on 10/6/2021 11:54 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Appendix B
Hele-on Bus Information

Route 301: Waimea Circulator

Effective September 05, 2021

Westbound to Kamuela View Estates

	Lakeland	Waimea					Kamuela View Estates	
	A	B	C	D	E	F	G	
	Highway 19 @ Mud Lane and Puu Pulehu Loop	Kamamalu Street @ Highway 19 (Waimea Civic Center)	Highway 19 @ Pukalani Rd (Ace Hardware/Parker Ranch Shopping Center)	Highway 19 @ fanside of Lindsey Road (Waimea Park, bus shelter)	Highway 19 @ Opelo Road	Highway 19 @ Jacaranda Inn	Ohina Street @ Mahua Street	Bus Goes to Where?
Bus Stop ID#	TBA	TBA	422	410	TBA	TBA	TBA	
	6:30 AM	6:40 AM	6:45 AM	6:47 AM	6:50 AM	6:55 AM	7:00 AM	301
	7:30 AM	7:40 AM	7:45 AM	7:47 AM	7:50 AM	7:55 AM	8:00 AM	301
	8:30 AM	8:40 AM	8:45 AM	8:47 AM	8:50 AM	8:55 AM	9:00 AM	301
	9:30 AM	9:40 AM	9:45 AM	9:47 AM	9:50 AM	9:55 AM	10:00 AM	301
	10:30 AM	10:40 AM	10:45 AM	10:47 AM	10:50 AM	10:55 AM	11:00 AM	301
	11:30 AM	11:40 AM	11:45 AM	11:47 AM	11:50 AM	11:55 AM	12:00 PM	301
	12:30 PM	12:40 PM	12:45 PM	12:47 PM	12:50 PM	12:55 PM	1:00 PM	301
	1:30 PM	1:40 PM	1:45 PM	1:47 PM	1:50 PM	1:55 PM	2:00 PM	301
	2:30 PM	2:40 PM	2:45 PM	2:47 PM	2:50 PM	2:55 PM	3:00 PM	301
	3:30 PM	3:40 PM	3:45 PM	3:47 PM	3:50 PM	3:55 PM	4:00 PM	301
	4:30 PM	4:40 PM	4:45 PM	4:47 PM	4:50 PM	4:55 PM	5:00 PM	301

--- Bus does not serve timepoint.

This trip continues to Hilo.

Monday-Friday only

Everyday service

Route 301: Waimea Circulator

Effective September 05, 2021

Eastbound to Lakeland

	Kamuela View Estates	Waimea					Lakeland	
	G	F	E	D	C	B	A	
	Ohina Street @ Mahua Street	Highway 19 @ Across from Jacranda Inn	Highway 19 @ Opelo Road	Highway 19 @ Across from Waimea Park	Highway 19 @ Pukalani Rd (Ace Hardware/Parker Ranch Shopping Center)	Kamamalu Street @ Highway 19 (Waimea Civic Center)	Highway 19 @ Mud Lane and Puu Pulehu Loop	Bus Goes to Where?
	TBA	TBA	TBA	421	422	TBA	TBA	
	7:00 AM	7:05 AM	7:10 AM	7:13 AM	7:15 AM	7:20 AM	7:25 AM	301
	8:00 AM	8:05 AM	8:10 AM	8:13 AM	8:15 AM	8:20 AM	8:25 AM	301
	9:00 AM	9:05 AM	9:10 AM	9:13 AM	9:15 AM	9:20 AM	9:25 AM	301
	10:00 AM	10:05 AM	10:10 AM	10:13 AM	10:15 AM	10:20 AM	10:25 AM	301
	11:00 AM	11:05 AM	11:10 AM	11:13 AM	See Route 60 to Hilo			60
	11:00 AM	11:05 AM	11:10 AM	11:13 AM	11:15 AM	11:20 AM	11:25 AM	301
	12:00 PM	12:05 PM	12:10 PM	12:13 PM	12:15 PM	12:20 PM	12:25 PM	301
	1:00 PM	1:05 PM	1:10 PM	1:13 PM	1:15 PM	1:20 PM	1:25 PM	301
	2:00 PM	2:05 PM	2:10 PM	2:13 PM	2:15 PM	2:20 PM	2:25 PM	301
	3:00 PM	3:05 PM	3:10 PM	3:13 PM	3:15 PM	3:20 PM	3:25 PM	301
	4:00 PM	4:05 PM	4:10 PM	4:13 PM	4:15 PM	4:20 PM	4:25 PM	301
	5:00 PM	5:05 PM	5:10 PM	5:13 PM	See Route 60 to Hilo			60

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 301 – Waimea Shuttle for everyone! This flexible type services combine ADA paratransit and general public transit into one service providing additional mobility in the Waimea 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.

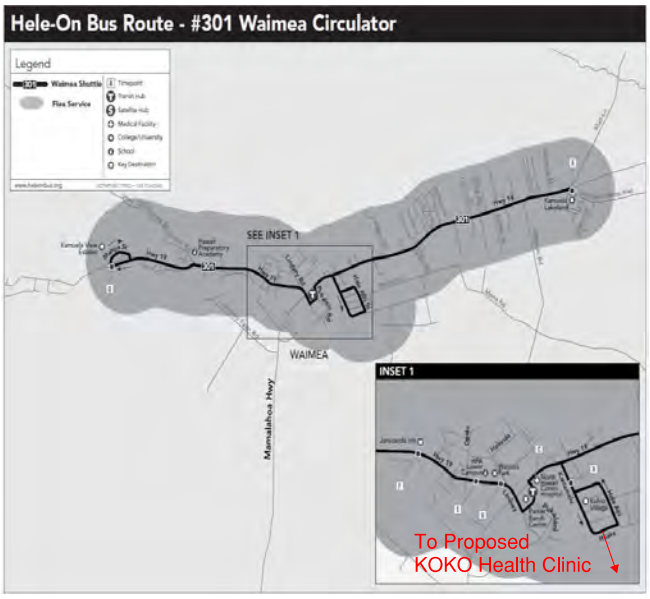
The fare for flex service is $4.00 for all passengers.

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.



Appendix C

Existing Intersection Analysis Worksheets

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	426	121	31	897	185	50
Future Volume (vph)	426	121	31	897	185	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	0.99			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.97			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3405			3533	1770	1565
Flt Permitted	1.00			0.92	0.95	1.00
Satd. Flow (perm)	3405			3246	1770	1565
Peak-hour factor, PHF	0.71	0.71	0.89	0.89	0.65	0.65
Adj. Flow (vph)	600	170	35	1008	285	77
RTOR Reduction (vph)	41	0	0	0	0	52
Lane Group Flow (vph)	729	0	0	1043	285	25
Confl. Peds. (#/hr)		2	2			2
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	18.4			26.0	13.2	15.8
Effective Green, g (s)	18.4			26.0	13.2	15.8
Actuated g/C Ratio	0.37			0.53	0.27	0.32
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1273			1730	474	661
v/s Ratio Prot	0.21			c0.03	c0.16	0.00
v/s Ratio Perm				c0.29		0.01
v/c Ratio	0.57			0.60	0.60	0.04
Uniform Delay, d1	12.3			8.0	15.7	11.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.6			0.6	2.2	0.0
Delay (s)	12.9			8.6	17.9	11.5
Level of Service	B			A	B	B
Approach Delay (s)	12.9			8.6	16.5	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	12	84	93	74	0	0
Future Vol, veh/h	12	84	93	74	0	0
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	56	56	60	60
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	20	142	166	132	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	164	0	557	93
Stage 1	-	-	-	-	93	-
Stage 2	-	-	-	-	464	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1427	-	495	970
Stage 1	-	-	-	-	936	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1424	-	432	968
Mov Cap-2 Maneuver	-	-	-	-	432	-
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	557	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.4	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1424	-
HCM Lane V/C Ratio	-	-	-	0.117	-
HCM Control Delay (s)	0	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.4	-

Intersection	
Int Delay, s/veh	6.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	12	0	1	144	107	45
Future Vol, veh/h	12	0	1	144	107	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	0	2	240	195	82

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	20	0	264	20
Stage 1	-	-	-	-	20	-
Stage 2	-	-	-	-	244	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1596	-	725	1058
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	797	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1596	-	724	1058
Mov Cap-2 Maneuver	-	-	-	-	724	-
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	796	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	799	-	-	1596	-
HCM Lane V/C Ratio	0.346	-	-	0.001	-
HCM Control Delay (s)	11.9	-	-	7.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.6	-	-	0	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	338	16	96	874	22	42
Future Vol, veh/h	338	16	96	874	22	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	445	21	113	1028	48	91

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	466	0	1710	456
Stage 1	-	-	-	-	456	-
Stage 2	-	-	-	-	1254	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1095	-	100	604
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	269	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1095	-	90	604
Mov Cap-2 Maneuver	-	-	-	-	90	-
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	241	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	36.5
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	90	604	-	-	1095	-
HCM Lane V/C Ratio	0.531	0.151	-	-	0.103	-
HCM Control Delay (s)	83.4	12	-	-	8.7	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	2.4	0.5	-	-	0.3	-

Intersection	
Int Delay, s/veh	4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	338	16	96	0	22	42
Future Vol, veh/h	338	16	96	0	22	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	445	21	113	0	48	91

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	466	0	682	456
Stage 1	-	-	-	-	456	-
Stage 2	-	-	-	-	226	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1095	-	415	604
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1095	-	372	604
Mov Cap-2 Maneuver	-	-	-	-	372	-
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	728	-

Approach	EB	WB	NB
HCM Control Delay, s	0	8.7	13.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	372	604	-	-	1095	-
HCM Lane V/C Ratio	0.129	0.151	-	-	0.103	-
HCM Control Delay (s)	16.1	12	-	-	8.7	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	0.5	-	-	0.3	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	972	107	21	541	79	31
Future Volume (vph)	972	107	21	541	79	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.99			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3479			3533	1770	1567
Flt Permitted	1.00			0.90	0.95	1.00
Satd. Flow (perm)	3479			3193	1770	1567
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.72	0.72
Adj. Flow (vph)	1080	119	23	601	110	43
RTOR Reduction (vph)	11	0	0	0	0	17
Lane Group Flow (vph)	1188	0	0	624	110	26
Confl. Peds. (#/hr)		1	1			2
Confl. Bikes (#/hr)		1				
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	22.3			28.7	4.5	5.9
Effective Green, g (s)	22.3			28.7	4.5	5.9
Actuated g/C Ratio	0.52			0.66	0.10	0.14
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1795			2132	184	395
v/s Ratio Prot	c0.34			c0.01	c0.06	0.00
v/s Ratio Perm				0.18		0.01
v/c Ratio	0.66			0.29	0.60	0.07
Uniform Delay, d1	7.7			3.0	18.5	16.2
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.9			0.1	5.1	0.1
Delay (s)	8.6			3.1	23.6	16.3
Level of Service	A			A	C	B
Approach Delay (s)	8.6			3.1	21.6	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	43.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	43	2	0	20	2	3
Future Vol, veh/h	43	2	0	20	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	71	71	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	61	3	0	28	3	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	64	0	91	63
Stage 1	-	-	-	-	63	-
Stage 2	-	-	-	-	28	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1551	-	914	1007
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	1000	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1551	-	914	1007
Mov Cap-2 Maneuver	-	-	-	-	914	-
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	1000	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	968	-	-	1551	-
HCM Lane V/C Ratio	0.008	-	-	-	-
HCM Control Delay (s)	8.8	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	53	0	0	35	0	0
Future Vol, veh/h	53	0	0	35	0	0
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	97	97	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	0	0	36	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	57	0	93	57
Stage 1	-	-	-	-	57	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1547	-	907	1009
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	986	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	906	1008
Mov Cap-2 Maneuver	-	-	-	-	906	-
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	986	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1546	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	925	29	19	393	20	20
Future Vol, veh/h	925	29	19	393	20	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	974	31	25	510	24	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1005	0	1550	990
Stage 1	-	-	-	-	990	-
Stage 2	-	-	-	-	560	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	689	-	125	299
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	689	-	121	299
Mov Cap-2 Maneuver	-	-	-	-	121	-
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	551	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	30.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	121	299	-	-	689	-
HCM Lane V/C Ratio	0.199	0.081	-	-	0.036	-
HCM Control Delay (s)	42	18.1	-	-	10.4	-
HCM Lane LOS	E	C	-	-	B	-
HCM 95th %tile Q(veh)	0.7	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	925	29	19	0	20	20
Future Vol, veh/h	925	29	19	0	20	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	974	31	25	0	24	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1005	0	1040	990
Stage 1	-	-	-	-	990	-
Stage 2	-	-	-	-	50	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	689	-	255	299
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	972	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	689	-	246	299
Mov Cap-2 Maneuver	-	-	-	-	246	-
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	937	-

Approach	EB	WB	NB
HCM Control Delay, s	0	10.4	19.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	246	299	-	-	689	-
HCM Lane V/C Ratio	0.098	0.081	-	-	0.036	-
HCM Control Delay (s)	21.2	18.1	-	-	10.4	-
HCM Lane LOS	C	C	-	-	B	-
HCM 95th %tile Q(veh)	0.3	0.3	-	-	0.1	-

Appendix D

Future Without Project Intersection Analysis Worksheets

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	107	126	99	173	31	11
Future Vol, veh/h	107	126	99	173	31	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	137	108	188	34	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	253	0	589	185
Stage 1	-	-	-	-	185	-
Stage 2	-	-	-	-	404	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1312	-	471	857
Stage 1	-	-	-	-	847	-
Stage 2	-	-	-	-	674	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1312	-	428	857
Mov Cap-2 Maneuver	-	-	-	-	428	-
Stage 1	-	-	-	-	847	-
Stage 2	-	-	-	-	612	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	493	-	-	1312	-
HCM Lane V/C Ratio	0.093	-	-	0.082	-
HCM Control Delay (s)	13	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.3	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	464	247	31	977	216	50
Future Volume (vph)	464	247	31	977	216	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	0.99			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.95			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3328			3534	1770	1565
Flt Permitted	1.00			0.87	0.95	1.00
Satd. Flow (perm)	3328			3088	1770	1565
Peak-hour factor, PHF	0.71	0.71	0.89	0.89	0.65	0.65
Adj. Flow (vph)	654	348	35	1098	332	77
RTOR Reduction (vph)	107	0	0	0	0	52
Lane Group Flow (vph)	895	0	0	1133	332	25
Confl. Peds. (#/hr)		2	2			2
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	20.4			28.0	14.5	17.1
Effective Green, g (s)	20.4			28.0	14.5	17.1
Actuated g/C Ratio	0.39			0.53	0.28	0.33
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1293			1669	488	658
v/s Ratio Prot	0.27			c0.03	c0.19	0.00
v/s Ratio Perm				c0.33		0.01
v/c Ratio	0.69			0.68	0.68	0.04
Uniform Delay, d1	13.4			9.0	16.9	12.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.6			1.1	3.9	0.0
Delay (s)	15.0			10.1	20.8	12.1
Level of Service	B			B	C	B
Approach Delay (s)	15.0			10.1	19.2	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	52.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	84	93	173	0	0
Future Vol, veh/h	23	84	93	173	0	0
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	56	56	60	60
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	39	142	166	309	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	183	0	753	112
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	641	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1404	-	380	947
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	528	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1401	-	325	945
Mov Cap-2 Maneuver	-	-	-	-	325	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	452	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.8	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1401	-
HCM Lane V/C Ratio	-	-	-	0.119	-
HCM Control Delay (s)	0	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.4	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	0	1	243	107	45
Future Vol, veh/h	23	0	1	243	107	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	0	2	405	195	82

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	38	0	447	38
Stage 1	-	-	-	-	38	-
Stage 2	-	-	-	-	409	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1572	-	569	1034
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	671	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1572	-	568	1034
Mov Cap-2 Maneuver	-	-	-	-	568	-
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	670	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	655	-	-	1572	-
HCM Lane V/C Ratio	0.422	-	-	0.001	-
HCM Control Delay (s)	14.4	-	-	7.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	2.1	-	-	0	-

Intersection	
Int Delay, s/veh	9.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	368	16	206	952	22	56
Future Vol, veh/h	368	16	206	952	22	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	484	21	242	1120	48	122

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	505	0	2099	495
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	1604	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1060	-	57	575
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	181	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1060	-	~ 44	575
Mov Cap-2 Maneuver	-	-	-	-	~ 44	-
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	140	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	96
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	44	575	-	-	1060	-
HCM Lane V/C Ratio	1.087	0.212	-	-	0.229	-
HCM Control Delay (s)	$ 307.4	12.9	-	-	9.4	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	4.5	0.8	-	-	0.9	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	5.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	368	16	206	0	22	56
Future Vol, veh/h	368	16	206	0	22	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	484	21	242	0	48	122

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	505	0	979	495
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	484	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1060	-	277	575
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	620	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1060	-	214	575
Mov Cap-2 Maneuver	-	-	-	-	214	-
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	479	-

Approach	EB	WB	NB
HCM Control Delay, s	0	9.4	16.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	214	575	-	-	1060	-
HCM Lane V/C Ratio	0.223	0.212	-	-	0.229	-
HCM Control Delay (s)	26.6	12.9	-	-	9.4	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	0.8	0.8	-	-	0.9	-

Intersection	
Int Delay, s/veh	8.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	132	96	33	22	250	87
Future Vol, veh/h	132	96	33	22	250	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	143	104	36	24	272	95

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	247	0	291	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	96	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1319	-	700	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	928	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1319	-	680	846
Mov Cap-2 Maneuver	-	-	-	-	680	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.7	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	716	-	-	1319	-
HCM Lane V/C Ratio	0.512	-	-	0.027	-
HCM Control Delay (s)	15.2	-	-	7.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.9	-	-	0.1	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1059	203	21	589	329	31
Future Volume (vph)	1059	203	21	589	329	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3441			3533	1770	1564
Flt Permitted	1.00			0.81	0.95	1.00
Satd. Flow (perm)	3441			2858	1770	1564
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.72	0.72
Adj. Flow (vph)	1177	226	23	654	457	43
RTOR Reduction (vph)	22	0	0	0	0	17
Lane Group Flow (vph)	1381	0	0	677	457	26
Confl. Peds. (#/hr)		1	1			2
Confl. Bikes (#/hr)		1				
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	29.5			37.3	19.3	22.1
Effective Green, g (s)	29.5			37.3	19.3	22.1
Actuated g/C Ratio	0.44			0.56	0.29	0.33
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1524			1629	512	636
v/s Ratio Prot	c0.40			c0.02	c0.26	0.00
v/s Ratio Perm				0.22		0.01
v/c Ratio	0.91			0.42	0.89	0.04
Uniform Delay, d1	17.3			8.4	22.7	15.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	8.0			0.2	17.6	0.0
Delay (s)	25.3			8.6	40.3	15.1
Level of Service	C			A	D	B
Approach Delay (s)	25.3			8.6	38.1	
Approach LOS	C			A	D	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	130	2	33	20	2	3
Future Vol, veh/h	130	2	33	20	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	71	71	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	186	3	46	28	3	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	189	0	308	188
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	120	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1397	-	688	859
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	910	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1397	-	665	859
Mov Cap-2 Maneuver	-	-	-	-	665	-
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	880	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	769	-	-	1397	-
HCM Lane V/C Ratio	0.01	-	-	0.033	-
HCM Control Delay (s)	9.7	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	140	0	33	35	0	0
Future Vol, veh/h	140	0	33	35	0	0
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	97	97	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	147	0	34	36	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	148	0	252	148
Stage 1	-	-	-	-	148	-
Stage 2	-	-	-	-	104	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1434	-	737	899
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	920	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1433	-	719	898
Mov Cap-2 Maneuver	-	-	-	-	719	-
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	898	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1433	-
HCM Lane V/C Ratio	-	-	-	0.024	-
HCM Control Delay (s)	0	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1008	29	71	428	20	122
Future Vol, veh/h	1008	29	71	428	20	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1061	31	92	556	24	147

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1092	0	1817	1077
Stage 1	-	-	-	-	1077	-
Stage 2	-	-	-	-	740	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	639	-	86	266
Stage 1	-	-	-	-	327	-
Stage 2	-	-	-	-	472	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	639	-	74	266
Mov Cap-2 Maneuver	-	-	-	-	74	-
Stage 1	-	-	-	-	327	-
Stage 2	-	-	-	-	404	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	39.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	74	266	-	-	639	-
HCM Lane V/C Ratio	0.326	0.553	-	-	0.144	-
HCM Control Delay (s)	75.6	34.1	-	-	11.6	-
HCM Lane LOS	F	D	-	-	B	-
HCM 95th %tile Q(veh)	1.2	3.1	-	-	0.5	-

Intersection	
Int Delay, s/veh	5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1008	29	71	0	20	122
Future Vol, veh/h	1008	29	71	0	20	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1061	31	92	0	24	147

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1092	0	1261	1077
Stage 1	-	-	-	-	1077	-
Stage 2	-	-	-	-	184	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	639	-	188	266
Stage 1	-	-	-	-	327	-
Stage 2	-	-	-	-	848	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	639	-	161	266
Mov Cap-2 Maneuver	-	-	-	-	161	-
Stage 1	-	-	-	-	327	-
Stage 2	-	-	-	-	726	-

Approach	EB	WB	NB
HCM Control Delay, s	0	11.6	33.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	161	266	-	-	639	-
HCM Lane V/C Ratio	0.15	0.553	-	-	0.144	-
HCM Control Delay (s)	31.3	34.1	-	-	11.6	-
HCM Lane LOS	D	D	-	-	B	-
HCM 95th %tile Q(veh)	0.5	3.1	-	-	0.5	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	107	126	99	173	31	11
Future Vol, veh/h	107	126	99	173	31	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	137	108	188	34	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	253	0	589	185
Stage 1	-	-	-	-	185	-
Stage 2	-	-	-	-	404	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1312	-	471	857
Stage 1	-	-	-	-	847	-
Stage 2	-	-	-	-	674	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1312	-	428	857
Mov Cap-2 Maneuver	-	-	-	-	428	-
Stage 1	-	-	-	-	847	-
Stage 2	-	-	-	-	612	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	493	-	-	1312	-
HCM Lane V/C Ratio	0.093	-	-	0.082	-
HCM Control Delay (s)	13	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.3	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	506	247	31	1065	216	50
Future Volume (vph)	506	247	31	1065	216	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	0.99			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.95			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3340			3534	1770	1565
Flt Permitted	1.00			0.87	0.95	1.00
Satd. Flow (perm)	3340			3065	1770	1565
Peak-hour factor, PHF	0.71	0.71	0.89	0.89	0.65	0.65
Adj. Flow (vph)	713	348	35	1197	332	77
RTOR Reduction (vph)	89	0	0	0	0	41
Lane Group Flow (vph)	972	0	0	1232	332	36
Confl. Peds. (#/hr)		2	2			2
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	22.0			29.7	14.7	17.4
Effective Green, g (s)	22.0			29.7	14.7	17.4
Actuated g/C Ratio	0.40			0.55	0.27	0.32
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1350			1696	478	644
v/s Ratio Prot	0.29			c0.04	c0.19	0.00
v/s Ratio Perm				c0.36		0.02
v/c Ratio	0.72			0.73	0.69	0.06
Uniform Delay, d1	13.6			9.3	17.8	12.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.9			1.6	4.3	0.0
Delay (s)	15.5			10.9	22.2	12.8
Level of Service	B			B	C	B
Approach Delay (s)	15.5			10.9	20.4	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	84	93	173	0	0
Future Vol, veh/h	23	84	93	173	0	0
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	56	56	60	60
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	39	142	166	309	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	183	0	753	112
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	641	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1404	-	380	947
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	528	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1401	-	325	945
Mov Cap-2 Maneuver	-	-	-	-	325	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	452	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.8	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1401	-
HCM Lane V/C Ratio	-	-	-	0.119	-
HCM Control Delay (s)	0	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.4	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	0	1	243	107	45
Future Vol, veh/h	23	0	1	243	107	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	0	2	405	195	82

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	38	0	447	38
Stage 1	-	-	-	-	38	-
Stage 2	-	-	-	-	409	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1572	-	569	1034
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	671	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1572	-	568	1034
Mov Cap-2 Maneuver	-	-	-	-	568	-
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	670	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	655	-	-	1572	-
HCM Lane V/C Ratio	0.422	-	-	0.001	-
HCM Control Delay (s)	14.4	-	-	7.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	2.1	-	-	0	-

Intersection	
Int Delay, s/veh	11.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	401	16	206	1038	22	56
Future Vol, veh/h	401	16	206	1038	22	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	528	21	242	1221	48	122

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	549	0	2244	539
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	1705	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1021	-	~ 46	542
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	161	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1021	-	~ 35	542
Mov Cap-2 Maneuver	-	-	-	-	~ 35	-
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	123	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	138.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	35	542	-	-	1021	-
HCM Lane V/C Ratio	1.366	0.225	-	-	0.237	-
HCM Control Delay (s)	$ 455	13.6	-	-	9.6	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	5.1	0.9	-	-	0.9	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	5.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	401	16	206	0	22	56
Future Vol, veh/h	401	16	206	0	22	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	528	21	242	0	48	122

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	549	0	1023	539
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	484	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1021	-	261	542
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	620	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1021	-	199	542
Mov Cap-2 Maneuver	-	-	-	-	199	-
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	473	-

Approach	EB	WB	NB
HCM Control Delay, s	0	9.6	17.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	199	542	-	-	1021	-
HCM Lane V/C Ratio	0.24	0.225	-	-	0.237	-
HCM Control Delay (s)	28.7	13.6	-	-	9.6	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	0.9	0.9	-	-	0.9	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	401	16	206	1038	22	56
Future Volume (veh/h)	401	16	206	1038	22	56
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	528	21	242	1221	48	122
Peak Hour Factor	0.76	0.76	0.85	0.85	0.46	0.46
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1017	40	604	1378	179	296
Arrive On Green	0.57	0.57	0.09	0.74	0.10	0.10
Sat Flow, veh/h	1787	71	1781	1870	1781	1585
Grp Volume(v), veh/h	0	549	242	1221	48	122
Grp Sat Flow(s),veh/h/ln	0	1858	1781	1870	1781	1585
Q Serve(g_s), s	0.0	11.1	3.0	30.4	1.5	4.2
Cycle Q Clear(g_c), s	0.0	11.1	3.0	30.4	1.5	4.2
Prop In Lane		0.04	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1058	604	1378	179	296
V/C Ratio(X)	0.00	0.52	0.40	0.89	0.27	0.41
Avail Cap(c_a), veh/h	0	1360	799	1887	522	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	8.1	5.4	6.1	25.6	22.0
Incr Delay (d2), s/veh	0.0	0.4	0.4	4.2	0.8	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.1	0.6	4.9	0.6	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	8.5	5.8	10.3	26.4	22.9
LnGrp LOS	A	A	A	B	C	C
Approach Vol, veh/h	549			1463	170	
Approach Delay, s/veh	8.5			9.6	23.9	
Approach LOS	A			A	C	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		11.2	10.3	40.0		50.3
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s		18.0	12.0	45.0		62.0
Max Q Clear Time (g_c+I1), s		6.2	5.0	13.1		32.4
Green Ext Time (p_c), s		0.4	0.4	3.5		12.9

Intersection Summary	
HCM 6th Ctrl Delay	10.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	8.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	132	96	33	22	250	87
Future Vol, veh/h	132	96	33	22	250	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	143	104	36	24	272	95

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	247	0	291	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	96	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1319	-	700	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	928	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1319	-	680	846
Mov Cap-2 Maneuver	-	-	-	-	680	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.7	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	716	-	-	1319	-
HCM Lane V/C Ratio	0.512	-	-	0.027	-
HCM Control Delay (s)	15.2	-	-	7.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.9	-	-	0.1	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1154	203	21	642	329	31
Future Volume (vph)	1154	203	21	642	329	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3448			3534	1770	1563
Flt Permitted	1.00			0.80	0.95	1.00
Satd. Flow (perm)	3448			2815	1770	1563
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.72	0.72
Adj. Flow (vph)	1282	226	23	713	457	43
RTOR Reduction (vph)	17	0	0	0	0	17
Lane Group Flow (vph)	1491	0	0	736	457	26
Confl. Peds. (#/hr)		1	1			2
Confl. Bikes (#/hr)		1				
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	36.2			44.0	21.7	24.5
Effective Green, g (s)	36.2			44.0	21.7	24.5
Actuated g/C Ratio	0.48			0.58	0.29	0.32
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1648			1662	507	609
v/s Ratio Prot	c0.43			c0.02	c0.26	0.00
v/s Ratio Perm				0.24		0.02
v/c Ratio	0.90			0.44	0.90	0.04
Uniform Delay, d1	18.2			8.9	26.0	17.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	7.4			0.2	19.1	0.0
Delay (s)	25.6			9.1	45.0	17.6
Level of Service	C			A	D	B
Approach Delay (s)	25.6			9.1	42.7	
Approach LOS	C			A	D	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	130	2	33	20	2	3
Future Vol, veh/h	130	2	33	20	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	71	71	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	186	3	46	28	3	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	189	0	308	188
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	120	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1397	-	688	859
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	910	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1397	-	665	859
Mov Cap-2 Maneuver	-	-	-	-	665	-
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	880	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	769	-	-	1397	-
HCM Lane V/C Ratio	0.01	-	-	0.033	-
HCM Control Delay (s)	9.7	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	140	0	33	35	0	0
Future Vol, veh/h	140	0	33	35	0	0
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	97	97	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	147	0	34	36	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	148	0	252	148
Stage 1	-	-	-	-	148	-
Stage 2	-	-	-	-	104	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1434	-	737	899
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	920	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1433	-	719	898
Mov Cap-2 Maneuver	-	-	-	-	719	-
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	898	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1433	-
HCM Lane V/C Ratio	-	-	-	0.024	-
HCM Control Delay (s)	0	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1098	29	71	467	20	122
Future Vol, veh/h	1098	29	71	467	20	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1156	31	92	606	24	147

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1187	0	1962	1172
Stage 1	-	-	-	-	1172	-
Stage 2	-	-	-	-	790	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	588	-	70	234
Stage 1	-	-	-	-	294	-
Stage 2	-	-	-	-	447	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	588	-	59	234
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	294	-
Stage 2	-	-	-	-	377	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	51.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	59	234	-	-	588	-
HCM Lane V/C Ratio	0.408	0.628	-	-	0.157	-
HCM Control Delay (s)	103	43.2	-	-	12.3	-
HCM Lane LOS	F	E	-	-	B	-
HCM 95th %tile Q(veh)	1.5	3.8	-	-	0.6	-

Intersection	
Int Delay, s/veh	5.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1098	29	71	0	20	122
Future Vol, veh/h	1098	29	71	0	20	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1156	31	92	0	24	147

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1187	0	1356	1172
Stage 1	-	-	-	-	1172	-
Stage 2	-	-	-	-	184	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	588	-	165	234
Stage 1	-	-	-	-	294	-
Stage 2	-	-	-	-	848	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	588	-	139	234
Mov Cap-2 Maneuver	-	-	-	-	139	-
Stage 1	-	-	-	-	294	-
Stage 2	-	-	-	-	716	-

Approach	EB	WB	NB
HCM Control Delay, s	0	12.3	42.2
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	139	234	-	-	588	-
HCM Lane V/C Ratio	0.173	0.628	-	-	0.157	-
HCM Control Delay (s)	36.3	43.2	-	-	12.3	-
HCM Lane LOS	E	E	-	-	B	-
HCM 95th %tile Q(veh)	0.6	3.8	-	-	0.6	-

HCM 6th Signalized Intersection Summary
40: Mana Rd & Mamalahoa Hwy

2031 Without Project PM
06/22/2022

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations							
Traffic Volume (veh/h)	1098	29	71	467	20	122	
Future Volume (veh/h)	1098	29	71	467	20	122	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No			No	No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	1156	31	92	606	24	147	
Peak Hour Factor	0.95	0.95	0.77	0.77	0.83	0.83	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	1212	33	213	1452	196	255	
Arrive On Green	0.67	0.67	0.05	0.78	0.11	0.11	
Sat Flow, veh/h	1813	49	1781	1870	1781	1585	
Grp Volume(v), veh/h	0	1187	92	606	24	147	
Grp Sat Flow(s),veh/h/ln	0	1862	1781	1870	1781	1585	
Q Serve(g_s), s	0.0	51.3	1.2	9.4	1.1	7.6	
Cycle Q Clear(g_c), s	0.0	51.3	1.2	9.4	1.1	7.6	
Prop In Lane		0.03	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	0	1245	213	1452	196	255	
V/C Ratio(X)	0.00	0.95	0.43	0.42	0.12	0.58	
Avail Cap(c_a), veh/h	0	1310	223	1529	364	404	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	0.0	13.3	22.5	3.3	35.3	34.2	
Incr Delay (d2), s/veh	0.0	14.8	1.4	0.2	0.3	2.1	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.0	20.0	1.3	1.8	0.5	2.9	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	0.0	28.1	23.9	3.5	35.6	36.2	
LnGrp LOS	A	C	C	A	D	D	
Approach Vol, veh/h	1187			698	171		
Approach Delay, s/veh	28.1			6.1	36.1		
Approach LOS	C			A	D		

Timer - Assigned Phs		2	3	4			8
Phs Duration (G+Y+Rc), s		14.7	9.5	63.9			73.4
Change Period (Y+Rc), s		5.0	5.0	5.0			5.0
Max Green Setting (Gmax), s		18.0	5.0	62.0			72.0
Max Q Clear Time (g_c+I1), s		9.6	3.2	53.3			11.4
Green Ext Time (p_c), s		0.3	0.0	5.6			4.1

Intersection Summary		
HCM 6th Ctrl Delay		21.3
HCM 6th LOS		C

HCM 6th TWSC
2: Future Homestead Road & Hiiaka St

2041 Without Project AM
06/21/2022

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	107	126	99	173	31	11
Future Vol, veh/h	107	126	99	173	31	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	137	108	188	34	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	253	0	589	185
Stage 1	-	-	-	-	185	-
Stage 2	-	-	-	-	404	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1312	-	471	857
Stage 1	-	-	-	-	847	-
Stage 2	-	-	-	-	674	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1312	-	428	857
Mov Cap-2 Maneuver	-	-	-	-	428	-
Stage 1	-	-	-	-	847	-
Stage 2	-	-	-	-	612	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	493	-	-	1312	-
HCM Lane V/C Ratio	0.093	-	-	0.082	-
HCM Control Delay (s)	13	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.3	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	600	247	31	1264	216	50
Future Volume (vph)	600	247	31	1264	216	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	0.99			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.96			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3361			3535	1770	1565
Flt Permitted	1.00			0.85	0.95	1.00
Satd. Flow (perm)	3361			3022	1770	1565
Peak-hour factor, PHF	0.71	0.71	0.89	0.89	0.65	0.65
Adj. Flow (vph)	845	348	35	1420	332	77
RTOR Reduction (vph)	66	0	0	0	0	34
Lane Group Flow (vph)	1127	0	0	1455	332	43
Confl. Peds. (#/hr)		2	2			2
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	25.7			33.5	14.7	17.5
Effective Green, g (s)	25.7			33.5	14.7	17.5
Actuated g/C Ratio	0.44			0.58	0.25	0.30
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1484			1764	447	605
v/s Ratio Prot	0.34			c0.04	c0.19	0.00
v/s Ratio Perm				c0.44		0.02
v/c Ratio	0.76			0.82	0.74	0.07
Uniform Delay, d1	13.7			10.0	20.0	14.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	2.3			3.3	6.6	0.0
Delay (s)	15.9			13.3	26.6	14.6
Level of Service	B			B	C	B
Approach Delay (s)	15.9			13.3	24.3	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	84	93	173	0	0
Future Vol, veh/h	23	84	93	173	0	0
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	56	56	60	60
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	39	142	166	309	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	183	0	753	112
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	641	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1404	-	380	947
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	528	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1401	-	325	945
Mov Cap-2 Maneuver	-	-	-	-	325	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	452	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.8	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1401	-
HCM Lane V/C Ratio	-	-	-	0.119	-
HCM Control Delay (s)	0	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.4	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	0	1	243	107	45
Future Vol, veh/h	23	0	1	243	107	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	0	2	405	195	82

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	38	0	447	38
Stage 1	-	-	-	-	38	-
Stage 2	-	-	-	-	409	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1572	-	569	1034
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	671	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1572	-	568	1034
Mov Cap-2 Maneuver	-	-	-	-	568	-
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	670	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	655	-	-	1572	-
HCM Lane V/C Ratio	0.422	-	-	0.001	-
HCM Control Delay (s)	14.4	-	-	7.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	2.1	-	-	0	-

Intersection	
Int Delay, s/veh	19.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	476	16	206	1232	22	56
Future Vol, veh/h	476	16	206	1232	22	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	626	21	242	1449	48	122

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	647	0	2570	637
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	1933	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	939	-	~ 29	477
Stage 1	-	-	-	-	527	-
Stage 2	-	-	-	-	124	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	939	-	~ 22	477
Mov Cap-2 Maneuver	-	-	-	-	~ 22	-
Stage 1	-	-	-	-	527	-
Stage 2	-	-	-	-	92	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	268.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	22	477	-	-	939	-
HCM Lane V/C Ratio	2.174	0.255	-	-	0.258	-
HCM Control Delay (s)	$ 912.2	15.1	-	-	10.2	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	6.1	1	-	-	1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	5.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	476	16	206	0	22	56
Future Vol, veh/h	476	16	206	0	22	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	626	21	242	0	48	122

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	647	0	1121	637
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	484	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	939	-	228	477
Stage 1	-	-	-	-	527	-
Stage 2	-	-	-	-	620	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	939	-	169	477
Mov Cap-2 Maneuver	-	-	-	-	169	-
Stage 1	-	-	-	-	527	-
Stage 2	-	-	-	-	460	-

Approach	EB	WB	NB
HCM Control Delay, s	0	10.2	20.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	169	477	-	-	939	-
HCM Lane V/C Ratio	0.283	0.255	-	-	0.258	-
HCM Control Delay (s)	34.5	15.1	-	-	10.2	-
HCM Lane LOS	D	C	-	-	B	-
HCM 95th %tile Q(veh)	1.1	1	-	-	1	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	476	16	206	1232	22	56
Future Volume (veh/h)	476	16	206	1232	22	56
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	626	21	242	1449	48	122
Peak Hour Factor	0.76	0.76	0.85	0.85	0.46	0.46
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1274	43	602	1519	164	236
Arrive On Green	0.71	0.71	0.06	0.81	0.09	0.09
Sat Flow, veh/h	1799	60	1781	1870	1781	1585
Grp Volume(v), veh/h	0	647	242	1449	48	122
Grp Sat Flow(s),veh/h/ln	0	1859	1781	1870	1781	1585
Q Serve(g_s), s	0.0	16.3	3.6	67.6	2.6	7.4
Cycle Q Clear(g_c), s	0.0	16.3	3.6	67.6	2.6	7.4
Prop In Lane		0.03	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1316	602	1519	164	236
V/C Ratio(X)	0.00	0.49	0.40	0.95	0.29	0.52
Avail Cap(c_a), veh/h	0	1333	706	1645	306	362
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	6.8	5.2	8.2	44.3	41.1
Incr Delay (d2), s/veh	0.0	0.3	0.4	12.5	1.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.0	0.8	17.5	1.2	2.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	7.1	5.6	20.6	45.3	42.8
LnGrp LOS	A	A	A	C	D	D
Approach Vol, veh/h	647			1691	170	
Approach Delay, s/veh	7.1			18.5	43.5	
Approach LOS	A			B	D	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		14.7	10.9	79.1		90.0
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s		18.0	12.0	75.0		92.0
Max Q Clear Time (g_c+I1), s		9.4	5.6	18.3		69.6
Green Ext Time (p_c), s		0.3	0.4	4.5		15.4

Intersection Summary	
HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	8.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	132	96	33	22	250	87
Future Vol, veh/h	132	96	33	22	250	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	143	104	36	24	272	95

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	247	0	291	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	96	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1319	-	700	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	928	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1319	-	680	846
Mov Cap-2 Maneuver	-	-	-	-	680	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.7	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	716	-	-	1319	-
HCM Lane V/C Ratio	0.512	-	-	0.027	-
HCM Control Delay (s)	15.2	-	-	7.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.9	-	-	0.1	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1370	203	21	762	329	31
Future Volume (vph)	1370	203	21	762	329	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3460			3535	1770	1562
Flt Permitted	1.00			0.75	0.95	1.00
Satd. Flow (perm)	3460			2649	1770	1562
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.72	0.72
Adj. Flow (vph)	1522	226	23	847	457	43
RTOR Reduction (vph)	13	0	0	0	0	13
Lane Group Flow (vph)	1735	0	0	870	457	30
Confl. Peds. (#/hr)		1	1			2
Confl. Bikes (#/hr)		1				
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	46.2			54.1	24.0	26.9
Effective Green, g (s)	46.2			54.1	24.0	26.9
Actuated g/C Ratio	0.52			0.61	0.27	0.31
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1814			1655	482	565
v/s Ratio Prot	c0.50			c0.02	c0.26	0.00
v/s Ratio Perm				0.31		0.02
v/c Ratio	0.96			0.53	0.95	0.05
Uniform Delay, d1	20.0			9.7	31.4	21.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	12.3			0.3	28.0	0.0
Delay (s)	32.3			10.0	59.5	21.6
Level of Service	C			A	E	C
Approach Delay (s)	32.3			10.0	56.2	
Approach LOS	C			A	E	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	88.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	130	2	33	20	2	3
Future Vol, veh/h	130	2	33	20	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	71	71	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	186	3	46	28	3	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	189	0	308	188
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	120	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1397	-	688	859
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	910	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1397	-	665	859
Mov Cap-2 Maneuver	-	-	-	-	665	-
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	880	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	769	-	-	1397	-
HCM Lane V/C Ratio	0.01	-	-	0.033	-
HCM Control Delay (s)	9.7	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	140	0	33	35	0	0
Future Vol, veh/h	140	0	33	35	0	0
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	97	97	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	147	0	34	36	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	148	0	252	148
Stage 1	-	-	-	-	148	-
Stage 2	-	-	-	-	104	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1434	-	737	899
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	920	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1433	-	719	898
Mov Cap-2 Maneuver	-	-	-	-	719	-
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	898	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1433	-
HCM Lane V/C Ratio	-	-	-	0.024	-
HCM Control Delay (s)	0	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1304	29	71	554	20	122
Future Vol, veh/h	1304	29	71	554	20	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1373	31	92	719	24	147

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1404	0	2292	1389
Stage 1	-	-	-	-	1389	-
Stage 2	-	-	-	-	903	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	486	-	43	175
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	396	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	486	-	35	175
Mov Cap-2 Maneuver	-	-	-	-	35	-
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	321	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	105.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	35	175	-	-	486	-
HCM Lane V/C Ratio	0.688	0.84	-	-	0.19	-
HCM Control Delay (s)	229.5	84.8	-	-	14.1	-
HCM Lane LOS	F	F	-	-	B	-
HCM 95th %tile Q(veh)	2.4	5.9	-	-	0.7	-

Intersection	
Int Delay, s/veh	9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1304	29	71	0	20	122
Future Vol, veh/h	1304	29	71	0	20	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1373	31	92	0	24	147

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1404	0	1573	1389
Stage 1	-	-	-	-	1389	-
Stage 2	-	-	-	-	184	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	486	-	121	175
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	848	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	486	-	98	175
Mov Cap-2 Maneuver	-	-	-	-	98	-
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	688	-

Approach	EB	WB	NB
HCM Control Delay, s	0	14.1	80.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	98	175	-	-	486	-
HCM Lane V/C Ratio	0.246	0.84	-	-	0.19	-
HCM Control Delay (s)	53.3	84.8	-	-	14.1	-
HCM Lane LOS	F	F	-	-	B	-
HCM 95th %tile Q(veh)	0.9	5.9	-	-	0.7	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1304	29	71	554	20	122
Future Volume (veh/h)	1304	29	71	554	20	122
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1373	31	92	719	24	147
Peak Hour Factor	0.95	0.95	0.77	0.77	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1386	31	120	1549	183	216
Arrive On Green	0.76	0.76	0.03	0.83	0.10	0.10
Sat Flow, veh/h	1822	41	1781	1870	1781	1585
Grp Volume(v), veh/h	0	1404	92	719	24	147
Grp Sat Flow(s),veh/h/ln	0	1863	1781	1870	1781	1585
Q Serve(g_s), s	0.0	106.6	2.5	15.6	1.8	12.8
Cycle Q Clear(g_c), s	0.0	106.6	2.5	15.6	1.8	12.8
Prop In Lane		0.02	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1417	120	1549	183	216
V/C Ratio(X)	0.00	0.99	0.77	0.46	0.13	0.68
Avail Cap(c_a), veh/h	0	1421	134	1568	220	249
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	16.9	49.8	3.5	59.4	59.8
Incr Delay (d2), s/veh	0.0	21.6	21.1	0.2	0.3	6.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	43.5	4.0	4.0	0.8	5.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	38.6	70.9	3.7	59.7	65.9
LnGrp LOS	A	D	E	A	E	E
Approach Vol, veh/h	1404			811	171	
Approach Delay, s/veh	38.6			11.3	65.0	
Approach LOS	D			B	E	

Timer - Assigned Phs		2	3	4			8
Phs Duration (G+Y+Rc), s		20.0	9.9	115.7			125.5
Change Period (Y+Rc), s		5.0	5.0	5.0			5.0
Max Green Setting (Gmax), s		18.0	6.0	111.0			122.0
Max Q Clear Time (g_c+I1), s		14.8	4.5	108.6			17.6
Green Ext Time (p_c), s		0.1	0.0	2.1			5.3

Intersection Summary			
HCM 6th Ctrl Delay		31.2	
HCM 6th LOS		C	

Appendix E

Future With Project Intersection Analysis Worksheets

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	110	138	111	185	34	14
Future Vol, veh/h	110	138	111	185	34	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	120	150	121	201	37	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	270	0	638	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	443	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1293	-	441	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	647	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1293	-	395	846
Mov Cap-2 Maneuver	-	-	-	-	395	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	579	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	468	-	-	1293	-
HCM Lane V/C Ratio	0.111	-	-	0.093	-
HCM Control Delay (s)	13.7	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.3	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	452	259	31	974	219	50
Future Volume (vph)	452	259	31	974	219	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	0.99			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.95			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3318			3534	1770	1565
Flt Permitted	1.00			0.88	0.95	1.00
Satd. Flow (perm)	3318			3102	1770	1565
Peak-hour factor, PHF	0.71	0.71	0.89	0.89	0.65	0.65
Adj. Flow (vph)	637	365	35	1094	337	77
RTOR Reduction (vph)	126	0	0	0	0	52
Lane Group Flow (vph)	876	0	0	1129	337	25
Confl. Peds. (#/hr)		2	2			2
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	20.9			28.5	14.5	17.1
Effective Green, g (s)	20.9			28.5	14.5	17.1
Actuated g/C Ratio	0.39			0.54	0.27	0.32
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1308			1689	484	652
v/s Ratio Prot	0.26			c0.03	c0.19	0.00
v/s Ratio Perm				c0.33		0.01
v/c Ratio	0.67			0.67	0.70	0.04
Uniform Delay, d1	13.2			8.8	17.3	12.3
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.3			1.0	4.3	0.0
Delay (s)	14.5			9.9	21.6	12.3
Level of Service	B			A	C	B
Approach Delay (s)	14.5			9.9	19.9	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	53.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	26	84	93	185	0	0
Future Vol, veh/h	26	84	93	185	0	0
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	56	56	60	60
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	44	142	166	330	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	188	0	779	117
Stage 1	-	-	-	-	117	-
Stage 2	-	-	-	-	662	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1398	-	367	941
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	517	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1395	-	313	939
Mov Cap-2 Maneuver	-	-	-	-	313	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	442	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1395	-
HCM Lane V/C Ratio	-	-	-	0.119	-
HCM Control Delay (s)	0	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.4	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	26	0	1	255	107	45
Future Vol, veh/h	26	0	1	255	107	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	0	2	425	195	82

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	43	0	472	43
Stage 1	-	-	-	-	43	-
Stage 2	-	-	-	-	429	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1566	-	551	1027
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	657	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1566	-	550	1027
Mov Cap-2 Maneuver	-	-	-	-	550	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	656	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	638	-	-	1566	-
HCM Lane V/C Ratio	0.433	-	-	0.001	-
HCM Control Delay (s)	14.9	-	-	7.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	2.2	-	-	0	-

Intersection	
Int Delay, s/veh	9.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	365	16	218	940	22	59
Future Vol, veh/h	365	16	218	940	22	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	480	21	256	1106	48	128

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	501	0	2109	491
Stage 1	-	-	-	-	491	-
Stage 2	-	-	-	-	1618	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1063	-	56	578
Stage 1	-	-	-	-	615	-
Stage 2	-	-	-	-	178	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1063	-	~ 43	578
Mov Cap-2 Maneuver	-	-	-	-	~ 43	-
Stage 1	-	-	-	-	615	-
Stage 2	-	-	-	-	135	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	96.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	43	578	-	-	1063	-
HCM Lane V/C Ratio	1.112	0.222	-	-	0.241	-
HCM Control Delay (s)	$ 320.2	13	-	-	9.5	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	4.5	0.8	-	-	0.9	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	5.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	365	16	218	0	22	59
Future Vol, veh/h	365	16	218	0	22	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	480	21	256	0	48	128

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	501	0	1003	491
Stage 1	-	-	-	-	491	-
Stage 2	-	-	-	-	512	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1063	-	268	578
Stage 1	-	-	-	-	615	-
Stage 2	-	-	-	-	602	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1063	-	203	578
Mov Cap-2 Maneuver	-	-	-	-	203	-
Stage 1	-	-	-	-	615	-
Stage 2	-	-	-	-	457	-

Approach	EB	WB	NB
HCM Control Delay, s	0	9.5	17.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	203	578	-	-	1063	-
HCM Lane V/C Ratio	0.236	0.222	-	-	0.241	-
HCM Control Delay (s)	28.1	13	-	-	9.5	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	0.9	0.8	-	-	0.9	-

HCM 6th Signalized Intersection Summary
40: Mana Rd & Mamalahoa Hwy

2026 With Project AM
06/22/2022

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	365	16	218	940	22	59
Future Volume (veh/h)	365	16	218	940	22	59
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	480	21	256	1106	48	128
Peak Hour Factor	0.76	0.76	0.85	0.85	0.46	0.46
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	862	38	599	1294	190	339
Arrive On Green	0.48	0.48	0.11	0.69	0.11	0.11
Sat Flow, veh/h	1779	78	1781	1870	1781	1585
Grp Volume(v), veh/h	0	501	256	1106	48	128
Grp Sat Flow(s),veh/h/ln	0	1856	1781	1870	1781	1585
Q Serve(g_s), s	0.0	9.5	3.1	22.2	1.2	3.4
Cycle Q Clear(g_c), s	0.0	9.5	3.1	22.2	1.2	3.4
Prop In Lane		0.04	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	900	599	1294	190	339
V/C Ratio(X)	0.00	0.56	0.43	0.85	0.25	0.38
Avail Cap(c_a), veh/h	0	1307	839	1956	645	743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	9.0	5.8	5.8	20.4	16.7
Incr Delay (d2), s/veh	0.0	0.5	0.5	2.5	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.6	0.5	2.8	0.5	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	9.6	6.3	8.3	21.1	17.4
LnGrp LOS	A	A	A	A	C	B
Approach Vol, veh/h	501			1362	176	
Approach Delay, s/veh	9.6			7.9	18.4	
Approach LOS	A			A	B	

Timer - Assigned Phs		2	3	4			8
Phs Duration (G+Y+Rc), s		10.3	10.3	29.1			39.4
Change Period (Y+Rc), s		5.0	5.0	5.0			5.0
Max Green Setting (Gmax), s		18.0	12.0	35.0			52.0
Max Q Clear Time (g_c+I1), s		5.4	5.1	11.5			24.2
Green Ext Time (p_c), s		0.4	0.4	2.9			10.3

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

HCM 6th TWSC
2: Future Homestead Road & Hiiaka St

2026 With Project PM
06/21/2022

Intersection	
Int Delay, s/veh	9.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	148	103	37	26	260	103
Future Vol, veh/h	148	103	37	26	260	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	161	112	40	28	283	112

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	273	0	325	217
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1290	-	669	823
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1290	-	648	823
Mov Cap-2 Maneuver	-	-	-	-	648	-
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	887	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.6	17
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	690	-	-	1290	-
HCM Lane V/C Ratio	0.572	-	-	0.031	-
HCM Control Delay (s)	17	-	-	7.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	3.6	-	-	0.1	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1052	210	21	579	339	31
Future Volume (vph)	1052	210	21	579	339	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3438			3533	1770	1564
Flt Permitted	1.00			0.81	0.95	1.00
Satd. Flow (perm)	3438			2851	1770	1564
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.72	0.72
Adj. Flow (vph)	1169	233	23	643	471	43
RTOR Reduction (vph)	23	0	0	0	0	18
Lane Group Flow (vph)	1379	0	0	666	471	25
Confl. Peds. (#/hr)		1	1			2
Confl. Bikes (#/hr)		1				
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	29.6			37.4	19.6	22.4
Effective Green, g (s)	29.6			37.4	19.6	22.4
Actuated g/C Ratio	0.44			0.56	0.29	0.33
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1518			1619	517	639
v/s Ratio Prot	c0.40			c0.02	c0.27	0.00
v/s Ratio Perm				0.21		0.01
v/c Ratio	0.91			0.41	0.91	0.04
Uniform Delay, d1	17.4			8.5	22.9	15.0
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	8.2			0.2	20.3	0.0
Delay (s)	25.6			8.7	43.1	15.1
Level of Service	C			A	D	B
Approach Delay (s)	25.6			8.7	40.8	
Approach LOS	C			A	D	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	146	2	33	24	2	3
Future Vol, veh/h	146	2	33	24	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	71	71	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	209	3	46	34	3	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	212	0	337	211
Stage 1	-	-	-	-	211	-
Stage 2	-	-	-	-	126	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1370	-	663	834
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	905	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1370	-	640	834
Mov Cap-2 Maneuver	-	-	-	-	640	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	874	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	744	-	-	1370	-
HCM Lane V/C Ratio	0.011	-	-	0.034	-
HCM Control Delay (s)	9.9	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	156	0	33	39	0	0
Future Vol, veh/h	156	0	33	39	0	0
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	97	97	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	164	0	34	40	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	165	0	273	165
Stage 1	-	-	-	-	165	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1413	-	716	879
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1412	-	697	878
Mov Cap-2 Maneuver	-	-	-	-	697	-
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.5	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1412	-
HCM Lane V/C Ratio	-	-	-	0.024	-
HCM Control Delay (s)	0	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	992	29	75	424	20	138
Future Vol, veh/h	992	29	75	424	20	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1044	31	97	551	24	166

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1075	0	1805	1060
Stage 1	-	-	-	-	1060	-
Stage 2	-	-	-	-	745	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	649	-	87	272
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	469	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	649	-	74	272
Mov Cap-2 Maneuver	-	-	-	-	74	-
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	399	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	41.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	74	272	-	-	649	-
HCM Lane V/C Ratio	0.326	0.611	-	-	0.15	-
HCM Control Delay (s)	75.6	37	-	-	11.5	-
HCM Lane LOS	F	E	-	-	B	-
HCM 95th %tile Q(veh)	1.2	3.7	-	-	0.5	-

Intersection	
Int Delay, s/veh	5.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	992	29	75	0	20	138
Future Vol, veh/h	992	29	75	0	20	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1044	31	97	0	24	166

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1075	0	1254	1060
Stage 1	-	-	-	-	1060	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	649	-	190	272
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	839	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	649	-	162	272
Mov Cap-2 Maneuver	-	-	-	-	162	-
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	714	-

Approach	EB	WB	NB
HCM Control Delay, s	0	11.5	36.3
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	162	272	-	-	649	-
HCM Lane V/C Ratio	0.149	0.611	-	-	0.15	-
HCM Control Delay (s)	31.1	37	-	-	11.5	-
HCM Lane LOS	D	E	-	-	B	-
HCM 95th %tile Q(veh)	0.5	3.7	-	-	0.5	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	992	29	75	424	20	138
Future Volume (veh/h)	992	29	75	424	20	138
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1044	31	97	551	24	166
Peak Hour Factor	0.95	0.95	0.77	0.77	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1121	33	250	1391	222	288
Arrive On Green	0.62	0.62	0.06	0.74	0.12	0.12
Sat Flow, veh/h	1807	54	1781	1870	1781	1585
Grp Volume(v), veh/h	0	1075	97	551	24	166
Grp Sat Flow(s),veh/h/ln	0	1861	1781	1870	1781	1585
Q Serve(g_s), s	0.0	39.4	1.3	8.1	0.9	7.3
Cycle Q Clear(g_c), s	0.0	39.4	1.3	8.1	0.9	7.3
Prop In Lane		0.03	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1155	250	1391	222	288
V/C Ratio(X)	0.00	0.93	0.39	0.40	0.11	0.58
Avail Cap(c_a), veh/h	0	1275	265	1528	422	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	12.9	17.3	3.5	29.5	28.4
Incr Delay (d2), s/veh	0.0	11.6	1.0	0.2	0.2	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	15.0	1.0	1.5	0.4	2.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	24.5	18.3	3.7	29.7	30.2
LnGrp LOS	A	C	B	A	C	C
Approach Vol, veh/h	1075			648	190	
Approach Delay, s/veh	24.5			5.9	30.1	
Approach LOS	C			A	C	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		14.4	9.4	52.1		61.5
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s		18.0	5.0	52.0		62.0
Max Q Clear Time (g_c+I1), s		9.3	3.3	41.4		10.1
Green Ext Time (p_c), s		0.4	0.0	5.7		3.6

Intersection Summary	
HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	110	138	111	185	34	14
Future Vol, veh/h	110	138	111	185	34	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	120	150	121	201	37	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	270	0	638	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	443	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1293	-	441	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	647	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1293	-	395	846
Mov Cap-2 Maneuver	-	-	-	-	395	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	579	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	468	-	-	1293	-
HCM Lane V/C Ratio	0.111	-	-	0.093	-
HCM Control Delay (s)	13.7	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.3	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	494	259	31	1062	219	50
Future Volume (vph)	494	259	31	1062	219	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	0.99			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.95			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3330			3534	1770	1565
Flt Permitted	1.00			0.86	0.95	1.00
Satd. Flow (perm)	3330			3056	1770	1565
Peak-hour factor, PHF	0.71	0.71	0.89	0.89	0.65	0.65
Adj. Flow (vph)	696	365	35	1193	337	77
RTOR Reduction (vph)	102	0	0	0	0	45
Lane Group Flow (vph)	959	0	0	1228	337	32
Confl. Peds. (#/hr)		2	2			2
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	21.8			29.5	14.8	17.5
Effective Green, g (s)	21.8			29.5	14.8	17.5
Actuated g/C Ratio	0.40			0.54	0.27	0.32
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1336			1684	482	648
v/s Ratio Prot	0.29			c0.04	c0.19	0.00
v/s Ratio Perm				c0.36		0.02
v/c Ratio	0.72			0.73	0.70	0.05
Uniform Delay, d1	13.7			9.4	17.7	12.7
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.9			1.6	4.4	0.0
Delay (s)	15.5			11.0	22.2	12.7
Level of Service	B			B	C	B
Approach Delay (s)	15.5			11.0	20.4	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	26	84	93	185	0	0
Future Vol, veh/h	26	84	93	185	0	0
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	56	56	60	60
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	44	142	166	330	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	188	0	779	117
Stage 1	-	-	-	-	117	-
Stage 2	-	-	-	-	662	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1398	-	367	941
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	517	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1395	-	313	939
Mov Cap-2 Maneuver	-	-	-	-	313	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	442	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1395	-
HCM Lane V/C Ratio	-	-	-	0.119	-
HCM Control Delay (s)	0	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.4	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	26	0	1	255	107	45
Future Vol, veh/h	26	0	1	255	107	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	0	2	425	195	82

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	43	0	472	43
Stage 1	-	-	-	-	43	-
Stage 2	-	-	-	-	429	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1566	-	551	1027
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	657	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1566	-	550	1027
Mov Cap-2 Maneuver	-	-	-	-	550	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	656	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	638	-	-	1566	-
HCM Lane V/C Ratio	0.433	-	-	0.001	-
HCM Control Delay (s)	14.9	-	-	7.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	2.2	-	-	0	-

Intersection	
Int Delay, s/veh	11.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	398	16	218	1026	22	59
Future Vol, veh/h	398	16	218	1026	22	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	524	21	256	1207	48	128

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	545	0	2254	535
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	1719	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1024	-	~ 46	545
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	159	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1024	-	~ 35	545
Mov Cap-2 Maneuver	-	-	-	-	~ 35	-
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	119	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	133.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	35	545	-	-	1024	-
HCM Lane V/C Ratio	1.366	0.235	-	-	0.25	-
HCM Control Delay (s)	$ 455	13.6	-	-	9.7	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	5.1	0.9	-	-	1	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	5.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	398	16	218	0	22	59
Future Vol, veh/h	398	16	218	0	22	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	524	21	256	0	48	128

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	545	0	1047	535
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	512	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1024	-	253	545
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	602	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1024	-	190	545
Mov Cap-2 Maneuver	-	-	-	-	190	-
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	452	-

Approach	EB	WB	NB
HCM Control Delay, s	0	9.7	18.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	190	545	-	-	1024	-
HCM Lane V/C Ratio	0.252	0.235	-	-	0.25	-
HCM Control Delay (s)	30.2	13.6	-	-	9.7	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	1	0.9	-	-	1	-

HCM 6th Signalized Intersection Summary
40: Mana Rd & Mamalahoa Hwy

2031 With Project AM
06/22/2022

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	398	16	218	1026	22	59
Future Volume (veh/h)	398	16	218	1026	22	59
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	524	21	256	1207	48	128
Peak Hour Factor	0.76	0.76	0.85	0.85	0.46	0.46
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	995	40	603	1368	185	310
Arrive On Green	0.56	0.56	0.09	0.73	0.10	0.10
Sat Flow, veh/h	1786	72	1781	1870	1781	1585
Grp Volume(v), veh/h	0	545	256	1207	48	128
Grp Sat Flow(s),veh/h/ln	0	1857	1781	1870	1781	1585
Q Serve(g_s), s	0.0	11.2	3.2	29.7	1.5	4.3
Cycle Q Clear(g_c), s	0.0	11.2	3.2	29.7	1.5	4.3
Prop In Lane		0.04	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1035	603	1368	185	310
V/C Ratio(X)	0.00	0.53	0.42	0.88	0.26	0.41
Avail Cap(c_a), veh/h	0	1377	792	1910	528	615
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	8.4	5.6	6.2	25.0	21.4
Incr Delay (d2), s/veh	0.0	0.4	0.5	3.9	0.7	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.1	0.6	4.8	0.6	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	8.8	6.1	10.1	25.8	22.2
LnGrp LOS	A	A	A	B	C	C
Approach Vol, veh/h	545			1463	176	
Approach Delay, s/veh	8.8			9.4	23.2	
Approach LOS	A			A	C	

Timer - Assigned Phs	2	3	4			8
Phs Duration (G+Y+Rc), s	11.3	10.6	38.8			49.4
Change Period (Y+Rc), s	5.0	5.0	5.0			5.0
Max Green Setting (Gmax), s	18.0	12.0	45.0			62.0
Max Q Clear Time (g_c+I1), s	6.3	5.2	13.2			31.7
Green Ext Time (p_c), s	0.4	0.4	3.4			12.7

Intersection Summary		
HCM 6th Ctrl Delay		10.4
HCM 6th LOS		B

HCM 6th TWSC
2: Future Homestead Road & Hiiaka St

2031 With Project PM
06/22/2022

Intersection	
Int Delay, s/veh	9.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	148	103	37	26	260	103
Future Vol, veh/h	148	103	37	26	260	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	161	112	40	28	283	112

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	273	0	325	217
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1290	-	669	823
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1290	-	648	823
Mov Cap-2 Maneuver	-	-	-	-	648	-
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	887	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.6	17
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	690	-	-	1290	-
HCM Lane V/C Ratio	0.572	-	-	0.031	-
HCM Control Delay (s)	17	-	-	7.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	3.6	-	-	0.1	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1147	210	21	632	339	31
Future Volume (vph)	1147	210	21	632	339	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3445			3534	1770	1563
Flt Permitted	1.00			0.79	0.95	1.00
Satd. Flow (perm)	3445			2799	1770	1563
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.72	0.72
Adj. Flow (vph)	1274	233	23	702	471	43
RTOR Reduction (vph)	18	0	0	0	0	17
Lane Group Flow (vph)	1489	0	0	725	471	26
Confl. Peds. (#/hr)		1	1			2
Confl. Bikes (#/hr)		1				
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	36.3			44.1	22.3	25.1
Effective Green, g (s)	36.3			44.1	22.3	25.1
Actuated g/C Ratio	0.48			0.58	0.29	0.33
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1636			1642	516	615
v/s Ratio Prot	c0.43			c0.02	c0.27	0.00
v/s Ratio Perm				0.24		0.01
v/c Ratio	0.91			0.44	0.91	0.04
Uniform Delay, d1	18.5			9.2	26.1	17.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	7.8			0.2	20.5	0.0
Delay (s)	26.4			9.4	46.6	17.5
Level of Service	C			A	D	B
Approach Delay (s)	26.4			9.4	44.2	
Approach LOS	C			A	D	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	146	2	33	24	2	3
Future Vol, veh/h	146	2	33	24	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	71	71	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	209	3	46	34	3	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	212	0	337	211
Stage 1	-	-	-	-	211	-
Stage 2	-	-	-	-	126	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1370	-	663	834
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	905	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1370	-	640	834
Mov Cap-2 Maneuver	-	-	-	-	640	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	874	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	744	-	-	1370	-
HCM Lane V/C Ratio	0.011	-	-	0.034	-
HCM Control Delay (s)	9.9	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	156	0	33	39	0	0
Future Vol, veh/h	156	0	33	39	0	0
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	97	97	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	164	0	34	40	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	165	0	273	165
Stage 1	-	-	-	-	165	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1413	-	716	879
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1412	-	697	878
Mov Cap-2 Maneuver	-	-	-	-	697	-
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.5	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1412	-
HCM Lane V/C Ratio	-	-	-	0.024	-
HCM Control Delay (s)	0	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1082	29	75	463	20	138
Future Vol, veh/h	1082	29	75	463	20	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1139	31	97	601	24	166

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1170	0	1950	1155
Stage 1	-	-	-	-	1155	-
Stage 2	-	-	-	-	795	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	597	-	71	240
Stage 1	-	-	-	-	300	-
Stage 2	-	-	-	-	445	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	597	-	59	240
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	300	-
Stage 2	-	-	-	-	373	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	55
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	59	240	-	-	597	-
HCM Lane V/C Ratio	0.408	0.693	-	-	0.163	-
HCM Control Delay (s)	103	48.1	-	-	12.2	-
HCM Lane LOS	F	E	-	-	B	-
HCM 95th %tile Q(veh)	1.5	4.5	-	-	0.6	-

Intersection	
Int Delay, s/veh	6.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1082	29	75	0	20	138
Future Vol, veh/h	1082	29	75	0	20	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1139	31	97	0	24	166

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1170	0	1349	1155
Stage 1	-	-	-	-	1155	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	597	-	166	240
Stage 1	-	-	-	-	300	-
Stage 2	-	-	-	-	839	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	597	-	139	240
Mov Cap-2 Maneuver	-	-	-	-	139	-
Stage 1	-	-	-	-	300	-
Stage 2	-	-	-	-	703	-

Approach	EB	WB	NB
HCM Control Delay, s	0	12.2	46.6
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	139	240	-	-	597	-
HCM Lane V/C Ratio	0.173	0.693	-	-	0.163	-
HCM Control Delay (s)	36.3	48.1	-	-	12.2	-
HCM Lane LOS	E	E	-	-	B	-
HCM 95th %tile Q(veh)	0.6	4.5	-	-	0.6	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1082	29	75	463	20	138
Future Volume (veh/h)	1082	29	75	463	20	138
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1139	31	97	601	24	166
Peak Hour Factor	0.95	0.95	0.77	0.77	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1156	31	198	1410	219	282
Arrive On Green	0.64	0.64	0.05	0.75	0.12	0.12
Sat Flow, veh/h	1812	49	1781	1870	1781	1585
Grp Volume(v), veh/h	0	1170	97	601	24	166
Grp Sat Flow(s),veh/h/ln	0	1861	1781	1870	1781	1585
Q Serve(g_s), s	0.0	49.9	1.3	9.5	1.0	7.8
Cycle Q Clear(g_c), s	0.0	49.9	1.3	9.5	1.0	7.8
Prop In Lane		0.03	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1188	198	1410	219	282
V/C Ratio(X)	0.00	0.99	0.49	0.43	0.11	0.59
Avail Cap(c_a), veh/h	0	1188	210	1424	394	437
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	14.4	21.2	3.6	31.7	30.8
Incr Delay (d2), s/veh	0.0	22.5	1.9	0.2	0.2	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	22.0	1.2	1.8	0.4	2.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	36.8	23.1	3.8	32.0	32.7
LnGrp LOS	A	D	C	A	C	C
Approach Vol, veh/h	1170			698	190	
Approach Delay, s/veh	36.8			6.5	32.6	
Approach LOS	D			A	C	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		15.0	9.4	57.0		66.4
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s		18.0	5.0	52.0		62.0
Max Q Clear Time (g_c+I1), s		9.8	3.3	51.9		11.5
Green Ext Time (p_c), s		0.3	0.0	0.1		4.0

Intersection Summary		
HCM 6th Ctrl Delay		26.1
HCM 6th LOS		C

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	110	138	111	185	34	14
Future Vol, veh/h	110	138	111	185	34	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	120	150	121	201	37	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	270	0	638	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	443	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1293	-	441	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	647	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1293	-	395	846
Mov Cap-2 Maneuver	-	-	-	-	395	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	579	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	468	-	-	1293	-
HCM Lane V/C Ratio	0.111	-	-	0.093	-
HCM Control Delay (s)	13.7	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.3	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	588	259	31	1261	219	50
Future Volume (vph)	588	259	31	1261	219	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	0.99			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.95			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3353			3535	1770	1565
Flt Permitted	1.00			0.85	0.95	1.00
Satd. Flow (perm)	3353			3018	1770	1565
Peak-hour factor, PHF	0.71	0.71	0.89	0.89	0.65	0.65
Adj. Flow (vph)	828	365	35	1417	337	77
RTOR Reduction (vph)	73	0	0	0	0	36
Lane Group Flow (vph)	1120	0	0	1452	337	41
Confl. Peds. (#/hr)		2	2			2
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	25.7			33.5	14.8	17.6
Effective Green, g (s)	25.7			33.5	14.8	17.6
Actuated g/C Ratio	0.44			0.57	0.25	0.30
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1478			1759	449	606
v/s Ratio Prot	0.33			c0.04	c0.19	0.00
v/s Ratio Perm				c0.43		0.02
v/c Ratio	0.76			0.83	0.75	0.07
Uniform Delay, d1	13.7			10.0	20.0	14.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	2.3			3.3	6.9	0.0
Delay (s)	16.0			13.3	27.0	14.5
Level of Service	B			B	C	B
Approach Delay (s)	16.0			13.3	24.7	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	26	84	93	185	0	0
Future Vol, veh/h	26	84	93	185	0	0
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	59	59	56	56	60	60
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	44	142	166	330	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	188	0	779	117
Stage 1	-	-	-	-	117	-
Stage 2	-	-	-	-	662	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1398	-	367	941
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	517	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1395	-	313	939
Mov Cap-2 Maneuver	-	-	-	-	313	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	442	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1395	-
HCM Lane V/C Ratio	-	-	-	0.119	-
HCM Control Delay (s)	0	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.4	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	26	0	1	255	107	45
Future Vol, veh/h	26	0	1	255	107	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	0	2	425	195	82

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	43	0	472	43
Stage 1	-	-	-	-	43	-
Stage 2	-	-	-	-	429	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1566	-	551	1027
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	657	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1566	-	550	1027
Mov Cap-2 Maneuver	-	-	-	-	550	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	656	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	638	-	-	1566	-
HCM Lane V/C Ratio	0.433	-	-	0.001	-
HCM Control Delay (s)	14.9	-	-	7.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	2.2	-	-	0	-

Intersection	
Int Delay, s/veh	21.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	473	16	218	1220	22	59
Future Vol, veh/h	473	16	218	1220	22	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	622	21	256	1435	48	128

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	643	0	2580	633
Stage 1	-	-	-	-	633	-
Stage 2	-	-	-	-	1947	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	942	-	~ 28	480
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	122	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	942	-	~ 20	480
Mov Cap-2 Maneuver	-	-	-	-	~ 20	-
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	89	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	293
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	20	480	-	-	942	-
HCM Lane V/C Ratio	2.391	0.267	-	-	0.272	-
HCM Control Delay (s)	$ 1038.1	15.2	-	-	10.2	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	6.3	1.1	-	-	1.1	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	5.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	473	16	218	0	22	59
Future Vol, veh/h	473	16	218	0	22	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	85	85	46	46
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	622	21	256	0	48	128

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	643	0	1145	633
Stage 1	-	-	-	-	633	-
Stage 2	-	-	-	-	512	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	942	-	221	480
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	602	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	942	-	161	480
Mov Cap-2 Maneuver	-	-	-	-	161	-
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	438	-

Approach	EB	WB	NB
HCM Control Delay, s	0	10.2	21
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	161	480	-	-	942	-
HCM Lane V/C Ratio	0.297	0.267	-	-	0.272	-
HCM Control Delay (s)	36.5	15.2	-	-	10.2	-
HCM Lane LOS	E	C	-	-	B	-
HCM 95th %tile Q(veh)	1.2	1.1	-	-	1.1	-

HCM 6th Signalized Intersection Summary
40: Mana Rd & Mamalahoa Hwy

2041 With Project AM
06/22/2022

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	473	16	218	1220	22	59
Future Volume (veh/h)	473	16	218	1220	22	59
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	622	21	256	1435	48	128
Peak Hour Factor	0.76	0.76	0.85	0.85	0.46	0.46
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1232	42	595	1497	172	254
Arrive On Green	0.69	0.69	0.06	0.80	0.10	0.10
Sat Flow, veh/h	1799	61	1781	1870	1781	1585
Grp Volume(v), veh/h	0	643	256	1435	48	128
Grp Sat Flow(s),veh/h/ln	0	1859	1781	1870	1781	1585
Q Serve(g_s), s	0.0	16.2	3.8	63.9	2.4	7.2
Cycle Q Clear(g_c), s	0.0	16.2	3.8	63.9	2.4	7.2
Prop In Lane		0.03	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1274	595	1497	172	254
V/C Ratio(X)	0.00	0.50	0.43	0.96	0.28	0.50
Avail Cap(c_a), veh/h	0	1274	721	1580	330	395
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	7.4	5.5	8.3	40.7	37.2
Incr Delay (d2), s/veh	0.0	0.3	0.5	13.8	0.9	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.0	0.9	17.0	1.1	2.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	7.7	6.0	22.1	41.6	38.8
LnGrp LOS	A	A	A	C	D	D
Approach Vol, veh/h	643			1691	176	
Approach Delay, s/veh	7.7			19.6	39.5	
Approach LOS	A			B	D	

Timer - Assigned Phs	2	3	4	8
Phs Duration (G+Y+Rc), s	14.4	11.2	71.5	82.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	18.0	13.0	64.0	82.0
Max Q Clear Time (g_c+I1), s	9.2	5.8	18.2	65.9
Green Ext Time (p_c), s	0.3	0.4	4.5	11.7

Intersection Summary	
HCM 6th Ctrl Delay	18.0
HCM 6th LOS	B

HCM 6th TWSC
2: Future Homestead Road & Hiiaka St

2041 With Project PM
06/21/2022

Intersection	
Int Delay, s/veh	9.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	148	103	37	26	260	103
Future Vol, veh/h	148	103	37	26	260	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	161	112	40	28	283	112

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	273	0	325	217
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1290	-	669	823
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1290	-	648	823
Mov Cap-2 Maneuver	-	-	-	-	648	-
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	887	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.6	17
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	690	-	-	1290	-
HCM Lane V/C Ratio	0.572	-	-	0.031	-
HCM Control Delay (s)	17	-	-	7.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	3.6	-	-	0.1	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1363	210	21	752	339	31
Future Volume (vph)	1363	210	21	752	339	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3458			3534	1770	1562
Flt Permitted	1.00			0.75	0.95	1.00
Satd. Flow (perm)	3458			2646	1770	1562
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.72	0.72
Adj. Flow (vph)	1514	233	23	836	471	43
RTOR Reduction (vph)	13	0	0	0	0	13
Lane Group Flow (vph)	1734	0	0	859	471	30
Confl. Peds. (#/hr)		1	1			2
Confl. Bikes (#/hr)		1				
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	5	3
Permitted Phases			8			5
Actuated Green, G (s)	46.2			54.1	24.1	27.0
Effective Green, g (s)	46.2			54.1	24.1	27.0
Actuated g/C Ratio	0.52			0.61	0.27	0.31
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1811			1652	483	566
v/s Ratio Prot	c0.50			c0.02	c0.27	0.00
v/s Ratio Perm				0.30		0.02
v/c Ratio	0.96			0.52	0.98	0.05
Uniform Delay, d1	20.1			9.7	31.8	21.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	12.4			0.3	34.3	0.0
Delay (s)	32.5			10.0	66.0	21.6
Level of Service	C			A	E	C
Approach Delay (s)	32.5			10.0	62.3	
Approach LOS	C			A	E	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	146	2	33	24	2	3
Future Vol, veh/h	146	2	33	24	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	71	71	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	209	3	46	34	3	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	212	0	337	211
Stage 1	-	-	-	-	211	-
Stage 2	-	-	-	-	126	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1370	-	663	834
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	905	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1370	-	640	834
Mov Cap-2 Maneuver	-	-	-	-	640	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	874	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	744	-	-	1370	-
HCM Lane V/C Ratio	0.011	-	-	0.034	-
HCM Control Delay (s)	9.9	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	156	0	33	39	0	0
Future Vol, veh/h	156	0	33	39	0	0
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	97	97	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	164	0	34	40	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	165	0	273	165
Stage 1	-	-	-	-	165	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1413	-	716	879
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1412	-	697	878
Mov Cap-2 Maneuver	-	-	-	-	697	-
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.5	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1412	-
HCM Lane V/C Ratio	-	-	-	0.024	-
HCM Control Delay (s)	0	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	10

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1288	29	75	550	20	138
Future Vol, veh/h	1288	29	75	550	20	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1356	31	97	714	24	166

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1387	0	2280	1372
Stage 1	-	-	-	-	1372	-
Stage 2	-	-	-	-	908	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	494	-	44	179
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	393	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	494	-	35	179
Mov Cap-2 Maneuver	-	-	-	-	35	-
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	316	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	118.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	35	179	-	-	494	-
HCM Lane V/C Ratio	0.688	0.929	-	-	0.197	-
HCM Control Delay (s)	229.5	102.2	-	-	14.1	-
HCM Lane LOS	F	F	-	-	B	-
HCM 95th %tile Q(veh)	2.4	7.1	-	-	0.7	-

Intersection	
Int Delay, s/veh	11.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1288	29	75	0	20	138
Future Vol, veh/h	1288	29	75	0	20	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	60	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	77	77	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1356	31	97	0	24	166

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1387	0	1566	1372
Stage 1	-	-	-	-	1372	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	494	-	122	179
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	839	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	494	-	98	179
Mov Cap-2 Maneuver	-	-	-	-	98	-
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	675	-

Approach	EB	WB	NB
HCM Control Delay, s	0	14.1	96
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	98	179	-	-	494	-
HCM Lane V/C Ratio	0.246	0.929	-	-	0.197	-
HCM Control Delay (s)	53.3	102.2	-	-	14.1	-
HCM Lane LOS	F	F	-	-	B	-
HCM 95th %tile Q(veh)	0.9	7.1	-	-	0.7	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1288	29	75	550	20	138
Future Volume (veh/h)	1288	29	75	550	20	138
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1356	31	97	714	24	166
Peak Hour Factor	0.95	0.95	0.77	0.77	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1363	31	119	1531	202	237
Arrive On Green	0.75	0.75	0.04	0.82	0.11	0.11
Sat Flow, veh/h	1821	42	1781	1870	1781	1585
Grp Volume(v), veh/h	0	1387	97	714	24	166
Grp Sat Flow(s),veh/h/ln	0	1863	1781	1870	1781	1585
Q Serve(g_s), s	0.0	107.9	3.4	16.5	1.8	14.6
Cycle Q Clear(g_c), s	0.0	107.9	3.4	16.5	1.8	14.6
Prop In Lane		0.02	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1394	119	1531	202	237
V/C Ratio(X)	0.00	1.00	0.81	0.47	0.12	0.70
Avail Cap(c_a), veh/h	0	1394	139	1552	218	252
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	18.2	52.2	3.9	58.6	59.3
Incr Delay (d2), s/veh	0.0	22.9	26.4	0.2	0.3	7.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	45.5	4.4	4.5	0.8	6.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	41.1	78.7	4.1	58.8	67.1
LnGrp LOS	A	D	E	A	E	E
Approach Vol, veh/h	1387			811	190	
Approach Delay, s/veh	41.1			13.1	66.1	
Approach LOS	D			B	E	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		21.7	10.3	115.0		125.3
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s		18.0	7.0	110.0		122.0
Max Q Clear Time (g_c+I1), s		16.6	5.4	109.9		18.5
Green Ext Time (p_c), s		0.1	0.0	0.1		5.3

Intersection Summary	
HCM 6th Ctrl Delay	33.6
HCM 6th LOS	C