JOSH GREEN, M.D.
GOVERNOR
STATE OF HAWAII
Ke Kiaʻāina o ka Mokuʻāina ʻo Hawaiʻi

SYLVIA J. LUKE
LT. GOVERNOR
STATE OF HAWAII
Ka Hope Kiaʻāina o ka Mokuʻāina ʻo Hawaiʻi

KALI WATSON
CHAIRPERSON, HHC
Ka Luna Hoʻokele

KATIE L. DUCATT
DEPUTY TO THE CHAIR
Ka Hope Luna Hoʻokele

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
Ka ʻOihana ʻĀina Hoʻopulapula Hawaiʻi
P. O. BOX 1879
HONOLULU, HAWAII 96805

May 22, 2024

Mary Alice Evans, Director
State of Hawaiʻi
Office of Planning and Sustainable Development
Environmental Review Program (ERP)
235 S. Beretania Street, Room 702
Honolulu, Hawaiʻi 96813

SUBJECT: Department of Hawaiian Home Lands (DHHL) Wailuku Single Family Residential Subdivision Project Final Environmental Assessment- Finding of No Significant Impact (FEA-FONSI)
Tax Map Key (TMK): (2) 3-5-002:003 (por.), Wailuku District on the Island of Maui

Dear Director Evans:

With this letter, the Hawaiian Homes Commission hereby transmits the Final Environmental Assessment- Finding of No Significant Impact (FEA-FONSI) for the DHHL Wailuku Single Family Residential Subdivision Project, located at TMK (2) 3-5-002:003 (por.) in the Wailuku district, on the Island of Maui, for publication in the June 08, 2024, edition of *The Environmental Notice*.

We have uploaded an electronic copy of this letter, the Environmental Review Program Publication Form, and a searchable PDF file of the FEA-FONSI compiled together by the Applicant's agent, G70 to your online submittal site.

Should you have any questions, please contact Kawika McKeague, AICP, G70 Principal by email at wailukusfr@g70.design or by phone at 808-523-5866.

Aloha,

Kali Watson

Kali Watson, Chairperson
Hawaiian Homes Commission

From: webmaster@hawaii.gov
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice
Date: Friday, May 24, 2024 4:32:15 PM

Action Name

Wailuku Single Family Residential Subdivision Project

Type of Document/Determination

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

HRS §343-5(a) Trigger(s)

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

Judicial district

Wailuku, Maui

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

(2) 3-5-002:003 (por.)

Action type

Agency

Other required permits and approvals

Clean Water Act, Informal Jurisdictional Determination; HRS Chapter 6E Compliance; HAR Chapter 11-55, National Pollutant Discharge Elimination System Permit; State Construction Plan Review; HAR Chapter 11-46, Noise Permit; County Permit to Excavate Public Right-of-Way; County Sewage Connection Permit; Building Permits for Building, Electrical, Plumbing, Sidewalk/Driveway, and Demolition Work; Grubbing, Excavation, Grading, and Stockpiling; Permit to Excavate Public Right-of-Way; County Water Use Permit

Proposing/determining agency

Department of Hawaiian Home Lands

Agency contact name

Cornelius Nugent

Agency contact email (for info about the action)

cornelius.f.nugent@hawaii.gov

Email address or URL for receiving comments

wailukusfr@g70.design

Agency contact phone

(808) 620-9278

Agency address

P.O. Box 1879
Honolulu, Hawaii 96805
United States

[Map It]

Is there a consultant for this action?

Yes

Consultant

G70

Consultant contact name

Mark Kawika McKeague

Consultant contact email

[kawikam@g70.design]

Consultant contact phone

(808) 936-1527

Consultant address

111 S. King Street
Suite 170
Honolulu, Hawaii 96825
United States
[Map It]

Action summary

The Project involves the development and construction of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key single-family residences [purchase and potential rent-with-option-to-purchase] and 31 vacant improved lots for single-family residences) for DHHL beneficiaries. Each of the 204 lots will have a minimum lot area of 7,500 square feet (SF). Project improvements on the Site will also include grading and grubbing and the installation of underground and overhead infrastructure to serve the residences and vacant lots, including potable water, fire protection, wastewater, drainage, street lights, electrical power, and telecommunication utility connections. Vehicle access to the Site will be provided by two full-access intersections along Kuikahi Drive. An approximately 3.1-acre linear park with an option for a community farm will be provided for residents on the southern portion of the Site.

Reasons supporting determination

HAR §11-200.1-2 defines "significant effect" as the sum of effects on the quality of the environment. Based on a review of the significance criteria outlined in HRS Chapter 343, and HAR §11-200.13, the Project has been determined to not result in a significant effect/impact on the quality of the environment. Therefore, per HAR §11-200.1-14, DHHL has issued a determination of Finding of No Significant Impact (FONSI) for the Project. The potential impacts of the Project have been fully examined and discussed in this Final EA. A summary of the Project assessed alongside the significance criteria is summarized below:

(1) Irrevocably commit a natural, cultural, or historic resource.

The Project will not irrevocably commit a natural, cultural, or historic resource. The property is not a shoreline fronting property. The proposed project will complement existing residential and urban uses found throughout Wailuku and Waikapū. A Biological Resource Study has been prepared to assess the potential impacts the Project would have on natural resources. According to the Biological Resource Study there are no native flora species, or host plants that support native fauna such as the Blackburn's Sphinx Moth (Manduca blackburni). One flora species of note is the Madagascar fireweed (Senecio madagascariensis Poir) which is on the USDA Natural Resources Conservation Service's Noxious Weed list and is considered a harmful weed which is harmful to the environment or animals and would be properly removed during construction. The Project does not involve an irrevocable commitment to loss or destruction of any natural resource. For further discussion, see Section 3.5, Flora and Fauna.

An AIS was prepared in 2005 by SCS, which was inclusive of the Site. The four historic sites found with the Site were indicative of the extensive industrial level sugar cane modifications and operations in the area and were assessed as significant under "Criterion D". These sites were adequately documented and no further work was recommended in the SHPD accepted AIS. A CIA was prepared by Keala Pono Archaeological Consulting, LLC. According to the CIA, there are no ongoing cultural practices identified at the Site.

While the SHPD has previously stated that no further work is necessary, DHHL has elected to conduct archaeological monitoring as an extra measure of assurance that all ground disturbance construction-related activities at the Site is managed in a culturally appropriate manner. As such, an AMP will be prepared in advance of site construction and the contractor, once selected, will be required to follow the provisions of the AMP. An archaeological field inspection was conducted by SCS on August 24, 2020 consisting of a pedestrian walk through of the Site to determine if Pōhakoʻi was present at the Site. No discoveries were made. The belief is that Pōhakoʻi may have been relocated due to the extensive agricultural clearing and landscape modifications that previously occurred in the area. Future efforts to locate this important stone and landmark will be undertaken during the archaeological monitoring of the Project area during future ground altering activities. DHHL is committed to keeping open access open for resource gathering and cultural purposes. With the implementation of proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on existing cultural properties, resources or traditional cultural and resource gathering practices.

(2) Curtail the range of beneficial uses of the environment.

The Project will not curtail the range of beneficial uses of the environment. According to HAR § 11-200-1-2, "environment" refers to humanity's surroundings, inclusive of all the physical, economic, cultural, and social conditions that exist within the area affected by a proposed action, including land, human, and animal communities, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. The Project involves the construction of residences for DHHL beneficiaries on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. The Site has not been in agricultural production for many years and is located within the directed growth plan limits and the Urban Growth and Rural Boundary in the County's Maui Island Plan: General Plan 2030. On Maui, approximately 70,714 acres of the land area are within the ALISH "Prime" agricultural designation, this represents approximately 15% of the island. The Project involves the use of 77 acres or 0.11% of the "Prime" acreage on Maui for a much-needed residential subdivision with lots and homes for Native Hawaiian beneficiaries and their families in an existing sub-urban/urban context.

The Project will provide residential housing that will assist in addressing the demand of the DHHL waiting list. Along with the Project, Urban growth in the surrounding area provide an opportunity for employment. In the long term, there will be increased expenditure for the buildout of single-family homes and maintenance of the Project. The Project will also generate revenues for the State and County. The Project seeks to support the Native Hawaiian population by providing residential accommodations, while the local economy benefits from job creation and resident spending.

The Project also aims to complement and enhance existing development within the Wailuku/Waikapū area. Careful consideration has been given to the site plan, lot layout, and linear park during the planning process to be sensitive and place appropriate to the surrounding Wailuku and Waikapū residential communities. The homes will not exceed two stories or 30 feet in height following the allowable height for both residential use and agricultural district. Development of the Project will utilize Best Management Practices (BMPs) to minimize any construction-related impacts. A State NPDES permit and County grading permit will be obtained to ensure that construction activity does not adversely impact water quality.

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

The Project does not conflict with the State's long-term environmental policies or goals and guidelines as expressed in HRS Chapter 343 and 344. This Draft EA was prepared to ensure the Project will not have a significant adverse impact on the environment. Where mitigation measures are recommended due to the Project's potential impacts, the DHHL will implement those applicable measures to the extent possible to curtail potential long-term impacts to the environment.

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

The Project will result in short-term economic benefits from construction that include direct, indirect, and induced employment opportunities and multiplier impacts. After development, the Project will have positive long-term effects on the community's social welfare by providing beneficiaries homesteading opportunities and permanent residences near governmental and commercial services and potential employment opportunities. Other beneficial impacts will continue through long-term jobs, annual taxes, including real property tax, and resident spending.

The Project is not anticipated to have a substantial adverse effect on cultural practices. A CIA was prepared for the Project by Keala Pono. According to the CIA, there are no cultural practices that occur at the Site. To minimize any potential impacts on cultural resources and practices in the greater Wailuku area, DHHL will implement relevant mitigation measures.

While the SHPD has previously stated that no further work is necessary, DHHL has elected to conduct archaeological monitoring as an extra measure of assurance that all ground disturbance construction-related activities at the Site is managed in a culturally appropriate manner. As such, an AMP will be prepared in advance of site construction and the contractor, once selected, will be required to follow the provisions of the AMP. An archaeological field inspection was conducted by SCS on August 24, 2020 consisting of a pedestrian walk through of the Site to determine if Pōhakoʻi was present at the Site. No discoveries were made. The belief is that Pōhakoʻi may have been relocated due to the extensive agricultural clearing and landscape modifications that previously occurred in the area. Future efforts to locate this important stone and landmark will be undertaken during the archaeological monitoring of the Project area during future ground altering activities. DHHL is committed to keeping open access open for resource gathering and cultural purposes. With the implementation of proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on existing cultural properties, resources or traditional cultural and resource gathering practices.

(5) Have a substantial adverse effect on public health.

The Project is not anticipated to have a substantial adverse effect on public health. The Project will comply with relevant State and County regulations during the construction and will implement BMPs to minimize and mitigate potential temporary air quality and noise impacts and secure NPDES permit(s), as necessary. The Phase 1 ESA did not reveal RECs, HRECs or CRECs on the Site. The Project is not anticipated to create a significant amount of GHG emissions and does not fall within the threshold of mandatory Federal GHG reporting.

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

The Project is not anticipated to involve adverse secondary impacts, such as significant population changes or effects on public facilities. The Project will provide needed long term, permanent housing in Wailuku, Central Maui for DHHL beneficiaries and their families. While some beneficiaries may move to Maui from neighboring islands to reside at this subdivision, most are expected to relocate from other areas on Maui. As such, the Project is not anticipated to involve substantial secondary impacts due to population/demographic changes. The DHHL will provide the necessary onsite and offsite infrastructure to support the Project, which is within service capacities and will not overcommit resources. No substantial changes or effects on public facilities are expected with the Project implementation.

(7) Involve a substantial degradation of environmental quality.

The Project is not anticipated to involve a substantial degradation of environmental quality. During construction, there is the potential for temporary short-term nuisances related to noise and dust in the immediate Project vicinity. The Project will comply with relevant State and County regulations and will implement BMPs, including dust control and noise mitigation measures, to minimize potential impacts and secure NPDES permit(s), as necessary to ensure that construction activity does not adversely impact nearby water quality. Drainage system improvements will be constructed in accordance with applicable regulatory design standards to ensure that surface runoff will not have an adverse effect on adjacent or downstream properties. Long-term significant impacts to soils, climate, water quality, flora and fauna, air quality, noise conditions, and natural resources are not anticipated.

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

The Project is not anticipated to have a substantial cumulative adverse effect upon the environment or involve a commitment for larger actions. The Project is limited to the development of the proposed residential subdivision and is not a phase or increment of a larger project. The Project is not reliant upon or a trigger for another development. The Project will have relatively negligible cumulative impacts, such as a change in use of agricultural lands, slight population shift, requirement of infrastructure such as potable water, wastewater service, power, and telecommunication, slight increase of traffic on surrounding roadways, and slight increase of GHG emissions. The project in question, situated within an area already developed with similar residential subdivisions, is not expected to have a substantial adverse effect on the environment. It is not part of a larger action or commitment to such actions, and given the surrounding residential developments, significant environmental impacts are not foreseen. The project occupies a relatively small portion of prime land on Maui, and the site is not designated as exclusive high-quality farmland. The project aims to meet beneficiary demand for residential homesteads in Central Maui, offering a prime location with readily available infrastructure and amenities. The slight population increase it will bring to the area is not expected to alter regional or Maui's overall population projections. Furthermore, the project's impacts on utilities and infrastructure are considered relatively negligible. In terms of climate change, its contribution to global greenhouse gas emissions will be relatively minor, complying with energy-efficient policies and mitigation measures. Additionally, the project is expected to have positive socio-economic impacts on jobs, earnings, tax revenues, and beneficiaries' access to essential services and employment opportunities. Consequently, with the proposed mitigation measures, the project is not expected to result in significant adverse cumulative, indirect, or secondary impacts on the environment or larger actions.

DHHL will provide the necessary infrastructure to serve the Project. Drainage, wastewater, water, and roadway improvements. This infrastructure will be designed to meet applicable local, State, and Federal regulations. The engineering and traffic reports prepared for the Project have assessed potential impacts and designed infrastructure systems in the context of future planned regional growth. The Project is anticipated to have beneficial short- and long-term cumulative and indirect impacts on jobs, earnings, and tax revenues. The socio-economic benefits associated with providing beneficiaries permanent residences nearby governmental and commercial services and potential employment opportunities are innumerable and should not be understated.
(9) Have a substantial adverse effect on a rare, threatened or endangered species, or its habitat.

A Biological Resources Study was prepared for the Project to ensure that any sensitive terrestrial flora/fauna biological resources within the Site would be identified and provided adequate protection. There are two native fauna species that were discovered on Site, the globe skimmer dragonfly (Pantala flavescens), and the endangered, endemic ʻōpeʻapeʻa or Hawaiian Hoary Bat (Lasiurus cinereus semotus). Migratory sea birds, and State-listed waterbirds may also exist within the Site though it was not identified during the Biological Resource Study. DHHL will implement mitigation measures typically recommended by USFWS or DOFAW to avoid or minimize potential adverse impacts to these species. To avoid impacts to the globe skimmer dragon fly, the contractor would do its best in avoiding harming the common species. To avoid impacts to the Hawaiian Hoary Bat, any woody plants greater than 15 feet tall will not be disturbed, removed, or trimmed during the bat birthing and pup-rearing season (June 1 through September 15). Additionally, barbed wire will not be used for fencing. If the woody plants that are greater than 15 feet must be disturbed, removed, or trimmed, the contractor will not do so without consulting USFWS and DLNR, DOFAW. Nighttime construction will be avoided during the seabird fledging period (September 15 through December 15) to prevent injury to seabirds. Outdoor lights will be shielded to the maximum extent possible to direct the light downward. The Contractor will provide construction crews with information about seabird fallout prior to the initiation of work. If a downed seabird is found, the Contractor will contact the USFWS immediately. With the implementation of the proposed mitigation measures, the Project is not anticipated to substantially affect rare, threatened, or endangered species or its habitat.

(10) Have a substantial adverse effect on air or water quality or ambient noise levels.

The Project is not anticipated to have a substantial adverse effect on air or water quality or ambient noise levels. During construction, there is the potential for temporary, short-term impacts on existing air quality, noise conditions in the immediate Project vicinity. Equipment mufflers or other noise attenuating equipment as well as proper vehicle maintenance and limiting construction to daylight hours will be used during construction activities. Construction noise impacts will be mitigated through compliance with the provisions of the State of Hawaiʻi, Department of Health (DOH) Administrative Rules Title 11, Chapter 46, “Community Noise Control.” These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in Chapter 46. In the long term, the proposed new community is not anticipated to significantly impact ambient noise levels. The Project will comply with applicable State and County regulations during the construction and will implement BMPs and will secure NPDES Permit(s), as required to minimize temporary impacts. A stormwater detention basin will reduce potential water pollution through sediment removal and will comply with the County’s water quality rules and regulations.

(11) Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

The Project is located in Flood Zone X, an area of minimal flood risk. The Site is located upland approximately 2.3-miles from the ocean outside of the Tsunami and Extreme Tsunami zone and the 3.2-foot projected SLRXA. Although irrigation water flows through the Site in manmade ditches (i.e. Waiheʻe ditch, and two unnamed ditches), recommended BMPs will be implemented during construction for erosion and sedimentation control to minimize potential impacts to water quality. Also, drainage improvements will be designed to mitigate runoff in accordance with County drainage and stormwater quality rules and regulations.

The Project is not anticipated to have a substantial adverse effect on or is likely to suffer damage by being in an environmentally sensitive area such as flood plain, tsunami zone, SLR-XA, 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.

The Project has been designed to complement and enhance the existing landscape and subdivisions within the Wailuku and Waikapū district. DHHL will also ensure that the single-family residences, when developed by individual owners on vacant lots, are consistent with the overall design intent and vision for the Project. Careful consideration has been given to the site plan, lot layout, turn-key homes, and linear park during the planning process to be sensitive and place appropriate to the surrounding developed Wailuku and Waikapū residential communities. The homes will not exceed two stories or 30 feet in height following the allowable height for residential.

The Project is not anticipated to have a substantial adverse effect on scenic vistas and view planes, during day or night. The Project design will be compatible with the surrounding residential buildings and generally within allowable development limits per the MCC.

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

Construction of the Project will require similar or less energy consumption and produce GHG emissions relative to other similar-sized residential projects. While the majority of construction-related activities utilize diesel operated construction equipment, there may be short-term electrical energy needs while the Project is under construction. Short-term greenhouse gas emissions associated with construction activities are anticipated during the construction phase of the Project. Following construction, energy consumption will be necessary for the operational phase of the Project. Energy conservation and efficiency measures will be incorporated into the Project design phase of development to reduce overall energy use and greenhouse gas emissions within the new residential community. Energy efficient fixtures, appliances and solar water heating systems will be installed in the residences, as feasible. The Project is not anticipated to require substantial energy consumption or emit substantial greenhouse gases.

Attached documents (signed agency letter & EA/EIS)

- Wailuku-SFR-ERP-FEA-Publication-Letter-part-1-signed.pdf
- Wailuku-FEA-2024-05-24.pdf

Shapefile

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

Action location map

- WailukuSFR_ProjectLocation.zip

Authorized individual

Kialoa Kaholokahiki Kiyuna Mossman

Authorization

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

Wailuku Single Family Residential Subdivision Project

FINAL ENVIRONMENTAL ASSESSMENT

WAILUKU, ISLAND OF MAUI

TMK: (2) 3-5-002:003 (POR.)

PROPOSING AGENCY/DETERMINING AGENCY:

STATE OF HAWAIʻI
DEPARTMENT OF HAWAIIAN HOME LANDS

PREPARED BY:

G70

JUNE 2024

Wailuku Single Family Residential Subdivision Project

FINAL ENVIRONMENTAL ASSESSMENT

WAILUKU, ISLAND OF MAUI

TMK: (2) 3-5-002:003 (POR.)

PROPOSING AGENCY/DETERMINING AGENCY:

STATE OF HAWAI'I
DEPARTMENT OF HAWAIIAN HOMELANDS
91-5420 KAPOLEI PARKWAY,
KAPOLEI, HAWAI'I 96707

The document and all ancillary documents were prepared under my direction and in accordance with the content requirements of Chapter 343, Hawai'i Revised Statutes, and Title 11, Chapter 200.1, Hawai'i Administrative Rules.

PREPARED BY:

G70
111 S. KING STREET, SUITE 170
HONOLULU, HI 96813

JUNE 2024

Table of Contents

List of Figures

List of Tables

Appendices

Acronyms and Abbreviations

AIS	Archaeological Inventory Survey
ALISH	Agricultural Lands of Importance to the State of Hawaiʻi
AMP	Archaeological Monitoring Plan
AMSL	Above Mean Sea Level
BMPs	Best Management Practices
CAB	Clean Air Branch, DOH, State
CATV	Cable Television
CDP	Census-designated Place
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CIA	Cultural Impact Assessment
CO_2 EQ	Carbon Dioxide Equivalents
County	County of Maui
CPHC	Central Pacific Hurricane Center
CREC	Controlled Recognized Environmental Conditions
CWRM	Commission on Water Resource Management, DLNR, State
CZM	Coastal Zone Management
dB	Decibel
dBA	A-weighted decibels
DBEDT	Department of Business, Economic Development and Tourism, State
DEM	Department of Environmental Management, County
DFPS	Department of Fire and Public Safety, County
DHHL	Department of Hawaiian Home Lands, State
DLNR	Department of Land and Natural Resources, State
DOE	Department of Education, State
DOFAW	Division of Forestry and Wildlife, DLNR, State
DOH	Department of Health, State
DOH-CWB	Clean Water Branch, DOH, State
DOH-SDWB	Safe Drinking Water Branch, DOH, State
DOT	Department of Transportation
DPW	Department of Public Works, County
DWS	Department of Water Supply, County
EA	Environmental Assessment
ED	Engineering Division, DPW, County
EPA	Environmental Protection Agency, United States
ESA	Environmental Site Assessment

FAA	Federal Aviation Administration
FDH	Fiber Distribution Hub
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
gpd	gallons per day
HAR	Hawai‘i Administrative Rules
HDOA	Department of Agriculture, State
HDOT	Department of Transportation, State
HECO	Hawaiian Electric Co. Ltd.
HHCA	Hawaiian Homes Commission Act
HREC	Historical Recognized Environmental Conditions
HRS	Hawai‘i Revised Statutes
HTCO	Hawaiian Telcom
HWMO	Hawai‘i Wildfire Management Organization
IAL	Important Agricultural Lands
IRHB	Indoor and Radiological Health Branch, DOH, State
kWh	Kilowatt Hours
KWWRF	Kahului Wastewater Reclamation Facility
LCA(w)	Land Commission Awards
LOS	Level of Service
LSB	Land Survey Bureau
LUC	Land Use Code
MCC	Maui County Code
MDOT	Department of Transportation, County
MDWS	County of Maui Department of Water Supply
mgd	Million Gallons per Day
MIP	Maui Island Plan
MPD	Maui Police Department, County
mph	Miles per Hour
NAAQS	National Ambient Air Quality Standards
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWS	National Weather Service
OGG	Kahului Airport
PER	Preliminary Engineering Report
PGA	Peak Ground Acceleration

PM	Particulate Matter
PTWC	Pacific Tsunami Warning Center, NOAA
PV	Photo Voltaic
RECs	Recognized Environmental Conditions
ROW	Right-of-Way
SAAQS	State Ambient Air Quality Standards
SCS	Scientific Consultant Services, Inc.
SDC	Seismic Design Category
SDWB	Safe Drinking Water Branch
SF	Square Feet
SHPD	State Historic Preservation Division, DLNR, State
SIC	Sandwich Isle Communications
SIHP	State Inventory of Historic Places
SLR	Sea Level Rise
SLR-XA	Sea Level Rise Exposure Area
SLU	State Land Use
SMA	Special Management Area
SMS	SMS Marketing & Research Services, Inc.
State	State of Hawaiʻi
SAAQS	State Ambient Air Quality Standards
TIAR	Traffic Impact Analysis Report
TMK	Tax Map Key
UIC	Underground Injection Control
U.S.	United States
USDA-NRCS	United States Department of Agriculture, Natural Resources Conservation Service
USFWS	United States Fish and Wildlife Service
WPOD	Wellhead Protection Overlay District
WUDP	Water Use and Development Plan
WRD	Wastewater Reclamation Division, DEM, County

Chapter 1

Introduction

Chapter 1

Introduction

1.1 Project Information Summary

Type of Document:	Final Environmental Assessment
Project Name:	Wailuku Single Family Residential Subdivision Project
Proposing Agency:	State of Hawaiʻi (State) Department of Hawaiian Home Lands (DHHL) 91-5420 Kapolei Parkway, Kapolei, Hawaiʻi 96707 Contact: Cornelius Nugent, Engineer, Land Development Division
Determining Agency:	Hawaiian Homes Commission 91-5420 Kapolei Parkway, Kapolei, Hawaiʻi 96707 Contact: Kali Watson, Chairperson
Agent:	G70 111 S. King Street, Suite 170 Honolulu, Hawaiʻi 96813 Contact: Kawika McKeague, AICP, Principal
Hawaiʻi Revised Statutes (HRS) Chapter 343 Trigger:	HRS §343-5(a)(1), Use of State lands and funds
Project Address:	101 Kuikahi Drive, Wailuku, Maui, Hawaiʻi (*Figure 1-1*)
Tax Map Key (TMK) and Fee Owner:	TMK: (2) 3-5-002:003 (por.); Kuikahi Properties, LLC (*Figure 1-2*)
Project Area:	Approximately 77-acres (TMK parcel is 148.012 acres)
State Land Use District:	Agricultural District (*Figure 1-3*)
County of Maui (County) Zoning District:	Agriculture District (*Figure 1-4*)
Wailuku-Kahului Community Plan (2002):	Agriculture District (*Figure 1-5*)
County Maui Island Plan:	Urban / Rural (*Figure 1-6*)
Special Management Area (SMA):	Outside of SMA (*Figure 1-7*)

Federal Emergency Management Agency Flood Zone:	Zone X (*Figure 1-8*)
Determination:	Anticipated Finding of No Significant Impact

1.2 Project Overview

The State of Hawai‘i (State), Department of Hawaiian Home Lands (DHHL) is proposing to undertake the “Wailuku Single Family Residential Subdivision Project” (Project), which involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots, (173 turn-key single-family residences [“residences”] and 31 vacant improved lots for single-family residences [“vacant lots”]); DHHL beneficiaries (“beneficiaries/residents”) will be able to purchase the residence out right or via a potential rent-with-option-to-purchase option. The Project is proposed to be developed on an approximately 77-acre portion (Site) of a parcel identified by Tax Map Key (TMK): (2) 3-5-002:003 (por.), located at 101 Kuikahi Drive in the Waikapū Ahupua‘a, Wailuku District, on the island of Maui, and is owned by the DHHL. See *Figure 1-1, Project Location*, and *Figure 1-2, Tax Map Key.*

1.3 Basis for Environmental Review

This Project triggers a need for an environmental review under Hawai‘i Revised Statutes (HRS) §343-5(a)(1), as it proposes the use of State land and funds. Therefore, this Final Environmental Assessment (EA) has been prepared in accordance with the requirements of HRS Chapter 343, and Hawai‘i Administrative Rules (HAR) Chapter 11-200.1.

This Final EA is presented in eight chapters and includes the following: a description of the Project; a list of necessary permits/approvals; a description of the existing environment, potential impacts and proposed mitigation measures on identified natural, cultural, and socioeconomic resources; a description of alternatives; a discussion of the Project’s relationship to land use plans and policies; findings supporting the determination; a list of stakeholders who participated in the consultation of the Final EA; and a list of references.

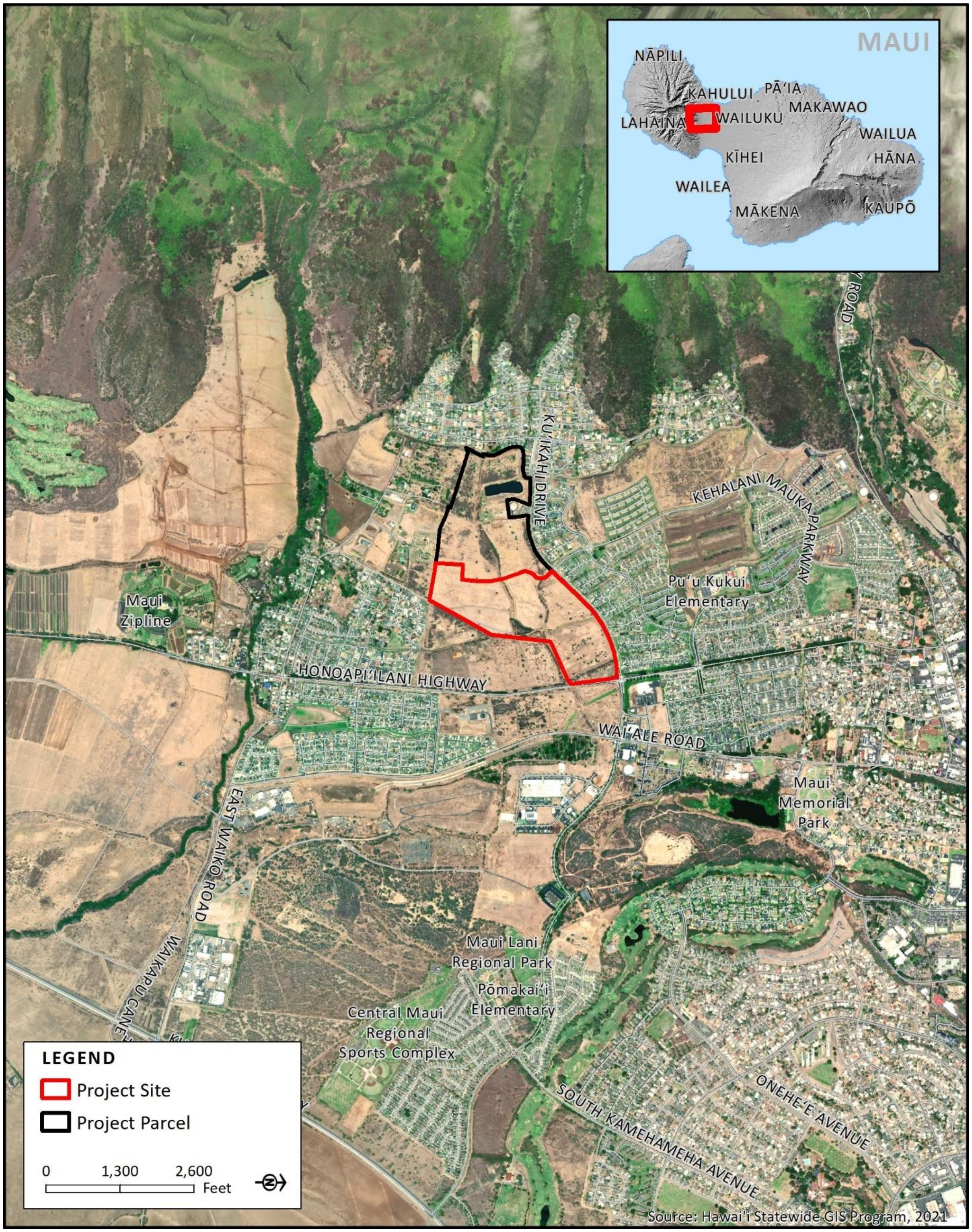

Figure 1-1 **Project Location**

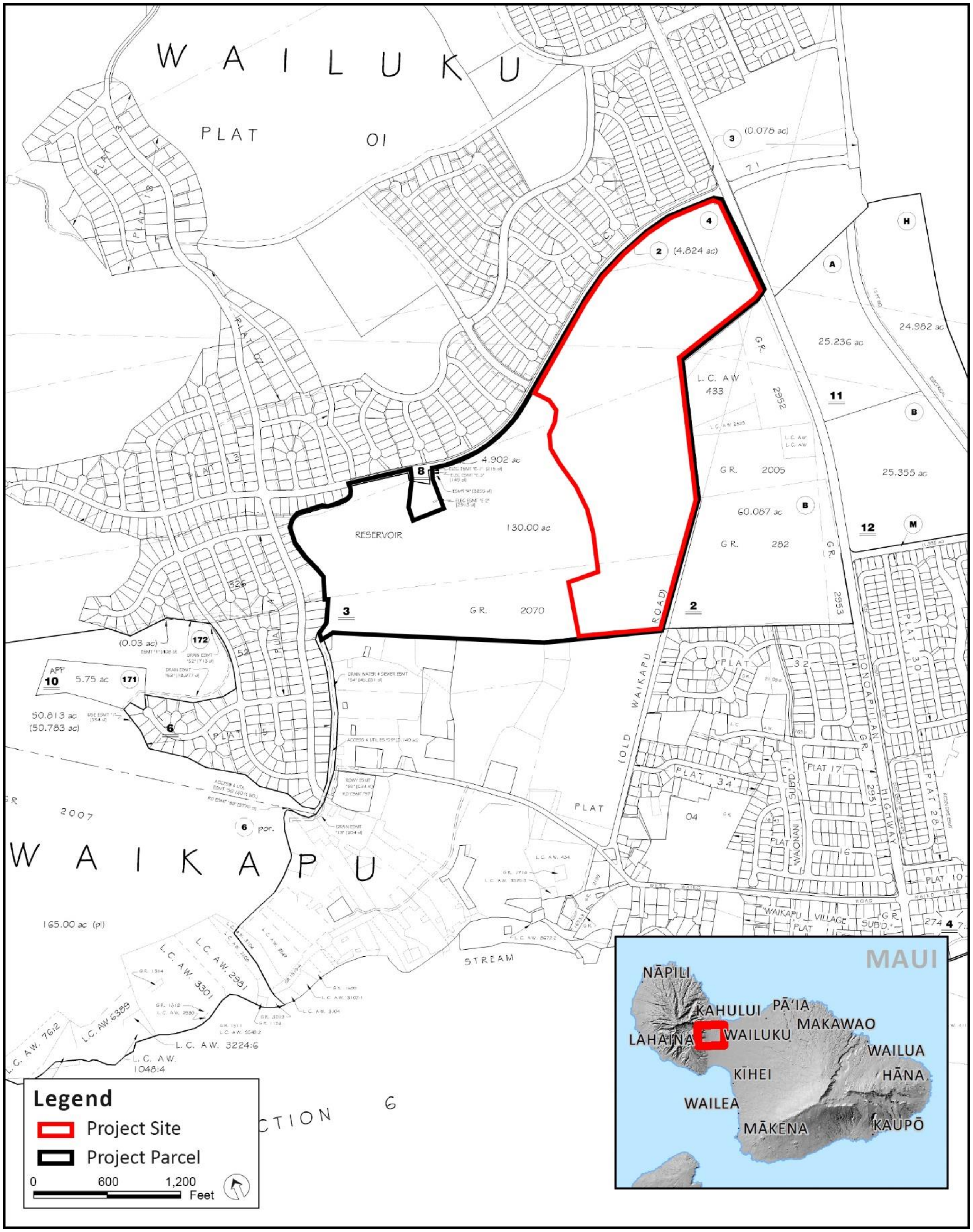

Figure 1-2 **Tax Map Key**

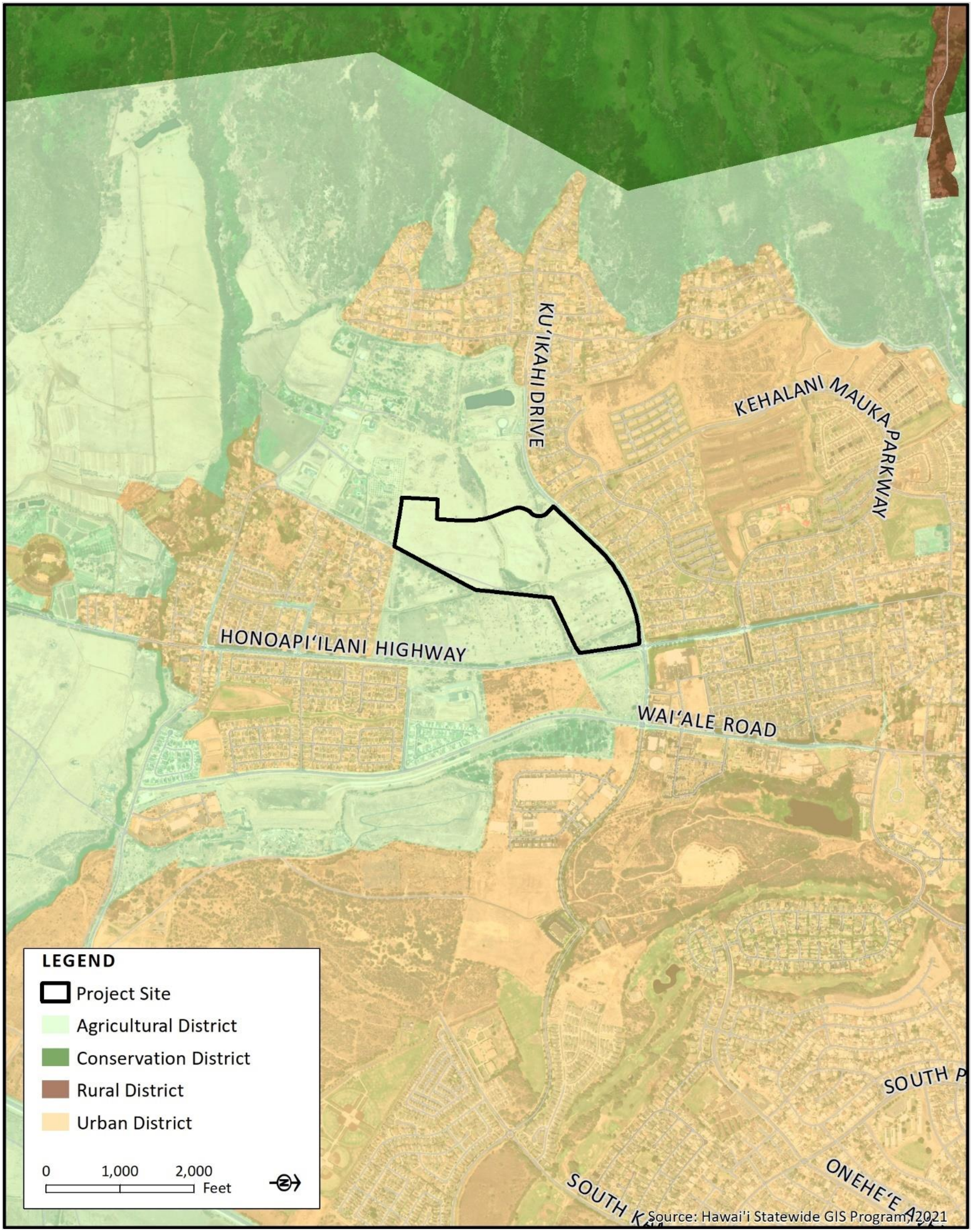

Figure 1-3 **State Land Use District**

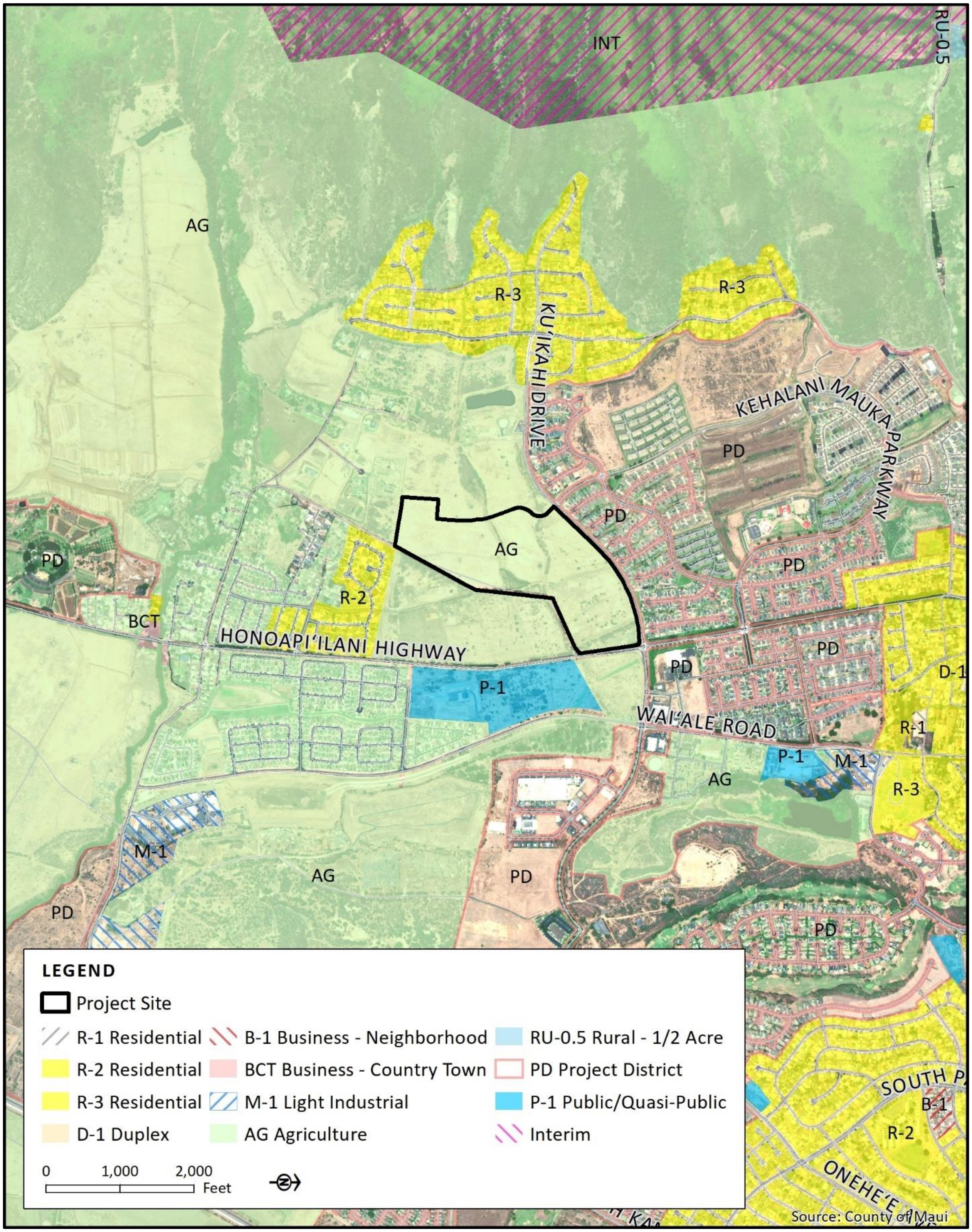

Figure 1-4 **County Zoning**

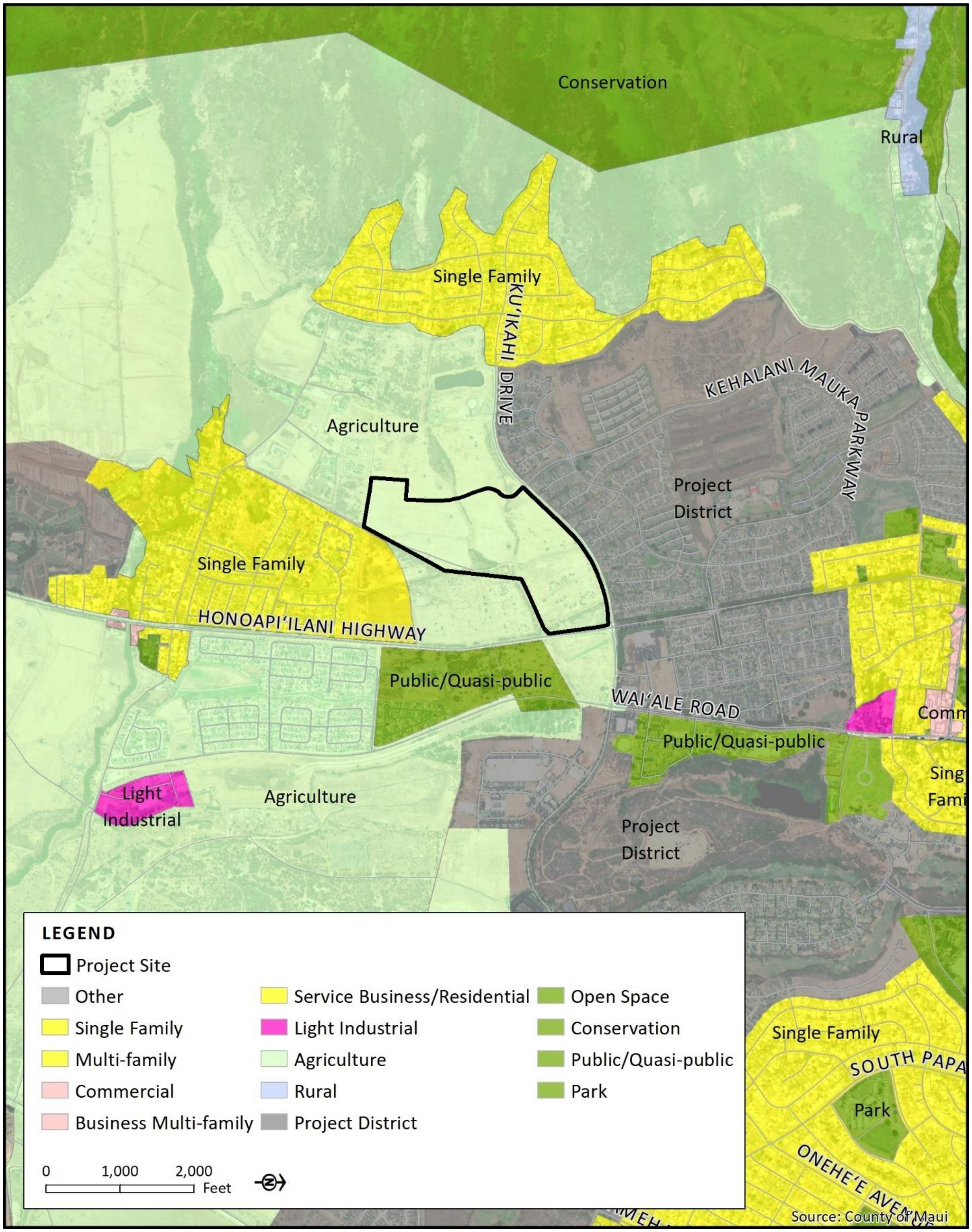

Figure 1-5 **Wailuku-Kahului Community Plan Land Use**

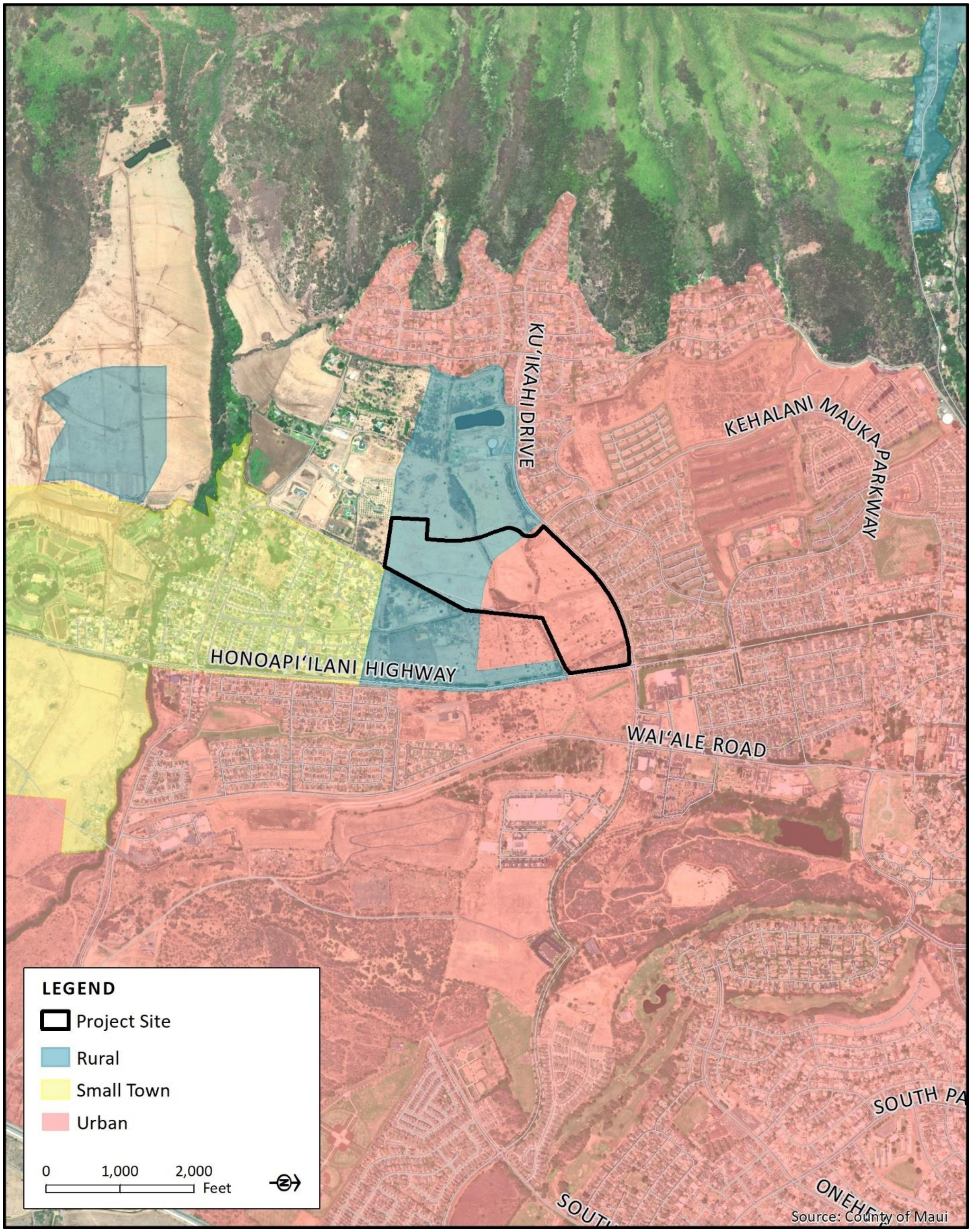

Figure 1-6 **County Maui Island Plan**

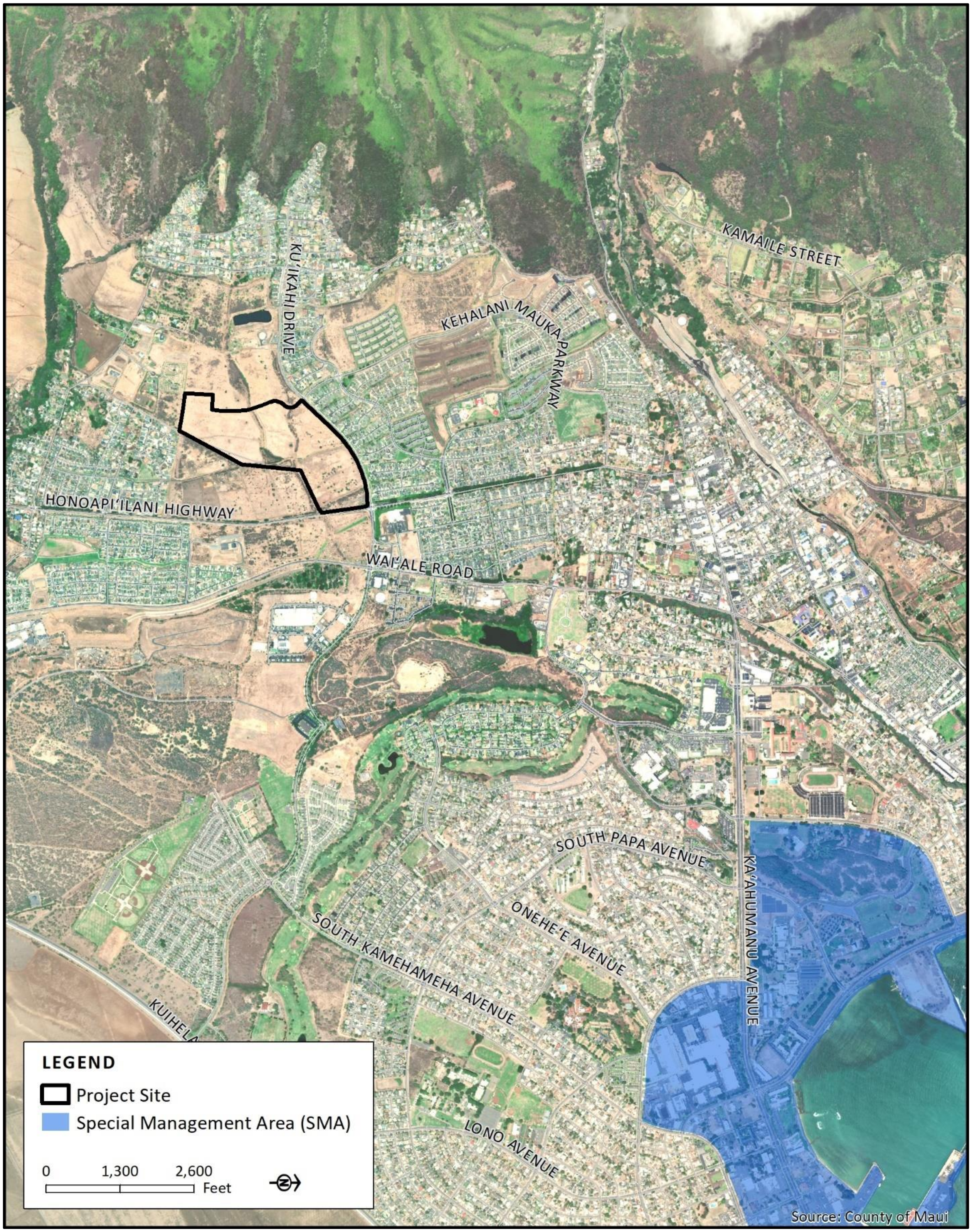

Figure 1-7 **Special Management Area**

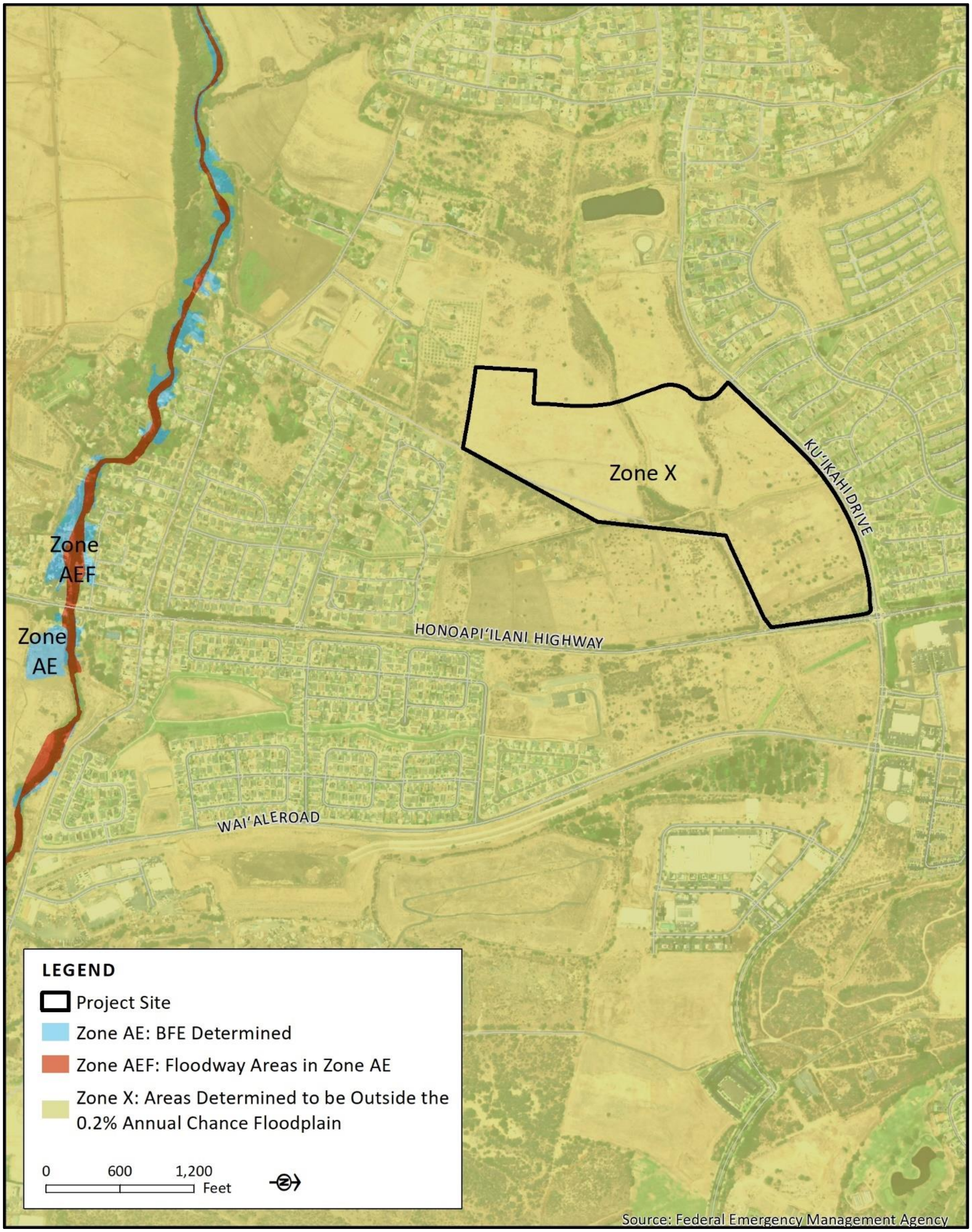

Figure 1-8 **FEMA Flood Zone**

Chapter 2

Description of the Proposed Action

Chapter 2

Description of the Proposed Action

2.1 Description of the Existing Facilities and Uses

The Site historically was utilized for agriculture (sugar cane and pineapple cultivation) from circa 1950 until the early 2000s. Remnants of an old irrigation network include the Waiheʻe Ditch, which runs through the center of the Site in a north-south direction. Additionally, there are two unnamed ditches – one runs in an east-west direction, the other in a north-south direction.

The Site is currently utilized as the base yard for Clean & Green Landscape Services who maintain the adjacent Kehalani development common area landscaping, and for goat grazing. The Site is undeveloped with no existing buildings, structures, utility infrastructure, or improved roads.

2.2 Description of the Proposed Action

The Project (Proposed Action) involves the development and construction of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key single-family residences [purchase and potential rent-with-option-to-purchase] and 31 vacant improved lots for single-family residences) for DHHL beneficiaries. Lot and residence sizes will be similar to those in nearby residential subdivisions. Each of the 204 lots will have a minimum lot area of 7,500 square feet (SF). The 173 residences will have a similar aesthetic to existing residences in nearby subdivisions, with horizontal siding and an asphalt shingle roof. The 173 turn-key residences will comprise of five residence model types – one- to two-story dwellings, ranging from 2 to 5 bedrooms and 1 to 3 baths, with living areas ranging from approximately 764 square SF to 1,675 SF. The provision of 31 vacant lots allows beneficiaries the flexibility to build a residence within a beneficiary's budget/preference on their own or to partner with a non-profit such as Habitat for Humanity. The 31 vacant lots will be improved with graded pads and utility connections stubbed to each lot. The conceptual subdivision site layout and lot configuration is shown in *Figure 2-1*, *Conceptual Site Plan*. Preliminary floor plans and exterior elevation renderings of the five residence model types are shown in *Appendix A, Preliminary Plans.*

Project improvements on the Site will also include grading and grubbing and the installation of underground and overhead infrastructure to serve the residences and vacant lots, including potable water, fire protection, wastewater, drainage, street lights, electrical power, and telecommunication utility connections. The Project involves the construction of a new underground drain inlet/line within the Site's internal streets, which will convey offsite and be allowed to pass through the project parcel into the existing drainageway adjacent to the Site until finally entering the Waiale Reservoir similar to what it does currently. An approximately 9-acre-foot stormwater detention basin will be located at the northeast corner of the Site to mitigate the anticipated increase in peak stormwater flows from the Site. Vehicle access to the Site will be provided by two full-access intersections along Kuikahi Drive. The subdivision will have new internal streets with 44-foot-wide Right of Ways (ROWs) and will generally conform to County of Maui (County) subdivision standards. Approximately 450 feet of paved shoulder along the southern side of Kuikahi Drive will be widened to provide a continuous 5-foot-wide paved walkway between Kehalani Mauka Parkway and Honoapiʻilani Highway. All internal streets within the Site will have a 5-foot-wide paved sidewalk along one side of the street. Bicyclists will be able to traverse along the low-volume internal streets. An approximately 3.1-acre linear park with an option for a community farm will be provided for residents on the southern portion of the Site. Landscaping and irrigation will be provided within the park and along internal streets consistent with County standards.

While the proposed Project is referred to as the "Wailuku Single Family Residential" Project, the DHHL recognizes the importance of placenames and will work with the beneficiaries, to select an appropriate placename for the subdivision that honors its location in Wailuku/Waikapū.

2.3 Project Background

The 1920 Hawaiian Homes Commission Act (HHCA), enacted by the U.S. Congress, was codified within the State Constitution in 1959. The DHHL is governed by the HHCA; with the mission to effectively manage the Hawaiian Homelands Trust and to administer and develop Hawaiian home lands to native Hawaiian beneficiaries (defined as having at least 50% blood quantum). Beneficiaries may receive 99-year homestead leases at $1 per year for residential purposes and the leases may be extended for an aggregate term not to exceed 199 years.

The purpose of the HHCA states:

(a) The Congress of the United States and the State of Hawaii declare that the policy of this Act is 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 the administration of this Act, and the preservation of the values, traditions, and culture of native Hawaiians.

(b) The principal purposes of this Act include but are not limited to:

- *(1) Establishing a permanent land base for the benefit and use of native Hawaiians, upon which they may live, farm, ranch, and otherwise engage in commercial or industrial or any other activities as authorized in this Act;*
- *(2) Placing native Hawaiians on the lands set aside under this Act in a prompt and efficient manner and assuring long-term tenancy to beneficiaries of this Act and their successors;*
- *(3) Preventing alienation of the fee title to the lands set aside under this Act so that these lands will always be held in trust for continued use by native Hawaiians in perpetuity;*

The HHCA vests onto the DHHL the authority to use its lands at its discretion. The HHCA Section 204 states, "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." Therefore, the HHCA grants the DHHL the authority to proceed with the development of the proposed residential subdivision even though the Site is not fully entitled for residential use. The DHHL intends to design and construct the Project to generally conform with the Maui County Code (MCC) development standards; however, the DHHL is authorized to exempt the Project from the MCC, and intends to, as presented in this Final EA.

The DHHL has implemented its own planning system consisting of a General Plan, Island Plans, Regional Plans, Program Plans, and Special Area Plans. The *DHHL General Plan Update* (adopted in 2022), lists the following Housing goals:

- GOAL HS-1: Increase the number of housing opportunities awarded each year.
- GOAL HS-2: Provide a mix of housing opportunities that reflect the needs and desires of native Hawaiian beneficiaries.

DHHL maintains waiting lists comprised of beneficiary applicants awaiting an opportunity to be awarded a homestead lease. The beneficiary demand for homesteading opportunities is very high; the current Maui Islandwide Residential Waiting List stands at approximately 3,838, as of December 31, 2021 (DHHL, 2021).

2.4 Project Purpose and Need

The purpose of the Project is to provide homesteading opportunities to beneficiaries, thereby fulfilling the above-stated purposes of the HHCA and the 2022 *DHHL General Plan Update*. The Project is needed to decrease the number of beneficiaries on the Maui Islandwide Residential Waiting List.

Additionally, the Project addresses DHHL beneficiaries' residential preferences. Based on a 2003 survey conducted by SMS Marketing & Research Services, Inc. (SMS), for the DHHL's *Maui Island Plan* (MIP), Central Maui was identified as the preferred residential homestead area by beneficiaries. A 2014 survey conducted by SMS, to update the Beneficiary Needs Survey (conducted in 1995, 2002 and 2008), found that more than two-thirds (68%) of the residential applicants identified a turn-key house as their first choice in property type and 84% of the applicants desired three or more bedrooms. Moreover, a 2020 survey conducted by SMS found that the overall majority of DHHL applicants (58%) want a residential lot and the majority of Maui applicants (52%) want a residential lot (Project).

The Project is proposed on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. The Site is also conveniently located near Wailuku Town, which has ample amenities and job opportunities for beneficiaries, with nearby State and County government offices, the Maui Memorial Medical Center, Fire and Police services, professional services, public and private schools, parks, grocery stores, restaurants, and retail outlets.

2.5 Project Site Location

The Site is approximately 77 acres and is located on TMK: (2) 3-5-002:003 (por.) at 101 Kuikahi Drive in Wailuku, on the island of Maui. See *Figure 1-1, Project Location*, and *Figure 1-2, Tax Map Key.* The Site is located within the "Agricultural" State Land Use (SLU) District, the "Agriculture" Maui County (County) Zoning District, designated "Urban" and "Rural" in the County's *Maui Island Plan*, and is in the "Agriculture" District per the County's *Wailuku-Kahului Community Plan (2002)*. See *Figure 1-3, State Land Use District*, *Figure 1-4, County Zoning, Figure 1-5, Wailuku-Kahului Community Plan Land Use Plan,* and *Figure 1-6, County Maui Island Plan*.

The Site is surrounded by residential subdivisions including the Kehalani master planned community (to the north), proposed Kuikahi Village (to the west), Wailuku Heights (to the west), and Waiolani Mauka (to the south). The site is also adjacent to the DHHL's planned Puʻuhona (fka Puʻunani) Homestead Subdivision (to the southeast) and Honoapiʻilani Highway (to the east). Preliminary Schedule and Costs

2.6 Preliminary Schedule and Costs

2.6.1 Schedule

Based on the DHHL's preliminary design, permitting, and development schedule, site work and construction is targeted to begin following receipt of all applicable permit approvals as outlined in Section 2.7.

2.6.2 Costs

The estimated development and construction cost for the Project, including the installation of infrastructure and construction of 204 residential lots (173 turn-key residences and 31 vacant lots), is pending. The Project will utilize State and private funds.

2.7 Required Permits and Approvals

The DHHL is not required to obtain State and County permits and approvals. However, the DHHL intends to obtain Federal, State and County permits and approvals as applicable to the Project, which are listed below in *Table 2-1*, *List of Anticipated Government Permits and Approvals.*

Table 2-1: List of Anticipated Government Permits and Approvals (if required)

Permit or Approval	Approving Agency
Clean Water Act, Informal Jurisdictional Determination	U.S. Army Corps of Engineers
HRS Chapter 343, Environmental Assessment	State of Hawai'i (State), Department of Hawaiian Home Lands, Hawaiian Homes Commission
Stream Channel Alteration Permit	State, Department of Land and Natural Resources (DLNR), Commission on Water Resource Management
HRS Chapter 6E Compliance	State, DLNR, State Historic Preservation Division
HAR Chapter 11-55, National Pollutant Discharge Elimination System Permit	State, Department of Health (DOH), Clean Water Branch
Construction Plan Review	State, DOH, Disability and Communication Access Board
HAR Chapter 11-46, Noise Permit	State, DOH, Indoor and Radiological Health Branch
Permit to Excavate Public Right-of-Way	State, Department of Transportation
Sewage Connection	County, Department of Environmental Management
Building Permits for Building, Electrical, Plumbing, Sidewalk/Driveway, and Demolition Work	County, Department of Public Works (DPW)
Grubbing, Excavation, Grading, and Stockpiling	County, DPW
Permit to Excavate Public Right-of-Way	County, Department of Transportation
Water Use Permit	County, Department of Water Supply

2.8 Consultation Summary

Listed below are the Federal, State and County agencies, elected officials, organizations, community leaders and neighbors who were engaged during the early consultation period and will receive notification of the publication of the Final EA. Early Consultation comments can be found in *Appendix B: Early Consultation Comments*. For more information, see Chapter 7.

Federal Agencies
United States (U.S.) Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office
U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Department of the Army, Regulatory Branch, U.S. Army Engineer District, Honolulu

State of Hawai'i Agencies
Department of Accounting and General Services
Department of Agriculture
Department of Business, Economic Development and Tourism (DBEDT), Office of Planning and Sustainable Development
Department of Education (DOE), Maui District
DOE, Planning Section, Facilities Development Branch
Department of Hawaiian Home Lands
Department of Health, Clean Air Branch
DOH, Disability and Communication Access Board
DOH, Indoor and Radiological Health Branch
DOH, Maui Sanitation Branch
Department of Land and Natural Resources, Division of Forestry and Wildlife
DLNR, Engineering Division
DLNR, Land Division
DLNR, Land Division, Maui District
DLNR, State Historic Preservation Division (SHPD)
Department of Transportation (DOT), Highways Division
DOT, Highways Division, Maui District
Hawai'i State Public Library System
Office of Hawaiian Affairs

County of Maui Agencies
Department of Environmental Management
Department of Fire and Public Safety
Department of Housing and Human Concerns
Department of Management
Department of Parks and Recreation
Department of Public Works
Department of Transportation
Department of Water Supply
Emergency Management Agency
Planning Department
Police Department

Elected Officials
State Senator Troy Hashimoto (District 5)
State Representative Tyson Miyake (District 10)
Mayor Richard Bissen, Maui County Office of the Mayor
Maui County Councilmember Alice L. Lee, Council Chair
Maui County Councilmember Tasha Kama, Presiding Officer Pro Tempore
Maui County Councilmember Keani Rawlins-Fernandez,
Maui County Councilmember Tom Cook
Maui County Councilmember Gabe Johnson
Maui County Councilmember Nohe U'u-Hodgins
Maui County Councilmember Tamara Paltin
Maui County Councilmember Shane Sinenci
Maui County Councilmember Yuki Lei Sugimura, Council Vice-chair

Utility Companies
Hawaiian Electric (Maui Electric Company, Ltd.)
Hawaiian Telcom
Spectrum

Organizations
Aha Moku O Wailuku: Clyde Kahalehau
Council for Native Hawaiian Advancement – Kūhiō Lewis; Chief Executive Officer
Kehalani Community Association
Maui Chamber of Commerce
Maui Economic Development Board
Maui Economic Opportunity, Inc.
Maui Mokupuni Council
Waikapū Community Association
Waikapū Gardens Homeowners Association
Wailuku Heights Extension Unit I Community Association
Wailuku Heights Extension Unit II Community Association
Waiolani Community Association
Waiolani Elua Community Association
Waiolani Mauka Community Association
University of Hawaiʻi at Mānoa, Institute for Astronomy

DHHL Homestead Leaders
ʻAhahui ʻĀina Hoʻopulapula o Waiohuli – Harry Rodriguez, Jr.
Ka ʻOhana o Kahikinui – Kaleo Cullen; Charmaine Day; Blossom Feiteira
Kēōkea Agriculture Hawaiian Homestead Association – Robin Newhouse
Leialiʻi Homestead Association – Rod Paʻahana
Paukukalo Community Association – Stephen Cramer
Paʻupena Community Development – Andrew A.M. Hatchie; Kekoa Enomoto
Sovereign Council of Hawaiian Homestead Associations
Sovereign Council of Hawaiian Homestead Associations- Kipukai Kualiʻi; SCHHA Chairman
Sovereign Council of Hawaiian Homestead Associations- Kekoa Enomoto; Maui Liason
Waiʻehu Kou 2 – Mark Adams
Waiʻehu Kou 3 – Roy Oliveira
Waiohuli Hawaiian Homestead Association – Perry Artates
Puʻuhona Hawaiian Homestead Association Attn: President Debbie Mahuna

Additionally, a consultation meeting was conducted by DDC2 LLC with the Puʻuhona Homestead Association on April 8, 2024. The Puʻuhona Homestead Association is made up of Native Hawaiian beneficiaries qualified to be on DHHL Lands. The purpose of this meeting was to discuss the Project with the DHHL beneficiaries that will be directly affected by the proposed action. The Puʻuhona Homestead Association was generally supportive of the Project and the President Debbie Mahuna provided a letter of support to the Final EA.

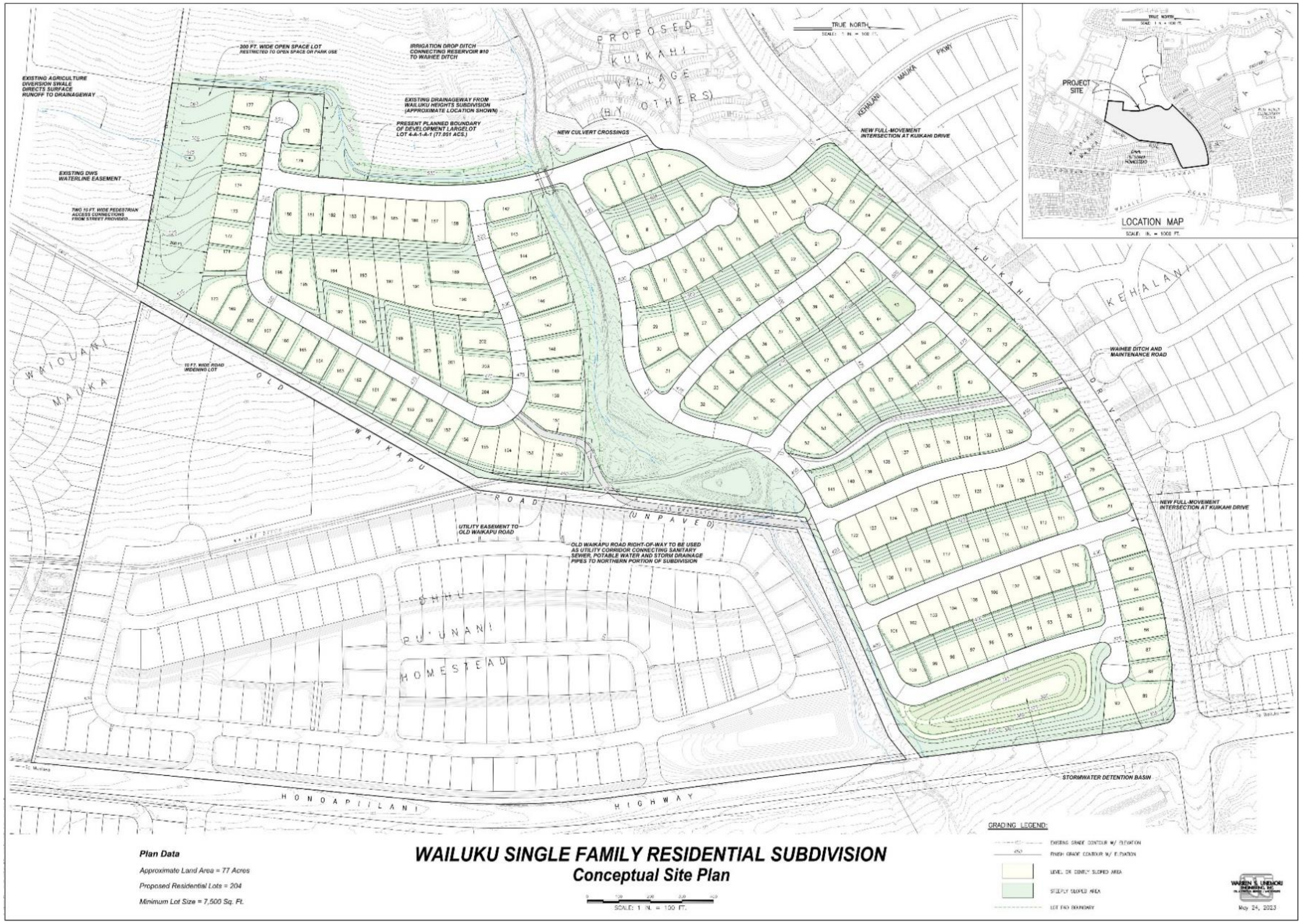

Figure 2-1

Conceptual Site Plan

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Chapter 3

Existing Conditions, Potential Impacts and Mitigation Measures

Chapter 3

Existing Conditions, Potential Impacts and Mitigation Measures

This chapter describes the existing environmental setting and conditions, evaluates the potential impacts of the Proposed Action, and proposes mitigation measures to diminish and/or resolve potential impacts.

3.1 Geology, Topography, Soils, and Agricultural Productivity

3.1.1 Geology and Topography

Existing Conditions

Maui was formed by the merging of two volcanoes, the East Maui volcano, known as Haleakalā, and the West Maui volcano, Maui Komohana. The merging of these volcanoes created the second largest island in the Hawaiian Islands. Haleakalā is a dormant volcano rising to 10,025 feet above mean sea level (AMSL). Maui Komohana is a deeply dissected volcano rising to 5,788 feet AMSL. Wailuku is located in the isthmus between Haleakalā and Mauna Kahalawai in Central Maui. To the west lies ʻĪao valley as well as Puʻu Kukui which reaches an elevation of 5,788 feet AMSL. To the east, the terrain rises gradually to the summit of Haleakalā.

The existing terrain slopes steadily downward across the Site from west to east at a grade of 8% - 10%. Elevation ranges from 565 feet at the southwest corner, to 350 feet at the northeast corner (WSUE, 2023).

Potential Impacts and Mitigation Measures

Limited earthwork such as excavation and grading will be required to accommodate construction of the Project. In the final stage of construction, the Site will be stabilized with pavement, gravel, or vegetative ground cover. Grubbing, Excavation, Grading, and Stockpiling permits will be obtained from the County, as necessary.

With the implementation of the proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on topography as the proposed improvements do not involve a substantial alteration of topographic conditions that adversely impact drainage patterns; or the excavation and/or disturbance of hazardous contaminants that compromise public health and safety. No additional mitigation is recommended.

3.1.2 Soils and Agricultural Productivity

Existing Conditions

According to the United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS), the Site consists of 4 different soil types: ʻĪao Clay (IcB), ʻĪao clay (IcC), ʻĪao cobbly silty clay (IbB), and ʻĪao cobbly silty clay (IbC). Permeability for each of these soil types are moderately high. These soils are formed from weathered alluvium derived from igneous rock (IbB and IbC) and basalt (IcB and IcC) (USDA-NRCS, 2019). See *Figure 3-1, Soil Characteristic*.

The Site is located within the "Agricultural" SLU District, the "Agriculture" County Zoning District, designated "Urban" and "Rural" in the County's *Maui Island Plan* and is in the "Agriculture" District per the County's *Wailuku-Kahului Community Plan (2002)*. See *Figure 1-3, State Land Use District*, *Figure 1-4, County Zoning,* and *Figure 1-5, Wailuku-Kahului Community Land Use Plan,* and *Figure 1-6, County Maui Island Plan*. The Site historically was utilized for agriculture (sugar cane and pineapple cultivation) from circa 1950 until the early 2000s; however, the Site has not been used for agricultural production for many years.

In 1977, the State Department of Agriculture (HDOA) developed a classification system to identify Agricultural Lands of Importance to the State of Hawaiʻi (ALISH). ALISH is based primarily on the soil classification of the land with three categories: Prime, Unique, and Other Important. Lands that have not been identified are deemed "Unclassified." The Site is classified as Prime agricultural lands, a similar classification as nearby residential subdivisions. ALISH Prime lands have quality soil with the moisture needed to produce and sustain high yield crops. See *Figure 3-2, Agricultural Lands of Importance to the State of Hawaiʻi (ALISH).*

The University of Hawaiʻi, Land Survey Bureau (LSB) prepared an inventory and evaluation of the State's land during the 1960-1970, to assign a productivity rating based on soil properties. These soil properties include texture, structure, depth, drainage, parent material, stoniness, topography, climate and rainfall. The five LSB classes include Class A, B, C, D, or E, with Class A representing the most productive soils and Class E representing the least productive soils. There are an estimated 447,250 acres of LSB Class A - C lands in Hawaiʻi. Permissible land uses for each LSB classification are listed in HRS 205-4.5. The majority of the Site contains soils rated as LSB Class A (a similar classification as nearby residential subdivisions), while a western portion of the Site contains soils rated as LSB Class E. See *Figure 3-3, Land Study Bureau Soil Rating.*

Administered by the State Land Use Commission (LUC), the Important Agricultural Lands (IAL) designation is a supplemental State land use classification for an exclusive sub-set of high-quality farmlands within the SLU Agricultural District, intended to be used in the long-term for active agricultural production (CCH, 2018). Act 233, SLH 2008, triggered the process to identify, map, and designate IAL throughout Hawaiʻi. As a result, each county has identified and mapped potential IAL within its jurisdiction in consultation and cooperation with the USDA, NRCS, HDOA, State DBEDT, Office of Planning, agricultural-interest groups, and landowners, and the public. As of September 04, 2020, a total of 136,489 acres are designated as IAL in Hawaiʻi; while 27,102 acres are designated as IAL on Maui (east of the Site) – primarily used for sugarcane cultivation (HDOA, 2022). The Site is not designated as an IAL. See *Figure 3-4, Important Agricultural Lands.*

Potential Impacts and Mitigation Measures

During construction, clearing and grubbing activities will temporarily disturb and expose soils. To minimize erosion, the Contractor will comply with applicable Federal, State, and County regulations for erosion control and will implement Best Management Practices (BMPs), which may include the following:

- Retaining existing ground cover as long as possible;
- Minimizing disturbed areas to reduce the fugitive dust;
- Stabilizing exposed soils as soon as practicable;
- Watering graded areas when ground cover is removed and when construction activity for each day has ceased;
- Installing silt and dust fences and filter socks around active work areas and inlet protection devices near drainage outlets; and
- Centralizing on-site vehicular traffic routes and locating potential dust-generating equipment in areas of the least impact.

An application for a National Pollutant Discharge Elimination System (NPDES) permit will be submitted to the State DOH for review and approval prior to the start of construction. A grading permit will also be applied for the County. The underlying soils do not pose limitations with respect to the Projects constructability. The Project is not anticipated to have an adverse effect on soils.

The Project involves the creation of an approximately 3.1-acre linear park with an option for a community farm for residents on the southern portion of the Site. The Site encompasses a relatively nominal portion of land designated as ALISH Prime land and LSB Class A. On Maui, approximately 70,714 acres (or 15% of the island) are designated as ALISH Prime land, while the Project involves the use of 77 acres (or 0.11%) of Maui's Prime land. Statewide, there are approximately 447,250 acres of LSB Class A - C lands; the Project involves the use of approximately 77 acres (or 0.02%) in LSB Class A - C lands. Moreover, the Site is not designated as an IAL - an exclusive sub-set of high-quality farmlands within the SLU Agricultural District.

While the Site is designated for agricultural use, the land has fallen out of productive agricultural cultivation for some time. Therefore, the DHHL will be exercising its authority to use its lands at its discretion, with the purpose of providing homesteading opportunities to beneficiaries. The DHHL is responding to beneficiaries' preferences, as results from a 2003 survey conducted for the DHHL's MIP concluded that Central Maui was the preferred residential homestead area for beneficiaries. Moreover, a 2020 survey conducted by SMS found that the majority of Maui applicants (52%) want a residential lot (SMS, 2020). As indicated in DHHL's MIP, most DHHL-owned lands in Central Maui are not suitable for residential uses; therefore, these lands are needed in Central Maui to meet the beneficiary demand for residential homesteads. The Site is a prime location for residential use, as it is a vacant, underutilized property, which is in a sub-urban/urban area of Wailuku, adjacent to existing residential subdivisions with readily available infrastructure. The Site is also conveniently located near Wailuku Town, which has ample amenities and job opportunities for beneficiaries, with nearby State and County government offices, the Maui Memorial Medical Center, Fire and Police services, professional services, public and private schools, parks, grocery stores, restaurants, and retail outlets. It should be noted that the DHHL is currently embarking on a statewide effort to develop an *Agriculture Program Plan*, which will help to identify DHHL lands ideal for agricultural use.

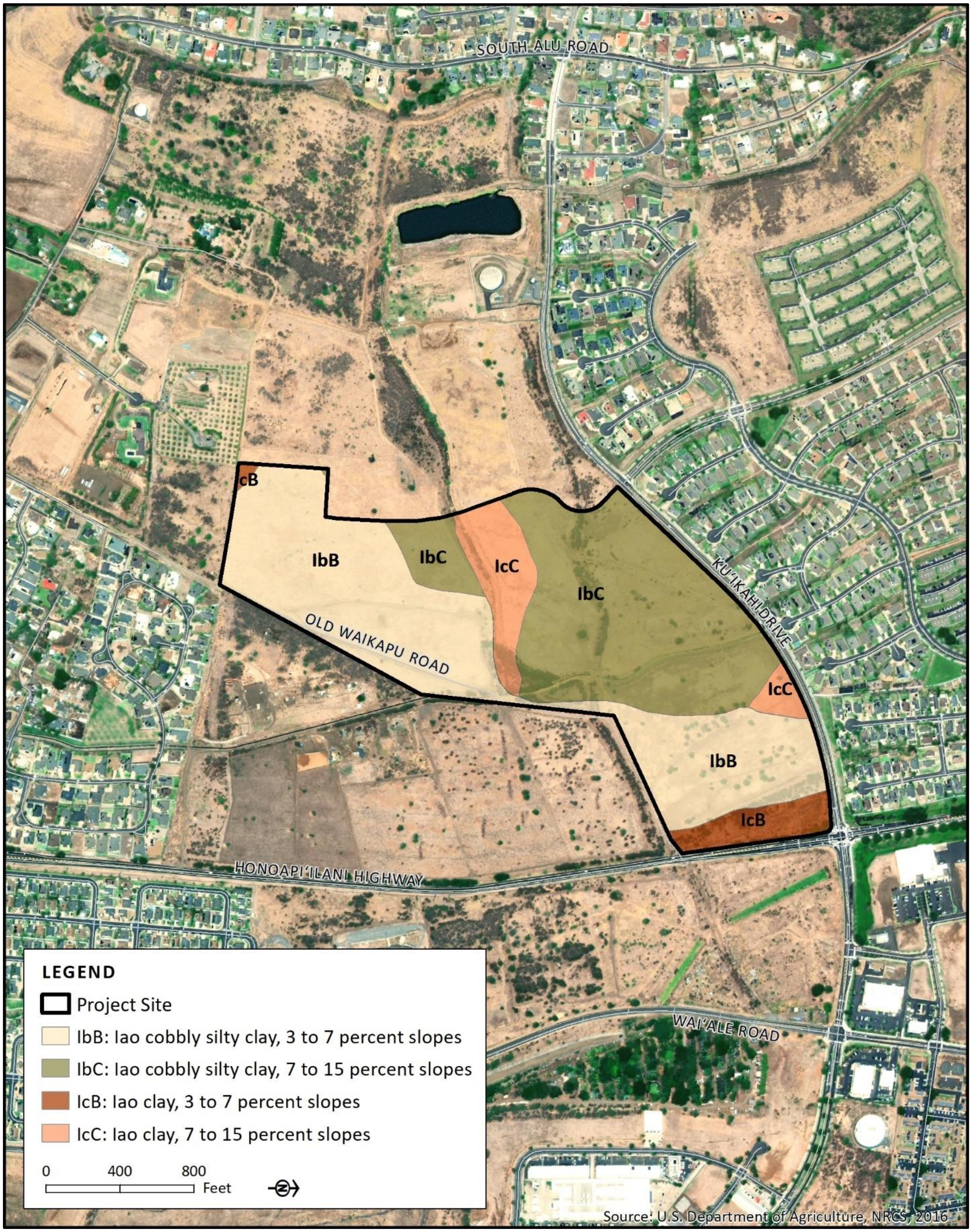

Figure 3-1 **Soil Characteristic**

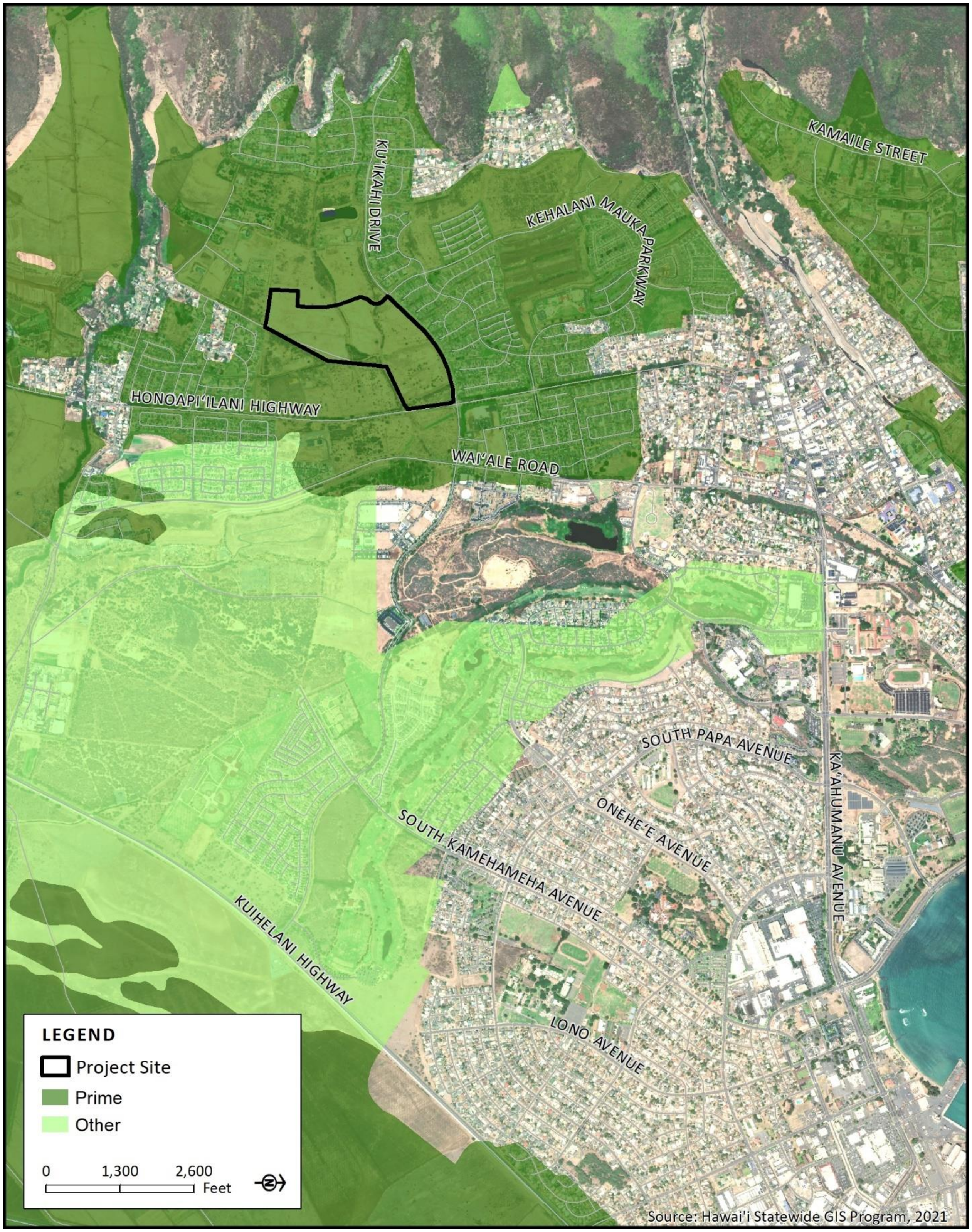

Figure 3-2 **Agricultural Lands of Importance to the State of Hawaiʻi (ALISH)**

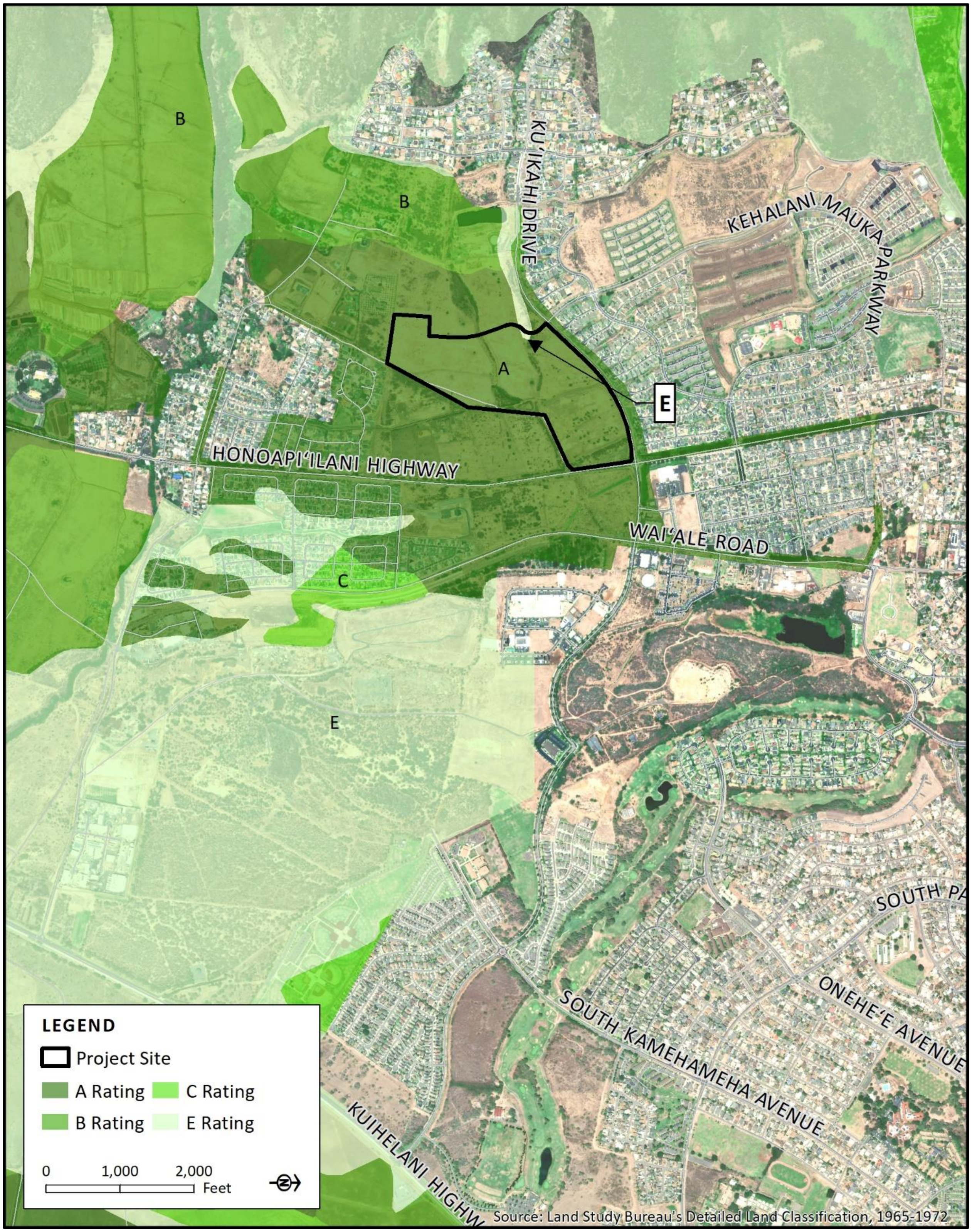

Figure 3-3 **Land Study Bureau Soil Rating**

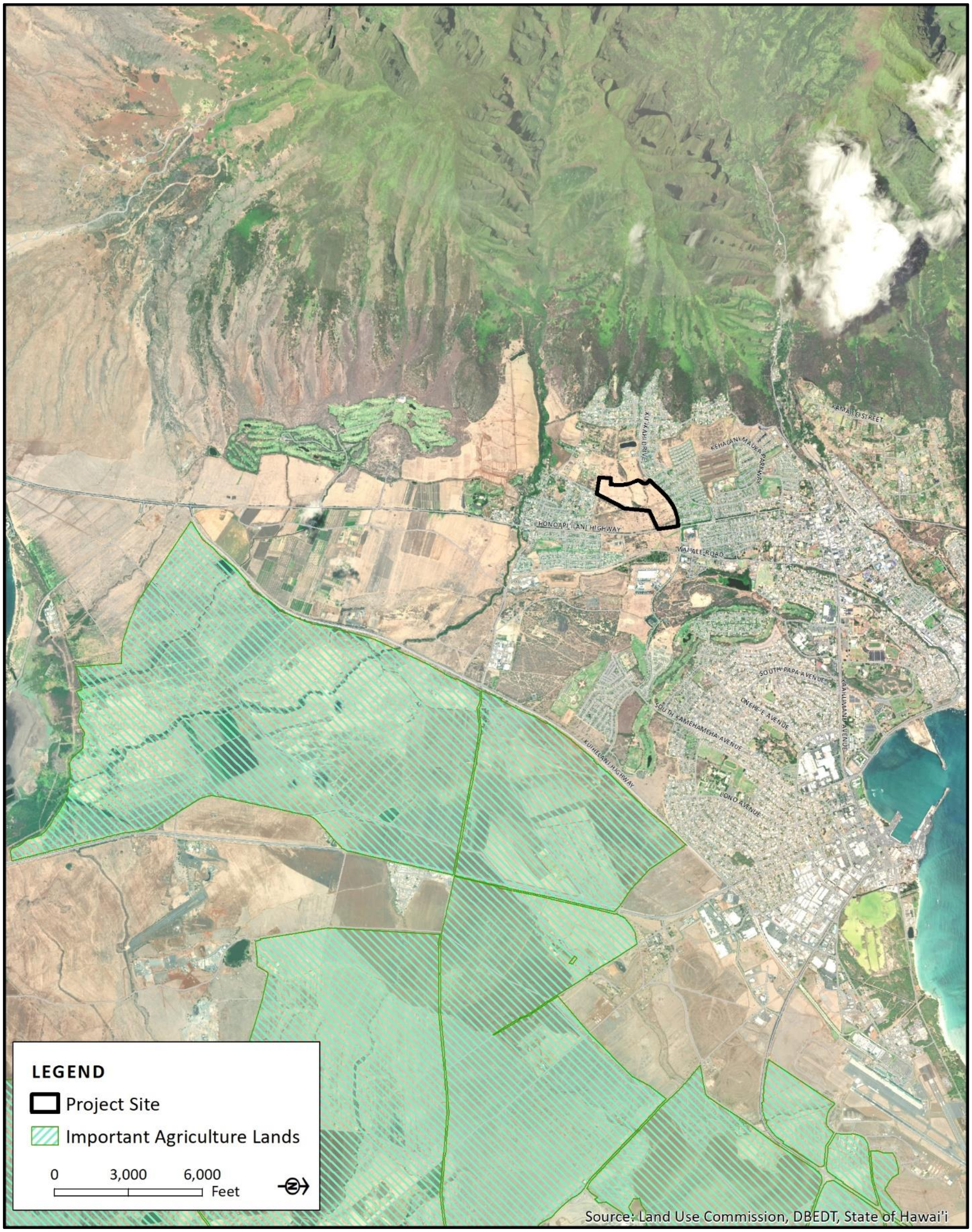

Figure 3-4 **Important Agricultural Lands**

3.2 Climate, Climate Change, and Sea Level Rise

Existing Conditions

Climate

The National Weather Service (NWS) defines climate as the expected frequency and state of the atmosphere, ocean, and land including variables such as temperature and wind speed and direction. Climate encompasses the weather over different periods of time (NWS, 2020a). Hawai‘i's climate is typically characterized by mild temperatures throughout the year, moderate humidity, persistent northeasterly trade winds, significant differences in rainfall within short distances, and infrequent severe storms (NWS, 2020b).

The Site is located in Wailuku, on the island of Maui; the climate in Wailuku is typical of most of Hawai‘i. The Kahului Airport houses the closest temperature monitoring station to the Site, which has recorded temperatures in the low 60s°F to high 80s°F. However, the normal temperature range in Wailuku from August (warmest month) to February (coldest month) is only 7.2°F. Moderate temperatures are associated with the slight seasonal variation in energy from the sun and the tempering effect of the ocean. The contrast between the dry season (May through October) and the wet season (November through April) in Wailuku is evident (County, 2018). Rainstorms usually occur several times during the wet season but are infrequent during the dry season. Approximately 50% of the normal annual rainfall occurs between December through February, and 80% occurs within the six-month wet season. According to the Kahului Airport station, the Wailuku-Kahului region receives an average of 17.83 inches of rain annually (County, 2020a); however, the Site receives an average of 25-35 inches of rain annually. See *Figure 3-5, Annual Rainfall.*

Climate Change and Sea Level Rise

The NWS defines climate change as “any significant change in the measures of climate lasting for an extended period of time…includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer” (NWS, 2020c). Climate scientists estimate that if greenhouse gases (GHG)[1] emissions continue to accelerate at current output trends, then the average global temperature will likely increase by 3 to 7°F (1.7 to 3.9°C) by the year 2100. As the Earth’s atmosphere warms, so does the ocean; and as the ocean warms it expands and increases in volume, producing thermosteric sea level rise (SLR) (Fletcher, 2010).

The Federal Greenhouse Gas Reporting Program mandates the reporting of GHG emissions from sources that emit 25,000 metric tons or more of carbon dioxide equivalent (CO_2 EQ) per year, per 40 Code of Federal Regulations (CFR) Part 98. Facilities on Maui that are required to report GHG emissions include Maui Electric Company’s Kahului Generating Station, Ma‘alaea Generating Station, Hawaiian Commercial and Sugar Company, and the Central Maui Landfill Refuse & Recycling Center (EPA, 2021).

Planning for climate change and SLR is challenging as there are multiple variables and changing and unknown factors. The County Council adopted Resolution No. 20-170 on December 4, 2020, which

1 GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several chlorofluorocarbons.

proposes to amend MCC, Chapter 2.80B, *General Plan and Community Plans.* This amendment would add a new goal, new/revised objectives, policies and implementing actions to the *Countywide Policy Plan*, which is a component of the County's *General Plan 2030*. This amendment would be a step in the direction of mitigating climate change and working toward resilience (County, 2021).

In 2017, the Hawai'i Climate Change Mitigation and Adaptation Commission, DLNR, Office of Conservation and Coastal Lands and Tetra Tech, Inc., prepared the *Hawai'i Sea Level Rise Vulnerability and Adaptation Report* (2017 SLR Report). The 2017 SLR Report produced a vulnerability model using the best available data and methods to determine the potential future exposure of each island to multiple coastal hazards because of SLR. Three chronic flooding hazards were modeled: passive "bathtub" flooding, annual high wave flooding, and coastal erosion. The three hazards were then combined to define the projected extent of chronic flooding due to SLR, called the SLR exposure area (SLR-XA). The *Hawai'i Sea Level Rise Viewer* is an online interactive map which illustrates the scale of potential SLR-XA at 0.5 feet, 1.1 feet, 2.0 feet and 3.2 feet. The Intergovernmental Panel on Climate Change's predicts up to 3.2 feet of global SLR by year 2100, based on a "business as usual" scenario where GHG emissions continue at the current rate of increase, recent observations and projections suggest that SLR could occur as early as 2060 (Tetra Tech et. al., 2017). It should be noted that the 2017 SLR Report and the SLR-XA model are resources which provide guidance, they are not laws, regulations, or ordinances. The SLR-XA model is a planning tool with limitations that requires verification at each individual site. Based on the SLR-XA model, the Site and surrounding areas, which are located inland toward the border of Waikapū and Wailuku, is not at risk of being impacted by 3.2 feet of SLR. See *Figure 3-6, Sea Level Rise Exposure Area.*

<u>Potential Impacts and Mitigation Measures</u>

Construction-related activities such as earthwork, grading, excavation, concrete work, stockpiling, and transport of building materials and construction spoils and debris, will result in the production of GHG emissions due to the generation of exhaust from construction vehicles and equipment. However, construction-related impacts will be temporary and cease upon the completion of the Project.

The Project involves the development of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots). Once the residences are built, GHG emissions will result from stationary sources (e.g., energy usage, water usage, solid waste generation, landscaping equipment, and consumer products) and non-stationary sources (e.g., vehicle trips). However, the average monthly energy use per household in Maui was 543 kilowatt hours (kWh) in 2019 (HSEO, 2020), and therefore, does not fall within the threshold of mandatory reporting under the Federal Greenhouse Gas Reporting Program (25,000 metric tons of CO_2 EQ). The Project will comply with DHHL's Ho'omaluō Energy Policy, which promotes the design and construction of new affordable energy-efficient homes using the "Hawai'i BuiltGreen" and "ENERGY STAR" programs. As a result, energy efficient fixtures, appliances and solar water heating systems will be installed in the residences, as feasible, which will reduce GHG emissions. Proposed landscaping and trees will be incorporated throughout the Site which will help to mitigate and absorb local GHG emissions. Furthermore, the proposed residences and improvements will not be impacted by 3.2 feet of SLR.

The impacts of GHG emissions are inherently cumulative and indirect; therefore, the Project will have a cumulative and indirect impact on climate change. However, with the implementation of the proposed mitigation measures, the Project is not anticipated to substantially contribute to climate change, as proposed improvements will not lead to a substantial increase in GHG emissions, associated with the consumption of electricity, compared to baseline conditions. No additional mitigation is recommended.

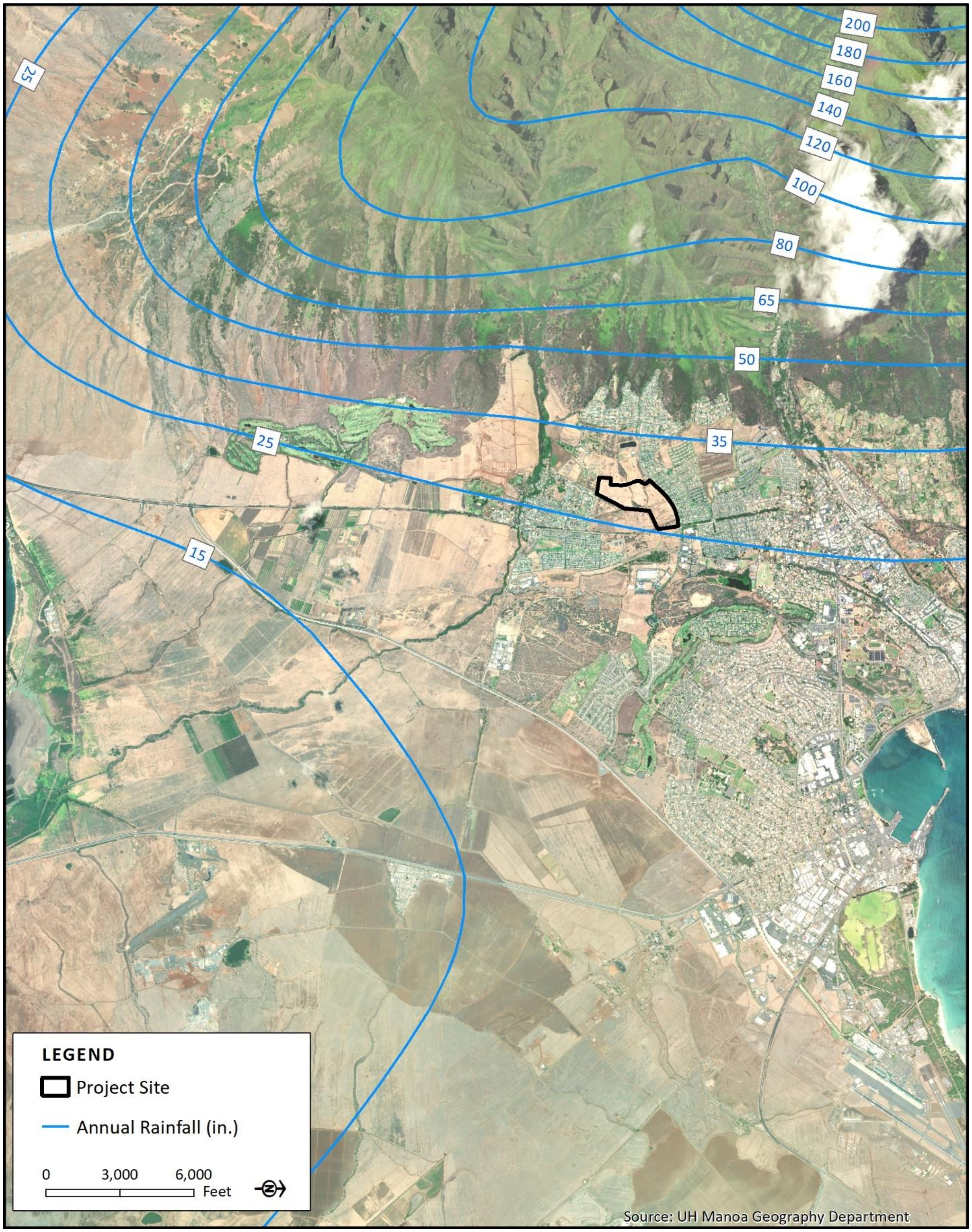

Figure 3-5 **Annual Rainfall**

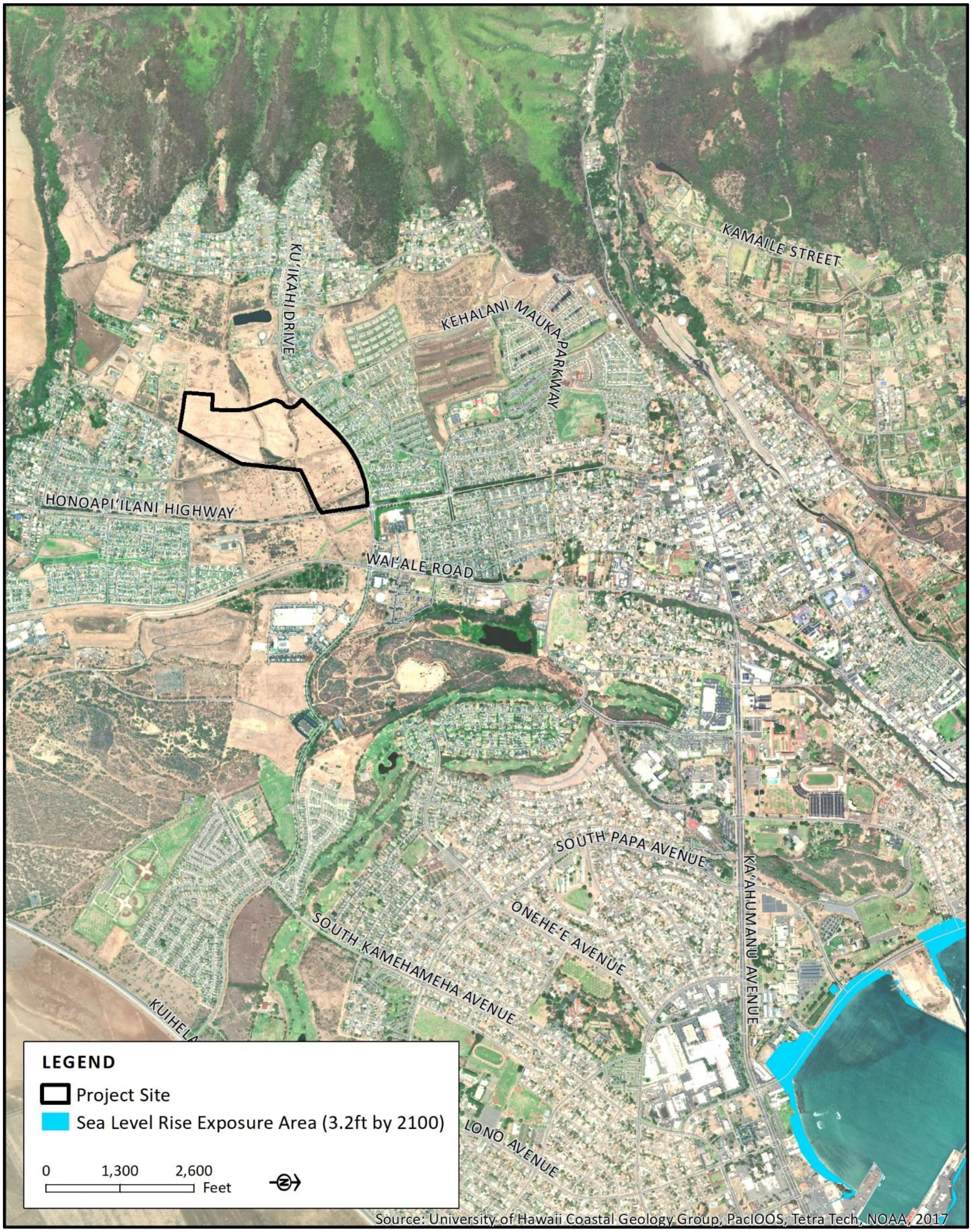

Figure 3-6 **Sea Level Rise Exposure Area**

3.3 Natural Hazards

3.3.1 Flooding

Existing Conditions

Flooding in Hawaiʻi primarily occurs as a result of stream overflow and surface runoff, following torrential rains that fall on steep slopes of mountain ranges. While floods are principally a natural event, most flood damage is a result of development on lands susceptible to flooding (Fletcher, et al., 2002). Flash flooding can occur in Wailuku during infrequent rainfall events that are of short duration but high intensity; rainfall runs down the steep hillside of the ʻĪao valley and collects in the coastal lowlands. Flooding has occurred along Wells Park and Main Street and has overtopped irrigation ditches (County, 2020a).

The Federal Emergency Management Agency (FEMA) prepares Flood Insurance Rate Maps (FIRM) based on flood studies to identify flood hazard areas and associated base flood elevations, or the elevation which water is anticipated to rise during the base flood. Based on the FEMA-FIRM No. 1500030393E (effective November 4, 2015), the Site is in Flood Zone X, an area determined to be of minimal flood risk, and outside of the 0.2% annual chance or 500-year floodplain. The Site is not in a Special Flood Hazard Area; therefore, flood insurance is not mandatory. See *Figure 1-8, FEMA Flood Zone*.

Potential Impacts and Mitigation Measures

During construction, the Site will be at minimal risk from the threat of flooding. The Site is no more vulnerable to flood events than the surrounding area in Flood Zone X. In the event of a flood, construction activities will cease, equipment and materials will be secured, and Federal, State and County regulations will be adhered to, to ensure the safety of construction workers and community members on/near the Site.

The FEMA Flood Insurance Program does not have regulations for development within Flood Zone X. The residences will be designed to comply with MCC, Chapter 19.62, *Flood Hazard Areas*, as applicable. If needed, the County may open emergency shelters throughout Maui; the nearest shelter will likely be the Maui High School – approximately 1.95 miles east of the Site.

The Project does not involve improvements that increase the risk of the public's safety during a flooding event. With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on the surrounding neighborhood during a flood event. No additional mitigation is recommended.

3.3.2 Hurricanes

Existing Conditions

Tropical cyclones (hurricanes, tropical storms, and tropical depressions) form in warm tropical waters and typically have sustained winds exceeding 73 miles per hour (mph). Hurricanes in Hawaiʻi typically occur during the summer to early winter months (June 1 to November 30). Hawaiʻi is impacted by hurricane near misses, which generate large wave swells and moderately high winds; however, hurricane strikes have been relatively rare (Fletcher, et al., 2002).

Hawaiʻi has been affected by *significant* hurricanes twice since 1982; hurricane ʻIwa was a category 1 hurricane (sustained winds of 74-95 mph), which passed over Kauaʻi on November 23, 1982 and hurricane ʻIniki was a category 4 hurricane (sustained winds of 130-156 mph), which passed over Kauaʻi on September 11, 1992. The most recent hurricane to threaten Hawaiʻi was hurricane Douglas, which entered the Central Pacific basin on July 24, 2020 as a category 4 hurricane, and weakened to a category 1 hurricane as it passed northwest of Maui (NWS, 2020d).

While hurricane strikes are a rare phenomenon in Hawaiʻi, it is prudent to assume that future events will occur. According to a survey conducted for the County's *Hazard Mitigation Plan Update*, most survey respondents who have lived in the County for 10+ years, have been impacted by hurricanes and high winds. The probability of a hurricane event impacting the Wailuku-Kahului area annually is between 10% to 90% (County, 2020a).

Potential Impacts and Mitigation Measures

During construction, the Site will be at minimal risk from the threat of hurricanes. The Site is no more vulnerable to hurricanes than the entire island of Maui. High winds associated with hurricanes can cause strong uplift forces on buildings, structures, construction materials and debris, which can attain high velocity and cause property damage and harm to life. Hurricane can also result in heavy rains and flash floods, which can inundate structures.

The Central Pacific Hurricane Center (CPHC) issues tropical cyclone warnings, watches, and advisories for tropical cyclones. The CPHC is activated when a tropical cyclone moves into the Central Pacific from the Eastern Pacific or the West, or forms in the Central Pacific. During Central Pacific tropical cyclone events, bulletins are regularly scheduled every six hours (CPHC, nd). A "Hurricane Watch" is typically issued 48 hours in advance of a potential hurricane and a "Hurricane Warning" is typically issued when sustained winds of at least 74 mph are expected within 36 hours. Upon issuance of a "Hurricane Warning," construction activities will cease, construction workers will secure the Site, and evacuate the Site until the hurricane threat has passed. Upon issuance of a "Hurricane Watch," construction workers will secure the Site as follows:

- Remove or secure equipment, machinery, construction materials, and portable toilets;
- Clean up all construction debris;
- Stop scheduled deliveries of building materials;
- Remove jobsite signage; and
- Locate and turn off jobsite utilities, including electricity, water, and gas.

The residences will be designed to comply with MCC, Chapter 16.26B, *Building Code*, to ensure they are hurricane resilient, as applicable. If needed, the County may open emergency shelters throughout Maui; an announcement will be made via radio and local television to let residents know which public schools will act as emergency shelters. The nearest shelter will likely be the Maui High School – approximately 1.95 miles east of the Site. Residents are encouraged to purchase hurricane and flood insurance as necessary and prepare emergency kits in the event of a hurricane.

The Project does not involve improvements that increase the risk of the public's safety during a hurricane event. With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on the surrounding neighborhood during a hurricane event. No additional mitigation is recommended.

3.3.3 Seismic Activity

Existing Conditions

Thousands of earthquakes occur every year in Hawai‘i. Most are insignificant, too small to be felt, and can only be detected by seismometers. On the other hand, some are strong enough to be felt on multiple islands, and others can cause significant damage across the State. The majority of earthquakes in Hawai‘i occur on and around Hawai‘i Island, especially near Kīlauea, Mauna Loa, and the Lō‘ihi volcanoes (USGS, nda). Approximately 95% of the earthquakes on the Hawai‘i Island are related to volcanic activity or the movement of magma within Kīlauea or Mauna Loa (Fletcher, et al., 2002). There are rare occurrences of seismic events/earthquakes on Maui and throughout the County. Small earthquakes, referred to as swarms, occur near the Haleakalā volcano, in eastern Maui. Faults within the County include the West Maui Fault, East Moloka‘i Fault, and an extensive fault system on Lāna‘i. In 2006, two earthquakes impacted Maui – a 6.7-magnitude earthquake west of Kiholo Bay followed by a 6.0-magnitude near Māhukona on Hawai‘i Island. These earthquakes resulted in a disaster declaration for the County with damages estimated at $28.1 million (County, 2020a).

The severity of an earthquake is classified by magnitude and intensity. Magnitude is a measure of the amount of energy released during an earthquake, while intensity is a measure of the severity of ground shaking. Seismic events are often characterized by peak ground acceleration (PGA), which is defined as the greatest increase in velocity or ground shaking at a particular geographic point during an earthquake (measure in percentage of gravity). A Seismic Design Category (SDC) is a classification assigned to buildings/structures based on occupancy and the severity of an earthquake, to ensure buildings/structures are earthquake resistant. There are five SDCs, ranging from A (small probability of damaging earth-quake effects) to E (Near major active faults capable of producing the most intense shaking). Maui is in the SDC “C” classification, or an area that could experience strong shaking. During an earthquake hazard, damage to buildings of good design and construction will be negligible; damage to ordinary buildings will be slight to moderate; and damage to poorly built structures will be considerable (USGS, ndb).

Potential Impacts and Mitigation Measures

During construction, the Site will be at minimal risk from the threat of earthquakes. The Site is no more vulnerable to seismic events than the entire island of Maui. The United States Geological Survey, Region 12 – Pacific Islands Office is the official source for seismic information in Hawai‘i, and provides updates on seismic activity. In the event of an intense earthquake of high magnitude, construction activities will cease; equipment and materials will be secured; and Federal, State and County regulations will be adhered to, to ensure the safety of construction workers and community members on/near the Site.

The residences will be designed to comply with current International Building Code and seismic design standards, per MCC, Chapter 16.26B, *Building Code,* as applicable. If needed, the County may open emergency shelters throughout Maui; the nearest shelter will likely be the Maui High School – approximately 1.95 miles east of the Site.

The Project does not involve improvements that increase the risk of the public’s safety during a seismic event. With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on the surrounding neighborhood during a seismic event. No additional mitigation is recommended.

3.3.4 Tsunami

Existing Conditions

A tsunami involves the generation of destructive waves, created by sea floor movements, often triggered by earthquakes, landslides, submarine faulting or volcanic eruptions. Tsunamis that impact Hawaiʻi typically originate from distant, seismically active areas bordering the Pacific Ocean, or from local, undersea earthquakes near Hawaiʻi Island (Fletcher, et al., 2002). While tsunamis are a rare phenomenon in Hawaiʻi, it is prudent to assume that future events will occur.

The National Oceanic and Atmospheric Administration (NOAA) assists in preparing Tsunami Evacuation Zone Maps for Hawaiʻi. The three defined zones include the "Tsunami Evacuation Zone" (represents areas at risk during an average tsunami event), the "Extreme Tsunami Zone" (refers to a tsunami originating near the Aleutian Islands in Alaska), and the "Safe Zone" (areas in the State not likely vulnerable to tsunami events). The Site is in the Safe Zone, as shown in *Figure 3-7, Tsunami Evacuation Zone.*

Potential Impacts and Mitigation Measures

During construction, the Site will be at minimal risk from the threat of tsunamis. The NOAA, Pacific Tsunami Warning Center (PTWC) issues four different tsunami alerts: a warning, an advisory, a watch, and an information statement. When a tsunami watch is issued, local officials will begin to plan for response and evacuations. When a tsunami advisory is issued, local officials start to evacuate the ocean and beaches. When an extreme tsunami warning is issued, a potential tsunami with significant widespread inundation is imminent or expected and the public should evacuate the Extreme Tsunami Zone. Depending on the type of tsunami warning issued by the NOAA, PTWC, construction activities may have to come to a halt; equipment and materials will be secured; and Federal, State and County regulations will be adhered to, to ensure the safety of construction workers and community members on/near the Site. If needed, the County may open emergency shelters throughout Maui outside of tsunami evacuation zones.

The Project does not involve improvements that increase the risk of the public's safety during a tsunami event. With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on the surrounding neighborhood during a tsunami event. No additional mitigation is recommended.

3.3.5 Wildfire

Existing Conditions

A wildfire is typically defined as a fire occurring in a wildland area (i.e., grassland, forest, brush land). Wildfires are a natural part of forest ecosystem management but may also be caused by humans. Over 80% of wildfires are started by negligent human behavior such as smoking in wooded areas, or unintentional lighting of dry grasses through use of machinery. There are three classes of wildland fires: surface fires (burns along the floor of a forest), ground fires (burns below the forest floor), and crown fires (spreads rapidly by wind and jumps along trees tops). The probability of a wildfire increases with drought conditions and climate change events. In Hawaiʻi, non-native, fire-prone grasses, and shrubs fuel wildfires. Wildfires can result in severe economic loss by destroying or damaging structures, utilities, roads, and other critical assets that are located within high-risk wildfire hazard areas (County, 2020a).

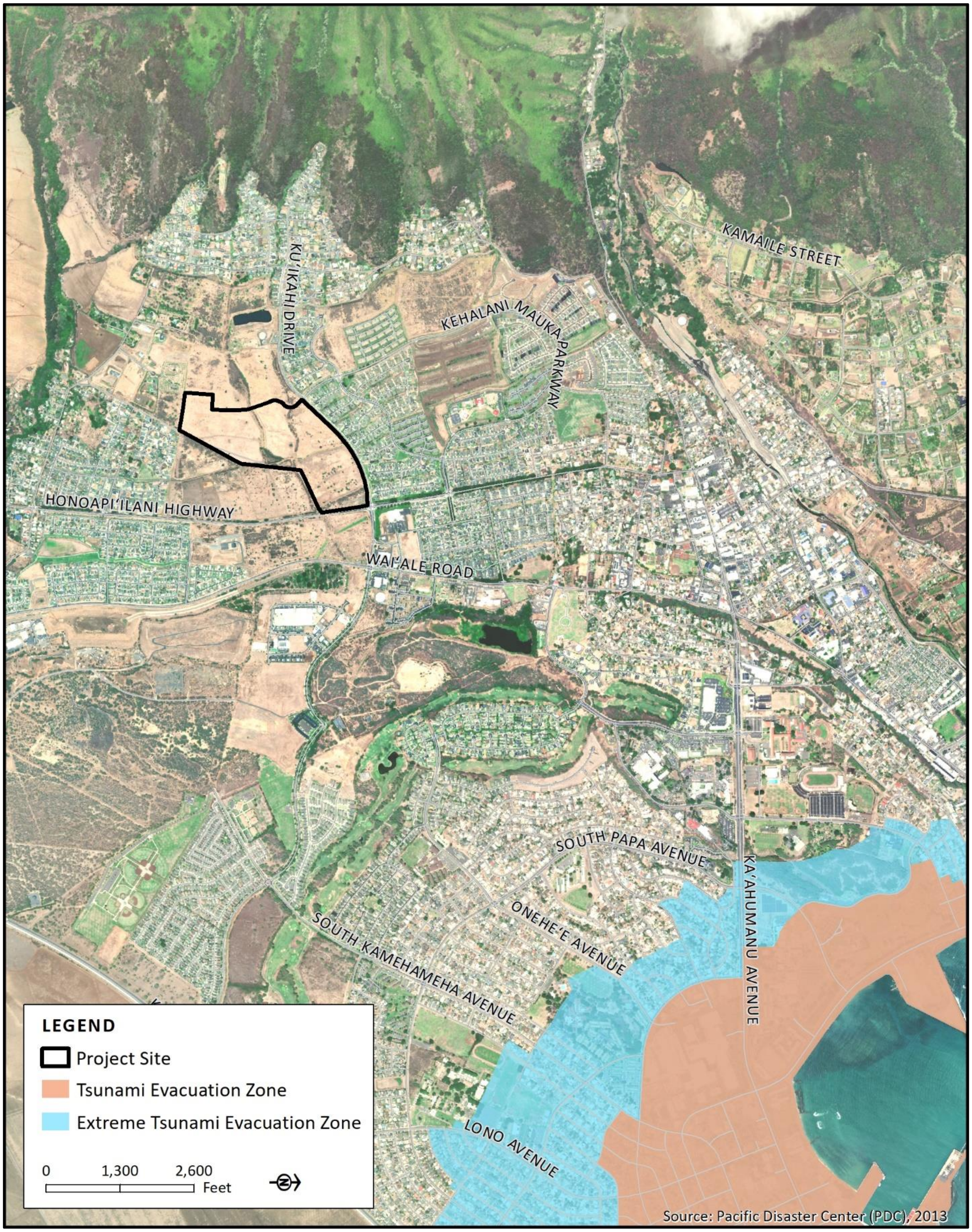

Figure 3-7 **Tsunami Evacuation Zone**

Maui County has experienced increased drought conditions over the last 30 years, which is expected to increase as climate change brings warmer temperatures, decreased stream flows, and decreased precipitation. The most recent wildfire on Maui was in August 2023, which covered an estimated 2,170 acres of the Lahaina area and claimed over a hundred lives (Maui County, 2018). The most recent fire in the Kahului-Wailuku area, occurred south of the Site at Waikō Road in 2019. The County's Hazard Mitigation Plan Update of 2020 utilized DLNR's categorizations of low, medium and high risk wildfire areas. This data was based on Wildland Urban Interface, which measures the area where urban development meets vegetated, wildfire prone undeveloped lands. According to the Hazard Mitigation Plan Update, the Site is not in a wildfire risk area (County 2020a). However, in coordination with Hawai'i Wildfire Management Organization (HWMO), the Project recognizes the localized area is designated as moderate to high-risk area for wildfire *(see Appendix K: Hawaii Wildfire Management Organization Memo for Wailuku Single Family Residential Subdivision Project)*.

<u>Potential Impacts and Mitigation Measures</u>

The proposed Project aims to mitigate the risk associated with wildifires through a combination of strategic planning an implementation of best management practices for wildfire prevention and response. By carefully designing the Project's site layout and landscaping, incorporating fire-resistant building materials, providing multiple points of access (ingress/egress), and implementing defensible space measures, the Project should aim to enhance this community's resilience to wildfires. Also, through proper design, the Project can potentially contribute to reducing the overall risk of wildfire ignition and spread in the area by utilizing currently fallow lands and implementing best managment practices at a localized scale.

The Contractor will ensure that equipment and machinery are operating properly; fire safety protocol is followed by construction workers, and that combustible construction materials are stored away from fire risk areas. As per the recommendations provided by the DLNR-Division of Forestry and Wildlife (DLNR-DOFAW) *(received April 2024)*, when engaging in activities that have a high risk of starting a wildfire (i.e. welding in grass), it is recommended that contractors: wet down the area before starting your task, continuously wet down the area as needed, have a fire extinguisher on hand, and in the event that your vision is impaired, (i.e. welding goggles) have a spotter to watch for fire starts.

Residences will be built with flame-resistant building materials, including ignition resistant materials for roofs, walls, windows and other building components, as feasible. To the extent possible, open spaces within the subdivision will be landscaped with native shrubs and grasses to decrease the frequency and intensity of potential wildfire events. Furthermore, DHHL will work with neighboring land owners of the subdivision that have adjacent large tracts of unmanaged vegetation to ask those land owners to provide adequate buffers as defensible spaces by removing flammable vegetation, converting vegetated areas to a use that ensures it stays consistently maintained, and/or by hardening with pavement, gravel, or other non-combustible material.

HWMO recommends that the future ROW include a provision for emergency evacuation use to be the width and condition of road necessary and recommended. The second permanent access point is an important measure to ensure residents in the community are not left vulnerable to evacuation traffic, or worse, blockage of one access point without any alternative. The ingress/egress options also serve emergency responders ability to access needs for suppressing fires and responding to emergencies. All access points must be two lanes to allow for bidirectional flow and to allow for continued flow in the event of a stalled vehicle. The two access points should be graded or maintained in adequate condition for 2-wheel drive vehicles to pass without issue.

Two permanent ingress/egress access points from Kuikahi Drive and a secondary emergency roadway along a portion of the Old Waikapu ROW will be constructed. This paved portion of Old Waikapu Road will only be used as a secondary access during emergencies to provide an alternative access route to Kuikahi Drive if the main western access becomes inundated with vehicles. All vehicles will be directed to Kuikahi Drive.

The park and any open space areas must have vegetative fuels maintenance plans for sustained fuels management and risk reduction over time.

It is also recommended that the Project conduct a baseline emergency evacuation route plan for the subdivision to aid in the safety of residents and emergency response planning for responders. The evacuation route plan should also include encouragement for the future beneficiaries that will live in this subdivision to participate in Hawaiʻi's Firewise Communities Program.

The Project will replace unmanaged and relatively inaccessible existing fallow fields of invasive grasses with Fire Code-compliant buildings, Fire Code-compliant access roads, and a modern County-maintained fire protection system with fire hydrants that together will enable faster emergency response, reliable containment and effective suppression of any fires that may occur in the Project area. With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on the surrounding neighborhood during a wildfire event. No additional mitigation is recommended.

3.4 Water Resources

3.4.1 Groundwater

<u>Existing Conditions</u>

The DLNR, Commission on Water Resource Management (CWRM) defines and regulates groundwater management areas (DLNR-CWRM, 2005). The Site is within the ʻĪao Aquifer System Groundwater Management Area; this typically requires property owners to obtain water use permits for water withdrawal/use, per HAR §13-171 (DLNR-CWRM, 2022). However, per HHCA §221(b), DHHL is authorized to use water to adequately supply the needs of beneficiaries.

The DLNR, CWRM also establishes groundwater hydrologic units for island regions/sub-regions, to provide a basis for managing groundwater resources and optimizing island-wide pumpage for aquifer systems. The Site is located within the Wailuku region, in the ʻĪao sub-regions (aquifer code: 60102) and has a hydrologic unit sustainable yield of 20 million gallons per day (mgd) (DLNR-CWRM, 2018).

The Site is located inland (mauka) of the underground injection control (UIC) line established by the DOH, Safe Drinking Water Branch (DOH-SDWB). Groundwater inland of the UIC line is considered a potential drinking water source; therefore, injection wells are prohibited inland of the UIC line (Tetra Tech, 2022).

A portion of the Project falls within a Maui Department of Water Supply's (MDWS) well's 10-year time-of-travel Zone C in the Wellhead Protection Overlay District (WPOD) area. The WPOD area models the specific hydrogeological characteristics regarding the migration of chemical pollutants and the survival times of bacteria and viruses to travel to the well. MDWS well's time-of-travel zone regulates various potential chemical pollution well contamination concerns (MDWS, 2024).

Potential Impacts and Mitigation Measures

During construction, groundwater is not anticipated to be encountered. Additionally, the Project does not involve the construction of an injection well, which is prohibited by the DOH-SDWB inland of the UIC. Therefore, the Project is not anticipated to have a significant adverse impact on groundwater in that regard

The majority of the proposed 77-acre Project would be developed outside of the WPOD Zone C wellhead protection area. However, a portion of the residential lots and a community park at the southern end of the property lies within Zone C. This is consistent with other similar residential subdivisions to the South that exist over the Zone C area. Guidelines provided by the MDWS emphasizes the importance of situating any proposed development as far as feasible from the wellhead. Measures such as stormwater infiltration basins should be considered and positioned outside the wellhead protection overlay district where possible, or as far as practical from the wellhead if that is not feasible. In accordance with MCC Section 19.61.100 and the Maui Island Water Use and Development Plan (WUDP), the drainage basin proposed for this Project at the northeast corner of the Site is located outside of the wellhead protection overlay district. The drainage basin follows the DWS and CWRM recommendation to implement feasible BMPs stormwater management strategies that enhance groundwater recharge. This includes permeable detention ponds to reduce stormwater loss which promotes the protection of groundwater and the value of treating stormwater as a resource when contained onsite.

Other activities, inclusive of parks, must comply with conservation practices outlined in Maui County Code Section 19.61.090(C), including using EPA WaterSense-labeled plumbing fixtures and Smart Approved WaterMark irrigation products to maximize water efficiency. Incorporating native Hawaiian plants adapted to the climate and minimizing the use of fertilizers and biocides are key measures that contribute to water conservation and watershed protection.

In cases where the development is partially within a wellhead protection overlay district, it is advisable that activities should be concentrated on portions outside the district wherever feasible. Additionally, DHHL holds the authority to supersede these recommendations but will incorporate best management practices as feasible. The community park will align with Maui County standards as feasible, emphasizing water conservation measures both indoors and outdoors.

By implementing these mitigation measures, the project is anticipated to have no significant adverse impact on groundwater resources or the surrounding neighborhood. No additional mitigation is recommended.

3.4.2 Surface Water

Existing Conditions

The Site is within the ʻĪao Aquifer System Surface Water Management Area (DLNR-CWRM, 2022).

The Kaiapaokaʻīlio stream, an intermittent stream (typically dry gully) that marks the boundary between the Wailuku ahupuaʻa and Waikapū ahupuaʻa (Coulter, 1935), traverses through the Site and eventually flows into a dry overflow basin in the Waiale Reservoir. The Kaiapaokaʻīlio stream is a misspelling of Kalapaokaʻīlio, which is the name of the ridgeline to the northwest of the Site (also known as Lapakalio (LCAw 71, 1849). The Kaiapaokaʻīlio stream originates in the mauka regions of the ʻĪao Aquifer System at approximately 890 feet above msl and flows in a west-east direction. The

Kaiapaoka‘īlio stream is classified by the DOH, Clean Water Branch (DOH-CWB) as a “Class 2” estuary (DOH-CWB, 2014); Class 2 waters should be protected for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping, and navigation. The Waihe‘e Ditch runs through the center of the Site in a north-south direction and is part of an old irrigation network. Additionally, there are two unnamed dry ditches – one runs in an east-west direction, the other in a north-south direction. The Wailuku Water Reservoir No. 10 that connects to the Waikapū Ditch is located west of the Site. See *Figure 3-8, Surface Waters*.

Potential Impacts and Mitigation Measures

During construction, the Contractor will install BMPs such as filter socks around active work areas to filter stormwater runoff and mitigate potential construction-related pollutants (e.g., sediment, pollutants, petroleum products, and debris) from entering surface waters. The Project will comply with HAR Chapters 11-54 and 11-55. National Pollutant Discharge Elimination System (NPDES). A NPDES General Permit for stormwater runoff discharges will be obtained from the State, DOH- CWB. NPDES General Permits for dewatering and hydrotesting water discharges may also be obtained from the DOH, CWB, if required. The Project will also apply for and obtain a County grading permit.

The Project involves the construction of a new underground drain inlet/line within the Site’s internal streets, which will convey offsite runoff and the intermittent flows of Kaiapaoka‘īlio stream, which is a typically dry drainageway. Consultation with the DLNR, CWRM may be required to determine whether a Stream Channel Alteration Permit is required for the modification and change in direction of stream flows. Additionally, informal consultation with the U.S. Army Corps of Engineers has been initiated to ensure that all surface water within the Site is not considered a water of the United States. Per 40 CFR 230.3(s), “waters of the United States” include waters such as intrastate streams (including intermittent streams) which could affect commerce including any such waters which could be used by travelers for recreational or other purposes or waters from which fish/shellfish could be sold.

With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on surface waters. No additional mitigation is recommended.

Figure 3-8 Surface Waters

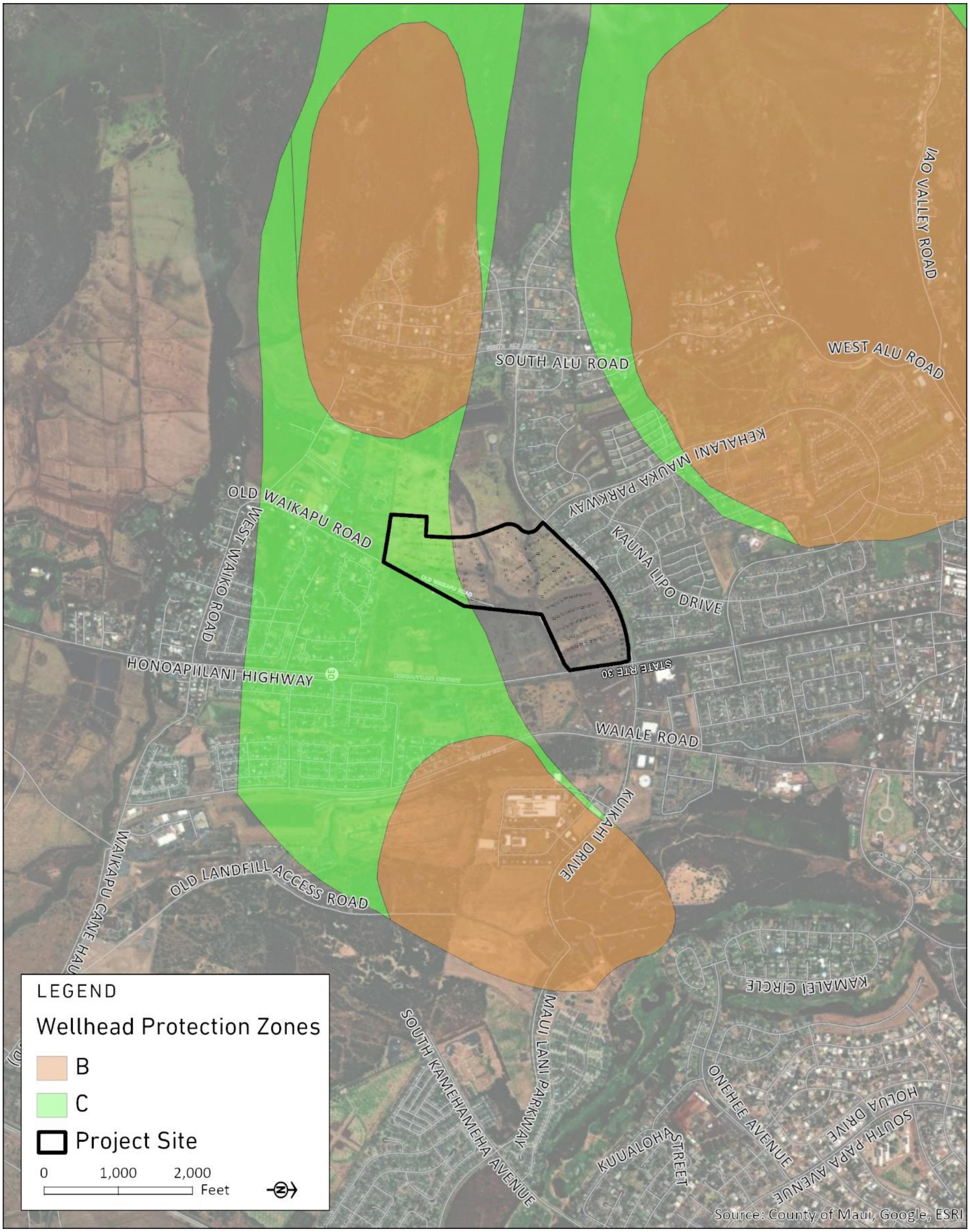

Figure 3-9 **Wellhead Protection Zones**

3.5 Flora and Fauna

A Biological Resources Study (Study) was prepared for the Project by Robert W. Hobdy in June 2022. The Study documents the existing flora and fauna species on the Site, identifies species that are likely to occur within the existing habitat, and determines the presence or likely occurrence of any native, Federally- or State- listed, threatened, or endangered species and special habitats. The Study method included a walk-through flora and fauna survey following routes to ensure maximum coverage; areas with high potential to harbor native or rare flora such as gullies were intensively examined. Field observations for fauna species was assisted by the use of binoculars and by listening to vocalizations. Notes were taken on the distribution, abundance, terrain and substrate for both flora and fauna species. Additionally, an evening visit was made to the Site to observe potential twilight activities and vocalizations of the endemic and endangered ʻŌpeʻapeʻa or Hawaiian hoary bat (*Lasiurus cinereus semotus*) (Hobdy, 2022). See *Appendix D: Biological Resources Study*.

3.5.1 Flora

Existing Conditions

There is a low diversity of flora on the Site, dominated by tall, dense grass, as much of the Site was heavily grazed by goats, cattle, horses, sheep, and deer. A total of 20 flora species were observed/recorded on the Site; Guinea grass (*Megathyrsus maximus*) and koa haole (*Leucaena leucocephala*) were the two most abundant species. The remaining 18 flora species were sparse only occurring in a few small patches or were identified as isolated individuals. Of mention is the Madagascar fireweed (*Senecio madagascariensis Poir*), which is on the United States Department of Agriculture's, Natural Resources Conservation Service's (USDA-NRCS) Noxious Weed list for the State and is considered a weed which is harmful to the environment or animals. There was no endemic, native, Polynesian-introduced, Federally- or State-listed, threatened, or endangered flora on the Site. Additionally, no host plants supporting the Blackburn's Sphinx Moth (*Manduca blackburni*) were observed within the Site (Hobdy, 2022). A full listing of the Study flora species with associated status and abundance classifications are listed below in *Table 3-1*, *Flora Species*.

Table 3-1: Flora Species			
Scientific Name	**Common Name**	**Status**	**Abundance**
ARECACEAE (Palm Family) *Washingtonia robusta* H. Wendland	Mexican washingtonia	Non-native	Rare
POACEAE (Grass Family) *Cenchrus ciliaris L.*	buffelgrass	Non-native	Uncommon
Megathyrsus maximus (Jacq.) Simon & Jacobs	Guineagrass	Non-native	Abundant
AMARANTHACEAE (Amaranth Family) *Amaranthus spinosus L.*	spiny amaranth	Non-native	Rare
ASTERACEAE (Sunflower flower) *Pluchea carolinensis* (Jacq.) G. Don	sourbush	Non-native	Rare
Senecio madagascariensis Poir.	Madagascar fireweed	Non-native	Uncommon
CASUARINACEAE (She-oak Family) *Casuarina equisetifolia L.*	common ironwood	Non-native	Rare
CUCURBITACEAE (Gourd Family) *Momordica charantia* L.	bitter melon	Non-native	Rare
EUPHORBIACEAE (Spurge Family) *Macaranga tanarius* (L.) Mull. Arg.	parasol leaf tree	Non-native	Rare
FABACEAE (Pea Family) *Indigofera suffruticosa* Mill.	inikō	Non-native	Rare
Leucaena leucocephala (Lam.) de Wit	koa haole	Non-native	Common
Neonotonia wightii (Wight & Arnott) Lackey	glycine	Non-native	Rare
Pithecellobium dulce (Roxb.) Benth.	'opiuma	Non-native	Uncommon
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe	Non-native	Rare
Vachellia farnesiana (L.) Wight & Arnott	klu	Non-native	Rare
LAMIACEAE (Mint Family) *Leonotis nepetifolia* (L.) R. Br.	lion's ear	Non-native	Rare
MALVACEAE (Mallow Family) *Malva parviflora L.*	cheeseweed	Non-native	Rare
Malvastrum coromandelianum (L.) Garcke	false mallow	Non-native	Rare
MYRTACEAE (Myrtle Family) *Szyzigium cumini* (L.) Skeels	Java plum	Non-native	Rare
NYCTAGINACEAE (Four-o'clock Family) *Boerhavia coccinea* Mill.	scarlet spiderling	Non-native	Rare

Potential Impacts and Mitigation Measures

During construction, most of the existing grasses, shrubs, and trees will be removed to accommodate the development of the residences and vacant lots. Thus, the Project will help to eradicate the Madagascar fireweed, and suppress the spread of this noxious weed, in accordance with the Plant Protection Act of 2000 (7 U.S.C 7701 *et seq*.).

The movement of plant or soil material between worksites will be minimized throughout construction; and equipment, materials, and personnel will be cleaned of excess soil and debris to minimize the risk of spreading fungal pathogens (e.g., Rapid ʻŌhiʻa Death), vertebrate and invertebrate pests (e.g., Little Fire Ants), or invasive plant parts and noxious plants (e.g., Madagascar fireweed).

The Project involves the installation of new landscaping which will border the Site and be interspersed along internal streets, which will provide shade and visual relief. A linear park on the southern portion of the Site will be landscaped with vegetation that correlates with the surrounding environment and conform to County standards. A landscape buffer will remain alongside the existing unnamed ditch that runs in a north-south direction. The detention basin fronting the northeast end of the Site will incorporate vegetation that preserves viewscapes along Honoapiʻilani Highway. Per HRS §103D-408, Hawaiian plants shall be incorporated in landscaping that utilizes public funds. Drought-tolerant and native plant species will be propagated where possible.

With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on Federally- or State-listed, threatened, or endangered flora species. No additional mitigation measures are recommended.

3.5.2 Fauna

Existing Conditions

Two native fauna species were observed on the Site, the globe skimmer dragonfly (*Pantala flavescens*) and the Federally- and State-listed endangered, endemic ʻŌpeʻapeʻa or Hawaiian Hoary Bat (*Lasiurus cinereus semotus*). The globe skimmer dragonfly is a common species and is of no conservation concern. The nocturnally active ʻŌpeʻapeʻa were recorded at two locations on the Site, using a bat detecting device (Babox III D) set to the frequency of 27,000 Hertz, that the bats are known to emit when echolocating for insect prey (Hobdy, 2022). ʻŌpeʻapeʻa have been found roosting in ʻōhiʻa (*Metrosideros polymorpha*), pu hala (*Pandanus tectorius*), coconut palms (*Cocos nucifera*), kukui (*Aleurites moluccana*), kiawe (*Proscopis pallida*), avocado (*Persea americana*), shower trees (*Cassie javanica*), pūkiawe (*Styphelia tameiameiae*), fern clumps, eucalyptus (*Eucalyptus spp.*), cook pine (*Araucaria columnaris*), and Norfolk Island pine (*Araucaria heterophylla*) stands. Bat activity varies with the season and altitude; the greatest level of activity occurs at low elevations (below 4,200 feet) from April to December (DLNR, 2015).

Five non-native mammalian species (often harmful to native ecosystems and native fauna) were observed during the survey, including domestic cattle (*Bos taurus* L.), domestic goats (*Capra hircus* L.), domestic sheep (*Ovis aries* L.), axis deer (*Axis axis Erxleben*), and domestic horse (*Equus caballus* L.). Non-native mammals such as cats, rats, and mice likely exist in the Project vicinity but were not observed (Hobdy, 2022).

Seven non-native bird species were observed on the Site, including the cattle egret (*Bubulcus ibis* L.), the pigeon (*Columba livia Gmelin*), the zebra dove (*Geopelia striata* L.), the spotted dove (*Streptopelia chinensis* Scopoli), the common chicken (*Gallus gallus* L.), the common myna (*Acridotheres tristis* L.), and the Japanese white-eye (*Zosterops japonicus*) (Hobdy, 2022). No native birds were observed on the Site; however, Hawaiian seabirds such as the federally endangered ʻUaʻu or Hawaiian petrel (*Pterodroma sanwichensis*), the State endangered ʻAkēʻakē or Band-rumped storm-petrel (*Oceanodroma castro*) and the federally threatened ʻAʻo or Newell's shearwater (*Puffinus newelli*) are known to fly over these lowland areas during the evening on the way to their burrows in the mountains (Hobdy, 2022). Additionally, based on consultation with the United States Fish and Wildlife Service (USFWS) on the adjacent TMK Parcel: (2)3-5-02:02 (dated August 30, 2019), the following species may occur in the vicinity or transit through the Site: federally listed Nēnē or Hawaiian goose (*Branta sandvicensis) and* State-listed Hawaiian waterbirds (Hawaiian duck [*Anas wyvilliana*], Hawaiian stilt [*Himantopus mexicanus knudseni*], Hawaiian coot [*Fulica alai*]) (DHHL, 2020a).

The Blackburn's Sphinx Moth (*Manduca blackburni*) was not observed, likely due to the lack of host plants within the Site. Four non-native insect species were observed on the Site, including the house fly (*Musca domestica* L.), dung fly (*Musca sorbens* Wiedemann), big-headed ant (*Pheidole megacephala* Fabricius), and short-horned grasshopper (*Oedaleus abruptus* Thunberg). The one non-native mollusk species observed was the giant East African snail (*Lissachatina fulica* Ferrussac) (Hobdy, 2022).

A full listing of the Study fauna species with associated status and abundance classifications are listed below in *Table 3-2*, *Fauna Species*.

<u>Potential Impacts and Mitigation Measures</u>

During the EA process, DHHL will continue to reach out for consultation with USFWS and DLNR-DOFAW. The following mitigation measures will be implemented prior to or during construction to minimize potential impacts to the following species:

- **Hawaiian Hoary Bat**: Woody plants greater than 15 feet tall will not be disturbed, removed, or trimmed during the bat birthing and pup-rearing season (June 1 through September 15). Additionally, barbed wire will not be used for fencing. If this cannot be avoided, woody plants greater than 15 feet tall should not be disturbed, removed, or trimmed without consulting USFWS and DLNR, DOFAW.
- **Hawaiian Seabirds**: Nighttime construction will be avoided during the seabird fledging period (September 15 through December 15) to prevent injury to seabirds. Outdoor lights will be shielded to the maximum extent possible, so the bulb can only be seen from below and as much as possible the lowest wattage bulbs will be used. The Contractor will provide construction crews with information about seabird fallout prior to the initiation of work. If a downed seabird is found, the Contractor will contact the USFWS immediately.
- **Hawaiian Waterbirds**: If a nest or active brood is discovered during construction the USFWS and DLNR, DOFAW, Maui Branch Office will be contacted within 48 hours. All activities within 100 feet of the active nest and/or brood will cease, and the bird(s) will not be approached, until the chicks/ducklings have fledged.
- **Globe Skimmer Dragonfly**: Though a common species throughout the Hawaiian Islands, the Contractor will do its best to avoid harming the species.

The Project recognizes the threat that nonnative predators pose on vulnerable native bird species. Covered trash receptacles will be used during the construction phase of the Project. DHHL will also inform future lessees of the dangers of nonnative predator species. DHHL will also inform the lessees that residents with pet cats be kept indoors or safely contained at all times. In addition, no feeding of feral cats should occur on the premises.

Table 3-2 Fauna Species			
Scientific Name	**Common Name**	**Status**	**Abundance**
MAMMALS			
BOVIDAE (Cattle Family) *Bos taurus* L.	domestic cattle	Non-native	Uncommon
Capra hircus L.	domestic goats	Non-native	Common
Ovis aries L.	domestic sheep	Non-native	Rare
CERVIDAE (Deer Family) *Axis axis* Erxleben	axis deer	Non-native	Rare
EQUIDAE (Horse Family) *Equus caballus* L.	domestic horse	Non-native	Uncommon
VESPERTILIONIDAE (Common Bat Family) *Lasiurus cinereus semotus* Allen	'ōpe'ape'a	Endemic	Rare
BIRDS			
ARDEIDAE (Heron Family) *Bubulcus ibis* L.	cattle egret	Non-native	Uncommon
COLUMBIDAE (Dove Family) *Columba livia* Gmelin	Pigeon	Non-native	Uncommon
Geopelia striata L.	zebra dove	Non-native	Uncommon
Streptopelia chinensis Scopoli	spotted dove	Non-native	Common
PHASIANIDAE (Pheasant Family) *Gallus gallus* L.	common chicken	Non-native	Rare
STURNIDAE (Starling Family) *Acridotheres tristis* L.	commmon myna	Non-native	Uncommon
ZOSTEROPIDAE (White-eye Family) *Zosterops japonicus* Temmink & Schlegel	Japanese white-eye	Non-native	Rare
INSECTS			
Order Diptera- flies Muscidae (House Fly Family) *Musca domestica* L.	house fly	Non-native	Rare
Musca sorbens Wiedemann	dung fly	Non-native	Uncommon
Order Hymenoptera- bees, wasps, ants Formicidae (ant family) *Pheidole megacephala* Fabricius	big-headed ant	Non-native	Rare
Order Odonata- dragonflies, damselflies Libellulidae (Skimmer Dragonfly Family) *Pantala flavescens* Fabricius	globe skimmer	Indigenous	Rare
Order Orthoptera - grasshoppers, crickets Arididae (Grashopper Family) *Oedaleus abruptus* Thunberg	short-horned grasshopper	Non-native	Rare
Mollusks Achatinidae (Achatinid Snail Family) *Lissachatina fulica* Ferrussac	giant East African snail	Non-native	Rare

The Project involves installation of streetlights along the subdivision roads. To avoid impacts to seabirds and light spillage, exterior lights will be fully shielded. Exterior lights will comply with HRS §201-8.5, *Night Sky Protection Strategy*, and MCC, Chapter 20.35, *Outdoor Lighting*, as amended.

With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on fauna species, as the Project will not result in a substantial decline or take of a Federally- or State- listed, threatened, or endangered species. No additional mitigation is recommended.

3.6 Air Quality

Existing Conditions

The Clean Air Act (42 U.S.C. 7401 et seq.) requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for seven criteria pollutants that are harmful to public health and the environment: carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, ozone, and particulate matter (PM) less than 10 and 2.5 microns respectively (PM_{10} and $PM_{2.5}$).

The DOH, Clean Air Branch (CAB) has established State Ambient Air Quality Standards (SAAQS) for criteria pollutants in HAR §11-59, *Ambient Air Quality Standards* and HAR §11-60, *Air Pollution Control*. The DOH, CAB, Air Surveillance and Analysis Section, collects measurements of ambient level pollutants in the air through a statewide monitoring network.

The DOH, CAB has an air monitoring station in Kahului at LOT 11-D-1-A-1-D-1 MAUI LANI (LRG-LOT) SUBD NO 7 Kuihelani Highway. Based on DOH, CAB's air monitoring data, Maui is currently in attainment for all applicable NAAQS and SAAQS (DOH-CAB, 2022).

There are no point sources of airborne pollutants in the vicinity of the Site. Minimal, indirect non-point sources of airborne pollutants in the vicinity are attributable to vehicular traffic and dust from surrounding fallow agricultural lands; however, prevailing winds quickly disperse these particulates.

Potential Impacts and Mitigation Measures

During construction, fugitive dust, criteria pollutants and GHG emissions will result from grubbing, grading, demolition, excavation, structure construction, and asphalt paving. However, construction-related emissions will be short-term, intermittent, and spread over several acres. The following mitigation measures will be implemented:

- Phasing/limiting disturbed areas;
- Stabilizing disturbed areas as soon as practicable;
- Periodic watering of exposed surfaces;
- Installation of dust screens around the perimeter of the Site;
- Regular maintenance of construction equipment;
- Covering open-bodied trucks when transporting soil materials;
- Application of water on disturbed areas and haul roads; and
- Reduction of speeds on unpaved roads to <15 mph.

Additionally, the Contractor will comply with HAR §11-60.1-33, *Air Pollution Control* and may develop a dust control management plan.

Once the Project is developed, direct and indirect criteria pollutant and GHG emissions may result from residential uses (e.g., energy usage, water usage, solid waste generation, landscaping equipment, and consumer products) and mobile sources (e.g., vehicle trips); however, the quantity of emissions will not result in a significant adverse impact on existing air quality.

With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on air quality, as the proposed improvements do not involve permanent point source activities that will impair the State's ability to meet Federal or State air quality standards. No additional mitigation is recommended.

3.7 Noise Conditions

Existing Conditions

Noise is defined as any unwanted or unpleasant sound that causes a disturbance or interferes with normal activities. It may be intermittent or continuous, steady, or impulsive, and stationary or temporary. Existing ambient noise in the Project vicinity is attributable to both the natural environment and human activity, from sources that are typical of residential environments.

In Hawai‘i, noise is regulated by the DOH, Indoor and Radiological Health Branch (IRHB), in accordance with HAR §11-46, *Community Noise Control*. HAR §11-46-3 defines maximum permissible sound levels (at property lines) for three land use classifications (i.e., zoning districts) and provides for the abatement and control of excessive noise sources, including stationary and temporary construction and industrial generated noise sources. "Class A" zoning districts include residential, conservation, preservation, public space, open space, or similar types of zoning districts; "Class B" zoning districts include multi-family dwelling, apartment, business, commercial, hotel, resort, or similar types of zoning districts; and "Class C" zoning districts include agriculture, country, industrial or similar types of zoning districts. The Site is in the Class C zoning district. The maximum permissible sound levels in the Class C zoning district are 70 A-weighted decibels (dBA) from 7:00 AM to 10:00 PM and 70 dBA from 10:00 PM to 7:00 AM. If impulsive sounds exceed 120 impulses in any 20-minute period, the noise limit is 10 dB above the maximum permissible sound level. Per HAR §11-46, noise levels are not permitted to exceed the maximum permissible sound levels for more than 10% of the time within any 20-minute period, except by permit or variance from DOH, IRHB.

Noise generated in the vicinity is primarily attributed to vehicular traffic along the surrounding roadways such as Honoapi‘ilani Highway, east of the Site. Also, due to the Site's proximity to the Kahului Airport, noise may occur from the occasional aircraft flight over the Site.

Potential Impacts and Mitigation Measures

During construction, short-term, intermittent noise impacts will occur during site work and earthwork phases (e.g., excavation, grading, sheet pile driving, concrete pouring, and hammering). Construction noise will gradually diminish as the exterior structure of the building is built and roofed.

The Contractor will obtain a noise permit from DOH, IRHB. A noise permit is required for construction activities (during 7:00 AM to 6:00 PM Monday through Friday and 9:00 to 6:00 PM on Saturday) that exceed 78 dBA or have a total cost of more than $250,000 (based on the value of the building permit). Additionally, the Contractor will employ the following mitigation measures to minimize noise impacts:

- Construction equipment and vehicles will be appropriately muffled and maintained to reduce backfires. Generators will be placed in locations distanced from neighbors, be equipped with an attached muffler, or use other noise-abatement methods in accordance with industry standards;
- Construction equipment use, including pile drivers, hydraulic hammers, and jackhammers, will be limited to Monday through Friday (9:00 AM to 5:30 PM); and
- Equipment staging and storage areas will be distanced from neighbors.

Once the Project is developed, additional ambient noise may result from residential uses and traffic; however, the quantity of noise will not result in a significant adverse impact on existing conditions.

With the implementation of the proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on existing noise conditions. No additional mitigation is recommended.

3.8 Utilities and Infrastructure

A Preliminary Engineering Report (PER) was prepared by Warren S. Unemori Engineering, Inc. for the Project in December, 2023. The PER evaluates the existing availability of potable water, wastewater, drainage, electrical, telecommunications, transportation infrastructure, and requirements for servicing the Project. See *Appendix E: Preliminary Engineering Report*.

3.8.1 Potable Water

Existing Conditions

The Department of Water Supply (DWS) manages the County potable water system, which comprises of an interconnected distribution network of reservoirs, wells, shafts, water tunnels, booster and pumping stations and water mains. The DWS provides potable water to approximately 36,400 customers in in the County, divided into five main system sections (Central Maui, Upcountry Maui, West Maui, East Maui, and Molokai). The Central Maui system has the most customers and includes Wailuku, Kahului, Pāʻia, Puʻunene, and Kihei. Central Maui potable water is sourced from groundwater from the ʻĪao Aquifer beneath the West Maui Mountains, which is naturally filtered by lava rocks (DWS, 2021a). The ʻĪao Water Treatment Plant treats approximately 3.2 mgd, using a next generation membrane barrier filtration and a non-hazardous on-site sodium hypochlorite generation system for disinfection (Cerizo, 2021). The DWS, Engineering Division develops and maintains water supply standards and inspects the construction of water system facilities for adherence to standards and policies (DWS, 2021c).

Potable water service to the Site is sourced from an existing DWS groundwater well, which distributes water from two 1.5 million gallon (mg) and 0.5 mg capacity storage tanks located along Kuikahi Drive at elevation 670 feet. The 0.5 mg storage tank will be constructed by DHHL for the DWS, in conjunction with DHHL's Puʻunani Homestead Subdivision (WSUE, 2023).

Potential Impacts and Mitigation Measures

Construction activities will require the use of potable water (or another water source secured by the Contractor) for dust control, vehicle wash down, and concrete mixing etc. These uses will be intermittent and will cease upon Project completion. The existing potable water system is anticipated to have sufficient capacity to accommodate the temporary demands from construction-related activities and is not anticipated to disrupt the potable water system.

The Project will require potable water for drinking, sanitation, irrigation, and fire protection. The anticipated average daily potable water demand for the 204 residences is estimated at 129,200 gallons per day (gpd). An estimated 204,000 gallons of storage capacity is required for the Project, per DWS standards, thus the DHHL will utilize a portion of its water storage credits from the DHHL's new 0.5 mg storage tank. A network of 8-inch water mains, service laterals and fire hydrants will be installed throughout the Site to serve the residences and will connect to the DWS' existing 12-inch mains along Kuikahi Drive and Old Waikapū Road (WSUE, 2023). See *Figure 3-10, Conceptual Potable Water System Plan* (Figure 4-1 in PER). The fire protection system will be designed to comply with the County Fire Code, Uniform Fire Code (2012), and HAR §12-45.2, *Water System Standards* (2002), and will be reviewed by the Department of Fire and Public Safety (DFPS) during the building permit review process. Water availability and the scope of required water infrastructure improvements will not be finalized until construction drawings, water meter reservation, and building permits are submitted to DWS and DFPS, per MCC §14.05.120. The Project will be processed under exemptions per Section 221 of the Hawaiian Homes Commission Act and MCC §14.12.030.H.

With the implementation of the proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on the existing potable water system, as the proposed improvements do not involve the creation of point-source pollution; a substantial alteration to any portion of the existing potable water system; or a substantial consumption of Central Maui's potable water. No additional mitigation is recommended.

3.8.2 Wastewater

Existing Conditions

The County, Department of Environmental Management, Wastewater Reclamation Division (DEM, WRD) is comprised of the Wastewater Administration and Wastewater Operations, which collectively share the responsibilities of achieving public health through maintenance of the County's wastewater facilities. Wastewater Operations consists of the Wastewater Facilities Program and Wastewater Collection System. The Wastewater Facilities Program manages, operates, maintains, and repairs the County wastewater and pumping facilities. The Wastewater Collection System manages, installs, maintains, and repairs County wastewater collection lines, force mains, and manholes (DEM, 2021). The County's Kahului Wastewater Reclamation Facility (KWWRF) serves the Site. The KWWRF has a design capacity of 7.9 mgd.

Wastewater service in the Project vicinity is currently provided by several gravity sewer collection mains, including an existing 12-/18-inch diameter sewer main located along Waiale Road which is conveys wastewater along Lower Main Street to the KWWRF; an 8-inch sewer main located within Kuikahi Drive which conveys wastewater from the Wailuku Heights subdivision to the 18-inch main on Waiale Road; and a planned 8-inch gravity sewer main located along Honoapiʻilani Highway (by DHHL to serve the Puʻunani Homestead Subdivision) (WSUE, 2023).

Potential Impacts and Mitigation Measures

During the period of construction, the Contractor will provide portable toilets for use by the construction workers. Wastewater from the portable toilets will be collected and discharged into a sewer manhole designated to receive septage. The Contractor will adhere to BMPs to prevent construction-related wastewater pollutants from discharging with stormwater runoff.

The 204 residences are anticipated to create an average wastewater flow of 71,400 gpd. A network of new 8-inch gravity sewer pipes will be installed within the Site's internal streets to collect wastewater from the residences and convey it toward the eastern portion of the Site adjacent to Honoapiʻilani Highway. Connection to the DEM's wastewater collection system will either involve installing a second 1,200-foot 8-inch diameter gravity sewer line from the Site to the existing 12-/18-inch diameter sewer main located along Waiale Road or connecting to the planned 8-inch sewer main along Honoapiʻilani Highway. The DEM is planning to construct a new 4.0 mgd-capacity treatment plant in Waikapū by 2029. Once the Waikapū plant becomes operational, wastewater flows will be directed from the Site for treatment and disposal. If the Project is completed before 2029, wastewater from the Site will be received and treated at the County's existing KWWRF. See *Figure 3-11, Conceptual Sewer System Plan: Alternative 1* and *Figure 3-12, Conceptual Sewer System Plan: Alternative 2* (Figure 5-1a and Figure 5-1b in the PER (WSUE, 2023).

With the implementation of the proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on the existing wastewater system. The increased wastewater generation from the Project will be accommodated by the County's wastewater service facilities, with improvements to ensure suitable system connections and flow controls. No additional mitigation is recommended.

3.8.3 Drainage

Existing Conditions

The County, Department of Public Works (DPW), Engineering Division (ED) provides engineering and inspection services for the planning, designing, and construction of the County's drainage system. The DPW, ED aims to improve the water quality that enters the County's drainage system, which discharges into waterways and eventually the Pacific Ocean.

The Site currently does not have any stormwater infrastructure. The existing terrain slopes steadily downward across the Site from west to east at a grade of 8 to 10 percent. The elevation ranges from 565 feet in the southwest and 350 feet at northeast corner. Current offsite runoff passes through the Site in two drainageways that converge into a single drainageway on the eastern side of the parcel above Old Waikapu Road then crosses Honoapiʻilani Highway and Waiale Road before entering a large underground pipeline that conveys it to Waiale Irrigation Reservoir. A majority of the onsite flow also passes through the Site and is conveyed at the Waiale Irrigation Reservoir while some of the onsite drainage flows toward Kuikahi Drive/Honoapiʻilani Highway intersection where it enters the existing underground storm drainage system on Kuikahi Drive that conveys it southward to the Kehalani Project District's Stormwater Retention Basin in Waikapu (WSUE, 2023).

Potential Impacts and Mitigation Measures

During construction, there is the potential for pollution associated with stormwater runoff to discharge into County drainage system and nearby surface waters. The Contractor will install BMPs such as temporary sedimentation basins, silt fence around active work areas and inlet protection devices near drainage outlets to handle the treatment of runoff and mitigate potential construction-related pollutants from entering drainage infrastructure and surface waters. The Project will comply with HAR Chapters 11-54 and 11-55. A NPDES General Permit for potential stormwater runoff discharges will be obtained from the DOH, CWB. NPDES General Permits for dewatering and hydrotesting water discharges may also be obtained from the DOH, CWB, if required.

The Project is estimated to result in a 10-year, 1-hour peak runoff stormwater discharge of 180.5 cubic feet per second (cfs) of runoff, which is a net increase of approximately 117.5 cfs from existing conditions (63 cfs). Offsite runoff will continue to pass through the Site via the existing unnamed ditch and a new underground drain inlet/line within the Site's internal streets before converging into the existing drainageway adjacent to the Site and entering the Waiale Reservoir. Onsite runoff will be directed into a new system of underground drain inlets/lines within the Site's internal streets before either 1) draining into the Waikapū Retention Basin, or 2) entering an approximately 9-acre-foot stormwater detention basin (located at the northeast corner of the Site), and eventually discharging into the Waiale Reservoir. The detention basin will fully mitigate the anticipated increase in peak flows from the Site and will reduce water pollution through sediment removal (WSUE, 2023). See *Figure 3-13, Conceptual Drainage System Plan* (Figure 3-4 in PER).

The Project will result in an increase in impervious surfaces and related stormwater runoff; however, the increase in Project-related stormwater runoff will be sufficiently mitigated by the proposed onsite detention system and Low-Impact Development features. With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on existing drainage infrastructure or surrounding properties.

3.8.4 Solid and Hazardous Waste

Existing Conditions

Residential and commercial solid waste, recyclables and compost generated in Central Maui are disposed/recycled at the Central Maui Landfill Refuse & Recycling Center in Puʻunēnē, situated approximately 7.0 miles from the Site. Construction wastes are accepted at the Central Maui Landfill by customers who have a construction and demolition landfill account and job number. Solid waste generated at the Site is hauled away and properly disposed of.

Tetra Tech, Inc. conducted a Phase 1 Environmental Site Assessment (ESA) for the Site in November 2022. See *Appendix F: Phase 1 Environmental Site Assessment Report.* The purpose of the Phase 1 ESA is to evaluate the presence of recognized environmental conditions (RECs) at the Site. A REC is defined as the presence or likely presence of any hazardous substance or petroleum product in, on, or at a property. There are two types of RECs – historical RECs (HREC) and controlled RECs (CREC). The Phase 1 ESA involved a review of environmental databases and records, and site reconnaissance visits on July 13, 2022, and October 18, 2022. The Phase 1 ESA did not reveal RECs, HRECs or CRECs on the Site. The Site was previously utilized for agriculture (likely sugar cane and pineapple cultivation) from at least 1950 until sometime in the early 2000s. Based on the historical agricultural use of the Site, environmentally persistent agricultural chemicals (pesticides and fertilizers) may have been applied and may still be present in the soil at concentrations that limit its suitability for certain uses. While the use of agricultural chemicals generally does not require regulatory enforcement, the potential for existing agricultural chemicals in the soil is a business environmental risk for the Site (Tetra Tech, 2022).

Potential Impacts and Mitigation Measures

During construction, green waste and non-hazardous construction materials will be generated from grubbing, grading, and construction of the residences and vacant lots, and utility infrastructure. Green waste and non-hazardous construction materials will be recycled or disposed of at the Central Maui Landfill or another approved facility. Any discovered hazardous waste will follow applicable Federal, State and County regulations and will be handled and disposed of at a facility permitted by the DOH, Solid and Hazardous Waste Branch. The Project will comply with HRS Chapters 342H and 3421 and HAR §11-260.1 to 11-279.1, 11-58.1, 11-280.1, 11-501, 11-503, and 11-504 as applicable.

Solid waste from the residences will be collected, recycled, and disposed of at the Central Maui Landfill (or approved facility).

The Phase 1 ESA did not reveal RECs, HRECs or CRECs on the Site (Tetra Tech, 2022). The Project is not anticipated to result in a significant adverse impact on the existing solid waste disposal system, as the proposed improvements will not lead to a substantial increase in the generation of solid waste during and/or post-construction or a delay or disruption in the collection of solid waste for the surrounding community. No additional mitigation is recommended.

3.8.5 Electrical Power and Telecommunications

Existing Conditions

Electrical power on Maui is generally provided by Hawaiian Electric Co. Ltd. (HECO). Existing HECO infrastructure in the Project vicinity includes three-phase primary underground lines running on the south side of Kuikahi Drive within the ROW below Alu Road (WSUE, 2023).

Hawaiian Telcom (HTCO) provides internet and telephone services on Maui and is currently in the process of designing an underground fiber communication/internet system which it plans to install on the north side of the Kuikahi Drive ROW. Sandwich Isle Communications (SIC) also provides television, and internet services on Maui, and has an underground fiber optic trunk line located along Honoapiʻilani Highway. Spectrum provides internet, telephone, and cable television (CATV) services on Maui but would need to extend their facilities across Kuikahi Drive to service the Site (WSUE, 2023).

Potential Impacts and Mitigation Measures

During construction, the Project will not adversely impact the provision of electrical power to the surrounding community. To mitigate potential impacts to underground utilities, coordination with HECO will be undertaken to locate service lines prior to excavation. The existing HECO system is anticipated to meet the electrical power requirements during construction activities. In the event of an electrical power outage, the Contractor will be prepared with an on-site generator.

An overhead distribution system is proposed for the Project, to remain consistent with DHHL's adjacent Puʻunani Homestead Subdivision; however, undergrounding the utilities will remain an option. HECO will extend its distribution system from Kehalani Mauka Parkway extension into the Site underground, before converting to an overhead distribution system with two riser poles. On-site electrical improvements will consist of a three-phase and single-phase overhead distribution system (poles, anchors, lines, pole-mounted transformers, and streetlights), which will be constructed by HECO based on the estimated electrical load demand of 1,224 kilowatts for 204 residences. HECO may require the installation of a substation to accommodate the estimated load demand. Required easements will be coordinated with HECO and neighboring properties (WSUE, 2023).

HECO will install overhead facilities (streetlights) after DHHL installs any required underground infrastructure (street light bases) for roads that will be turned over to the County. DHHL will install streetlights on roads that remain private, and private pole-mounted streetlights would need to be metered. All exterior lighting will comply with the County's Outdoor Lighting Ordinance. If space does not allow for handhole placement, or if the Site does not have curb and gutter, infrastructure may require the use of manholes or traffic-rated handholes where possible. Exemptions to MCC §12.16.010, §18.20.140.B, and §16.26B.3600 will be required to install the overhead power equipment rather than undergrounding. Each residence owner will need to submit a service request to HECO prior to or during construction (WSUE, 2023). See *Figure 3-13, Conceptual Electrical System Plan* (Figure 6-1 in the PER).

During construction, the Project is not anticipated to have an adverse impact on existing telecommunication systems. To mitigate potential impacts to underground utilities, coordination with HTCO, SIC and Spectrum will be undertaken to locate service lines prior to excavation.

HTCO will provide internet and telephone services to the residences by connecting to their new underground fiber communication/internet system on Kuikahi Drive ROW or via the Kehalani Mauka Parkway extension. Fiber optic equipment or a fiber distribution hub (FDH) will be installed and centrally located within the Site to provide service to residences. Required easements will be coordinated with HTCO 's planning department. Telephone cables will be installed at HTCO's expense, and each residence owner will need to submit a service request to HTCO and pay monthly fees. SIC will construct an overhead distribution system extending into the Site from its trunk line on Honoapiʻilani Highway at its expense, and each residence owner will need to submit a service request to SIC and pay monthly fees. Spectrum will provide internet, telephone, and CATV services to the residences by extending their facilities across Kuikahi Drive. Spectrum may require two power supply pads to be installed within the Site. Required easements will be coordinated with Spectrum. The power supply equipment and cables will be installed at Spectrum's expense, and each residence owner will need to submit a service request to Spectrum and pay monthly fees. HTCO, SIC and Spectrum will install overhead facilities (poles, anchors, lines, and pole-mounted transformers) after DHHL installs any required underground infrastructure, including conduits, handholes and concrete pads. Exemptions to MCC §12.16.010, §18.20.140.B, and §16.26B.3600 will be required to install the overhead telecommunications equipment serving the Project rather than undergrounding (WSUE, 2023). See *Figure 3-14, Conceptual Electrical System Plan* (Figure 6-1 in the PER).

With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on HECO facilities. Project engineers will coordinate with HECO to install the necessary infrastructure to meet the electrical power requirements of the Project, without causing disruptions to the surrounding community. No additional mitigation is recommended.

With the implementation of the proposed mitigation measures, the Project is also not anticipated to have a significant adverse impact on existing telecommunication infrastructure, as the proposed improvements are not anticipated to cause delays or disruptions to the surrounding community. No additional mitigation is recommended.

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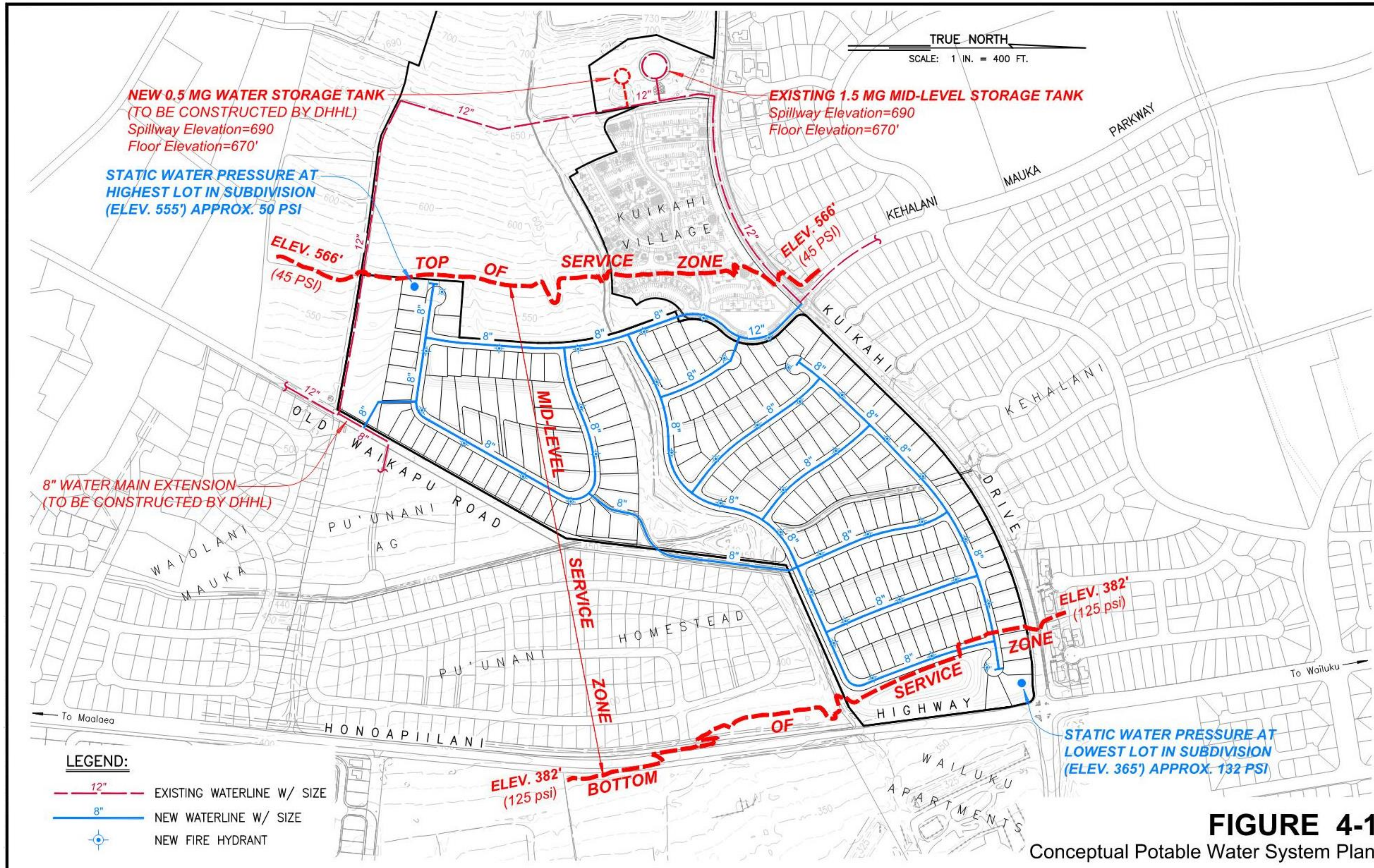

Figure 3-10 **Conceptual Potable Water System Plan**

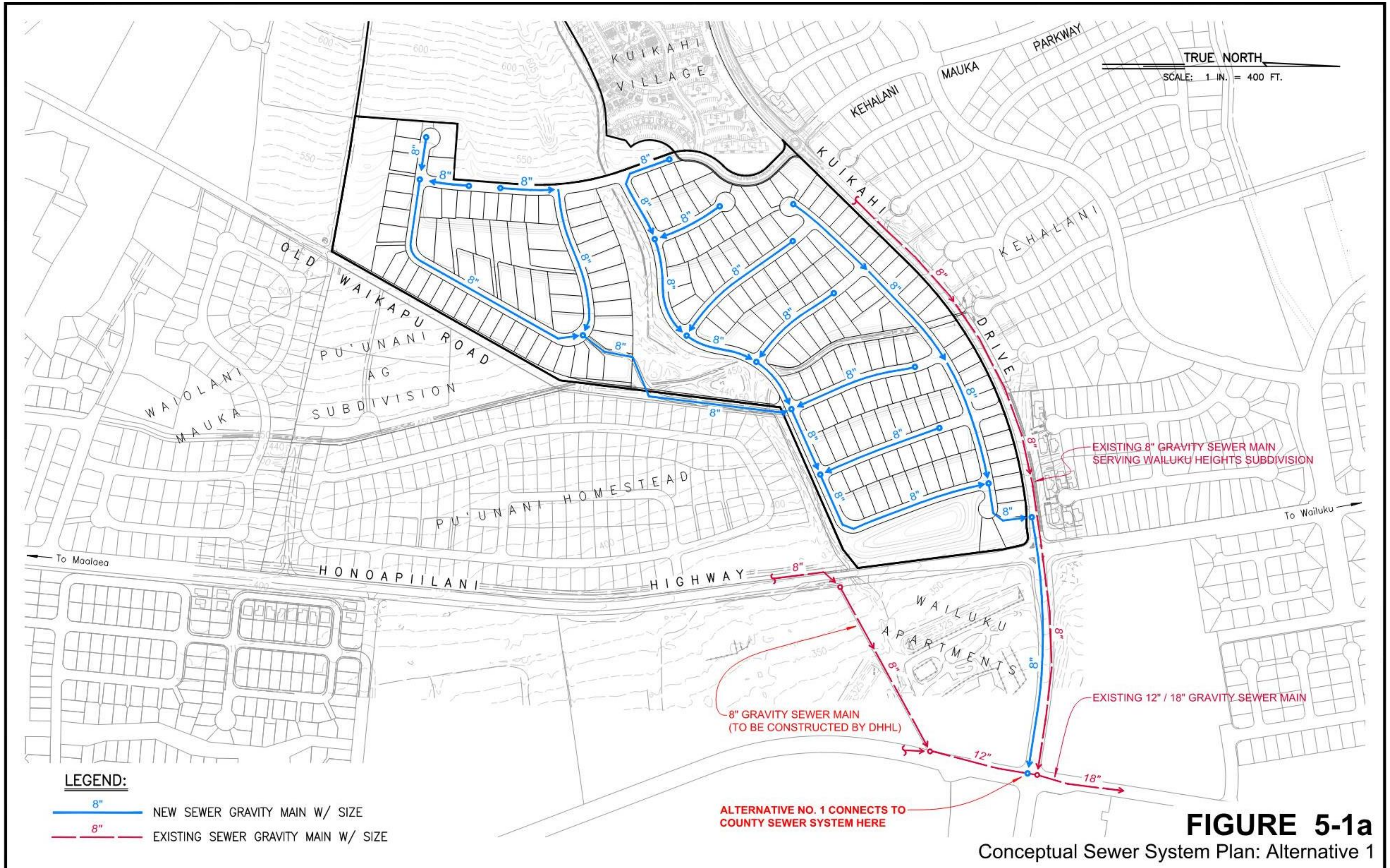

Figure 3-11 **Conceptual Sewer System Plan: Alternative 1**

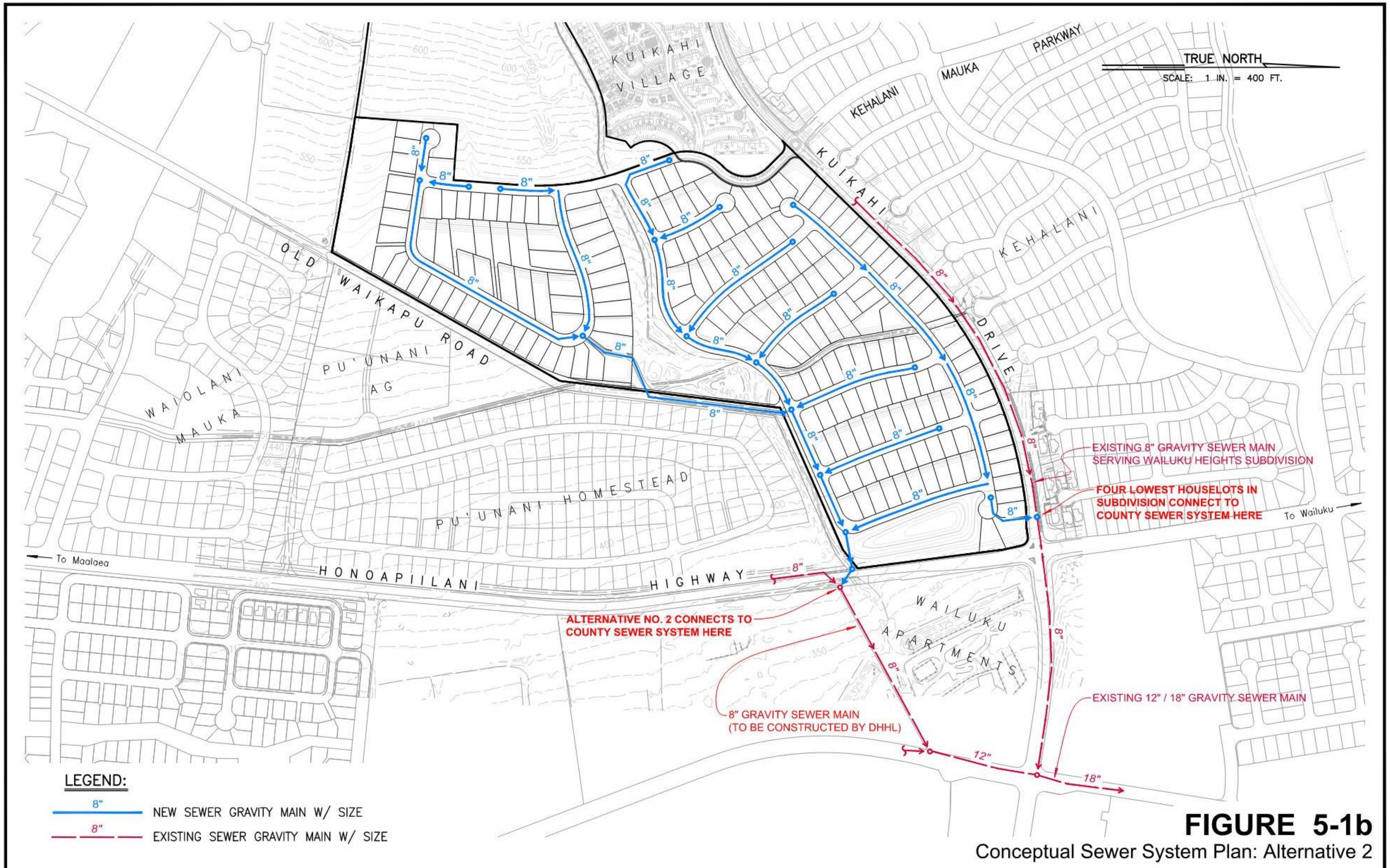

Figure 3-12 **Conceptual Sewer System Plan: Alternative 2**

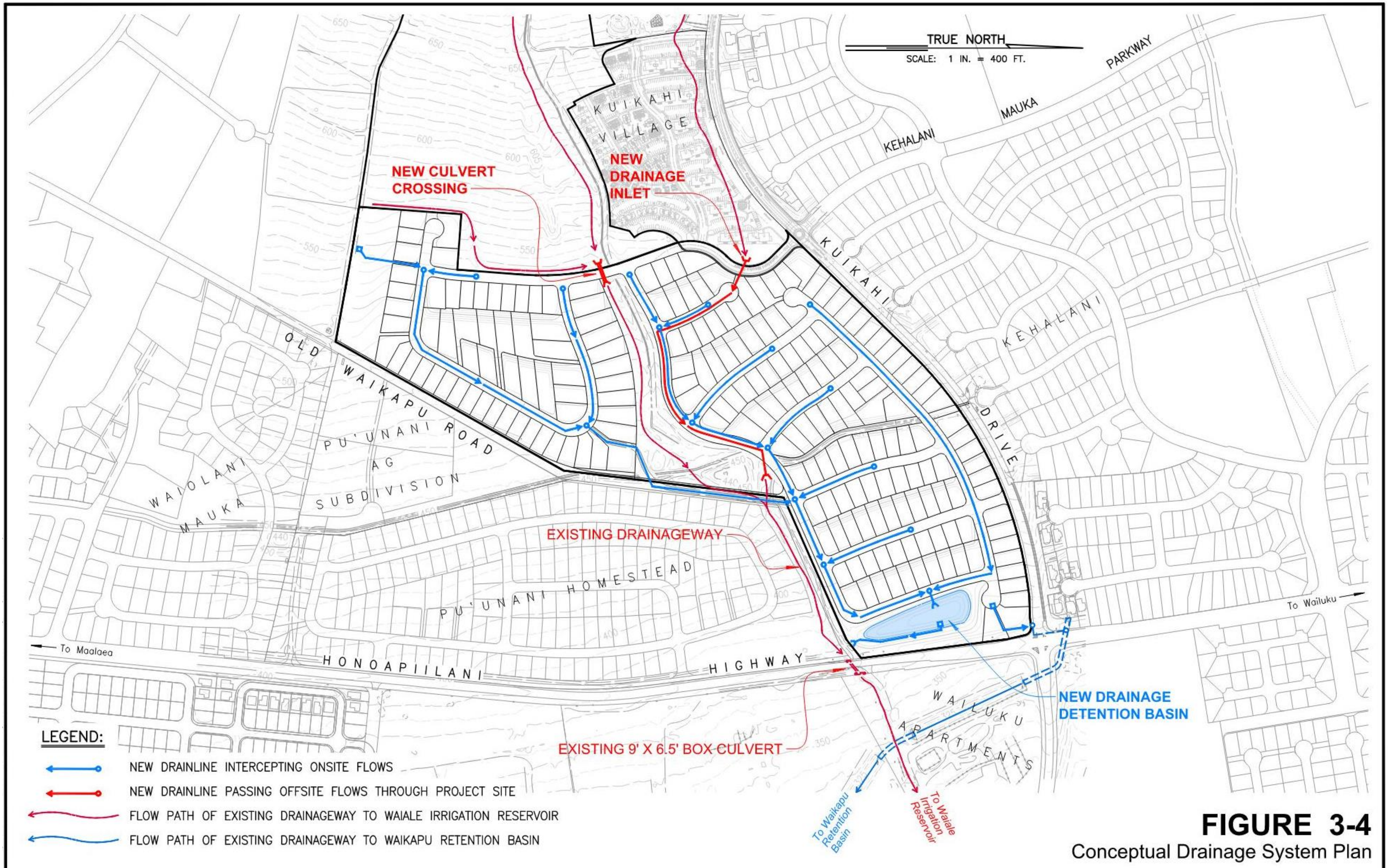

Figure 3-13 **Conceptual Drainage System Plan**

Figure 3-14 **Conceptual Electrical System Plan**

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3.9 Transportation System

A Traffic Impact Analysis Report (TIAR) was prepared for the Project by Austin Tsutsumi & Associates, Inc. (ATA) in 2023. See *Appendix G: Traffic Impact Analysis Report.* The TIAR studied existing traffic operating conditions during the weekday AM and PM peak hours within the Site vicinity; estimated vehicular trips generated by the Project; evaluated future (2028) traffic conditions (with and without the Project); and recommended roadway improvements and mitigative measures to reduce/eliminate the impacts resulting from Project-generated traffic.

3.9.1 Roadways, Access, and Traffic

Existing Conditions

Roadways and Access

Existing main roadways providing access to the Site, within the Site vicinity, are briefly described below:

- Kuikahi Drive is an east-west, two-way, two-lane, undivided collector roadway with posted speed limits ranging between 25-30 mph.
- Honoapiʻilani Highway is a north-south, two-way, two-lane, undivided arterial highway with posted speed limits ranging between 30-45 mph. Right turn channelization is provided at all major intersections within the Site vicinity.
- Kehalani Mauka Parkway is an east-west, two-way, four-lane, divided collector roadway with posted speed limits ranging between 20-30 mph on each side of Honoapiʻilani Highway.
- Waiale Road is a north-south, two-way, two-lane, undivided collector roadway. Waiale Road has a posted speed limit of 20 mph from Lower Main Street and transitions to 25 mph from Waiinu Road to Maui Lani Parkway/Kuikahi Drive and increased again to 30 mph from Maui Lani Parkway/Kuikahi Drive to its southern terminus at Waikō Road.
- Old Waikapū Road abuts the Site along its eastern side and is a County ROW that has been abandoned as a public thoroughfare in favor of other modern streets, though provides access and connection to the site off of Honoapiʻilani Highway (WSUE, 2023 & ATA, 2023).

Traffic

According to the 2016 *Highway Capacity Manual* (6th Edition), published by the Transportation Research Board, roadway facilities are described by their level of service (LOS), which is qualified by traffic flow factors such as speed, travel time, delay, and freedom to maneuver. Six LOS are defined, from LOS A (least congested operating conditions) to LOS F (most congested operating conditions). Operations are designated as LOS F when volumes exceed capacity, resulting in stop-and-go conditions. The State, Department of Transportation (HDOT) and County Department of Transportation (MDOT) generally defines an impact as an intersection or turning movement that lowers from an LOS D or better to LOS E or F.

The TIAR evaluated turning movements and LOS for the below-listed intersections in the Site vicinity for existing conditions during weekday AM (7:00 AM to 8:00 AM) and PM (3:45 PM to 4:45 PM and 4:15 PM to 5:15 PM) peak hours. See *Figure 3-15, TIAR Study Intersections* for study intersection locations (Figure 1.1 in the TIAR). See *Figure 3-16, TIAR Existing, Base year, and Future Year*

Conditions w/Waiale and w/MLP Ext. for existing LOS summaries at the study intersections (Table 3.1 in the TIAR):

- Kamehameha Avenue/Maui Lani Parkway
- Waiale Road/Kaohu Street & Oluloa Drive
- Waiale Road/Waiinu Road
- Waiale Road/Olomea Street & Waimaluhia Lane
- Waiale Road/Kaupō Street
- Waiale Road/Kuikahi Drive/Maui Lani Parkway
- Waiale Road/Kokilolio Street
- Waiale Road/ Hāʻawi Street
- Waiale Road/Nokekula Loop
- Waiale Road/ʻOhana Hana Loop
- Waikō Road/Waiale Road
- Kuikahi Drive/Kehalani Village Center Drive
- Honoapiʻilani Highway/Kehalani Mauka Parkway
- Honoapiʻilani Highway/Kuikahi Drive
- Honoapiʻilani Highway/Pilikana Street
- Honoapiʻilani Highway/Waikō Road
- Kuikahi Drive/Kehalani Mauka Parkway (ATA, 2023)

The intersections abutting the Site include Kuikahi Drive/Kehalani Mauka Parkway and Honoapiʻilani Highway/Kuikahi Drive. The Kuikahi Drive/Kehalani Mauka Parkway is an unsignalized “T” intersection with an exclusive left-turn lane from the eastbound approach and an exclusive right-turn and left-turn lanes on the southbound approach The movement at this intersection operates at LOS B or better during AM and PM peak hours of traffic. The intersection of Honoapiʻilani Highway/Kuikahi Drive is a 4-way signalized intersection with exclusive left- and right-turn lanes on all approaches. The northbound right-turn movement also includes an exclusive eastbound acceleration lane. The movement at this intersection currently operates at LOS C or better during AM and PM peak hours. Other intersections of concern in terms of increased traffic include Kamehameha Avenue/Maui Lani Parkway, Waiale Road/Kuikahi Drive/Maui Lani Parkway. Kamehameha Avenue/Maui Lani Parkway is currently controlled by a roundabout and is located 700 ft northeast of Pomaikai Elementary School. This roundabout unfortunately has led to an increase in traffic volumes, however all movements at this roundabout operate at LOS B or better during AM and PM peaks. The Waiale Road/Kuikahi Drive/Maui Lani Parkway is a signalized intersection with an exclusive left-turn lanes on all approaches and an exlusive right-turn lane from the west-bound approach. The movement at this intersection currently opperate at LOS D or better during peak hours of traffic and while the existing right-of-way along Waiale Road does not allow for widening of additional lanes, the south-bound left-turn lane was recently lengthened without affecting the adjacent north-boubd left-turn pocket into Kehalani Village Center (ATA, 2023).

The County is planning to undertake the "Waiale Road Extension" project, which is anticipated to begin at a T-intersection with Honoapiʻilani Highway and end at the Waikō Road/Waiale Road intersection. It is anticipated that a portion of the trips from the south will reroute directly onto Waiale Road Extension, resulting in a reduction of trips along Honoapiʻilani Highway south of Kuikahi Drive, and along Kuikahi Drive between Honoapiʻilani Highway and Waikō Road. Additionally, the planned "Maui Lani Parkway Extension" project is anticipated to stretch from the existing Maui Lani Parkway and extend northward and intersect with Waiinu Road. This extension is anticipated to provide an alternate route to and from Kahului and Wailuku and alleviate congestion along Waiale Road. To be conservative, the TIAR included analysis scenarios with and without the Waiale Road Extension and Maui Lani Parkway Extension, reflected in the following three scenarios:

- Scenario 1: Without Waiale Road Extension and Without Maui Lani Parkway Extension
- Scenario 2: With Waiale Road Extension and Without Maui Lani Parkway Extension
- Scenario 3: With Waiale Road Extension and With Maui Lani Parkway Extension (ATA, 2023)

Potential Impacts and Mitigation Measures

Roadways and Access

Access to the Site will be provided by two full-access driveways along Kuikahi Drive. The existing Kuikahi Drive/Kehalani Mauka Parkway "T"-intersection will be converted into a 4-way intersection ("west driveway"). The "east driveway" will be located approximately 700 feet to the west from the Honoapiʻilani Highway/Kuikahi Drive intersection (ATA, 2023). A paved emergency roadway will be constructed along a portion of the Old Waikapū Road ROW to provide residences in the southern portion of the Site a second exit route to the east driveway, in the event of a fire or emergency should the primary driveway access at the west driveway be blocked. A network of new internal streets will connect to the two driveways along Kuikahi Drive and provide access to the residences. The new internal streets will have 44-foot-wide ROWs and generally conform to County subdivision standards. The southern shoulder of Kuikahi Drive will be widened to the limit of the existing 60-foot ROW. An exemption from MCC §18.20.080 will be required to eliminate the requirement for concrete curbs and gutters along Kuikahi Drive. An exemption from MCC §18.20.095 will be required to allow street trees to be planted in front yards where the location of driveway aprons, street signs, fire hydrants, utility equipment or utility lines do not leave sufficient planting space within the ROW (WSUE, 2023). See *Figure 3-17, Conceptual Roadway Plan* (Figure 2-1 in the PER).

Traffic

During construction, construction-related traffic will be temporarily noticeable, but will not significantly increase traffic on surrounding streets. During construction, the following mitigation measures are recommended, for optimal traffic conditions:

- Trucks delivering construction material and disposing of construction waste should be scheduled on weekdays during times of non-peak commuter periods (9:00 AM to 3:00 PM);
- All construction vehicles will be kept in proper operating condition to prevent adverse impacts on public roadways; and
- Construction plans and drainage/discharge/connection permit applications for work done within a HDOT ROW will be submitted to the HDOT, Highway Division for review and approval. This applies to underground and overhead powerlines and stormwater management structures within the HDOT ROW's. Similarly, construction plans and

drainage/discharge/connection permit applications for work done within a MDOT ROW will be submitted to the MDOT for review and approval.

- Permit applications to operate or transport oversize and/or overweight vehicles and loads over State highways will be submitted if and when necessary to the HDOT, Highway Division for review and approval. Similarly, permit applications to operate or transport oversize and/or overweight vehicles and loads over County roads will be submitted to MDOT for review and approval if and when necessary.

Based on the trip rates in the *Trip Generation Manual (11th Edition)*, the Project is anticipated to generate 143 daily vehicle trips in the AM peak hour and 195 daily vehicle trips in the PM peak hour (entering/exiting the Site). The TIAR also evaluated turning movements and LOS for the study intersections for base year (2028 without the Project) and future year (2028 with the Project) conditions during weekday AM (7:00 AM to 8:00 AM) and PM (3:45 PM to 4:45 PM and 4:15 PM to 5:15 PM) peak hours. See Table 6.1, Table 7.1, and Table 8.1 in the TIAR for base and future year LOS summaries (ATA, 2023).

Under Scenario 1, base year (2028 without the Project) traffic conditions and LOS of turning movements at various study intersections are anticipated to worsen from existing conditions, due to nearby anticipated developments and defacto growth in the TIAR study area. Scenario 1, future year (2028 with the Project) Project trips are anticipated to only account for a small percentage of Future Year traffic along roadways. Sixty (60) to one-hundred and one (101) vehicles are expected to be added in both directions during AM and PM peak hours along Kuikahi Drive between Honoapiʻilani Highway and Waiale Road. This corresponds to approximately 3-5% of traffic along Kuikahi Drive. Twenty-two (ww) to twenty-five (25) vehicles are expected to be added during AM and PM peak hours along Waiale Road between Waiinu Road and Kuikahi Drive. This corresponds to less than 1% of Future Year traffic. Lastly, approximately 15 vehicles are expected to be added in both directions during AM and PM peak hours on Honoapiʻilani Highway north of Kuikahi drive, and approximately 24-34 vehicles are expected to be added in both directions during AM and PM peak hours on Honoapiʻilani Highway south of Kuikahi Drive. These volumes correspond to less than 2% of Honoapiʻilani Highway volumes. Scenario 1, future year (2028 with the Project) traffic conditions are similar to base year conditions; however, LOS is anticipated to lower slightly at four intersections:

- Kamehameha Avenue/Maui Lani Parkway: The eastbound approach is anticipated to lower to LOS F and overcapacity conditions with Future Year conditions, from LOS D and near-capacity conditions with Base Year conditions.
- Waiale Road/Kuikahi Drive: The westbound through movement is anticipated to lower to LOS F and overcapacity during the PM peak hour, and the eastbound through/right-turn movement is anticipated to lower to LOS E during the AM peak hour.
- Honoapiʻilani Highway/Kehalani Parkway: The eastbound left-turn movement lowers to LOS E with Future Year Conditions, from LOS D with Base Year conditions, during the PM peak hour.
- Honoapiʻilani Highway/Kuikahi Drive: The eastbound through/right-turn movement lowers to LOS E with Future Year conditions, from LOS D with Base Year conditions, during the AM peak hour. Also, the westbound left-turn movement lowers to LOS F and overcapacity conditions with Future Year conditions, from LOS E with Base Year conditions, during the PM peak hour (ATA, 2023).

Under Scenario 2, base year (2028 without the Project) traffic conditions at the Honoapiʻilani Highway/Kuikahi Drive, Honoapiʻilani Highway/Pilikana Street intersection, and Honoapiʻilani Highway/Waikō Road intersection are anticipated to improve during both AM and PM peak hours, due to reduced volumes along Honoapiʻilani Highway after being rerouted to the Waiale Road Extension (ATA 2023). Under Scenario 2, future year (2028 with the Project) traffic conditions are similar to base year conditions however, delays and overcapacity increases slightly at four intersections. Notably, the eastbound left-turn movement at the Honoapiʻilani Highway/Kehalani Parkway intersection is anticipated to lower from LOS D to LOS E during the PM peak hour. Also, due to the anticipated increased delay along Waiale Road/Kuikahi Drive under Scenario 2, the northbound through-right movement is anticipated to lower from LOS E to LOS F during PM peak hours. The Honoapiʻilani Highway/Kehalani Parkway intersection eastbound left-turn movement is anticipated to lower from LOS D to LOS E with Future Year conditions during the PM peak hour as well under Scenario 2. A signal may become warranted at the Waiale Road/Kokilolio Street Intersection depending on how traffic is rerouted (ATA, 2023).

Under Scenario 3, base year (2028 without the Project) traffic conditions are forecasted to generally improve the critical segment along Waiale Road between Waiinu Road and Kuikahi Drive as trips are rerouted away from Waiale Road and onto the Maui Lani Parkway Extension. Under Scenario 3, future year (2028 with the Project) traffic conditions are similar to base year conditions; however, LOS lowers slightly at two intersections. Notably, the eastbound left-turn movement at the Honoapiʻilani Highway/Kehalani Parkway intersection lowers from LOS D to LOS E during the PM peak hour, and the westbound through and southbound left-turn movement at Waiale Road/Kuikahi Drive which are expected to lower LOS from D to E during PM peak hours as well.

Traffic operations at the two driveway access intersections are anticipated to be identical with all three scenarios and all movements are forecasted to operate at LOS C or better across AM and PM peak hours, with both operating as stop-controlled intersections on the minor approaches (ATA, 2023). The TIAR recommends the following to be considered due to Project-generated traffic:

- The signal timing at the Waiale Road/Kuikahi Drive intersection should be optimized to accommodate traffic increases. This recommendation will likely occur during various stages of the Wailuku Apartments project.
- At the proposed Kuikahi Drive/Kehalani Mauka Parkway intersection (west driveway access into the Site), it is assumed to operate with a two-way stop control on the minor streets. However, if at a future date, a signal warrant is found to be met based on actual traffic volumes, a signal or a roundabout could be considered, if design constraints such as sight distance requirements are met, at the discretion of the County; and
- A westbound left-turn storage lane into the Site should be provided, at the east driveway access intersection into the Site (ATA, 2023).

This area will most likely see an overall increase in traffic due to the fourteen (14) other proposed developments occurring in the Wailuku area separate and unrelated to the Project (ATA, 2023). With the implementation of the proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on roadways, access, and traffic conditions in the Site vicinity. No additional mitigation is recommended.

3.9.2 Mass Transit, Pedestrian and Bicycle Facilities

Existing Conditions

The Maui Bus Service, operated by Roberts Hawai‘i, provides public transit service around the island with 13 bus routes. Each route typically operates seven days a week, including holidays. The #1 Wailuku Loop bus route, the #2 Wailuku Reverse bus route, and the #20 Lahaina Islander bus route run near the Site. The nearest bus stops to the Site are at the Kehalani Mauka Parkway/Kamole Street intersection (0.4 miles from the Site) and on Honoapi‘ilani Highway (1.5 miles from the Site).

There are pedestrian and bicycle lanes along Kuikahi Drive, between Kehalani Mauka Parkway and Honoapi‘ilani Highway. There are also pedestrian and bicycle lanes at the front end of Kehalani Mauka Parkway going north and at the Kuikahi Drive/Honoapi‘ilani Highway intersection (WSUE, 2023).

According to the letter by Maui Economic Opportunity, Inc. (MEO, 2024), the Maui Bus ADA Paratransit and County of Maui Human Services transportation systems also utilize the surrounding transportation corridors for the transportation of clients to dialysis and health appointments.

Potential Impacts and Mitigation Measures

If a Maui Bus transit route is affected during construction, the MDOT will be notified at least one month in advance to allow the Maui Bus to plan its operations accordingly. The Project may result in a slight increase in transit usage, which can be accommodated by the existing Maui Bus Service operations within the Site vicinity.

The Project is not anticipated to cause any significant delay or present any safety hazards to The Maui Bus ADA Paratransit and County of Maui Human Services specialized transportation systems operations. It is anticipated that any population within the Project area will also benefit from the assistance of the Maui Bus ADA Paratransit and County of Maui Human Services transportation.

The Project will promote walkability and bicycle accessibility to and through the Site. Approximately 450 feet of paved shoulder along the southern side of Kuikahi Drive will be widened to provide a continuous 5-foot-wide paved walkway for pedestrians between Kehalani Mauka Parkway and Honoapi‘ilani Highway. All internal streets within the Site will have a 5-foot-wide paved sidewalk along one side of the street to provide pedestrian routes to Kuikahi Drive. Bicyclists will be able to traverse along the low-volume internal streets (unmarked bicycle routes) throughout the Site. An exemption from MCC §18.20.070 to reduce the requirement for 5-foot-wide sidewalks on both sides of all streets will be required, which is consistent with other similar existing DHHL residential subdivisions in the area (WSUE, 2023). See *Figure 3-18, Conceptual Bike and Pedestrian Plan* (Figure 2-3 in the PER).

With the implementation of the proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on mass transit, pedestrian or bicycle facilities as the proposed improvements do not involve the obstruction or removal of facilities that would permanently limit the public’s use of mass transit, pedestrian, or bicycle routes. No additional mitigation is recommended.

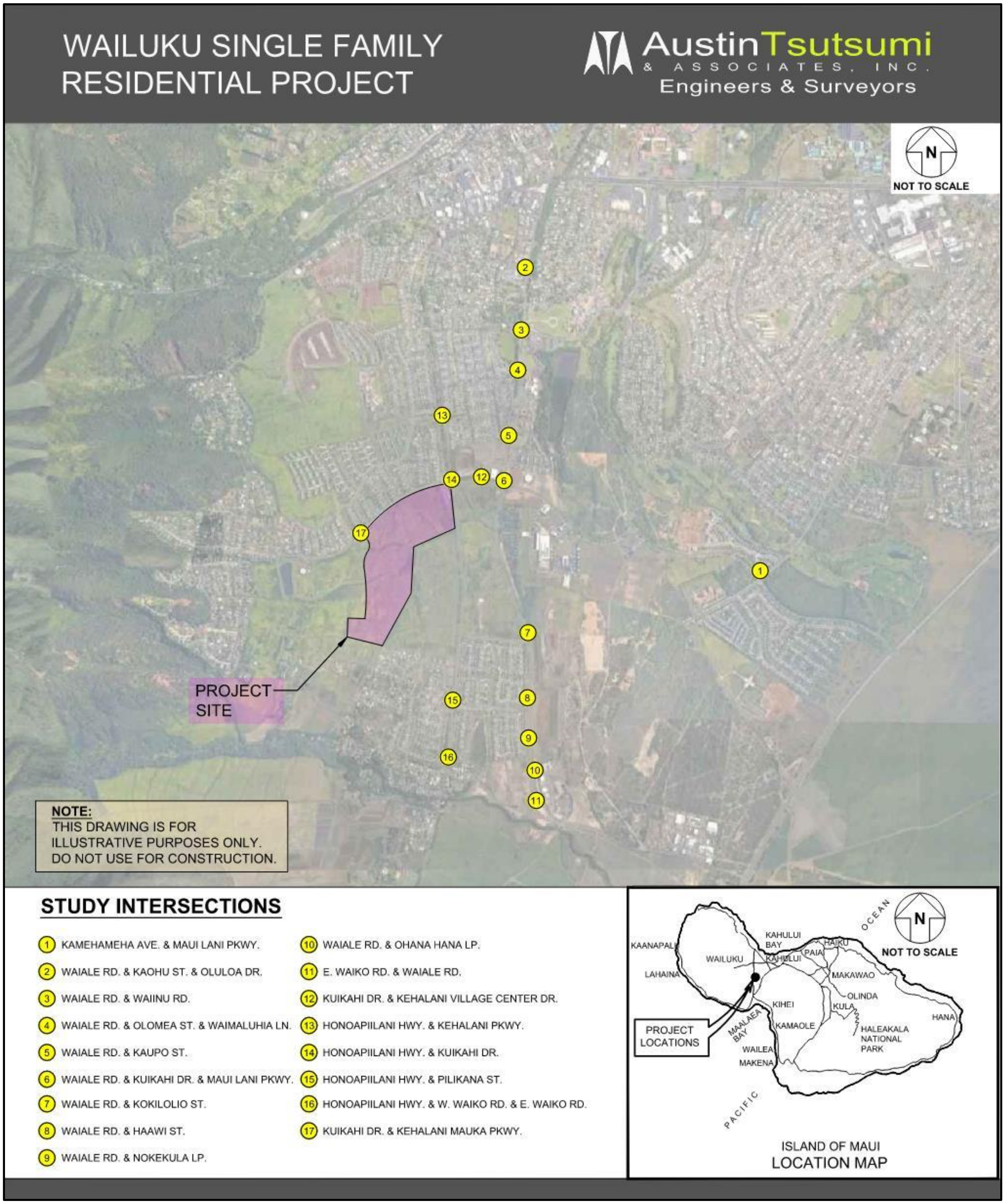

Figure 3-15 **TIAR Study Intersections**

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Table 8.1: Existing, Base Year, and Future Year Conditions WITH Waiale Ext. WITH MLP Ext.

Intersection	Existing Conditions						Base Year Conditions WITH Waiale Ext. & WITH MLP Ext.						Future Year Conditions WITH Waiale Ext. & WITH MLP Ext.					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kamehameha Ave & Maui Lani Pkwy																		
NB LT/TH/RT	14.9	0.74	B	8.8	0.51	A	60.3	1.01	F*	19.9	0.70	C	75.6	1.06	F*	22.3	0.75	C
EB LT/TH/RT	9.1	0.72	A	10.4	0.81	B	25.9	0.96	D	54.2	1.08	F*	32.3	0.99	D	61.0	1.10	F*
WB LT/TH/RT	7.5	0.61	A	12.1	0.80	B	14.3	0.77	B	84.5	1.14	F*	14.3	0.77	B	84.3	1.14	F*
SB LT/TH/RT	9.8	0.78	A	9.7	0.77	A	25.8	0.94	D	60.9	1.07	F*	26.2	0.94	D	61.3	1.08	F*
Overall	10.2	0.78	B	10.5	0.81	B	30.2	1.01	F*	60.7	1.14	F*	35.4	1.06	F*	63.0	1.14	F*
2: Waiale Rd & Kaohu St/Oluloa Dr																		
NB LT/TH	72.8	1.05	F*	50.3	0.96	F	175.3	1.39	F*	180.4	1.43	F*	181.4	1.41	F*	186.2	1.45	F*
NB RT	8.7	0.01	A	8.8	0.04	A	9.3	0.01	A	9.7	0.05	A	9.3	0.02	A	9.7	0.05	A
EB LT	14.0	0.23	B	12.7	0.15	B	14.9	0.25	B	14.0	0.17	B	15.0	0.26	B	14.0	0.17	B
EB TH/RT	13.4	0.31	B	14.3	0.38	B	15.7	0.42	C	19.0	0.58	C	15.7	0.42	C	19.2	0.59	C
WB LT/TH/RT	13.4	0.12	B	12.8	0.07	B	15.0	0.14	B	15.1	0.09	C	15.1	0.14	C	15.2	0.09	C
SB LT/TH/RT	106.4	1.15	F*	100.9	1.11	F*	238.6	1.54	F*	295.3	1.67	F*	240.4	1.54	F*	302.8	1.70	F*
Overall	75.3	-	F	64.3	-	F	173.2	-	F	199.3	-	F	176.3	-	F	204.9	-	F
3: Waiale Rd & Waiinu Rd																		
NB TH/RT	-	-	-	-	-	-	8.1	0.89	A	4.4	0.74	A	4.6	0.75	A	4.6	0.75	A
WB LT	471.5	1.81	F*	520.6	1.97	F*	-	-	-	-	-	-	-	-	-	-	-	-
WB LT/RT	-	-	-	-	-	-	4.1	0.30	A	4.6	0.40	A	4.7	0.41	A	4.7	0.41	A
WB RT	16.9	0.18	C	13.9	0.13	B	-	-	-	-	-	-	-	-	-	-	-	-
SB LT	11.7	0.11	B	9.9	0.08	A	-	-	-	-	-	-	-	-	-	-	-	-
SB LT/TH	-	-	-	-	-	-	1.7	0.66	A	4.6	0.83	A	5.0	0.85	A	5.0	0.85	A
Overall	42.5	-	-	69.7	-	-	5.1	0.89	A	4.5	0.83	A	4.8	0.85	A	4.8	0.85	A
4: Waiale Rd & Olomea St/MCCC Driveway																		
NB LT	9.4	0.03	A	10.1	0.05	B	9.2	0.02	A	10.0	0.05	B	9.2	0.02	A	10.1	0.05	B
EB LT/TH	789.1	2.41	F*	247.1	1.13	F*	635.1	2.12	F*	223.6	1.10	F*	678.5	2.21	F*	249.2	1.16	F*
EB RT	13.5	0.06	B	15.1	0.06	C	12.9	0.05	B	14.7	0.06	B	12.9	0.05	B	14.9	0.06	B
WB LT/TH/RT	48.4	0.16	E	22.3	0.11	C	39.6	0.13	E	21.0	0.10	C	41.0	0.13	E	21.7	0.10	C
SB LT	10.4	0.01	B	9.1	0.01	A	10.1	0.01	B	9.0	0.01	A	10.1	0.01	B	9.1	0.01	A
Overall	57.7	-	-	11.8	-	-	53.2	-	-	11.8	-	-	56.2	-	-	13.0	-	-
5: Waiale Rd & Kaupo St																		
NB LT	8.6	0.04	A	8.9	0.05	A	8.5	0.05	A	8.8	0.06	A	8.5	0.05	A	8.9	0.06	A
EB LT	94.5	0.82	F	34.1	0.20	D	85.0	0.83	F	41.6	0.46	E	93.2	0.86	F	43.9	0.48	E
EB RT	12.4	0.11	B	12.6	0.06	B	11.8	0.13	B	12.6	0.13	B	11.9	0.13	B	12.7	0.13	B
Overall	7.8	-	-	1.4	-	-	9.2	-	-	3.6	-	-	9.9	-	-	3.7	-	-
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy																		
NB LT	23.2	0.25	C	25.0	0.19	C	25.8	0.49	C	26.4	0.42	C	26.7	0.51	C	28.6	0.48	C
NB TH/RT	36.8	0.82	D	32.9	0.71	C	232.3	1.41	F*	65.5	0.96	E	240.4	1.43	F*	73.2	0.99	E
EB LT	22.0	0.79	C	17.7	0.71	B	20.0	0.68	C	34.4	0.74	C	20.5	0.70	C	42.4	0.83	D
EB TH/RT	23.3	0.73	C	18.7	0.64	B	51.5	0.94	D	55.8	0.92	E	58.0	0.97	E	57.5	0.92	E
WB LT	24.5	0.16	C	17.3	0.22	B	29.3	0.72	C	47.7	0.91	D	32.1	0.75	C	50.4	0.91	D
WB TH	34.0	0.80	C	32.7	0.85	C	30.2	0.60	C	48.2	0.89	D	31.0	0.62	C	56.6	0.94	E
WB RT	26.3	0.14	C	19.3	0.17	B	23.6	0.05	C	26.1	0.08	C	23.9	0.05	C	25.9	0.08	C
SB LT	25.2	0.72	C	31.6	0.80	C	29.1	0.64	C	47.8	0.76	D	29.7	0.64	C	60.0	0.83	E
SB TH/RT	24.1	0.50	C	23.6	0.51	C	35.9	0.74	D	36.5	0.68	D	37.1	0.75	D	39.7	0.72	D
Overall	26.7	-	C	25.4	-	C	80.6	-	F	49.0	-	D	83.5	-	F	54.3	-	D

Figure 3-16 **TIAR Existing, Base year, and Future Year Conditions w/Waiale and w/MLP Ext.**

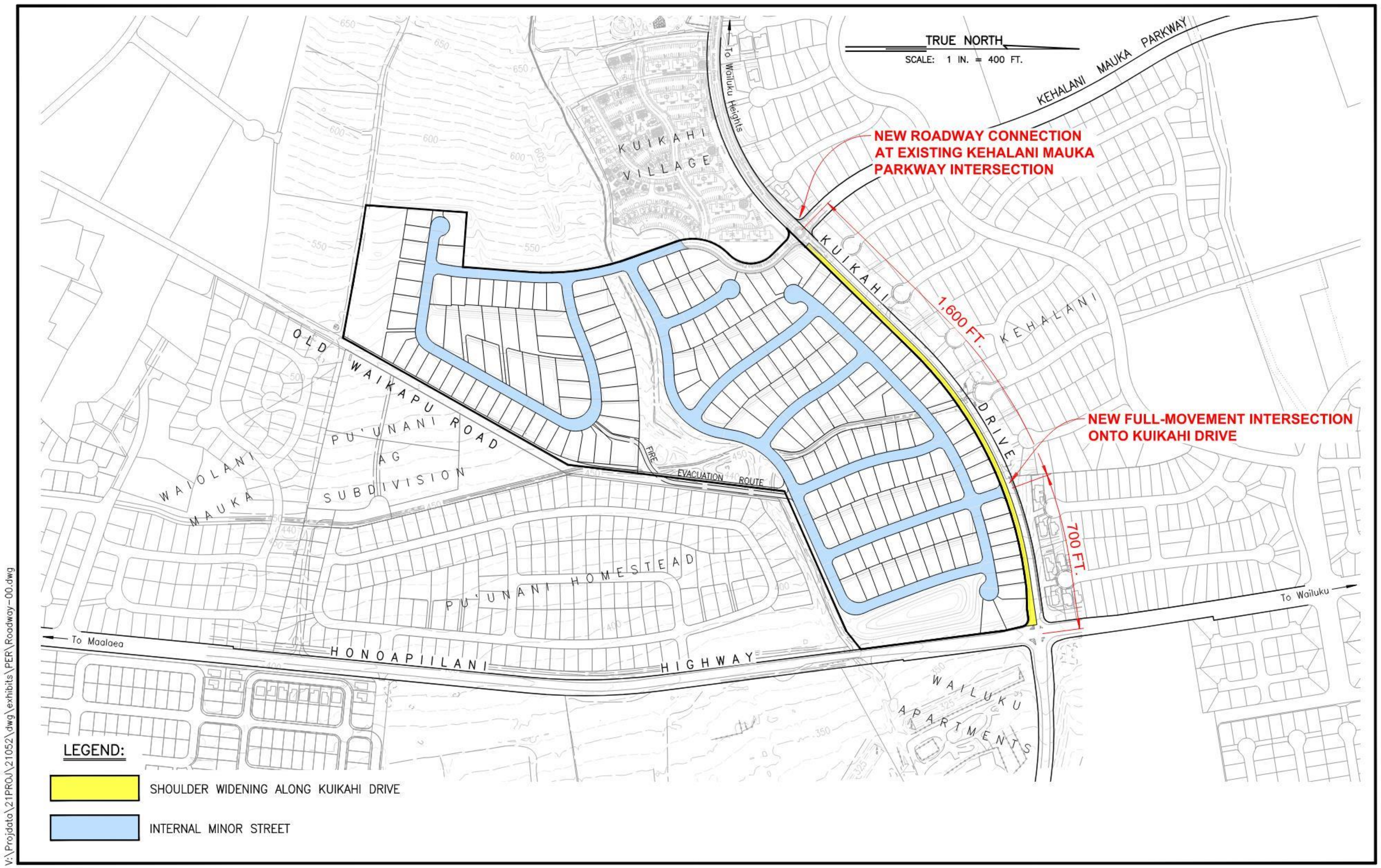

Figure 3-17 **Conceptual Roadway Plan**

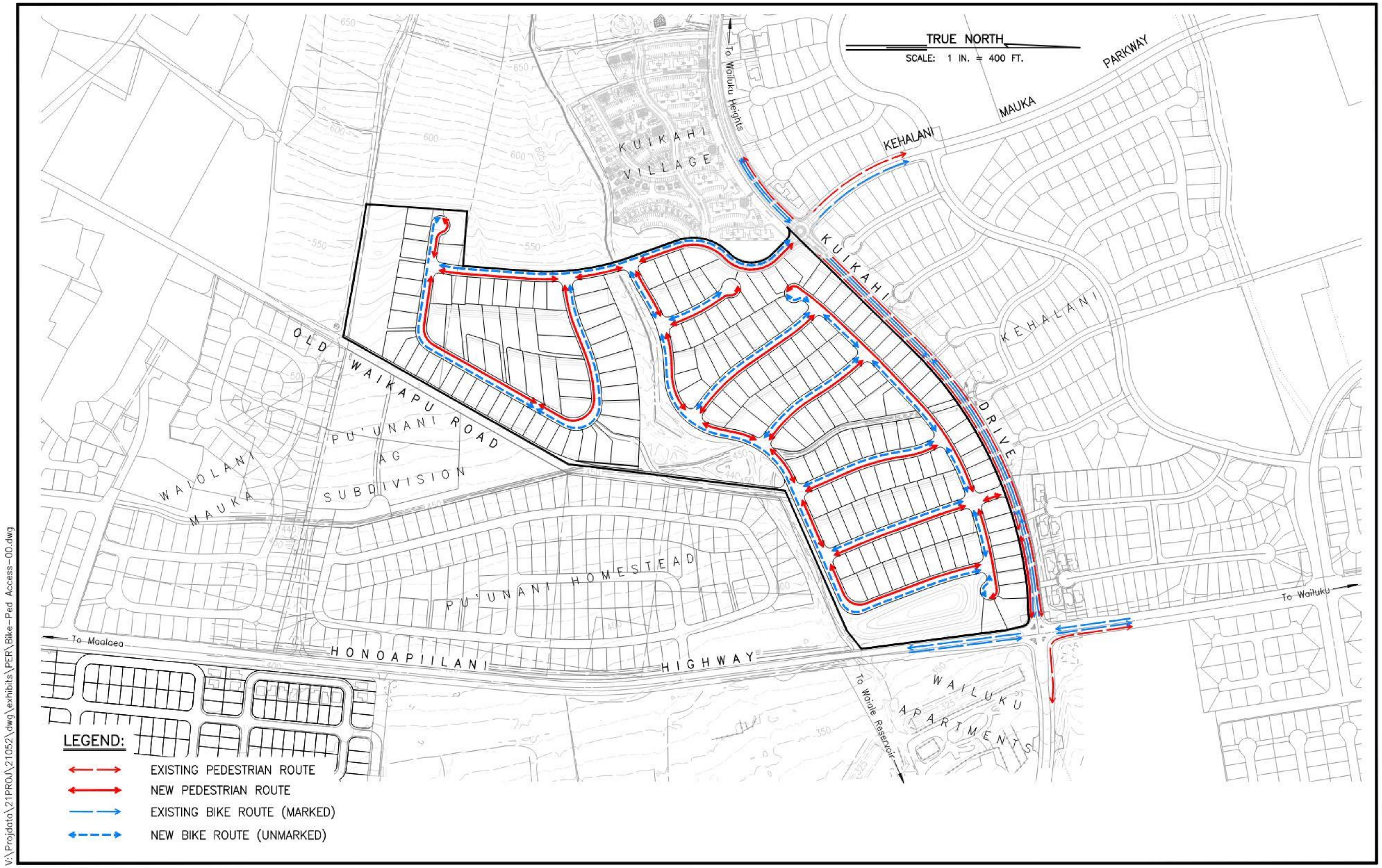

Figure 3-18 **Conceptual Bike and Pedestrian Plan**

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3.10 Public Facilities and Services

3.10.1 Recreational Facilities

Existing Conditions

The State, DLNR, Division of State Parks operates and maintains the State's parks, while the County, Department of Parks and Recreation operates and maintains the County's parks, recreation areas and recreational programs. There is an abundance of public recreational facilities in Central Maui. State and County public recreational facilities located near the Site include the following (listed from nearest to farthest):

- Wailuku Heights Park – approximately 0.38 miles west of the Site;
- Waikapū Community Center & Park – approximately 0.58 miles southeast of the Site;
- Wailuku Elementary School Park – approximately 0.65 miles north of the Site;
- Maui Lani Regional Park – approximately 0.69 miles northeast of the Site;
- Kehalani Mauka Park – approximately 0.70 miles north of the Site;
- Wells State Park – approximately 1.03 miles northeast of the Site;
- Honoliʻi Park – approximately 1.06 miles north of the Site;
- Central Maui Regional Sports Complex – approximately 1.11 miles east of the Site;
- Lihikai Park – approximately 1.35 miles northeast of the Site;
- Kahului Community Center – approximately 1.36 miles east of the Site;
- Pōmaikaʻi Park – approximately 1.37 miles east of the Site; and
- Puʻuʻōhala Park – approximately 1.73 miles north of the Site (County, nd).

Potential Impacts and Mitigation Measures

During construction, traffic congestion and detours may have a minimal and temporary impact on public access to nearby recreational facilities within a 1.0-mile radius from the Site. However, mitigation measures are proposed in **Section 3.9.1, Roadways, Access, and Traffic** to manage construction-related traffic.

While the existing public recreational facilities in the Project vicinity will be sufficient for the residents, the Project involves the creation of an approximately 3.1-acre linear park on the southern portion of the Site. The 200-ft wide linear park will also serve as a buffer between Waikapū and Wailuku that has been requested by the County and the community. DHHL intends to work with the County to have them maintain the linear park.

With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on existing recreational facilities, as the Project does not involve a long-term loss of access or overuse of recreational facilities. No additional mitigation is recommended.

3.10.2 Educational Facilities

Existing Conditions

Numerous public and private educational facilities are located near the Site. The Project is within the State, Department of Education (DOE) Maui High School Complex service area. The nearby DOE and private schools that would service residents (18 years old and younger), include the following (listed from nearest to farthest):

- Puʻu Kukui Elementary School – approximately 0.45 miles north of the Site;
- Wailuku Elementary School – approximately 0.86 miles north of the Site;
- Pōmaikaʻi Elementary School – approximately 0.93 miles east of the Site;
- ʻĪao Intermediate School – approximately 0.95 miles northeast of the Site;
- Pūnana Leo O Maui Hawaiian Immersion School – approximately 1.0 mile north of the Site;
- Maui Waena Intermediate School – approximately 1.25 miles east of the Site;
- Lihikai Elementary School – approximately 1.35 miles northwest of the Site;
- St. Anthony School – approximately 1.50 miles northeast of the Site;
- Baldwin High School – approximately 1.53 miles northeast of the Site;
- Kahului Elementary School – approximately 1.95 miles east of the Site;
- Maui High School – approximately 1.95 miles east of the Site;
- Hawaiian Mission Academy – approximately 2.75 miles east of the Site; and
- Kaʻahumanu Hou Christian School – approximately 2.88 miles east of the Site.
- Kamehameha Schools Maui located approximately 11.23 miles east from the Site;
- Seabury Hall located approximately 12.66 miles east from the Site;

It should be noted that the DOE is in the process of acquiring additional adjacent land to expand the Puʻu Kukui Elementary School.

The Hawaiʻi State Legislature via Act 245 authorized the Board of Education to approve School Impact Districts, which allows the collection of impact fees. These School Impact Districts are in areas of high growth that require new schools, or the expansion of existing schools, to accommodate the increase in new families and projected school enrollments. The Project is within the Central Maui Impact District (DOE, 2021).

Potential Impacts and Mitigation Measures

During construction, traffic congestion and detours may have a minimal and temporary impact on public access to nearby schools within a 1.0-mile radius from the Site. However, mitigation measures are proposed in **Section 3.9.1, Roadways, Access, and Traffic** to manage construction-related traffic.

The Project involves the construction of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots). According to the early consultation letter from DOE received in November, the schools servicing the Project include Puʻu Kukui Elementary, Maui Waena Intermediate, and Maui High

School. Puʻu Kukui elementary is operating at capacity, however DOE stated in their letter that the projected enrollment for the next five years suggests that the school will be below its capacity. Maui Waena Intermediate and Maui High are currently operating above capacity, however a five-year projection by DOE suggests both schools will operate below capacity (DOE, 2023). The Project is located within the Central Maui School Impact Fee District.

With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on existing educational facilities in the Project vicinity. No additional mitigation is recommended.

3.10.3 Police

Existing Conditions

The County, Maui Police Department (MPD) provides police protection services for Maui. The MPD has six patrol districts; the Site is within District 1 – Wailuku (MPD, 2021). The nearest MPD station is located at 55 Mahalani Street in Wailuku, approximately 1.5 mile from the Site.

Potential Impacts and Mitigation Measures

During construction, there may be an increase in phone calls to the police concerning Project-related traffic and noise. This may result in minor adjustments of police allocation within Central Maui, to provide traffic control at the Site. However, this reallocation of police services would be minimal and temporary.

The Project is not anticipated to have a significant adverse impact on MPD's operations. The Project will not result in a substantial population growth or a demographic shift, and thus is not anticipated to substantially increase long-term demand for police services. No additional mitigation is recommended.

3.10.4 Fire

Existing Conditions

The DFPS provides emergency and non-emergency services for Maui. DFPS responds to emergencies, including fires, medical emergencies, hazardous materials incidents, motor vehicle accidents, natural disasters, and technical rescues. DFPS provides non-emergency services including public education, fire inspections, and permit review. The DFPS has 10 fire stations on Maui (DFPS, 2021). The nearest DFPS fire station is the Wailuku Fire Station, located at 21 Kinipopo Street, approximately 1.17 miles from the Site.

Potential Impacts and Mitigation Measures

During construction, there may be a minimal increase in the demand for fire services, should construction worker safety emergency situations arise. Coordination with the DFPS will be necessary to ensure fire vehicle access to the Site is maintained.

The Project will be designed and constructed in compliance with MCC, Chapter 16.04C, *Fire Code*. Driveways will have unobstructed width and vertical clearance to meet DFPS requirements. A paved emergency roadway will be constructed along a portion of the Old Waikapu Road ROW to provide house lots in southern portion of the Site a second exit route to Kuikahi Drive that can be used in case of a fire or other emergency should the primary access route on the western side of the development become blocked. The DFPS will review construction drawings during the building permit review process, to ensure that fire department access, water supply for fire protection, and fire and life safety requirements are addressed. Additional mitigation measures are proposed in **Section 3.3.5, Wildfire**.

With the implementation of the proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on DFPS' operations. The Project will not result in a substantial population growth or a demographic shift, and thus is not anticipated to substantially increase long-term demand for fire services. No additional mitigation is recommended.

3.10.5 Emergency Medical

Existing Conditions

Medical facilities located near the Site include the following (listed from nearest to farthest):

- The Maui Medical Group-Wailuku – approximately 1.11 miles north of the Site; and
- The Maui Memorial Medical Center – approximately 1.23 miles northeast of the Site. This is the only acute and emergency care hospital on Maui.

Potential Impacts and Mitigation Measures

During construction, there may be a minimal increase in the demand for medical services, should worker safety emergency situations arise. Emergency vehicle access to the Site will be maintained for the duration of construction.

With the implementation of the proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on emergency medical services. The Project will not result in a substantial population growth or a demographic shift, and thus is not anticipated to substantially increase long-term demand for emergency medical services. No additional mitigation is recommended.

3.10.6 Airport

Existing Conditions

The Project is currently located approximately 3.52-miles away from the Kahului Airport (OGG). Due to the Project's proximity to OGG, the Project and future lessees may experience potential single event noise from aircraft operations. There is also a potential for fumes, smoke, vibrations, odors, etc., resulting from occasional aircraft flight operations over or near the project. These incidences may increase or decrease over time and are dependent on airport operations.

Potential Impacts and Mitigation Measures

Due to the proximity of the Site to OGG there, the Project has considered its potential impact on airport operations. The Federal Aviation Administration (FAA) requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or Alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9 if the Project is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway. However, this Project will not exceed a 100:1 surface from any point on the runway and therefore does not require the submittal of an FAA Form 7460-1 (Please see *Figure 3-19 Flight Pathways from Kahului Airport*).

Solar energy photo voltaic (PV) systems may be offered as an option on the residential homes. If any lease holder would like to incorporate PV for their homes, that lease holder will be made aware that they may be required to complete a glint and glare analysis and may need for a separate FAA form 7460-1. They will also be made aware that they may be required to mitigate any impacts caused by glint and glare and radio frequency interference (RFI).

The Project's landscaping and vegetation does not intend to create a wildlife attractant. DHHL will review the FAA Advisory Circular 150/5200-33C, Hazardous Wildlife Attractants On Or Near Airports for guidance. If the project's landscaping creates a wildlife attractant, DHHL shall immediately mitigate the hazard upon notification by the HDOT and/or FAA.

No further impacts are anticipated on airport operations and the airport is not anticipated to impact the construction or operation of the Project. No further mitigation measures are required at this time.

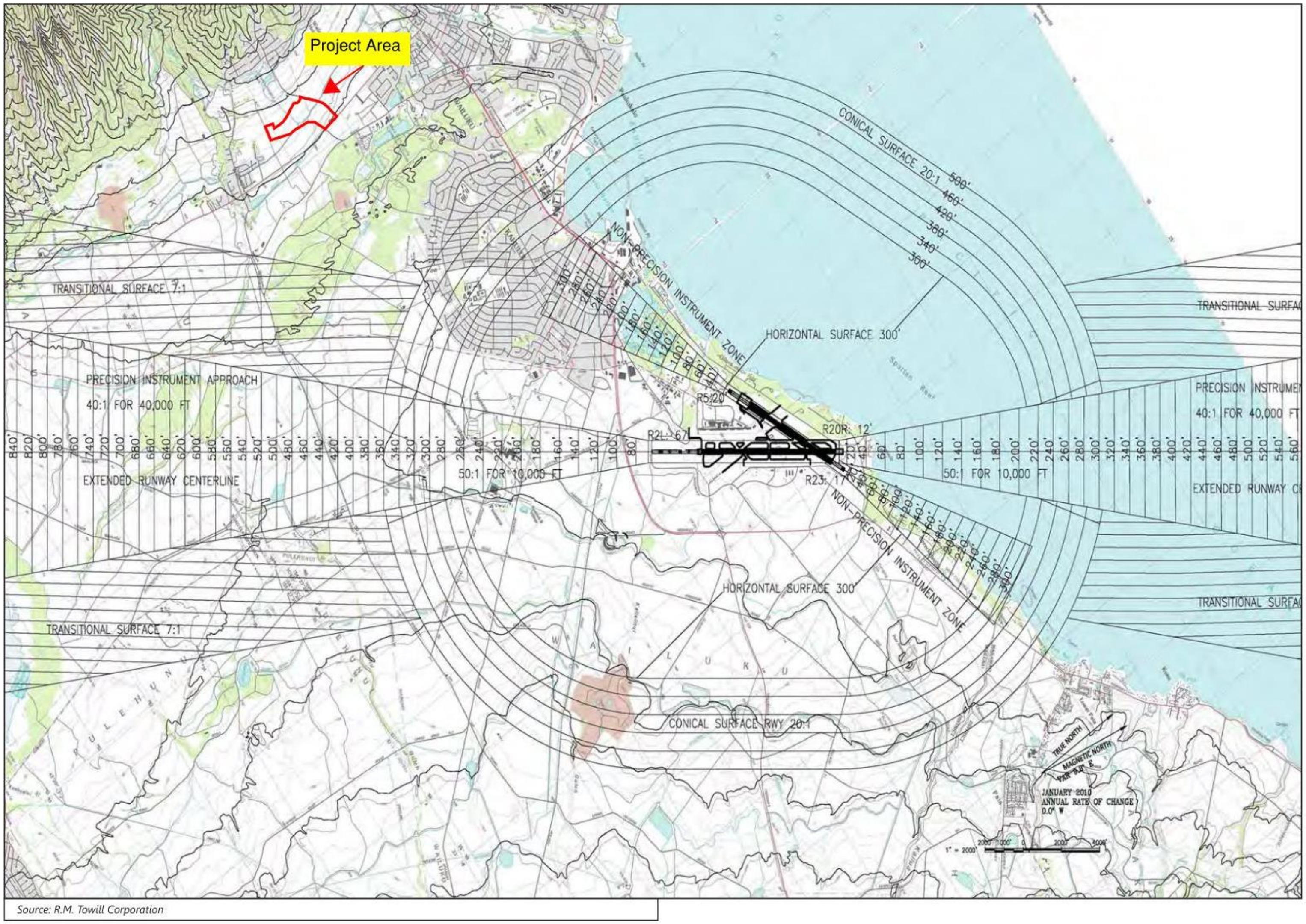

Figure 6-10 Airspace Plan

Kahului Airport Master Plan Update

Figure 3-19 **Flight Pathways from Kahului Airport**

3.11 Historic, Archaeological, and Cultural Resources

3.11.1 Historic and Archaeological Resources

Existing Conditions

An Archaeological Inventory Survey (AIS) was prepared by Scientific Consultant Services, Inc. (SCS) in October 2005. The "AIS Survey Area" comprised of TMK parcels: (2) 3-5-002:002 and 003, totaling 215.8 acres, and included the Site. The AIS was prepared in accordance with HRS §6E-42 and HAR §13-284. The AIS consists of a background settlement pattern research, findings from a pedestrian and subsurface survey, and recommendations (SCS, 2005). The Final AIS was approved by the DLNR, State Historic Preservation Division (SHPD) on November 18, 2005 and was given a "No Historic Properties Affected" determination with no archaeological mitigation recommended (LOG NO. 2005.2398). The Final AIS and SHPD's acceptance letter are in *Appendix H: Archaeological Inventory Survey*.

Context

The Wailuku and Waikapū regions were once known as Na Wai ʻEhā (the four waters consisting of Wailuku, Waikapū, Waiheʻe and Waiʻehu) in the pre-contact era. Wailuku ahupuaʻa was one of the first areas settled by native Hawaiians as archaeological studies dates the settlement of this area between the years 1100 A.D. – 1200 A.D. Though most habitation sites were located in valleys (ʻĪao valley, and Waikapū valley), the Site was predominantly used for agriculture (ʻUala, and potato patches, loʻi kalo, pigs, hala trees, and wauke patches). The area of Na Wai ʻEhā eventually became one of five population centers on Maui, as well as an area of chiefly residence. Portions of the current city of Wailuku were also built atop former agricultural terraces. In the post-contact era, sugar interests took the forefront of the Wailuku and Kahului economy, and cane fields, mills, ditches, a railroad, and other infrastructure forever changed the landscape. Sugar business began to grow with plantations and mills in Wailuku, Waiheʻe, Waikapū, and Haʻikū in the 1860s with plantation camps being established in Puʻunene, Kahului, and Wailuku. To support the industrial levels of sugar cane, and later pineapples, water was diverted from traditional sources (Waikapū stream and western aquifers or springs). Vestiges of the sugar industry remain, particularly the ditches and reservoirs that were used in the industrial level sugar cane operation. Previous archaeological studies in the vicinity of the Site can be dated back to 1909; however, no previous archaeological work has been conducted within the Site. Archaeological studies nearest the Site which failed to produce any artifacts or cultural deposits aside from historic surface scatter and basalt adze. Outside the immediate vicinity of the Site, traditional Hawaiian artifacts and human burials were identified (SCS, 2005).

Methodology

Fieldwork consisted of systematic pedestrian survey of the entire 215.80-acre parcel to assess the presence/absence of surface features and artifacts as well as to assess soil deposits amenable to testing. A 100% surface survey was conducted by two to three crewmembers spaced closely together (5 meters apart), walking parallel along north-south transects. Representative areas were demarcated for subsurface testing. All subsurface testing was done mechanically by backhoe. Following excavation each trench was thoroughly documented via stratigraphic layer profiles, soil analysis, photography, and location plotting. A vast area was tested with these intermittent trenches; however, excavation produced negative results in terms of subsurface cultural material of interest to the archaeological record. While no cultural materials were collected from any trench, soil samples were taken from each trench and analyzed in the field. Photographs were taken first of trench locations prior to excavation, secondly of at least one profile (or multiples) of each trench, and thirdly, overview shots were taken of the respective trench at the base of excavation (SCS, 2005).

Findings

Seven archaeological sites were documented in the AIS, but only four are located within the Site. There are two irrigation ditches, the Waiheʻe ditch (State Inventory of Historic Places [SIHP] 50-50-04-5197) and an un-named ditch (SIHP 50-50-04-5729), that originate outside of and/or extend beyond the Site, multiple soil erosion berm features (SIHP 50-50-04-5278), and an old County dirt road known as “Old Waikapū Road” (SIHP 50-50-04-5730). These four historic sites provide context on the importance of and extensive landscape modifications from the industrial level sugar cane operations in and around the Site. All four historic sites were assessed as significant under “Criterion D,” as they yield or have the potential to yield information important in prehistory or history. These sites have been adequately documented and no further work is recommended (SCS, 2005). See *Figure 3-20, Archaeological Inventory Survey Features.* No burial features or human remains were identified during pedestrian surveys or subsurface testing.

An archaeological field inspection was conducted by SCS on August 24, 2020, consisting of a pedestrian walk-through of the site to determine if Pōhakoʻi the legendary grinding stone was preset at the site. No discoveries were made.

Consultation

As previously mentioned, the Final AIS was approved by the DLNR, SHPD on November 18, 2005 and was given a “No Historic Properties Affected” determination, with no archaeological mitigation recommended (LOG NO. 2005.2398). Consultation under HRS 6E-8 was initiated by DHHL with SHPD on November 3, 2023 to request updated concurrence on SHPD’s previous “No Historic Properties Affected” determination on the Final AIS. A subsurface testing plan was submitted to the SHPD for review and approval, and was conducted on August 16 and 25, 2005. The pedestrian survey involved a visual inspection of the ground surface spanning the entire site, to identify surface archaeological remains. Test trenches were excavated using a backhoe in 21 locations throughout the Site and each trench was thoroughly documented via stratigraphic layer profiles, soil analysis, photography and location plotting on a Site map (SCS, 2022). See *Appendix H: Archaeological Inventory Survey* for more detail on the AIS.

<u>Potential Impacts and Mitigation Measures</u>

The Project involves the removal of six soil berms (SIHP 5728), to accommodate the construction of the residences and vacant lots. Most of SIHP 5197 and SIHP 5729 will be retained and buffered with open space and landscaping. SIHP 5730 will remain relatively undisturbed and only a portion will serve as a secondary emergency Fire Evacuation Route for the residents.

The DHHL has initiated consultation under HRS 6E-8 for this Project and has requested an update to SHPD’s previous “No Historic Properties Affected” determination on the Final AIS. Additionally, the Office of Hawaiian Affairs, the Maui Island Burial Council and other stakeholders will be consulted as necessary.

While the SHPD has previously stated that no further work is necessary, the DHHL has elected to conduct archaeological monitoring during all ground disturbing construction-related activities at the Site in response to consultation completed for the CIA. As such, an Archaeological Monitoring Plan (AMP) will be prepared in advance of site construction and the contractor, once selected, will be required to follow the provisions of the AMP. If during construction, human skeletal remains are inadvertently discovered, work shall cease immediately, and appropriate agencies will be notified, pursuant to the Native American Graves Protection and Repatriation Act.

There are historic properties at the Site (e.g. plantation irrigation ditches) that are considered potential architecture resources by SHPD. Based on coordination with DHHL, a qualified architectural historian will evaluate the significance of these historic properties under an Architectural Reconnaissance Level Survey prior to Project implementation. Any resources that are identified as historically significant architecturally will be documented and mitigation provided if needed. There are five criteria for significance, and seven criteria for integrity. SIHP 50-50-04-5474 (Kama Ditch) found within the general vicinity of the Site, is significant under Criterion a and d, however Kama Ditch had a loss of historic integrity due to the heavy development over a significant portion of the ditch. Moreover, similar sugarcane ditches have been documented in the thematic ditch survey, Thematic Historic Context Study: Irrigation Ditches In Hawaii, (Mason, 2018). Based upon past evaluation on historical resources within the general vicinity of the Site (i.e. Kama Ditch), our conclusion is that the documentation of these sites are anticipated to be adequate.

With the implementation of the proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on historic and archaeological resources.

3.11.2 Cultural Resources

Existing Conditions

The Cultural Impact Assessment (CIA) was prepared for the Project by Keala Pono Archaeological Consulting, LLC in January 2024. The CIA comprises archival background research that synthesizes traditional and historic accounts for the Waikapū and the Wailuku ahupuaʻa. Both ahupuaʻa are also located in the modern district of Wailuku. The CIA includes interviews with community members, which will be valuable in identifying cultural and traditional resources and practices of importance and potential concerns regarding the Project (Keala Pono, 2024). See *Appendix I: Cultural Impact Assessment.*

Context

There were once five centers of population on the island of Maui traditionally, one of which was West Maui which included Wailuku and Waikapū. Wailuku was a gathering place and home to important chiefs and their attendants. The waters of Waikapū stream were once diverted to feed loʻi systems as evident by the remnants of extensive loʻi systems that were still visible in the early 1930's. To the northwest of the Site is ʻĪao valley, a fertile valley important for agriculture and a burial place for aliʻi (chief). ʻĪao's waters helped support the already extensive loʻi systems that thrived in this area. The coastal region of West Maui which includes Wailuku, supported a number of fishing villages. In addition to the abundant agriculture and the coastal fishing villages, fishponds were constructed in the region. Two major ponds include Kanahā fishpond and Mauʻoni fishpond.

Hawaiian place names provide a "living and largely intelligible history" for these landscapes. There are a number of traditional Hawaiian place names for Wailuku (dangerous waters) and Waikapū (waters of the conch shell), that provide insight into how these places were viewed and remembered. Traditionally, Wailuku and Waikapū did not belong to a district and were referred to as Na poko, meaning smaller divisions of land. Waiheʻe (squid liquid) named after the famed story of Keakaokū who was attacked by a huge squid whose slime flowed over the land, and Waiehu (water spray) were also independent ahupuaʻa. These four ahupuaʻa together was referred to as Puali Komohana (west isthmus) in the book of the Mahele. During the Māhele these four ahupuaʻa were grouped into the modern District of Wailuku. The Wailuku district is also known as Nā Wai ʻEhā or "the four waters," in reference to the streams within the four great valleys (Keala Pono, 2024). Several sources state that Waikapū refers to a pū (conch shell) located in a cave in Waikapū, that could be heard across the Hawaiian Islands, until it was stolen by Puapua-lenalena, a dog with supernatural capabilities (Pukui et al., 1974, Kaualililehua, 1872 & Keala Pono, 2024). Another source claims there were sacred waters in the area, hence Wai (water) kapu (sacred). Other places related to the Site include the following:

- Kamaʻomaʻo Plain which is located near Puʻunēnē where ghosts are believed to have wandered in this area;
- Kepaniwai Park, which literally means "water dam" which is a reference to when the Wailuku stream was choked with human bodies after a battle; and
- Puʻunēnē town and cinder pit which literally means goose hill

ʻŌlelo noʻeau (proverbs) are another means by which Hawaiian history has been handed down. Some of the ʻōlelo noʻeau speak to the character of the area describing the cliff trail from Wailuku to Lahaina known as the ʻAʻalaloa, the cloudy and valley of Wailuku, and Nā wai ʻehā. Some ʻōlelo noʻeau speak to the charcteristics of winds for the area rains in the area. The name of the wind in Wailuku is makani lawe malie (wind that takes it easy). Another wind of Wailuku is laiki (Small fish) (Kanepuu, 1967 in Sterling 1998 from Keala Pono 2024). The name of the wind in Waikapū is makani kokololio or kololio (gusty wind) (Nuuhiwa in Sterling 1998 from Keala Pono 2024). Some ʻōlelo noʻeau speak to the phrases and land marks from historic battles in the area. These include land marks such as Kepaniwai, or Waʻuwaʻupali (scratching of cliffs), and the phrase "Wehe i ka mākāhā i komo ka iʻa" spoken by Kaleopuʻupuʻu, priest to Kahekili, refering to the application of strategy to trap the enemy (Keala Pono, 2024). For a more detailed discussion on the ʻōlelo noʻeau for this area, please see *Appendix I: Cultural Impact Assessment*.

Moʻolelo (stories) and mele (songs) are another popular way of passing down knowledge to the next generation. These moʻolelo and mele are typically associated with place names and give the place a life of its own. The island of Maui for instance was named after the legendary demigod Māui who is known for his legendary task of learning the secret of fire, snaring the sun and changing landscapes (Pukui et al., 1974). As previously mentioned, Waikapū was named after a pū that could be heard across the archipellago. It was later stolen by a supernatural dog, never to be heard again. Some actually draw similarities of the pū in this story to the troops of Kamehameha I, who once assembled for battle by sounding the pū. Wailuku also lives up to its name as the ahupuaʻa that has hosted so many of the aformentioned historic battles, including the battle between Kiha-a-Piʻilani and his brother Lono-a-Piʻilani, the battle of Kalaniopuʻu with his ʻālapa warriors and Kahekili, then ruler of Maui, and the battle between Kamehameha I and the Kahekili marking the beginning of his unification of Hawaiʻi. The mele provided in the CIA speak to Nā wai ʻehā by discribing each ahupuaʻa in great detail (Keala Pono, 2024). For a more detailed discussion on the moʻolelo or mele for this area, please see *Appendix I: Cultural Impact Assessment*.

Missionaries began arriving on Maui in 1832 and built a Girl's School in Wailuku. The sugar industry was introduced shortly after in Waikapū and Wailuku, impacting the landscape and daily life. Due to the abundance of fresh water and accessible land in Wailuku, the sugar plantations were able to profit within a short period of time. A network of irrigation ditches soon extended throughout the region, including the Waiheʻe Ditch located on the Site. Plantation roads were constructed which extend through the Site today. The sugar boom in Wailuku contributed to the creation of the Kahului Harbor as a major trade port. Water from the Waikapū and Wailuku streams were used to support the sugarcane fields for over 100 years, formally ending in 1988 (Keala Pono, 2024).

Partially due to the popularity of commercial agriculture in Hawaii, King Kamehameha III Land Commission Awards (LCA) within or partially within the Site (awarded between 1856 and 1883) include 1.66 acres awarded to Keliiolelo (LCA 3525:2), 5.45 acres awarded to William McLane (LCA 3201:2), 11.75 acres awarded to Manu (LCA 408), 131.3 acres awarded to William Humphreys (LCA 326), and 303.5 acres awarded to Michael J. Nowlein (LCA 71) (Keala Pono, 2024).

Community Consultation

The CIA was conducted between November and December 2023 through a multi-phase process. Interviewees were selected because they met one or more of the following: 1) was referred by Keala Pono Archaeological Consulting or DDC2 LLC; 2) had/has ties to the Project area or vicinity; 3) is a known Hawaiian cultural resource person; 4) is a known Hawaiian cultural practitioner; and/or 5) was referred by other cultural resource professionals. These interviews were conducted via telephone, videoconference, or email. Transcriptions were completed by listening to the recording of each interview and verifying the transcript with each interviewee. A total of 23 potential interviewees were contacted, resulting in four interviews and one written response by email (Keala Pono, 2024).

<u>Potential Impacts and Mitigation Measures</u>

The purpose of the Project is to provide homesteading opportunities to DHHL beneficiaries and decrease the number of beneficiaries on the DHHL Maui Islandwide Residential Waiting List, thereby fulfilling the purpose of the HHCA and the 2022 *DHHL General Plan Update*. Homesteading opportunities are critical to the perpetuation and preservation of native Hawaiian culture and traditions. The Project also involves the installation of new landscaping bordering the Site, along the internal streets, and within the linear park; drought-tolerant and native plant species will be propagated where possible.

While the proposed Project is referred to as the “Wailuku Single Family Residential” Project, the DHHL recognizes the importance of placenames and will work with the beneficiaries, to select an appropriate placename for the subdivision (and internal street names) that honors its location in Wailuku/Waikapū.

The CIA noted that there are no ongoing cultural practices identified at the Site. The CIA also noted that the proposed Project may have the potential to affect natural and cultural resources such as fresh water, iwi kūpuna, and historic properties located within the Project boundaries and wider area. These issues were brought up during interviews and consultation process. All four interviewees expressed concern that iwi kūpuna may be found on the property and wanted to ensure they would be protected, if encountered. Additional concerns encountered during the consultation process include:

- Loss of cultural identities
- Loss of connection to the land
- Loss of the continuation and remembrance of cultural practices
- Potential impacts to freshwater resources
- Potential impacts to areas currently in the loʻi kalo

- Potential impacts of increased traffic use of Old Waikapū/Old Government Road impacting the cultural and historical integrity of the area (e.g., impacts to a neighborhood comprised of old homes, many over 100 years, to the associated rock walls, and to old trees.

These concerns are being addressed through project design. Some examples of how the Project intends to address these concerns includes the continued flow of freshwater resources through the Site, and the perpetuation of the cultural identity and connection to one's land through signage and street names created through community consultation. The linear park could also encourage the return of cultural practices at the Site. Other recommendations and mitigations for the Project include:

- Have an on-site archaeological monitor – one per earth-moving machine – during construction related ground alterations;
- Have an on-site cultural monitor during construction related ground alterations;
- Have an on-site cultural advisor, who is well vetted, respected, familiar with the Project, and overall area, to inform community, SHPD, and developer of inadvertent findings of iwi kūpuna, during construction related ground alterations;
- Preserve and protect fresh water and all natural resources;
- Conduct an archaeological field inspection to determine presence/absence of Pōhāko'i prior to the commencement of ground altering activities;
- Keep access to the property open to allow the community to pule;
- Place signage that appropriately reflects the cultural and historical significance of the area;
- Keep access to freshwater resources (i.e., surface water and the Maui aquifer) open; and
- Keep access to natural resources open.

While the SHPD has previously stated that no further work is necessary, the DHHL has elected to conduct archaeological monitoring as an extra measure of assurance that all ground disturbance construction-related activities at the Site is managed in a culturally appropriate manner. As such, an AMP will be prepared in advance of site construction and the contractor, once selected, will be required to follow the provisions of the AMP. An archaeological field inspection was conducted by SCS on August 24, 2020, consisting of a pedestrian walk through of the Site to determine if Pōhako'i was present at the Site. No discoveries were made. It is noted that although Pōhako'i may have been relocated given the extensive agricultural clearing and landscape modifications that previously occurred in the area, future efforts to locate this important stone will be undertaken during the archaeological monitoring of the Project area during future ground-altering activities. DHHL is committed to keeping access open for resources and cultural purposes.

With the implementation of proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on existing cultural properties, resources or traditional cultural and resource gathering practices.

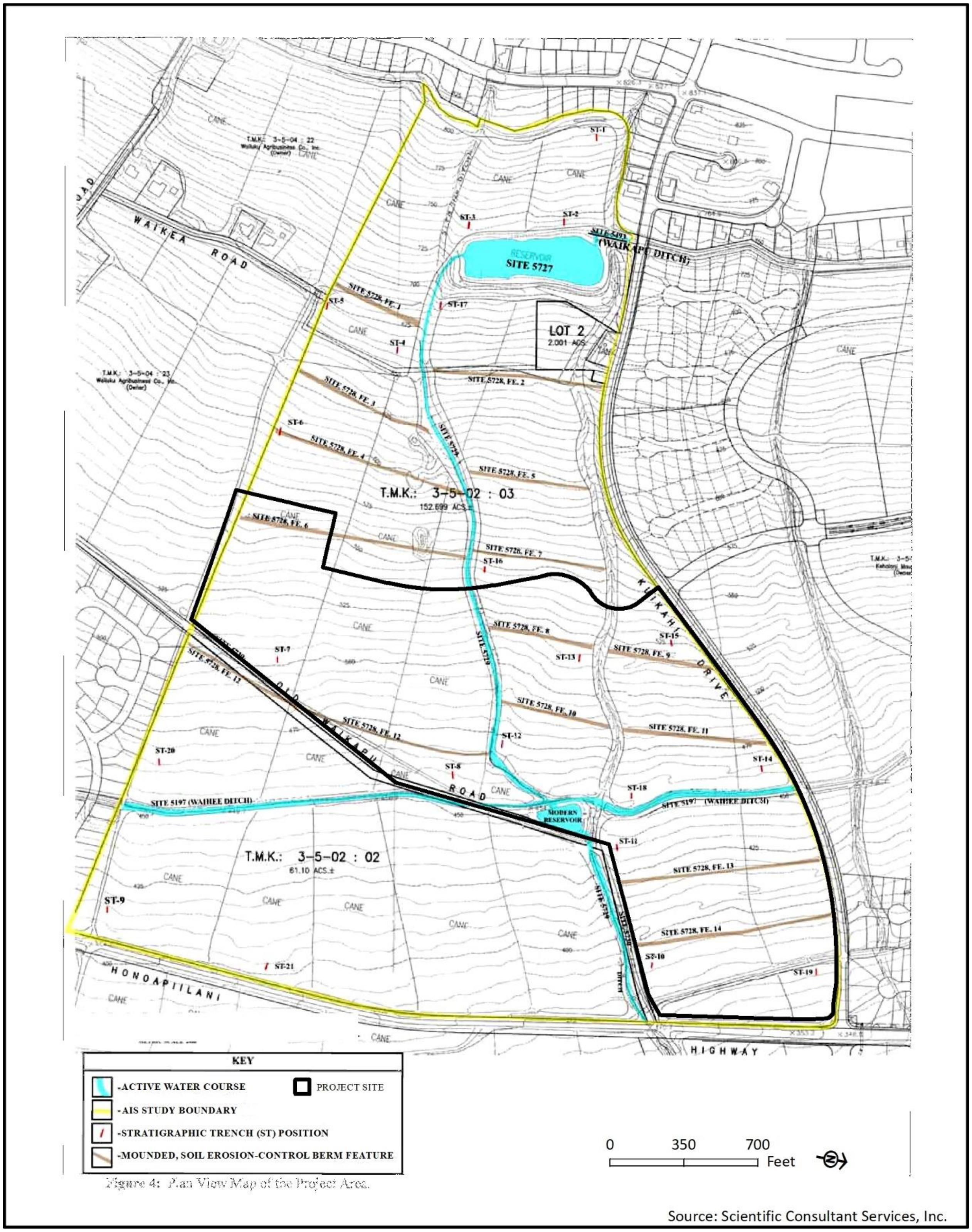

Figure 3-20 **Archaeological Inventory Survey Features**

3.12 Socio-Economic Characteristics

Existing Conditions

The estimated population of Maui County in 2020 was 164,754 (USCB, 2020) and is projected to increase to 211,537 by the year 2045 (County, 2020b). The County's *Socio-Economic Forecast* (2006) contains the economic projections for the Maui County General Plan 2030. This report indicates that the Wailuku-Kahului region is expected to grow faster than other parts of Maui and is home to over a third of Maui's households. The population of the Wailuku-Kahului region is estimated to increase to 71,223 by 2030 (PD, 2006). The estimated population of the Wailuku Census-Designated Place (CDP) was 17,697 in 2020. Approximately 70.3% of the Wailuku CDP population 16+ years old was in the labor force during 2016-2020. The median household income in the Wailuku CDP was $76,624 (in 2020 dollars) during 2016-2020 (USCB, 2020).

In 2020, the majority of DHHL lessee households on Maui comprised of three to four people per household, with no children. Approximately 55% of households had 1-2 adults that were employed full-time, while approximately 28% of households had 1-2 adults that were employed part-time (DHHL, 2020b). For further information, see *Figure 3-21, 2020 Lessee Characteristics*.

The economy of Maui is heavily dependent upon the visitor industry. However, the COVID-19 pandemic has had far reaching impacts on the economy and visitor industry on Maui, due to stay-at-home regulations and travel quarantines. Many businesses shut down or drastically reduced operations. As the State has slowly reopened, businesses have also reopened, and unemployment has gradually decreased. Wailuku serves as the governmental and commercial center of the region with State and County agency offices and professional services surrounding the High Street-Main Street intersection, while Waikapū consists of residential development, former agricultural lands, small businesses, and the Maui Tropical Plantation. The Site is south of Wailuku and north of Waikapū and is surrounded by residential developments and some fallow former agricultural lands. Median sales prices for single-family residences and condominiums on Maui have reached historically high rates, highlighting the need for affordable housing.

Potential Impacts and Mitigation Measures

The Project involves developing a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries in the growing Central Maui region. The Project is consistent with the existing residential land use and community character of the area.

The Project will lead to a slight population increase for the Wailuku-Waikapū area; however, it is not anticipated to significantly alter the region or Maui's population projections. While some beneficiaries may move to Maui from neighboring islands to reside at this subdivision, most are expected to relocate from other areas on Maui; therefore, the Project is not anticipated to significantly alter the regions demographic.

The Project is anticipated to generate short-term economic benefits through the employment of design and construction firms and purchasing of construction materials. In addition, the State and County will receive general excise tax revenues and income taxes. In the long term, the beneficiaries will contribute to the County revenue fund through property taxes. Additionally, the socio-economic benefits associated with providing DHHL beneficiaries permanent residences nearby governmental and commercial services and potential employment opportunities are innumerable and should not be understated.

The Project is in support of DHHL's mission to effectively manage the Hawaiian Home Lands trust and to develop and deliver land to beneficiaries. The DHHL maintains waiting lists comprised of beneficiary applicants awaiting an opportunity to be awarded a homestead lease. The beneficiary demand for homesteading opportunities is very high; the current Maui Islandwide Residential Waiting List stands at approximately 3,838, as of December 31, 2021 (DHHL, 2021). While this Project aims to benefit DHHL beneficiaries, the DHHL notes that all ongoing housing development proposals within Central Maui will help to address Maui's housing shortage, and all residential developers share the overarching goal of improving Maui's quality of life by providing much need housing.

The Project is anticipated to result in long-term beneficial socio-economic impacts, as the proposed improvements will result in increased residences for native Hawaiian beneficiaries; as well as direct, indirect, and cumulative impacts on jobs, earnings, and tax revenues. No mitigation is recommended.

		County of Residence					
		Honolulu	Maui	Hawai'i	Kaua'i	Out of State	Total
		Col %	Col %	Col %	Col %	Col %	Col %
Household Size	1 to 2 people	23.1%	25.8%	41.9%	30.7%	57.1%	28.5%
	3 to 4 people	30.8%	29.5%	30.5%	34.3%	28.6%	30.7%
	5 to 6 people	26.3%	24.8%	14.7%	14.5%	0.0%	22.4%
	7 or more	17.8%	15.8%	8.6%	16.3%	14.3%	15.3%
	Not reported	2.0%	4.1%	4.3%	4.2%	0.0%	3.1%
Household Members Under Age 18	None	33.3%	33.8%	48.7%	43.4%	28.6%	37.4%
	One member	17.3%	13.5%	11.9%	9.6%	28.6%	14.9%
	Two members	18.5%	17.6%	11.2%	15.1%	14.3%	16.4%
	Three members	9.2%	9.5%	5.5%	7.8%	0.0%	8.3%
	Four or more members	7.7%	8.4%	4.9%	9.0%	0.0%	7.3%
	Not reported	14.0%	17.1%	17.8%	15.1%	28.6%	15.6%
Household Members Over Age 70	None	49.4%	44.8%	52.1%	51.8%	14.3%	49.0%
	One member	21.5%	19.9%	16.6%	20.5%	28.6%	20.1%
	Two members	11.3%	12.3%	12.1%	9.0%	42.9%	11.7%
	Three members	1.9%	.4%	.8%	.6%	0.0%	1.3%
	Four or more members	1.7%	2.1%	1.2%	.6%	0.0%	1.6%
	Not reported	14.2%	20.4%	17.2%	17.5%	14.3%	16.3%
Adults in Household Employed Full-time	None	7.3%	8.6%	12.7%	9.0%	14.3%	8.9%
	1-2 adults	54.8%	54.9%	49.1%	54.8%	42.9%	53.5%
	3-5 adults	20.1%	12.8%	9.2%	9.6%	0.0%	15.4%
	6 or more adults	1.0%	.2%	1.0%	2.4%	14.3%	1.1%
	Not reported	16.8%	23.4%	28.0%	24.1%	28.6%	21.1%
Adults in Household Employed Part-time	None	26.8%	21.3%	23.3%	25.3%	28.6%	24.9%
	1-2 adults	24.8%	27.9%	24.7%	24.1%	28.6%	25.3%
	3-5 adults	1.0%	.7%	1.4%	1.2%	0.0%	1.0%
	6 or more adults	0.0%	0.0%	0.0%	.6%	0.0%	.0%
	Not reported	47.4%	50.1%	50.7%	48.8%	42.9%	48.7%

Source: DHHL, 2020b

Figure 3-21 **2020 Lessee Characteristics**

3.13 Fiscal and Economic Resources

Existing Conditions

Fiscal and Economic resources include construction cost and impact fees of the Project, direct, indirect, and induced expenditures from infrastructure, job and employment opportunities and earnings, and direct and indirect economic growth opportunities. An economic and fiscal Impact Report was created for the Project in December 2023 by John Child & Company Appraisers & Consultants (see *Appendix J: Economic and Fiscal Impact of the Wailuku Single-Family Residential Subdivision*. This Project will include the development of 204-lots (173-turnkey single family homes and 31-vacant lots) using DHHL (State) funds. The minimum lot size is 7,500 square feet. Housing layouts will range from a 2 bedrooms/1 bath single story home with 752 square feet of livable area to 5 bedrooms/3 bath, two-story with 1,672 square feet of livable area. The majority of the turn-key homes will be 4 to 5 bedrooms homes with at least 1,604 square feet of livable areas. The vacant lots will be leased to beneficiaries who will construct their own homes by 1) being an owner builder 2) hiring their own contractor, or 3) partnering with Habitat for Humanity. The subdivision plans are anticipated to be completed and submitted to the State and County reviewing agencies by the beginning of 2025. The homes are planned to be constructed and sold by 2029 (John Child & Company Appraisers & Consultants, 2023).

Potential Impacts and Mitigation Measures

Expenditures associated with use of roads, schools, parks and State and County services are projected to be negligible. DHHL and DDC2 LLC will request exemptions of fees that have historically been granted for DHHL properties (John Child & Company Appraisers & Consultants, 2023).

Total construction of the Project with direct, indirect, and induced expenditures is estimated to be at $275,026,000. Employment earnings from the construction of the Project and indirect and induced earnings is estimated to be around $194,400,000. (JC&C, 2023).

The Project fees and assessments for the Site development budget anticipates a DOE assessment of $1,096,092 to be paid to the state. The anticipated budget for Site development during construction include $95,248 for County permit fees, $2,571,223 for water meter & installation fees, $1,283,052 for Maui Electric fees. The total budget for Project fees and assessments for site development for construction is $5,045,615 (John Child & Company Appraisers & Consultants, 2023).

This DHHL Project is expected to be exempt from real property taxes for the first eight years. The annual real property tax is anticipated to average $530 per housing unit and $108,000 annually for the entire subdivision (John Child & Company Appraisers & Consultants, 2023).

The proposed Project will have both positive short-term and long-term economic fiscal impacts to the State of Hawai‘i and County of Maui during and after construction. No other migration is recommended.

3.14 Visual and Scenic Resources

Existing Conditions

Visual and scenic resources include panoramic views and vistas, landmarks, landscape features and open space areas.

The County *Maui Island Plan* identifies the following as protected views: Haleakalā, ʻĪao Valley, the Mauna Kahalawai (West Maui Mountains), Puʻu ʻŌlaʻi, Kahoʻolawe, Molokini, Molokaʻi, Lānaʻi, Mauna Kea, Mauna Loa, and the Pacific Ocean. The following roadways are identified as scenic corridors: Haleakalā Highway, Honoapiʻilani Highway, Hāna Highway, Kula Highway, and Kahekili Highway (PD, 2012).

Mauna Kahālāwai (West Maui Mountains) is to the west, Haleakalā is to the east, the Pacific Ocean is to the northeast, and Honoapiʻilani Highway is adjacent of the Site. The Site is predominantly surrounded by residential developments similar in scale to the Project and some fallow former agricultural lands.

Potential Impacts and Mitigation Measures

Construction activities and equipment will be visible from neighboring properties. However, construction-related visual impacts will be temporary. Dust screens will be installed at the Site, which will have a dual function of mitigating the dispersion of dust and screening views into the Site, thereby mitigating visual distractions to the surrounding area.

The Site is not within a designated historic district and will not adversely impact protected views or scenic corridors. The design and scale of the single-family residences will be compatible with the surrounding residential subdivisions in Waiolani Mauka, Kehalani master planned community, and the Puʻuhona Homestead Subdivision (which is in construction). The residential subdivision is appropriately setback from Honoapiʻilani Highway and Kuikahi Drive. The Project will generally conform with the allowable height and development limits per the MCC. The residences will be painted with neutral/natural colors to blend into the surrounding landscape. The Project will improve the overall aesthetics of the Site with well-designed single-family residences, open space, and landscaping.

In addition, there will be a 3.1-acre linear park along the southern boundary of the Project. This 200-ft wide linear park will also serve as a buffer between Wakapū and Wailuku that has been requested by the County and community. The Project is not anticipated to have a significant adverse impact on visual, scenic, and open space resources in the vicinity of the Site. No mitigation is recommended.

3.15 Potential Cumulative, Indirect, and Secondary Impacts

Per HAR §11-200.1-2, cumulative impacts result from the incremental effects of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individual minor actions, that become collectively significant over time. Indirect or secondary impacts are associated with, but do not result directly from, an action. They are reasonably foreseeable impacts that are caused by the action but are distanced by time and space from the Site. Indirect impacts may include growth-inducing effects and other effects related to changes in the land use patterns, population density, and related effects on air and water and other natural resources.

The Project is proposed to be implemented in an area developed with residential subdivisions of a similar nature. The Project is not a phase of a larger action, nor does it represent a commitment to such actions. Given the surrounding residential developments, significant environmental impacts are not anticipated as a result of the Project. The Site encompasses a relatively nominal portion of land designated as ALISH Prime land and LSB Class A. On Maui, approximately 70,714 acres (or 15% of the island) are designated as ALISH Prime land, while the Project involves the use of 77 acres (or 0.11%) of Maui's Prime land. Statewide, there are approximately 447,250 acres of LSB Class A - C lands; the Project involves the use of approximately 77 acres (or 0.02%) in LSB Class A - C lands. Moreover, the Site is not designated as an IAL – an exclusive sub-set of high-quality farmlands within the SLU Agricultural District. While the Site is designated for agricultural use, the land has fallen out of productive agricultural cultivation for some time. Therefore, the DHHL will be exercising its authority to use its lands at its discretion, with the purpose of providing homesteading opportunities to beneficiaries. The DHHL is responding to beneficiaries' preferences, as results from a 2003 survey conducted for the DHHL's MIP concluded that Central Maui was identified as the preferred residential homestead area by beneficiaries. Moreover, a 2020 survey conducted by SMS found that the majority of Maui applicants (52%) want a residential lot (SMS, 2020). As indicated in DHHL's MIP, most DHHL-owned lands in Central Maui are not suitable for residential uses; therefore, these lands are needed in Central Maui to meet the beneficiary demand for residential homesteads. The Site is a prime location for residential use, as it is a vacant, underutilized property, which is in a sub-urban/urban area of Wailuku, adjacent to existing residential subdivisions with readily available infrastructure. The Site is also conveniently located near Wailuku Town, which has ample amenities and job opportunities for beneficiaries, with nearby State and County government offices, the Maui Memorial Medical Center, Fire and Police services, professional services, public and private schools, parks, grocery stores, restaurants, and retail outlets. It should be noted that the DHHL is currently embarking on a statewide effort to develop an *Agriculture Program Plan*, which will help to identify DHHL lands ideal for agricultural use.

The Project will lead to a slight population increase for the Wailuku-Waikapū area; however, it is not anticipated to alter the region or Maui's population projections. As such, cumulative impacts on the shift of population are relatively negligible.

The Project requires the provision of basic infrastructure such as potable water, wastewater service, power, and telecommunication; however, the Project will be developed within service capacities and will not overcommit resources. Further, the TIAR concluded that study intersections will operate at a similar LOS during base and future year scenarios. Minor traffic and roadway improvements will be implemented; however, a traffic signal was not warranted at either of the Project's proposed intersections on Kuikahi Drive. Roadway improvements will be implemented to handle the ingress and egress for the Project. As such, cumulative impacts on utilities and infrastructure are relatively negligible.

The impacts of climate change are inherently cumulative and indirect, as they occur incrementally over time and are distanced by time and space from the Site. The Project's individual contribution to the cumulative impacts of global GHG emissions (with the implementation of proposed mitigation measures) will be relatively negligible and does not fall within the threshold of mandatory federal GHG reporting. The Project will comply with DHHL's Hoʻomaluō Energy Policy, which promotes the design and construction of new affordable energy-efficient homes using the "Hawaiʻi BuiltGreen" and "ENERGY STAR" programs. Energy efficient fixtures, appliances and solar water heating systems will be installed in the residences, as feasible, which will reduce GHG emissions. Additionally, proposed landscaping and trees will be incorporated throughout the Site which will help to mitigate and absorb local GHG emissions.

The construction of the Project is anticipated to have a beneficial short- and long-term cumulative and indirect impacts on jobs, earnings, and tax revenues. Additionally, the socio-economic benefits associated with providing beneficiaries with permanent residences nearby governmental and commercial services and potential employment opportunities are innumerable and should not be understated.

Therefore, with the proposed mitigation measures, the Project is not anticipated to result in significant adverse cumulative, indirect, or secondary impacts.

Chapter 4

Alternatives to the Proposed Action

Chapter 4

Alternatives to the Proposed Action

This chapter describes a range of alternatives considered to the Proposed Action, and a high-level analysis of the potential impacts in comparison to the Proposed Action.

4.1 Alternative A – No Action

Alternative A or the "No Action" alternative refers to the future conditions that would result should the Project not proceed.

Under Alternative A, there would be no potential short-term, construction-related impacts (e.g., dust generation, vehicular traffic, intermittent noise) or long-term, operational impacts to the existing natural environment (e.g., water resources, air quality, and flora/fauna) and existing human environment (e.g., potable water system, wastewater system, traffic conditions, noise conditions, and visual resources). However, without the Project there would be no direct or indirect economic growth opportunities, no short-term or long-term benefits to the County and State due to impact fees and real property taxes, and no job and employment opportunities and earning creation during and after construction. The existing lands have been fallow for many years and in that time the surrounding areas have been urbanized with residential subdivisions and other developments. These fallow lands present a fire hazard and could endanger surrounding communities under Alternative A. The Project would be consistent with the existing single-family residential housing in the area and would minimize fire hazards by implementing BMPs and recommendations provided by HWMO.

Alternative A would fail to provide new homestead opportunities for DHHL beneficiaries and result in continued wait time for DHHL beneficiaries on the waiting lists; therefore, Alternative A is in direct conflict with the stated purposes of the DHHL and HHCA and would not meet the objectives of the Proposed Action. For this reason, Alternative A is not considered a viable alternative.

4.2 Alternative B – Density of Lots and Design Configuration

Alternative B or the "Different Design" alternative involves the consideration of various site configurations with different lot and house designs/sizes resulting in either greater or lesser housing unit yield than the Proposed Action. Essentially, smaller lots/houses would yield more housing units, and larger lots/houses would yield less housing units.

Under Alternative B, there would be potential short-term, construction-related impacts (e.g., dust generation, vehicular traffic, intermittent noise) similar to the Proposed Action; however, mitigation measures would be implemented, and potential impacts would cease after construction. There could also be potential long-term operational impacts to the existing natural environment and existing human environment. Creating smaller lots to increase the number of residential opportunities has the potential to increase GHG emissions impacting air quality, disturb stream resources, disturb native fauna species that exist on Site, increase usage and over consumption of potable water systems, over use of wastewater systems, increased traffic, and noise conditions, and impacts to visual resources by not conforming to surrounding environment. While decreasing the potential of short-term and long-term impacts on the surrounding environment, creating larger lots would service less DHHL beneficiaries and would be less effective in addressing the issue of the increasing DHHL waiting list. For these reasons, Alternative B is not considered a viable option.

4.3 Alternative C – Deferral of The Project

Alternative C or the "Deferral of The Project" refers to a delay in development or proposed action. This alternative is not considered viable. DHHL's commitment to planning, design, and construction allows for the Project to proceed at present. A deferral in Project implementation will likely result in higher development costs and greater uncertainty with respect to infrastructure systems adequacy. In addition, economic impacts resulting from delays in the project may also result in a longer waiting time for those of the DHHL homestead waiting list thereby not allowing the DHHL to fulfill its mission of providing homestead opportunities for Native Hawaiian beneficiaries. On the heels of the Lahaina fires, the demand for housing on Maui, especially amongst the Native Hawaiian population, is a major concern of Federal, State, and County agencies. Any delay in the implementation of this Project would only serve to burden Native Hawaiian beneficiaries, especially those affected by the Lahaina fires. DHHL believes that the project can be viably developed under current market and financing conditions. For these reasons, the "deferred action alternative" or Alternative C is not considered appropriate.

Chapter 5

Relationship to Plans and Policies

Chapter 5

Relationship to Plans and Policies

This chapter outlines the Project's consistency and compliance with applicable State and County land use plans and policies. Plans and policies include the *Hawai'i State Plan, State Housing Functional Plan, Hawai'i 2050 Sustainability Plan, Hawai'i State Land Use District Boundaries, Hawai'i Coastal Zone Management Program, DHHL General Plan Update*, *DHHL Maui Island Plan*, *Maui County General Plan 2030,* and the Maui County Zoning Code Title 19. It should be noted that DHHL is not required to comply with State or County land use plans, policies, and regulations based on the HHCA.

5.1 Hawai'i State Plan

The Hawai'i State Planning Act, adopted in 1978, and promulgated in HRS Chapter 226, resulted in the *Hawai'i State Plan*. The *Hawai'i State Plan* provides goals, objectives, policies, and priority guidelines for growth, development and the allocation of resources throughout the state in various areas of State interest. The purpose of the *Hawai'i State Plan* is to improve the planning process in the State; increase the effectiveness of government and private actions; improve coordination among different agencies and levels of government; provide for wise use of Hawai'i's resources and to guide the future development of the State.

State goals under the Hawai'i State Planning Act are set to guarantee, for present and future generations, those elements of choice and mobility to ensure that individuals and groups may approach their desired levels of self-reliance and self-determination:

- A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i present and future generations.
- A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life.

Objectives and policies of the *Hawai'i State Plan* are discussed based on their relevance to the Project in the below *Table 5.1, Hawai'i State Plan.*

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
§226-1: Findings and Purpose			
§226-2: Definitions			
§226-3: Overall Theme			
§226-4: State Goals. In order to guarantee, for the present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels of self-reliance and self-determination, it shall be the goal of the State to achieve:			
(1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai‘i's present and future generations	X		
(2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.	X		
(3) Physical, social and economic well-being, for individuals and families in Hawai‘i, that nourishes a sense of community responsibility, of caring, and of participation in community life.	X		
<u>Discussion:</u> The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. The Project will help to create physical, social and economic well-being for Native Hawaiian beneficiaries and their families and will create a beautiful neighborhood, with an inviting streetscape and landscaped open spaces.			
§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 Hawai‘i's people to pursue their physical, social and economic aspirations while recognizing the unique needs of each county.	X		
(2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs-and desires.	X		
(3) Promote increased opportunities for Hawai‘i's people to pursue their socioeconomic aspirations throughout the islands.	X		
(4) Encourage research activities and public awareness programs to foster and understanding of Hawai‘i's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawai‘i's population.			X
(5) Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among states, provided that such actions do not prevent the reunion of immediate family members.			X
(6) Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population			X
(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area	X		
<u>Discussion:</u> The Project will be in close proximity to existing government, business and commercial destinations at Wailuku and Kahului, thus providing increased employment opportunities for residents. The Project is proposed on an underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure.			
§226-6 Objectives and policies for the economy in general. (a) Planning for the State's economy in general shall be directed toward achievement of the following objectives:			

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai‘i's people.	X		
(2) A steadily growing and diversified economic base that is not overly dependent on a few industries and includes the development and expansion of industries on the neighbor islands.	X		
(b) To achieve the general economic objectives, it shall be the policy of this State to:			
(1) Promote and encourage entrepreneurship within Hawai‘i by residents and nonresidents of the State.			X
(2) Expand Hawai‘i's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.			X
(3) Promote Hawai‘i as an attractive market for environmentally and socially sound investment activities that benefit Hawai‘i's people.			X
(4) Transform and maintain Hawai‘i as a place that welcomes and facilitates innovative activity that may lead to commercial opportunities.			X
(5) Promote innovative activity that may pose initial risks, but ultimately contribute to the economy of Hawai‘i.			X
(6) Seek broader outlets for new or expanded Hawai‘i business investments.			X
(7) Expand existing markets and penetrate new markets for Hawai‘i's products and services.			X
(8) Assure that the basic economic needs of Hawai‘i's people are maintained in the event of disruptions in overseas transportation.			X
(9) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.	X		
(10) Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawai‘i's small-scale producers, manufacturers, and distributors.			X
(11) Encourage labor-intensive activities that are economically satisfying, and which offer opportunities for upward mobility.	X		
(12) Encourage innovative activities that may not be labor-intensive, but may otherwise contribute to the economy of Hawai‘i.			X
(13) Foster greater cooperation and coordination between the government and private sectors in developing Hawai‘i's employment and economic growth opportunities.	X		
(14) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.			X
(15) Maintain acceptable working conditions and standards for Hawai‘i's workers.	X		
(16) Provide equal employment opportunities for all segments of Hawai‘i's population through affirmative action and nondiscrimination measures.	X		
(17) Stimulate the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.			X
(18) Encourage businesses that have favorable financial multiplier effects within Hawai‘i's economy.	X		
(19) Promote and protect intangible resources in Hawai‘i, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.			X
(20) Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new, potential growth industries in particular.			X

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(21) Foster a business climate in Hawai‘i--including attitudes, tax and regulatory policies, and financial and technical assistance programs--that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.			X
<u>Discussion:</u> The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries, enabling a diversity of community members to continue to reside on Maui. The Project will be in close proximity to existing government, business and commercial services in Wailuku, thus providing increased equal employment opportunities for residents. Additionally, during construction, the Project will provide short-term employment opportunities.			
§226-7 Objectives and policies for the economy - agriculture. (a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:			
(1) Viability of Hawai‘i's sugar and pineapple industries.			X
(2) Growth and development of diversified agriculture throughout the State.			X
(3) An agriculture industry that continues to constitute a dynamic and essential component of Hawai‘i's strategic, economic, and social well-being.			X
(b) To achieve the agriculture objectives, it shall be the policy of this State to:			
(1) Establish a clear direction for Hawai‘i's agriculture through stakeholder commitment and advocacy.			X
(2) Encourage agriculture by making best use of natural resources.			X
(3) Provide the governor and the legislature with information and options needed for prudent decision making for the development of agriculture.			X
(4) Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.			X
(5) Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawai‘i's economy.			X
(6) Seek the enactment and retention of federal and state legislation that benefits Hawai‘i's agricultural industries.			X
(7) Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawai‘i's producers and consumer markets locally, on the continental United States, and internationally.			X
(8) Support research and development activities that provide greater efficiency and economic productivity in agriculture.			X
(9) Enhance agricultural growth by providing public incentives and encouraging private initiatives.			X
(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.			X
(11) Increase the attractiveness and opportunities for an agricultural education and livelihood.			X
(12) Expand Hawai‘i's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.			X
(13) Promote economically competitive activities that increase Hawai‘i's agricultural self-sufficiency.			X
(14) Promote and assist in the establishment of sound financial programs for diversified agriculture.			X
(15) Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.			X

Table 5-1: Hawaiʻi State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(16) Facilitate the transition of agricultural lands in economically non-feasible agricultural production to economically viable agricultural uses.			X
(17) Perpetuate, promote, and increase use of traditional Hawaiian farming systems, such as the use of loko iʻa, māla, and irrigated loʻi, and growth of traditional Hawaiian crops, such as kalo, ʻuala, and ʻulu.			X
(18) Increase and develop small-scale farms.			X
Discussion: The objectives and policies specified in HRS §226-7 are not directly applicable to the Project. The Project involves the creation of an approximately 3.1-acre linear park with an option for a community farm on the southern portion of the Site.			
§226-8 Objective and policies for the economy--visitor industry. (a) Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawaiʻi's economy. (b) To achieve the visitor industry objective, it shall be the policy of this State to:			
(1) Support and assist in the promotion of Hawaiʻi's visitor attractions and facilities.			X
(2) Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawaiʻi's people.			X
(3) Improve the quality of existing visitor destination areas.			X
(4) Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.			X
(5) Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawaiʻi's people.			X
(6) Provide opportunities for Hawaiʻi's people to obtain job training and education that will allow for upward mobility within the visitor industry.			X
(7) Foster a recognition of the contribution of the visitor industry to Hawaiʻi's economy and the need to perpetuate the aloha spirit.			X
(8) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaiʻi's cultures and values.			X
Discussion: The objectives and policies specified in HRS §226-8 are not directly applicable to the Project.			
§226-9 Objective and policies for the economy--federal expenditures. (a) Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawaiʻi's economy. (b) To achieve the federal expenditures objective, it shall be the policy of this State to:			
(1) Encourage the sustained flow of federal expenditures in Hawaiʻi that generates long-term government civilian employment.			X
(2) Promote Hawaiʻi's supportive role in national defense.			X
(3) Promote the development of federally supported activities in Hawaiʻi that respect state-wide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaiʻi's environment.			X
(4) Increase opportunities for entry and advancement of Hawaiʻi's people into federal government service.			X
(5) Promote federal use of local commodities, services, and facilities available in Hawaiʻi.			X
(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawaiʻi.			X

Table 5-1: Hawaiʻi State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(7) Pursue the return of federally controlled lands in Hawaiʻi that are not required for either the defense of the nation or for other purposes of national importance and promote the mutually beneficial exchanges of land between federal agencies, the State, and the counties.			X
<u>Discussion:</u> The objectives and policies specified in HRS §226-9 are not directly applicable to the Project.			
§226-10 Objectives and policies for the economy--potential growth and innovative activities. (a) Planning for the State's economy with regard to potential growth and innovative activities shall be directed towards achievement of the objective of development and expansion of potential growth and innovative activities that serve to increase and diversify Hawaiʻi's economic base. (b) To achieve the potential growth and innovative activity objective, it shall be the policy of this State to:			
(1) Facilitate investment and employment growth in economic activities that have the potential to expand and diversify Hawaiʻi's economy, including but not limited to diversified agriculture, aquaculture, renewable energy development, creative media, health care, and science and technology-based sectors;			X
(2) Facilitate investment in innovative activity that may pose risks or be less labor-intensive than other traditional business activity, but if successful, will generate revenue in Hawaiʻi through the export of services or products or substitution of imported services or products;			X
(3) Encourage entrepreneurship in innovative activity by academic researchers and instructors who may not have the background, skill, or initial inclination to commercially exploit their discoveries or achievements;			X
(4) Recognize that innovative activity is not exclusively dependent upon individuals with advanced formal education, but that many self-taught, motivated individuals are able, willing, sufficiently knowledgeable, and equipped with the attitude necessary to undertake innovative activity;			X
(5) Increase the opportunities for investors in innovative activity and talent engaged in innovative activity to personally meet and interact at cultural, art, entertainment, culinary, athletic, or visitor-oriented events without a business focus;			X
(6) Expand Hawaiʻi's capacity to attract and service international programs and activities that generate employment for Hawaiʻi's people;			X
(7) Enhance and promote Hawaiʻi's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts;			X
(8) Accelerate research and development of new energy-related industries based on wind, solar, ocean, underground resources, and solid waste;			X
(9) Promote Hawaiʻi's geographic, environmental, social, and technological advantages to attract new or innovative economic activities into the State;			X
(10) Provide public incentives and encourage private initiative to attract new or innovative industries that best support Hawaiʻi's social, economic, physical, and environmental objectives;			X
(11) Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research;			X
(12) Develop, promote, and support research and educational and training programs that will enhance Hawaiʻi's ability to attract and develop economic activities of benefit to Hawaiʻi;			X
(13) Foster a broader public recognition and understanding of the potential benefits of new or innovative growth-oriented industry in Hawaiʻi;			X
(14) Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawaiʻi's social, economic, physical, and environmental objectives;			X
(15) Increase research and development of businesses and services in the telecommunications and information industries;			X

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(16) Foster the research and development of nonfossil fuel and energy efficient modes of transportation; and			x
(17) Recognize and promote health care and health care information technology as growth industries.			x
Discussion: The objectives and policies specified in HRS §226-10 are not directly applicable to the Project.			
§226-10.5 Objectives and policies for the economy--information industry. (a) Planning for the State's economy with regard to telecommunications and information technology shall be directed toward recognizing that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawai‘i as a leader in broadband and wireless communications and applications in the Pacific Region. (b) To achieve the information industry objective, it shall be the policy of this State to:			
(1) Promote efforts to attain the highest speeds of electronic and wireless communication within Hawai‘i and between Hawai‘i and the world, and make high speed communication available to all residents and businesses in Hawai‘i;			X
(2) Encourage the continued development and expansion of the telecommunications infrastructure serving Hawai‘i to accommodate future growth and innovation in Hawai‘i's economy;			X
(3) Facilitate the development of new or innovative business and service ventures in the information industry which will provide employment opportunities for the people of Hawai‘i;			X
(4) Encourage mainland- and foreign-based companies of all sizes, whether information technology-focused or not, to allow their principals, employees, or contractors to live in and work from Hawai‘i, using technology to communicate with their headquarters, offices, or customers located out-of-state;			X
(5) Encourage greater cooperation between the public and private sectors in developing and maintaining a well-designed information industry;			X
(6) Ensure that the development of new businesses and services in the industry are in keeping with the social, economic, and physical needs and aspirations of Hawai‘i's people;			X
(7) Provide opportunities for Hawai‘i's people to obtain job training and education that will allow for upward mobility within the information industry;			X
(8) Foster a recognition of the contribution of the information industry to Hawai‘i's economy; and			X
(9) Assist in the promotion of Hawai‘i as a broker, creator, and processor of information in the Pacific.			X
Discussion: The objectives and policies specified in HRS §226-10.5 are not directly applicable to the Project.			
§226-11 Objectives and policies for the physical environment--land-based, shoreline, and marine resources. (a) Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:			
(1) Prudent use of Hawai‘i's land-based, shoreline, and marine resources.			X
(2) Effective protection of Hawai‘i's unique and fragile environmental resources.	X		
(b) To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:			
(1) Exercise an overall conservation ethic in the use of Hawai‘i's natural resources.			X
(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.	X		
(3) Take into account the physical attributes of areas when planning and designing activities and facilities.	X		

Table 5-1: Hawai'i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.			X
(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.			X
(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.	X		
(7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.			X
(8) Pursue compatible relationships among activities, facilities and natural resources.	X		
(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational and scientific purposes.			X
<u>Discussion:</u> The Project is not located within the Special Management Area (SMA) or shoreline area or SLR-XA. The Project will be developed on an underutilized property, where infrastructure is readily available. The Project design and scale will be compatible with the surrounding residential uses and generally within allowable development limits per the MCC. The Project will utilize BMPs to ensure that natural resources are not adversely impacted by construction activities. Impacts to any endangered or threatened species located on the Site will be mitigated during the construction and operation phases of the Project. For more information see **Section 3.5 Flora and Fauna.**			
§226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources. (a) Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multi-cultural/historical resources. (b) To achieve the scenic, natural beauty, and historic resources objectives, it shall be the policy of this State to:			
(1) Promote the preservation and restoration of significant natural and historic resources.	X		
(2) Provide incentives to maintain and enhance historic, cultural, and scenic amenities.			X
(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.	X		
(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.			X
(5) Encourage the design of developments and activities that complement the natural beauty of the islands.	X		
<u>Discussion:</u> The Project is not anticipated to have an impact on significant natural, cultural, and historic resources or view sheds and vistas. The Project will be designed to complement the existing built environment and will not detract from the surrounding natural beauty of Maui. The proposed turn-key homes will be similar in scale and size to existing residential developments nearby and landscaping proposed with the Project is intended to enhance the Project's visual relationship with its immediate surrounding environment. For more information see **Section 3.11, Historic, Archaeological, and Cultural Resources** and **Section 3.15, Visual and Scenic Resources.**			
§226-13 Objectives and policies for the physical environment--land, air, and water quality. (a) Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:			
(1) Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources.	X		
(2) Greater public awareness and appreciation of Hawai'i's environmental resources.			X
(b) To achieve the land, air, and water quality objectives, it shall be the policy of this State to:			

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(1) Foster educational activities that promote a better understanding of Hawai‘i's limited environmental resources.			X
(2) Promote the proper management of Hawai‘i's land and water resources.	X		
(3) Promote effective measures to achieve desired quality in Hawai‘i's surface, ground and coastal waters.	X		
(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai‘i's people.	X		
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.	X		
(6) Encourage design and construction practices that enhance the physical qualities of Hawai‘i's communities.	X		
(7) Encourage urban developments in close proximity to existing services and facilities.	X		
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawai‘i's people, their cultures and visitors.			X
Discussion: The Project is not anticipated to have significant impacts on land, air, and water resources. The Project will comply with the relevant Federal, State, and County rules and regulations. The Project will be developed on an underutilized property, where infrastructure is readily available and in close proximity to existing government, business, and commercial services and facilities. The Project is not anticipated to increase or exacerbate the public's safety or property from natural or man-induced hazards. For more information, see **Section 3.3, Natural Hazards, Section 3.4, Water Resources,** and **Section 3.6, Air Quality.**			
§226-14 Objective and policies for facility systems--in general. (a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives. (b) To achieve the general facility systems objective, it shall be the policy of this State to:			
(1) Accommodate the needs of Hawai‘i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.			X
(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.			X
(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.	X		
(4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.			X
Discussion: The DHHL will provide the necessary infrastructure improvements to support the Project, which is within service capacities and will not overcommit resources.			
§226-15 Objectives and policies for facility systems--solid and liquid wastes. (a) Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:			
(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.	X		
(2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.	X		
(b) To achieve solid and liquid waste objectives, it shall be the policy of this State to:			

Table 5-1: Hawai'i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(1) Encourage the adequate development of sewerage facilities that complement planned growth.			X
(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.	X		
(3) Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.			X
Discussion: The DHHL will provide the necessary infrastructure improvements (including wastewater and solid waste services) to support the Project, which is within service capacities and will not overcommit resources. Water conservation measures will be incorporated to the Project design and operations to the extent possible to reduce solid and liquid wastes.			
§226-16 Objective and policies for facility systems--water. (a) Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities. (b) To achieve the facility systems water objective, it shall be the policy of this State to:			
(1) Coordinate development of land use activities with existing and potential water supply.	X		
(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.			X
(3) Reclaim and encourage the productive use of runoff water and wastewater discharges.			X
(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.	X		
(5) Support water supply services to areas experiencing critical water problems.			X
(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.	X		
Discussion: The existing water system is anticipated to be adequate to accommodate the Project. Coordination will be undertaken with the MDWS to determine if certain improvements to the County's water system will be required to service the Project. The Project will implement water conservation measures such as incorporating water efficient fixtures and drought tolerant landscaping to reduce irrigation water demands, as feasible. For further discussion, see **Section 3.4.1 Groundwater and Section 3.8.1, Potable Water**.			
§226-17 Objectives and policies for facility systems--transportation. (a) Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:			
(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.	X		
(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.			X
(b) To achieve the transportation objectives, it shall be the policy of this State to:			
(1) Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;	X		
(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;	X		

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;	X		
(4) Provide for improved accessibility to shipping, docking, and storage facilities;			X
(5) Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;			X
(6) Encourage transportation systems that serve to accommodate present and future development needs of communities;	X		
(7) Encourage a variety of carriers to offer increased opportunities and advantages to inter-island movement of people and goods;			X
(8) Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs;			X
(9) Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;	X		
(10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawai‘i's natural environment;	X		
(11) Encourage safe and convenient use of low-cost, energy- efficient, non-polluting means of transportation;	X		
(12) Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and			X
(13) Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.	X		
<u>Discussion:</u> The Project will promote walkability and bicycle accessibility to and through the Site, and thus supports State and County goals to promote multi-modal transportation and to reduce the use of fossil fuels. For further discussion, see **Section 3.9, Transportation System.**			
§226-18 Objectives and policies for facility systems--energy. (a) Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:			
(1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;			X
(2) Increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawai‘i's dependence on imported fuels for electrical generation and ground transportation;	X		
(3) Greater diversification of energy generation in the face of threats to Hawai‘i's energy supplies and systems;			X
(4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use; and			X
(5) Utility models that make the social and financial interests of Hawai‘i's utility customers a priority.			X
(b) To achieve the energy objectives, it shall be the policy of this State to ensure the short- and long-term provision of adequate, reasonably priced, and dependable energy services to accommodate demand. (c) To further achieve the energy objectives, it shall be the policy of this State to:			
(1) Support research and development as well as promote the use of renewable energy sources;	X		
(2) Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;			X
(3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and			X

Table 5-1: Hawai'i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;			
(4) Promote all cost-effective conservation of power and fuel supplies through measures, including: (A) Development of cost-effective demand-side management programs; (B) Education; (C) Adoption of energy-efficient practices and technologies; and (D) Increasing energy efficiency and decreasing energy use in public infrastructure;	X		
(5) Ensure to the extent that new supply-side resources are needed, the development or expansion of energy systems utilizes the least-cost energy supply option and maximizes efficient technologies;			X
(6) Support research, development, and demonstration of energy efficiency, load management, and other demand-side management programs, practices, and technologies;			X
(7) Promote alternate fuels and energy efficiency by encouraging diversification of transportation modes and infrastructure;	X		
(8) Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications; and	X		
(9) Support actions that reduce, avoid, or sequester Hawai'i's greenhouse gas emissions through agriculture and forestry initiatives.			X
(10) Provide priority handling and processing for all state and county permits required for renewable energy projects;			X
(11) Ensure that liquefied natural gas is used only as a cost-effective transitional, limited-term replacement of petroleum for electricity generation and does not impede the development and use of other cost-effective renewable energy sources; and			X
(12) Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawai'i.			X
Discussion: Energy efficient fixtures, appliances and solar water heating systems will be installed in the residences, as feasible. In addition, individual homeowners will be able to install solar PV systems on their homes if desired. The Project will promote walkability and bicycle accessibility to and through the Site, and thus supports State and County goals to promote multi-modal transportation and to reduce the use of fossil fuels. For further discussion, see **Section 3.9, Transportation System.**			
§226-18.5 Objectives and policies for facility systems--telecommunications. (a) Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people. (b) To achieve the telecommunications objective, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand. (c) To further achieve the telecommunications objective, it shall be the policy of this State to:			
(1) Facilitate research and development of telecommunications systems and resources;			X
(2) Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning;			X
(3) Promote efficient management and use of existing telecommunications systems and services; and			X
(4) Facilitate the development of education and training of telecommunications personnel.			X
Discussion: The objectives and policies specified in HRS §226-18.5 are not directly applicable to the Project.			

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§226-19 Objectives and policies for socio-cultural advancement--housing. (a) Planning for the State's socio- cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:			
(1) Greater opportunities for Hawai‘i's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more rental and for sale affordable housing is made available to extremely low-, very low-, lower-, moderate-, and above moderate-income segments of Hawai‘i's population.	X		
(2) The orderly development of residential areas sensitive to community needs and other land uses.	X		
(3) The development and provision of affordable rental housing by the State to meet the housing needs of Hawai‘i's people.			X
(b) To achieve the housing objectives, it shall be the policy of this State to:			
(1) Effectively accommodate the housing needs of Hawai‘i's people.	X		
(2) Stimulate and promote feasible approaches that increase affordable rental and for sale housing choices for extremely low-, very low-, lower-, moderate-, and above moderate-income households.	X		
(3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.	X		
(4) Promote appropriate improvement, rehabilitation, and maintenance of existing rental and for sale housing units and residential areas.			X
(5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.	X		
(6) Facilitate the use of available vacant, developable, and underutilized urban lands for housing.			X
(7) Foster a variety of lifestyles traditional to Hawai‘i through the design and maintenance of neighborhoods that reflect the culture and values of the community.	X		
(8) Promote research and development of methods to reduce the cost of housing construction in Hawai‘i.			X
<u>Discussion:</u> The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. The Project involves the construction of residences on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. The Project will increase the affordable housing stock on Maui, and will Increase homeownership opportunities for Native Hawaiian beneficiary households of all incomes, including lower income that can partner with Habitat for Humanity to build affordable homes on the vacant lots.			
§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.			X
(2) Maintenance of sanitary and environmentally healthful conditions in Hawai‘i's communities.			X
(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.			X

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(2) Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.			X
(3) Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.			X
(4) Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.			X
(5) Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.			X
(6) Improve the State's capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement.			X
(7) Prioritize programs, services, interventions, and activities that address identified social determinants of health to improve native Hawaiian health and well-being consistent with the United States Congress' declaration of policy as codified in title 42 United States Code section 11702, and to reduce health disparities of disproportionately affected demographics, including native Hawaiians, other Pacific Islanders, and Filipinos. The prioritization of affected demographic groups other than native Hawaiians may be reviewed every ten years and revised based on the best available epidemiological and public health data.			X
<u>Discussion:</u> The objectives and policies specified in HRS §226-20(b) are not directly applicable to the Project.			
§226-21 Objective and policies for socio-cultural advancement--education. (a) Planning for the State's socio- cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations. (b) To achieve the education objective, it shall be the policy of this State to:			
(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.			X
(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.	X		
(3) Provide appropriate educational opportunities for groups with special needs.			X
(4) Promote educational programs which enhance understanding of Hawai‘i's cultural heritage.			X
(5) Provide higher educational opportunities that enable Hawai‘i's people to adapt to changing employment demands.			X
(6) Assist individuals, especially those experiencing critical employment problems or barriers, or undergoing employment transitions, by providing appropriate employment training programs and other related educational opportunities.			X
(7) Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.			X
(8) Emphasize quality educational programs in Hawai‘i's institutions to promote academic excellence.			X
(9) Support research programs and activities that enhance the education programs of the State.			X
<u>Discussion:</u> The Project will be located in proximity of educational opportunities within the Central Maui area.			

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
§226-22 Objective and policies for socio-cultural advancement--social services. (a) Planning for the State's socio-cultural advancement with regard to social services shall be directed towards the achievement of the objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being. (b) To achieve the social service objective, it shall be the policy of the State to:			
(1) Assist individuals, especially those in need of attaining a minimally adequate standard of living and those confronted by social and economic hardship conditions, through social services and activities within the State's fiscal capacities.	X		
(2) Promote coordination and integrative approaches among public and private agencies and programs to jointly address social problems that will enable individuals, families, and groups to deal effectively with social problems and to enhance their participation in society.			X
(3) Facilitate the adjustment of new residents, especially recently arrived immigrants, into Hawai‘i's communities.			X
(4) Promote alternatives to institutional care in the provision of long-term care for elder and disabled populations.			X
(5) Support public and private efforts to prevent domestic abuse and child molestation, and assist victims of abuse and neglect.			X
(6) Promote programs which assist people in need of family planning services to enable them to meet their needs.			X
<u>Discussion:</u> The Project will help DHHL beneficiaries to attain an adequate standard of living through the provision of affordable homesteading opportunities for their families. The Project will be in close proximity to existing government, business and commercial destinations at Wailuku, thus providing increased through social services and activities for beneficiaries.			
§226-23 Objective and policies for socio-cultural advancement--leisure. (a) Planning for the State's socio- cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations. (b) To achieve the leisure objective, it shall be the policy of this State to:			
(1) Foster and preserve Hawai‘i's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.			X
(2) Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.			X
(3) Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.			X
(4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.			X
(5) Ensure opportunities for everyone to use and enjoy Hawai‘i's recreational resources.	X		
(6) Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.	X		
(7) Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawai‘i's people.			X
(8) Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.			X

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(9) Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawai‘i's population to participate in the creative arts.			X
(10) Assure adequate access to significant natural and cultural resources in public ownership.			X
Discussion: The existing public recreational facilities in the Project vicinity will be sufficient for the residents. In addition, the Project involves the creation of an approximately 3.1-acre linear park with an option for a community farm on the southern portion of the Site.			
§226-24 Objective and policies for socio-cultural advancement--individual rights and personal well-being. (a) Planning for the State's socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socio-economic needs and aspirations. (b) To achieve the individual rights and personal well-being objective, it shall be the policy of this State to:			
(1) Provide effective services and activities that protect individuals from criminal acts and unfair practices and that alleviate the consequences of criminal acts in order to foster a safe and secure environment.			X
(2) Uphold and protect the national and state constitutional rights of every individual.	X		
(3) Assure access to, and availability of, legal assistance, consumer protection, and other public services which strive to attain social justice.			X
(4) Ensure equal opportunities for individual participation in society.	X		
Discussion: The Project will provide increased opportunities for Native Hawaiian beneficiaries to access affordable housing.			
§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 Hawai‘i's people. (b) To achieve the culture objective, it shall be the policy of this State to:			
(1) Foster increased knowledge and understanding of Hawai‘i's ethnic and cultural heritages and the history of Hawai‘i.	X		
(2) Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawai‘i's people and which are sensitive and responsive to family and community needs.			X
(3) Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawai‘i.	X		
(4) Encourage the essence of the aloha spirit in people's daily activities to promote harmonious relationships among Hawai‘i's people and visitors.			X
Discussion: The Project will minimize impacts to historic and cultural sites. A CIA was prepared for the Project and fosters increased knowledge of Native Hawaiian cultural practices, as well as history of the Project area. For further discussion, see **Section 3.11.2, Cultural Resources**.			
§226-26 Objectives and policies for socio-cultural advancement--public safety. (a) Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:			
(1) Assurance of public safety and adequate protection of life and property for all people.	X		
(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.			X

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(3) Promotion of a sense of community responsibility for the welfare and safety of Hawai‘i's people.			X
(b) To achieve the public safety objectives, it shall be the policy of this State to:			
(1) Ensure that public safety programs are effective and responsive to community needs.			X
(2) Encourage increased community awareness and participation in public safety programs.			X
(c) To further achieve public safety objectives related to criminal justice, it shall be the policy of this State to:			
(1) Support criminal justice programs aimed at preventing and curtailing criminal activities.			X
(2) Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.			X
(3) Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.			X
(d) To further achieve public safety objectives related to emergency management, it shall be the policy of this State to:			
(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.			X
(2) Enhance the coordination between emergency management programs throughout the State.			X
<u>Discussion:</u> During construction, relevant State, and County requirements will be implemented to ensure the safety of staff, construction crews and community members. The Project is not anticipated to increase or exacerbate the public's safety or property from natural or man-induced hazards. For more information, see **Section 3.3, Natural Hazards.**			
§226-27 Objectives and policies for socio-cultural advancement--government. (a) Planning the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:			
(1) Efficient, effective, and responsive government services at all levels in the State.			X
(2) Fiscal integrity, responsibility, and efficiency in the state government and county governments.			X
(b) To achieve the government objectives, it shall be the policy of this State to:			
(1) Provide for necessary public goods and services not assumed by the private sector.	X		
(2) Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.	X		
(3) Minimize the size of government to that necessary to be effective.			X
(4) Stimulate the responsibility in citizens to productively participate in government for a better Hawai‘i.			X
(5) Assure that government attitudes, actions, and services are sensitive to community needs and concerns.	X		
(6) Provide for a balanced fiscal budget.			X
(7) Improve the fiscal budgeting and management system of the State.			X
(8) Promote the consolidation of state and county governmental functions to increase the effective and efficient delivery of government programs and services and to eliminate duplicative services wherever feasible.			X

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
<u>Discussion:</u> The Project involves the development of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries – a necessary public good. Public meetings will be held during the planning of the Project to incorporate community input, needs and concerns. In addition, the Chapter 343, HRS environmental review process advances transparency in the flow of Project-related information to the public.			
§226-101 Purpose. The purpose of this part is to establish overall priority guidelines to address areas of statewide concern.			
§226-102 Overall direction. The State shall strive to improve the quality of life for Hawai‘i's present and future population through the pursuit of desirable courses of action in seven major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation.			
§226-103 Economic priority guidelines. (a) Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawai‘i's people and achieve a stable and diversified economy:			
(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises. (A) Encourage investments which:			
(i) Reflect long term commitments to the State;			X
(ii) Rely on economic linkages within the local economy;			X
(iii) Diversify the economy;			X
(iv) Reinvest in the local economy;	X		
(v) Are sensitive to community needs and priorities; and	X		
(vi) Demonstrate a commitment to provide management opportunities to Hawai‘i residents.	X		
(B) Encourage investments in innovative activities that have a nexus to the State, such as:			X
(i) Present or former residents acting as entrepreneurs or principals;			X
(ii) Academic support from an institution of higher education in Hawai‘i;			X
(iii) Investment interest from Hawai‘i residents;			X
(iv) Resources unique to Hawai‘i that are required for innovative activity; and			X
(v) Complementary or supportive industries or government programs or projects.			X
(2) Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.			X
(3) Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.			X
(4) Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.			X
(5) Streamline the processes for building and development permit and review and telecommunication infrastructure installation approval and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where scientific evidence indicates that public health, safety, and welfare would not be adversely affected.			X
(6) Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawai‘i's small-scale producers, manufacturers, and distributors.			X

Table 5-1: Hawai'i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(7) Continue to seek legislation to protect Hawai'i from transportation interruptions between Hawai'i and the continental United States.			X
(8) Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:			X
(A) An industry that can take advantage of Hawai'i's unique location and available physical and human resources.			X
(B) A clean industry that would have minimal adverse effects on Hawai'i's environment.			X
(C) An industry that is willing to hire and train Hawai'i's people to meet the industry's labor needs at all levels of employment.			X
(D) An industry that would provide reasonable income and steady employment.			X
(9) Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawai'i business.			X
(10) Enhance the quality of Hawai'i's labor force and develop and maintain career opportunities for Hawai'i's people through the following actions:			X
(A) Expand vocational training in diversified agriculture, aquaculture, information industry, and other areas where growth is desired and feasible.			X
(B) Encourage more effective career counseling and guidance in high schools and post-secondary institutions to inform students of present and future career opportunities.			X
(C) Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired.			X
(D) Promote career opportunities in all industries for Hawai'i's people by encouraging firms doing business in the State to hire residents.			X
(E) Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on- the-job training opportunities.			X
(F) Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.			X
(b) Priority guidelines to promote the economic health and quality of the visitor industry:			
(1) Promote visitor satisfaction by fostering an environment which enhances the aloha spirit and minimizes inconveniences to Hawai'i's residents and visitors.			X
(2) Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provide for adequate shoreline setbacks and beach access.			X
(3) Support appropriate capital improvements to enhance the quality of existing resort destination areas and provide incentives to encourage investment in upgrading, repair, and maintenance of visitor facilities.			X
(4) Encourage visitor industry practices and activities which respect, preserve, and enhance Hawai'i's significant natural, scenic, historic, and cultural resources.			X
(5) Develop and maintain career opportunities in the visitor industry for Hawai'i's people, with emphasis on managerial positions.			X
(6) Support and coordinate tourism promotion abroad to enhance Hawai'i's share of existing and potential visitor markets.			X
(7) Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.			X

Table 5-1: Hawaiʻi State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(8) Support law enforcement activities that provide a safer environment for both visitors and residents alike.			X
(9) Coordinate visitor industry activities and promotions to business visitors through the state network of advanced data communication techniques.			X
(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:			
(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.			X
(2) Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawaiʻi.			X
(3) Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.			X
(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:			
(1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.			X
(2) Assist in providing adequate, reasonably priced water for agricultural activities.			X
(3) Encourage public and private investment to increase water supply and to improve transmission, storage, and irrigation facilities in support of diversified agriculture and aquaculture.			X
(4) Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing costs.			X
(5) Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawaiʻi's agricultural community.			X
(6) Seek favorable freight rates for Hawaiʻi's agricultural products from interisland and overseas transportation operators.			X
(7) Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.			X
(8) Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.			X
(9) Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.			X
(10) Support the continuation of land currently in use for diversified agriculture.			X
(11) Encourage residents and visitors to support Hawaiʻi's farmers by purchasing locally grown food and food products.			X
(e) Priority guidelines for water use and development:			
(1) Maintain and improve water conservation programs to reduce the overall water consumption rate.	X		
(2) Encourage the improvement of irrigation technology and promote the use of non-potable water for agricultural and landscaping purposes.	X		
(3) Increase the support for research and development of economically feasible alternative water sources.			X
(4) Explore alternative funding sources and approaches to support future water development programs and water system improvements.			X
(f) Priority guidelines for energy use and development:			
(1) Encourage the development, demonstration, and commercialization of renewable energy sources.	X		

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(2) Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.			X
(3) Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.			X
(4) Encourage the development and use of energy conserving and cost-efficient transportation systems.	X		
(g) Priority guidelines to promote the development of the information industry:			
(1) Establish an information network that will serve as the catalyst for establishing a viable information industry in Hawai‘i.			X
(2) Encourage the development of services such as financial data processing, a products and services exchange, foreign language translations, telemarketing, teleconferencing, a twenty-four-hour international stock exchange, international banking, and a Pacific Rim management center.			X
(3) Encourage the development of small businesses in the information field such as software development, the development of new information systems and peripherals, data conversion and data entry services, and home or cottage services such as computer programming, secretarial, and accounting services.			X
(4) Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.			X
(5) Encourage research activities, including legal research in the information and telecommunications fields.			X
(6) Support promotional activities to market Hawai‘i's information industry services.			X
(7) Encourage the location or co-location of telecommunication or wireless information relay facilities in the community, including public areas, where scientific evidence indicates that the public health, safety, and welfare would not be adversely affected.			X
<u>Discussion:</u> The Project will be in close proximity to existing government, business and commercial services in Wailuku, thus providing increased equal employment opportunities for residents. Additionally, the Project will provide short-term employment opportunities during construction. The Project will incorporate energy and water conservation and will promote multi-modal transportation.			
§226-104 Population growth and land resources priority guidelines. (a) Priority guidelines to effect desired statewide growth and distribution:			
(1) Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawai‘i's people.	X		
(2) Manage a growth rate for Hawai‘i's economy that will parallel future employment needs for Hawai‘i's people.			X
(3) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.	X		
(4) Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.	X		
(5) Explore the possibility of making available urban land, low-interest loans, and housing subsidies to encourage the provision of housing to support selective economic and population growth on the neighbor islands.			X
(6) Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.			X
(7) Support the development of high technology parks on the neighbor islands.			X

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(b) Priority guidelines for regional growth distribution and land resource utilization:			
(1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.	X		
(2) Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.			X
(3) Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.	X		
(4) Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.			X
(5) In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a noncontiguous new urban core.	X		
(6) Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.			X
(7) Pursue rehabilitation of appropriate urban areas.			X
(8) Support the redevelopment of Kakaʻako into a viable residential, industrial, and commercial community.			X
(9) Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.	X		
(10) Identify critical environmental areas in Hawaiʻi to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.			X
(11) Identify all areas where priority should be given to preserving rural character and lifestyle.			X
(12) Utilize Hawaiʻi's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.	X		
(13) Protect and enhance Hawaiʻi's shoreline, open spaces, and scenic resources.	X		
<u>Discussion:</u> The Project involves the construction of residences on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. The Project will utilize State and private funds. The Project will also minimize impacts to historic and cultural sites, as well as visual and scenic resources. For further discussion see **3.11, Archaeological and Cultural Resources** and **Section 3.14, Visual and Scenic Resources.**			
§226-105 Crime and criminal justice. Priority guidelines in the area of crime and criminal justice:			
(1) Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment.			X
(2) Target state and local resources on efforts to reduce the incidence of violent crime and on programs relating to the apprehension and prosecution of repeat offenders.			X
(3) Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities.			X
(4) Reduce overcrowding or substandard conditions in correctional facilities through a comprehensive approach among all criminal justice agencies which may include sentencing law revisions and use of alternative sanctions other than incarceration for persons who pose no danger to their community.			X

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(5) Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions.			X
(6) Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization.			X
Discussion: The priority guidelines specified in HRS §226-105 are not directly applicable to the Project.			
§226-106 Affordable housing. Priority guidelines for the provision of affordable housing:			
(1) Seek to use marginal or nonessential agricultural land, urban land, and public land to meet housing needs of extremely low-, very low-, lower-, moderate-, and above moderate-income households.	X		
(2) Encourage the use of alternative construction and development methods as a means of reducing production costs.			X
(3) Improve information and analysis relative to land availability and suitability for housing.			X
(4) Create incentives for development which would increase home ownership and rental opportunities for Hawai'i's extremely low-, very low-, lower-, and moderate-income households and residents with special needs.	X		
(5) Encourage continued support for government or private housing programs that provide low interest mortgages to Hawai'i's people for the purchase of initial owner-occupied housing.	X		
(6) Encourage public and private sector cooperation in the development of rental housing alternatives.			X
(7) Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.			X
(8) Give higher priority to the provision of quality housing that is affordable for Hawai'i's residents and less priority to development of housing intended primarily for individuals outside of Hawai'i.	X		
Discussion: The Project involves the construction of residences on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure to provide homestead opportunities for DHHL beneficiaries in an area that is close to the government, business, and commercial centers of Wailuku and Kahului. The Project will utilize State and private funds.			
§226-107 Quality education. Priority guidelines to promote quality education:			
(1) Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement;			X
(2) Continue emphasis on general education "core" requirements to provide common background to students and essential support to other university programs;			X
(3) Initiate efforts to improve the quality of education by improving the capabilities of the education workforce;			X
(4) Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision-making responsibilities;			X
(5) Increase and improve the use of information technology in education by the availability of telecommunications equipment for:			
(A) The electronic exchange of information;			X
(B) Statewide electronic mail; and			X
(C) Access to the Internet.			X
(D) Encourage programs that increase the public's awareness and understanding of the impact of information technologies on our lives;			X

Table 5-1: Hawai‘i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(6) Pursue the establishment of Hawai‘i's public and private universities and colleges as research and training centers of the Pacific;			X
(7) Develop resources and programs for early childhood education;			X
(8) Explore alternatives for funding and delivery of educational services to improve the overall quality of education; and			X
(9) Strengthen and expand educational programs and services for students with special needs.			X
<u>Discussion:</u> The priority guidelines specified in HRS §226-107 are not directly applicable to the Project.			
§226-108 Sustainability. Priority guidelines and principles to promote sustainability shall include:			
(1) Encouraging balanced economic, social, community, and environmental priorities;	X		
(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State;	X		
(3) Promoting a diversified and dynamic economy;			X
(4) Encouraging respect for the host culture;	X		
(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations;	X		
(6) Considering the principles of the ahupua‘a system; and			X
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawai‘i.			X
<u>Discussion:</u> The Project involves the development of a new residential subdivision for DHHL beneficiaries on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure – which honors the host culture. The Project will minimize impacts to the natural resources, by balancing economic, social, community, and environmental priorities.			
§226-109 Climate change adaptation priority guidelines. Priority guidelines to prepare the State to address the impacts of climate change, including impacts to the areas of agriculture; conservation lands; coastal and nearshore marine areas; natural and cultural resources; education; energy; higher education; health; historic preservation; water resources; the built environment, such as housing, recreation, transportation; and the economy shall:			
(1) Ensure that Hawai‘i's people are educated, informed, and aware of the impacts climate change may have on their communities;			X
(2) Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies;			X
(3) Invest in continued monitoring and research of Hawai‘i’s climate and the impacts of climate change on the State;			X
(4) Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change;			X
(5) Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change;			X
(6) Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments;			X
(7) Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options;			X

Table 5-1: Hawai'i State Plan Part 1. Overall Theme, Goals, Objectives, and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(8) Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities and other nongovernmental entities, including nonprofit entities;			X
(9) Use management and implementation approaches that encourage the continual collection, evaluation, and integration of new information and strategies into new and existing practices, policies, and plans; and			X
(10) Encourage planning and management of the natural and built environments that effectively integrate climate change policy.	X		
Discussion: Energy efficient fixtures, appliances and solar water heating systems will be installed in the residences, as feasible, which will reduce GHG emissions. In addition, the Project is in an area that is outside of the natural landscape features such as flood zones, tsunami evacuation zones, SMA, as well as the projected SLR hazard area in order to avoid impacts related to climate change. For further discussion, see **Section 3.2, Climate, Climate Change, and Sea Level Rise**.			

5.2 State Housing Functional Plan

The 2017 State Housing Functional Plan (Housing Functional Plan) aims to implement the goals, objectives and policies of the Hawai'i State Plan and County General Plans, in accordance with HRS Chapter 226. The Housing Functional Plan provides specific and implementable strategies, policies and priority actions to address the current housing shortage in Hawai'i, based on joint public-private partnerships to finance, build, and maintain an adequate supply of affordable housing.

According to the Housing Functional Plan, approximately 44% of Maui's households are cost-burdened, meaning they pay more than 30% of their income for housing costs; this is comparatively higher than the approximately 36% of Hawai'i households that are cost-burdened[1]. Additionally, 20.2% of households were crowded or doubled-up (housing units are occupied by two or more families or groups of persons who are not related by birth, marriage, or adoption) in 2016. Approximately 12,648 units will be needed by Maui's workforce and lower income households (i.e., those earning 140% and below the MFI)[2].

The following is a discussion of the Project's consistency with the pertinent Housing Functional Plan objectives, strategies, policies, and implementing actions:

OBJECTIVE C: ADDRESS BARRIERS TO RESIDENTIAL DEVELOPMENT.

> *STRATEGY: Coordinate and facilitate the production of housing by addressing development impediments including lack of land, infrastructure, and regulations that add to the cost of housing.*
>
> *POLICY C (2): Coordinate and share regional infrastructure investments between State, counties, and private developers.*

Discussion: The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. The residences will be constructed on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. The Project will utilize State and private funds.

1 Data from the 2016 Hawai'i Housing Planning Study.

5.3 Hawai‘i 2050 Sustainability Plan

The *Hawai‘i 2050 Sustainability Plan* (2050 Plan) – Decennial Update: Charting a Course for the Decade of Action (2020-2030) was revised and published in June 2021. The 2050 Plan serves as the State's climate and sustainability strategic action plan, pursuant to HRS 226-65. The 2050 Plan will guide the State through 2020-2030, which the United Nations declared the "Decade of Action," to accelerate progress toward 17 Sustainable Development Goals (SDGs) worldwide. The 2050 Plan identifies Hawai‘i's progress toward achieving the 17 SDGs (through State and County laws, policies, programs, plans and initiatives), gaps where SDGs are not being addressed, and recommends actions for how to enhance sustainability and climate change adaptation in Hawai‘i. The 2050 Plan identifies 8 focus areas, 38 strategies, and more than 250 recommended actions to undertake in the next decade.

The following is a discussion of the Project's consistency with the pertinent SDGs identified in the 2050 Plan:

Sustainable Development Goal 1: No Poverty – End Poverty in All its Forms Everywhere.

- *Ensuring social protection systems are in place to cover poor and vulnerable populations.*
- *Ensuring equal rights to economic resources and access to basic services, property, natural resources, and technology.*

<u>Discussion:</u> The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. Therefore, Native Hawaiian beneficiaries will have increased access to property through long-term permanent housing.

Sustainable Development Goal 5: Gender Equality – Achieve Gender Equality and Empower All Women and Girls.

- *Ensuring equal access for women to property ownership, financial services, economic resources, and technological resources to promote empowerment of women.*

<u>Discussion</u>: The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. Therefore, Native Hawaiian beneficiaries of all genders will have increased access to property ownership.

Sustainable Development Goal 9: Industry, Innovation, and Infrastructure – Build Resilient Infrastructure, Promote Inclusive and Sustainable Industrialization, and Foster Innovation.

- *Improving the sustainability and equity of all existing and future infrastructure.*

<u>Discussion</u>: The Project will promote walkability and bicycle accessibility to and through the Site. Approximately 450 feet of paved shoulder along the southern side of Kuikahi Drive will be widened to provide a continuous 5-foot-wide paved walkway and all internal streets within the Site will have a 5-foot-wide paved sidewalk along one side of the street for pedestrian access. Bicyclists will be able to traverse along the low-volume internal streets (unmarked bicycle routes) throughout the Site (WSUE, 2022). The Project is also served by the #1 Wailuku Loop bus route, the #2 Wailuku Reverse bus route, and the #20 Lahaina Islander bus route which will provide a sustainable and equitable form of public transportation and encourage walking and biking.

Sustainable Development Goal 11: Sustainable Cities and Communities – Make Cities and Human Settlements Inclusive, Safe, Resilient, and Sustainable.

- *Affordable housing.*
- *Access to public spaces.*
- *Sustainable transportation systems, including public transport.*
- *Safe cultural and natural heritage.*
- *Protected against losses related to natural disasters.*
- *Reduced adverse per capital environmental impact of cities (air quality, waste management).*

Discussion: The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. The Project also includes an approximately 3.1-acre linear park with the option for a community farm.

The Project will promote walkability and bicycle accessibility to and through the Site. The Project is also served by the #1 Wailuku Loop bus route, the #2 Wailuku Reverse bus route, and the #20 Lahaina Islander bus route.

During construction, the Project will comply with State and County regulations during the construction and will implement BMPs to minimize temporary, short-term impacts on existing air quality in the immediate Project vicinity. For further discussion, see **Section 3.6, Air Quality.**

During construction, green waste and non-hazardous construction waste will be generated. Once constructed, the residents will generate solid waste. The Project will comply with HRS Chapters 342H and 342I and HAR §11-260.1 to 11-279.1, 11-58.1, and 11-280.1 as applicable. For further discussion, see **Section 3.8.4, Solid and Hazardous Waste.**

5.4 Hawai‘i State Land Use District Boundaries

The Hawai‘i SLU law, HRS Chapter 205, was adopted in 1961. The SLU law is meant to preserve and protect the state's lands and encourage the uses to which the lands are best suited. Under HRS Chapter 205, State lands are classified in four SLU districts: (1) Conservation, (2) Agricultural, (3) Urban, and (4) Rural. The LUC is responsible for SLU district standards and for determining the boundaries of each SLU district.

The Site is situated within the Agricultural District. Jurisdiction of the Agricultural District lies primarily with each County. See *Figure 1-3, State Land Use District*.

Discussion: The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. The HHCA gives the DHHL the authority to use its lands at its discretion; therefore, the DHHL has the authority to proceed with the Project without the lands being fully entitled for residential use. Specifically, HHCA Section 204, states 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."

5.5 Hawai'i Coastal Zone Management Program

The Coastal Zone Management Act of 1972 (16 USC §1451), as amended through Public Law 104-150, created the coastal management program and the National Estuarine Research Reserve system. The coastal states are authorized to develop and implement a State Coastal Zone Management (CZM) Program. The objectives of the Hawai‘i CZM Program, HRS §205A-2, are to protect valuable and vulnerable coastal resources such as coastal ecosystems, special scenic and cultural values and recreational opportunities. The objectives of the program are also to reduce coastal hazards and to improve the review process for activities proposed within the coastal zone.

The Hawai‘i CZM Law delegates each County with designating and administering the SMA within the State’s coastal areas that extends inland from the shoreline. Development within this SMA is subject to County approval to ensure the proposal is consistent with the policies and objectives of the Hawai‘i CZM Program. The Project is located outside of the SMA. See *Figure 1-7, Special Management Area.*

The following is a discussion of the Project’s consistency with the Hawai‘i CZM Program objectives and policies:

<u>Recreational Resources</u>

Objective: Provide coastal recreational opportunities accessible to the public.

(A) Improve coordination and funding of coastal recreation planning and management; and

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

- *Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;*
- *Requiring restoration of coastal resources that have significant recreational and ecosystem value, including, but not limited to coral reefs, surfing sites, fishponds, sand beaches, and coastal dunes, when these resources will be unavoidably damaged by development; or requiring monetary compensation to the State for recreation when restoration is not feasible or desirable;*
- *Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*
- *Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
- *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;*
- *Adopting water quality standards and regulating point and nonpoint sources of pollution to protect and where feasible, restore the recreational value of coastal waters;*
- *Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, artificial reefs for surfing and fishing; and*
- *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 that dedication against the requirements of section 46-6.

Discussion: The Project will not restrict or interfere with public access to coastal or recreational resources and is located outside of the SMA and inland over 2.3-miles from the shoreline. During construction, BMPs will be implemented to protect and regulate point and nonpoint sources of pollution to protect the recreational value of coastal waters. Stormwater detention basin will be located at the northeast corner of the Site, which will mitigate the anticipated increase in peak flows from the Site and will reduce water pollution through sediment removal. A NPDES General Permit for stormwater runoff discharges will be obtained from the DOH, CWB prior to construction. NPDES General Permits for dewatering and hydrotesting water discharges may also be obtained from the DOH, CWB, if required. For further discussion, see **Section 3.8.3, Drainage.**

Historic Resources

Objective: Protect, preserve and, where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawai'i 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: A Final AIS was prepared to identify significant archeological resources that may exist at the Site. For further discussion, see **Section 3.11, Historic, Archaeological, and Cultural Resources**.

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 those 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 residences will be visible from various viewpoints in the Site vicinity. However, the Project is not anticipated to have significant impacts to scenic view planes or resources and will not impact public views to and along the shoreline. The Project will be designed to be compatible with existing residential subdivisions with homes of similar scale and size and will generally be within allowable development limits per the MCC. For further discussion, see **Section 3.13, Visual and Scenic Resources.**

<u>Coastal Ecosystems</u>

Objective: Protect valuable coastal ecosystems, including reefs, beaches, and coastal dunes, 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 of significant biological or economic importance, including reefs, beaches, and dunes;

(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 which 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.

<u>Discussion</u>: The Project will not impact coastal ecosystems, including reefs, beaches, and coastal dunes and is located outside of the SMA and inland over 2.3-miles from the shoreline. During construction, BMPs will be implemented to protect and regulate point and nonpoint sources of pollution to protect the recreational value of coastal waters. A stormwater detention basin will be located at the northeast corner of the Site, which will mitigate the anticipated increase in peak flows from the Site and will reduce water pollution through sediment removal. A NPDES General Permit for stormwater runoff discharges will be obtained from the DOH, CWB prior to construction. NPDES General Permits for dewatering and hydrotesting water discharges may also be obtained from the DOH, CWB, if required. For further discussion, see **Section 3.8.3, Drainage.**

<u>Economic Uses</u>

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 and coastal related development are located, designed, and constructed to minimize exposure to coastal hazards and adverse social, visual, and environmental impacts in the coastal zone management area; and

(C) Direct the location and expansion of coastal development to areas designated and used for that development and permit reasonable long-term growth at those areas, and permit coastal development outside of designated areas when:

(i) Use of designated locations is not feasible;

(ii) Adverse environmental effects and risks from coastal hazards are minimized; and

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

<u>Discussion</u>: The Site is not near the shoreline and will not interfere with coastal-dependent or coastal-related development such as harbors and ports, visitor-industry facilities, and energy generating facilities.

<u>Coastal Hazards</u>

Objective: Reduce hazard to life and property from coastal hazards.

(A) Develop and communicate adequate information about the risks of coastal hazards;

(B) Control development, including planning and zoning control, in areas subject to coastal hazards;

(C) Ensure that developments comply with requirements of the National Flood Insurance Program; and

(D) Prevent coastal flooding from inland projects.

<u>Discussion</u>: The Project will not pose a hazard to life, property from coastal hazards. The Site is not within the Tsunami Evacuation Zone. The Site is within the FEMA Flood Zone X (minimal flood risk, outside of 0.2% annual chance floodplain). The Project is also located outside of the 3.2 feet SLR-XA. For further discussion, see **Section 3.3, Natural Hazards.**

<u>Managing Development</u>

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.

<u>Discussion</u>: The Project will not have an impact on coastal resources and hazards. This Final EA identifies potential impacts and proposes mitigation measures to address anticipated impacts from the construction and operation of the Project. During early consultation, agencies, organizations, and residents were consulted and will continue to be informed throughout the planning process.

<u>Public Participation</u>

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.

<u>Discussion</u>: The Project will not have an impact on CZM processes. This Final EA identifies potential impacts and proposes mitigation measures to address anticipated impacts from the construction and operation of the Project. During early consultation, agencies, organizations, and residents were consulted and will continue to be informed throughout the planning process.

Beach and Coastal Dune Protection

Objective: (1) Protect beaches and coastal dunes for: public use and recreation; the benefit of coastal ecosystems; and use as natural buffers against coastal hazards; and (2) Coordinate and fund beach management and protection.

(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 shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities;*

(C) *Minimize the construction of public shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities;*

(D) *Minimize grading of and damage to coastal dunes;*

(E) *Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor; and*

(F) *Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor.*

Discussion: The Project is located over 2.3-miles inland and will not impact the public use and recreation of beaches and coastal dunes, coastal ecosystems, of natural buffers.

Marine and Coastal 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 and coastal processes, impacts of climate change and sea level rise, marine life, and other ocean resources to acquire and inventory information necessary to understand how coastal development activities relate to and impact ocean and coastal resources; and

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

Discussion: The Project will not impact the protection, use or development of marine and coastal resources.

5.6 Department of Hawaiian Home Lands (DHHL) Plans

5.6.1 DHHL General Plan Update

The *DHHL General Plan Update* (adopted on November 21, 2022), is an update of the *DHHL General Plan,* which was initially adopted in 2002. The *DHHL General Plan Update* sets the vision and establishes goals and policies to guide the decision-making of the HHC and the DHHL plans, programs, and policies for the next 20 years (until 2040). The *DHHL General Plan* provides guiding principles, goals, policies, and metrics that are organized into the following themes: Land Use and Water Resources, Infrastructure, Housing, Food Production, Healthy Communities, Natural and Cultural Resource Management, Revenue Generation and Economic Development.

The following is a discussion regarding the Project's consistency with applicable objectives in the *DHHL General Plan Update*.

Land Use and Water Resources

Goal LU-1: Utilize Hawaiian home lands for uses most appropriate to meet the needs and desires of the beneficiary population

Policy

- *LU-1A: Increase beneficiary participation in the planning, development, and use of Hawaiian home lands and improve communications between DHHL and the beneficiary community.*
- *LU-1D: Incorporate Native Hawaiian mana'o, traditional place names, historical uses, and cultural knowledge in land use planning to identify appropriate uses in appropriate places.*

Goal LU-2: Encourage a balanced pattern of contiguous growth into urban and rural centers.

Policy

- *LU-2A: Prioritize the development of homestead communities in areas with suitable development conditions that are close to jobs, transportation, infrastructure, and services.*

Goal LU-3: Protect life and property from the effects of natural hazards and climate change on Hawaiian home lands.

Policy

- *LU-3A: Assess vulnerability of populations, resources, and infrastructure across Hawaiian home lands to climate change and natural hazards and conduct climate resilience and adaptation planning in high vulnerability areas.*
- *LU-3D: Designate evacuation routes, shelters and refuge areas for homestead communities and ensure they are marked and advertised in Regional Plans or Special Area Plans.*

Discussion: The Site will be in close proximity to existing government, business and commercial services in Wailuku, thus providing increased economic opportunities and community services for DHHL beneficiaries. The Project is located within the regional growth boundary on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. The Project addresses beneficiaries' residential preferences. The DHHL has a good working relationship with the County, to ensure reliable and adequate delivery of services to beneficiaries.

The Site is not located in an area that is particularly susceptible to natural hazards and disaster. The Site is not within the Tsunami Evacuation Zone. The Site is within the FEMA Flood Zone X (minimal flood risk, outside of 0.2% annual chance floodplain). The Project is also located outside of the 3.2 feet SLR-XA. A portion of the Old Waikapū Road will serve as a secondary emergency Fire Evacuation Route for the residents. For further discussion, see **Section 3.3, Natural Hazards.** Beneficiaries will be consulted throughout the EA process for this Project. DHHL recognizes the importance of placenames and will work with the beneficiaries, to select an appropriate placename for the subdivision (and internal street names) that honors its location in Wailuku/Waikapū.

Infrastructure

Goal IN-1: Provide and maintain infrastructure for homestead communities within resource limitations.

Policy

- *IN-1A Design infrastructure to County standards and transfer systems to the Counties whenever possible for development within Residential, Commercial, and Industrial areas.*

Goal IN-2: Promote innovative, cost-effective, and sustainable ways to meet infrastructure needs.

Policy

- *N-2C Promote energy self-sufficiency, climate change mitigation, and sustainability by implementing DHHL's Energy Policy.*

Discussion: The DHHL intends to design and construct the Project to generally conform with the Maui County Code (MCC) development standards; however, the DHHL is authorized to exempt the Project from the MCC, and intends to, as presented in this Final EA. The Project will comply with applicable sections of DHHL's Hoʻomaluō Energy Policy, specifically objective 3 and objective 4. Objective 3 of the DHHL Energy Policy is Kūkulu pono: Design and build homes and communities that are energy efficient, self-sufficient and sustainable. This objective promotes the design and construction of new affordable energy-efficient homes using the "Hawaiʻi BuiltGreen" and "ENERGY STAR" programs. Objective 4 of the DHHL Energy Policy is Kōkua nō i nā kahu: Provide energy efficiency, self-sufficiency, and sustainability opportunities to existing homesteaders and their communities. This objective supports the identification of effective energy efficient, and conservation retrofit applications as well as developing a plan to assist homesteaders with the retrofitting of their homes. As a result, energy efficient fixtures, appliances and solar water heating systems will be installed in the residences, as feasible.

Housing

GOAL HS-1: Increase the number of housing opportunities awarded each year.

Policy

- *HS-1A Maintain a housing development pipeline in proportion to the number of applicants on the residential waiting list for each island.*

GOAL HS-2: Provide a mix of housing opportunities that reflect the needs and desires of native Hawaiian beneficiaries.

Policy

- *HS-2A Provide a variety of residential types that match beneficiary needs in terms of housing products (owner-builder, turnkey, self-help, etc.), types of housing units (single family, multi-family, kupuna housing, rental, etc.) and financing.*

GOAL HS-4: Develop integrated residential communities that are reflective of the diverse socio-economic profiles of the native Hawaiian community.

Policy

- *HS-4A: Ensure the availability of a range of housing types and affordability to accommodate persons and families of all income levels and in locations that are convenient to employment and public and private facilities.*

Discussion: The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. There will be five residence model types, one- to two-story, ranging from 2 to 5 bedrooms and 1 to 3 baths, with living/floor areas ranging from approximately 764 SF to 1,675 SF. The Project will help the DHHL work towards the residential goals in the DHHL Maui Islan Plan to deliver an average of 500 new residential housing opportunities per year to beneficiaries.

Food Production

Goal FP-4: Conserve the most productive agriculture lands for agricultural use.

Policy

- *FP-4A: Consult soil types and rating systems such as ALISH, LSB, and the Hawaiʻi soil atlas in the siting and design of homestead communities and prioritize these lands for land uses that support food production during DHHL Island Plan updates.*

Goal FP-5: Promote a diversity of food production on Hawaiian home lands.

Policy

- *FP-5B: Designate areas on Hawaiian home lands for communal growing and processing of food through the Community Agriculture land use designation.*

Discussion: The Site is designated as ALISH Prime land and LSB Class A - C lands but is not designated as an IAL. The Project involves the creation of an approximately 3.1-acre linear park with an option for a community farm on the southern portion of the Site. Beneficiaries will help to determine the quantity of square footage from the 3.1-acre linear park, if any, to be set aside for community farming purposes and will have the choice to participate in the communal farm program. The community farm may involve food and non-food crops for subsistence agricultural production and/or to support community-based economic development opportunities.

<u>Natural and Cultural Resource Management</u>

<u>Goal RM-1: Be responsible, long-term stewards of the Trust's lands and the natural, historic and community resources located on these lands.</u>

<u>Policy</u>

- *RM-1B Identify, preserve, and protect significant natural, historic and cultural resources on Hawaiian home lands, using the Special District or Conservation land use designations to identify areas with resources requiring protection or management.*

<u>Discussion:</u> A CIA and Final AIS were completed for the Project area to ensure protection of cultural, and historic resources. The DHHL will comply with State rules and regulations regarding the preservation of archaeological and historic sites. Native Hawaiians will be able to use natural resources on the Site for traditional and cultural purposes. For further discussion, see **Section 3.11, Historic, Archaeological, and Cultural Resources**.

5.6.2 DHHL Maui Island Plan

The DHHL *Maui Island Plan* (MIP) was adopted in 2004 and serves as a comprehensive resource for planning and managing the DHHL lands in Maui and establishes land use designations to encourage orderly social, physical, and economic development. The MIP gauges beneficiary needs and demands, examines infrastructure needs and opportunities from an island-wide perspective, proposes plans for both homesteading and non-homesteading uses, estimates costs for both on- and off-site infrastructure, and identifies priority areas for homestead development. The MIP enables the DHHL to coordinate its developments with State, County, and private sector development projects on Maui.

The Site is part of DHHL's land acquisition for Act 279; therefore, is not yet designated by the MIP for a specific use. Acquiring this Site is consistent with a residential goal of the MIP to secure additional lands in Central Maui to meet the beneficiary demand for residential homesteads.

<u>Part A: Residential Goals for the Maui Island Plan</u>

- *Objective (1): Deliver an average of 500 new residential housing opportunities per year in proportion to the number of applicants on the residential waiting list for each island.*

<u>Discussion:</u> The Project will support DHHL's goal of delivering an average of 500 new residential housing opportunities per year by developing a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries on Maui.

<u>Part B: Socio-Economic</u>

- *Objective (1): Using Hawaiian Home Lands for uses most appropriate to meet the needs and desires of the beneficiary population.*
- *Objective (2): Directing urban growth to priority development areas based on infrastructure availability, feasible site condition, beneficiary preferences, and job opportunities.*

<u>Discussion:</u> The results of a 2003 survey in the MIP conclude that most beneficiaries prefer an award of improved land with turn-key single-family residences. In addition, almost 900 beneficiaries indicated a preference of the Wailuku area in terms of award location. The Project fulfills beneficiaries' preferences, in that it involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries.

Additionally, the Project is located within the regional growth boundary on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. The Site will be in close proximity to existing government, business and commercial services in Wailuku, thus providing increased economic opportunities and community services for beneficiaries.

Part D: Environmental Characteristics

- *Objective (1): Preserving Cultural resources and archaeological sites and attempting to reforest DHHL lands using Native Hawaiian plants.*

Discussion: A CIA and Final AIS were completed for the Project area to ensure protection of cultural, and historic resources. The DHHL will comply with State rules and regulations regarding the preservation of archaeological and historic sites. For further discussion, see **Section 3.11, Historic, Archaeological, and Cultural Resources.**

5.7 Maui County General Plan 2030

5.7.1 Countywide Policy Plan

The *Countywide Policy Plan* was adopted in March 2010 and is a comprehensive policy plan for the County. The *Countywide Policy Plan* is the first component of the *General Plan 2030* update and acts as an over-arching values statement providing a policy framework for the County *Maui Island Plan* and Community Plans. The Countywide Policy Plan provides broad goals, objectives, policies, and implementing actions that portray the desired direction of the County's future.

The goals, objectives and policies are organized into the following 11 strategies: protect the natural environment; preserve the local cultures and traditions; improve education; strengthen social and healthcare services; expand housing opportunities for residents; strengthen the local economy; improve parks and public facilities; diversify transportation options; improve physical infrastructure; promote sustainable land use and growth management; and strive for good governance. The following is a discussion regarding the Project's consistency with applicable goals, objectives, and policies of the *Countywide Policy Plan*.

PART A: Protect the Natural Environment

Goal: Maui County's natural

Objective (1): Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations.

Objective (2): Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island.

Objective (3): Improve the stewardship of the natural environment.

Discussion: The Project is not anticipated to have an impact on environmentally sensitive, locally valued natural resources, native ecology, or native biodiversity. For further discussion, see **Section 3.5, Flora and Fauna.**

PART B: Preserve Local Cultures and Traditions

Objective (1): Perpetuate the Hawaiian culture as a vital force in the lives of residents.

Objective (2): Emphasize respect for our island lifestyle and our unique local cultures, family, and natural environment.

Objective (3): Preserve for present and future generations the opportunity to know and experience the arts, culture, and history of Maui County.

Objective (4): Preserve and restore significant historic architecture, structures, cultural sites, cultural districts, and cultural landscapes.

Discussion: The purpose of the Project is to provide homesteading opportunities to DHHL beneficiaries and decrease the number of beneficiaries on the Maui Islandwide Residential Waiting List, thereby fulfilling the purpose of the HHCA and the 2022 *DHHL General Plan Update*. Homesteading opportunities for Native Hawaiian families are critical to the perpetuation and preservation of native Hawaiian culture and traditions. A CIA and Final AIS were completed for the Project to ensure protection of cultural and historic resources. The DHHL will comply with State rules and regulations regarding the preservation of archaeological and historic sites. For further discussion, see **Section 3.11, Historic, Archaeological, and Cultural Resources**.

PART E: Expand Housing Opportunities for Residents

Objective (1): Reduce the affordable housing deficit for residents.

Objective (3): Increase and maintain the affordable housing inventory.

Discussion: The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. By providing long-term permanent housing for Native Hawaiian families, the Project will reduce the affordable housing deficit on Maui and increase the affordable housing inventory.

PART H: Diversify Transportation Options

Objective (1): Maui County will have an efficient, economical, and environmentally sensitive means of moving people and goods.

Objective (2): Reduce the reliance on the automobile and fossil fuels by encouraging walking, bicycling, and other energy-efficient and safe alternative modes of transportation.

Objective (5): Improve and expand the planning and management of transportation systems.

Discussion: The Project will promote walkability and bicycle accessibility to and through the Site. Approximately 450 feet of paved shoulder along the southern side of Kuikahi Drive will be widened to provide a continuous 5-foot-wide paved walkway and all internal streets within the Site will have a 5-foot-wide paved sidewalk along one side of the street for pedestrian access. Bicyclists will be able to traverse along the low-volume internal streets (unmarked bicycle routes) throughout the Site (WSUE, 2022). The Project is also served by the #1 Wailuku Loop bus route, the #2 Wailuku Reverse bus route, and the #20 Lahaina Islander bus route which will provide a sustainable and equitable form of public transportation and encourage walking and biking.

PART I: Improve Physical Infrastructure

Objective (2): Improve waste-disposal practices and systems to be efficient, safe, and as environmentally sound as possible.

Objective (3): Significantly increase the use of renewable and green technologies to promote energy efficiency and energy self-sufficiency.

Objective (4): Direct growth in a way that makes efficient use of existing infrastructure and to areas where there is available infrastructure capacity.

Objective (5): Improve the planning and management of infrastructure systems.

<u>Discussion</u>: The residences will be constructed on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. Energy efficient fixtures, appliances and solar water heating systems will be installed in the residences, as feasible.

<u>PART J: Promote Sustainable Land Use and Growth Management</u>

Objective (1): Improve land use management and implement a directed-growth strategy.

Objective (3): Design all developments to be in harmony with the environment and to protect each community's sense of place.

Objective (4): Improve and increase efficiency in land use planning and management.

<u>Discussion</u>: The residences will be constructed on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. Lot and residence sizes and scales will be similar to residences in nearby subdivisions. The residences will have a similar aesthetic to existing residences in nearby subdivisions, with board and batten paneling and an asphalt shingle roof.

<u>PART K: Strive for Good Governance</u>

Objective (1): Strengthen governmental planning, coordination, consensus building, and decision making.

Objective (2): Promote civic engagement.

<u>Discussion</u>: The DHHL has and will continue to coordinate with State and County agencies and engage stakeholders throughout the EA process. See **Chapter 7** for a list of agencies, organizations, elected officials and individuals that will be consulted and will be notified of the publication of this Final EA.

5.7.2 County Maui Island Plan

The County's *Maui Island Plan* assesses the existing conditions, trends, and issues specific to the island of Maui; provides policy direction for the use and development of land, extension and improvement of transportation services and infrastructure, development of community facilities, expansion of the island's economic base, provision of housing, and protection of natural and culture resources; establishes policies to manage change and to direct decisions about future land use and development; and provides the foundation to set capital improvement priorities, precise zoning ordinances, and develop other implementation tools.

The Site is within the directed growth plan limits and Urban and Rural districts of the County's *Maui Island Plan*. See *Figure 1-6, County Maui Island Plan*. The following is a discussion of the Project's consistency with applicable objectives and policies of the *Maui Island Plan*.

<u>Chapter 1: Population</u>

<u>Goal 1.1:</u> *Maui's people, values, and lifestyles thrive through strong, healthy, and vibrant island communities.*

Objectives:

1.1.1 *Greater retention and return of island residents by providing viable work, education, and lifestyle options.*

Policies:

1.1.1.a *Expand programs that enable the community to meet the education, employment, housing, and social goals of youth and young adults.*

1.1.1.b *Expand housing, transportation, employment, and social opportunities to ensure residents are able to comfortably age within their communities.*

Discussion: The Site is conveniently located near Wailuku Town, which has ample amenities and education and employment opportunities for beneficiaries, with nearby State and County government offices, the Maui Memorial Medical Center, Fire and Police services, professional services, public and private schools, parks, grocery stores, restaurants, and retail outlets. For some residents, the Project may provide an opportunity to live and work in the same community and eliminate commuting.

Chapter 4: Economic Development

Goal 4.1: *Maui will have a balanced economy composed of a variety of industries that offer employment opportunities and well-paying jobs and a business environment that is sensitive to resident needs and the island's unique natural and cultural resources.*

Objectives:

4.1.1 *A more diversified economy.*

4.1.3 *Improve the island's business climate.*

Policies:

4.1.1.b *Support the creation of new jobs and industries that provide a living wage.*

4.1.3.b *Ensure an adequate supply of affordable workforce housing.*

4.1.3.c *Develop neighborhoods and communities that are attractive to the workforce of a diversified economy.*

Goal 4.7: *Maui will have effective education and workforce development programs and initiatives that are aligned with economic development goals.*

Policies:

4.7.2.c *Encourage the education and training of our residents to meet the needs of a diversified economy.*

Discussion: The Site is conveniently located near Wailuku Town, which has ample amenities and education and employment opportunities for beneficiaries, with nearby State and County government offices, professional services, restaurants, and retail outlets. For some residents, the Project may provide an opportunity to live and work in the same community and eliminate commuting.

Chapter 5: Housing

Goal 5.1: *Maui will have safe, decent, appropriate, and affordable housing for all residents developed in a way that contributes to strong neighborhoods and a thriving island community.*

<u>Objectives:</u>

5.1.1 More livable communities that provide for a mix of housing types, land uses, income levels, and age.

5.1.4 Provide infrastructure in a more timely manner to support the development of affordable housing.

<u>Policies:</u>

5.1.1.a Promote livable communities (compact/walkable/bikeable access to transit) that provide for a mix of housing types and land uses, including parks, open space, and recreational areas.

5.1.1b Promote planning approaches that provide a mix of multifamily and single-family housing units to expand housing choices.

5.1.2.b Utilize the following approaches to promote resident housing and to minimize off-shore market impacts:

(1) Ensure that the future housing stock is composed of a mix of housing types (multifamily, small lots, ohana units, co-housing, cottage houses, etc.);

(2) Encourage new housing in proximity to jobs and services, in places that are conducive/affordable to island residents

5.1.3.a Consider regulations that can help keep affordable housing available at affordable rents.

5.1.3.b Seek to have ownership of affordable for-sale and rental housing vested in non-profit community land trust, or other qualified housing provider, committed to keeping such housing affordable in perpetuity.

5.1.3.c Facilitate the use of public lands in urban areas that are suitable for affordable housing.

5.1.4.a Prioritize the development of infrastructure that supports the development of affordable housing.

5.1.4.c Tailor infrastructure requirements to correspond with appropriate level-of-service standards to help control housing costs to maintain safety.

5.1.6.a Support fast-track processing procedures for the following housing-related entitlements: affordable housing projects/units; indigenous Hawaiian housing/units; and special-needs housing units (seniors, disabled, homeless, etc.).

<u>Discussion</u>: The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. The residences will be constructed on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure.

<u>Chapter 6: Infrastructure and Public Facilities</u>

<u>Public Facilities</u>

<u>Goal</u>: Maui will have adequate public facilities that meet the diverse needs of residents.

<u>Objectives:</u>

6.7.1 More effective planning for public facilities to meet community needs.

<u>Policies:</u>

6.7.1.b Establish appropriate level-of-service standards for public facilities provided by the County.

Discussion: The Project requires the provision of basic infrastructure such as potable water, wastewater service, power, and telecommunication; however, the Project will be developed within service capacities and will not overcommit resources.

Chapter 7: Land Use

Urban Areas

Goal: Maui will have livable human-scale urban communities, an efficient and sustainable land use pattern, and sufficient housing and services for Maui residents.

Objectives:

7.3.1 Facilitate and support a more compact, efficient, human-scale urban development pattern.

Policies:

7.3.1.a Ensure higher-density compact urban communities, infill, and redevelopment of underutilized urban lots within Urban Growth Boundaries.

7.3.2.c Facilitate self-sufficient communities and shorten commutes by:

(1) Directing residential development to job-rich areas;

(2) Allowing for appropriate commercial development and community services to shorten commutes; and

7.3.2.f Facilitate the development of housing by focusing projects in locations where land and infrastructure costs facilitate the development of affordably-priced housing.

7.3.2.i Develop communities that provide sufficient parks, schools, libraries, and other essential public facilities and services to serve resident needs.

Discussion: The Site is also conveniently located near Wailuku Town, which has ample amenities and education and employment opportunities for beneficiaries, with nearby State and County government offices, professional services, restaurants, and retail outlets. For some residents, the Project may provide an opportunity to live and work in the same community and eliminate commuting.

5.7.3 Wailuku-Kahului Community Plan

The 2002 *Wailuku-Kahului Community Plan* (Community Plan) reflects current and anticipated conditions in the Wailuku-Kahului region and advances planning goals, objectives, policies, and implementation considerations to guide decision-making in the region through the year 2010. The Community Plan provides recommendations to address the goals, objectives, and policies in the *General Plan 2030*, while recognizing the historic values and unique spiritual significance of island cultures of Wailuku-Kahului, to enhance the region's overall living environment.

The Site is within the Community Plan's Agriculture District. See *Figure 1-5, Wailuku-Kahului Community Land Use*. The following is a discussion regarding the Project's consistency with the applicable goals, objectives, and policies, implementing actions, and planning standards of the Community Plan.

Environment

Goal: A clean and attractive physical and natural environment in which man-made developments or alterations to the natural environment relate to sound environmental and ecological practices, and important scenic and open space resources are maintained for public use and enjoyment.

Objectives and Policies:

6. *Encourage the use of siltation basins and other erosion control features in the design of drainage systems.*
14. *Promote the planting and maintenance of trees and other landscape planting to enhance the streetscapes and the built-environment.*

Discussion: A stormwater detention basin will be located at the northeast corner of the Site, which will mitigate the anticipated increase in peak flows from the Site and will reduce water pollution through sediment removal. A NPDES General Permit for stormwater runoff discharges will be obtained from the DOH-CWB prior to construction. NPDES General Permits for dewatering and hydrotesting water discharges may also be obtained from the DOH-CWB, if required. For further discussion, see **Section 3.8.3, Drainage.**

The Project involves the installation of new landscaping along internal streets, which will provide shade and visual relief. Per HRS §103D-408, Hawaiian plants shall be incorporated in landscaping that utilizes public funds. Drought-tolerant plant species will be propagated where possible.

Cultural Resources

Goal: Identification, protection, preservation, enhancement, and where appropriate, use of cultural practices and sites, historic sites and structures, and cultural landscapes and view planes that:

2. *Preserve and protect native Hawaiian rights and practices customarily and traditionally exercised for subsistence, cultural and religious purposes in accordance with Article XII, Section 7, of the Hawaii State Constitution, and the Hawaii Supreme Court's PASH opinion, 79 HAW. 425 (1995).*

Objectives and Policies:

2. *Recognize the importance of historically and archaeologically sensitive sites and encourage their preservation through development project review.*
3. *Protect and preserve historic, cultural and archaeological sites and resources through on-going programs to identify and register important sites, and encourage their restoration. This shall include structures and elements that are a significant and functional part of Hawaii's ethnic and cultural heritage.*
5. *Require development projects to identify all cultural resources located within the project area as part of initial project studies. Further, require that all proposed activity include recommendations to mitigate potential adverse impacts on cultural resources.*

Implementing Actions:

2. *Require development projects to identify all cultural resources located within or adjacent to the project area and consult with individuals knowledgeable about such cultural resources prior to application as part of the County development review process. Further, require that all proposed activity include recommendations to mitigate potential adverse impacts on*

cultural resources including site avoidance, adequate buffer areas, and interpretation. Particular attention should be directed toward dune areas, known and probable pre-contact habitation areas, and other sites and areas listed in No. 5 below, with review by the Cultural Resources Commission, where appropriate.

__Discussion:__ A Final AIS was prepared to assess potential Project impacts on archaeological and historic properties. See *Appendix H: Archaeological Inventory Survey*. A CIA was prepared to assess potential Project impacts on existing cultural resources and practices. See *Appendix I: Cultural Impact Assessment.* The DHHL will comply with State rules and regulations regarding the preservation of archaeological and historic sites. For further discussion on proposed mitigation measures, see **Section 3.11, Historic, Archaeological, and Cultural Resources**.

__Housing__

<u>Goal</u>: A sufficient supply and choice of attractive, sanitary and affordable housing accommodations for the broad cross section of residents, including the elderly.

<u>Objectives and Policies:</u>

1. *Seek alternative residential growth areas within the planning region, with high priority given to the Wailuku and Kahului areas. This action should recognize that crucial issues of maintaining important agricultural lands, achieving efficient patterns of growth, and providing adequate housing supply and choice of price and location must be addressed and resolved.*
6. *Coordinate the planning, design and construction of public infrastructure improvements with major residential projects that have an affordable housing component.*

<u>Implementing Actions:</u>

1. *Develop a comprehensive housing strategy for low and moderate income groups involving government and private industry cooperation that provides an adequate supply of housing for the various strata of income. This approach would combine the resources of Federal, State, County, and private enterprise to improve the availability of rental and ownership housing targeted to various need groups. Anti-speculation and specification of a percentage of low and moderate income units in major projects are tools which should be considered as part of an overall housing program.*

__Discussion:__ The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. The residences will be constructed on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. The Project will utilize State and private funds. By providing housing to families in a centrally located area, they will have easier access to utilize social and healthcare services, if needed. This Project directly affects Native Hawaiians and aspires to improve their quality of life by providing affordable homes.

__Government:__

<u>Goal</u>: Government that demonstrates the highest standards of fairness; responsiveness to the needs of the community; fiscal integrity; effectiveness in planning and implementation of programs and projects; a fair and equitable approach to taxation and regulation; and efficient, results-oriented management.

Objectives and Policies:

5. *Ensure that adequate infrastructure is or will be available to accommodate planned development.*

Discussion: The Project requires the provision of basic infrastructure such as potable water, wastewater service, power, and telecommunication; however, the Project will be developed within service capacities and will not overcommit resources.

Land Use

Goal: An attractive, well-planned community with a mixture of compatible land uses in appropriate areas to accommodate the future needs of residents and visitors in a manner that provides for the social and economic well-being of residents and the preservation and enhancement of the region's environmental resources and traditional towns and villages.

Objectives and Policies:

16. *Upon adoption of this plan, allow no further development unless infrastructure, public facilities, and services needed to service new development are available prior to or concurrent with the impacts of new development.*

Discussion: The Project requires the provision of basic infrastructure such as potable water, wastewater service, power, and telecommunication; however, the Project will be developed within service capacities and will not overcommit resources.

Infrastructure

Goal: Timely and environmentally sound planning, development and maintenance of infrastructure systems which serve to protect and preserve the safety and health of the region's residents, commuters and visitors through the provision of clean water, effective waste disposal and drainage systems, and efficient transportation systems which meet the needs of the community.

Water and Utilities:

Objectives and Policies:

3. *Promote water conservation and education programs.*

Drainage:

Objectives and Policies:

1. *Ensure that storm water run-off and siltation from proposed development will not adversely affect the marine environment and nearshore and offshore water quality. Minimize the increase in discharge of storm water runoff to coastal waters by preserving flood storage capacity in low-lying areas, and encouraging infiltration of runoff.*

Energy:

Objectives and Policies:

2. *Develop efficient circulation systems, public transportation and promote bicycle and pedestrian travel to reduce energy expenditures for travel.*

Transportation:

Objectives and Policies:

2. *Provide bikeway and walkway systems in the Wailuku-Kahului area which offer safe and pleasant means of access, particularly along routes accessing residential districts, major community facilities and activity centers, school sites, and the shoreline between Kahului Harbor and Paʻia.*
5. *For future residential development, prohibit direct lot access from primary roads.*
6. *Accommodate bicycle and pedestrian ways within planned roadway improvements.*

Discussion: The Project will implement water conservation measures such as incorporating water efficient fixtures and drought tolerant landscaping to reduce irrigation water demands. Energy efficient fixtures, appliances and solar water heating systems will be installed in the residences, as feasible.

A stormwater detention basin will be located at the northeast corner of the Site, which will mitigate the anticipated increase in peak flows from the Site and will reduce water pollution through sediment removal. A NPDES General Permit for stormwater runoff discharges will be obtained from the DOH, CWB prior to construction. NPDES General Permits for dewatering and hydrotesting water discharges may also be obtained from the DOH, CWB, if required. For further discussion, see **Section 3.8.3, Drainage.**

The Project will promote walkability and bicycle accessibility to and through the Site. Approximately 450 feet of paved shoulder along the southern side of Kuikahi Drive will be widened to provide a continuous 5-foot-wide paved walkway and all internal streets within the Site will have a 5-foot-wide paved sidewalk along one side of the street for pedestrian access. Bicyclists will be able to traverse along the low-volume internal streets (unmarked bicycle routes) throughout the Site (WSUE, 2022). The Project is also served by the #1 Wailuku Loop bus route, the #2 Wailuku Reverse bus route, and the #20 Lahaina Islander bus route which will provide a sustainable and equitable form of public transportation and encourage walking and biking.

Urban Design

Goal: An attractive and functionally integrated urban environment that enhances neighborhood character, promotes quality design, defines a unified landscape planting and beautification theme along major public roads and highways, watercourses and at major public facilities, and recognizes the historic importance and traditions of the region.

Objectives and Policies:

10. *Incorporate drought tolerant plant species and xeriscaping in future landscape planting.*
11. *Use native Hawaiian plants for landscape planting in public projects to the extent practicable.*

Discussion: The Project involves the installation of new landscaping along internal streets, which will provide shade and visual relief. Per HRS §103D-408, Hawaiian plants shall be incorporated in landscaping that utilizes public funds. Drought-tolerant plant species will be propagated where possible.

Planning Standards:

2. *Cultural Resources:*
    a. *Require development projects to identify significant cultural resources located within the project area as part of initial project studies. Further require that all proposed activity include recommendations to mitigate potential adverse impacts on cultural resources.*
3. *Urban Design*
    a. *General*
        3. *Incorporate drought tolerant plant species and xeriscaping in future landscape planting.*
        4. *Use native plants for landscape planting in public projects to the extent practicable.*

Discussion: A CIA was prepared to assess potential Project impacts on existing cultural resources and practices. See *Appendix I: Cultural Impact Assessment.* The DHHL will comply with State rules and regulations regarding the preservation of archaeological and historic sites. For further discussion on proposed mitigation measures, see **Section 3.11, Historic, Archaeological, and Cultural Resources**.

The Project involves the installation of new landscaping along internal streets, which will provide shade and visual relief. Per HRS §103D-408, Hawaiian plants shall be incorporated in landscaping that utilizes public funds. Drought-tolerant plant species will be propagated where possible.

5.8 Maui County Zoning Code, MCC Title 19

The purpose of MCC Title 19, *Zoning*, is to regulate the appropriate use of land, conserve property values, prevent activities that may be detrimental to existing land uses, and to promote health, safety, and welfare within each County district. The standards set forth in the MCC define the districts and development standards for land use zoning, as it relates to the permitted uses, special uses, area, height, yard areas, and off-street parking and loading for various purposes.

The Site is located within the “Agriculture” County Zoning District. See *Figure 1-4, County Zoning*. Per, MCC § 19.30A.010, the purposed of the Agriculture District are to promote agricultural development; preserve and protect agricultural resources; and support the agricultural character and components of the County's economy and lifestyle.

Discussion: The Project involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key residences and 31 vacant lots) for DHHL beneficiaries. The residences will be designed to generally conform with the R-2 Zoning District development standards, which requires a minimum lot size of 7,500 SF. The HHCA vests onto the DHHL the authority to use its lands at its discretion. The HHCA Section 204 states, “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.” Therefore, the HHCA grants the DHHL the authority to proceed with the development of the proposed residential subdivision even though the Site is not fully entitled for residential use.

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Chapter 6

Findings Supporting the Anticipated Determination

Chapter 6

Findings Supporting the Anticipated Determination

6.1 Anticipated Determination

HAR §11-200.1-2 defines “significant effect” as the *sum of effects* on the quality of the environment. Based on a review of the significance criteria outlined in HRS Chapter 343, and HAR §11-200.13, the Project has been determined to not result in a significant effect/impact on the quality of the environment. Therefore, per HAR §11-200.1-14, DHHL has issued a determination of Finding of No Significant Impact (FONSI) for the Project. The potential impacts of the Project have been fully examined and discussed in this Final EA. A summary of the Project assessed alongside the significance criteria is summarized below:

(1) Irrevocably commit a natural, cultural, or historic resource.

The Project will not irrevocably commit a natural, cultural, or historic resource. The property is not a shoreline fronting property. The proposed project will complement existing residential and urban uses found throughout Wailuku and Waikapū. A Biological Resource Study has been prepared to assess the potential impacts the Project would have on natural resources. Please see *Appendix D*: *Biological Resources Study* for more information. According to the Biological Resource Study there are no native flora species, or host plants that support native fauna such as the Blackburn’s Sphinx Moth (*Manduca blackburni*). One flora species of note is the Madagascar fireweed (*Senecio madagascariensis Poir*) which is on the USDA Natural Resources Conservation Service’s Noxious Weed list and is considered a harmful weed which is harmful to the environment or animals and would be properly removed during construction. The Project does not involve an irrevocable commitment to loss or destruction of any natural resource. For further discussion, see **Section 3.5, Flora and Fauna**.

An AIS was prepared in 2005 by SCS, which was inclusive of the Site. See *Appendix H: Archaeological Inventory Survey*. The four historic sites found with the Site were indicative of the extensive industrial level sugar cane modifications and operations in the area and were assessed as significant under “Criterion D”. These sites were adequately documented and no further work was recommended in the SHPD accepted AIS. A CIA was prepared by Keala Pono Archaeological Consulting, LLC. See *Appendix I: Cultural Impact Assessment.* According to the CIA, there are no ongoing cultural practices identified at the Site.

While the SHPD has previously stated that no further work is necessary, DHHL has elected to conduct archaeological monitoring as an extra measure of assurance that all ground disturbance construction-related activities at the Site is managed in a culturally appropriate manner. As such, an AMP will be prepared in advance of site construction and the contractor, once selected, will be required to follow the provisions of the AMP. An archaeological field inspection was conducted by SCS on August 24, 2020 consisting of a pedestrian walk through of the Site to determine if Pōhakoʻi was present at the

Site. No discoveries were made. The belief is that Pōhakoʻi may have been relocated due to the extensive agricultural clearing and landscape modifications that previously occurred in the area. Future efforts to locate this important stone and landmark will be undertaken during the archaeological monitoring of the Project area during future ground altering activities. DHHL is committed to keeping open access open for resource gathering and cultural purposes. With the implementation of proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on existing cultural properties, resources or traditional cultural and resource gathering practices. For further discussion, see **Section 3.11, Historic, Archaeological, and Cultural Resources.**

(2) *Curtail the range of beneficial uses of the environment.*

The Project will not curtail the range of beneficial uses of the environment. According to HAR § 11-200-1-2, "environment" refers to humanity's surroundings, inclusive of all the physical, economic, cultural, and social conditions that exist within the area affected by a proposed action, including land, human, and animal communities, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. The Project involves the construction of residences for DHHL beneficiaries on a vacant, underutilized property, adjacent to existing residential developments of similar nature, with readily available infrastructure. The Site has not been in agricultural production for many years and is located within the directed growth plan limits and the Urban Growth and Rural Boundary in the County's Maui Island Plan: General Plan 2030. On Maui, approximately 70,714 acres of the land area are within the ALISH "Prime" agricultural designation, this represents approximately 15% of the island. The Project involves the use of 77 acres or 0.11% of the "Prime" acreage on Maui for a much-needed residential subdivision with lots and homes for Native Hawaiian beneficiaries and their families in an existing sub-urban/urban context.

The Project will provide residential housing that will assist in addressing the demand of the DHHL waiting list. Along with the Project, Urban growth in the surrounding area provide an opportunity for employment. In the long term, there will be increased expenditure for the buildout of single-family homes and maintenance of the Project. The Project will also generate revenues for the State and County. The Project seeks to support the Native Hawaiian population by providing residential accommodations, while the local economy benefits from job creation and resident spending.

The Project also aims to complement and enhance existing development within the Wailuku/Waikapū area. Careful consideration has been given to the site plan, lot layout, and linear park during the planning process to be sensitive and place appropriate to the surrounding Wailuku and Waikapū residential communities. The homes will not exceed two stories or 30 feet in height following the allowable height for both residential use and agricultural district.

Development of the Project will utilize Best Management Practices (BMPs) to minimize any construction-related impacts. A State NPDES permit and County grading permit will be obtained to ensure that construction activity does not adversely impact water quality. For further discussion, see **Section 3.1, Geology, Topography, Soils, and Agricultural Productivity.**

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

The Project does not conflict with the State's long-term environmental policies or goals and guidelines as expressed in HRS Chapter 343 and 344. This Draft EA was prepared to ensure the Project will not have a significant adverse impact on the environment. Where mitigation measures are recommended due to the Project's potential impacts, the DHHL will implement those applicable measures to the extent possible to curtail potential long-term impacts to the environment.

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

The Project will result in short-term economic benefits from construction that include direct, indirect, and induced employment opportunities and multiplier impacts. After development, the Project will have positive long-term effects on the community's social welfare by providing beneficiaries homesteading opportunities and permanent residences near governmental and commercial services and potential employment opportunities. Other beneficial impacts will continue through long-term jobs, annual taxes, including real property tax, and resident spending.

The Project is not anticipated to have a substantial adverse effect on cultural practices. A CIA was prepared for the Project by Keala Pono. According to the CIA, there are no cultural practices that occur at the Site. To minimize any potential impacts on cultural resources and practices in the greater Wailuku area, DHHL will implement relevant mitigation measures.

While the SHPD has previously stated that no further work is necessary, DHHL has elected to conduct archaeological monitoring as an extra measure of assurance that all ground disturbance construction-related activities at the Site is managed in a culturally appropriate manner. As such, an AMP will be prepared in advance of site construction and the contractor, once selected, will be required to follow the provisions of the AMP. An archaeological field inspection was conducted by SCS on August 24, 2020 consisting of a pedestrian walk through of the Site to determine if Pōhakoʻi was present at the Site. No discoveries were made. The belief is that Pōhakoʻi may have been relocated due to the extensive agricultural clearing and landscape modifications that previously occurred in the area. Future efforts to locate this important stone and landmark will be undertaken during the archaeological monitoring of the Project area during future ground altering activities. DHHL is committed to keeping open access open for resource gathering and cultural purposes. With the implementation of proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on existing cultural properties, resources or traditional cultural and resource gathering practices. For further discussion, see **Section 3.11, Historic, Archaeological, and Cultural Resources.**

(5) Have a substantial adverse effect on public health.

The Project is not anticipated to have a substantial adverse effect on public health. The Project will comply with relevant State and County regulations during the construction and will implement BMPs to minimize and mitigate potential temporary air quality and noise impacts and secure NPDES permit(s), as necessary. The Phase 1 ESA did not reveal RECs, HRECs or CRECs on the Site. The Project is not anticipated to create a significant amount of GHG emissions and does not fall within the threshold of mandatory Federal GHG reporting. For further discussion, see **3.2, Climate, Climate Change, and Sea Level Rise, Section 3.6, Air Quality, Section 3.7, Noise Conditions, 3.8.4, Solid and Hazardous Waste,** and **Section 3.9, Transportation System.**

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

The Project is not anticipated to involve adverse secondary impacts, such as significant population changes or effects on public facilities. The Project will provide needed long term, permanent housing in Wailuku, Central Maui for DHHL beneficiaries and their families. While some beneficiaries may move to Maui from neighboring islands to reside at this subdivision, most are expected to relocate from other areas on Maui. As such, the Project is not anticipated to involve substantial secondary impacts due to population/demographic changes. The DHHL will provide the necessary onsite and offsite infrastructure to support the Project, which is within service capacities and will not overcommit resources. No substantial changes or effects on public facilities are expected with the Project implementation.

(7) Involve a substantial degradation of environmental quality.

The Project is not anticipated to involve a substantial degradation of environmental quality. During construction, there is the potential for temporary short-term nuisances related to noise and dust in the immediate Project vicinity. The Project will comply with relevant State and County regulations and will implement BMPs, including dust control and noise mitigation measures, to minimize potential impacts and secure NPDES permit(s), as necessary to ensure that construction activity does not adversely impact nearby water quality. Drainage system improvements will be constructed in accordance with applicable regulatory design standards to ensure that surface runoff will not have an adverse effect on adjacent or downstream properties. Long-term significant impacts to soils, climate, water quality, flora and fauna, air quality, noise conditions, and natural resources are not anticipated. For further discussion, see **Section 3.1, Geology, Topography, and Soils, Section 3.2, Climate, Climate Change, and Sea Level Rise, Section 3.4, Water Resources, Section 3.5, Flora and Fauna, Section 3.6, Air Quality,** and **Section 3.7, Noise Conditions.**

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

The Project is not anticipated to have a substantial cumulative adverse effect upon the environment or involve a commitment for larger actions. The Project is limited to the development of the proposed residential subdivision and is not a phase or increment of a larger project. The Project is not reliant upon or a trigger for another development. The Project will have relatively negligible cumulative impacts, such as a change in use of agricultural lands, slight population shift, requirement of infrastructure such as potable water, wastewater service, power, and telecommunication, slight increase of traffic on surrounding roadways, and slight increase of GHG emissions. The project in question, situated within an area already developed with similar residential subdivisions, is not expected to have a substantial adverse effect on the environment. It is not part of a larger action or commitment to such actions, and given the surrounding residential developments, significant environmental impacts are not foreseen. The project occupies a relatively small portion of prime land on Maui, and the site is not designated as exclusive high-quality farmland. The project aims to meet beneficiary demand for residential homesteads in Central Maui, offering a prime location with readily available infrastructure and amenities. The slight population increase it will bring to the area is not expected to alter regional or Maui's overall population projections. Furthermore, the project's impacts on utilities and infrastructure are considered relatively negligible. In terms of climate change, its contribution to global greenhouse gas emissions will be relatively minor, complying with energy-efficient policies and mitigation measures. Additionally, the project is expected to have positive socio-economic impacts on jobs, earnings, tax revenues, and beneficiaries' access to essential services and employment opportunities. Consequently, with the proposed mitigation measures, the project is not expected to result in significant adverse cumulative, indirect, or secondary impacts on the environment or larger actions.

DHHL will provide the necessary infrastructure to serve the Project. Drainage, wastewater, water, and roadway improvements. This infrastructure will be designed to meet applicable local, State, and Federal regulations. The engineering and traffic reports prepared for the Project have assessed potential impacts and designed infrastructure systems in the context of future planned regional growth. The Project is anticipated to have beneficial short- and long-term cumulative and indirect impacts on jobs, earnings, and tax revenues. The socio-economic benefits associated with providing beneficiaries permanent residences nearby governmental and commercial services and potential employment opportunities are innumerable and should not be understated. For further discussion, see **Section 3.15, Potential Cumulative, Indirect, and Secondary Impacts.**

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

A Biological Resources Study was prepared for the Project to ensure that any sensitive terrestrial flora/fauna biological resources within the Site would be identified and provided adequate protection. There are two native fauna species that were discovered on Site, the globe skimmer dragonfly (*Pantala flavescens*), and the endangered, endemic ʻōpeʻapeʻa or Hawaiian Hoary Bat (*Lasiurus cinereus semotus*). Migratory sea birds, and State-listed waterbirds may also exist within the Site though it was not identified during the Biological Resource Study. DHHL will implement mitigation measures typically recommended by USFWS or DOFAW to avoid or minimize potential adverse impacts to these species. To avoid impacts to the globe skimmer dragon fly, the contractor would do its best in avoiding harming the common species. To avoid impacts to the Hawaiian Hoary Bat, any woody plants greater than 15 feet tall will not be disturbed, removed, or trimmed during the bat birthing and pup-rearing season (June 1 through September 15). Additionally, barbed wire will not be used for fencing. If the woody plants that are greater than 15 feet must be disturbed, removed, or trimmed, the contractor will not do so without consulting USFWS and DLNR, DOFAW. Nighttime construction will be avoided during the seabird fledging period (September 15 through December 15) to prevent injury to seabirds. Outdoor lights will be shielded to the maximum extent possible to direct the light downward. The Contractor will provide construction crews with information about seabird fallout prior to the initiation of work. If a downed seabird is found, the Contractor will contact the USFWS immediately. With the implementation of the proposed mitigation measures, the Project is not anticipated to substantially affect rare, threatened, or endangered species or its habitat. For further discussion, see **Section 3.5, Flora and Fauna** or see *Appendix D: Biological Resources Study*.

(10) Have a substantial adverse effect on air or water quality or ambient noise levels.

The Project is not anticipated to have a substantial adverse effect on air or water quality or ambient noise levels. During construction, there is the potential for temporary, short-term impacts on existing air quality, noise conditions in the immediate Project vicinity. Equipment mufflers or other noise attenuating equipment as well as proper vehicle maintenance and limiting construction to daylight hours will be used during construction activities. Construction noise impacts will be mitigated through compliance with the provisions of the State of Hawaiʻi, Department of Health (DOH) Administrative Rules Title 11, Chapter 46, "Community Noise Control." These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in Chapter 46. In the long term, the proposed new community is not anticipated to significantly impact ambient noise levels. The Project will comply with applicable State and County regulations during the construction and will implement BMPs and will secure NPDES Permit(s), as required to minimize temporary impacts. A stormwater detention basin will reduce potential water pollution through sediment removal and will comply with the County's water quality rules and regulations. For further discussion, see **Section 3.4, Water Resources, Section 3.6, Air Quality,** and **Section 3.7, Noise Conditions.**

(11) Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

The Project is located in Flood Zone X, an area of minimal flood risk. The Site is located upland approximately 2.3-miles from the ocean outside of the Tsunami and Extreme Tsunami zone and the 3.2-foot projected SLRXA. Although irrigation water flows through the Site in manmade ditches (i.e. Waiheʻe ditch, and two unnamed ditches), recommended BMPs will be implemented during construction for erosion and sedimentation control to minimize potential impacts to water quality. Also, drainage improvements will be designed to mitigate runoff in accordance with County drainage and stormwater quality rules and regulations.

The Project is not anticipated to have a substantial adverse effect on or is likely to suffer damage by being in an environmentally sensitive area such as flood plain, tsunami zone, SLR-XA, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters. For further discussion, see **Section 3.2, Climate, Climate Change, and Sea Level Rise** and **Section 3.3, Natural Hazards.**

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

The Project has been designed to complement and enhance the existing landscape and subdivisions within the Wailuku and Waikapū district. DHHL will also ensure that the single-family residences, when developed by individual owners on vacant lots, are consistent with the overall design intent and vision for the Project. Careful consideration has been given to the site plan, lot layout, turn-key homes, and linear park during the planning process to be sensitive and place appropriate to the surrounding developed Wailuku and Waikapū residential communities. The homes will not exceed two stories or 30 feet in height following the allowable height for residential.

The Project is not anticipated to have a substantial adverse effect on scenic vistas and view planes, during day or night. The Project design will be compatible with the surrounding residential buildings and generally within allowable development limits per the MCC. For further discussion, see **Section 3.14, Visual and Scenic Resources.**

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

Construction of the Project will require similar or less energy consumption and produce GHG emissions relative to other similar-sized residential projects. While the majority of construction-related activities utilize diesel operated construction equipment, there may be short-term electrical energy needs while the Project is under construction. Short-term greenhouse gas emissions associated with construction activities are anticipated during the construction phase of the Project. Following construction, energy consumption will be necessary for the operational phase of the Project. Energy conservation and efficiency measures will be incorporated into the Project design phase of development to reduce overall energy use and greenhouse gas emissions within the new residential community. Energy efficient fixtures, appliances and solar water heating systems will be installed in the residences, as feasible. The Project is not anticipated to require substantial energy consumption or emit substantial greenhouse gases. For further discussion, see **Section 3.2, Climate, Climate Change, and Sea Level Rise.**

6.2 Summary

Based on the information and findings in this Final EA, it is determined that the Project will have no significant impact on the environment. The Final EA recommends mitigation measures to alleviate identified potential impacts. Further evaluation of the Project's impacts through the preparation of an Environmental Impact Statement is not warranted. An FONSI is determined for this Project.

Chapter 7

Agencies, Organizations, and Individuals Consulted in the EA Process

Chapter 7

Agencies, Organizations, and Individuals Consulted in the EA Process

7.1 Consultation

An early consultation letter and information handout for the Project was mailed to stakeholders (e.g., Federal, State and County agencies, elected officials, organizations, community leaders and neighbors) to initiate the environmental review process, and to inform and gather input from the community. *Table 7-1, Consultation with Agencies, Organizations, and Individuals* lists the stakeholders who were engaged during the early consultation period and who will receive notification of the publication of this Final EA. Comments made during early consultation period can be found in *Appendix B: Early Consultation Comments*. *Table 7-2, Responses to Comments Received During Early Consultation* provides responses to the comments received during the 30-day early consultation period. Comments are arranged by subject matter.

Note: The DOH, CWB will no longer be responding directly to requests for comments on Environmental Assessments, per correspondence (File 10019CEC.21) dated October 21, 2021 – standard comments are available on the DOH, CWB's website.

Table 7-1 Consultation with Agencies, Organizations, and Individuals

Stakeholders	Early Consultation Mail-out	Early Consultation Comments Received	Notification of Draft EA	Draft EA Comments Received
Federal Agencies				
U. S. Department of the Interior, Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office	X		X	
U.S. Department of Agriculture, Natural Resources Conservation Service	X		X	
U.S. Department of the Army, Regulatory Branch, U.S. Army Engineer District, Honolulu	X		X	X
State of Hawai'i Agencies				
Department of Accounting and General Services	X		X	X
Department of Agriculture	X		X	

Table 7-1 Consultation with Agencies, Organizations, and Individuals

Stakeholders	Early Consultation Mail-out	Early Consultation Comments Received	Notification of Draft EA	Draft EA Comments Received
Department of Business, Economic Development and Tourism, Office of Planning and Sustainable Development	X		X	
Department of Education (DOE), Maui District	X	X	X	X
DOE, Planning Section, Facilities Development Branch	X		X	
Department of Health (DOH)	X	X	X	
DOH, Clean Air Branch	X	X	X	X
DOH, Disability and Communication Access Board	X	X	X	
DOH, Indoor and Radiological Health Branch	X		X	
DOH, Maui Sanitation Branch	X		X	
Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife	X		X	X
DLNR, Engineering Division	X	X	X	X
DLNR, Land Division	X		X	
DLNR, Land Division, Maui District	X		X	
DLNR, State Historic Preservation Division	X		X	
Department of Transportation (DOT), Highways Division	X	X	X	X
DOT, Highways Division, Maui District	X		X	
Hawai'i State Public Library System	X		X	
Office of Hawaiian Affairs	X		X	
State of Hawaii Office of Planning & Sustainable Development	X	X	X	X
County of Maui Agencies				
Department of Environmental Management	X		X	
Department of Fire and Public Safety	X		X	X
Department of Housing and Human Concerns	X	X	X	X
Department of Management	X		X	
Department of Parks and Recreation	X	X	X	
Department of Public Works	X		X	

Table 7-1 Consultation with Agencies, Organizations, and Individuals				
Stakeholders	**Early Consultation Mail-out**	**Early Consultation Comments Received**	**Notification of Draft EA**	**Draft EA Comments Received**
Department of Transportation	X		X	
Department of Water Supply	X		X	
Emergency Management Agency	X		X	
County of Maui Planning Department	X		X	X
Police Department	X	X	X	
Elected Officials				
State Senator Troy Hashimoto (District 5)	X		X	
State Representative Tyson Miyake (District 10)	X		X	
Mayor Richard Bissen, Maui County Office of the Mayor	X		X	
Maui County Councilmember Alice L. Lee, Council Chair	X	X	X	
Maui County Councilmember Tasha Kama, Presiding Officer Pro Tempore	X		X	
Maui County Councilmember Keani Rawlins-Fernandez	X		X	
Maui County Councilmember Tom Cook	X		X	
Maui County Councilmember Gabe Johnson	X		X	
Maui County Councilmember Nohe U'u-Hodgins	X		X	
Maui County Councilmember Tamara Paltin	X		X	
Maui County Councilmember Shane Sinenci	X		X	
Maui County Councilmember Yuki Lei Sugimura, Council Vice-Chair	X		X	
Utility Companies				
Hawaiian Electric (Maui Electric Company, Ltd.)	X		X	
Hawaiian Telcom	X		X	
Spectrum	X		X	
Organizations and Individuals				
Aha Moku O Wailuku	X		X	
Historic Hawaii Foundation	X		X	
Kehalani Community Association	X		X	

Table 7-1 Consultation with Agencies, Organizations, and Individuals				
Stakeholders	**Early Consultation Mail-out**	**Early Consultation Comments Received**	**Notification of Draft EA**	**Draft EA Comments Received**
Maui Chamber of Commerce	X		X	
Maui Economic Development Board	X		X	
Maui Economic Opportunity, Inc.	X		X	X
Maui Mokupuni Council	X		X	
Waikapū Community Association	X		X	
Waikapū Gardens Homeowners Association	X		X	
Wailuku Heights Extension Unit I Community Association	X	X	X	X
Waiolani Community Association	X		X	
Waiolani Elua Community Association	X		X	
Waiolani Mauka Community Association	X		X	
University of Hawaiʻi Mānoa, Institute for Astronomy	X		X	
DHHL Homestead Leaders				
ʻAhahui ʻĀina Hoʻopulapula o Waiohuli – Harry Rodriguez, Jr.	X		X	
Ka ʻOhana o Kahikinui – Kaleo Cullen; Charmaine Day; Blossom Feiteira	X		X	
Kēōkea Agriculture Hawaiian Homestead Association – Robin Newhouse	X		X	
Leialiʻi Homestead Association – Rod Paʻahana	X		X	
Paukukalo Community Association – Stephen Cramer	X		X	
Paʻupena Community Development – Andrew A.M. Hatchie; Kekoa Enomoto	X		X	
Puʻuhona Hawaiian Homestead Association	X	X	X	X
Sovereign Council of Hawaiian Homestead Associations	X		X	
Waiʻehu Kou 2 – Mark Adams	X		X	
Waiʻehu Kou 3 – Roy Oliveira	X		X	
Waiohuli Hawaiian Homestead Association – Perry Artates	X		X	

7.2 Response to Comments Received During Early Consultation

Table 7-2 Responses to Comments Received During Early Consultation

Stakeholder	Comment	Response
Air Quality		
State of Hawaii, Department of Health: Clean Air Branch	The Clean Air Branch (CAB) Would like to make the following comments on the subject: • For Construction and Other activities associated with the project, the applicable provisions of Hawaii Administrative Rules § 11-60.1-33 shall be followed to mitigate fugitive dust impacts. • Also, please see our standard comments at: https://health.hawaii.gov/cab/files/2022/05/Standard-Comments-for-Land-Use-Reviews-Clean-Air-Branch-2022-1.pdf	Thank you for your comment. Construction and other activities associated with the Project shall follow applicable sections of HAR § 11-60.1-33 to mitigate fugitive dust impacts and shall adhere to DOH-Clean air Branch's standard comments.
Community Consultation		
Wailuku Heights Extension Community Association	The WHECA Board of Directors is requesting to be involved in the design of the site and transportation corridors associated with your project. We are requesting a seat at the table in the early design phases as we feel our representation of our perspective/opinion on the proposed site and roadway design to accommodate the project is of utmost importance. We ask to be notified of the next design meeting with the Department of Public Works and the State of Hawaii Department of Transportation so we may attend and observe the design discussion. We will be requesting legal standing regarding the environmental planning process of this project.	Thank you for the comment. The Project includes two access points into the Site. No further work will be done to impact any transportation corridor or roadway designs by this Project. We welcome you to join in any and all forms of public testimony including this Environmental Assessment. Your comments on the Project are appreciated.
Education		
Wailuku Heights Extension Community Association	WHECA Members associated with the local school systems have indicated that the existing schools are in an overload condition and believe that there needs to be sufficient study efforts made to determine the expansion needs of the local school systems.	Thank you for the comment. According to the early consultation letter from DOE received in November 2023, the schools servicing the Project include Pu'u Kukui Elementary, Maui Waena Intermediate, and Maui High School. Pu'u Kukui elementary is operating at capacity, however the projected enrollment for the next five years suggests that the school will be below its capacity. Maui Waena Intermediate and Maui High are currently operating above capacity, however a five-year projection suggests both schools will operate below capacity (DOE, 2023). It should be noted that the DOE is in the

Table 7-2 Responses to Comments Received During Early Consultation		
Stakeholder	**Comment**	**Response**
		process of acquiring additional adjacent land to expand the Pu'u Kukui Elementary School.
State of Hawai'i, Department of Education	The Department has determined that the schools servicing the Project area are Puu Kukui Elementary, Maui Waena Intermediate, and Maui High School. Puu Kukui Elementary is operating at capacity. However, the projected enrollment for the next five years suggests that the school will be below its capacity. Maui Waena Intermediate and Maui High are currently operating above capacity. A five year projection suggests both schools will operate below capacity.	Thank you for your comment. This information has been incorporated in the Educational Facilities section of the Draft Environmental Assessment.
Natural Hazards		
Wailuku Heights Extension Community Association	WHECA Members are deeply concerned about the condition of the existing transportation systems and the lack of analysis of emergency evacuation in a fire scenario. This is a very serious concern due to the direction and velocity of the prevailing winds and the fact that WHECA will be at the end of the transportation corridors required for an expedient emergency escape. Based upon this concern, WHECA Members request a thorough and comprehensive engineering study regarding the load currently on the transportation system(s) and proposed load associated with all these additional developments on the transportation system(s). We will also be requesting that the County of Maui and the State of Hawaii complete a revised technical review and updated plan for a wildfire emergency evacuation. This plan will be required to include technical data obtained from the analysis of the Lahaina fire.	Thank you for the comment. The Project supports WHECA requesting the County or State complete an updated plan for a wildfire emergency evacuation for the area, as mentioned in WHECA's letter. The Project will be designed and constructed in compliance with the applicable sections of MCC, Chapter 16.04C, *Fire Code*. The DFPS will review construction drawings during the building permit review process, to ensure that fire department access, water supply for fire protection, and fire and life safety requirements are addressed. Residences will be built with flame-resistant building materials, as feasible. The Project will remove tall, non-native grasses and replace them with homes for Native Hawaiian families that have been waiting years for housing. The Project does not involve improvements that will increase the risk of the public's safety during a wildfire event. With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on the surrounding neighborhood during a wildfire event.
State of Hawai'i, Department of Land and Natural Resources – Engineering Division	The rules and regulations of National Flood Insurance Program (NFIP), Title 44 of the Code Federal regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). Be advised that 44 CFR, Chapter 1 Subchapter B, Part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate	Thank you for your comment. The Site is located in Flood Zone X. The FEMA Flood Insurance Program does not have regulations for development within Flood Zone X. The residences will be designed to comply with MCC, Chapter 19.62, Flood Hazard Areas, as applicable. If needed, the County may open emergency shelters throughout Maui; the nearest shelter will likely be the Maui High School – approximately 1.95 miles east of the Site. The Project does not involve

Table 7-2 Responses to Comments Received During Early Consultation		
Stakeholder	**Comment**	**Response**
	higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.	improvements that increase the risk of the public's safety during a flooding event. With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on the surrounding neighborhood during a flood event. No additional mitigation is recommended.
	The owner of the project property and/or their representative is responsible to research the Flood Hazard 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 Services Center (msc.fema.gov). Our flood Hazard Assessment Tool (FHAT)(fhat.hawaii.gov) could also be used to research flood hazard information.	Thank you for your comment. The Site is located in Flood Zone X. The FEMA Flood Insurance Program does not have regulations for development within Flood Zone X. The residences will be designed to comply with MCC, Chapter 19.62, Flood Hazard Areas, as applicable. If needed, the County may open emergency shelters throughout Maui; the nearest shelter will likely be the Maui High School – approximately 1.95 miles east of the Site. The Project does not involve improvements that increase the risk of the public's safety during a flooding event. With the implementation of the proposed mitigation measures, the Project is not anticipated to have a significant adverse impact on the surrounding neighborhood during a flood event. No additional mitigation is recommended.
Resource Availability		
Wailuku Heights Extension Community Association	The consistent droughts that have been experienced in the last five (5) years have developed concerns about the water supply for this area of Maui. Based upon this concern, WHECA Members request a thorough and comprehensive engineering/hydrology study regarding the load currently on the system(s) and proposed load associated with all these additional developments on the system(s).	Thank you for the comment. The anticipated average daily potable water demand for the 204 residences for DHHL beneficiaries is estimated at 129,200 gallons per day (gpd). A network of 8-inch water mains, service laterals and fire hydrants will be installed throughout the Site to serve the residences and will connect to the DWS' existing 12-inch mains along Kuikahi Drive and Old Waikapū Road (WSUE, 2023). MCC §14.12.030.H and Section 221 of the Hawaiian Homes Commission Act provide DHHL residential Projects with certain rights and allowances for water in an effort to get Native Hawaiians and their families into long term, stable housing. We appreciate WHECA's overall perspective for this housing project as positive and that it supports development in this area of Maui, especially since these lots and homes will be for Native Hawaiian DHHL beneficiaries and their families.

Table 7-2 Responses to Comments Received During Early Consultation

Stakeholder	Comment	Response
Surrounding Environment		
County of Maui, Office of Council Chair Alice L. Lee	As you may know, Chair Lee has been advocating for a buffer between Waikapu and Wailuku, and so we are encouraged that your letter that the project includes a park that will serve as a 200-foot buffer. Will this be owned and maintained by the project's homeowners' association, or do you anticipate it being dedicated to the County?	Thank you for the comment. DHHL intends to work with the County to have them maintain the 3.1-acre linear park on the southern portion of the Site. This 200-ft wide linear park is also intended to serve as a buffer between Waikapū and Wailuku that has been requested by the County and community.
State of Hawai'i, Office of Planning & Sustainable Development	We understand and respect that DHHL beneficiaries typically prefer homes on large lots. However, large lot subdivision infrastructure is costly to construct and maintain. DHHL may wish to consider a subdivision layout design that clusters residences to minimize the costs of infrastructure installation and maintenance; or allows for additional homesteads.	Thank you for the comment. The Project encapsulates 204 lots on 77 acres with 173-turn-key homes and 31 vacant lots. The area for each residential lot is consistent with what DHHL has offered to beneficiaries in other residential subdivisions on Maui and is similar to and complements the existing residential lot sizes in the area, keeping with the character of the surrounding subdivision layout designs. This will in turn minimize the cost of infrastructure installation and maintenance and allows for the greatest amount of homesteads as possible.
Traffic and Multimodal Transportation		
Wailuku Heights Extension Community Association	The WHECA Members already feel the transportation corridors are underdeveloped due to extremely long queues at the intersections of Kuikahi Drive and Waiale Road & Maui Lani Parkway and South Kamehameha Avenue for multiple hours in the morning and late afternoon/evening. This transportation system overload does not include the additional loading associated with the soon opening Kaulana Mahina workforce housing development (324 multi-family units) and proposed Kuikahi Village Project (202 residential units). The environmental assessment for the Kuikahi Village Project indicated no significant impact which was based upon a round-a-bout located at the intersection of Kuikahi Drive and Kehalani Mauka Parkway, which according to the developer was removed from the project. WHECA requested involvement in the planning and design of the transportation systems for the Kuikahi Village Project. WHECA has also requested the County of Maui to revise the approved use of the apron of Kuikahi Drive (West of Honoapiilani Highway) to not permit parking of vehicles due to the concern regarding bicycle lane safety.	Thank you for the comment. With the implementation of proposed mitigation measures by DHHL, the Project is not anticipated to result in a significant adverse impact on roadways, access, and traffic conditions in the Site vicinity. These mitigation measures include: optimizing the signal timing at Waiale Road/Kuikahi Drive intersection, the installation of two-way stop controls on minor streets at the Kuikahi Drive /Kehalani Mauka Parkway intersection, and a westbound left-turn storage lane into Site at the east driveway access intersection.

Table 7-2 Responses to Comments Received During Early Consultation		
Stakeholder	**Comment**	**Response**
State of Hawai'i, Department of Transportation	The Hawaii Department of Transportation (HDOT) reviewed the pre-Draft EA consultation materials for the subject Department of Hawaiian Home Lands (DHHL) project and has the following comments:	
	1. There is potential for the project to result in adverse direct, indirect, and cumulative impacts on state highway traffic conditions and multimodal transportation safety.	Thank you for the comment. With the implementation of proposed mitigation measures by DHHL, the Project is not anticipated to result in a significant adverse impact on roadways, access, and traffic conditions in the Site vicinity. These mitigation measures include: optimizing the signal timing at the Waiale Road/Kuikahi Drive intersection, the installation of two-way stop controls on minor streets at the Kuikahi Drive/Kehalani Mauka Parkway intersection, and a westbound left-turn storage lane into Site at the east driveway access intersection. No additional mitigation is recommended.
	2. The HDOT reviewed and commented on the Early Consultation Draft EA and Traffic Impact Assessment Report (TIAR) for the adjacent DHHL Puunani Homestead Subdivision that is currently under construction. We suggest the project development team review these HDOT communications to anticipate and address relevant HDOT comments in the Wailuku Single Family Residential Draft EA.	Thank you for the comment. We have looked at the TIAR and the Draft EA prepared for the DHHL Puunani Homestead Subdivision. With the implementation of the proposed mitigation measures, the Project is not anticipated to result in a significant adverse impact on mass transit, pedestrian or bicycle facilities as the proposed improvements do not involve the obstruction or removal of facilities that would permanently limit the public's use of mass transit, pedestrian, or bicycle routes.
	3. Include a TIAR in the Draft EA for HDOT review. The analysis should assess traffic conditions, multimodal transportation safety conditions and interconnectivity with adjacent developments in the region.	Thank you for the comment. A TIAR has been completed for the Project and included in the Draft EA for HDOT review. This TIAR assesses existing and future traffic conditions, multimodal transportation safety conditions, and interconnectivity with adjacent developments in the region.
	4. The Draft EA project description should clearly describe existing and proposed access routes to the site and the remainder of the parcel. Describe and planned work within the state highway system. Honoapiilani Highway (State Route 30) is on the eastern boundary of the site.	Thank you for the comment. The Project description in the Draft EA will clearly describe the existing and proposed access routes to the site. The Draft EA will also describe any planned work within the state highway system.
	5. Assess the applicability of the following HDOT permits: a) Permit to Perform Work Upon State Highways is required for any work within the state highway Right-of-Way (ROW). b) Permit to operate or Transport Oversize and/or Overweight Vehicles and Loads Over State Highways. c) Permit for	Thank you for the comment. Applicability of HDOT permits will be assessed including permits to perform work upon state highways for any work within the state highway ROW, permits to operate or transport oversize and/or overweight vehicles and loads over state

Table 7-2 Responses to Comments Received During Early Consultation		
Stakeholder	**Comment**	**Response**
	occupancy and Use of State Highway ROW. This applies to underground and overhead power lines and stormwater management structures within the state highway ROW.	highways, and permits for occupancy and use of state highway ROW which also applies to underground and overhead power lines and stormwater management structures within the state highway ROW.
Compliance with Codes and Regulations		
County of Maui, Police Department	In Review of the submitted documents, we have no objections to the upcoming construction project if it meets the minimal standards set forth by county and state laws. If the roads will be temporarily closed due to alternating traffic, we suggest the project manager utilize flag men to conduct traffic control and to have proper signage posted along the routes during construction.	Thank you for the comment. The Contractor will contact you if the roads will be temporarily closed due to alternating traffic that is in need of flag men to conduct traffic control. Proper signage will also be posted along the routes during construction.
County of Maui, Department of Housing & Human Concerns	Based on our review, we have determined that the project is not subject to Chapter 2.96 Maui County Code, and does not require residential workforce housing agreement. At the present time, the Department has no additional comments to offer.	Thank you for your comment. We have noted that the Project does not require residential workforce housing agreement with the County.
No Comment		
County of Maui, Department of Parks and Recreation	In accordance with Maui County Code 18.16.320 Parks and Playgrounds, this project is exempt from park assessment fees. The Department of Parks and Recreation has no further comments at this time.	Thank you for your comment. It has been noted that the Project is exempt from park assessment fees.
State of Hawaii, Disability and Communication Access Board	Thank you for your consideration, however, DCAB does not review environmental issues and therefore has no comments regarding this project proposal. DCAB does provide accessibility-related technical assistance and would welcome the opportunity to provide informal assistance prior to the official submittal for the above-referenced project.	Thank you for your comment. Any guidance and informal assistance on accessibility that you can provide for this Project is appreciated.
State of Hawai‘i, Department of Health	The Environmental Health Services Division has no comments to offer. It is strongly recommended that the Standard Comments found at the Department's website: https://health.hawaii.gov/epo/landuse/ be reviewed and any comments specifically applicable to this project should be adhered to.	Thank you for your comment. The applicable standard comments and mitigation recommendations on the website for Department of Health will be adhered to for the Project.

7.3 Response to Comments Received During the Draft Environmental Assessment Comment Period

Table 7-3: Responses to Comments Received During Draft Environmental Assessment Comment Period			
Stakeholder	**Date**	**Comment**	**Response**
Groundwater and Surface Water Resources			
US Army Corps of Engineers, Honolulu District	3/21/2024	I am reviewing your Draft Environmental Assessment for the Wailuku Single Family Residential Subdivision to determine whether the project will impact any federal jurisdictional waters.	Thank you for your comment. We will work with USACE to ensure that the Project is not affecting any Waters of the United States.
County of Maui Department of Water Supply	05/03/2024	Proposed Project is Within MDWS Wellhead Protection Overlay District (WPOD), Maui County Code (MCC) 19.61: A portion of the proposed project falls within an MDWS well's 2-year time-of-travel Zone B in the WPOD area. The WPOD area models the specific hydrogeological characteristics regarding the migration of chemical pollutants and the survival times of bacteria and viruses to travel to the well. Approximately 53 acres fall into the 2-year time-of-travel Zone B, and approximately 95 acres fall into the 10-year time-of-travel Zone C, which regulates various chemical pollution well contamination concerns. Maui County Code (MCC) 19.61.100 Design Guidelines: The following design guidelines must apply to subdivisions that create four or more developable lots: A. Proposed development and uses must be located as far from the wellhead as feasible. B. Storm-water infiltration basins must be located outside the wellhead protection overlay district where feasible, provided that if this is not feasible, then the basins must be located as far from the wellhead as feasible. C. Active parks and schools must implement a conservation practice standard in accordance with MCC Section 19.61.090(C). D. If a development or use is proposed on property which is partially within a wellhead protection overlay district, the proposed development	Thank you for your review of the Draft Environmental Assessment and for your comment. After further review, only the 10-year time-of-travel Zone C in the Wellhead Protection Overlay District (WPOD) is captured in a portion of the proposed 77-acre Project area, whereas Zone B is located west and outside of the Project area. Also, we have noted that a majority of the proposed 77-acre project will be developed outside of the Zone C wellhead protection area. However, as this Project is a proposed DHHL residential subdivision, a portion of the residential lots and a community park at the southern end of the Site falls within Zone C. This is consistent with other similar residential subdivisions to the South that exist over the Zone C area. The drainage basin proposed for this Project at the northeast corner of the Project is located outside of the wellhead protection overlay district. The drainage basin follows the DWS recommendation to implement feasible BMPs such as permeable detention ponds to reduce stormwater loss which promotes the protection of groundwater and the value of treating stormwater as a resource,

		or use must be located to the maximum extent feasible on the portion of the property that is outside the wellhead protection overlay district. MAUI ISLAND WATER USE AND DEVELOPMENT PLAN (WUDP) The proposed project may have the potential to accomplish stormwater management within the proposed project footprint, which could be used for stormwater mitigation and retention for irrigation reuse; however, storm-water infiltration basins should be located outside the Wellhead Protection Overlay District where feasible, and if not, then the basins shall be located as far from the wellhead as practicable. The Commission on Water Resource Management (CWRM) promotes the protection of groundwater and the value of treating stormwater as a resource, including groundwater recharge capability when contained onsite. We recommend implementing Best Management Practices (BMPs) contained in the document, such as permeable surfaces to reduce stormwater loss (for example, permeable detention ponds and vegetated filter strips), and bio-retention rain gardens. MCC 19.61.090 Best Management Practices (BMPs) The following standards apply to uses in zones B and C of any WPOD. Construction activities must be in accordance with MCC Chapter 20.08 and the following standards: 1. There must be a designated person on-site during construction activities who must be responsible for supervising the use, storage, and handling of hazardous material and who must take appropriate mitigating actions necessary in the event of fire or spill. 2. Hazardous materials left on site when the site is unsupervised must be inaccessible to the public. Locked storage sheds, locked fencing, locked fuel tanks on construction vehicles, or other techniques may be used if they will prevent access. 3. Construction vehicles and stationary equipment that are found to be leaking fuel, hydraulic fluid, or other hazardous materials must be removed from the site and from any wellhead protection overlay district zone. The vehicle or equipment may be repaired in place, provided the leakage is completely contained. 4. Hazardous materials must not be allowed to enter stormwater systems. Conservation BMPs Indoor	including groundwater recharge capability when contained onsite. DHHL has within its power to supersede these recommendations, however DHHL will work with DWS to incorporate BMPs as feasible.

		1. Use EPA WaterSense labeled plumbing fixtures. 2. Install bathroom sink faucets with fixtures that do not exceed 1 gallon per minute (GPM) and showerheads with a flow rate of 1.5 GPM at 60 psi. Outdoor 1. Use Smart Approved WaterMark irrigation products. Examples include evapotranspiration irrigation controllers, drip irrigation, and water saving spray heads. 2. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaiʻi. 3. Use native Hawaiian climate-adapted plants for landscaping. Native Hawaiian plants adapted to the area conserve water and protect the watershed from degradation due to invasive species. 4. After plant establishment, to avoid stimulating excessive growth, avoid fertilizing and pruning. Time watering to occur in the early morning or evening to limit evaporation. Limit the use of turf. 5. Replanting of denuded areas should include soil amendments and temporary irrigation. Use high seeding rates to ensure rapid establishment of stands of plants. 6. Retain ground cover until the last possible date. Stabilize denuded areas by sodding or planting as soon as possible. Use high seeding rates to ensure rapid establishment of stands of plants. 7. Avoid fertilizers and biocides, or apply biocides only during dry periods of low rainfall.	As feasible, the proposed park will follow MCC standards and will aim to incorporate the indoor and outdoor water conservation BMPs listed in your letter.
Traffic			
Maui Economic Opportunity, Inc.	3/25/2024	Our only concerns are about traffic. Because we run The Maui Bus ADA Paratransit and County of Maui Human Services specialized transportation systems, our buses need to traverse the corridors of the project without significant delay or safety hazards. MEO wants to remain on schedule because our buses transport clients to dialysis and health appointments.	Thank you for the comment. The Project is not anticipated to cause any significant delay or present any safety hazards to The Maui Bus ADA Paratransit and County of Maui Human services specialized transportation systems operations.

Wailuku Heights Extension Community Association	4/8/2024	**Section 3.9 Transportation/Traffic**- The report indicates that this development will only add 24-34 vehicles during peak am/pm traffic periods. This development is advertised as base level income housing and low-incomehousing (we fully support this use) which has a high percentage of working-class citizens. We also know that these community members tend to have large amounts of family members living in a single-family residence. We believe that the data used in this study is highly suspect. We request that this specific section of the report be peer reviewed by knowledgeable professionals. Based upon our concerns regarding the data used to develop the study, we believe the traffic scenarios represented will be misrepresenting actual traffic scenarios. Our community members already feel the transportation corridors are underdeveloped due to extremely long queues at the intersections of Kuikahi Dr. and Waiale Rd. & Maui Lani Parkway and South Kamehameha Avenue for multiple hours in the morning and late afternoon/evening. This transportation system overload does not include the additional loading associated with the soon opening Kaulana Mahina workforce housing development (324 multi-family units) and proposed Kuikahi Village Project (202 residential units). The environmental assessment for the Kuikahi Village Project indicated no significant impact which was based upon a round-a-bout located at the intersection of Kuikahi Dr. and Kehalani Mauka Parkway, which according to the developer was removed from the project. Our organization requested involvement in the planning and design of the transportation systems for the Kuikahi Village Project. Our community has also requested the County of Maui revise the approved use of the apron of Kuikahi Dr. (West of Honoapiilani highway) to not permit parking of vehicles due to the concern regarding bicycle lane safety.	Thank you for your review of the Draft Environmental Assessment and for your comment. The TIAR indicates 143(195) new project trips generated by the Project during the AM(PM) peak hours of traffic. Trip generation for the Project is based upon guidance set forth in the Trip Generation Manual, 11th Edition, published by the Institute of Transportation Engineers (ITE), which is the standard trip generation methodology that is accepted by the State of Hawaii Department of Transportation and County of Maui. The Kaulana Mahina project was included in Base Year projections and listed in Section 4.2 of the TIAR under its name at the time, "Wailuku Apartments". The Kuikahi Village project was also included in Base Year projections under the name "Kuikahi Residential". The TIAR states that with Future Year projections, traffic volumes at the Kuikahi Drive/Kehalani Mauka Parkway fall just short of meeting a signal warrant. Therefore, it was assumed that the intersection would operate with two-way stop control upon buildout. If, at a future date, a signal warrant is found to be met based upon actual volumes, a signal or roundabout could be considered for implementation, provided that design constraints, including sight distance requirements can be met during the design phase. Ultimately, the type (signal vs roundabout) and timing of the traffic control device that will be installed will be the discretion of the County of Maui. Kuikahi Drive falls under the jurisdiction of

			the County of Maui, and therefore, the County will specify parking allowances along Kuikahi Drive.
		Our community members are deeply concerned about the condition of the existing transportation systems and the lack of analysis of emergency evacuation in a fire scenario. This is a very serious concern due to the direction and velocity of the prevailing winds and the fact that our community will be at the end of the transportation corridors required for an expedient emergency escape. Based upon this concern our community members request a thorough and comprehensive engineering study regarding the load currently on the transportation system(s) and proposed load associated with all these additional developments on the transportation system(s).	The Wailuku Single-Family Residential Subdivision will be configured so that each home will have a minimum of two emergency fire evacuation routes to Kuikahi Drive as prescribed by Maui County's Fire Code. Once at Kuikahi Drive, evacuees can reach Honoapiilani Highway via either Kuikahi Drive or Kehalani Mauka Parkway; or Main Street via Alu Road. Development of the Wailuku Single-Family Residential Subdivision will replace unmanaged and relatively inaccessible existing fallow agricultural and pasture lands with Fire Code-compliant, fire-resistant buildings served by underground powerlines, Fire Code-compliant access roads, and a modern County-maintained fire protection system that together will enable faster emergency response, reliable containment and effective suppression of any potential fires that may occur in the project area.
		The Board of Directors of the Wailuku Heights Extension Phase 1 Home Owners Association are requesting to be involved in the design of the site and transportation corridors associated with your project. We are requesting a seat at the table in the early design phases as we feel our representation of our perspective/opinion on the proposed site and roadway design to accommodate the project is of utmost importance. We ask to be notified of the next design meeting with the DPW and Hawaii DOT so we may attend and observe the design discussion. We will be requesting legal standing regarding the environmental planning process of this project.	Regional traffic congestion which was observed in existing conditions is anticipated to be addressed by the planned, future Waiale Road Extension, which is anticipated to reduce volumes along Kuikahi Drive, and the planned Maui Lani Parkway Extension, which is anticipated to reduce volumes and congestion along Waiale Road between Kuikahi Drive and Waiinu Road. To improve operations upon build-out of the Project, the TIAR recommended that the signal at the Waiale Road/Kuikahi Drive intersection be optimized.

Phillip P	4/8/2024	Hi, I'm writing to oppose this subdivision on 101 Kuikahi Drive. The heavy traffic flow right now, makes commute stressful. With the new hawaiian homes and new apartments coming up. It will add even more commute time. Traffic is backed up from kehalani foodland coming down to the maui lani roundabout and on to Kamehameha Ave. More and more people are taking waiko rd as by pass but even then that road is getting backed up. By having more traffic, longer wait time drivers will become more impatient and will be speeding, with schools near by, kids crossing dangerous and poorlyplan roundabout, heavy traffic for miles away is a recipe for disaster.The roads/ its design are not big enough to handle the traffic as it is right now, let alone more subdivision ex: anuhea is only 70% complete and more subdivision/ homes to come. With hawaiian homes not subject to "additional" building permits many build small homes will start and turn simple homes into "filaminimums" which means additional dwellings and eventually becomes a parking mess and fire hazard.	Thank you for your review of the Draft Environmental Assessment and for your comment. The DHHL is generally supportive of governmental efforts to create a reasonable nexus-based traffic impact fee system which can be equitably applied to all developments, and which will help implement regional traffic improvements. However, at the same time, the DHHL's position is unique from other larger scale master planned development projects, as it seeks to target affordable housing needs specifically for its Native Hawaiian beneficiaries and their families. The proposed action calls for single family housing units that aims to encourage parking within the subdivision and not along Kuikahi Drive or along other travel corridors such as Honoapiilani Highway and Kehalani Mauka Parkway. Regional traffic congestion which was observed in existing conditions is anticipated to be addressed by the planned, future Waiale Road Extension, which is anticipated to reduce volumes along Kuikahi Drive, and the planned Maui Lani Parkway Extension, which is anticipated to reduce volumes and congestion along Waiale Road between Kuikahi Drive and Waiinu Road. To improve operations upon build-out of the Project, the TIAR recommended that the signal at the Waiale Road/Kuikahi Drive intersection be optimized.
Education			
Wailuku Heights Extension Community Association	4/8/2024	Community members associated with the local school systems have indicated that the existing schools are in an overload condition and believe that there needs to be sufficient study efforts made to determine the expansion needs of the local school systems. This particular study simply concludes that the future analysis (projections) of pupils is to be decreasing, yet there is no actual data analysis presented.	Thank you for your review of the Draft Environmental Assessment and for your comment. According to our letter received from the State of Hawaii Department of Education, the schools in the area will be operating below capacity. For more information, please see the State of Hawaii Department of Education comments in *Appendix B: Early Consultation Comments* or please contact the State of Hawaii Department of Education. DHHL

			must rely on the State DOE's letter since they are the controlling jurisdiction for our local school systems. We would also like to reiterate that the DOE is in the process of acquiring additional adjacent land to expand the Pu'u Kukui Elementary School.
Wildfire			
Maui Economic Opportunity, Inc.	3/25/2024	In addition, given the August 8 wildfires, MEO hopes there are multiple access routes to the new project and throughout the region should there be fires or other disasters/emergencies.	Thank you for your review of the Draft Environmental Assessment and for your comment. There are currently two access points in and out of the subdivision. In the case of an emergency and the main road through the subdivision gets inundated, the southern portion of the subdivision may utilize a secondary emergency access route along a portion of the Old Waikapu Road.
Wailuku Heights Extension Community Association	4/8/2024	**Section 3.3.5 Wildfire** -Our community association does not agree with the statement that this area is not considered a wildfire risk area. Our community association has noticed long periods of drought drying out yards, farmlands, etc. while there is a prevailing wind moving from the Northeast up through to the West Maui mountains. Claiming that our proximity to the Iao valley provides wildfire protection to our communities seems like a direct misunderstanding/misrepresentation of our community geography and specific wildfire conditions. This statement created great concern in our community association and therefore we request that this specific section of the report be peer reviewed by knowledgeable professionals. We also disagree that this development does not include improvements that will increase risk of public safety during a wildfire event as the transportation corridor requires analysis based upon what was learned from the Lahaina fire. It would be a great disservice to all our Wailuku communities if this analysis is not completed with an honest evaluation of data associated with the Lahaina wildfire. We request that this specific section of the report be peer reviewed by knowledgeable professionals. This is a very serious concern due to the direction and velocity of the prevailing winds and the fact that our community will be at the end of the transportation corridors required for an expedient emergency	Thank you for your review of the Draft Environmental Assessment and for your comment. We worked with Hawaii Wildfire Management Organization (HWMO), the leading experts in wildfire prevention, management and recovery in the State of Hawai'i, to best mitigate any fire hazards that could be present within the Project area. The designation wild fire risk areas comes from the Maui County Hazard Mitigation Plan Update released in August of 2020. At the time, this was the most up to date data on fire risk areas available. We have amended our statement to reflect the findings of HWMO the localized area of Wailuku is designated as moderate to high-risk. However, by adhering to the best practices laid out by HWMO, the Project, through proper design, can potentially contribute to reducing the overall risk of wildfire ignition and spread throughout the area by utilizing currently fallow lands and implementing best management practices at a localized scale. For more information please see *Appendix J: Hawaii*

		escape. Based upon this concern our community members request a thorough and comprehensive engineering study regarding the load currently on the transportation system(s) and proposed load associated with all these additional developments on the transportation system(s). We will also be requesting that the County of Maui and the State of Hawaii complete a revised technical review and updated plan for a wildfire emergency evacuation. This plan will be required to include technical data obtained from the analysis of the Lahaina fire.	*Wildfire Management Organization Memo for the Wailuku SFR Subdivision Project* Your point on a thorough study on transportation corridors is well founded. The Project will have an evacuation plan in place in the case of a natural hazard, a wildfire or any other emergency event that requires the community to evacuate. HWMO also encouraged other residential subdivisions, such as WHECA, to participate in Hawai'i's Firewise Communities Program. A thorough transportation and engineering study has been conducted for the area that is inclusive of the additional developments on the transportation system. These studies can be found in *Appendix D: Preliminary Engineering Report,* and *Appendix F: Traffic Impact Analysis Report*. The Project will replace unmanaged and relatively inaccessible existing fallow fields of invasive grasses with Fire Code-compliant buildings, Fire Code-compliant access roads, and a modern County-maintained fire protection system with fire hydrants that together will enable faster emergency response, reliable containment and effective suppression of any fires that may occur in the Project area.
Division of Forestry and Wildlife	4/18/2024	Due to the arid climate and risks of wildfire to listed species, we recommend coordinating with the Hawai'i Wildfire Management Organization at (808) 850-0900 or admin@hawaiiwildfire.org, on how wildfire prevention can be addressed in the project area. When engaging in activities that have a high risk of starting a wildfire (i.e. welding in grass), it is recommended that you: • Wet down the area before starting your task, • Continuously wet down the area as needed, • Have a fire extinguisher on hand, and • In the event that your vision is impaired, (i.e. welding goggles) have a spotter to watch for fire starts.	Thank you for reviewing the Draft Environmental Assessment and for your comments back. The Project team has contacted Hawai'i Wildfire Management Organization and have incorporated their recommendations to minimize any potential wildfire events. During the construction and operation phases of the Project, DHHL will encourage the contractor and DHHL lessees to abide by the recommendation set forth by HWMO and DOFAW to prevent a wildfire event.

Wildlife			
Division of Forestry and Wildlife	4/18/2024	DOFAW provides the following additional comments regarding the potential for the proposed work to affect listed species in the vicinity of the project area. DOFAW recommends minimizing the movement of plant or soil material between worksites. Soil and plant material may contain detrimental fungal pathogens (e.g., Rapid ʻŌhiʻa Death), vertebrate and invertebrate pests (e.g., Little Fire Ants, Coqui Frogs, etc.), or invasive plant parts (e.g., African Tulip, Octopus Tree, Trumpet Tree, etc.) that could harm our native species and ecosystems. We recommend consulting the Big Island Invasive Species Committee (BIISC) at (808) 933-3340 to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species. DOFAW is concerned about impacts to vulnerable birds from nonnative predators such as cats, rodents, and mongooses. We recommend taking action to minimize predator presence; remove cats, place bait stations for rodents and mongoose, and provide covered trash receptacles. Cats prey on native birds, including State-listed endangered waterbirds, seabirds, and forest birds. Predation is instinctive and means that even well-fed cats will hunt and kill wildlife. Therefore, DOFAW recommends that homeowner associations request that residents with pet cats be kept indoors or safely contained. In addition, no feeding of feral cats should occur on the premises. 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.	Thank you for reviewing the Draft Environmental Assessment and for your comments back. A biological study was conducted for the Site and did not find any ʻōhiʻa trees on site or little fire ants, coqui frogs, African Tulip, Octopus trees, or trumpet trees. The most abundant plant species in the area include Guinea grass and koa haole, while the most abundant fauna species in the area include goats and spotted doves. Despite the low risk, the movement of soil and plant material will be contained and minimized to greatest extent possible during the construction phase. This will ensure the containment of any fungal pathogens, vertebrate and invertebrate pests, invasive plants and invasive plant parts that could possibly harm native species and ecosystems. The Project recognizes the threat that nonnative predators pose on vulnerable native bird species. Covered trash receptacles will be used during the construction phase of the Project. DHHL will also inform future lessees of the dangers of nonnative predator species. DHHL will also inform the lessees that residents with pet cats be kept indoors or safely contained at all times. In addition, no feeding of feral cats should occur on the premises.

Compliance with Codes and Regulation			
County of Maui Department of Housing & Human Concerns	3/8/2024	Based on our review, we have determined that the project is not subject to Chapter 2.96, Maui County Code, and does not require a residential workforce housing agreement. At the present time the Department has no additional comments to offer.	Thank you for your review of the Draft Environmental Assessment and for your comment. We have noted that the Project does not require a residential workforce housing agreement.
State of Hawaii Department of Education	4/8/2024	Thank you for your letter dated March 6, 2024. The Hawaii State Department of Education (Department) previously provided comments dated November 27, 2023 and would like to provide the following information. Based on the information provided, the Department has determined that the Wailuku Single Family Residential Subdivision Project is exempt from paying the School Impact fees. Pursuant to Hawaii Revised Statute Section 302A-1603, any form of housing developed by the Department of Hawaiian Home Lands for use by beneficiaries of the 1920 Hawaiian Homes Commission Act.	Thank you for your review of the Draft Environmental Assessment and for your comment. We have noted that the DOE has determined that the Project is exempt from paying School Impact fees pursuant to Hawaii Revised Statutes Section 302A-1603, any form of housing developed by the Department of Hawaiian Home Lands.
County of Maui Department of Planning	4/8/2024	The Department of Planning (Department) is in receipt of the above-referenced Draft EA for the Wailuku Single Family Residential Subdivision. For preparation of the Final EA, the Department provides the following comments: The Department notes that the Department of Hawaiian Home Lands (DHHL) has elected to pursue an Archaeological Monitoring Plan. Once completed, the Department is requesting a copy of the accepted plan, as well as a copy of the plan approval by the Department of Land and Natural Resources-State Historic Preservation Division for our files. The proposed traffic mitigation is noted. The Department suggests that you obtain comments from the Department of Public Works, as well as the State Department of Transportation to attempt to further alleviate regional traffic. The amount of units proposed is substantive enough that regional traffic mitigation must be considered. We note the proposed bikeways/pedestrian paths along the roadways. We urge DHHL to consider adding more bikeways/pedestrian paths, in particular to connect subdivisions, similar to the adjacent Kehalani Project District area. It will be much safer and provide another option of getting to/from the area, away from traffic. We recommend that native street trees be planted.	Thank you for your review of the Draft Environmental Assessment and for your comment. Once completed and accepted by SHPD, a copy of the Archaeological Monitoring Plan, as well as a copy of the plan approval by the Department of Land and Natural Resources- State Historic Preservation Division will be sent to the County of Maui Department of Planning. We have also requested comments from the Department of Public Works during the Early consultation period and during the Draft Environmental Assessment 30-day comment period and have not received correspondence. We have also reached out to the State Department of Transportation and they responded that the Project traffic would not have a significant adverse impact on Honopiʻilani Highway intersections. They also support the TIAR (Section 10) recommendations for roadway improvements on county roadways to improve regional traffic conditions. They further state that no recommendations are warented or proposed for state highways.

			We have also noted your comment on adding more bikeways/pedestrian paths to connect subdivisions similar to the adjacent Kehalani Project District areas. The design process will best try to implement multimodal travel including walking and biking. We have noted your comment about planting native street trees. This Project will implement the planting of Native trees where possible while also preserving the character of the surrounding area.
State of Hawaii Department of Transportation	4/9/2024	1. Thank you for addressing HDOT's early consultation comments (HWY-PL 23-2.3623 dated November 16, 2023) in the DEA. 2. The project will be accessed from two driveways on Kuikahi Drive (County jurisdiction). Honoapiilani Highway (State Route 30) is adjacent to the eastern boundary of the site and intersects with Kuikahi Drive at the northeast corner of the site. The site's eastern driveway is approximately 700 feet from the Honoapiilani Highway and Kuikahi Drive intersection. No access driveways are proposed on Honoapiilani Highway; therefore, the project would not have adverse direct impacts on state highways traffic conditions. 3. We reviewed the Traffic Impact Assessment Report (TIAR), dated November 6, 2023 (4 of the 22 intersections studied included Honoapiilani Highway). All four intersections operate at overall Level of Service (LOS) C or better during peak traffic hours, under existing conditions. Currently, there are 14 new or expansion of existing developments planned in the site vicinity by 2028, which is the year of project occupancy. The increased number of trips due to regional growth (without project) by 2028 would result in LOS E or F for specific turning movements during peak traffic hours at Honoapiilani Highway intersections with Kehalani Highway and Kuikahi Drive. The overall LOS for these two intersections would be D without the project. The proposed project would increase the traffic volume by less than two percent on Honoapiilani Highway in 2028 during peak traffic hours. The overall LOS at these two intersections remains at D, but some turning movements would experience additional delays with the project. The planned Waiale Road Extension and the Maui Lani Parkway Extension projects are to be completed by 2028 and would mitigate regional traffic conditions. Specifically, the Honoapiilani	Thank you for your review of the Draft Environmental Assessment and for your comment. We have noted that HDOT's early consultation comments were addressed in the DEA. We also note that HDOT supports the TIAR recommendations for roadway improvements on county roadways to improve regional traffic conditions. We also note that HDOT has no recommendations warranted or proposed for state highways.

		Highway and Kuikahi Drive intersection would improve overall from LOS D to C, and all turning movements would operate at LOS D or better with or without the project, during peak traffic hours. The Honoapiilani Highway and Kehalani Highway intersection is less affected by the planned roadway extensions and remains overall at LOS D, with or without the project. The project traffic would not have a significant adverse impact on the Honoapiilani Highway intersections. We support the TIAR (Section 10) recommendations for roadway improvements on county roadways to improve regional traffic conditions. No recommendations are warranted or proposed for state highways. 4. The DEA (Section 3.8.3) describes an increase in site runoff of 117.5 cubic feet per second. No additional discharge of surface water run-off onto the Honoapiilani Highway right-of-way is permitted. This includes the use of the existing state drainage culverts and channels. All additional stormwater runoff from the project site shall be managed and mitigated onsite or diverted from Honoapiilani Highway. 5. Utility improvements are proposed within the Honoapiilani Highway right-of-way and the HDOT permits are required, as noted in Draft EA Section 3.9. 6. The proposed residence project is approximately 3.52 miles from the property boundary of Kahului Airport (OGG). All projects within 5 miles from Hawaii State airports are advised to read the Technical Assistance Memorandum (TAM) for guidance with development and activities that may require further review and permits. The TAM can be viewed at this link: http://files.hawaii.gov/dbedt/op/docs/TAM-FAA-DOTAirports_08-01-2016.pdf. 7. Federal Aviation Administration (FAA) regulation requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or Alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9, if the construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. Construction equipment and staging area heights, including heights of temporary construction cranes, shall be included in the submittal. The form and criteria for submittal can be found at the following website: https://oeaaa.faa.gov/oeaaa/external/portal.jsp. Please provide a copy of the FAA response to the Part 77 analysis to the HDOT Airport Planning Section.	We have noted your comment on additional site runoff and will ensure that any additional stormwater runoff from the Site shall be managed and mitigated onsite or diverted from Honoapiilani Highway. The Project will require utility improvements. The proper HDOT permits will be secured before utility improvement work within the Honoapiilani Highway right-of-way. The Project also lies within 3.52 miles from the Kahului Airport (OGG) property boundary and will read the Technical Assistance Memorandum (TAM). The Federal Aviation Administration (FAA) requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or Alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9 if the Project is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway. However, this Project will not exceed a 100:1 surface from any point on the runway and therefore does not require the submittal of an FAA Form 7460-1 (Please see *Figure 3-18 Flight pathways from Kahului Airport)*

		8. Due to the project's proximity to OGG, the applicant and future beneficiaries should be aware of potential single event noise from aircraft operations. There is also a potential for fumes, smoke, vibrations, odors, etc., resulting from occasional aircraft flight operations over or near the project. These incidences may increase or decrease over time and are dependent on airport operations. 9. If a solar energy photovoltaic (PV) system is going to be installed, be aware that PV systems located in or near the approach path of aircrafts can create a hazardous condition for pilots due to possible glint and glare reflected from the PV panel array. If glint or glare from the PV array creates a hazardous condition for pilots, the owner of the PV system shall be prepared to immediately mitigate the hazard upon notification by the HDOT and/or FAA. The FAA requires a glint and glare analysis for all solar energy PV systems near airports. The www.sandia.gov/glare website has information and guidance with the preparation of a glint and glare analysis. A separate FAA Form 7460-1 will be necessary for the solar energy PV system. After the FAA determination of the Form 7460-1 glint and glare analysis, a copy shall be provided to the HDOT Airport Planning Section by the owner of the solar energy PV system. Solar energy PV systems have also been known to emit radio frequency interference (RFI) to aviation-dedicated radio signals, thereby disrupting the reliability of air-to-ground communications. Again, the owner of the solar energy PV system shall be prepared to immediately mitigate the RFI hazard upon notification by the HDOT and/or FAA. 10. The proposed development shall not provide landscape and vegetation that will create a wildlife attractant, which can potentially become a hazard to aircraft operations. Please review the FAA Advisory Circular 150/5200-33C, Hazardous Wildlife Attractants On Or Near Airports for guidance. If the project's landscaping creates a wildlife attractant, the developer shall immediately mitigate the hazard upon notification by the HDOT and/or FAA.	We have noted your comment and future lease holders will be made aware of potential single event noise from aircraft operations. They will also be made aware of potential for fumes, smoke, vibrations, odors, etc., resulting from occasional aircraft flight operations over or near the project. We also note that these incidences may increase or decrease over time and are dependent on airport operations. Solar energy photo voltaic (PV) systems may be offered as an option on the residential homes. If any lease holder would like to incorporate PV for their homes, they will be made aware that they may be required to complete a glint and glare analysis and the need for a separate FAA form 7460-1. They will also be made aware that they may be required to mitigate any impacts caused by glint and glare and radio frequency interference (RFI). The Project's landscaping and vegetation does not intend to create a wildlife attractant. DHHL will review the FAA Advisory Circular 150/5200-33C, Hazardous Wildlife Attractants On Or Near Airports for guidance. If the project's landscaping creates a wildlife attractant, DHHL shall immediately mitigate the hazard upon notification by the HDOT and/or FAA.
Comments in Support			

Pu'uhona Hawaiian Homestead Association	3/12/2024	I fully support this initiative which aims to provide housing for native Hawaiian families. After reviewing the project EA, I find no issues or objections. The assessment adequately addresses the project's impacts, which are not deemed significant and are typical for any housing project. Moreover, any potential minor impacts are overshadowed by the urgent need of DHHL beneficiaries who have been awaiting access to land for decades. Increasing the housing inventory through projects like this one will also alleviate Maui's housing shortage, providing long-term housing solutions for our hardworking local families.	Thank you for your review of the Draft Environmental Assessment and we thank you for your support on the Project.
Ginger Kapaku (Private Citizen	3/26/2024	I'm glad what I read for Maui to move on to next step. There's so much to read but action is moving on to next project to have native Hawaiian on Hawaiian Home Lands. I am one is waiting very patiently .	Thank you for your review of the Draft Environmental Assessment and we thank you for your support on the Project.
No Comment			
State of Hawaii, Department of Accounting & General Services	3/13/2024	No comment.	Thank you for your review of the Draft Environmental Assessment and for your comment.
State of Hawaii, Department of Health, Clean Air Branch	3/18/2024	The Department of Health Clean Air Branch has no further comments on the subject DEA-AFNSI.	Thank you for your review of the Draft Environmental Assessment and for your comment.
State of Hawaii, Office of Planning & Sustainable Development	4/4/2024	The Office of Planning and Sustainable Development (OPSD) previously commented on the project during the early consultation period. OPSD finds that the DEA has addressed our suggestion regarding an alternate subdivision design and has no further comment.	Thank you for your review of the Draft Environmental Assessment and for your comment.
State of Hawaii, Department of Land and Natural Resources: Engineering Division	4/5/2024	We have no additional comments	Thank you for your review of the Draft Environmental Assessment and for your comment.
County of Maui Department of Fire & Public Safety	4/9/2024	Thank you for the opportunity to review your project. At this time, the Fire Prevention Bureau has no comments.	Thank you for your review of the Draft Environmental Assessment and for your comment.

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Chapter 8

References

Chapter 8

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Appendices

Appendix A

Preliminary Plans

LILILEHUA
2 BEDROOM, 1 BATH

AREA CALCULATION

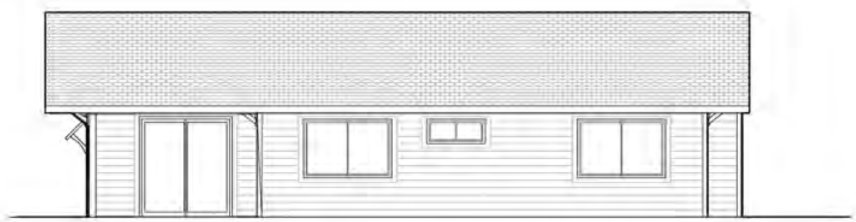
FIRST FLOOR LIVING AREA:	764 S.F.
GARAGE AREA:	416 S.F.
COVERED ENTRY:	50 S.F.
TOTAL FLOOR AREA:	1,230 S.F.

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.

LILILEHUA

2 BEDROOM, 1 BATH
ONE STORY

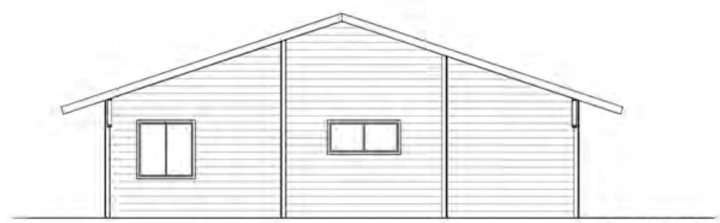
FRONT ROAD ELEVATION



BACK ELEVATION

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.

LIVING ROOM ELEVATION



GARAGE SIDE ELEVATION


LILILEHUA MODEL
Not to scale. Subject to change. These drawings are conceptual only and for the convenience of reference. It should not be relied upon as representation express or implied, of the final size, location or dimensions of any lot, building area, or house. The developer, its agents, associate companies, and suppliers expressly reserve the right to make any modifications,
revisions, and changes it deems desirable by law or governmental bodies including but not limited to modifying plans, building elevations including paint colors, roof design, specifications, features and sales price without prior notice or obligation. Does not include furniture, certain appliances, home accessories and plants, exterior landscaping, and/or vehicles.

ILIMA

3 BEDROOM, 2 BATH

AREA CALCULATION

FIRST FLOOR LIVING AREA:	1,211 SF
GARAGE AREA:	494 SF
COVERED ENTRY:	79 SF
TOTAL FLOOR AREA:	1,784 SF

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.

ILIMA

3 BEDROOM, 2 BATH
ONE STORY

RIGHT SIDE ELEVATION

LEFT SIDE ELEVATION

REAR ELEVATION

FRONT ELEVATION

ILIMA WITH FAMILY ROOM

3 BEDROOM, 2 BATH

AREA CALCULATION

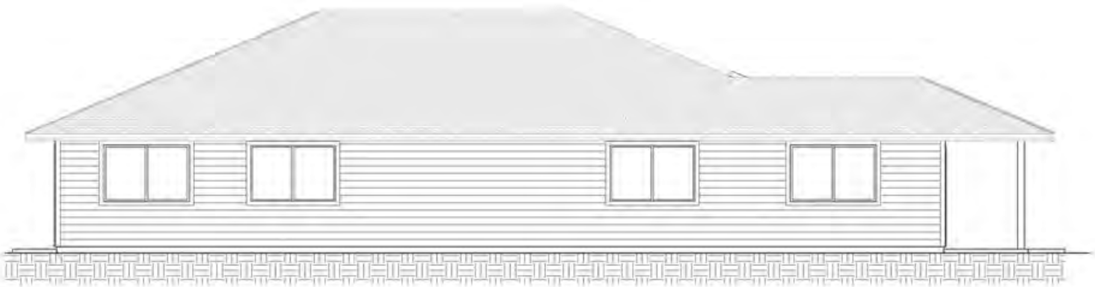
FIRST FLOOR LIVING AREA:	1,527 SF
GARAGE AREA:	494 SF
COVERED ENTRY:	79 SF
TOTAL FLOOR AREA:	2,100 SF

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.

ILIMA
WITH FAMILY ROOM

3 BEDROOM, 2 BATH
ONE STORY

RIGHT SIDE ELEVATION



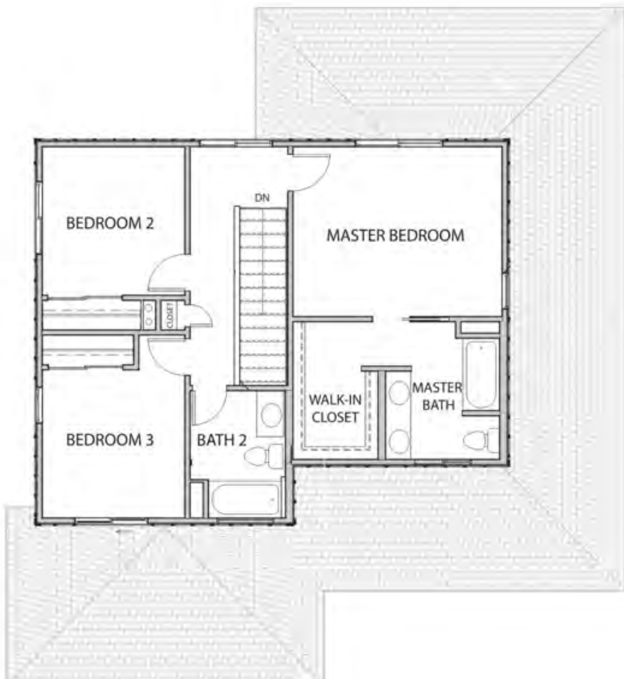
LEFT SIDE ELEVATION

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.

REAR ELEVATION

FRONT ELEVATION


ILIMA MODEL
Not to scale. Subject to change. These drawings are conceptual only and for the convenience of reference. It should not be relied upon as representation express or implied, of the final size, location or dimensions of any lot, building area, or house. The developer, its agents, associate companies, and suppliers expressly reserve the right to make any modifications, revisions, and changes it deems desirable by law or governmental bodies including but not limited to modifying plans, building elevations including paint colors, roof design, specifications, features and sales price without prior notice or obligation. Does not include furniture, certain appliances, home accessories and plants, exterior landscaping, and/or vehicles.



2ND LEVEL FLOOR PLAN

MAIN LEVEL FLOOR PLAN

MOKIHANA

4 BEDROOM, 3 BATH

AREA CALCULATION

FIRST FLOOR LIVING AREA:	830 SF
SECOND FLOOR LIVING AREA:	774 SF
TOTAL LIVING AREA:	**1,604 SF**
GARAGE AREA:	459 SF
COVERED ENTRY:	55 SF
TOTAL FLOOR AREA:	**2,118 SF**

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.

MOKIHANA

4 BEDROOM, 3 BATH
TWO STORY

LEFT SIDE ELEVATION

RIGHT SIDE ELEVATION

REAR ELEVATION

FRONT ELEVATION

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.


MOKIHANA MODEL
Not to scale. Subject to change. These drawings are conceptual only and for the convenience of reference. It should not be relied upon as representation express or implied, of the final size, location or dimensions of any lot, building area, or house. The developer, its agents, associate companies, and suppliers expressly reserve the right to make any modifications,
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LEHUA

4 BEDROOM, 3 BATH

AREA CALCULATION

FIRST FLOOR LIVING AREA:	800 SF
SECOND FLOOR LIVING AREA:	804 SF
TOTAL LIVING AREA:	**1,655 SF**
GARAGE AREA:	472 SF
COVERED ENTRY:	26 SF
TOTAL FLOOR AREA:	**2,153 SF**

2ND LEVEL FLOOR PLAN

MAIN LEVEL FLOOR PLAN

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.

LEHUA
4 BEDROOM, 3 BATH
TWO STORY

RIGHT SIDE ELEVATION

FRONT ELEVATION

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.

REAR ELEVATION

LEFT SIDE ELEVATION


LEHUA MODEL
Not to scale. Subject to change. These drawings are conceptual only and for the convenience of reference. It should not be relied upon as representation express or implied, of the final size, location or dimensions of any lot, building area, or house. The developer, its agents, associate companies, and suppliers expressly reserve the right to make any modifications, revisions, and changes it deems desirable by law or governmental bodies including but not limited to modifying plans, building elevations including paint colors, roof design, specifications, features and sales price without prior notice or obligation. Does not include furniture, certain appliances, home accessories and plants, exterior landscaping, and/or vehicles.

LOKELANI

5 BEDROOM, 3 BATH

AREA CALCULATION

FIRST FLOOR LIVING AREA:	802 SF
SECOND FLOOR LIVING AREA:	874 SF
TOTAL LIVING AREA:	**1,676 SF**
GARAGE AREA:	457 SF
COVERED ENTRY:	79 SF
TOTAL FLOOR AREA:	**2,212 SF**

2ND LEVEL FLOOR PLAN

MAIN LEVEL FLOOR PLAN

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.

LOKELANI

5 BEDROOM, 3 BATH
TWO STORY

REAR ELEVATION

LEFT SIDE ELEVATION

RIGHT SIDE ELEVATION

FRONT ELEVATION

Not to scale. Subject to change. The developer, its agents, associate companies and suppliers reserve the right to modify plans, building elevations, roof design, specifications, features and sales price without prior notice or obligation. Plan does not reflect final construction. Does not include furniture or vehicles.


LOKELANI MODEL
Not to scale. Subject to change. These drawings are conceptual only and for the convenience of reference. It should not be relied upon as representation express or implied, of the final size, location or dimensions of any lot, building area, or house. The developer, its agents, associate companies, and suppliers expressly reserve the right to make any modifications, revisions, and changes it deems desirable by law or governmental bodies including but not limited to modifying plans, building elevations including paint colors, roof design, specifications, features and sales price without prior notice or obligation. Does not include furniture, certain appliances, home accessories and plants, exterior landscaping, and/or vehicles.

Appendix B

Early Consultation Comments

JOSH GREEN, M.D.
GOVERNOR

KEITH T. HAYASHI
SUPERINTENDENT

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

OFFICE OF FACILITIES AND OPERATIONS

November 27, 2023

Mark Kawika McKeague, AICP
G70
111 S. King Street, Suite 170
Honolulu Hawaii 96813

Re: Request for Early Consultation to Prepare a Hawaii Revised Statute, Chapter 343 Draft Environmental Assessment, Wailuku Single Family Residential, 101 Kuikahi Drive Waikapu, Island of Maui, Hawaii, Tax Map Key: (2)3-5-002:003 (por.)

Dear Mr. McKeague:

Thank you for your letter dated November 3, 2023. The Hawaii State Department of Education (Department) has reviewed the information provided and has the following comments on the Request for Early Consultation to Prepare a Hawaii Revised Statute, Chapter 343 Draft Environmental Assessment for the Wailuku Single Family Residential (Project).

The Department has determined that the schools servicing the Project area are Puu Kukui Elementary, Maui Waena Intermediate, and Maui High School. Puu Kukui Elementary is operating at capacity. However, the projected enrollment for the next five years suggests that the school will be below its capacity. Maui Waena Intermediate and Maui High are currently operating above capacity. A five year projection suggests both schools will operate below capacity.

Should you have any suggestions, please contact Cori China, of the Facilities Development Branch, Planning Section, at (808) 784-5080 or via email at cori.china@k12.hi.us.

We appreciate the opportunity to comment.

Sincerely,

Roy Ikeda
Interim Public Works Manager
Planning Section

RI:ctc
c: Facilities Development Branch

JOSH GREEN, M.D.
GOVERNOR OF HAWAIʻI
KE KIAʻĀINA O KA MOKUʻĀINA ʻO HAWAIʻI

KENNETH S. FINK, MD, MGA, MPH
DIRECTOR OF HEALTH
KA LUNA HOʻOKELE

STATE OF HAWAIʻI
DEPARTMENT OF HEALTH
KA ʻOIHANA OLAKINO
Maui District Health Office
54 South High St. Rm. #300
Wailuku, HI 96793

Lorrin W. Pang, M.D., M.P.H.
District Health Officer

November 29, 2023

Mr. Mark Kawika McKeague, AICP
G70
111 S. King Street, Suite 170
Honolulu, Hawaii 96813

Dear Mr. McKeague:

Subject: DEA Wailuku Single Family Residential
TMK: (2) 3-5-002:003 (por)
101 Ku'ikahi Drive
Wailuku, HI 96793

Thank you for the opportunity to review this project. The Environmental Health Services Division has no comments to offer.
It is strongly recommended that the Standard Comments found at the Department's website: https://health.hawaii.gov/epo/landuse/ be reviewed and any comments specifically applicable to this project should be adhered to.

Should you have any questions, please contact me at patricia.kitkowski@doh.hawaii.gov or 808 984-8230.

Sincerely,

Patti Kitkowski

Patti Kitkowski
District Environmental Health Program Chief

Aloha,

Thank you for the opportunity to provide comments on the request for early consultation to prepare a Hawaii Revised Statue, chapter 343 draft environmental assessment for the Wailuku Single Family Residential project in Waikapu, Island of Maui. The Clean Air Branch (CAB) would like to make the following comments on the subject:

- For construction and other activities associated with the project, the applicable provisions of Hawaii Administrative Rules §11-60.1-33 shall be followed to mitigate fugitive dust impacts.
- Also, please see our standard comments at:

https://health.hawaii.gov/cab/files/2022/05/Standard-Comments-for-Land-Use-Reviews-Clean-Air-Branch-2022-1.pdf

Please let us know if you have any questions or concerns.

Thank you very much,
Colby

Standard Comments for Land Use Reviews
Clean Air Branch
Hawaii State Department of Health

If your proposed project:

Requires an Air Pollution Control Permit

- You must obtain an air pollution control permit from the Clean Air Branch and comply with all applicable conditions and requirements. If you do not know if you need an air pollution control permit, please contact the Permitting Section of the Clean Air Branch.
- Permit application forms can be found here: https://health.hawaii.gov/cab/permit-application-forms/

Includes construction, demolition, or renovation activities that involve potential asbestos and lead containing materials:

- Asbestos may be present in any existing structure. Prior to demolition, you must contact the Indoor and Radiological Health Branch, Asbestos-Lead Section. Testing may be required to determine if building materials may contain asbestos, such as: drywall, vinyl floor tile, mastic, caulking, roofing materials, insulation, special coatings, etc.
- Structures built prior to 1980 may also contain lead paint. Prior to demolition, contact the Indoor and Radiological Health Branch, Asbestos-Lead Section. Testing may need to be conducted to determine if building materials contain lead.
- Some construction activities have the potential to create excessive noise and may require noise permits. For DOH Noise Permits and/or Variances and for more information on the Indoor and Radiological Health Branch, please visit: https://health.hawaii.gov/irhb/

Includes demolition of structures or land clearing

- Department of Health, Administrative Rule: Title 11, Chapter 26, Vector Control, Section 11-26-35, Rodents; Demolition of Structures and Clearing of Sites and Vacant Lots, requires that:
    - No person, firm or corporation shall demolish or clear any structure, site, or vacant lot without first ascertaining the presence or absence of rodents which may endanger the public health by dispersal from such premises.
    - Should such inspection reveal the presence of rodents, the person, firm, or corporation shall eradicate the rodents before demolishing or clearing the structure, site, or vacant lot.
    - The Department may conduct an independent inspection to monitor compliance, or request a written report.
- The purpose of this rule is to prevent rodents from dispersing into adjacent areas from infested buildings or vacant lands during demolition or land clearing.
- Contractors may either hire a pest control firm or do the job themselves with a qualified employee. Rodenticides must be inspected daily and replenished as necessary to provide a continuous supply for at least one week prior to the start of any work.

- To submit notifications or for more information, contract the Vector Control Branch: https://health.hawaii.gov/vcb/

Has the potential to generate fugitive dust

- You must reasonably control the generation of all airborne, visible fugitive dust. Note that construction activities that occur near to existing residences, businesses, public areas and major thoroughfares exacerbate potential dust concerns. It is recommended that a dust control management plan be developed which identifies and mitigates all activities that may generate airborne, visible fugitive dust. The plan, which does *not* require Department of Health approval, should help you recognize and minimize potential airborne, visible fugitive dust problems.
- Construction activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust. In addition, for cases involving mixed land use, we strongly recommend that buffer zones be established, wherever possible, in order to alleviate potential nuisance complaints.
- You must provide reasonable measures to control airborne, visible fugitive dust from the road areas and during the various phases of construction. These measures include, but are not limited to, the following:
    - Planning the different phases of construction, focusing on minimizing the amount of airborne, visible fugitive dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
    - Providing an adequate water source at the site prior to start-up of construction activities; Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
    - Minimizing airborne, visible fugitive dust from shoulders and access roads;
    - Providing reasonable dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
    - Controlling airborne, visible fugitive dust from debris being hauled away from the project site.
- If you have questions about fugitive dust, please contact the Enforcement Section of the Clean Air Branch

Increases the population and potential number of vehicles in an area:

- The creation of apartment buildings, complexes, and residential communities may increase the overall population in an area. Increasing the population in an area may inadvertently lead to more air pollution via vehicle exhaust. Vehicle exhaust releases molecules in the air that negatively impact human health and air quality, as they are known lung irritants, carcinogens, and greenhouse gases.
- Ensure that residents keep their vehicle idling time to three (3) minutes or less.
- Provide bike racks and/or electric vehicle charging stations for residents.
- Ensure that there are sufficient and safe pedestrian walkways and crosswalks throughout and around the development.
- Conduct a traffic study to ensure that the new development does not significantly impact traffic in the area.

Clean Air Branch (808) 586-4200 cab@doh.hawaii.gov	Indoor Radiological Health Branch (808) 586-4700	Vector Control Branch (808) 586-4400

DISABILITY AND COMMUNICATION ACCESS BOARD
1010 Richards Street, Rm. 118 • Honolulu, Hawai'i 96813
Ph. (808) 586-8121 (V) • Fax (808) 586-8129 • (808) 586-8162 TTY

November 27, 2023

Mr. Mark Kawika McKeague, AICP
Principal
G70
111 South King Street
Suite 170
Honolulu, HI 96813

Regarding: Request for Early Consultation to Prepare a Hawai'i Revised Statutes, Chapter 343 Draft Environmental Assessment
Wailuku Single Family Residential
101 Ku'ikahi Drive
Waikapū, Island of Maui, Hawai'i
Tax Map Key: (2) 3-5-002:003 (por)

Dear Mr. McKeague:

The Disability and Communication Access Board (DCAB) received the request for the above-referenced project requesting an environmental review of the proposed residential subdivision development. Thank you for your consideration, however, DCAB does not review environmental issues and therefore has no comments regarding this project proposal. DCAB does provide accessibility-related technical assistance and would welcome the opportunity to provide informal assistance prior to the official submittal for the above-referenced project.

Should you have any questions, please feel free to contact Rodney Kanno, Facility Access Coordinator at (808) 586-8121.

Sincerely,

KIRBY L. SHAW
Executive Director

G70

NOV - 6 2023

111 S. King Street
Suite 170
Honolulu, HI 96813
808.523.5866
www.g70.design

November 3, 2023

Subject: Request for Early Consultation to Prepare a Hawai'i Revised Statute, Chapter 343 Draft Environmental Assessment
Wailuku Single Family Residential
101 Ku'ikahi Drive
Waikapū, Island of Maui, Hawai'i
Tax Map Key: (2) 3-5-002:003 (por.)

Aloha:

On behalf of the State of Hawai'i, Department of Hawaiian Home Lands (DHHL) and DDC2 LLC, a wholly owned entity of Dowling Company, Inc., G70 is undertaking the preparation of a Draft Environmental Assessment (EA) for the "Wailuku Single Family Residential" ("Project") located in Waikapū, Maui, Hawai'i. The Draft EA will be prepared in accordance with Hawai'i Revised Statutes, Chapter 343 and Hawai'i Administrative Rules, Chapter 11-200.1.

The "Wailuku Single Family Residential" ("Project") site is approximately 77 acres and is located on TMK: (2) 3-5-002:003 (por.) at 101 Ku'ikahi Drive in Waikapū, on the island of Maui, Hawai'i. See *Figure 1: Project Location and Tax Map Key.*

The project site is surrounded by residential subdivisions including Kehalani (to the north), proposed Ku'ikahi Village (to the west), Wailuku Heights (to the west), Pu'unani Agriculture Subdivision (to the south) and Waiolani Mauka (to the south). The site is also adjacent to the State of Hawai'i (State), Department of Hawaiian Home Lands' (DHHL) Pu'unani Homestead Subdivision currently in construction (to the southeast) and the State Honoapi'ilani Highway (to the east).

The Project is located within the "Agricultural" State Land Use District, the "Agriculture" Maui County (County) Zoning District, designated "Urban" and "Rural" in the County's Maui Island Plan, and is in the "Agriculture" District per the County's Wailuku-Kahului Community Plan (2002).

DHHL is proposing to develop and construct a new residential subdivision, comprised of a maximum of 204 residential lots (anticipated 176 turn-key single-family residences and 28 vacant lots for single-family residences) for DHHL beneficiaries. Lot and residence sizes will be similar to those in nearby residential subdivisions. Each of the 204 lots will have a minimum lot area of 7,500 square feet (SF). The 176 residences will have a similar aesthetic to existing residences in nearby subdivisions, with board and batten paneling or horizontal siding and an asphalt shingle roof. The 176 turn-key residences will comprise of five residence model types – one- to two-story dwellings, ranging from 3 to 5 bedrooms and 2 to 3 baths, with living areas ranging from approximately 1,210 square SF to 1,675 SF. The provision of 28 vacant lots allows beneficiaries the flexibility to build a residence within a beneficiary's budget/preference or to partner with Habitat for Humanity Maui. The 28 vacant lots will be improved with graded pads and utility connections stubbed to each lot. 'Ohana and accessory dwelling units will not be permitted on any of the 204 lots. The project will also include a park at the southern edge of the project area with two pedestrian entrances. This park will also double as a 200ft buffer between the project area and the community to the south, allowing for the separation of Wailuku and Waikapū. The project will also include a stormwater detention basin at the northeastern edge of the parcel for drainage purposes.

Project improvements on the Site will also include grading and grubbing and the installation of underground and overhead infrastructure to serve the residences and vacant lots, including potable water, fire protection, wastewater, drainage, electrical power, and telecommunication utility connections.

We are conducting early consultation with agencies, elected officials, community leaders, organizations, and individuals who are interested in the environmental review of this Project. If you would like to provide comments, please send via U.S. mail or email to the G70 contact indicated below, no later than December 3, 2023.

G70
111 S. King Street, Suite 170
Honolulu, HI 96813
Attn: Mark Kawika McKeague, AICP
Phone: (808) 523-5866
Email: WailukuSFR@g70.design

Thank you for your participation in the early consultation for this Project.

Sincerely,

GROUP 70 INTERNATIONAL, INC., dba G70

Mark Kawika McKeague, AICP
Principal

Enclosure: Early Consultation Handout

cc: Stewart Matsunaga, DHHL
Darren Okimoto, DDC2 LLC

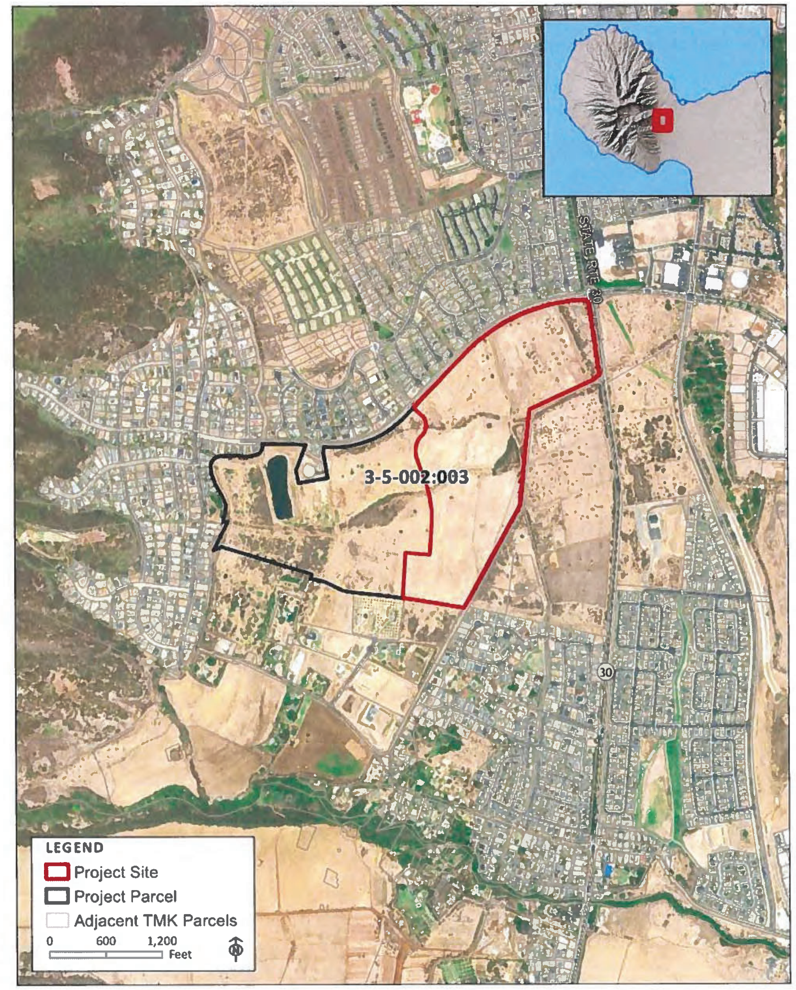

Figure 1: Project Location and Tax Map Key

JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

November 7, 2023

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 – Maui District (daniel.l.ornellas@hawaii.gov)
X Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

TO: ~~FROM:~~ Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Request for Early Consultation for Draft Environmental Assessment for the Proposed **Wailuku Single Family Residential** Project
LOCATION: 101 Ku'ikahi Drive, Waikapu, Island of Maui; TMK: (2) 3-5-002:003 por.
APPLICANT: G70 on behalf of State Department of Hawaiian Home Lands and DDC2 LLC

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **December 1, 2023.**

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

BRIEF COMMENTS:

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

Signed: [signature]
Print Name: Carty S. Chang, Chief Engineer
Division: Engineering Division
Date: Dec 1, 2023

Attachments
cc: Central File

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Request for Early Consultation for Draft Environmental Assessment for the Proposed Wailuku Single Family Residential Project
Location: 101 Ku'ikahi Drive, Waikapu, Island of Maui
TMK(s): (2) 3-5-002:003 por.
Applicant: G70 on behalf of State Department of Hawaiian Home Lands and DDC2 LLC

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) (fhat.hawaii.gov) 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: [signature]
CARTY S. CHANG, CHIEF ENGINEER

Date: Dec 1, 2023

JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

December 1, 2023

Group 70 International, Inc. dba G70
Attn: Mr. Kawika McKeague, Principal Planner
111 S. King Street, Suite 170
Honolulu, Hawaii 96813-4307

via email: WailukuSFR@g70.design

Dear Mr. McKeague:

SUBJECT: Request for Early Consultation for Draft Environmental Assessment for the Proposed **Wailuku Single Family Residential** Project located at 101 Ku'ikahi Drive, Waikapu, Island of Maui; TMK: (2) 3-5-002:003 por. on behalf of State Department of Hawaiian Home Lands and DDC2 LLC

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 Engineering Division 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

JOSH GREEN, M.D.
GOVERNOR
KE KIAʻĀINA

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF TRANSPORTATION | KA ʻOIHANA ALAKAU
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

EDWIN H. SNIFFEN
DIRECTOR
KA LUNA HOʻOKELE

Deputy Directors
Nā Hope Luna Hoʻokele
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

HWY 3031
HWY-PL 23-2.3623

November 16, 2023

Mr. Mark Kawika McKeague
Principal
G70
111 South King Street, Suite 170
Honolulu, Hawaii 96813

Dear Mr. McKeague:

Subject: Request for Early Consultation
Draft Environmental Assessment (EA)
Wailuku Single Family Residential
101 Kuikahi Drive
Waikapu, Maui, Hawaii
Tax Map Key No. (2) 3-5-002: 003 (Por.)

The Hawaii Department of Transportation (HDOT) reviewed the pre-Draft EA consultation materials for the subject Department of Hawaiian Home Lands (DHHL) project and has the following comments:

1. There is potential for the project to result in adverse direct, indirect, and cumulative impacts on state highway traffic conditions and multimodal transportation safety.

2. The HDOT reviewed and commented on the Early Consultation Draft EA and Traffic Impact Assessment Report (TIAR) for the adjacent DHHL Puunani Homestead Subdivision that is currently under construction. We suggest the project development team review these HDOT communications to anticipate and address relevant HDOT comments in the Wailuku Single Family Residential Draft EA.

3. Include a TIAR in the Draft EA for HDOT review. The analysis should assess traffic conditions, multimodal transportation safety conditions and interconnectivity with adjacent developments in the region.

4. The Draft EA project description should clearly describe existing and proposed access routes to the site and the remainder of the parcel. Describe any planned work within the state highway system. Honoapiilani Highway (State Route 30) is on the eastern boundary of the site.

5. Assess the applicability of the following HDOT permits:

   a. Permit to Perform Work Upon State Highways is required for any work within the state highway Right-of-Way (ROW). The application includes the review and approval of construction drawings and a Traffic Management Plan.

   b. Permit to Operate or Transport Oversize and/or Overweight Vehicles and Loads Over State Highways.

   c. Permit for the Occupancy and Use of State Highway ROW. This applies to underground and overhead power lines and stormwater management structures within the state highway ROW.

If you have any questions, please contact Jeyan Thirugnanam, Land Use Planning Enginner, Planning Branch at (808) 587-6336 or by email at jeyan.thirugnanam@hawaii.gov. Please reference file review number PL 2023-111.

Sincerely,

SERGIO GEORGE G. ABCEDE
Highways Administrator

STATE OF HAWAIʻI
OFFICE OF PLANNING
& SUSTAINABLE DEVELOPMENT

JOSH GREEN, M.D.
GOVERNOR

SYLVIA LUKE
LT. GOVERNOR

MARY ALICE EVANS
INTERIM DIRECTOR

235 South Beretania Street, 6th Floor, Honolulu, Hawaiʻi 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaiʻi 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: https://planning.hawaii.gov/

Coastal Zone Management Program
Environmental Review Program
Land Use Commission
Land Use Division
Special Plans Branch
State Transit-Oriented Development
Statewide Geographic Information System
Statewide Sustainability Branch

DTS202311070858NA

November 29, 2023

G70
111 S. King Street, Suite 170
Honolulu, Hawaii 96813
Attn: Mark Kawika McKeague, AICP

Dear Mr. McKeague:

Subject: Chapter 343 HRS, Early Consultation for
Wailuku Single Family Residential
101 Kuikahi Drive
TMK No. (2) 3-5-002:003(por.)
Waikapu, Maui

Thank you for the opportunity to comment on the subject Early Consultation.

The Project Site and Proposed Development
The State Department of Hawaiian Home Lands (DHHL) plans to develop a residential subdivision on approximately 77 acres of land in Waikapu. The project site is within the State Agricultural District and contains soils rated "A" under the Land Study Bureau's productivity classification system. The site is also zoned "Agriculture" under county zoning, designated "Urban" and "Rural" in the Maui Island Plan and in the "Agriculture" District in the Wailuku-Kahului Community Plan.

The project site is bordered to the north by the Kehalani residential subdivision in the State Urban District. Other residential subdivisions surrounding the site are Kuikahi Village and Wailuku Heights on the west, the Puunani Agriculture Subdivision in the State Agricultural District and Waiolani Mauka in the State Urban District on the south, and DHHL's Puunani Homestead Subdivision on the southeast. The State Honoapiilani Highway is on the site's eastern border.

The proposed project will consist of a maximum of 204 residential lots, including 176 turn-key single-family residences and 28 vacant lots for single-family residences, for DHHL beneficiaries. Each lot will have a minimum lot area of 7,500 square feet. The 176 residences will be made up of five residence models: one- to two-story dwellings, ranging from three to five bedrooms and two to three baths. Ohana and accessory dwelling units will not be allowed on any lot. The project will include a park on the southern edge with 2 pedestrian entrances. DHHL will provide infrastructure improvements including a stormwater detention basis on the northeastern edge, potable water, fire protection, wastewater, drainage, electrical power, and telecommunications utility connections.

Office of Planning and Sustainable Development's Comment
We understand and respect that DHHL beneficiaries typically prefer homes on large lots. However, large lot subdivision infrastructure is costly to construct and maintain. DHHL may wish to consider a subdivision layout design that clusters residences to minimize the costs of infrastructure installation and maintenance; or allows for additional homesteads.

If you have any questions, please contact Aaron Setogawa at (808) 587-2883 or email aaron.h.setogawa@hawaii.gov.

Mahalo,

Mary Alice Evans

Mary Alice Evans
Interim Director

RICHARD T. BISSEN, JR.
Mayor

LORI TSUHAKO
Director

SAUMALU MATA'AFA
Deputy Director

DEPARTMENT OF HOUSING & HUMAN CONCERNS
COUNTY OF MAUI
2200 MAIN STREET, SUITE 546
WAILUKU, MAUI, HAWAI'I 96793
PHONE: (808) 270-7805

November 9, 2023

Mark Kawika McKeague, AICP
G70
11 S. King Street, Suite 170
Honolulu, Hawaii 96813

Dear Mr. McKeague:

SUBJECT: REQUEST FOR EARLY CONSULTATION TO PREPARE A HAWAII REVISED STATUTE, CHAPTER 343, DRAFT ENVIRONMENTAL ASSESSMENT, WAILUKU SINGLE FAMILY RESIDENTIAL, 101 KUIKAHI DRIVE, WAIKAPU, ISLAND OF MAUI, HAWAII TAX MAP KEY: (2) 3-5-002:003 (POR.)

The Department has reviewed the information submitted for the above subject project. Based on our review, we have determined that the project is not subject to Chapter 2.96, Maui County Code, and does not require a residential workforce housing agreement. At the present time, the Department has no additional comments to offer.

Please contact Mr. Buddy Almeida, Housing Administrator at (808) 270-7351 if you have any questions.

Sincerely,

Lori Tsuhako

LORI TSUHAKO, LSW, ACSW
Director of Housing and Human Concerns

xc: Buddy Almeida, Housing Administrator

RICHARD T. BISSEN, JR.
Mayor

KEKUHAUPIO R. AKANA
Managing Director

PATRICK S. MCCALL
Director

SHANE T. DUDOIT
Deputy Director

DEPARTMENT OF PARKS AND RECREATION
COUNTY OF MAUI
700 HALI'A NAKOA STREET, UNIT 2
WAILUKU, MAUI, HAWAI'I 96793
www.mauicounty.gov

November 14, 2023

Mark Kawika McKeague, Principal
G70
111 S. King Street, Suite 170
Honolulu, Hawaii 96813

Dear Mr. McKeague:

SUBJECT: REQUEST FOR EARLY CONSULTATION TO PREPARE A HAWAI'I REVISED STATUTES, CHAPTER 343 DRAFT ENVIRONMENTAL ASSESSMENT, FOR PROPOSED DEPARTMENT OF HAWAIIAN HOME LANDS' WAILUKU SINGLE FAMILY RESIDENTIAL; 101 KU'IKAHI DRIVE, WAIKAPŪ, ISLAND OF MAUI, HAWAI'I; TMK (2) 3-5-002:003 (POR.)

Thank you for the opportunity to review and comment on the subject project. In accordance with Maui County Code 18.16.320 Parks and Playgrounds, this project is exempt from park assessment fees. The Department of Parks and Recreation has no further comments at this time.

Should you have any questions, please feel free to contact me or Samual A. Marvel, Chief of Planning and Development, at samual.marvel@co.maui.hi.us or (808) 270-6173.

Sincerely,

PATRICK S. MCCALL
Director of Parks and Recreation

c: Samual A. Marvel, Chief of Planning and Development

PSM:SAM:csa

POLICE DEPARTMENT
COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, MAUI, HAWAII 96793
TELEPHONE: (808) 244-6400
FAX: (808) 244-6411

RICHARD T. BISSEN, JR.
MAYOR

JOHN PELLETIER
CHIEF OF POLICE

WADE M. MAEDA
DEPUTY CHIEF OF POLICE

OUR REFERENCE

YOUR REFERENCE

November 20, 2023

Mr. Mark Kawika McKeague, AICP
G70
111 South King Street, Suite 170
Honolulu, Hawaii 96813

Re: Request for Early Consultation to Prepare a Hawaii Revised Statute, Chapter 343 Draft Environmental Assessment Wailuku Single Family Residential at 101 Kuikahi Drive, Waikapu, Island of Maui, Hawaii, TMK: (2) 3-5-002:003 (por.)

Dear Mr. McKeague:

This is in response to your letter dated November 3, 2023 requesting comments on the Draft Environmental Assessment for the "Wailuku Single Family Residential" project.

In review of the submitted documents, we have no objections to the upcoming construction project if it meets the minimal standards set forth by county codes and state laws. If the roads will be temporarily closed due to alternating traffic, we suggest the project manager utilize flag men to conduct traffic control and to have proper signage posted along the routes during construction. Thank you for giving us the opportunity to comment on this project.

Sincerely,

Assistant Chief Keola Tom
for: JOHN PELLETIER
Chief of Police

Michele Chouteau McLean, AICP
Office of Council Chair Alice L. Lee
Direct: 808-270-7641

Aloha G70,

Mahalo for your pre-consultation letter. Please consider this email a question and not comments on the project.

As you may know, Chair Lee has been advocating for a buffer between Waikapu and Wailuku, and so we are encouraged that your letter that the project includes a park that will serve as a 200-foot buffer. Will this be owned and maintained by the project's homeowners' association, or do you anticipate it being dedicated to the County?

Thanks again,
Michele.

WAILUKU HEIGHTS EXTENSION COMMUNITY ASSOCIATION

Post Office Box 968
Wailuku, Maui, Hawaii 96793

November 30, 2023

VIA E-MAIL WailukuSFR@g70.design
& U.S. MAIL

G70
111 South King Street, Suite 170
Honolulu, HI 96813
Attn: Mark Kawika McKeague, AICP
(808) 523-5866

Re: Proposed 101 Kuikahi Wailuku Single Family Residential Project Draft Environmental Assessment– Wailuku Heights Extension Community Association Comments

Dear Mr. McKeague & G70:

Thank you for the Draft Environmental Assessment Request for Comments submission package. We submitted your documents to the Wailuku Heights Extension Community Association ("WHECA") Members and have obtained comments from the WHECA Members. The overall perspective from the WHECA Members is positive as we support development in this area of Maui. There is also a healthy amount of concern regarding the proposed project as the WHECA Members already feel the development pressure on the existing transportation corridors, and they have additional concerns regarding other infrastructure components/systems, such as water/sewer and education/school capacities.

The WHECA Members already feel the transportation corridors are underdeveloped due to extremely long queues at the intersections of Kuikahi Drive and Waiale Road & Maui Lani Parkway and South Kamehameha Avenue for multiple hours in the morning and late afternoon/evening. This transportation system overload does not include the additional loading associated with the soon opening Kaulana Mahina workforce housing development (324 multi-family units) and proposed Kuikahi Village Project (202 residential units). The environmental assessment for the Kuikahi Village Project indicated no significant impact which was based upon a round-a-bout located at the intersection of Kuikahi Drive and Kehalani Mauka Parkway, which according to the developer was removed from the project. WHECA requested involvement in the planning and design of the transportation systems for the Kuikahi Village Project. WHECA has also requested the County of Maui to revise the approved use of the apron of Kuikahi Drive (West of Honoapiilani Highway) to not permit parking of vehicles due to the concern regarding bicycle lane safety.

WHECA Members are deeply concerned about the condition of the existing transportation systems and the lack of analysis of emergency evacuation in a fire scenario. This is a very serious concern due to the direction and velocity of the prevailing winds and the fact that WHECA will be at the end of the transportation corridors required for an expedient emergency escape. Based upon this concern, WHECA Members request a thorough and comprehensive engineering study regarding the load currently on the transportation system(s) and proposed load associated with all these additional developments on the transportation system(s). We will also be requesting that the County of Maui and the State of Hawaii complete a revised technical review and updated plan for a wildfire emergency evacuation. This plan will be required to include technical data obtained from the analysis of the Lahaina fire.

WHECA Members associated with the local school systems have indicated that the existing schools are in an overload condition and believe that there needs to be sufficient study efforts made to determine the expansion needs of the local school systems.

The consistent droughts that have been experienced in the last five (5) years have developed concerns about the water supply for this area of Maui. Based upon this concern, WHECA Members request a thorough and comprehensive engineering/hydrology study regarding the load currently on the system(s) and proposed load associated with all these additional developments on the system(s).

The WHECA Board of Directors is requesting to be involved in the design of the site and transportation corridors associated with your project. We are requesting a seat at the table in the early design phases as we feel our representation of our perspective/opinion on the proposed site and roadway design to accommodate the project is of utmost importance. We ask to be notified of the next design meeting with the Department of Public Works and the State of Hawaii Department of Transportation so we may attend and observe the design discussion. We will be requesting legal standing regarding the environmental planning process of this project.

Sincerely,

/s/ *Joshua Ching*
Joshua Ching, President
WHECA Phase I

cc: WHECA Board of Directors (via email only)
WHECA Environmental Committee (via email only)

On Dec 4, 2023 at 10:03 pm, JOYCELYN M VICTORINO joycelynmv@aol.com wrote:

Wayne
I agree and appreciate your response and comments.

Joycelyn
Sent from my iPhone

On Dec 4, 2023, at 7:10 PM, Wayne Hedani <wnhedani@gmail.com> wrote:

I think this is a well thought out letter. Still, we are in the midst of a historic housing crisis with the loss of 2000 units in West Maui and must do everything in our power to create new housing for our people without delay. Temperance and compassion must rule the day.
Aloha,
Wayne N. Hedani

On Thu, Nov 30, 2023 at 4:00 PM WHECA Phase1 <whecacommittee@gmail.com> wrote:

Dear Mr. McKeague and G70,
Attached please find a letter dated November 30, 2023 from Joshua Ching, President of the Wailuku Heights Extension Community Association, regarding the above-referenced matter. The hard copy is being sent to you via U.S. Mail.

Thank you.

WHECA

Appendix C

Draft Environment Assessment Comments

From: Ginger Kapaku <gnaeole@icloud.com>
Sent: Tuesday, March 26, 2024 5:45 PM
To: Wailuku SFR
Subject: Waikapu subdivision

I'm glad what I read for maui to move on to next step . There's so much to read but action is moving on to next project to have native Hawaiian on Hawaiian Home land . I am one is waiting very patiently.
Much mahalo
Sent from my iPhone

From: Rojek, David J CIV (USA) <David.J.Rojek@usace.army.mil>
Sent: Thursday, March 21, 2024 2:54 PM
To: Wailuku SFR
Cc: Koskelo, Vera B CIV USARMY CEPOH (USA)
Subject: DEA Wailuku Single Family Residential Subdivision Comments

Aloha Kawika,

I am reviewing your Draft Environmental Assessment for the Wailuku Single Family Residential Subdivision to determine whether the project will impact any federal jurisdictional waters. Can you provide more photos, specifically of the Kaiapaokaʻīlio stream, the two ditches outlined in Figure 3-8 (Waihe'e and the unnamed one running parallel to Waihe'e), and the drainage basin also outlined in Figure 3-8? In addition, could you provide a map with points where the photos were taken. Please reach out to me if you have any questions or concerns.

Mahalo!

David Rojek
Biologist, Regulatory Branch
US Army Corps of Engineers, Honolulu District
808-835-4599
US Army Corps of Engineers®

JOSH GREEN, M.D.
GOVERNOR
KE KIAʻĀINA

KEITH A. REGAN
COMPTROLLER
KA LUNA HOʻOMALU HANA LAULĀ

MEOH-LENG SILLIMAN
DEPUTY COMPTROLLER
KA HOPE LUNA HOʻOMALU HANA LAULĀ

STATE OF HAWAIʻI | KA MOKUʻĀINA O HAWAIʻI
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES | KA ʻOIHANA LOIHELU A LAWELAWE LAULĀ
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)24.040

MAR 13 2024

Mark Kawika McKeague, AICP
G70
111 S. King Street, Suite 170
Honolulu, Hawaii 96813

Dear Mark Kawika McKeague:

Subject: Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI)
Wailuku Single Family Residence Subdivision Project
Wailuku, Island of Maui, Hawaii
TMK No. (2) 3-5-002:003 (por.)

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.

If you have any questions, your staff may call Dora Choy-Johnson of the Public Works Division at (808) 586-0488.

Sincerely,

GORDON S. WOOD
Acting Public Works Administrator

DC:mc
c: Jeff Pearson, DAGS-MDO

JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

April 5, 2024

Group 70 International, Inc. dba G70
Attn: Mr. Kawika McKeague, Principal Planner — via email: wailukusfr@g70.design
111 S. King Street, Suite 170
Honolulu, Hawaii 96813-4307

Dear Mr. McKeague:

SUBJECT: Draft Environmental Assessment for **Wailuku Single Family Residential Subdivision Project** located at Wailuku, Island of Maui; TMK: (2) 3-5-002: 003 (por.) on behalf of State Department of Hawaiian Home Lands

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 Engineering Division 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

Enclosure
cc: Central Files

JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

March 11, 2024

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 – Maui District (daniel.l.ornellas@hawaii.gov)
X Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

TO: ~~FROM:~~ Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Draft Environmental Assessment for **Wailuku Single Family Residential Subdivision Project**
LOCATION: Wailuku, Island of Maui; TMK: (2) 3-5-002: 003 (por.)
APPLICANT: G70 International, Inc., dba G70 on behalf of State Department of Hawaiian Home Lands

Transmitted for your review and comment is information on the above-referenced subject matter. The DEA was published on March 8, 2024, by the State Environmental Review Program (formerly the Office of Environmental Quality Control) at the Office of Planning and Sustainable Development in the periodic bulletin, The Environmental Notice, available at the following link:

https://files.hawaii.gov/dbedt/erp/The_Environmental_Notice/2024-03-08-TEN.pdf

Please submit any comments by **April 5, 2024**. If no response is received by this date, we will assume your agency has no comments. Should you have any questions, please contact Darlene Nakamura directly via email 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: [signature]
Print Name: Carty S. Chang, Chief Engineer
Division: Engineering Division
Date: Mar 22, 2024

Attachments

JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

March 11, 2024

MEMORANDUM

FROM: **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 – Maui District (daniel.l.ornellas@hawaii.gov)
X Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

TO: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Draft Environmental Assessment for **Wailuku Single Family Residential Subdivision Project**
LOCATION: Wailuku, Island of Maui; TMK: (2) 3-5-002: 003 (por.)
APPLICANT: G70 International, Inc., dba G70 on behalf of State Department of Hawaiian Home Lands

Transmitted for your review and comment is information on the above-referenced subject matter. The DEA was published on March 8, 2024, by the State Environmental Review Program (formerly the Office of Environmental Quality Control) at the Office of Planning and Sustainable Development in the periodic bulletin, The Environmental Notice, available at the following link:

https://files.hawaii.gov/dbedt/erp/The_Environmental_Notice/2024-03-08-TEN.pdf

Please submit any comments by **April 5, 2024**. If no response is received by this date, we will assume your agency has no comments. Should you have any questions, please contact Darlene Nakamura directly via email 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: [signature]
Print Name: Jason D. Omick, Acting Wildlife Prog.Mgr.
Division: Forestry and Wildlife
Date: Apr 16, 2024

Attachments

JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA

DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

April 16, 2024

Log no. 4472

MEMORANDUM

TO: RUSSELL Y. TSUJI, Administrator
Land Division

FROM: JASON D. OMICK, Acting Wildlife Program Manager
Division of Forestry and Wildlife

SUBJECT: Request for Consultation on the Draft Environmental Assessment for the Wailuku Single Family Residential Subdivision Project, Maui.

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your request for consultation regarding the draft environmental assessment (DEA) for the Wailuku single family residential subdivision project, located on the Island of Maui; TMK(s): (2) 3-5-002: 003 (por.). The Department of Hawaiian Homelands (DHHL) proposes to develop and construct a new residential subdivision for a maximum of 204 lots that will have a minimum lot area of 7,500 square feet. Approximately 173 turn-key single-family residences and 31 vacant improved lots for single-family residence are being proposed. Project improvements of the site will also include grading and grubbing and the installation of underground and overhead infrastructure to serve the residences and vacant lots. An approximately 9-acre-foot stormwater detention basin will be in the northeast corner of the site to mitigate the anticipated increase in peak stormwater flows from the site. Work will include but is not limited to installing internal streets with 44-foot-wide Right of Ways will be constructed.

DOFAW concurs with the measures included in the DEA intended to avoid construction and operational impacts to State-listed species including the ʻōpeʻapeʻa or Hawaiian Hoary bat (*Lasiurus cinereus semotus*), koloa maoli or Hawaiian Duck (*Anas wyvilliana*), aeʻo or Hawaiian Stilt (*Himantopus mexicanus knudseni*), ʻalae keʻokeʻo or Hawaiian Coot (*Fulica alai*), ʻalae ʻula or Hawaiian Common Gallinule (*Gallinula chloropus sandvicensis*) nēnē or Hawaiian Goose (*Branta sandvicensis*, and seabirds. For illustrations and guidance related to seabird-friendly light styles that also protect the dark, starry skies of Hawaiʻi please visit https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf. We also appreciate the measures outlined for the use of native plant species and the use of Best Management Practices during and after construction to contain any soils and sediment with the purpose of preventing damage to near-shore waters and marine ecosystems.

DOFAW provides the following additional comments regarding the potential for the proposed work to affect listed species in the vicinity of the project area.
DOFAW recommends minimizing the movement of plant or soil material between worksites. Soil and plant material may contain detrimental fungal pathogens (e.g., Rapid ʻŌhiʻa Death), vertebrate and invertebrate pests (e.g., Little Fire Ants, Coqui Frogs, etc.), or invasive plant parts (e.g., African Tulip, Octopus Tree, Trumpet Tree, etc.) that could harm our native species and ecosystems. We recommend consulting the Big Island Invasive Species Committee (BIISC) at (808) 933-3340 to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

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

Cats prey on native birds, including State-listed endangered waterbirds, seabirds, and forest birds. Predation is instinctive and means that even well-fed cats will hunt and kill wildlife. Therefore, DOFAW recommends that homeowner associations request that residents with pet cats be kept indoors or safely contained. In addition, no feeding of feral cats should occur on the premises.
Due to the arid climate and risks of wildfire to listed species, we recommend coordinating with the Hawaiʻi Wildfire Management Organization at (808) 850-0900 or admin@hawaiiwildfire.org, on how wildfire prevention can be addressed in the project area. When engaging in activities that have a high risk of starting a wildfire (i.e. welding in grass), it is recommended that you:

- Wet down the area before starting your task,
- Continuously wet down the area as needed,
- Have a fire extinguisher on hand, and
- In the event that your vision is impaired, (i.e. welding goggles) have a spotter to watch for fire starts.

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 Kate Cullison, Protected Species Habitat Conservation Planning Coordinator via email at katherine.cullison@hawaii.gov.

Sincerely,

JASON D. OMICK
Acting Wildlife Program Manager

JOSH GREEN, M.D.
GOVERNOR

KEITH T. HAYASHI
SUPERINTENDENT

STATE OF HAWAIʻI
DEPARTMENT OF EDUCATION
KA ʻOIHANA HOʻONAʻAUAO
P.O. BOX 2360
HONOLULU, HAWAIʻI 96804

OFFICE OF FACILITIES AND OPERATIONS

April 5, 2024

Mr. Kawika McKeague, Principal Planner
Group 70 International, Inc. dba G70
111 South King Street, Suite 170
Honolulu, Hawaii 96813

Re: Department of Hawaiian Home Lands (DHHL) Wailuku Single Family Residential Subdivision Project
Draft Environmental Assessment-Anticipated Finding of No Significant Impact (DEA-AFONSI)
Tax Map Key (TMK): (2)3-5-002:003 (por), Wailuku District on the Island of Maui

Dear Mr. McKeague:

Thank you for your letter dated March 6, 2024. The Hawaii State Department of Education (Department) previously provided comments dated November 27, 2023 and would like to provide the following information.

Based on the information provided, the Department has determined that the Wailuku Single Family Residential Subdivision Project is exempt from paying the School Impact fees. Pursuant to Hawaii Revised Statute Section 302A-1603, any form of housing developed by the Department of Hawaiian Home Lands for use by beneficiaries of the 1920 Hawaiian Homes Commission Act.

Should you have any questions, please contact Cori China, of the Facilities Development Branch, Planning Section, at (808) 784-5080 or email at cori.china@k12.hi.us.

We appreciate the opportunity to comment.

Sincerely,

Roy Ikeda
Interim Public Works Manager
Planning Section

RI:ctc

c: Desiree Sides, Complex Area Superintendent, Baldwin-Kekaulike-Kulanihakoi-Maui Complex Areas
Facilities Development Branch

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

From: DOH.CABPDTSS <DOH.CABPDTSS@doh.hawaii.gov>
Sent: Monday, March 18, 2024 9:08 AM
To: Wailuku SFR
Subject: DOH-CAB Comments on DEA-AFNSI on Wailuku Single Family Residential Subdivision Project

Subject: Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFNSI) on Wailuku Single Family Residential Subdivision Project

Agency: Stewart T. Matsunaga
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, HI 96805
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(808) 620-9500

Consultant: Mark Kawika McKeague, AICP
Group 70 International, Inc.
111 South King Street, #170
Honolulu, HI 96813
kawikam@g70.design
(808) 523-5866

Aloha,

Thank you for addressing our comments in Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFNSI) pertaining to the Wailuku Single Family Residential Subdivision Project. The Department of Health Clean Air Branch has no further comments on the subject DEA-AFNSI.

Thanks,

JOSH GREEN, M.D.
GOVERNOR
KE KIA'ĀINA

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF TRANSPORTATION | KA 'OIHANA ALAKAU
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

EDWIN H. SNIFFEN
DIRECTOR
KA LUNA HO'OKELE

Deputy Directors
Nā Hope Luna Ho'okele
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

IN REPLY REFER TO:

STP 00444.24
STP 8.3735

April 5, 2024

VIA EMAIL: wailukusfr@g70.design

Mr. Mark Kawika McKeague, AICP
Principal Planner
Group 70 International, dba G70
111 South King Street, Suite 170
Honolulu, Hawaii 96813

Dear Mr. McKeague:

Subject: Draft Environmental Assessment (DEA)
Wailuku Single Family Residential Subdivision
Wailuku, Maui, Hawaii
Tax Map Keys: (2) 3-5-002: 003 (por.)

Thank you for your letter, dated March 6, 2024, requesting the Hawaii Department of Transportation's (HDOT) review and comments on the DEA for the subject project. HDOT understands the Department of Hawaiian Home Lands is proposing to develop a maximum of 204 residential lots which will be comprised of 173 turn-key single-family residences and 31 improved vacant lots for single-family residences. The proposed project will be developed on an approximately 77-acre portion of a parcel in the Waikapu area of Maui.

HDOT has the following comments:

1. Thank you for addressing HDOT's early consultation comments (HWY-PL 23-2.3623 dated November 16, 2023) in the DEA.

2. The project will be accessed from two driveways on Kuikahi Drive (County jurisdiction). Honoapiilani Highway (State Route 30) is adjacent to the eastern boundary of the site and intersects with Kuikahi Drive at the northeast corner of the site. The site's eastern driveway is approximately 700 feet from the Honoapiilani Highway and Kuikahi Drive intersection.

   No access driveways are proposed on Honoapiilani Highway; therefore, the project would not have adverse direct impacts on state highways traffic conditions.

3. We reviewed the Traffic Impact Assessment Report (TIAR), dated November 6, 2023 (4 of the 22 intersections studied included Honoapiilani Highway). All four intersections operate at overall Level of Service (LOS) C or better during peak traffic hours, under existing conditions.

   Currently, there are 14 new or expansion of existing developments planned in the site vicinity by 2028, which is the year of project occupancy. The increased number of trips due to regional

   growth (without project) by 2028 would result in LOS E or F for specific turning movements during peak traffic hours at Honoapiilani Highway intersections with Kehalani Highway and Kuikahi Drive. The overall LOS for these two intersections would be D without the project. The proposed project would increase the traffic volume by less than two percent on Honoapiilani Highway in 2028 during peak traffic hours. The overall LOS at these two intersections remains at D, but some turning movements would experience additional delays with the project.

   The planned Waiale Road Extension and the Maui Lani Parkway Extension projects are to be completed by 2028 and would mitigate regional traffic conditions. Specifically, the Honoapiilani Highway and Kuikahi Drive intersection would improve overall from LOS D to C, and all turning movements would operate at LOS D or better with or without the project, during peak traffic hours. The Honoapiilani Highway and Kehalani Highway intersection is less affected by the planned roadway extensions and remains overall at LOS D, with or without the project.

   The project traffic would not have a significant adverse impact on the Honoapiilani Highway intersections.

   We support the TIAR (Section 10) recommendations for roadway improvements on county roadways to improve regional traffic conditions. No recommendations are warranted or proposed for state highways.

4. The DEA (Section 3.8.3) describes an increase in site runoff of 117.5 cubic feet per second. No additional discharge of surface water run-off onto the Honoapiilani Highway right-of-way is permitted. This includes the use of the existing state drainage culverts and channels. All additional stormwater runoff from the project site shall be managed and mitigated onsite or diverted from Honoapiilani Highway.

5. Utility improvements are proposed within the Honoapiilani Highway right-of-way and the HDOT permits are required, as noted in Draft EA Section 3.9.

6. The proposed residence project is approximately 3.52 miles from the property boundary of Kahului Airport (OGG). All projects within 5 miles from Hawaii State airports are advised to read the Technical Assistance Memorandum (TAM) for guidance with development and activities that may require further review and permits. The TAM can be viewed at this link: http://files.hawaii.gov/dbedt/op/docs/TAM-FAA-DOTAirports_08-01-2016.pdf.

7. Federal Aviation Administration (FAA) regulation requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or Alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9, if the construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. Construction equipment and staging area heights, including heights of temporary construction cranes, shall be included in the submittal. The form and criteria for submittal can be found at the following website: https://oeaaa.faa.gov/oeaaa/external/portal.jsp. Please provide a copy of the FAA response to the Part 77 analysis to the HDOT Airport Planning Section.

8. Due to the project's proximity to OGG, the applicant and future beneficiaries should be aware of potential single event noise from aircraft operations. There is also a potential for fumes, smoke,

vibrations, odors, etc., resulting from occasional aircraft flight operations over or near the project. These incidences may increase or decrease over time and are dependent on airport operations.

9. If a solar energy photovoltaic (PV) system is going to be installed, be aware that PV systems located in or near the approach path of aircrafts can create a hazardous condition for pilots due to possible glint and glare reflected from the PV panel array. If glint or glare from the PV array creates a hazardous condition for pilots, the owner of the PV system shall be prepared to immediately mitigate the hazard upon notification by the HDOT and/or FAA.

   The FAA requires a glint and glare analysis for all solar energy PV systems near airports. The www.sandia.gov/glare website has information and guidance with the preparation of a glint and glare analysis. A separate FAA Form 7460-1 will be necessary for the solar energy PV system. After the FAA determination of the Form 7460-1 glint and glare analysis, a copy shall be provided to the HDOT Airport Planning Section by the owner of the solar energy PV system.

   Solar energy PV systems have also been known to emit radio frequency interference (RFI) to aviation-dedicated radio signals, thereby disrupting the reliability of air-to-ground communications. Again, the owner of the solar energy PV system shall be prepared to immediately mitigate the RFI hazard upon notification by the HDOT and/or FAA.

10. The proposed development shall not provide landscape and vegetation that will create a wildlife attractant, which can potentially become a hazard to aircraft operations. Please review the FAA Advisory Circular 150/5200-33C, Hazardous Wildlife Attractants On Or Near Airports for guidance. If the project's landscaping creates a wildlife attractant, the developer shall immediately mitigate the hazard upon notification by the HDOT and/or FAA.

If there are any questions, please contact Mr. Blayne Nikaido, Planner, Land Use Section of the HDOT Statewide Transportation Planning Office at (808) 831-7979 or via email at blayne.h.nikaido@hawaii.gov.

Sincerely,

EDWIN H. SNIFFEN
Director of Transportation

STATE OF HAWAIʻI
OFFICE OF PLANNING
& SUSTAINABLE DEVELOPMENT

235 South Beretania Street, 6th Floor, Honolulu, Hawaiʻi 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaiʻi 96804

JOSH GREEN, M.D.
GOVERNOR

SYLVIA LUKE
LT. GOVERNOR

MARY ALICE EVANS
DIRECTOR

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: https://planning.hawaii.gov/

Coastal Zone Management Program
Environmental Review Program
Land Use Commission
Land Use Division
Special Plans Branch
State Transit-Oriented Development
Statewide Geographic Information System
Statewide Sustainability Branch

DTS 202403111038NA

April 4, 2024

Group 70 International, Inc. dba G70
111 S. King Street, Suite 170
Honolulu, HI 96813

Attn: Kawika McKeague, Principal Planner

Dear Mr. McKeague:

Subject: Draft Environmental Assessment
Wailuku Single Family Residential Subdivision
TMK No.: (2) 3-5-002:003 (por.)
Wailuku, Maui

Thank you for the opportunity to comment on the subject Draft Environmental Assessment (DEA).

The Project Site and Proposed Development
The State Department of Hawaiian Home Lands (DHHL) plans to develop a residential subdivision on approximately 77 acres of land in Waikapū. The project site is within the State Agricultural District and contains soils rated "A" under the Land Study Bureau's productivity classification system. The site is also zoned "Agriculture" under county zoning, designated "Urban" and "Rural" in the Maui Island Plan and in the "Agriculture" District in the *Wailuku-Kahului Community Plan (2002)*.

The project site is bordered to the north by the Kehalani residential subdivision in the State Urban District. Other residential subdivisions surrounding the site are Kuikahi Village and Wailuku Heights on the west, the Puʻunani Agriculture Subdivision in the State Agricultural District and Waiolani Mauka in the State Urban District on the south, and DHHL's Puʻunani Homestead Subdivision on the southeast. The State Honoapiʻilani Highway is on the site's eastern border.

The proposed project will consist of a maximum of 204 residential lots, including 173 turn-key single-family residences (for purchase outright or a potential rent-with-option-to-buy) and 31 vacant improved lots for single-family residences for DHHL beneficiaries. Each lot will have a minimum lot area of

7,500 square feet. The 173 residences will be made up of five models: one- to two-story dwellings, ranging from two to five bedrooms and one to three baths. Ohana and accessory dwelling units will not be allowed on any lot. The project will include a park on the southern edge with two pedestrian entrances. DHHL will provide infrastructure improvements including a stormwater detention basin on the northeastern edge, potable water, fire protection, wastewater, drainage, electrical power, and telecommunications utility connections.

DHHL commissioned a 2014 update of its Beneficiary Needs Survey which found that 68% of the residential applicants identified a turn-key house as their first choice in property type and 84% desired three or more bedrooms. In addition, a 2020 survey found that 58% of DHHL applicants want a residential lot and 52% of Maui applicants want a residential lot.

The DEA discusses several alternatives. One, Alternative B, considered various site configurations with different lot and house designs/sizes resulting in greater or lesser housing unit yields than the Proposed Action. After considering alternate design concepts, the DEA found that "the Site layout and housing design of the Proposed Action proved to be the most practicable and most desired among DHHL beneficiaries…" (DEA, pg. 4-2).

OPSD Comment
The Office of Planning and Sustainable Development (OPSD) previously commented on the project during the early consultation period. OPSD finds that the DEA has addressed our suggestion regarding an alternate subdivision design and has no further comment.

If you have any questions, please contact Aaron Setogawa at (808) 587-2883 or email aaron.h.setogawa@hawaii.gov. If you wish to respond to this comment letter, please include DTS 202403111038NA in the subject line.

Mahalo,

Mary Alice Evans

Mary Alice Evans
Director

RICHARD T. BISSEN, JR.
Mayor

LORI TSUHAKO
Director

SAUMALU MATA'AFA
Deputy Director

DEPARTMENT OF HOUSING
& HUMAN CONCERNS
COUNTY OF MAUI
2200 MAIN STREET, SUITE 546
WAILUKU, MAUI, HAWAI'I 96793
PHONE: (808) 270-7805

March 8, 2024

Mr. Kawika McKeague
Principal Planner
Group 70 International, Inc. dba G70
111 S. King Street, Suite 170
Honolulu, Hawaii 96813

Dear Mr. McKeague:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE DEPARTMENT OF HAWAIIAN HOMELANDS (DHHL) WAILUKU SINGLE FAMILY RESIDENTIAL SUBDIVISION PROJECT, TMK (2) 3-5-002:003 (POR.) LOCATED IN THE WAILUKU DISTRICT, ON THE ISLAND OF MAUI, HAWAII

The Department has reviewed the information submitted for the above subject project. Based on our review, we have determined that the project is not subject to Chapter 2.96, Maui County Code, and does not require a residential workforce housing agreement. At the present time, the Department has no additional comments to offer.

Please contact Mr. Buddy Almeida, Housing Administrator, at (808) 270-7351 if you have any questions.

Sincerely,

Lori Tsuhako

LORI TSUHAKO, LSW, ACSW
Director of Housing and Human Concerns

cc: Buddy Almeida, Housing Administrator

RICHARD T. BISSEN, JR.
Mayor

KATE L. K. BLYSTONE
Director

ANA LILLIS
Deputy Director

DEPARTMENT OF PLANNING
COUNTY OF MAUI
ONE MAIN PLAZA
2200 MAIN STREET, SUITE 315
WAILUKU, MAUI, HAWAI'I 96793

April 8, 2024

Mr. Roderick Kalani Fronda
Department of Hawaiian Home Lands
91-5420 Kapolei Parkway
Kapolei, Hawaii 96707

Mr. Mark Kawika McKeague
G70
111 South King Street, Suite 170
Honolulu, Hawaii 96813

Dear Mr. Fronda and Mr. McKeague:

SUBJECT: COMMENTS ON DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE WAILUKU SINGLE FAMILY RESIDENTIAL SUBDIVISION, WAILUKU, ISLAND OF MAUI, HAWAII; TMK: (2) 3-5-002:003 (POR.) (EAC2024-00002)

The Department of Planning (Department) is in receipt of the above-referenced Draft EA for the Wailuku Single Family Residential Subdivision. For preparation of the Final EA, the Department provides the following comments:

1. The Department notes that the Department of Hawaiian Home Lands (DHHL) has elected to pursue an Archaeological Monitoring Plan. Once completed, the Department is requesting a copy of the accepted plan, as well as a copy of the plan approval by the Department of Land and Natural Resources-State Historic Preservation Division for our files.

2. The proposed traffic mitigation is noted. The Department suggests that you obtain comments from the Department of Public Works, as well as the State Department of Transportation to attempt to further alleviate regional traffic. The amount of units proposed is substantive enough that regional traffic mitigation must be considered.

3. We note the proposed bikeways/pedestrian paths along the roadways. We urge DHHL to consider adding more bikeways/pedestrian paths, in particular to connect subdivisions, similar to the adjacent Kehalani Project District area. It will be much safer and provide another option of getting to/from the area, away from traffic.

4. We recommend that native street trees be planted.

Thank you for the opportunity to comment. Please include the Department on the distribution list for the Final EA. Should you require further clarification, please contact Staff Planner Tara Furukawa at tara.furukawa@mauicounty.gov or at (808) 270-7520.

Sincerely,

Ana Lillis
Deputy Planning Director

xc: Danny A. Dias, Planning Program Administrator, Current Division (PDF)
Jordan Hart, Planning Program Administrator, Zoning Administration & Enforcement Division (PDF)
Jacky Takakura, Planning Program Administrator, Long-Range Division (PDF)
Scott Forsythe, Planning Program Administrator, Plan Implementation Division (PDF)
Tara K. Furukawa, Staff Planner (PDF)
Roderick Kalani Fronda, Department of Hawaiian Home Lands, Applicant (PDF)
Mark Kawika McKeague, G70, Consultant (PDF)

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RICHARD T. BISSEN, JR.
Mayor

JOSIAH K. NISHITA
Managing Director

BRADFORD K. VENTURA
Fire Chief

GAVIN L.M. FUJIOKA
Deputy Fire Chief

DEPARTMENT OF FIRE & PUBLIC SAFETY
COUNTY OF MAUI
313 Manea Place
Wailuku, Maui, Hawai'i 96732
www.mauicounty.gov

April 9, 2024

VIA EMAIL: wailukusfr@g70.design

Mr. Kawika McKeague
G70 International, Inc.
111 South King Street, Suite 170
Honolulu, HI 96813

SUBJECT: Department of Hawaiian Home Lands (DHHL)
Wailuku Single Family Residential Project, Wailuku, Maui
Draft Environmental Review Program

Dear Mr. McKeague:

Thank you for the opportunity to review your project. At this time, the Fire Prevention Bureau has no comments.

Please feel free to respond back should you want to identify or inquire about any specific fire-related public safety concerns for this or any additional future projects.

Our office continues to reserve the right to comment on the proposed project during the building or subdivision permit review process when detailed plans for this project are routed to our office for formal review. We can be reached at 808.876.4686 or by email at fire.planreview@mauicounty.gov.

Sincerely,

Fire Plans Review
Fire Prevention Bureau
Maui Fire Department

MG:jp

RICHARD T. BISSEN, JR.
Mayor

JOSIAH NISHITA
Managing Director

JOHN STUFFLEBEAN, P.E.
Director

JAMES A. LANDGRAF
Deputy Director

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAI'I 96793
http://www.mauicounty.gov/water

April 30, 2024

Mr. Kali Watson, Chairman
State of Hawai`i Department of Hawaiian Homelands
P.O. Box 1879
Honolulu, Hawai`i 96805

Dear Mr. Watson:

Re: Department of Hawaiian Home Lands (DHHL) Wailuku Single Family Residential Subdivision Project Draft Environmental Assessment-Anticipated Finding of No Significant Impact (DEA-AFONSI)
TMK: (2) 3-5-002:003 (por.), Wailuku District on the Island of Maui

Thank you for the opportunity for the County of Maui Department of Water Supply (MDWS) to submit comments on the Wailuku Single Family Residential Subdivision, which involves the development of a new residential subdivision, comprised of a maximum of 204 residential lots (173 turn-key single-family residences and 31 vacant improved lots for single-family residences). Please be aware that the applicant needs to coordinate with our MDWS Engineering Division regarding construction plans.

Proposed Project is Within MDWS Wellhead Protection Overlay District (WPOD), Maui County Code (MCC) 19.61

A portion of the proposed project falls within an MDWS well's 2-year time-of-travel Zone B in the WPOD area. The WPOD area models the specific hydrogeological characteristics regarding the migration of chemical pollutants and the survival times of bacteria and viruses to travel to the well. Approximately 53 acres fall into the 2-year time-of-travel Zone B, and approximately 95 acres fall into the 10-year time-of-travel Zone C, which regulates various chemical pollution well contamination concerns. Please reference https://mauicounty.maps.arcgis.com/apps/webappviewer/index.html?id=b9aab056bb7a4aaebdee698d1b7ead52, scroll down the layers navigation pane to "Wellhead Protection Zones," and check that box. Enter your TMK or address into the search bar/box. If you are entering a TMK into the box, make sure to omit: 1) the first digit, which is the island number (2 for Maui); 2) any dashes between numbers; and 3) the colon, if there is one. For this project, you would enter the TMK number into the search box like this: 35002003. Zoom in and/or out to see your project in the Wellhead Overlay Zone.

"By Water All Things Find Life"

Maui County Code (MCC) 19.61.100 Design Guidelines
The following design guidelines must apply to subdivisions that create four or more developable lots:

A. Proposed development and uses must be located as far from the wellhead as feasible.
B. Storm-water infiltration basins must be located outside the wellhead protection overlay district where feasible, provided that if this is not feasible, then the basins must be located as far from the wellhead as feasible.
C. Active parks and schools must implement a conservation practice standard in accordance with MCC Section 19.61.090(C).
D. If a development or use is proposed on property which is partially within a wellhead protection overlay district, the proposed development or use must be located to the maximum extent feasible on the portion of the property that is outside the wellhead protection overlay district.

MAUI ISLAND WATER USE AND DEVELOPMENT PLAN (WUDP)
Stormwater Drainage Management to Supplement Irrigation Sources
The proposed project may have the potential to accomplish stormwater management within the proposed project footprint, which could be used for stormwater mitigation and retention for irrigation reuse; however, storm-water infiltration basins should be located outside the Wellhead Protection Overlay District where feasible, and if not, then the basins shall be located as far from the wellhead as practicable. The Commission on Water Resource Management (CWRM) promotes the protection of groundwater and the value of treating stormwater as a resource, including groundwater recharge capability when contained onsite. Please see CWRM's *A Handbook for Stormwater Reclamation and Reuse Best Management Practices in Hawai'i, December 2008,* found here: http://files.hawaii.gov/dlnr/cwrm/planning/hsrar_handbook.pdf. We recommend implementing Best Management Practices (BMPs) contained in the document, such as permeable surfaces to reduce stormwater loss (for example, permeable detention ponds and vegetated filter strips), and bio-retention rain gardens.

MCC 19.61.090 Best Management Practices (BMPs)
The following standards apply to uses in zones B and C of any WPOD. Construction activities must be in accordance with MCC Chapter 20.08 and the following standards:

1. There must be a designated person on-site during construction activities who must be responsible for supervising the use, storage, and handling of hazardous material and who must take appropriate mitigating actions necessary in the event of fire or spill.
2. Hazardous materials left on site when the site is unsupervised must be inaccessible to the public. Locked storage sheds, locked fencing, locked fuel tanks on construction vehicles, or other techniques may be used if they will prevent access.
3. Construction vehicles and stationary equipment that are found to be leaking fuel, hydraulic fluid, or other hazardous materials must be removed from the site and from any wellhead protection overlay district zone. The vehicle or equipment may be repaired in place, provided the leakage is completely contained.
4. Hazardous materials must not be allowed to enter stormwater systems.

Conservation BMPs
Indoor

1. Use EPA WaterSense labeled plumbing fixtures.
2. Install bathroom sink faucets with fixtures that do not exceed 1 gallon per minute (GPM) and showerheads with a flow rate of 1.5 GPM at 60 psi.

Outdoor

1. Use Smart Approved WaterMark irrigation products. Examples include evapotranspiration irrigation controllers, drip irrigation, and water saving spray heads.
2. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawai'i.
3. Use native Hawaiian climate-adapted plants for landscaping. Native Hawaiian plants adapted to the area conserve water and protect the watershed from degradation due to invasive species.
4. After plant establishment, to avoid stimulating excessive growth, avoid fertilizing and pruning. Time watering to occur in the early morning or evening to limit evaporation. Limit the use of turf.
5. Replanting of denuded areas should include soil amendments and temporary irrigation. Use high seeding rates to ensure rapid establishment of stands of plants.
6. Retain ground cover until the last possible date. Stabilize denuded areas by sodding or planting as soon as possible. Use high seeding rates to ensure rapid establishment of stands of plants.
7. Avoid fertilizers and biocides, or apply biocides only during dry periods of low rainfall.

Additional BMPs for residences that apply to the proposed project are located at the MDWS website https://waterresources.mauicounty.gov/165/Best-Management-Practices---Home.

We hope you find this information useful. Should you have any questions, please contact staff planner Alex Buttaro at (808) 463-3103 or alex.buttaro@mauicounty.gov.

Sincerely,

John Stufflebean, P.E.
Director
BAB

Cc: MDWS Engineering

File Location: S:\PLANNING\Permit_Review\Projects Review\planning review\DHHL\ 235002003 DHHL-Wailuku-Single-Family-Residential-Subdivision

Maui Economic Opportunity, Inc.

P.O. Box 2122
Kahului, HI 96733
808-249-2990
Fax: 808-249-2991
www.meoinc.org

March 15, 2024

Group 70 International, Inc., dba G70
111 S. King St., Suite 170
Honolulu, HI 96813
Attn: Kawika McKeague, Principal Planner

Re: Wailuku Single Family Residential Subdivision, TMK (2) 3-5-002:003 (por) (Wailuku, Maui, Hawai'i)

To Whom It May Concern,

Maui Economic Opportunity, Inc., a 59-year-old Community Action Partnership nonprofit, supports this project and the homes to be built, which will provide badly needed workforce housing units for Native Hawaiians. Affordable housing is always at the top of our lists of community needs, and the crisis has worsened significantly since the wildfires. In addition, any project that reduces the wait list for Department of Hawaiian Home Lands beneficiaries should be supported.

As a partner in the development of an affordable housing rental project, MEO believes the more affordable units in the community the better. The development is a fill-in project surrounded by urban communities, will not have significant environmental impacts and has no apparent major historical and cultural sites on the land.

Our only concerns are about traffic.

Because we run The Maui Bus ADA Paratransit and County of Maui Human Services specialized transportation systems, our buses need to traverse the corridors of the project without significant delay or safety hazards. MEO wants to remain on schedule because our buses transport clients to dialysis and health appointments.

In addition, given the August 8 wildfires, MEO hopes there are multiple access routes to the new project and throughout the region should there be fires or other disasters/emergencies.

We trust these issues will be addressed and remedied.

Thank you for the opportunity to comment on this critically needed project.

Sincerely,

Debbie Cabebe, SHRM-SCP
Chief Executive Officer

Pu'uhona Hawaiian Homestead Association
℅ Debbie Mahuna, President
P.O. Box 1148
Wailuku, Maui HI. 96793-6148
Email: Puuhona@gmail.com
Website: WWW.Puuhona.com

March 10, 2024

Group 70 International, Inc. dba G70
111 S. King Street, Suite 170
Honolulu, HI 96813
Attn: Kawika McKeague, Principal Planner
Email: wailukusfr@g70.design

SUBJECT: **Draft Environmental Assessment for the Department of Hawaiian Home Lands (DHHL) Wailuku Single Family Residential Subdivision Project Wailuku, Maui, Hawaii**

Dear Mr. McKeague:

Thank you for allowing me the opportunity to provide my comments on the Draft Environmental Assessment for this DHHL project.

I fully support this initiative, which aims to provide housing for native Hawaiian families. After reviewing the project EA, I find no issues or objections. The assessment adequately addresses the project's impacts, which are not deemed significant and are typical for any housing project. Moreover, any potential minor impacts are overshadowed by the urgent need of DHHL beneficiaries who have been awaiting access to land for decades. Increasing the housing inventory through projects like this one will also help alleviate Maui's housing shortage, providing long-term housing solutions for our hardworking local families.

Mahalo for the opportunity to comment.

Sincerely,

Debbie Mahuna
President
Pu'uhona Hawaiian Homestead Association

WAILUKU HEIGHTS EXTENSION COMMUNITY ASSOCIATION
Post Office Box 968
Wailuku, Maui, Hawaii 96793

April 8, 2024

VIA EMAIL (WAILUKUSFR@G70.DESIGN) AND FIRST CLASS MAIL

G70
Attn: Mark Kawika McKeague, AICP
111 South King Street, Suite 170
Honolulu, HI 96813
(808) 523-5866

RE: Proposed Wailuku Single Family Residential Subdivision Draft Environmental Assessment – Wailuku Heights Extension Community Association Comments

Dear Mr. McKeague & G70:

Thank you for the Draft Environmental Assessment Request for Comments submission package. We submitted your documents to our community and have obtained comments from our members. The overall perspective from our community members is positive as we support development in this area of Maui. There is also a healthy amount of concern regarding the proposed project as our residents already feel the development pressure on the existing transportation corridors, and they have additional concerns regarding other infrastructure components/systems such as water/sewer and education/school capacities.

Section 3.3.5 Wildfire

Our community association does not agree with the statement that this area is not considered a wildfire risk area. Our community association has noticed long periods of drought drying out yards, farmlands, etc. while there is a prevailing wind moving from the Northeast up through to the West Maui mountains. Claiming that our proximity to the Iao valley provides wildfire protection to our communities seems like a direct misunderstanding/misrepresentation of our community geography and specific wildfire conditions. This statement created great concern in our community association and therefore we request that this specific section of the report be peer reviewed by knowledgeable professionals. We also disagree that this development does not include improvements that will increase risk of public safety during a wildfire event as the transportation corridor requires analysis based upon what was learned from the Lahaina fire. It would be a great disservice to all our Wailuku communities if this analysis is not completed with an honest evaluation of data associated with the Lahaina wildfire. We request that this specific section of the report be peer reviewed by knowledgeable professionals.

Section 3.9 Transportation/Traffic

The report indicates that this development will only add 24-34 vehicles during peak am/pm traffic periods. This development is advertised as base level income housing and low-income housing (we fully support this use) which has a high percentage of working-class citizens. We also know that these community members tend to have large amounts of family members living in a single-family residence. We believe that the data used in this study is highly suspect. We request that this specific section of the report be peer reviewed by knowledgeable professionals. Based upon our concerns regarding the data used to develop the study, we believe the traffic scenarios represented will be misrepresenting actual traffic scenarios.

Our community members already feel the transportation corridors are underdeveloped due to extremely long queues at the intersections of Kuikahi Dr. and Waiale Rd. & Maui Lani Parkway and South Kamehameha Avenue for multiple hours in the morning and late afternoon/evening. This transportation system overload does not include the additional loading associated with the soon opening Kaulana Mahina workforce housing development (324 multi-family units) and proposed Kuikahi Village Project (202 residential units). The environmental assessment for the Kuikahi Village Project indicated no significant impact which was based upon a round-a-bout located at the intersection of Kuikahi Dr. and Kehalani Mauka Parkway, which according to the developer was removed from the project. Our organization requested involvement in the planning and design of the transportation systems for the Kuikahi Village Project. Our community has also requested the County of Maui revise the approved use of the apron of Kuikahi Dr. (West of Honoapiilani highway) to not permit parking of vehicles due to the concern regarding bicycle lane safety.

Our community members are deeply concerned about the condition of the existing transportation systems and the lack of analysis of emergency evacuation in a fire scenario. This is a very serious concern due to the direction and velocity of the prevailing winds and the fact that our community will be at the end of the transportation corridors required for an expedient emergency escape. Based upon this concern our community members request a thorough and comprehensive engineering study regarding the load currently on the transportation system(s) and proposed load associated with all these additional developments on the transportation system(s). We will also be requesting that the County of Maui and the State of Hawaii complete a revised technical review and updated plan for a wildfire emergency evacuation. This plan will be required to include technical data obtained from the analysis of the Lahaina fire.

Community members associated with the local school systems have indicated that the existing schools are in an overload condition and believe that there needs to be sufficient study efforts made to determine the expansion needs of the local school systems. This particular study simply concludes that the future analysis (projections) of pupils is to be decreasing, yet there is no actual data analysis presented.

The Board of Directors of the Wailuku Heights Extension Phase 1 Home Owners Association are requesting to be involved in the design of the site and transportation corridors associated with your project. We are requesting a seat at the table in the early design phases as we feel our representation of our perspective/opinion on the proposed site and roadway design to accommodate the project is of utmost importance. We ask to be notified of the next design meeting with the DPW and Hawaii DOT so we may attend and observe the design discussion. We will be requesting legal standing regarding the environmental planning process of this project.

Sincerely,

/s/ *Joshua Ching*

Joshua Ching, President
WHECA Phase I

cc: Board Members and Environmental Committee WHECA Phase I (via email only)

From: Phillip P <phillipmrp@yahoo.com>
Sent: Monday, April 8, 2024 9:09 PM
To: Wailuku SFR
Subject: DHHL 101 Kuikahi Drive

Hi, I'm writing to oppose this subdivision on 101 Kuikahi Drive.
The heavy traffic flow right now, makes commute stressful. With the new hawaiian homes and new apartments coming up. It will add even more commute time. Traffic is backed up from kehalani foodland coming down to the maui lani roundabout and on to Kamehameha Ave.
More and more people are taking waiko rd as by pass but even then that road is getting backed up. By having more traffic, longer wait time drivers will become more impatient and will be speeding, with schools near by, kids crossing dangerous and poorlyplan roundabout, heavy traffic for miles away is a recipe for disaster.
The roads/ its design are not big enough to handle the traffic as it is right now, let alone more subdivision ex: anuhea is only 70% complete and more subdivision/ homes to come.
With hawaiian homes not subject to "additional" building permits many build small homes will start and turn simple homes into "filaminimums" which means additional dwellings and eventually becomes a parking mess and fire hazard.

Thankyou for your time,
Phillip

Sent from Yahoo Mail on Android

Appendix D

Biological Resources Study

BIOLOGICAL RESOURCES STUDY

FOR THE

WAILUKU SINGLE FAMILY RESIDENTIAL PROJECT

WAILUKU, MAUI

by

Robert W. Hobdy
Environmental Consultant
Kokomo, Maui
June 2022

Prepared for:
DDC LLC

FLORA AND FAUNA STUDY
WAILUKU SINGLE FAMILY RESIDENTIAL PROJECT
WAILUKU, MAUI

INTRODUCTION

The Wailuku Single Family Residential Project TMK (2) 3-5-002:003 (portion), 77 acres of undeveloped land between Wailuku and Waikapu in central Maui (see Figure 1). It is located above Honoapi'ilani Highway adjacent to the southside of Kuikahi Drive and a residential community on former sugar cane lands that are currently fallow. This biological study was initiated in compliance with environmental requirements of the planning process.

SITE DESCRIPTION

The project area is situated on moderately sloping lands on the lower eastern slopes of the West Maui mountains. The vegetation consists mainly of a dense growth of tall grasses with scattered shrubs and small trees. The soils are characterized as Iao cobbly silty clay, 7 – 15% slopes (1bC) and Iao clay, 7 – 15% slopes (1cC), which are deep, alluvial, well-drained soils (Foote et al, 1972). Rainfall averages 30 inches per year with most occurring during the winter months (Armstrong, 1983).

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the proposed Wailuku Single Family Residential Project which was conducted in June 2022. The objectives of the survey were to:

1. Document what plant and animal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are Federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used following routes to ensure maximum coverage of the habitats in this property. Areas most likely to harbor native or rare plants such as gullies were more intensively examined. Notes were made on plant species, distribution and abundance as well on terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation in the project area was dominated by tall, dense grass. Plant diversity was low and much of the area has been heavily grazed by goats, cattle, horses, sheep and deer. A total of 20 plant species were recorded during the survey. One species Guinea grass (*Megathyrsus maximus*) was abundant throughout the project area. One other species was common, koa haole (*Leucaena leucocephala*). The remaining 18 plant species were either uncommon or rare. Not a single native plant was found during the survey.

DISCUSSION AND RECOMMENDATIONS

The vegetation throughout the project area was dominated by just a few non-native plants. All of the plants recorded during the survey were common, non-native species and are of no particular environmental concern.

No federally listed Endangered or Threatened native plant species (USFWS, 2022) were encountered during the course of the survey. Nor were any species that are candidates for such status seen. No special plant habitats or rare plant communities were seen on the property.

As a result of these above conditions there is little of botanical concern on this property and the proposed land use changes are not expected to have a significant negative impact on the botanical resources in this part of Maui.

No recommendations are deemed necessary or appropriate regarding the botanical resources on this property.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within each of two groups: Monocots and Dicots. Taxonomy and nomenclature of the plants are in accordance with Wagner et al. (1999).

For each species, the following information is provided:

1. Scientific name with author citation.
2. Common English or Hawaiian name.
3. Bio-geographical status. The following symbols are used:

   endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.

   indigenous = native to the Hawaiian Islands and, also to one or more other geographic area(s).

   Polynesian = all those plants brought to these islands by the Polynesians during the course of their migrations.

   non-native = all those plants brought to the islands intentionally or accidentally after western contact.

4. Abundance of each species within the project area:

   abundant = forming a major part of the vegetation within the project area.

   common = widely scattered throughout the area or locally abundant within a portion of it.

   uncommon = scattered sparsely throughout the area or occurring in a few small patches.

   rare = only a few isolated individuals within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MONOCOTS			
ARECACEAE (Palm Family)			
Washingtonia robusta H. Wendland	Mexican washingtonia	non-native	rare
POACEAE (Grass Family)			
Cenchrus ciliaris L.	buffelgrass	non-native	uncommon
Megathyrsus maximus (Jacq.) Simon & Jacobs	Guinea grass	non-native	abundant
DICOTS			
AMARANTHACEAE (Amaranth Family)			
Amaranthus spinosus L.	spiny amaranth	non-native	rare
ASTERACEAE (Sunflower flower)			
Pluchea carolinensis (Jacq.) G. Don	sourbush	non-native	rare
Senecio madagascariensis Poir.	Madagascar fireweed	non-native	uncommon
CASUARINACEAE (She-oak Family)			
Casuarina equisetifolia L.	common ironwood	non-native	rare
CUCURBITACEAE (Gourd Family)			
Momordica charantia L.	bitter melon	non-native	rare
EUPHORBIACEAE (Spurge Family)			
Macaranga tanarius (L.) Mull. Arg.	parasol leaf tree	non-native	rare
FABACEAE (Pea Family)			
Indigofera suffruticosa Mill.	inikō	non-native	rare
Leucaena leucocephala (Lam.) de Wit	koa haole	non-native	common
Neonotonia wightii (Wight & Arnott) Lackey	glycine	non-native	rare
Pithecellobium dulce (Roxb.) Benth.	'opiuma	non-native	uncommon
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe	non-native	rare
Vachellia farnesiana (L.) Wight & Arnott	klu	non-native	rare
LAMIACEAE (Mint Family)			
Leonotis nepetifolia (L.) R. Br.	lion's ear	non-native	rare
MALVACEAE (Mallow Family)			
Malva parviflora L.	cheeseweed	non-native	rare
Malvastrum coromandelianum (L.) Garcke	false mallow	non-native	rare
MYRTACEAE (Myrtle Family)			
Szyzigium cumini (L.) Skeels	Java plum	non-native	rare
NYCTAGINACEAE (Four-o'clock Family)			
Boerhavia coccinea Mill.	scarlet spiderling	non-native	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activities, and location as well as observations of trails, tracks, scat and signs of feeding. In addition, an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the endemic and Endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

MAMMALS

Six species of mammals were observed in the project area during two site visits. Taxonomy and nomenclature of the mammals follows Tomich (1986). These were the Endangered Hawaiian hoary bat, domestic goats (*Capra hircus*), cattle (*Bos taurus*), horses (*Equus caballus*), sheep (*Ovis aries*) and axis deer (*Axis axis*).

An evening survey was made in the project area to determine any presence of the Hawaiian bat. A bat detecting device (Batbox III D) was used at three locations, set to the frequency of 27,000 Hertz that these bats are known to emit when echo-locating for nocturnal flying insect prey. Bat activity was detected at two locations with the use of this device.

Other non-native mammals that would likely use this project area, but which were not seen, include rats (*Rattus* spp.), mice (*Mus domesticus*) and domestic cats (*Felis catus*).

BIRDS

Bird diversity and total numbers were low in this habitat. Taxonomy and nomenclature follow American Ornithological Society (2022). Just seven widespread non-native bird species were observed during two site visits. One species was common, the spotted dove (*Streptopelia chinensis*). Four species were uncommon, the cattle egret (*Bubulcus ibis*), the pigeon (*Columba livia*), the zebra dove (*Geopelia striata*) and the common myna (*Acridotheres tristis*). A few other non-native bird species would likely utilize this habitat occasionally, but this dry, nearly monotypic grassland is not suitable for Hawaii's native forest birds, sea birds, water birds or nēnē, and none were seen.

INSECTS

Insect species and total numbers were likewise sparse in this habitat. Taxonomy and nomenclature follow Nishida et al (1992). Just six insects were recorded during two site visits. One species was uncommon, the dung fly (*Musca sorbens*). One of these species was the indigenous native globe skimmer dragonfly (*Pantala flavescens*).

DISCUSSION AND RECOMMENDATIONS

Of all mammals, birds, mollusk, and insect species recorded in this project area only one mammal and one insect were native species. Heavy grazing and browsing by domestic and wild ungulates has reduced plant species to only the hardiest and least edible components. This in turn has resulted in low numbers of all other animal species here.

The indigenous native globe skimmer dragonfly is a common species on all of the Hawaiian Islands and is also found in many other tropical countries worldwide. It is of no conservation concern.

Endangered Hawaiian bats were recorded at two locations during the survey. These wide-ranging, nocturnally active flying mammals utilize a diversity of habitats. The U.S. Fish and Wildlife Service has guidelines for their protection such as avoiding the removal of trees over fifteen feet in height during the summer pupping season between April and mid-September.

Another Endangered species, the Blackburn's sphinx moth (*Manduca blackburni*), was looked for but not found. The lack of any of their host plants on this project area, however, makes their presence unlikely.

No native bird species were found on the property during two site visits. However, there are native seabirds, the Endangered Hawaiian petrel (*Pterodroma sanwichensis*) and Band-rumped storm-petrel (*Oceanodroma castro*) and the Threatened Newell's shearwater (*Puffinus newelli*), that fly over these lowlands during the evening on the way to their burrows high in the mountains. These seabirds, and especially the fledglings, are attracted to bright lights in the evenings and early dawn hours and can become disoriented and crash. They are then vulnerable to injury; vehicle strikes and predators. It is recommended that any significant outdoor lighting in any proposed development on this property be shielded to direct the light downward to minimize disorientation of these protected seabirds.

No other issues are anticipated with wildlife species.

ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within four groups: Mammals, Birds, Mollusks and Insects. For each species the following information is provided:

1. Common name.

2. Scientific name.

3. Bio-geographical status. The following symbols are used:

   endemic = native only to Hawaii; not naturally occurring anywhere else in the world.

   indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).

   non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.

   migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii, the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.

4. Abundance of each species within the project area:

   abundant = many flocks or individuals seen throughout the area at all times of day.

   common = a few flocks or well scattered individuals throughout the area.

   uncommon = only one flock or several individuals seen within the project area.

   rare = only one or two seen within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MAMMALS			
BOVIDAE (Cattle Family)			
Bos taurus L.	domestic cattle	non-native	uncommon
Capra hircus L.	domestic goats	non-native	common
Ovis aries L.	domestic sheep	non-native	rare
CERVIDAE (Deer Family)			
Axis axis Erxleben	axis deer	non-native	rare
EQUIDAE (Horse Family)			
Equus caballus L.	domestic horse	non-native	uncommon
VESPERTILIONIDAE (Common Bat Family)			
Lasiurus cinereus semotus Allen	'ōpe'ape'a	Endemic	rare
BIRDS			
ARDEIDAE (Heron Family)			
Bubulcus ibis L.	cattle egret	non-native	uncommon
COLUMBIDAE (Dove Family)			
Columba livia Gmelin	pigeon	non-native	uncommon
Geopelia striata L.	zebra dove	non-native	uncommon
Streptopelia chinensis Scopoli	spotted dove	non-native	common
PHASIANIDAE (Pheasant Family)			
Gallus gallus L.	common chicken	non-native	rare
STURNIDAE (Starling Family)			
Acridotheres tristis L.	commmon myna	non-native	uncommon
ZOSTEROPIDAE (White-eye Family)			
Zosterops japonicus Temmink & Schlegel	Japanese white-eye	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
INSECTS			
Order DIPTERA - flies			
MUSCIDAE (House Fly Family)			
Musca domestica L.	house fly	non-native	rare
Musca sorbens Wiedemann	dung fly	non-native	uncommon
Order HYMENOPTERA - bees, wasps, ants			
FORMICIDAE (Ant Family)			
Pheidole megacephala Fabricius	big-headed ant	non-native	rare
Order ODONATA - dragonflies, damselflies			
LIBELLULIDAE (Skimmer Dragonfly Family)			
Pantala flavescens Fabricius	globe skimmer	indigenous	rare
Order ORTHOPTERA - grasshoppers, crickets			
ACRIDIDAE (Grasshopper Family)			
Oedaleus abruptus Thunberg	short-horned grasshopper	non-native	rare
MOLLUSKS			
ACHATINIDAE (Achatinid Snail Family)			
Lissachatina fulica Ferrussac	giant East African snail	non-native	rare

Figure 1. Wailuku Single Family Residential Project - Wailuku, Maui.
TMK (2) 3-5-02:003 (portion)

Figure 2. Wailuku Single Family Residential Project – Wailuku, Maui

Figure 3. Wailuku Single Family Residential Project – Wailuku, Maui.


Figure 4. Wailuku Single Family Residential Project – Wailuku, Maui.

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Appendix E

Preliminary Engineering Report

Established 1969

Preliminary Engineering Report

Wailuku Single-Family Residential Project

Wailuku, Maui, Hawaii
TMK: (2) 3-5-002: por. 003

Prepared For:

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

WARREN S. UNEMORI ENGINEERING, INC.
Civil and Structural Engineers – Land Surveyors
Wells Street Professional Center – Suite 403
2145 Wells Street
Wailuku, Maui, Hawaii 96793

December 6, 2023

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TABLE OF CONTENTS

Preliminary Engineering Report
for
Wailuku Single-Family Residential Project

1. INTRODUCTION

1.1 Purpose

This report describes the existing infrastructure in the vicinity of the Wailuku Single-Family Residential Project and identifies the key improvements needed to implement the proposed development plan.

1.2 Project Location

The 77-acre Wailuku Single-Family Residential Project is located in Wailuku, Maui, on the western (mauka) side of Honoapiilani Highway and the southern side of Kuikahi Drive. The project site is an undeveloped 77-acre land parcel at Tax Map Key 3-5-002: portion of 003.

1.3 Project Description

The Wailuku Single-Family Residential Project will be an urban residential subdivision development by the Department of Hawaiian Home Lands (DHHL) consisting of up to 204 single-family houselots, with each lot having an area of approximately 7,500 square feet.

2. ROADWAY IMPROVEMENTS

2.1 Existing Conditions

Kuikahi Drive is the principal public roadway providing vehicular access to the undeveloped project site.[1] Old Waikapu Road, which abuts the project site along its eastern side, is a substandard County right-of-way that has fallen into disrepair and been abandoned as a public thoroughfare in favor of other more modern streets serving the area.

2.2 Proposed Improvements

2.2.1 Vehicular Access Improvements

A network of public streets will extend from Kuikahi Drive into the Wailuku Single-Family Residential Project to provide access to all houselots. These internal streets will connect to Kuikahi Drive at the two locations depicted on Figure 2-1. The westernmost entrance into the new subdivision will be located on the south side of the existing intersection with Kehalani Mauka Parkway, to which either a conventional westbound left turn lane or roundabout will be added. The second entrance will be a new full-movement intersection located approximately 1600 feet east of Kehalani Mauka Parkway and 700 feet west of Honoapiilani Highway.

[1] Kuikahi Drive is a two-lane collector roadway owned by the County of Maui and maintained by its Dept. of Public Works Highways Division.

The new internal streets will have 44-foot wide rights-of-way and generally conform to current Maui County subdivision standards except as noted in Section 2.3 below. The southern shoulder of Kuikahi Drive will be widened to the limit of the existing 60-foot right-of-way. (See Figure 2-2)

2.2.2 Bike and Pedestrian Access Improvements

Approximately 450 feet of paved shoulder along the southern side of Kuikahi Drive will be widened to provide a continuous 5-foot wide paved walkway for pedestrians between Kehalani Mauka Parkway and Honoapiilani Highway. All internal streets will have a 5-foot wide paved sidewalk installed along one side to provide a pedestrian route to Kuikahi Drive. (See Figure 2-3)

Bicycle connectivity between the houselots and the existing marked bike lanes on Kuikahi Drive will be provided by the low-volume minor streets extending throughout the interior of the subdivision.

2.2.3 Emergency Evacuation Route

A paved emergency roadway will be constructed along a portion of the Old Waikapu Road right-of-way to provide houselots in the southern portion of the subdivision a second exit route to Kuikahi Drive that can be used in case of a fire or other emergency should the primary access route on the western side of the development become blocked.

2.3 Code Exemptions

The following exemptions must be sought to limit improvements to those described above.

2.3.1 Exemption from *MCC 18.20.070 (Sidewalks)* reducing the requirement for five foot wide sidewalks on both sides of all streets to a single five foot wide sidewalk on one side of all streets.

2.3.2 Exemption from *MCC 18.20.080 (Curbs and gutters)* eliminating the requirement for concrete curbs and gutters to be constructed along Kuikahi Drive.

2.3.3 Exemption from *MCC 18.20.095 (Street trees)* to allow required street trees to be planted in front yards in circumstances where the location of driveway aprons, street signs, fire hydrants, utility equipment or utility lines does not leave sufficient planting space within the public right-of-way.

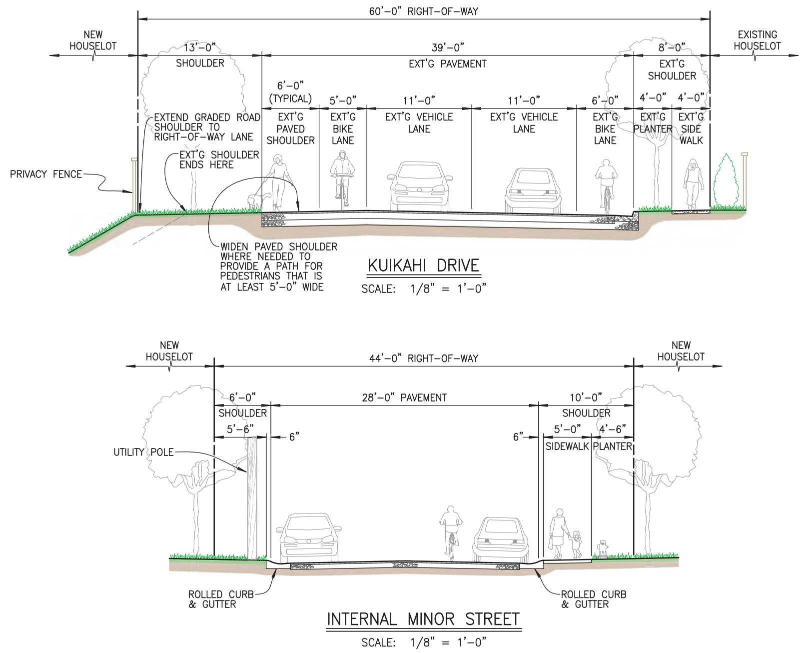

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FIGURE 2-2
Street Sections

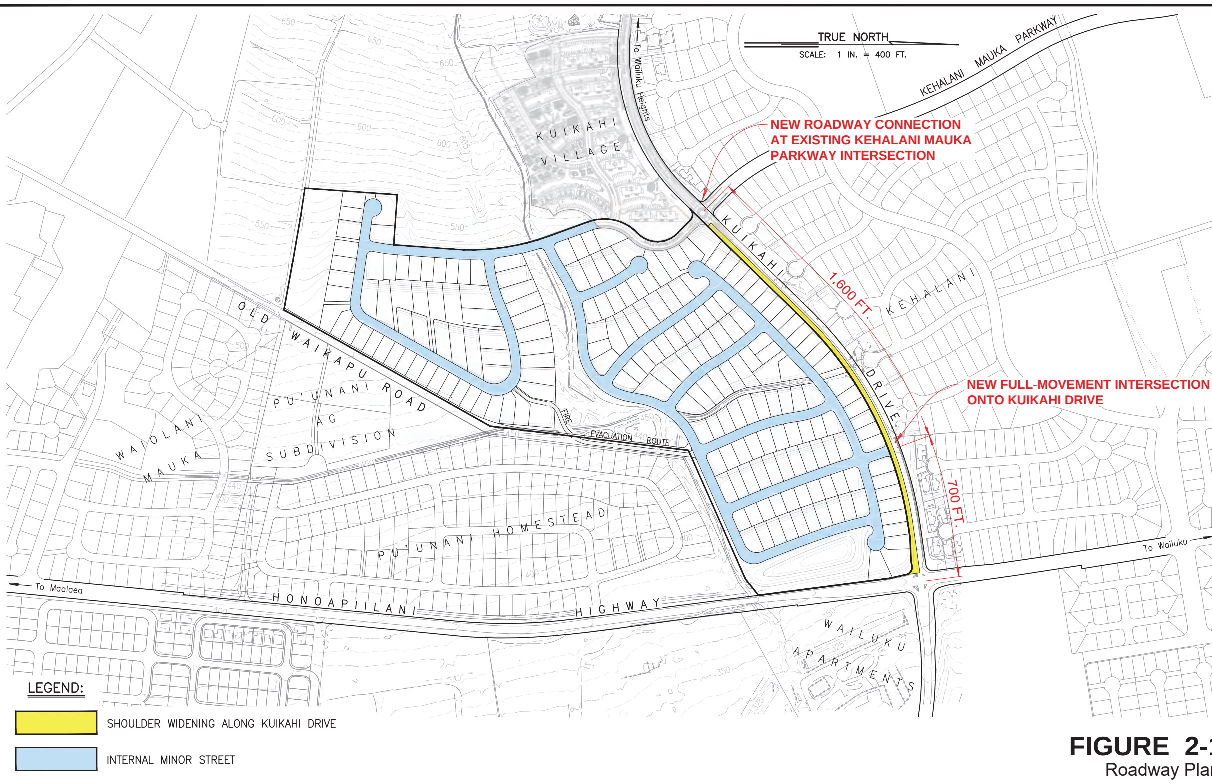

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FIGURE 2-1
Roadway Plan

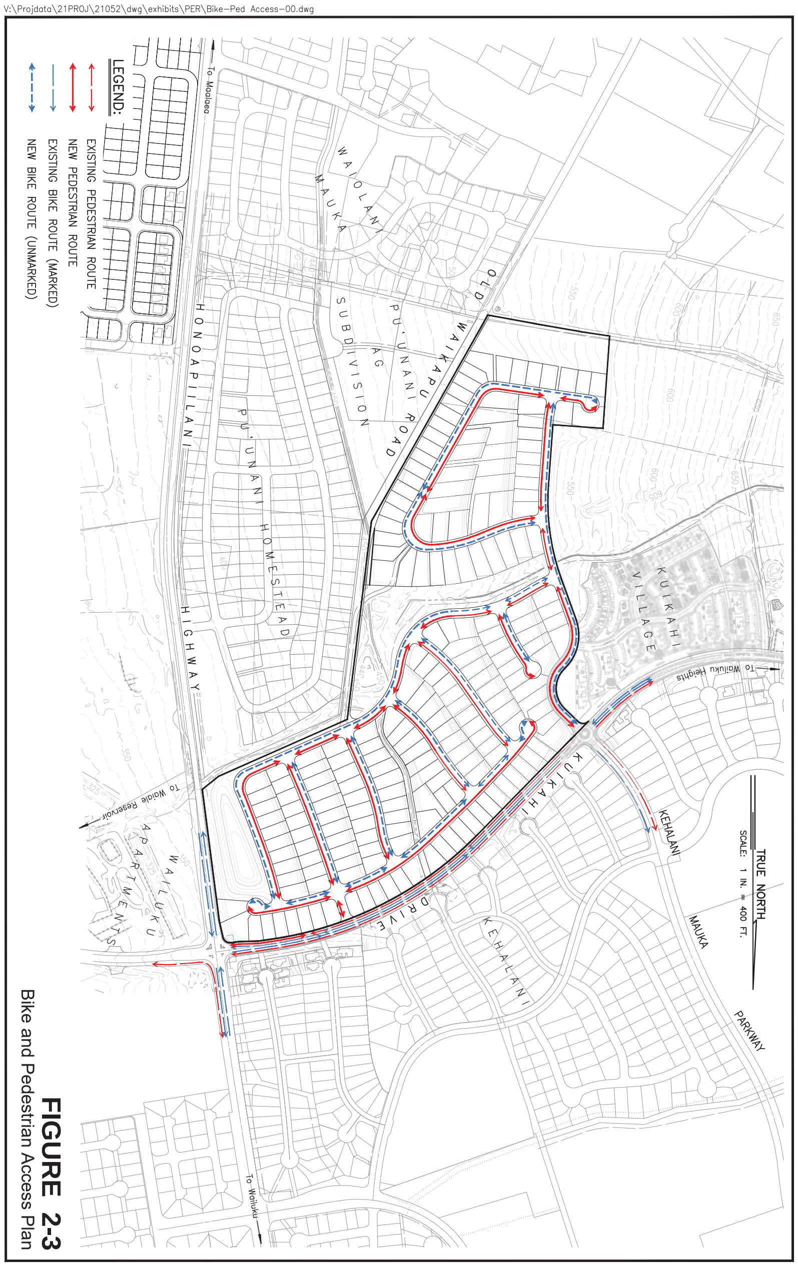


FIGURE 2-3
Bike and Pedestrian Access Plan

3. DRAINAGE

3.1 Existing Conditions

3.1.1 Topography and Soils

The 77-acre project site was once used for cultivating sugar cane and pineapple; however, it is no longer used for crops -- only as an occasional animal pasture.

The existing terrain slopes steadily downward across the site from west to east at a grade of 8 to 10 percent. Elevation ranges from 565 feet at the southwest corner of the site, to 350 feet at its northeast corner. An existing drainage gully bisects the site in the east-west direction, while an existing irrigation ditch and maintenance access road bisects it in the north-south direction.

The USDA Natural Resources Conservation Service identifies Iao Clay (IcC) and Iao Cobbly Silty Clay (IbB, IbC) as the predominant soil types found on the project site. (See Figure 3-1) These Iao clay soils are reported to produce a medium amount of runoff and represent a slight to moderate erosion hazard.[2]

[2] United States Department of Agriculture, Soil Conservation Service, *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, August 1972, pp. 46-47, Maps 99-100.

3.1.2 Flood and Tsunami Zone

FEMA's Flood Insurance Rate Map for Maui County locates the project site within Zone X, outside of both the 500-year floodplain and tsunami zone.[3] Appendix A-1 contains a current DLNR Flood Hazard Assessment Report for the parcel.

3.1.3 Existing Drainage Condition

Offsite Flows

The undeveloped project site receives offsite flows from approximately 411 acres of land located above and to the west of the project site. (See Figure 3-2) Runoff from these offsite lands passes through the project site in two drainageways that converge into a single drainageway on the eastern side of the parcel above Old Waikapu Road then crosses Honoapiilani Highway and Waiale Road before entering a large underground pipeline that conveys it to Waiale Irrigation Reservoir[4] where it is impounded. Table 3-1 summarizes the magnitude of these offsite flows.

[3] U.S. Department of Homeland Security, Federal Emergency Management Agency, *Flood Insurance Rate Map, Maui County, Hawaii*, Community-Panel Numbers 150003 0391E, September 25, 2009, and 150003 0393F, November 04, 2015.

[4] TMK 3-8-046: 020

TABLE 3-1
Offsite Drainage Summary
(100 yr. - 24 hr. storm)

Drainage Area	Receiving Facility	Approx. Area Draining to Receiving Drainageway	Pre-Development Peak Runoff (100 yr - 24 hr)
A	Waiale Irrigation Reservoir	179 Ac.	575 cfs
B	Waiale Irrigation Reservoir	232 Ac.	758 cfs
Total		411 Ac.	1,333 cfs

Onsite Flows

Surface runoff generated by the undeveloped 77-acre project site sheet flows eastward in two primary directions. (See Figure 3-3) 64.8 acres flows towards the natural drainageway passing through the project site which drains to Waiale Reservoir; while the remaining 12.2 acres drain to the Kuikahi Drive / Honoapiilani Highway intersection where runoff enters the existing underground storm drainage system on Kuikahi Drive that conveys it southward to the Kehalani Project District's Stormwater Retention Basin in Waikapu. The 10-year 1-hour peak flow rate generated by the project site in its current, undeveloped state is estimated to be 63 cubic feet per second (cfs)[5] as summarized in Table 3-2 below.

[5] Supporting calculations may be found in Appendix A-3.

TABLE 3-2
Pre-Development Onsite Drainage Summary
(10 yr. - 1 hr. storm)

Receiving Facility	Approx. Area Draining to Receiving Drainageway	Pre-Development Peak Runoff (10 yr - 1 hr)
Waiale Irrigation Reservoir	64.8 Ac.	52.1 cfs
Kehalani Waikapu Retention Basin	12.2 Ac.	10.9 cfs
Total	77.0 Ac.	63.0 cfs

3.2 Drainage Plan

3.2.1 Projected Increase in Onsite Runoff Due to Development

The Wailuku Single-Family Residential Project is expected to produce a 10-year 1-hour peak runoff of 180.5 cfs once fully developed.[6] This represents a net increase of approximately 117.5 cfs attributable to development of the project area. Table 3-3 summarizes the post-development drainage condition before mitigation measures have been applied.

[6] See Appendix A-4 for supporting calculations.

TABLE 3-3
Post-Development Onsite Drainage Summary BEFORE Mitigation
(10 yr. - 1 hr. storm)

Receiving Facility	Approx. Area Draining to Receiving Facility	Pre-Development Peak Runoff (10 yr - 1 hr)	Post-Development Peak Runoff *BEFORE* Mitigation	Net Change in Peak Flow *BEFORE* Mitigation
Waiale Irrigation Reservoir	74.2 Ac.	52.1 cfs	172.9 cfs	+120.8 cfs
Kehalani Waikapu Retention Basin	2.8 Ac.	10.9 cfs	7.6 cfs	-3.3 cfs
Total	77.0 Ac.	63.0 cfs	180.5 cfs	+117.50 cfs

3.2.2 Proposed Improvements

Offsite Flows

Runoff from offsite lands will be allowed to pass through the project parcel in either an open drainageway or underground pipeline in the manner allowed under Maui County's Storm Drainage Rules. (See Figure 3-4)

Onsite Peak Flow Mitigation

Onsite surface runoff generated by the roads and homes within the Wailuku Single-Family Residential Project will be directed to drain inlets located along the internal streets. The collected runoff will then be conveyed by underground drainage pipes to a stormwater detention basin located at the northeast corner of the subdivision which, in turn, will discharge into the existing drainage gully on the east side of the project site. (See Figure 3-5) This detention basin, whose capacity will be at least 9 acre-feet [7], will fully mitigate the expected increase in peak flow by limiting the downstream release of stormwater to a flow rate which does not exceed pre-development levels in compliance with Maui County storm drainage standards.[8]

Water Quality Measures

Maui County requires the implementation of water quality control measures to reduce water pollution from stormwater runoff.[9] A "detention based" treatment approach will be employed by the Wailuku Single-Family Residential Project to mitigate stormwater-related water pollution associated with the developed site. This will involve providing additional storage volume in the detention basin to facilitate sediment removal in addition to peak flow mitigation.[10]

[7] The drainage basin will be sized to route the 50-year 1-hour design storm with a downstream release not exceeding the 10-year 1-hour pre-development peak discharge of 52.1 cfs. Detention basin sizing calculations can be found in Appendix A-5.

[8] County of Maui, Department of Public Works and Waste Management, "Rules for the Design of Storm Drainage Facilities in the County of Maui," Title MC-15, Chapter 4, November 2, 1995.

[9] County of Maui, Department of Public Works, "Rules for the Design of Storm Water Treatment Best Management Practices," Title MC-15, Chapter 111, November 15, 2012.

[10] 3.5 acre-feet of storage capacity will be provided below the basin outlet to provide the volume for sedimentation required by County storm water quality rules. The calculation of this required volume can be found in Appendix A-5.1.

3.2.3 Post-Development Runoff After Application of Mitigation Measures

The proposed stormwater detention basin will fully mitigate the increase in peak flow attributable to development while simultaneously providing water pollution control. Table 3-4 summarizes the storage capacity within the stormwater detention basin needed to achieve both these objectives.

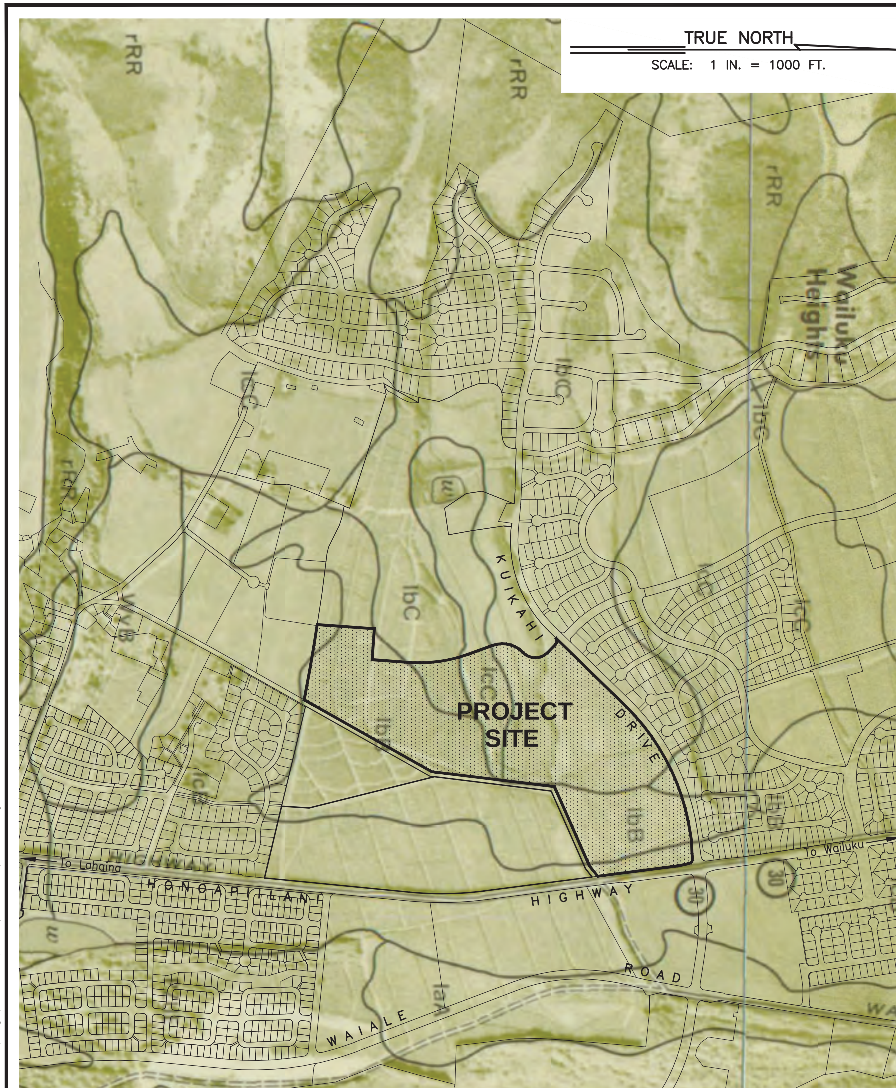
TABLE 3-4
Stormwater Detention Basin Capacity

Approximate Minimum Detention Storage Volume Required to Ensure Post-Development Peak Flow Does Not Exceed Pre-Development Peak Flow	5.1 Ac-ft
Minimum 48 hr. Retention Capacity Needed to Meet Maui County Stormwater Quality Requirements	3.5 Ac-ft
Minimum Basin Volume Needed to Meet Maui County Drainage Rules and Water Quality Requirements	8.6 Ac-ft

Once the detention basin is in place, the hydrologic impact on downstream properties resulting from the proposed development of The Wailuku Single-Family Residential Project will be fully mitigated, as summarized in Table 3-5.

TABLE 3-5
Post-Development Onsite Drainage Summary AFTER Mitigation
(10 yr. - 1 hr. storm)

Receiving Facility	Approx. Area Draining to Receiving Facility	Pre-Development Peak Runoff (10 yr - 1 hr)	Post-Development Peak Runoff *BEFORE Mitigation*	Post-Development Peak Runoff *AFTER Mitigation*	Net Change in Peak Flow *AFTER* Mitigation
Waiale Irrigation Reservoir	74.2 Ac.	52.1 cfs	172.9 cfs	≤52.1 cfs	≤0 cfs
Kehalani Waikapu Retention Basin	2.8 Ac.	10.9 cfs	7.6 cfs	7.6 cfs	-3.3 cfs
Total	77.0 Ac.	63.0 cfs	180.5 cfs	< 63.0 cfs	< 0 cfs



Source:
U.S. Department of Agriculture, Soil Conservation Service, "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii", 1972, Map Sheets 99–100.

FIGURE 3-1
Soil Survey Map

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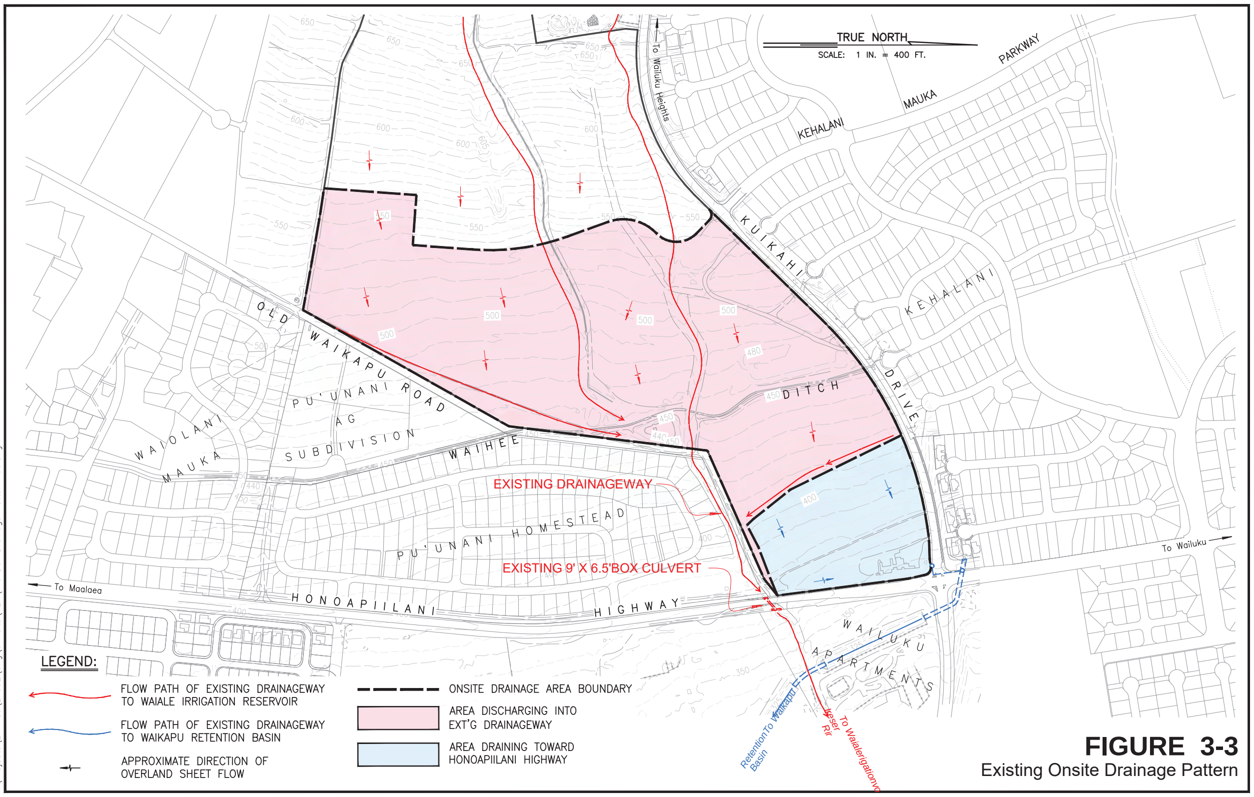


FIGURE 3-3
Existing Onsite Drainage Pattern

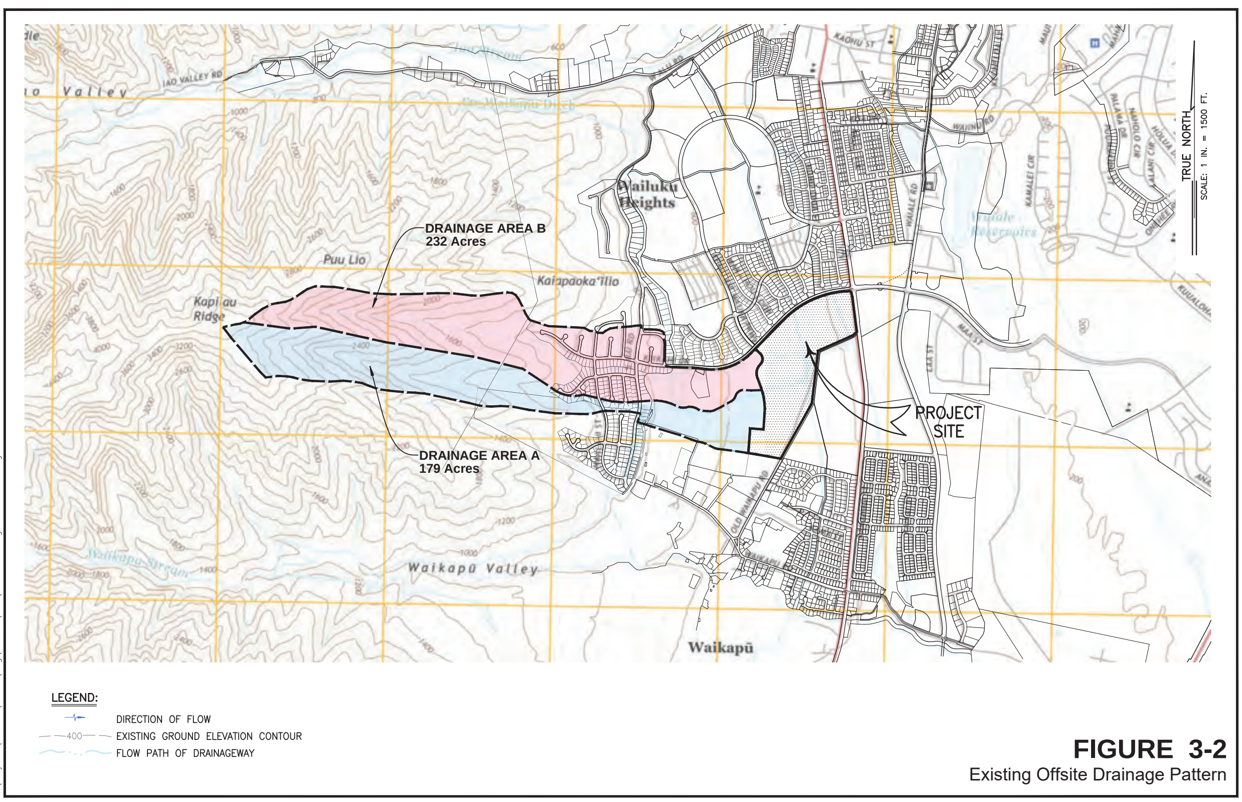


FIGURE 3-2
Existing Offsite Drainage Pattern

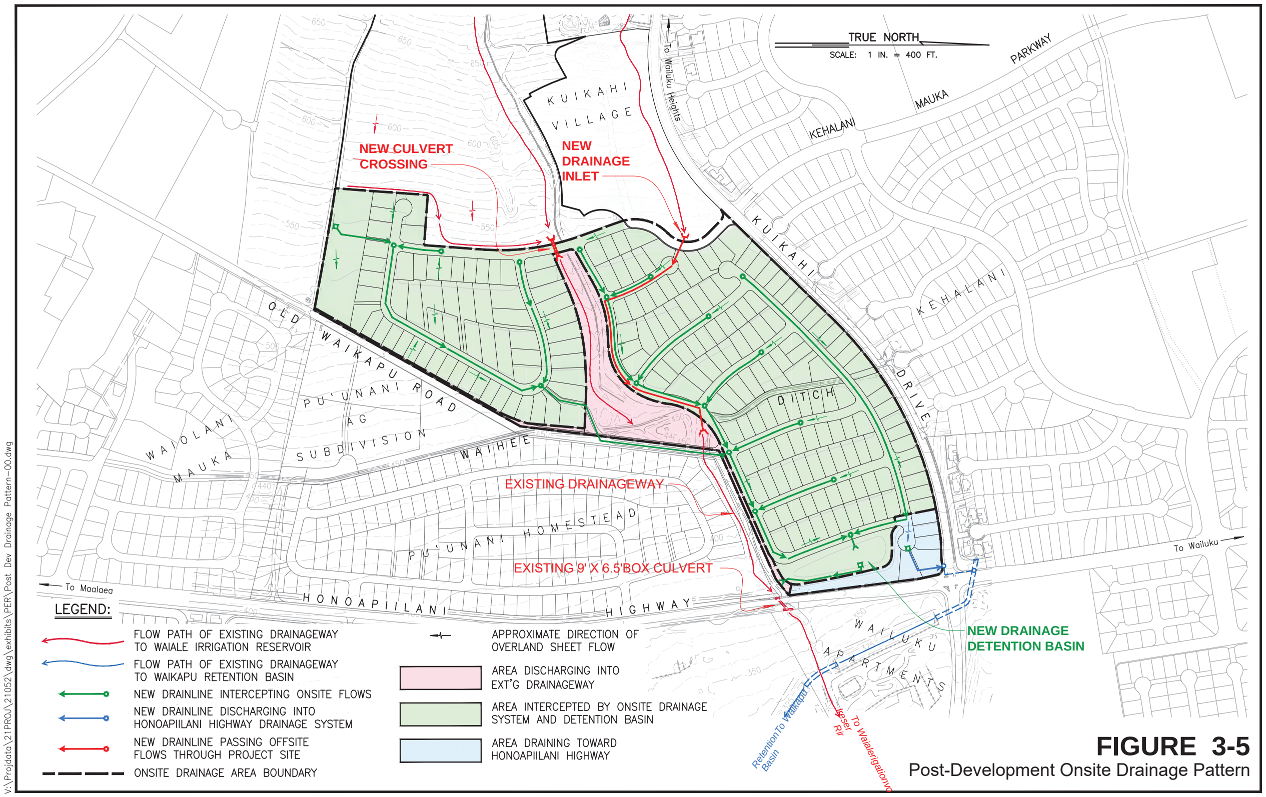


FIGURE 3-5
Post-Development Onsite Drainage Pattern

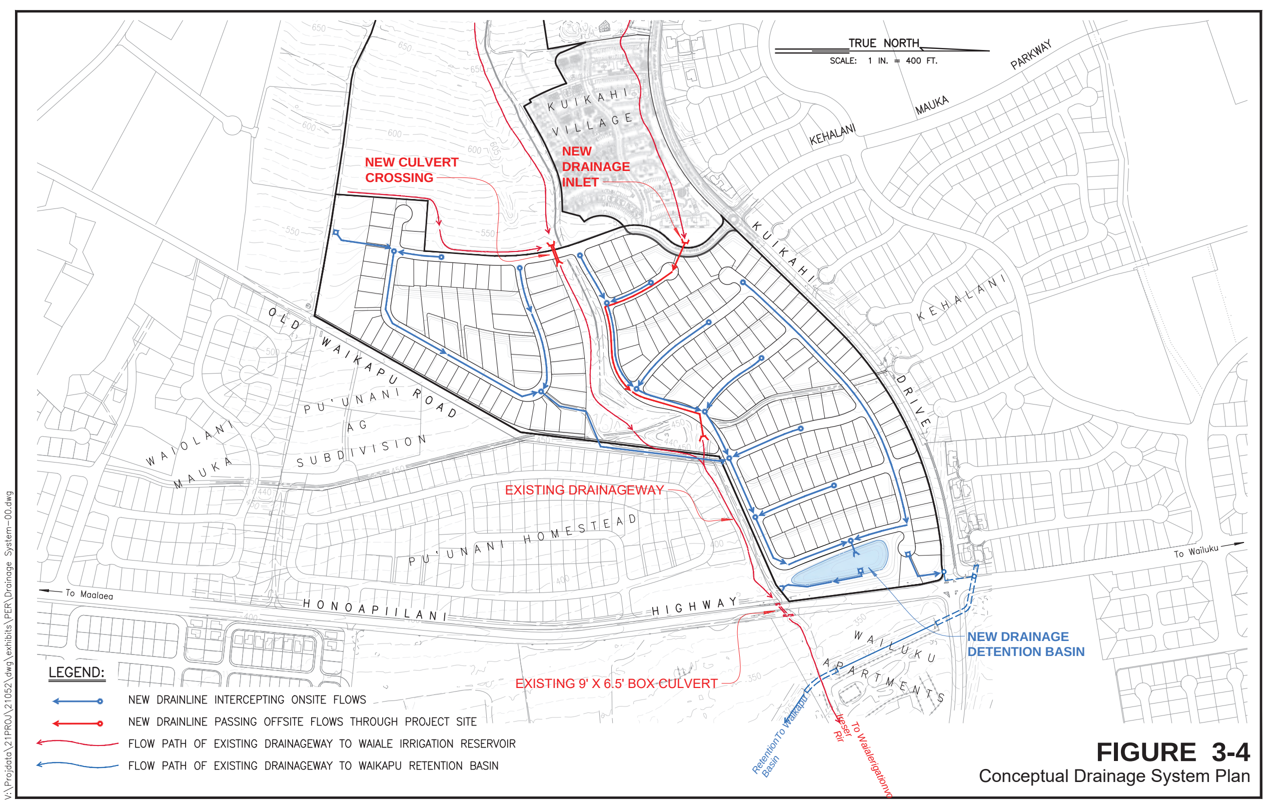


FIGURE 3-4
Conceptual Drainage System Plan

4. WATER SYSTEM

4.1 Existing Infrastructure

The Wailuku Single Family Residential Project is located within the Maui County Department of Water Supply's Central Maui water system. Water for the project will be supplied from the Dept. of Water Supply's distribution system in Waikapu, which uses a groundwater well as its source and distributes water from two 1.5 MG and 0.5 MG[11] capacity storage tanks located along Kuikahi Drive at elevation 670 feet.

4.2 Projected Demand

Average daily water consumption by the 204 single-family homes comprising the Wailuku Single-Family Residential Project is projected to be approximately 129,200 gallons per day (gpd).[12]

4.3 Proposed Improvements

Water Source

No water source improvements are proposed with the Wailuku Single-Family Residential Project. The subdivision will be processed under exemptions present in Section 221 of the Hawaiian Homes Commission Act and Section 14.12.030.H of the Maui County Code.

[11] The 0.5MG storage tank will be constructed by DHHL for the Dept. of Water Supply in conjunction with DHHL's Pu'unani Homestead subdivision.

[12] Water demand calculations may be found in Appendix B-1.

Distribution System

Water mains will be extended into the subdivision from the Dept. of Water Supply's existing 12-inch distribution mains along Kuikahi Drive and Old Waikapu Road. A network of 8-inch distribution mains within the subdivision on which service laterals and fire hydrants have been installed will then provide water service and fire protection to the individual houselots in accordance with Dept. of Water Supply standards.[13] (See Figure 4-1)

Reservoir Storage Capacity

204,000 gallons[14] of storage capacity is needed by the Wailuku Single-Family Residential Project under Maui County Dept. of Water Supply standards. DHHL will utilize a portion of its water storage credits from the new 0.5 MG storage tank it is constructing for the Dept. of Water Supply to cover the water storage requirements for the Wailuku Single-Family Residential Project.

[13] Water system will provide a static water pressures ranging from 50 psi to 132 psi and deliver a fire flow of 1,000 gpm for at least 2 hours duration (120,000 gallons) from the 0.5 MG and 1.5 MG storage tanks. [Ref. Maui County Dept. of Water Supply, *Water System Standards*, 2002, pp.111-4 to 111-6.]

[14] Water storage calculations may be found in Appendix B-2.

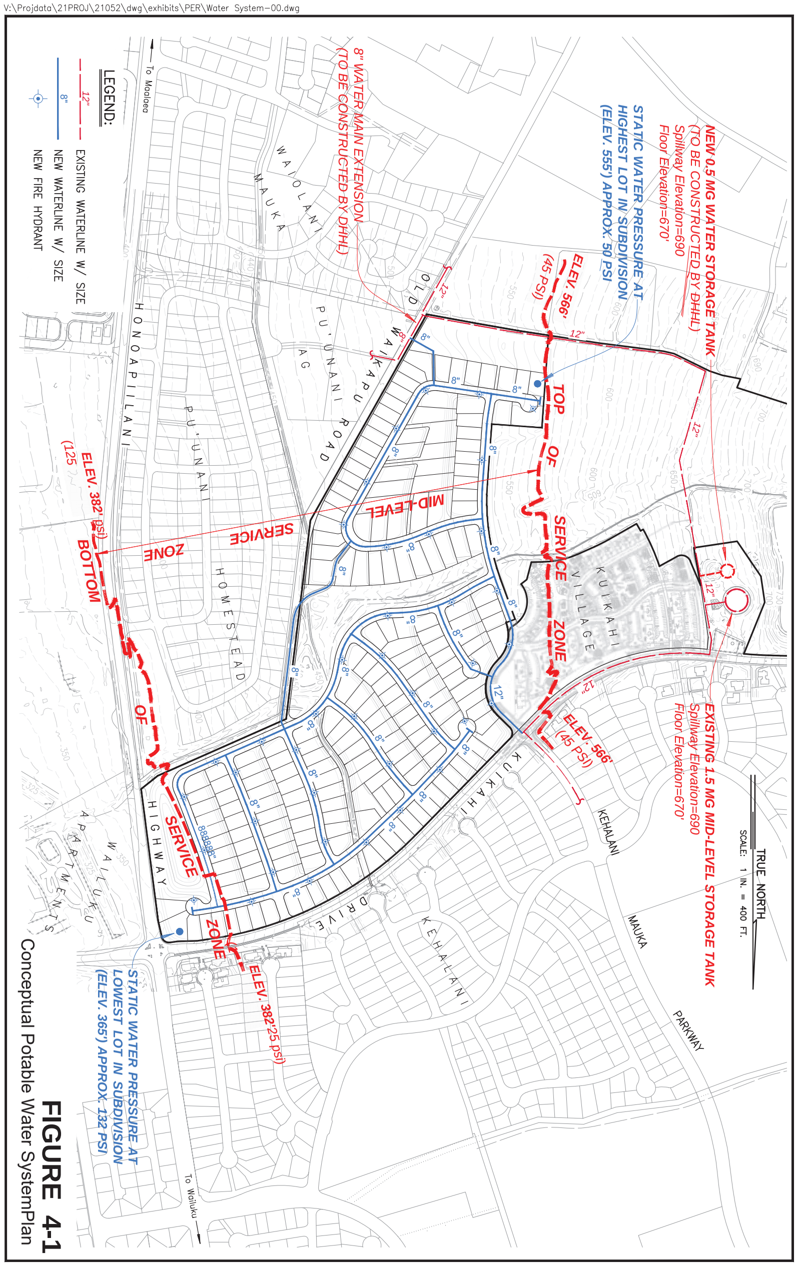


FIGURE 4-1
Conceptual Potable Water SystemPlan

5. WASTEWATER SYSTEM

5.1 Existing Infrastructure

The land parcel on which the Wailuku Single-Family Residential Project is located currently has no sewer service; however, the area in which it is located is served by the County of Maui's sewerage system, which collects wastewater and conveys it to the Kahului Wastewater Reclamation Facility (KWWRF) for treatment and disposal.

Several gravity sewer collection mains operated by Maui County are located near the project site, including:

- an existing 12-/18-inch diameter main located along Waiale Road which collects wastewater from the Waikapu and Kehalani residential areas and conveys it along Lower Main Street to the KWWRF;
- an 8-inch main located within Kuikahi Drive which conveys wastewater from the Wailuku Heights subdivision to the 18-inch main on Waiale Road described above; and
- a planned 8-inch gravity main located along Honoapiilani Highway which will serve DHHL's Pu'unani Homestead subdivision.

5.2 Projected Demand

The Wailuku Single-Family Residential Project is expected to generate 71,400 gallons of wastewater per day.[15]

[15] Wastewater demand calculations can be found in Appendix C.

5.3 **Proposed Improvements**

Collection System

A branching network of new gravity sewer pipes will be installed within the subdivision's internal streets to collect wastewater from its houselots and convey it toward the low eastern end of the project parcel adjacent to Honoapiilani Highway.

Two Alternatives for connecting the Wailuku Single-Family Residential Project to the County sewerage collection system are being considered since the existing 8-inch gravity main along Kuikahi Drive does not possess sufficient remaining capacity to accommodate wastewater flows from an additional 204 houselots[16].

- Alternative 1 will involve installing a second 1,200 foot long, 8-inch diameter gravity sewerline from the project site to the 12"/18" County sewer main along Waiale Road. (See Figure 5-1a)
- Alternative 2 will involve making a connection to the planned 8-inch sewer main along Honopiilani Highway which DHHL will be installing to serve its Pu'unani Homestead subdivision. (See Figure 5-1b).

[16] See Appendix C-2 for an estimate of remaining capacity in the existing 8-inch sewerline on Kuikahi Drive.

Treatment Plant Capacity

Maui County is planning the construction of a new 4.0 million gallon per day (MGD) capacity treatment plant in Waikapu which it expects to complete in 2029. Once this new plant becomes operational, wastewater flows from the Wailuku Single-Family Residential Project together with other new developments and existing portions of urban Wailuku and Waikapu will be re-directed to the new Waikapu plant for treatment and disposal. This new treatment plant will possess ample capacity to accommodate the 0.07 MGD of wastewater that the Wailuku Single-Family Residential Project is expected to generate.

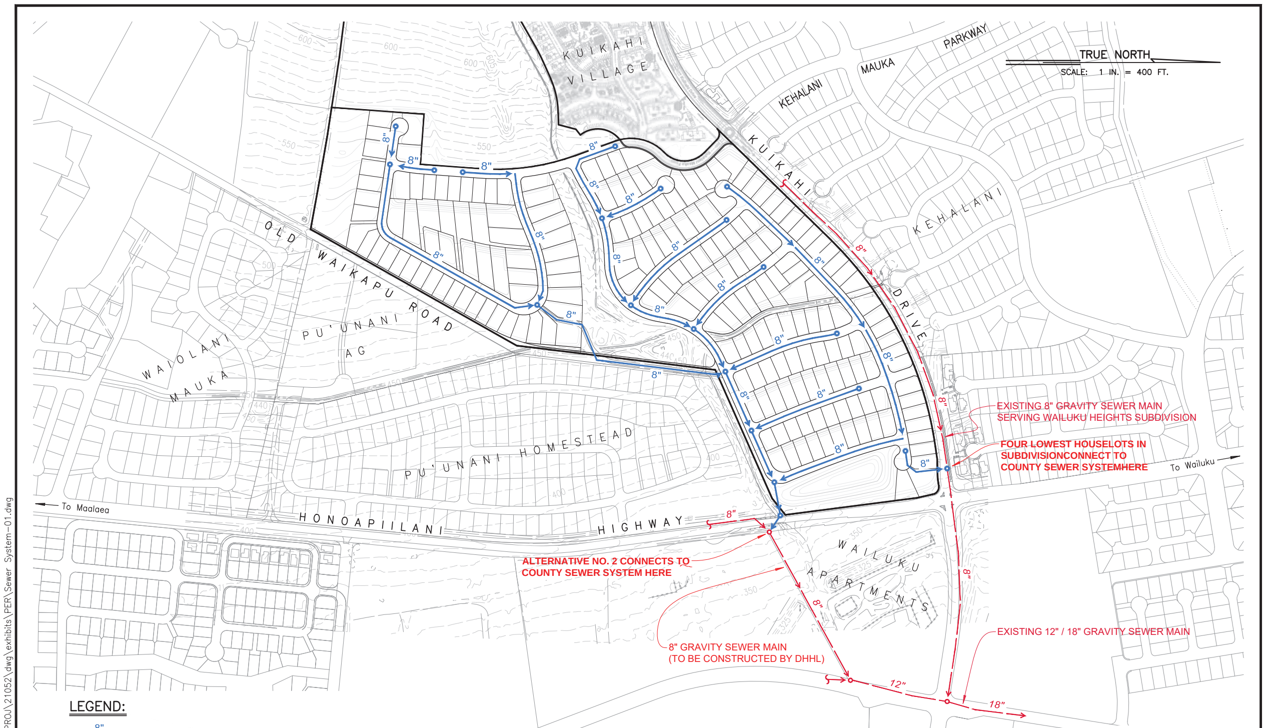


FIGURE 5-1b
Conceptual Sewer System Plan: Alternative 2

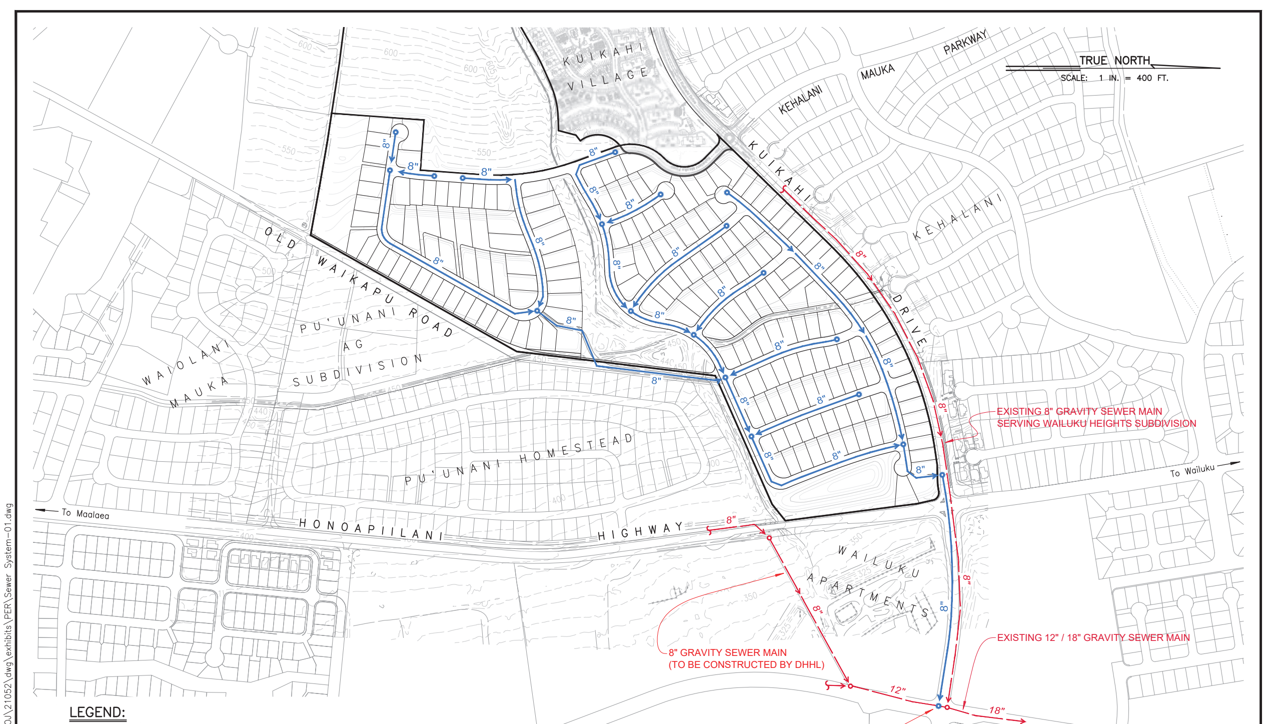


FIGURE 5-1a
Conceptual Sewer System Plan: Alternative 1

6. POWER AND TELECOMMUNICATIONS

6.1 Existing Infrastructure

Hawaiian Electric Company (Maui County) has existing three-phase primary underground lines running on the south side of Kuikahi Drive within the right-of-way below Alu Road. However, HECO's existing facilities and infrastructure will likely need to be upgraded and extended to accommodate the Wailuku Single-Family Residential Project.

Both Hawaiian Telcom and Spectrum do not have adequate underground facilities along Kuikahi Drive and will likely need to upgrade and extend their facilities and infrastructure accordingly.

A site inspection and consultation with the utilities were used to layout the connections for the Wailuku Single-Family Residential Project.

6.2 Project Design

An overhead distribution system is proposed for the Wailuku Single-Family Residential Project in order to remain consistent with DHHL's nearby Pu'unani Homestead subdivision; however, the installation of utilities underground remains an option.[17]

[17]The exemptions to the Maui County Code needed to install utilities overhead are identified in Section 6.3 of this report.

6.2.1 Hawaiian Electric Company (Maui County)

HECO will extend its distribution system from Kehalani Mauka Parkway Extension into the Wailuku Single-Family Residential Project site underground before converting to an overhead distribution with two riser poles. On-site electrical improvements will consist of a three-phase and single-phase overhead distribution system. The three-phase system will be mainly used to serve any three-phase load demand that may be needed. The single-phase system will power the residential lots and street lighting. The installation of the overhead distribution facilities (poles, anchors, lines, pole-mounted transformers and street lights) will be furnished by HECO in accordance with its requirements based on the estimated projected electrical load demand shown in Table 6-1. The distribution facilities will be installed as part of the site work, however, service requests for each individual unit will need to be submitted to HECO separately by the individual unit owner prior to or during construction.

HECO may require the installation of a substation to accommodate this development's anticipated load demand. Easements will be required to cover any facilities located in private property and required vehicular access. Easements should also include Hawaiian Telcom and Spectrum's facilities.

Further details will be worked out with HECO during the design stage of the project.

TABLE 6-1
Estimated Project Demand Load

Unit Type	Number	HECO Estimate		NEC Estimate (kW)
		kW/Lot	Total kW	
Single-Family Residence	204	6	1,224	6,120

6.2.2 Hawaiian Telcom

Hawaiian Telcom provides telephone and DSL services in the area. No television service is currently available on Maui.

Hawaiian Telcom is currently in the process of designing an underground fiber communication/internet system which it plans to install on the northern side of the Kuikahi Drive right-of-way from the intersection of Honoapiilani Highway to the Wailuku Heights subdivision. This new infrastructure will be capable of servicing the Wailuku Single-Family Residential Project. Hawaiian Telcom could also choose to extend their facilities from Kehalani Mauka Parkway Extension. Fiber optic equipment or a fiber distribution hub (FDH) will be installed and centrally located within the project to provide individual service. The FDH equipment will act as a distribution point for all Hawaiian Telcom's telecommunication services within this project. Telephone cables will be installed at Hawaiian Telcom's expense with individual customers responsible for service connection requests and monthly rental fees.

Preferred easement location for FDH equipment will be transmitted upon receipt of information from Hawaiian Telcom's planning department once detailed plans are available. All required telephone support structures such as the fiber distribution hub (FDH), etc. are to be covered by easements where applicable.

Further details will be worked out with Hawaiian Telcom during the design stage of the project.

6.2.3 Spectrum

Spectrum is the cable television provider on Maui, but also can provide telephone and internet connection. Spectrum will need to extend their facilities across Kuikahi Drive to service the Wailuku Single-Family Residential Project. The developer will be responsible for coordinating any required off-site and on-site infrastructure installation with Spectrum. Spectrum will possibly need two power supply pads to be installed within the project site. The installation cost of the power supply equipment and all related cables will be at Spectrum's expense. Like the other utilities, it will also be the responsibility of the individual unit or home owner to submit their own service request for the desired service connection, rental equipment, installation and monthly fees with Spectrum, accordingly.

Easements will be required to cover any underground facilities located in private property along with vehicular access.

Further details will be worked out with Spectrum during the design stage of the project.

6.2.4 Sandwich Isle Communications

Sandwich Isle Communications has an underground fiber optic trunk line located along Honoapiilani Highway and will be offered the opportunity to provide telephone and internet service to the project on a competitive basis with Spectrum and Hawaiian Telcom.

SIC will design and construct an overhead distribution system extension into the project from its trunk line on Honoapiilani Highway at its expense, and individual customers will be responsible for their own monthly fees.

Further details will be worked out with Sandwich Isle Communications during the design stage of the project.

6.2.5 Site Improvements

The overhead distribution system into the project may include Hawaiian Electric Company (Maui County), Hawaiian Telcom and Spectrum infrastructure. The utility companies will install their own overhead facilities (poles, anchors, lines, pole-mounted transformers and street lights). Developer will be responsible to install any underground utility infrastructure, including conduits, handholes, street light bases and concrete pads for electrical, telephone and cable television/internet equipment. Utility companies will provide and install their cables and equipment after the required infrastructures have been installed and approved. Street light poles and fixtures will be provided and installed by HECO

for all roads that will be turned over to the County. On private roads, light fixtures will be the responsibility of the developer.

All exterior lighting will comply to the Maui County Outdoor Lighting Ordinance.[18] Public lights will be installed on utility poles at a 20' height, per HECO and County Standards. If streets remain private, private pole-mounted street lights may be used for area and street lighting, but will need to be metered.

There is also a concern for physical space within each part of the project as the lots may leave limited space for any required underground utility facilities. If space does not allow for handhole placement, or if the project does not have curb and gutter, utility infrastructure may require the use of manholes or traffic-rated handholes where possible. See Figure 6-1 for rough preliminary layouts of project electrical infrastructure.

6.3 Code Exemptions

Exemptions to Maui County Code Section 12.16.010 (Placement of Utility Poles), Section 18.20.140.B (Utility lines and facilities) and Section 16.26B.3600 (Improvements to Public Streets) will be required in order to install the power and telecommunications equipment serving the Wailuku Single-Family Residential Project overhead rather than underground.

[18]Ref. Maui County Code, Chapter 20.35 - Outdoor Lighting.

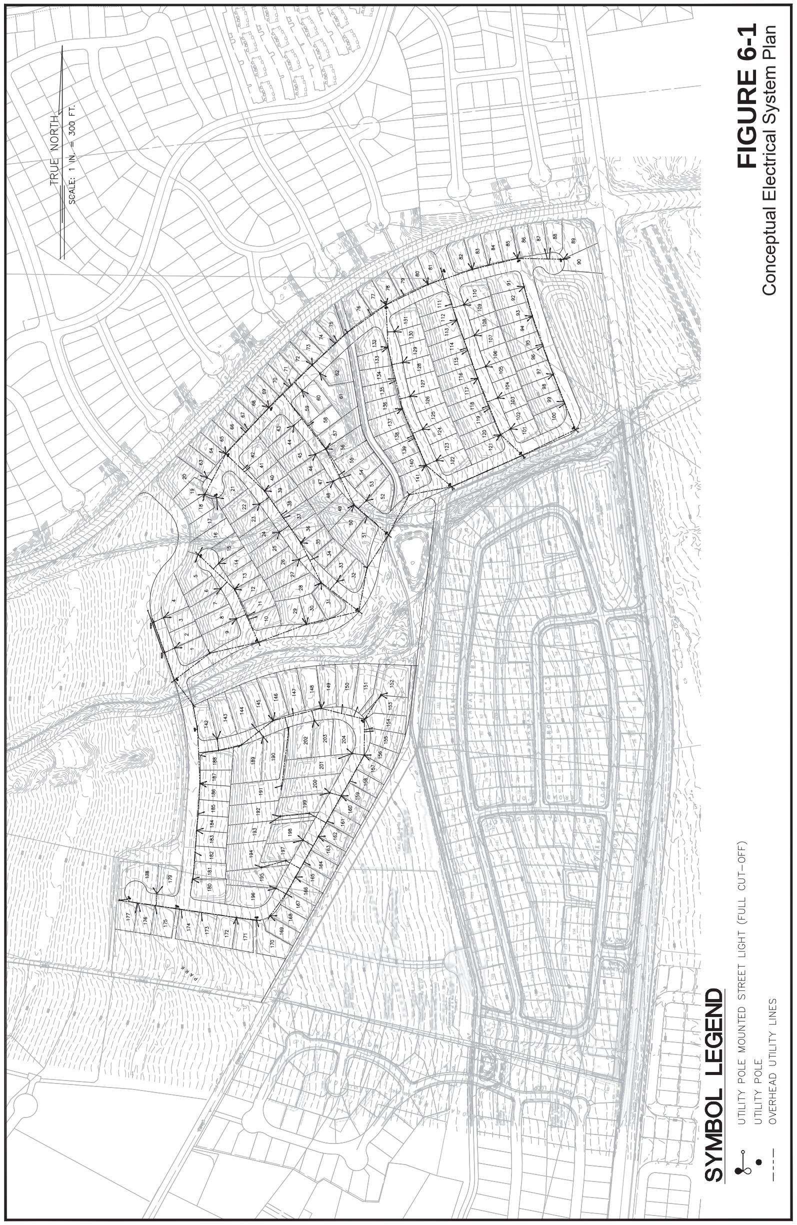
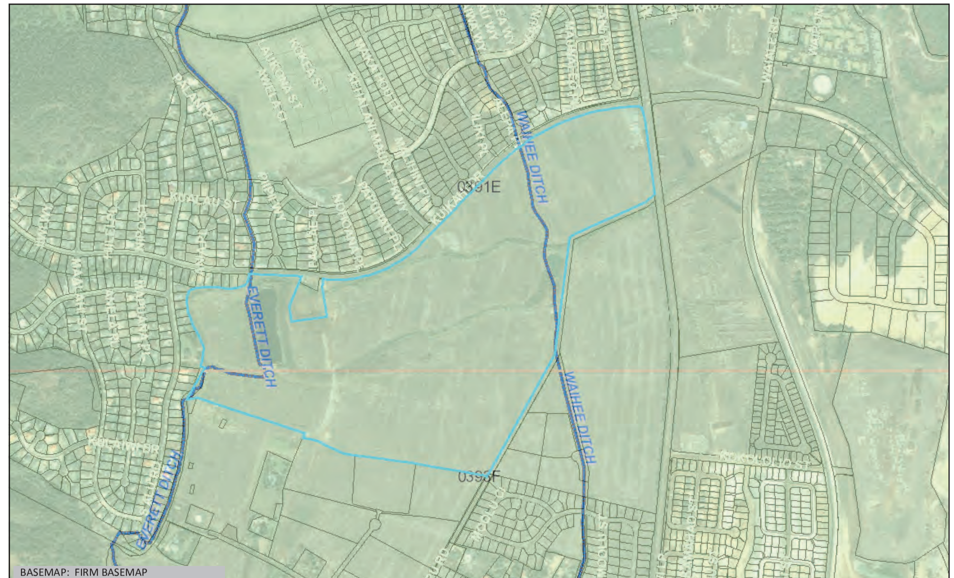


FIGURE 6-1
Conceptual Electrical System Plan

APPENDIX A
Drainage Calculations

APPENDIX A-1

DLNR Flood Hazard Assessment Report for TMK 3-5-002:003



Flood Hazard Assessment Report

www.hawaiinfip.org

Property Information

COUNTY:	MAUI
TMK NO:	(2) 3-5-002:003
WATERSHED:	IAO
PARCEL ADDRESS:	WAILUKU, HAWAII

Notes:

Flood Hazard Information

FIRM INDEX DATE:	NOVEMBER 04, 2015
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL - EFFECTIVE DATE:	1500030391E - SEPTEMBER 25, 2009 1500030393F - NOVEMBER 04, 2015

THIS PROPERTY IS WITHIN A TSUNAMI EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: YES (MA-0151)
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

N

0 600 1,200 ft

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(*Note: legend does not correspond with NFHL*)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A**: No BFE determined.
- **Zone AE**: BFE determined.
- **Zone AH**: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO**: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V**: Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE**: Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF**: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded)**: Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X**: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D**: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

APPENDIX A-2
Offsite Runoff (100-yr./24-hr.)

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/25/2022

Area

Description: Offsite surface runoff draining toward south end of project site (Area A).

	Land Area	Hydrologic Soil Type
Fallow Cropland/Pasture:	38.6 acres	B (IbB, IbC, IcB, IcC)
Forest:	38.6 acres	C (rRR)
Forest:	93.8 acres	D (rRT)
Residential (1/6 acre):	4.3 acres	B (IbC)
Residential (1/6 acre):	3.7 acres	C (rRR)
Total (A):	179.0 acres	

Runoff Coefficient

Fallow Cropland/Pasture (Soil Type B - IbB, IbC, IcB, IcC):	75
Forest (Soil Type C - rRR):	70
Forest (Soil Type D - rRT):	77
Residential (Soil Type B - IbC):	80
Residential (Soil Type C - rRR):	87
Weighted Curve Number (CN):	75

Time of Concentration

Avg. Slope: 25%
Hydraulic Length: 10,810 feet
Time of Concentration (T_c): 49.7 minutes

Intensity

Project Location: Wailuku, Maui, Hawaii
Design Storm: 100-year recurrence interval, 24-hour duration
Rainfall Depth: 12.0 in.
Rainfall Distribution: Type I

Flow Rate

Q = 575 ft.^{3}/sec.

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/25/2022

Area

Description: Offsite surface runoff draining toward north end of project site (Area B).

	Land Area	Hydrologic Soil Type
Fallow Cropland/Pasture:	33.8 acres	B (IbB, IbC, IcB, IcC)
Forest:	54.1 acres	C (rRR)
Forest:	79.4 acres	D (rRT)
Residential (1/6 acre):	57.9 acres	B (IbC)
Residential (1/6 acre):	4.6 acres	C (rRR)
Water Tank Site:	2.4 acres	B (IbC, IcC)
Total (A):	232.2 acres	

Runoff Coefficient

Fallow Cropland/Pasture (Soil Type B - IbB, IbC, IcB, IcC):	75
Forest (Soil Type C - rRR):	70
Forest (Soil Type D - rRT):	77
Residential (Soil Type B - IbC):	80
Residential (Soil Type C - rRR):	87
Water Tank Site (Soil Type B - IbC, IcC):	80
Weighted Curve Number (CN):	76

Time of Concentration

Avg. Slope: 25%
Hydraulic Length: 10,270 feet
Time of Concentration (T_c): 46.3 minutes

Intensity

Project Location: Wailuku, Maui, Hawaii
Design Storm: 100-year recurrence interval, 24-hour duration
Rainfall Depth: 12.0 in.
Rainfall Distribution: Type I

Flow Rate

Q = 758 ft.^{3}/sec.

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APPENDIX A-3
Pre-Development Surface Runoff (10-yr./1-hr.)

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/13/2022

Area

Description: Pre-development runoff draining toward existing drainageway.

Total Area (A): 64.8 acres

Runoff Coefficient

Infiltration:	[Medium]	→	0.07
Relief:	[Rolling]	→	0.03
Vegetal Cover:	[Good]	→	0.03
Development:	[Agricultural]	→	0.15
Open Area Runoff Coefficient, C:			0.28

Time of Concentration

Runoff Length: 1,219 ft.
Start Elevation: 532 ft. M.S.L.
End Elevation: 436 ft. M.S.L.
Average Slope: 7.9 %
Time of Concentration (T_c): 38 minutes

Intensity

Project Location: Wailuku, Maui, Hawaii
Design Storm: 10-year recurrence interval, 1-hour duration
Rainfall Depth: 2.25 in.
Intensity (I): 2.87 in./hr.

Flow Rate & Volume

$Q = C \cdot I \cdot A$
$= 52.1$ ft.^{3}/sec.

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/13/2022

Area

Description: Pre-development runoff draining toward Honoapiilani Highway.

Total Area (A): 12.2 acres

Runoff Coefficient

Infiltration:	[Medium]	→	0.07
Relief:	[Rolling]	→	0.03
Vegetal Cover:	[Good]	→	0.03
Development:	[Agricultural]	→	0.15
Open Area Runoff Coefficient, C:			0.28

Time of Concentration

Runoff Length: 932 ft.
Start Elevation: 400 ft. M.S.L.
End Elevation: 354 ft. M.S.L.
Average Slope: 4.9 %
Time of Concentration (T_c): 29 minutes

Intensity

Project Location: Wailuku, Maui, Hawaii
Design Storm: 10-year recurrence interval, 1-hour duration
Rainfall Depth: 2.25 in.
Intensity (I): 3.20 in./hr.

Flow Rate & Volume

$Q = C \cdot I \cdot A$
$= 10.9$ ft.^{3}/sec.

APPENDIX A-4
Post-Development Surface Runoff (10-yr./1-hr.)

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/14/2022

Area

Description: Post-development runoff intercepted by onsite drainage system.

SF Residential Area:	65.3	acres
Park Area:	2.1	acres
Total Area (A):	67.4	acres

Runoff Coefficient

SF Residential Runoff Coefficient:	0.55
Park Runoff Coefficient:	0.30
Weighted Runoff Coefficient (C):	0.54

Time of Concentration

Time of Concentration (T_c): 10 minutes

Intensity

Project Location: Wailuku, Maui, Hawaii
Design Storm: 10-year recurrence interval, 1-hour duration
Rainfall Depth: 2.25 in.
Intensity (I): 4.60 in./hr.

Flow Rate & Volume

$$Q = C \cdot I \cdot A$$
$$= 167.4 \text{ ft.}^3\text{/sec.}$$

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/14/2022

Area

Description: Post-development runoff draining toward Honoapiilani Highway.

SF Residential Area:	1.7 acres
Landscape Area:	1.1 acres
Total Area (A):	2.8 acres

Runoff Coefficient

SF Residential Runoff Coefficient:	0.55
Landscape Runoff Coefficient:	0.35
Weighted Runoff Coefficient (C):	0.47

Time of Concentration

Time of Concentration (T_c): 5 minutes

Intensity

Project Location: Wailuku, Maui, Hawaii
Design Storm: 10-year recurrence interval, 1-hour duration
Rainfall Depth: 2.25 in.
Intensity (I): 5.75 in./hr.

Flow Rate & Volume

Q = C · I · A
= 7.6 ft.^{3}/sec.

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/14/2022

Area

Description: Post-development runoff draining toward existing drainageway.

Total Area (A): 6.8 acres

Runoff Coefficient

Infiltration:	[Medium]	→	0.07
Relief:	[Rolling]	→	0.03
Vegetal Cover:	[Good]	→	0.03
Development:	[Agricultural]	→	0.15
Open Area Runoff Coefficient (C):			0.28

Time of Concentration

Runoff Length:	1,219 ft.
Start Elevation:	532 ft. M.S.L.
End Elevation:	436 ft. M.S.L.
Average Slope:	7.9 %
Time of Concentration (T_c):	38 minutes

Intensity

Project Location: Wailuku, Maui, Hawaii
Design Storm: 10-year recurrence interval, 1-hour duration
Rainfall Depth: 2.25 in.
Intensity (I): 2.87 in./hr.

Flow Rate & Volume

Q = C · I · A
= 5.5 ft.^{3}/sec.

APPENDIX A-5

Detention Basin Sizing Calculations (50-yr./1-hr.)

APPENDIX A-5.1

Storage Capacity Needed to Meet Water Quality Requirements

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Storm Water Treatment

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/14/2022

Purpose: To determine the required basin volume to meet the County of Maui, Department of Public Works' "Rules for the Design of Storm Water Treatment Best Management Practices"

Calculations: The required design volume for detention based control is computed by the MCC §15-111-5.a.1.C formula:

WQDV = C · 1" · A · 3630

where, WQDV = water quality design volume in cubic feet
C = EPA volumetric runoff coefficient
A = gross area of the site in acres = 77.0 ac.
1" = design storm for detention based water quality system
3630 = conversion factor

The EPA volumetric runoff coefficient, C, calculated from the formula given in MCC §15-111-5.a.1.A is:

C = 0.05 + (0.009) · (IMP)

where, IMP = percentage of impervious area
= (impervious area) / (gross area) · 100
= (42.4 ac.) / (77.0 ac.) · 100
= 55

Since IMP = 55, the value of C is:

C = 0.05 + (0.009) · (55)
= 0.55

Compute the required design volume for a 1" storm with C = 0.55:

WQDV = C · 1" · A · 3630
= 0.55 · 1" · 77.0 · 3630
= 153,731 ft^3
= 3.5 Ac.-ft.

APPENDIX A-5.2
Basin Inflow/Outflow Hydrograph

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 07 / 14 / 2022

Hyd. No. 1

Detention Storage Inflow/Outflow Hydrograph

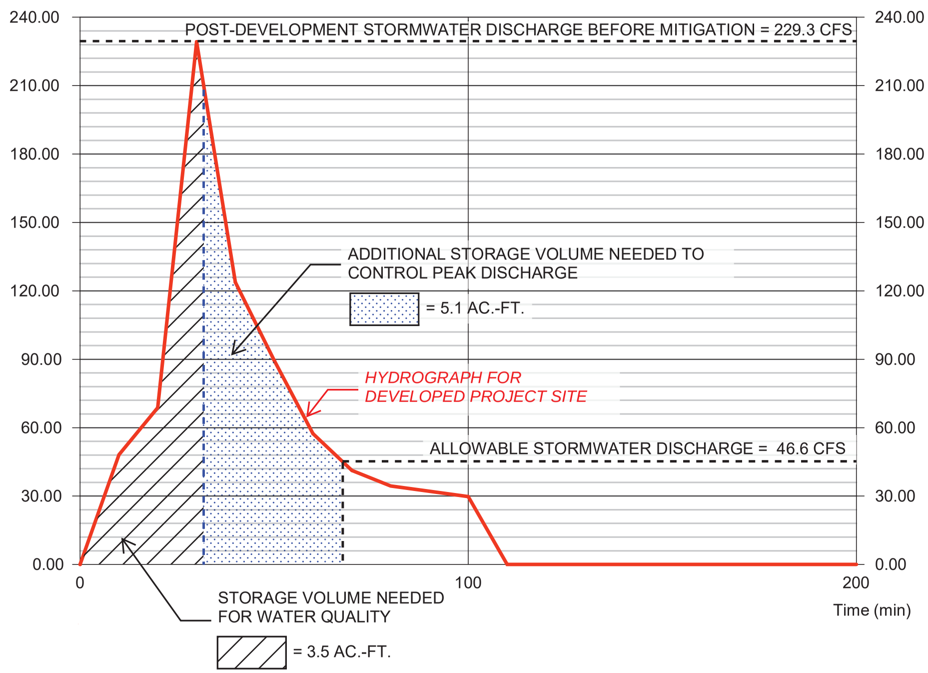
Hydrograph type	= Manual	Peak discharge	= 229.30 cfs
Storm frequency	= 50 yrs	Time to peak	= 30 min
Time interval	= 10 min	Hyd. volume	= 10.391 acft

NOTES:

1. TOTAL REQUIRED STORAGE VOLUME = + = 8.6 AC.-FT. (SEE BELOW GRAPH)
2. HYDROGRAPH DEPICTS 50-YR., 1-HR. STORM FOR WAILUKU, HI (DEPTH = 3.20 IN.)
3. ALLOWABLE STORMWATER DISCHARGE = 52.1 CFS - 5.5 CFS = 46.6 CFS

Detention Storage Inflow/Outflow Hydrograph

Hyd. No. 1 -- 50 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 07 / 14 / 2022

Hyd. No. 1

50-Yr Post-Development Hydrograph

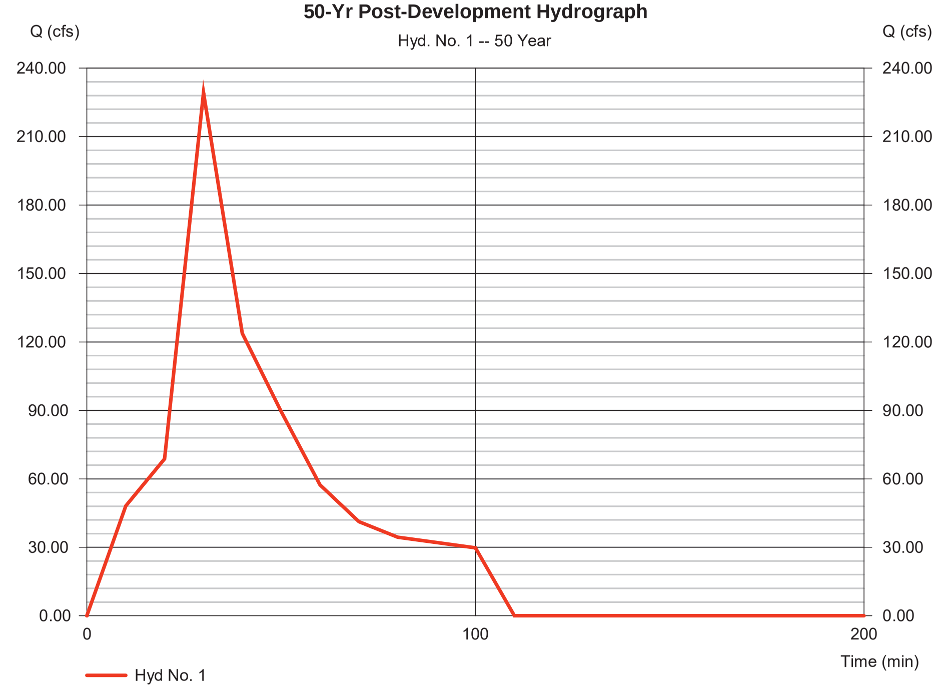
Hydrograph type	= Manual	Peak discharge	= 229.30 cfs
Storm frequency	= 50 yrs	Time to peak	= 30 min
Time interval	= 10 min	Hyd. volume	= 10.391 acft

Universal Rational Hydrograph Parameters for 50-Yr, 1-Hr Storm

T/Tc	T (min)	Q/Qp	Q (cfs)
0	0.00	0.00	0.00
1	10.00	0.21	48.15
2	20.00	0.30	68.79
3	30.00	1.00	229.30
4	40.00	0.54	123.82
5	50.00	0.39	89.43
6	60.00	0.25	57.33
7	70.00	0.18	41.27
8	80.00	0.15	34.40
9	90.00	0.14	32.10
10	100.00	0.13	29.81
11	110.00	0.00	0.00

50-Yr Post-Development Hydrograph

Hyd. No. 1 -- 50 Year



Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/14/2022

Area

Description: Pre-development runoff draining toward existing drainageway.

Total Area (A): 64.8 acres

Runoff Coefficient

Infiltration:	[Medium]	→	0.07
Relief:	[Rolling]	→	0.03
Vegetal Cover:	[Good]	→	0.03
Development:	[Agricultural]	→	0.15
Open Area Runoff Coefficient, C:			0.28

Time of Concentration

Runoff Length:	1,219 ft.
Start Elevation:	532 ft. M.S.L.
End Elevation:	436 ft. M.S.L.
Average Slope:	7.9 %
Time of Concentration (T_c):	38 minutes

Intensity

Project Location: Wailuku, Maui, Hawaii
Design Storm: 50-year recurrence interval, 1-hour duration
Rainfall Depth: 3.20 in.
Intensity (I): 4.08 in./hr.

Flow Rate & Volume

$$Q = C \cdot I \cdot A$$
$$= 74.0 \ \text{ft.}^3\text{/sec.}$$

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/14/2022

Area

Description: Post-development runoff intercepted by onsite drainage system and detention basin.

SF Residential Area:	65.3 acres
Park Area:	2.1 acres
Total Area (A):	67.4 acres

Runoff Coefficient

SF Residential Runoff Coefficient:	0.55
Park Runoff Coefficient:	0.30
Weighted Runoff Coefficient (C):	0.54

Time of Concentration

Time of Concentration (T_c): 10 minutes

Intensity

Project Location: Wailuku, Maui, Hawaii
Design Storm: 50-year recurrence interval, 1-hour duration
Rainfall Depth: 3.20 in.
Intensity (I): 6.30 in./hr.

Flow Rate & Volume

$$Q = C \cdot I \cdot A$$
$$= 229.3 \ \text{ft.}^3\text{/sec.}$$

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Wailuku Single Family Residential Project
Project No.: 21052.50
Engineer: Clarissa S. Ong
Date: 7/14/2022

Area

Description: Post-development runoff draining toward existing drainageway.

Total Area (A): 6.8 acres

Runoff Coefficient

Infiltration:	[Medium]	→	0.07
Relief:	[Rolling]	→	0.03
Vegetal Cover:	[Good]	→	0.03
Development:	[Agricultural]	→	0.15
Open Area Runoff Coefficient (C):			0.28

Time of Concentration

Runoff Length: 1,219 ft.
Start Elevation: 532 ft. M.S.L.
End Elevation: 436 ft. M.S.L.
Average Slope: 7.9 %
Time of Concentration (T_c): 38 minutes

Intensity

Project Location: Wailuku, Maui, Hawaii
Design Storm: 50-year recurrence interval, 1-hour duration
Rainfall Depth: 3.20 in.
Intensity (I): 4.08 in./hr.

Flow Rate & Volume

$$Q = C \cdot I \cdot A$$
$$= 7.8 \text{ ft.}^3\text{/sec.}$$

APPENDIX B
Potable Water Calculations

APPENDIX B-1
Potable Water Demand Calculation

WAILUKU SINGLE-FAMILY RESIDENTIAL PROJECT

Calculation of Average Daily Potable Water Demand

Land Use	Basis		Average Daily Consumption Rate[1]		Average Daily Demand
Single-Family Houselots	207 D.U.	x	600 gals/D.U.	==>	124,200 gpd
Irrigated Open Space	4.0 Ac.	x	1,700 gals/Ac	==>	6,800 gpd
Total					131,000 gpd

Sources:

[1] Rate taken from Water System Standards, Department of Water Supply, County of Maui, State of Hawaii, 2002, Table 100-18, p. 111-3.

APPENDIX B-2
Potable Water Storage Capacity Calculation

WAILUKU SINGLE-FAMILY RESIDENTIAL PROJECT
Reservoir Sizing Based on MCC §14.05.020 Criteria

Minimum Capacity Required by MCC §14.05.20.A.1

Basis	Needed Storage Capacity	
Fire Flow	120,000 gals.	
Maximum Daily Demand	196,500 gals.	
1,000 Gallons Per Lot	204,000 gals.	<== ***Controlling Value***

Minimum Storage Tank Size Per DWS Standards

Minimum required tank size determined by rounding needed storage capacity up to the next standard tank size specified in Section 105.10.A of DWS' Water System Standards.

∴ Minimum required tank size ≥ 0.3 MG

WAILUKU SINGLE-FAMILY RESIDENTIAL PROJECT

Required Storage Capacity Based Upon Fire Flow Demand

Land Use	Fire Flow Duration		Fire Flow Rate[1]		Needed Storage Capacity
Single-Family Residential	2 hours	x	1,000 gals/min.	==>	120,000 gals.

Source:

[1] Fire flow rate taken from Water System Standards, Department of Water Supply, County of Maui, State of Hawaii, 2002, Table 100-19, p. 111-4.

WAILUKU SINGLE-FAMILY RESIDENTIAL PROJECT

Required Storage Capacity Based Upon Maximum Daily Demand

Land Use	Basis		Average Daily Consumption Rate[1]		Average Daily Demand	Peaking Factor[2]		Max. Daily Demand and Needed Storage Capacity
Single-Family Houselots	204 D.U.	x	600 gals/D.U.	==>	122,400 gpd	x *1.5*	==>	183,600 gpd
Irrigated Open Space	4.0 Ac.	x	1,700 gals/Ac	==>	6,800 gpd	x *1.5*	==>	10,200 gpd
Total					129,200 gpd			193,800 gpd

Sources:

[1] Rate taken from Water System Standards, Department of Water Supply, County of Maui, State of Hawaii, 2002, Table 100-18, p. 111-3

[2] Max. daily demand factor taken from Water System Standards, Department of Water Supply, County of Maui, State of Hawaii, 2002, Table 100-20, p. 111-5.

WAILUKU SINGLE-FAMILY RESIDENTIAL PROJECT

Required Storage Capacity Based Upon 1,000 Gallons Per Lot

Land Use	Basis		Storage Demand[1]		Needed Storage Capacity
Single-Family Residential	204 lots	x	1,000 gals. / lot	==>	204,000 gals.

Source:

[1] Residential district storage demand of 1,000 gallons per lot prescribed by Maui County Code Section 14.05.020.A.1 (Reservoirs/Storage Tanks).

APPENDIX C

Wastewater Calculations

APPENDIX C-1

Wastewater Demand Calculation

WAILUKU SINGLE-FAMILY RESIDENTIAL PROJECT

Projected Wastewater Demand

Source	Base Unit		Contribution Rate		Average Daily Demand
Single-Family Dwellings	204 units	x	350 gals/unit/day*	==>	71,400 gpd
Total	204 units				71,400 gpd

Source:

** Contribution rate taken from County of Maui, Wastewater Reclamation Division, "Wastewater Flow Standards," February 2, 2000.*

APPENDIX C-2
Capacity Remaining in 8-inch Sewerline on Kuikahi Drive

WAILUKU SINGLE-FAMILY RESIDENTIAL PROJECT
Calculation of Capacity Remaining in Wailuku Heights'
8-inch Gravity Sewerline on Kuikahi Drive

PURPOSE:

Determine the capacity remaining in the existing 8-inch gravity sewerline on Kuikahi Drive originally installed to serve the Wailuku Heights Subdivision and estimate the number of houselots this remaining capacity could serve.

CALCULATIONS:

Compute the Design Peak Flow discharged by the existing Wailuku Heights Subdivision into the existing 8-inch gravity sewerline located along Kuikahi Drive using the procedure outlined in Chapter 20, Section 22.2 of the *Design Standards of the Department of Wastewater Management*.[1]

Design Peak Flow = (Design Maximum Flow) + (Wet Weather Infiltration)

where: Design Maximum Flow = (Max Wastewater Flow) + (Dry Weather Infiltration)
= (avg. daily single-lot flow demand) x (# lots) x (peaking factor)
+ (dry weather infiltration rate/person) x (# persons per lot) x (# lots)
= (350 gpd/lot) x (426 lots) x (4.2) + (5 gpd/person) x (4 persons/lot) x (426 lots)
= 626,220 + 8,520 gpd
= 634,740 gpd

given: Max. Wastewater Flow
= (avg. daily single-lot flow demand) x (# lots) x (peaking factor)
Dry Weather Infiltration
= (dry weather infiltration rate/person) x (# persons per lot)
Avg daily single-lot flow demand = 350 gpd/lot[2]
Number of lots = 426 lots
Peaking factor[3] = 4.2

---

[1] City and County of Honolulu, State of Hawaii, *Design Standards of the Department of Wastewater Management*, Volume I: "General Requirements for Wastewater Facilities, Design of Sewers and Pump Stations," Chapter 20 "Design of Sewers," Section 22.2 "Design Flows," July 1993, pp. 18-20.

[2] County of Maui, Wastewater Reclamation Division, "Wastewater Flow Standards," February 2, 2000.

[3] City and County of Honolulu, State of Hawaii, *Design Standards of the Department of Wastewater Management*, Volume I: "General Requirements for Wastewater Facilities, Design of Sewers and Pump Stations," July 1993, Figure 22.2.4 "Maximum Rate of Flow Chart," p.30.

Dry weather infiltration rate/person
= 5 gpd/person for sewers above ground water table[4]
Number of persons/lot[5] = 4 persons/lot for single-family occupancy

and: Wet Weather Infiltration = (wet weather infiltration rate/acre) x (tributary area)
= (1,250 gpd/acre) x (130 acres)
= 162,500 gpd

given: Wet weather infiltration rate/acre
= 1,250 for sewers above the ground water table[6]
Tributary area (Wailuku Heights) = 130 acres

Therefore: Design Peak Flow = (Design Maximum Flow) + (Wet Weather Infiltration)
= 634,740 gpd + 162,500 gpd
= 797,240 gpd
≈ 800,000 gpd

Full-flow capacity of controlling sewerline segment indicated on Figure C-2
= 900,000 gpd *(8-inch line @ 1.79% slope, n = 0.015)*

Capacity remaining in 8-inch sewerline
= (Full-flow capacity of 8-inch sewerline) - (Design Peak Flow)
= 900,000 gpd - 800,000 gpd
= 100,000 gpd

Approximate number of R-2 sized houselots that could be served by remaining capacity
= 100,000 gpd ÷ 1,878 gpd/houselot[7]
≈ 53 houselots

V:\Projdata\21PROJ\21052\Reports\Preliminary Engineering Report\Calcs\Sewer\Remaining Capacity Calculation_rev05.wpd

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[4] Ibid., Section 22.2.5 "Dry Weather Infiltration/Inflow," p.19.

[5] Ibid., Wastewater Reclamation Division, "Wastewater Flow Standards."

[6] Ibid., Section 22.2.5 "Wet Weather Infiltration/Inflow," p.20.

[7] Pro-rated flow from a single houselot = 800,000 gpd ÷ 426 houselots = 1,878 gpd/houselot

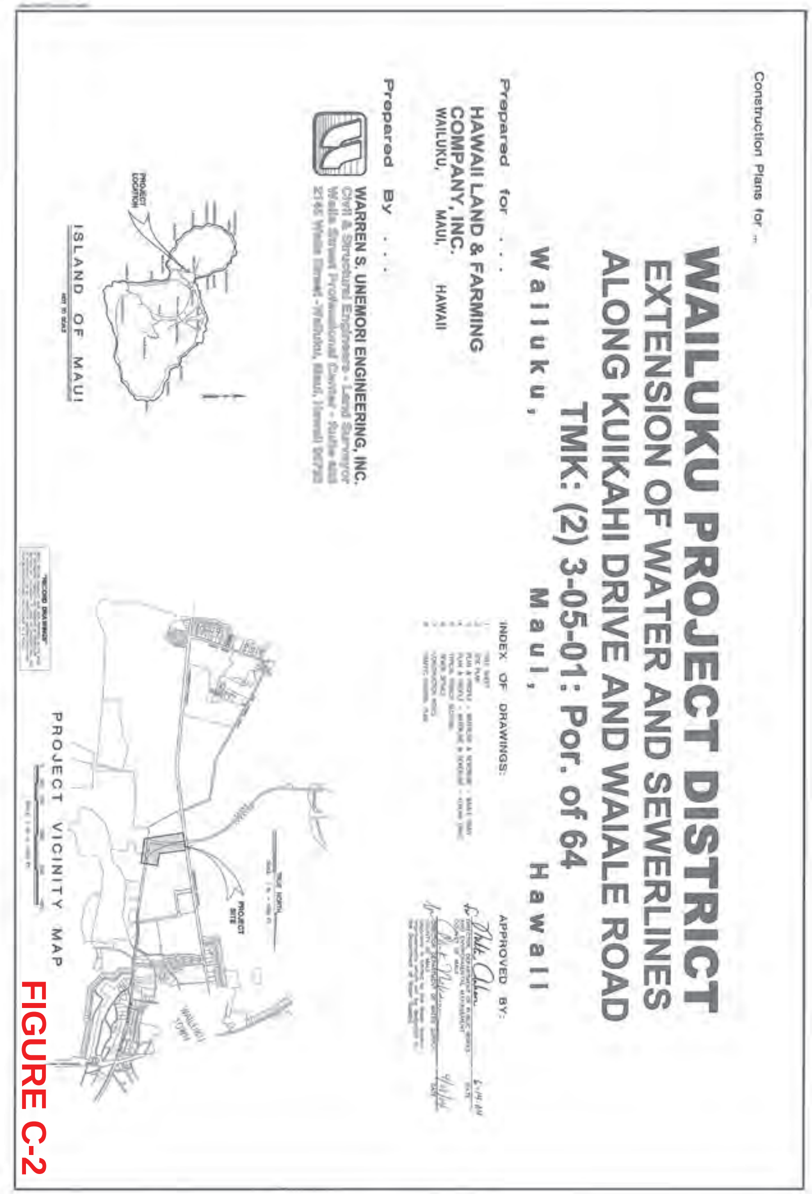

FIGURE C-2

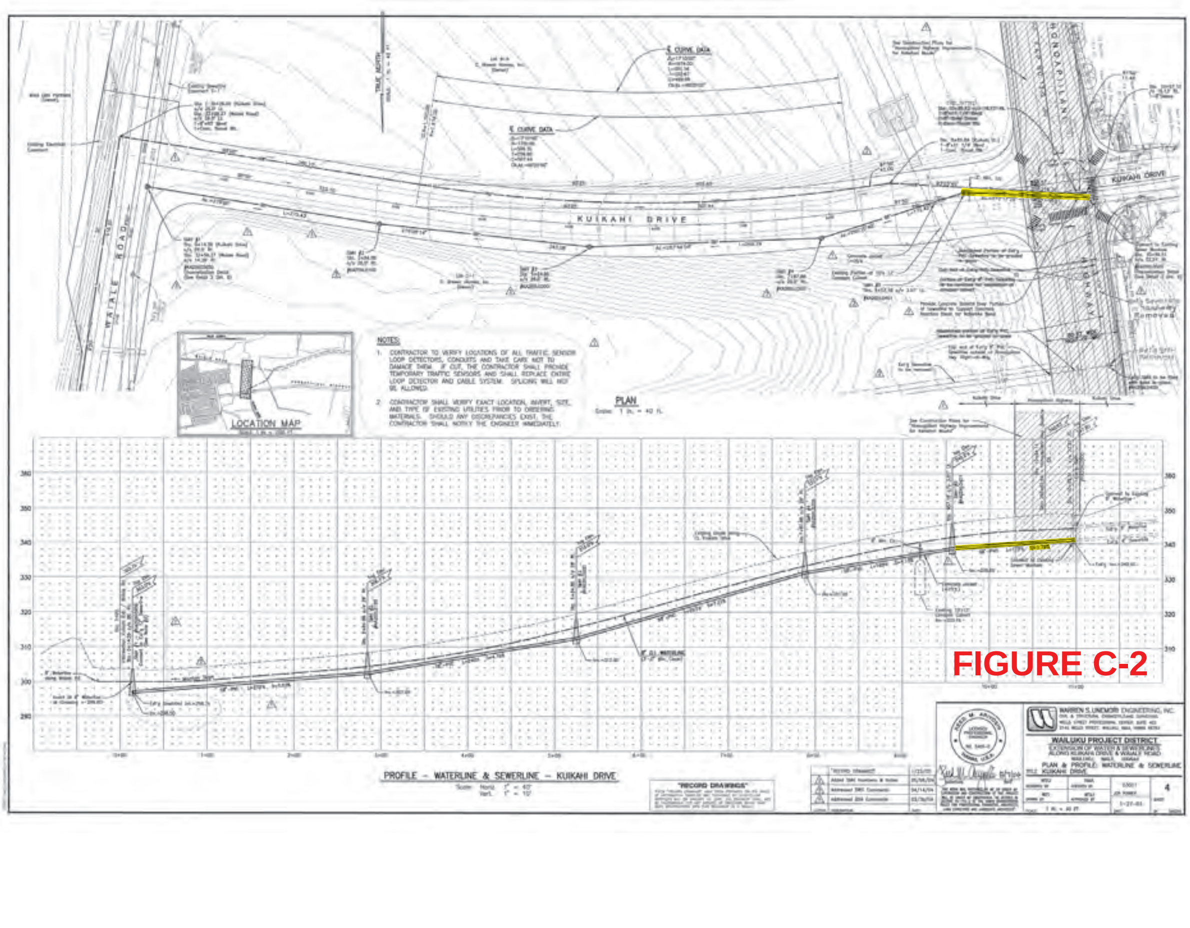
KUIKAHI DRIVE
NOTES:
1. CONTRACTOR TO VERIFY LOCATIONS OF ALL TRAFFIC SENSOR LOOP DETECTORS, CONDUITS AND TAKE CARE NOT TO DAMAGE THEM. IF CUT, THE CONTRACTOR SHALL PROVIDE TEMPORARY TRAFFIC SENSORS AND SHALL REPLACE ENTIRE LOOP DETECTOR AND CABLE SYSTEM. SPLICING WILL NOT BE ALLOWED.
2. CONTRACTOR SHALL VERIFY EXACT LOCATION, INVERT, SIZE, AND TYPE OF EXISTING UTILITIES PRIOR TO ORDERING MATERIALS. SHOULD ANY DISCREPANCIES EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.
LOCATION MAP
PLAN
PROFILE - WATERLINE & SEWERLINE - KUIKAHI DRIVE
"RECORD DRAWINGS"
WARREN S. UNEMORI ENGINEERING, INC.
WAILUKU PROJECT DISTRICT

FIGURE C-2

Appendix F

Phase 1 Environmental Site Assessment

Phase I Environmental Site Assessment

Wailuku Single Family Residential Subdivision

Tax Map Key (TMK): (2) 3-5-002:003, Wailuku, Maui County, Hawaii

November 23, 2022

PRESENTED TO

DDC, LLC
2005 Main Street
Wailuku, Maui, Hawaii 96793
(808) 268-4377

PRESENTED BY

Tetra Tech, Inc.
737 Bishop Street, Suite 2340
Honolulu, Hawaii 96813
(808) 441 6600

EXECUTIVE SUMMARY

This Phase I Environmental Site Assessment (ESA) was conducted by Tetra Tech, Inc. (Tetra Tech) for DDC, LLC, in conformance with the scope and limitations of the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*, ASTM International Designation: E 1527-13, and Tetra Tech's proposal, dated May 27, 2022. Any exceptions to, or deletions from, this practice are described in Section 1.4 of this report. The Subject Property for this Phase I ESA includes approximately 77 acres on the west side of the intersection of Kuikahi Drive and Honoapiilani Highway.

- This assessment has revealed _no_ recognized environmental condition (REC), historical RECs (HREC) or controlled RECs (CREC) in connection with the Subject Property.
- The following *business environmental risk* (BER) was identified:
  - The Subject Property was agricultural land from at least 1950 until sometime between 2000 and 2017. Based on the historical use of the Subject Property as agricultural land since at least 1950, environmentally persistent agricultural chemicals may have been applied to the Subject Property. Although the normal use and application of agricultural chemicals generally does not trigger enforcement actions or assessments by regulatory agencies, agricultural chemicals may be present in near surface soil at concentrations that limit its suitability for certain on- and off-site uses. As such, the potential for environmentally persistent agricultural chemicals in soil represents a business environmental risk (BER) for the Subject Property.

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

On June 10, 2022, Tetra Tech, Inc. (Tetra Tech) was authorized by Mr. Darren Okimoto of DDC, LLC to conduct a Phase I Environmental Site Assessment (ESA). The focus of this Phase I ESA included approximately 77 acres of Tax Map Key (TMK) (2) 3-5-002:003 (parent parcel), which encompasses approximately 148 acres in Wailuku, Maui County, Hawaii herein referred to as the "Subject Property" (**Appendix A**: Figure 1 and Figure 2). The Subject Property is located on the west side of the intersection of Kuikahi Drive and Honoapiilani Highway.

1.1 PURPOSE

The goal of this ESA is to identify recognized environmental conditions (REC), historical RECs (HREC), and controlled RECs (CREC) to the Subject Property. RECs are the presence or likely presence of any hazardous substances or petroleum products in, on, or at a Subject Property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. The term includes hazardous substances or petroleum products, even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies (Section 1.1.1 E 1527-13, ASTM International [ASTM] 2013). An HREC is a past release of any hazardous substances or petroleum products that has occurred in connection with the Subject Property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the Subject Property to any required controls (Section 3.2.39 E 1527-21, ASTM 2021). A CREC is a REC resulting from a past release of hazardous substances of petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (Section 3.2.17 E 1527-13, ASTM 2013).

This ESA is intended to satisfy one of the requirements for the innocent landowner defense, the contiguous property exemption, and the bona fide prospective purchaser exemption to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) liability: that is, the practices that constitute "all appropriate inquiry into the previous ownership and uses of the Subject Property consistent with good customary practice," as defined in 42 U.S. Code Section 9601 (35)(B).

1.2 SCOPE OF WORK

The scope of work (SOW), based on the ASTM E 1527-13 Environmental Site Assessments: Phase I Environmental Site Assessment Process and Tetra Tech's proposal, dated May 27, 2022, was to identify whether RECs, HRECs, or CRECs are present on the Subject Property. Phase I ESAs typically are conducted in a four-phase process, including: records review; site reconnaissance; interviews with current owners and occupants of the Subject

Property, and local government agencies; and preparation of a report. A list of referenced documents used during this investigation is provided in Section 11.

Any items listed in the ASTM method that are not specifically identified as being present in the report can be assumed not to be present within the Subject Property or within such distance to the Subject Property as to be of potential concern to the Subject Property. Any item mentioned but not specifically identified as being a REC, HREC, or CREC can be assumed not to be a REC, HREC, or CREC for the Subject Property.

1.3 SIGNIFICANT ASSUMPTIONS

The sampling and analysis of radon, lead in water, soil and/or groundwater samples, and the evaluation of indoor and/or outdoor air quality, regulatory compliance, industrial hygiene, or noise impacts were beyond the scope of this evaluation. Similarly, the identification of geological or geotechnical hazards were beyond the scope of this assessment.

1.4 DEVIATIONS

There were no deletions or deviations from ASTM E 1527-13 or Tetra Tech's proposal with the exception of the following. For each deviation noted, the Tetra Tech Environmental Professional has conducted an analysis of the data gaps or failures and their impact on Tetra Tech's ability to render an opinion regarding conditions indicative of releases or threatened releases of petroleum products or hazardous substances.

- Time gaps of more than five years were noted in available historical information. Based on the consistent, observed use of the Subject Property in all reviewed historical information, the primarily undeveloped nature of the Subject Property, and the commercial and residential nature of the surrounding area, the presence of time gaps does not impact Tetra Tech's ability to render an opinion regarding potential REC.

- Readily available historical information dating back prior to 1924 was not available. Based on the consistent observed use of the Subject Property in all reviewed historical information, the lack of historical information dating back prior to 1924 does not impact Tetra Tech's ability to render an opinion regarding potential REC.

1.5 LIMITATIONS AND EXCEPTIONS

This report was compiled based partially on information supplied to Tetra Tech from outside sources and other information in the public domain. The conclusions and opinions herein are based on the information Tetra Tech obtained in compiling the report. This information is on file at Tetra Tech's office in Honolulu, Hawaii. Tetra Tech makes no warranty as to the accuracy of statements made by others which may be contained in the report, nor are any other warranties or guarantees, expressed or implied, included or intended by the report except that it has been prepared in accordance with the current generally accepted practices and standards consistent with the level of care and skill exercised under similar circumstances by other professional consultants or firms performing the same or similar services. Because the facts forming the basis for the report are subject to professional interpretation, differing conclusions could be reached. Tetra Tech does not assume responsibility for the discovery and elimination of hazards that could possibly cause accidents, injuries, or damage. Compliance with submitted recommendations or suggestions does not assure elimination of hazards or the fulfillment of client's obligations under local, state, or federal laws or any modifications or changes to such laws. None of the work performed hereunder shall constitute or be represented as a legal opinion of any kind or nature but shall be a representation of findings of fact from records examined.

1.6 SPECIAL TERMS AND CONDITIONS

The terms and conditions set forth in Tetra Tech's contract with DDC, LLC in conjunction with the task authorization received for the project (June 10, 2022) shall govern this engagement.

1.7 STATEMENT OF USER RELIANCE

The term "User" is defined in ASTM E 1527-13 as "the party seeking to use Practice E 1527-13 to complete an environmental site assessment of the property. A User may include, without limitation, a potential purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager." The scope of services and the report have been completed on behalf of and for the exclusive use of DDC, LLC solely for their use and reliance in the Phase I ESA of the Subject Property. DDC, LLC is the only party to which Tetra Tech has explained the risks involved, and which has been involved in the shaping of the scope of services needed to satisfactorily manage those risks, if any, from DDC, LLC point of view.

Accordingly, Tetra Tech's findings and opinions related in this report may not be relied upon by any party except for DDC, LLC without the consent of Tetra Tech. Tetra Tech may be available to contract with other parties to develop findings and opinions related specifically to such other parties' unique risk management concerns related to the Subject Property.

1.8 STATEMENT OF QUALIFICATIONS

Tetra Tech is a leading provider of specialized management consulting and technical services in three principal business areas: resource management, infrastructure, and communications. Tetra Tech's clients include a diverse base of public and private sector organizations serviced through more than 400 offices in the United States and internationally.

Tetra Tech's technical staff has demonstrated competence and ability in preparing environmental assessments through long-term working relationships with local commercial firms and government agencies. Tetra Tech has conducted environmental assessments at a wide variety of properties including industrial, manufacturing, commercial, and residential sites. Tetra Tech has performed Phase I ESAs for banks, private developers, county and city agencies, and commercial firms.

Tetra Tech personnel are well-trained and have extensive experience in the acquisition and interpretation of the collected data. Data gathering efforts focus on historical aspects of site activities that would contribute to spills, leaks or disposal of hazardous materials and petroleum products. Identifying contaminant issues that could impede development of the site, through either high costs or remedial actions, is a goal of data gathering and interpretation. Tetra Tech also identifies potential sources of contamination in the areas adjacent to the site, such as leaking underground storage tanks (LUST) that could impact the site, and therefore become a REC.

2.0 SITE DESCRIPTION

This section provides a brief description of the Subject Property and the physical setting based on information obtained from a records review prior to the site reconnaissance, as well as information provided by the Subject Property owner and purchaser representatives. Observations regarding the current land use of the Subject Property and adjoining facilities made during the site reconnaissance are described in Section 4, Site Reconnaissance.

2.1 SUBJECT PROPERTY LOCATION AND LEGAL DESCRIPTION

The Subject Property is located on the west side of the intersection of Kuikahi Drive and Honoapiilani Highway in Wailuku, Maui County, Hawaii (**Appendix A:** Figure 2). The Subject Property consists of approximately 77 acres of TMK (2) 3-5-002:003 (parent parcel), which encompasses approximately 148 acres in Wailuku, Maui County, Hawaii. The parcel has an agricultural land use classification. According to the County of Maui, the Subject Property is owned by Kuikahi Properties LLC (County of Maui 2022).

2.2 SITE AND VICINITY GENERAL CHARACTERISTICS

The Subject Property is currently undeveloped land. The Subject Property is bounded as follows: to the north by Kuikahi Drive, with residential development beyond; to the east by Honoapiilani Highway, with a grocery store, residential development and agricultural land beyond; to the south by agricultural land and residential development, with agricultural land beyond; and, to the west by agricultural land and water supply storage area, with a water tank and reservoir with residential development.

2.3 CURRENT AND PAST USES OF THE SUBJECT PROPERTY

The Subject Property currently is used for goat grazing, agricultural use, and a base yard for Clean & Green Landscape Services. The Subject Property historically has been agricultural land.

2.4 DESCRIPTIONS OF STRUCTURES, ROADS, OTHER IMPROVEMENTS ON THE SITE

The Subject Property is currently undeveloped land with no structures or roads. A concrete irrigation canal is present running north to south through the center of the Subject Property.

2.5 CURRENT AND PAST USES OF ADJOINING/SURROUNDING PROPERTIES

The surrounding area is currently and has historically been primarily used for agricultural and residential uses.

2.6 GEOLOGIC, HYDROGEOLOGIC, HYDROLOGIC, AND TOPOGRAPHIC CONDITIONS

The following sections describe the environmental setting of the Subject Property and surrounding area.

2.6.1 Topography

According to the 2013 United States Geological Survey (USGS) 7.5-minute series Wailuku, Hawaii Topographic Quadrangle Map (**Appendix A**: Figure 1), the Subject Property is approximately 485 feet above mean sea level (msl). This information was confirmed by the Environmental Data Resources, Inc. (EDR; a Tetra Tech contractor) Radius Map with GeoCheck. The EDR Radius Map is presented in **Appendix B**. The local topographic gradient is to the east, and the regional topography slopes downward to the east toward the Pacific Ocean, which is approximately 2.4 mile east of the Subject Property.

2.6.2 Geologic Setting

According to the EDR Radius Map (**Appendix B**), the regional Soil Survey Geographic Database (SSURGO) indicates the primary soil component at the Subject Property is Lao series soil. Soils of the Lao series are well-drained, not hydric, and have slow infiltrations rates.

2.6.3 Hydrogeology

According to "Aquifer Identification and Classification for the Island of Hawaii" (Mink and Lau 1990), the Kahului Aquifer System of the Central Aquifer Sector underlies the Subject Property. The aquifer is high level. Fresh water does not have contact with seawater, is unconfined, and is in sedimentary, nonvolcanic lithology. The aquifer is currently ecologically important. The water in this aquifer is low salinity with 250 milligrams per liter (mg/l) to 1,000 mg/l of chloride. It is irreplaceable and has a high vulnerability to contamination (Mink and Lau 1993).

The site is located on the inland (mauka) of the underground injection control (UIC) line established by the Hawaii Department of Health (HDOH) Safe Drinking Water Branch (SDWB) to protect groundwater resources. Groundwater inland (mauka) of the UIC line is considered a potential drinking water source. Groundwater seaward (makai) of the UIC line is considered as non-potable and saline. Injection wells are prohibited inland of the UIC line (HDOH SDWB 2022).

Based on a review of topographic maps, local topographic gradient is to the east, and the regional topography slopes downward east toward the Pacific Ocean. In the absence of site-specific data or other indicators, the direction of groundwater flow has been inferred from the regional topography to be to the east. The local gradient and groundwater flow direction under the Subject Property may be influenced naturally by zones of higher or lower permeability, tidal fluctuations, nearby wetlands, or nearby wells. Actual groundwater flow direction can only be determined through collection of site-specific groundwater elevation data. Information available in the EDR report and other available historical references did not indicate direction of groundwater flow near the Subject Property.

2.6.4 Hydrology

Based on observations made during the site reconnaissance, surface water flow on the Subject Property is likely variable based on the localized depressions and elevations surrounding the Subject Property, with a general topographic gradient toward the east.

3.0 USER PROVIDED INFORMATION

3.1 SUMMARY OF TITLE INFORMATION

DDC, LLC did not provide a copy of the current title record for the Subject Property. An environmental lien search pertaining to the Subject Property was ordered from EDR, including a copy of the current title (**Appendix C**). In 2020, the Subject Property was transferred to Kuikahi Properties LLC from Waihee Valley Regenesis LLC.

3.2 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

DDC, LLC was not aware of any information regarding Subject Property environmental liens or activity and use limitations (AUL). EDR's environmental lien search pertaining to the Subject Property identified no environmental liens or AULs (**Appendix C**).

3.3 SPECIALIZED KNOWLEDGE

The Subject Property owner and the Subject Property purchaser representatives were *not* aware of any specialized knowledge regarding RECs, HRECs, or CRECs or any environmental conditions or concerns associated with the Subject Property. Refer to **Appendix D** for the completed Owner and User Questionnaires.

3.4 OWNER, SUBJECT PROPERTY MANAGER, AND OCCUPANT INFORMATION

According to the County of Maui, the Subject Property is owned by Kuikahi Properties LLC (County of Maui 2022). Mr. Lawrence Carnicelli, Vice President of Development for Kuikahi Properties, LLC, is considered the Subject Property manager. The Subject Property is undeveloped, and as such there is no on-site property manager and there are no Subject Property occupants.

3.5 REASON FOR PERFORMING PHASE I ESA

DDC, LLC requested this Phase I ESA to satisfy one of the requirements for the innocent landowner defense from CERCLA liability.

4.0 SITE RECONNAISSANCE

The initial site reconnaissance for this ESA was conducted on July 13, 2022, with a follow-up reconnaissance performed on October 18 2022, by Ms. Suzan Pankenier, Tetra Tech Environmental Scientist.

4.1 METHODOLOGY AND LIMITING CONDITIONS

The site reconnaissance consisted of a visual inspection of the Subject Property in accordance with the requirements set forth in 40 *Code of Federal Regulations* (CFR) Part 312. The visual inspection also included the perimeter area of the Subject Property to determine the presence of objects of environmental concern. All areas of the Subject Property were accessible during the site reconnaissance.

Photographic documentation of the site reconnaissance is presented in **Appendix E**.

4.2 GENERAL SITE SETTING

The following sections describe the Subject Property's current and past uses and exterior features.

4.2.1 Site Description

The Subject Property consists of approximately 77 acres of TMK (2) 3-5-002:003 which encompasses approximately 148 acres and is located on the west side of the intersection of Kuikahi Drive and Honoapiilani Highway in Wailuku, Maui County, Hawaii.

4.2.2 Current and Past Site Use

The Subject Property currently is used for goat grazing, agricultural use, and a base yard for Clean & Green Landscape Services. The Subject Property historically has been agricultural land.

4.2.3 Exterior Observations

The Subject Property is undeveloped land with no structures. A concrete irrigation canal is present running north to south through the center of the Subject Property.

4.2.4 Interior Observations

There were no structures on the Subject Property at the time of the site reconnaissance.

4.3 SPECIFIC RECONNAISSANCE ITEMS

4.3.1 Hazardous Substances and Petroleum Products

During the July 13, 2022, site reconnaissance, a backup generator was observed on the northeast portion of the Subject Property (**Appendix A:** Figure 2). The generator had a fuel gauge on the front and likely contains diesel fuel. Staining was observed beneath the generator. The staining was relatively minor, appears to be recent, and was considered *de minimis* at the time of inspection. The Subject Property owner subsequently removed the generator and stained soil after the July 2022 site reconnaissance. This was confirmed during the October 18, 2022 follow-up site reconnaissance, during which there was no evidence of staining. Based upon the cleanup status of this *de minimis* staining, it does not represent a REC for the Subject Property

No other evidence of hazardous substances or petroleum products was observed on the Subject Property during the site reconnaissance.

4.3.2 Hazardous Waste

No evidence of storage or discharge of hazardous waste was observed on the Subject Property during the site reconnaissance.

4.3.3 Landfills, Dumps, Burials, or Solid Waste Disposal

Various nonhazardous solid waste and irrigation piping and parts were observed throughout the Subject Property. The presence of nonhazardous solid waste and irrigation piping and parts does not represent a REC for the Subject Property.

During the July 13, 2022, site reconnaissance, three abandoned vehicles were observed on the Subject Property (**Appendix A:** Figure 2). One vehicle was located in the extreme northeast corner of the Subject Property, with the two remaining vehicles located in the north-central portion of the Subject Property. These vehicles likely contained fuel, in addition to motor oil and other automotive fluids, with the potential for leaks to the ground surface. However, during the October 18, 2022 follow-up site reconnaissance, the vehicles had been removed from the Subject Property, and there was no evidence of staining observed beneath the vehicles. Therefore, the past presence of abandoned vehicles does not represent a REC for the Subject Property.

No other visual evidence of past or present landfills, dumps, or burials was observed on the Subject Property during the site reconnaissance.

4.3.4 Storage Tanks

Underground Storage Tanks (USTs)

No visual evidence of past or present on-site USTs, including pipes, pumps, or stains was observed on the Subject Property during the site reconnaissance.

Aboveground Storage Tanks (ASTs)

During the July 13, 2022, site reconnaissance, a heavily corroded abandoned AST was observed on the northwestern boundary of the Subject Property (**Appendix A:** Figure 2). The AST appeared to be at least 1,000-gallon capacity. The former contents of this AST are unknown, although it is likely the AST was used in another location, and was discarded in the current location when empty. During the October 18, 2022 site reconnaissance, Tetra Tech observed that the AST had been removed and there was no evidence of staining in the area; therefore, this former AST does not represent a REC for the Subject Property.

Four orange storage containers were observed on the eastern portion of the Subject Property. The contents of these containers is unknown but may have been for water. Water tanks do not pose a REC for the Subject Property.

No other visual evidence of past or present on-site ASTs, including pipes, pumps, or stains was observed on the Subject Property during the site reconnaissance.

4.3.5 Polychlorinated Biphenyl (PCB) Containing Equipment

No PCB containing equipment was observed on the Subject Property.

4.3.6 Heating, Ventilation, and Air Conditioning System and Fuel Source

No heating or ventilation systems were observed on the Subject Property during the site reconnaissance, as the property is currently undeveloped.

4.3.7 Drains, Sumps, Pools of Liquids, Standing Water, Cisterns, and Cesspools

No sumps, pools of liquids, cisterns, or cesspools were observed on the Subject Property during the site reconnaissance.

4.3.8 Pits, Ponds, and Lagoons

No pits, ponds, or lagoons were identified on the Subject Property during the site reconnaissance.

4.3.9 Stains or Corrosion and Stained Soil or Pavement

Stained soil was observed during the site reconnaissance beneath the portable generator, discussed in Section 4.3.1, above.

4.3.10 Areas of Dead, Distressed, Discolored, or Stained Vegetation

No areas of dead, distressed, discolored, or stained vegetation that may be indicative of a REC were observed on the Subject Property.

4.3.11 Possible Fill or Grading

No fill or grading was observed during the site reconnaissance.

4.3.12 Chemical Gases, Petroleum Products, or Other Noxious Odors

No chemical gas, petroleum product, or other noxious odors were noted at the time of the site reconnaissance.

4.3.13 Wastewater and Storm Water Systems and Discharges

No evidence of wastewater discharges was observed on the Subject Property during the site reconnaissance.

Storm water is anticipated to infiltrate into the vegetated surfaces at the Subject Property or flow toward the drainage canal that runs north to south through the center of the Subject Property.

4.3.14 Wells and Potable Water Supply

No dry, irrigation, injection, abandoned, or other wells were observed on the Subject Property.

As previously discussed, the site is located on the inland (mauka) side of the UIC line established by the HDOH SDWB. Groundwater inland (mauka) of the UIC line is considered a potential drinking water source (HDOH SDWB 2022).

A search of the USGS and state databases identified two Federal USGS wells and nine water wells within a 1-mile radius of the Subject Property. Presence of nearby water wells does not pose a REC for the Subject Property.

4.3.15 Utilities

The Subject Property is not currently connected to utilities.

4.3.16 Wetlands

ASTM E 1527-13 does not require a field assessment for wetlands. However, identification of potential wetlands near the property was conducted by Tetra Tech. According to the electronic National Wetlands Inventory (NWI) data supplied by EDR, there are no wetlands within one mile of the Subject Property. No potential wetland areas were identified during the site reconnaissance.

4.3.17 Lead-Based Paint

ASTM Practice E 1527-13 does not require a survey or testing for the presence of lead-based paint (LBP). Sampling for LBP may be included when, (1) the age of structures on the Subject Property justifies sampling, and (2) the proposed activities present a potential to encounter and disturb LBP. However, as there were no structures present on the Subject Property at the time of the site reconnaissance, LBP does not represent a concern for the Subject Property.

4.3.18 Asbestos-Containing Building Materials

ASTM Practice E 1527-13 does not require testing for the presence of asbestos-containing materials (ACM) as part of a Phase I ESA. Sampling for ACM may be included when, (1) the age of structures on the Subject Property justifies sampling, and (2) the proposed activities present a potential to encounter and disturb asbestos. However, as there were no structures present on the Subject Property at the time of the site reconnaissance, ACM does not represent a concern for the Subject Property.

4.3.19 Mold

ASTM Practice E 1527-13 does not require assessment of property conditions for potential of mold growth. Further, there are no structures present on the Subject Property.

4.3.20 Other Site-Specific Environmental Conditions

No other site-specific environmental conditions were noted during the site reconnaissance.

4.4 VICINITY RECONNAISSANCE

The surrounding properties appear to be primarily residential and agricultural land. The Subject Property is bounded as follows: to the north by Kuikahi Drive, with residential development beyond; to the east by Honoapiilani Highway, with a grocery store, residential development and agricultural land beyond; to the south by agricultural land and residential development, with agricultural land beyond; and, to the west by agricultural land and water supply storage area, with a water tank and reservoir beyond.

5.0 INTERVIEWS

The objective of conducting interviews is to obtain information concerning RECs, HRECs, or CRECs in connection with the Subject Property. In lieu of interviews, the owner and buyer representatives completed the Owner and User Questionnaires, respectively, which are presented in **Appendix D**. Additionally, information requests for available records were submitted to the Hawaii Department of Health, as discussed below in Section 5.6.

5.1 INTERVIEW WITH OWNER

The Owner Questionnaire was completed by Kuikahi Properties LLC. The owner was not aware of any environmental concerns associated with the Subject Property, indicating that the historic use of the property has been agricultural, predominantly for sugar cane.

5.2 INTERVIEW WITH KEY SITE MANAGER

The parcel is currently vacant, and therefore has no on-site manager.

5.3 INTERVIEW WITH CURRENT OCCUPANTS

The Subject Property is vacant with no occupants.

5.4 INTERVIEW WITH PAST SUBJECT PROPERTY OWNERS/OCCUPANTS

No interviews were conducted with past Subject Property owners or occupants.

5.5 INTERVIEW WITH ADJACENT PROPERTY OWNERS

No interviews were conducted with adjacent property owners.

5.6 INTERVIEW WITH LOCAL GOVERNMENT OFFICIALS

Tetra Tech requested to review previous environmental reports and records for the Subject Property from the HDOH Solid and Hazardous Waste Branch (SHWB) and HDOH Hazard Evaluation and Emergency Response (HEER) Office libraries. A response was not received from either agency at the time this report was completed. A letter addendum will be provided in the event that a response with relevant information is received from either the SHWB or the HEER Office.

6.0 RECORDS REVIEW

The purpose of the records review is to obtain and review records that will help identify RECs, HRECs, or CRECs in connection with the Subject Property.

6.1 ENVIRONMENTAL RECORDS SOURCES

The following sources of environmental records were accessed and reviewed as part of this assessment.

6.1.1 Environmental Database Search

Federal, state, regional, and local records were reviewed to assess whether the Subject Property or facilities within the approximate minimum search distance have experienced significant unauthorized releases of hazardous substances or other events with potentially adverse environmental effects. EDR performed a database search of the Subject Property in accordance with the ASTM E 1527-13 and Tetra Tech's proposal. A copy of this report is included as **Appendix B**.

The databases searched have been developed and are updated by federal, state, and local agencies. While these databases are reliable and comprehensive, there have been cases where the data presented are out of date and no longer reflective of actual facility conditions. The Government Records Searched/Data Currency Tracking section of the EDR report in **Appendix B** identifies when each database was updated.

A review of the facilities listed within the EDR-Radius Map with GeoCheck report was conducted and the following results were indicated:

- The Subject Property was not listed in any of the databases searched by EDR.
- EDR identified nine (9) sites within 1 mile of the Subject Property. All of these sites are listed in the State Hazardous Waste database.
  - **Hawaii Land & Farming Company, Inc.** at 631 Meakanu Lane is approximately 0.376 mile northeast of the Subject Property. No further information was available from EDR. According to the HEER system, the site received a no further action (NFA) determination letter with institutional controls in 2004. The site had arsenic-contaminated soil which required a cap of 18 to 24 inches of clean fill to adequately prevent exposure (HDOH HEER 2022). Based on the regulatory status and crossgradient location from the Subject Property, this listing does not represent a REC for the Subject Property.
  - **Kehalani Development** is approximately 0.409 mile north-northwest of the Subject Property. No further information was available from EDR. According to the HEER Office system, the site received a NFA determination letter in 2011 (HDOH HEER 2022). Based on the regulatory status, crossgradient location, and separating distance with respect to the Subject Property, this listing does not represent a REC for the Subject Property.

- **Waimaluhia Maui Meth/Drug Lab ACT 170** at 115 Waimaluhia Lane is approximately 0.414 mile east-northeast of the Subject Property. According to EDR, the site was cleaned up to residential use standards, and a NFA determination letter was issued. Based on the regulatory status, downgradient location, and separating distance with regard to the Subject Property, this listing does not represent a REC for the Subject Property.

- **Waikapu Dump** at Waikapu Road is approximately 0.591 mile east-southeast of the Subject Property. No further information was available from EDR. According to the HEER Office system, the site received a NFA determination letter in 1996 (HDOH HEER 2022). Based on the regulatory status, downgradient location, and separating distance from the Subject Property, this listing does not represent a REC for the Subject Property.

- **Maalaea 710 Acre and 906 Acre site** is approximately 0.814 mile south-southwest of the Subject Property. No further information was available from EDR or the HEER Office system (HDOH HEER 2022). Based on the crossgradient location from the Subject Property, this listing does not pose a REC for the Subject Property.

- **Kehalani Development Quonset Hut Module 18 and Shaft** at Omaomao Street is approximately 0.819 mile north of the Subject Property. No further information was available from EDR. According to the HEER system, the site received a NFA determination letter in 2017 (HDOH HEER 2022). Based on the regulatory status and crossgradient location from the Subject Property, this listing does not pose a REC for the Subject Property.

- **Waiale Ash Pile** at Maui Lani Parkway is approximately 0.862 mile northeast of the Subject Property. No further information was available from EDR. According to the HEER system, the site is a low priority brownfields site (HDOH HEER 2022). Based on the crossgradient location and separating distance from the Subject Property, this listing does not represent a REC for the Subject Property.

- **Maui Lani** is approximately 0.875 mile east of the Subject Property. No further information was available from EDR. According to the HEER system, a Phase I ESA was performed at the site in 2004. No RECs were identified (HDOH HEER 2022). Based on the regulatory status, downgradient location, and separating distance from the Subject Property, this listing does not represent a REC for the Subject Property.

- **Organizational Maintenance Shop #3 (OMS #3)** at 260 South Market Street is approximately 0.956 mile north-northeast of the Subject Property. According to EDR the site was assigned a low hazard priority. Based on the crossgradient location and separating distance from the Subject Property, this listing does not represent a REC for the Subject Property.

- The EDR report did not identify any "orphan" facilities (facilities that, because of poor or inadequate address information, could not be mapped by EDR).

6.1.2 Vapor Encroachment Screen

Tetra Tech completed an initial vapor encroachment screen to determine if a vapor encroachment condition (VEC) exists in the subsurface below any existing or proposed Subject Property structures from hazardous substances, petroleum, and petroleum products that can include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and inorganic volatile compounds. The Tier 1 non-invasive vapor encroachment screen was performed for the chemicals of concern and the approximate recommended minimum search distances included in ASTM E 2600-15 "Standard Guide for Vapor Encroachment Screening on Sites Involved in Real Estate Transactions." The following minimum search distances are outlined in ASTM E 2600-15 (ASTM 2015).

Area of Concern Approximate Minimum Search Distances Surrounding the Subject Property		
Standard Environmental Record Sources (where available)	**Chemicals of Concern (miles)**	**Petroleum Hydrocarbon Chemicals of Concern (miles)**
Federal NPL	0.33	0.10
Federal CERCLIS	0.33	0.10
Federal RCRA CORRACTS	0.33	0.10
Federal RCRA non-CORRACTS TSD	0.33	0.10
Federal RCRA Generators	Subject Property Only	Subject Property Only
Federal Institutional Control/Engineering Control	Subject Property Only	Subject Property Only
Federal ERNS	Subject Property Only	Subject Property Only
State and Tribal-equivalent NPL	0.33	0.10
State and Tribal-equivalent CERCLIS	0.33	0.10
State and Tribal Landfill or Solid Waste Disposal Sites	0.33	0.10
State and Tribal LUST	0.33	0.10
State and Tribal UST	Subject Property Only	Subject Property Only
State and Tribal Institutional Control/Engineering Control	Subject Property Only	Subject Property Only
State and Tribal Voluntary Cleanup	0.33	0.10
State and Tribal Brownfield	0.33	0.10

Notes:
CERCLIS Comprehensive Environmental Response, Compensation, and Liability Information System
CORRACTS RCRA Corrective Action Activity
ERNS Emergency Response Notification System
LUST Leaking Underground Storage Tank
NPL National Priority List
RCRA Resource Conservation and Recovery Act
TSD RCRA Treatment, Storage, and Disposal
UST Underground Storage Tank

Based on the results of the initial vapor encroachment screening, no sites were identified within the recommended minimum search distances.

6.1.3 Valuation Reduction for Environmental Issues

DDC, LLC provided no information regarding valuation reduction for environmental issues associated with the Subject Property.

6.1.4 Local Jurisdiction Record

Tetra Tech reviewed readily available property information for the Subject Property at County of Maui Real Property Tax Assessment website. The Subject Property parent parcel has an "agricultural" property class designation (County of Maui 2022).

6.1.5 Wetlands

ASTM E 1527-13 does not require a field assessment for wetlands; however, as discussed above in Section 4.3.16, a database review for wetlands was conducted per Tetra Tech's proposal. Wetlands may be identified based on vegetation, hydrology, and soils in accordance with the Classification of Wetlands and Deepwater Habitats (Cowardin et al. 1979). In support of this definition, wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and similar areas (U.S. Army Corps of Engineers 1987). In support of this definition, the United States Fish and Wildlife Service (USFWS) maintains the NWI, a geographic information system (GIS)-based relational database of wetlands that have been mapped throughout the country.

According to the electronic NWI data supplied by EDR, there are no wetlands within 1 mile of the Subject Property (**Appendix B**). No potential wetland areas were identified during the site reconnaissance.

6.1.6 Radon

Testing for radon gas is not required by ASTM E 1527-13. However, a database review for radon gas was conducted per Tetra Tech's proposal. The Subject Property is in Radon Zone Level 3 and therefore has an indoor average radon level of less than 2 picoCuries/Liter (pCi/L). The National Radon database is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey conducted by the EPA between the years 1986 to 1992. The EPA recommends that action be taken to reduce radon if the radon level is greater than 4 pCi/L in homes (EPA 2013). This guideline may be applied to workplaces. Therefore, radon does not represent a concern to the Subject Property.

6.1.7 Engineering and Institutional Controls

As part of the environmental records search performed by EDR, the United States databases for institutional and engineering controls were searched and no records information was reported for the Subject Property.

6.1.8 Title Records

DDC, LLC did not provide a copy of the current title record for the Subject Property. An environmental lien search pertaining to the Subject Property was ordered from EDR, including a copy of the current title (**Appendix C**). In 2020, the Subject Property was transferred to Kuikahi Properties LLC from Waihee Valley Regenesis LLC.

6.2 DEVIATIONS

Deviations from the ASTM E 1527-13 or Tetra Tech's proposal are summarized in Section 1.4.

6.3 HISTORICAL USE INFORMATION FOR THE SUBJECT PROPERTY AND ADJOINING PROPERTIES

Historical data regarding the Subject Property and surrounding area were gathered to determine past uses and evaluate visible environmental issues that may constitute REC. The following sections describe the aerial photographs, Sanborn maps, topographic maps, city directories, plat maps, and previous environmental reports available for the Subject Property. Historical use documentation referenced in the following sections is included as **Appendix F**.

6.3.1 Aerial Photographs

A search for historical aerial photographs was conducted by EDR, and aerial photographs dated 1950, 1965, 1975 and 2000 were provided to Tetra Tech for review. Historical Information Gatherers (HIG) also conducted a search for aerial photographs. Aerial photographs dated 1950, 1998, 2000 and 2017. The review of these photographs is summarized below:

Year	Comments
1950	**Subject Property**: The Subject Property appears to be agricultural land with several drainageways bisecting the property. **Surrounding Area**: The surrounding area appears to be primarily undeveloped land.
1965	**Subject Property**: The Subject Property appears similar to the 1950 photograph. **Surrounding Area**: The surrounding area appears to be similar to the 1954 photograph.
1975	**Subject Property**: The Subject Property appears to be similar to the 1965 photograph. **Surrounding Area**: The surrounding area appears to be similar to the 1965 photograph.
1998	**Subject Property**: The Subject Property appears to be similar to the 1975 photograph with a pond on the east-central boundary of the Subject Property. **Surrounding Area**: The surrounding area appears to be similar to the 1975 photograph, with Kuikahi Drive to the north of the Subject Property and Honoapiilani Highway to the east of the Subject Property.
2000	**Subject Property**: The Subject Property appears to be similar to the 1998 photograph. **Surrounding Area**: The surrounding area appears to be similar to the 1998 photograph.

Year	Comments
2017	**Subject Property**: The Subject Property no longer appears to be used for agricultural purposes. Several storage containers on the north central portion of the Subject Property and four storage containers or small structures are visible on the central portion of the Subject Property. **Surrounding Area**: The area to the north, southeast and south of the Subject Property appears to be residential developed. An orchard is visible southwest of the Subject Property.

The Subject Property appeared have been agricultural land from at least 1950 until sometime between 2000 and 2017. Based on the historical use of the Subject Property as agricultural land since at least 1950, environmentally persistent agricultural chemicals may have been applied to the Subject Property. Although the normal use and application of agricultural chemicals generally does not trigger enforcement actions or assessments by regulatory agencies, agricultural chemicals may be present in near surface soil at concentrations that limit its suitability for certain on- and off-site uses. As such, the potential for environmentally persistent agricultural chemicals in soil represents a BER for the Subject Property.

No potential RECs for the Subject Property were identified during the review of the aerial photographs.

6.3.2 Sanborn Map Report

A search for historical fire insurance maps was requested from EDR. No coverage was available for the Subject Property. EDR's "no coverage" certificate is provided in **Appendix F**.

6.3.3 Historical Topographic Maps

A search for historical topographic maps was conducted by EDR and USGS topographic maps dated 1922, 1923, 1955, 1961, 1977, 1983, 1997, 2013, and 2017 were provided to Tetra Tech for review. The review of these maps is summarized below:

Year/Name/ Scale	Comments
1922/1923 Paia, Wailuku, Kihei, Maalaea 1:31,680	**Subject Property:** The Subject Property is depicted as undeveloped land the Waihee Ditch running through the center of the Subject Property. **Surrounding Area:** The areas surrounding the Subject Property appear to be primarily undeveloped with the Wailuku Sugar Company Railroad to the east and the Waikapu Church to the south of the Subject Property.
1955 Wailuku 1:24,000	**Subject Property:** The Subject Property is depicted similar to the previous map with additional drainage canals running through the Subject Property. **Surrounding Area:** The surrounding area is depicted similar to the previous map with the city of Wailuku to the north and Waikapu to the south of the Subject Property.
1961 Maui 1:62,500	**Subject Property:** The Subject Property is depicted similar to the previous map. **Surrounding Area:** The surrounding area is depicted similar to the previous map with Honoapiilani Highway depicted east of the Subject Property.

Year/Name/ Scale	Comments
1977 Wailuku 1:24,000	**Subject Property:** The Subject Property is depicted similar to the previous map. **Surrounding Area:** The surrounding area is depicted similar to the previous map.
1983 Wailuku 1:24,000	**Subject Property:** The Subject Property is depicted similar to the previous map. **Surrounding Area:** The surrounding area is depicted similar to the previous map.
1997 Wailuku 1:24,000	**Subject Property:** The Subject Property is depicted similar to the previous map with two small ponds on the east central boundary of the Subject Property. **Surrounding Area:** The surrounding area is depicted similar to the previous map.
2013 Wailuku 1:24,000	**Subject Property:** The Subject Property is depicted similar to the previous map. **Surrounding Area:** The surrounding area is depicted similar to the previous map with additional development to the north, southeast, east and west of the Subject Property.
2017 Wailuku 1:24,000	**Subject Property:** The Subject Property is depicted similar to the previous map. **Surrounding Area:** The surrounding area is depicted similar to the previous map.

No potential RECs to the Subject Property were identified during review of the historical topographic maps.

6.3.4 City Directories

City directory listings did not identify the Subject Property. The surrounding areas were primarily residential listings along Kuikahi Drive and commercial listings along Honoapiilani Highway. No potential RECs to the Subject Property were identified during review of the city directories.

6.3.5 Property Tax Records

A search for property tax records was requested from EDR; however, EDR did not have any coverage for the Subject Property.

Tetra Tech reviewed the County of Maui Real Property Tax Office property cards for TMK (2) 3-5-002:003. The property card is presented in **Appendix F**. Based upon review of the property tax records, there were no RECs identified for the Subject Property.

6.3.6 Building Permits

A search for historical building permits was requested from EDR. Several building permit records were available for the Subject Property regarding the construction of the residential development (grading, underground utilities, driveways, etc.) and the drinking water facility to the west of the Subject Property. Building permit records were available for the surrounding properties and included commercial and electrical type permits. There were no RECs identified in the review of building permit records.

6.3.7 Previous Reports

A Phase I ESA was performed in 2004 by Vuich Environmental Consultants, Inc. (Vuich) for TMK (2) 3-5-002:003 which includes the Subject Property (Vuich 2004). According to the Phase I ESA, sugar cane and pineapple agriculture had been previously active on and adjacent to the Subject Property for several decades. Both pesticide (including arsenic) and fertilizer use are related to this type of agriculture. The Phase I ESA did not identify any RECs for the Subject Property.

7.0 FINDINGS

- This assessment has revealed _no_ recognized environmental conditions (REC), historical RECs (HREC) or controlled RECs (CREC) in connection with the Subject Property.
- The following *business environmental risk* (BER) was identified:
  - The Subject Property was agricultural land from at least 1950 until sometime between 2000 and 2017. Based on the historical use of the Subject Property as agricultural land since at least 1950, environmentally persistent agricultural chemicals may have been applied to the Subject Property. Although the normal use and application of agricultural chemicals generally does not trigger enforcement actions or assessments by regulatory agencies, agricultural chemicals may be present in near surface soil at concentrations that limit its suitability for certain on- and off-site uses. As such, the potential for environmentally persistent agricultural chemicals in soil represents a business environmental risk (BER) for the Subject Property.

8.0 CERTIFICATION STATEMENT

The resumes of the environmental assessors who conducted the site reconnaissance and prepared the report and the resume of the environmental professional who oversaw completion of this work are provided in Appendix G. We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in 40 CFR 312.10 of this part. We have the specific qualifications based on education, training, and experience to assess a Subject Property of the nature, history, and setting of the Subject Property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312 and attest to the completeness and accuracy of the information contained in this report.

We appreciate the opportunity to work with you on this project. If you have any questions concerning the findings and conclusions contained in this report, please call Eric Jensen at (808) 441-6600.

- **Site Visit Completed By:**

Suzan Pankenier
Environmental Scientist

- **Report Prepared By:**

Kaitlyn Mitchell

Kaitlyn Mitchell
Environmental Scientist

- **Report Reviewed by:**

Eric M. Jensen, CHMM
Operations Manager

9.0 REFERENCES

ASTM International (ASTM). 2013. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process E 1527-13.

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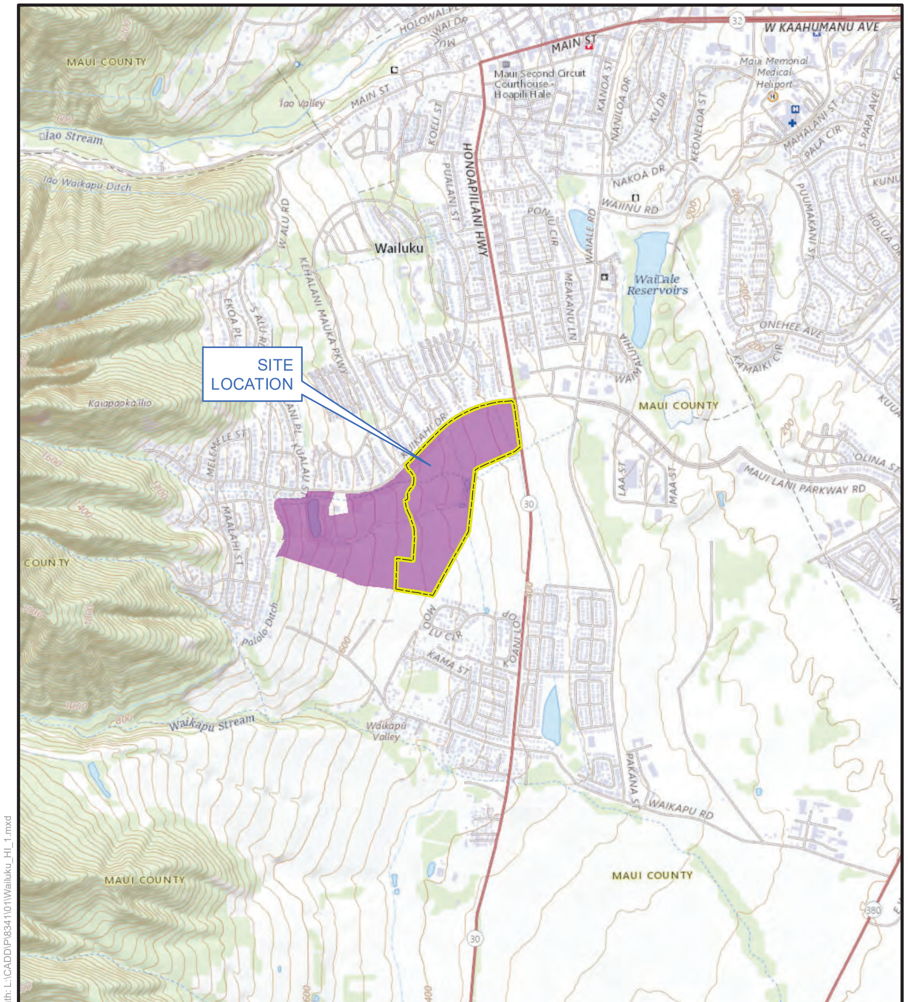
APPENDIX A

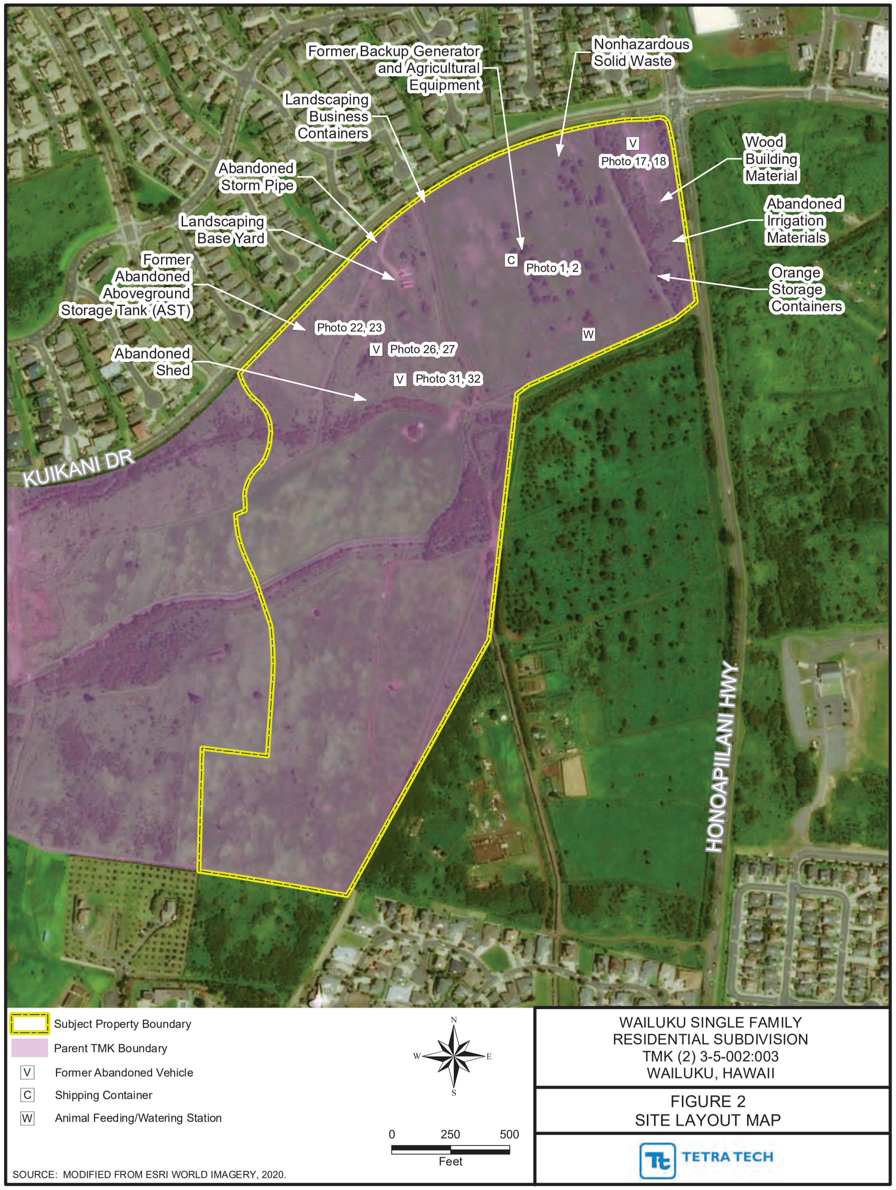
FIGURES



WAILUKU SINGLE FAMILY RESIDENTIAL SUBDIVISION
TMK (2) 3-5-002:003
WAILUKU, HAWAII

FIGURE 1
SITE LOCATION MAP

TETRA TECH



APPENDIX B

EDR RADIUS MAP WITH GEOCHECK

Wailuku Maui Phase I ESA
101 Kuikahi Drive
Wailuku, HI 96793

Inquiry Number: 7026358.2s
June 21, 2022

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

FORM-LBB-ASH

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E1527-21), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

101 KUIKAHI DRIVE
WAILUKU, HI 96793

COORDINATES

Latitude (North):	20.8664740 - 20˚ 51' 59.30''
Longitude (West):	156.5071180 - 156˚ 30' 25.62''
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	759377.5
UTM Y (Meters):	2309244.5
Elevation:	485 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	9372279 WAILUKU, HI
Version Date:	2017

MAPPED SITES SUMMARY

Target Property Address:
101 KUIKAHI DRIVE
WAILUKU, HI 96793

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	HAWAII LAND & FARMIN	631 MEAKANU LN	SHWS	Lower	1987, 0.376, NE
2	KEHALANI DEVELOPMENT		SHWS	Higher	2158, 0.409, NNW
3	WAIMALUHIA MAUI METH	115 WAIMALUHIA LN	SHWS, CDL, SPILLS	Lower	2185, 0.414, ENE
4	WAIKAPU DUMP	WAIKAPU RD	SHWS	Lower	3119, 0.591, ESE
5	MAALAEA 710 ACRE AND		SHWS	Higher	4296, 0.814, SSW
6	KEHALANI DEVELOPMENT	OMAOMAO ST	SHWS	Lower	4326, 0.819, North
7	WAIALE ASH PILE	MAUI LANI PKWY	SHWS	Lower	4549, 0.862, NE
8	MAUI LANI		SHWS	Lower	4622, 0.875, East
9	ORGANIZATIONAL MAINT	260 S MARKET ST	SHWS	Lower	5050, 0.956, NNE

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL .... National Priority List
Proposed NPL .... Proposed National Priority List Sites
NPL LIENS .... Federal Superfund Liens

Lists of Federal Delisted NPL sites

Delisted NPL .... National Priority List Deletions

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY .... Federal Facility Site Information listing
SEMS .... Superfund Enterprise Management System

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE .... Superfund Enterprise Management System Archive

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS .... Corrective Action Report

Lists of Federal RCRA TSD facilities

RCRA-TSDF .... RCRA - Treatment, Storage and Disposal

Lists of Federal RCRA generators

RCRA-LQG .... RCRA - Large Quantity Generators
RCRA-SQG .... RCRA - Small Quantity Generators
RCRA-VSQG .... RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

Federal institutional controls / engineering controls registries

LUCIS .... Land Use Control Information System

EXECUTIVE SUMMARY

US ENG CONTROLS .... Engineering Controls Sites List
US INST CONTROLS .... Institutional Controls Sites List

Federal ERNS list

ERNS .... Emergency Response Notification System

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF .... Permitted Landfills in the State of Hawaii

Lists of state and tribal leaking storage tanks

LUST .... Leaking Underground Storage Tank Database
INDIAN LUST .... Leaking Underground Storage Tanks on Indian Land

Lists of state and tribal registered storage tanks

FEMA UST .... Underground Storage Tank Listing
UST .... Underground Storage Tank Database
INDIAN UST .... Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

ENG CONTROLS .... Engineering Control Sites
INST CONTROL .... Sites with Institutional Controls

Lists of state and tribal voluntary cleanup sites

INDIAN VCP .... Voluntary Cleanup Priority Listing
VCP .... Voluntary Response Program Sites

Lists of state and tribal brownfield sites

BROWNFIELDS .... Brownfields Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS .... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY .... SWRCY
INDIAN ODI .... Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9 .... Torres Martinez Reservation Illegal Dump Site Locations
ODI .... Open Dump Inventory
IHS OPEN DUMPS .... Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL .... Delisted National Clandestine Laboratory Register
CDL .... Clandestine Drug Lab Listing

EXECUTIVE SUMMARY

US CDL .... National Clandestine Laboratory Register
PFAS .... PFAS Contamination Site Listing

Local Land Records

LIENS 2 .... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS .... Hazardous Materials Information Reporting System
SPILLS .... Release Notifications
SPILLS 90 .... SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR .... RCRA - Non Generators / No Longer Regulated
FUDS .... Formerly Used Defense Sites
DOD .... Department of Defense Sites
SCRD DRYCLEANERS .... State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR .... Financial Assurance Information
EPA WATCH LIST .... EPA WATCH LIST
2020 COR ACTION .... 2020 Corrective Action Program List
TSCA .... Toxic Substances Control Act
TRIS .... Toxic Chemical Release Inventory System
SSTS .... Section 7 Tracking Systems
ROD .... Records Of Decision
RMP .... Risk Management Plans
RAATS .... RCRA Administrative Action Tracking System
PRP .... Potentially Responsible Parties
PADS .... PCB Activity Database System
ICIS .... Integrated Compliance Information System
FTTS .... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS .... Material Licensing Tracking System
COAL ASH DOE .... Steam-Electric Plant Operation Data
COAL ASH EPA .... Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER .... PCB Transformer Registration Database
RADINFO .... Radiation Information Database
HIST FTTS .... FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS .... Incident and Accident Data
CONSENT .... Superfund (CERCLA) Consent Decrees
INDIAN RESERV .... Indian Reservations
FUSRAP .... Formerly Utilized Sites Remedial Action Program
UMTRA .... Uranium Mill Tailings Sites
LEAD SMELTERS .... Lead Smelter Sites
US AIRS .... Aerometric Information Retrieval System Facility Subsystem
US MINES .... Mines Master Index File
ABANDONED MINES .... Abandoned Mines
FINDS .... Facility Index System/Facility Registry System
DOCKET HWC .... Hazardous Waste Compliance Docket Listing
UXO .... Unexploded Ordnance Sites
ECHO .... Enforcement & Compliance History Information
FUELS PROGRAM .... EPA Fuels Program Registered Listing
AIRS .... List of Permitted Facilities
DRYCLEANERS .... Permitted Drycleaner Facility Listing

EXECUTIVE SUMMARY

Financial Assurance .... Financial Assurance Information Listing
LEAD .... LEAD
UIC .... Underground Injection Wells Listing
MINES MRDS .... Mineral Resources Data System

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP .... EDR Proprietary Manufactured Gas Plants
EDR Hist Auto .... EDR Exclusive Historical Auto Stations
EDR Hist Cleaner .... EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS .... Recovered Government Archive State Hazardous Waste Facilities List
RGA LF .... Recovered Government Archive Solid Waste Facilities List
RGA LUST .... Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Lists of state- and tribal hazardous waste facilities

SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Health.

A review of the SHWS list, as provided by EDR, and dated 02/22/2022 has revealed that there are 9 SHWS sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
KEHALANI DEVELOPMENT		NNW 1/4 - 1/2 (0.409 mi.)	2	8
MAALAEA 710 ACRE AND		SSW 1/2 - 1 (0.814 mi.)	5	14

Lower Elevation	Address	Direction / Distance	Map ID	Page
HAWAII LAND & FARMIN	631 MEAKANU LN	NE 1/4 - 1/2 (0.376 mi.)	1	8

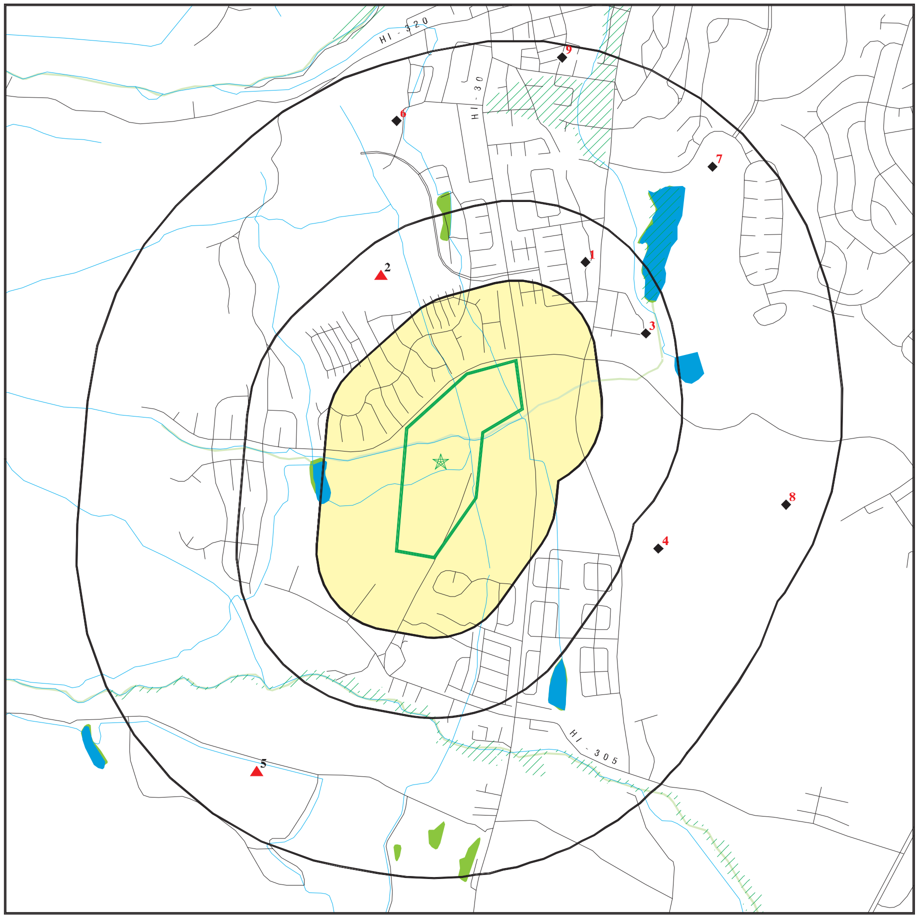
EXECUTIVE SUMMARY

Lower Elevation	Address	Direction / Distance	Map ID	Page
WAIMALUHIA MAUI METH	***115 WAIMALUHIA LN***	***ENE 1/4 - 1/2 (0.414 mi.)***	***3***	***9***
WAIKAPU DUMP	WAIKAPU RD	ESE 1/2 - 1 (0.591 mi.)	4	14
KEHALANI DEVELOPMENT	OMAOMAO ST	N 1/2 - 1 (0.819 mi.)	6	15
WAIALE ASH PILE	MAUI LANI PKWY	NE 1/2 - 1 (0.862 mi.)	7	16
MAUI LANI		E 1/2 - 1 (0.875 mi.)	8	17
ORGANIZATIONAL MAINT	260 S MARKET ST	NNE 1/2 - 1 (0.956 mi.)	9	18

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 7026358.2S

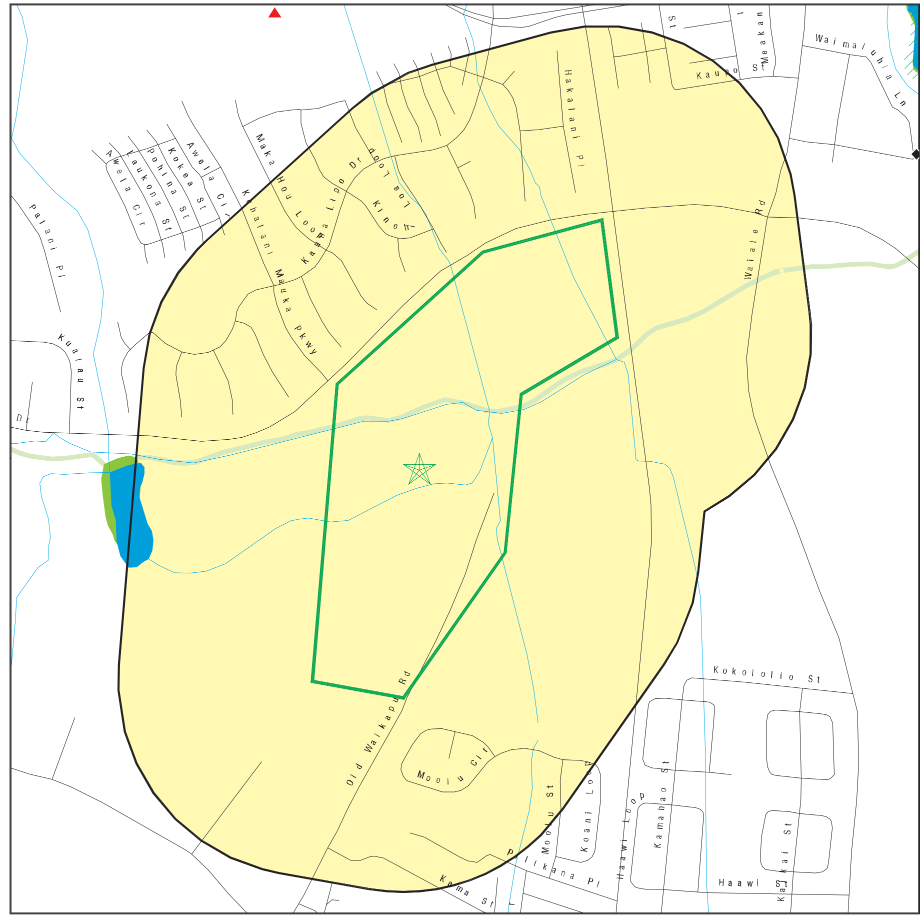


- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Wailuku Maui Phase I ESA ADDRESS: 101 Kuikahi Drive Wailuku HI 96793 LAT/LONG: 20.866474 / 156.507118	CLIENT: Tetra Tech EMI CONTACT: Kaitlyn Mitchell INQUIRY #: 7026358.2s DATE: June 21, 2022 2:00 pm

DETAIL MAP - 7026358.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Wailuku Maui Phase I ESA ADDRESS: 101 Kuikahi Drive Wailuku HI 96793 LAT/LONG: 20.866474 / 156.507118	CLIENT: Tetra Tech EMI CONTACT: Kaitlyn Mitchell INQUIRY #: 7026358.2s DATE: June 21, 2022 2:00 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Lists of Federal NPL (Superfund) sites								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Lists of Federal Delisted NPL sites								
Delisted NPL	1.000		0	0	0	0	NR	0
Lists of Federal sites subject to CERCLA removals and CERCLA orders								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Lists of Federal CERCLA sites with NFRAP								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA facilities undergoing Corrective Action								
CORRACTS	1.000		0	0	0	0	NR	0
Lists of Federal RCRA TSD facilities								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA generators								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-VSQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROLS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
Lists of state- and tribal hazardous waste facilities								
SHWS	1.000		0	0	3	6	NR	9
Lists of state and tribal landfills and solid waste disposal facilities								
SWF/LF	0.500		0	0	0	NR	NR	0
Lists of state and tribal leaking storage tanks								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	0.500		0	0	0	NR	NR	0
Lists of state and tribal registered storage tanks								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
ENG CONTROLS	0.500		0	0	0	NR	NR	0
INST CONTROL	0.500		0	0	0	NR	NR	0
Lists of state and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
Lists of state and tribal brownfield sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
PFAS	0.500		0	0	0	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
SPILLS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AIRS	TP		NR	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
LEAD	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
MINES MRDS	TP		NR	NR	NR	NR	NR	0

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
RGA HWS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		0	0	0	3	6	0	9

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Map ID / Direction / Distance / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
1 **NE** **1/4-1/2** **0.376 mi.** **1987 ft.**	**HAWAII LAND & FARMING COMPANY, INC.** **631 MEAKANU LN** **WAILUKU, HI 96732**	**SHWS**	**S126282573** **N/A**

Relative: **Lower**
Actual: **260 ft.**

SHWS:

Name:	HAWAII LAND & FARMING COMPANY, INC.
Address:	631 MEAKANU LN
City,State,Zip:	WAILUKU, HI 96732
Supplemental Location:	Not reported
Island:	Maui
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported
Island:	Maui
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	1445
Location Description:	631 Meakanu Lane
Is Public:	True
Update On:	2020-03-05 15:52:10
Latitude:	20.875900
Longitude:	-156.500000

Map ID / Direction / Distance / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
2 **NNW** **1/4-1/2** **0.409 mi.** **2158 ft.**	**KEHALANI DEVELOPMENT** **WAILUKU, HI**	**SHWS**	**S111704776** **N/A**

Relative: **Higher**
Actual: **505 ft.**

SHWS:

Name:	KEHALANI DEVELOPMENT
Address:	Not reported
City,State,Zip:	WAILUKU, HI
Supplemental Location:	Not reported

KEHALANI DEVELOPMENT (Continued) **S111704776**

Island:	Maui
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported
Island:	Maui
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	323
Location Description:	Not reported
Is Public:	True
Update On:	2019-05-30 20:35:41
Latitude:	20.875000
Longitude:	-156.510000

Map ID / Direction / Distance / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
3 **ENE** **1/4-1/2** **0.414 mi.** **2185 ft.**	**WAIMALUHIA MAUI METH / DRUG LAB ACT 170** **115 WAIMALUHIA LN** **WAILUKU, HI 96793**	**SHWS** **CDL** **SPILLS**	**S108859869** **N/A**

Relative: **Lower**
Actual: **240 ft.**

SHWS:

Name:	WAIMALUHIA MAUI METH / DRUG LAB ACT 170
Address:	115 WAIMALUHIA LN
City,State,Zip:	WAILUKU, HI 96793
Supplemental Location:	Not reported
Island:	Maui
Environmental Interest:	Waimaluhia Maui Meth / Drug Lab Act 170
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Anna Fernandez
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard

WAIMALUHIA MAUI METH / DRUG LAB ACT 170 (Continued) **S108859869**

Island: Maui
SDAR Environmental Interest Name: Waimaluhia Maui Meth / Drug Lab Act 170
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER Office
Potential Hazard And Controls: No Hazard
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Found: Methamphetamine in interior of the unit
Nature of Residual Contamination: Cleaned up to Residential Use
Use Restrictions: No Hazard Present For Unrestricted Residential Use
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Unrestricted Residential Use
Document Date: 05/07/2007
Document Number: 2007-304-AF
Document Subject: No Further Action Determination
Project Manager: Anna Fernandez
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782
Facility ID: 2650
Location Description: 115 Waimaluhia Ln, Unit 202
Is Public: True
Update On: 2020-10-07 08:59:55
Latitude: 20.872600
Longitude: -156.497146

CDL:
Date Notified: 7/5/2007
Cleanup Status: Completed / No Further Action Needed / Remediated

SPILLS:
Name: WAIMALUHIA MAUI METH / DRUG LAB ACT 170
Address: 115 WAIMALUHIA LN
Address 2: UNIT 202
City,State,Zip: WAILUKU, HI 96793
Island: Maui
Supplemental Loc. Text: Not reported
Case Number: 20070305-0950
Facility Registry ID: Not reported
HID Number: Not reported
Lead and Program: HEER EP&R
ER: Site Visit
Less Or Greater Than: Not reported
Units: Waimaluhia Maui Meth
Activity Type: Response
Activity Lead: Anna Fernandez
Assignment End Date: 2007-04-01 00:00:00
Result: Refer to SDAR
File Under: County of Maui, Police Department
Substances: Acetone, Red Phosphorous, Methyl Ethyl Ketone, propane, alkalai, meth oil
Quanity: 0.5
Units: Gallons

WAIMALUHIA MAUI METH / DRUG LAB ACT 170 (Continued) **S108859869**

Reported Date: Not reported
Release Date: Not reported
Release Duration: Not reported
Media: Not reported
Waterbody: Not reported
Summary: Not reported

Is Noteworthy for Reports: Not reported
Is the Release a Fugitive Dumping: Not reported
Tax Map Key: Not reported
Assigned SOSC: Not reported
Notified Agencies: Not reported
Response Measures Taken: Not reported
Incident Report Number: Not reported
Coordination Needed: Not reported
Tier II Facility: Not reported
RMP: Not reported
Follow-up Received On: Not reported
Cost Recovery: Not reported
Invoice To: Not reported
Closed Date: Not reported
Comments: Not reported
Latitude: 20.876446999999999
Longitude: -156.498333

Name: WAIMALUHIA MAUI METH / DRUG LAB ACT 170
Address: 115 WAIMALUHIA LN
Address 2: UNIT 202
City,State,Zip: WAILUKU, HI 96793
Island: Maui
Supplemental Loc. Text: Not reported
Case Number: 20070305-0950
Facility Registry ID: Not reported
HID Number: Not reported
Lead and Program: HEER EP&R
ER: Site Visit
Less Or Greater Than: Not reported
Units: Waimaluhia Maui Meth
Activity Type: Response
Activity Lead: Anna Fernandez
Assignment End Date: 2007-04-01 00:00:00
Result: Refer to SDAR
File Under: County of Maui, Police Department
Substances: Acetone, Red Phosphorous, Methyl Ethyl Ketone, propane, alkalai, meth oil
Quanity: 0.5
Units: Gallons
Reported Date: Not reported
Release Date: Not reported
Release Duration: Not reported
Media: Not reported
Waterbody: Not reported
Summary: Not reported

Is Noteworthy for Reports: Not reported
Is the Release a Fugitive Dumping: Not reported
Tax Map Key: Not reported

WAIMALUHIA MAUI METH / DRUG LAB ACT 170 (Continued) **S108859869**

Assigned SOSC: Not reported
Notified Agencies: Not reported
Response Measures Taken: Not reported
Incident Report Number: Not reported
Coordination Needed: Not reported
Tier II Facility: Not reported
RMP: Not reported
Follow-up Received On: Not reported
Cost Recovery: Not reported
Invoice To: Not reported
Closed Date: Not reported
Comments: Not reported
Latitude: 20.873024999999998
Longitude: -156.498347

Name: WAIMALUHIA MAUI METH / DRUG LAB ACT 170
Address: 115 WAIMALUHIA LN
Address 2: UNIT 202
City,State,Zip: WAILUKU, HI 96793
Island: Maui
Supplemental Loc. Text: Not reported
Case Number: 20070305-0950
Facility Registry ID: Not reported
HID Number: Not reported
Lead and Program: HEER EP&R
ER: Site Visit
Less Or Greater Than: Not reported
Units: Waimaluhia Maui Meth
Activity Type: Response
Activity Lead: Terry Corpus
Assignment End Date: 2007-03-12 00:00:00
Result: SOSC NFA
File Under: County of Maui, Police Department
Substances: Acetone, Red Phosphorous, Methyl Ethyl Ketone, propane, alkalai, meth oil
Quanity: 0.5
Units: Gallons
Reported Date: Not reported
Release Date: Not reported
Release Duration: Not reported
Media: Not reported
Waterbody: Not reported
Summary: Not reported

Is Noteworthy for Reports: Not reported
Is the Release a Fugitive Dumping: Not reported
Tax Map Key: Not reported
Assigned SOSC: Not reported
Notified Agencies: Not reported
Response Measures Taken: Not reported
Incident Report Number: Not reported
Coordination Needed: Not reported
Tier II Facility: Not reported
RMP: Not reported
Follow-up Received On: Not reported
Cost Recovery: Not reported
Invoice To: Not reported

WAIMALUHIA MAUI METH / DRUG LAB ACT 170 (Continued) **S108859869**

Closed Date: Not reported
Comments: Not reported
Latitude: 20.876446999999999
Longitude: -156.498333

Name: WAIMALUHIA MAUI METH / DRUG LAB ACT 170
Address: 115 WAIMALUHIA LN
Address 2: UNIT 202
City,State,Zip: WAILUKU, HI 96793
Island: Maui
Supplemental Loc. Text: Not reported
Case Number: 20070305-0950
Facility Registry ID: Not reported
HID Number: Not reported
Lead and Program: HEER EP&R
ER: Site Visit
Less Or Greater Than: Not reported
Units: Waimaluhia Maui Meth
Activity Type: Response
Activity Lead: Terry Corpus
Assignment End Date: 2007-03-12 00:00:00
Result: SOSC NFA
File Under: County of Maui, Police Department
Substances: Acetone, Red Phosphorous, Methyl Ethyl Ketone, propane, alkalai, meth oil
Quanity: 0.5
Units: Gallons
Reported Date: Not reported
Release Date: Not reported
Release Duration: Not reported
Media: Not reported
Waterbody: Not reported
Summary: Not reported

Is Noteworthy for Reports: Not reported
Is the Release a Fugitive Dumping: Not reported
Tax Map Key: Not reported
Assigned SOSC: Not reported
Notified Agencies: Not reported
Response Measures Taken: Not reported
Incident Report Number: Not reported
Coordination Needed: Not reported
Tier II Facility: Not reported
RMP: Not reported
Follow-up Received On: Not reported
Cost Recovery: Not reported
Invoice To: Not reported
Closed Date: Not reported
Comments: Not reported
Latitude: 20.873024999999998
Longitude: -156.498347

4
ESE
1/2-1
0.591 mi.
3119 ft.

WAIKAPU DUMP
WAIKAPU RD
KAHULUI, HI 96732

SHWS **1006819647**
N/A

Relative: **Lower**
Actual: **306 ft.**

SHWS:

Name:	WAIKAPU DUMP
Address:	WAIKAPU RD
City,State,Zip:	KAHULUI, HI 96732
Supplemental Location:	Not reported
Island:	Maui
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported
Island:	Maui
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	2263
Location Description:	Waikapu Rd
Is Public:	True
Update On:	2019-05-30 20:35:41
Latitude:	20.862590
Longitude:	-156.496614

5
SSW
1/2-1
0.814 mi.
4296 ft.

MAALAEA 710 ACRE AND 906 ACRE SITE

MAALAEA, HI

SHWS **S110061637**
N/A

Relative: **Higher**
Actual: **706 ft.**

SHWS:

Name:	MAALAEA 710 ACRE AND 906 ACRE SITE
Address:	Not reported
City,State,Zip:	MAALAEA, HI
Supplemental Location:	Not reported

MAALAEA 710 ACRE AND 906 ACRE SITE (Continued) **S110061637**

Island:	Maui
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported
Island:	Maui
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	2759
Location Description:	Not reported
Is Public:	True
Update On:	2019-05-30 20:35:41
Latitude:	20.852500
Longitude:	-156.516000

6
North
1/2-1
0.819 mi.
4326 ft.

KEHALANI DEVELOPMENT QUONSET HUT MODULE 18 AND SHA
OMAOMAO ST
WAILUKU, HI

SHWS **S128195963**
N/A

Relative: **Lower**
Actual: **395 ft.**

SHWS:

Name:	KEHALANI DEVELOPMENT QUONSET HUT MODULE 18 AND SHAFT
Address:	OMAOMAO ST
City,State,Zip:	WAILUKU, HI
Supplemental Location:	Not reported
Island:	Maui
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported

KEHALANI DEVELOPMENT QUONSET HUT MODULE 18 AND SHAFT (Continued) **S128195963**

Island:	Maui
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	1211
Location Description:	Off of Omaomao Street
Is Public:	True
Update On:	2020-09-21 19:31:08
Latitude:	20.881983
Longitude:	-156.509249

7
NE
1/2-1
0.862 mi.
4549 ft.

Relative: Lower
Actual: 200 ft.

WAIALE ASH PILE
MAUI LANI PKWY
WAILUKU, HI 96793

SHWS **S126283208** **N/A**

SHWS:

Name:	WAIALE ASH PILE
Address:	MAUI LANI PKWY
City,State,Zip:	WAILUKU, HI 96793
Supplemental Location:	Not reported
Island:	Maui
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported
Island:	Maui
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported

MAP FINDINGS

Map ID / Direction / Distance / Elevation | Site | Database(s) | EDR ID Number / EPA ID Number

WAIALE ASH PILE (Continued) **S126283208**

Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	2649
Location Description:	End of Maui Lani Pkwy, Site of Proposed Mahalani Extension
Is Public:	True
Update On:	2019-07-14 20:16:23
Latitude:	20.879900
Longitude:	-156.494000

8
East
1/2-1
0.875 mi.
4622 ft.

Relative: Lower
Actual: 200 ft.

MAUI LANI
WAILUKU, HI

SHWS **S126282943** **N/A**

SHWS:

Name:	MAUI LANI
Address:	Not reported
City,State,Zip:	WAILUKU, HI
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported
Island:	Oahu
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported

MAUI LANI (Continued) **S126282943**

Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	914
Location Description:	Not reported
Is Public:	True
Update On:	2021-12-13 16:52:29
Latitude:	20.864577
Longitude:	-156.490459

9
NNE
1/2-1
0.956 mi.
5050 ft.

ORGANIZATIONAL MAINTENANCE SHOP #3 (OMS #3)
260 S MARKET ST
WAILUKU, HI 96793

SHWS **1006818976**
N/A

Relative: **Lower**
Actual: **256 ft.**

SHWS:

Name:	ORGANIZATIONAL MAINTENANCE SHOP #3 (OMS #3)
Address:	260 S MARKET ST
City,State,Zip:	WAILUKU, HI 96793
Supplemental Location:	Not reported
Island:	Maui
Environmental Interest:	Organizational Maintenance Shop #3 (OMS #3)
HID Number:	Not reported
Facility Registry Identifier:	110013767352
Lead Agency:	HEER Office
Program:	State
Project Manager:	Unassigned
Hazard Priority:	Low
Potential Hazards And Controls:	Hazard Undetermined
Island:	Maui
SDAR Environmental Interest Name:	Organizational Maintenance Shop #3 (OMS #3)
HID Number:	Not reported
Facility Registry Identifier:	110013767352
Lead Agency:	HEER Office
Potential Hazard And Controls:	Hazard Undetermined
Priority:	Low
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Unassigned
Contact Information:	(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782
Facility ID:	2205
Location Description:	260 S Market St
Is Public:	True
Update On:	2019-05-30 20:35:41
Latitude:	20.884800

ORGANIZATIONAL MAINTENANCE SHOP #3 (OMS #3) (Continued) **1006818976**

Longitude:	-156.501000

ORPHAN SUMMARY

Count: 0 records.

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/27/2022	Source: EPA
Date Data Arrived at EDR: 05/05/2022	Telephone: N/A
Date Made Active in Reports: 05/31/2022	Last EDR Contact: 06/01/2022
Number of Days to Update: 26	Next Scheduled EDR Contact: 07/11/2022
	Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1 Telephone 617-918-1143	EPA Region 6 Telephone: 214-655-6659
EPA Region 3 Telephone 215-814-5418	EPA Region 7 Telephone: 913-551-7247
EPA Region 4 Telephone 404-562-8033	EPA Region 8 Telephone: 303-312-6774
EPA Region 5 Telephone 312-886-6686	EPA Region 9 Telephone: 415-947-4246
EPA Region 10 Telephone 206-553-8665	

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/27/2022	Source: EPA
Date Data Arrived at EDR: 05/05/2022	Telephone: N/A
Date Made Active in Reports: 05/31/2022	Last EDR Contact: 06/01/2022
Number of Days to Update: 26	Next Scheduled EDR Contact: 07/11/2022
	Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991	Source: EPA
Date Data Arrived at EDR: 02/02/1994	Telephone: 202-564-4267
Date Made Active in Reports: 03/30/1994	Last EDR Contact: 08/15/2011
Number of Days to Update: 56	Next Scheduled EDR Contact: 11/28/2011
	Data Release Frequency: No Update Planned

Lists of Federal Delisted NPL sites

Delisted NPL: National Priority List Deletions
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/27/2022	Source: EPA
Date Data Arrived at EDR: 05/05/2022	Telephone: N/A
Date Made Active in Reports: 05/31/2022	Last EDR Contact: 06/01/2022
Number of Days to Update: 26	Next Scheduled EDR Contact: 07/11/2022
	Data Release Frequency: Quarterly

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY: Federal Facility Site Information listing
A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 05/25/2021	Source: Environmental Protection Agency
Date Data Arrived at EDR: 06/24/2021	Telephone: 703-603-8704
Date Made Active in Reports: 09/20/2021	Last EDR Contact: 04/01/2022
Number of Days to Update: 88	Next Scheduled EDR Contact: 07/11/2022
	Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System
SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 04/27/2022	Source: EPA
Date Data Arrived at EDR: 05/05/2022	Telephone: 800-424-9346
Date Made Active in Reports: 05/31/2022	Last EDR Contact: 06/01/2022
Number of Days to Update: 26	Next Scheduled EDR Contact: 07/25/2022
	Data Release Frequency: Quarterly

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 04/27/2022	Source: EPA
Date Data Arrived at EDR: 05/05/2022	Telephone: 800-424-9346
Date Made Active in Reports: 05/31/2022	Last EDR Contact: 06/01/2022
Number of Days to Update: 26	Next Scheduled EDR Contact: 07/25/2022
	Data Release Frequency: Quarterly

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 02/28/2022	Source: EPA
Date Data Arrived at EDR: 03/02/2022	Telephone: 800-424-9346
Date Made Active in Reports: 03/17/2022	Last EDR Contact: 04/06/2022
Number of Days to Update: 15	Next Scheduled EDR Contact: 07/04/2022
	Data Release Frequency: Quarterly

Lists of Federal RCRA TSD facilities

RCRA-TSDF: RCRA - Treatment, Storage and Disposal
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 02/28/2022	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/02/2022	Telephone: (415) 495-8895
Date Made Active in Reports: 03/17/2022	Last EDR Contact: 04/06/2022
Number of Days to Update: 15	Next Scheduled EDR Contact: 07/04/2022
	Data Release Frequency: Quarterly

Lists of Federal RCRA generators

RCRA-LQG: RCRA - Large Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/28/2022	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/02/2022	Telephone: (415) 495-8895
Date Made Active in Reports: 03/17/2022	Last EDR Contact: 04/06/2022
Number of Days to Update: 15	Next Scheduled EDR Contact: 07/04/2022
	Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 02/28/2022
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/17/2022
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 04/06/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

RCRA-VSQG: RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/28/2022
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/17/2022
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 04/06/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 02/08/2022
Date Data Arrived at EDR: 02/11/2022
Date Made Active in Reports: 05/10/2022
Number of Days to Update: 88

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 08/22/2022
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 02/21/2022
Date Data Arrived at EDR: 02/23/2022
Date Made Active in Reports: 05/24/2022
Number of Days to Update: 90

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/24/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

US INST CONTROLS: Institutional Controls Sites List

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 02/21/2022
Date Data Arrived at EDR: 02/23/2022
Date Made Active in Reports: 05/24/2022
Number of Days to Update: 90

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/04/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2021
Date Data Arrived at EDR: 03/01/2022
Date Made Active in Reports: 03/10/2022
Number of Days to Update: 9

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/15/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

Lists of state- and tribal hazardous waste facilities

SHWS: Sites List

Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 02/22/2022
Date Data Arrived at EDR: 03/09/2022
Date Made Active in Reports: 04/06/2022
Number of Days to Update: 28

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/10/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Semi-Annually

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF: Permitted Landfills in the State of Hawaii

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 03/17/2022
Date Data Arrived at EDR: 03/24/2022
Date Made Active in Reports: 06/16/2022
Number of Days to Update: 84

Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 06/15/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Varies

Lists of state and tribal leaking storage tanks

LUST: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 02/23/2022
Date Data Arrived at EDR: 02/24/2022
Date Made Active in Reports: 05/19/2022
Number of Days to Update: 84

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 05/27/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Semi-Annually

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/12/2021	Source: EPA Region 8
Date Data Arrived at EDR: 11/15/2021	Telephone: 303-312-6271
Date Made Active in Reports: 02/08/2022	Last EDR Contact: 06/13/2022
Number of Days to Update: 85	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/12/2021	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/15/2021	Telephone: 415-972-3372
Date Made Active in Reports: 02/08/2022	Last EDR Contact: 06/13/2022
Number of Days to Update: 85	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 10/12/2021	Source: EPA Region 10
Date Data Arrived at EDR: 11/15/2021	Telephone: 206-553-2857
Date Made Active in Reports: 02/08/2022	Last EDR Contact: 06/13/2022
Number of Days to Update: 85	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 10/12/2021	Source: EPA, Region 5
Date Data Arrived at EDR: 11/15/2021	Telephone: 312-886-7439
Date Made Active in Reports: 02/08/2022	Last EDR Contact: 06/13/2022
Number of Days to Update: 85	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 10/12/2021	Source: EPA Region 6
Date Data Arrived at EDR: 11/15/2021	Telephone: 214-665-6597
Date Made Active in Reports: 02/08/2022	Last EDR Contact: 06/13/2022
Number of Days to Update: 85	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/28/2021	Source: EPA Region 1
Date Data Arrived at EDR: 06/11/2021	Telephone: 617-918-1313
Date Made Active in Reports: 09/07/2021	Last EDR Contact: 06/13/2022
Number of Days to Update: 88	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/28/2021	Source: EPA Region 4
Date Data Arrived at EDR: 06/22/2021	Telephone: 404-562-8677
Date Made Active in Reports: 09/20/2021	Last EDR Contact: 06/13/2022
Number of Days to Update: 90	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

Lists of state and tribal registered storage tanks

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 10/14/2021	Source: FEMA
Date Data Arrived at EDR: 11/05/2021	Telephone: 202-646-5797
Date Made Active in Reports: 02/01/2022	Last EDR Contact: 04/04/2022
Number of Days to Update: 88	Next Scheduled EDR Contact: 07/18/2022
	Data Release Frequency: Varies

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 02/23/2022	Source: Department of Health
Date Data Arrived at EDR: 02/24/2022	Telephone: 808-586-4228
Date Made Active in Reports: 05/19/2022	Last EDR Contact: 05/27/2022
Number of Days to Update: 84	Next Scheduled EDR Contact: 09/05/2022
	Data Release Frequency: Semi-Annually

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 10/12/2021	Source: EPA Region 6
Date Data Arrived at EDR: 11/15/2021	Telephone: 214-665-7591
Date Made Active in Reports: 02/08/2022	Last EDR Contact: 06/13/2022
Number of Days to Update: 85	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 10/12/2021	Source: EPA Region 10
Date Data Arrived at EDR: 11/15/2021	Telephone: 206-553-2857
Date Made Active in Reports: 02/08/2022	Last EDR Contact: 06/13/2022
Number of Days to Update: 85	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/12/2021	Source: EPA Region 8
Date Data Arrived at EDR: 11/15/2021	Telephone: 303-312-6137
Date Made Active in Reports: 02/08/2022	Last EDR Contact: 06/13/2022
Number of Days to Update: 85	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 10/12/2021	Source: EPA Region 9
Date Data Arrived at EDR: 11/15/2021	Telephone: 415-972-3368
Date Made Active in Reports: 02/08/2022	Last EDR Contact: 06/13/2022
Number of Days to Update: 85	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/06/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/14/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

ENG CONTROLS: Engineering Control Sites
A listing of sites with engineering controls in place.

Date of Government Version: 04/17/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 9

Source: Department of Health
Telephone: 404-586-4249
Last EDR Contact: 06/10/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

INST CONTROL: Sites with Institutional Controls
Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 04/17/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 9

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/10/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Lists of state and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/15/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/08/2021
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Response Program Sites
Sites participating in the Voluntary Response Program. The purpose of the VRP is to streamline the cleanup process in a way that will encourage prospective developers, lenders, and purchasers to voluntarily cleanup properties.

Date of Government Version: 02/22/2022
Date Data Arrived at EDR: 03/09/2022
Date Made Active in Reports: 04/06/2022
Number of Days to Update: 28

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/10/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

Lists of state and tribal brownfield sites

BROWNFIELDS: Brownfields Sites
With certain legal exclusions and additions, the term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Date of Government Version: 02/22/2022
Date Data Arrived at EDR: 03/09/2022
Date Made Active in Reports: 04/06/2022
Number of Days to Update: 28

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/10/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 02/23/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 03/10/2022
Number of Days to Update: 0

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY: SWRCY
A listing of recycling and drop-off facilities located in Hawaii.

Date of Government Version: 03/17/2022	Source: Department of Health
Date Data Arrived at EDR: 03/24/2022	Telephone: 808-586-4226
Date Made Active in Reports: 06/16/2022	Last EDR Contact: 06/15/2022
Number of Days to Update: 84	Next Scheduled EDR Contact: 10/03/2022
	Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/03/2007	Telephone: 703-308-8245
Date Made Active in Reports: 01/24/2008	Last EDR Contact: 04/21/2022
Number of Days to Update: 52	Next Scheduled EDR Contact: 08/08/2022
	Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009	Source: EPA, Region 9
Date Data Arrived at EDR: 05/07/2009	Telephone: 415-947-4219
Date Made Active in Reports: 09/21/2009	Last EDR Contact: 04/14/2022
Number of Days to Update: 137	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: No Update Planned

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985	Source: Environmental Protection Agency
Date Data Arrived at EDR: 08/09/2004	Telephone: 800-424-9346
Date Made Active in Reports: 09/17/2004	Last EDR Contact: 06/09/2004
Number of Days to Update: 39	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014	Source: Department of Health & Human Serivces, Indian Health Service
Date Data Arrived at EDR: 08/06/2014	Telephone: 301-443-1452
Date Made Active in Reports: 01/29/2015	Last EDR Contact: 04/28/2022
Number of Days to Update: 176	Next Scheduled EDR Contact: 08/08/2022
	Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 02/22/2022	Source: Drug Enforcement Administration
Date Data Arrived at EDR: 02/23/2022	Telephone: 202-307-1000
Date Made Active in Reports: 05/10/2022	Last EDR Contact: 05/24/2022
Number of Days to Update: 76	Next Scheduled EDR Contact: 09/05/2022
	Data Release Frequency: No Update Planned

CDL: Clandestine Drug Lab Listing
A listing of clandestine drug lab site locations.

Date of Government Version: 08/04/2010	Source: Department of Health
Date Data Arrived at EDR: 09/10/2010	Telephone: 808-586-4249
Date Made Active in Reports: 10/22/2010	Last EDR Contact: 06/02/2022
Number of Days to Update: 42	Next Scheduled EDR Contact: 09/19/2022
	Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/22/2022	Source: Drug Enforcement Administration
Date Data Arrived at EDR: 02/23/2022	Telephone: 202-307-1000
Date Made Active in Reports: 05/10/2022	Last EDR Contact: 05/24/2022
Number of Days to Update: 76	Next Scheduled EDR Contact: 09/05/2022
	Data Release Frequency: Quarterly

PFAS: PFAS Contamination Site Listing
A listing of sites where "Potential PFAS" were found. The listing includes sites with "PFAs" and "fluoro", and site names that include "firefight", fire fight", "fire train".

Date of Government Version: 02/25/2022	Source: Department of Health
Date Data Arrived at EDR: 02/28/2022	Telephone: 808-586-4249
Date Made Active in Reports: 03/10/2022	Last EDR Contact: 06/10/2022
Number of Days to Update: 10	Next Scheduled EDR Contact: 09/19/2022
	Data Release Frequency: Varies

Local Land Records

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 04/27/2022	Source: Environmental Protection Agency
Date Data Arrived at EDR: 05/05/2022	Telephone: 202-564-6023
Date Made Active in Reports: 05/31/2022	Last EDR Contact: 06/01/2022
Number of Days to Update: 26	Next Scheduled EDR Contact: 07/11/2022
	Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/21/2022	Source: U.S. Department of Transportation
Date Data Arrived at EDR: 03/21/2022	Telephone: 202-366-4555
Date Made Active in Reports: 06/14/2022	Last EDR Contact: 03/21/2022
Number of Days to Update: 85	Next Scheduled EDR Contact: 07/04/2022
	Data Release Frequency: Quarterly

SPILLS: Release Notifications
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 02/17/2022
Date Data Arrived at EDR: 02/18/2022
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 4

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/13/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Varies

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 03/10/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/11/2013
Number of Days to Update: 39

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 02/28/2022
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/17/2022
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 04/06/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/01/2021
Date Data Arrived at EDR: 02/15/2022
Date Made Active in Reports: 05/10/2022
Number of Days to Update: 84

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 05/17/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 06/07/2021
Date Data Arrived at EDR: 07/13/2021
Date Made Active in Reports: 03/09/2022
Number of Days to Update: 239

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/12/2022
Next Scheduled EDR Contact: 07/25/2022
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 11/06/2019
Number of Days to Update: 574

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/05/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/06/2022
Next Scheduled EDR Contact: 08/22/2022
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/21/2022
Date Data Arrived at EDR: 03/21/2022
Date Made Active in Reports: 06/14/2022
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 03/21/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 04/28/2022
Next Scheduled EDR Contact: 08/15/2022
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/06/2022
Next Scheduled EDR Contact: 08/15/2022
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/17/2020
Date Made Active in Reports: 09/10/2020
Number of Days to Update: 85

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2018	Source: EPA
Date Data Arrived at EDR: 08/14/2020	Telephone: 202-566-0250
Date Made Active in Reports: 11/04/2020	Last EDR Contact: 05/20/2022
Number of Days to Update: 82	Next Scheduled EDR Contact: 08/29/2022
	Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 01/19/2022	Source: EPA
Date Data Arrived at EDR: 01/19/2022	Telephone: 202-564-4203
Date Made Active in Reports: 04/11/2022	Last EDR Contact: 04/20/2022
Number of Days to Update: 82	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Annually

ROD: Records Of Decision
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 04/27/2022	Source: EPA
Date Data Arrived at EDR: 05/05/2022	Telephone: 703-416-0223
Date Made Active in Reports: 05/31/2022	Last EDR Contact: 06/01/2022
Number of Days to Update: 26	Next Scheduled EDR Contact: 09/12/2022
	Data Release Frequency: Annually

RMP: Risk Management Plans
When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 04/27/2022	Source: Environmental Protection Agency
Date Data Arrived at EDR: 05/04/2022	Telephone: 202-564-8600
Date Made Active in Reports: 05/10/2022	Last EDR Contact: 04/18/2022
Number of Days to Update: 6	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995	Source: EPA
Date Data Arrived at EDR: 07/03/1995	Telephone: 202-564-4104
Date Made Active in Reports: 08/07/1995	Last EDR Contact: 06/02/2008
Number of Days to Update: 35	Next Scheduled EDR Contact: 09/01/2008
	Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 01/25/2022	Source: EPA
Date Data Arrived at EDR: 02/03/2022	Telephone: 202-564-6023
Date Made Active in Reports: 02/25/2022	Last EDR Contact: 06/01/2022
Number of Days to Update: 22	Next Scheduled EDR Contact: 08/15/2022
	Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 01/20/2022	Source: EPA
Date Data Arrived at EDR: 01/20/2022	Telephone: 202-566-0500
Date Made Active in Reports: 03/25/2022	Last EDR Contact: 04/08/2022
Number of Days to Update: 64	Next Scheduled EDR Contact: 07/18/2022
	Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/23/2016	Telephone: 202-564-2501
Date Made Active in Reports: 02/10/2017	Last EDR Contact: 03/31/2022
Number of Days to Update: 79	Next Scheduled EDR Contact: 07/18/2022
	Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009	Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 08/18/2017
Number of Days to Update: 25	Next Scheduled EDR Contact: 12/04/2017
	Data Release Frequency: No Update Planned

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009	Source: EPA
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 08/18/2017
Number of Days to Update: 25	Next Scheduled EDR Contact: 12/04/2017
	Data Release Frequency: No Update Planned

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/11/2022	Source: Nuclear Regulatory Commission
Date Data Arrived at EDR: 03/15/2022	Telephone: 301-415-7169
Date Made Active in Reports: 06/14/2022	Last EDR Contact: 04/18/2022
Number of Days to Update: 91	Next Scheduled EDR Contact: 08/01/2022
	Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2020 — Source: Department of Energy
Date Data Arrived at EDR: 11/30/2021 — Telephone: 202-586-8719
Date Made Active in Reports: 02/22/2022 — Last EDR Contact: 06/02/2022
Number of Days to Update: 84 — Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 01/12/2017 — Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/05/2019 — Telephone: N/A
Date Made Active in Reports: 11/11/2019 — Last EDR Contact: 05/25/2022
Number of Days to Update: 251 — Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 09/13/2019 — Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/06/2019 — Telephone: 202-566-0517
Date Made Active in Reports: 02/10/2020 — Last EDR Contact: 05/06/2022
Number of Days to Update: 96 — Next Scheduled EDR Contact: 08/15/2022
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/01/2019 — Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/01/2019 — Telephone: 202-343-9775
Date Made Active in Reports: 09/23/2019 — Last EDR Contact: 03/28/2022
Number of Days to Update: 84 — Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006 — Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007 — Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007 — Last EDR Contact: 12/17/2007
Number of Days to Update: 40 — Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006 — Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007 — Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007 — Last EDR Contact: 12/17/2008
Number of Days to Update: 40 — Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/02/2020 — Source: Department of Transporation, Office of Pipeline Safety
Date Data Arrived at EDR: 01/28/2020 — Telephone: 202-366-4595
Date Made Active in Reports: 04/17/2020 — Last EDR Contact: 04/26/2022
Number of Days to Update: 80 — Next Scheduled EDR Contact: 08/08/2022
Data Release Frequency: Quarterly

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2021 — Source: Department of Justice, Consent Decree Library
Date Data Arrived at EDR: 01/14/2022 — Telephone: Varies
Date Made Active in Reports: 03/25/2022 — Last EDR Contact: 04/04/2022
Number of Days to Update: 70 — Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Varies

BRS: Biennial Reporting System
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2019 — Source: EPA/NTIS
Date Data Arrived at EDR: 03/02/2022 — Telephone: 800-424-9346
Date Made Active in Reports: 03/25/2022 — Last EDR Contact: 03/02/2022
Number of Days to Update: 23 — Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014 — Source: USGS
Date Data Arrived at EDR: 07/14/2015 — Telephone: 202-208-3710
Date Made Active in Reports: 01/10/2017 — Last EDR Contact: 04/05/2022
Number of Days to Update: 546 — Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program
DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 07/26/2021 — Source: Department of Energy
Date Data Arrived at EDR: 07/27/2021 — Telephone: 202-586-3559
Date Made Active in Reports: 10/22/2021 — Last EDR Contact: 04/28/2022
Number of Days to Update: 87 — Next Scheduled EDR Contact: 08/15/2022
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 08/30/2019
Date Data Arrived at EDR: 11/15/2019
Date Made Active in Reports: 01/28/2020
Number of Days to Update: 74

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/16/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 09/01/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/01/2022
Date Data Arrived at EDR: 02/23/2022
Date Made Active in Reports: 05/24/2022
Number of Days to Update: 90

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/25/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Semi-Annually

MINES VIOLATIONS: MSHA Violation Assessment Data
Mines violation and assessment information. Department of Labor, Mine Safety & Health Administration.

Date of Government Version: 03/21/2022
Date Data Arrived at EDR: 03/22/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 3

Source: DOL, Mine Safety & Health Admi
Telephone: 202-693-9424
Last EDR Contact: 05/26/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Quarterly

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing
This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 05/06/2020
Date Data Arrived at EDR: 05/27/2020
Date Made Active in Reports: 08/13/2020
Number of Days to Update: 78

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/27/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing
Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/27/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines
An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/10/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/14/2022
Number of Days to Update: 96

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 05/13/2022
Date Data Arrived at EDR: 05/18/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 13

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 05/18/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information
ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 01/01/2022
Date Data Arrived at EDR: 01/04/2022
Date Made Active in Reports: 01/10/2022
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 04/05/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing
A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 05/06/2021
Date Data Arrived at EDR: 05/21/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 05/19/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites
A listing of unexploded ordnance site locations

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 01/11/2022
Date Made Active in Reports: 02/14/2022
Number of Days to Update: 34

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 04/12/2022
Next Scheduled EDR Contact: 07/25/2022
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/17/2022
Date Data Arrived at EDR: 02/17/2022
Date Made Active in Reports: 05/10/2022
Number of Days to Update: 82

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/17/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Quarterly

AIRS: List of Permitted Facilities
A listing of permitted facilities in the state.

Date of Government Version: 11/24/2021
Date Data Arrived at EDR: 11/29/2021
Date Made Active in Reports: 02/14/2022
Number of Days to Update: 77

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 05/19/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Varies

DRYCLEANERS: Permitted Drycleaner Facility Listing
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 03/31/2021
Date Data Arrived at EDR: 04/01/2021
Date Made Active in Reports: 06/22/2021
Number of Days to Update: 82

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 05/19/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Varies

Financial Assurance: Financial Assurance Information Listing
A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 06/07/2022
Date Data Arrived at EDR: 06/10/2022
Date Made Active in Reports: 06/16/2022
Number of Days to Update: 6

Source: Department of Health
Telephone: 808-586-4226
Last EDR Contact: 06/02/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

LEAD: Lead Inspection Listing
Lead inspections

Date of Government Version: 03/07/2022
Date Data Arrived at EDR: 03/08/2022
Date Made Active in Reports: 04/11/2022
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-5800
Last EDR Contact: 06/15/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

UIC: Underground Injection Wells Listing
A listing of underground injection well locations.

Date of Government Version: 02/07/2013
Date Data Arrived at EDR: 02/12/2013
Date Made Active in Reports: 04/09/2013
Number of Days to Update: 56

Source: Department of Health
Telephone: 808-586-4258
Last EDR Contact: 05/19/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

PCS ENF: Enforcement data
No description is available for this data

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/06/2015
Number of Days to Update: 29

Source: EPA
Telephone: 202-564-2497
Last EDR Contact: 03/31/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Varies

PCS INACTIVE: Listing of Inactive PCS Permits
An inactive permit is a facility that has shut down or is no longer discharging.

Date of Government Version: 11/05/2014
Date Data Arrived at EDR: 01/06/2015
Date Made Active in Reports: 05/06/2015
Number of Days to Update: 120

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/31/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Semi-Annually

PCS: Permit Compliance System
PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 55

Source: EPA, Office of Water
Telephone: 202-564-2496
Last EDR Contact: 03/31/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Semi-Annually

MINES MRDS: Mineral Resources Data System
Mineral Resources Data System

Date of Government Version: 04/06/2018
Date Data Arrived at EDR: 10/21/2019
Date Made Active in Reports: 10/24/2019
Number of Days to Update: 3

Source: USGS
Telephone: 703-648-6533
Last EDR Contact: 05/27/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A
Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A
Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A
Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List
The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 191
Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List
The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/17/2014
Number of Days to Update: 200
Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank
The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 186
Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines
Source: Endeavor Business Media
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Electric Power Transmission Line Data
Source: Endeavor Business Media
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.
Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.
Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.
Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.
Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Office of Planning
Telephone: 808-587-2895

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

WAILUKU MAUI PHASE I ESA
101 KUIKAHI DRIVE
WAILUKU, HI 96793

TARGET PROPERTY COORDINATES

Latitude (North):	20.866474 - 20˚ 51' 59.31''
Longitude (West):	156.507118 - 156˚ 30' 25.62''
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	759377.5
UTM Y (Meters):	2309244.5
Elevation:	485 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	9372279 WAILUKU, HI
Version Date:	2017

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

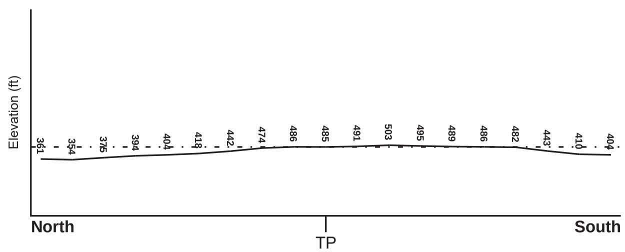
TOPOGRAPHIC INFORMATION

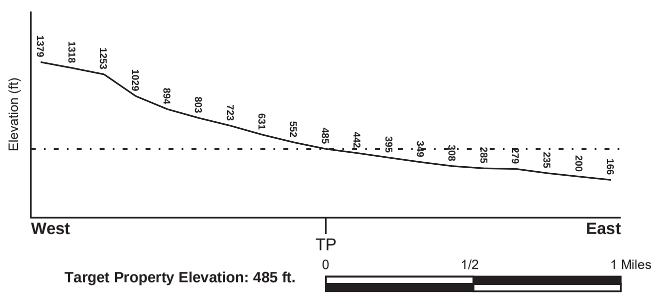
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General East

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 485 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
1500030391E	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
1500030387E	FEMA FIRM Flood data
1500030393F	FEMA FIRM Flood data
1500030389F	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NOT AVAILABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

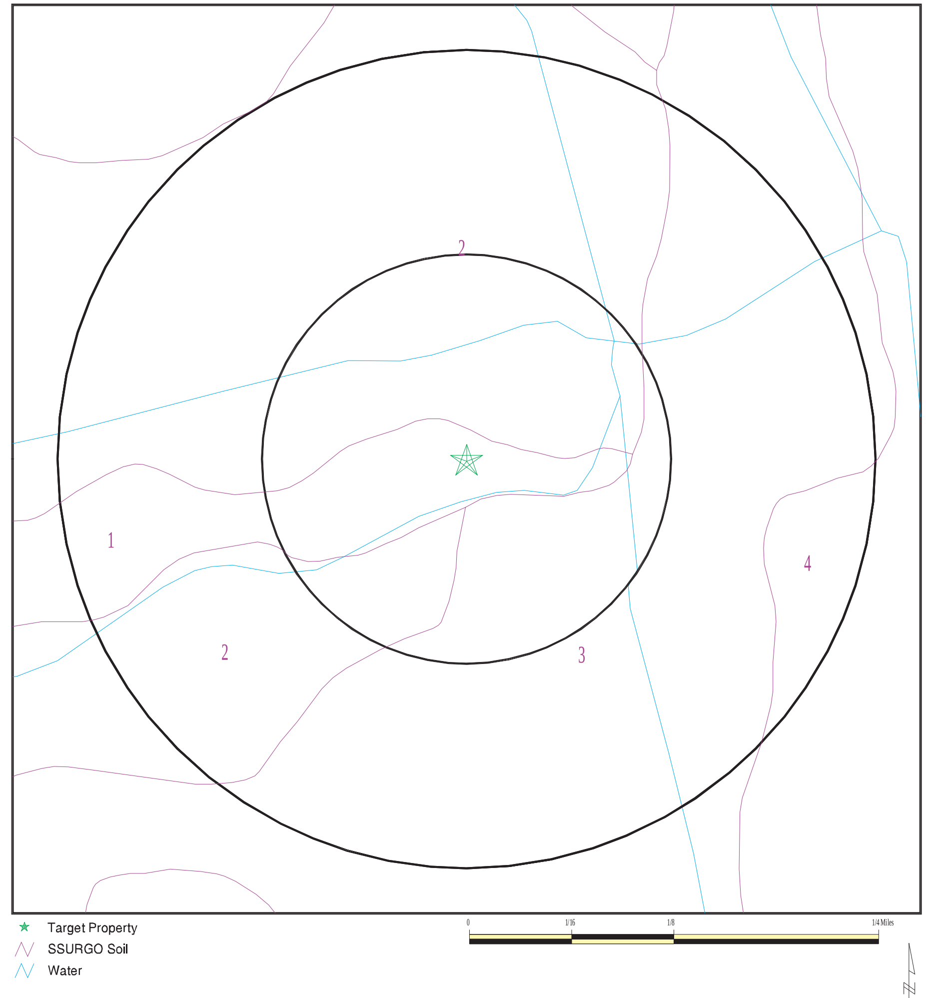
Era: -
System: -
Series: -
Code: N/A *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: -

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 7026358.2s



SITE NAME: Wailuku Maui Phase I ESA ADDRESS: 101 Kuikahi Drive Wailuku HI 96793 LAT/LONG: 20.866474 / 156.507118	CLIENT: Tetra Tech EMI CONTACT: Kaitlyn Mitchell INQUIRY #: 7026358.2s DATE: June 21, 2022 2:00 pm

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Iao

Soil Surface Texture: clay

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		Soil Reaction (pH)
1	0 inches	14 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
2	14 inches	48 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
3	48 inches	59 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Map ID: 2

Soil Component Name: Iao

Soil Surface Texture: cobbly silty clay

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		Soil Reaction (pH)
1	0 inches	14 inches	cobbly silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
2	14 inches	48 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
3	48 inches	59 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6

Soil Map ID: 3

Soil Component Name: Iao

Soil Surface Texture: cobbly silty clay

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	conductivity micro m/sec	Soil Reaction (pH)
1	0 inches	14 inches	cobbly silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
2	14 inches	48 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
3	48 inches	59 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6

Soil Map ID: 4

Soil Component Name: Iao

Soil Surface Texture: clay

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information

	Boundary			Classification		Saturated hydraulic	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	conductivity micro m/sec	Soil Reaction (pH)
1	0 inches	14 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
2	14 inches	48 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
3	48 inches	59 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	USGS40000269052	1/4 - 1/2 Mile South
B6	USGS40000269051	1/2 - 1 Mile SSW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

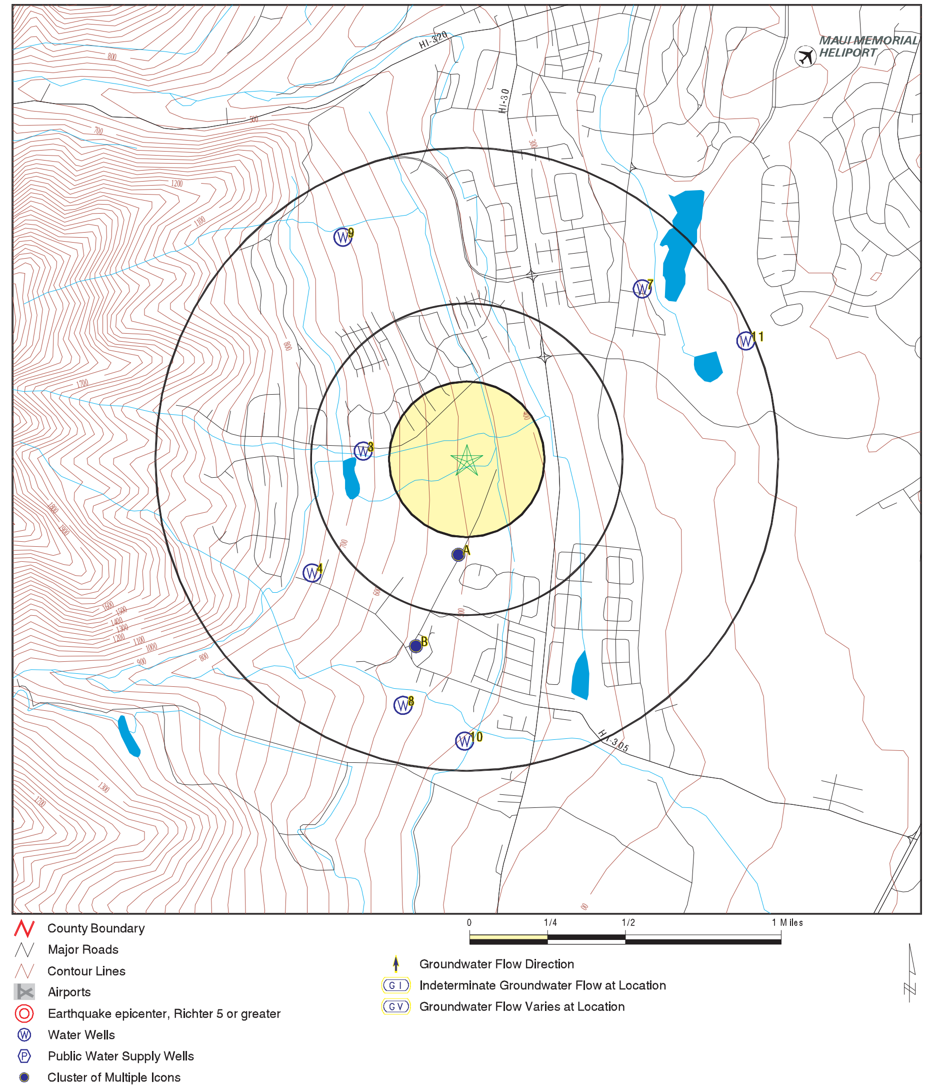
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	HI1200000003439	1/4 - 1/2 Mile South
3	HI1200000003497	1/4 - 1/2 Mile West
4	HI1200000003441	1/2 - 1 Mile SW
B5	HI1200000003438	1/2 - 1 Mile SSW
7	HI1200000003496	1/2 - 1 Mile NE
8	HI1200000003410	1/2 - 1 Mile SSW
9	HI1200000003500	1/2 - 1 Mile NNW
10	HI1200000003408	1/2 - 1 Mile South
11	HI1200000003494	1/2 - 1 Mile ENE

PHYSICAL SETTING SOURCE MAP - 7026358.2s



SITE NAME:	Wailuku Maui Phase I ESA	CLIENT:	Tetra Tech EMI
ADDRESS:	101 Kuikahi Drive	CONTACT:	Kaitlyn Mitchell
	Wailuku HI 96793	INQUIRY #:	7026358.2s
LAT/LONG:	20.866474 / 156.507118	DATE:	June 21, 2022 2:00 pm

Map ID Direction Distance Elevation	Database	EDR ID Number
A1 **South** **1/4 - 1/2 Mile** **Higher**	**FED USGS**	**USGS40000269052**

Organization ID:	USGS-HI	Organization Name:	USGS Hawaii Water Science Center
Monitor Location:	6-5130-02 Waikapu 2, Maui, HI		
Type:	Well	Description:	Not Reported
HUC:	20020000	Drainage Area:	Not Reported
Drainage Area Units:	Not Reported	Contrib Drainage Area:	Not Reported
Contrib Drainage Area Unts:	Not Reported	Aquifer:	Hawaii volcanic-rock aquifers
Formation Type:	Wailuku Volcanic Series, Lava Flows		
Aquifer Type:	Unconfined single aquifer	Construction Date:	19740701
Well Depth:	1020	Well Depth Units:	ft
Well Hole Depth:	1020	Well Hole Depth Units:	ft

Ground water levels,Number of Measurements:	163	Level reading date:	2004-04-02
Feet below surface:	Not Reported	Feet to sea level:	11.18
Note:	Not Reported		
Level reading date:	2004-02-10	Feet below surface:	Not Reported
Feet to sea level:	11.02	Note:	Not Reported
Level reading date:	2004-01-05	Feet below surface:	Not Reported
Feet to sea level:	10.96	Note:	Not Reported
Level reading date:	2003-11-13	Feet below surface:	Not Reported
Feet to sea level:	10.70	Note:	Not Reported
Level reading date:	2003-10-02	Feet below surface:	Not Reported
Feet to sea level:	10.93	Note:	Not Reported
Level reading date:	2003-08-19	Feet below surface:	Not Reported
Feet to sea level:	11.15	Note:	Not Reported
Level reading date:	2003-07-10	Feet below surface:	Not Reported
Feet to sea level:	11.12		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2003-05-14	Feet below surface:	Not Reported
Feet to sea level:	11.21		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2003-03-31	Feet below surface:	Not Reported
Feet to sea level:	11.34		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2003-02-11	Feet below surface:	Not Reported
Feet to sea level:	11.15		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2003-01-07	Feet below surface:	Not Reported
Feet to sea level:	11.18		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-11-19	Feet below surface:	Not Reported
Feet to sea level:	11.14		
Note:	Other conditions existed that would affect the measured water level.		

Level reading date:	2002-10-01	Feet below surface:	Not Reported
Feet to sea level:	10.23		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-08-20	Feet below surface:	Not Reported
Feet to sea level:	11.20		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-07-02	Feet below surface:	Not Reported
Feet to sea level:	11.31		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-05-14	Feet below surface:	Not Reported
Feet to sea level:	11.48		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-04-02	Feet below surface:	Not Reported
Feet to sea level:	11.55		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-02-21	Feet below surface:	Not Reported
Feet to sea level:	11.50		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-01-08	Feet below surface:	Not Reported
Feet to sea level:	11.53		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2001-12-04	Feet below surface:	Not Reported
Feet to sea level:	11.28		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2001-10-16	Feet below surface:	Not Reported
Feet to sea level:	11.08	Note:	Not Reported
Level reading date:	2001-08-21	Feet below surface:	Not Reported
Feet to sea level:	11.14	Note:	Not Reported
Level reading date:	2001-07-03	Feet below surface:	Not Reported
Feet to sea level:	11.10	Note:	Not Reported
Level reading date:	2001-05-15	Feet below surface:	Not Reported
Feet to sea level:	11.16	Note:	Not Reported
Level reading date:	2001-04-03	Feet below surface:	Not Reported
Feet to sea level:	11.11	Note:	Not Reported
Level reading date:	2001-03-08	Feet below surface:	Not Reported
Feet to sea level:	11.18	Note:	Not Reported
Level reading date:	2001-01-09	Feet below surface:	Not Reported
Feet to sea level:	11.43	Note:	Not Reported
Level reading date:	2000-12-07	Feet below surface:	Not Reported
Feet to sea level:	11.45	Note:	Not Reported
Level reading date:	2000-10-03	Feet below surface:	Not Reported
Feet to sea level:	11.38	Note:	Not Reported
Level reading date:	2000-08-24	Feet below surface:	Not Reported
Feet to sea level:	11.30	Note:	Not Reported

Level reading date:	2000-07-06	Feet below surface:	Not Reported
Feet to sea level:	11.41	Note:	Not Reported
Level reading date:	2000-05-16	Feet below surface:	Not Reported
Feet to sea level:	11.58	Note:	Not Reported
Level reading date:	2000-04-04	Feet below surface:	Not Reported
Feet to sea level:	11.73	Note:	Not Reported
Level reading date:	2000-02-24	Feet below surface:	Not Reported
Feet to sea level:	12.19	Note:	Not Reported
Level reading date:	2000-01-04	Feet below surface:	Not Reported
Feet to sea level:	12.66	Note:	Not Reported
Level reading date:	1999-11-22	Feet below surface:	Not Reported
Feet to sea level:	12.53	Note:	Not Reported
Level reading date:	1999-10-01	Feet below surface:	Not Reported
Feet to sea level:	12.48	Note:	Not Reported
Level reading date:	1999-08-24	Feet below surface:	Not Reported
Feet to sea level:	12.11	Note:	Not Reported
Level reading date:	1999-07-02	Feet below surface:	Not Reported
Feet to sea level:	11.76	Note:	Not Reported
Level reading date:	1999-05-19	Feet below surface:	Not Reported
Feet to sea level:	12.08	Note:	Not Reported
Level reading date:	1999-05-19	Feet below surface:	Not Reported
Feet to sea level:	12.08	Note:	Not Reported
Level reading date:	1999-03-30	Feet below surface:	Not Reported
Feet to sea level:	12.33	Note:	Not Reported
Level reading date:	1999-03-09	Feet below surface:	Not Reported
Feet to sea level:	12.21	Note:	Not Reported
Level reading date:	1999-01-05	Feet below surface:	Not Reported
Feet to sea level:	12.38	Note:	Not Reported
Level reading date:	1998-12-01	Feet below surface:	Not Reported
Feet to sea level:	12.06	Note:	Not Reported
Level reading date:	1998-09-29	Feet below surface:	Not Reported
Feet to sea level:	12.11	Note:	Not Reported
Level reading date:	1998-09-29	Feet below surface:	Not Reported
Feet to sea level:	12.11	Note:	Not Reported
Level reading date:	1998-08-24	Feet below surface:	Not Reported
Feet to sea level:	12.11	Note:	Not Reported
Level reading date:	1998-07-02	Feet below surface:	Not Reported
Feet to sea level:	12.12	Note:	Not Reported
Level reading date:	1998-05-26	Feet below surface:	Not Reported
Feet to sea level:	12.20	Note:	Not Reported
Level reading date:	1998-04-01	Feet below surface:	Not Reported
Feet to sea level:	12.18	Note:	Not Reported

Level reading date:	1998-02-23	Feet below surface:	Not Reported
Feet to sea level:	12.36	Note:	Not Reported
Level reading date:	1998-01-05	Feet below surface:	Not Reported
Feet to sea level:	12.51	Note:	Not Reported
Level reading date:	1997-11-25	Feet below surface:	Not Reported
Feet to sea level:	12.30	Note:	Not Reported
Level reading date:	1997-10-01	Feet below surface:	Not Reported
Feet to sea level:	12.52	Note:	Not Reported
Level reading date:	1997-08-25	Feet below surface:	Not Reported
Feet to sea level:	12.84	Note:	Not Reported
Level reading date:	1997-08-06	Feet below surface:	Not Reported
Feet to sea level:	12.97	Note:	Not Reported
Level reading date:	1997-06-30	Feet below surface:	Not Reported
Feet to sea level:	12.89	Note:	Not Reported
Level reading date:	1997-05-27	Feet below surface:	Not Reported
Feet to sea level:	12.92	Note:	Not Reported
Level reading date:	1997-04-01	Feet below surface:	Not Reported
Feet to sea level:	12.99	Note:	Not Reported
Level reading date:	1997-02-24	Feet below surface:	Not Reported
Feet to sea level:	12.85	Note:	Not Reported
Level reading date:	1997-01-03	Feet below surface:	Not Reported
Feet to sea level:	12.43	Note:	Not Reported
Level reading date:	1996-11-25	Feet below surface:	Not Reported
Feet to sea level:	11.94	Note:	Not Reported
Level reading date:	1996-10-01	Feet below surface:	Not Reported
Feet to sea level:	11.88	Note:	Not Reported
Level reading date:	1996-08-26	Feet below surface:	Not Reported
Feet to sea level:	12.13	Note:	Not Reported
Level reading date:	1996-07-01	Feet below surface:	Not Reported
Feet to sea level:	12.12	Note:	Not Reported
Level reading date:	1996-05-28	Feet below surface:	Not Reported
Feet to sea level:	12.20	Note:	Not Reported
Level reading date:	1996-04-04	Feet below surface:	Not Reported
Feet to sea level:	12.50	Note:	Not Reported
Level reading date:	1996-03-07	Feet below surface:	Not Reported
Feet to sea level:	12.41	Note:	Not Reported
Level reading date:	1996-01-17	Feet below surface:	Not Reported
Feet to sea level:	12.34	Note:	Not Reported
Level reading date:	1995-10-02	Feet below surface:	Not Reported
Feet to sea level:	12.41	Note:	Not Reported
Level reading date:	1995-08-24	Feet below surface:	Not Reported
Feet to sea level:	12.53	Note:	Not Reported

Level reading date:	1995-07-12	Feet below surface:	Not Reported
Feet to sea level:	12.53	Note:	Not Reported
Level reading date:	1995-05-16	Feet below surface:	Not Reported
Feet to sea level:	12.70	Note:	Not Reported
Level reading date:	1995-01-18	Feet below surface:	Not Reported
Feet to sea level:	13.01	Note:	Not Reported
Level reading date:	1994-11-15	Feet below surface:	Not Reported
Feet to sea level:	13.09	Note:	Not Reported
Level reading date:	1994-08-18	Feet below surface:	Not Reported
Feet to sea level:	12.92	Note:	Not Reported
Level reading date:	1994-06-21	Feet below surface:	Not Reported
Feet to sea level:	12.55	Note:	Not Reported
Level reading date:	1994-05-05	Feet below surface:	Not Reported
Feet to sea level:	12.72	Note:	Not Reported
Level reading date:	1994-03-17	Feet below surface:	Not Reported
Feet to sea level:	12.62	Note:	Not Reported
Level reading date:	1994-01-20	Feet below surface:	Not Reported
Feet to sea level:	12.61	Note:	Not Reported
Level reading date:	1993-12-10	Feet below surface:	Not Reported
Feet to sea level:	12.56	Note:	Not Reported
Level reading date:	1993-11-08	Feet below surface:	Not Reported
Feet to sea level:	12.55	Note:	Not Reported
Level reading date:	1993-08-27	Feet below surface:	Not Reported
Feet to sea level:	12.66	Note:	Not Reported
Level reading date:	1993-07-07	Feet below surface:	Not Reported
Feet to sea level:	12.76	Note:	Not Reported
Level reading date:	1993-05-10	Feet below surface:	Not Reported
Feet to sea level:	12.83	Note:	Not Reported
Level reading date:	1993-04-01	Feet below surface:	Not Reported
Feet to sea level:	12.84	Note:	Not Reported
Level reading date:	1993-02-16	Feet below surface:	Not Reported
Feet to sea level:	12.83	Note:	Not Reported
Level reading date:	1992-12-29	Feet below surface:	Not Reported
Feet to sea level:	13.02	Note:	Not Reported
Level reading date:	1992-11-10	Feet below surface:	Not Reported
Feet to sea level:	12.97	Note:	Not Reported
Level reading date:	1992-09-15	Feet below surface:	Not Reported
Feet to sea level:	13.03	Note:	Not Reported
Level reading date:	1992-08-05	Feet below surface:	Not Reported
Feet to sea level:	12.98	Note:	Not Reported
Level reading date:	1992-06-24	Feet below surface:	Not Reported
Feet to sea level:	12.96	Note:	Not Reported

Level reading date:	1992-04-23	Feet below surface:	Not Reported
Feet to sea level:	12.87	Note:	Not Reported
Level reading date:	1992-02-28	Feet below surface:	Not Reported
Feet to sea level:	13.10	Note:	Not Reported
Level reading date:	1992-01-30	Feet below surface:	Not Reported
Feet to sea level:	13.04	Note:	Not Reported
Level reading date:	1991-12-05	Feet below surface:	Not Reported
Feet to sea level:	13.27	Note:	Not Reported
Level reading date:	1991-10-17	Feet below surface:	Not Reported
Feet to sea level:	13.27	Note:	Not Reported
Level reading date:	1991-09-06	Feet below surface:	Not Reported
Feet to sea level:	13.57	Note:	Not Reported
Level reading date:	1991-07-08	Feet below surface:	Not Reported
Feet to sea level:	13.52	Note:	Not Reported
Level reading date:	1991-05-28	Feet below surface:	Not Reported
Feet to sea level:	13.52	Note:	Not Reported
Level reading date:	1991-04-12	Feet below surface:	Not Reported
Feet to sea level:	13.65	Note:	Not Reported
Level reading date:	1991-03-05	Feet below surface:	Not Reported
Feet to sea level:	13.73	Note:	Not Reported
Level reading date:	1991-01-28	Feet below surface:	Not Reported
Feet to sea level:	13.83	Note:	Not Reported
Level reading date:	1990-12-11	Feet below surface:	Not Reported
Feet to sea level:	13.78	Note:	Not Reported
Level reading date:	1990-10-29	Feet below surface:	Not Reported
Feet to sea level:	13.75	Note:	Not Reported
Level reading date:	1990-08-22	Feet below surface:	Not Reported
Feet to sea level:	13.79	Note:	Not Reported
Level reading date:	1990-06-27	Feet below surface:	Not Reported
Feet to sea level:	13.89	Note:	Not Reported
Level reading date:	1990-05-31	Feet below surface:	Not Reported
Feet to sea level:	13.94	Note:	Not Reported
Level reading date:	1990-04-20	Feet below surface:	Not Reported
Feet to sea level:	13.93	Note:	Not Reported
Level reading date:	1990-03-15	Feet below surface:	Not Reported
Feet to sea level:	14.05	Note:	Not Reported
Level reading date:	1990-01-31	Feet below surface:	Not Reported
Feet to sea level:	14.08	Note:	Not Reported
Level reading date:	1989-11-28	Feet below surface:	Not Reported
Feet to sea level:	14.12	Note:	Not Reported
Level reading date:	1989-10-31	Feet below surface:	Not Reported
Feet to sea level:	14.05	Note:	Not Reported

Level reading date:	1989-08-24	Feet below surface:	Not Reported
Feet to sea level:	13.87	Note:	Not Reported
Level reading date:	1989-07-25	Feet below surface:	Not Reported
Feet to sea level:	13.83	Note:	Not Reported
Level reading date:	1989-05-23	Feet below surface:	Not Reported
Feet to sea level:	13.84	Note:	Not Reported
Level reading date:	1989-05-02	Feet below surface:	Not Reported
Feet to sea level:	13.93	Note:	Not Reported
Level reading date:	1989-03-08	Feet below surface:	Not Reported
Feet to sea level:	13.94	Note:	Not Reported
Level reading date:	1989-01-18	Feet below surface:	Not Reported
Feet to sea level:	13.88	Note:	Not Reported
Level reading date:	1988-12-14	Feet below surface:	Not Reported
Feet to sea level:	13.96	Note:	Not Reported
Level reading date:	1988-10-13	Feet below surface:	Not Reported
Feet to sea level:	13.80	Note:	Not Reported
Level reading date:	1988-09-14	Feet below surface:	Not Reported
Feet to sea level:	13.90	Note:	Not Reported
Level reading date:	1988-07-22	Feet below surface:	Not Reported
Feet to sea level:	13.98	Note:	Not Reported
Level reading date:	1988-05-20	Feet below surface:	Not Reported
Feet to sea level:	14.23	Note:	Not Reported
Level reading date:	1988-04-19	Feet below surface:	Not Reported
Feet to sea level:	14.27	Note:	Not Reported
Level reading date:	1988-02-24	Feet below surface:	Not Reported
Feet to sea level:	14.29	Note:	Not Reported
Level reading date:	1988-01-12	Feet below surface:	Not Reported
Feet to sea level:	14.39	Note:	Not Reported
Level reading date:	1987-11-30	Feet below surface:	Not Reported
Feet to sea level:	14.40	Note:	Not Reported
Level reading date:	1987-10-14	Feet below surface:	Not Reported
Feet to sea level:	14.41	Note:	Not Reported
Level reading date:	1987-08-28	Feet below surface:	Not Reported
Feet to sea level:	14.77	Note:	Not Reported
Level reading date:	1987-07-15	Feet below surface:	Not Reported
Feet to sea level:	15.03	Note:	Not Reported
Level reading date:	1987-05-21	Feet below surface:	Not Reported
Feet to sea level:	14.79	Note:	Not Reported
Level reading date:	1987-04-10	Feet below surface:	Not Reported
Feet to sea level:	14.69	Note:	Not Reported
Level reading date:	1987-02-27	Feet below surface:	Not Reported
Feet to sea level:	14.51	Note:	Not Reported

Level reading date:	1987-01-16	Feet below surface:	Not Reported
Feet to sea level:	14.26	Note:	Not Reported
Level reading date:	1986-11-28	Feet below surface:	Not Reported
Feet to sea level:	14.12	Note:	Not Reported
Level reading date:	1986-10-14	Feet below surface:	Not Reported
Feet to sea level:	13.96	Note:	Not Reported
Level reading date:	1986-08-14	Feet below surface:	Not Reported
Feet to sea level:	14.27	Note:	Not Reported
Level reading date:	1986-07-09	Feet below surface:	Not Reported
Feet to sea level:	14.38	Note:	Not Reported
Level reading date:	1986-05-28	Feet below surface:	Not Reported
Feet to sea level:	14.31	Note:	Not Reported
Level reading date:	1986-04-21	Feet below surface:	Not Reported
Feet to sea level:	13.98	Note:	Not Reported
Level reading date:	1986-02-28	Feet below surface:	Not Reported
Feet to sea level:	13.74	Note:	Not Reported
Level reading date:	1986-01-13	Feet below surface:	Not Reported
Feet to sea level:	13.57	Note:	Not Reported
Level reading date:	1985-11-27	Feet below surface:	Not Reported
Feet to sea level:	13.73	Note:	Not Reported
Level reading date:	1985-10-23	Feet below surface:	Not Reported
Feet to sea level:	13.56	Note:	Not Reported
Level reading date:	1985-09-18	Feet below surface:	Not Reported
Feet to sea level:	13.56	Note:	Not Reported
Level reading date:	1985-08-30	Feet below surface:	Not Reported
Feet to sea level:	13.58	Note:	Not Reported
Level reading date:	1985-07-09	Feet below surface:	Not Reported
Feet to sea level:	13.59	Note:	Not Reported
Level reading date:	1985-05-20	Feet below surface:	Not Reported
Feet to sea level:	13.51	Note:	Not Reported
Level reading date:	1985-04-08	Feet below surface:	Not Reported
Feet to sea level:	13.48	Note:	Not Reported
Level reading date:	1985-02-20	Feet below surface:	Not Reported
Feet to sea level:	13.55	Note:	Not Reported
Level reading date:	1985-01-16	Feet below surface:	Not Reported
Feet to sea level:	13.53	Note:	Not Reported
Level reading date:	1984-11-23	Feet below surface:	Not Reported
Feet to sea level:	13.63	Note:	Not Reported
Level reading date:	1984-10-16	Feet below surface:	Not Reported
Feet to sea level:	13.80	Note:	Not Reported
Level reading date:	1984-08-29	Feet below surface:	Not Reported
Feet to sea level:	14.07	Note:	Not Reported

Level reading date:	1984-07-05	Feet below surface:	Not Reported
Feet to sea level:	14.20	Note:	Not Reported
Level reading date:	1984-05-23	Feet below surface:	Not Reported
Feet to sea level:	14.15	Note:	Not Reported
Level reading date:	1984-04-10	Feet below surface:	Not Reported
Feet to sea level:	14.05	Note:	Not Reported
Level reading date:	1984-02-27	Feet below surface:	Not Reported
Feet to sea level:	13.83	Note:	Not Reported
Level reading date:	1984-01-17	Feet below surface:	Not Reported
Feet to sea level:	13.81	Note:	Not Reported
Level reading date:	1983-12-07	Feet below surface:	Not Reported
Feet to sea level:	13.79	Note:	Not Reported
Level reading date:	1983-10-17	Feet below surface:	Not Reported
Feet to sea level:	13.97	Note:	Not Reported

A2
South
1/4 - 1/2 Mile
Higher

HI WELLS **HI1200000003439**

Well #:	6-5130-002	Pump Rate (g/m):	0
Well Owner:	Kitagawa Motors Inc.		
Land Owner:	Kitagawa Motors Inc.		
Well Use:	Unused	Well Name:	Waikapu 2
Original Well Name:	Not Reported	Driller:	Roscoe Moss Hawaii Inc
Well Construction Type:	Percussion	Casing Diameter (in):	20
Ground Elevation (ft):	518	Well Depth (ft):	1020
Solid Casing Depth:	520	Perforated Casing Depth:	570
Major Well Use:	Unused	Initial Water Level (ft):	10.3
Water Level After Drilling:	0	Water Level After Install:	0
Chloride Content (mg/L):	13	Date Tested:	09-JUL-74
Test Pump Rate (g/m):	500	Test Drawdown Rate(ft):	73
Test Chloride Content (MG/L):	50	Test Water Temp:	21
Temp Unit:	C	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Year Installed:	0
Draft Year:	Not Reported	Hole Bottom Elevation:	-502
Solid Casing Bottom Elevation:	-2	Perforated Casing Bottom Elevation:	-52
Pump Capacity (MM gal/day):	0	Pump Intake Depth:	0
Latest Head:	Not Reported	Latest WCR1 Report:	01-JUL-74
Latest WCR2 Report:	Not Reported	Transmissivity:	0
Min to Pump 5 Volumes:	0		

3
West
1/4 - 1/2 Mile
Higher

HI WELLS **HI1200000003497**

Well #:	6-5230-002	Pump Rate (g/m):	0
Well Owner:	Commission on Water Resource Management, CWRM		
Land Owner:	County of Maui		
Well Use:	Deep (through Transition zone)		
Well Name:	Iao Deep Monitor		
Original Well Name:	Not Reported		

Driller:	Blaise Clay (Water Resources International, Inc.)		
Well Construction Type:	Rotary	Casing Diameter (in):	8
Ground Elevation (ft):	682	Well Depth (ft):	1800
Solid Casing Depth:	703	Perforated Casing Depth:	0
Major Well Use:	Deep (through Transition zone)		
Initial Water Level (ft):	13.93	Water Level After Drilling:	0
Water Level After Install:	0	Chloride Content (mg/L):	0
Date Tested:	Not Reported	Test Pump Rate (g/m):	0
Test Drawdown Rate(ft):	0	Test Chloride Content (MG/L):	0
Test Water Temp:	0	Temp Unit:	Not Reported
Max Chloride Level:	Not Reported	Minimum Chloride Level:	Not Reported
Year Installed:	0	Draft Year:	Not Reported
Hole Bottom Elevation:	-1118	Solid Casing Bottom Elevation:	-21
Perforated Casing Bottom Elevation:	0	Pump Capacity (MM gal/day):	0
Pump Intake Depth:	0	Latest Head:	Not Reported
Latest WCR1 Report:	27-JUN-06	Latest WCR2 Report:	Not Reported
Transmissivity:	0	Min to Pump 5 Volumes:	0

4
SW
1/2 - 1 Mile
Higher

HI WELLS **HI1200000003441**

Well #:	6-5131-001	Pump Rate (g/m):	1400
Well Owner:	Maui Department of Water Supply, MDWS		
Land Owner:	County of Maui	Well Use:	County
Well Name:	Waikapu Tank Site		
Original Well Name:	Waikapu Mauka		
Driller:	Water Resources International, Inc.		
Well Construction Type:	Rotary	Casing Diameter (in):	18
Ground Elevation (ft):	763	Well Depth (ft):	870
Solid Casing Depth:	765	Perforated Casing Depth:	865
Major Well Use:	County	Initial Water Level (ft):	18.35
Water Level After Drilling:	0	Water Level After Install:	0
Chloride Content (mg/L):	30	Date Tested:	10-DEC-99
Test Pump Rate (g/m):	1425	Test Drawdown Rate(ft):	5.54
Test Chloride Content (MG/L):	31	Test Water Temp:	71
Temp Unit:	F	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Year Installed:	2010
Draft Year:	Not Reported	Hole Bottom Elevation:	-106
Solid Casing Bottom Elevation:	-1	Perforated Casing Bottom Elevation:	-101
Pump Capacity (MM gal/day):	2.016	Pump Intake Depth:	0
Latest Head:	Not Reported	Latest WCR1 Report:	31-MAY-00
Latest WCR2 Report:	20-DEC-19	Transmissivity:	68813
Min to Pump 5 Volumes:	46.40899983		

B5
SSW
1/2 - 1 Mile
Higher

HI WELLS **HI1200000003438**

Well #:	6-5130-001	Pump Rate (g/m):	0
Well Owner:	State of Hawaii, DLNR Land Division Oahu, DLNR-LD		
Land Owner:	State of Hawaii, DLNR Land Division Oahu, DLNR-LD		
Well Use:	Water Level Observaiton		
Well Name:	Waikapu 1	Original Well Name:	Not Reported
Driller:	Ocean View Drilling Co., Ltd.		
Well Construction Type:	Percussion	Casing Diameter (in):	8

Ground Elevation (ft):	551	Well Depth (ft):	757
Solid Casing Depth:	569	Perforated Casing Depth:	609
Major Well Use:	Water Level Observaiton		
Initial Water Level (ft):	12	Water Level After Drilling:	0
Water Level After Install:	0	Chloride Content (mg/L):	20
Date Tested:	Not Reported	Test Pump Rate (g/m):	90
Test Drawdown Rate(ft):	40	Test Chloride Content (MG/L):	45
Test Water Temp:	21	Temp Unit:	C
Max Chloride Level:	Not Reported	Minimum Chloride Level:	Not Reported
Year Installed:	0	Draft Year:	Not Reported
Hole Bottom Elevation:	-206	Solid Casing Bottom Elevation:	-18
Perforated Casing Bottom Elevation:	-58	Pump Capacity (MM gal/day):	0
Pump Intake Depth:	0	Latest Head:	Not Reported
Latest WCR1 Report:	01-JAN-61	Latest WCR2 Report:	Not Reported
Transmissivity:	0	Min to Pump 5 Volumes:	0

B6
SSW
1/2 - 1 Mile
Higher

FED USGS USGS40000269051

Organization ID:	USGS-HI	Organization Name:	USGS Hawaii Water Science Center
Monitor Location:	6-5130-01 Waikapu 1, Maui, HI		
Type:	Well	Description:	former local well no. W14
HUC:	20020000	Drainage Area:	Not Reported
Drainage Area Units:	Not Reported	Contrib Drainage Area:	Not Reported
Contrib Drainage Area Unts:	Not Reported	Aquifer:	Hawaii volcanic-rock aquifers
Formation Type:	Wailuku Volcanic Series, Lava Flows		
Aquifer Type:	Unconfined single aquifer	Construction Date:	19610101
Well Depth:	757	Well Depth Units:	ft
Well Hole Depth:	757	Well Hole Depth Units:	ft

Ground water levels,Number of Measurements:	120	Level reading date:	2004-05-13
Feet below surface:	Not Reported	Feet to sea level:	13.21
Note:	Not Reported		
Level reading date:	2004-04-02	Feet below surface:	Not Reported
Feet to sea level:	11.99	Note:	Not Reported
Level reading date:	2004-02-10	Feet below surface:	Not Reported
Feet to sea level:	11.44	Note:	Not Reported
Level reading date:	2004-01-05	Feet below surface:	Not Reported
Feet to sea level:	10.48	Note:	Not Reported
Level reading date:	2004-01-05	Feet below surface:	Not Reported
Feet to sea level:	10.40	Note:	Not Reported
Level reading date:	2003-11-13	Feet below surface:	Not Reported
Feet to sea level:	11.68	Note:	Not Reported
Level reading date:	2003-10-02	Feet below surface:	Not Reported
Feet to sea level:	11.70	Note:	Not Reported
Level reading date:	2003-08-19	Feet below surface:	Not Reported
Feet to sea level:	11.54	Note:	Not Reported
Level reading date:	2003-07-10	Feet below surface:	Not Reported
Feet to sea level:	12.22		

Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2003-05-14	Feet below surface:	Not Reported
Feet to sea level:	11.77		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2003-03-31	Feet below surface:	Not Reported
Feet to sea level:	11.94		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2003-02-11	Feet below surface:	Not Reported
Feet to sea level:	11.48		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2003-01-07	Feet below surface:	Not Reported
Feet to sea level:	11.95		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-11-19	Feet below surface:	Not Reported
Feet to sea level:	12.36		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-10-01	Feet below surface:	Not Reported
Feet to sea level:	12.59		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-07-02	Feet below surface:	Not Reported
Feet to sea level:	12.11		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-05-14	Feet below surface:	Not Reported
Feet to sea level:	12.26		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-04-02	Feet below surface:	Not Reported
Feet to sea level:	12.16		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-02-21	Feet below surface:	Not Reported
Feet to sea level:	12.09		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-01-08	Feet below surface:	Not Reported
Feet to sea level:	11.65		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2001-12-04	Feet below surface:	Not Reported
Feet to sea level:	11.58		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2001-10-16	Feet below surface:	Not Reported
Feet to sea level:	11.58	Note:	Not Reported
Level reading date:	2001-08-21	Feet below surface:	Not Reported
Feet to sea level:	12.73	Note:	Not Reported
Level reading date:	2001-07-03	Feet below surface:	Not Reported
Feet to sea level:	12.57	Note:	Not Reported
Level reading date:	2001-05-15	Feet below surface:	Not Reported
Feet to sea level:	11.51	Note:	Not Reported

Level reading date:	2001-04-03	Feet below surface:	Not Reported
Feet to sea level:	11.28	Note:	Not Reported
Level reading date:	2001-03-08	Feet below surface:	Not Reported
Feet to sea level:	11.49		
Note:	A nearby site that taps the same aquifer was being pumped.		
Level reading date:	2001-01-09	Feet below surface:	Not Reported
Feet to sea level:	11.93	Note:	Not Reported
Level reading date:	2000-12-07	Feet below surface:	Not Reported
Feet to sea level:	12.08	Note:	Not Reported
Level reading date:	2000-10-03	Feet below surface:	Not Reported
Feet to sea level:	11.75		
Note:	A nearby site that taps the same aquifer was being pumped.		
Level reading date:	2000-08-24	Feet below surface:	Not Reported
Feet to sea level:	11.31	Note:	Not Reported
Level reading date:	2000-07-06	Feet below surface:	Not Reported
Feet to sea level:	11.56	Note:	Not Reported
Level reading date:	2000-05-16	Feet below surface:	Not Reported
Feet to sea level:	11.55	Note:	Not Reported
Level reading date:	2000-04-04	Feet below surface:	Not Reported
Feet to sea level:	11.21	Note:	Not Reported
Level reading date:	2000-02-24	Feet below surface:	Not Reported
Feet to sea level:	11.97	Note:	Not Reported
Level reading date:	2000-01-04	Feet below surface:	Not Reported
Feet to sea level:	12.08	Note:	Not Reported
Level reading date:	1999-11-22	Feet below surface:	Not Reported
Feet to sea level:	12.05	Note:	Not Reported
Level reading date:	1999-10-01	Feet below surface:	Not Reported
Feet to sea level:	12.27	Note:	Not Reported
Level reading date:	1999-08-24	Feet below surface:	Not Reported
Feet to sea level:	12.04	Note:	Not Reported
Level reading date:	1999-07-02	Feet below surface:	Not Reported
Feet to sea level:	11.68	Note:	Not Reported
Level reading date:	1999-07-02	Feet below surface:	Not Reported
Feet to sea level:	11.68	Note:	Not Reported
Level reading date:	1999-05-19	Feet below surface:	Not Reported
Feet to sea level:	11.65	Note:	Not Reported
Level reading date:	1999-05-19	Feet below surface:	Not Reported
Feet to sea level:	11.65	Note:	Not Reported
Level reading date:	1999-03-30	Feet below surface:	Not Reported
Feet to sea level:	12.31	Note:	Not Reported
Level reading date:	1999-03-30	Feet below surface:	Not Reported
Feet to sea level:	12.31	Note:	Not Reported

Level reading date:	1999-03-09	Feet below surface:	Not Reported
Feet to sea level:	12.35	Note:	Not Reported
Level reading date:	1999-01-05	Feet below surface:	Not Reported
Feet to sea level:	13.62	Note:	Not Reported
Level reading date:	1999-01-05	Feet below surface:	Not Reported
Feet to sea level:	13.62	Note:	Not Reported
Level reading date:	1998-12-01	Feet below surface:	Not Reported
Feet to sea level:	12.82	Note:	Not Reported
Level reading date:	1998-09-29	Feet below surface:	Not Reported
Feet to sea level:	12.23	Note:	Not Reported
Level reading date:	1998-08-24	Feet below surface:	Not Reported
Feet to sea level:	12.00	Note:	Not Reported
Level reading date:	1998-07-02	Feet below surface:	Not Reported
Feet to sea level:	11.54	Note:	Not Reported
Level reading date:	1998-05-26	Feet below surface:	Not Reported
Feet to sea level:	12.13	Note:	Not Reported
Level reading date:	1998-04-01	Feet below surface:	Not Reported
Feet to sea level:	11.86	Note:	Not Reported
Level reading date:	1998-02-23	Feet below surface:	Not Reported
Feet to sea level:	12.49	Note:	Not Reported
Level reading date:	1998-01-05	Feet below surface:	Not Reported
Feet to sea level:	13.05	Note:	Not Reported
Level reading date:	1997-11-25	Feet below surface:	Not Reported
Feet to sea level:	11.90	Note:	Not Reported
Level reading date:	1997-10-01	Feet below surface:	Not Reported
Feet to sea level:	13.20	Note:	Not Reported
Level reading date:	1997-08-25	Feet below surface:	Not Reported
Feet to sea level:	13.93	Note:	Not Reported
Level reading date:	1997-08-06	Feet below surface:	Not Reported
Feet to sea level:	14.13	Note:	Not Reported
Level reading date:	1997-06-30	Feet below surface:	Not Reported
Feet to sea level:	14.35	Note:	Not Reported
Level reading date:	1997-05-27	Feet below surface:	Not Reported
Feet to sea level:	15.09	Note:	Not Reported
Level reading date:	1997-04-01	Feet below surface:	Not Reported
Feet to sea level:	16.21	Note:	Not Reported
Level reading date:	1997-02-24	Feet below surface:	Not Reported
Feet to sea level:	14.48	Note:	Not Reported
Level reading date:	1997-01-03	Feet below surface:	Not Reported
Feet to sea level:	12.15	Note:	Not Reported
Level reading date:	1996-11-25	Feet below surface:	Not Reported
Feet to sea level:	11.56	Note:	Not Reported

Level reading date:	1996-10-01	Feet below surface:	Not Reported
Feet to sea level:	12.02	Note:	Not Reported
Level reading date:	1996-08-26	Feet below surface:	Not Reported
Feet to sea level:	12.84	Note:	Not Reported
Level reading date:	1996-07-01	Feet below surface:	Not Reported
Feet to sea level:	12.59	Note:	Not Reported
Level reading date:	1996-05-28	Feet below surface:	Not Reported
Feet to sea level:	12.32	Note:	Not Reported
Level reading date:	1996-04-04	Feet below surface:	Not Reported
Feet to sea level:	12.49	Note:	Not Reported
Level reading date:	1996-03-07	Feet below surface:	Not Reported
Feet to sea level:	11.66	Note:	Not Reported
Level reading date:	1996-01-17	Feet below surface:	Not Reported
Feet to sea level:	12.11	Note:	Not Reported
Level reading date:	1995-10-02	Feet below surface:	Not Reported
Feet to sea level:	12.67	Note:	Not Reported
Level reading date:	1995-08-24	Feet below surface:	Not Reported
Feet to sea level:	12.82	Note:	Not Reported
Level reading date:	1995-07-12	Feet below surface:	Not Reported
Feet to sea level:	13.18	Note:	Not Reported
Level reading date:	1995-05-16	Feet below surface:	Not Reported
Feet to sea level:	13.03	Note:	Not Reported
Level reading date:	1995-01-18	Feet below surface:	Not Reported
Feet to sea level:	13.03	Note:	Not Reported
Level reading date:	1994-11-15	Feet below surface:	Not Reported
Feet to sea level:	13.34	Note:	Not Reported
Level reading date:	1994-08-18	Feet below surface:	Not Reported
Feet to sea level:	13.94	Note:	Not Reported
Level reading date:	1994-06-21	Feet below surface:	Not Reported
Feet to sea level:	13.44	Note:	Not Reported
Level reading date:	1994-05-05	Feet below surface:	Not Reported
Feet to sea level:	13.65	Note:	Not Reported
Level reading date:	1994-03-17	Feet below surface:	Not Reported
Feet to sea level:	13.56	Note:	Not Reported
Level reading date:	1994-01-20	Feet below surface:	Not Reported
Feet to sea level:	12.76	Note:	Not Reported
Level reading date:	1993-12-10	Feet below surface:	Not Reported
Feet to sea level:	12.78	Note:	Not Reported
Level reading date:	1993-11-08	Feet below surface:	Not Reported
Feet to sea level:	12.96	Note:	Not Reported
Level reading date:	1993-08-27	Feet below surface:	Not Reported
Feet to sea level:	13.58	Note:	Not Reported

Level reading date:	1993-07-07	Feet below surface:	Not Reported
Feet to sea level:	14.09	Note:	Not Reported
Level reading date:	1993-05-14	Feet below surface:	Not Reported
Feet to sea level:	14.40	Note:	Not Reported
Level reading date:	1993-05-10	Feet below surface:	Not Reported
Feet to sea level:	14.30	Note:	Not Reported
Level reading date:	1993-04-01	Feet below surface:	Not Reported
Feet to sea level:	14.44	Note:	Not Reported
Level reading date:	1993-02-16	Feet below surface:	Not Reported
Feet to sea level:	13.49	Note:	Not Reported
Level reading date:	1992-12-29	Feet below surface:	Not Reported
Feet to sea level:	14.35	Note:	Not Reported
Level reading date:	1992-11-10	Feet below surface:	Not Reported
Feet to sea level:	14.16	Note:	Not Reported
Level reading date:	1992-09-15	Feet below surface:	Not Reported
Feet to sea level:	14.31	Note:	Not Reported
Level reading date:	1992-08-05	Feet below surface:	Not Reported
Feet to sea level:	14.12	Note:	Not Reported
Level reading date:	1992-06-24	Feet below surface:	Not Reported
Feet to sea level:	14.50	Note:	Not Reported
Level reading date:	1992-04-23	Feet below surface:	Not Reported
Feet to sea level:	14.50	Note:	Not Reported
Level reading date:	1992-02-28	Feet below surface:	Not Reported
Feet to sea level:	14.14	Note:	Not Reported
Level reading date:	1992-01-30	Feet below surface:	Not Reported
Feet to sea level:	14.15	Note:	Not Reported
Level reading date:	1991-12-05	Feet below surface:	Not Reported
Feet to sea level:	14.18	Note:	Not Reported
Level reading date:	1991-10-17	Feet below surface:	Not Reported
Feet to sea level:	14.48	Note:	Not Reported
Level reading date:	1991-09-06	Feet below surface:	Not Reported
Feet to sea level:	15.19	Note:	Not Reported
Level reading date:	1991-07-08	Feet below surface:	Not Reported
Feet to sea level:	15.05	Note:	Not Reported
Level reading date:	1991-05-28	Feet below surface:	Not Reported
Feet to sea level:	15.13	Note:	Not Reported
Level reading date:	1991-04-12	Feet below surface:	Not Reported
Feet to sea level:	16.00	Note:	Not Reported
Level reading date:	1991-03-05	Feet below surface:	Not Reported
Feet to sea level:	14.86	Note:	Not Reported
Level reading date:	1991-01-28	Feet below surface:	Not Reported
Feet to sea level:	16.18	Note:	Not Reported

Level reading date:	1990-12-11	Feet below surface:	Not Reported
Feet to sea level:	15.53	Note:	Not Reported
Level reading date:	1990-10-29	Feet below surface:	Not Reported
Feet to sea level:	15.76	Note:	Not Reported
Level reading date:	1990-08-22	Feet below surface:	Not Reported
Feet to sea level:	16.56	Note:	Not Reported
Level reading date:	1990-06-27	Feet below surface:	Not Reported
Feet to sea level:	17.92	Note:	Not Reported
Level reading date:	1990-05-31	Feet below surface:	Not Reported
Feet to sea level:	18.70	Note:	Not Reported
Level reading date:	1990-04-20	Feet below surface:	Not Reported
Feet to sea level:	17.88	Note:	Not Reported
Level reading date:	1990-03-15	Feet below surface:	Not Reported
Feet to sea level:	16.26	Note:	Not Reported
Level reading date:	1990-01-31	Feet below surface:	Not Reported
Feet to sea level:	16.01	Note:	Not Reported
Level reading date:	1989-11-28	Feet below surface:	Not Reported
Feet to sea level:	16.75	Note:	Not Reported
Level reading date:	1989-10-31	Feet below surface:	Not Reported
Feet to sea level:	16.86	Note:	Not Reported
Level reading date:	1989-08-24	Feet below surface:	Not Reported
Feet to sea level:	17.35	Note:	Not Reported
Level reading date:	1989-07-25	Feet below surface:	Not Reported
Feet to sea level:	17.93	Note:	Not Reported

7
NE
1/2 - 1 Mile
Lower

HI WELLS **HI1200000003496**

Well #:	6-5230-001	Pump Rate (g/m):	230
Well Owner:	Ka Hale A Ke Ola Homeless Resource Center, Inc., KHAKO		
Land Owner:	County of Maui	Well Use:	Landscape/ Water Features
Well Name:	Ka Hale A Ke Ola		
Original Well Name:	Not Reported		
Driller:	Wailani Drilling Services Inc		
Well Construction Type:	Rotary	Casing Diameter (in):	10
Ground Elevation (ft):	249	Well Depth (ft):	300
Solid Casing Depth:	280	Perforated Casing Depth:	300
Major Well Use:	Landscape/ Water Features		
Initial Water Level (ft):	4.09	Water Level After Drilling:	0
Water Level After Install:	0	Chloride Content (mg/L):	30
Date Tested:	19-SEP-97	Test Pump Rate (g/m):	270
Test Drawdown Rate(ft):	.04	Test Chloride Content (MG/L):	30
Test Water Temp:	22.8	Temp Unit:	C
Max Chloride Level:	Not Reported	Minimum Chloride Level:	Not Reported
Year Installed:	1998	Draft Year:	Not Reported
Hole Bottom Elevation:	-51	Solid Casing Bottom Elevation:	-21
Perforated Casing Bottom Elevation:	-41	Pump Capacity (MM gal/day):	.331
Pump Intake Depth:	268	Latest Head:	Not Reported

Latest WCR1 Report:	19-SEP-97	Latest WCR2 Report:	27-FEB-02
Transmissivity:	894722	Min to Pump 5 Volumes:	32.56670558

8
SSW
1/2 - 1 Mile
Higher

HI WELLS **HI1200000003410**

Well #:	6-5030-004	Pump Rate (g/m):	0
Well Owner:	Waikapu Properties, LLC		
Land Owner:	Waikapu Properties, LLC		
Well Use:	Irrigation (non-domestic, non-agricujlture)		
Well Name:	Waikapu Country Town 6		
Original Well Name:	Waiale Partners 3		
Driller:	Wailani Drilling Services Inc		
Well Construction Type:	Rotary	Casing Diameter (in):	0
Ground Elevation (ft):	533.36	Well Depth (ft):	600
Solid Casing Depth:	5	Perforated Casing Depth:	5
Major Well Use:	Irrigation (non-domestic, non-agricujlture)		
Initial Water Level (ft):	6.49	Water Level After Drilling:	0
Water Level After Install:	0	Chloride Content (mg/L):	0
Date Tested:	Not Reported	Test Pump Rate (g/m):	0
Test Drawdown Rate(ft):	0	Test Chloride Content (MG/L):	0
Test Water Temp:	0	Temp Unit:	F
Max Chloride Level:	Not Reported	Minimum Chloride Level:	Not Reported
Year Installed:	0	Draft Year:	Not Reported
Hole Bottom Elevation:	-66.64	Solid Casing Bottom Elevation:	528.36
Perforated Casing Bottom Elevation:	528.36	Pump Capacity (MM gal/day):	0
Pump Intake Depth:	0	Latest Head:	Not Reported
Latest WCR1 Report:	25-OCT-19	Latest WCR2 Report:	Not Reported
Transmissivity:	0	Min to Pump 5 Volumes:	0

9
NNW
1/2 - 1 Mile
Higher

HI WELLS **HI1200000003500**

Well #:	6-5230-005	Pump Rate (g/m):	1400
Well Owner:	Maui Department of Water Supply, MDWS		
Land Owner:	RCFC Kehalani, LLC		
Well Use:	County	Well Name:	Wailuku 2
Original Well Name:	Not Reported		
Driller:	Derrick's Well Drilling & Pump Services, LLC		
Well Construction Type:	Not Reported	Casing Diameter (in):	18
Ground Elevation (ft):	614.77	Well Depth (ft):	720
Solid Casing Depth:	645	Perforated Casing Depth:	715
Major Well Use:	County	Initial Water Level (ft):	9.07
Water Level After Drilling:	10.47	Water Level After Install:	9.57
Chloride Content (mg/L):	68	Date Tested:	27-JUN-14
Test Pump Rate (g/m):	1435	Test Drawdown Rate(ft):	2.35
Test Chloride Content (MG/L):	61	Test Water Temp:	70
Temp Unit:	F	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Year Installed:	2016
Draft Year:	Not Reported	Hole Bottom Elevation:	-105.23
Solid Casing Bottom Elevation:	-30.23	Perforated Casing Bottom Elevation:	-100.23
Pump Capacity (MM gal/day):	2.016	Pump Intake Depth:	0
Latest Head:	Not Reported	Latest WCR1 Report:	04-DEC-14
Latest WCR2 Report:	02-JUN-16	Transmissivity:	229067

Min to Pump 5 Volumes:	37.27905239		

10
South
1/2 - 1 Mile
Lower

HI WELLS **HI1200000003408**

Well #:	6-5030-002	Pump Rate (g/m):	0
Well Owner:	Waikapu Properties, LLC		
Land Owner:	Waikapu Properties, LLC		
Well Use:	Agriculture		
Well Name:	Waikapu Country Town #4 - Ag		
Original Well Name:	Waiale Partners 1		
Driller:	Michael Robertson (Wailani Drilling Services Inc)		
Well Construction Type:	Rotary	Casing Diameter (in):	14
Ground Elevation (ft):	464.17	Well Depth (ft):	596
Solid Casing Depth:	50	Perforated Casing Depth:	50
Major Well Use:	Agriculture	Initial Water Level (ft):	12.85
Water Level After Drilling:	0	Water Level After Install:	0
Chloride Content (mg/L):	20	Date Tested:	01-AUG-14
Test Pump Rate (g/m):	1000	Test Drawdown Rate(ft):	25.5
Test Chloride Content (MG/L):	0	Test Water Temp:	0
Temp Unit:	Not Reported	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Year Installed:	0
Draft Year:	Not Reported	Hole Bottom Elevation:	-131.83
Solid Casing Bottom Elevation:	414.17	Perforated Casing Bottom Elevation:	414.17
Pump Capacity (MM gal/day):	0	Pump Intake Depth:	0
Latest Head:	Not Reported	Latest WCR1 Report:	09-SEP-14
Latest WCR2 Report:	Not Reported	Transmissivity:	0
Min to Pump 5 Volumes:	0		

11
ENE
1/2 - 1 Mile
Lower

HI WELLS **HI1200000003494**

Well #:	6-5229-006	Pump Rate (g/m):	500
Well Owner:	Maui Lani Partners		
Land Owner:	Maui Lani Partners		
Well Use:	County	Well Name:	Maui Lani 7
Original Well Name:	Not Reported	Driller:	Valley Well Drilling, LLC
Well Construction Type:	Rotary	Casing Diameter (in):	14
Ground Elevation (ft):	0	Well Depth (ft):	223
Solid Casing Depth:	181	Perforated Casing Depth:	211
Major Well Use:	County	Initial Water Level (ft):	4.5
Water Level After Drilling:	0	Water Level After Install:	0
Chloride Content (mg/L):	22	Date Tested:	12-MAY-06
Test Pump Rate (g/m):	550	Test Drawdown Rate(ft):	.9
Test Chloride Content (MG/L):	39	Test Water Temp:	72.5
Temp Unit:	F	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Year Installed:	0
Draft Year:	Not Reported	Hole Bottom Elevation:	0
Solid Casing Bottom Elevation:	0	Perforated Casing Bottom Elevation:	0
Pump Capacity (MM gal/day):	.72	Pump Intake Depth:	0
Latest Head:	Not Reported	Latest WCR1 Report:	26-JUL-06
Latest WCR2 Report:	Not Reported	Transmissivity:	0
Min to Pump 5 Volumes:	0		

AREA RADON INFORMATION

Federal EPA Radon Zone for MAUI County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 96793

Number of sites tested: 11

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.291 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Office of Planning
Telephone: 808-587-2895

HYDROGEOLOGIC INFORMATION

AQUIFLOW[R] Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Well Index Database
Source: Commission on Water Resource Management
Telephone: 808-587-0214
CWRM maintains a Well Index Database to track specific information pertaining to the construction and installation of production wells in Hawaii.

OTHER STATE DATABASE INFORMATION

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

APPENDIX C

TITLE REPORT

Wailuku Maui Phase I ESA
101 Kuikahi Drive
Wailuku, HI 96793

Inquiry Number: 7026358.7
June 23, 2022

EDR Environmental Lien and AUL Search

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Environmental Lien and AUL Search

The EDR Environmental Lien and AUL Search Report provides results from a search of available current land title records for environmental cleanup liens and other activity and use limitations, such as engineering controls and institutional controls.

A network of professional, trained researchers, following established procedures, uses client supplied address information to:

- search for parcel information and/or legal description;
- search for ownership information;
- research official land title documents recorded at jurisdictional agencies such as recorders' offices, registries of deeds, county clerks' offices, etc.;
- access a copy of the deed;
- search for environmental encumbering instrument(s) associated with the deed;
- provide a copy of any environmental encumbrance(s) based upon a review of key words in the instrument(s) (title, parties involved, and description); and
- provide a copy of the deed or cite documents reviewed.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EDR Environmental Lien and AUL Search

TARGET PROPERTY INFORMATION

ADDRESS

101 Kuikahi Drive
Wailuku Maui Phase I ESA
Wailuku, HI 96793

ENVIRONMENTAL LIEN

Environmental Lien:	Found ☐	Not Found ☒

OTHER ACTIVITY AND USE LIMITATIONS (AULs)

AULs:	Found ☐	Not Found ☒

RESEARCH SOURCE

Source 1:
Bureau of Conveyances
Maui, HI

PROPERTY INFORMATION

Deed 1:

Type of Deed:	Warranty Deed
Title is vested in:	KUIKAHI PROPERTIES LLC
Title received from:	WAIHE'E VALLEY REGENESIS LLC
Deed Dated	6/6/2020
Deed Recorded:	6/6/2020
Book:	NA
Page:	NA
Volume:	NA
Instrument:	74820382
Docket:	NA
Land Record Comments:	
Miscellaneous Comments:	
Legal Description:	See Exhibit
Legal Current Owner:	KUIKAHI PROPERTIES LLC
Parcel # / Property Identifier:	350020030000
Comments:	See Exhibit

Deed Exhibit 1

410

STATE OF HAWAII
BUREAU OF CONVEYANCES
RECORDED
June 26, 2020 8:01 AM
Doc No(s) A-74820382

/s/ LESLIE T. KOBATA
REGISTRAR

1 1/1 OFC
B-33529445

Conveyance Tax: $19,626.60

OMJ

LAND COURT SYSTEM	REGULAR SYSTEM

Return by: Mail (X) Pick Up ( ) To:

JENKINS & JENKINS L.L.P.
Wailuku Executive Center
24 North Church Street, Suite 407
Wailuku, Maui, HI 96793

TITLE GUARANTY OF HAWAII HAS FILED THIS DOCUMENT FOR RECORD AS AN ACCOMMODATION ONLY. THIS DOCUMENT HAS NOT BEEN REVIEWED OR IN ANY WAY EXAMINED AS TO ITS EFFECT ON REAL PROPERTY

RS

Total Pages: 15
TG 156524C

TMK: (2) 3-5-002-003

DOC.NO. A72640109

WARRANTY DEED

GRANTOR: **WAIHE'E VALLEY REGENESIS LLC**, a Hawaii limited liability company

GRANTEE: **KUIKAHI PROPERTIES, LLC**, a Hawai'i limited liability company

GRANTEE'S
ADDRESS: 191 Waihe'e Valley Road, Wailuku, Hawai'i 96793

PROPERTY: Lot 4-A of the "Wailuku Heights Extension Subdivision," situate, lying and being on the westerly side of Honoapiilani Highway (F.A.P.No. 13-G) and on the southerly side of Kuikahi Drive at Waikapu, District of Wailuku, Island and County of Maui, State of Hawaii

WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS:

That WAIHE'E VALLEY REGENESIS LLC, a Hawaii limited liability company, the address of which is 191 Waihe'e Valley Road, Wailuku, Hawai'i 96793, hereinafter called the "Grantor," in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration to Grantor paid by KUIKAHI PROPERTIES, LLC, a Hawai'i limited liability company, the address of which is 191 Waihe'e Valley Road, Wailuku, Hawai'i 96793, hereinafter called the "Grantee," the receipt whereof is hereby acknowledged, does hereby grant and convey unto the Grantee as Tenant in Severalty, all of Grantor's right, title and interest in and to the real property described in Exhibit "A" attached hereto and by this reference incorporated herein, subject, however, to all encumbrances noted on said Exhibit "A."

TO HAVE AND TO HOLD the same, together with any improvements thereon and the rights, easements, privileges, and appurtenances thereunto belonging or appertaining unto the Grantee, its heirs, executors, administrators, successors, and assigns of the Grantee, forever.

AND the Grantor covenants with the Grantee that the former is now seized in fee simple of the property granted; that the latter shall enjoy the same without any lawful disturbance; that the same is free from all encumbrances except the liens and encumbrances hereinbefore mentioned and set forth in Exhibit "A;" and that the GRANTOR will WARRANT and DEFEND the Grantee against the lawful claims and demands of all persons claiming by, through or under the Grantor, except as aforesaid.

The terms "Grantor" and "Grantee," as and when used herein, or any pronouns used in place thereof, shall mean and include the masculine or feminine, or neuter, the singular or plural number, individuals or entities, and their and each of their respective successors, heirs, personal representatives, and permitted assigns, according to the context hereof. If these presents shall be signed by two or more Grantees, all covenants for such parties shall for all purposes be joint and several.

IN WITNESS WHEREOF, the Grantor has executed these presents on this 21st day of May, 2020.

WAIHE'E VALLEY REGENESIS LLC
A Hawaii limited liability company

By: J. Varel, Trustee of the Angelia Varel Trust dated July 18, 2008
Its: Member

* *Notary Certification Acknowledgment* *

STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

This 15 page WARRANTY DEED (plus Exhibit) dated MAY 2 1 2020, was executed on this date: MAY 2 1 2020, in the Second Circuit of the State of Hawaii, who before me, Wendee N. Bodden, the undersigned officer, personally appeared, **J. VAREL**, Trustee aforesaid, did say that he is a member of WAIHE'E VALLEY REGENESIS LLC, a Hawaii limited liability company, and that the instrument was signed in behalf of the limited liability company by authority of its members and J. VAREL, Trustee aforesaid, acknowledged the instrument to be the free act and deed of the limited liability company.

WENDEE N. BODDEN
Commission No. 86-24
Notary Public, State of Hawaii
My Commission Expires: 2-2-2022

(seal)

EXHIBIT "A"

All of that certain parcel of land (being portion(s) of the land(s) described in and covered by Royal Patent Grant Number 2007, Apana 3 to J. Richardson, Royal Patent Number 5926, Land Commission Award Number 8875 to Kanaina, Royal Patent Number 2004, Land Commission Award Number 920, Apana 2 to John Richardson & Co., Royal Patent Grant Number 2070 to John Richardson, Royal Patent Number 7659, Land Commission Award Number 326 to William Humphreys, and Royal Patent Number 4529-B and 4549, Land Commission Award Number 71 to Michael J. Nowlein) situate, lying and being on the westerly side of Honoapiilani Highway (F.A.P. No. 13-G) and on the southerly side of Kuikahi Drive at Waikapu, District of Wailuku, Island and County of Maui, State of Hawaii, being LOT 4-A of the "WAILUKU HEIGHTS EXTENSION SUBDIVISION" and thus bounded and described as per survey dated April 3, 2014, to-wit:

Beginning at a point at the southeasterly corner of this lot, the record coordinates of said point of beginning referred to Government Survey Triangulation Station "LUKE" being 6,628.71 feet south and 3,801.51 feet west and running by azimuths measured clockwise from true South:

1.	100° 22'	256.51	feet along Lot 11 (Road Widening Lot) and 4 of Waikapu Ranch, Inc. Subdivision, being also along the remainder of Grant 2007:3 to J. Richardson to a point;
2.	99° 56'	235.85	feet along Lot 4 of Waikapu Ranch, Inc. Subdivision, being also along the remainder of Grant 2007:3 to J. Richardson to a point;
3.	98° 42'	417.29	feet along Lots 4 and 5 of Waikapu Ranch, Inc. Subdivision, being also along the remainders of Grant 2007:3 to J. Richardson and Royal Patent 5926, Land Commission Award 8875 to Kanaina to a point;
4.	97° 13'	345.11	feet along Lots 5 and 6 of Waikapu Ranch, Inc. Subdivision, being also along the remainders of

Royal Patent 5926, Land Commission Award 8875 to Kanaina and Royal Patent 2004, Land Commission 920:2 to John Richardson & Co. to a point;

5. 103° 02' 56.84 feet along Lot 6 of Waikapu Ranch, Inc. Subdivision, being also along the remainder of Royal Patent 2004, Land Commission Award 920:2 to John Richardson & Co. to a point;

6. 116° 14' 207.67 feet along same to a point;

7. 108° 03' 69.55 feet along same to a point;

8. 101° 12' 97.40 feet along same to a point;

9. 202° 20' 49.79 feet along Lot 1-A-1 of Waiko Mauka Ag Subdivision, being also along the remainder of Royal Patent 2004, Land Commission Award 920:2 to John Richardson & Co.;

10. 107° 50' 1,013.76 feet along Lot 1-A-1 of Waiko Mauka Ag Subdivision, being also along Royal Patent 2004, Land Commission Award 920:2 to John Richardson & Co.; Royal Patent 3144, Land Commission Award 3539:2 to Kapule, and Royal Patent 3153, Land Commission Award 8806:2 to Kalapuna to a point;

11. 77° 48' 93.06 feet along Grant 1842:1 to Kalapuna to a point;

12. Thence along Lot 172 of Land Court Application 52, being also along the middle of water course with all its sinuosities, the direct azimuth and distance being;
208° 45' 50" 331.90 feet to a point;

13. 96° 59' 30" 41.67 feet along Lot 172 of Land Court Application 52 to a point;

14. 199° 08' 0.63 feet along Lot 23 of Land Court Application 52 to a point;

15. 190° 45' 173.77 feet along Lot 271 of Wailuku Heights Extension - Unit I (File Plan <u>1707</u>) to a point;

16. 157° 40' 97.53 feet along same to a point;

17. 150° 15' 130.47 feet along Lots 271 and 270 of Wailuku Heights Extension Unit I - (File Plan <u>1707</u>) to a point;

18. 159° 00' 136.16 feet along Lots 270, 269 and 268 of Wailuku Heights Extension - Unit I (File Plan <u>1707</u>) to a point;

19. 176° 20' 88.86 feet along Lots 268 and 267 of Wailuku Heights Extension - Unit I (File Plan <u>1707</u>) to a point;

20. Thence along Lots 266, 265, 49 and 48 of Wailuku Heights Extension - Unit I (File Plan <u>1707</u>) on a curve the right, having a radius of 108.00 feet, the chord azimuth and distance being:
222° 40' 156.25 feet to a point;

21. 268° 00' 176.26 feet along Lots 48, 47 & 46 of Wailuku Heights Extension - Unit I (File Plan 1707) to a point;

22. 279° 00' 45.86 feet along Lots 46 and 45 of Wailuku Heights Extension - Unit I (File Plan 1707) to a point;

23. Thence along Lots 45, 44 and 43 of Wailuku Heights Extension - Unit I (File Plan 1707) on a curve to the left, having a radius of 350.00 feet, the chord azimuth and distance being:
267° 27' 30" 140.06 feet to a point;

24. 255° 55' 28.25 feet along Lot 43 of Wailuku Heights Extension Unit I - (File Plan 1707) to a point;

25. Thence along same on a curve to left, having a radius of 75.00 feet, the chord azimuth and distance being:
221° 02' 55" 85.75 feet to a point;

26. 186° 10' 50" 45.87 feet along Lots 43 and 274 (Kuikahi Drive) of Wailuku Heights Extension Unit I - (File Plan 1707) to a point;

27. 271° 35' 341.99 feet along the southerly side of Kuikahi Drive to a point;

28. Thence along same on a curve to the right, with the point of curvature azimuth from the radial point being:
181° 35' and the point of tangency azimuth

from the radial point being:
185° 27' 40", having a radius of 1,885.86 feet, the chord azimuth and distance being:
273° 31' 20" 127.61 feet to a point;

29. 22° 00' 291.89 feet along Lot 4-B of Wailuku Heights Extension Subdivision, being also along the remainders of Royal Patent 4529 and 4549, Land Commission Award 71 to Michael J. Nowlein and Royal Patent 7659, Land Commission Award 326 to Wm. Humphreys to a point;

30. 351° 30' 137.12 feet along Lot 4-B of Wailuku Heights Extension Subdivision, being also along the remainder of Royal Patent 7659, Land Commission Award 326 to Wm. Humphreys to a point;

31. 261° 30' 319.36 feet along same to a point;

32. 171° 30' 272.30 feet along same to a point;

33. 185° 04' 20" 65.29 feet along same to a point;

34. Thence along the southerly side of Kuikahi Drive on a curve to the left, with the point of curvature azimuth from the radial point being:
6° 24' 59" and the point of tangency azimuth from the radial point being:
314° 21', having a radius of 1,065.74 feet, the chord azimuth

and distance being:
250° 22' 59.5"
935.49 feet to a point;

35.	224° 21'	916.59	feet along same to a point;
36.	Thence along same on a curve to the right, having a radius of 1,885.86 feet, the chord azimuth and distance being: 243° 05' 30" 1,211.86 feet to a point;		
37.	261° 50'	67.22	feet along same to a point;
38.	268° 15' 20"	103.55	feet along same to a point;
39.	261° 50'	40.00	feet along same to a point;
40.	Thence along same on a curve to the right, with the point of curvature azimuth from the radial point being: 171° 50' and the point of tangency azimuth from the radial point being: 262° 39', having a radius of 38.00 feet, the chord azimuth and distance being: 307° 14' 30" 54.12 feet to a point;		
41.	347° 18' 40"	85.99	feet along same to a point;
42.	352° 39' 11"	693.10	feet along the westerly side of Honoapiilani Highway (F.A.P. No. 13-G) to a point;
43.	51° 17'	111.24	feet along the northerly side of Old Waikapu Road to a point;
44.	66° 10'	734.67	feet along same to a point;

45.	6° 59'	1,048.66	feet along the westerly side of Old Waikapu Road to a point;
46.	29° 26'	1,238.89	feet along same to the point of beginning and containing an area of 148.012 acres, more or less.

Being the same premises conveyed to Grantor herein by Deed dated November 6, 2019, recorded in the Bureau of Conveyances of the State of Hawaii November 21, 2019 as Document No. A72640109.

SUBJECT, HOWEVER, to the following:

1. Mineral and water rights of any nature.

2. Reservoir(s) referenced on tax map and any matters arising out of Chapter 179D of the Hawaii Revised Statutes.

3. DESIGNATION OF EASEMENT "A"

   PURPOSE : sewer
   SHOWN : on subdivision map prepared by Warren S. Unemori, Land Surveyor, with Warren S. Unemori Engineering, Inc., dated October 10, 1979, approved by the Planning Director, County of Maui, on March 19, 1980, as SUB No. 3.998

4. DESIGNATION OF EASEMENT "B"

   PURPOSE : landscaping
   SHOWN : on subdivision map prepared by Warren S. Unemori, Land Surveyor, with Warren S. Unemori Engineering, Inc., dated October 10, 1979, approved by the Planning Director, County of Maui, on March 19, 1980, as SUB No. 3.998

5. GRANT

TO : HAWAIIANA INVESTMENT CO., INC., a Hawaii corporation

DATED : September 23, 1980
RECORDED : Liber 15016 Page 323
GRANTING : a non-exclusive easement for landscaping purposes and across Easement B; and being more particularly described therein

Above easement amended by AMENDMENT OF EASEMENT dated February 25, 1983, recorded in Liber 16895 at Page 565; re: metes and bounds description).

-Note:- The metes and bounds description used in the above item is the amended metes and bounds description for EASEMENT "B" as shown in the aforementioned amendment recorded in Liber 16895 at Page 565.

6. GRANT

TO : THE COUNTY OF MAUI, a political subdivision of the State of Hawaii

DATED : January 24, 1983
RECORDED : Liber 17680 Page 534
GRANTING : an easement for sewerline, waterline and drainage purposes over and across Easement K; and more particularly described therein

7. GRANT

TO : MAUI ELECTRIC COMPANY, LIMITED and GTE HAWAIIAN TELEPHONE COMPANY INCORPORATED, now known as HAWAIIAN TELCOM, INC.

DATED : January 5, 1987
RECORDED : Liber 20331 Page 23
GRANTING : a nonexclusive right and easement for utility purposes as shown on maps attached thereto

8. The terms and provisions contained in the following:

INSTRUMENT : DECLARATION OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS

DATED : December 30, 2002

RECORDED : Document No. 2002-234375
PARTIES : WAILUKU AGRIBUSINESS CO., INC., a Hawaii corporation ("Wailuku"); LLOYD K. SODETANI ("Sodetani"); and ENDURANCE INVESTORS, LLC, a Washington limited liability company ("Endurance")

PARTIAL ASSIGNMENT AND ASSUMPTION OF RIGHTS AND OBLIGATIONS UNDER DECLARATION OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS dated effective as of August 6, 2004, recorded as Document No. 2004-161728, by and between WAILUKU AGRIBUSINESS CO., INC., a Hawaii corporation ("Wailuku"), and WAILUKU KUIKAHI LLC, a Hawaii limited liability company ("Kuikahi").

ASSIGNMENT OF DECLARATION OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS by and between Wailuku Agribusiness, Co., Inc. and Wailuku Water Company, LLC, dated October 1, 2005, recorded as Document No. 2005-229075.

CORRECTION TO ASSIGNMENT OF DECLARATIONS OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS dated August 27, 2007, recorded as Document No. 2007-157854.

ASSIGNMENT OF IN GROSS RESERVATIONS dated effective October 1, 2005, recorded as Document No. 2005-229077.

ASSIGNMENT AND ASSUMPTION OF RIGHTS AND OBLIGATIONS UNDER DECLARATIONS OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS dated as of February 28, 2018, recorded as Document No. A-66330469, by and between WAILUKU KUIKAHI LLC, a Hawaii limited liability company ("Assignor"), and WEST OAHU FINANCING LLC, a Hawaii limited liability company ("Assignee").

9. The terms and provisions contained in the following:

INSTRUMENT : DECLARATION OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS

DATED : as of August 6, 2004
RECORDED : Document No. 2004-161729

ASSIGNMENT OF DECLARATION OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS by and between Wailuku Agribusiness, Co., Inc. and Wailuku Water Company, LLC, dated October 1, 2005, recorded as Document No. 2005-229075.

CORRECTION TO ASSIGNMENT OF DECLARATIONS OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS dated August 27, 2007, recorded as Document No. 2007-157854.

ASSIGNMENT OF IN GROSS RESERVATIONS dated effective October 1, 2005, recorded as Document No. 2005-229077.

AMENDMENT TO DECLARATION OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS dated September 15, 2008, recorded as Document No. 2008-151661.

ASSIGNMENT AND ASSUMPTION OF RIGHTS AND OBLIGATIONS UNDER DECLARATIONS OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS dated as of February 28, 2018, recorded as Document No. A-66330469, by and between WAILUKU KUIKAHI LLC, a Hawaii limited liability company ("Assignor"), and WEST OAHU FINANCING LLC, a Hawaii limited liability company ("Assignee").

10. DESIGNATION OF EASEMENT "B"

PURPOSE : waterline
SHOWN : on subdivision map prepared by Reed M. Ariyoshi, Land Surveyor, with Warren S. Unemori Engineering, Inc., dated April 9, 2007, revised on November 15, 2012, approved by the Planning Director, County of Maui, on January 15, 2013, Subdivision File No. 3.2099

11. GRANT

TO : MAUI ELECTRIC COMPANY, LIMITED, a Hawaii corporation

DATED : July 27, 2010
RECORDED : Document No. 2010-158217
GRANTING : a nonexclusive easement for utility purposes over and across Easement "E-1" and "E-3", shown on map attached and being more particularly described therein

12. GRANT

TO : COUNTY OF MAUI

DATED : February 15, 2012
RECORDED : Document No. A-44350728
GRANTING : an easement for waterline purposes over Easement "A" shown on map attached and being more particularly described therein

13. Unrecorded GRAZING LICENSE AGREEMENT dated effective as of November 15, 2015, by and between WAILUKU KUIKAHI LLC, a Hawaii limited liability company ("Licensor"), and MANUEL J. RAMAYA ("Licensee"), subject to any matters arising from or affecting the same.

14. GRANT

TO : COUNTY OF MAUI

DATED : February 28, 2018
RECORDED : Document No. A-66380370
GRANTING : a nonexclusive easement for water meter and waterline purposes, being more particularly described therein and as shown on map attached thereto

15. Any lien (or claim of lien) for services, labor or material arising from an improvement or work related to the land described in Schedule C herein.

16. Any unrecorded leases and matters arising from or affecting the same.

17. Discrepancies, conflicts in boundary lines, shortage in area, encroachments or any other matters which a correct survey or archaeological study would disclose.

END OF EXHIBIT "A"

APPENDIX D

INTERVIEW DOCUMENTATION

737 Bishop Street, Suite 2340
Honolulu, Hawaii 96813
808.441.6600

File Review Request

To:	HDOH HEER – Mae Rose Domingo	**From:**	Kaitlyn Mitchell
Email:	MaeRose.Domingo@doh.hawaii.gov	**Pages:**	3
Phone:	808.586.4249	**Date:**	7/12/2022
Re:	File Review Request	**CC:**	

☑ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Hello Mae Rose,

I would like to request to review available for the following property.

- 101 Kuikahi Drive (Parcel 350020030000), Wailuku, HI
  - See attached parcel report

Please contact me if you have any questions.

Mahalo,

Kaitlyn Mitchell, Environmental Scientist
Tetra Tech, Inc.
415 Oak Street
Kansas City, MO 64106

Direct: 816.412.1742 | Fax: 816.410.1748
Kaitlyn.mitchell@tetratech.com

COUNTY OF MAUI Hawaii

Parcel Information

Parcel Number	350020030000
Location Address	101 KUIKAHI DR WAILUKU HI 96793
Neighborhood Code	3655-5
Legal Information	LOT 4-A WAILUKU HEIGHTS EXT SUBD 148.012 AC DES
Land Area	148.012 Acres
Parcel Note	

View Map

Owner Information

Owner Names
KUIKAHI PROPERTIES LLC Fee Owner

Mailing Address
KUIKAHI PROPERTIES LLC
191 WAIHEE VALLEY RD
WAILUKU HI 96793

Assessment Information

⊞ Show Historical Assessments

Year	Tax Class	Market Land Value	Agricultural Land Value	Assessed Land	Building Value	Total Assessed Value	Total Exemption Value	Total Net Taxable Value
2022	AGRICULTURAL	$3,173,400	$11,500	$11,500	$0	$11,500	$0	$11,500

How to calculate real property taxes

Agricultural Assessment Information

Acres	Description	Assessed Value
148.012	PASTUR	$11,545

This parcel has land in agricultural usage and therefore agricultural usage assessments have been made.

Historical Tax Information

Year	Tax	Payments and Credits	Penalty	Interest	Other	Amount Due
⊞ 2021	$19,430.33	($19,430.33)	$0.00	$0.00	$0.00	$0.00
⊞ 2020	$19,430.33	($19,430.33)	$0.00	$0.00	$0.00	$0.00
⊞ 2019	$19,430.33	($19,430.33)	$0.00	$0.00	$0.00	$0.00
⊞ 2018	$26,628.60	($26,628.60)	$0.00	$0.00	$0.00	$0.00
⊞ 2017	$21,015.77	($21,015.77)	$0.00	$0.00	$0.00	$0.00
⊞ 2016	$19,030.62	($19,030.62)	$0.00	$0.00	$0.00	$0.00

Click a year to see tax payment information for the year.

Sales Information

Sale Date	Price	Instrument Number	Instrument Type	Valid Sale or Other Reason	Document Type	Record Date	Land Court #	Land Court Cert
5/21/2020	$3,271,100	A74820382	Fee conveyance	Related individuals	Warranty deed	6/26/2020		
11/6/2019	$5,500,000	A72640109	Fee conveyance	Valid Sale	Warranty deed	11/21/2019		
2/28/2018	$0	A66380370	Easements		Grant of easement	3/5/2018		
2/28/2018	$0	A69640753	Recorded document		Name change	1/25/2019		
2/28/2018	$3,300,000	A66330470	Fee conveyance	Valid Sale	Warranty deed	2/28/2018		
2/15/2012	$0	A44350728	Easements	Related individuals	Grant of easement	2/22/2012		
7/27/2010	$0	10-158217	Easements		Grant of easement	10/19/2010		
8/6/2004	$4,450,000	04-161727	Fee conveyance	Valid Sale	Limited warranty/apartment deed	8/6/2004		
3/18/1988	$0	0000000000						

Maui's Automated Planning & Permitting System

Click Here to View All Planning and Permitting Info Regarding This TMK

Permit Information

Maui's Automated Planning & Permitting System link

Date	Permit Number	Reason	Permit Amount
2/17/2010	B20100188	Other see notes	$5,000
2/17/2010	B20100187	Other see notes	$40,000

Recent Sales In Area

Sale date range:

From:

07/12/2019

To:

07/12/2022

Sales by Neighborhood

Sales by Subdivision

1500

Feet

Sales by Distance

Generate Owner List by Radius

Distance:

100

Fee

Use Address From:

◉ Owner ○ Property

Select export file format:

Address labels (5160)

International mailing labels that exceed 5 lines are not supported on the Address labels (5160). For international addresses, please use the xlsx, csv or tab download formats.

☑ Show All Owners

☐ Show Parcel ID on Label

Skip Labels

0

Download

No data available for the following modules: Current Tax Bill Information, Appeal Information, Home Exemption Information, Improvement Information, Commercial Improvement Information, Accessory Information, Sketches.

737 Bishop Street, Suite 2340
Honolulu, Hawaii 96813
808.441.6600

TETRA TECH

File Review Request

To:	HDOH SHWB – Amy Liana	**From:**	Kaitlyn Mitchell
Email:	amy.liana@doh.hawaii.gov	**Pages:**	3
Phone:	808.586.4226	**Date:**	7/12/2022
Fax:	808.586.7509		
Re:	File Review	**CC:**	

☑ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Hello Amy,

I would like to request to review available files for the following property.

- 101 Kuikahi Drive (Parcel 350020030000), Wailuku, HI
  - See attached parcel report

Please contact me if you have any questions.

Mahalo,

Kaitlyn Mitchell, Environmental Scientist
Tetra Tech, Inc.
415 Oak Street
Kansas City, MO 64106

Direct: 816.412.1742 | Fax: 816.410.1748
Kaitlyn.mitchell@tetratech.com

COUNTY OF MAUI Hawaii

Parcel Information

Parcel Number	350020030000
Location Address	101 KUIKAHI DR WAILUKU HI 96793
Neighborhood Code	3655-5
Legal Information	LOT 4-A WAILUKU HEIGHTS EXT SUBD 148.012 AC DES
Land Area	148.012 Acres
Parcel Note	

View Map

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Owner Names
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Mailing Address
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WAILUKU HI 96793

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How to calculate real property taxes

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3/18/1988	$0	0000000000						

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Maui's Automated Planning & Permitting System link

Date	Permit Number	Reason	Permit Amount
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2/17/2010	B20100187	Other see notes	$40,000

Recent Sales In Area

Sale date range:

From: 07/12/2019

To: 07/12/2022

Sales by Neighborhood

Sales by Subdivision

1500

Feet

Sales by Distance

Generate Owner List by Radius

Distance:

100

Feet

Use Address From:

◉ Owner ○ Property

Select export file format:

Address labels (5160)

International mailing labels that exceed 5 lines are not supported on the Address labels (5160). For international addresses, please use the xlsx, csv or tab download formats.

☑ Show All Owners

☐ Show Parcel ID on Label

Skip Labels

0

Download

No data available for the following modules: Current Tax Bill Information, Appeal Information, Home Exemption Information, Improvement Information, Commercial Improvement Information, Accessory Information, Sketches.

Developed by Schneider GEOSPATIAL

Last Data Upload: 7/12/2022, 3:09:28 AM

Version 2.3.206

TETRA TECH

PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)

OWNER QUESTIONNAIRE

&

DOCUMENT REQUEST

➢ *Please complete this Questionnaire as fully as possible to the best of your knowledge.*

Not all properties will have all of the information requested. But it is important to provide what is known.

Wherever you answer "YES", please provide all relevant information either on the following pages or copies of relevant documents, reports, and/or correspondence.

This document will be included in the Phase I Environmental Site Assessment (ESA) report that Tetra Tech, Inc. (Tetra Tech) is preparing. By sending this document to Tetra Tech, you are acknowledging and agreeing to the inclusion of this document in Tetra Tech's Phase I ESA report.

If you have any questions, please call Tetra Tech, at 808.441.6600, and ask for Eric Jensen. You may also e-mail us at eric.jensen@tetratech.com

WHEN COMPLETED, PLEASE RETURN THIS DOCUMENT ALONG WITH ALL RELEVANT MATERIALS To:

Tetra Tech, Inc.
737 Bishop Street, Suite 2340
Honolulu, HI 96813
Phone: 808.441.6600
Fax: 808.836.1689
Attention: Eric Jensen
Email: eric.jensen@tetratech.com

OWNER QUESTIONNAIRE

Property Address:	Tax Map Keys: (2) 3-5-002-003, Wailuku, Island of Maui, Hawaii
Name of Person completing Questionnaire:	Lawrence Carnicelli
Position/Relationship of Person completing Questionnaire:	VP of Development
Signature of Person Completing Questionnaire:	
Date:	7/27/2022

1. What is the current use of the property?

( ) Residential - Single Family
( ) Residential - Multifamily
( ) Commercial
( ) Industrial/Manufacturing
( ) Unimproved/Raw Land
(x) Agriculture
( ) Other:

Details: Various animal herds.

2. What is the age of the structure (s)?

( ) Built in or before 1980; built in ________. (If multiple structures, add details below)
( ) Built after 1980; built in ________. (If multiple structures, add details below)
(x) N/A

Note: Please include description below, and construction date if multiple structures:

Description(s): ________

If Q2 is answered "built prior to 1980", and Q1 answered "Residential":

2a. Do you believe asbestos *may* be present in the structure?

( ) Yes
( ) No
( ) Unknown

Details:

2b. Is it *possible* that lead-based paint has been used on the structure?

( ) Yes
( ) No
( ) Unknown

Details:

3. What is the ownership history of the property?

Grantor	Grantee	Date of Transaction
Waihee Valley Regenesis	Kuikahi Properties LLC	June 26, 2020

4. What were the previous uses of the property?

Historically, this property has been in agricultural use. Most notably, sugar cane cultivation.

5. Are there any adjoining properties that may have had spills or other releases to the environment that have impacted the Subject Site?

( ) Yes
( ) No
(x) Unknown

Details:

6. Are there currently, or have there been previously, any industrial drums (typically 55 gallons) or other containers of chemicals located on the property?

( ) Yes
( ) No
(x) Unknown

Details:

7. Are there currently, or have there been previously, any underground storage tanks (USTs) on the property?

( ) Yes
( ) No
(x) Unknown

Details:

8. **Are there currently, or have there been previously, any above ground storage tanks (ASTs) on the property?**

( ) Yes
( ) No
(x) Unknown

Details:

9. **Are there currently, or have there been previously, any flooring, drains, or walls located within the Site that are, or have been, stained by substances other than water or which are emanating foul orders?**

( ) Yes
( ) No
(x) Unknown

Details:

10. **Is there currently, or has there been previously, any stained soil on the property?**

( ) Yes
( ) No
(x) Unknown

Details:

11. **Has an Environmental Assessment ever been performed on the property?**

(x) Yes (Please provide Title & Date of Report).
Kuikahi Village Project Final EA,
May 23, 2022

( ) No
( ) Unknown

➢ **If Q11 is answered "YES", is a copy of the report available?**

(x) Yes
( ) No
( ) Unknown

Details: Available on the Environmental Review Program website.

12. **Are you aware of any environmental release or impact to the Subject Site or surrounding properties?**

( ) Yes
( ) No, not aware
(x) Unknown

Details:

13. **Are you aware of any environmental liens or activity and land use limitations recorded against the property?**

(x) Yes
( ) No

Details: The property is subject to various State and County land use and zoning laws.

14. **Any Other Relevant Information regarding the Property ?**

Details:

TETRA TECH

PHASE I ENVIRONMENTAL SITE ASSESSMENT
ASTM 1527-13 USER QUESTIONNAIRE

Please email the Completed Questionnaire eric.jensen@tetratech.com., or fax to (808) 836.1689. Thank You.

Property Name: Wailuku Residential Project
Property Address: Tax Map Keys: (2) 3-5-002-003 (portion), Wailuku, Island of Maui, Hawaii

In order to qualify for one of the *Landowner Liability Protections* (LLPs)[1] offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the "*Brownfields Amendments*")[2], the *user* must conduct the following inquiries required by 40 CFR 312.25, 312.28, 312.29, 312.30, and 312.31. These inquiries must also be conducted by EPA Brownfield Assessment and Characterization grantees. The *user* should provide the following information to the *environmental professional*. Failure to conduct these inquiries could result in a determination that "*all appropriate* inquiries" is not complete.

(1.) Environmental cleanup liens that are filed or recorded against the *property* (40CFR312.25).
Did a search of recorded land title records (or judicial records where appropriate)[3] identify any environmental liens filed or recorded against the *property* under federal, tribal, state or local law?

Yes **X No**

If yes, please provide the details:

(2.) Activity and land use limitations that are in place on the *property* or that have been filed or recorded against the *property* (40 CFR 312.26(a)(1)(v) and vi)).
Did a search of *recorded land title records* (or judicial records where appropriate)[3] identify any AULs, such as *engineering controls*, land use restrictions or *institutional controls* that are in place at the *property* and/or have been filed or recorded against the *property* under federal, tribal, state or local law?

Yes **X** No

If yes, please provide the details:

(3.) Specialized knowledge or experience of the person seeking to qualify for the LLP (40CFR312.28).
Do you have any specialized knowledge or experience related to the *property* or nearby properties? For example, are you involved in the same line of business as the current of former *occupants* of the *property* or an *adjoining property* so that you would have specialized knowledge of the chemicals and processes used by this type of business?

Yes **X** No

737 Bishop Street, Suite 2340, Honolulu, HI 96813
Tel 808.441.6600 Fax 808.836.1689
www.tetratech.com

TETRA TECH

If yes, please provide the details:

(4.) Relationship of the purchase price to the fair market value of the property if it were not contaminated (40CFR312.29).
Does the purchase price being paid for this *property* reasonably reflect the fair market value of the *property*? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the *property*?

X Yes No

If yes, please provide the details:
The purchase price being paid for the property reasonably reflects the fair market value of the property.

(5.) Commonly known or *reasonably ascertainable* information about the *property* (40CFR312.30).
Are you aware of commonly known or reasonably ascertainable information about the *property* that would help the *environmental professional* to identify conditions indicative of releases or threatened releases? For example,

(a) Do you know the past uses of the *property*?	**X** Yes **No**
(b) Do you know of specific chemicals that are present or once were present at the *property*?	Yes **X** No
(c) Do you know of spills or other chemical releases that have taken place at the *property*?	Yes **X** No
(d) Do you know of any environmental cleanups that have taken place at the *property*?	Yes **X** No

If yes, please provide the details: The property was formerly used for growing sugar cane.

(6.) The degree of obviousness of the presence of likely presence of contamination at the *property*, and the ability to detect the contamination by appropriate investigation (40CFR312.31).
Based on your knowledge and experience related to the *property*, are there any *obvious* indicators that point to the presence or likely presence of contamination at the *property*?

Yes **X** No

If yes, please provide the details:

737 Bishop Street, Suite 2340, Honolulu, HI 96813
Tel 808.441.6600 Fax 808.836.1689
www.tetratech.com

In addition, certain information should be collected, if available, and provided to the *environmental professional* conducting the *Phase I Environmental Site Assessment*. This information is intended to assist the *environmental professional* but is not necessarily required to qualify for one of the *LLPs*. The information includes:

(a) the reason why the Phase I is being performed,
Evaluation of business risk to determine suitability of land for Residential Development.

(b) the type of *property* and type of *property* transaction, for example, sale, purchase, exchange, etc.
Type of Property: Agriculture; Type of Property Transaction: Purchase

(c) the complete and correct address for the *property* (a map or other documentation showing *property* location and boundaries is helpful),
Portion of TMK (2) 3-5-002-003

(d) the scope of services desired for the Phase I (including whether any parties to the *property* transaction may have a required standard scope of services or whether any considerations beyond the requirements of Practice E 1527 are to be considered),
Standard requirements of ASTM E 1527

(e) identification of all parties who will rely on the Phase I *report,*
Currently, DDC LLC and Dowling Company, Inc.

(f) identification of the site contact and how the contact can be reached,
Lawrence Carnicelli of Kuikahi Properties LLC (808) 283-6090

(g) any special terms and conditions which must be agreed upon by the *environmental professional*, and

(h) any other knowledge or experience with the *property* that may be pertinent to the *environmental professional* (for example, copies of any available prior *environmental site assessment reports*, documents, correspondence, etc., concerning the *property* and its environmental condition).
2004 Phase I Environmental Site Assessment report prepared by Vuich Environmental Consultants, Inc.

737 Bishop Street, Suite 2340, Honolulu, HI 96813
Tel 808.441.6600 Fax 808.836.1689
www.tetratech.com

[1] Landowner Liability Protections, or LLPs, is the term used to describe the three types of potential defenses to Superfund liability in EPA's *Interim Guidance Regarding Criteria Landowners Must Meet in Order to Quality for Bona Fide Prospective Purchaser, Contiguous Property Owner, or Innocent Landowner Limitations on CERCLA Liability ("Common Elements"* Guide) issued on March 6, 2003.

[2] P.L. 107-118.

[3] In certain jurisdictions, federal, tribal, state, or local statutes, or regulations specify that environmental liens and AULs be filed in judicial records rather than in land title records. In such cases judicial records must be searched for environmental liens and AULs.

PERSON COMPLETING QUESTIONNAIRE

Name: Darren K. Okimoto Title: Senior Project Manager

Company: DDC LLC / Dowling Company, Inc. Years familiar with property: Less than 1 year

Signed: Dan K. Okimoto Date: July 26, 2022

737 Bishop Street, Suite 2340, Honolulu, HI 96813
Tel 808.441.6600 Fax 808.836.1689
www.tetratech.com

APPENDIX E

SITE PHOTOGRAPHS

Photographic Documentation
Wailuku Single Family Residential Subdivision
Wailuku, Hawaii
Tetra Tech Project Number: 103P8341

Photo: 1

Description:

View of backup generator and *de minimis* staining on the northeastern portion of the Subject Property during the July 13, 2022 site reconnaissance. Generator and staining subsequently removed (Refer to Photo 2).

Orientation:

Facing southwest

Photo: 2

Description:

October 18, 2022 view of former backup generator location with *de minimis* staining removed.

Orientation:

Facing southwest

Photo: 3

Description:

View of water channel that runs north-south through the Subject Property.

Orientation:

Facing south

Photo: 4

Description:

View of the north-central portion of the Subject Property.

Orientation:

Facing north

Photo: 45

Description:

View of end of the water channel on the northern boundary of the Subject Property, with Kuikahi Road beyond.

Orientation:

Facing north

Photo: 6

Description:

View of landscaping business's shipping containers (red arrow) on the northeastern portion of the Subject Property.

Orientation:

Facing southwest

Photo: 7

Description:

View of gate to access the Subject Property from Kukahi

Photo: 8
Description:

View of various non-hazardous solid waste on northeastern portion of Subject Property.

Orientation:

Facing south

Photographic Documentation
Wailuku Single Family Residential Subdivision
Wailuku, Hawaii
Tetra Tech Project Number: 103P8341

Photo: 9

Description:

View of a tent with an eating area and a shipping container associated on the northwest portion of the subject property.

Orientation:

Facing south

Photo: 10

Description:

View of agricultural equipment and a backup generator on the north-central portion of the subject property.

Orientation:

Facing east

Photo: 11

Description:

View of an animal feeding/water station on the north central portion of the Subject Property.

Orientation:

Facing east

Photo: 12

Description:

View of storage containers on the adjacent property to the east of the Subject Property.

Orientation:

Facing south

Photographic Documentation
Wailuku Single Family Residential Subdivision
Wailuku, Hawaii
Tetra Tech Project Number: 103P8341

Photo: 13

Description:

View of the central portion of the Subject Property.

Orientation:

Facing northeast

Photo: 14

Description:

View of the central portion of the Subject Property.

Orientation:

Facing northwest

Photo: 15

Description:

View of the water channel running north-south through the Subject Property.

Orientation:

Facing south

Photo: 16

Description:

View of the northeastern portion of the Subject Property.

Orientation:

Facing west

Photo: 17

Description:

View of an abandoned vehicle in the extreme northeast corner of the Subject Property during the July 13, 2022 site reconnaissance. Vehicle subsequently removed (Refer to Photo 18).

Orientation:

Facing south

Photo: 18

Description:

October 18, 2022 view of former location of the abandoned vehicle in Photo 17.

Orientation:

Facing south

Photo: 19

Description:

View of wood building material on the northeastern portion of the Subject Property.

Orientation:

Facing west

Photo: 20

Description:

View of abandoned irrigation materials on the northeast portion of the Subject Property.

Orientation:

Facing north

Photographic Documentation
Wailuku Single Family Residential Subdivision
Wailuku, Hawaii
Tetra Tech Project Number: 103P8341

Photo: 21

Description:

View of abandoned irrigation materials on the northeast portion of the Subject Property.

Orientation:

Facing north

Photo: 22

Description:

View of an abandoned rusted aboveground storage tank (AST) on the northwest portion of the Subject Property.

Orientation:

Facing southeast

Photo: 23

Description:

October 18, 2022 view of former location of abandoned AST in Photo 22.

Orientation:

Facing southeast

Photo: 24

Description:

View of the landscaping base yard that is currently in use on the northwestern portion of the Subject Property.

Orientation:

Facing east

Photo: 25

Description:

View of non-hazardous solid waste and building material between storage containers at the landscaping base yard on the north-central portion of the Subject Property.

Orientation:

Facing southwest

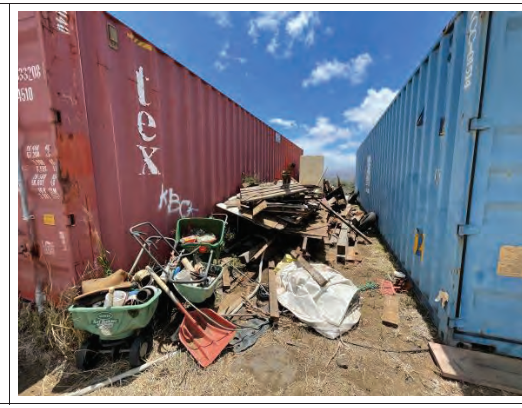

Photo: 26

Description:

View of an abandoned vehicle on the north-central portion of the Subject Property during the July 13, 2022 site reconnaissance. Vehicle subsequently removed (Refer to Photo 27).

Orientation:

Facing south

Photo: 27

Description:

October 18, 2022 view of the former location of abandoned vehicle in Photo 26.

Orientation:

Facing south

Photo: 28

Description:

View of an abandoned shed on the central portion of the Subject Property.

Orientation:

Facing east

Photo: 29

Description:

View of a goat feeding area on the central portion of the Subject Property.

Orientation:

Facing east

Photo: 30

Description:
View of the Subject Property from the western boundary.

Orientation:
Facing east

Photo: 31

Description:

View of an abandoned vehicle on the north-central portion of the Subject Property during the July 13, 2022, site reconnaissance. Vehicle subsequently removed (Refer to Photo 32).

Orientation:

Facing northwest

Photo: 32

Description:

October 18, 2022 view of the utility bed remnants of former abandoned vehicle in Photo 31. Vehicle chassis entirely removed.

Orientation:

Facing northwest

Photo: 33

Description:

View of the landscaping base yard on the north-central portion of the Subject Property.

Orientation:

Facing northeast

Photo: 34

Description:

View of an abandoned storm pipe on the northwestern portion of the Subject Property.

Orientation:

Facing southwest

Photo: 35

Description:

View of the Subject Property from the southeast boundary.

Orientation:

Facing northwest

Photo: 36

Description:

View of the water channel on the adjacent property to the east.

Orientation:

Facing north.

Photo: 37

Description:

View of rooster farm and potential landscaping business adjacent to the south of the Subject Property.

Orientation:

Facing north

Photo: 38

Description:

View of west adjacent property (utility-scale solar project).

Orientation:

Facing east

Photographic Documentation
Wailuku Single Family Residential Subdivision
Wailuku, Hawaii
Tetra Tech Project Number: 103P8341

Photo: 39 **Description:** View of an abandoned metal structure south of Subject Property. **Orientation:** Facing east	

APPENDIX F

HISTORICAL USE DOCUMENTATION

Wailuku Maui Phase I ESA
101 Kuikahi Drive
Wailuku, HI 96793

Inquiry Number: 7026358.8
June 21, 2022

EDR Building Permit Report

Target Property and Adjoining Properties

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR BUILDING PERMIT REPORT

About This Report

The EDR Building Permit Report provides a practical and efficient method to search building department records for indications of environmental conditions. Generated via a search of municipal building permit records gathered from more than 1,600 cities nationwide, this report will assist you in meeting the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

Building permit data can be used to identify current and/or former operations and structures/features of environmental concern. The data can provide information on a target property and adjoining properties such as the presence of underground storage tanks, pump islands, sumps, drywells, etc., as well as information regarding water, sewer, natural gas, electrical connection dates, and current/former septic tanks.

ASTM and EPA Requirements

ASTM E 1527-13 lists building department records as a "standard historical source," as detailed in § 8.3.4.7: "Building Department Records - The term building department records means those records of the local government in which the property is located indicating permission of the local government to construct, alter, or demolish improvements on the property." ASTM also states that "Uses in the area surrounding the property shall be identified in the report, but this task is required only to the extent that this information is revealed in the course of researching the property itself."

EPA's Standards and Practices for All Appropriate Inquires (AAI) states: "§312.24: Reviews of historical sources of information. (a) Historical documents and records must be reviewed for the purposes of achieving the objectives and performance factors of §312.20(e) and (f). Historical documents and records may include, but are not limited to, aerial photographs, fire insurance maps, building department records, chain of title documents, and land use records."

Methodology

EDR has developed the EDR Building Permit Report through our partnership with BuildFax, the nation's largest repository of building department records. BuildFax collects, updates, and manages building department records from local municipal governments. The database now includes 30 million permits, on more than 10 million properties across 1,600 cities in the United States.

The EDR Building Permit Report comprises local municipal building permit records, gathered directly from local jurisdictions, including both target property and adjoining properties. Years of coverage vary by municipality. Data reported includes (where available): date of permit, permit type, permit number, status, valuation, contractor company, contractor name, and description.

Incoming permit data is checked at seven stages in a regimented quality control process, from initial data source interview, to data preparation, through final auditing. To ensure the building department is accurate, each of the seven quality control stages contains, on average, 15 additional quality checks, resulting in a process of approximately 105 quality control "touch points."

For more information about the EDR Building Permit Report, please contact your EDR Account Executive at (800) 352-0050.

EDR® Environmental Data Resources Inc

BUILD FAX PROPERTY HISTORY

EXECUTIVE SUMMARY: SEARCH DOCUMENTATION

A search of building department records was conducted by Environmental Data Resources, Inc (EDR) on behalf of Tetra Tech EMI on Jun 21, 2022.

TARGET PROPERTY

101 Kuikahi Drive
Wailuku, HI 96793

SEARCH METHODS

EDR searches available lists for both the Target Property and Surrounding Properties.

RESEARCH SUMMARY

Building permits identified: **YES**

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Maui County

Year	Source	TP	Adjoining
2022	Maui County, Planning Department		X
2021	Maui County, Planning Department		X
2020	Maui County, Planning Department		X
2019	Maui County, Planning Department		X
2018	Maui County, Planning Department		X
2017	Maui County, Planning Department		X
2016	Maui County, Planning Department		X
2015	Maui County, Planning Department		X
2014	Maui County, Planning Department		X
2013	Maui County, Planning Department		X
	Maui County, Planning Department	X	
2012	Maui County, Planning Department		X
2011	Maui County, Planning Department		X
2010	Maui County, Planning Department		X
	Maui County, Planning Department	X	
2009	Maui County, Planning Department		X
2008	Maui County, Planning Department		X
2007	Maui County, Planning Department		X
	Maui County, Planning Department	X	
2006	Maui County, Planning Department		X
	Maui County, Planning Department	X	
2005	Maui County, Planning Department		X
	Maui County, Planning Department	X	
2004	Maui County, Planning Department	X	
2003	Maui County, Planning Department		
2002	Maui County, Planning Department		
2001	Maui County, Planning Department		
2000	Maui County, Planning Department		

EXECUTIVE SUMMARY: SEARCH DOCUMENTATION

Year	Source	TP	Adjoining
1999	Maui County, Planning Department		
1998	Maui County, Planning Department		
1997	Maui County, Planning Department		
1996	Maui County, Planning Department		
1995	Maui County, Planning Department		X
1994	Maui County, Planning Department		
1993	Maui County, Planning Department		
1992	Maui County, Planning Department		
1991	Maui County, Planning Department		
1990	Maui County, Planning Department		
1989	Maui County, Planning Department		
1988	Maui County, Planning Department		X
1987	Maui County, Planning Department		
1986	Maui County, Planning Department		X
1985	Maui County, Planning Department		
1984	Maui County, Planning Department		
1983	Maui County, Planning Department	X	
1982	Maui County, Planning Department		
1981	Maui County, Planning Department		
1980	Maui County, Planning Department	X	
1979	Maui County, Planning Department		
1978	Maui County, Planning Department		
1977	Maui County, Planning Department		
1976	Maui County, Planning Department		
1975	Maui County, Planning Department		
1974	Maui County, Planning Department		
1973	Maui County, Planning Department		
1972	Maui County, Planning Department		
1971	Maui County, Planning Department		

Name: JurisdictionName
Years: Years
Source: Source
Phone: Phone

BUILDING DEPARTMENT RECORDS SEARCHED

Name: Maui County
Years: 1971-2022
Source: Maui County, Planning Department, WAILUKU, HI
Phone: (808) 270-7735

TARGET PROPERTY FINDINGS

TARGET PROPERTY DETAIL

101 Kuikahi Drive
Wailuku, HI 96793

101 KUIKAHI DR

Date:	**9/9/2013**
Permit Type:	**SUB6**
Description:	**WAILUKU HEIGHTS EXTENSION SUBDIVISION, WALTER K. SCHENK SUBDIVISION**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	SUB6 T20130001, SUB6 20130001
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

Date:	**3/3/2010**
Permit Type:	**E**
Description:	**Scope: Underground service, 3 phase 4 wire, 480/277V to 200A, 1 feeder not over 100A, 1-15KVA transformer, 2 motor over 15hp to 50hp, 2 lighting branch circuits, 11 receptacle branch circuits, 1 manual transfer switch. |NOTE: PLANS SUBMITTED AND REVIEWED ELECTRICAL ENGINEER, FLOYD A NAKAMURA, PE 0003405**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20100440
Status:	DONE
Valuation:	$40,000.00
Contractor Company:	
Contractor Name:	PACIFIC ELECTRO-MECHANICAL INC

TARGET PROPERTY FINDINGS

Date:	**2/17/2010**
Permit Type:	**B**
Description:	**Scope: Transformer Pad/Foundation for Pump Station |Special inspection requires for Items 1 & for by Alan L. Unemori.**
Permit Description:	**BUILDING PERMIT**
Work Class:	329 STRUCTURES OTHER THAN BLDGS
Proposed Use:	U-1 PVT GARAGE,CARPORT,SHED,AG BLDG
Permit Number:	B 20100188
Status:	EXPR
Valuation:	$5,000.00
Contractor Company:	
Contractor Name:	

Date:	**2/17/2010**
Permit Type:	**B**
Description:	**Scope: Mechanical Building for Water Tank |Special inspection requires for Items 1 & for by Alan L. Unemori.**
Permit Description:	**BUILDING PERMIT**
Work Class:	328 OTHER NON-RESIDENTIAL BLDGS
Proposed Use:	U-1 PVT GARAGE,CARPORT,SHED,AG BLDG
Permit Number:	B 20100187
Status:	DONE
Valuation:	$40,000.00
Contractor Company:	
Contractor Name:	

Date:	**8/3/2007**
Permit Type:	**G**
Description:	**Fill: 7,000 CY Excavate: 0 CY Grubb: 1/2 AC**
Permit Description:	**GRADING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	G 20070077
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

TARGET PROPERTY FINDINGS

Date:	**3/28/2007**
Permit Type:	**D**
Description:	**16 X 20 ASPHALT**
Permit Description:	**DRIVEWAY PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	D 20070055
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	TOWNE REALTY OF HAWAII

Date:	**9/25/2006**
Permit Type:	**D**
Description:	**12' x 10' concrete apron**
Permit Description:	**DRIVEWAY PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	D 20060177
Status:	CLSD
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

Date:	**3/21/2006**
Permit Type:	**G**
Description:	**Fill: 21,000 CY (GRADED AREA 1 ACRE) Excavate: Grubb:**
Permit Description:	**GRADING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	G 20060026
Status:	OPEN
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

TARGET PROPERTY FINDINGS

Date: **1/4/2006**
Permit Type: **B**
Description: **Scope: 1.5 MG WATERTANK |SPECIAL INSPECTION REQUIREMENT by engineer James Walfish for #1, #2, #4, #12, & #15.**

Permit Description: **BUILDING PERMIT**
Work Class: 329 STRUCTURES OTHER THAN BLDGS
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: B 20060012
Status: EXPR
Valuation: $1,828,598.00
Contractor Company:
Contractor Name: DYK INCORPORATED

Date: **10/7/2005**
Permit Type: **G**
Description: **Fill: 1,200 CY Excavate: 7,660 CY Grubb: 2.0 ACRES**

Permit Description: **GRADING PERMIT**
Work Class:
Proposed Use:
Permit Number: G 20050117
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **7/29/2005**
Permit Type: **D**
Description: **10' X 15' Asphalt concrete driveway**

Permit Description: **DRIVEWAY PERMIT**
Work Class:
Proposed Use:
Permit Number: D 20050141
Status: CLSD
Valuation: $0.00
Contractor Company:
Contractor Name:

TARGET PROPERTY FINDINGS

Date: **4/13/2005**
Permit Type: **WTP**
Description: **KEHALANI MAUKA OFFSITE WATERLINE (OFFSITE WATERLINE FROM WAIKO ROAD TO KUIKAHI DRIVE) |KUIKAHI DRIVE - INSTALLATION OF 12" WATERLINE**

Permit Description: **WORK TO PERFORM PERMIT**
Work Class:
Proposed Use:
Permit Number: WTP 20050030
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **3/14/2005**
Permit Type: **G**
Description: **Fill: Excavate: Grubb: 9 acres**

Permit Description: **GRADING PERMIT**
Work Class:
Proposed Use:
Permit Number: G 20050030
Status: OPEN
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **11/5/2004**
Permit Type: **B**
Description: **Scope: 3 CONSTRUCTION TRAILERS CONNECTED BY A COVERED DECK**

Permit Description: **BUILDING PERMIT**
Work Class: 706 TEMPORARY STRUCTURES (TENTS,BOOTHS,ETC)
Proposed Use: B OFFICE,PROF,SVCTYPE, & EATING ESTB
Permit Number: B 20043166
Status: DONE
Valuation: $2,000.00
Contractor Company:
Contractor Name: TOWNE REALTY OF HAWAII

TARGET PROPERTY FINDINGS

Date:	**11/5/2004**
Permit Type:	**B**
Description:	**Scope: SALES TRAILER**
Permit Description:	**BUILDING PERMIT**
Work Class:	706 TEMPORARY STRUCTURES (TENTS,BOOTHS,ETC)
Proposed Use:	B OFFICE,PROF,SVCTYPE, & EATING ESTB
Permit Number:	B 20043167
Status:	DONE
Valuation:	$2,000.00
Contractor Company:	
Contractor Name:	TOWNE REALTY OF HAWAII

Date:	**9/22/2004**
Permit Type:	**GPC**
Description:	**Fill: 6735 CY Excavate: 834 CY Grubb:**
Permit Description:	**GRADING PLAN CHECK**
Work Class:	
Proposed Use:	
Permit Number:	GPC 20040039
Status:	OPEN
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

Date:	**8/31/1983**
Permit Type:	**SUBD**
Description:	**(EASEMENTS ONLY)**
Permit Description:	**SUBDIVISION**
Work Class:	
Proposed Use:	
Permit Number:	SUBD 301208
Status:	A
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

TARGET PROPERTY FINDINGS

Date:	**12/1/1980**
Permit Type:	**SUBD**
Description:	
Permit Description:	**SUBDIVISION**
Work Class:	
Proposed Use:	
Permit Number:	SUBD 300997
Status:	A
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

Date:	**3/19/1980**
Permit Type:	**SUBD**
Description:	
Permit Description:	**SUBDIVISION**
Work Class:	
Proposed Use:	
Permit Number:	SUBD 300998
Status:	A
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

MAKA HOU PL

11 MAKA HOU PL

Date:	**4/21/2016**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-4BDRM/2 1/2BATH-2007**

Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20161391
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MICHAEL SANTIAGO

14 MAKA HOU PL

Date:	**9/6/2011**
Permit Type:	**E**
Description:	**Scope: NEW GRID-TIED PHOTOVOLTAIC SOLAR POWER SYSTEM WHICH CONSIST OF 1 ARRAY FOR A TOTAL OF 14-250 WATT SOLAR WORLD MODULES WITH 14-215 WATT ENPHASE MICRO-INVERTER. PANELS & ENPHASE INVERTERS MOUNTED ON ROOFTOP OF EXISTING 3 BEDROOM/2 BATH DWELLING BUILT IN 2007. |Fee Summary: 1 feeder not over 100A, (1)Renewable Energy System**

Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20111854
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	THE SONSHINE SOLAR CORP

22 MAKA HOU PL

Date:	**7/10/2015**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-3BDRM/2 1/2BATH-2007**

Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20152335
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	ERIK J NELSON

Date:	**6/2/2008**
Permit Type:	**B**
Description:	**Scope: ROCK RETAINING WALL AT REAR OF DWELLING |NO SPECIAL INSPECTION REQUIRED**

Permit Description:	**BUILDING PERMIT**
Work Class:	704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:	U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number:	B 20081009
Status:	EXPR
Valuation:	$11,000.00
Contractor Company:	
Contractor Name:	

ADJOINING PROPERTY FINDINGS

Date: **6/2/2008**
Permit Type: **G-RS**
Description: **Fill: 44 cy Excavate: 0 Grubb: 0**

Permit Description: **MINOR GRADING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: G-RS 20080083
Status: DONE
Valuation: $11,000.00
Contractor Company:
Contractor Name:

25 MAKA HOU PL

Date: **10/26/2011**
Permit Type: **E**
Description: **Scope: NEW GRID-TIED PHOTOVOLTAIC SOLAR POWER SYSTEM WHICH CONSIST OF 1 ARRAY FOR A TOTAL OF 22-235 WATT KYOCERA SOLAR MODULES WITH 22-190 WATT ENPHASE MICRO-INVERTER. PANELS & ENPHASE INVERTERS MOUNTED ON ROOFTOP OF EXISTING 3 BEDROOM/2 1/2 BATH DWELLING BUILT IN 2007. |Fee Summary: 1 feeder not over 100A, (1)Renewable Energy System**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20112504
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: KAPP ELECTRIC, INC.

ADJOINING PROPERTY FINDINGS

30 MAKA HOU PL

Date: **6/19/2018**
Permit Type: **E**
Description: **REVAMP 100A METER-2BDRM/2BATH-1986**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20181066
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: BRIAN P DANIELLS

Date: **3/17/2015**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-3BDRM/2 1/2BATH-2007**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20150813
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: KAPP ELECTRIC, INC.

Date:	**5/23/1995**
Permit Type:	**B**
Description:	**ADDITION: ENCLOS EXISTING CARPORT TO LIVING RM/OFFICE/BATHROOM/EXISTING LVG RM TO BECOME DINING RM/NEW CARPORT. WALLS: EXISTING. PARTITIONS: 2X4 STUDS. FDN: EXISTING. FLR: EXSTG. ROOF: TORCH ON ROOL.**
Permit Description:	**BUILDING PERMIT**
Work Class:	434 RESIDENTIAL - (ADD, ALTER, CONVERT)
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	B 951125
Status:	EXPR
Valuation:	$17,640.00
Contractor Company:	
Contractor Name:	

Date:	**3/16/1995**
Permit Type:	**HE**
Description:	**Scope: 11 receptacles, 10 switches, 10 fixtures, 1 fire alarm |Address: 30 Makaio Place, Haiku |Electrical Contractor: DAVID T. HUDSON |*** THIS PERMIT EXPIRED DUE TO INACTIVITY - NEED TO APPLY FOR MISC INSPECTION WITH A FEE OF $68.00 TO FINALIZE THIS PERMIT. *** lms 2/9/2018**
Permit Description:	**PRE-KIVA ELECTRICAL PERMITS**
Work Class:	
Proposed Use:	
Permit Number:	HE 951251
Status:	EXPR
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

Date:	**6/22/1988**
Permit Type:	**HE**
Description:	**Scope: OHANA DWELLING |Fee Summary: Underground service 1ph, 3w, 120/240V to 100A, 1 feeder not over 100A, 21 receptacles, 11 switches, 12 fixtures, 1 disposal, 1 range hood, 1 water heater, 1 range, 1 dryer, 1 smoke detector device |Electrical Contractor: PYRAMID ELECTRIC CORP**
Permit Description:	**PRE-KIVA ELECTRICAL PERMITS**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	
Permit Number:	HE 881596
Status:	DONE
Valuation:	$28,000.00
Contractor Company:	
Contractor Name:	

Date:	**5/16/1988**
Permit Type:	**B**
Description:	**OHANA DWELLING**
Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	
Permit Number:	B 881324
Status:	ISSD
Valuation:	$28,000.00
Contractor Company:	
Contractor Name:	

Date: **7/7/1986**
Permit Type: **HE**
Description: **Scope: DWELLING |Fee Summary: Underground service 1ph, 3w, 120/240V to 100A, 1 feeder not over 100A, 44 receptacles, 43 switches, 48 fixtures, 2 exhaust fans, 1 disposal, 1 range hood, 1 dishwasher, 1 water heater, 1 range, 1 dryer, 2 smoke detector devices |Electrical Contractor: MAUKA ELECTRIC COMPANY INC**

Permit Description: **PRE-KIVA ELECTRICAL PERMITS**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use:
Permit Number: HE 861662
Status: DONE
Valuation: $35,420.00
Contractor Company:
Contractor Name:

Date: **6/12/1986**
Permit Type: **B**
Description: **DWELLING/CARPORT**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use:
Permit Number: B 861166
Status: ISSD
Valuation: $35,420.00
Contractor Company:
Contractor Name:

33 MAKA HOU PL

Date: **10/23/2015**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-4BDRM/2 1/2BATH-2007**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20153376
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: JAMES K F ARUDA

38 MAKA HOU PL

Date: **3/28/2022**
Permit Type: **E**
Description: **MAIN DWELLING ADDITION/ALTERATION**
EL DWLGADD: ELEC WORK-DWELLING ADDITION/ALTERATION
Project: Williams, Jack & Joanne

Scope: Main Dwelling/Garage/Open Lanai - Main Dwelling Addition/Alteration - Enlarge the Existing Master Bedroom and New Open Lanai.
Dimensions: 8 x 16
128 sf- add'l living

Fee Summary: (12) LIGHTING FIXTURES, (10) SWITCHES, (12) RECEPTACLE OUTLETS, (1) CEILING FAN

Permit Description: **Electrical Permit - Residential**
Work Class:
Proposed Use:
Permit Number: E 20220702
Status: Issued
Valuation: $60,000.00
Contractor Company:
Contractor Name: JOSEPH S PACI

ADJOINING PROPERTY FINDINGS

Date: **12/9/2021**
Permit Type: **B**
Description: **Now occupied as: Dwelling/Garage To be occupied as: Main Dwelling/Garage/Open Lanai |Scope: Main Dwelling Addition/Alteration - Enlarge the Existing Master Bedroom and New Open Lanai. |Dimensions: 8 x 16 128 sf- add'l living |SI NR**

Permit Description: **BUILDING PERMIT**
Work Class: 434 RESIDENTIAL - (ADD, ALTER, CONVERT)
Proposed Use: R-3(06) OCCUPANTS ARE PRIMARILY PERMANENT
Permit Number: B 20211459
Status: OPEN
Valuation: $60,000.00
Contractor Company:
Contractor Name: MAKANA CONSTRUCTION LLC

Date: **8/2/2018**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM WITH BATTERY BACK UP**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20181511
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: TONY M SILVA

Date: **6/3/2010**
Permit Type: **E**
Description: **Scope: 1 solar water heater**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20100997
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: THE SONSHINE SOLAR CORP

ADJOINING PROPERTY FINDINGS

Date: **5/28/2010**
Permit Type: **P**
Description: **Plumbing Scope of Work: |1 solar water heater on existing SF dwelling**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20100607
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: THE SONSHINE SOLAR CORP

39 MAKA HOU PL

Date: **6/6/2014**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-4BDRM/2 1/2BATH-2007**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20142014
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: RONALD L BOWES

Date: **2/24/2011**
Permit Type: **E**
Description: **Scope: 5 - 230 watt panels**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20110336
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: MAUI PACIFIC SOLAR INC

ADJOINING PROPERTY FINDINGS

Date:	**4/8/2010**
Permit Type:	**E**
Description:	**Scope:**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20100609
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	STAN'S ELECTRICAL SERVICE LLC

Date:	**12/9/2008**
Permit Type:	**B**
Description:	**Scope: Retaining Rock Terrace Wall to rear of dwelling (69.21 x 6 to rear 24 x 6' to sides for upper tier) (60 x 6 to rear 20 x 6 to sides for lower tier) |No special inspection required.**
Permit Description:	**BUILDING PERMIT**
Work Class:	704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:	U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number:	B 20081901
Status:	DONE
Valuation:	$15,000.00
Contractor Company:	
Contractor Name:	

Date:	**12/9/2008**
Permit Type:	**G-RS**
Description:	**Fill: 0 cy Excavate: 90 cy Grubb: 1700 sf**
Permit Description:	**MINOR GRADING PERMIT**
Work Class:	704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:	
Permit Number:	G-RS 20080149
Status:	DONE
Valuation:	$15,000.00
Contractor Company:	
Contractor Name:	

ADJOINING PROPERTY FINDINGS

Date:	**10/23/2008**
Permit Type:	**E**
Description:	**Scope: 1 solar water heater**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20082774
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	STAN'S ELECTRICAL SERVICE LLC

Date:	**9/30/2008**
Permit Type:	**P**
Description:	**Plumbing Scope of Work: |1 Solar Heater**
Permit Description:	**PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20081915
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MAUI PACIFIC SOLAR INC

6 MAKA HOU PL

Date:	**6/10/2014**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-3BDRM/2 1/2BATH-2007**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20142093
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	R Z ELECTRIC INC

MALIHINI PL

12 MALIHINI PL

Date:	**6/14/2016**
Permit Type:	**E**
Description:	**MAIN DWELLING ALTERATION/ADDITION**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20161902
Status:	DONE
Valuation:	$29,800.00
Contractor Company:	
Contractor Name:	JOSEPH J MITCHELL

Date:	**6/3/2016**
Permit Type:	**B**
Description:	**MAIN DWELLING ALTERATION/ADDITION**
Permit Description:	**BUILDING PERMIT**
Work Class:	434 RESIDENTIAL - (ADD, ALTER, CONVERT)
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	B 20160620
Status:	OPEN
Valuation:	$29,800.00
Contractor Company:	
Contractor Name:	

Date:	**3/21/2016**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-3BDRM/2 1/2BATH-2007**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20160920
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JAMES K F ARUDA

Date:	**12/16/2010**
Permit Type:	**E**
Description:	**Scope: 1 feeder not over 100A, 3-175 watt panels**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20102486
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	HALEAKALA SOLAR INC

Date:	**11/4/2009**
Permit Type:	**E**
Description:	**Scope: 1 feeder not over 100A, 20 - 175 panels.**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20092138
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	HALEAKALA SOLAR INC

Date: **1/8/2008**
Permit Type: **E**
Description: **Scope: 1 feeder not over 100, 1 spa disconnect, 1 pool heater, 1 spa motor 1 - 3 HP | *** Per Susan @ Building Planning Review, Building Permit not needed*****

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20080060
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: FREDERICK R STEINECK

Date: **12/14/2007**
Permit Type: **E**
Description: **Scope: 1 solar water heater**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20074231
Status: DONE
Valuation: $232,500.00
Contractor Company:
Contractor Name: ROBERT E HILBUN

Date: **12/3/2007**
Permit Type: **P**
Description: **Plumbing Scope of work: |1 Heaters-Solar**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20072867
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: HALEAKALA SOLAR INC

15 MALIHINI PL

Date: **12/8/2015**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-3BDRM/2BATH-2007**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20154833
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: MARK R DEVEREAUX

19 MALIHINI PL

Date: **9/2/2010**
Permit Type: **P**
Description: **Plumbing Scope of Work: |1 bar sink 1 for repair or alteration of drainage or vent piping**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20100913
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: RICKY A. SANCHES

20 MALIHINI PL

Date: **8/28/2014**
Permit Type: **E**
Description: **MAIN DWELLING ADDITION**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20143096
Status: DONE
Valuation: $35,000.00
Contractor Company:
Contractor Name: GARY M KATO

Date: **8/19/2014**
Permit Type: **B**
Description: **MAIN DWELLING ADDITION**

Permit Description: **BUILDING PERMIT**
Work Class: 434 RESIDENTIAL - (ADD, ALTER, CONVERT)
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20141073
Status: DONE
Valuation: $35,000.00
Contractor Company:
Contractor Name: CABINGAS CONSTRUCTION LLC

Date: **11/8/2011**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-3BDRM/2 1/2BATH-2007, Scope: NEW GRID-TIED PHOTOVOLTAIC SOLAR POWER SYSTEM WHICH CONSIST OF 2 ARRAYS FOR A TOTAL OF 18-235 WATT SOLAR WORLD MODULES WITH 18-215 WATT ENPHASE MICRO-INVERTER. ARRAY #1: 9-235 WATT SOLAR WORLD MODULES WITH 9-215 WATT ENPHASE MICRO-INVERTER. ARRAY #2: 9-235 WATT SOLAR WORLD MODULES WITH 9-215 WATT ENPHASE MICRO-INVERTER. PANELS & ENPHASE INVERTERS MOUNTED ON ROOFTOP OF EXISTING 3 BEDROOM/2 1/2 BATH DWELLING BUILT IN 2007. |Fee Summary: 1 feeder over 100A to 200A, (2) Renewable Energy System**

Permit Description: **ELECTRICAL PERMIT, ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20112705
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: GARY M KATO

28 MALIHINI PL

Date: **6/5/2014**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-3BDRM/2BATH-2007**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20141991
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: WARREN T HIGA

31 MALIHINI PL

Date: **10/12/2015**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-4BDRM/2BATH-2007**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20153985
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: R Z ELECTRIC INC

36 MALIHINI PL

Date: **10/27/2009**
Permit Type: **P**
Description: **Plumbing Scope of Work: |1 solar water heater on existing SF dwelling**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20091297
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: HALEAKALA SOLAR INC

Date: **10/26/2009**
Permit Type: **E**
Description: **Scope: 1 solar water heater**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20092071
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: HALEAKALA SOLAR INC

4 MALIHINI PL

Date: **7/16/2015**
Permit Type: **E**
Description: **REVAMP 200A METER-3BDRM/2 1/2BATH-2007**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20152412
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: DONALD J VARNI

Date: **7/10/2015**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-3BDRM/2 1/2BATH-2007**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20152302
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: HENRY MELVIN LUM HO JR

ADJOINING PROPERTY FINDINGS

45 MALIHINI PL

Date:	**7/17/2008**
Permit Type:	**E**
Description:	**Scope: 1 solar water heater**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20081965
Status:	OPEN
Valuation:	$0.00
Contractor Company:	
Contractor Name:	STAN'S ELECTRICAL SERVICE LLC

Date:	**4/23/2008**
Permit Type:	**P**
Description:	**Plumbing Scope of Work: |1 Heaters-Solar on existing SF Dwelling**
Permit Description:	**PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20080827
Status:	EXPR
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MAUI PACIFIC SOLAR INC

ADJOINING PROPERTY FINDINGS

50 MALIHINI PL

Date:	**1/2/2008**
Permit Type:	**P**
Description:	**DSGN 2004/0016 |Now occupied as: N/A |To be occupied as: Dwelling/Garage/Covered Lanais |Options: B: Hip Roof Style & Horizontal Siding |Living Area: 1308 sf Garage: 441 sf Lanai/Entry: 251 sf |Dimensions: |Walls: Partitions: Foundation: Floors: Roof: Ceiling: Basement: |Plumbing Scope of Work: |1 Solar Water Heater**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20080015
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	THE SONSHINE SOLAR CORP

Date:	**12/26/2007**
Permit Type:	**E**
Description:	**Scope: 1 solar water heater**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20074314
Status:	DONE
Valuation:	$120,336.00
Contractor Company:	
Contractor Name:	JACK R MORRIS

NOHOANA PL

14 NOHOANA PL

Date:	**4/4/2014**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-4BDRM/3 1/2BATH-2006**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20141139
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JOHN L HOOPII

Date:	**4/23/2008**
Permit Type:	**P**
Description:	**Now occupied as: vacant |Scope: 2 Story Dwl/Garage/Cov Entry, Deck, Lanai |Dimensions: Walls: 2 x 4, 2 x 6 Partitions: 2 x 4 Foundation: concrete Floors: concrete/plywood Roof: comp shingles Ceiling: gyp board Basement: |Plumbing Scope of Work: |1 Heaters-Solar on existing SF Dwelling**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	P 20080829
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MAUI PACIFIC SOLAR INC

Date:	**8/28/2007**
Permit Type:	**GAS**
Description:	**Now occupied as: vacant |Scope: 2 Story Dwl/Garage/Cov Entry, Deck, Lanai ** Gas Scope of Work: |1 Gas Stoves 1 For each gas piping system using pipes one inch in diameter or less |**Haleakala Plumbing paid to finalize permit 3/1/2012.**
Permit Description:	**GAS PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	GAS 20070312
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JERRY K WILLIAMS

Date:	**7/30/2007**
Permit Type:	**E**
Description:	**Scope: Underground service 1ph, 3w, 120/240V to 200A, 2 feeders not over 100A, 4924 sq. ft.....ONE METER ONLY ALLOWED FOR THIS DWELLING == 8/27/07 - Additional fees to this permit for 1 solar water heater. LMS**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	E 20072629
Status:	DONE
Valuation:	$479,000.00
Contractor Company:	
Contractor Name:	JAMES E SPENCE

Date: **6/6/2007**
Permit Type: **P**
Description: **Now occupied as: vacant |Scope: 2 Story Dwl/Garage/Cov Entry, Deck, Lanai |Dimensions: Walls: 2 x 4, 2 x 6 Partitions: 2 x 4 Foundation: concrete Floors: concrete/plywood Roof: comp shingles Ceiling: gyp board Basement: |Plumbing Scope of Work: |4 water closets 6 basins 3 bath tubs 1 showers 1 laundry tray 1 washing machine 1 sink 1 dishwasher 1 garbage disposal 1 heaters-electric 1 Building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20071440
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: JERRY K WILLIAMS

Date: **7/31/2006**
Permit Type: **B**
Description: **Now occupied as: vacant |Scope: 2 Story Dwl/Garage/Cov Entry, Deck, Lanai |Dimensions: Walls: 2 x 4, 2 x 6 Partitions: 2 x 4 Foundation: concrete Floors: concrete/plywood Roof: comp shingles Ceiling: gyp board Basement:**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20061695
Status: DONE
Valuation: $479,000.00
Contractor Company:
Contractor Name: GREGORY O HATCHER

15 NOHOANA PL

Date: **10/2/2008**
Permit Type: **P**
Description: **Now occupied as: VACANT |To be occupied as: MAIN DWELLING/GARAGE |Dimensions: 45X75 3,584 SF - LIVING 523 SF- GARAGE/STORAGE 790 SF- COV. DECKS/LANAI/ENTRY Walls: 2X4 Partitions: 2X4 Foundation: CONC Floors: TILE Roof: ARCH 80 Ceiling: GYP BD Basement: NA | NO SPECIAL INSPECTION REQUIRED | Plumbing Scope of Work: |1 Solar Heater**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20081942
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: MAUI PACIFIC SOLAR INC

Date: **6/30/2008**
Permit Type: **E**
Description: **Scope: Underground service, 1 phase, 3 wire, 120/240V to 200A, 2 feeders not over 100, 4879 SF, 2 motors over 1 to 3, 1 solar water heater. Single Family Residence. ONE METER ONLY ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20081789
Status: OPEN
Valuation: $395,120.00
Contractor Company:
Contractor Name: ROMEO Y GUZMAN

ADJOINING PROPERTY FINDINGS

Date: **5/13/2008**
Permit Type: **P**
Description: **Now occupied as: VACANT |To be occupied as: MAIN DWELLING/GARAGE |Dimensions: 45X75 3,584 SF - LIVING 523 SF- GARAGE/STORAGE 790 SF- COV. DECKS/LANAI/ENTRY Walls: 2X4 Partitions: 2X4 Foundation: CONC Floors: TILE Roof: ARCH 80 Ceiling: GYP BD Basement: NA | NO SPECIAL INSPECTION REQUIRED |Plumbing Scope of Work: |4 water closets 5 basins 2 bath tubs 1 shower 1 laundry tray 1 washing machine 1 sink 1 dishwasher 1 garbage disposal 2 bar sink 1 heater-electric 1 refrigerator 1 spa (jacuzzi) 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20080959
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: BADUA CONTRACTING LLC

Date: **1/11/2008**
Permit Type: **B**
Description: **Scope: CMU RETAINING WALLS |80' X 4'-6' | NO SPECIAL INSPECTION REQUIRED**

Permit Description: **BUILDING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: B 20080095
Status: EXPR
Valuation: $7,800.00
Contractor Company:
Contractor Name:

Date: **1/11/2008**
Permit Type: **B**
Description: **Now occupied as: VACANT |To be occupied as: MAIN DWELLING/GARAGE |Dimensions: 45X75 3,584 SF - LIVING 523 SF- GARAGE/STORAGE 790 SF- COV. DECKS/LANAI/ENTRY Walls: 2X4 Partitions: 2X4 Foundation: CONC Floors: TILE Roof: ARCH 80 Ceiling: GYP BD Basement: NA | NO SPECIAL INSPECTION REQUIRED**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20080094
Status: DONE
Valuation: $395,120.00
Contractor Company:
Contractor Name:

Date: **1/11/2008**
Permit Type: **D**
Description:

Permit Description: **DRIVEWAY PERMIT**
Work Class:
Proposed Use:
Permit Number: D 20080008
Status: CLSD
Valuation: $0.00
Contractor Company:
Contractor Name:

20 NOHOANA PL

Date:	**12/15/2011**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-3BDRM/3 1/2BATH-2008, Scope: NEW GRID-TIED PHOTOVOLTAIC SOLAR POWER SYSTEM WHICH CONSIST OF 2 ARRAYS FOR A TOTAL OF 20-245 WATT SUNTECH SOLAR MODULES WITH 20-215 WATT ENPHASE MICRO-INVERTER. ARRAY #1: 10-245 WATT SUNTECH SOLAR MODULES WITH 10-215 WATT ENPHASE MICRO-INVERTER. ARRAY #2: 10-245 WATT SUNTECH SOLAR MODULES WITH 10-215 WATT ENPHASE MICRO-INVERTER. PANELS & ENPHASE INVERTERS MOUNTED ON ROOFTOP OF EXISTING 3 BEDROOM/3 1/2 BATH DWELLING BUILT IN 2008. |Fee Summary: 1 feeder not over 100A, (2)Renewable Energy System |***NOTE TO INSPECTOR - PLEASE READ STATEMENT IN "COMMENTS"*** **
Permit Description:	**ELECTRICAL PERMIT, ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20113143
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	ROMEO Y GUZMAN

Date:	**9/30/2008**
Permit Type:	**P**
Description:	**Now occupied as: VACANT |TO BE OCCUPIED AS: MAIN DWELLING/GARAGE |Scope 86x53 731 sf - garage 2,584 sf - living 760 sf- cov. entry/lanai |Dimensions: Walls: CMU Partitions: 2X4 Foundation: CONC Floors: CONC Roof: MONIER TILE Ceiling: GTP BD Basement: NA |NO SPECIAL INSPECTION REQUIRED |Plumbing Scope of Work: |1 Solar Heater**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	P 20081933
Status:	EXPR
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MAUI PACIFIC SOLAR INC

Date:	**5/7/2008**
Permit Type:	**E**
Description:	**Scope: Underground service 1ph, 3w, 120/240V to 200A, 2 feeders not over 100A, 4077 sq. ft., 1 solar water heater.....ONE METER ONLY ALLOWED FOR THIS DWELLING |== 07/24/08 - additional fees - 1 motor over 1 to 3 - paid by R G Electric - cnf**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	E 20081318
Status:	DONE
Valuation:	$302,840.00
Contractor Company:	
Contractor Name:	ROMEO Y GUZMAN

Date:	**1/18/2008**
Permit Type:	**P**
Description:	**Now occupied as: VACANT |TO BE OCCUPIED AS: MAIN DWELLING/GARAGE |Dimensions: Walls: CMU Partitions: 2X4 Foundation: CONC Floors: CONC Roof: MONIER TILE Ceiling: GTP BD Basement: NA |NO SPECIAL INSPECTION REQUIRED |Plumbing Scope of Work: |4 water closet 5 basins 2 bath tubs 1 shower 1 laundry tray 1 washing machine 1 dryer 1 sink 1 dishwasher 1 heater-electric 1 spa (jacuzzi) 1 building sewer to lateral**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	P 20080125
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	BADUA CONTRACTING LLC

Date:	**12/21/2007**
Permit Type:	**B**
Description:	**Now occupied as: VACANT |TO BE OCCUPIED AS: MAIN DWELLING/GARAGE |Scope 86x53 731 sf - garage 2,584 sf - living 760 sf- cov. entry/lanai |Dimensions: Walls: CMU Partitions: 2X4 Foundation: CONC Floors: CONC Roof: MONIER TILE Ceiling: GTP BD Basement: NA |NO SPECIAL INSPECTION REQUIRED**
Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	B 20072653
Status:	DONE
Valuation:	$302,840.00
Contractor Company:	
Contractor Name:	

Date:	**12/21/2007**
Permit Type:	**G-RS**
Description:	**Fill: 400cy Excavate: 50cy Grubb: 1900sf**
Permit Description:	**MINOR GRADING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	U-1 PVT GARAGE,CARPORT,SHED,AG BLDG R-3 DWLS/LODGING
Permit Number:	G-RS 20070216
Status:	DONE
Valuation:	$302,840.00
Contractor Company:	
Contractor Name:	

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Date:	**2/23/2006**
Permit Type:	**E**
Description:	**....NEW SOLAR WATER HEATER ON RESIDENCE**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20060537
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DORVIN D LEIS CO INC

Date:	**1/19/2006**
Permit Type:	**P**
Description:	**Scope: Dwl/garage/cov lanai |1. includes reverse model 2. Hip and gable roof options - Option A 3. Family Room instead of Bedroom #5 4. Den instead of Bedroom #1 |2-story: 5bedrm/3bathrm |1st Liv Area 1,056 sf x $90 = $ 95,040 2nd Liv Area 1,490 sf x $90 = $ 134,100 Garage 548 sf x $30 = $ 16,440 Lanais 607 sf x $25 = $ 15,175 TOTALS 3,701 sf $ 261,000 |Plumbing Scope of Work: |5 lawn sprinklers per piping valve 1" 1 for vacuum breaker or backfill protective device installed to piping or equipment served**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20060059
Status:	EXPR
Valuation:	$261,000.00
Contractor Company:	
Contractor Name:	KIHEI GARDENS AND LANDSCAPING COMPANY LLP

Date: **1/18/2006**
Permit Type: **E**
Description: **Scope: 1 irrigation system**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: E 20060152
Status: DONE
Valuation: $261,000.00
Contractor Company:
Contractor Name: KIHEI GARDENS AND LANDSCAPING COMPANY LLP

Date: **7/14/2005**
Permit Type: **E**
Description: **Scope: Underground service to 200A, 1PH, 3W, 1 feeder over 100 to 200A, 3701 sq. ft., 2 motors not over 1HP.........ONLY ONE METER ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: E 20052229
Status: OPEN
Valuation: $0.00
Contractor Company:
Contractor Name: DU-WATTS ELECTRIC, INC.

Date: **7/12/2005**
Permit Type: **P**
Description: **Scope: Dwl/garage/cov lanai |1. includes reverse model 2. Hip and gable roof options - Option A 3. Family Room instead of Bedroom #5 4. Den instead of Bedroom #1 |2-story: 5bedrm/3bathrm |1st Liv Area 1,056 sf x $90 = $ 95,040 2nd Liv Area 1,490 sf x $90 = $ 134,100 Garage 548 sf x $30 = $ 16,440 Lanais 607 sf x $25 = $ 15,175 TOTALS 3,701 sf $ 261,000 |Plumbing Scope of Work: |3 Water Closets 5 Basins 2 Bath Tubs 1 Shower 1 Laundry Tray 1 Washing Machine 1 Dryer 1 Sink 1 Dishwasher 1 Garbage Disposal 1 Solar Heater 1 Refrigerator 1 Spa 1 Building Sewer to Lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: P 20051450
Status: DONE
Valuation: $261,000.00
Contractor Company:
Contractor Name: DORVIN D LEIS CO INC

Date: **7/6/2005**
Permit Type: **B**
Description: **Scope: Dwl/garage/cov lanai |1. includes reverse model 2. Hip and gable roof options - Option A 3. Family Room instead of Bedroom #5 4. Den instead of Bedroom #1 |2-story: 5bedrm/3bathrm |1st Liv Area 1,056 sf x $90 = $ 95,040 2nd Liv Area 1,490 sf x $90 = $ 134,100 Garage 548 sf x $30 = $ 16,440 Lanais 607 sf x $25 = $ 15,175 TOTALS 3,701 sf $ 261,000**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20051333
Status: DONE
Valuation: $261,000.00
Contractor Company:
Contractor Name: TOWNE REALTY OF HAWAII

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Date:	**2/23/2006**
Permit Type:	**E**
Description:	**....NEW SOLAR WATER HEATER ON RESIDENCE**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20060538
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DORVIN D LEIS CO INC

Date:	**1/19/2006**
Permit Type:	**P**
Description:	**Scope: 1 Story Dwelling/Garage/Covered Lanai |Option B |Living Area 1,547 sf Lanai 171 sf Garage 465 sf |Three Bedrooms/Two Bathrooms |Options: 1. Left or Right 2. Hip or Gable Roof Options**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20060060
Status:	EXPR
Valuation:	$157,000.00
Contractor Company:	
Contractor Name:	KIHEI GARDENS AND LANDSCAPING COMPANY LLP

Date:	**1/18/2006**
Permit Type:	**E**
Description:	**Scope: 1 irrigation system**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20060153
Status:	DONE
Valuation:	$157,000.00
Contractor Company:	
Contractor Name:	KIHEI GARDENS AND LANDSCAPING COMPANY LLP

Date:	**7/14/2005**
Permit Type:	**E**
Description:	**Scope: Underground service to 200A, 1PH, 3W, 1 feeder over 100 to 200A, 2183 sq. ft., 2 motors not over 1HP......ONLY ONE METER ALLOWED FOR THIS DWELLING.**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20052230
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DU-WATTS ELECTRIC, INC.

ADJOINING PROPERTY FINDINGS

Date:	**7/12/2005**
Permit Type:	**P**
Description:	**Scope: 1 Story Dwelling/Garage/Covered Lanai |Option B |Living Area 1,547 sf Lanai 171 sf Garage 465 sf |Three Bedrooms/Two Bathrooms |Options: 1. Left or Right 2. Hip or Gable Roof Options |Plumbing Scope of Work: |2 Water Closets 3 Basins 1 Bath Tub 1 Shower 1 Laundry Tray 1 Washing Machine 1 Dryer 1 Sink 1 Dishwasher 1 Garbage Disposal 1 Solar Heater 1 Refrigerator 1 Spa 1 Building Sewer to Lateral**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20051451
Status:	DONE
Valuation:	$157,000.00
Contractor Company:	
Contractor Name:	DORVIN D LEIS CO INC

Date:	**7/6/2005**
Permit Type:	**B**
Description:	**Scope: 1 Story Dwelling/Garage/Covered Lanai |Option B |Living Area 1,547 sf Lanai 171 sf Garage 465 sf |Three Bedrooms/Two Bathrooms |Options: 1. Left or Right 2. Hip or Gable Roof Options**
Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	B 20051331
Status:	DONE
Valuation:	$157,000.00
Contractor Company:	
Contractor Name:	TOWNE REALTY OF HAWAII

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Date:	**4/16/2015**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-3BDRM/2 1/2BATH-2007**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20151186
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JAMES K F ARUDA

Date:	**12/9/2011**
Permit Type:	**P**
Description:	**SOLAR WATER HEATER ON EXST SF DWELLING, DSGN 2006/0028 Scope: Dwelling/Garage/Covered Lanai *** Plumbing Scope of Work: (BP2007/0570) |1 Solar Water Heater**
Permit Description:	**PLUMBING PERMIT, PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20111277
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JOHN S NEALEY

ADJOINING PROPERTY FINDINGS

Date: **11/16/2011**
Permit Type: **E**
Description: **SOLAR HEATER-3 BD/2 FULL/1/2 BATH-2007, Scope: Solar Water Heater installation on an existing 3 bedroom-2 full baths-one 1/2 bath dwelling built in 2007 |Fee summary: 1 solar water heater**

Permit Description: **ELECTRICAL PERMIT, ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20112829
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: DONALD J VARNI

Date: **9/23/2008**
Permit Type: **B**
Description: **Scope: Detached BBQ structure |Second Structure on Property |Dimensions: 10' x 3' 4" |Walls: 6 X 6 Posts Partitions: N/A Foundation: Concrete Floors: Concrete Roof: Built-Up Ceiling: Open Basement: N/A**

Permit Description: **BUILDING PERMIT**
Work Class: 329 STRUCTURES OTHER THAN BLDGS
Proposed Use: U-1 PVT GARAGE,CARPORT,SHED,AG BLDG
Permit Number: B 20081600
Status: DONE
Valuation: $1,000.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **8/12/2008**
Permit Type: **E**
Description: **Scope: 2 fixtures, 2 motors over 1 to 3, 1 pool heater**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 329 STRUCTURES OTHER THAN BLDGS
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: E 20082210
Status: OPEN
Valuation: $60,000.00
Contractor Company:
Contractor Name: TIMOTHY R K PISONI

Date: **8/12/2008**
Permit Type: **P**
Description: **Scope: 20 X 40 CONCRETE POOL |NO SPECIAL INSPECTION REQUIRED |Plumbing Scope of Work: |1 Swimming pool 1 Heat pump 1 for vacuum breaker or backflow protective device installed to piping or equipment served**

Permit Description: **PLUMBING PERMIT**
Work Class: 329 STRUCTURES OTHER THAN BLDGS
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: P 20081610
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: QUALITY CRAFT BUILDERS INC

Date: **8/1/2008**
Permit Type: **B**
Description: **Scope: 20 X 40 CONCRETE POOL |NO SPECIAL INSPECTION REQUIRED**

Permit Description: **BUILDING PERMIT**
Work Class: 329 STRUCTURES OTHER THAN BLDGS
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: B 20081384
Status: DONE
Valuation: $60,000.00
Contractor Company:
Contractor Name: QUALITY CRAFT BUILDERS INC

ADJOINING PROPERTY FINDINGS

Date: **6/19/2007**
Permit Type: **E**
Description: **...NEW BURGLAR ALARM SYSTEM**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20072124
Status: DONE
Valuation: $236,705.00
Contractor Company:
Contractor Name: GRESHAM ELECTRIC INC

Date: **5/14/2007**
Permit Type: **E**
Description: **Scope: Underground service 120/240V to 200A, 1PH, 3W, 1 feeder over 100A to 200A, 2556 sq. ft., 2 motors not over 1HP.......ONLY ONE METER ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20071704
Status: OPEN
Valuation: $236,705.00
Contractor Company:
Contractor Name: DU-WATTS ELECTRIC, INC.

ADJOINING PROPERTY FINDINGS

Date: **4/11/2007**
Permit Type: **P**
Description: **DSGN 2006/0028 |Now occupied as: N/A |Scope: Dwelling/Garage/Covered Lanai |Options: Right Bedroom #3 or Den Exterior Finish: 3. Territorial - Horizontal Lap Siding w/ Stucco Wainscoting Accents |Dimensions: 45' X 60' 2" |Walls: 2 X 4 Studs Partitions: 2 X 4 Studs; Gyp Board Foundation: Concrete Floors: Concrete Roof: Asphalt Shingles Ceiling: Gyp Board Basement: N/A |Plumbing Scope of Work: |3 water closets 4 basins 2 bathtubs 1 shower 1 laundry tray 1 washing machine 1 dryer 1 sink 1 dishwasher 1 garbage disposal 1 solar heater 1 refrigerator 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20070880
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: DORVIN D LEIS CO INC

Date: **3/21/2007**
Permit Type: **B**
Description: **DSGN 2006/0028 |Now occupied as: N/A |Scope: Dwelling/Garage/Covered Lanai |Options: Right Bedroom #3 or Den Exterior Finish: 3. Territorial - Horizontal Lap Siding w/ Stucco Wainscoting Accents |Dimensions: 45' X 60' 2" |Walls: 2 X 4 Studs Partitions: 2 X 4 Studs; Gyp Board Foundation: Concrete Floors: Concrete Roof: Asphalt Shingles Ceiling: Gyp Board Basement: N/A**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20070570
Status: DONE
Valuation: $236,705.00
Contractor Company:
Contractor Name: TOWNE REALTY OF HAWAII

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Date:	**2/23/2006**
Permit Type:	**E**
Description:	**....NEW SOLAR WATER HEATER ON RESIDENCE**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20060539
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DORVIN D LEIS CO INC

Date:	**1/19/2006**
Permit Type:	**P**
Description:	**Scope: Dwl/garage/cov lanai |1. includes reverse model 2. Hip and gable roof options - Option A 3. Bedroom #5 instead of Family Room |Two-story: 5bedrm/3bath |1st Liv Area 897 sf x $90 = $ 80,730 2nd Liv Area 1,574 sf x $90 = $ 141,660 Garage 614 sf x $30 = $ 18,420 Lanais 347 sf x $25 = $ 8,675 TOTALS 3,432 sf $ 249,000 | Plumbing Scope of Work: |6 lawn sprinklers per pipnig valve 1" 1 for vacuum breaker or backflow protective device installed to piping or equipment served**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20060061
Status:	EXPR
Valuation:	$249,000.00
Contractor Company:	
Contractor Name:	KIHEI GARDENS AND LANDSCAPING COMPANY LLP

Date:	**1/18/2006**
Permit Type:	**E**
Description:	**Scope: 1 irrigation system**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20060154
Status:	DONE
Valuation:	$249,000.00
Contractor Company:	
Contractor Name:	KIHEI GARDENS AND LANDSCAPING COMPANY LLP

Date:	**7/14/2005**
Permit Type:	**E**
Description:	**Scope: Underground service to 200A, 1PH, 3W, 1 feeder over 100 to 200A, 3432 sq. ft., 2 motors not over 1HP......ONLY ONE METER ALLOWED FOR THIS DWELLING.**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20052231
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DU-WATTS ELECTRIC, INC.

Date: **7/12/2005**
Permit Type: **P**
Description: **Scope: Dwl/garage/cov lanai |1. includes reverse model 2. Hip and gable roof options - Option A 3. Bedroom #5 instead of Family Room |Two-story: 5bedrm/3bath |1st Liv Area 897 sf x $90 = $ 80,730 2nd Liv Area 1,574 sf x $90 = $ 141,660 Garage 614 sf x $30 = $ 18,420 Lanais 347 sf x $25 = $ 8,675 TOTALS 3,432 sf $ 249,000 |Plumbing Scope of Work: |3 Water Closets 4 Basins 2 Bath Tubs 1 Shower 1 Laundry Tray 1 Washing Machine 1 Dryer 1 Sink 1 Dishwasher 1 Garbage Disposal 1 Solar Heater 1 Refrigerator 1 Spa 1 Building Sewer to Lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: P 20051452
Status: DONE
Valuation: $249,000.00
Contractor Company:
Contractor Name: DORVIN D LEIS CO INC

Date: **7/6/2005**
Permit Type: **B**
Description: **Scope: Dwl/garage/cov lanai |1. includes reverse model 2. Hip and gable roof options - Option A 3. Bedroom #5 instead of Family Room |Two-story: 5bedrm/3bath |1st Liv Area 897 sf x $90 = $ 80,730 2nd Liv Area 1,574 sf x $90 = $ 141,660 Garage 614 sf x $30 = $ 18,420 Lanais 347 sf x $25 = $ 8,675 TOTALS 3,432 sf $ 249,000**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20051335
Status: DONE
Valuation: $249,000.00
Contractor Company:
Contractor Name: TOWNE REALTY OF HAWAII

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Date: **11/6/2007**
Permit Type: **E**
Description: **Scope:**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20073830
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: DORVIN D LEIS CO INC

Date: **6/19/2007**
Permit Type: **E**
Description: **..NEW BURGLAR ALARM SYSTEM**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20072125
Status: OPEN
Valuation: $251,890.00
Contractor Company:
Contractor Name: GRESHAM ELECTRIC INC

Date: **5/14/2007**
Permit Type: **E**
Description: **Scope: Underground service 120/240V to 200A, 1PH, 3W, 1 feeder over 100A to 200A, 2911 sq. ft., 2 motors not over 1HP........ONLY ONE METER ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20071703
Status: DONE
Valuation: $251,890.00
Contractor Company:
Contractor Name: DU-WATTS ELECTRIC, INC.

Date: **4/11/2007**
Permit Type: **P**
Description: **DSGN 2006/0029 |Now occupied as: N/A |Scope: Dwelling/Garage/Covered Lanai |Options: Left Exterior Finish: 1. Plantation - Board & Batten w/ Moss Rock Stone Veneer Accents |Dimensions: 44' X 74' |Walls: 2 X 4 Studs Partitions: 2 X 4 Studs; Gyp Board Foundation: Concrete Floors: Concrete Roof: Asphalt Shingles Ceiling: Gyp Board Basement: N/A |Plumbing Scope of Work: |3 water closets 5 basins 2 bathtubs 1 shower 1 laundry tray 1 washing machine 1 dryer 1 sink 1 dishwasher 1 garbage disposal 1 solar heater 1 refrigerator 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20070879
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: DORVIN D LEIS CO INC

Date: **3/21/2007**
Permit Type: **B**
Description: **DSGN 2006/0029 |Now occupied as: N/A |Scope: Dwelling/Garage/Covered Lanai |Options: Left Exterior Finish: 1. Plantation - Board & Batten w/ Moss Rock Stone Veneer Accents |Dimensions: 44' X 74' |Walls: 2 X 4 Studs Partitions: 2 X 4 Studs; Gyp Board Foundation: Concrete Floors: Concrete Roof: Asphalt Shingles Ceiling: Gyp Board Basement: N/A**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20070571
Status: DONE
Valuation: $251,890.00
Contractor Company:
Contractor Name: TOWNE REALTY OF HAWAII

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Date: **3/28/2022**
Permit Type: **E**
Description: **SOLAR WATER HEATER-5BDRM/4BATH-2005**
EL SWH: ELEC WORK-SOLAR WATER HEATER SYSTEM
Project: DECLAN EUGENE MCCARTHY

Scope: Solar Water Heater ON EXISTING 5 BEDROOM / 4 BATH DWELLING BUILT IN 2005

Fee Summary: 1 solar water heater

Permit Description: **Electrical Permit - Solar Water Heater**
Work Class:
Proposed Use:
Permit Number: E 20220700
Status: Completed
Valuation: $0.00
Contractor Company:
Contractor Name: RONALD L BOWES

Date:	**3/28/2022**
Permit Type:	**P**
Description:	**SOLAR WATER HEATER INSTALLATION ON EXST** **PL SWH RES: PLBG WORK-SOLAR WATER HEATER-RESIDENTIAL** **Project: MCCARTHY, DECLAN** **Plumbing scope of work:** **1 Water Heater - solar**
Permit Description:	**Plumbing Permit**
Work Class:	
Proposed Use:	
Permit Number:	P 20220346
Status:	Completed
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MAUI PACIFIC SOLAR INC

Date:	**10/30/2020**
Permit Type:	**B**
Description:	**MAIN DWELLING ADD/ALT**
Permit Description:	**BUILDING PERMIT**
Work Class:	434 RESIDENTIAL - (ADD, ALTER, CONVERT)
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	B 20201046
Status:	OPEN
Valuation:	$2,990.00
Contractor Company:	
Contractor Name:	

Date:	**4/24/2018**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-5BDRM/4BATH-2005**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20180697
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	ANDREA L LAURIN

Date:	**12/7/2012**
Permit Type:	**B**
Description:	**ROCK RETAINING WALL AFTER-THE-FACT**
Permit Description:	**BUILDING PERMIT**
Work Class:	704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:	U(06) MISCELLANEOUS BUILDINGS/STRUCTURES
Permit Number:	B 20121507
Status:	DONE
Valuation:	$4,100.00
Contractor Company:	
Contractor Name:	

Date:	**5/3/2012**
Permit Type:	**B**
Description:	**DETACHED COVERED/TRELLIS PATIO**
Permit Description:	**BUILDING PERMIT**
Work Class:	329 STRUCTURES OTHER THAN BLDGS
Proposed Use:	U-1 PVT GARAGE,CARPORT,SHED,AG BLDG
Permit Number:	B 20120485
Status:	DONE
Valuation:	$2,000.00
Contractor Company:	
Contractor Name:	

ADJOINING PROPERTY FINDINGS

Date:	**2/23/2006**
Permit Type:	**E**
Description:	**....NEW SOLAR WATER HEATER ON RESIDENCE**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20060540
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DORVIN D LEIS CO INC

Date:	**1/27/2006**
Permit Type:	**P**
Description:	**Plumbing Scope of Work: |2 lawn sprinklers per piping valve 1" 1 for vacuum breaker or backflow protective device installed to piping or equipment**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20060167
Status:	EXPR
Valuation:	$269,000.00
Contractor Company:	
Contractor Name:	KIHEI GARDENS AND LANDSCAPING COMPANY LLP

Date:	**1/23/2006**
Permit Type:	**E**
Description:	**.....NEW IRRIGATION CONTROL LOT 32**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20060198
Status:	OPEN
Valuation:	$0.00
Contractor Company:	
Contractor Name:	KIHEI GARDENS AND LANDSCAPING COMPANY LLP

ADJOINING PROPERTY FINDINGS

Date:	**7/14/2005**
Permit Type:	**E**
Description:	**Scope: Underground service to 200A, 1PH, 3W, 1 feeder over 100 to 200A, 3827 sq. ft., 2 motors not over 1HP.......ONLY ONE METER ALLOWED FOR THIS DWELLING.**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20052232
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DU-WATTS ELECTRIC, INC.

Date:	**7/12/2005**
Permit Type:	**P**
Description:	**Scope: Dwl/garage/cov lanai |1. includes reverse model 2. Hip and gable roof options 3. Bedroom 5 instead of Family Room 4. Bedroom 1 instead of Den |2-story: 5bedrm/4bathrm |1st Liv Area 1,136 sf x $90 = $ 102,240 2nd Liv Area 1,490 sf x $90 = $ 134,100 Garage 548 sf x $30 = $ 16,440 Lanais 653 sf x $25 = $ 16,325 TOTALS 3,827 sf $ 269,000 |Plumbing Scope of Work: |4 Water Closets 6 Basins 3 Bath Tubs 1 Shower 1 Laundry Tray 1 Washing Machine 1 Dryer 1 Sink 1 Dishwasher 1 Garbage Disposal 1 Solar Heater 1 Refrigerator 1 Spa 1 Building Sewer to Lateral**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20051453
Status:	DONE
Valuation:	$269,000.00
Contractor Company:	
Contractor Name:	DORVIN D LEIS CO INC

Date: **7/6/2005**
Permit Type: **B**
Description: **Scope: Dwl/garage/cov lanai |1. includes reverse model 2. Hip and gable roof options 3. Bedroom 5 instead of Family Room 4. Bedroom 1 instead of Den |2-story: 5bedrm/4bathrm |1st Liv Area 1,136 sf x $90 = $ 102,240 2nd Liv Area 1,490 sf x $90 = $ 134,100 Garage 548 sf x $30 = $ 16,440 Lanais 653 sf x $25 = $ 16,325 TOTALS 3,827 sf $ 269,000**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20051332
Status: DONE
Valuation: $269,000.00
Contractor Company:
Contractor Name: TOWNE REALTY OF HAWAII

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Date: **10/27/2008**
Permit Type: **P**
Description: **DSGN 2006/0027 |Now occupied as: N/A |Scope: Dwelling/Garage/Covered Lanai |Options: Left Exterior Finish: 1. Plantation - Board & Batten w/ Moss Rock Stone Veneer Accents |Dimensions: 40' X 64' 6" |Walls: 2 X 4 Studs Partitions: 2 X 4 Studs; Gyp Board Foundation: Concrete Floors: Concrete Roof: Asphalt Shingles Ceiling: Gyp Board Basement: N/A |Plumbing Scope of Work: |1 Solar Heater on existing SF Dwelling**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20082084
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: THE SONSHINE SOLAR CORP

Date: **10/24/2008**
Permit Type: **E**
Description: **Scope: 1 solar water heater**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20082802
Status: OPEN
Valuation: $212,875.00
Contractor Company:
Contractor Name: JACK R MORRIS

Date: **6/19/2007**
Permit Type: **E**
Description: **....NEW BURGLAR ALARM SYSTEM**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20072126
Status: DONE
Valuation: $212,875.00
Contractor Company:
Contractor Name: GRESHAM ELECTRIC INC

Date: **5/14/2007**
Permit Type: **E**
Description: **Scope: Underground service 120/240V to 200A, 1PH, 3W, 1 feeder over 100A to 200A, 2310 sq. ft., 2 motors not over 1HP.......ONLY ONE METER ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20071702
Status: DONE
Valuation: $212,875.00
Contractor Company:
Contractor Name: DU-WATTS ELECTRIC, INC.

ADJOINING PROPERTY FINDINGS

Date:	**4/11/2007**
Permit Type:	**P**
Description:	**DSGN 2006/0027 |Now occupied as: N/A |Scope: Dwelling/Garage/Covered Lanai |Options: Left Exterior Finish: 1. Plantation - Board & Batten w/ Moss Rock Stone Veneer Accents |Dimensions: 40' X 64' 6" |Walls: 2 X 4 Studs Partitions: 2 X 4 Studs; Gyp Board Foundation: Concrete Floors: Concrete Roof: Asphalt Shingles Ceiling: Gyp Board Basement: N/A |Plumbing Scope of Work: |2 water closets 3 basins 2 bathtubs 1 shower 1 laundry tray 1 washing machine 1 dryer 1 sink 1 dishwasher 1 garbage disposal 1 solar heater 1 refrigerator 1 building sewer to lateral**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	P 20070878
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DORVIN D LEIS CO INC

Date:	**3/21/2007**
Permit Type:	**B**
Description:	**DSGN 2006/0027 |Now occupied as: N/A |Scope: Dwelling/Garage/Covered Lanai |Options: Left Exterior Finish: 1. Plantation - Board & Batten w/ Moss Rock Stone Veneer Accents |Dimensions: 40' X 64' 6" |Walls: 2 X 4 Studs Partitions: 2 X 4 Studs; Gyp Board Foundation: Concrete Floors: Concrete Roof: Asphalt Shingles Ceiling: Gyp Board Basement: N/A**
Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	B 20070569
Status:	DONE
Valuation:	$212,875.00
Contractor Company:	
Contractor Name:	TOWNE REALTY OF HAWAII

ADJOINING PROPERTY FINDINGS

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Date:	**8/26/2011**
Permit Type:	**E**
Description:	**Scope: GRID-TIED PHOTOVOLTAIC SOLAR POWER SYSTEM WHICH CONSIST OF 1 ARRAY FOR A TOTAL OF 11-230 WATT CANADIAN SOLAR MODULES WITH 11-190 WATT ENPHASE MICRO-INVERTER. PANELS & ENPHASE INVERTERS MOUNTED ON ROOFTOP OF EXISTING 5 BEDROOM/3 BATH DWELLING BUILT IN 2005. |Fee Summary: 1 feeder not over 100A, (1)Renewable Energy System**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20111767
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JOHN L HOOPII

Date:	**2/23/2006**
Permit Type:	**E**
Description:	**....NEW SOLAR WATER HEATER ON RESIDENCE**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20060541
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DORVIN D LEIS CO INC

Date: **1/27/2006**
Permit Type: **P**
Description: **DSGN 2002/0007 |Scope: Dwl/garage/cov lanai |Option B |1. includes reverse model 2. Hip and gable roof options - Option 3. Bedroom 5 instead of Family Room |Two-story: 5bedrm/3bath |1st Liv Area 897 sf x $90 = $ 80,730 2nd Liv Area 1,574 sf x $90 = $ 141,660 Garage 614 sf x $30 = $ 18,420 Lanais 347 sf x $25 = $ 8,675 TOTALS 3,432 sf $ 249,000 |Plumbing Scope of Work: |14 lawn sprinklers per piping valve 1" 1 for vacuum breaker or backflow protective device installed to piping or equipment served**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: P 20060168
Status: EXPR
Valuation: $249,000.00
Contractor Company:
Contractor Name: KIHEI GARDENS AND LANDSCAPING COMPANY LLP

Date: **1/23/2006**
Permit Type: **E**
Description: **....NEW IRRIGATION CONTROL**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: E 20060199
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: KIHEI GARDENS AND LANDSCAPING COMPANY LLP

Date: **7/14/2005**
Permit Type: **E**
Description: **Scope: Underground service to 200A, 1PH, 3W, 1 feeder over 100 to 200A, 3432 sq. ft., 2 motors not over 1HP.......ONLY ONE METER ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: E 20052233
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: DU-WATTS ELECTRIC, INC.

Date: **7/12/2005**
Permit Type: **P**
Description: **DSGN 2002/0007 |Scope: Dwl/garage/cov lanai |Option B |1. includes reverse model 2. Hip and gable roof options - Option 3. Bedroom 5 instead of Family Room |Two-story: 5bedrm/3bath |1st Liv Area 897 sf x $90 = $ 80,730 2nd Liv Area 1,574 sf x $90 = $ 141,660 Garage 614 sf x $30 = $ 18,420 Lanais 347 sf x $25 = $ 8,675 TOTALS 3,432 sf $ 249,000 |Plumbing Scope of Work: |3 Water Closets 4 Basins 2 Bath Tubs 1 Shower 1 Laundry Tray 1 Washing Machine 1 Dryer 1 Sink 1 Dishwasher 1 Garbage Disposal 1 Solar Heater 1 Refrigerator 1 Spa 1 Building Sewer to Lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: P 20051454
Status: DONE
Valuation: $249,000.00
Contractor Company:
Contractor Name: DORVIN D LEIS CO INC

ADJOINING PROPERTY FINDINGS

Date:	**7/6/2005**
Permit Type:	**B**
Description:	**DSGN 2002/0007 |Scope: Dwl/garage/cov lanai |Option B |1. includes reverse model 2. Hip and gable roof options - Option 3. Bedroom 5 instead of Family Room |Two-story: 5bedrm/3bath |1st Liv Area 897 sf x $90 = $ 80,730 2nd Liv Area 1,574 sf x $90 = $ 141,660 Garage 614 sf x $30 = $ 18,420 Lanais 347 sf x $25 = $ 8,675 TOTALS 3,432 sf $ 249,000**

Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	B 20051334
Status:	DONE
Valuation:	$249,000.00
Contractor Company:	
Contractor Name:	TOWNE REALTY OF HAWAII

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Date:	**11/14/2011**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-3BDRM/2 1/2BATH-2008, Scope: NEW GRID-TIED PHOTOVOLTAIC SOLAR POWER SYSTEM WHICH CONSIST OF 2 ARRAYS FOR A TOTAL OF 26-255 WATT SOLAR WORLD MODULES WITH 26-215 WATT ENPHASE MICRO-INVERTER. ARRAY #1: 13-255 WATT SOLAR WORLD MODULES WITH 13-215 WATT ENPHASE MICRO-INVERTER. ARRAY #2: 13-255 WATT SOLAR WORLD MODULES WITH 13-215 WATT ENPHASE MICRO-INVERTER. PANELS & ENPHASE INVERTERS MOUNTED ON ROOFTOP OF EXISTING 3 BEDROOM/2 1/2 BATH DWELLING BUILT IN 2008. |Fee Summary: 1 feeder not over 100A, (2)Renewable Energy System**

Permit Description:	**ELECTRICAL PERMIT, ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20112796
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	THE SONSHINE SOLAR CORP

ADJOINING PROPERTY FINDINGS

Date:	**10/24/2008**
Permit Type:	**E**
Description:	**Scope: 1 burglar alarm**

Permit Description:	**ELECTRICAL PERMIT**
Work Class:	437 COMMERCIAL - (ADD, ALTER, CONVERT)
Proposed Use:	A-3 ASSEMBLY WITHOUT STAGE & OCC LOAD
Permit Number:	E 20082794
Status:	OPEN
Valuation:	$1,700,000.00
Contractor Company:	
Contractor Name:	VYANET SECURITY GROUP LLC

Date:	**10/20/2008**
Permit Type:	**E**
Description:	**Scope: Underground service, 1 phase, 3 wire, 120/240V, 1 feeder over 100 to 200, 3,302 SF. Single Family Residence. ONE METER ONLY ALLOWED FOR THIS DWELLING.**

Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20082739
Status:	OPEN
Valuation:	$300,000.00
Contractor Company:	
Contractor Name:	KILOHANA ELECTRIC INC

ADJOINING PROPERTY FINDINGS

Date: **9/30/2008**
Permit Type: **P**
Description: **Now occupied as: Vacant |To be occupied as: 1-Story Dwelling, Garage, Covered Lanai |Dimensions: 46' X 78' |Living: 2,387 sf Garage: 475 sf Covered Front Entry: 160 sf Rear Covered Lanai: 280 sf Total: 3,302 sf |Walls: 2x4, Board & Batten w/ Rock Veneer Partitions: 2s4, Gyp Brd Foundation: Concrete Floors: Concrete Roof: Presidential Shingles Ceiling: Gyp Brd Basement: (na) |NO SPECIAL INSPECTION REQUIRED |Plumbing Scope of Work: |1 Solar Heater**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: P 20081919
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: MAUI PACIFIC SOLAR INC

Date: **7/29/2008**
Permit Type: **P**
Description: **Now occupied as: Vacant |To be occupied as: 1-Story Dwelling, Garage, Covered Lanai |Dimensions: 46' X 78' |Living: 2,387 sf Garage: 475 sf Covered Front Entry: 160 sf Rear Covered Lanai: 280 sf Total: 3,302 sf |Walls: 2x4, Board & Batten w/ Rock Veneer Partitions: 2s4, Gyp Brd Foundation: Concrete Floors: Concrete Roof: Presidential Shingles Ceiling: Gyp Brd Basement: (na) |NO SPECIAL INSPECTION REQUIRED |Plumbing Scope of Work: |3 water closets 4 basins 1 bath tubs 2 shower 1 laundry tray 1 washing machine 1 sink 1 dishwasher 1 garbage disposal 1 heater-electric 1 heater-solar 1 refrigerator 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: P 20081484
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: RJ PLUMBING

ADJOINING PROPERTY FINDINGS

Date: **6/24/2008**
Permit Type: **B**
Description: **Now occupied as: Vacant |To be occupied as: 1-Story Dwelling, Garage, Covered Lanai |Dimensions: 46' X 78' |Living: 2,387 sf Garage: 475 sf Covered Front Entry: 160 sf Rear Covered Lanai: 280 sf Total: 3,302 sf |Walls: 2x4, Board & Batten w/ Rock Veneer Partitions: 2s4, Gyp Brd Foundation: Concrete Floors: Concrete Roof: Presidential Shingles Ceiling: Gyp Brd Basement: (na) |NO SPECIAL INSPECTION REQUIRED**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20081199
Status: DONE
Valuation: $300,000.00
Contractor Company:
Contractor Name: TAKITANI CONSTRUCTION COMPANY INC

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Date: **4/23/2020**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM WITH BATTERY BACK UP**
EL PV RBB: ELEC WORK-PV SYS RESID W/ BATTERY BKUP
Project: KAREN L CHRISTENSON TRUST

Scope: NEW GRID-TIED PHOTOVOLTAIC SOLAR POWER SYSTEM WITH BATTERY BACK UP WHICH CONSIST OF (2) ARRAYS FOR A TOTAL OF (31) - 410 WATT SUNPOWER MODULES WITH (31) - P505 WATT OPTIMIZERS WIRED AS (2) STRINGS OF (10) & (1) STRING OF (11) CONNECTED TO (1) SOLAR EDGE SE10000H-US INVERTER. INSTALL (2) TESLA POWERWALL 2 AC BATTERY & (1) TESLA BACK UP GATEWAY. INSTALL (1) NON-UTILITY METER.
PANELS & OPTIMIZERS MOUNTED ON ROOFTOP OF EXISTING 3 BEDROOM / 2 BATH DWELLING BUILT IN 2008. INVERTER, BATTERY, NON-UTILITY METER MOUNTED ON WALL NEXT TO METER MAIN ON THIS SAME STRUCTURE.

Fee Summary: 3 Feeders 100-200A, (1) Renewable Energy System, (1) Non-Utility Meter

Permit Description: **Electrical Permit - Renewable Energy System**
Work Class:
Proposed Use:
Permit Number: E 20200989
Status: Completed
Valuation: $0.00
Contractor Company:
Contractor Name: MATIAS I BESASSO

Date: **1/4/2008**
Permit Type: **E**
Description: **Scope: Underground service, 1ph, 3w, 120/240V to 200A, 1 feeder over 100 to 200, 2746 SF, Single Family Residence. ONE METER ONLY ALLOWED FOR THIS DWELLING**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20080041
Status: DONE
Valuation: $258,320.00
Contractor Company:
Contractor Name: ELECTRICAL EXPRESS, INC.

Date: **10/1/2007**
Permit Type: **P**
Description: **Now occupied as: Vacant Lot |Scope: Dwelling, Garage, Covered Lanai/Entry |Dimensions: |Walls: 2x4, stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete Roof: pres shingles Ceiling: gyp brd Basement: (na) |NO SPECIAL INSPECTION REQUIRED |Plumbing Scope of Work: |2 water closet 2 basins 1 bath tub 1 Shower 1 laundry tray 1 washing machine 1 garbage disposal 1 bar sink 1 heater-electric 1 hot tub 1 Building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20072345
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: BADUA CONTRACTING LLC

Date: **9/5/2007**
Permit Type: **B**
Description: **Now occupied as: Vacant Lot |Scope: Dwelling, Garage, Covered Lanai/Entry |Dimensions: |Walls: 2x4, stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete Roof: pres shingles Ceiling: gyp brd Basement: (na) |NO SPECIAL INSPECTION REQUIRED**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20071845
Status: DONE
Valuation: $258,320.00
Contractor Company:
Contractor Name:

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Date: **9/1/2009**
Permit Type: **E**
Description: **Scope: 46 - 195 watts**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20091661
Status: OPEN
Valuation: $800,000.00
Contractor Company:
Contractor Name: RISING SUN SOLAR ELECTRIC LLC

Date: **4/28/2009**
Permit Type: **P**
Description: **Now occupied as: Vacant Lot |Scope: New 2-Story Main Dwelling, Garage, Covered Lanai |(to include: 1st floor: Master bdrm 1 with master bath and walk-in closet, master bdrm 2 with master bath only, great room with adjacent sitting room, kitchen with pantry, powder room , garage with w/d and storage room, interior stair access, and covered lanais 2nd floor: master bedroom 3 with walk-in closet and master bath, family room , bedroom 2, bedroom 3 and full bath, storage closet. |Dimensions: 118x67 5,385 sf - living 873 sf- garage 521 sf- cov. lanai |Walls: 2x4, Stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete Roof: concrete tile Ceiling: gyp brd Basement: (na) |SPECIAL INSPECTION REQUIRED BY Engineer Richard Sato for items 2, 5, and 6. |Plumbing Scope of Work: (ADD FEES TO P2008/0610) |1 bath tub 2 bar sink**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20090519
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: S C PLUMBING LTD

Date: **4/22/2009**
Permit Type: **E**
Description: **Scope: 1 burglar alarm system**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20090802
Status: OPEN
Valuation: $800,000.00
Contractor Company:
Contractor Name: SINGH SECURITY SYSTEMS LLC

Date: **3/12/2009**
Permit Type: **E**
Description: **Scope: 1 solar water heater**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20090497
Status: DONE
Valuation: $800,000.00
Contractor Company:
Contractor Name: ROBERT E HILBUN

ADJOINING PROPERTY FINDINGS

Date:	**3/11/2009**
Permit Type:	**P**
Description:	**Now occupied as: Vacant Lot |Scope: New 2-Story Main Dwelling, Garage, Covered Lanai |(to include: 1st floor: Master bdrm 1 with master bath and walk-in closet, master bdrm 2 with master bath only, great room with adjacent sitting room, kitchen with pantry, powder room , garage with w/d and storage room, interior stair access, and covered lanais 2nd floor: master bedroom 3 with walk-in closet and master bath, family room , bedroom 2, bedroom 3 and full bath, storage closet. |Dimensions: 118x67 5,385 sf - living 873 sf- garage 521 sf- cov. lanai |Walls: 2x4, Stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete Roof: concrete tile Ceiling: gyp brd Basement: (na) |SPECIAL INSPECTION REQUIRED BY Engineer Richard Sato for items 2, 5, and 6. |Plumbing Scope of Work: |1 Solar Heater on existing SF Main Dwelling**
Permit Description:	**PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20090313
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	HALEAKALA SOLAR INC

Date:	**5/29/2008**
Permit Type:	**P**
Description:	**Now occupied as: Vacant Lot |Scope: New 2-Story Main Dwelling, Garage, Covered Lanai |(to include: 1st floor: Master bdrm 1 with master bath and walk-in closet, master bdrm 2 with master bath only, great room with adjacent sitting room, kitchen with pantry, powder room , garage with w/d and storage room, interior stair access, and covered lanais 2nd floor: master bedroom 3 with walk-in closet and master bath, family room , bedroom 2, bedroom 3 and full bath, storage closet. |Dimensions: 118x67 5,385 sf - living 873 sf- garage 521 sf- cov. lanai |Walls: 2x4, Stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete Roof: concrete tile Ceiling: gyp brd Basement: (na) |SPECIAL INSPECTION REQUIRED BY Engineer Richard Sato for items 2, 5, and 6. |Plumbing Scope of Work: |8 lawn sprinklers per piping valve 1" 1 vacuum breaker or backflow protective device installed to piping or equipment served**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	P 20081061
Status:	EXPR
Valuation:	$0.00
Contractor Company:	
Contractor Name:	S C PLUMBING LTD

ADJOINING PROPERTY FINDINGS

Date:	**5/27/2008**
Permit Type:	**GAS**
Description:	**Now occupied as: Vacant Lot |Scope: New 2-Story Main Dwelling, Garage, Covered Lanai |(to include: 1st floor: Master bdrm 1 with master bath and walk-in closet, master bdrm 2 with master bath only, great room with adjacent sitting room, kitchen with pantry, powder room , garage with w/d and storage room, interior stair access, and covered lanais 2nd floor: master bedroom 3 with walk-in closet and master bath, family room , bedroom 2, bedroom 3 and full bath, storage closet. |Dimensions: 118x67 5,385 sf - living 873 sf- garage 521 sf- cov. lanai |Walls: 2x4, Stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete Roof: concrete tile Ceiling: gyp brd Basement: (na) |SPECIAL INSPECTION REQUIRED BY Engineer Richard Sato for items 2, 5, and 6. | Gas Scope of Work: |1 Gas Heaters and/or Vent 1 Gas Stoves 1 Gas Dryer 1 For each gas piping system using pipes one inch in diameter or less**
Permit Description:	**GAS PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	GAS 20080115
Status:	OPEN
Valuation:	$0.00
Contractor Company:	
Contractor Name:	S C PLUMBING LTD

Date:	**4/10/2008**
Permit Type:	**E**
Description:	**Scope: Undergroud service, 1 phase, 3 wire, 120/240v to 200A, 1 feeder over 100 to 200, 6779 SF, 1 irrigation, 1 solar water heater. Single Family Residence. ONE METER ONLY ALLOWED FOR THIS DWELLING. == 08/14/09 - additional fees to add 1 feeder, motors and A/C control wiring - fees paid by Maui Light House Electrical & Maintenance - cnf**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	E 20081047
Status:	DONE
Valuation:	$800,000.00
Contractor Company:	
Contractor Name:	MAUI LIGHT HOUSE ELECTRICAL & MAINTENANCE INC

ADJOINING PROPERTY FINDINGS

Date: **3/31/2008**
Permit Type: **P**
Description: **Now occupied as: Vacant Lot |Scope: New 2-Story Dwelling, Garage, Covered Lanai |(to include: 1st floor: Master bdrm 1 with master bath and walk-in closet, master bdrm 2 with master bath only, great room with adjacent sitting room, kitchen with pantry, powder room , garage with w/d and storage room, interior stair access, and covered lanais 2nd floor: master bedroom 3 with walk-in closet and master bath, family room , bedroom 2, bedroom 3 and full bath, storage closet. |Dimensions: 118x67 5,385 sf - living 873 sf- garage 521 sf- cov. lanai |Walls: 2x4, Stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete Roof: concrete tile Ceiling: gyp brd Basement: (na) |SPECIAL INSPECTION REQUIRED BY Engineer Richard Sato for items 2, 5, and 6. |Plumbing Scope of Work: (ADD FEES ON P2009/0519) |5 water closets 7 basins 1 bath tubs 3 shower 1 laundry tray 2 washing machine 1 sink 1 dishwasher 1 garbage disposal 3 bar sink 1 heater-electric 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20080610
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: S C PLUMBING LTD

Date: **3/14/2008**
Permit Type: **B**
Description: **Scope: Retaining Wall |220' long..."Anchor Diamond" conc unit blocks |SPECIAL INSPECTION REQUIRED BY Engineer Richard Sato for items 2, 5, and 6.**

Permit Description: **BUILDING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: B 20080460
Status: DONE
Valuation: $100,000.00
Contractor Company:
Contractor Name: AKINAKA CONSTRUCTION INC.

ADJOINING PROPERTY FINDINGS

Date: **3/14/2008**
Permit Type: **B**
Description: **Now occupied as: Vacant Lot |Scope: New 2-Story Main Dwelling, Garage, Covered Lanai |(to include: 1st floor: Master bdrm 1 with master bath and walk-in closet, master bdrm 2 with master bath only, great room with adjacent sitting room, kitchen with pantry, powder room , garage with w/d and storage room, interior stair access, and covered lanais 2nd floor: master bedroom 3 with walk-in closet and master bath, family room , bedroom 2, bedroom 3 and full bath, storage closet. |Dimensions: 118x67 5,385 sf - living 873 sf- garage 521 sf- cov. lanai |Walls: 2x4, Stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete Roof: concrete tile Ceiling: gyp brd Basement: (na) |SPECIAL INSPECTION REQUIRED BY Engineer Richard Sato for items 2, 5, and 6.**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20080459
Status: DONE
Valuation: $800,000.00
Contractor Company:
Contractor Name: AKINAKA CONSTRUCTION INC.

Date: **3/14/2008**
Permit Type: **D**
Description:

Permit Description: **DRIVEWAY PERMIT**
Work Class:
Proposed Use:
Permit Number: D 20080049
Status: CLSD
Valuation: $0.00
Contractor Company:
Contractor Name: AKINAKA CONSTRUCTION INC.

Date:	**3/14/2008**
Permit Type:	**G-RS**
Description:	**Fill: 600 cy Excavate: 0 Grubb: 14743 cy**

Permit Description:	**MINOR GRADING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	G-RS 20080038
Status:	DONE
Valuation:	$800,000.00
Contractor Company:	
Contractor Name:	AKINAKA CONSTRUCTION INC.

PAPUHAU PL

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Date:	**11/9/2015**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-4BDRM/4 1/2BATH-2014**

Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20154396
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	BRYAN R LAMPSHIRE

Date:	**8/12/2014**
Permit Type:	**P**
Description:	**SOLAR WATER HEATER ON MAIN DWELLING**

Permit Description:	**PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20140974
Status:	DONE
Valuation:	$550,000.00
Contractor Company:	
Contractor Name:	JOHN S NEALEY

Date:	**8/11/2014**
Permit Type:	**E**
Description:	**SOLAR WATER HEATER FOR THE EXISTING DWEL**

Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20142878
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JAMES K F ARUDA

Date:	**5/29/2014**
Permit Type:	**E**
Description:	**MAIN DWELLING/GARAGE/COVERED LANAI**

Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20141854
Status:	DONE
Valuation:	$550,000.00
Contractor Company:	
Contractor Name:	ERNEST E CALIVA JR

Date: **5/22/2014**
Permit Type: **P**
Description: **MAIN DWELLING/GARAGE/COVERED LANAI**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20140559
Status: DONE
Valuation: $550,000.00
Contractor Company:
Contractor Name: HAROLD J MONIZ

Date: **4/3/2014**
Permit Type: **B**
Description: **MAIN DWELLING/GARAGE/COVERED LANAI**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20140442
Status: DONE
Valuation: $550,000.00
Contractor Company:
Contractor Name: CHRISTOPHER P. DELLA

Date: **4/3/2014**
Permit Type: **B**
Description: **RETAINING WALL & FENCE**

Permit Description: **BUILDING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U(06) MISCELLANEOUS BUILDINGS/STRUCTURES
Permit Number: B 20140443
Status: DONE
Valuation: $70,000.00
Contractor Company:
Contractor Name: RYKO CONCRETE & MASONRY

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Date: **12/15/2020**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM WITH BATTERY BACK UP**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20203083
Status: OPEN
Valuation: $0.00
Contractor Company:
Contractor Name: MICHAEL T MONIZ

Date: **10/19/2020**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM WITH BATTERY BACK UP**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20202556
Status: OPEN
Valuation: $0.00
Contractor Company:
Contractor Name: VAIRAJI C ANANDA

Date: **3/31/2015**
Permit Type: **P**
Description: **SOLAR WATER HEATER ON NEW SF DWELLING**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20150271
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: SUNKING INC

ADJOINING PROPERTY FINDINGS

Date:	**3/23/2015**
Permit Type:	**E**
Description:	**SOLAR WATER HEATER-3 BDRM/2 BATH-2014**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20150890
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	HENRY MELVIN LUM HO JR

Date:	**1/9/2015**
Permit Type:	**E**
Description:	**MAIN DWELLING, GARAGE**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20150061
Status:	DONE
Valuation:	$356,559.00
Contractor Company:	
Contractor Name:	PAUL P PACUBAS

Date:	**12/3/2014**
Permit Type:	**P**
Description:	**MAIN DWELLING, GARAGE**
Permit Description:	**PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20141372
Status:	DONE
Valuation:	$356,559.00
Contractor Company:	
Contractor Name:	LAWRENCE M NAKAMA

ADJOINING PROPERTY FINDINGS

Date:	**5/13/2014**
Permit Type:	**B**
Description:	**MAIN DWELLING, GARAGE**
Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	B 20140663
Status:	DONE
Valuation:	$356,559.00
Contractor Company:	
Contractor Name:	DANIEL H K PALAKIKO

Date:	**5/13/2014**
Permit Type:	**D**
Description:	**DRIVEWAY**
Permit Description:	**DRIVEWAY PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	D 20140045
Status:	EXPR
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DANIEL H K PALAKIKO

Date: **11/5/2007**
Permit Type: **P**
Description: **DSGN 2006/0031 |Now occupied as: N/A |Scope: Dwelling/Garage/Covered Lanai |Options: Left or Right Bedroom #4 or Sitting Room Bedroom #4 and Loft or Family Room Exterior Finish: |3. plantation $294,680 |Dimensions: 39' 2" X 61' 8" |1st Floor Living: 1,246 sf 2nd Floor Living: 1,158 sf Garage: 649 sf 1st Floor Covered Lanai: 138 sf Total: 3,357 sf |Walls: 2 X 4 Studs Partitions: 2 X 4 Studs; Gyp Board Foundation: Concrete Floors: Concrete Roof: Asphalt Shingles Ceiling: Gyp Board Basement: N/A |Plumbing Scope of Work: |3 water closets 5 basins 2 bath tubs 1 shower 1 laundry tray 1 washing machine 1 dryer 1 sink 1 dishwasher 1 garbage disposal 1 heater-solar 1 refrigerator 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20072658
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: DORVIN D LEIS CO INC

Date: **10/23/2007**
Permit Type: **E**
Description: **Scope: Underground service, 1ph, 3w, 120/208v to 100a, 1 feeder not over 100, 3,357 sq. ft., Single Family Dwelling. ONE METER ONLY ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20073629
Status: OPEN
Valuation: $294,680.00
Contractor Company:
Contractor Name: DU-WATTS ELECTRIC, INC.

Date: **9/22/2007**
Permit Type: **B**
Description: **DSGN 2006/0031 |Now occupied as: N/A |Scope: Dwelling/Garage/Covered Lanai |Options: Left or Right Bedroom #4 or Sitting Room Bedroom #4 and Loft or Family Room Exterior Finish: |3. plantation $294,680 |Dimensions: 39' 2" X 61' 8" |1st Floor Living: 1,246 sf 2nd Floor Living: 1,158 sf Garage: 649 sf 1st Floor Covered Lanai: 138 sf Total: 3,357 sf |Walls: 2 X 4 Studs Partitions: 2 X 4 Studs; Gyp Board Foundation: Concrete Floors: Concrete Roof: Asphalt Shingles Ceiling: Gyp Board Basement: N/A**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20071987
Status: EXPR
Valuation: $294,680.00
Contractor Company:
Contractor Name: TOWNE REALTY OF HAWAII

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Date: **5/7/2014**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-4BDRM/2 1/2BATH-2009**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20141565
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: JAMES K F ARUDA

ADJOINING PROPERTY FINDINGS

Date: **6/25/2010**
Permit Type: **E**
Description: **Scope: 1 solar water heater**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20101173
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: STAN'S ELECTRICAL SERVICE LLC

Date: **6/10/2010**
Permit Type: **P**
Description: **Now occupied as:Vacant |To be occupied as:Main Dwelling/Garage |Scope: 3 bedroom, 2 full bathrooms, 1/2 bath, laundry room, office, covered lanai, and 4 car garage. |Dimensions: |Walls: 2x4 studs Partitions:2x5 studs Foundation:concrete Floors:concrete Roof:asphalt shingles Ceiling:gyp board Basement: na |No special inspection required. |Plumbing Scope of Work: |1 solar water heater on existing SF dwelling**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20100640
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: MAUI PACIFIC SOLAR INC

ADJOINING PROPERTY FINDINGS

Date: **12/15/2009**
Permit Type: **E**
Description: **Scope: Underground service, 1 phase 3 wire, 12/240V to 200A, 1 feeder over 100A to 200A, 3898 SQ FT, 1 solar water heater. Single Family Residence. ONE METER ONLY ALLOWED FOR THIS DWELLING. === ========================== 01/19/2010 - additional fees to add A/C unto this permit - 2 Condenser Units, 2 FCU 3hp - 8hp, 2 A/C Control Wiring, 1 Solar Water Heater - fees paid by Paz Electric - cnf**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20092517
Status: DONE
Valuation: $400,000.00
Contractor Company:
Contractor Name: SILVESTRE O PAZ

Date: **12/1/2009**
Permit Type: **P**
Description: **Now occupied as:Vacant |To be occupied as:Main Dwelling/Garage |Scope: 3 bedroom, 2 full bathrooms, 1/2 bath, laundry room, office, covered lanai, and 4 car garage. |Dimensions: |Walls: 2x4 studs Partitions:2x5 studs Foundation:concrete Floors:concrete Roof:asphalt shingles Ceiling:gyp board Basement: na |No special inspection required. |Plumbing Scope of Work: (PERMIT CANCELLED 6/3/2010 BY CONTRACTOR) |1 solar water heater on existing SF dwelling**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20091489
Status: CXLD
Valuation: $0.00
Contractor Company:
Contractor Name: MAUI PACIFIC SOLAR INC

Date: **9/9/2009**
Permit Type: **P**
Description: **Now occupied as:Vacant |To be occupied as:Main Dwelling/Garage |Scope: 3 bedroom, 2 full bathrooms, 1/2 bath, laundry room, office, covered lanai, and 4 car garage. |Dimensions: |Walls: 2x4 studs Partitions:2x5 studs Foundation:concrete Floors:concrete Roof:asphalt shingles Ceiling:gyp board Basement: na |No special inspection required. |Plumbing Scope of Work: |4 water closets 5 basins 2 bath tub 1 shower 1 laundry tray 1 washing machine 1 sink 1 dishwasher 1 garbage disposal 1 heater-electric 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20091041
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: HAROLD J MONIZ

Date: **8/11/2009**
Permit Type: **B**
Description: **Now occupied as:Vacant |To be occupied as:Main Dwelling/Garage |Scope: 3 bedroom, 2 full bathrooms, 1/2 bath, laundry room, office, covered lanai, and 4 car garage. |Dimensions: |Walls: 2x4 studs Partitions:2x5 studs Foundation:concrete Floors:concrete Roof:asphalt shingles Ceiling:gyp board Basement: na |No special inspection required.**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20090922
Status: DONE
Valuation: $400,000.00
Contractor Company:
Contractor Name: RAMON ALVIOR

Date: **9/9/2008**
Permit Type: **B**
Description: **Scope: CMU RETAINING WALL APPROX 62' L X UP TO 6' HIGH**

Permit Description: **BUILDING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: B 20081549
Status: DONE
Valuation: $35,000.00
Contractor Company:
Contractor Name:

Date: **9/9/2008**
Permit Type: **G-RS**
Description: **Scope: CMU RETAINING WALL APPROX 62' L X UP TO 6' HIGH | Fill: 84 cy Excavate: Grubb: 6'**

Permit Description: **MINOR GRADING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: G-RS 20080119
Status: DONE
Valuation: $35,000.00
Contractor Company:
Contractor Name:

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Date:	**12/16/2013**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-4BDRM/2 1/2BATH-2006**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20133492
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JAMES K F ARUDA

Date:	**5/8/2012**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-4BDRM/2 1/2BATH-2006**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20121483
Status:	OPEN
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JOHN L HOOPII

Date:	**1/24/2012**
Permit Type:	**E**
Description:	**SOLAR HEATER-4 BD/2 FULL BATH-1 1/2 BATH**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20120223
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DONALD J VARNI

Date:	**11/21/2011**
Permit Type:	**P**
Description:	**SOLAR WATER HEATER ON EXST SF DWELLING, Now occupied as: NA Scope: 2-STORY DWELLING/GARAGE/LANAI |Plumbing Scope of Work: |1 Solar Water Heater**
Permit Description:	**PLUMBING PERMIT, PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20111198
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JOHN S NEALEY

Date:	**5/4/2007**
Permit Type:	**E**
Description:	**Scope: 1 Burglar alarm**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	E 20071570
Status:	OPEN
Valuation:	$400,000.00
Contractor Company:	
Contractor Name:	SECURITY TECH, LLC

ADJOINING PROPERTY FINDINGS

Date: **3/15/2007**
Permit Type: **E**
Description: **Scope: Underground service, 1PH, 3W, 120/240V to 200A, 1 Feeder over 100-200A, 3789 sq ft., 1 Motor not over 1HP........ONE METER ONLY ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20070917
Status: DONE
Valuation: $400,000.00
Contractor Company:
Contractor Name: PILTZ ELECTRIC SERVICES, INC.

Date: **10/4/2006**
Permit Type: **P**
Description: **Now occupied as: NA |Scope: 2-STORY DWELLING/GARAGE/LANAI |Dimensions: Walls: 2X4, 2X6, 2X8 STUDS Partitions: 2X4, 2X6 STUDS Foundation: CONC Floors: CONC/PLYWD Roof: MONIER TILE Ceiling: GYPBD Basement: NA |SPECIAL INSPECTION REQUIREMENT BY ENGINEER JOEL CORPUZ FOR #2 #7 |Plumbing Scope of Work: |3 water closets 4 basins 2 bathtubs 1 shower 1 laundry tray 1 washing machine 1 sink 1 dishwasher 2 garbage disposals 1 barsink 1 electric heater 1 lawn sprinklers per piping valve 1" 1 for vacuum breaker or backflow protective device installed to piping or equipment served 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20062491
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: NAKAMA PLUMBING INC

ADJOINING PROPERTY FINDINGS

Date: **9/21/2006**
Permit Type: **B**
Description: **Scope: CMU Retaining Wall |SPECIAL INSPECTION REQUIREMENT by engineer Joel Corpuz for 7.**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20062078
Status: DONE
Valuation: $10,000.00
Contractor Company:
Contractor Name: MAUI CONSTRUCTION INC

Date: **9/21/2006**
Permit Type: **G-RS**
Description: **Fill: 0 Excavate: 27 Grubb: 82**

Permit Description: **MINOR GRADING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: G-RS 20060190
Status: OPEN
Valuation: $0.00
Contractor Company:
Contractor Name: MAUI CONSTRUCTION INC

Date: **8/29/2006**
Permit Type: **B**
Description: **Now occupied as: NA |Scope: 2-STORY DWELLING/GARAGE/LANAI |Dimensions: Walls: 2X4, 2X6, 2X8 STUDS Partitions: 2X4, 2X6 STUDS Foundation: CONC Floors: CONC/PLYWD Roof: MONIER TILE Ceiling: GYPBD Basement: NA |SPECIAL INSPECTION REQUIREMENT BY ENGINEER JOEL CORPUZ FOR #2 #7**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20061904
Status: EXPR
Valuation: $400,000.00
Contractor Company:
Contractor Name: MAUI CONSTRUCTION INC

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Date: **7/23/2015**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-4BDRM/3 1/2BATH-2006**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20152532
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: JAMES K F ARUDA

Date: **10/30/2006**
Permit Type: **E**
Description: **Scope: Underground service, 1PH, 3W, 120/240V to 200A, 2 feeder not over 100A, 3704 sq ft.....ONE METER ONLY ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: E 20063717
Status: DONE
Valuation: $300,000.00
Contractor Company:
Contractor Name: NICANOR E CASUMPANG JR

Date: **8/15/2006**
Permit Type: **P**
Description: **Now occupied as: VACANT |To be occupied as: DWELLING/GARAGE |Dimensions: 76x44 2,776 sf - living 674 sf- garage/storage 254 sf- cov./uncov deck/lanai Walls: 2X4 Partitions: 2X4 Foundation: CONC Floors: PLYWOOD Roof: PRES ROOF Ceiling: GYP BD Basement: NA |SPECIAL INSPECTION REQUIREMENT by engineer Joel Corpuz for #7. |Plumbing Scope of Work: |4 water closets 4 basins 3 bath tubs 1 shower 1 laundry tray 1 washing machine 1 dryer 1 sink 1 garbage disposal 1 solar heater 1 building sewer to present sewer**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: P 20062067
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: SAVA ILIN

ADJOINING PROPERTY FINDINGS

Date: **7/17/2006**
Permit Type: **B**
Description: **Now occupied as: VACANT |To be occupied as: DWELLING/GARAGE |Dimensions: 76x44 2,776 sf - living 674 sf- garage/storage 254 sf- cov./uncov deck/lanai Walls: 2X4 Partitions: 2X4 Foundation: CONC Floors: PLYWOOD Roof: PRES ROOF Ceiling: GYP BD Basement: NA |SPECIAL INSPECTION REQUIREMENT by engineer Joel Corpuz for #7.**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20061596
Status: DONE
Valuation: $300,000.00
Contractor Company:
Contractor Name:

23 PAPUHAU PL

Date: **1/8/2018**
Permit Type: **B**
Description: **CONCRETE/CMU RETAINING WALL**

Permit Description: **BUILDING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U(06) MISCELLANEOUS BUILDINGS/STRUCTURES
Permit Number: B 20180019
Status: DONE
Valuation: $3,900.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **8/3/2017**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-6BDRM/3 1/2BATH-2015**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20171619
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: BRYAN R LAMPSHIRE

Date: **7/10/2017**
Permit Type: **E**
Description: **EMPTY RACEWAY FOR FUTURE PV SYSTEM**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20171471
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: RISING SUN SOLAR ELECTRIC LLC

Date: **11/22/2016**
Permit Type: **P**
Description: **SOALR WATER HEATER -MAIN DWELLING/GARAGE**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20161166
Status: DONE
Valuation: $657,860.00
Contractor Company:
Contractor Name: MAUI PACIFIC SOLAR INC

Date: **6/30/2015**
Permit Type: **E**
Description: **MAIN DWELLING/GARAGE**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20152115
Status: DONE
Valuation: $657,860.00
Contractor Company:
Contractor Name: ERNEST E CALIVA JR

Date: **6/4/2015**
Permit Type: **P**
Description: **MAIN DWELLING/GARAGE**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20150567
Status: DONE
Valuation: $657,860.00
Contractor Company:
Contractor Name: HAROLD J MONIZ

Date: **3/19/2015**
Permit Type: **B**
Description: **MAIN DWELLING/GARAGE**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20150423
Status: DONE
Valuation: $657,860.00
Contractor Company:
Contractor Name: CHRISTOPHER P. DELLA

Date: **5/29/2014**
Permit Type: **B**
Description: **CMU RETAINING WALL**

Permit Description: **BUILDING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: B 20140752
Status: DONE
Valuation: $26,250.00
Contractor Company:
Contractor Name:

28 PAPUHAU PL

Date: **11/14/2016**
Permit Type: **E**
Description: **MAIN DWELLING ADDITION**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20163343
Status: DONE
Valuation: $5,000.00
Contractor Company:
Contractor Name: ERNEST E CALIVA JR

Date: **11/4/2016**
Permit Type: **B**
Description: **MAIN DWELLING ADDITION**

Permit Description: **BUILDING PERMIT**
Work Class: 434 RESIDENTIAL - (ADD, ALTER, CONVERT)
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20161210
Status: DONE
Valuation: $5,000.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **12/16/2013**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-5BDRM/3 1/2BATH-2007**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20133502
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: JOHN L HOOPII

Date: **2/25/2013**
Permit Type: **B**
Description: **MAIN DWELLING ADDITION (ADDENDUM)**

Permit Description: **BUILDING PERMIT**
Work Class: 434 RESIDENTIAL - (ADD, ALTER, CONVERT)
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20130184
Status: DONE
Valuation: $2,500.00
Contractor Company:
Contractor Name: BADUA CONTRACTING LLC

Date: **11/27/2012**
Permit Type: **P**
Description: **MAIN DWELLING ADDITION**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20121287
Status: DONE
Valuation: $35,000.00
Contractor Company:
Contractor Name: BOBBY B SALES

ADJOINING PROPERTY FINDINGS

Date: **11/19/2012**
Permit Type: **E**
Description: **MAIN DWELLING ADDITION**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20123582
Status: DONE
Valuation: $35,000.00
Contractor Company:
Contractor Name: ERNEST E CALIVA JR

Date: **10/16/2012**
Permit Type: **B**
Description: **MAIN DWELLING ADDITION**

Permit Description: **BUILDING PERMIT**
Work Class: 434 RESIDENTIAL - (ADD, ALTER, CONVERT)
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20121280
Status: DONE
Valuation: $35,000.00
Contractor Company:
Contractor Name: BADUA CONTRACTING LLC

Date: **10/10/2012**
Permit Type: **P**
Description: **SOLAR WATER HEATER ON EXST SF DWELLING**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20121071
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: QUINN K DESILVA

ADJOINING PROPERTY FINDINGS

Date: **9/12/2012**
Permit Type: **E**
Description: **SOLAR WATER HEATER-5 BD-3 1/2 BATH-2007**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20122751
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: JOHN L HOOPII

Date: **8/31/2012**
Permit Type: **B**
Description: **RETAINING WALL / TERRACED**

Permit Description: **BUILDING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U(06) MISCELLANEOUS BUILDINGS/STRUCTURES
Permit Number: B 20121014
Status: DONE
Valuation: $12,500.00
Contractor Company:
Contractor Name: ASELI KAFOA

Date: **6/8/2007**
Permit Type: **E**
Description: **Scope: Underground service, 200A, 120/240V, 1PH, 3W, 1 Feeder 100-200A, 4056 sq ft.........ONE METER ONLY ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20072016
Status: DONE
Valuation: $638,000.00
Contractor Company:
Contractor Name: ELECTRICAL CONNECTION MAUI LLC

ADJOINING PROPERTY FINDINGS

Date: **12/26/2006**
Permit Type: **P**
Description: **Now occupied as: N/A |Scope: 2 STORY DWL, COV'D LANAIS, 3 CAR GARAGE |Dimensions: Walls: 2X4 Partitions: 2X4 Foundation: CONC Floors: CONC, WOOD Roof: CONC TILE Ceiling: GYP BD Basement: N/A |Plumbing Scope of Work: |4 water closets 5 basins 2 Bath Tubs 1 shower 1 laundry tray 1 washing machine 1 Dryer 1 sink 1 Dishwasher 1 garbage disposal 1 Heaters-Electric 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20063194
Status: DONE
Valuation: $638,000.00
Contractor Company:
Contractor Name: BADUA CONTRACTING LLC

Date: **12/8/2006**
Permit Type: **B**
Description: **Now occupied as: N/A |Scope: 2 STORY DWL, COV'D LANAIS, 3 CAR GARAGE |Dimensions: Walls: 2X4 Partitions: 2X4 Foundation: CONC Floors: CONC, WOOD Roof: CONC TILE Ceiling: GYP BD Basement: N/A**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20062688
Status: DONE
Valuation: $638,000.00
Contractor Company:
Contractor Name: RAMON ALVIOR

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Date: **12/27/2018**
Permit Type: **E**
Description: **MAIN DWELLING ADDITION**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20182531
Status: DONE
Valuation: $100,000.00
Contractor Company:
Contractor Name: PAUL P PACUBAS

Date: **10/30/2018**
Permit Type: **P**
Description: **MAIN DWELLING ADDITION**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20181133
Status: DONE
Valuation: $100,000.00
Contractor Company:
Contractor Name: ANTHONY S NOTLEY

Date: **9/28/2018**
Permit Type: **B**
Description: **MAIN DWELLING ADDITION**

Permit Description: **BUILDING PERMIT**
Work Class: 434 RESIDENTIAL - (ADD, ALTER, CONVERT)
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20181171
Status: DONE
Valuation: $100,000.00
Contractor Company:
Contractor Name:

Date: **7/27/2015**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-3BDRM/3BATH-2014**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20152599
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: R Z ELECTRIC INC

Date: **8/25/2014**
Permit Type: **P**
Description: **SOLAR WATER HEATER ON SF DWELLING**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20141006
Status: DONE
Valuation: $400,000.00
Contractor Company:
Contractor Name: MAUI PACIFIC SOLAR INC

Date: **6/20/2014**
Permit Type: **B**
Description: **RETAINING WALL**

Permit Description: **BUILDING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U(06) MISCELLANEOUS BUILDINGS/STRUCTURES
Permit Number: B 20140843
Status: DONE
Valuation: $31,500.00
Contractor Company:
Contractor Name:

Date: **6/20/2014**
Permit Type: **G-RS**
Description: **GRADING**

Permit Description: **MINOR GRADING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U(06) MISCELLANEOUS BUILDINGS/STRUCTURES
Permit Number: G-RS 20140046
Status: DONE
Valuation: $31,500.00
Contractor Company:
Contractor Name:

Date: **5/27/2014**
Permit Type: **P**
Description: **MAIN DWELLING, GARAGE**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20140598
Status: DONE
Valuation: $400,000.00
Contractor Company:
Contractor Name: AVELINO BADUA

Date: **5/7/2014**
Permit Type: **E**
Description: **MAIN DWELLING, GARAGE**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20141559
Status: DONE
Valuation: $400,000.00
Contractor Company:
Contractor Name: SILVESTRE O PAZ

Date: **4/28/2014**
Permit Type: **B**
Description: **MAIN DWELLING, GARAGE**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use:
Permit Number: B 20140555
Status: DONE
Valuation: $400,000.00
Contractor Company:
Contractor Name:

Date: **1/18/2013**
Permit Type: **B**
Description: **MAIN DWELLING, GARAGE, COV'D LANAI**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20130061
Status: CXLD
Valuation: $310,000.00
Contractor Company:
Contractor Name:

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Date: **8/7/2015**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-3BDRM/2BATH-2013**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20152833
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: JAMES V LONERGAN

ADJOINING PROPERTY FINDINGS

Date:	**2/20/2014**
Permit Type:	**B**
Description:	**CMU RETAINING WALL**
Permit Description:	**BUILDING PERMIT**
Work Class:	704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:	U(06) MISCELLANEOUS BUILDINGS/STRUCTURES
Permit Number:	B 20140244
Status:	DONE
Valuation:	$26,550.00
Contractor Company:	
Contractor Name:	

Date:	**2/20/2014**
Permit Type:	**G-RS**
Description:	**GRADING**
Permit Description:	**MINOR GRADING PERMIT**
Work Class:	704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:	U(06) MISCELLANEOUS BUILDINGS/STRUCTURES
Permit Number:	G-RS 20140017
Status:	DONE
Valuation:	$26,550.00
Contractor Company:	
Contractor Name:	

Date:	**9/4/2013**
Permit Type:	**P**
Description:	**SOLAR WATER HEATER ON EXST SF DWELLING**
Permit Description:	**PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20130912
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	SOUTH PACIFIC PLUMBING LLC

ADJOINING PROPERTY FINDINGS

Date:	**3/5/2013**
Permit Type:	**P**
Description:	**MAIN DWELLING, GARAGE, COVD ENTRY/LANAI**
Permit Description:	**PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20130251
Status:	DONE
Valuation:	$275,000.00
Contractor Company:	
Contractor Name:	MARC V BONOFIGLIO

Date:	**3/5/2013**
Permit Type:	**E**
Description:	**MAIN DWELLING, GARAGE, COVD ENTRY/LANAI**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20130612
Status:	DONE
Valuation:	$275,000.00
Contractor Company:	
Contractor Name:	DARRIN K LAEPAA

Date:	**11/29/2012**
Permit Type:	**B**
Description:	**MAIN DWELLING, GARAGE, COVD ENTRY/LANAI**
Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	B 20121457
Status:	DONE
Valuation:	$275,000.00
Contractor Company:	
Contractor Name:	3-D BUILDERS & DESIGN INC

ADJOINING PROPERTY FINDINGS

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Date:	**6/28/2007**
Permit Type:	**P**
Description:	**Now occupied as: Vacant Lot |Scope: New 2-Story Dwelling, Covered Lanais, Garage, Covered Entry |Dimensions: 42x60 2,736 sf- living 440 sf- garage 226 sf- cov. entry/deck Walls: 2x4, Plywood Siding Partitions: 2x4, 2x6, Gyp Brd Foundation: Concrete Floors: Concrete, Wood Roof: Presidential Shingles Ceiling: Gyp Brd Basement: |Plumbing scope of work: |1 Solar water heater for existing SF Main Dwelling.**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20071698
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	ALLEN'S PLUMBING INC

Date:	**6/26/2007**
Permit Type:	**E**
Description:	**Scope: Underground service 1ph, 3w, 120/240V to 200A, 2 feeders not over 100A, 3402 sq. ft.....ONE METER ONLY ALLOWED FOR THIS DWELLING**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20072272
Status:	OPEN
Valuation:	$325,000.00
Contractor Company:	
Contractor Name:	NICANOR E CASUMPANG JR

ADJOINING PROPERTY FINDINGS

Date:	**1/11/2007**
Permit Type:	**P**
Description:	**Now occupied as: Vacant Lot |Scope: New 2-Story Dwelling, Covered Lanais, Garage, Covered Entry |Dimensions: 42x60 2,736 sf- living 440 sf- garage 226 sf- cov. entry/deck Walls: 2x4, Plywood Siding Partitions: 2x4, 2x6, Gyp Brd Foundation: Concrete Floors: Concrete, Wood Roof: Presidential Shingles Ceiling: Gyp Brd Basement: |Plumbing Scope of Work: |4 water closets 4 basins 4 bath tubs 1 laundry tray 1 washing machine 1 sink 1 garbage disposal 1 garbage disposal 1 barsink 1 electric heater 1 refrigerator 1 building sewer to lateral**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20070051
Status:	EXPR
Valuation:	$0.00
Contractor Company:	
Contractor Name:	LAURENCE D SOTTO

Date:	**9/28/2006**
Permit Type:	**B**
Description:	**Now occupied as: Vacant Lot |Scope: New 2-Story Dwelling, Covered Lanais, Garage, Covered Entry |Dimensions: 42x60 2,736 sf- living 440 sf- garage 226 sf- cov. entry/deck Walls: 2x4, Plywood Siding Partitions: 2x4, 2x6, Gyp Brd Foundation: Concrete Floors: Concrete, Wood Roof: Presidential Shingles Ceiling: Gyp Brd Basement:**
Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	B 20062129
Status:	DONE
Valuation:	$325,000.00
Contractor Company:	
Contractor Name:	DANTE S AGRA

4 PAPUHAU PL

Date:	**6/20/2019**
Permit Type:	**E**
Description:	**Scope: RETROFIT EXISTING SYSTEM (E2018/2116) WHICH CONSISTS OF: (24) - 235 CANADIAN WATT SOLAR MODULES & (11) - 327 WATT SUNPOWER SOLAR MODULES (1) SOLAR EDGE SE6000H-US 240VAC WITH INTEGRATED DC DISCONNECT ADDING: (4) - 327 WATT SUNPOWER SOLAR MODULES WIRED AS (1) STRING OF (13) & (1) STRING OF (22) (2) TESLA POWERWALL 2 BATTERIES AT 13.5 KWH EACH. INSTALL A ENERGY METER (NON-UTILITY METER). PANELS MOUNTED ON ROOFTOP OF EXISTING 3 BEDROOM / 3 BATH DWELLING BUILT IN 2006. INVERTER, BATTERIES, NON-UTILITY METER MOUNTED ON WALL NEXT TO METER MAIN ON THIS SAME STRUCTURE. |Fee Summary: 1 feeder over 100A to 200A, (1)Renewable Energy System, (1) Non-Utility Meter == AMEND SCOPE OF WORK TO THE FOLLOWING: RETROFIT EXISTING SYSTEM (E2018/2116) WHICH CONSISTS OF: (24) - 235 CANADIAN WATT SOLAR MODULES & (11) - 327 WATT SUNPOWER SOLAR MODULES (1) SOLAR EDGE SE6000H-US 240VAC WITH INTEGRATED DC DISCONNECT ADDING: (4) - 327 WATT SUNPOWER SOLAR MODULES WIRED AS (1) STRING OF (13) & (1) STRING OF (22) (1) TESLA POWERWALL 2 BATTERIES AT 13.5 KWH EACH. INSTALL A ENERGY METER (NON-UTILITY METER). PANELS MOUNTED ON ROOFTOP OF EXISTING 3 BEDROOM / 3 BATH DWELLING BUILT IN 2006. INVERTER, BATTERIES, NON-UTILITY METER MOUNTED ON WALL NEXT TO METER MAIN ON THIS SAME STRUCTURE. lms 8/29/2019**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20191291
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MATIAS I BESASSO

Date:	**11/8/2018**
Permit Type:	**P**
Description:	**SOLAR WATER HEATER ON EXISTING SF DWL**
Permit Description:	**PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20181208
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	SHAWN P COULLAHAN

Date:	**11/1/2018**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-3BDRM/3BATH-2006**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20182116
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MATIAS I BESASSO

ADJOINING PROPERTY FINDINGS

Date: **12/19/2011**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-3BDRM/3BATH-2006, Scope: NEW GRID-TIED PHOTOVOLTAIC SOLAR POWER SYSTEM WHICH CONSIST OF 2 ARRAYS FOR A TOTAL OF 24-235 WATT CANADIAN SOLAR MODULES WITH 24-215 WATT ENPHASE ENVOY MICRO-INVERTER. ARRAY #1: 12-235 WATT CANADIAN SOLAR MODULES WITH 12-215 WATT ENPHASE ENVOY MICRO-INVERTER. ARRAY #2: 12-235 WATT CANADIAN SOLAR MODULES WITH 12-215 WATT ENPHASE ENVOY MICRO-INVERTER. PANELS & ENPHASE INVERTERS MOUNTED ON ROOFTOP OF EXISTING 3 BEDROOM/3 BATH DWELLING BUILT IN 2006. |Fee Summary: 1 feeder not over 100A, (2)Renewable Energy System**

Permit Description: **ELECTRICAL PERMIT, ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20113215
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: GERALD W LAU HEE

Date: **1/7/2008**
Permit Type: **B**
Description: **Now occupied as: DWELLING, GARAGE, OPEN BREEZEWAY |Scope: MAIN DWL ADD/ALT: NEW TRELLIS COVERED DECK |Dimensions: 15x24 360 sf |Walls: Partitions: Foundation: POST & PIER Floors: WOOD Roof: TRELLIS Ceiling: Basement: | NO SPECIAL INSPECTION REQUIRED**

Permit Description: **BUILDING PERMIT**
Work Class: 434 RESIDENTIAL - (ADD, ALTER, CONVERT)
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20080030
Status: EXPR
Valuation: $10,000.00
Contractor Company:
Contractor Name: LEEWARD FINISH AND REMODELING

ADJOINING PROPERTY FINDINGS

Date: **10/26/2007**
Permit Type: **E**
Description: **Scope:**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: E 20073699
Status: OPEN
Valuation: $650,000.00
Contractor Company:
Contractor Name: GODFREY G Y MAU

Date: **10/25/2007**
Permit Type: **P**
Description: **Now occupied as: N/A |Scope: DWL, OFFICE (PLAN REVIEW WAIVER) |Dimensions: Walls: 2X6, 2X4 Partitions: 2X6, 2X4 Foundation: CONC Floors: CONC Roof: CONC TILE Ceiling: GYP BD Basement: N/A | Plumbing Scope of Work: |6 lawn sprinklers per piping valve 1" 1 vacuum breaker or backflow protective device installed to piping or equipment served**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: P 20072543
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: GODFREY G Y MAU

ADJOINING PROPERTY FINDINGS

Date:	**5/23/2007**
Permit Type:	**CO-L**
Description:	**Now occupied as: N/A |Scope: DWL, OFFICE (PLAN REVIEW WAIVER) |Dimensions: Walls: 2X6, 2X4 Partitions: 2X6, 2X4 Foundation: CONC Floors: CONC Roof: CONC TILE Ceiling: GYP BD Basement: N/A**
Permit Description:	**CO - WAIVER RELEASE LETTER**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	CO-L 20070012
Status:	DONE
Valuation:	$650,000.00
Contractor Company:	
Contractor Name:	ARCHITECTURAL DESIGN & CONSTRUCTION, INC.

Date:	**5/23/2007**
Permit Type:	**CO-L**
Description:	**Now occupied as: N/A |Scope: DWL, OFFICE (PLAN REVIEW WAIVER) |Dimensions: Walls: 2X6, 2X4 Partitions: 2X6, 2X4 Foundation: CONC Floors: CONC Roof: CONC TILE Ceiling: GYP BD Basement: N/A**
Permit Description:	**CO - WAIVER RELEASE LETTER**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	CO-L 20070013
Status:	DONE
Valuation:	$650,000.00
Contractor Company:	
Contractor Name:	ARCHITECTURAL DESIGN & CONSTRUCTION, INC.

Date:	**10/2/2006**
Permit Type:	**P**
Description:	**Now occupied as: N/A |Scope: DWL, OFFICE (PLAN REVIEW WAIVER) |Dimensions: Walls: 2X6, 2X4 Partitions: 2X6, 2X4 Foundation: CONC Floors: CONC Roof: CONC TILE Ceiling: GYP BD Basement: N/A | Plumbing Scope of Work: |1 solar heater**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20062462
Status:	DONE
Valuation:	$650,000.00
Contractor Company:	
Contractor Name:	HALEAKALA SOLAR INC

Date:	**9/27/2006**
Permit Type:	**E**
Description:	**Scope: 1 SOLAR WATER HEATER**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20063327
Status:	DONE
Valuation:	$650,000.00
Contractor Company:	
Contractor Name:	ROBERT E HILBUN

ADJOINING PROPERTY FINDINGS

Date:	**6/19/2006**
Permit Type:	**P**
Description:	**Scope: DETACHED GARAGE |Plumbing Scope Of Work: Per Contractor and Gerdel Morgan of ADC, bathroom on approved plans. | 1 water closet 1 basin 1 bath tub 1 laundry tray 1 building sewer to lateral**
Permit Description:	**PLUMBING PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	P 20061537
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	ALFRED T BEARDSWORTH

Date:	**6/19/2006**
Permit Type:	**P**
Description:	**Now occupied as: N/A |Scope: DWL, OFFICE (PLAN REVIEW WAIVER) |Dimensions: Walls: 2X6, 2X4 Partitions: 2X6, 2X4 Foundation: CONC Floors: CONC Roof: CONC TILE Ceiling: GYP BD Basement: N/A |Plumbing Scope Of Work: |2 water closets 3 basins 2 bath tubs 1 shower 1 laundry tray 1 washing machine 1 sink 1 dishwasher 1 electric heater 1 building sewer to lateral**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20061546
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	ALFRED T BEARDSWORTH

ADJOINING PROPERTY FINDINGS

Date:	**5/18/2006**
Permit Type:	**E**
Description:	**Scope: Underground service 120/240V to 200A, 1PH, 3W, 2 feeders not over 100A, 2936 sq. ft......ONE METER ONLY ALLOWED FOR THIS DWELLING**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20061617
Status:	OPEN
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MICHAEL L YAP

Date:	**5/18/2006**
Permit Type:	**E**
Description:	**Scope: 500 sq. ft......METER NOT ALLOWED FOR THIS STRUCTURE**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	438 ADDITIONS OF RES GARAGES/CARPORT
Proposed Use:	U-1 PVT GARAGE,CARPORT,SHED,AG BLDG
Permit Number:	E 20061616
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MICHAEL L YAP

Date: **5/3/2006**
Permit Type: **B**
Description: **Now occupied as: N/A |Scope: DWL, OFFICE (PLAN REVIEW WAIVER) |Dimensions: Walls: 2X6, 2X4 Partitions: 2X6, 2X4 Foundation: CONC Floors: CONC Roof: CONC TILE Ceiling: GYP BD Basement: N/A**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20060962
Status: DONE
Valuation: $650,000.00
Contractor Company:
Contractor Name: ARCHITECTURAL DESIGN & CONSTRUCTION, INC.

Date: **5/3/2006**
Permit Type: **B**
Description: **Scope: DETACHED GARAGE |*6/22/09 - CO-L issued on May 23, 2007 - T Hashimoto**

Permit Description: **BUILDING PERMIT**
Work Class: 438 ADDITIONS OF RES GARAGES/CARPORT
Proposed Use: U-1 PVT GARAGE,CARPORT,SHED,AG BLDG
Permit Number: B 20060963
Status: DONE
Valuation: $100,000.00
Contractor Company:
Contractor Name: ARCHITECTURAL DESIGN & CONSTRUCTION, INC.

Date: **4/13/2006**
Permit Type: **B**
Description: **Scope: Retaining Wall (162' x 6')**

Permit Description: **BUILDING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: B 20060833
Status: EXPR
Valuation: $29,160.00
Contractor Company:
Contractor Name:

Date: **4/13/2006**
Permit Type: **G-RS**
Description: **Fill: 400 CY Excavate: 100 CY Grubb: 0.26**

Permit Description: **MINOR GRADING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use: U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number: G-RS 20060093
Status: OPEN
Valuation: $0.00
Contractor Company:
Contractor Name:

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Date: **4/16/2015**
Permit Type: **E**
Description: **MAIN DWELLING,GARAGE, COVD ENTRY/LANAI**

Permit Description: **ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20151157
Status: OPEN
Valuation: $425,195.00
Contractor Company:
Contractor Name: JEFFREY T TAKEMOTO

Date: **2/24/2015**
Permit Type: **P**
Description: **MAIN DWELLING-SOLAR WATER HEATER**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20150192
Status: DONE
Valuation: $425,195.00
Contractor Company:
Contractor Name: MAUI PACIFIC SOLAR INC

Date: **8/14/2014**
Permit Type: **P**
Description: **MAIN DWELLING,GARAGE, COVD ENTRY/LANAI**

Permit Description: **PLUMBING PERMIT**
Work Class:
Proposed Use:
Permit Number: P 20140988
Status: DONE
Valuation: $425,195.00
Contractor Company:
Contractor Name: HAROLD J MONIZ

Date: **5/15/2014**
Permit Type: **B**
Description: **CMU RETAINING WALL**

Permit Description: **BUILDING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:
Permit Number: B 20140680
Status: EXPR
Valuation: $20,850.00
Contractor Company:
Contractor Name:

Date: **5/15/2014**
Permit Type: **B**
Description: **MAIN DWELLING,GARAGE, COVD ENTRY/LANAI**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number: B 20140679
Status: EXPR
Valuation: $425,195.00
Contractor Company:
Contractor Name: RAMON ALVIOR

Date: **5/15/2014**
Permit Type: **G-RS**
Description: **CMU RETAINING WALL**

Permit Description: **MINOR GRADING PERMIT**
Work Class: 704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:
Permit Number: G-RS 20140033
Status: DONE
Valuation: $20,850.00
Contractor Company:
Contractor Name:

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Date: **4/10/2007**
Permit Type: **E**
Description: **Scope: Underground service, 1PH, 3W, 120/240V to 200A, 1 Feeder over 100-200A, 2476 sq ft., 1 Motor over 1-3HP.......ONE METER ONLY ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20071183
Status: DONE
Valuation: $300,000.00
Contractor Company:
Contractor Name: PAUL P PACUBAS

Date: **3/20/2007**
Permit Type: **P**
Description: **Now occupied as: Vacant Lot |Scope: Dwelling, 2-Car Garage, Covered Patio (1-Story) |Plumbing Scope of Work: |1 solar heater**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20070719
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: MAUI PACIFIC SOLAR INC

Date: **1/16/2007**
Permit Type: **P**
Description: **Now occupied as: Vacant Lot |Scope: Dwelling, 2-Car Garage, Covered Patio (1-Story) |Dimensions: 54x52 1,800 sf- living 487 sf- garage 188 sf- cov. lanai |Walls: 2x4, stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete Roof: arch 80 Ceiling: gyp brd Basement: |Plumbing Scope of Work: |3 water closets 4 basins 2 bath tubs 1 shower 1 laundry tray 1 washing machine 1 sink 1 dishwasher 1 garbage disposal 1 electric heater 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20070083
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: HAROLD J MONIZ

Date: **11/28/2006**
Permit Type: **B**
Description: **Now occupied as: Vacant Lot |Scope: Dwelling, 2-Car Garage, Covered Patio (1-Story) |Dimensions: 54x52 1,800 sf- living 487 sf- garage 188 sf- cov. lanai |Walls: 2x4, stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete Roof: arch 80 Ceiling: gyp brd Basement:**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20062584
Status: DONE
Valuation: $300,000.00
Contractor Company:
Contractor Name: FLORO DELLA

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Date: **5/21/2008**
Permit Type: **E**
Description: **Scope: Underground service 1ph, 3w, 120/240V to 200A, 1 feeder over 100A to 200A, 3753 sq. ft.....ONE METER ONLY ALLOWED FOR THIS DWELLING**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20081396
Status: DONE
Valuation: $400,000.00
Contractor Company:
Contractor Name: PAUL P PACUBAS

Date:	**12/4/2007**
Permit Type:	**P**
Description:	**Now occupied as: Vacant Lot |Scope: Main Dwelling, Garage, Covered Lanai |Dimensions: 54x54 2,792 sf- living 553 sf- garage/storage 408 sf- cov. lanai/entry |Walls: cmu, 2 x 4 Partitions: 2 x 4 studs Foundation: concrete Floors: concrete Roof: monier Ceiling: gyp board Basement: na |SPECIAL INSPECTION REQUIRED BY ENGINEER Joel Corpuz for item 7 |Plumbing Scope of Work: |5 water closets 7 basins 1 bath tubs 2 shower 1 laundry tray 1 washing machine 1 sink 1 garbage disposal 1 heaters-electric 1 refrigerator 2 spa (jacuzzi) 1 building sewer to lateral**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	P 20072876
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	BADUA CONTRACTING LLC

Date:	**10/5/2007**
Permit Type:	**B**
Description:	**Now occupied as: Vacant Lot |Scope: Main Dwelling, Garage, Covered Lanai |Dimensions: 54x54 2,792 sf- living 553 sf- garage/storage 408 sf- cov. lanai/entry |Walls: cmu, 2 x 4 Partitions: 2 x 4 studs Foundation: concrete Floors: concrete Roof: monier Ceiling: gyp board Basement: na |SPECIAL INSPECTION REQUIRED BY ENGINEER Joel Corpuz for item 7**
Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number:	B 20072075
Status:	DONE
Valuation:	$400,000.00
Contractor Company:	
Contractor Name:	GEOFFREY'S CONSTRUCTION INC

Date:	**10/5/2007**
Permit Type:	**B**
Description:	**Scope: CMU Retaining Wall |94' x 6' | SPECIAL INSPECTION REQUIRED BY ENGINEER Joel Corpuz for item 7**
Permit Description:	**BUILDING PERMIT**
Work Class:	704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:	U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number:	B 20072076
Status:	DONE
Valuation:	$11,280.00
Contractor Company:	
Contractor Name:	GEOFFREY'S CONSTRUCTION INC

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Date:	**5/26/2009**
Permit Type:	**B**
Description:	**Scope: APPROX 6' CMU RETAINING WALLS (271' L X 6' H) |No special inspection required.**
Permit Description:	**BUILDING PERMIT**
Work Class:	704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:	U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number:	B 20090605
Status:	EXPR
Valuation:	$40,000.00
Contractor Company:	
Contractor Name:	

ADJOINING PROPERTY FINDINGS

Date:	**5/26/2009**
Permit Type:	**G-RS**
Description:	**Fill: 0 Excavate:136 Grubb: 1528 SQ FT HEIGHT: 6 FEET**
Permit Description:	**MINOR GRADING PERMIT**
Work Class:	704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:	U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number:	G-RS 20090042
Status:	DONE
Valuation:	$40,000.00
Contractor Company:	
Contractor Name:	

Date:	**5/23/2007**
Permit Type:	**E**
Description:	**Scope: Underground service, 1PH, 3W, 120/240V to 200A, 1 Feeder over 100-200A, 3402 sq ft............ONE METER ONLY ALLOWED FOR THIS DWELLING.**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20071834
Status:	DONE
Valuation:	$325,000.00
Contractor Company:	
Contractor Name:	PAUL P PACUBAS

ADJOINING PROPERTY FINDINGS

Date:	**12/27/2006**
Permit Type:	**P**
Description:	**Now occupied as: N/A |Scope: 2 STORY DWL, GARAGE, COV'D LANAI, PLAY RM W/WET BAR |Dimensions: Walls: 2X4, 2X6 Partitions: 2X4 Foundation: CONC Floors: CONC, WOOD Roof: PRESIDENTIAL Ceiling: GYP BD Basement: N/A |SPECIAL INSPECTION REQUIREMENT BY ENGINEER JOEL N. CORPUZ FOR #2. |Plumbing Scope of Work: |5 water closets 4 basinis 4 bath tub 1 laundry tray 1 washing machine 1 sink 1 Bar sink 1 electric heater 1 building sewer to present sewer**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20063205
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	BADUA CONTRACTING LLC

Date:	**10/3/2006**
Permit Type:	**B**
Description:	**Now occupied as: N/A |Scope: 2 STORY DWL, GARAGE, COV'D LANAI, PLAY RM W/WET BAR |Dimensions: Walls: 2X4, 2X6 Partitions: 2X4 Foundation: CONC Floors: CONC, WOOD Roof: PRESIDENTIAL Ceiling: GYP BD Basement: N/A |SPECIAL INSPECTION REQUIREMENT BY ENGINEER JOEL N. CORPUZ FOR #2.**
Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	B 20062151
Status:	DONE
Valuation:	$325,000.00
Contractor Company:	
Contractor Name:	DANTE S AGRA

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Date: **12/19/2011**
Permit Type: **E**
Description: **GRID-TIED PV SYSTEM-5BDRM/3BATH-2007, Scope: NEW GRID-TIED PHOTOVOLTAIC SOLAR POWER SYSTEM WHICH CONSIST OF 2 ARRAYS FOR A TOTAL OF 24-235 WATT CANADIAN SOLAR MODULES WITH 24-215 WATT ENPHASE ENVOY MICRO-INVERTER. ARRAY #1: 12-235 WATT CANADIAN SOLAR MODULES WITH 12-215 WATT ENPHASE ENVOY MICRO-INVERTER. ARRAY #2: 12-235 WATT CANADIAN SOLAR MODULES WITH 12-215 WATT ENPHASE ENVOY MICRO-INVERTER. PANELS & ENPHASE INVERTERS MOUNTED ON ROOFTOP OF EXISTING 5 BEDROOM/3 BATH DWELLING BUILT IN 2007. |Fee Summary: 1 feeder not over 100A, (2)Renewable Energy System**

Permit Description: **ELECTRICAL PERMIT, ELECTRICAL PERMIT**
Work Class:
Proposed Use:
Permit Number: E 20113214
Status: DONE
Valuation: $0.00
Contractor Company:
Contractor Name: GERALD W LAU HEE

Date: **3/13/2008**
Permit Type: **E**
Description: **Scope: Underground service 1ph, 3w, 120/240V to 200A, 2 feeders not over 100A, 4437 sq. ft.....ONE METER ONLY ALLOWED FOR THIS DWELLING.**

Permit Description: **ELECTRICAL PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: E 20080804
Status: OPEN
Valuation: $400,000.00
Contractor Company:
Contractor Name: LAU HEE ELECTRIC INC

Date: **8/21/2007**
Permit Type: **P**
Description: **Now occupied as: Vacantl Lot |Scope: New 2-Story Dwelling, Garage, Covered Deck |Dimensions: 50x48 3,787 sf - living 520 sf - garage 85 sf- cov. entry 130 sf- uncov. deck |Walls: 2x4, stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete, wood Roof: monier tile Ceiling: gyp brd Basement: (na) |NO SPECIAL INSPECTION REQUIRED |Plumbing Scope of Work: |3 water closet 5 basins 2 bath tubs 1 showers 1 laundry tray 1 washing machine 1 sink 1 bar sink 1 heaters-electric 1 building sewer to lateral**

Permit Description: **PLUMBING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: P 20072085
Status: EXPR
Valuation: $0.00
Contractor Company:
Contractor Name: BADUA CONTRACTING LLC

Date: **7/18/2007**
Permit Type: **B**
Description: **Now occupied as: Vacantl Lot |Scope: New 2-Story Dwelling, Garage, Covered Deck |Dimensions: 50x48 3,787 sf - living 520 sf - garage 85 sf- cov. entry 130 sf- uncov. deck |Walls: 2x4, stucco Partitions: 2x4, gyp brd Foundation: concrete Floors: concrete, wood Roof: monier tile Ceiling: gyp brd Basement: (na) |NO SPECIAL INSPECTION REQUIRED**

Permit Description: **BUILDING PERMIT**
Work Class: 101 SINGLE FAMILY, DETACHED
Proposed Use: R-3 DWLS/LODGING HSE/CONGREGATE RES U-1 PVT
Permit Number: B 20071505
Status: DONE
Valuation: $400,000.00
Contractor Company:
Contractor Name:

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Date:	**4/20/2015**
Permit Type:	**E**
Description:	**GRID-TIED PV SYSTEM-3BDRM/4 1/2BATH-2006**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	
Proposed Use:	
Permit Number:	E 20151228
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	NO PROBLEM ELECTRIC INC

Date:	**7/9/2007**
Permit Type:	**P**
Description:	**Now occupied as: VACANT |To be occupied as: DWELLING/GARAGE/COV.LANAIS: GARAGE, MASTER BEDROOM/BATH/WALK IN CLOSET/POWDER ROOM, LAUNDRY ROOM, GREAT ROOM, KITCHEN, DINING ROOM, TV ROOM, BEDROOM, 2 BATHROOMS, COVERED LANAIS, POOL EQUIP. ROOM. |Dimensions: 114x44 2,676 sf- living 528 sf- garage 820 sf- cov. lanai Walls: 2X4 Partitions: 2X4 Foundation: CONC Floors: CONC Roof: COMP SHINGLES Ceiling: GYP BD Basement: NA |Plumbing scope of work: |1 Solar water heater for existing SF Main Dwelling.**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20071782
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	HALEAKALA SOLAR INC

Date:	**7/9/2007**
Permit Type:	**E**
Description:	**...SOLAR WATER HEATER ON EXISTING MAIN DWELLING (4216 SF DWELLING)**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20072411
Status:	DONE
Valuation:	$350,000.00
Contractor Company:	
Contractor Name:	ROBERT E HILBUN

Date:	**9/8/2006**
Permit Type:	**E**
Description:	**Scope: Underground service, 1PH, 3W, 120/240V to 200A, 1 Feeder overr 100 to 200A, 4216 sq ft, 2 Motor over 1 to 3HP......ONE METER ONLY ALLOWED FOR THIS DWELLING.**
Permit Description:	**ELECTRICAL PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	E 20063114
Status:	OPEN
Valuation:	$350,000.00
Contractor Company:	
Contractor Name:	ANTOINE J LOPES

ADJOINING PROPERTY FINDINGS

Date:	**7/21/2006**
Permit Type:	**P**
Description:	**Now occupied as: VACANT |To be occupied as: DWELLING/GARAGE/COV.LANAIS: GARAGE, MASTER BEDROOM/BATH/WALK IN CLOSET/POWDER ROOM, LAUNDRY ROOM, GREAT ROOM, KITCHEN, DINING ROOM, TV ROOM, BEDROOM, 2 BATHROOMS, COVERED LANAIS, POOL EQUIP. ROOM. |Dimensions: 114x44 2,676 sf- living 528 sf- garage 820 sf- cov. lanai Walls: 2X4 Partitions: 2X4 Foundation: CONC Floors: CONC Roof: COMP SHINGLES Ceiling: GYP BD Basement: NA |Plumbing Scope Of Work: |5 water closets 6 basins 3 bath tubs 2 showers 2 laundry trays 1 washing machine 1 sink 1 dishwasher 1 garbage disposal 1 refrigerator 1 plumbing piping without fixtures 1 buildng sewer to lateral**
Permit Description:	**PLUMBING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	P 20061863
Status:	DONE
Valuation:	$0.00
Contractor Company:	
Contractor Name:	JOWELL PLUMBING

Date:	**7/10/2006**
Permit Type:	**B**
Description:	**Now occupied as: VACANT |To be occupied as: DWELLING/GARAGE/COV.LANAIS: GARAGE, MASTER BEDROOM/BATH/WALK IN CLOSET/POWDER ROOM, LAUNDRY ROOM, GREAT ROOM, KITCHEN, DINING ROOM, TV ROOM, BEDROOM, 2 BATHROOMS, COVERED LANAIS, POOL EQUIP. ROOM. |Dimensions: 114x44 2,676 sf- living 528 sf- garage 820 sf- cov. lanai Walls: 2X4 Partitions: 2X4 Foundation: CONC Floors: CONC Roof: COMP SHINGLES Ceiling: GYP BD Basement: NA**
Permit Description:	**BUILDING PERMIT**
Work Class:	101 SINGLE FAMILY, DETACHED
Proposed Use:	R-3 DWLS/LODGING HSE/CONGREGATE RES
Permit Number:	B 20061522
Status:	DONE
Valuation:	$350,000.00
Contractor Company:	
Contractor Name:	

ADJOINING PROPERTY FINDINGS

Date:	**7/10/2006**
Permit Type:	**B**
Description:	**CMU RETAINING WALL AT REAR AND LEFT OF PROPERTY. 3-6 FEET.**
Permit Description:	**BUILDING PERMIT**
Work Class:	704 FENCES, RETAINING WALL, SEAWALLS, ETC.
Proposed Use:	U-2 FENCES,RETAINING WALLS,POOLS,TANKS,TOWER
Permit Number:	B 20061523
Status:	DONE
Valuation:	$15,000.00
Contractor Company:	
Contractor Name:	

GLOSSARY

General Building Department concepts

- **ICC:** The International Code Council. The governing body for the building/development codes used by all jurisdictions who've adopted the ICC guidelines. MOST of the US has done this. Canada, Mexico, and other countries use ICC codes books and guides as well. There are a few states who have added guidelines to the ICC codes to better fit their needs. For example, California has added seismic retrofit requirements for most commercial structures.
- **Building Department (Permitting Authority, Building Codes, Inspections Department, Building and Inspections):** This is the department in a jurisdiction where an owner or contractor goes to obtain permits and inspections for building, tearing down, remodeling, adding to, re-roofing, moving or otherwise making changes to any structure, Residential or Commercial.
- **Jurisdiction:** This is the geographic area representing the properties over which a Permitting Authority has responsibility.
- **GC:** General Contractor. Usually the primary contractor hired for any Residential or Commercial construction work.
- **Sub:** Subordinate contracting companies or subcontractors. Usually a "trades" contractor working for the GC. These contractors generally have an area of expertise in which they are licensed like Plumbing, Electrical, Heating and Air systems, Gas Systems, Pools etc. (called "trades").
- **Journeymen:** Sub contractors who have their own personal licenses in one or more trades and work for different contracting companies, wherever they are needed or there is work.
- **HVAC (Mechanical, Heating & Air companies):** HVAC = Heating, Ventilation, and Air Conditioning.
- **ELEC (Electrical, TempPole, TPole, TPower, Temporary Power, Panel, AMP Change, Power Release):** Electrical permits can be pulled for many reasons. The most common reason is to increase the AMPs of power in an electrical power panel. This requires a permit in almost every jurisdiction. Other commons reason for Electrical permits is to insert a temporary power pole at a new construction site. Construction requires electricity, and in a new development, power has yet to be run to the lot. The temporary power pole is usually the very first permit pulled for new development. The power is released to the home owner when construction is complete and this sometimes takes the form of a Power Release permit or inspection.
- **"Pull" a permit:** To obtain and pay for a building permit.
- **CBO:** Chief Building Official
- **Planning Department:** The department in the development process where the building /structural plans are reviewed for their completeness and compliance with building codes
- **Zoning Department:** The department in the development process where the site plans are reviewed for their compliance with the regulations associated with the zoning district in which they are situated.
- **Zoning District:** A pre-determined geographic boundary within a jurisdiction where certain types of structures are permitted / prohibited. Examples are Residential structure, Commercial/Retail structures, Industrial/Manufacturing structures etc. Each zoning district has regulations associated with it like the sizes of the lots, the density of the structures on the lots, the number of parking spaces required for certain types of structures on the lots etc.
- **PIN (TMS, GIS ID, Parcel#):** Property Identification Number and Tax Map System number.
- **State Card (Business license):** A license card issued to a contractor to conduct business.
- **Building Inspector (Inspector):** The inspector is a building department employee that inspects building construction for compliance to codes.
- **C.O.:** Certificate of Occupancy. This is the end of the construction process and designates that the owners now have permission to occupy a structure after its building is complete. Sometimes also referred to as a Certificate of Compliance.

GLOSSARY

Permit Content Definitions

- Permit Number: The alphanumerical designation assigned to a permit for tracking within the building department system. Sometimes the permit number gives clues to its role, e.g. a "PL" prefix may designate a plumbing permit.
- Description: A field on the permit form that allows the building department to give a brief description of the work being done. More often than not, this is the most important field for EP's to find clues to the prior use (s) of the property.
- Permit Type: Generally a brief designation of the type of job being done. For example BLDG-RES, BLDG-COM, ELEC, MECH etc.

Sample Building Permit Data

Date: Nov 09, 2000
Permit Type: Bldg -
New Permit Number: 101000000405
Status: Valuation: $1,000,000.00
Contractor Company: OWNER-BUILDER
Contractor Name:

Description: New one store retail (SAV-ON) with drive-thru pharmacy. Certificate of Occupancy.

Wailuku Maui Phase I ESA
101 Kuikahi Drive
Wailuku, HI 96793

Inquiry Number: 7026358.5
June 23, 2022

The EDR-City Directory Image Report

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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Data by
infoUSA®

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	***Target Street***	***Cross Street***	***Source***
2017	☑	☑	EDR Digital Archive
2014	☑	☑	EDR Digital Archive
2010	☑	☑	EDR Digital Archive
2005	☑	☑	EDR Digital Archive
2000	☑	☑	EDR Digital Archive
1995	☑	☑	EDR Digital Archive
1992	☑	☑	EDR Digital Archive

FINDINGS

TARGET PROPERTY STREET

101 Kuikahi Drive
Wailuku, HI 96793

Year	***CD Image***	***Source***
KUIKAHI DR		
2017	pg A2	EDR Digital Archive
2014	pg A4	EDR Digital Archive
2010	pg A7	EDR Digital Archive
2005	pg A9	EDR Digital Archive
2000	pg A11	EDR Digital Archive
1995	pg A13	EDR Digital Archive
1992	pg A15	EDR Digital Archive

FINDINGS

CROSS STREETS

Year	CD Image	Source
HONOAPIILANI HWY		
2017	pg. A1	EDR Digital Archive
2014	pg. A3	EDR Digital Archive
2010	pg. A6	EDR Digital Archive
2005	pg. A8	EDR Digital Archive
2000	pg. A10	EDR Digital Archive
1995	pg. A12	EDR Digital Archive
1992	pg. A14	EDR Digital Archive

City Directory Images

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

HONOAPIILANI HWY 2017

517	HAMAMURA, WAYNE T
523	HAMAMURA, WAYNE
529	DUPONT, PETRA M
1442	POLIDO, RENEE L
1450	HALL, DARREL G
1458	SUPNET, LAURALINE R
	TING, ALLEN Y
1470	MATTOS, MOSES A
1476	BRUDDAH WILLYS STICKY RIBS
	MAUI FLAVORS CATERING
1484	EVERYTHINGS YOUNG & ROSIE
1486	WAIKAPU ON 30
1494	RAWSON, JOHN B
1510	BUMANGLAG, MANUEL B
1670	BRUDDAH WILLYS STICKY RIBS
	FLYIN HAWAIIAN ZIPLINE
	KUMU FARMS
	MAUI FLAVORS CATERING
	MAUI TROPICAL PLANTATION
	MAUI ZIPLINE COMPANY
2500	KAHILI GOLF COURSE
	THE KING KAMEHAMEHA GOLF CLUB
3959	ALOHA CONCIERGE

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

KUIKAHI DR 2017

331	JIMENEZ, JAI
332	HASEGAWA, EARL A
345	COSMA, FRANCIS F
352	WAKI, ROBERT M
353	FORONDA, ROLANDO R
363	FRITTER, DALLAS S
369	WIETZEL, JEAN
371	WU, SHU
375	ESKYFLAVOR
	HAIKU HOT YOGA MAUI
382	FUJIMOTO, DON S
412	SHIMABUKU, EDDIE N
413	VU, HUNG M
421	CANHA, ROBERT J
429	WAKAMATSU, DIANE A
442	BAL, BERYL M
449	BREEN, JOHN J
453	WAKI, DANIEL I
463	HAMAI, ADEL S
471	KIYONAGA, THELMA Y
472	FREY, WERNER E
479	SHISHIDO, COLLEEN N
509	PAET, ROMEO A
512	MORRIS, THOMAS E
515	DILGER, CHARLES E
519	UNEMORI, JOY M
523	ALTURA, GEOFFREY G
526	AZEKA, JANE T
527	BYRD, ROGER
531	NAKAMURA, CRAIG G
534	VELASCO, GARRY S
547	ROBBINS, KAREN K
553	FILIPELLI, GERALD R
559	TASAKI, MITCHELL N
560	KWAK, JAE D
565	ABREU, VIVIAN A
566	KIM, K
575	BALANGITAO, JOSEPH J
576	OCONNOR, ROBERT J
585	BROWN, F
586	HEDANI, WAYNE N
595	SPALLINO THOS MD & LAUREN
	SPALLINO, THOMAS O
602	GRANGER, MATHEW S
606	PURSLEY, WILLIAM E

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

HONOAPIILANI HWY 2014

517	OCCUPANT UNKNOWN,
523	HAMAMURA M DR
	HAMAMURA, WAYNE
529	OCCUPANT UNKNOWN,
549	YOKOUCHI, JON M
1292	SARDINHA, WILSAND
1442	KAAHANUI, MARILYN I
1450	HALL, DARREL G
1458	ESTABILLO, ROSA P
	VILLANUEVA, MARIO
1470	MATTOS, MOSES A
1476	DAVIS, JEFFERSON L
1482	GOMEZ, KATHRINE
1484	EVERYTHINGS YOUNG & ROSIE
1486	WAIKAPU ON 30
1490	SUZUKI, CLAYTON S
1494	RAWSON, JOHN B
1510	BUMANGLAG, MANUEL B
1670	BRUDDAH WILLYS STICKY RIBS
	FLYIN HAWAIIAN ZIPLINE
	KUMU FARMS
	MAUI FLAVORS CATERING
	MAUI TROPICAL PLANTATION
	MAUI ZIPLINE COMPANY
	WIKI ENTERPRISE
2500	KAHILI GOLF COURSE
	KAHILI RESTAURANT
	KING KAMEHAMEHA GOLF CLUB THE
	MMK MAUI LP
5452	COURTEMANCHE, RANDY J

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

KUIKAHI DR 2014

307	HARRISON, KAIKOO
331	JIMENEZ, JAI
332	HASEGAWA, EARL A
333	VALOROSO, JEREMY
335	LUTHY, SUSAN A
345	COSMA, FRANCIS F
352	WAKI, ROBERT M
353	FORONDA, ROLANDO R
363	JANUS, JAN D
369	OCCUPANT UNKNOWN,
371	KIM, MICHAEL E
379	YAMASHIRO, MICHAEL N
382	FUJIMOTO, DON S
412	SHIMABUKU, EDDIE N
413	VU, HUNG M
421	CANHA, ROBERT J
429	WAKAMATSU, DIANE A
441	KODAMA, KYLE R
442	BAL, BERYL M
449	BREEN, JOHN J
453	OCCUPANT UNKNOWN,
463	HAMAI, ADEL S
471	KIYONAGA, EDWARD S
472	FREY, WERNER G
479	SHISHIDO, ROBERT T
509	PAET, ROMEO A
512	MORRIS, THOMAS E
515	DILGER, CHARLES E
519	UNEMORI, JOY M
523	ALTURA, GEOFFREY G
526	AZEKA, JANE T
527	TAKAHASHI, DONNA J
531	NAKAMURA, CRAIG G
534	VELASCO, GARRY S
535	OCCUPANT UNKNOWN,
541	KAM, MICHAEL E
547	ROBBINS, KAREN K
548	KHALAFALLA, SAM S
553	OCCUPANT UNKNOWN,
555	HENDRIXSON, DAVID
559	OCCUPANT UNKNOWN,
560	OCCUPANT UNKNOWN,
565	ABREU, VIVIAN A
566	OHARA, MARIANN
575	BALANGITAO, JOSEPH J
576	OCONNOR, ROBERT J
585	PARDUCCI, KIMBERLY
586	HEDANI, WAYNE N
595	SPALLINO THOS MD & LAUREN
	SPALLINO, THOMAS O

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

KUIKAHI DR 2014 (Cont'd)

596	OAK, SUSAN D
606	PURSLEY, WILLIAM E

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

HONOAPIILANI HWY 2010

517	HAMAMURA, WAYNE T
523	HAMAMURA, MASAMI
529	OCCUPANT UNKNOWN,
549	YOKOUCHI, JON M
970	HENDRICKS, MATTHEW
995	CARRARI, KIMBERLEE
1442	RIVAS, CARLOS L
1450	HALL, DARREL G
1458	ESTABILLO, ROSA P
	VILLANUEVA, MARIO
1460	SHATTO, LA D
1470	MATTOS, MOSES A
1476	MAUI FLAVORS CATERING
1486	WAIKAPU ON 30
1490	SUZUKI, CLAYTON S
1494	FARMER, R
1670	MAUI TROPICAL PLANTATION
	NTA PACIFIC
	PINEAPPLES & MORE
2500	KAHILI GOLF COURSE
	KAHILI RESTAURANT
	KING KAMEHAMEHA GOLF CLUB
	MMK MAUI LP
3911	OCCUPANT UNKNOWN,
5452	COURTEMANCHE, RANDY J

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

KUIKAHI DR 2010

330	NELSON, DON A
332	HASEGAWA, EARL A
333	VALOROSO, JEREMY
335	WOESSNER JAMES W MD
	WOESSNER, JAMES W
345	COSMA, FRANCIS F
352	WAKI, ROBERT M
353	FORONDA, ROLANDO R
363	JANUS, JAN D
369	TABBAL, RODOLPO R
371	OCCUPANT UNKNOWN,
379	YAMASHIRO, MICHAEL N
382	FUJIMOTO, DON S
412	SHIMABUKU, EDDIE N
421	CANHA, ROBERT J
429	WAKAMATSU, DIANE A
441	KODAMA, KYLE R
442	BAL, BERY M
443	FILIPELLI, MALIA M
449	BREEN, JOHN J
453	WAKI, DANIEL I
463	HAMAI, CLIFFORD T
471	KIYONAGA, THELMA Y
472	FREY, WERNER G
479	SHISHIDO, ROBERT T
509	PAET, ROMEO A
512	MORRIS, THOMAS E
515	AMERICAN ELECTRIC
	DILGER, CHARLES E
519	UNEMORI, JOY M
523	ALTURA, ESTHER P
526	PFISTER, STEPHEN J
527	TAKAHASHI, SHERYL A
531	NAKAMURA, CRAIG G
534	VELASCO, ABSALON S
540	CAIRES, CAROLYN
541	OCCUPANT UNKNOWN,
547	ROBBINS, KAREN K
553	FILIPELLI, GERALD R
559	CHONG, LAURA J
565	ABREU, VIVIAN A
566	OCCUPANT UNKNOWN,
575	BALANGITAO, JOSEPH J
576	OCONNOR, ROBERT J
585	BAYRON, ANDREW P
586	HEDANI, WAYNE N
595	SPALLINO, THOMAS J
596	OAK, SUSAN D
602	OCCUPANT UNKNOWN,
606	PURSLEY, WILLIAM E

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

HONOAPIILANI HWY 2005

517	HAMAMURA, WAYNE T
523	HAMAMURA, MASAMI
529	DUPONT, PETRA K
549	YOKOUCHI, JON M
995	CARRARI, KIMBERLEE
1292	RICHARDS, DON
1442	KAAHANUI, MARILYN L
1450	HALL, DARREL G
	PROFESSIONAL COMMUNICATIONS LLC
1476	ETY INC
1484	CUTTING EDGE CORP
	PROPERTIES LLC
1486	MAUI SIGNS
1670	MAUI TROPICAL PLANTATION
2500	GRAND WAIKAPU COUNTRY CLUB
	HFJ WAIKAPU INC
	MAUI BANQUETS
	MMK MAUI LP
	SANDALWOOD GOLF COURSE INC
	THE KING KAMEHAMEHA GOLF CLUB
3911	LAZEAR, DAVID G

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

KUIKAHI DR 2005

330	NELSON, DON A
332	HASEGAWA, EARL A
338	KAIWI, JULIA H
345	COSMA, FRANCIS F
352	WAKI, ROBERT M
353	FORONDA, ROLANDO R
363	MONIZ, CLIFFORD K
369	TABBAL, RODOLPO
371	KIM, MICHAEL E
379	OCCUPANT UNKNOWN,
382	FUJIMOTO, DON S
412	SHIMABUKU, EDDIE N
421	OCCUPANT UNKNOWN,
429	OCCUPANT UNKNOWN,
442	BAL, KIMBERLY A
449	MORGAN, JERRY A
453	WAKI, DANIEL I
463	HAMAI, NICHOLE S
471	KIYONAGA, THELMA Y
472	FREY, WERNER G
479	SHISHIDO, ROBERT T
509	PAET, ROMEO A
512	OCCUPANT UNKNOWN,
515	DILGER, CHARLES E
523	ALTURA, ESTHER P
526	PFISTER, STEPHEN J
527	TAKAHASHI, DONNA J
531	NAKAMURA, CRAIG E
535	OCCUPANT UNKNOWN,
541	KAM, MICHAEL E
547	ROBBINS, KAREN K
553	FILIPELLI, GERALD R
559	TASAKI, MITCHELL N
560	OCCUPANT UNKNOWN,
565	ABREU, VIVIAN A
566	VANNGUYEN, LONG
575	BALANGITAO, JOSEPH J
576	OCONNOR, ROBERT J
585	BAYRON, ANDREW P
586	HEDANI, WAYNE N
595	SPALLINO, THOMAS J
602	BURSEAU, GREGORY K
606	PURSLEY, WILLIAM E

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

HONOAPIILANI HWY 2000

450	LAZEAR, DAVID
	REEDY, JAMES
451	ELUA, J
455	RAPACZ, JOHN S
457	FURMATO, MICHAEL V
517	HAMAMURA, D
523	HAMAMURA, M
529	OBER, S
549	YOKOUCHI, MASARU
970	PIZARRO, REYES G
1486	MAUI SIGNS
1670	MAUI TROPICAL PLANTATION
	NTA PACIFIC
2500	GRAND WAIKAPU COUNTRY CLUB BANQUET SERVICES
	GRAND WAIKAPU COUNTRY CLUB MONROES
	GRAND WAIKAPU COUNTRY CLUB PRO SHOP
	GRAND WAIKAPU COUNTRY CLUB THE GRILL
	GRAND WAIKAPU RESORT GOLF & SPA ACCOUNTING
	GRAND WAIKAPU RESORT GOLF & SPA ADMINISTRATION
	GRAND WAIKAPU RESORT GOLF & SPA DIRECTOR OF GOLF
	GRND WAIKAPU RESRT GOLF & SPA GOLF CRS MAINTENANCE
	GRND WAIKAPU RESRT GOLF & SPA GRND WAIKAPU COUNTRY
	GRND WAIKAPU RESRT GOLF & SPA S&ALWOOD GOLF CRS
	SANDALWOOD GOLF COURSE BANQUET SERVICES
	SANDALWOOD GOLF COURSE PRO SHOP
	SANDALWOOD GOLF COURSE SANDALWOOD RESTAURANT

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

KUIKAHI DR 2000

335	OCCUPANT UNKNOWN,
345	COSMA, FRANCIS
352	WAKI, ROBERT
353	FORONDA, ROLAND
363	YAP, ALLEN
369	OCCUPANT UNKNOWN,
371	KIM, MICHAEL E
382	FUJIMOTO, DON S
412	SHIMABUKU, EDWARD N
442	OCCUPANT UNKNOWN,
449	OCCUPANT UNKNOWN,
463	OCCUPANT UNKNOWN,
471	KIYONAGA, THELMA
472	FREY, WERNER
479	SHISHIDO, ROBERT
509	PAET, ROMEO A
512	OCCUPANT UNKNOWN,
515	DILGER, CHARLES E
523	ALTURA, ESTHER
535	CROWLEY, MOIRA S
541	OCCUPANT UNKNOWN,
547	OCCUPANT UNKNOWN,
553	FILIPELLI, GERALD R
559	CHONG, LAURA J
	RUSSELL BUILDERS EMPLOYEES RES
560	MIGNANO, M
575	BALANGITAO, JOSEPH J
576	OCCUPANT UNKNOWN,
586	OCCUPANT UNKNOWN,
595	SPALLINO THOMAS MD
	SPALLINO, THOMAS
596	OCCUPANT UNKNOWN,
602	GERARD, JEFF
606	PURSLEY, GAIL M

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

HONOAPIILANI HWY 1995

517	HAMAMURA, D
523	HAMAMURA, M
529	OCCUPANT UNKNOWNN
549	YOKOUCHI, MASARU
1466	GOO, ERNEST
1470	THOMPSON, WILLIAM H
1486	MAUI SIGNS
1526	KAUFMAN, SHERRIE
	ROBINSON, WILL
2500	SANDALWOOD GOLF COURSE
	SANDALWOOD RESTAURANT
	WAIKAPU GOLF COURSES
	WAIKAPU VALLEY COUNTRY CLUB

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

KUIKAHI DR 1995

335	SNIFFEN, JOHN
345	COSMA, FRANCIS
352	WAKI, ROBERT
353	FORONDA, ROLAND
363	YAP, ALLEN
369	OCCUPANT UNKNOWNN
371	KIM, MICHAEL E
382	FUJIMOTO, DON S
412	SHIMABUKU, EDWARD N
429	OCCUPANT UNKNOWNN
449	OCCUPANT UNKNOWNN
463	HAMAI, C T
471	KIYONAGA, EDWARD
472	BELTRAN, RAYMOND
479	SHISHIDO, ROBERT
509	PAET, ROMEO A SR
512	ANDRES, MANUEL C
515	BOCK, JOE
	DEAN, RITCH L
519	UNEMORI, JOY N
523	ALTURA, ESTHER
526	OCCUPANT UNKNOWNN
531	OCCUPANT UNKNOWNN
535	CROWLEY, MOIRA S
541	YIP, WARREN M
547	OCCUPANT UNKNOWNN
553	FILIPELLI, GERALD R
559	WAIEHU, TERRACE I
560	YANAGI, K L
575	BALANGITAO, JOSEPH J
576	OCCUPANT UNKNOWNN
585	MALOTT, KENNY
586	YAMAGUCHI, HAROLD H
595	SPALLINO, THOMAS
596	PAA, EDWARD T
602	MORGAN, JERRY A
606	LAWRENCE, JAMIE

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

HONOAPIILANI HWY 1992

450	KROUTIL, WILLIAM E
451	FEIL, MONIQUE
	HADA, WES
523	HAMAMURA, M
529	BUETTNER, TED
549	YOKOUCHI, MASARU
1466	GOO, ERNEST
1470	THOMPSON, WILLIAM H
1526	KAUFMAN, SHERRIE

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

KUIKAHI DR 1992

335	SNIFFEN, JOHN
345	COSMA, FRANCIS
352	WAKI, ROBERT
353	FORONDA, ROLAND
363	YAP, ALLEN
369	NAKATA, L
371	KIM, MICHAEL E
412	SHIMABUKU, EDWARD N
463	HAMAI, C T
471	KIYONAGA, EDWARD
479	SHISHIDO, ROBERT
512	ANDRES, MANUEL C
515	BOCK, JOE
	STERLING, DAVID
523	ALTURA, ESTHER
553	FILIPELLI, GERALD R
	NAKAMURA, G
560	YANAGI, K L
570	HOLLISTER, FRANK
586	YAMAGUCHI, HAROLD H
595	SPALLINO, THOMAS
602	MORGAN, JERRY A
606	LAWRENCE, JAMIE

Wailuku Maui Phase I ESA
101 Kuikahi Drive
Wailuku, HI 96793

Inquiry Number: 7026358.11
June 24, 2022

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

06/24/22

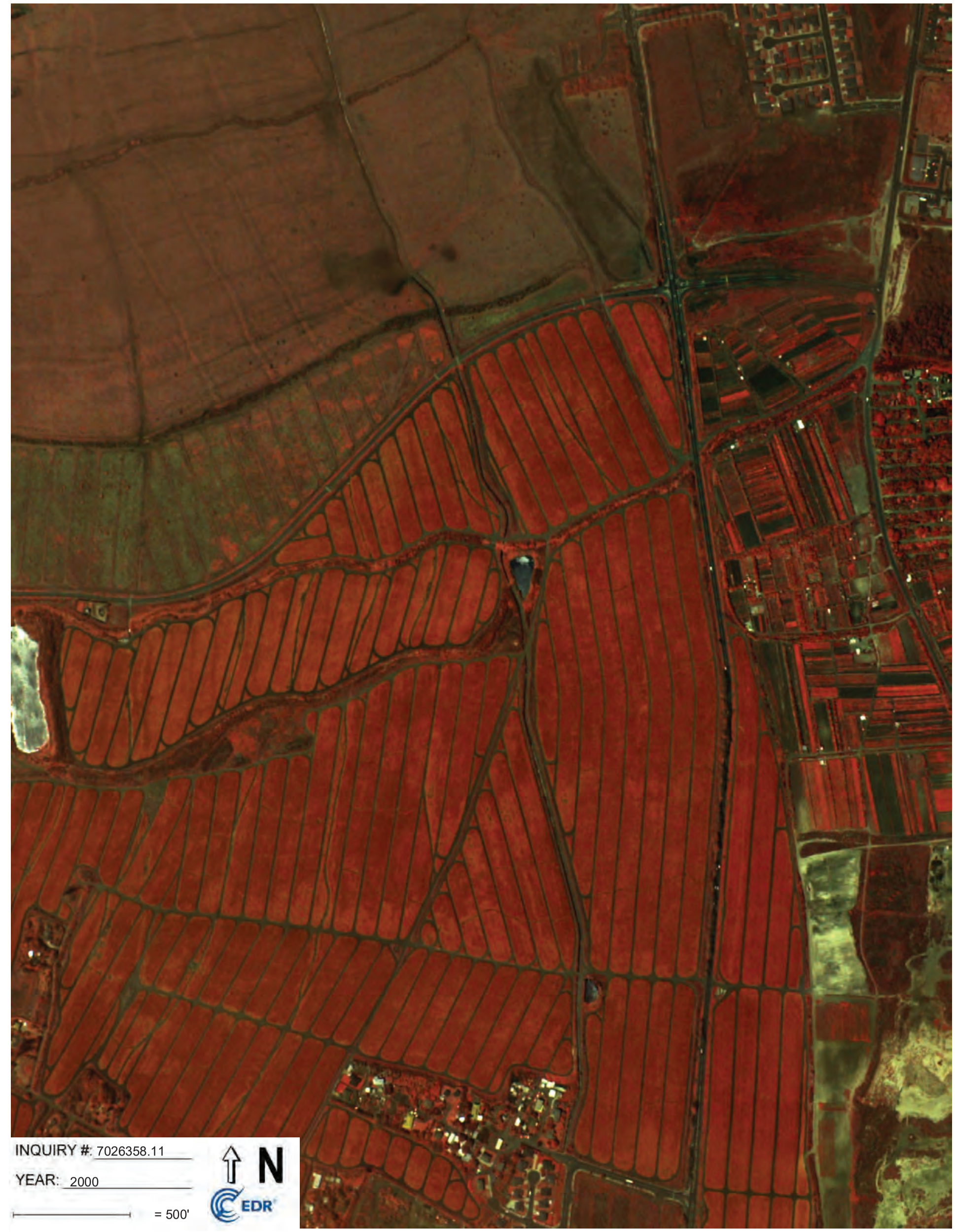
Site Name:	Client Name:
Wailuku Maui Phase I ESA	Tetra Tech EMI
101 Kuikahi Drive	415 Oak Street
Wailuku, HI 96793	Kansas City, MO 64106
EDR Inquiry # 7026358.11	Contact: Kaitlyn Mitchell

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2000	1"=500'	Acquisition Date: April 12, 2000	USGS/DOQQ
1975	1"=500'	Flight Date: July 22, 1975	USGS
1965	1"=500'	Flight Date: January 28, 1965	USDA
1950	1"=500'	Flight Date: September 28, 1950	USGS

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.




INQUIRY #: 7026358.11
YEAR: 1975
= 500'
N
EDR


INQUIRY #: 7026358.11
YEAR: 1965
= 500'
N
EDR

Wailuku Maui Phase I ESA

101 Kuikahi Drive

Wailuku, HI 96793

Inquiry Number: 7026358.11

June 24, 2022

The EDR Aerial Photo Decade Package

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EDR Aerial Photo Decade Package

06/24/22

Site Name:	Client Name:
Wailuku Maui Phase I ESA	Tetra Tech EMI
101 Kuikahi Drive	415 Oak Street
Wailuku, HI 96793	Kansas City, MO 64106
EDR Inquiry # 7026358.11	Contact: Kaitlyn Mitchell

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

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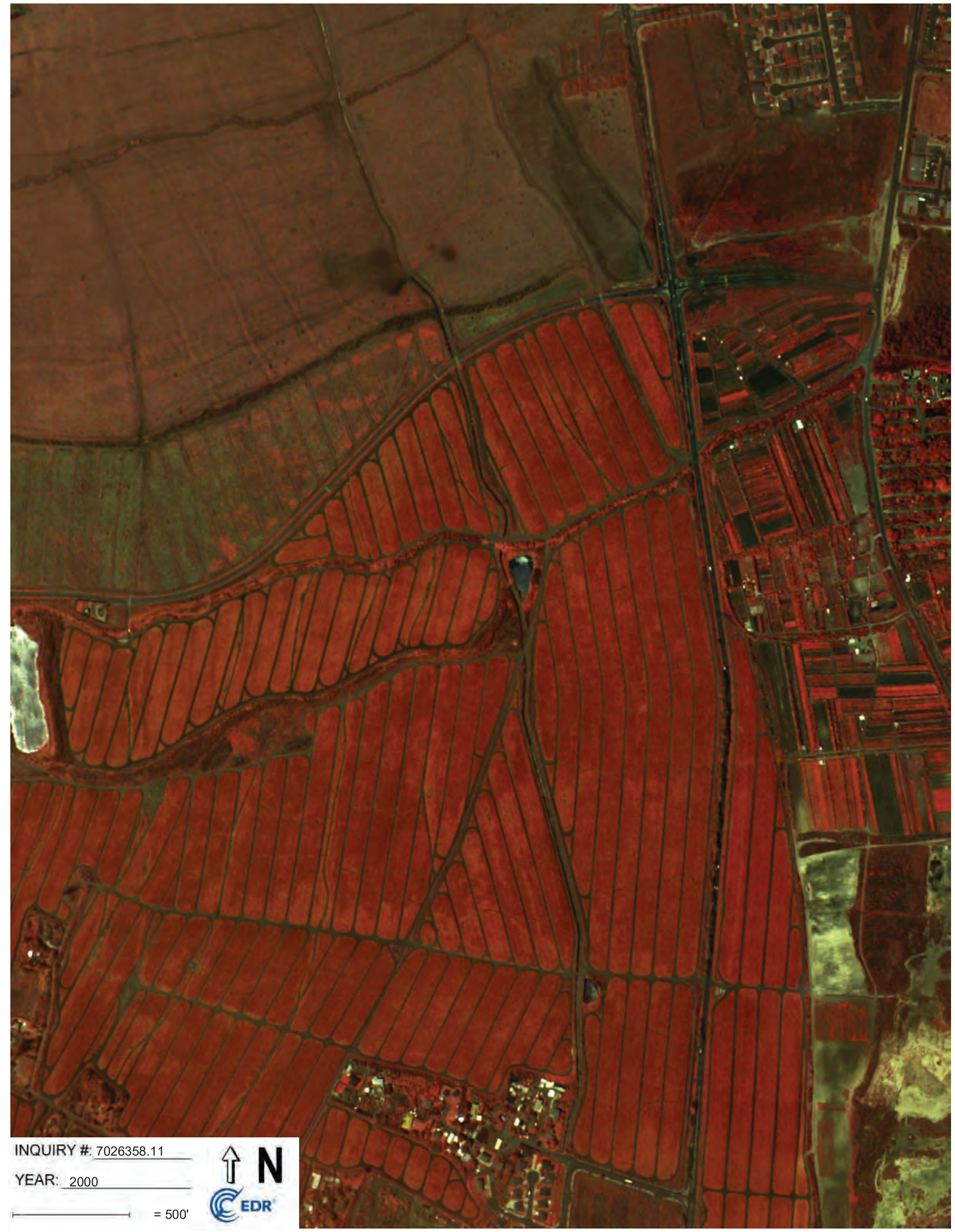
When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

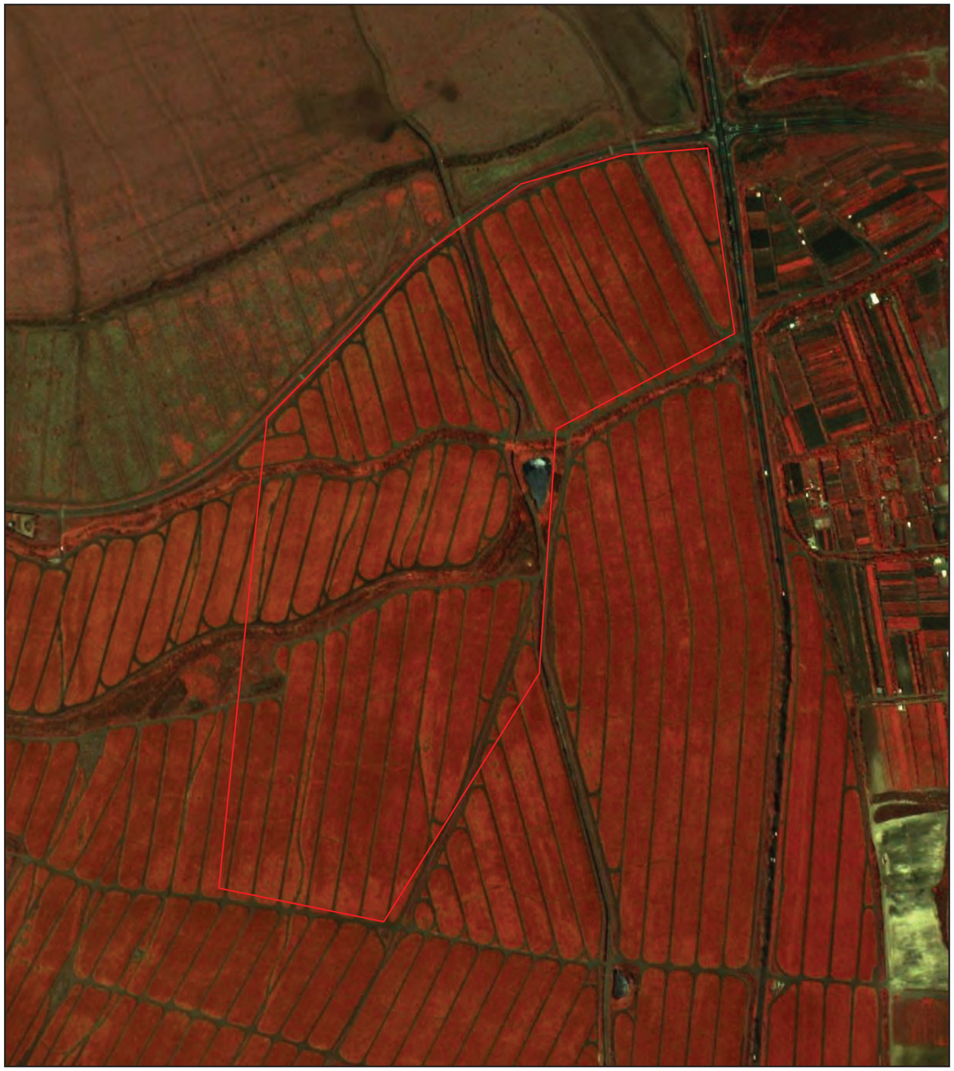



INQUIRY #: 7026358.11
YEAR: 1975
= 500'
N
EDR


INQUIRY #: 7026358.11
YEAR: 1965
= 500'
N
EDR

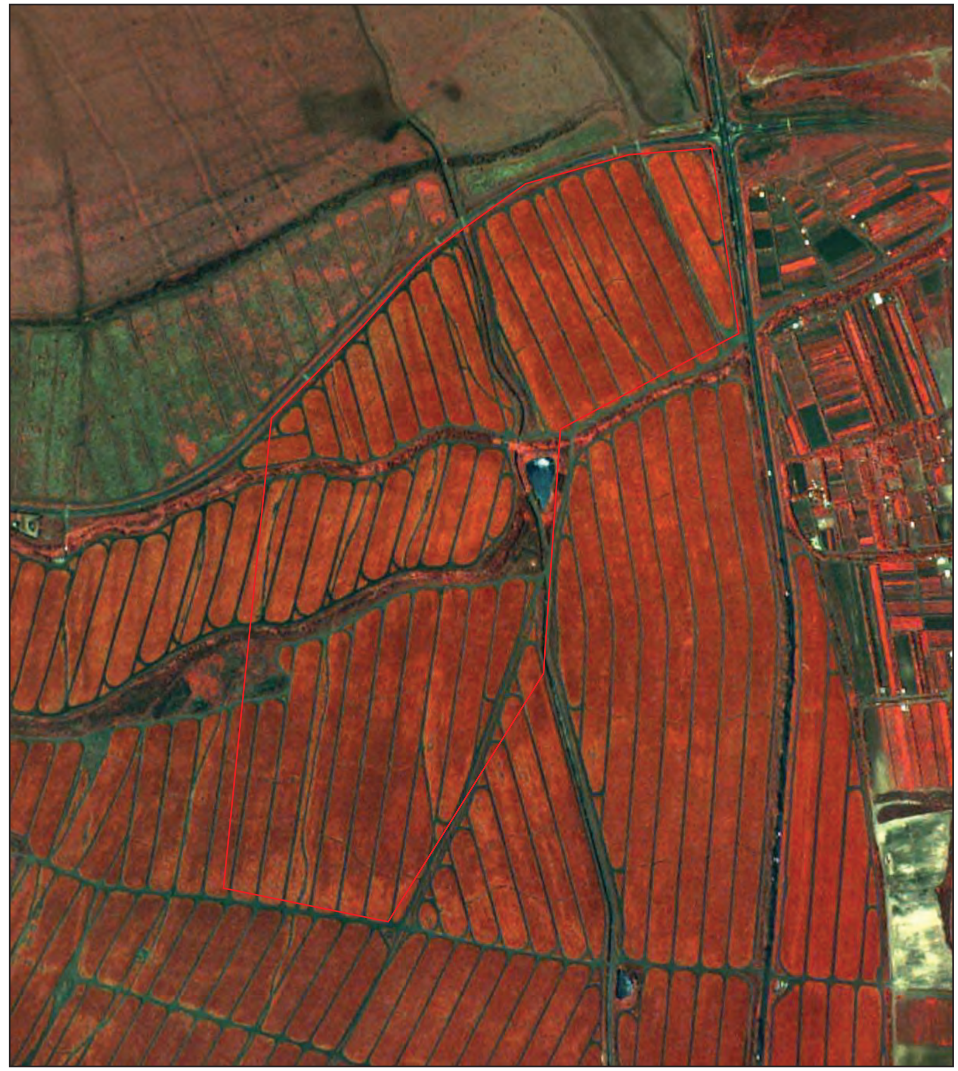
Site boundaries shown in red are approximate

Wailuku Phase I ESA 101 Kuikahi Drive Wailuku, HI	N	**2017** HIG Project # 2057432 Client Project # Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	HIG



Site boundaries shown in red are approximate

Wailuku Phase I ESA 101 Kuikahi Drive Wailuku, HI	N	**2000** HIG Project # 2057432 Client Project # Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com



Site boundaries shown in red are approximate

Wailuku Phase I ESA 101 Kuikahi Drive Wailuku, HI	N	**1998** HIG Project # 2057432 Client Project # Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com

Site boundaries shown in red are approximate

Wailuku Phase I ESA 101 Kuikahi Drive Wailuku, HI	N	**1950** HIG Project # 2057432 Client Project # Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com

Parcel Information

Parcel Number	350020030000
Location Address	101 KUIKAHI DR WAILUKU HI 96793
Neighborhood Code	3655-5
Legal Information	LOT 4-A WAILUKU HEIGHTS EXT SUBD 148.012 AC DES
Land Area	148.012 Acres
Parcel Note	

View Map

Owner Information

Owner Names
KUIKAHI PROPERTIES LLC Fee Owner

Mailing Address
KUIKAHI PROPERTIES LLC
191 WAIHEE VALLEY RD
WAILUKU HI 96793

Assessment Information

⊞ Show Historical Assessments

Year	Tax Class	Market Land Value	Agricultural Land Value	Assessed Land	Building Value	Total Assessed Value	Total Exemption Value	Total Net Taxable Value
2022	AGRICULTURAL	$3,173,400	$11,500	$11,500	$0	$11,500	$0	$11,500

How to calculate real property taxes

Agricultural Assessment Information

Acres	Description	Assessed Value
148.012	PASTUR	$11,545

This parcel has land in agricultural usage and therefore agricultural usage assessments have been made.

Historical Tax Information

Year	Tax	Payments and Credits	Penalty	Interest	Other	Amount Due
⊞ 2021	$19,430.33	($19,430.33)	$0.00	$0.00	$0.00	$0.00
⊞ 2020	$19,430.33	($19,430.33)	$0.00	$0.00	$0.00	$0.00
⊞ 2019	$19,430.33	($19,430.33)	$0.00	$0.00	$0.00	$0.00
⊞ 2018	$26,628.60	($26,628.60)	$0.00	$0.00	$0.00	$0.00
⊞ 2017	$21,015.77	($21,015.77)	$0.00	$0.00	$0.00	$0.00
⊞ 2016	$19,030.62	($19,030.62)	$0.00	$0.00	$0.00	$0.00

Click a year to see tax payment information for the year.

Sales Information

Sale Date	Price	Instrument Number	Instrument Type	Valid Sale or Other Reason	Document Type	Record Date	Land Court #	Land Court Cert
5/21/2020	$3,271,100	A74820382	Fee conveyance	Related individuals	Warranty deed	6/26/2020		
11/6/2019	$5,500,000	A72640109	Fee conveyance	Valid Sale	Warranty deed	11/21/2019		
2/28/2018	$0	A66380370	Easements		Grant of easement	3/5/2018		
2/28/2018	$0	A69640753	Recorded document		Name change	1/25/2019		
2/28/2018	$3,300,000	A66330470	Fee conveyance	Valid Sale	Warranty deed	2/28/2018		
2/15/2012	$0	A44350728	Easements	Related individuals	Grant of easement	2/22/2012		
7/27/2010	$0	10-158217	Easements		Grant of easement	10/19/2010		
8/6/2004	$4,450,000	04-161727	Fee conveyance	Valid Sale	Limited warranty/apartment deed	8/6/2004		
3/18/1988	$0	0000000000						

Maui's Automated Planning & Permitting System

Click Here to View All Planning and Permitting Info Regarding This TMK

Permit Information

Maui's Automated Planning & Permitting System link

Date	Permit Number	Reason	Permit Amount
2/17/2010	B20100188	Other see notes	$5,000
2/17/2010	B20100187	Other see notes	$40,000

Recent Sales In Area

Sale date range:

From:

07/12/2019

To:

07/12/2022

Sales by Neighborhood

Sales by Subdivision

1500

Feet

Sales by Distance

Generate Owner List by Radius

Distance:

100

Fee

Use Address From:

Owner Property

Select export file format:

Address labels (5160)

International mailing labels that exceed 5 lines are not supported on the Address labels (5160). For international addresses, please use the xlsx, csv or tab download formats.

Download

Show All Owners

Show Parcel ID on Label

Skip Labels

0

No data available for the following modules: Current Tax Bill Information, Appeal Information, Home Exemption Information, Improvement Information, Commercial Improvement Information, Accessory Information, Sketches.

Developed by Schneider GEOSPATIAL

Last Data Upload: 7/12/2022, 3:09:28 AM

Version 2.3.206

Wailuku Maui Phase I ESA
101 Kuikahi Drive
Wailuku, HI 96793

Inquiry Number: 7026358.6
June 21, 2022

The EDR Property Tax Map Report

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Property Tax Map Report

Environmental Data Resources, Inc.'s EDR Property Tax Map Report is designed to assist environmental professionals in evaluating potential environmental conditions on a target property by understanding property boundaries and other characteristics. The report includes a search of available property tax maps, which include information on boundaries for the target property and neighboring properties, addresses, parcel identification numbers, as well as other data typically used in property location and identification.

NO COVERAGE

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Wailuku Maui Phase I ESA
101 Kuikahi Drive
Wailuku, HI 96793

Inquiry Number: 7026358.3
June 21, 2022

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

06/21/22

Site Name:	Client Name:
Wailuku Maui Phase I ESA	Tetra Tech EMI
101 Kuikahi Drive	415 Oak Street
Wailuku, HI 96793	Kansas City, MO 64106
EDR Inquiry # 7026358.3	Contact: Kaitlyn Mitchell

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Tetra Tech EMI were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # F5BF-496C-990B

PO # 103P8341.01

Project Wailuku Phase I ESA

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: F5BF-496C-990B

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

✔ Library of Congress
✔ University Publications of America
✔ EDR Private Collection

The Sanborn Library LLC Since 1866™

Limited Permission To Make Copies

Tetra Tech EMI (the client) is permitted to make up to FIVE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

Wailuku Maui Phase I ESA
101 Kuikahi Drive
Wailuku, HI 96793

Inquiry Number: 7026358.4
June 21, 2022

EDR Historical Topo Map Report
with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

06/21/22

Site Name:	Client Name:
Wailuku Maui Phase I ESA	Tetra Tech EMI
101 Kuikahi Drive	415 Oak Street
Wailuku, HI 96793	Kansas City, MO 64106
EDR Inquiry # 7026358.4	Contact: Kaitlyn Mitchell

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Tetra Tech EMI were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:		*Coordinates:*	
P.O.#	103P8341.01	**Latitude:**	20.866474 20° 51' 59" North
Project:	Wailuku Phase I ESA	**Longitude:**	-156.507118 -156° 30' 26" West
		UTM Zone:	Zone 4 North
		UTM X Meters:	759373.47
		UTM Y Meters:	2309380.77
		Elevation:	484.46' above sea level

Maps Provided:

2017
2013
1997
1983
1977
1961
1955
1922, 1923

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2017 Source Sheets

Wailuku
2017
7.5-minute, 24000

2013 Source Sheets

Wailuku
2013
7.5-minute, 24000

1997 Source Sheets

Wailuku
1997
7.5-minute, 24000
Aerial Photo Revised 1997

1983 Source Sheets

Wailuku
1983
7.5-minute, 24000
Aerial Photo Revised 1977

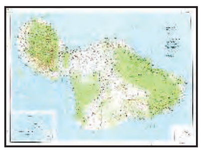
Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1977 Source Sheets

Wailuku
1977
7.5-minute, 24000
Aerial Photo Revised 1977

1961 Source Sheets



MAUI
1961
15-minute, 62500

1955 Source Sheets

Wailuku
1955
7.5-minute, 24000
Aerial Photo Revised 1950

1922, 1923 Source Sheets

PAIA
1922
7.5-minute, 31680

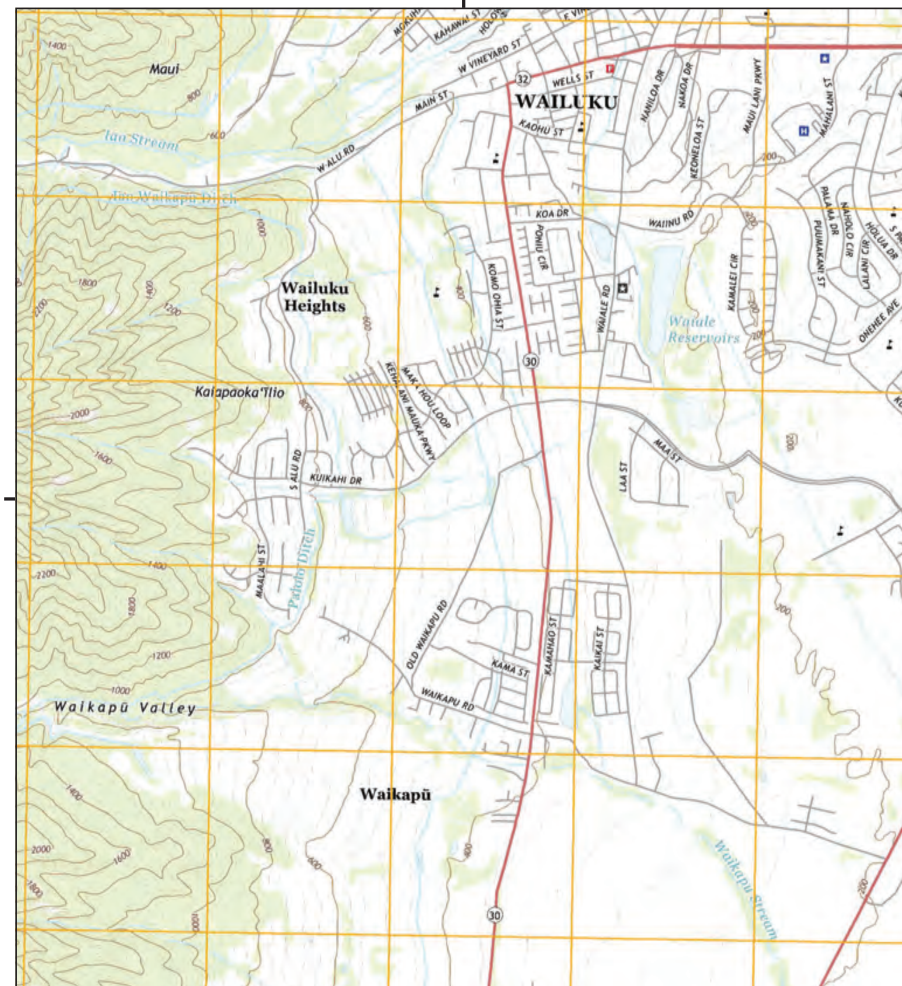
WAILUKU
1922
7.5-minute, 31680

KIHEI
1922
7.5-minute, 31680

MAALAEA
1923
7.5-minute, 31680

Historical Topo Map

2017



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

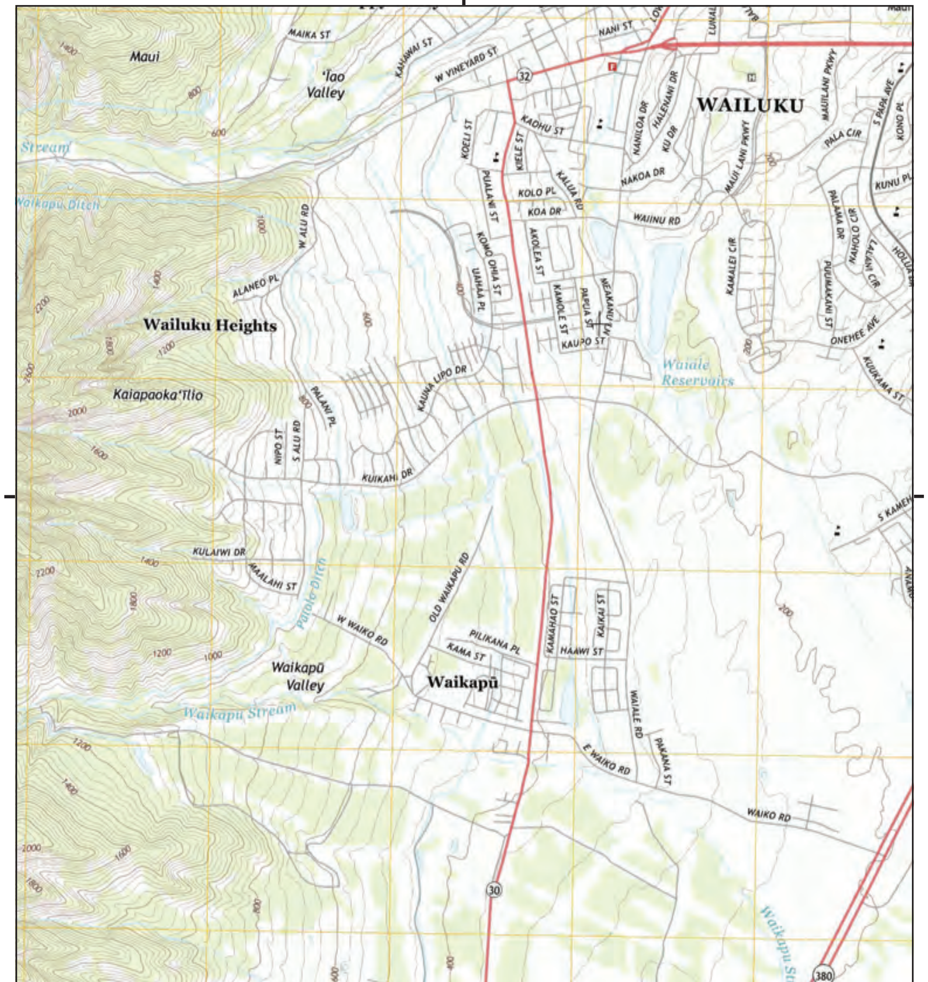
NW N NE
W E
SW S SE

TP, Wailuku, 2017, 7.5-minute

SITE NAME: Wailuku Maui Phase I ESA
ADDRESS: 101 Kuikahi Drive
Wailuku, HI 96793
CLIENT: Tetra Tech EMI

Historical Topo Map

2013



This report includes information from the following map sheet(s).

NW	N	NE
W		E
SW	S	SE

TP, Wailuku, 2013, 7.5-minute

0 Miles 0.25 0.5 1 1.5

SITE NAME: Wailuku Maui Phase I ESA
ADDRESS: 101 Kuikahi Drive
Wailuku, HI 96793
CLIENT: Tetra Tech EMI

N

Historical Topo Map

1997

This report includes information from the following map sheet(s).

NW	N	NE
W		E
SW	S	SE

TP, Wailuku, 1997, 7.5-minute

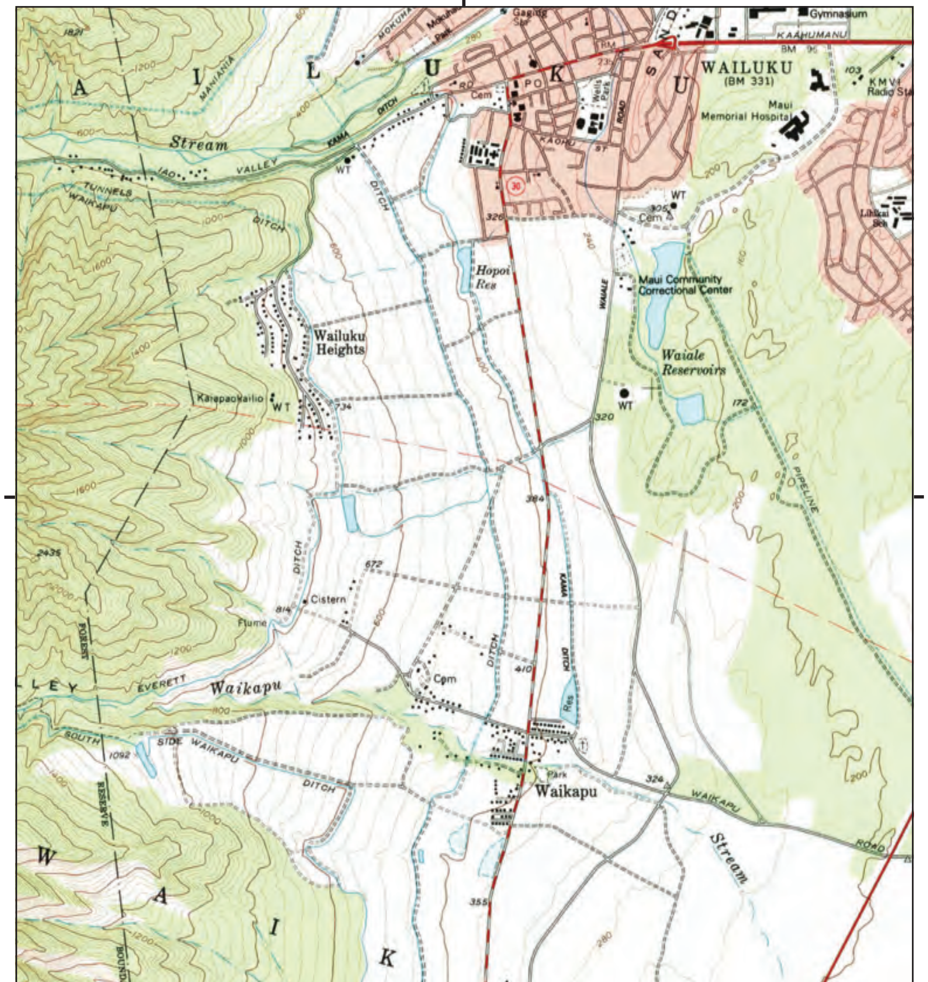
0 Miles 0.25 0.5 1 1.5

SITE NAME: Wailuku Maui Phase I ESA
ADDRESS: 101 Kuikahi Drive
Wailuku, HI 96793
CLIENT: Tetra Tech EMI

N

Historical Topo Map

1983



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Wailuku, 1983, 7.5-minute

SITE NAME: Wailuku Maui Phase I ESA
ADDRESS: 101 Kuikahi Drive
Wailuku, HI 96793
CLIENT: Tetra Tech EMI

N

7026358 - 4 page 8

Historical Topo Map

1977

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Wailuku, 1977, 7.5-minute

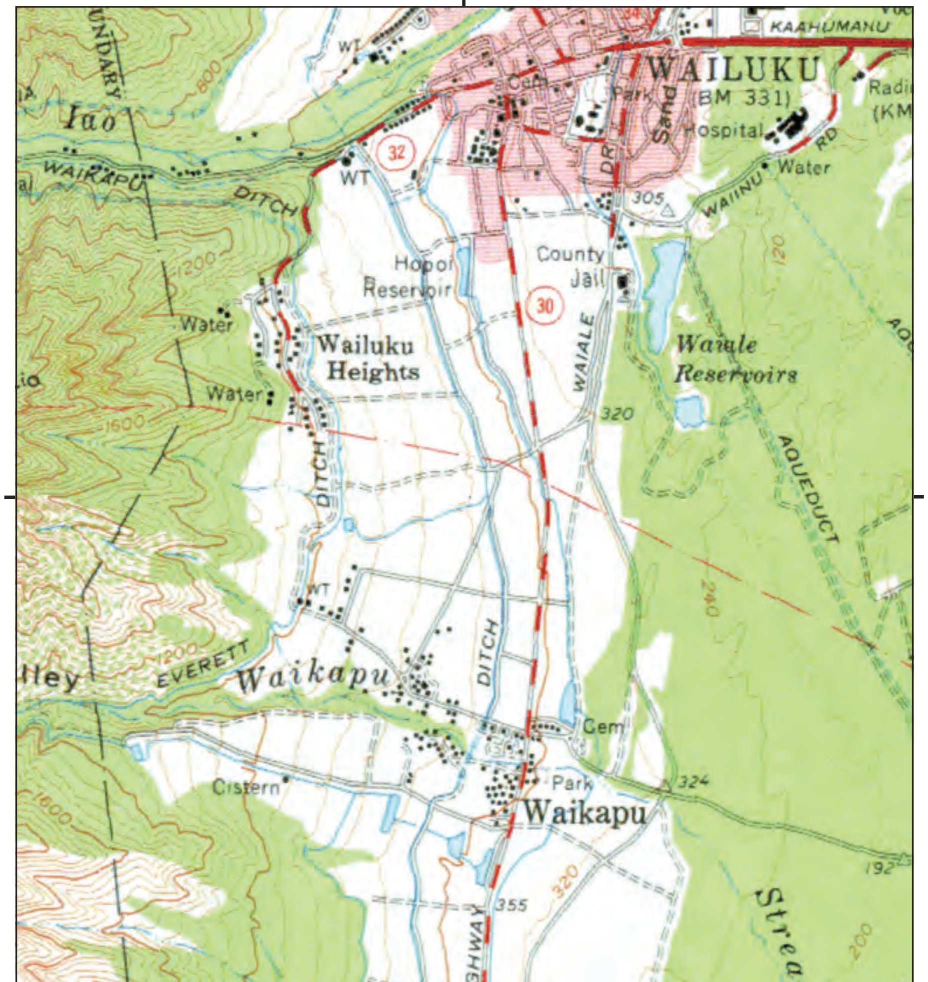
SITE NAME: Wailuku Maui Phase I ESA
ADDRESS: 101 Kuikahi Drive
Wailuku, HI 96793
CLIENT: Tetra Tech EMI

N

7026358 - 4 page 9

Historical Topo Map

1961



This report includes information from the following map sheet(s).

TP, MAUI, 1961, 15-minute

0 Miles 0.25 0.5 1 1.5

SITE NAME: Wailuku Maui Phase I ESA
ADDRESS: 101 Kuikahi Drive
Wailuku, HI 96793
CLIENT: Tetra Tech EMI

Historical Topo Map

1955

This report includes information from the following map sheet(s).

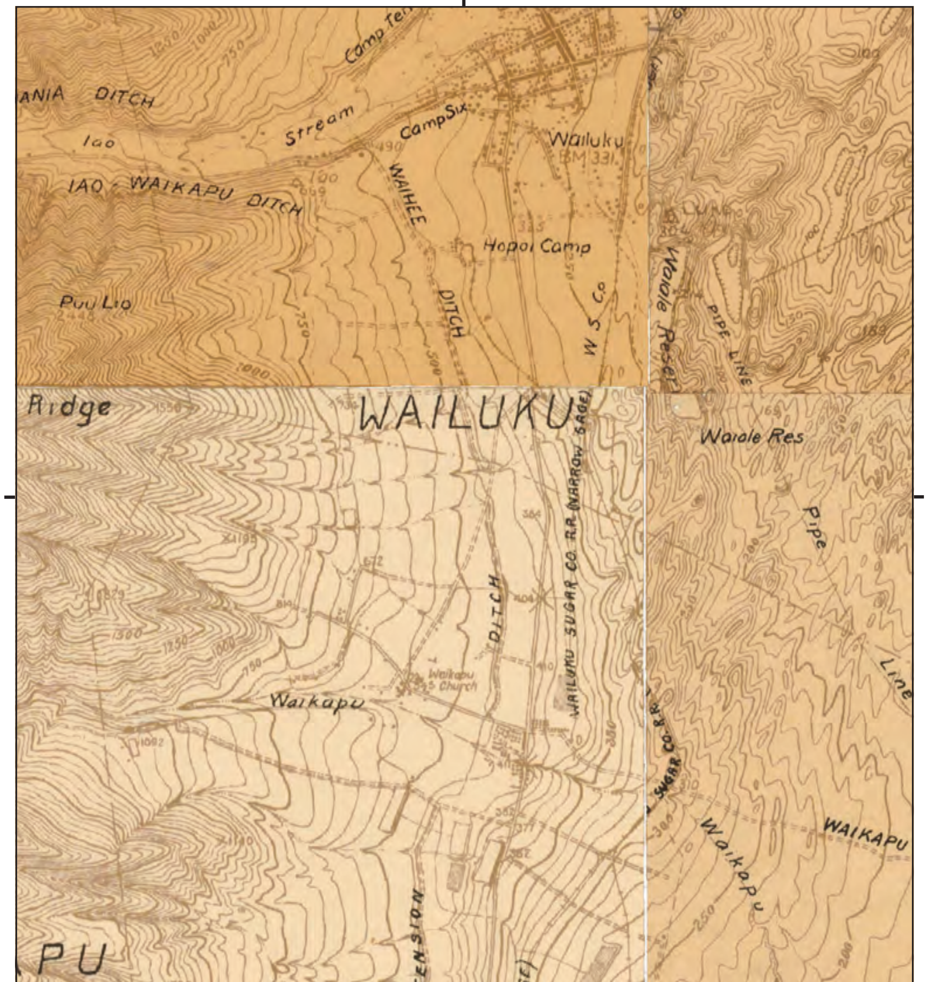
TP, Wailuku, 1955, 7.5-minute

0 Miles 0.25 0.5 1 1.5

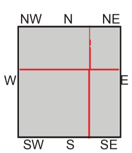
SITE NAME: Wailuku Maui Phase I ESA
ADDRESS: 101 Kuikahi Drive
Wailuku, HI 96793
CLIENT: Tetra Tech EMI

Historical Topo Map

1922, 1923



This report includes information from the following map sheet(s).



TP, MAALAEA, 1923, 7.5-minute
NE, PAIA, 1922, 7.5-minute
SE, KIHEI, 1922, 7.5-minute
NW, WAILUKU, 1922, 7.5-minute

0 Miles 0.25 0.5 1 1.5

SITE NAME: Wailuku Maui Phase I ESA
ADDRESS: 101 Kuikahi Drive
Wailuku, HI 96793
CLIENT: Tetra Tech EMI

N

7026358 - 4 page 12

APPENDIX G

ASSESSOR AND ENVIRONMENTAL PROFESSIONAL RESUMES

TETRA TECH

Eric M. Jensen, CHMM
Operations Manager

EXPERIENCE SUMMARY

Mr. Jensen, a Master Level Certified Hazardous Materials Manager (CHMM), is currently the Operations Manager of Tetra Tech, Inc's Honolulu Office. In this role, he also serves as a Senior Program Manager. He is in charge of senior technical review and oversight on environmental projects and programs in the Honolulu office. Mr. Jensen has a history of 33 years of diverse program management experience in the environmental consulting industry, including managing large scale contracts for state agencies, municipalities and commercial clients. Mr. Jensen's experience includes projects requiring innovative approaches to solving unique environmental issues. Mr. Jensen possesses significant experience related to environmental characterization activities, including: Due Diligence portfolios for commercial, telecom, financial lending institutions, and NGOs; site investigation of soil/groundwater contamination for commercial, private, state, municipal, federal, and NGO clients; and, investigations related to "Brownfields" redevelopment activities.

As Operations Manager, Mr. Jensen manages and coordinates fiscal, personnel, client management, and business development aspects of the local profit center. Mr. Jensen is also responsible for oversight of all local commercial, municipal, state, and federal projects. As a Senior Program Manager, Mr. Jensen is directly responsible for managing the office's third 5-year technical support contract with the Hawaii Department of Health (DOH) Hazard Evaluation and Emergency Response (HEER) Office.

Representative Client Summary

- ***State:*** DOH HEER Office; DOH Bioterrorism Branch; DOH Solid and Hazardous Waste Branch; Hawaii Dept. of Land and Natural Resources (DLNR); Virginia Dept. of Transportation (VDOT).
- ***Federal:*** USEPA; U.S. Navy (NAVFAC PAC); U.S. Air Force (AFCEE).
- ***Municipal:*** City & County of Honolulu (Dept. of Emergency Management); County of Maui (Dept. of Environmental Management); City of Boston; City of Chicago; various local and county municipalities in several states.
- ***Commercial:*** Kapolei Property Development, LLC; James Campbell Company; D.R. Horton; Amoco Oil Company; ConocoPhillips; Exxon Oil Company; Gulf Oil Company; Shell Oil Company; Star Enterprise (Texaco); Sun Oil Company; CSX Transportation, Inc.; Norfolk Southern Corporation; Continental Teves, Inc.; Sanmina-SCI Corporation; Clinchfield Coal Company.
- ***Telecom:*** AT&T Wireless; Sprint/Nextel; American Tower Corporation; Omnipoint Communications (T-Mobile); Xohm; Cox; Verizon.
- ***Major Financial Institutions:*** Bank of America; Bear Stearns; Citigroup; Citizens Bank; Column Financial; GMAC; Lehman Brothers; Morgan Stanley; and, Prudential Mortgage Capital.
- ***NGOs:*** Trust for Public Land; and, Ulupono Initiative.

EDUCATION

B.S., Geology, Ohio University, 1987

AREAS OF EXPERTISE

Operations Management

Program Management

Environmental Site Investigation and Cleanup

REGISTRATIONS/ AFFILIATIONS

Certified Hazardous Materials Manager (CHMM), Master Level, #12655, current

Massachusetts Dept. of Fire Services Approved Third Party UST Inspector, #1159

(Refer to Pg. 7 for additional)

TRAINING/ CERTIFICATIONS

OSHA 8-Hour HAZWOPER Refresher Training, current

OSHA HAZWOPER Supervisor Training

OSHA 30-Hour Construction Safety Course

Hawaii Certified Lead-Based Paint Inspector and Risk Assessor #PB-0972

ICS 100, 200, 300, 339, 400, 700

OFFICE

Honolulu, HI

YEARS OF EXPERIENCE

33

CONTACT

808-441-4784 Office
808-225-7084 Cell
eric.jensen@tetratech.com

RELEVANT EXPERIENCE

Current/Recent Contract Management

Non-Emergency Environmental Services Support for Hawaii Department of Health (DOH), Hazard Evaluation and Emergency Response (HEER) Office, Program Manager (Ongoing). Mr. Jensen is the Program Manager for Tetra Tech's third 5-year contract (and two previous contracts) with the DOH, which includes technical, policy, regulatory, and procedural support for a diverse variety of programs, many of which are multi-agency in nature, reaching out to large, diverse constituencies. This contract consists of numerous distinct Task Orders, requiring management of key project aspects, working closely with DOH supervisors, managers, and emergency responders. Responsibilities include cost analysis/budget management, scheduling, and supervision of key support staff. More than 240 Task Orders performed under three contracts to date include various programmatic studies, pilot studies related to innovative field investigation methods, policy development support, technical assistance, public outreach, and task order coordination and implementation.

Representative task orders include: providing 8-hour OSHA HAZWOPER Refresher Training; Landfill dust impact study; Industrial Park canal sediment study; Former Kilauea Sugar Company Pesticide Mixing Area Site Investigation (ultimately a USEPA residential neighborhood remedial action); development of various sections of the HEER Office Technical Guidance Manual (TGM), including Section 5 (Soil and Sediment Sampling Guidance), Section 8 (Field Screening and Field Analysis Methods), and Section 17 (Site Cleanup Planning and Cleanup Options); Ecological Risk Assessment Program development; Waikea Pond sediment sampling support; Kekaha Emergency Generator Site Responsiveness Summary; Brownfields Forum support; Community Involvement support (East Kapolei Pesticide Mixing Area); Vertical Multi-Increment Sampling Pilot Study, field support; Pearl Harbor sediment MIS pilot study, field support; Large Volume Purge (LVP) pilot study (design and field support); Clean Fill Guidance; HEPCRA Rule Making support; Contaminant Awareness Training; EndNote® Support; Fact Sheets (Termaticides, Canec, and Arsenic in Soils); general expert support and third party review; support Solid and Hazardous Waste Branch (SHWB), in the review of solid waste permit applications for landfills on Oahu, Maui, and Molokai, and providing general as-needed technical support to the solid waste program; and, various subcontracting (including subject matter experts) for XRF sampling and drilling support, clerical support, In-Vivo Arsenic Bioavailability study by the University of Australia, TGM Website maintenance, Laboratory analysis of PFAS in fish tissue samples; Site Characterizaiton training; institutional control monitoring; underwater PFAS passive sampling; and child lead safety expert; split-sampling support for the Navy's Red Hill fueling facility; data validation related to the Red Hill release and related residential sampling; and the Red Hill residential sampling database.

Scopes of work involve working closely with DOH managers developing guidance and methods for the DOH HEER Office Technical Guidance Manual (TGM). Cumulative contract value $10M.

U.S. EPA and Hawaii Department of Health (DOH), Solid and Hazardous Waste Branch (SHWB), RCRA Enforcement and Policy Assistance. Program Manager. Program-wide technical support to DOH SHWB Underground Storage Tank (UST) Division, with tasks including: providing expert support reviewing remedial alternatives and cleanup action at high priority DOH sites; designing informational brochures, handouts, and poster for National Brownfields Conference; geocoding 1,500 former sites and developed Google Earth-based geodatabase for easy desktop review and analysis; rectifying significant data quality concerns at the Tripler Army Medical Center UST Site; preparing QAPrP for UST Division.

Estate of James Campbell (James Campbell LLC, Aina Nui Corporation, Kapolei Properties, LLC), Phase I ESAs, Phase II Subsurface Investigations, and Peer Review/ Oversight for Various Properties, Campbell Industrial Park and Proximity, Oahu, HI. Program Manager. Phase I Environmental Site Assessments (ESAs; Due Diligence in accordance with ASTM E1527-13, All Appropriate Inquiry [AAI]) and Phase II Subsurface Soil and Groundwater Investigations for various properties to facilitate real property transactions; Review Phase I and Phase II Reports prepared by others for Campbell properties, and provide professional opinion and recommendations.

Performed Fast Track Site Investigation for pipeline easement release, resulting in a No Further Action with Institutional Controls (NFAIC) letter for the site issued by the HEER Office.

Local Program Contract Oversight and Coordination - Emergency Management/Community Resilience (EM/CR) Program projects, including the following contracts:

City and County of Honolulu, Department of Emergency Management (DEM) –Public Disaster Awareness Campaign Project. Programmatic Oversight. Project involved social scientists, emergency managers, market researchers, media producers, and communications specialists to improve public disaster preparedness and resilience in Hawaii. Project included initial research to establish a baseline preparedness level, including meetings with nongovernmental organizations to learn more about disaster preparedness in hard-to-reach and under-served populations. Developed a preparedness strategy, including complementary messages and multiple methods to reach key demographics and a month-long state-wide campaign. Post-campaign research performed to evaluate messaging effectiveness. Contract value $500K.

City and County of Honolulu, Department of Emergency Management – Hawaii Catastrophic Hurricane Response and Logistics Frameworks. Programmatic Oversight. Project included developing County-specific response frameworks and associated logistics annexes on behalf of the Hawaii RCPT for all four counties. The frameworks included the guidance on essential activities such as public warning, evacuation, and mass care consistent with a catastrophic event such as a hurricane. The initial planning project took place over the course of 2013 and included diverse stakeholder groups from each county, including all aspects of governmental, private, and nonprofit groups. Project included a gap analysis and providing logistics planning templates for each county. Contract value $1.3M.

State of Hawaii, Department of Defense - Grant Closeout Programmatic Support, Development and Implementation of a Regional Resource Database; and, Development of a Strategic-level Population Redistribution Analysis. Programmatic Oversight. Project involved: updating/finalizing a Citizen Preparedness Plan, Training and Evaluation Plan, Comprehensive Strategic Plan, and Sustainment Plan; developing a web-based resource database integrating FEMA resource typing as well as customized regional resource typing, including development, training, and associated user guides and manuals; and, identifying capacities of each county to support evacuees from neighboring islands in the event of a major disaster, as well as evaluating the ability of four major mainland cities on the west coast to support large populations of displaced evacuees. Contract value $590K.

Hawaii County, Department of Planning - Kilauea Eruption Community Relief, Relocation, and Recovery Planning. Programmatic Oversight. Tetra Tech assisted Hawaii County with a multiphase project to support recovery activities in the wake of the 2018 Kilauea Eruption and subsequent federal disaster declaration. For more than a year, Tetra Tech worked closely with the County and conducted multiple rounds of data validation, community engagement, objective setting and project identification, resulting in a Recovery and Resiliency Plan that provides the County with a blueprint for a variety of strategies and projects to facilitate meaningful recovery to the County residents and businesses that were displaced or impacted. Contract value $2M.

Representative DOD Hawaii Experience

Army Corps of Engineers, State of Hawaii Commercial Harbors Dredging Project, Oahu, Maui, Kauai, Hawaii Harbors, Hawaii. Program oversight of pre-dredging project to conduct sediment characterization, biological assessments (BAs), and environmental assessment (EA). Project elements included: development and execution of a sampling and analysis plan to conduct sediment sampling and provide sediment analysis reports for US Environmental Protection Agency (EPA)-approval of ocean disposal of dredge material; BA, an Essential Fish Habitat Analysis, NEPA compliance documentation, and permit acquisition related to the maintenance dredging of the federally-managed areas of Hawaii's five commercial harbors as well as one small boat harbor; vessel-based sediment sampling; and, resource agency informal and formal consultations. Contract Value $1.5M.

US Navy, Pacific Division, Comprehensive Long-term Environmental Action Navy (CLEAN) II Program,

Regional Groundwater Assessment, Former Manana Storage Area and Pearl City Junction, Oahu, Hawaii. Deputy Project Manager for a groundwater assessment of potential impacts from releases of arsenic, dieldrin, and polychlorinated biphenyls (PCBs) to soil at former Navy properties. Coordinated and supervised project subcontractors during installation of monitoring wells using the large diameter hollow-stem auger and air-rotary drilling methods. Coordinated and supervised installation of dedicated pneumatic pumps and subsequent low-flow sampling. Reviewed chemical and lithologic data to interpret contaminant occurrence and transport. Coordinated preparation of a Regional Groundwater Assessment Report. Evaluated potential off-site sources of impact to Pearl City Junction facility, including potential former on- and off-site Air Force fuel pipelines.

Air Force Center for Environmental Excellence (AFCEE), Demolition and decommissioning Work Plan, Johnston Atoll, U.S. Territory. Project Manager, field work and office efforts related to development of a demolition and decommissioning database for use by government agencies and the demolition general contractor to generate demolition plans, as well as bid packages for demolition and decommissioning of all Johnston Atoll facilities. Focused primarily on asbestos locations and quantities throughout the facility. Assisted with setup and entry of data into the database, and preparation of narratives describing preparation of plans, demolition and decommissioning procedures and requirements, regulations and procedures for hazardous materials removal and disposal, as well as final development of the demolition and decommissioning database. Attended meetings with client, and presentation of final deliverable to AFCEE.

Naval Facilities Engineering Service Center (NFESC), in association with Battelle Columbus Operations, Environmental Restoration Department, Background Sediment Guidance Documents, Oahu, Hawaii. Project Scientist, assisting with preparation of training manuals to provide Navy environmental restoration personnel with step-by-step instructions for geochemical regression and statistical methods for evaluating environmental background concentrations. Developed and completed the case study section of the Guidance Document. Background evaluation is essential to distinguish between sediments that have been impacted by a site-related chemical release and uncontaminated sediments (specifically as applied to the various lochs of Pearl Harbor).

Representative Brownfields and Policy Experience

CSX-Real Property, Site Characterization/Brownfields Redevelopment, Former Rolling Mill Site, Cumberland, Maryland. Mr. Jensen was the Project Manager for the first Brownfields site in Maryland. The MDE Brownfields Policy and program were actually developed concurrently with the redevelopment of the Former CSX Rolling Mill Site. This was a collaborative effort among a national real estate developer, CSX Real Property (the property owner), the City of Cumberland Maryland, and the State of Maryland Department of the Environment. This site was instrumental in development of the State of Maryland's Brownfields Policy. The preliminary assessment included coordination of three phases of site characterization activities (including soil borings, monitoring well installation, soil and groundwater sampling, records reviews, and well searches) for the 34-acre former steel rolling mill to assess/remediate/manage VOCs related to degreasing solvents, PAHs, free phase product, and heavy-end residual TPH. Coordinated Remedial Action Plan initiatives during site development, which included excavation and disposal of approximately 11,000 tons of soil. Prepared weekly updates to the MDE. Managed development of soil and groundwater assessment plans, including preparation of drilling and sampling (soil and groundwater) work plans based on the constituents present at the site and the locations of former industrial operations.

This project included routine meetings and related outreach with all stakeholders involved, working together to achieve a common goal of redeveloping a derelict blighted property in a traditionally low-income part of the community into a viable shopping plaza. The success of the development resulted in providing the surrounding community with a national chain grocery store and free-standing pharmacy, national chain restaurants, and a gasoline station. Previously, most community members needed to take mass transit to stores several miles away for typical shopping needs.

CSX-Real Property, Site Characterization/Brownfields Redevelopment, Former Asphalt Batch Plant Site, Hinton, West Virginia. Mr. Jensen was the Project Manager for one of the first Brownfields site in the State of

West Virginia. This project was instrumental in furthering the Brownfields policy only recently (at the time) initiated by the West Virginia Department of Environmental Protection (WVDEP). The required methods of assessment and cleanup were significantly modified concurrently with this property development, in that there was substantial streamlining to the existing policy, such that the developer could move quickly with the cleanup and approval process, thereby reducing holding costs to the developer, resulting in rapid development of a derelict property. This project required close collaboration among all stakeholders, including the national real estate developer, CSX Real Property, the City of Hinton, and the WVDEP. Key elements of this project were frequent communication and distribution of information to all stakeholders, and outreach to the City of Hinton to ensure them that all proper legal and regulatory controls were maintained throughout the process.

The assessment required multiple phases of site characterization to delineate the extent of petroleum hydrocarbon contamination to soil, and evaluate groundwater impact. A Remedial Action Plan was developed for the removal of contaminated soil by excavation. Mr. Jensen coordinated all excavation and soil disposal activities in a manner to assure all stakeholders that the assessment and remedial action would achieve site closure. A “No Further Action” status was issued by the WVDEP, which allowed the sale and commercial redevelopment of the site. The property was fully developed as a commercial business plaza.

Representative Innovative Remediation Projects

Continental Teves (Formerly ITT Automotive), Site Characterization/Permit Activities/Bioremediation System Installation Coordination, Culpeper, Virginia. Project Manager for evaluation of VOC impact to groundwater and coordination of installation of Enhanced Bioremediation System to clean up VOC contamination in fractured bedrock. This was a collaborative project, including Continental Teves working in partnership with the State of Virginia’s program, under the oversight of the U.S. EPA. Site activities included review of five years of data collected by previous consultants. Developed comprehensive sample plan to evaluate extent of ground water impact by VOCs utilizing low flow sampling technique. Ground water sampling included microbial assessment to determine the extent of biodegradation/bio-activity at the site. Utilized analytical data to evaluate the necessity and feasibility of ground water remediation activity at the site. Compiled a comprehensive database of all data previously collected to aid in evaluate future site activities. Performed quarterly permit ground water sampling and reporting (Hazardous Waste Management Post-Closure Permit) related to prior closure of two surface impoundments (sludge lagoons) impacted by a chrome-plating process. Prepared chemical concentration isocontour maps, ground water elevation contour maps, comprehensive data tables, evaluated data trends, and coordinated statistical analysis of ground water analytical data. Prepared "Request for Major Permit Modification to Implement Groundwater Corrective Action", related to the Post-Closure Permit, for submittal to the Virginia Department of Environmental Quality (VDEQ). The document was accepted by the VDEQ, and the public notice process was performed as related to corrective action via bioremediation. Coordinated installation of Enhanced Bioremediation System installation, pilot testing, and system start-up, and evaluated operational data and associated trends

USEPA Region III, Natural Gas Leak Site, Midway, West Virginia. Response Manager under corporate contract with the USEPA, for remediation of a natural gas leak originating from an abandoned oil well, which resulted in contamination of a residential drinking water well with natural gas, and also causing a natural gas seep located adjacent to the primary roadway, resulting in potential explosion risk in the event of an accident. This project involved collaboration of multiple stakeholders, including the landowner, the USEPA Technical Assistance Team, and the West Virginia Department of Environmental Protection Division of Oil and Gas. Coordinated innovative natural gas assessment, to evaluate extent of impact of the natural gas leak. The assessment required development of site-specific natural gas monitoring probes with sample-collection valves, including fabrication of disposable stainless steel drive points for installation. Please note that this investigation was performed before the advent of current soil gas sampling methodologies. Identified and retained a Natural Gas Expert from West Virginia University to help understand the nature and occurrence of natural gas in this immediate location, and how best to mitigate the impact to the water well and eliminate the roadside seep. Coordinated site remedial activities with USEPA Technical Assistance Team, the West Virginia DEP Oil and Gas Division, the drilling subcontractor, and field

supervision personnel. Managed site activities, which included drilling a 1,400-foot-deep well to vent off natural gas seeping into the overburden and impacting the supply well and adjacent roadway. The water supply well was also double-cased to minimize gas infiltration, and vented to prevent buildup. A carbon filtration system was installed to remove petroleum hydrocarbons from the supply well water.

Representative Innovative Assessment

The following site utilized innovative assessment practices, and numeric risk characterization, which resulted in redevelopment of a contaminated industrial property as a health and fitness center without a requirement for a deed restriction or remediation.

Sanmina-SCI Corporation–Facility Closure Site Assessment, Wilmington, Massachusetts. Project Manager for subsurface investigation related to closure of a former printed circuit board facility, which included a copper plating operation, for property divestment. Subject Property was a 200,000 square foot manufacturing facility on a 14.25-acre parcel. Project included soil and groundwater investigation related to an evaluation of the extent of copper impact to soil above regulatory levels, and nickel impact to groundwater above regulatory levels. Investigation included an extensive network of interior and exterior soil borings and groundwater monitoring wells. Required extensive use of video monitoring of interior delivery and drain line system throughout the facility to identify potential areas of concern where lines were deteriorated. Utilized limited-access tracked Geoprobe direct-push drill rig for soil boring and groundwater sample collection. Coordinated with a Certified Industrial Hygienist and Risk Assessor for evaluation of the data using numeric risk assessment, which resulted in regulatory closure, allowing for redevelopment of this former intense industrial facility into a national chain health and fitness center, without the need for a deed restriction or remediation.

Chicago Transit Authority (CTA) – Elevated Subway System Orange Line, Due Diligence Environmental Assessment for Privatization Divestment, Chicago, Illinois. Project Manager/Coordinator for Due Diligence Environmental Assessment and Compliance Audit of the CTA’s Orange Line Elevated Subway System, for a pilot privatization divestment. Project involved the following: a 9-mile section of track; seven (7) passenger stations; eight (8) electrical substations; one (1) switching substation; and, the primary railcar maintenance facility for the Orange Line. In order to perform due diligence in accordance with ASTM 1527-05, to identify potential areas of contamination along the right-of-way, a 9-mile linear environmental database search (EDR Search) was required. Project included site inspections, visual inspection of rail line, and associated historical research and database evaluations, and a compliance audit for the railcar maintenance facility. This project included complicated interactions between the key stakeholders (client, the buyer, and the City) to maintain the discrete nature of the deal, and to meet strict project deadlines.

Representative Large Municipal Contract Management

City of Boston, Underground Storage Tank Replacement Project, Multiple Fire Station Facilities, Boston, Massachusetts. Project Manager for coordination and oversight of underground storage tank removal/replacement and subsequent assessment activities (soil boring/monitoring well installation/reporting); evaluation of site assessment data; delineation of separate phase hydrocarbon (SPH) extent and occurrence; evaluation and implementation of passive SPH remediation (viscous weathered fuel oil and diesel fuel); supervising/coordinating removal of SPH-contaminated soil during UST closure activities; recommendations for additional assessment actions to lead to site closure; and, regulatory reporting of all site activities to the State of Massachusetts under the Massachusetts Contingency Plan.

County of Roanoke, Multiple Fire Station Facilities, Site Characterization and Contamination Abatement, Virginia. Project Manager for site characterization related to releases from gasoline, diesel fuel, and fuel oil USTs. Conducted monitoring well installation, groundwater sampling and aquifer testing (slug tests), sensitive receptor surveys, coordinated and collected potable well and spring samples from downgradient residents. Prepared Site Characterization Reports (SCR) detailing assessment results and remedial options for submittal to the VDEQ.

Prepared proposals for corrective action measures, comprised of excavation and disposal of petroleum contaminated soil. Coordinated and supervised all corrective actions. Prepared Contamination Abatement Measures Summary Reports. Received "No Further Action" for all facilities after state regulatory review.

Representative Large Commercial Contract Management

Verizon Wireless Northeast Region Client Manager, New England (Massachusetts, Maine, New Hampshire, Vermont, Rhode Island, Connecticut). Telecommunications Division Program Manager and Senior Scientist for Verizon Wireless projects throughout New England. As a Client/Program Manager for Verizon Wireless projects, Mr. Jensen performed daily client management activities and senior review of Due Diligence Investigations, provided technical evaluation and recommendations related to environmental concerns identified during various stages of site investigation, and associated implications, and coordinated and managed Subsurface Investigations for telecommunications sites.

REGISTRATIONS/AFFILIATIONS

Member, Alliance of Hazardous Materials Professionals (AHMP; formerly Academy of Certified Hazardous Materials Managers (ACHMM), since 2005.

Member, Institute of Hazardous Materials Management (IHMM), since 2005.

Member, Society of American Military Engineers (SAME). Served on Annual Pacific Industry Forum Planning Committee since 2011.

Member, Hawaii Association of Environmental Professionals (HAEP).

TRAINING/CERTIFICATIONS

State of Hawaii Certified Lead Inspector, Cert. #PB-0972
EPA/DOH Accredited Lead Inspector Initial Training Course (24-hour), 2017.
OSHA 8-Hour Supervisors of Hazardous Waste Operations Course, 1989.
OSHA 40-Hour HAZWOPER training, 1989.
OSHA 30-Hour Construction Safety Course, 2014.
49 CRF Dept. of Transportation (Parts 100 to 199) 24-Hour IATA Dangerous Goods Training, 2013.
RF Site Safety Awareness Training, 2008.

ICS 100 – Introduction to the Incident Command System (ICS)
ICS 200 – ICS for Single Resource and Initial Action Incidents
ICS 300 – Intermediate ICS for Expanding Incidents
ICS 339 – Division/Group Supervisor Course
ICS 400 – Advanced ICS
ICS 700 – National Incident Management System (NIMS) – Introduction

National Safety Council, Certification for Adult CPR, 2020.
National Safety Council, Basic First Aid Course, 2020.

Third Party UST Inspector Training, State of Massachusetts Department of Fire Services, 2009.

Community Emergency Response Team (CERT) certification training (26-hrs), State of Hawaii Department of Emergency Management, 2010.

REPRESENTATIVE SPECIALIZED CONTINUING EDUCATION

CECOS/NAVFAC TRAINING

- CECOS Course, Advanced Munitions Response Site Management, 24-hrs, 2013.

- CECOS Course, NEPA Navy Executive Overview, 4-hrs, 2012.
- CECOS Course, NEPA Application Course, 24-hrs, 2012.
- CECOS Course, Human Health Risk Assessment, 24-hrs, 2011.
- CECOS Course, Basic Environmental Law Seminar, 24-hrs, 2011
- CECOS Course, Navy Environmental Restoration Program, 24-hrs, 2010
- Remediation Innovative Technology Seminar (RITS), NAVFAC Training, Honolulu, 16-hrs, 2010-2014, 2016, 2017, 2019, 2020.

EMPLOYMENT HISTORY

2010 – Present	Operations Manager/Sr. Program Manager, Tetra Tech, Inc., Honolulu, Hawaii
2003 – 2010	Program Manager/Sr. Scientist, EBI Consulting, Burlington, Massachusetts
1995 – 2003	Senior Project Manager/Geologist, Earth Tech, Inc., Hawaii, Massachusetts, Virginia
1994 – 1995	Project Manager, Dewberry & Davis Engineering, Virginia
1988 – 1994	Project Manager, Handex, Inc., New Jersey, Pennsylvania, North Carolina
1988 (Summer)	Drill Rig Geologist/Supervisor, South Dakota Geological Survey

TETRA TECH

Kaitlyn Mitchell
Project Manager/Environmental Scientist

EXPERIENCE SUMMARY

Ms. Mitchell is an Environmental Scientist with twelve years of experience managing projects and providing technical support for clients in the government and private sectors. Major area of expertise includes Phase I and II ESAs; National Environmental Policy Act (NEPA) reporting; hazardous materials surveys including asbestos, lead, mold, and household hazardous waste; demolition and abatement contractor oversight. Project management in these areas includes, managing multiple project sites simultaneously; overseeing field teams; technical report preparation; environmental field sampling; quality control and quality assurance for environmental field work; and client communication. Ms. Mitchell has worked for over a decade on brownfield sites throughout EPA Region 7 under various federal, state, and municipal contracts. Ms. Mitchell has participated in emergency response training for the EPA dealing with chemical, biological and radiological agents. Ms. Mitchell has also worked extensively on creating proposals and cost estimates to finalize time critical submittals.

EDUCATION

M.E., Project Management, University of Kansas, 2017

B.S., Environmental Science, University of Kansas, 2010

Minor, Geography, University of Kansas, 2010

AREAS OF EXPERTISE

Project Management

Phase I ESAs

Asbestos, Lead-Based Paint, Mold

NEPA Reporting

Environmental Sampling

KEY TRAINING/ CERTIFICATIONS

40-hour OSHA HAZWOPER with 8-hour Refreshers

CPR and Standard First Aid

AHERA Asbestos Inspector

Current Asbestos Inspector License for the State of Iowa and Missouri.

OFFICE

Kansas City, MO

YEARS OF EXPERIENCE

12

CONTACT

816-412-1742

RELEVANT EXPERIENCE

Environmental Analysis and Permitting

Unified Government (UG) Brownfields Assessment Grant Program – Kansas City, Kansas. 12/22/2014 to Present - Ms. Mitchell is the Program Manager for the "One-KC Bi-State Grant" program administered by the UG. To date, Tetra Tech has completed ESAs at dozens of sites, ranging from small single building commercial sites to area-wide assessments covering city blocks and dozens of structures. The assessments included Phase I and II ESAs, hazardous materials assessments (including ACM, LBP/LCM, PCB, and other hazardous materials), UST assessment and removal, and PCAs. For each site, a QAPP was developed and approved by EPA. Coordination with end users, UG officials, EPA, and KDHE was necessary for project success. As Program Manager, Ms. Mitchell provides critical communication with the client, has written and reviewed the final deliverables, and participated in community outreach seminars and meetings to work with stakeholders on various redevelopment plans under the contract.

REPA Targeted Brownfields Assessment Program – EPA Region 7. 2019 to Present - Ms. Mitchell is the Project Manager for the REPA 6 Zone III Target Brownfields Assessment program for EPA Region 7. Tetra Tech will complete Phase I and II ESAs, hazardous materials assessments (including ACM, LBP/LCM, PCB, and other hazardous materials), UST assessment and removal, and ABCAs. For each site, a QAPP will be developed and approved by EPA. Coordination with end users, community stakeholders, EPA, and KDHE will be necessary for project success. As Program Manager, Ms. Mitchell provides critical communication with the client, has written and reviewed the final deliverables, and participated in community outreach seminars and meetings to work with stakeholders on various redevelopment plans under the contract.

Kansas City, Missouri On-Call Environmental Services Contract – Kansas City, Missouri. 2014 to Present

Ms. Mitchell is the Project Manager for the "One-KC Bi-State Grant" program administered by city of Kansas City, Missouri (KCMO). To date, Tetra Tech has completed ESAs at dozens of sites, ranging from small single building commercial sites to area-wide assessments covering city blocks and dozens of structures. The assessments included Phase I and II ESAs, hazardous materials assessments (including ACM, LBP/LCM, PCB, and other hazardous materials), UST assessment and removal, and PCAs. For each site, a QAPP was developed and approved by EPA. Coordination with end users, KCMO officials, EPA, and KDHE was necessary for project success. As Project Manager, Ms. Mitchell provides critical communication with the client, has written and reviewed the final deliverables, and participated in community outreach seminars and meetings to work with stakeholders on various redevelopment plans under the contract.

Phase I Environmental Site Assessment, Verizon Wireless. Ms. Mitchell has completed many Phase I ESAs, which included an on-site assessment followed by a detailed records review of the site. Environmental risk was identified followed by determination if further sampling was recommended.

Unified Government of Wyandotte County, Kansas City, Kansas

Ms. Mitchell prepared multiple Phase I and Phase II ESA reports for targeted Brownfield assessments for hazardous and petroleum sites in Wyandotte County, Kansas City, Kansas. Ms. Mitchell's responsibility for the Phase I ESAs included assessing potential RECs and writing reports providing conclusions regarding potential RECs and recommendations for further work. This project included interpretation of an EDR database report, historical aerials, historic topographic maps, and city directories.

Martin Marietta Materials, Phase I and Phase II Environmental Site Assessments for Multiple Sites in Colorado and Wyoming

Ms. Mitchell prepared multiple Phase I ESA reports for Martin Marietta Materials in Colorado as part of a property acquisition. Ms. Mitchell's responsibility for the Phase I ESAs included assessing potential RECs and providing conclusions regarding potential RECs and recommendations for further work.

Citadel Plaza Redevelopment Area Area-Wide Phase I Environmental Site Assessment of 156 Parcels, Kansas City, Missouri

Ms. Mitchell was performed an area-wide Phase I ESA on 156 parcels within the Citadel Plaza Redevelopment Area generally bounded by residential housing, wooded land and East 60th Street, the east side of Prospect Avenue to Bruce R. Watkins Highway, 63rd Street and Brooklyn Avenue in Kansas City, Jackson County, Missouri. Numerous RECs were identified associated with the subject property and surrounding properties including the following sources of contamination: area-wide asbestos contamination in soil, dry cleaners, gas stations, former filling stations, former printers, and auto repair/auto service stations either on the subject property or hydraulically upgradient. Phase II field activities were recommended to address the RECs found during the area-wide Phase I ESA.

Phase II Environmental Site Assessment, Nebraska Department of Environmental Quality, Omaha, NE. Ms. Mitchell conducted site assessment of soil, groundwater and building materials to determine the extent of contamination at an industrial plant in West Point and Lincoln, NE.

Phase II and III Environmental Site Assessment, EPA Region 7 START Contract. Ms. Mitchell conducted site assessment of soil to determine the extent of lead contamination for areas in the state of Missouri where previous lead mining activities occurred. Samples were taken from residences throughout two counties.

Emergency Response Training, EPA Region 7 START Contract. Ms. Mitchell has participated in level A emergency response training for the EPA Region 7 START Contract that included a variety of situations including radiation release and unknown biological hazard release scenarios.

National Environmental Policy Act (NEPA) Reports

Ms. Mitchell has completed NEPA reports in conjunction with a private telecommunication company's environmental site assessments (ESAs). The scope of work for the NEPA report includes NEPA Categorical Exclusion checklists, consultation with state and local agencies to evaluate the presence of threatened and endangered species, historically significant structures, sensitive areas, wetland delineations, biological evaluations, sacred Native American lands, and flood hazards on or near the subject properties. Because construction of cellular communication towers are federally regulated projects by the Federal Communications Commission (FCC), new cellular towers and certain collocations projects are subject to Section 106 consultation in accordance with the Advisory Council on Historic Preservation – 36 CFR 800 – and the Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings. Ms. Mitchell maintains contact with all individuals involved in the NEPA and Section 106 processes, including the client, archaeological and architectural historians, site acquisition consultants, engineers, state agencies including the United States Fish and Wildlife Service, state conservation agencies, SHPOs, tribal entities, and citizens identified through public involvement.

Unified Government of Wyandotte County, Kansas, Targeted Brownfields Assessment Grant Program – Kansas City, Kansas. Ms. Mitchell is the Program Manager for the Targeted Brownfield Assessment "One-KC Bi-State Grant" program administered by the Unified Government of Wyandotte County, Kansas. To date, Tetra Tech has completed ESA at over a dozen sites, ranging from small single building commercial sites, to large multi-block projects covering dozens of structures. The ESAs included Phase I and II, hazardous materials assessments (asbestos, LBP, PCBs and other hazardous materials), UST assessment and removal and property condition assessments. For each site Quality Assurance Project Plan (QAPP) were developed and approved by the EPA, and coordination with end users, County officials, the EPA and the Kansas Department of Health and Environment was necessary for project success. As Program Manager, Ms. Mitchell provides critical communication with the client and has written and reviewed the final deliverables required for the contract.

Enforcement and Compliance

American Recovery and Reinvestment Act (ARRA) Inspections, Mississippi, Ohio, New York, New Jersey, Pennsylvania, South Dakota, Missouri, Nebraska, Iowa and Kansas

Ms. Mitchell conducted ARRA inspections across the United States in 2010 and 2011. The inspections were conducted at sites who had obtained ARRA funding for projects such as wastewater and water treatment plant upgrades, well installations, storage, water line installation, pump stations, construction projects, etc. The purpose of the inspections was to ensure the recipients were in compliance with all ARRA requirements including Davis-Bacon, Buy America, Jobs Reporting, Green Project Reserve, and Poster/logo requirements. A memo was generated after each inspection to summarize the findings.

On-site Compliance at Ford Motor Company Kansas City Assembly Plant and Stamping Plant, Claycomo, Missouri, 2013

Ms. Mitchell provided environmental support during a large-scale remediation project at the former Ford Paint Kitchen. Tasks included conducting oversight of excavation activities, performing field screenings, and preparing and dispensing load tickets for proper hazardous material disposal.

Spill Prevention Control and Countermeasures Plan (SPCC) Support, Kansas Army National Guard – Adjutant General, Armory and Field Maintenance Facilities Across Kansas, 2016-2018

Ms. Mitchell prepared draft and final SPCC plans consistent with the requirements as outlined in 40 Code of Federal Regulations (CFR) Section 112 for 13 armory and field maintenance facilities throughout Kansas. As part of this activity, Ms. Mitchell conducted site visits to identify all regulated storage units, collect information on all secondary containment structures and their capacities, and an inventory of all materials regulated under 40CFR 112.

Hazardous Materials Surveys

Environmental Assessment Services, Flood Damaged Homes – Cedar Rapids, Iowa. Ms. Mitchell is licensed in the state of Iowa as an asbestos inspector. Ms. Mitchell completed asbestos surveys, mold identification and household hazardous waste identification on approximately 1,000 flood damaged homes in the Cedar Rapids, Iowa area. Ms. Mitchell is responsible for the following tasks: hazardous materials survey report preparation and upload to a Share Point website; close-out post remediation report preparation, organization and filling of all field sheets, lab results, and sample chain of custodies; conducted sample result interpretation; and finally development of all files and field sheets needed for the oversight of the remediation of the hazardous materials in the homes prior to their demolition.

Environmental Assessment Services, AMC Entertainment Inc.

Ms. Mitchell has conducted asbestos inspections at AMC movie theaters throughout the United States. Tasks included conducting a non-destructive asbestos inspection, gathering photographic evidence, and compiling a report based on the laboratory results.

Former Missouri State Prison, Targeted Brownfields Assessment – Jefferson City, Missouri. Ms. Mitchell is licensed in the state of Missouri as an asbestos inspector. Ms. Mitchell was a part of a project team that completed a full hazardous materials inspection on the approximately 745,000 square foot 40 building complex. The inspection started with a Phase I ESA, followed by a full asbestos, lead based paint and mold inspection. Potentially PCB containing caulking was sampled along with an inventory and categorization of all household hazardous waste in the buildings was completed. She also helped with the final deliverables preparation required for the contract.

Rockhill Greens Redevelopment, Targeted Brownfields Assessment – Kansas City, Missouri. Ms. Mitchell is licensed in the state of Missouri as an asbestos inspector. Ms. Mitchell was a part of a project team that completed a full hazardous materials survey on the approximately 100,000 square foot 7 building complex. The inspection started with a Phase I ESA, followed by a full asbestos, lead based paint and mold inspection. Potentially PCB containing caulking was sampled along with an inventory and categorization of all household hazardous waste in the buildings was completed. She also helped with the final deliverables preparation required for the contract.

Horace Mann School, Missouri Voluntary Cleanup Program – Kansas City, Missouri. Ms. Mitchell is licensed in the state of Missouri as an asbestos inspector. She acted as an asbestos inspector and Missouri Air Sampling Technician for the contract. Ms. Mitchell assisted in developing an Analysis to Brownfields Cleanup Alternatives (ABCA) to evaluate the remediation options (including costs) for the removal of the hazardous materials identified in the 3-Story 50,000 square foot building prior to the demolition activities. Ms. Mitchell then assisted in developing a Remedial Action Plan (RAP) for the removal of the hazardous materials identified based on the preferred option listed in the ABCA. The ABCA and the RAP are the first steps in the process to complete the Missouri Brownfields Voluntary Cleanup Program (MBVCP), which is a Brownfields program in the State that provides funding for renovations projects. Ms. Mitchell was part of the team that provided oversight, along with air monitoring and clearance sampling for the removal of the hazardous materials.

Indian Springs Mall Redevelopment, Targeted Brownfields Assessment – Kansas City, Kansas.
Ms. Mitchell is licensed in the state of Kansas as an asbestos inspector. He acted as an asbestos inspector for the contract. Ms. Mitchell led a team that completed a full hazardous materials inspection on the 4 building complex, encompassing approximately 800,000 square foot. The inspection started with a Phase I and Phase II ESA, followed by a full asbestos, lead based paint and mold inspection. Potentially PCB containing caulking was sampled along with an inventory and categorization of all household hazardous waste in the buildings was completed. Ms. Mitchell provided critical communication with the client.

KCMO Schools, Targeted Brownfields Assessment – Kansas City, Kansas

Ms. Mitchell is licensed in the state of Missouri as an asbestos inspector. She acted as an asbestos inspector for the contract. Ms. Mitchell led a team that completed a full hazardous materials inspection on four KCMO schools (Bryant, Blenheim, Graceland and 7 Oaks). The inspections started with a Phase I and Phase II ESA, followed by a full asbestos, lead based paint and mold inspection. Potentially PCB containing caulking was sampled along with an inventory and categorization of all household hazardous waste in the buildings was completed.
Ms. Mitchell provided critical communication with the client. She also wrote the final deliverables required for the contract.

Seven Oaks School Redevelopment Project – Kansas City, Missouri

Ms. Mitchell is licensed in the state of Missouri as an asbestos inspector. She provided technical services for the contract. Ms. Mitchell conducted Phase I ESA, Radon Testing and a Vapor Encroachment Screening for the 3-Story 40,000 square foot building in anticipation of renovations for senior housing at the site. Once this was complete, Ms. Mitchell assisted in developing Bid Plans and Specifications for the remediation phases of the project, which included, asbestos, LBP and hazardous waste.

Environmental Assessment Services, City of Kansas City, MO, 63rd and Prospect Redevelopment Area, Kansas City, Missouri (2013-2014)

Ms. Mitchell conducted asbestos inspections at over 100 former residential parcels in the 63rd and Prospect Redevelopment area. Tasks included obtaining soil samples, cataloguing household hazardous waste, and verifying parcel locations with a land survey. In addition, Ms. Mitchell conducted DPT soil and groundwater sampling at several former commercial parcels.

Hazardous Materials Survey, Ford Motor Company Kansas City Assembly Plant and Stamping Plant, Claycomo, Missouri, 2013

Ms. Mitchell was part of a team that conducted an asbestos inspection of 75% of the Ford Assembly Plant as well as the accessory and support buildings. Tasks included sampling plan development, sample collection and analysis, implementation of a material damage ranking, and field documentation. Ms. Mitchell consolidated all the findings from the assessment into a report deliverable, which included sample results, interpretation, recommendations, and detailed figures. Ms. Mitchell is currently on call for hazardous material sampling when the need arises for the client. Each year a re-inspection is performed at the plant to assess the damage of asbestos containing materials.

Hazardous Materials Survey – Hickam Air Force Base, Honolulu, Hawaii

Ms. Mitchell assists the Program Manager, providing critical communication with the client and providing guidance in following all regulatory guidelines for the project. Ms. Mitchell also directs field sampling teams collecting asbestos and lead based paint samples. She also assists with writing and reviewing the final deliverables required for the contract.

Kipapa Tunnels Munitions Response Site Asbestos Surveys, Mililani, Hawaii, U.S. Army Corps of Engineers (USACE), Huntsville Division. Ms. Mitchell served as an asbestos inspector for this project. The USACE completed a remedial investigation/feasibility study for 80 storage tunnels that were formerly used by the U.S. Army to store chemical agent, munitions, ordnance, and other hazardous/toxic waste. Many of the storage tunnels have been sealed and inaccessible for over 30 years. She served as field team member and assisted with sampling activities in Level C PPE over a period of approximately 6 months. During the project 909 bulk asbestos samples, 573 dust samples (via microvac), and 21 asbestos in soil/IDW samples were collected. Ms. Mitchell assisted in writing the final asbestos survey summary report that was incorporated into the remedial investigation report.

Stormwater Management

Stormwater Compliance Inspections, Kansas City Phase I, Phase II, and Lee's Summit Pipeline Replacement Project, Missouri Gas Energy, 2013-present

Ms. Mitchell is currently involved in assisting Missouri Gas Energy with maintaining compliance for erosion control along East 107th Street in Kansas City, Missouri. Tasks include checking silt fencing, silt socks, and other best management practices weekly and after rain events for integrity and compliance. Reports and photologs are generated after each inspection.

Stormwater Compliance Inspections, Ford Motor Company Kansas City Stamping Plant, Claycomo, Missouri, 2013-present

Ms. Mitchell is currently involved in assisting Ford with maintaining compliance for erosion control and stormwater protection at Ford's Stamping Plant in Liberty, Missouri. Ms. Mitchell inspects best management practices (BMP) in areas predisposed to erosion to determine if stormwater protection is adequate. An inspection report and photolog is generated after each inspection.

Stormwater Pollution Prevention Plan, KMW Limited, Various Kansas Locations, 2015-2018

Ms. Mitchell is the project manager for stormwater pollution prevention plan (SWPPP) projects for KMW plants located in Sterling, Great Bend, and Lyons, Kansas. Ms. Mitchell performs the yearly SWPPP inspections and updates the SWPPPs for each facility. She also assists the Sterling, Kansas facility with facilitating and reporting pretreatment monitoring requirements to the Kansas Department of Health and Environment on a quarterly basis.

ADDITIONAL EXPERIENCE

MS Excel, MS Word, MS Outlook, MS PowerPoint, and ArcGIS

EMPLOYMENT HISTORY

2010 - Present Environmental Scientist, Tetra Tech, Kansas City, Missouri

TETRA TECH

Suzan Pankenier
Client Manager/Operations Director

EXPERIENCE SUMMARY

Ms. Suzan Pankenier is a Client Manager and Operations Director with more than 21 years of experience in the environmental and solid waste industry, providing oversight of multiple projects. She supports compliance and air quality related service growth initiatives around the country and manages the West Coast compliance and air permitting team. She has experience working with federal, state, and local regulations concerning air, water, and solid waste disposal regulatory compliance and air quality permitting for various landfills, as well as providing regulatory compliance oversight for preparing documents and plans. Ms. Pankenier has investigated impacted groundwater, stormwater, stream water, and soils at various commercial and industrial sites in the Western United States. She manages organics and anaerobic digester (AD) projects with combined heat and power engines, permitted and determined emissions from organic waste receiving, conveying, material handling, covered aerated static pile (CASP) air quality permitting, engines, flares, in-vessel composting of digestate, and windrow composting, and provided air permitting for various enclosed flare projects, including ultra-low emissions (ZULE) flares, and renewable natural gas (RNG)/landfill gas to energy (LFGTE) projects.

Ms. Pankenier has extensive experience with landfill sites subject to local, state, and federal rules and regulations in California, Nevada, Oregon, Washington, and Hawaii. She has related experience in the areas of Title V permit review, permitting, data collection and analysis, and review and quality assurance/quality control of compliance demonstration reports. Ms. Pankenier oversees the preparation of monthly, quarterly, semi-annual, and annual reports in accordance with sites' Title V permits and other applicable permits and regulations.

RELEVANT EXPERIENCE

COMPLIANCE / AIR PERMITTING

- Implements and ensures facility compliance with New Source Performance Standards/ Emissions Guidelines (NSPS/EG) regulations, WWW/XXX local regulations, and site-specific permit conditions.
- Project manager for anaerobic digesters with combined heat and power engines. Permitted and determined emissions from organic waste receiving, conveying, material handling, engines, flares, in-vessel composting of digestate, windrow composting, CASP, LFGTE, and RNG air permitting.
- Provides support as a Client Manager to grow the overall business in the waste management industry across the country. Instrumental in developing business and opening an office in new region (Pacific Northwest).
- Manages and supervises a dedicated team of eight air compliance staff and field personnel across three offices in the West Region.
- Direct coordination with clients and other external clients.
- Responsible for resolving compliance issues that come up across projects and delegates solutions to team members for resolution.

EDUCATION

B.A., Environmental Analysis and Design, University of California, Irvine, 2001

AREA OF EXPERTISE

- Title V Air Compliance and Permitting
- Title V Federal/local/state permitting, applications, and compliance reporting Anaerobic Digesters
- Landfill operations and permit compliance.
- Covered Aerated Static Pile (CASP)/LFGTE/RNG Air Permitting

REGISTRATIONS/ AFFILIATIONS

Air and Waste Management Association (AWMA)

TRAINING/CERTIFICATIONS

OSHA 40-hr. HAZWOPER Training

OSHA 8-hr. HAZWOPER Refresher

DOT and IATA Hazardous Materials/ Dangerous Goods Shipment Training

OFFICE

Dublin, CA

CONTACT

suzan.pankenier@tetratech.com

- Client manager for air permitting for various enclosed flare projects, including ZULE flares, oversight of AERMOD modeling, and site landfill gas flow emissions. Client manager for performance (source testing) oversight and reporting, landfill odor training, landfill expansions and Title V compliance.
- Client manager for Gas Collection and Control System (GCCS) Design Plans, Landfill Gas Monitoring Plans, Startup, Shutdown, and Malfunction (SSM) Plans, and Surface Emissions Monitoring (SEM) Plans.
- Client manager for greenhouse gas (GHG) monitoring, GHG Plans and reporting, Greenhouse Gas Tailoring Rule and Mandatory Reporting Rule.
- Project manager for Title V permitting (Title V Permit applications and renewals, permit modifications, higher operating value [HOV] requests).
- Provided overall environmental management of the Hawaii market area, including oversight of three landfills and personnel on the islands of Kauai, Oahu, and the Big Island. Ensured business operated in compliance with all applicable federal, state, and local regulations, site permit conditions, and company policies.
- Supported Hawaii organization, District Managers, and area Vice President in management and interpretation of air quality, wastewater, stormwater, and site compliance issues.
- Assessed and audited Hawaii landfills to detect existing or potential violations of environmental regulations or health hazards, determine preventive measures, and follow up to ensure proper implementation of suggested measures.
- Conducted National Pollutant Discharge Elimination System (NPDES) permitting and monitored NPDES compliance at construction sites, including documenting and agency reporting for groundwater treatment systems.

Client Manager for County of Maui Landfill, Hana Landfill, Lanai Landfill, and Molokai Landfill, Halehaka Landfill

- Title V permitting (Title V Permit applications and renewals, permit modifications, higher operating value [HOV] requests).
- Monthly routine air compliance and landfill data review, management, oversight of all aspects related to Title V air compliance.
- Conduct site visits and fieldwork as needed for environmental monitoring, review equipment configurations and verify permit requirements.

Client Manager, Air Compliance Services, Republic Services Landfills, California Northern and Southern California, Nevada

- Conducted annual air compliance site audits of multiple facility operations to verify compliance with permit requirements. Review of local, state and federal regulatory changes and applicability to facilities, update emission inventory source list, air permits, operation and maintenance plans.
- Review and verify operational data. Produce monthly operating reports. Identify and submit Reportable Compliance Actions on behalf of facility.
- Lead monthly meetings with operations and maintenance staff and landfill managers. Relay compliance observations, discuss course of action, and compliance and permitting updates
- Prepare federal Title V renewal applications, incorporating New Source Review requirements as needed. Submit draft permits for agency review.
- Conduct site visits as needed to review equipment configurations and verify permit requirements.
- Annual emissions inventories.
- Responsible for preparation and submittal of semi-annual and annual air compliance reporting requirements.
- Provide greenhouse gas (GHG) data compilation, calculations, and reporting requirements per 40 CFR 98.
- Communicate with agencies to assist clients with compliance determinations.
- Provided information and analysis of situations and data for preparing material and evidence for use in hearings, lawsuits, and response to regulatory agencies.

Project Manager, Air Compliance Services, Waste Management Landfills, California, Oregon, Washington

- Conducted compliance services, permitting (air and other permits), design, and construction management, including design and construction management of a large LFG wellfield improvement project.
- Conducted routine air compliance services, design, and construction management services. Design work included LFG well field improvement projects and expansion of the GCCS into current and future filling areas within the landfill boundaries.
- Conducted compliance, permitting (air and other permits), design, and construction management. Permitting includes an application for permit modifications for a new flare. Design work included an LFG wellfield improvements project to mitigate LFG migration, decrease surface emissions, and provide more LFG to the engine and flare facilities.
- Air compliance, permitting (air and other permits), design, and construction management. Design work included an LFG wellfield improvements project.
- Air compliance and construction management. Construction management services were provided for a new flare, LFG wells, and piping improvements.
- Provided air compliance, permitting (air and other permits), design, and construction management services including design for wellfield improvements and master planning for the final closure of the landfill.

Client Manager for CASP/LFGTE/RNG Permitting/Air Projects

- Permitting services to transition to CASP composting from windrow operations, which were allowable under the existing Solid Waste Facility Permit (SWFP). Tetra Tech worked to establish Bay Area Air Quality Management District (BAAQMD) permitting application. Also permitted several RNG/LFGTE projects in CA.
- Monthly routine air compliance and CASP data review, management, oversight for air permit compliance.

Landfill Expansion Permitting

- Client Manager for a vertical expansion air permit application to assist with the development of a Major Facility Review (MFR) Title V Permit Application to obtain a BAAQMD air permit for the increase in design capacity. Tetra Tech compiled supporting information and completed the forms and narrative needed to prepare the application for submittal to BAAQMD.
- Non-methane organic compound (NMOC) and Design Capacity Reporting (DCR).

PERSONNEL TRAINING

- Provides leadership, development, and training to landfill personnel on topics such as waste acceptance and handling, permit compliance, regulatory requirements, landfill operational and environmental control plans, and operating manuals.
- Facilitates and participates in Health and Safety meetings and training sessions.
- Internal and external air quality and permitting trainings.
- Served as the contact and liaison between Waste Management of Hawaii (WMH) and various regulatory agencies to develop and maintain positive relationships. Handles site inspections (internal and external, scheduled and unscheduled). Demonstrated ability to build rapport and resolve issues among multiple entities with conflicting interests.

Appendix G

Traffic Impact Analysis Report

TRAFFIC IMPACT ANALYSIS REPORT WAILUKU SINGLE FAMILY RESIDENTIAL PROJECT

WAILUKU, MAUI, HAWAII

DRAFT FINAL

November 6, 2023

Prepared for:

DDC LLC
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Wailuku, Hawaii 96793

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TRAFFIC IMPACT ANALYSIS REPORT

WAILUKU SINGLE FAMILY RESIDENTIAL PROJECT

Wailuku, Maui, Hawaii

DRAFT FINAL

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Prepared by

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Civil Engineers • Surveyors
Honolulu • Wailuku

November 6, 2023

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APPENDICES

AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

TERRANCE S. ARASHIRO, P.E.
ADRIENNE W.L.H. WONG, P.E., LEED AP
DEANNA M.R. HAYASHI, P.E.
PAUL K. ARITA, P.E.
ERIK S. KANESHIRO, L.P.L.S., LEED AP
MATT K. NAKAMOTO, P.E.
GARRETT K. TOKUOKA, P.E.

WAILUKU SINGLE FAMILY RESIDENTIAL PROJECT TRAFFIC IMPACT ANALYSIS REPORT

Wailuku, Maui, Hawaii

1. INTRODUCTION

This report documents the findings of a traffic study conducted by Austin, Tsutsumi & Associates, Inc. (ATA) to evaluate the potential traffic impacts resulting from the proposed Wailuku Single Family Residential project (hereinafter referred to as the "Project") located in Wailuku, Maui, Hawaii.

1.1 Location

The Project is located in Wailuku on the island of Maui on approximately 77 acres of land as a portion of the larger 148-acre parcel identified as TMK: (2) 3-5-002:003 (por.). The Project will be bounded by Honoapiilani Highway to the east and the Kuikahi Drive to the north. See Figure 1.1 for Project location.

1.2 Project Description

The Project proposes the development of up to 204 single-family (R-1) residential units, with no Ohana units. Access to the site is proposed from two full-access driveways along Kuikahi Drive. The west access point for the project will convert the existing Kuikahi Drive/Kehalani Mauka Parkway "T"-intersection into a 4-way intersection. The east access is planned to be located approximately 700 feet to the west of the Honoapiilani Highway/Kuikahi Drive intersection. See Figure 1.2 for Site Plan.

REPLY TO:
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HONOLULU, HAWAII
WAILUKU, MAUI, HAWAII
HILO, HAWAII

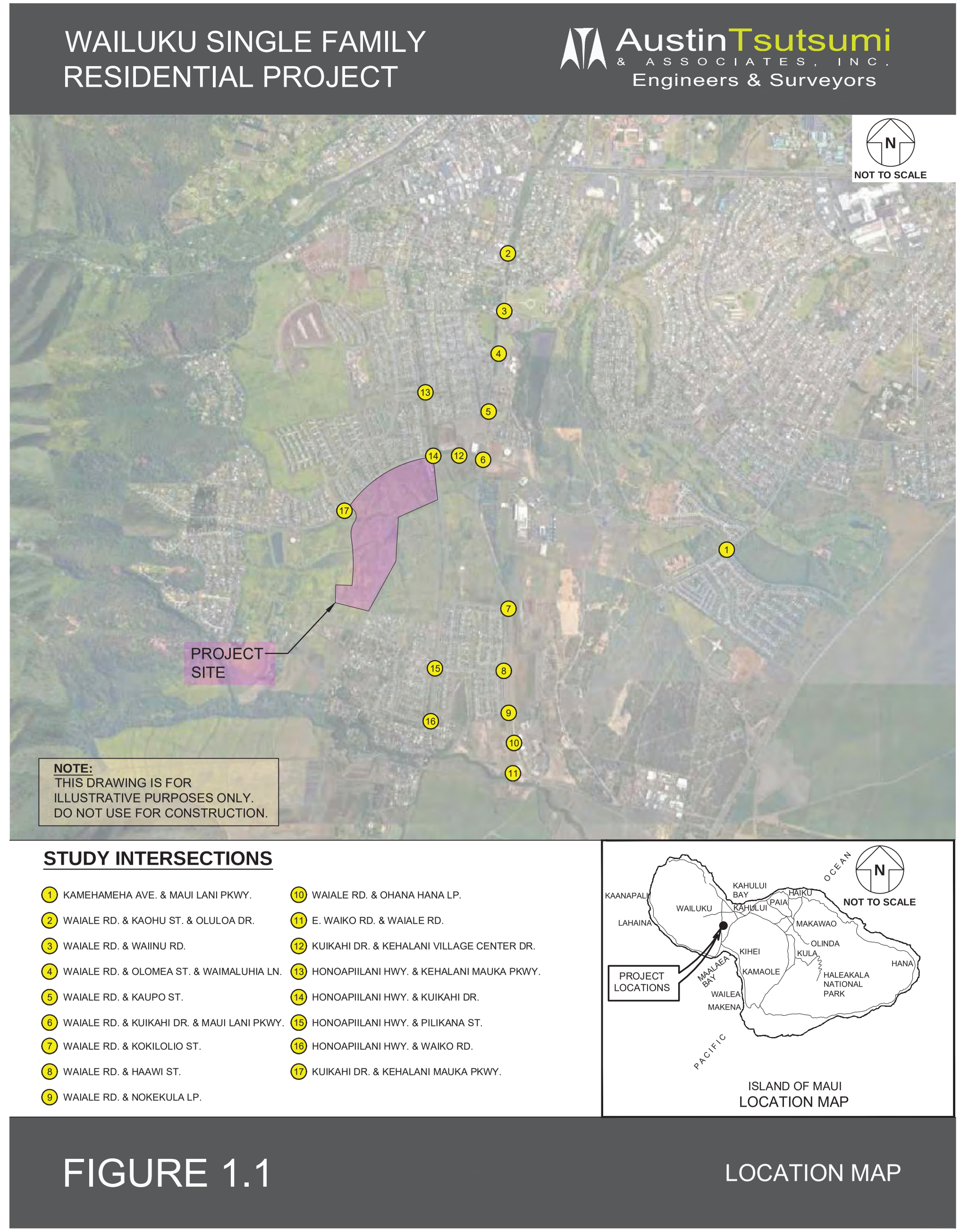

FIGURE 1.1 LOCATION MAP

WAILUKU SINGLE FAMILY RESIDENTIAL PROJECT

Austin Tsutsumi & Associates, Inc.
Engineers & Surveyors

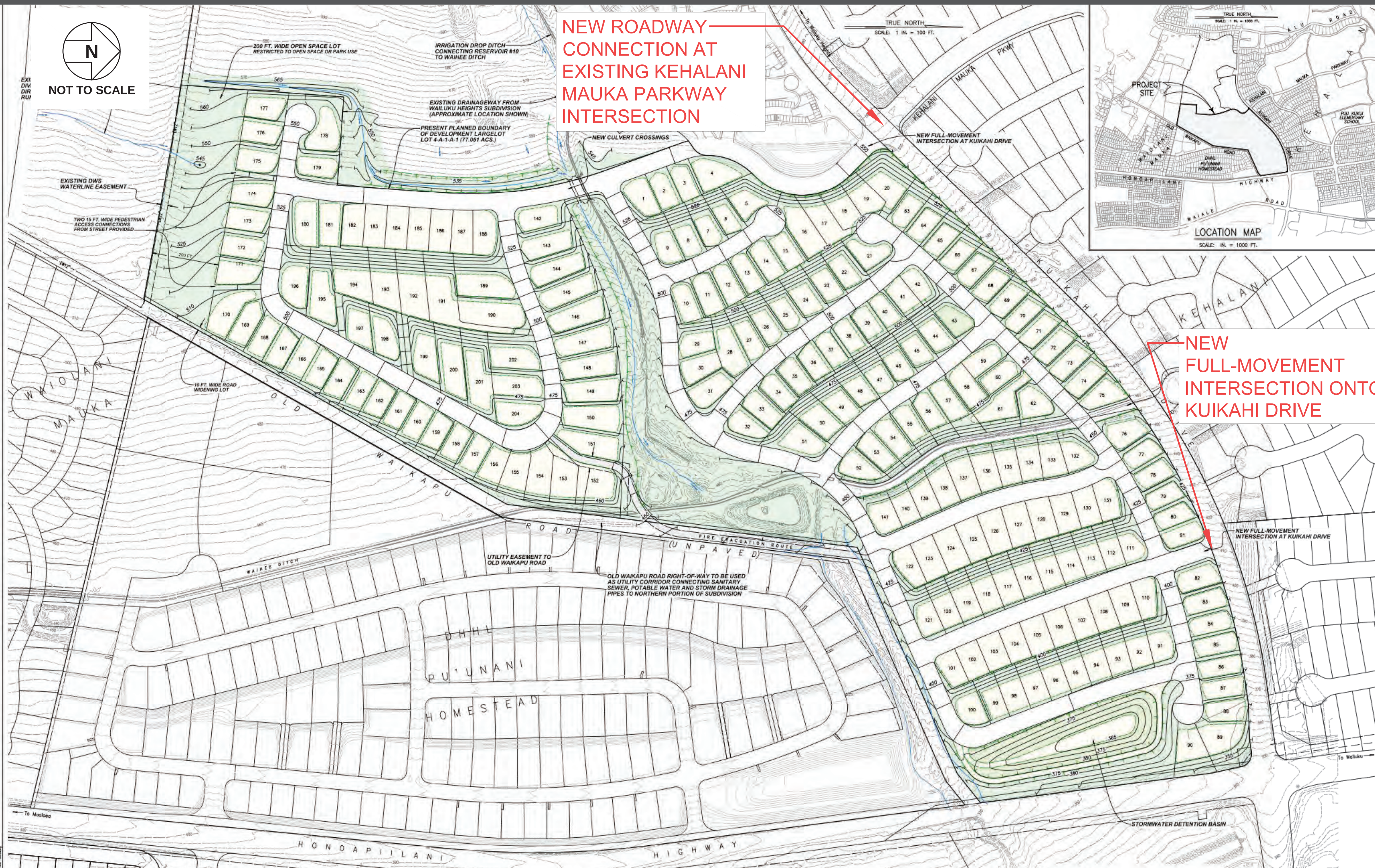

FIGURE 1.2

CONCEPTUAL SITE PLAN

2. METHODOLOGY

This study will address the following:

- Assess existing traffic operating conditions during the weekday AM and PM peak hours of traffic within the study area.
- Traffic Projections for the following Base Year 2028 (without the Project) scenarios:
  - Base Year 2028 (without the Project), WITHOUT Waiale Road Ext. and WITHOUT Maui Lani Parkway Ext.
  - Base Year 2028 (without the Project), WITH Waiale Road Ext. and WITHOUT Maui Lani Parkway Ext.
  - Base Year 2028 (without the Project), WITH Waiale Road Ext. and WITH Maui Lani Parkway Ext.
- Estimate the vehicular trips that will be generated by the Project.
- Traffic projections for the following Future Year 2028 (with Project) scenarios:
  - Future Year 2028 (with the Project), WITHOUT Waiale Road Ext. and WITHOUT Maui Lani Parkway Ext.
  - Future Year 2028 (with the Project), WITH Waiale Road Ext. and WITHOUT Maui Lani Parkway Ext.
  - Future Year 2028 (with the Project), WITH Waiale Road Ext. and WITH Maui Lani Parkway Ext.
- Recommendations for roadway improvements or other mitigative measures, as appropriate, to reduce or eliminate the adverse impacts resulting from traffic generated by the Project.

2.1 Intersection Methodology

Level of Service (LOS) is a qualitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A to congested conditions at LOS F. The Highway Capacity Manual (HCM), 6th Edition, includes methods for calculating volume to capacity ratios, delays, and corresponding Levels of Service that were utilized in this study. See Appendix B for Level of Service Criteria.

Analyses for the signalized and stop-controlled study intersections were performed using the traffic analysis software Synchro, which is able to prepare reports based on the methodologies described in the HCM. Roundabout analysis was performed using SIDRA Intersection, which is also able to prepare reports based on SIDRA methodologies. These reports contain control delay results as based on intersection lane geometry, signal timing, and hourly traffic volumes. Based on the vehicular delay at each intersection, a LOS is assigned to each approach and intersection movement as a qualitative measure of performance. These results, as confirmed or refined by field observations, constitute the technical analysis that will form the basis of the recommendations outlined in this report.

3. EXISTING TRAFFIC CONDITIONS

3.1 Roadway Network

The following are brief descriptions of the existing roadways studied within the vicinity of the Project:

East Waiko Road is an east-west, two-way, two-lane, undivided collector roadway with a posted speed limit of 20 mph in the Project study area. East Waiko Road extends westward from Kuihelani Highway to Honoapiilani Highway where it continues as West Waiko Road within the Waikapu residential neighborhood.

Honoapiilani Highway is a north-south, two-way, two-lane, undivided arterial highway with posted speed limits ranging between 30 miles per hour (mph) and 45 mph. Honoapiilani Highway begins as the continuation of South High Street near Kahookele Street and continues southward through Waikapu, Maalaea, and wraps around the “Pali” to West Maui. Right turn channelization is provided at all of its major intersections within the study area.

Kamehameha Avenue is generally a north-south, two-way, two-lane undivided roadway which provides connectivity between the Wailuku and Kahului areas. Kamehameha Ave begins to the north with its intersection with Hana Highway near the Kanaha Pond, extends westward and then curves southward where it currently terminates near the Pomaikai Elementary School. Kamehameha Avenue has a speed limit of 20 mph and a posted school zone speed limit of 20 mph near the Pomaikai Elementary School.

Kaohu Street is an east-west, two-way, two-lane, undivided local roadway on the northern side of the Project Site that extends from High Street to the west and ends at Waiale Road to the east, before turning into Oluloa Drive, to serve a residential subdivision. Kaohu Street provides access to various residential homes, various businesses and the Maui County Building. The posted speed limit is 20 mph with a posted school zone speed limit of 20 mph enforced between the hours of 7:00 AM and 6:00 PM.

Kaupo Street is an east-west, two-way, two-lane, undivided local roadway that services the Kehalani residential subdivision consisting of various single family and multi-family dwellings. Kaupo Street also provides northerly access to the Kehalani Village Center. The posted speed limit on Kaupo Street is 20 mph.

Kehalani Mauka Parkway is an east-west, two-way, four-lane, divided collector roadway with posted speed limits ranging between 20 mph and 30 mph on either side of Honoapiilani Highway. Kehalani Parkway extends east of Honoapiilani Highway from the lower Kehalani residential subdivision at Kamole Street and continues in the mauka direction, transitioning into a two-lane roadway and curving north past Puu Kukui Elementary School in the upper Kehalani residential subdivisions.

Kuikahi Drive is an east-west, two-way, two-lane, undivided collector roadway with posted speed limits ranging between 25 mph and 30 mph. Kuikahi Drive begins approximately 1.2 miles west of Honoapiilani Highway within the Wailuku Heights development and extends eastward past Honoapiilani Highway, terminating near The Church of Jesus Christ of Latter Day Saints, where Kuikahi Drive becomes Maui Lani Parkway.

Maui Lani Parkway is an east-west, two-way, two-lane, divided roadway with a posted speed limit of 30 mph that provides connection for the Waiale area to regional roadways. Maui Lani Parkway begins to the east at it's T-intersection with Kuihelani Highway and terminates to the west at its intersection with Waiale Road, where it transitions into Kuikahi Drive.

Nokekula Loop, Haawi Street & Kokilolio Street are east-west, two-way, two-lane, undivided local roadway to the west of Waiale Road with a posted speed limit of 20 mph. These three roads service the Waikapu Gardens Phase I residential neighborhood

Ohana Hana Loop is an east-west, two-way, two-lane, undivided local roadway to the west of Waiale Road with a posted speed limit of 20 mph. Ohana Hana Loop extends from Waiale Road and services the Waikapu Gardens Phase II residential neighborhood.

Olomea Street is an east-west, two-way, two-lane, undivided local roadway that services the Kehalani residential subdivision consisting of various single family and multi-family dwellings. The posted speed limit on Olomea Street is 30 mph.

Oluloa Road is a short two-way, two-lane roadway which begins to the west at Waiale Road and runs southeast until it curves to the northeast and continues as Naniloa Drive. The posted speed limit on Oluloa Road is 20 mph.

Pilikana Street is an east-west, two way, two-lane roadway which begins to the east at its intersection with Honoapiilani Highway and continues westward until it ends as a cul-de-sac. The posted speed limit on this roadway is 20 mph.

Waiale Road is a north-south, two-way, two-lane, undivided collector roadway. To the north, Waiale Road serves as the southern connection to Lower Main Street and extends past the Maui Community Correctional Center, Kehalani Village Center and various residential subdivisions, eventually terminating at a T-intersection with East Waiko Road. Waiale Road has a posted speed limit of 20 mph from Lower Main Street and transitions to 25 mph from Waiinu Road to Maui Lani Parkway/Kuikahi Drive and increased again to 30 mph from Maui Lani Parkway/Kuikahi Drive to its southern terminus at Waiko Road.

Waiinu Road is an east-west, two-way, two-lane, undivided roadway which begins to the west at a T-interstection with Waiale Road and continues eastward where it transitions to Puumele Street at its intersection with Maui Lani Parkway. The posted speed limit on this roadway is 25 mph.

Waimaluhia Lane is an east-west two-way, two-lane roadway which begins to the west at its intersection with Kamole Street within the Kehalani Village shopping center and continues eastward where it terminates to the west within the Hale Makana O Waiale development. There are no posted speed limit signs along this roadway.

3.2 Existing Traffic Volumes

Intersection analysis within the study area was performed on the following intersections due to their proximity to the Project. Turning movement volumes were collected at each of the following Study Intersections on the dates noted:

- Kamehameha Avenue/Maui Lani Parkway (Unsignalized) - *March 2022*
- Waiale Road/Kaohu Street & Oluloa Drive (Unsignalized) - *April 2019*

- Waiale Road/Waiinu Road (Unsignalized) - *March 2022*
- Waiale Road/Olomea Street (Unsignalized) - *March 2022*
- Waiale Road/Kaupo Street (Unsignalized) - *April 2019*
- Waiale Road/Kuikahi Drive & Maui Lani Parkway (Signalized) - *March 2022*
- Waiale Road/Kokilolio Street (Unsignalized) - *April 2019*
- Waiale Road/Haawi Street (Unsignalized) - *April 2019*
- Waiale Road/Nokekula Loop (Unsignalized) - *April 2019*
- Waiale Road/Ohana Hana Loop (Unsignalized) - *April 2019*
- Waiko Road/Waiale Road (Unsignalized) - *April 2019*
- Kuikahi Drive/Kehalani Village Center Driveway (Unsignalized) - *April 2019*
- Honoapiilani Highway/Kehalani Parkway (Signalized) - *March 2022*
- Honoapiilani Highway/Kuikahi Drive (Signalized) - *March 2022*
- Honoapiilani Highway/Pilikana Street (Signalized) - *May 2018*
- Honoapiilani Highway/Waiko Road (Signalized) - *May 2018*
- Kuikahi Drive & Kehalani Mauka Parkway (Unsignalized) – March 2022

Based on the traffic count data, the weekday AM peak hour of traffic was determined to occur between 7:00 AM to 8:00 AM, while the weekday PM peak hour of traffic was determined to occur between 3:45 PM to 4:45 PM and 4:15 PM to 5:15 PM. The traffic count data is provided in Appendix A for the existing intersections studied.

3.3 Existing Traffic Conditions Analysis and Observations

Kamehameha Avenue/Maui Lani Parkway is currently controlled by a roundabout and is located 700 feet northeast of Pomaikai Elementary School. The roundabout at this intersection was constructed in July 2020, and comparison with historical volumes shows that traffic volumes at the roundabout increased by about 35% compared to 2019 volumes when the intersection operated as a 4-way stop. However, analysis shows that all movements at the roundabout operate at LOS B or better across both peak hours.

Waiale Road/Kaohu Street/Oluloa Drive is a four-way stop intersection with shared left-turn/through/right-turn lanes along Waiale Road and the westbound approach along Oluloa Drive. An exclusive left-turn lane and shared through/right-turn lane is provided along the eastbound approach on Kaohu Street.

Traffic was generally observed to progress unimpeded along Waiale Road during the AM peak hour, except between 7:30-7:50 AM, where southbound traffic on Waiale Road could queue back near to Wells Street. More critically, northbound traffic on Waiale Road was observed to slowly progress through the intersection. For a brief 5-10 minute period starting from 7:30 AM, northbound traffic spilled back at varying lengths from this four-way stop to the Waiale Road/Waiinu Road intersection, causing congestion that stretched back towards Kuikahi Drive. Operationally, the northbound and southbound approaches along Waiale Road operate at or over-capacity conditions with LOS F during the AM peak hour. Congestion and queuing along Waiale Road generally dissipated around 7:50-7:55 AM. During the PM peak hour, the southbound approach also operates at LOS F and overcapacity conditions and the northbound left-turn/through movement operates at LOS F during the PM peak hour.

Various constraints limit options to implement mitigative measures to curb congestive conditions at this intersection and along Waiale Road. Based on the Four-Hour signal warrant in the Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition, a signal is warranted based on existing traffic volumes. However, installation of a traffic signal system will be challenging given the existing alignment of the roadway, right-of-way constraints and skewed approach for Oluloa Drive. The lane striping along Waiale Road is currently adjacent to the westernmost limits of the County's right-of-way. Some undeveloped right-of-way is available on the easternmost limits of the County's right-of-way, so Waiale Road may need to be realigned to fit a traffic signal system at this intersection. Waiale Road may also require widening to provide exclusive left-turn lanes, given the relatively high volume of through traffic to reduce blocking of through vehicles by queued left-turn vehicles. A mini roundabout is likely infeasible due to the existing right-of-way constraints as well as the skewed approach from Oluloa Drive that inhibits perpendicular intersection approaches necessary for roundabouts. A mini roundabout may be able to fit if Waiale Road is realigned and the Oluloa Road leg is removed at this intersection. Mitigation to remove stop control along the Waiale Road approach (creating a two-way stop-controlled intersection) will also be negatively impacted by the skewed approach from Oluloa Drive, making it difficult for vehicles along Oluloa Drive to detect approaching free flowing northbound vehicles along Waiale Road. Right-of-way acquisition may be needed to provide more space for the options of a traffic signal, roundabout, widening improvements and/or the realignments of Waiale Road and Oluloa Drive to provide perpendicular intersection approach angles.

Waiale Road/Waiinu Road is an unsignalized T-intersection that is stop-controlled on the westbound Waiinu Road approach. In both the AM and PM peak hours the westbound left-turn lane operates at LOS F and overcapacity conditions with lengthy delays.

As noted above, northbound congestion can spill back into this intersection from the Waiale Road/Kaohu Street/Oluloa Drive four-way stop intersection during portions of the AM peak hour, causing congestion that stretches back towards Kuikahi Drive. Northbound congestion is further impacted at this intersection due to a heavy northbound right-turn movement as turning vehicles slow in anticipation of the turn, also slowing all vehicles in the single-lane northbound approach.

Some northbound vehicles along Waiale Road were also observed to stop within the through travel lane to allow southbound left-turn and westbound left-turn vehicles (ranging from 1-6 vehicles at a time) to turn onto or off of Waiale Road, which contributed to the lengthy queues along Waiale Road. During the PM peak hour, traffic along Waiale Road generally operated smoothly, but queues continued to be observed along the westbound leg of Waiinu Road. Queues along the westbound approach were variable throughout the peak period, and depended on gaps in traffic and the occurrence of northbound and southbound Waiale Road vehicles stopping within the through lane to allow westbound vehicles from Waiinu Road to turn onto Waiale Road.

The County plans to construct a roundabout at this intersection, and it was included in the Statewide Transportation Improvements Plan for 2023. Although the exact design and timeline for completion of this roundabout is unknown, it was included for analysis purposes in the Base and Future Year scenarios.

Waiale Road/Olomea Street is an unsignalized intersection which is stop-controlled on the eastbound Olomea Street approach. The driveway for the Maui Community Correctional center (MCCC) is slightly offset to the south of the Olomea Street intersection. This driveway was considered to be the westbound approach. During the AM and PM peak hours of traffic, the

eastbound left-turn/through movement operates at LOS F and overcapacity conditions. During the AM peak hour, due to northbound congestion along Waiale Road, some northbound vehicles along Waiale Road were observed to stop within the through travel lane to allow eastbound left-turn vehicles to turn onto Waiale Road, which contributed to the northbound congestion. Based on a signal warrant, a signal is warranted with existing conditions. However, as a temporary mitigative measure, a median refuge lane may help reduce eastbound left-turn vehicle delays by allowing vehicles to turn onto Waiale Road with a two-stage approach; turning left into the refuge lane after finding gaps in southbound traffic, then merging into the Waiale Road through lane after finding gaps in northbound traffic.

This 4-legged intersection is unconventional in that the east-leg of the intersection consists of two (2) full movement driveways separated by a utility pole. The northernmost east-leg driveway appears to be within the Maui Memorial Park property, providing access at its southwest corner of the site. The southernmost east-leg driveway services MCCC as its sole access to Waiale Road. Existing vehicles currently utilize both driveways, with traffic primarily generated by the MCCC. Ideally, it would be best to remove the southernmost east-leg driveway to MCCC and have MCCC work with Maui Memorial Park to allow a shared easement access to the northernmost east-leg driveway that services Maui Memorial Park. This consolidates multiple turning movements at two closely spaced driveways, better lines up with the Olomea Street leg of the intersection and would remove the southbound left-turners that can queue up in the northbound left-turn lane to access MCCC using the southernmost east-leg. Left-turn restrictions could have negative effects since this is the sole access to MCCC and southbound left-turners would need to continue further south ¼-mile to Waimaluhia Lane and circulate back up to turn right into the MCCC. Illegal u-turn movements will likely be made to avoid the detour to Waimaluhia Lane. If agreements cannot be made for a shared easement, the southernmost east-leg driveway should be restricted to right-in, right-out only to remove southbound left-turner from encroaching into the existing northbound left-turn lane.

Waiale Road/Kaupo Street is an unsignalized T-intersection with exclusive left-turn and right-turn lanes along the Kaupo Street approach and shared northbound through/left-turn and shared southbound through/right-turn lanes along Waiale Road. During the AM peak hour, the eastbound left-turn operates at LOS F. Similar to the Waiale Road/Olomea Street intersection, observations indicated that some northbound vehicles along Waiale Road stopped within the through travel lane to allow eastbound left-turn vehicles to turn onto Waiale Road, which contributed to the northbound congestion spilling back to Kuikahi Drive during the AM peak hour. An exclusive northbound left-turn lane and/or a median refuge lane may be considered to improve operations at this intersection and reduce vehicle spill back into Kuikahi Drive. A signal is not warranted with existing conditions.

Waiale Road/Kuikahi Drive/Maui Lani Parkway is a signalized intersection with exclusive left-turn lanes on all approaches and an exclusive right-turn lane on the westbound approach. All movements at this intersection currently operate at LOS D or better during the AM and PM peak hours of traffic. However, for about 20-30 minutes during the AM peak hour, vehicles were observed to queue beyond the length of the eastbound left-turn storage lane to the Kehalani Village Drive or as far as Honoapiilani Highway. These queues occur at variable lengths and are dependent on existing northbound queues that spill back from Waiale Road into the Waiale Road/Kuikahi Drive intersection, which limits full progression for eastbound left-turning vehicles. During the PM peak hour, some southbound congestion occurs, primarily due to the short existing southbound left-turn lane. While the existing right-of-way along Waiale Road does not allow for widening of additional lanes, the southbound left-turn lane was recently lengthened without affecting the adjacent northbound left-turn pocket into Kehalani Village Center.

Waiale Road @ Kokilolio Street, Haawi Street, Nokekula Loop, and Ohana Hana Loop are unsignalized T-intersections servicing the Waikapu Gardens Phase I and II developments. All movements at these intersections currently operate at LOS B or better with no significant delays during the AM and PM peak hours of traffic.

Waiale Road/Waiko Road is an unsignalized T-intersection with shared lanes on all approaches and the southbound approach stop-controlled. All movements at this intersection currently operate at LOS C or better with no significant delays or queues during both peak hours of traffic.

Kuikahi Drive/Kehalani Village Center Access is an unsignalized T-intersection with exclusive left-turns in the eastbound and southbound directions. All movements at this intersection currently operate at LOS B or better during the AM and PM peak hours of traffic with the exception of the southbound left-turn movement which operates at LOS E during the AM and PM peak hours of traffic.

Honoapiilani Highway/Kehalani Parkway is a signalized intersection with exclusive left-turn and right-turn lanes on all approaches. The channelized northbound and southbound right-turn movements also include exclusive eastbound and westbound receiving lanes, respectively. All movements at this intersection currently operate at LOS D or better during the AM and PM peak hours of traffic. For a portion of the AM peak hour, the eastbound left-turn movement operates with queues that extend to or beyond the existing left-turn storage lane and some vehicles may require two cycle lengths to clear the intersection. Heavy traffic during a short period of time is reflective of typical school traffic conditions, as these queuing conditions were observed to last about 30 minutes during the AM peak hour, generally between 7:15-7:45 AM and primarily stem from traffic generated by the Puu Kukui Elementary School.

In addition, northbound traffic queues along Honoapiilani Highway were observed to spill back from the Wailuku Elementary School and Main Street area to near Kehalani Parkway at its maximum for about 5-10 minutes during the AM peak hour.

Honoapiilani Highway/Kuikahi Drive is a signalized intersection with exclusive left-turn and right-turn lanes on all approaches. The channelized northbound right-turn movement also includes an exclusive eastbound acceleration lane. All movements at this intersection currently operate at LOS C or better during both AM and PM peak hours.

Honoapiilani Highway/Pilikana Street is a signalized intersection with an exclusive left-turn lane on the northbound approach and a channelized right-turn lane on the southbound approach. All movements at this intersection operate at LOS C or higher for both peak hours.

Honoapiilani Highway/Waiko Road is a signalized intersection with exclusive left-turn lanes on the northbound and southbound approaches, and exclusive right-turn lanes on the eastbound and southbound approaches. All movements at this intersection currently operate at LOS C or better with no significant delays or queuing during the AM and PM peak hours of traffic.

Kuikahi Drive/Kehalani Mauka Parkway is an unsignalized intersection with an exclusive left-turn lane on the eastbound approach, and exclusive right-turn and left-turn lanes on the southbound approach. All movements operate at LOS B or better during both peak hours of traffic.

Figure 3.1 illustrates the existing lane configuration, existing traffic volumes, and LOS for each study intersection. Table 3.1 summarizes the existing LOS at the study intersections. LOS worksheets are provided in Appendix C.

WAILUKU SINGLE FAMILY
RESIDENTIAL PROJECT

Austin Tsutsumi & Associates, Inc.
Engineers & Surveyors

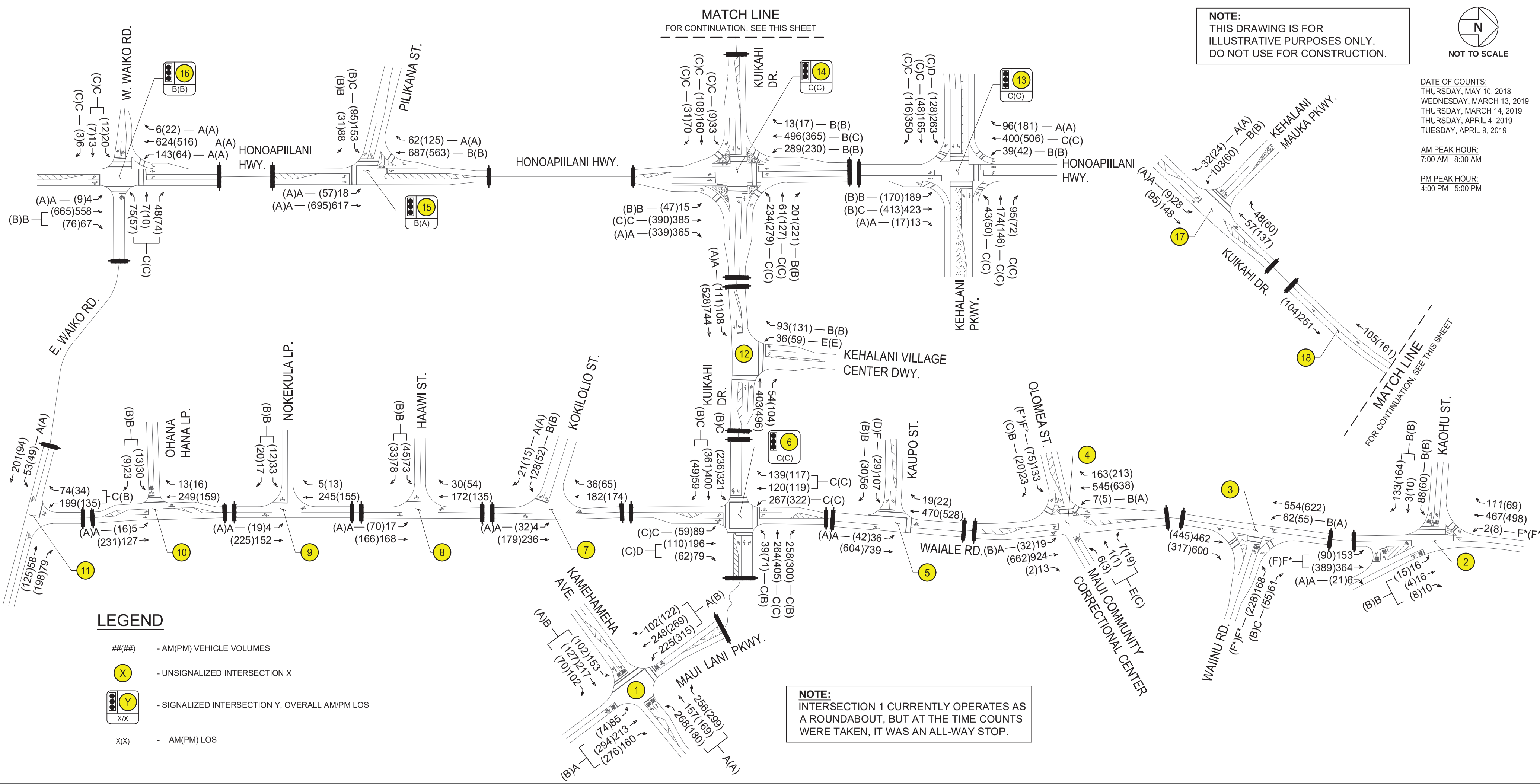

FIGURE 3.1

EXISTING CONDITIONS, LANE CONFIGURATIONS,
TRAFFIC VOLUMES AND LOS

Table 3.1 : Existing Conditions Level of Service Summary

Intersection	Existing Conditions AM HCM Delay	AM v/c Ratio	AM LOS	PM HCM Delay	PM v/c Ratio	PM LOS
1: Kamehameha Ave & Maui Lani Pkwy						
NB LT/TH/RT	14.9	0.74	B	8.8	0.51	A
EB LT/TH/RT	10.2	0.72	A	10.4	0.81	B
WB LT/TH/RT	7.5	0.61	A	12.1	0.80	B
SB LT/TH/RT	9.8	0.78	A	9.7	0.77	A
Overall	10.2	0.78	B	10.5	0.81	B
2: Waiale Rd & Kaohu St/Oluloa Dr						
NB LT/TH	72.8	1.05	F*	50.3	0.96	F
NB RT	8.7	0.01	A	8.8	0.04	A
EB LT	14.0	0.23	B	12.7	0.15	B
EB TH/RT	13.4	0.31	B	14.3	0.38	B
WB LT/TH/RT	13.4	0.12	B	12.8	0.07	B
SB LT/TH/RT	106.4	1.15	F*	100.9	1.11	F*
Overall	75.3	-	F	64.3	-	F
3: Waiale Rd & Waiinu Rd						
WB LT	471.5	1.81	F*	520.6	1.97	F*
WB RT	16.9	0.18	C	13.9	0.13	B
SB LT	11.7	0.11	B	9.9	0.08	A
Overall	42.5	-	-	69.7	-	-
4: Waiale Rd & Olomea St/MCCC Driveway						
NB LT	9.4	0.03	A	10.1	0.05	B
EB LT/TH	789.1	2.41	F*	247.1	1.13	F*
EB RT	13.5	0.06	B	15.1	0.06	C
WB LT/TH/RT	48.4	0.16	E	22.3	0.11	C
SB LT	10.4	0.01	B	9.1	0.01	A
Overall	57.7	-	-	11.8	-	-
5: Waiale Rd & Kaupo St						
NB LT	8.6	0.04	A	8.9	0.05	A
EB LT	94.5	0.82	F	34.1	0.20	D
EB RT	12.4	0.11	B	12.6	0.06	B
Overall	7.8	-	-	1.4	-	-
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy						
NB LT	23.2	0.25	C	25.0	0.19	C
NB TH/RT	36.8	0.82	D	32.9	0.71	C
EB LT	22.0	0.79	C	17.7	0.71	B
EB TH/RT	23.3	0.73	C	18.7	0.64	B
WB LT	24.5	0.16	C	17.3	0.22	B
WB TH	34.0	0.80	C	32.7	0.85	C
WB RT	26.3	0.14	C	19.3	0.17	B
SB LT	25.2	0.72	C	31.6	0.80	C
SB TH/RT	24.1	0.50	C	23.6	0.51	C
Overall	26.7	-	C	25.4	-	C
7: Waiale Rd & Kokololio St						
NB LT	7.7	0.00	A	7.8	0.03	A
EB LT	14.0	0.26	B	12.7	0.11	B
EB RT	9.5	0.03	A	9.5	0.02	A
Overall	3.3	-	-	2.0	-	-
8: Waiale Rd & Haawi St						
NB LT	7.7	0.01	A	7.8	0.06	A
EB LT/RT	11.9	0.24	B	12.0	0.14	B
Overall	3.6	-	-	2.9	-	-

* Denotes overcapacity condition, v/c ≥ 1.

Table 3.1: Existing Conditions Level of Service Summary Cont'd

Intersection	Existing Conditions AM HCM Delay	AM v/c Ratio	AM LOS	PM HCM Delay	PM v/c Ratio	PM LOS
9: Waiale Rd & Nokekula Lp						
NB LT	7.8	0.00	A	7.6	0.02	A
EB LT/RT	11.3	0.09	B	10.3	0.05	B
Overall	1.3	-	-	1.1	-	-
10: Waiale Rd & Ohana Hana Loop						
NB LT	7.8	0.00	A	7.6	0.01	A
EB LT/RT	10.7	0.08	B	10.4	0.03	B
Overall	1.4	-	-	0.8	-	-
11: E Waiko Rd & Waiale Rd						
EB LT	7.6	0.04	A	8.1	0.04	A
SB LT/RT	16.1	0.48	C	14.2	0.32	B
Overall	7.2	-	-	4.4	-	-
12: Kuikahi Dr & Kehalani Village Center Dr						
EB LT	8.8	0.11	A	9.4	0.13	A
SB LT	47.4	0.32	E	49.2	0.45	E
SB RT	12.0	0.16	B	14.0	0.26	B
Overall	2.6	-	-	4.0	-	-
13: Honoapiilani Hwy & Kehalani Pkwy						
NB LT	17.1	0.56	B	16.2	0.53	B
NB TH	22.6	0.66	C	18.4	0.57	B
NB RT	0.0	0.00	A	0.0	0.00	A
EB LT	51.7	0.93	D	23.3	0.54	C
EB TH	22.4	0.35	C	24.3	0.12	C
EB RT	21.3	0.19	C	23.9	0.05	C
WB LT	26.8	0.14	C	26.6	0.15	C
WB TH	33.5	0.74	C	32.0	0.59	C
WB RT	28.9	0.05	C	28.7	0.03	C
SB LT	17.7	0.13	B	14.4	0.12	B
SB TH	28.4	0.76	C	25.6	0.78	C
SB RT	0.0	0.00	A	0.0	0.00	A
Overall	29.7	-	C	22.7	-	C
14: Honoapiilani Highway & Kuikahi Drive						
NB LT	18.2	0.05	B	17.1	0.13	B
NB TH	27.9	0.74	C	27.9	0.74	C
NB RT	0.0	0.00	A	0.0	0.00	A
EB LT	27.1	0.10	C	28.3	0.03	C
EB TH	32.3	0.64	C	31.1	0.43	C
EB RT	27.7	0.04	C	26.2	0.02	C
WB LT	23.4	0.61	C	22.4	0.61	C
WB TH	22.6	0.14	C	21.0	0.26	C
WB RT	15.1	0.13	B	14.3	0.14	B
SB LT	16.5	0.70	B	16.7	0.62	B
SB TH	19.7	0.68	B	20.1	0.56	C
SB RT	11.1	0.01	B	14.1	0.01	B
Overall	22.7	-	C	22.3	-	C
15: Honoapiilani Hwy & Pilikana St						
NB LT	8.2	0.06	A	7.2	0.15	A
NB TH	5.7	0.57	A	6.0	0.66	A
EB LT	22.4	0.63	C	18.6	0.44	B
EB RT	18.3	0.06	B	16.4	0.00	B
SB TH	11.6	0.79	B	11.5	0.75	B
SB RT	6.2	0.05	A	7.2	0.11	A
Overall	10.2	-	B	9.1	-	A

* Denotes overcapacity condition, v/c ≥ 1.

Table 3.1: Existing Conditions Level of Service Summary Cont'd

Intersection	Existing Conditions					
	AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd						
NB LT	7.0	0.01	A	5.4	0.02	A
NB TH/RT	12.1	0.70	B	11.5	0.74	B
EB LT/TH	22.9	0.12	C	26.3	0.08	C
EB RT	22.4	0.01	C	25.9	0.01	C
WB LT/TH/RT	24.7	0.44	C	28.6	0.49	C
SB LT	7.7	0.34	A	7.7	0.18	A
SB TH	8.3	0.60	A	6.7	0.47	A
SB RT	4.6	0.00	A	4.3	0.01	A
Overall	11.3	-	B	11.0	-	B
17: Kuikahi Dr & Kehalani Mauka Pkwy						
EB LT	7.5	0.02	A	7.7	0.01	A
SB LT	11.5	0.17	B	10.8	0.10	B
SB RT	8.8	0.04	A	9.3	0.03	A
Overall	4.0	-	-	2.5	-	-

* Denotes overcapacity condition, v/c ≥ 1.

4. BASE YEAR 2028 TRAFFIC CONDITIONS

4.1 Defacto Growth Rate

Projections for Base Year 2028 traffic were based upon existing traffic counts performed by ATA, the Maui Regional Travel Demand Model (MRTDM) growth for forecast years of 2028 and 2035, and nearby developments in the immediate vicinity of the Project. The resulting growth rate along study roadways was approximately 1.0 percent per year.

4.2 Traffic Forecasts for Known Developments

By Year 2028, the following developments shown in Figure 4.1 and Table 4.1 may be constructed. The Kehalani Village Center and Maui Lani Village Center are currently constructed. The associated growth in occupancy for these two centers is described below.

- **Waikapu Light Industrial Project** - Proposed 8.5-acre industrial development along Waiko Road. Forecast traffic growth generated by this development was obtained from the Project's TIAR dated April 2013 and was added to the roadway network.

- **Waiale Business Park** – Formerly known as "Waiko Light Industrial Subdivision", this industrial park along Waiko Road will include approximately 102,414 SF of commercial space and 215,195 SF of light industrial uses. Forecast traffic growth was based on the latest land use breakdown and was added to the roadway network.

- **Emmanuel Lutheran Pre-School** – Proposed relocation of Emmanuel Lutheran Church Maui church and school facilities to a currently unoccupied lot bound by the proposed Wailuku Apartments to the north, proposed Waikapu Ventures Affordable Housing to the south, Waiale Road to the east, and Honoapiilani Highway to the west. At full build-out this development envisions a new preschool, K-8 school and buildings for church/office related functions, dependent on funding. In December 2018, State Land Use Commission (LUC) approved a 10-year time extension for developers with a condition to obtain funding and build a multi-purpose building for the preschool/church activities within six (6) years. This TIAR assumes the preschool, with the 30-student enrollment, will be completed by Year 2028. All remaining components of the development are anticipated to occur beyond Year 2028.

- **Maui Lani Village Center** – Expansion of the existing retail center in the Maui Lani subdivision currently occupied by Walgreen and a mix of various commercial, office, residential and warehouse uses. Based on the historic growth of this site, approximately 83,000 SF of commercial, 33,000 SF of office and 231,000 SF of warehouse/self-storage space may be completed by year 2028. The forecast AM and PM peak hour trips were generated based on the cumulative ITE Trip generation and added to the roadway network.

- **Kehalani Village Center** – Infill development of the existing retail center in the Kehalani subdivision currently occupied by Longs Drugs, Foodland, Foodland Gas, American Savings Bank, Coffee Bean Tea & Leaf, McDonalds and Fabmac Homes. It is anticipated that the Kehalani Village Center will be expanded with infill commercial space and 56 multi-family dwelling units. The forecast AM and PM peak hour trips for the remaining development were estimated based on current forecasts and were added to the roadway network.

- **Kehalani Mauka** – Expansion of the existing residential subdivision located north of Kuikahi Drive, west of Honoapiilani Highway and east of Wailuku Heights. Kehalani Mauka is partially developed with residential homes and the Puu Kukui Elementary School. Based on the latest projections, it is anticipated that Kehalani Mauka will be fully complete by the Year 2028, which includes full build-out and occupancy of the remaining 345 single-family units currently under construction.

- **Waikapu Country Town** – This future development is currently satisfying required conditions to obtain building permits for construction. When fully built out, this development will construct 1,579 residential units, 169,600 SF commercial space and a 750-student Elementary School. As of the writing of this report, the project has not broken ground and was therefore assumed to be 25% built-out by 2028.

- **Waikapu Ventures Affordable Housing** – Proposed residential subdivision with 68 single-family units and 12 multi-family units on land bound by Emmanuel Lutheran Pre-School to the north, Waiale Elua to the south, Waiale Road to the east, and Honoapiilani Highway to the west. The forecast AM and PM peak hour trips were obtained from the Project's TIAR dated 2018 and added to the roadway network.

- **Wailuku Apartments** – Proposed 324 multi-family dwelling units upon 14.4 acres of undeveloped land bound by Kuikahi Drive to the north, the proposed Emmanuel Lutheran Pre-School to the south, Waiale Road to the east, and Honoapiilani Highway to the west. Vehicular access is anticipated to be provided by two new project accesses; one along Kuikahi Drive directly across the Kehalani Village Center driveway and one along Waiale Road. Wailuku Apartments is currently in construction phase.

- **Maui Lani Parkways Phase 3** – Proposed additional 74 single-family units to the existing Maui Lani Parkways Phase 1 and 2 residential subdivision bound by Maui Lani Parkway to the south and The Dunes at Maui Lani Golf Course to the north.

- **Ag Subdivision Lots** – Proposed five (5) Ag lots, adjacent and to the west of the Project site. Build-out and occupancy is unknown, but for purposes of this TIAR, was assumed to be occupied by Year 2028. Ohana units will be permitted and access to the site will occur temporarily by the existing dirt road easement just north of the Waiolani Subdivision. Permanent access will occur via the future Puunani Homestead south access.

- **Gentry (Maui Lani Ph 8B & 8C)** – Proposed 291 single-family dwelling units. As of the writing of this report, site work for this project has not yet begun; however, it was conservatively assumed that occupancy would occur at a rate of 1 home per week thereafter until all homes are completed. Therefore, by Year 2028, it was assumed that all units in the development would be completed and occupied.

- **Puunani Homesteads** – Proposed 137 turn-key homes and 24 vacant residential lots, for a total of 161 single-family dwelling units, bounded by Honoapiilani Highway to the east and the Waiolani residential subdivision to the south. Access to the site will occur via two (2) new driveways off of Honoapiilani Highway. The forecast AM and PM peak hour trips

were obtained from the Project's TIAR dated August 31, 2020 and was added to the roadway network.

- **Kuikahi Residential** – Proposed development of a total of 204 residential units, including 120 multi-family residential units, 34 duplex units, 16 live-work units, 28 studio units, and 6 single-family lots. Access to the site is proposed via two (2) new driveways off of Kuikahi Drive, with primary access from a new leg at the Kuikahi Drive/Kehalani Mauka Parkway intersection which will convert the existing T-intersection into a 4-way intersection. Secondary access to the Kuikahi Residential project will be provided via a new driveway from Kuikahi Drive located approximately 0.20 miles west of the primary driveway.

Table 4.1: Total Trips Generated by Known Developments in Project Vicinity [1]

Known Development	Land Use	Units	AM Peak Hour			PM Peak Hour		
			Enter	Exit	Total	Enter	Exit	Total
Waikapu Light Industrial Project	Industrial Park	8.5 Acres	74	15	89	21	79	100
Waiale Business Park	Retail/Light Industrial	102,414 SF retail 215,195 SF light ind.	187	79	266	183	253	436
Emmanuel Lutheran Pre-School	Daycare	30 Students	15	14	29	12	14	26
Maui Lani Village Center (formerly VMX) [1]	Commercial, Office, Warehouse	83,000 SF commercial, 33,000 SF office, 231,000 SF warehouse	89	27	116	117	234	411
Kehalani Village Center [2]	Commercial, Residential	100,000 SF 56 MF units	37	41	78	133	138	271
Kehalani Mauka [3]	Single-Family, Multi-Family Residential	345 SF units	72	223	295	208	123	331
Waikapu Country Town [4]	Residential, Retail & School	1579 SF/MF unit 169,600 SF commercial 750-student K-5 School	409	746	1,155	852	633	1,485
Waikapu Ventures Affordable Housing	Single-Family, Multi-Family Residential	68 SF units 12 MF units	17	51	68	54	32	86
Wailuku Apartments	Multi-Family Residential	324 MF units	36	103	139	90	51	141
Maui Lani Parkways Phase 3	Single-Family	74 SF units	14	43	57	48	28	76
Ag Subdivision Lots	Single-Family Residential	10 SF units	3	9	12	8	4	12
Gentry (Maui Lani Ph 8B & 8C)	Single-Family Residential	291 SF units	53	158	211	178	105	283
Puunani Homesteads	Single-Family	161 SF units	30	89	119	101	60	161
Kuikahi Residential	Single-Family, Multi-Family Residential	6 SF units 198 units	24	78	102	73	43	116

Note:
1. Maui Lani Village Center projections are based on historic growth rate. Majority of expansion attributed to lower trip generating office and warehouse land uses.
2. Kehalani Village Center is already partially completed with Longs Drugs, Foodland, Foodland Gas and McDonalds. Trips shown accounts for the additional 100,000 SF of commercial space and multi-family low-rise units anticipated to be completed by Year 2028. ITE recommended 34% pass-by reduction applied to new retail.
3. Kehalani Mauka projections based on latest assumptions for growth.
4. Trips for the fully built-out Waikapu Country Town taken from Final EIS dated December 2016.

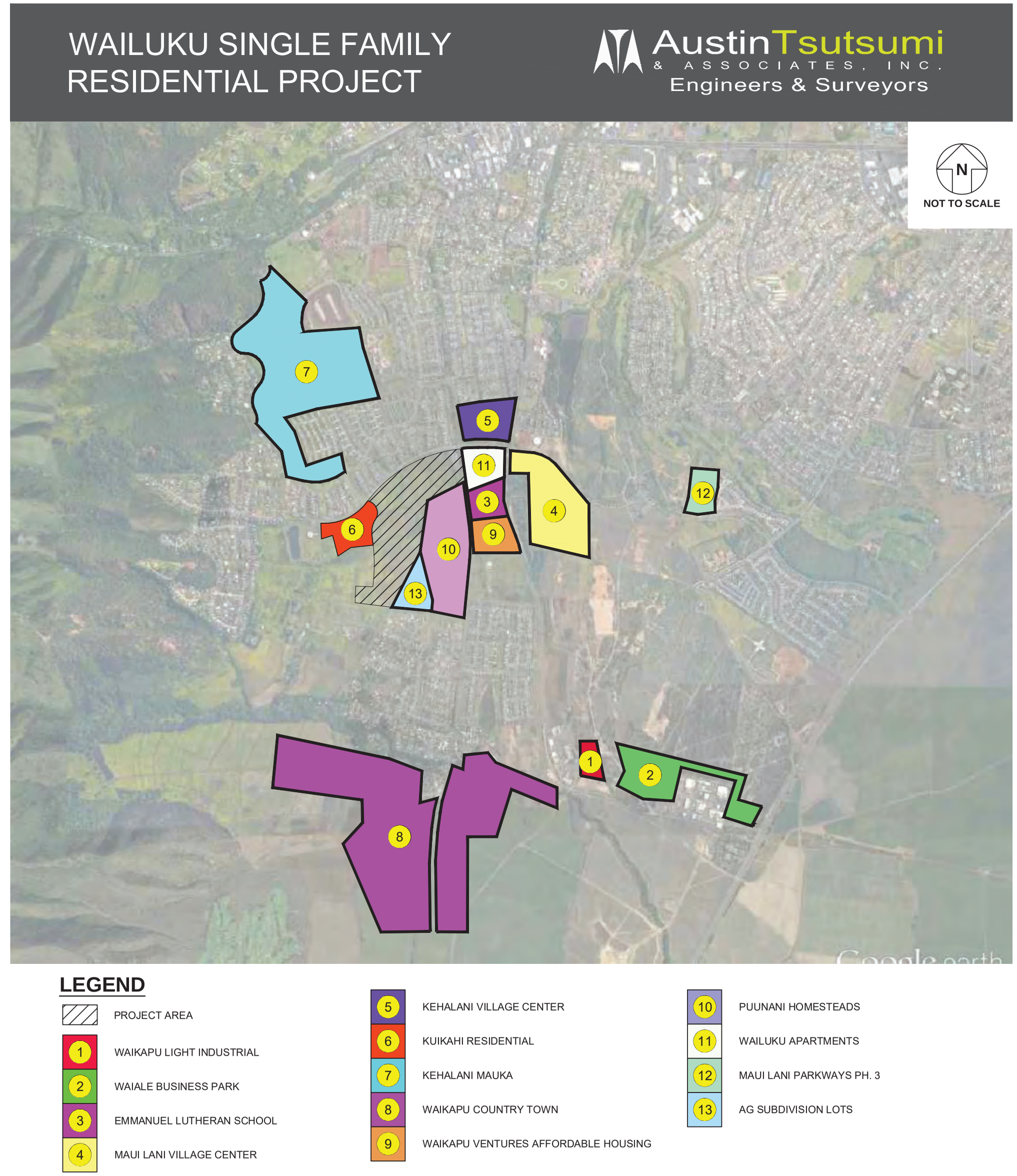

FIGURE 4.1
BACKGROUND DEVELOPMENTS IN PROJECT VICINITY

4.3 Planned Roadway Projects

Several roadway projects are planned in the vicinity of the Project:

- Roundabout at Waiale Road/Waiinu Road: It is planned that a roundabout will be installed at the Waiale Road/Waiinu Road intersection which will help the flow of traffic through the corridor. It was included in the County's Transportation Improvements Program for FY 2023 and was assumed to be complete by Year 2028.

- Waiale Road Extension: The planned Waiale Road Extension is anticipated to begin to the south at a T-intersection with Honoapiilani Highway, south Waiko Road, to the existing Waiko Road/Waiale Road intersection. In a Maui News article, dated August 9, 2022, it was publicized that the Waiale Road Extension received federal funds for its construction. According to the article, Maui County expects bidding on the project to open before the end of 2024, and once construction begins, it will take approximately 18 months to complete. As a result of the Waiale Road Extension, it is anticipated that trips from the south which currently take the Honoapiilani Highway – Kuikahi Drive – Waiale Road route and vice versa, will reroute directly onto Waiale Road Extension, resulting in a reduction of trips along Honoapiilani Highway and Kuikahi Drive. To be conservative, an analysis scenario was developed to show conditions without the Waiale Road Extension completed, and another with Waiale Road Extension completed.

- Maui Lani Parkway Extension: The planned Maui Lani Parkway Extension is anticipated to stretch from the existing Maui Lani Parkway and extend northward and intersect with Waiinu Road at its existing north intersection with Maui Lani Parkway and Puumele Street. This roadway is anticipated to provide an alternate route to and from Kahului and Wailuku and alleviate congestion along Waiale Road. It is not known exactly when the roadway will be completed; therefore, two Base Year conditions have been developed, one of which analyzes conditions without Maui Lani Parkway Extension completed and another with Maui Lani Parkway Extension completed.

- Signal Optimization at Waiale Road/Kuikahi Drive: At various stages of occupancy of the Wailuku Apartments project, the signal timing at the Waiale Road/Kuikahi Drive intersection will be optimized to accommodate traffic increases.

Figure 4.2 shows the location and approximate alignments for the planned roadway improvements. Figure 4.3 and Figure 4.4 show the reroutes forecasted for the Waiale Road Extension and the Maui Lani Parkway Extension, respectively.

4.4 Analysis Scenarios

As described in Section 4.3, a number of analysis scenarios have been developed to reflect various levels of completion of the Waiale Road Extension and Maui Lani Parkway Extension, since the exact timeline of these projects are not yet known, including the following:

- Base Year and Future Year WITHOUT Waiale Road Extension WITHOUT Maui Lani Parkway Extension
- Base Year and Future Year WITH Waiale Road Extension WITHOUT Maui Lani Parkway Extension

- Base Year and Future Year WITH Waiale Road Extension and WITH Maui Lani Parkway Extension.

Analysis for each of the Base Year and Future Year scenarios listed above can be found in Section 6, 7, and 8.

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FIGURE 4.2

PLANNED ROADWAY IMPROVEMENTS

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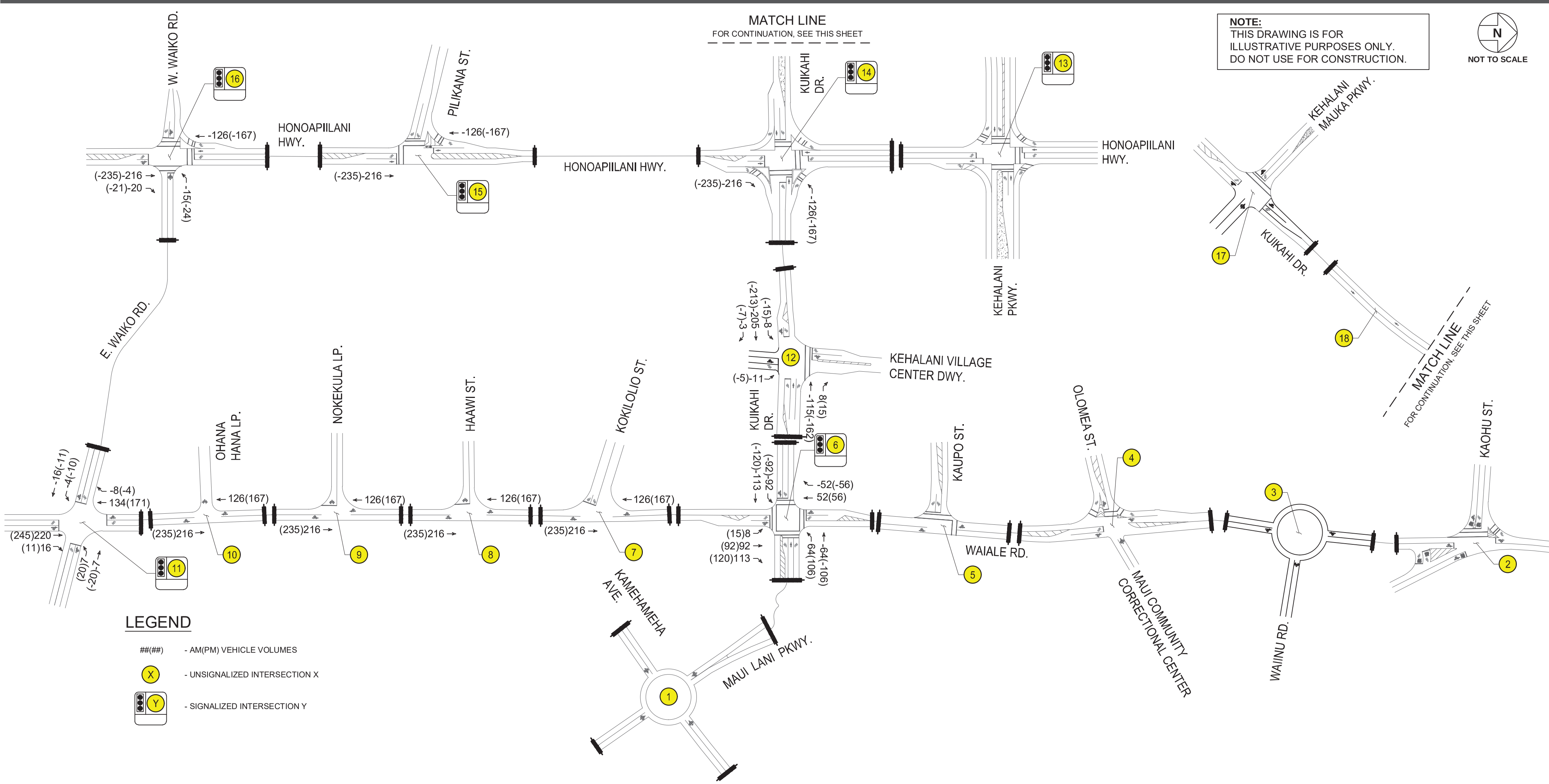

FIGURE 4.3

WAIALE ROAD EXTENSION REROUTE

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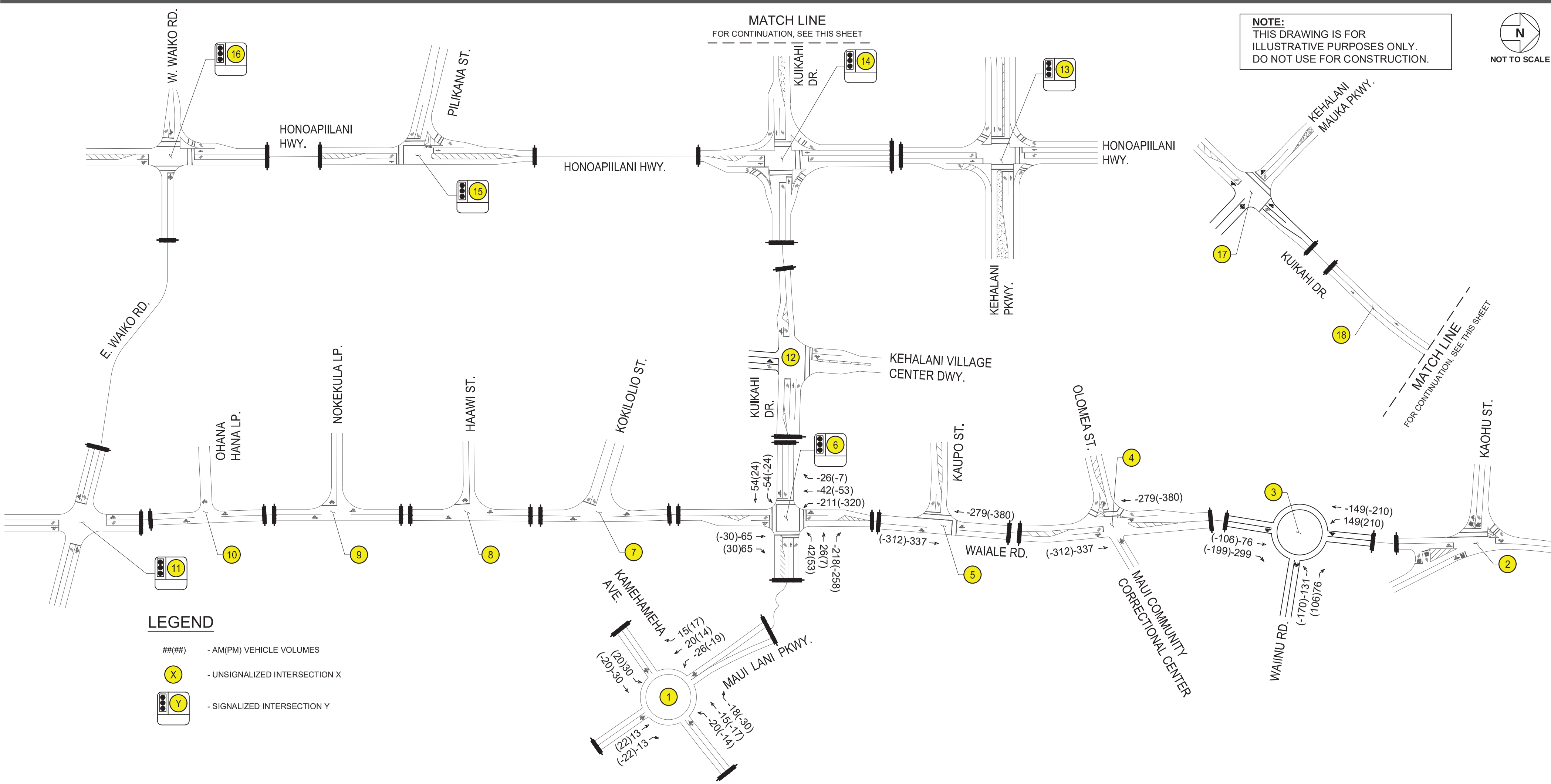

FIGURE 4.4

MAUI LANI PARKWAY EXTENSION REROUTE

5. PROJECT TRIP GENERATION

5.1 Background

The Project proposes the development of up to 204 single-family (R-1) residential units, with no Ohana units. Access to the site is proposed from two full-access driveways along Kuikahi Drive. The west access point for the project will convert the existing Kuikahi Drive/Kehalani Mauka Parkway "T"-intersection into a 4-way intersection. The east access is planned to be located approximately 700 feet to the west of the Honoapiilani Highway/Kuikahi Drive intersection.

5.1.1 Trip Generation

The Institute of Transportation Engineers (ITE) publishes a book based on empirical data compiled from a body of more than 4,250 trip generation studies submitted by public agencies, developers, consulting firms, and associations. This publication, titled Trip Generation Manual, 11th Edition, provides trip rates and/or formulae based on graphs that correlate vehicular trips with independent variables. The independent variable can range from Dwelling Units (DU) for single-family attached homes to Gross Floor Area (GFA) for commercial and office development. See Tables 5.1 and 5.2 for Trip Generation formulae and projections for the Project.

Table 5.1: Project Trip Generation Rates

Land Use Type	Independent Variable	AM Peak Hour		PM Peak Hour	
		Rate	% Enter	Rate	% Enter
Single Family Detached Housing (ITE 210)	Dwelling Units (DU)	[a]	26%	[b]	63%

Notes:
[a] T = EXP(0.91 * Ln(X) + 0.12)
[b] T = EXP(0.94 * Ln(X) + 0.27)

Table 5.2: New Project-Generated Trips

Land Use Type	Quantity	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Single Family Detached Housing (ITE 210)	204 DU	37	106	143	123	72	195

5.1.2 Trip Distribution

At the two (2) Project intersections, trips were distributed based on percentages derived from existing turning movement volumes at the Kuikahi Drive/Kehalani Mauka Parkway intersection since the intersection serves the similar residential uses to the Project.

Beyond the Project intersections, trips were assigned based upon existing travel patterns in the remaining study area and likely interaction between land uses. A portion of trips were distributed to the nearby Puu Kukui Elementary School via Kehalani Mauka Parkway. The traffic generated by the Project was added to the forecast Base Year 2028 traffic volumes within the vicinity of the Project for each of the analysis scenarios to constitute the traffic volumes for the Future Year 2028 traffic conditions for each respective analysis scenario.

6. ANALYSIS SCENARIO: WITHOUT WAIALE EXTENSION AND WITHOUT MAUI LANI PARKWAY EXTENSION

6.1 Base Year 2028 Analysis WITHOUT Waiale Extension and WITHOUT Maui Lani Parkway Extension

With additional traffic generated by nearby developments and defacto growth in the study area, delay and LOS of turning movements at various intersections throughout the network are anticipated to worsen from existing conditions. Major regional congestive conditions are anticipated to persist.

At the Maui Lani Parkway/Kamehameha Avenue intersection, the majority of movements at the roundabout are anticipated to operate with overcapacity conditions during the AM & PM peak hours; though as congestion increases at the roundabout, volumes may reroute to other routes (Waiale Road, Honoapiilani Highway, etc.) in favor of shorter travel times.

At the Waiale Road/Kaohu Street/Oluloa Drive intersection, the northbound and southbound approaches are anticipated to operate at LOS F and overcapacity conditions for both AM and PM peak hours, similar to Existing conditions. As discussed in Section 3.3, limited available right-of-way makes improvements at this intersection difficult.

As discussed in Section 4.3, a roundabout is anticipated to be installed at the Waiale Road/Waiinu Road intersection by Year 2028. Analysis suggests that with the increased volumes from defacto growth and background projects, northbound approach is anticipated to operate at LOS F and overcapacity conditions during the AM peak hour. During the PM peak hour, the southbound approach of the roundabout is anticipated to operate near-capacity.

At Waiale Road intersections with Olomea Street and Kaupo Street, movements from the minor street are anticipated to operate at LOS F and overcapacity conditions during both AM and PM peak hours due to high conflicting volumes along Waiale Road. However, it is anticipated that drivers along Waiale Road may yield to drivers on the minor streets and delay on the minor street approaches, as observed in Existing conditions, and as a result, delay may be reduced from what the analysis suggests. No improvements are planned for this intersection; however in the interim, it may be possible to stripe a median refuge lane along Waiale Road, which would allow drivers from the minor streets to turn onto Waiale Road in two phases, yielding to only one direction of traffic at a time, which would reduce delay on those minor street approaches.

At the Waiale Road/Kuikahi Drive intersections, the northbound shared through/right-turn, eastbound left-turn, westbound through, and southbound left-turn movement are anticipated to operate at LOS F and overcapacity conditions during the AM peak hour. During the PM peak hour, the eastbound left-turn movement and southbound approach are anticipated to operate at LOS F and overcapacity conditions, and the westbound through and southbound through/right-turn movements are anticipated to operate at LOS E, with the westbound through movement operating near capacity. Due to limited right-of-way especially on the southbound and eastbound approaches, widening is difficult. As the Wailuku Apartments project is built out, this signal will be optimized, though it is anticipated that the intersection will continue to operate with multiple approaches being overcapacity with Base Year conditions.

At the Kuikahi Drive/Kehalani Village Center intersection, the Wailuku Apartments project is anticipated to convert the existing 3-way intersection into a 4-way intersection. The northbound shared left-turn/through movement and the southbound left-turn/through movement are anticipated to operate at LOS F and overcapacity conditions during both peak hours.

At the Honoapiilani Highway/Kehalani Parkway intersection, various turning movements are anticipated to operate at LOS E/F during both AM and PM peak hours due to long phases to accommodate high volumes along the mainline Honoapiilani Highway, though all movements are anticipated to operate under capacity.

At the Honoapiilani Highway/Kuikahi Drive intersection, various movements are anticipated to operate at LOS E/F and the westbound left-turn movement is anticipated to operate at LOS F and overcapacity during the AM peak hour, and the eastbound through and westbound left-turn movement are anticipated to operate at LOS E during the PM peak hour.

For purposes of this TIAR, a new south leg will be constructed at the Waiale Road/Waiko Road intersection, to only service WCT. Waiale Road Extension is not included in this scenario, so regional rerouted trips are not included. A signal is assumed to be constructed by Waikapu Country Town, to service their development south of the intersection. All movements are anticipated to operate at LOS C or better across both peak hours.

As discussed in Section 4.3, the Maui Lani Parkway Extension is the major capacity improvement that is anticipated to reduce traffic volumes along Waiale Road and alleviate some congestive congestions.

Base Year 2028 WITHOUT Waiale Extension and WITHOUT Maui Lani Parkway Extension lane configuration, volumes, and LOS can be found in Figure 6.1 and a LOS summary can be found in Table 6.1.

6.2 Future Year 2028 Analysis WITHOUT Waiale Extension and WITHOUT Maui Lani Parkway Extension

Project trips are anticipated to account for a small percentage of Future Year traffic along roadways in the study area, as detailed below:

- Kuikahi Drive: 60-101 vehicles in both directions during each peak hour along Kuikahi Drive between Honoapiilani Highway and Waiale Road, which corresponds to approximately 3-5% of traffic along Kuikahi Drive
- Waiale Road: 22-25 vehicles in both directions during each peak hour along the critical segment of Waiale Road between Waiinu Road and Kuikahi Drive, which corresponds to less than 1% of Future Year traffic.
- Honoapiilani Highway: Approximately 15 vehicles in both directions during each peak hour on Honoapiilani Highway north of Kuikahi Drive, and approximately 24-34 vehicles in both directions during each peak hour on Honoapiilani Highway south of Kuikahi Drive. These volumes correspond to less than 2% of Honoapiilani Highway volumes.

In general, Future Year conditions are very similar to Base Year conditions, with nearly identical LOS on all movements, with a few exceptions listed below. For the majority of the movements described below, the volume increase between Base Year and Future Year movements are relatively small; however, these small increases pushed the LOS beyond its Base Year threshold.

- Kamehameha Avenue/Maui Lani Parkway: The eastbound approach is anticipated to lower to LOS F and overcapacity conditions with Future Year conditions, from LOS D and near-capacity conditions with Base Year conditions.
- Waiale Road/Kuikahi Drive: The westbound through movement is anticipated to lower to LOS F and overcapacity during the PM peak hour, and the eastbound through/right-turn movement is anticipated to lower to LOS E during the AM peak hour.
- Honoapiilani Highway/Kehalani Parkway: The eastbound left-turn movement lowers to LOS E with Future Year Conditions, from LOS D with Base Year conditions, during the PM peak hour.
- Honoapiilani Highway/Kuikahi Drive: The eastbound through/right-turn movement lowers to LOS E with Future Year conditions, from LOS D with Base Year conditions, during the AM peak hour. Also, the westbound left-turn movement lowers to LOS F and overcapacity conditions with Future Year conditions, from LOS E with Base Year conditions, during the PM peak hour.

At the Kuikahi Drive/Kehalani Mauka Parkway intersection with the west project access, a signal warrant is not anticipated to be met with forecast volumes and the intersection was therefore analyzed as a two-way stop-controlled intersection; though the volumes appear to be close to warranting a signal – short by 1 warranted hour. Therefore, this intersection is anticipated to be unsignalized, with stop-control on the minor streets. With the intersection operating with two-way stop control, all movements at both study intersections are anticipated to operate at LOS C or better across both peak hours.

If, at a future date, a signal warrant is found to be met based on actual volumes, it is customary for both a signal and roundabout option to be considered for implementation. At this location, a mini roundabout may be feasible given the relatively large space of currently vacant lands south of the intersection, but various concerns will need to be addressed during design including grading, horizontal and vertical sight distance on all approaches, and enforcement of speeds along the relatively steep Kuikahi Drive approaches. The design of the roundabout itself may assist in lowering the speeds along Kuikahi Drive as drivers slow down to maneuver through the roundabout entries and yield to circulating vehicles. Ultimately, the type and timing of the traffic control device installed (roundabout or signal) will be discretion of County of Maui.

Figure 6.2 shows Project trips generated and Figure 6.3 shows Future Year 2028 WITHOUT Waiale Extension and WITHOUT Maui Lani Parkway Extension lane configuration, volumes, and LOS. A LOS summary can be found in Table 6.1.

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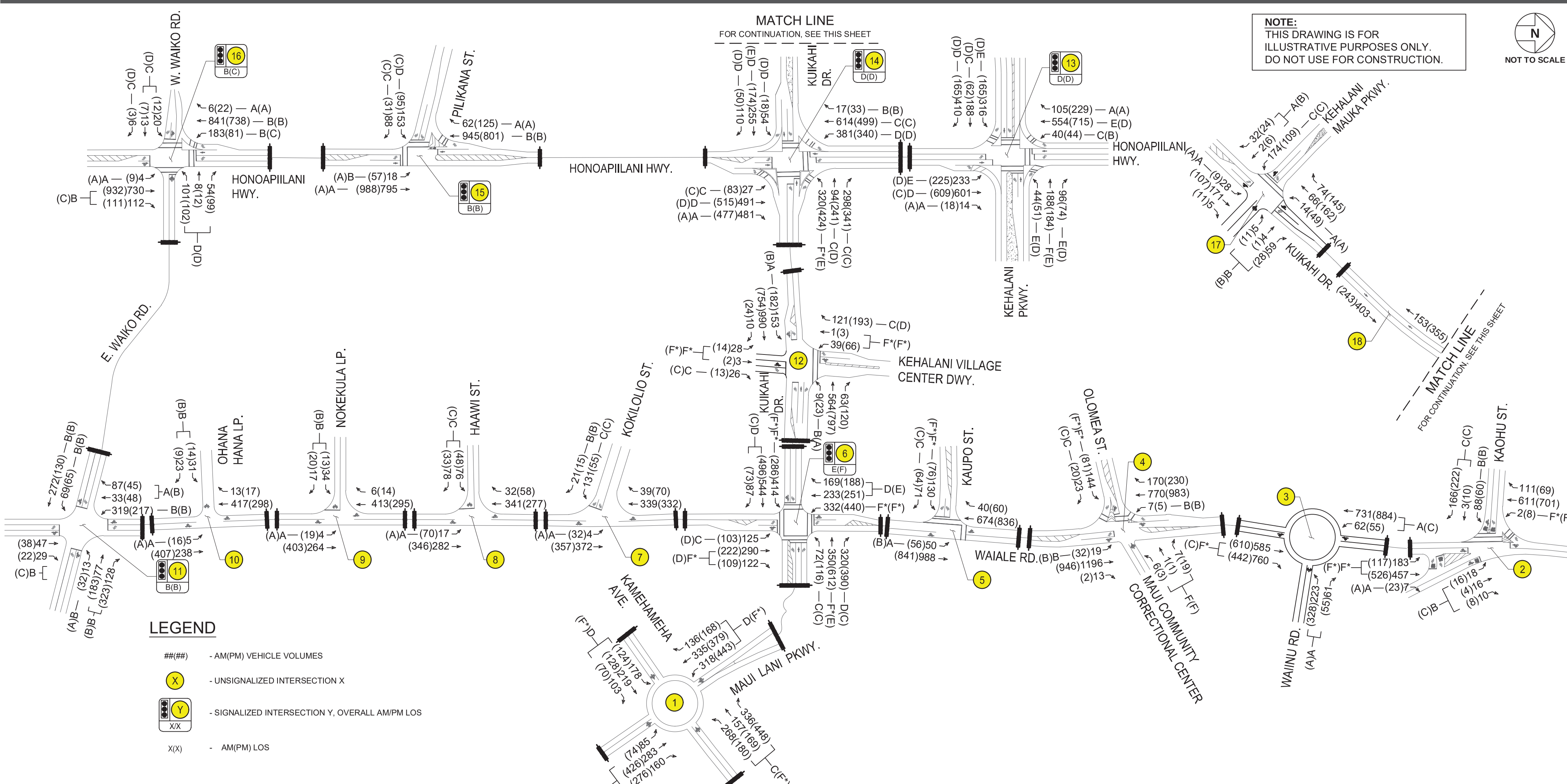

FIGURE 6.1

BASE YEAR 2028 WITHOUT WAIALE ROAD EXTENSION AND WITHOUT MAUI LANI PARKWAY EXTENSION CONDITIONS, LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS

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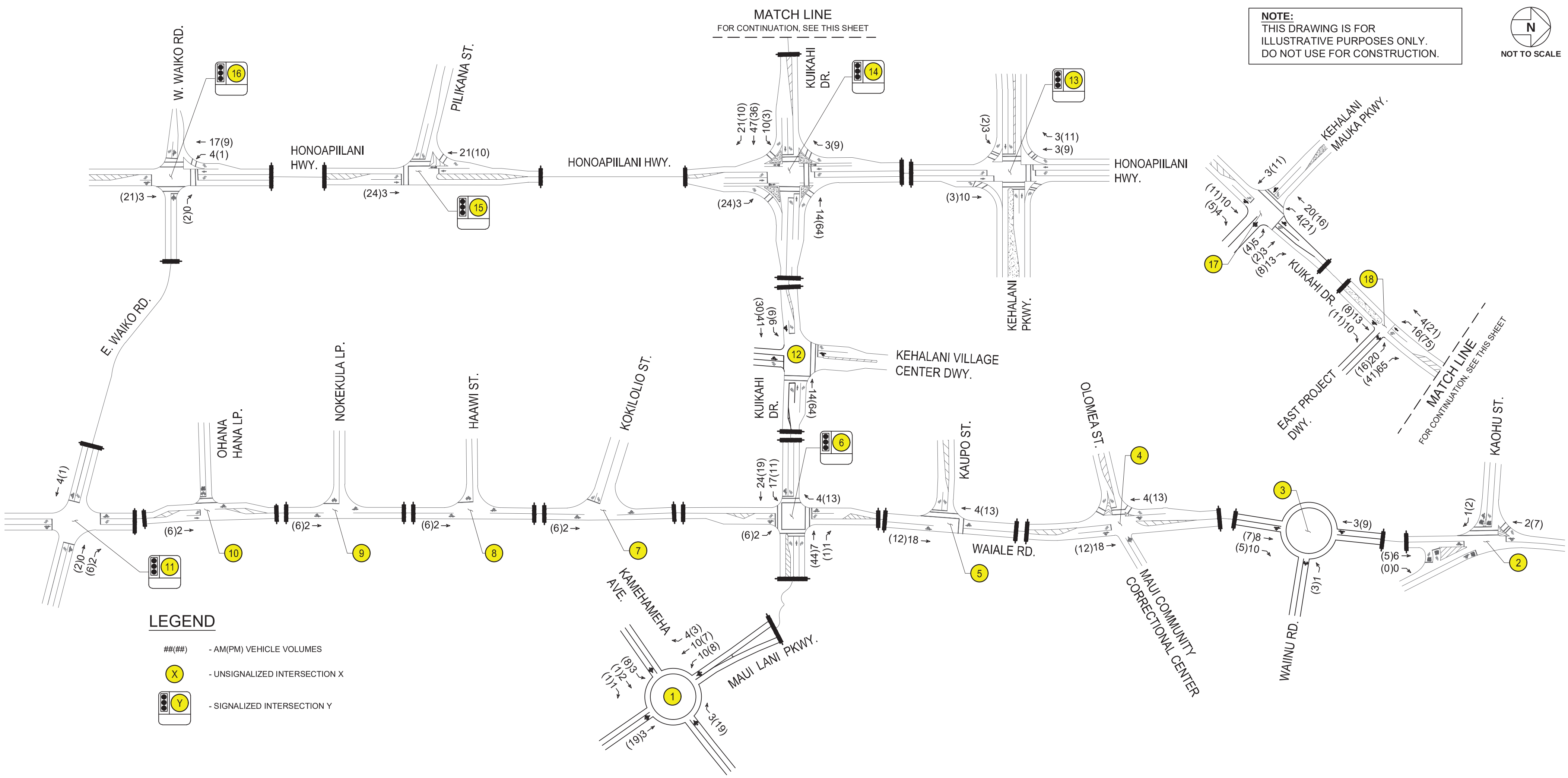

FIGURE 6.2

PROJECT TRIPS WITHOUT WAIALE ROAD EXTENSION
AND WITHOUT MAUI LANI PARKWAY EXTENSION

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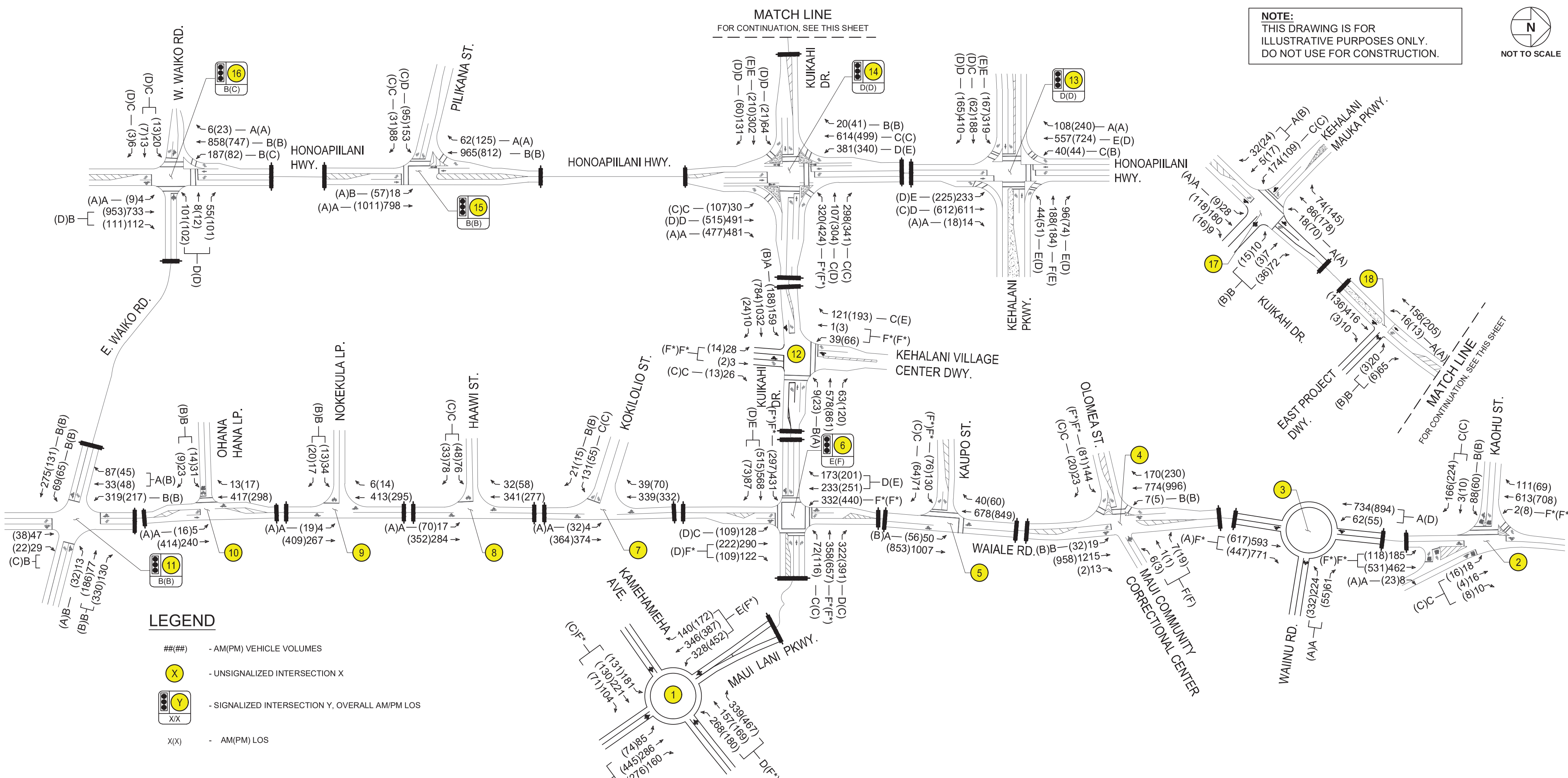

FIGURE 6.3

FUTURE YEAR 2028 WITHOUT WAIALE ROAD EXTENSION AND WITHOUT MAUI LANI PARKWAY EXTENSION CONDITIONS, LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS

Table 6.1: Existing, Base Year, and Future Year Conditions WITHOUT Waiale Ext. WITHOUT MLP Ext.

Intersection	Existing Conditions						Base Year Conditions WITHOUT Waiale Ext. & WITHOUT MLP Ext.						Future Year Conditions WITHOUT Waiale Ext. & WITHOUT MLP Ext.					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
7: Waiale Rd & Kokololio St																		
NB LT	7.7	0.00	A	7.8	0.03	A	8.1	0.00	A	8.3	0.03	A	8.1	0.00	A	8.3	0.03	A
EB LT	14.0	0.26	B	12.7	0.11	B	21.9	0.40	C	19.1	0.19	C	22.1	0.41	C	19.3	0.19	C
EB RT	9.5	0.03	A	9.5	0.02	A	10.7	0.04	B	10.7	0.03	B	10.7	0.04	B	10.7	0.03	B
Overall	3.3	-	-	2.0	-	-	3.5	-	-	1.7	-	-	3.5	-	-	1.7	-	-
8: Waiale Rd & Haawi St																		
NB LT	7.7	0.01	A	7.8	0.06	A	8.2	0.02	A	8.2	0.06	A	8.2	0.02	A	8.2	0.06	A
EB LT/RT	11.9	0.24	B	12.0	0.14	B	16.3	0.35	C	16.8	0.23	C	16.3	0.35	C	16.9	0.23	C
Overall	3.6	-	-	2.9	-	-	3.2	-	-	2.3	-	-	3.2	-	-	2.3	-	-
9: Waiale Rd & Nokekula Lp																		
NB LT	7.8	0.00	A	7.6	0.02	A	8.3	0.00	A	8.0	0.02	A	8.3	0.00	A	8.0	0.02	A
EB LT/RT	11.3	0.09	B	10.3	0.05	B	14.6	0.13	B	12.8	0.07	B	14.6	0.13	B	12.8	0.07	B
Overall	1.3	-	-	1.1	-	-	1.0	-	-	0.8	-	-	1.0	-	-	0.8	-	-
10: Waiale Rd & Ohana Hana Loop																		
NB LT	7.8	0.00	A	7.6	0.01	A	8.3	0.01	A	8.0	0.01	A	8.3	0.01	A	8.0	0.01	A
EB LT/RT	10.7	0.08	B	10.4	0.03	B	12.6	0.11	B	12.1	0.05	B	12.6	0.11	B	12.1	0.05	B
Overall	1.4	-	-	0.8	-	-	1.0	-	-	0.5	-	-	1.0	-	-	0.5	-	-
11: E Waiko Rd & Waiale Rd																		
NB TH/RT	-	-	-	-	-	-	17.6	0.24	B	23.9	0.25	C	17.6	0.24	B	24.3	0.25	C
EB LT	7.6	0.04	A	8.1	0.04	A	12.9	0.19	B	11.6	0.21	B	12.9	0.19	B	11.7	0.21	B
EB TH/RT	-	-	-	-	-	-	16.9	0.69	B	11.1	0.19	B	16.9	0.69	B	11.0	0.19	B
WB LT	-	-	-	-	-	-	14.1	0.05	B	9.9	0.06	A	14.0	0.05	B	9.8	0.06	A
WB TH/RT	-	-	-	-	-	-	17.5	0.56	B	17.8	0.80	B	17.5	0.56	B	17.9	0.80	B
SB LT	-	-	-	-	-	-	11.1	0.52	B	17.3	0.48	B	11.1	0.52	B	17.6	0.48	B
SB TH/RT	-	-	-	-	-	-	7.2	0.10	A	13.1	0.12	B	7.2	0.10	A	13.4	0.12	B
SB LT/RT	16.1	0.48	C	14.2	0.32	B	-	-	-	-	-	-	-	-	-	-	-	-
Overall	7.2	-	-	4.4	-	-	14.1	-	B	16.1	-	B	14.1	-	B	16.3	-	B
12: Kuikahi Dr & Kehalani Village Center Dr																		
NB LT/TH	-	-	-	-	-	-	644.7	1.53	F*	1433.3	2.17	F*	739.3	1.69	F*	2014.6	2.90	F*
NB RT	-	-	-	-	-	-	20.3	0.11	C	15.1	0.04	C	21.3	0.11	C	15.6	0.04	C
EB LT	8.8	0.11	A	9.4	0.13	A	9.8	0.18	A	12.3	0.29	B	10.0	0.19	A	13.0	0.31	B
WB LT	-	-	-	-	-	-	10.7	0.02	B	9.7	0.03	A	10.9	0.02	B	9.8	0.03	A
SB LT	47.4	0.32	E	49.2	0.45	E	-	-	-	-	-	-	-	-	-	-	-	-
SB LT/TH	-	-	-	-	-	-	551.9	1.50	F*	1296.1	3.13	F*	689.9	1.74	F*	1738.7	3.95	F*
SB RT	12.0	0.16	B	14.0	0.26	B	15.0	0.27	C	29.2	0.60	D	15.2	0.27	C	35.1	0.65	E
Overall	2.6	-	-	4.0	-	-	22.9	-	-	55.0	-	-	26.4	-	-	70.7	-	-
13: Honoapiilani Hwy & Kehalani Pkwy																		
NB LT	17.1	0.56	B	16.2	0.53	B	58.2	0.91	E	41.6	0.87	D	59.8	0.92	E	43.7	0.88	D
NB TH	22.6	0.66	C	18.4	0.57	B	41.6	0.80	D	22.7	0.67	C	43.1	0.81	D	22.7	0.67	C
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT	51.7	0.93	D	23.3	0.54	C	63.4	0.96	E	54.3	0.82	D	65.6	0.96	E	57.7	0.84	E
EB TH	22.4	0.35	C	24.3	0.12	C	34.2	0.30	C	37.0	0.16	D	34.4	0.30	C	37.5	0.16	D
EB RT	21.3	0.19	C	23.9	0.05	C	35.9	0.41	D	36.3	0.08	D	36.0	0.40	D	36.8	0.08	D
WB LT	26.8	0.14	C	26.6	0.15	C	55.3	0.19	E	42.9	0.19	D	56.2	0.19	E	43.3	0.19	D
WB TH	33.5	0.74	C	32.0	0.59	C	92.1	0.89	F	60.2	0.81	E	94.4	0.89	F	61.1	0.82	E
WB RT	28.9	0.05	C	28.7	0.03	C	58.0	0.03	E	45.3	0.02	D	59.0	0.03	E	45.8	0.02	D
SB LT	17.7	0.13	B	14.4	0.12	B	32.9	0.21	C	17.8	0.15	B	33.7	0.22	C	17.7	0.15	B
SB TH	28.4	0.76	C	25.6	0.78	C	56.0	0.88	E	37.0	0.88	D	57.7	0.89	E	37.6	0.88	D
SB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
Overall	29.7	-	C	22.7	-	C	52.9	-	D	36.9	-	D	54.4	-	D	37.8	-	D

* Denotes overcapacity condition, v/c ≥ 1.

Table 6.1: Existing, Base Year, and Future Year Conditions WITHOUT Waiale Ext. WITHOUT MLP Ext.

Intersection	Existing Conditions						Base Year Conditions WITHOUT Waiale Ext. & WITHOUT MLP Ext.						Future Year Conditions WITHOUT Waiale Ext. & WITHOUT MLP Ext.					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kamehameha Ave & Maui Lani Pkwy																		
NB LT/TH/RT	14.9	0.74	B	8.8	0.51	A	73.1	1.05	F*	20.0	0.71	C	81.9	1.08	F*	21.5	0.74	C
EB LT/TH/RT	9.1	0.72	A	10.4	0.81	B	33.3	0.99	D	62.4	1.10	F*	40.6	1.02	F*	65.5	1.11	F*
WB LT/TH/RT	7.5	0.61	A	12.1	0.80	B	15.1	0.78	C	70.1	1.10	F*	15.2	0.78	C	85.7	1.15	F*
SB LT/TH/RT	9.8	0.78	A	9.7	0.77	A	28.3	0.96	D	61.2	1.08	F*	29.1	0.97	D	74.9	1.12	F*
Overall	10.2	0.78	B	10.5	0.81	B	35.5	1.05	F*	59.4	1.10	F*	40.1	1.08	F*	69.3	1.15	F*
2: Waiale Rd & Kaohu St/Oluloa Dr																		
NB LT/TH	72.8	1.05	F*	50.3	0.96	F	175.3	1.39	F*	180.4	1.43	F*	181.4	1.41	F*	186.2	1.45	F*
NB RT	8.7	0.01	A	8.8	0.04	A	9.3	0.01	A	9.7	0.05	A	9.3	0.02	A	9.7	0.05	A
EB LT	14.0	0.23	B	12.7	0.15	B	14.9	0.25	B	14.0	0.17	B	15.0	0.26	B	14.0	0.17	B
EB TH/RT	13.4	0.31	B	14.3	0.38	B	15.7	0.42	C	19.0	0.58	C	15.7	0.42	C	19.2	0.59	C
WB LT/TH/RT	13.4	0.12	B	12.8	0.07	B	15.0	0.14	B	15.1	0.09	C	15.1	0.14	C	15.2	0.09	C
SB LT/TH/RT	106.4	1.15	F*	100.9	1.11	F*	238.6	1.54	F*	295.3	1.67	F*	240.4	1.54	F*	302.8	1.70	F*
Overall	75.3	-	F	64.3	-	F	173.2	-	F	199.3	-	F	176.3	-	F	204.9	-	F
3: Waiale Rd & Waiinu Rd																		
NB TH/RT	-	-	-	-	-	-	44.8	1.09	F*	1.1	0.85	A	51.4	1.10	F*	1.2	0.86	A
WB LT	471.5	1.81	F*	520.6	1.97	F*	-	-	-	-	-	-	-	-	-	-	-	-
WB LT/RT	-	-	-	-	-	-	5.6	0.39	A	8.2	0.53	A	5.6	0.38	A	8.6	0.55	A
WB RT	16.9	0.18	C	13.9	0.13	B	-	-	-	-	-	-	-	-	-	-	-	-
SB LT	11.7	0.11	B	9.9	0.08	A	-	-	-	-	-	-	-	-	-	-	-	-
SB LT/TH	-	-	-	-	-	-	4.3	0.75	A	23.6	0.98	C	4.0	0.75	A	27.3	1.00	D
Overall	42.5	-	-	69.7	-	-	26.8	1.09	F*	11.2	0.98	B	30.6	1.10	F*	12.7	1.00	B
4: Waiale Rd & Olomea St/MCCC Driveway																		
NB LT	9.4	0.03	A	10.1	0.05	B	10.5	0.03	B	12.4	0.07	B	10.5	0.03	B	12.5	0.07	B
EB LT/TH	789.1	2.41	F*	247.1	1.13	F*	3099.0	7.12	F*	1921.3	4.40	F*	3266.5	7.45	F*	2043.4	4.63	F*
EB RT	13.5	0.06	B	15.1	0.06	C	17.1	0.08	C	22.6	0.10	C	17.2	0.08	C	23.1	0.10	C
WB LT/TH/RT	48.4	0.16	E	22.3	0.11	C	137.6	0.37	F	59.7	0.28	F	147.3	0.39	F	63.2	0.29	F
SB LT	10.4	0.01	B	9.1	0.01	A	12.0	0.02	B	10.4	0.01	B	12.1	0.02	B	10.5	0.01	B
Overall	57.7	-	-	11.8	-	-	190.5	-	-	68.0	-	-	198.9	-	-	71.5	-	-
5: Waiale Rd & Kaupo St																		
NB LT	8.6	0.04	A	8.9	0.05	A	9.6	0.07	A	10.6	0.09	B	9.6	0.07	A	10.7	0.09	B
EB LT	94.5	0.82	F	34.1	0.20	D	765.6	2.36	F*	408.8	1.48	F*	826.6	2.48	F*	450.5	1.56	F*
EB RT	12.4	0.11	B	12.6	0.06	B	15.9	0.19	C	19.5	0.22	C	16.0	0.19	C	19.9	0.22	C
Overall	7.8	-	-	1.4	-	-	51.8	-	-	17.0	-	-	55.2	-	-	18.5	-	-
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy																		
NB LT	23.2	0.25	C	25.0	0.19	C	30.8	0.52	C	38.5	0.60	D	31.3	0.53	C	41.2	0.65	D
NB TH/RT	36.8	0.82	D	32.9	0.71	C	89.3	1.02	F*	41.4	0.68	D	89.3	1.02	F*	41.0	0.66	D
EB LT	22.0	0.79	C	17.7	0.71	B	74.3	1.02	F*	135.2	1.15	F*	86.2	1.06	F*	163.7	1.22	F*
EB TH/RT	23.3	0.73	C	18.7	0.64	B	49.5	0.94	D	33.4	0.77	C	56.9	0.97	E	35.9	0.80	D
WB LT	24.5	0.16	C	17.3	0.22	B	33.9	0.42	C	26.0	0.43	C	34.8	0.46	C	27.2	0.46	C
WB TH	34.0	0.80	C	32.7	0.85	C	92.6	1.02	F*	69.7	0.99	E	99.3	1.04	F*	93.5	1.07	F*
WB RT	26.3	0.14	C	19.3	0.17	B	36.2	0.29	D	28.2	0.30	C	36.3	0.31	D	28.7	0.30	C
SB LT	25.2	0.72	C	31.6	0.80	C	166.4	1.25	F*	418.1	1.79	F*	166.4	1.25	F*	400.5	1.76	F*
SB TH/RT	24.1	0.50	C	23.6	0.51	C	42.7	0.80	D	65.4	0.93	E	43.4	0.81	D	67.5	0.94	E
Overall	26.7	-	C	25.4	-	C	75.7	-	E	111.9	-	F	80.0	-	E	117.0	-	F

* Denotes overcapacity condition, v/c ≥ 1.

Table 6.1: Existing, Base Year, and Future Year Conditions WITHOUT Waiale Ext. WITHOUT MLP Ext.

Intersection	Existing Conditions						Base Year Conditions WITHOUT Waiale Ext. & WITHOUT MLP Ext.						Future Year Conditions WITHOUT Waiale Ext. & WITHOUT MLP Ext.					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
14: Honoapiilani Highway & Kuikahi Drive																		
NB LT	18.2	0.05	B	17.1	0.13	B	24.1	0.11	C	25.6	0.26	C	26.2	0.12	C	26.9	0.33	C
NB TH	27.9	0.74	C	27.9	0.74	C	40.9	0.83	D	47.7	0.86	D	45.3	0.85	D	51.1	0.87	D
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT	27.1	0.10	C	28.3	0.03	C	38.2	0.16	D	48.9	0.09	D	38.6	0.18	D	49.0	0.09	D
EB TH	32.3	0.64	C	31.1	0.43	C	49.2	0.86	D	58.6	0.84	E	58.3	0.88	E	66.2	0.87	E
EB RT	27.7	0.04	C	26.2	0.02	C	38.3	0.06	D	45.5	0.02	D	39.3	0.11	D	44.6	0.03	D
WB LT	23.4	0.61	C	22.4	0.61	C	88.5	1.01	F*	73.2	0.98	E	114.3	1.09	F*	87.5	1.02	F*
WB TH	22.6	0.14	C	21.0	0.26	C	32.9	0.21	C	35.5	0.45	D	34.7	0.23	C	38.1	0.56	D
WB RT	15.1	0.13	B	14.3	0.14	B	20.9	0.30	C	21.6	0.34	C	21.4	0.30	C	21.9	0.34	C
SB LT	16.5	0.70	B	16.7	0.62	B	39.0	0.93	D	51.8	0.93	D	45.7	0.94	D	57.0	0.94	E
SB TH	19.7	0.68	B	20.1	0.56	C	25.3	0.73	C	27.9	0.63	C	27.4	0.73	C	30.5	0.65	C
SB RT	11.1	0.01	B	14.1	0.01	B	12.7	0.01	B	17.5	0.02	B	13.6	0.01	B	19.0	0.03	B
Overall	22.7	-	C	22.3	-	C	41.6	-	D	44.9	-	D	48.4	-	D	49.7	-	D
15: Honoapiilani Hwy & Pilikana St																		
NB LT	8.2	0.06	A	7.2	0.15	A	12.1	0.08	B	9.6	0.18	A	12.8	0.08	B	9.7	0.19	A
NB TH	5.7	0.57	A	6.0	0.66	A	5.5	0.64	A	7.4	0.82	A	5.5	0.63	A	7.7	0.83	A
EB LT	22.4	0.63	C	18.6	0.44	B	36.5	0.77	D	27.0	0.52	C	37.8	0.78	D	27.5	0.53	C
EB RT	18.3	0.06	B	16.4	0.00	B	28.0	0.04	C	23.5	0.01	C	29.0	0.03	C	23.9	0.01	C
SB TH	11.6	0.79	B	11.5	0.75	B	13.5	0.87	B	12.2	0.82	B	14.3	0.87	B	12.2	0.83	B
SB RT	6.2	0.05	A	7.2	0.11	A	5.0	0.05	A	6.0	0.11	A	4.9	0.05	A	6.0	0.11	A
Overall	10.2	-	B	9.1	-	A	11.9	-	B	10.2	-	B	12.3	-	B	10.4	-	B
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd																		
NB LT	7.0	0.01	A	5.4	0.02	A	9.0	0.01	A	8.4	0.03	A	9.3	0.01	A	8.5	0.03	A
NB TH/RT	12.1	0.70	B	11.5	0.74	B	16.5	0.81	B	32.2	0.95	C	16.7	0.82	B	35.8	0.97	D
EB LT/TH	22.9	0.12	C	26.3	0.08	C	32.3	0.13	C	38.2	0.08	D	32.6	0.13	C	38.5	0.08	D
EB RT	22.4	0.01	C	25.9	0.01	C	31.7	0.01	C	37.8	0.00	D	31.9	0.01	C	38.1	0.00	D
WB LT/TH/RT	24.7	0.44	C	28.6	0.49	C	36.0	0.59	D	44.7	0.71	D	36.3	0.59	D	45.3	0.71	D
SB LT	7.7	0.34	A	7.7	0.18	A	15.4	0.59	B	26.0	0.46	C	15.8	0.61	B	27.7	0.51	C
SB TH	8.3	0.60	A	6.7	0.47	A	11.1	0.73	B	10.8	0.63	B	11.5	0.74	B	11.0	0.64	B
SB RT	4.6	0.00	A	4.3	0.01	A	4.6	0.00	A	5.4	0.01	A	4.6	0.00	A	5.4	0.01	A
Overall	11.3	-	B	11.0	-	B	15.8	-	B	25.3	-	C	16.1	-	B	27.3	-	C
17: Kuikahi Dr & Kehalani Mauka Pkwy																		
NB LT/TH/RT	-	-	-	-	-	-	10.1	0.09	B	10.6	0.06	B	10.7	0.13	B	11.6	0.10	B
EB LT	7.5	0.02	A	7.7	0.01	A	7.6	0.02	A	8.0	0.01	A	7.6	0.02	A	8.0	0.01	A
WB LT	-	-	-	-	-	-	7.6	0.01	A	7.6	0.04	A	7.7	0.01	A	7.6	0.05	A
SB LT	11.5	0.17	B	10.8	0.10	B	17.1	0.39	C	16.3	0.27	C	19.5	0.44	C	19.1	0.32	C
SB TH/RT	-	-	-	-	-	-	9.2	0.04	A	10.6	0.05	B	9.6	0.05	A	12.1	0.08	B
SB RT	8.8	0.04	A	9.3	0.03	A	-	-	-	-	-	-	-	-	-	-	-	-
Overall	4.0	-	-	2.5	-	-	6.8	-	-	4.5	-	-	7.3	-	-	5.2	-	-
18: East Project Driveway & Kuikahi Drive/Kuikahi Dr																		
NB LT/RT	-	-	-	-	-	-	-	-	-	-	-	-	12.9	0.17	B	12.6	0.12	B
WB LT	-	-	-	-	-	-	-	-	-	-	-	-	8.3	0.02	A	8.0	0.06	A
Overall	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	1.7	-	-

* Denotes overcapacity condition, v/c ≥ 1.

7. ANALYSIS SCENARIO: WITH WAIALE EXTENSION AND WITHOUT MAUI LANI PARKWAY EXTENSION

As discussed in Section 4.3, as a result of the Waiale Road Extension, it is anticipated that trips from the south which currently take the Honoapiilani Highway – Kuikahi Drive – Waiale Road route and vice versa, will reroute directly onto Waiale Road Extension, resulting in a reduction of trips along Honoapiilani Highway south of Kuikahi Drive, and along Kuikahi Drive between Honoapiilani Highway and Waiko Road.

Along Honoapiilani Highway south of Kuikahi Drive, it is forecasted that the Waiale Road Extension would reroute approximately 200-250 trips in both directions along Honoapiilani Highway, to the Waiale Road Extension, which results in a reduction of the corresponding number of trips at the northbound right-turn approach at the Honoapiilani Highway/Kuikahi Drive intersection, and along Kuikahi Drive fronting the Kehalani Village Center. At the Waiale Road/Kuikahi Drive intersection, movements which would have previously been eastbound left-turn or through movements would become northbound through and right-turn movements with the Waiale Road Extension.

In the southbound direction, it is forecasted that southbound right-turn and westbound through trips which would have previously utilized Kuikahi Drive and then turn left onto Honoapiilani Highway would become southbound through and westbound left-turn trips to utilize the Waiale Road Extension.

7.1 Base Year 2028 Analysis WITH Waiale Extension and WITHOUT Maui Lani Parkway Extension

Along Waiale Road, at study intersections north of Kuikahi Drive, including Kaohu Street, Waiinu Road, Olomea Street, and Kaupo Street, operations are anticipated to be identical to that of Base Year conditions WITHOUT Waiale Extension, as described in Section 6.1.1, as no trips are anticipated to be rerouted from those intersections. For the same reason, operations at Honoapiilani Highway/Kehalani Mauka Parkway are anticipated to be identical to the WITHOUT Waiale Road scenario.

At the Waiale Road/Kuikahi Drive intersection, the heavy increase in northbound and southbound Waiale Road traffic is anticipated to result in increased delay and overcapacity conditions on the northbound through/right-turn movement and the southbound left-turn movement during the AM peak hour. In addition, the eastbound shared through/right-turn movement is anticipated to operate at LOS E during the AM peak hour. During the PM peak hour, the northbound through/right-turn movement is anticipated to operate at LOS E and the southbound left-turn movement is anticipated to operate at LOS F and overcapacity conditions. Signal timing optimization may help balance delay; however, as all these movements conflict, lengthening phase times would inevitably result in other movements becoming increasingly congested.

As a result of the increased volumes along Waiale Road, it is anticipated that Waiale Road/Kokilolio Street eastbound left-turn movement is anticipated to operate at LOS F during the AM peak hour and LOS E during the PM peak hour; though the movement is anticipated to continue to operate under capacity. A signal may become warranted at the Waiale Road/Kokilolio Street intersection depending on how traffic in the area is rerouted after the opening of Waiale

Road Extension, and this intersection may be monitored and a signal installed if determined to be appropriate.

At the Kuikahi Drive/Kehalani Village Center driveway, the northbound shared left-turn/through movement is anticipated to operate at LOS F across both peak hours, and the southbound left-turn/through movement is anticipated to operate at LOS F during the AM peak hour and LOS F and overcapacity conditions during the PM peak hour. This is an improvement over the WITHOUT Waiale Road Extension shown in Section 6, as a result of reduced volumes along Kuikahi Drive, which had both the northbound and southbound shared left-turn/through movements operating at LOS F and overcapacity conditions across both peak hours.

At the Honoapiilani Highway/Kuikahi Drive intersection, reduced volumes along Honoapiilani Highway as a result of the Waiale Road Extension improves the overcapacity conditions forecasted in the WITHOUT Waiale Road Extension scenario and all movements are anticipated to operate under capacity at LOS D or better across both peak hours.

As a result of reduced volumes, all movements at the Honoapiilani Highway/Pilikana Street intersection and Honoapiilani Highway/Waiko Road intersection will improve over WITHOUT Waiale Road Extension conditions to all operate at LOS D or better across both peak hours.

Base Year 2028 WITH Waiale Extension and WITHOUT Maui Lani Parkway Extension lane configuration, volumes, and LOS can be found in Figure 7.1 and a LOS summary can be found in Table 7.1.

7.2 Future Year 2028 Analysis WITH Waiale Extension and WITHOUT Maui Lani Parkway Extension

Project trips were distributed through the study intersections in the same manner with all analysis scenarios, but as a result of reroutes due to Waiale Road, may make up varying percentages of overall Future Year traffic between scenarios. The distribution for this scenario is described below:

- Kuikahi Drive: 60-101 vehicles in both directions during each peak hour along Kuikahi Drive between Honoapiilani Highway and Waiale Road, which corresponds to approximately 4-6% of traffic along Kuikahi Drive
- Waiale Road: 22-25 vehicles in both directions during each peak hour along the critical segment of Waiale Road between Waiinu Road and Kuikahi Drive, which corresponds to less than 1% of Future Year traffic.
- Honoapiilani Highway: Approximately 15 vehicles in both directions during each peak hour on Honoapiilani Highway north of Kuikahi Drive, and approximately 24-34 vehicles in both directions during each peak hour on Honoapiilani Highway south of Kuikahi Drive. These volumes correspond approximately 1.5-2.1% of Honoapiilani Highway volumes.

In general, Future Year conditions are very similar to Base Year conditions, with identical LOS on all movements, with a few exceptions:

- Kamehameha Avenue/Maui Lani Parkway: The eastbound approach is anticipated to lower to LOS F and overcapacity conditions with Future Year conditions, from LOS D and near-capacity conditions with Base Year conditions.

- Waiale Road/Kuikahi Drive: The northbound through-right movement is anticipated to lower from LOS E with Base Year conditions to LOS F and overcapacity conditions during the PM peak hour.
- Honopiilani Highway/Kehalani Parkway: The eastbound left-turn movement is anticipated to lower from LOS D with Base Year conditions to LOS E with Future Year conditions during the PM peak hour.

All movements at the two project access intersections are anticipated to operate at LOS C or better across both peak hours, with both operating as stop-controlled intersections on the minor approaches.

Figure 7.2 shows Project trips generated and Figure 7.3 shows Future Year 2028 WITH Waiale Extension and WITHOUT Maui Lani Parkway Extension lane configuration, volumes, and LOS. A LOS summary can be found in Table 7.1.

WAILUKU SINGLE FAMILY RESIDENTIAL PROJECT

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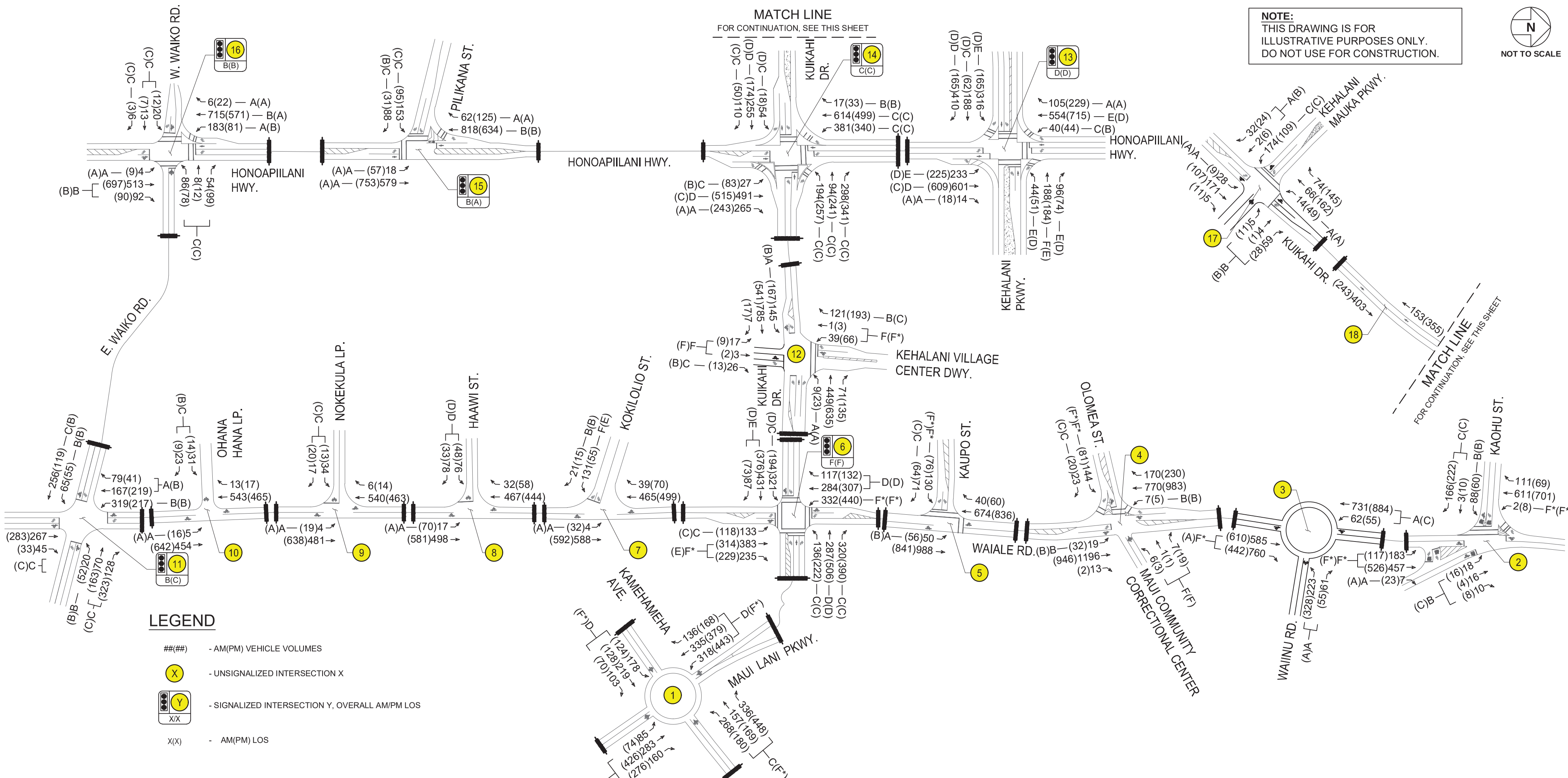

LEGEND

- ##(##) - AM(PM) VEHICLE VOLUMES
- X - UNSIGNALIZED INTERSECTION X
- Y X/X - SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
- X(X) - AM(PM) LOS

FIGURE 7.1

BASE YEAR 2028 WITH WAIALE ROAD EXTENSION AND WITHOUT MAUI LANI PARKWAY EXTENSION CONDITIONS, LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS

WAILUKU SINGLE FAMILY
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Engineers & Surveyors

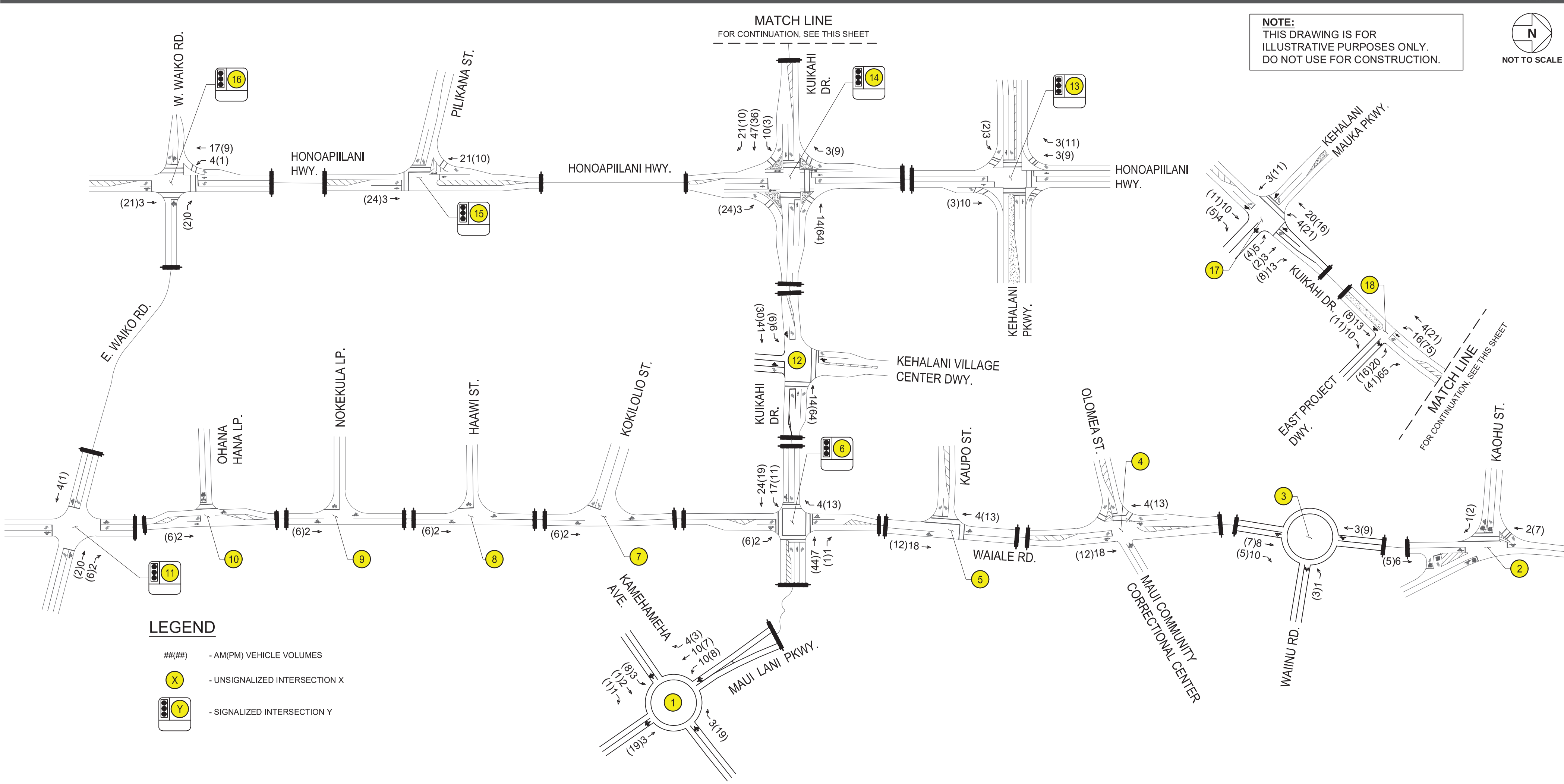

FIGURE 7.2

PROJECT TRIPS WITH WAIALE ROAD EXTENSION
AND WITHOUT MAUI LANI PARKWAY EXTENSION

WAILUKU SINGLE FAMILY
RESIDENTIAL PROJECT

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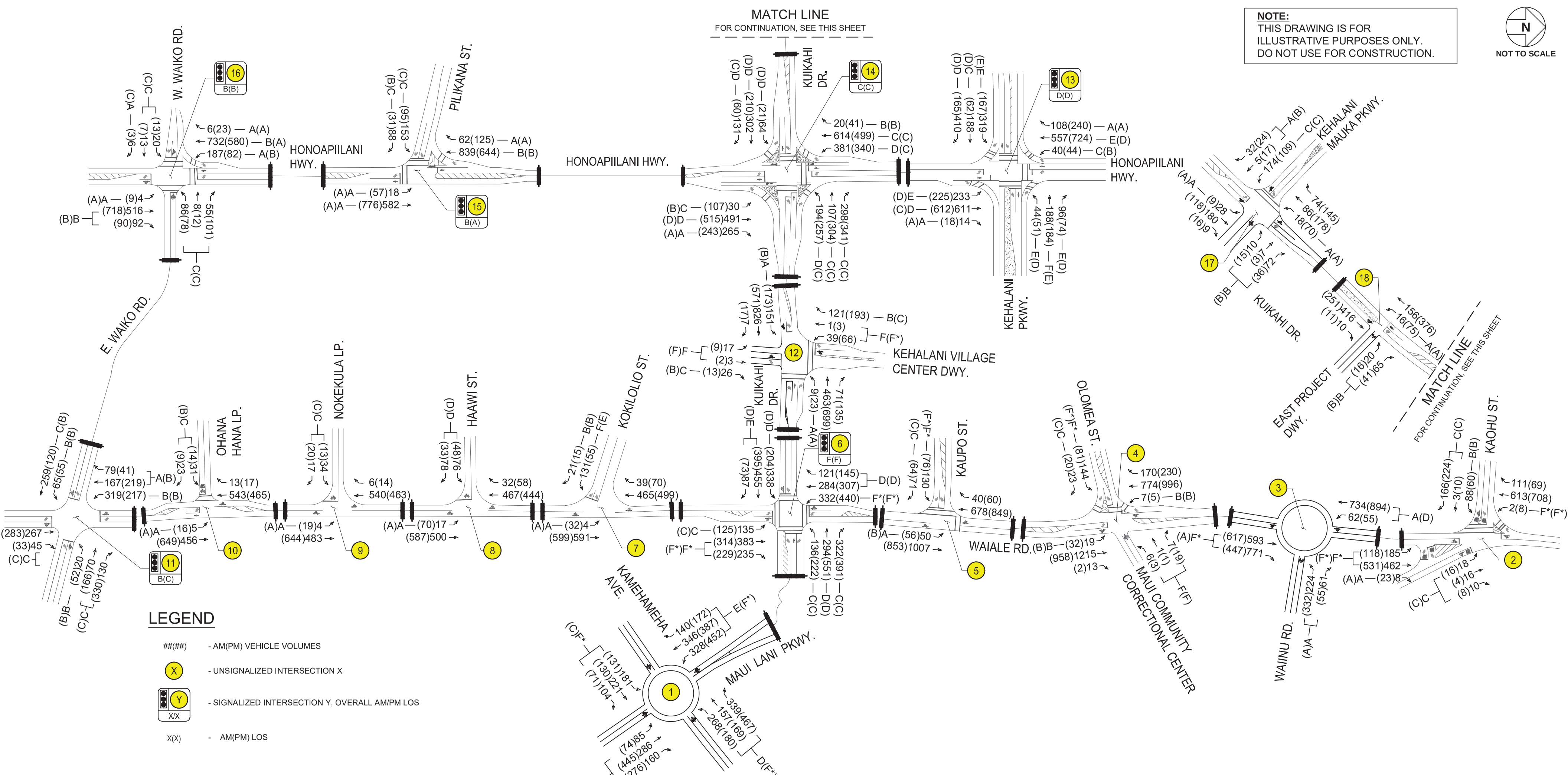

FIGURE 7.3

FUTURE YEAR 2028 WITH WAIALE ROAD EXTENSION AND WITHOUT MAUI LANI PARKWAY EXTENSION CONDITIONS, LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS

Table 7.1: Existing, Base Year, and Future Year Conditions WITH Waiale Ext. WITHOUT MLP Ext.

Intersection	Existing Conditions						Base Year Conditions WITH Waiale Ext. & WITHOUT MLP Ext.						Future Year Conditions WITH Waiale Ext. & WITHOUT MLP Ext.					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
7: Waiale Rd & Kokololio St																		
NB LT	7.7	0.00	A	7.8	0.03	A	8.5	0.00	A	8.9	0.04	A	8.5	0.00	A	8.9	0.04	A
EB LT	14.0	0.26	B	12.7	0.11	B	51.5	0.68	F	37.2	0.35	E	52.1	0.68	F	37.8	0.36	E
EB RT	9.5	0.03	A	9.5	0.02	A	11.8	0.04	B	12.2	0.03	B	11.8	0.04	B	12.2	0.03	B
Overall	3.3	-	-	2.0	-	-	5.7	-	-	2.0	-	-	5.7	-	-	2.0	-	-
8: Waiale Rd & Haawi St																		
NB LT	7.7	0.01	A	7.8	0.06	A	8.6	0.02	A	8.8	0.07	A	8.6	0.02	A	8.8	0.07	A
EB LT/RT	11.9	0.24	B	12.0	0.14	B	27.4	0.52	D	31.3	0.40	D	27.5	0.52	D	31.5	0.40	D
Overall	3.6	-	-	2.9	-	-	3.7	-	-	2.5	-	-	3.8	-	-	2.5	-	-
9: Waiale Rd & Nokekula Lp																		
NB LT	7.8	0.00	A	7.6	0.02	A	8.7	0.00	A	8.5	0.02	A	8.7	0.00	A	8.5	0.02	A
EB LT/RT	11.3	0.09	B	10.3	0.05	B	21.1	0.20	C	18.0	0.12	C	21.2	0.20	C	18.1	0.12	C
Overall	1.3	-	-	1.1	-	-	1.0	-	-	0.6	-	-	1.0	-	-	0.6	-	-
10: Waiale Rd & Ohana Hana Loop																		
NB LT	7.8	0.00	A	7.6	0.01	A	8.7	0.01	A	8.5	0.02	A	8.7	0.01	A	8.5	0.02	A
EB LT/RT	10.7	0.08	B	10.4	0.03	B	15.1	0.14	C	14.9	0.06	B	15.1	0.14	C	14.9	0.07	B
Overall	1.4	-	-	0.8	-	-	0.8	-	-	0.4	-	-	0.8	-	-	0.4	-	-
11: E Waiko Rd & Waiale Rd																		
NB TH/RT	-	-	-	-	-	-	20.5	0.73	C	28.3	0.79	C	20.6	0.73	C	28.9	0.79	C
EB LT	7.6	0.04	A	8.1	0.04	A	16.6	0.20	B	16.6	0.23	B	16.6	0.20	B	16.8	0.23	B
EB TH/RT	-	-	-	-	-	-	22.1	0.73	C	16.8	0.21	B	22.2	0.73	C	16.8	0.21	B
WB LT	-	-	-	-	-	-	17.6	0.09	B	14.0	0.10	B	17.6	0.09	B	14.0	0.10	B
WB TH/RT	-	-	-	-	-	-	21.4	0.54	C	24.7	0.83	C	21.4	0.53	C	25.0	0.84	C
SB LT	-	-	-	-	-	-	12.3	0.64	B	18.3	0.60	B	12.3	0.64	B	18.7	0.61	B
SB TH/RT	-	-	-	-	-	-	7.5	0.28	A	13.8	0.36	B	7.5	0.28	A	14.2	0.36	B
SB LT/RT	16.1	0.48	C	14.2	0.32	B	-	-	-	-	-	-	-	-	-	-	-	-
Overall	7.2	-	-	4.4	-	-	16.4	-	B	21.2	-	C	16.5	-	B	21.6	-	C
12: Kuikahi Dr & Kehalani Village Center Dr																		
NB LT/TH	-	-	-	-	-	-	144.5	0.48	F	243.2	0.48	F	179.6	0.56	F	385.4	0.66	F
NB RT	-	-	-	-	-	-	15.9	0.08	C	12.4	0.03	B	16.7	0.08	C	12.7	0.03	B
EB LT	8.8	0.11	A	9.4	0.13	A	9.2	0.16	A	10.9	0.23	B	9.3	0.17	A	11.4	0.25	B
WB LT	-	-	-	-	-	-	9.7	0.01	A	8.8	0.03	A	9.9	0.01	A	8.9	0.03	A
SB LT	47.4	0.32	E	49.2	0.45	E	-	-	-	-	-	-	-	-	-	-	-	-
SB LT/TH	-	-	-	-	-	-	171.4	0.76	F	368.7	1.36	F*	226.3	0.89	F	541.8	1.71	F*
SB RT	12.0	0.16	B	14.0	0.26	B	13.1	0.23	B	20.1	0.47	C	13.3	0.23	B	23.1	0.52	C
Overall	2.6	-	-	4.0	-	-	7.9	-	-	19.0	-	-	9.3	-	-	25.4	-	-
13: Honoapiilani Hwy & Kehalani Pkwy																		
NB LT	17.1	0.56	B	16.2	0.53	B	58.2	0.91	E	41.6	0.87	D	59.8	0.92	E	43.7	0.88	D
NB TH	22.6	0.66	C	18.4	0.57	B	41.6	0.80	D	22.7	0.67	C	43.1	0.81	D	22.7	0.67	C
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT	51.7	0.93	D	23.3	0.54	C	63.4	0.96	E	54.3	0.82	D	65.6	0.96	E	57.7	0.84	E
EB TH	22.4	0.35	C	24.3	0.12	C	34.2	0.30	C	37.0	0.16	D	34.4	0.30	C	37.5	0.16	D
EB RT	21.3	0.19	C	23.9	0.05	C	35.9	0.41	D	36.3	0.08	D	36.0	0.40	D	36.8	0.08	D
WB LT	26.8	0.14	C	26.6	0.15	C	55.3	0.19	E	42.9	0.19	D	56.2	0.19	E	43.3	0.19	D
WB TH	33.5	0.74	C	32.0	0.59	C	92.1	0.89	F	60.2	0.81	E	94.4	0.89	F	61.1	0.82	E
WB RT	28.9	0.05	C	28.7	0.03	C	58.0	0.03	E	45.3	0.02	D	59.0	0.03	E	45.8	0.02	D
SB LT	17.7	0.13	B	14.4	0.12	B	32.9	0.21	C	17.8	0.15	B	33.7	0.22	C	17.7	0.15	B
SB TH	28.4	0.76	C	25.6	0.78	C	56.0	0.88	E	37.0	0.88	D	57.7	0.89	E	37.6	0.88	D
SB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
Overall	29.7	-	C	22.7	-	C	52.9	-	D	36.9	-	D	54.4	-	D	37.8	-	D

* Denotes overcapacity condition, v/c ≥ 1.

Table 7.1: Existing, Base Year, and Future Year Conditions WITH Waiale Ext. WITHOUT MLP Ext.

Intersection	Existing Conditions						Base Year Conditions WITH Waiale Ext. & WITHOUT MLP Ext.						Future Year Conditions WITH Waiale Ext. & WITHOUT MLP Ext.					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kamehameha Ave & Maui Lani Pkwy																		
NB LT/TH/RT	14.9	0.74	B	8.8	0.51	A	71.3	1.05	F*	20.0	0.71	C	81.9	1.08	F*	21.5	0.74	C
EB LT/TH/RT	9.1	0.72	A	10.4	0.81	B	33.3	0.99	D	62.4	1.10	F*	40.6	1.02	F*	65.6	1.11	F*
WB LT/TH/RT	7.5	0.61	A	12.1	0.80	B	15.1	0.78	C	70.1	1.10	F*	15.2	0.78	C	89.3	1.15	F*
SB LT/TH/RT	9.8	0.78	A	9.7	0.77	A	28.3	0.96	D	61.2	1.08	F*	29.1	0.97	D	74.1	1.12	F*
Overall	10.2	0.78	B	10.5	0.81	B	35.5	1.05	F*	59.4	1.10	F*	40.1	1.08	F*	69.3	1.15	F*
2: Waiale Rd & Kaohu St/Oluloa Dr																		
NB LT/TH	72.8	1.05	F*	50.3	0.96	F	175.3	1.39	F*	180.4	1.43	F*	181.4	1.41	F*	186.2	1.45	F*
NB RT	8.7	0.01	A	8.8	0.04	A	9.3	0.01	A	9.7	0.05	A	9.3	0.02	A	9.7	0.05	A
EB LT	14.0	0.23	B	12.7	0.15	B	14.9	0.25	B	14.0	0.17	B	15.0	0.26	B	14.0	0.17	B
EB TH/RT	13.4	0.31	B	14.3	0.38	B	15.7	0.42	C	19.0	0.58	C	15.7	0.42	C	19.2	0.59	C
WB LT/TH/RT	13.4	0.12	B	12.8	0.07	B	15.0	0.14	B	15.1	0.09	C	15.1	0.14	C	15.2	0.09	C
SB LT/TH/RT	106.4	1.15	F*	100.9	1.11	F*	238.6	1.54	F*	295.3	1.67	F*	240.4	1.54	F*	302.8	1.70	F*
Overall	75.3	-	F	64.3	-	F	173.2	-	F	199.3	-	F	176.3	-	F	204.9	-	F
3: Waiale Rd & Waiinu Rd																		
NB TH/RT	-	-	-	-	-	-	44.8	1.09	F*	1.1	0.85	A	51.4	1.10	F*	1.2	0.86	A
WB LT	471.5	1.81	F*	520.6	1.97	F*	-	-	-	-	-	-	-	-	-	-	-	-
WB LT/RT	-	-	-	-	-	-	5.6	0.39	A	8.2	0.53	A	5.6	0.38	A	8.6	0.55	A
WB RT	16.9	0.18	C	13.9	0.13	B	-	-	-	-	-	-	-	-	-	-	-	-
SB LT	11.7	0.11	B	9.9	0.08	A	-	-	-	-	-	-	-	-	-	-	-	-
SB LT/TH	-	-	-	-	-	-	4.3	0.75	A	23.6	0.98	C	4.0	0.75	A	27.3	1.00	D
Overall	42.5	-	-	69.7	-	-	26.8	1.09	F*	11.2	0.98	B	30.6	1.10	F*	12.7	1.00	B
4: Waiale Rd & Olomea St/MCCC Driveway																		
NB LT	9.4	0.03	A	10.1	0.05	B	10.5	0.03	B	12.4	0.07	B	10.5	0.03	B	12.5	0.07	B
EB LT/TH	789.1	2.41	F*	247.1	1.13	F*	3099.0	7.12	F*	1921.3	4.40	F*	3266.5	7.45	F*	2043.4	4.63	F*
EB RT	13.5	0.06	B	15.1	0.06	C	17.1	0.08	C	22.6	0.10	C	17.2	0.08	C	23.1	0.10	C
WB LT/TH/RT	48.4	0.16	E	22.3	0.11	C	137.6	0.37	F	59.7	0.28	F	147.3	0.39	F	63.2	0.29	F
SB LT	10.4	0.01	B	9.1	0.01	A	12.0	0.02	B	10.4	0.01	B	12.1	0.02	B	10.5	0.01	B
Overall	57.7	-	-	11.8	-	-	190.5	-	-	68.0	-	-	198.9	-	-	71.5	-	-
5: Waiale Rd & Kaupo St																		
NB LT	8.6	0.04	A	8.9	0.05	A	9.6	0.07	A	10.6	0.09	B	9.6	0.07	A	10.7	0.09	B
EB LT	94.5	0.82	F	34.1	0.20	D	765.6	2.36	F*	408.8	1.48	F*	826.6	2.48	F*	450.5	1.56	F*
EB RT	12.4	0.11	B	12.6	0.06	B	15.9	0.19	C	19.5	0.22	C	16.0	0.19	C	19.9	0.22	C
Overall	7.8	-	-	1.4	-	-	51.8	-	-	17.0	-	-	55.2	-	-	18.5	-	-
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy																		
NB LT	23.2	0.25	C	25.0	0.19	C	26.5	0.48	C	28.2	0.50	C	27.1	0.50	C	27.6	0.41	C
NB TH/RT	36.8	0.82	D	32.9	0.71	C	250.6	1.45	F*	67.5	0.97	E	255.0	1.46	F*	80.0	1.01	F*
EB LT	22.0	0.79	C	17.7	0.71	B	31.9	0.85	C	39.1	0.83	D	36.0	0.88	D	49.7	0.90	D
EB TH/RT	23.3	0.73	C	18.7	0.64	B	56.9	0.95	E	42.6	0.81	D	66.0	0.98	E	40.9	0.79	D
WB LT	24.5	0.16	C	17.3	0.22	B	30.8	0.60	C	28.7	0.72	C	32.0	0.64	C	28.1	0.70	C
WB TH	34.0	0.80	C	32.7	0.85	C	46.6	0.79	D	49.2	0.90	D	51.3	0.83	D	54.9	0.93	D
WB RT	26.3	0.14	C	19.3	0.17	B	32.7	0.27	C	29.8	0.38	C	33.7	0.31	C	29.5	0.38	C
SB LT	25.2	0.72	C	31.6	0.80	C	129.8	1.16	F*	872.6	2.83	F*	132.8	1.17	F*	1019.4	3.15	F*
SB TH/RT	24.1	0.50	C	23.6	0.51	C	35.2	0.75	D	42.7	0.80	D	36.3	0.76	D	35.7	0.59	D
Overall	26.7	-	C	25.4	-	C	95.5	-	F	163.8	-	F	98.5	-	F	188.3	-	F

* Denotes overcapacity condition, v/c ≥ 1.

8. ANALYSIS SCENARIO: WITH WAIALE EXTENSION AND WITH MAUI LANI PARKWAY EXTENSION

The planned Maui Lani Parkway Extension is anticipated to stretch from the existing Maui Lani Parkway and extend northward and intersect with Waiinu Road at its existing north intersection with Maui Lani Parkway and Puumele Street. This roadway is anticipated to provide an alternate route to and from Kahului and Wailuku and alleviate congestion along Waiale Road.

Approximately 275-380 vehicles in each direction are anticipated to be rerouted to the Maui Lani Parkway Extension.

8.1 Base Year 2028 Analysis WITH Waiale Extension and WITH Maui Lani Parkway Extension

Traffic operations at the Waiale Road/Kaohu Street and Honoapiilani Highway/Kehalani Mauka Parkway intersections are anticipated to be identical to the WITHOUT Waiale Extension WITHOUT Maui Lani Parkway scenario, as no trips are anticipated to be rerouted from those intersections. As a result, the Waiale Road/Kaohu Street intersection is anticipated to continue to operate at LOS F and overcapacity conditions on the northbound left-turn/through movement and southbound approach as it did in all other analysis scenarios, similar to operations with Existing conditions. As previously discussed, limited right-of-way and the skewed westbound approach makes physical at this intersection difficult. The Honoapiilani Highway/Kehalani Mauka Parkway will continue to operate with various turning movements operating at LOS E/F due to long cycle lengths to accommodate high volumes along mainline Honoapiilani Highway, though all movements are anticipated to operate under capacity.

At the Kamehameha Avenue/Maui Lani Parkway intersection, most movements are anticipated to operate at LOS F and overcapacity conditions due to increased volumes from defacto growth and background projects, similar to conditions with the other two analysis scenarios.

In general, the Maui Lani Parkway Extension is forecasted to improve operations on the critical segment along Waiale Road between Waiinu Road and Kuikahi Drive as trips are rerouted away from Waiale Road and onto the Maui Lani Parkway Extension.

Turning movements from the minor streets are anticipated to experience an increase in delay over Existing conditions; however the increase in delay is far less than other analysis scenarios. The eastbound shared left-turn/through movement at the Olomea Street intersection is anticipated to continue to operate at LOS F and overcapacity conditions, and at the Kaupo Street intersection, the eastbound left-turn movement is anticipated to operate at LOS F and overcapacity conditions during the AM peak hour and LOS E during the PM peak hour. As previously discussed, the installation of median refuge lanes may assist drivers turning onto Waiale Road from the minor streets, and reduce delay.

At the Waiale Road/Kuikahi Drive intersection, the northbound shared through/right-turn lane is anticipated to operate at LOS F and overcapacity during the AM peak hour, and various other turning movements are anticipated to operate at LOS E during the PM peak hour. As previously stated, limited right-of-way especially on the eastbound and southbound approaches makes widening at this intersection difficult. Signal timing optimization may help balance delay; however,

Table 7.1: Existing, Base Year, and Future Year Conditions WITH Waiale Ext. WITHOUT MLP Ext.

Intersection	Existing Conditions						Base Year Conditions WITH Waiale Ext. & WITHOUT MLP Ext.						Future Year Conditions WITH Waiale Ext. & WITHOUT MLP Ext.					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
14: Honoapiilani Highway & Kuikahi Drive																		
NB LT	18.2	0.05	B	17.1	0.13	B	21.2	0.10	C	18.7	0.24	B	23.6	0.12	C	19.9	0.31	B
NB TH	27.9	0.74	C	27.9	0.74	C	35.3	0.81	D	33.2	0.81	C	39.9	0.83	D	35.6	0.82	D
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT	27.1	0.10	C	28.3	0.03	C	33.9	0.16	C	37.5	0.08	D	35.1	0.17	D	37.7	0.10	D
EB TH	32.3	0.64	C	31.1	0.43	C	43.8	0.84	D	45.0	0.79	D	50.5	0.87	D	46.4	0.83	D
EB RT	27.7	0.04	C	26.2	0.02	C	34.1	0.06	C	34.9	0.02	C	35.7	0.11	D	34.3	0.03	C
WB LT	23.4	0.61	C	22.4	0.61	C	33.7	0.68	C	32.7	0.72	C	37.7	0.72	D	33.7	0.75	C
WB TH	22.6	0.14	C	21.0	0.26	C	31.6	0.23	C	32.7	0.56	C	33.3	0.25	C	34.8	0.67	C
WB RT	15.1	0.13	B	14.3	0.14	B	20.9	0.32	C	21.4	0.39	C	21.2	0.31	C	21.6	0.39	C
SB LT	16.5	0.70	B	16.7	0.62	B	29.8	0.92	C	27.4	0.89	C	37.5	0.93	D	31.6	0.90	C
SB TH	19.7	0.68	B	20.1	0.56	C	22.9	0.73	C	21.3	0.62	C	25.1	0.73	C	23.7	0.64	C
SB RT	11.1	0.01	B	14.1	0.01	B	11.3	0.01	B	13.1	0.02	B	12.4	0.01	B	14.5	0.03	B
Overall	22.7	-	C	22.3	-	C	30.3	-	C	28.9	-	C	34.7	-	C	31.2	-	C
15: Honoapiilani Hwy & Pilikana St																		
NB LT	8.2	0.06	A	7.2	0.15	A	9.4	0.07	A	7.7	0.16	A	9.7	0.07	A	7.7	0.16	A
NB TH	5.7	0.57	A	6.0	0.66	A	4.7	0.49	A	6.1	0.68	A	4.6	0.49	A	6.2	0.70	A
EB LT	22.4	0.63	C	18.6	0.44	B	28.8	0.72	C	20.7	0.46	C	30.2	0.74	C	21.0	0.46	C
EB RT	18.3	0.06	B	16.4	0.00	B	22.5	0.05	C	18.1	0.01	B	23.3	0.05	C	18.4	0.01	B
SB TH	11.6	0.79	B	11.5	0.75	B	11.8	0.83	B	11.7	0.77	B	11.8	0.83	B	11.7	0.78	B
SB RT	6.2	0.05	A	7.2	0.11	A	5.5	0.05	A	6.9	0.11	A	5.4	0.05	A	6.8	0.11	A
Overall	10.2	-	B	9.1	-	A	10.7	-	B	9.2	-	A	10.9	-	B	9.3	-	A
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd																		
NB LT	7.0	0.01	A	5.4	0.02	A	8.1	0.01	A	6.6	0.02	A	8.2	0.01	A	6.6	0.02	A
NB TH/RT	12.1	0.70	B	11.5	0.74	B	12.7	0.70	B	14.3	0.78	B	12.6	0.69	B	14.8	0.79	B
EB LT/TH	22.9	0.12	C	26.3	0.08	C	22.4	0.11	C	28.6	0.07	C	23.1	0.11	C	29.6	0.08	C
EB RT	22.4	0.01	C	25.9	0.01	C	22.0	0.01	C	28.3	0.00	C	0.0	0.00	A	29.2	0.00	C
WB LT/TH/RT	24.7	0.44	C	28.6	0.49	C	24.5	0.47	C	32.5	0.60	C	25.3	0.48	C	33.6	0.61	C
SB LT	7.7	0.34	A	7.7	0.18	A	8.3	0.43	A	10.4	0.25	B	8.3	0.44	A	11.0	0.26	B
SB TH	8.3	0.60	A	6.7	0.47	A	10.1	0.70	B	8.2	0.52	A	10.2	0.71	B	8.2	0.52	A
SB RT	4.6	0.00	A	4.3	0.01	A	4.9	0.00	A	5.0	0.01	A	4.8	0.00	A	5.0	0.01	A
Overall	11.3	-	B	11.0	-	B	12.2	-	B	13.8	-	B	12.2	-	B	14.2	-	B
17: Kuikahi Dr & Kehalani Mauka Pkwy																		
NB LT/TH/RT	-	-	-	-	-	-	10.1	0.09	B	10.6	0.06	B	10.7	0.13	B	11.6	0.10	B
EB LT	7.5	0.02	A	7.7	0.01	A	7.6	0.02	A	8.0	0.01	A	7.6	0.02	A	8.0	0.01	A
WB LT	-	-	-	-	-	-	7.6	0.01	A	7.6	0.04	A	7.7	0.01	A	7.6	0.05	A
SB LT	11.5	0.17	B	10.8	0.10	B	17.1	0.39	C	16.3	0.27	C	19.5	0.44	C	19.1	0.32	C
SB TH/RT	-	-	-	-	-	-	9.2	0.04	A	10.6	0.05	B	9.6	0.05	A	12.1	0.08	B
SB RT	8.8	0.04	A	9.3	0.03	A	-	-	-	-	-	-	-	-	-	-	-	-
Overall	4.0	-	-	2.5	-	-	6.8	-	-	4.5	-	-	7.3	-	-	5.2	-	-
18: East Project Driveway & Kuikahi Drive/Kuikahi Dr																		
NB LT/RT	-	-	-	-	-	-	-	-	-	-	-	-	12.9	0.17	B	12.6	0.12	B
WB LT	-	-	-	-	-	-	-	-	-	-	-	-	8.3	0.02	A	8.0	0.06	A
Overall	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	1.7	-	-

* Denotes overcapacity condition, v/c ≥ 1.

as all these movements conflict, lengthening phase times would inevitably result in other movements becoming increasingly congested.

As a result of the increased volumes along Waiale Road, it is anticipated that the eastbound left-turn movement of the Waiale Road/Kokilolio Street is anticipated to operate at LOS F during the AM peak hour and LOS E during the PM peak hour; though the movement is anticipated to continue to operate under capacity. A signal may become warranted at the Waiale Road/Kokilolio Street intersection depending on how traffic in the area is rerouted after the opening of Waiale Road Extension, and this intersection may be monitored and a signal installed if determined to be appropriate.

At the Kuikahi Drive/Kehalani Village Center driveway, the northbound shared left-turn/through movement is anticipated to operate at LOS F across both peak hours, and the southbound left-turn/through movement is anticipated to operate at LOS F during the AM peak hour and LOS F and overcapacity conditions during the PM peak hour. This is an improvement over the WITHOUT Waiale Road Extension shown in Section 6, as a result of reduced volumes along Kuikahi Drive, which had both the northbound and southbound shared left-turn/through movements operating at LOS F and overcapacity conditions across both peak hours.

At the Honopaiilani Highway intersections with Pilikana and Waiko Road, all movements are anticipated to operate at LOS D or better across both peak hours.

Base Year 2028 WITH Waiale Extension and WITH Maui Lani Parkway Extension lane configuration, volumes, and LOS can be found in Figure 8.1 and a LOS summary can be found in Table 8.1.

8.2 Future Year 2028 Analysis WITH Waiale Extension and WITH Maui Lani Parkway Extension

Project trips were distributed through the study intersections in the same manner with all analysis scenarios, but as a result of reroutes due to Waiale Road, may make up varying percentages of overall Future Year traffic between scenarios. The distribution for this scenario is described below:

- Kuikahi Drive: 60-101 vehicles in both directions during each peak hour along Kuikahi Drive between Honoapiilani Highway and Waiale Road, which corresponds to approximately 4-6% of traffic along Kuikahi Drive
- Waiale Road: 22-25 vehicles in both directions during each peak hour along the critical segment of Waiale Road between Waiinu Road and Kuikahi Drive, which corresponds to less than 1% of Future Year traffic.
- Honoapiilani Highway: Approximately 15 vehicles in both directions during each peak hour on Honoapiilani Highway north of Kuikahi Drive, and approximately 24-34 vehicles in both directions during each peak hour on Honoapiilani Highway south of Kuikahi Drive. These volumes correspond approximately 1.5-2.1% of Honoapiilani Highway volumes.

In general, Future Year conditions are very similar to Base Year conditions, with identical LOS on all movements, with a few exceptions.

- Waiale Road/Kuikahi Drive: During the PM peak hour, the westbound through and southbound left-turn movements are anticipated to lower to LOS E with Future Year conditions, from LOS D with Base Year conditions.
- Honoapiilani Highway/Kehalani Parkway: The eastbound left-turn movement lowers to LOS E with Future Year Conditions, from LOS D with Base Year conditions, during the PM peak hour.

All movements at the two project access intersections are anticipated to operate at LOS C or better across both peak hours, with both operating as stop-controlled intersections on the minor approaches.

Figure 8.2 shows Project trips generated and Figure 8.3 shows Future Year 2028 WITH Waiale Extension and WITH Maui Lani Parkway Extension lane configuration, volumes, and LOS. A LOS summary can be found in Table 8.1.

WAILUKU SINGLE FAMILY
RESIDENTIAL PROJECT

Austin Tsutsumi & Associates, Inc.
Engineers & Surveyors

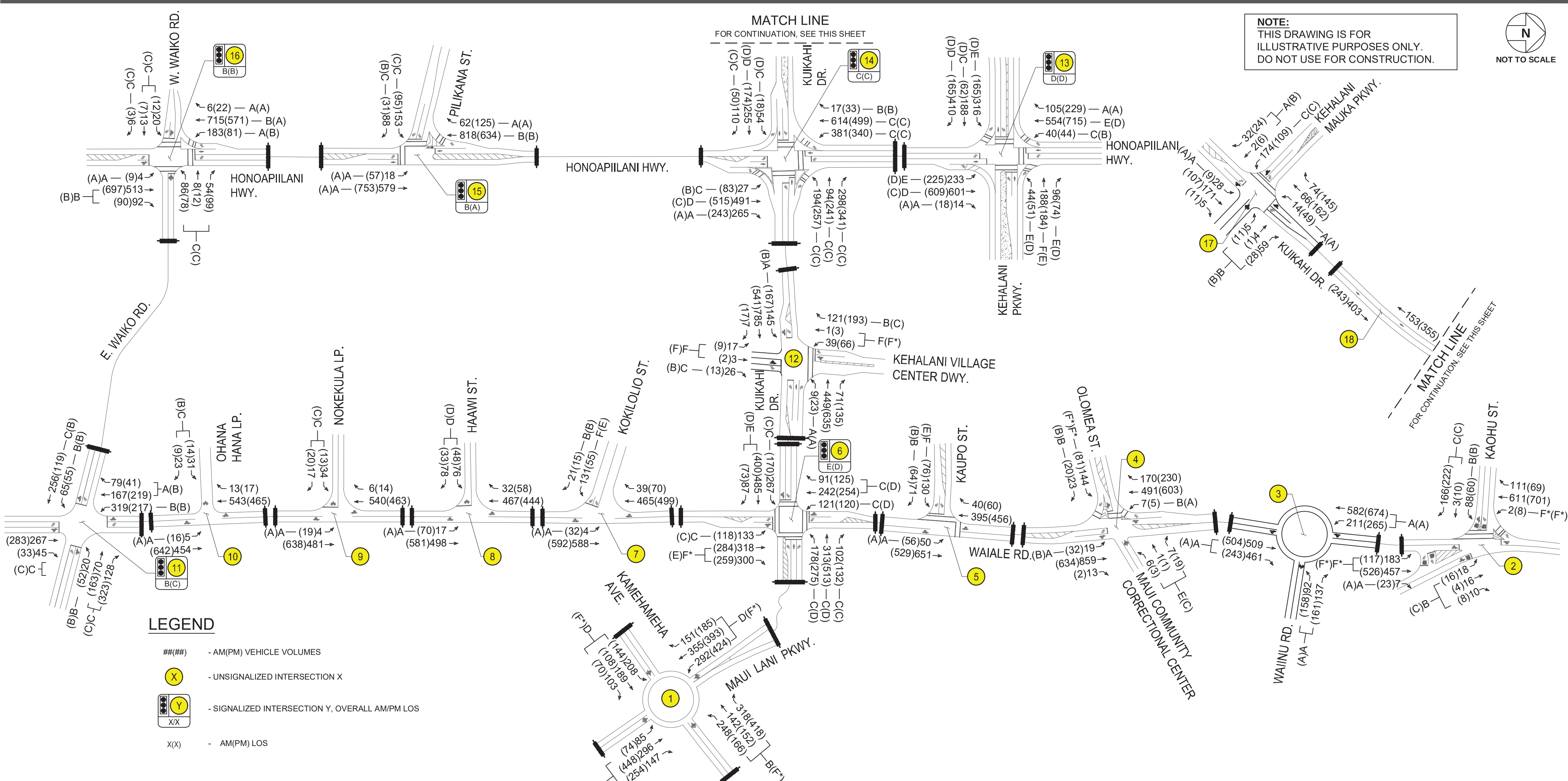

FIGURE 8.1

BASE YEAR 2028 WITH WAIALE ROAD EXTENSION AND WITH MAUI LANI PARKWAY EXTENSION CONDITIONS, LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS

AustinTsutsumi & ASSOCIATES, INC. Engineers & Surveyors

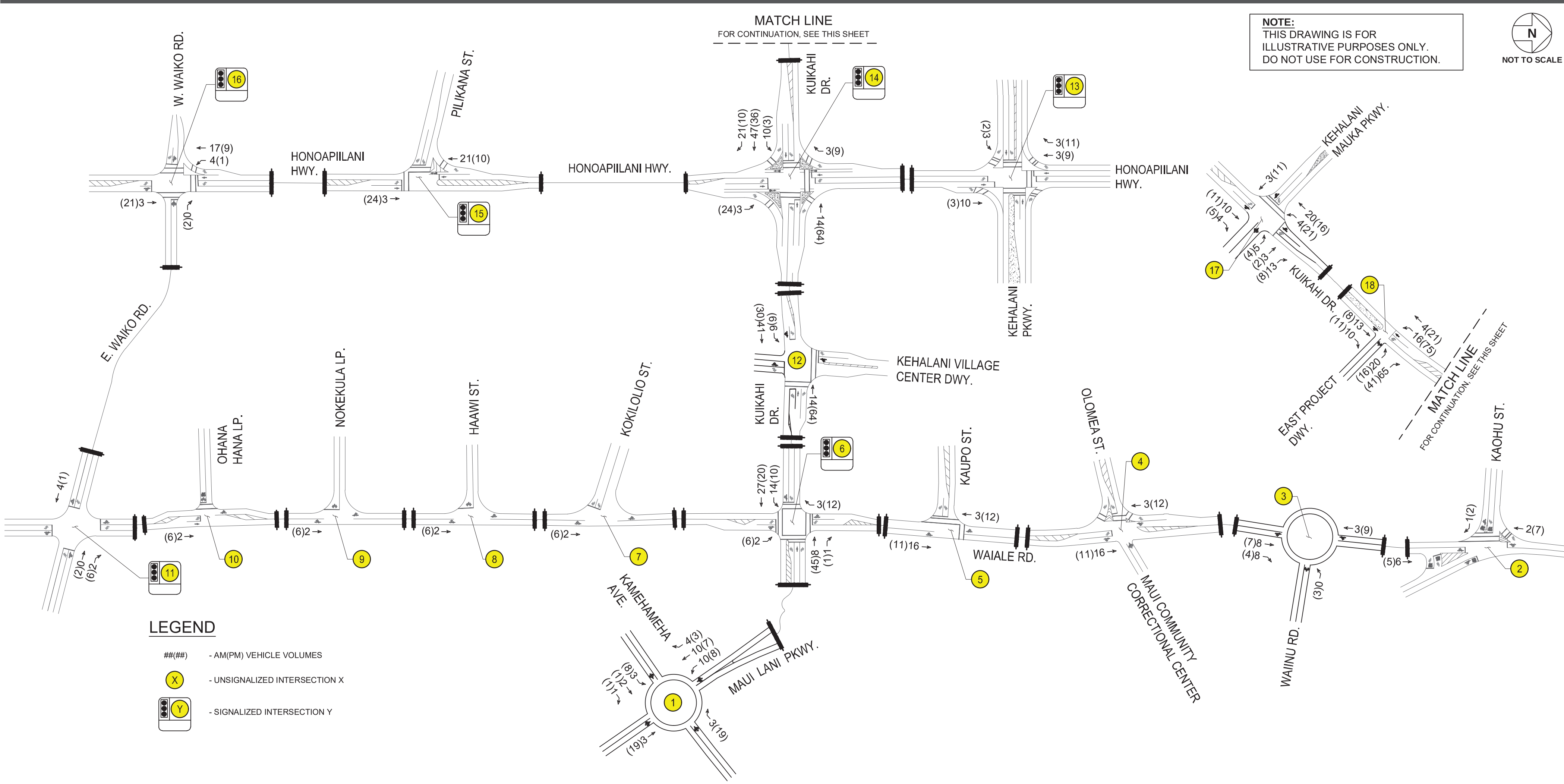

FIGURE 8.2

PROJECT TRIPS WITH WAIALE ROAD EXTENSION
AND WITH MAUI LANI PARKWAY EXTENSION

WAILUKU SINGLE FAMILY
RESIDENTIAL PROJECT

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

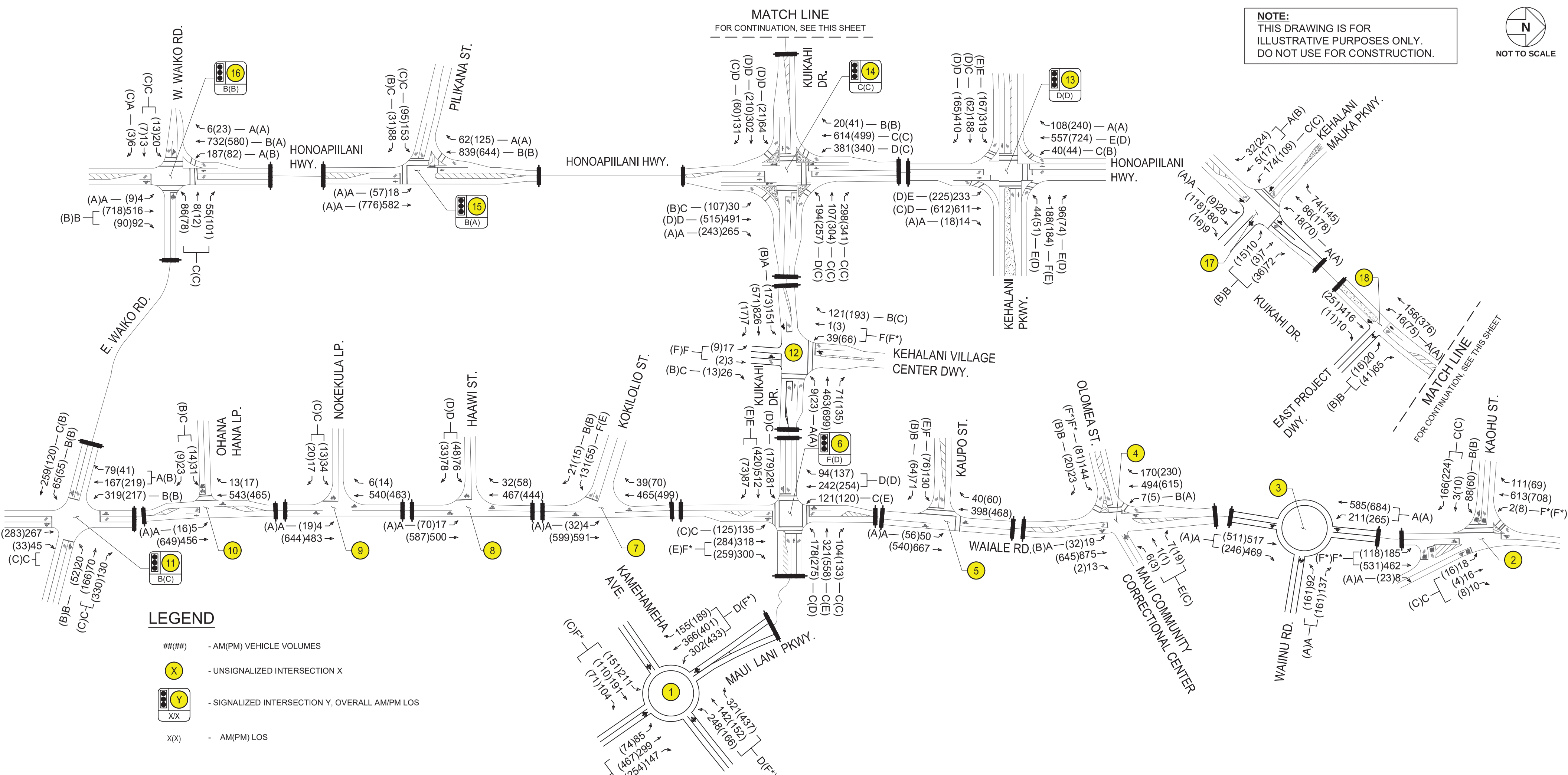

FIGURE 8.3

FUTURE YEAR 2028 WITH WAIALE ROAD EXTENSION AND WITH MAUI LANI PARKWAY EXTENSION CONDITIONS, LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS

Table 8.1: Existing, Base Year, and Future Year Conditions WITH Waiale Ext. WITH MLP Ext.

Intersection	Existing Conditions						Base Year Conditions WITH Waiale Ext. & WITH MLP Ext.						Future Year Conditions WITH Waiale Ext. & WITH MLP Ext.					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
7: Waiale Rd & Kokololio St																		
NB LT	7.7	0.00	A	7.8	0.03	A	8.5	0.00	A	8.9	0.04	A	8.5	0.00	A	8.9	0.04	A
EB LT	14.0	0.26	B	12.7	0.11	B	51.5	0.68	F	37.2	0.35	E	52.1	0.68	F	37.8	0.36	E
EB RT	9.5	0.03	A	9.5	0.02	A	11.8	0.04	B	12.2	0.03	B	11.8	0.04	B	12.2	0.03	B
Overall	3.3	-	-	2.0	-	-	5.7	-	-	2.0	-	-	5.7	-	-	2.0	-	-
8: Waiale Rd & Haawi St																		
NB LT	7.7	0.01	A	7.8	0.06	A	8.6	0.02	A	8.8	0.07	A	8.6	0.02	A	8.8	0.07	A
EB LT/RT	11.9	0.24	B	12.0	0.14	B	27.4	0.52	D	31.3	0.40	D	27.5	0.52	D	31.5	0.40	D
Overall	3.6	-	-	2.9	-	-	3.7	-	-	2.5	-	-	3.8	-	-	2.5	-	-
9: Waiale Rd & Nokekula Lp																		
NB LT	7.8	0.00	A	7.6	0.02	A	8.7	0.00	A	8.5	0.02	A	8.7	0.00	A	8.5	0.02	A
EB LT/RT	11.3	0.09	B	10.3	0.05	B	21.1	0.20	C	18.0	0.12	C	21.2	0.20	C	18.1	0.12	C
Overall	1.3	-	-	1.1	-	-	1.0	-	-	0.6	-	-	1.0	-	-	0.6	-	-
10: Waiale Rd & Ohana Hana Loop																		
NB LT	7.8	0.00	A	7.6	0.01	A	8.7	0.01	A	8.5	0.02	A	8.7	0.01	A	8.5	0.02	A
EB LT/RT	10.7	0.08	B	10.4	0.03	B	15.1	0.14	C	14.9	0.06	B	15.1	0.14	C	14.9	0.07	B
Overall	1.4	-	-	0.8	-	-	0.8	-	-	0.4	-	-	0.8	-	-	0.4	-	-
11: E Waiko Rd & Waiale Rd																		
NB TH/RT	-	-	-	-	-	-	20.5	0.73	C	28.3	0.79	C	20.6	0.73	C	28.9	0.79	C
EB LT	7.6	0.04	A	8.1	0.04	A	16.6	0.20	B	16.6	0.23	B	16.6	0.20	B	16.8	0.23	B
EB TH/RT	-	-	-	-	-	-	22.1	0.73	C	16.8	0.21	B	22.2	0.73	C	16.8	0.21	B
WB LT	-	-	-	-	-	-	17.6	0.09	B	14.0	0.10	B	17.6	0.09	B	14.0	0.10	B
WB TH/RT	-	-	-	-	-	-	21.4	0.54	C	24.7	0.83	C	21.4	0.53	C	25.0	0.84	C
SB LT	-	-	-	-	-	-	12.3	0.64	B	18.3	0.60	B	12.3	0.64	B	18.7	0.61	B
SB TH/RT	-	-	-	-	-	-	7.5	0.28	A	13.8	0.36	B	7.5	0.28	A	14.2	0.36	B
SB LT/RT	16.1	0.48	C	14.2	0.32	B	-	-	-	-	-	-	-	-	-	-	-	-
Overall	7.2	-	-	4.4	-	-	16.4	-	B	21.2	-	C	16.5	-	B	21.6	-	C
12: Kuikahi Dr & Kehalani Village Center Dr																		
NB LT/TH	-	-	-	-	-	-	144.5	0.48	F	243.2	0.48	F	179.6	0.56	F	385.4	0.66	F
NB RT	-	-	-	-	-	-	15.9	0.08	C	12.4	0.03	B	16.7	0.08	C	12.7	0.03	B
EB LT	8.8	0.11	A	9.4	0.13	A	9.2	0.16	A	10.9	0.23	B	9.3	0.17	A	11.4	0.25	B
WB LT	-	-	-	-	-	-	9.7	0.01	A	8.8	0.03	A	9.9	0.01	A	8.9	0.03	A
SB LT	47.4	0.32	E	49.2	0.45	E	-	-	-	-	-	-	-	-	-	-	-	-
SB LT/TH	-	-	-	-	-	-	171.4	0.76	F	368.7	1.36	F*	226.3	0.89	F	541.8	1.71	F*
SB RT	12.0	0.16	B	14.0	0.26	B	13.1	0.23	B	20.1	0.47	C	13.3	0.23	B	23.1	0.52	C
Overall	2.6	-	-	4.0	-	-	7.9	-	-	19.0	-	-	9.3	-	-	25.4	-	-
13: Honoapiilani Hwy & Kehalani Pkwy																		
NB LT	17.1	0.56	B	16.2	0.53	B	58.2	0.91	E	41.6	0.87	D	59.8	0.92	E	43.7	0.88	D
NB TH	22.6	0.66	C	18.4	0.57	B	41.6	0.80	D	22.7	0.67	C	43.1	0.81	D	22.7	0.67	C
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT	51.7	0.93	D	23.3	0.54	C	63.4	0.96	E	54.3	0.82	D	65.6	0.96	E	57.7	0.84	E
EB TH	22.4	0.35	C	24.3	0.12	C	34.2	0.30	C	37.0	0.16	D	34.4	0.30	C	37.5	0.16	D
EB RT	21.3	0.19	C	23.9	0.05	C	35.9	0.41	D	36.3	0.08	D	36.0	0.40	D	36.8	0.08	D
WB LT	26.8	0.14	C	26.6	0.15	C	55.3	0.19	E	42.9	0.19	D	56.2	0.19	E	43.3	0.19	D
WB TH	33.5	0.74	C	32.0	0.59	C	92.1	0.89	F	60.2	0.81	E	94.4	0.89	F	61.1	0.82	E
WB RT	28.9	0.05	C	28.7	0.03	C	58.0	0.03	E	45.3	0.02	D	59.0	0.03	E	45.8	0.02	D
SB LT	17.7	0.13	B	14.4	0.12	B	32.9	0.21	C	17.8	0.15	B	33.7	0.22	C	17.7	0.15	B
SB TH	28.4	0.76	C	25.6	0.78	C	56.0	0.88	E	37.0	0.88	D	57.7	0.89	E	37.6	0.88	D
SB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
Overall	29.7	-	C	22.7	-	C	52.9	-	D	36.9	-	D	54.4	-	D	37.8	-	D

* Denotes overcapacity condition, v/c ≥ 1.

Table 8.1: Existing, Base Year, and Future Year Conditions WITH Waiale Ext. WITH MLP Ext.

Intersection	Existing Conditions						Base Year Conditions WITH Waiale Ext. & WITH MLP Ext.						Future Year Conditions WITH Waiale Ext. & WITH MLP Ext.					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kamehameha Ave & Maui Lani Pkwy																		
NB LT/TH/RT	14.9	0.74	B	8.8	0.51	A	60.3	1.01	F*	19.9	0.70	C	75.6	1.06	F*	22.3	0.75	C
EB LT/TH/RT	9.1	0.72	A	10.4	0.81	B	25.9	0.96	D	54.2	1.08	F*	32.3	0.99	D	61.0	1.10	F*
WB LT/TH/RT	7.5	0.61	A	12.1	0.80	B	14.3	0.77	B	84.5	1.14	F*	14.3	0.77	B	84.3	1.14	F*
SB LT/TH/RT	9.8	0.78	A	9.7	0.77	A	25.8	0.94	D	60.9	1.07	F*	26.2	0.94	D	61.3	1.08	F*
Overall	10.2	0.78	B	10.5	0.81	B	30.2	1.01	F*	60.7	1.14	F*	35.4	1.06	F*	63.0	1.14	F*
2: Waiale Rd & Kaohu St/Oluloa Dr																		
NB LT/TH	72.8	1.05	F*	50.3	0.96	F	175.3	1.39	F*	180.4	1.43	F*	181.4	1.41	F*	186.2	1.45	F*
NB RT	8.7	0.01	A	8.8	0.04	A	9.3	0.01	A	9.7	0.05	A	9.3	0.02	A	9.7	0.05	A
EB LT	14.0	0.23	B	12.7	0.15	B	14.9	0.25	B	14.0	0.17	B	15.0	0.26	B	14.0	0.17	B
EB TH/RT	13.4	0.31	B	14.3	0.38	B	15.7	0.42	C	19.0	0.58	C	15.7	0.42	C	19.2	0.59	C
WB LT/TH/RT	13.4	0.12	B	12.8	0.07	B	15.0	0.14	B	15.1	0.09	C	15.1	0.14	C	15.2	0.09	C
SB LT/TH/RT	106.4	1.15	F*	100.9	1.11	F*	238.6	1.54	F*	295.3	1.67	F*	240.4	1.54	F*	302.8	1.70	F*
Overall	75.3	-	F	64.3	-	F	173.2	-	F	199.3	-	F	176.3	-	F	204.9	-	F
3: Waiale Rd & Waiinu Rd																		
NB TH/RT	-	-	-	-	-	-	8.1	0.89	A	4.4	0.74	A	4.6	0.75	A	4.6	0.75	A
WB LT	471.5	1.81	F*	520.6	1.97	F*	-	-	-	-	-	-	-	-	-	-	-	-
WB LT/RT	-	-	-	-	-	-	4.1	0.30	A	4.6	0.40	A	4.7	0.41	A	4.7	0.41	A
WB RT	16.9	0.18	C	13.9	0.13	B	-	-	-	-	-	-	-	-	-	-	-	-
SB LT	11.7	0.11	B	9.9	0.08	A	-	-	-	-	-	-	-	-	-	-	-	-
SB LT/TH	-	-	-	-	-	-	1.7	0.66	A	4.6	0.83	A	5.0	0.85	A	5.0	0.85	A
Overall	42.5	-	-	69.7	-	-	5.1	0.89	A	4.5	0.83	A	4.8	0.85	A	4.8	0.85	A
4: Waiale Rd & Olomea St/MCCC Driveway																		
NB LT	9.4	0.03	A	10.1	0.05	B	9.2	0.02	A	10.0	0.05	B	9.2	0.02	A	10.1	0.05	B
EB LT/TH	789.1	2.41	F*	247.1	1.13	F*	635.1	2.12	F*	223.6	1.10	F*	678.5	2.21	F*	249.2	1.16	F*
EB RT	13.5	0.06	B	15.1	0.06	C	12.9	0.05	B	14.7	0.06	B	12.9	0.05	B	14.9	0.06	B
WB LT/TH/RT	48.4	0.16	E	22.3	0.11	C	39.6	0.13	E	21.0	0.10	C	41.0	0.13	E	21.7	0.10	C
SB LT	10.4	0.01	B	9.1	0.01	A	10.1	0.01	B	9.0	0.01	A	10.1	0.01	B	9.1	0.01	A
Overall	57.7	-	-	11.8	-	-	53.2	-	-	11.8	-	-	56.2	-	-	13.0	-	-
5: Waiale Rd & Kaupo St																		
NB LT	8.6	0.04	A	8.9	0.05	A	8.5	0.05	A	8.8	0.06	A	8.5	0.05	A	8.9	0.06	A
EB LT	94.5	0.82	F	34.1	0.20	D	85.0	0.83	F	41.6	0.46	E	93.2	0.86	F	43.9	0.48	E
EB RT	12.4	0.11	B	12.6	0.06	B	11.8	0.13	B	12.6	0.13	B	11.9	0.13	B	12.7	0.13	B
Overall	7.8	-	-	1.4	-	-	9.2	-	-	3.6	-	-	9.9	-	-	3.7	-	-
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy																		
NB LT	23.2	0.25	C	25.0	0.19	C	25.8	0.49	C	26.4	0.42	C	26.7	0.51	C	28.6	0.48	C
NB TH/RT	36.8	0.82	D	32.9	0.71	C	232.3	1.41	F*	65.5	0.96	E	240.4	1.43	F*	73.2	0.99	E
EB LT	22.0	0.79	C	17.7	0.71	B	20.0	0.68	C	34.4	0.74	C	20.5	0.70	C	42.4	0.83	D
EB TH/RT	23.3	0.73	C	18.7	0.64	B	51.5	0.94	D	55.8	0.92	E	58.0	0.97	E	57.5	0.92	E
WB LT	24.5	0.16	C	17.3	0.22	B	29.3	0.72	C	47.7	0.91	D	32.1	0.75	C	50.4	0.91	D
WB TH	34.0	0.80	C	32.7	0.85	C	30.2	0.60	C	48.2	0.89	D	31.0	0.62	C	56.6	0.94	E
WB RT	26.3	0.14	C	19.3	0.17	B	23.6	0.05	C	26.1	0.08	C	23.9	0.05	C	25.9	0.08	C
SB LT	25.2	0.72	C	31.6	0.80	C	29.1	0.64	C	47.8	0.76	D	29.7	0.64	C	60.0	0.83	E
SB TH/RT	24.1	0.50	C	23.6	0.51	C	35.9	0.74	D	36.5	0.68	D	37.1	0.75	D	39.7	0.72	D
Overall	26.7	-	C	25.4	-	C	80.6	-	F	49.0	-	D	83.5	-	F	54.3	-	D

* Denotes overcapacity condition, v/c ≥ 1.

9. CONCLUSIONS

The Project proposes the development of up to 204 single-family (R-1) residential units, with no Ohana units. Access to the site is proposed from two full-access driveways along Kuikahi Drive. The west access point for the project will convert the existing Kuikahi Drive/Kehalani Mauka Parkway "T"-intersection into a 4-way intersection. The east access is planned to be located approximately 700 feet to the west of the Honoapiilani Highway/Kuikahi Drive intersection.

9.1 Existing Conditions

During the busiest 20 minutes of the AM peak hour, southbound traffic along Waiale Road can queue back to Wells Street from the Waiale Road/Kaohu Street/Oluloa Drive intersection and in the opposite direction, northbound queues can spill back beyond Kuikahi Drive. As a result of the extensive queue spillback especially in the critical northbound direction during the AM peak hour, operations on the minor streets at intersections along Waiale were affected; though it was observed that drivers along Waiale Road would sometimes yield to vehicles on the minor street which improved operations on the minor street but contributed to the spillback along Waiale Road.

When the queue extended to Kuikahi Drive, progression of turning movements onto Waiale Road is blocked, and were observed to queue beyond the length of the eastbound left-turn storage and as far as Honoapiilani Highway.

During the PM peak hour, some southbound congestion occurs along Waiale Road, primarily due to the short existing southbound left-turn lane at the Waiale Road/Kuikahi Drive Extension.

At the Kamehameha Avenue/Maui Lani Parkway roundabout, historical volumes shows that traffic volumes at the roundabout increased by about 35% compared to 2019 volumes when the intersection operated as a 4-way stop.

The Honoapiilani Highway/Kehalani Parkway intersection provides access to the Puu Kukui Elementary School. As a result, the eastbound left-turn movement queues beyond the existing left-turn storage lane and some vehicles may require two cycle lengths to clear the intersection during the AM peak hour. Heavy traffic during a short period of time is reflective of typical school traffic conditions. Similarly, northbound traffic queues along Honoapiilani Highway were observed to spill back from the Wailuku Elementary School and Main Street area to near Kehalani Parkway at its maximum for about 5-10 minutes during the AM peak hour.

9.2 Analysis Scenarios

As described in Section 4.3, a number of analysis scenarios have been developed to reflect various levels of completion of the Waiale Road Extension and Maui Lani Parkway Extension, since the exact timeline of these projects are not yet known. The scenarios and their anticipated reroutes are described below:

- Base Year and Future Year WITHOUT Waiale Road Extension WITHOUT Maui Lani Parkway Extension
- Base Year and Future Year WITH Waiale Road Extension WITHOUT Maui Lani Parkway Extension

Table 8.1: Existing, Base Year, and Future Year Conditions WITH Waiale Ext. WITH MLP Ext.

Intersection	Existing Conditions						Base Year Conditions WITH Waiale Ext. & WITH MLP Ext.						Future Year Conditions WITH Waiale Ext. & WITH MLP Ext.					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
14: Honoapiilani Highway & Kuikahi Drive																		
NB LT	18.2	0.05	B	17.1	0.13	B	21.2	0.10	C	18.7	0.24	B	23.6	0.12	C	19.9	0.31	B
NB TH	27.9	0.74	C	27.9	0.74	C	35.3	0.81	D	33.2	0.81	C	39.9	0.83	D	35.6	0.82	D
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT	27.1	0.10	C	28.3	0.03	C	33.9	0.16	C	37.5	0.08	D	35.1	0.17	D	37.7	0.10	D
EB TH	32.3	0.64	C	31.1	0.43	C	43.8	0.84	D	45.0	0.79	D	50.5	0.87	D	46.4	0.83	D
EB RT	27.7	0.04	C	26.2	0.02	C	34.1	0.06	C	34.9	0.02	C	35.7	0.11	D	34.3	0.03	C
WB LT	23.4	0.61	C	22.4	0.61	C	33.7	0.68	C	32.7	0.72	C	37.7	0.72	D	33.7	0.75	C
WB TH	22.6	0.14	C	21.0	0.26	C	31.6	0.23	C	32.7	0.56	C	33.3	0.25	C	34.8	0.67	C
WB RT	15.1	0.13	B	14.3	0.14	B	20.9	0.32	C	21.4	0.39	C	21.2	0.31	C	21.6	0.39	C
SB LT	16.5	0.70	B	16.7	0.62	B	29.8	0.92	C	27.4	0.89	C	37.5	0.93	D	31.6	0.90	C
SB TH	19.7	0.68	B	20.1	0.56	C	22.9	0.73	C	21.3	0.62	C	25.1	0.73	C	23.7	0.64	C
SB RT	11.1	0.01	B	14.1	0.01	B	11.3	0.01	B	13.1	0.02	B	12.4	0.01	B	14.5	0.03	B
Overall	22.7	-	C	22.3	-	C	30.3	-	C	28.9	-	C	34.7	-	C	31.2	-	C
15: Honoapiilani Hwy & Pilikana St																		
NB LT	8.2	0.06	A	7.2	0.15	A	9.4	0.07	A	7.7	0.16	A	9.7	0.07	A	7.7	0.16	A
NB TH	5.7	0.57	A	6.0	0.66	A	4.7	0.49	A	6.1	0.68	A	4.6	0.49	A	6.2	0.70	A
EB LT	22.4	0.63	C	18.6	0.44	B	28.8	0.72	C	20.7	0.46	C	30.2	0.74	C	21.0	0.46	C
EB RT	18.3	0.06	B	16.4	0.00	B	22.5	0.05	C	18.1	0.01	B	23.3	0.05	C	18.4	0.01	B
SB TH	11.6	0.79	B	11.5	0.75	B	11.8	0.83	B	11.7	0.77	B	11.8	0.83	B	11.7	0.78	B
SB RT	6.2	0.05	A	7.2	0.11	A	5.5	0.05	A	6.9	0.11	A	5.4	0.05	A	6.8	0.11	A
Overall	10.2	-	B	9.1	-	A	10.7	-	B	9.2	-	A	10.9	-	B	9.3	-	A
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd																		
NB LT	7.0	0.01	A	5.4	0.02	A	8.1	0.01	A	6.6	0.02	A	8.2	0.01	A	6.6	0.02	A
NB TH/RT	12.1	0.70	B	11.5	0.74	B	12.7	0.70	B	14.3	0.78	B	12.6	0.69	B	14.8	0.79	B
EB LT/TH	22.9	0.12	C	26.3	0.08	C	22.4	0.11	C	28.6	0.07	C	23.1	0.11	C	29.6	0.08	C
EB RT	22.4	0.01	C	25.9	0.01	C	22.0	0.01	C	28.3	0.00	C	0.0	0.00	A	29.2	0.00	C
WB LT/TH/RT	24.7	0.44	C	28.6	0.49	C	24.5	0.47	C	32.5	0.60	C	25.3	0.48	C	33.6	0.61	C
SB LT	7.7	0.34	A	7.7	0.18	A	8.3	0.43	A	10.4	0.25	B	8.3	0.44	A	11.0	0.26	B
SB TH	8.3	0.60	A	6.7	0.47	A	10.1	0.70	B	8.2	0.52	A	10.2	0.71	B	8.2	0.52	A
SB RT	4.6	0.00	A	4.3	0.01	A	4.9	0.00	A	5.0	0.01	A	4.8	0.00	A	5.0	0.01	A
Overall	11.3	-	B	11.0	-	B	12.2	-	B	13.8	-	B	12.2	-	B	14.2	-	B
17: Kuikahi Dr & Kehalani Mauka Pkwy																		
NB LT/TH/RT	-	-	-	-	-	-	10.1	0.09	B	10.6	0.06	B	10.7	0.13	B	11.6	0.10	B
EB LT	7.5	0.02	A	7.7	0.01	A	7.6	0.02	A	8.0	0.01	A	7.6	0.02	A	8.0	0.01	A
WB LT	-	-	-	-	-	-	7.6	0.01	A	7.6	0.04	A	7.7	0.01	A	7.6	0.05	A
SB LT	11.5	0.17	B	10.8	0.10	B	17.1	0.39	C	16.3	0.27	C	19.5	0.44	C	19.1	0.32	C
SB TH/RT	-	-	-	-	-	-	9.2	0.04	A	10.6	0.05	B	9.6	0.05	A	12.1	0.08	B
SB RT	8.8	0.04	A	9.3	0.03	A	-	-	-	-	-	-	-	-	-	-	-	-
Overall	4.0	-	-	2.5	-	-	6.8	-	-	4.5	-	-	7.3	-	-	5.2	-	-
18: East Project Driveway & Kuikahi Drive/Kuikahi Dr																		
NB LT/RT	-	-	-	-	-	-	-	-	-	-	-	-	12.9	0.17	B	12.6	0.12	B
WB LT	-	-	-	-	-	-	-	-	-	-	-	-	8.3	0.02	A	8.0	0.06	A
Overall	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	1.7	-	-

* Denotes overcapacity condition, v/c ≥ 1.

- Base Year and Future Year <u>WITH</u> Waiale Road Extension and <u>WITH</u> Maui Lani Parkway Extension.

9.3 Year 2028 <u>WITHOUT</u> Waiale Road Extension <u>WITHOUT</u> Maui Lani Parkway Extension

9.3.1 Base Year 2028 <u>WITHOUT</u> Waiale Road Extension <u>WITHOUT</u> Maui Lani Parkway Extension

A number of nearby developments are anticipated to be completed by Year 2028 and were included as part of this study. With additional traffic generated by nearby developments and defacto growth in the study area, delay and LOS of turning movements at various intersections throughout the network are anticipated to worsen from existing conditions. Major regional congestive conditions are anticipated to persist.

9.3.2 Future Year 2028 <u>WITHOUT</u> Waiale Extension and <u>WITHOUT</u> Maui Lani Parkway Extension

In general, Future Year conditions are very similar to Base Year conditions, with nearly identical LOS on all movements, with a few exceptions. For the majority of the movements described below, the volume increase between Base Year and Future Year movements are relatively small; however, these small increases pushed the LOS beyond its Base Year threshold.

At the Kuikahi Drive/Kehalani Mauka Parkway intersection with the west project access, a signal warrant is not anticipated to be met with forecast volumes and the intersection was therefore analyzed as a two-way stop-controlled intersection; though the volumes appear to be close to warranting a signal, short by 1 warranted hour. Therefore, this intersection is anticipated to be unsignalized, with stop-control on the minor streets. With the intersection operating with two-way stop control, all movements at both study intersections are anticipated to operate at LOS C or better across both peak hours.

If, at a future date, a signal warrant is found to be met based on actual volumes, it is customary for both a signal and roundabout option to be considered for implementation. At this location, a mini roundabout may be feasible given the relatively large space of currently vacant lands south of the intersection, provided that design requirements can be met. The design of the roundabout itself may assist in lowering the speeds along Kuikahi Drive as drivers slow down to maneuver through the roundabout entries and yield to circulating vehicles. Ultimately, the type and timing of the traffic control device installed (roundabout or signal) will be discretion of County of Maui.

9.4 Year 2028 <u>WITH</u> Waiale Road Extension <u>WITHOUT</u> Maui Lani Parkway Extension

9.4.1 Base Year 2028 <u>WITH</u> Waiale Road Extension <u>WITHOUT</u> Maui Lani Parkway Extension

As a result of the Waiale Road Extension, it is anticipated that a portion of the trips from the south which currently take the Honoapiilani Highway – Kuikahi Drive – Waiale Road route and vice versa, will reroute directly onto Waiale Road Extension, resulting in a reduction of trips along Honoapiilani Highway south of Kuikahi Drive, and along Kuikahi Drive between Honoapiilani Highway and Waiko Road.

In the southbound direction, it is forecasted that southbound right-turn and westbound through trips which would have previously utilized Kuikahi Drive and then turn left onto Honoapiilani Highway would become southbound through and westbound left-turn trips to utilize the Waiale Road Extension.

The reroutes are anticipated to result in increased delay and overcapacity conditions on various movements at the Waiale Road/Kuikahi Drive intersection. In addition, the increased volumes along Waiale Road is anticipated to result in the minor street eastbound approach at the Waiale Road/Kokilolio Street intersection operating at LOS E(F) during the AM(PM) peak hours. A signal may become warranted at the Waiale Road/Kokilolio Street intersection depending on how traffic in the area is rerouted after the opening of Waiale Road Extension, and this intersection may be monitored and a signal installed if determined to be appropriate.

On the other hand, the reroutes are anticipated to improve conditions at the Honoapiilani Highway intersections with Pilikana Street, Waiko Road, Kuikahi Drive, and the Kuikahi Drive/Kehalani Village Center driveway with the reduced volumes.

Other major regional congestive conditions described in Existing Conditions and Base Year <u>WITHOUT</u> Waiale Extension and <u>WITHOUT</u> Maui Lani Parkway Extension are anticipated to persist.

9.4.2 Future Year 2028 <u>WITH</u> Waiale Road Extension <u>WITHOUT</u> Maui Lani Parkway Extension

Project trips were distributed through the study intersections in the same manner with all analysis scenarios. In general, Future Year <u>WITH</u> Waiale Road Extension and <u>WITHOUT</u> Maui Lani Parkway Extension conditions are very similar to Base Year <u>WITH</u> Waiale Road Extension and <u>WITHOUT</u> Maui Lani Parkway Extension conditions, with identical LOS on all movements, with a few exceptions. For the majority of the movements, the volume increase between Base Year and Future Year movements are relatively small; however, these small increases pushed the LOS beyond its Base Year threshold.

Operations at the two project access intersections are anticipated to be identical with all three (3) analysis scenarios and all movements are forecasted to operate at LOS C or better across both peak hours, with both operating as stop-controlled intersections on the minor approaches.

9.5 Year 2028 <u>WITH</u> Waiale Road Extension <u>WITH</u> Maui Lani Parkway Extension

9.5.1 Base Year 2028 <u>WITH</u> Waiale Road Extension <u>WITH</u> Maui Lani Parkway Extension

The planned Maui Lani Parkway Extension is anticipated to stretch from the existing Maui Lani Parkway and extend northward and intersect with Waiinu Road at its existing north intersection with Maui Lani Parkway and Puumele Street. This roadway is anticipated to provide an alternate route to and from Kahului and Wailuku and alleviate congestion along Waiale Road. Approximately 275-380 vehicles in each direction are anticipated to be rerouted to the Maui Lani Parkway Extension.

For this analysis scenario, in addition to the trips rerouted by the Waiale Road Extension as previously described, the Maui Lani Parkway Extension is forecasted to improve operations on the critical segment along Waiale Road between Waiinu Road and Kuikahi Drive as trips are rerouted away from Waiale Road and onto the Maui Lani Parkway Extension. As a result, operations at intersections along this critical stretch still experience an increase in delay over Existing Conditions due to additional volumes from background projects and defacto growth; however the increase is far less compared to other scenarios.

9.5.2 Future Year 2028 WITH Waiale Road Extension WITH Maui Lani Parkway Extension

Project trips were distributed through the study intersections in the same manner with all analysis scenarios. In general, Future Year WITH Waiale Road Extension and WITH Maui Lani Parkway Extension conditions are very similar to Base Year WITH Waiale Road Extension and WITH Maui Lani Parkway Extension conditions, with identical LOS on all movements, with a few exceptions. For the majority of the movements, the volume increase between Base Year and Future Year movements are relatively small; however, these small increases pushed the LOS beyond its Base Year threshold.

Operations at the two project access intersections are anticipated to be identical with all three (3) analysis scenarios and all movements are forecasted to operate at LOS C or better across both peak hours, with both operating as stop-controlled intersections on the minor approaches.

10. RECOMMENDATIONS

The Maui Lani Parkway Extension will help mitigate congestive conditions along Waiale Road during the peak periods of traffic. As interim improvements, the following could be considered for Base Year 2028 conditions WITHOUT the Project:

Waiale Road Corridor

- For future planning purposes along Waiale Road:
  - Consider various traffic control treatment options at Waiale Road/Kaohu Street intersection that may include roadway widening, traffic signal and/or roundabout, depending on resolution to various geometric constraints.
  - Median refuge lanes along Waiale Road could be considered to help ease entry of left-turn vehicles onto Waiale Road.

The following Future Year 2028 recommendations should be considered WITH the Project:

- At the Waiale Road/Kuikahi Drive intersection, signal timing should be optimized.
- At the proposed Kuikahi Drive/Kehalani Mauka Parkway intersection, which is the west access point for the Project, it was assumed that the intersection would operate with two-way stop control on the minor streets, as a signal warrant is projected to not be met, short by one warranting hour.
  - If, at a future date, a signal warrant is found to be met based on actual volumes, a signal or a roundabout could be considered for implementation, provided that design constraints, including sight distance requirements, can be met during the design phase. Ultimately, the type and timing of the traffic control device installed (roundabout or signal) will be discretion of County of Maui.
- At the Kuikahi Drive/East Project Driveway intersection, provide a westbound left-turn storage lane into the project.

11. REFERENCES

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4. Austin, Tsutsumi & Associates, Waikapu Light Industrial Project TIAR, 2013.
5. Federal Highway Administration, Manual on Uniform Traffic Control Devices, 2009.
6. Fehr & Peers, Waikapu Country Town TIAR, December 2016.
7. Institute of Transportation Engineers, Trip Generation, 11th Edition, 2019.
8. Maui News, Maui County to Receive $25M for Waiale Road Extension, August 9, 2022.
9. Phillip Rowell & Associates, Waiko Road Light Industrial Park TIAR, 2014.
10. Transportation Research Board, Highway Capacity Manual, 6th Edition.

APPENDICES

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX A

TRAFFIC COUNT DATA

Austin Tsutsumi & Associates
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File Name : Honoapiilani Hwy-Kehalani Mauka Pkwy
Site Code :
Start Date : 3/29/2022
Page No : 1

Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	HONOAPIILANI HWY Southbound				KEHALANI MAUKA PKWY Westbound				HONOAPIILANI HWY Northbound				KEHALANI MAUKA PKWY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	1	79	13	2	2	7	7	0	12	47	1	0	24	18	43	1	257
06:45 AM	4	98	18	0	13	10	14	1	17	66	0	0	53	21	57	0	372
Total	5	177	31	2	15	17	21	1	29	113	1	0	77	39	100	1	629
07:00 AM	7	102	28	0	8	37	16	1	38	92	0	0	62	27	94	1	513
07:15 AM	8	89	23	2	13	53	31	0	53	120	4	0	85	36	88	0	605
07:30 AM	9	104	26	3	13	45	27	2	67	102	5	0	77	63	104	1	648
07:45 AM	15	105	19	1	9	39	21	2	31	109	4	0	39	39	64	1	498
Total	39	400	96	6	43	174	95	5	189	423	13	0	263	165	350	3	2264
08:00 AM	7	75	24	3	8	15	12	1	25	85	4	0	22	13	37	1	332
08:15 AM	5	59	16	2	6	13	17	0	17	95	0	0	29	16	44	1	320
Grand Total	56	711	167	13	72	219	145	7	260	716	18	0	391	233	531	6	3545
Apprch %	5.9	75.1	17.6	1.4	16.3	49.4	32.7	1.6	26.2	72	1.8	0	33.7	20.1	45.7	0.5	
Total %	1.6	20.1	4.7	0.4	2	6.2	4.1	0.2	7.3	20.2	0.5	0	11	6.6	15	0.2	
Motorcycles	0	2	0	0	0	0	0	0	1	3	0	0	0	1	1	0	8
% Motorcycles	0	0.3	0	0	0	0	0	0	0.4	0.4	0	0	0	0.4	0.2	0	0.2
Cars & Light Goods	56	684	165	0	72	212	141	0	252	698	18	0	387	229	523	0	3437
% Cars & Light Goods	100	96.2	98.8	0	100	96.8	97.2	0	96.9	97.5	100	0	99	98.3	98.5	0	97
Buses	0	13	1	0	0	4	3	0	3	4	0	0	2	2	1	0	33
% Buses	0	1.8	0.6	0	0	1.8	2.1	0	1.2	0.6	0	0	0.5	0.9	0.2	0	0.9
Single-Unit Trucks	0	10	1	0	0	3	1	0	4	8	0	0	2	0	6	0	35
% Single-Unit Trucks	0	1.4	0.6	0	0	1.4	0.7	0	1.5	1.1	0	0	0.5	0	1.1	0	1
Articulated Trucks	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Articulated Trucks	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	1	0	0	0	0	0	0	0	3	0	0	0	1	0	0	5
% Bicycles on Road	0	0.1	0	0	0	0	0	0	0	0.4	0	0	0	0.4	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	13	0	0	0	7	0	0	0	0	0	0	0	6	26
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	0	0	0	0	100	0.7

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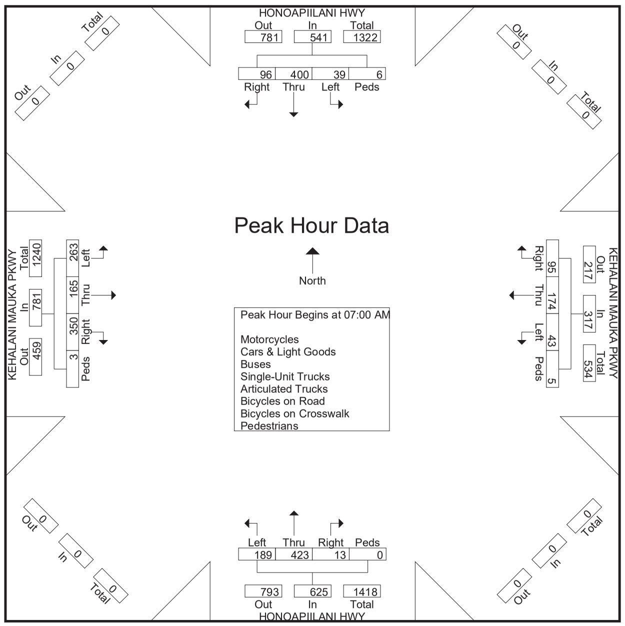
File Name : Honoapiilani Hwy-Kehalani Mauka Pkwy
Site Code :
Start Date : 3/29/2022
Page No : 2

	HONOAPIILANI HWY Southbound					KEHALANI MAUKA PKWY Westbound					HONOAPIILANI HWY Northbound					KEHALANI MAUKA PKWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	7	102	**28**																**1**		
07:15 AM	**8**	**89**	**23**	**2**	**122**	**13**	**53**	**31**	**0**	**97**	53	**120**	**4**	**0**	**177**	**85**	**36**	**88**	**0**	**209**	**605**
07:30 AM	**9**	**104**	**26**	**3**	**142**	13	45	27	**2**	87	**67**	**102**	**5**	0	174	77	**63**	**104**	**1**	**245**	**648**
07:45 AM	**15**	**105**	19	1	140	9	39	21	2	71	31	109	4	0	144	39	39	64	1	143	498
Total Volume	39	400	96	6	541	43	174	95	5	317	189	423	13	0	625	263	165	350	3	781	2264
% App. Total	7.2	73.9	17.7	1.1		13.6	54.9	30	1.6		30.2	67.7	2.1	0		33.7	21.1	44.8	0.4		
PHF	.650	.952	.857	.500	.952	.827	.821	.766	.625	.817	.705	.881	.650	.000	.883	.774	.655	.841	.750	.797	.873



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	HONOAPIILANI HWY Southbound				KEHALANI MAUKA PKWY Westbound				HONOAPIILANI HWY Northbound				KEHALANI MAUKA PKWY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	17	112	29	0	6	20	19	0	37	90	8	0	39	16	45	1	439
03:45 PM	9	101	33	2	8	29	20	1	30	117	8	0	33	14	37	1	443
Total	26	213	62	2	14	49	39	1	67	207	16	0	72	30	82	2	882
04:00 PM	12	101	45	0	11	32	16	0	43	102	3	0	25	15	26	0	431
04:15 PM	12	123	46	0	13	33	24	2	50	118	6	0	42	9	33	0	511
04:30 PM	5	118	44	2	11	46	20	1	39	106	1	0	36	13	24	0	466
04:45 PM	16	139	50	2	18	35	11	0	36	89	8	0	26	13	36	0	479
Total	45	481	185	4	53	146	71	3	168	415	18	0	129	50	119	0	1887
05:00 PM	9	126	41	0	8	32	17	0	45	100	2	0	24	13	23	0	440
05:15 PM	15	76	40	1	1	33	25	2	39	92	4	0	24	5	18	0	375
Grand Total	95	896	328	7	76	260	152	6	319	814	40	0	249	98	242	2	3584
Apprch %	7.2	67.6	24.7	0.5	15.4	52.6	30.8	1.2	27.2	69.4	3.4	0	42.1	16.6	40.9	0.3	
Total %	2.7	25	9.2	0.2	2.1	7.3	4.2	0.2	8.9	22.7	1.1	0	6.9	2.7	6.8	0.1	
Motorcycles	0	4	0	0	0	2	0	0	0	2	2	0	0	0	0	0	10
% Motorcycles	0	0.4	0	0	0	0.8	0	0	0	0.2	5	0	0	0	0	0	0.3
Cars & Light Goods	95	874	325	0	76	258	148	0	318	803	38	0	249	98	241	0	3523
% Cars & Light Goods	100	97.5	99.1	0	100	99.2	97.4	0	99.7	98.6	95	0	100	100	99.6	0	98.3
Buses	0	9	0	0	0	0	4	0	0	2	0	0	0	0	0	0	15
% Buses	0	1	0	0	0	0	2.6	0	0	0.2	0	0	0	0	0	0	0.4
Single-Unit Trucks	0	4	3	0	0	0	0	0	0	6	0	0	0	0	1	0	14
% Single-Unit Trucks	0	0.4	0.9	0	0	0	0	0	0	0.7	0	0	0	0	0.4	0	0.4
Articulated Trucks	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3
% Articulated Trucks	0	0.2	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Road	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4
% Bicycles on Road	0	0.3	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	4
% Bicycles on Crosswalk	0	0	0	14.3	0	0	0	16.7	0	0	0	0	0	0	0	100	0.1
Pedestrians	0	0	0	6	0	0	0	5	0	0	0	0	0	0	0	0	11
% Pedestrians	0	0	0	85.7	0	0	0	83.3	0	0	0	0	0	0	0	0	0.3

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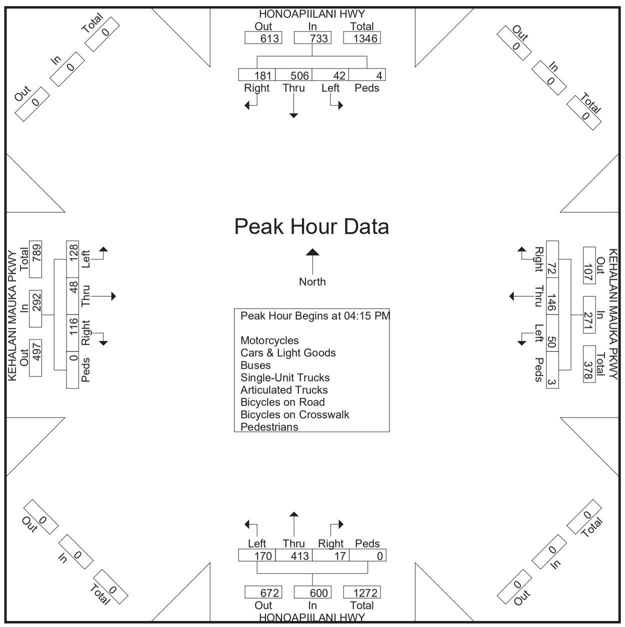
	HONOAPIILANI HWY Southbound					KEHALANI MAUKA PKWY Westbound					HONOAPIILANI HWY Northbound					KEHALANI MAUKA PKWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	12	123	46	0	181	13	33	**24**	**2**	72	**50**	**118**			**174**	**42**				**84**	**511**
04:30 PM	5	118	44	**2**			**46**			**78**	39	106	1	0	146	36	**13**	24	0	73	466
04:45 PM	**16**	**139**	**50**		**207**	**18**	35	11	0	64	36	89	**8**	0	133	26	13	**36**			
05:00 PM	**9**	**126**	**41**	**0**	**176**	**8**	**32**	**17**	**0**	**57**	**45**	**100**	**2**	**0**	**147**	**24**	**13**	**23**	**0**	**60**	**440**
Total Volume	42	506	181	4	733	50	146	72	3	271	170	413	17	0	600	128	48	116	0	292	1896
% App. Total	5.7	69	24.7	0.5		18.5	53.9	26.6	1.1		28.3	68.8	2.8	0		43.8	16.4	39.7	0		
PHF	.656	.910	.905	.500	.885	.694	.793	.750	.375	.869	.850	.875	.531	.000	.862	.762	.923	.806	.000	.869	.928



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File Name : Honoapiilani Hwy-Kuikahi Dr
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	HONOAPIILANI HWY Southbound				KUIKAHI DR Westbound				HONOAPIILANI HWY Northbound				KUIKAHI DR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	39	77	2	2	59	14	25	0	4	32	62	0	2	26	9	0	353
06:45 AM	58	98	1	0	51	14	25	1	3	58	75	0	0	30	11	0	425
Total	97	175	3	2	110	28	50	1	7	90	137	0	2	56	20	0	778
07:00 AM	79	124	1	0	55	11	31	0	3	81	86	0	7	45	16	1	540
07:15 AM	70	114	2	1	64	15	66	0	2	103	84	0	14	46	17	0	598
07:30 AM	71	130	3	0	64	16	56	0	4	107	100	0	6	29	22	1	609
07:45 AM	69	128	7	0	51	19	48	0	6	94	95	0	6	40	15	0	578
Total	289	496	13	1	234	61	201	0	15	385	365	0	33	160	70	2	2325
08:00 AM	43	71	1	1	75	26	38	0	2	66	70	0	3	44	17	0	457
08:15 AM	52	63	2	4	62	22	24	0	9	89	74	0	2	27	10	0	440
Grand Total	481	805	19	8	481	137	313	1	33	630	646	0	40	287	117	2	4000
Apprch %	36.6	61.3	1.4	0.6	51.6	14.7	33.6	0.1	2.5	48.1	49.4	0	9	64.3	26.2	0.4	
Total %	12	20.1	0.5	0.2	12	3.4	7.8	0	0.8	15.8	16.1	0	1	7.2	2.9	0.1	
Motorcycles	1	0	1	0	1	0	1	0	0	3	1	0	0	0	2	0	10
% Motorcycles	0.2	0	5.3	0	0.2	0	0.3	0	0	0.5	0.2	0	0	0	1.7	0	0.2
Cars & Light Goods	467	789	18	0	460	133	302	0	31	617	636	0	39	285	113	0	3890
% Cars & Light Goods	97.1	98	94.7	0	95.6	97.1	96.5	0	93.9	97.9	98.5	0	97.5	99.3	96.6	0	97.2
Buses	7	8	0	0	1	0	4	0	0	3	3	0	0	1	1	0	28
% Buses	1.5	1	0	0	0.2	0	1.3	0	0	0.5	0.5	0	0	0.3	0.9	0	0.7
Single-Unit Trucks	5	6	0	0	17	3	6	0	1	3	5	0	1	1	1	0	49
% Single-Unit Trucks	1	0.7	0	0	3.5	2.2	1.9	0	3	0.5	0.8	0	2.5	0.3	0.9	0	1.2
Articulated Trucks	1	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	5
% Articulated Trucks	0.2	0	0	0	0.4	0.7	0	0	0	0	0.2	0	0	0	0	0	0.1
Bicycles on Road	0	2	0	0	0	0	0	0	1	4	0	0	0	0	0	0	7
% Bicycles on Road	0	0.2	0	0	0	0	0	0	3	0.6	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
% Bicycles on Crosswalk	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	2	10
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	100	0.2

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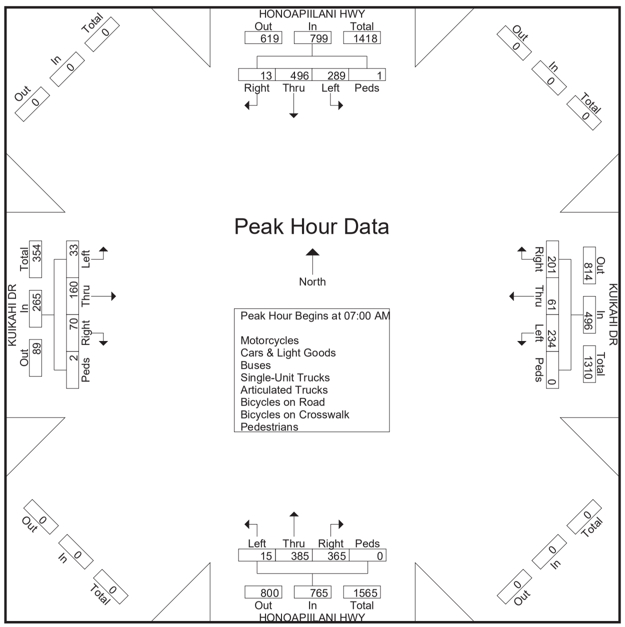
	HONOAPIILANI HWY Southbound					KUIKAHI DR Westbound					HONOAPIILANI HWY Northbound					KUIKAHI DR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**79**				**204**	55	11	31	0	97	3	81	86	0	170	7	45	16	**1**		
07:15 AM	**70**	**114**	**2**	**1**	**187**	**64**	15	**66**	**0**	**145**	2	103	84	0	189	**14**	**46**	17	0	**77**	598
07:30 AM	71	**130**	3	0	204	64	16	56	0	136	4	**107**	**100**	0	**211**	6	29	**22**			**609**
07:45 AM	69	128	**7**				**19**				**6**										
Total Volume	289	496	13	1	799	234	61	201	0	496	15	385	365	0	765	33	160	70	2	265	2325
% App. Total	36.2	62.1	1.6	0.1		47.2	12.3	40.5	0		2	50.3	47.7	0		12.5	60.4	26.4	0.8		
PHF	.915	.954	.464	.250	.979	.914	.803	.761	.000	.855	.625	.900	.913	.000	.906	.589	.870	.795	.500	.860	.954



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	HONOAPIILANI HWY Southbound				KUIKAHI DR Westbound				HONOAPIILANI HWY Northbound				KUIKAHI DR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	56	86	3	0	70	37	50	0	11	86	95	0	2	39	11	0	546
03:45 PM	73	86	3	0	57	32	54	0	11	98	85	0	4	32	10	0	545
Total	129	172	6	0	127	69	104	0	22	184	180	0	6	71	21	0	1091
04:00 PM	53	72	2	1	82	31	62	0	14	89	77	0	2	25	6	1	517
04:15 PM	56	96	6	3	64	32	49	0	12	116	98	0	2	22	8	0	564
04:30 PM	48	111	6	0	76	32	56	0	10	87	79	0	1	29	7	0	542
04:45 PM	60	113	9	0	81	37	47	0	15	90	68	0	2	20	7	0	549
Total	217	392	23	4	303	132	214	0	51	382	322	0	7	96	28	1	2172
05:00 PM	43	94	9	0	70	30	67	0	6	88	66	0	3	24	6	0	506
05:15 PM	30	72	4	0	76	29	42	1	17	91	84	0	4	18	4	0	472
Grand Total	419	730	42	4	576	260	427	1	96	745	652	0	20	209	59	1	4241
Apprch %	35.1	61.1	3.5	0.3	45.6	20.6	33.8	0.1	6.4	49.9	43.7	0	6.9	72.3	20.4	0.3	
Total %	9.9	17.2	1	0.1	13.6	6.1	10.1	0	2.3	17.6	15.4	0	0.5	4.9	1.4	0	
Motorcycles	0	2	0	0	1	0	1	0	0	4	1	0	0	0	1	0	10
% Motorcycles	0	0.3	0	0	0.2	0	0.2	0	0	0.5	0.2	0	0	0	1.7	0	0.2
Cars & Light Goods	414	712	42	0	570	258	426	0	95	731	634	0	20	204	58	0	4164
% Cars & Light Goods	98.8	97.5	100	0	99	99.2	99.8	0	99	98.1	97.2	0	100	97.6	98.3	0	98.2
Buses	4	6	0	0	0	0	0	0	0	2	6	0	0	0	0	0	18
% Buses	1	0.8	0	0	0	0	0	0	0	0.3	0.9	0	0	0	0	0	0.4
Single-Unit Trucks	1	4	0	0	5	2	0	0	1	7	11	0	0	4	0	0	35
% Single-Unit Trucks	0.2	0.5	0	0	0.9	0.8	0	0	1	0.9	1.7	0	0	1.9	0	0	0.8
Articulated Trucks	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Articulated Trucks	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	5	0	0	0	0	0	0	0	1	0	0	0	1	0	0	7
% Bicycles on Road	0	0.7	0	0	0	0	0	0	0	0.1	0	0	0	0.5	0	0	0.2
Bicycles on Crosswalk	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2
% Bicycles on Crosswalk	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	100	0
Pedestrians	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	4
% Pedestrians	0	0	0	75	0	0	0	100	0	0	0	0	0	0	0	0	0.1

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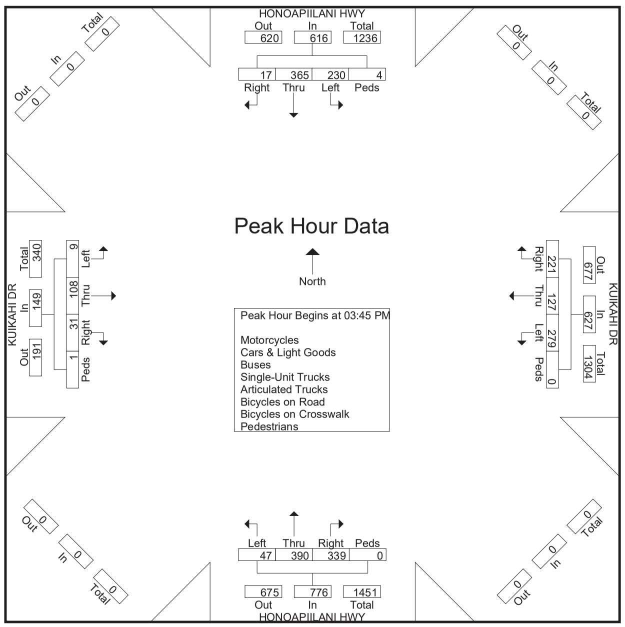
	HONOAPIILANI HWY Southbound					KUIKAHI DR Westbound					HONOAPIILANI HWY Northbound					KUIKAHI DR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	**73**						**32**									**4**	**32**	**10**		**46**	545
04:00 PM	53	72	2	1	128	**82**	31	**62**		**175**	**14**								**1**		
04:15 PM	**56**	**96**	**6**	**3**	**161**	**64**	**32**	**49**	**0**	**145**	**12**	**116**	**98**	0	**226**	2	22	8	0	32	**564**
04:30 PM	48	**111**	6	0	**165**	76	32	56	0	164	10	87	79	0	176	1	29	7	0	37	542
Total Volume	230	365	17	4	616	279	127	221	0	627	47	390	339	0	776	9	108	31	1	149	2168
% App. Total	37.3	59.3	2.8	0.6		44.5	20.3	35.2	0		6.1	50.3	43.7	0		6	72.5	20.8	0.7		
PHF	.788	.822	.708	.333	.933	.851	.992	.891	.000	.896	.839	.841	.865	.000	.858	.563	.844	.775	.250	.810	.961



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	HONOAPIILANI HWY SOUTHBOUND				WESTBOUND				PILIKANA ST NORTHBOUND				HONOAPIILANI HWY EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	0	144	10	0	0	0	0	0	3	101	0	0	25	0	22	0	305
06:45	0	184	11	0	0	0	0	0	1	109	0	0	28	0	19	0	352
Total	0	328	21	0	0	0	0	0	4	210	0	0	53	0	41	0	657
07:00	0	163	15	0	0	0	0	0	3	126	0	0	49	0	28	0	384
07:15	0	163	17	0	0	0	0	0	3	164	0	0	58	0	32	0	437
07:30	0	181	15	0	0	0	0	0	7	189	0	0	32	0	19	0	443
07:45	0	180	15	0	0	0	0	0	5	138	0	0	14	0	9	0	361
Total	0	687	62	0	0	0	0	0	18	617	0	0	153	0	88	0	1625
08:00	0	173	16	0	0	0	0	0	5	125	0	0	10	0	12	0	341
08:15	0	138	3	0	0	0	0	0	3	128	0	0	9	0	4	0	285
Grand Total	0	1326	102	0	0	0	0	0	30	1080	0	0	225	0	145	0	2908
Apprch %	0	92.9	7.1	0	0	0	0	0	2.7	97.3	0	0	60.8	0	39.2	0	
Total %	0	45.6	3.5	0	0	0	0	0	1	37.1	0	0	7.7	0	5	0	
Motorcycles	0	7	0	0	0	0	0	0	0	5	0	0	0	0	0	0	12
% Motorcycles	0	0.5	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0.4
Cars & Light Goods	0	1273	101	0	0	0	0	0	29	1056	0	0	223	0	145	0	2827
% Cars & Light Goods	0	96	99	0	0	0	0	0	96.7	97.8	0	0	99.1	0	100	0	97.2
Buses	0	12	1	0	0	0	0	0	1	10	0	0	0	0	0	0	24
% Buses	0	0.9	1	0	0	0	0	0	3.3	0.9	0	0	0	0	0	0	0.8
Single-Unit Trucks	0	26	0	0	0	0	0	0	0	7	0	0	1	0	0	0	34
% Single-Unit Trucks	0	2	0	0	0	0	0	0	0	0.6	0	0	0.4	0	0	0	1.2
Articulated Trucks	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
% Articulated Trucks	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Bicycles on Road	0	1	0	0	0	0	0	0	0	2	0	0	1	0	0	0	4
% Bicycles on Road	0	0.1	0	0	0	0	0	0	0	0.2	0	0	0.4	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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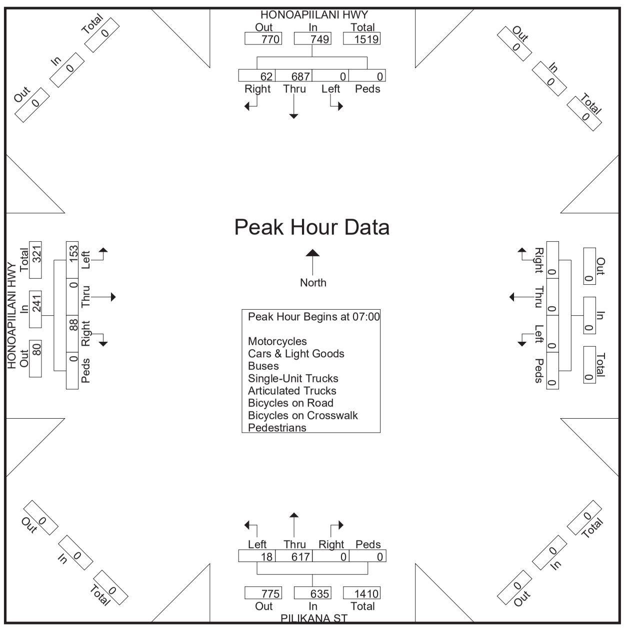
	HONOAPIILANI HWY SOUTHBOUND					WESTBOUND					PILIKANA ST NORTHBOUND					HONOAPIILANI HWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	163	15	0	178	0	0	0	0	0	3	126	0	0	129	49	0	28	0	77	384
07:15	0	163	**17**	0	180	0	0	0	0	0	3	164	0	0	167	**58**	0	**32**	0	**90**	437
07:30	0	**181**	15	0	**196**	0	0	0	0	0	**7**	**189**	0	0	**196**	32	0	19	0	51	**443**
07:45	0	180	15	0	195	0	0	0	0	0	5	138	0	0	143	14	0	9	0	23	361
Total Volume	0	687	62	0	749	0	0	0	0	0	18	617	0	0	635	153	0	88	0	241	1625
% App. Total	0	91.7	8.3	0		0	0	0	0		2.8	97.2	0	0		63.5	0	36.5	0		
PHF	.000	.949	.912	.000	.955	.000	.000	.000	.000	.000	.643	.816	.000	.000	.810	.659	.000	.688	.000	.669	.917



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	HONOAPIILANI HWY SOUTHBOUND				WESTBOUND				PILIKANA ST NORTHBOUND				HONOAPIILANI HWY EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:15	0	140	16	0	0	0	0	0	7	170	0	0	16	0	1	0	350
15:30	0	153	27	0	0	0	0	0	14	169	0	0	15	0	4	0	382
15:45	0	130	25	0	0	0	0	0	9	183	0	0	25	0	5	1	378
Total	0	423	68	0	0	0	0	0	30	522	0	0	56	0	10	1	1110
16:00	0	128	26	0	0	0	0	0	12	176	0	0	24	0	11	0	377
16:15	0	130	34	0	0	0	0	0	14	180	0	0	21	0	12	0	391
16:30	0	135	31	0	0	0	0	0	19	177	0	0	29	0	2	1	394
16:45	0	170	34	0	0	0	0	0	12	162	0	0	21	0	6	0	405
Total	0	563	125	0	0	0	0	0	57	695	0	0	95	0	31	1	1567
17:00	0	150	28	0	0	0	0	0	15	171	0	0	13	0	11	0	388
Grand Total	0	1136	221	0	0	0	0	0	102	1388	0	0	164	0	52	2	3065
Apprch %	0	83.7	16.3	0	0	0	0	0	6.8	93.2	0	0	75.2	0	23.9	0.9	
Total %	0	37.1	7.2	0	0	0	0	0	3.3	45.3	0	0	5.4	0	1.7	0.1	
Motorcycles	0	2	0	0	0	0	0	0	2	5	0	0	0	0	0	0	9
% Motorcycles	0	0.2	0	0	0	0	0	0	2	0.4	0	0	0	0	0	0	0.3
Cars & Light Goods	0	1122	217	0	0	0	0	0	100	1359	0	0	163	0	49	0	3010
% Cars & Light Goods	0	98.8	98.2	0	0	0	0	0	98	97.9	0	0	99.4	0	94.2	0	98.2
Buses	0	10	0	0	0	0	0	0	0	9	0	0	0	0	0	0	19
% Buses	0	0.9	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.6
Single-Unit Trucks	0	2	4	0	0	0	0	0	0	12	0	0	1	0	1	0	20
% Single-Unit Trucks	0	0.2	1.8	0	0	0	0	0	0	0.9	0	0	0.6	0	1.9	0	0.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Road	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	3
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	3.8	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.1

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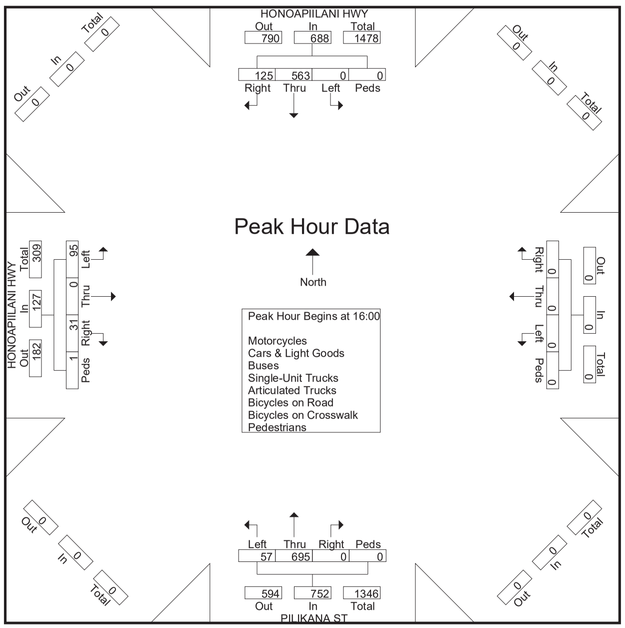
	HONOAPIILANI HWY SOUTHBOUND					WESTBOUND					PILIKANA ST NORTHBOUND					HONOAPIILANI HWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	0	128	26	0	154	0	0	0	0	0	12	176	0	0	188	24	0	11	0	**35**	377
16:15	0	130	**34**	0	164	0	0	0	0	0	14	**180**	0	0	194	21	0	**12**	0	33	391
16:30	0	135	31	0	166	0	0	0	0	0	**19**	177	0	0	**196**	**29**	0	2	**1**	32	394
16:45	0	**170**	34	0	**204**	0	0	0	0	0	12	162	0	0	174	21	0	6	0	27	**405**
Total Volume	0	563	125	0	688	0	0	0	0	0	57	695	0	0	752	95	0	31	1	127	1567
% App. Total	0	81.8	18.2	0		0	0	0	0		7.6	92.4	0	0		74.8	0	24.4	0.8		
PHF	.000	.828	.919	.000	.843	.000	.000	.000	.000	.000	.750	.965	.000	.000	.959	.819	.000	.646	.250	.907	.967



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	HONOAPIILANI HWY SOUTHBOUND				WAIKO RD WESTBOUND				HONOAPIILANI HWY NORTHBOUND				WAIKO RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	16	130	2	0	10	0	3	0	0	89	4	0	3	7	2	1	267
06:45	15	206	1	0	19	1	5	0	1	97	12	0	7	5	7	0	376
Total	31	336	3	0	29	1	8	0	1	186	16	0	10	12	9	1	643
07:00	28	161	0	0	16	2	9	0	0	112	13	1	3	4	1	0	350
07:15	29	154	0	0	18	1	14	0	1	141	17	0	6	5	1	0	387
07:30	46	148	1	0	19	4	15	0	3	167	17	0	8	0	2	0	430
07:45	40	161	5	0	22	0	10	0	0	138	20	0	3	4	2	0	405
Total	143	624	6	0	75	7	48	0	4	558	67	1	20	13	6	0	1572
08:00	16	160	1	1	16	4	8	0	0	111	11	1	4	2	2	1	338
08:15	5	147	2	0	18	3	3	0	2	123	10	0	8	1	1	1	324
Grand Total	195	1267	12	1	138	15	67	0	7	978	104	2	42	28	18	3	2877
Apprch %	13.2	85.9	0.8	0.1	62.7	6.8	30.5	0	0.6	89.6	9.5	0.2	46.2	30.8	19.8	3.3	
Total %	6.8	44	0.4	0	4.8	0.5	2.3	0	0.2	34	3.6	0.1	1.5	1	0.6	0.1	
Motorcycles	0	6	0	0	0	0	0	0	0	4	1	0	0	0	0	0	11
% Motorcycles	0	0.5	0	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0.4
Cars & Light Goods	191	1220	12	0	137	15	65	0	6	958	101	0	41	27	16	0	2789
% Cars & Light Goods	97.9	96.3	100	0	99.3	100	97	0	85.7	98	97.1	0	97.6	96.4	88.9	0	96.9
Buses	2	10	0	0	1	0	1	0	0	11	1	0	0	1	1	0	28
% Buses	1	0.8	0	0	0.7	0	1.5	0	0	1.1	1	0	0	3.6	5.6	0	1
Single-Unit Trucks	2	23	0	0	0	0	1	0	1	4	0	0	1	0	1	0	33
% Single-Unit Trucks	1	1.8	0	0	0	0	1.5	0	14.3	0.4	0	0	2.4	0	5.6	0	1.1
Articulated Trucks	0	6	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7
% Articulated Trucks	0	0.5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2
Bicycles on Road	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3
% Bicycles on Road	0	0.2	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	3	6
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	100	0	0	0	100	0.2

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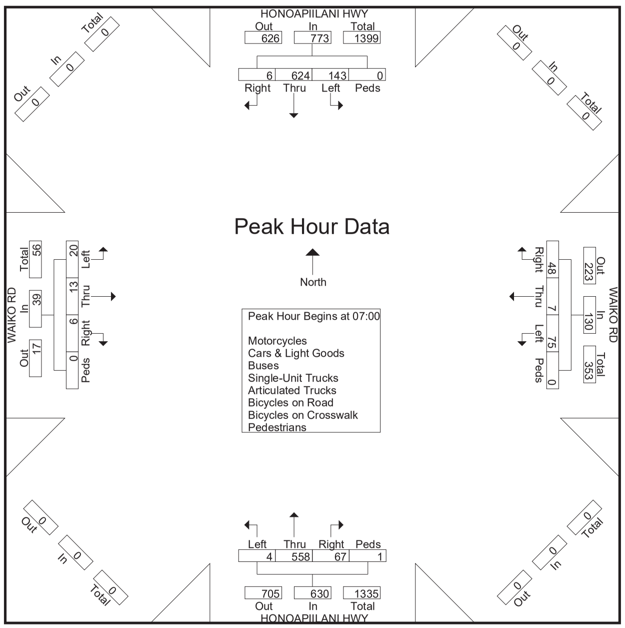
	HONOAPIILANI HWY SOUTHBOUND					WAIKO RD WESTBOUND					HONOAPIILANI HWY NORTHBOUND					WAIKO RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	28	**161**	0	0	189	16	2	9	0	27	0	112	13	**1**	126	3	4	1	0	8	350
07:15	29	154	0	0	183	18	1	14	0	33	1	141	17	0	159	6	**5**	1	0	**12**	387
07:30	**46**	148	1	0	195	19	**4**	**15**	0	**38**	**3**	**167**	17	0	**187**	**8**	0	**2**	0	10	**430**
07:45	40	161	**5**	0	**206**	**22**	0	10	0	32	0	138	**20**	0	158	3	4	2	0	9	405
Total Volume	143	624	6	0	773	75	7	48	0	130	4	558	67	1	630	20	13	6	0	39	1572
% App. Total	18.5	80.7	0.8	0		57.7	5.4	36.9	0		0.6	88.6	10.6	0.2		51.3	33.3	15.4	0		
PHF	.777	.969	.300	.000	.938	.852	.438	.800	.000	.855	.333	.835	.838	.250	.842	.625	.650	.750	.000	.813	.914



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	HONOAPIILANI HWY SOUTHBOUND				WAIKO RD WESTBOUND				HONOAPIILANI HWY NORTHBOUND				WAIKO RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:15	5	114	3	0	12	2	17	0	2	150	10	0	1	4	3	0	323
15:30	16	144	4	0	17	5	6	1	3	178	21	0	3	2	0	0	400
15:45	11	108	5	0	13	3	18	1	2	183	16	0	2	5	2	0	369
Total	32	366	12	0	42	10	41	2	7	511	47	0	6	11	5	0	1092
16:00	14	125	3	0	14	4	13	1	4	165	19	0	2	1	3	0	368
16:15	21	113	4	0	7	2	21	0	1	171	19	0	6	2	0	1	368
16:30	17	114	3	0	20	3	24	0	2	183	16	0	0	3	0	0	385
16:45	12	164	12	0	16	1	16	0	2	146	22	0	4	1	0	0	396
Total	64	516	22	0	57	10	74	1	9	665	76	0	12	7	3	1	1517
17:00	15	136	6	0	12	4	21	0	1	154	26	0	2	1	1	1	380
Grand Total	111	1018	40	0	111	24	136	3	17	1330	149	0	20	19	9	2	2989
Apprch %	9.5	87.1	3.4	0	40.5	8.8	49.6	1.1	1.1	88.9	10	0	40	38	18	4	
Total %	3.7	34.1	1.3	0	3.7	0.8	4.6	0.1	0.6	44.5	5	0	0.7	0.6	0.3	0.1	
Motorcycles	1	5	0	0	0	0	0	0	0	8	0	0	0	0	0	0	14
% Motorcycles	0.9	0.5	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.5
Cars & Light Goods	109	998	40	0	110	24	135	0	16	1294	147	0	20	19	7	0	2919
% Cars & Light Goods	98.2	98	100	0	99.1	100	99.3	0	94.1	97.3	98.7	0	100	100	77.8	0	97.7
Buses	0	9	0	0	0	0	0	0	0	9	0	0	0	0	0	0	18
% Buses	0	0.9	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0.6
Single-Unit Trucks	0	4	0	0	0	0	0	0	0	14	1	0	0	0	0	0	19
% Single-Unit Trucks	0	0.4	0	0	0	0	0	0	0	1.1	0.7	0	0	0	0	0	0.6
Articulated Trucks	1	1	0	0	1	0	0	0	0	4	0	0	0	0	0	0	7
% Articulated Trucks	0.9	0.1	0	0	0.9	0	0	0	0	0.3	0	0	0	0	0	0	0.2
Bicycles on Road	0	1	0	0	0	0	1	0	1	1	1	0	0	0	2	0	7
% Bicycles on Road	0	0.1	0	0	0	0	0.7	0	5.9	0.1	0.7	0	0	0	22.2	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2
% Bicycles on Crosswalk	0	0	0	0	0	0	0	33.3	0	0	0	0	0	0	0	50	0.1
Pedestrians	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	3
% Pedestrians	0	0	0	0	0	0	0	66.7	0	0	0	0	0	0	0	50	0.1

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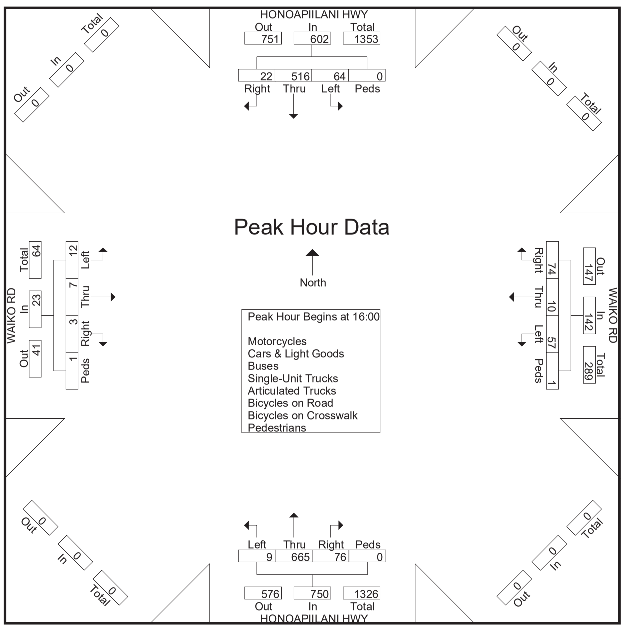
	HONOAPIILANI HWY SOUTHBOUND					WAIKO RD WESTBOUND					HONOAPIILANI HWY NORTHBOUND					WAIKO RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	14	125	3	0	142	14	**4**	13	**1**	32	**4**	165	19	0	188	2	1	**3**	0	6	368
16:15	**21**	113	4	0	138	7	2	21	0	30	1	171	19	0	191	**6**	2	0	**1**	**9**	368
16:30	17	114	3	0	134	**20**	3	**24**	0	**47**	2	**183**	16	0	**201**	0	**3**	0	0	3	385
16:45	12	**164**	**12**	0	**188**	16	1	16	0	33	2	146	**22**	0	170	4	1	0	0	5	**396**
Total Volume	64	516	22	0	602	57	10	74	1	142	9	665	76	0	750	12	7	3	1	23	1517
% App. Total	10.6	85.7	3.7	0		40.1	7	52.1	0.7		1.2	88.7	10.1	0		52.2	30.4	13	4.3		
PHF	.762	.787	.458	.000	.801	.713	.625	.771	.250	.755	.563	.908	.864	.000	.933	.500	.583	.250	.250	.639	.958



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File Name : Kehalani Mauka Pkwy-Kuikahi Dr
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KEHALANI MAUKA PKWY Southbound				KUIKAHI DR Westbound				Northbound				KUIKAHI DR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	12	0	1	0	0	7	12	0	0	0	0	0	0	23	0	0	55
06:45 AM	17	0	0	0	0	7	15	0	0	0	0	0	4	23	0	0	66
Total	29	0	1	0	0	14	27	0	0	0	0	0	4	46	0	0	121
07:00 AM	28	0	4	0	0	7	11	0	0	0	0	0	1	41	0	0	92
07:15 AM	25	0	9	2	0	11	11	0	0	0	0	0	12	49	0	0	119
07:30 AM	27	0	14	3	0	11	10	0	0	0	0	0	9	30	0	0	104
07:45 AM	29	0	8	2	0	19	12	0	0	0	0	0	5	29	0	0	104
Total	109	0	35	7	0	48	44	0	0	0	0	0	27	149	0	0	419
08:00 AM	22	0	1	4	0	16	15	0	0	0	0	0	2	40	0	0	100
08:15 AM	14	0	1	1	0	16	16	0	0	0	0	0	2	24	0	1	75
Grand Total	174	0	38	12	0	94	102	0	0	0	0	0	35	259	0	1	715
Apprch %	77.7	0	17	5.4	0	48	52	0	0	0	0	0	11.9	87.8	0	0.3	
Total %	24.3	0	5.3	1.7	0	13.1	14.3	0	0	0	0	0	4.9	36.2	0	0.1	
Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
% Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	0	0.1
Cars & Light Goods	170	0	37	0	0	91	100	0	0	0	0	0	34	256	0	0	688
% Cars & Light Goods	97.7	0	97.4	0	0	96.8	98	0	0	0	0	0	97.1	98.8	0	0	96.2
Buses	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
% Buses	1.1	0	2.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4
Single-Unit Trucks	2	0	0	0	0	3	1	0	0	0	0	0	1	2	0	0	9
% Single-Unit Trucks	1.1	0	0	0	0	3.2	1	0	0	0	0	0	2.9	0.8	0	0	1.3
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
% Bicycles on Road	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	1	13
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	100	1.8

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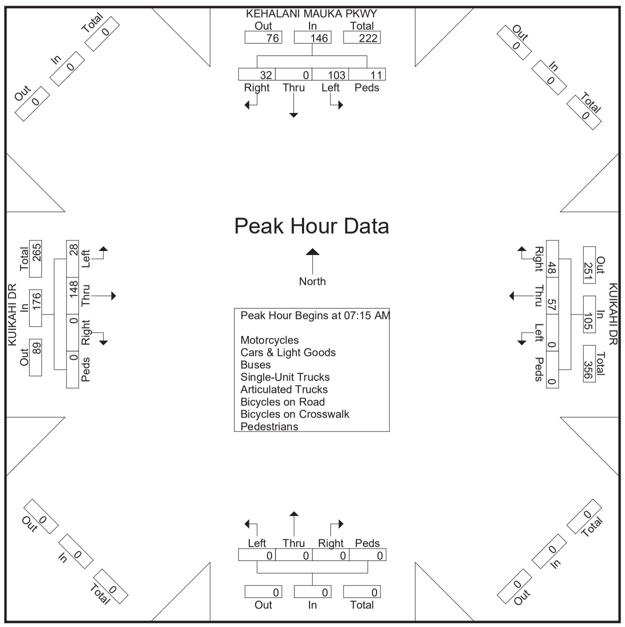
	KEHALANI MAUKA PKWY Southbound					KUIKAHI DR Westbound					Northbound					KUIKAHI DR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	25	0	9	2	36	0	11	11	0	22	0	0	0	0	0	**12**	**49**	0	0	**61**	**119**
07:30 AM	27	0	**14**		**44**	0	11	10	0	21	0	0	0	0	0	9	30	0	0	39	104
07:45 AM	**29**						**19**			**31**	0	0	0	0	0	5	29	0	0	34	104
08:00 AM	22	0	1	**4**				**15**													
Total Volume	103	0	32	11	146	0	57	48	0	105	0	0	0	0	0	28	148	0	0	176	427
% App. Total	70.5	0	21.9	7.5		0	54.3	45.7	0		0	0	0	0		15.9	84.1	0	0		
PHF	.888	.000	.571	.688	.830	.000	.750	.800	.000	.847	.000	.000	.000	.000	.000	.583	.755	.000	.000	.721	.897



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File Name : Kehalani Mauka Pkwy-Kuikahi Dr
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KEHALANI MAUKA PKWY Southbound				KUIKAHI DR Westbound				Northbound				KUIKAHI DR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	26	0	11	1	0	33	10	0	0	0	0	0	4	24	0	0	109
03:45 PM	13	0	3	1	0	36	23	0	0	0	0	0	2	26	0	0	104
Total	39	0	14	2	0	69	33	0	0	0	0	0	6	50	0	0	213
04:00 PM	9	0	4	0	0	32	16	0	0	0	0	0	0	23	0	0	84
04:15 PM	12	0	6	2	0	36	11	0	0	0	0	0	3	22	0	0	92
04:30 PM	13	0	5	0	0	33	18	0	0	0	0	0	2	24	0	0	95
04:45 PM	9	0	5	2	0	38	19	0	0	0	0	0	4	21	0	0	98
Total	43	0	20	4	0	139	64	0	0	0	0	0	9	90	0	0	369
05:00 PM	9	0	1	1	0	33	16	0	0	0	0	0	3	22	0	0	85
05:15 PM	3	0	8	1	0	29	24	0	0	0	0	0	3	20	0	0	88
Grand Total	94	0	43	8	0	270	137	0	0	0	0	0	21	182	0	0	755
Apprch %	64.8	0	29.7	5.5	0	66.3	33.7	0	0	0	0	0	10.3	89.7	0	0	
Total %	12.5	0	5.7	1.1	0	35.8	18.1	0	0	0	0	0	2.8	24.1	0	0	
Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars & Light Goods	92	0	41	0	0	269	134	0	0	0	0	0	21	179	0	0	736
% Cars & Light Goods	97.9	0	95.3	0	0	99.6	97.8	0	0	0	0	0	100	98.4	0	0	97.5
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single-Unit Trucks	1	0	2	0	0	1	2	0	0	0	0	0	0	2	0	0	8
% Single-Unit Trucks	1.1	0	4.7	0	0	0.4	1.5	0	0	0	0	0	0	1.1	0	0	1.1
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	3
% Bicycles on Road	1.1	0	0	0	0	0	0.7	0	0	0	0	0	0	0.5	0	0	0.4
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	8
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	1.1

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File Name : Kehalani Mauka Pkwy-Kuikahi Dr
Site Code :
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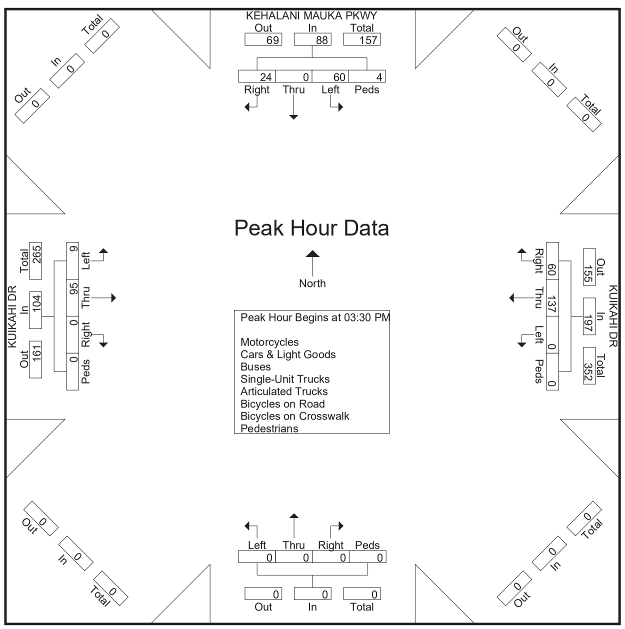
	KEHALANI MAUKA PKWY Southbound					KUIKAHI DR Westbound					Northbound					KUIKAHI DR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:30 PM																					
03:30 PM	**26**		**11**		**38**	0	33	10	0	43	0	0	0	0	0	**4**				**28**	**109**
03:45 PM	13	0	3	1	17	0	**36**	**23**		**59**	0	0	0	0	0	2	**26**	0	0	28	104
04:00 PM	9	0	4	0	13	0	32	16	0	48	0	0	0	0	0	0	23	0	0	23	84
04:15 PM	12	0	6	**2**																	
Total Volume	60	0	24	4	88	0	137	60	0	197	0	0	0	0	0	9	95	0	0	104	389
% App. Total	68.2	0	27.3	4.5		0	69.5	30.5	0		0	0	0	0		8.7	91.3	0	0		
PHF	.577	.000	.545	.500	.579	.000	.951	.652	.000	.835	.000	.000	.000	.000	.000	.563	.913	.000	.000	.929	.892



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Site Code :
Start Date : 4/9/2019
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KEHALANI VILLAGE CENTER DWY SOUTHBOUND				KUIKAHI DR WESTBOUND				NORTHBOUND				KUIKAHI DR EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	7	0	26	0	0	120	14	0	0	0	0	0	23	161	0	0	351
06:45	11	0	30	0	0	137	14	0	0	0	0	0	14	181	0	0	387
Total	18	0	56	0	0	257	28	0	0	0	0	0	37	342	0	0	738
07:00	4	0	28	0	0	116	16	0	0	0	0	0	27	154	0	0	345
07:15	3	0	21	0	0	107	18	0	0	0	0	0	23	176	0	0	348
07:30	10	0	26	1	0	118	14	0	0	0	0	0	15	114	0	0	298
07:45	11	0	25	0	0	94	10	0	0	0	0	0	18	129	0	0	287
Total	28	0	100	1	0	435	58	0	0	0	0	0	83	573	0	0	1278
08:00	3	0	11	0	0	74	17	0	0	0	0	0	10	124	0	0	239
08:15	7	0	14	0	0	76	15	0	0	0	0	0	14	135	0	0	261
Grand Total	56	0	181	1	0	842	118	0	0	0	0	0	144	1174	0	0	2516
Apprch %	23.5	0	76.1	0.4	0	87.7	12.3	0	0	0	0	0	10.9	89.1	0	0	
Total %	2.2	0	7.2	0	0	33.5	4.7	0	0	0	0	0	5.7	46.7	0	0	
Motorcycles	0	0	0	0	0	2	0	0	0	0	0	0	1	3	0	0	6
% Motorcycles	0	0	0	0	0	0.2	0	0	0	0	0	0	0.7	0.3	0	0	0.2
Cars & Light Goods	54	0	181	0	0	807	114	0	0	0	0	0	143	1147	0	0	2446
% Cars & Light Goods	96.4	0	100	0	0	95.8	96.6	0	0	0	0	0	99.3	97.7	0	0	97.2
Buses	0	0	0	0	0	2	0	0	0	0	0	0	0	12	0	0	14
% Buses	0	0	0	0	0	0.2	0	0	0	0	0	0	0	1	0	0	0.6
Single-Unit Trucks	1	0	0	0	0	27	2	0	0	0	0	0	0	8	0	0	38
% Single-Unit Trucks	1.8	0	0	0	0	3.2	1.7	0	0	0	0	0	0	0.7	0	0	1.5
Articulated Trucks	1	0	0	0	0	3	2	0	0	0	0	0	0	2	0	0	8
% Articulated Trucks	1.8	0	0	0	0	0.4	1.7	0	0	0	0	0	0	0.2	0	0	0.3
Bicycles on Road	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	3
% Bicycles on Road	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.2	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0

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Site Code :
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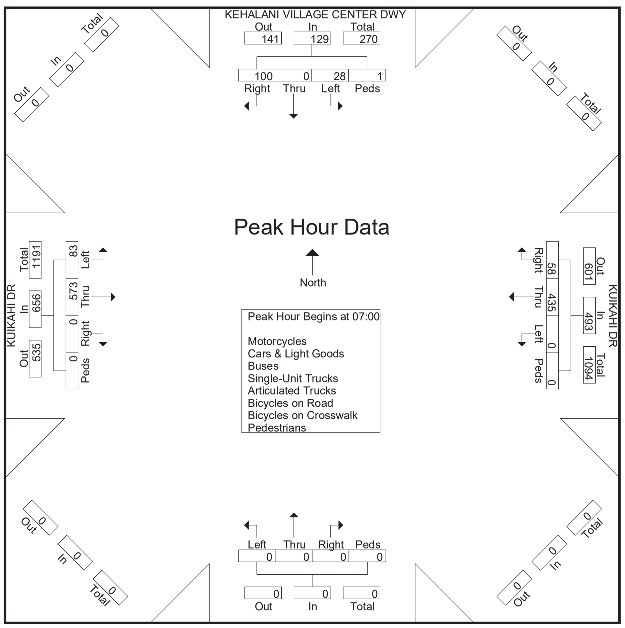
	KEHALANI VILLAGE CENTER DWY SOUTHBOUND					KUIKAHI DR WESTBOUND					NORTHBOUND					KUIKAHI DR EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 07:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	4	0	**28**	0	32	0	116	16	0	**132**	0	0	0	0	0	**27**	154	0	0	181	345
07:15	3	0	21	0	24	0	107	**18**	0	125	0	0	0	0	0	23	**176**	0	0	**199**	**348**
07:30	10	0	26	**1**	**37**	0	**118**	14	0	132	0	0	0	0	0	15	114	0	0	129	298
07:45	**11**	0	25	0	36	0	94	10	0	104	0	0	0	0	0	18	129	0	0	147	287
Total Volume	28	0	100	1	129	0	435	58	0	493	0	0	0	0	0	83	573	0	0	656	1278
% App. Total	21.7	0	77.5	0.8		0	88.2	11.8	0		0	0	0	0		12.7	87.3	0	0		
PHF	.636	.000	.893	.250	.872	.000	.922	.806	.000	.934	.000	.000	.000	.000	.000	.769	.814	.000	.000	.824	.918



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KEHALANI VILLAGE CENTER DWY SOUTHBOUND				KUIKAHI DR WESTBOUND				NORTHBOUND				KUIKAHI DR EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:30	20	0	32	0	0	121	27	0	0	0	0	0	17	155	0	0	372
15:45	11	0	25	1	0	123	16	0	0	0	0	0	23	136	0	0	335
Total	31	0	57	1	0	244	43	0	0	0	0	0	40	291	0	0	707
16:00	9	0	37	0	0	113	23	0	0	0	0	0	32	130	0	0	344
16:15	11	0	27	2	0	119	24	0	0	0	0	0	15	103	0	0	301
16:30	16	0	30	0	0	135	21	0	0	0	0	0	23	101	0	0	326
16:45	12	0	34	2	0	116	33	0	0	0	0	0	30	112	0	0	339
Total	48	0	128	4	0	483	101	0	0	0	0	0	100	446	0	0	1310
17:00	9	0	32	1	0	102	31	1	0	0	0	0	31	109	0	0	316
17:15	11	0	26	0	0	93	19	0	0	0	0	0	26	93	0	0	268
Grand Total	99	0	243	6	0	922	194	1	0	0	0	0	197	939	0	0	2601
Apprch %	28.4	0	69.8	1.7	0	82.5	17.4	0.1	0	0	0	0	17.3	82.7	0	0	
Total %	3.8	0	9.3	0.2	0	35.4	7.5	0	0	0	0	0	7.6	36.1	0	0	
Motorcycles	0	0	2	0	0	3	0	0	0	0	0	0	2	2	0	0	9
% Motorcycles	0	0	0.8	0	0	0.3	0	0	0	0	0	0	1	0.2	0	0	0.3
Cars & Light Goods	98	0	241	0	0	912	193	0	0	0	0	0	193	912	0	0	2549
% Cars & Light Goods	99	0	99.2	0	0	98.9	99.5	0	0	0	0	0	98	97.1	0	0	98
Buses	1	0	0	0	0	1	1	0	0	0	0	0	2	9	0	0	14
% Buses	1	0	0	0	0	0.1	0.5	0	0	0	0	0	1	1	0	0	0.5
Single-Unit Trucks	0	0	0	0	0	6	0	0	0	0	0	0	0	11	0	0	17
% Single-Unit Trucks	0	0	0	0	0	0.7	0	0	0	0	0	0	0	1.2	0	0	0.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0.1
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	6	0	0	0	1	0	0	0	0	0	0	0	0	7
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	0	0	0	0	0	0.3

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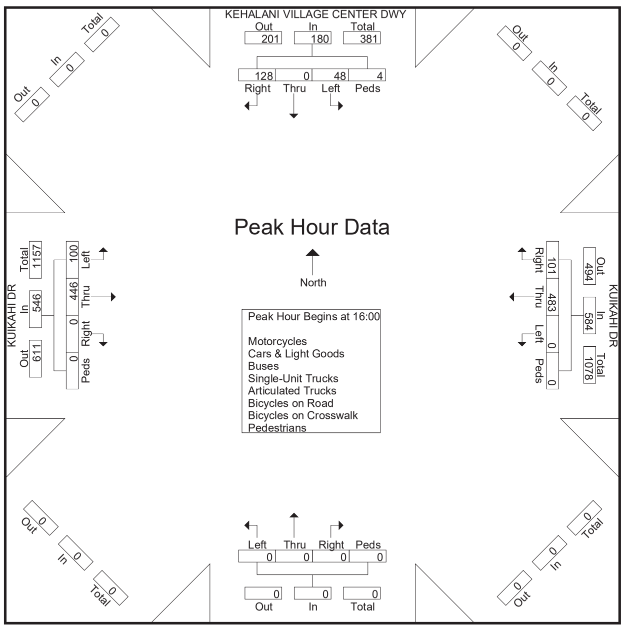
	KEHALANI VILLAGE CENTER DWY SOUTHBOUND					KUIKAHI DR WESTBOUND					NORTHBOUND					KUIKAHI DR EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	9	0	37	0	46	0	113	23	0	136	0	0	0	0	0	32	130	0	0	162	344
16:15	11	0	27	2	40	0	119	24	0	143	0	0	0	0	0	15	103	0	0	118	301
16:30	16	0	30	0	46	0	135	21	0	156	0	0	0	0	0	23	101	0	0	124	326
16:45	12	0	34	2	48	0	116	33	0	149	0	0	0	0	0	30	112	0	0	142	339
Total Volume	48	0	128	4	180	0	483	101	0	584	0	0	0	0	0	100	446	0	0	546	1310
% App. Total	26.7	0	71.1	2.2		0	82.7	17.3	0		0	0	0	0		18.3	81.7	0	0		
PHF	.750	.000	.865	.500	.938	.000	.894	.765	.000	.936	.000	.000	.000	.000	.000	.781	.858	.000	.000	.843	.952



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	MAUI LANI PKWY Southbound				KAMEHAMEHA AVE Westbound				MAUI LANI PKWY Northbound				KAMEHAMEHA AVE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	27	53	8	1	72	5	51	0	2	49	23	0	18	6	14	2	331
06:45 AM	60	68	16	3	73	8	62	0	11	44	29	0	13	19	23	6	435
Total	87	121	24	4	145	13	113	0	13	93	52	0	31	25	37	8	766
07:00 AM	55	68	19	9	70	43	67	0	15	50	32	0	27	37	18	3	513
07:15 AM	49	57	39	20	62	43	54	0	37	49	31	0	44	55	31	2	573
07:30 AM	56	57	26	14	63	45	70	0	21	51	58	0	40	64	34	7	606
07:45 AM	65	66	18	6	73	26	65	0	12	63	39	0	42	61	19	6	561
Total	225	248	102	49	268	157	256	0	85	213	160	0	153	217	102	18	2253
08:00 AM	48	77	13	0	58	13	64	0	5	74	21	0	14	18	11	2	418
08:15 AM	45	75	8	2	33	6	56	0	5	62	21	0	9	12	5	4	343
Grand Total	405	521	147	55	504	189	489	0	108	442	254	0	207	272	155	32	3780
Apprch %	35.9	46.2	13	4.9	42.6	16	41.4	0	13.4	55	31.6	0	31.1	40.8	23.3	4.8	
Total %	10.7	13.8	3.9	1.5	13.3	5	12.9	0	2.9	11.7	6.7	0	5.5	7.2	4.1	0.8	
Motorcycles	1	2	0	0	0	0	0	0	1	1	0	0	1	0	0	0	6
% Motorcycles	0.2	0.4	0	0	0	0	0	0	0.9	0.2	0	0	0.5	0	0	0	0.2
Cars & Light Goods	395	495	147	0	493	186	481	0	107	424	248	0	206	271	150	0	3603
% Cars & Light Goods	97.5	95	100	0	97.8	98.4	98.4	0	99.1	95.9	97.6	0	99.5	99.6	96.8	0	95.3
Buses	2	6	0	0	5	2	1	0	0	6	1	0	0	1	1	0	25
% Buses	0.5	1.2	0	0	1	1.1	0.2	0	0	1.4	0.4	0	0	0.4	0.6	0	0.7
Single-Unit Trucks	7	14	0	0	6	1	7	0	0	9	5	0	0	0	0	0	49
% Single-Unit Trucks	1.7	2.7	0	0	1.2	0.5	1.4	0	0	2	2	0	0	0	0	0	1.3
Articulated Trucks	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	6
% Articulated Trucks	0	0.8	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0.2
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.6	0	0.1
Bicycles on Crosswalk	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0	18	63
% Bicycles on Crosswalk	0	0	0	81.8	0	0	0	0	0	0	0	0	0	0	0	56.2	1.7
Pedestrians	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	14	24
% Pedestrians	0	0	0	18.2	0	0	0	0	0	0	0	0	0	0	0	43.8	0.6

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File Name : Maui Lani Pkwy-Kamehameha Ave
Site Code :
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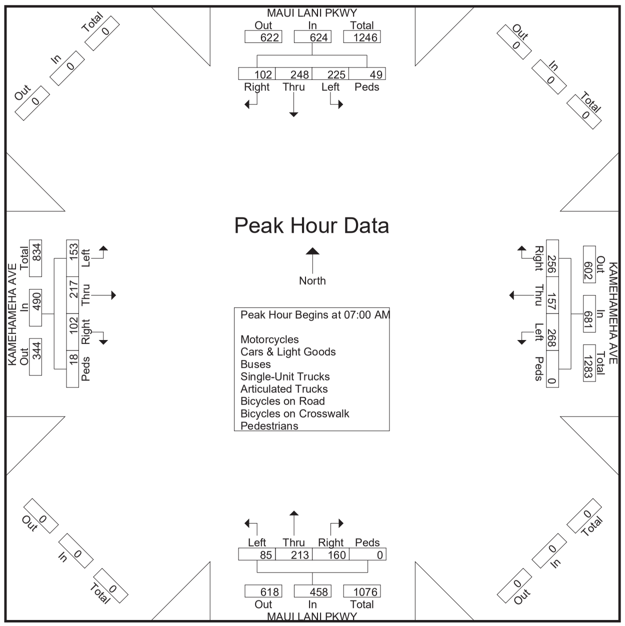
	MAUI LANI PKWY Southbound					KAMEHAMEHA AVE Westbound					MAUI LANI PKWY Northbound					KAMEHAMEHA AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	55	**68**	19	9	151	70	43	67	0	**180**	15	50	32	0	97	27	37	18	3	85	513
07:15 AM	49	57	**39**	**20**	**165**	62	43	54	0	159	**37**					**44**					
07:30 AM	**56**	**57**	**26**	**14**	**153**	**63**	**45**	**70**	**0**	**178**	**21**	**51**	**58**	0	**130**	40	**64**	**34**	**7**	**145**	**606**
07:45 AM	**65**					**73**	26	65	0	164	12	**63**									
Total Volume	225	248	102	49	624	268	157	256	0	681	85	213	160	0	458	153	217	102	18	490	2253
% App. Total	36.1	39.7	16.3	7.9		39.4	23.1	37.6	0		18.6	46.5	34.9	0		31.2	44.3	20.8	3.7		
PHF	.865	.912	.654	.613	.945	.918	.872	.914	.000	.946	.574	.845	.690	.000	.881	.869	.848	.750	.643	.845	.929



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File Name : Maui Lani Pkwy-Kamehameha Ave
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	MAUI LANI PKWY Southbound				KAMEHAMEHA AVE Westbound				MAUI LANI PKWY Northbound				KAMEHAMEHA AVE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	79	63	41	0	36	34	87	0	19	73	62	0	24	19	17	0	554
03:45 PM	85	63	35	1	36	62	66	0	13	71	70	0	30	36	19	1	588
Total	164	126	76	1	72	96	153	0	32	144	132	0	54	55	36	1	1142
04:00 PM	77	72	35	2	36	50	72	0	24	72	69	0	26	32	22	1	590
04:15 PM	80	68	27	2	47	28	89	0	22	75	67	0	21	33	17	0	576
04:30 PM	73	66	25	1	61	29	72	0	15	76	70	0	25	26	12	2	553
04:45 PM	73	86	19	0	36	22	73	0	17	71	89	0	20	17	7	1	531
Total	303	292	106	5	180	129	306	0	78	294	295	0	92	108	58	4	2250
05:00 PM	67	73	30	2	34	35	67	0	20	61	95	0	15	18	10	0	527
05:15 PM	51	60	25	3	45	18	76	0	17	69	81	0	29	31	21	0	526
Grand Total	585	551	237	11	331	278	602	0	147	568	603	0	190	212	125	5	4445
Apprch %	42.3	39.8	17.1	0.8	27.3	23	49.7	0	11.2	43.1	45.8	0	35.7	39.8	23.5	0.9	
Total %	13.2	12.4	5.3	0.2	7.4	6.3	13.5	0	3.3	12.8	13.6	0	4.3	4.8	2.8	0.1	
Motorcycles	1	4	0	0	0	0	2	0	0	1	2	0	0	0	0	0	10
% Motorcycles	0.2	0.7	0	0	0	0	0.3	0	0	0.2	0.3	0	0	0	0	0	0.2
Cars & Light Goods	581	544	235	0	327	276	593	0	147	564	591	0	190	210	124	0	4382
% Cars & Light Goods	99.3	98.7	99.2	0	98.8	99.3	98.5	0	100	99.3	98	0	100	99.1	99.2	0	98.6
Buses	1	0	0	0	1	0	1	0	0	0	4	0	0	0	0	0	7
% Buses	0.2	0	0	0	0.3	0	0.2	0	0	0	0.7	0	0	0	0	0	0.2
Single-Unit Trucks	2	3	0	0	3	1	5	0	0	3	6	0	0	0	1	0	24
% Single-Unit Trucks	0.3	0.5	0	0	0.9	0.4	0.8	0	0	0.5	1	0	0	0	0.8	0	0.5
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	2	0	0	1	1	0	0	0	0	0	0	2	0	0	6
% Bicycles on Road	0	0	0.8	0	0	0.4	0.2	0	0	0	0	0	0	0.9	0	0	0.1
Bicycles on Crosswalk	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	4
% Bicycles on Crosswalk	0	0	0	27.3	0	0	0	0	0	0	0	0	0	0	0	20	0.1
Pedestrians	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	4	12
% Pedestrians	0	0	0	72.7	0	0	0	0	0	0	0	0	0	0	0	80	0.3

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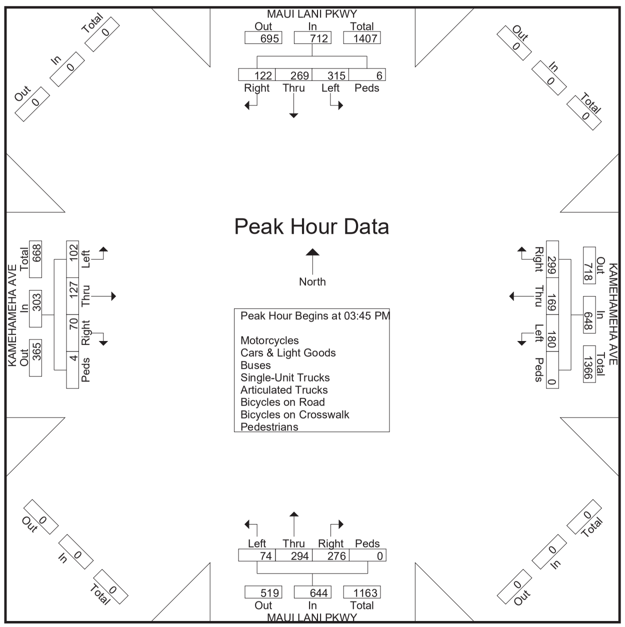
	MAUI LANI PKWY Southbound					KAMEHAMEHA AVE Westbound					MAUI LANI PKWY Northbound					KAMEHAMEHA AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	**85**		**35**				**62**			**164**	13	71	**70**	0	154	**30**	**36**	19	1	**86**	588
04:00 PM	77	**72**	35	**2**	**186**	36	50	72	0	158	**24**				**165**	26	32	**22**			**590**
04:15 PM	80	68	27	2	177	47	28	**89**													
04:30 PM	**73**	**66**	**25**	**1**	**165**	**61**	29	72	0	162	15	**76**	**70**	**0**	**161**	**25**	**26**	**12**	**2**	**65**	**553**
Total Volume	315	269	122	6	712	180	169	299	0	648	74	294	276	0	644	102	127	70	4	303	2307
% App. Total	44.2	37.8	17.1	0.8		27.8	26.1	46.1	0		11.5	45.7	42.9	0		33.7	41.9	23.1	1.3		
PHF	.926	.934	.871	.750	.957	.738	.681	.840	.000	.988	.771	.967	.986	.000	.976	.850	.882	.795	.500	.881	.978



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WESTBOUND				WAIALE RD NORTHBOUND				HAAWI ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	0	36	4	0	0	0	0	0	3	21	0	0	18	0	17	0	99
06:45	0	42	12	0	0	0	0	0	2	28	0	0	24	0	19	0	127
Total	0	78	16	0	0	0	0	0	5	49	0	0	42	0	36	0	226
07:00	0	46	7	0	0	0	0	0	4	48	0	0	26	0	29	0	160
07:15	0	46	7	0	0	0	0	0	4	46	0	0	21	0	20	0	144
07:30	0	35	6	0	0	0	0	0	6	38	0	0	14	0	10	0	109
07:45	0	33	8	0	0	0	0	0	2	25	0	0	7	0	14	0	89
Total	0	160	28	0	0	0	0	0	16	157	0	0	68	0	73	0	502
08:00	0	22	6	0	0	0	0	0	5	11	0	0	15	0	8	0	67
08:15	0	19	6	0	0	0	0	0	1	16	0	0	11	0	8	0	61
Grand Total	0	279	56	0	0	0	0	0	27	233	0	0	136	0	125	0	856
Apprch %	0	83.3	16.7	0	0	0	0	0	10.4	89.6	0	0	52.1	0	47.9	0	
Total %	0	32.6	6.5	0	0	0	0	0	3.2	27.2	0	0	15.9	0	14.6	0	
Motorcycles	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Motorcycles	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Cars & Light Goods	0	265	56	0	0	0	0	0	25	222	0	0	136	0	125	0	829
% Cars & Light Goods	0	95	100	0	0	0	0	0	92.6	95.3	0	0	100	0	100	0	96.8
Buses	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4
% Buses	0	0.7	0	0	0	0	0	0	7.4	0	0	0	0	0	0	0	0.5
Single-Unit Trucks	0	6	0	0	0	0	0	0	0	9	0	0	0	0	0	0	15
% Single-Unit Trucks	0	2.2	0	0	0	0	0	0	0	3.9	0	0	0	0	0	0	1.8
Articulated Trucks	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5
% Articulated Trucks	0	1.4	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0.6
Bicycles on Road	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : Waiale Rd - Haawi St
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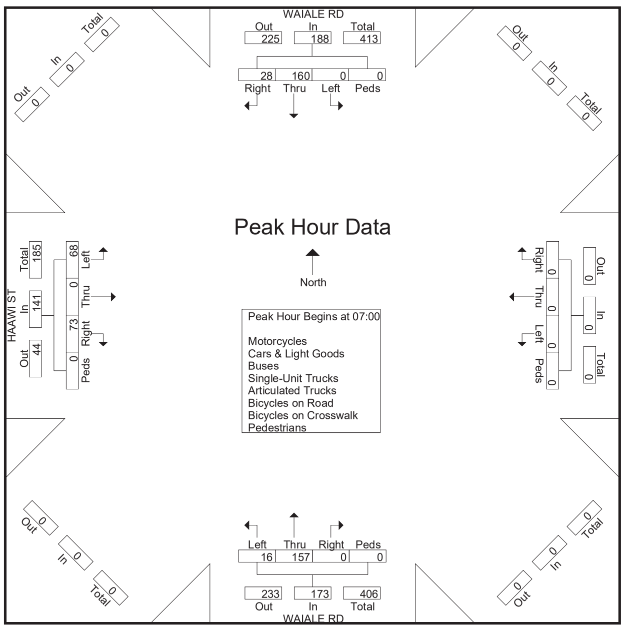
	WAIALE RD SOUTHBOUND					WESTBOUND					WAIALE RD NORTHBOUND					HAAWI ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 07:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	**46**	7	0	**53**	0	0	0	0	0	4	**48**	0	0	**52**	**26**	0	**29**	0	**55**	**160**
07:15	0	46	7	0	53	0	0	0	0	0	4	46	0	0	50	21	0	20	0	41	144
07:30	0	35	6	0	41	0	0	0	0	0	**6**	38	0	0	44	14	0	10	0	24	109
07:45	0	33	**8**	0	41	0	0	0	0	0	2	25	0	0	27	7	0	14	0	21	89
Total Volume	0	160	28	0	188	0	0	0	0	0	16	157	0	0	173	68	0	73	0	141	502
% App. Total	0	85.1	14.9	0		0	0	0	0		9.2	90.8	0	0		48.2	0	51.8	0		
PHF	.000	.870	.875	.000	.887	.000	.000	.000	.000	.000	.667	.818	.000	.000	.832	.654	.000	.629	.000	.641	.784



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WESTBOUND				WAIALE RD NORTHBOUND				HAAWI ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:30	0	37	7	0	0	0	0	0	18	41	0	0	9	0	8	0	120
15:45	0	33	14	0	0	0	0	0	15	38	0	0	13	0	5	1	119
Total	0	70	21	0	0	0	0	0	33	79	0	0	22	0	13	1	239
16:00	0	42	17	0	0	0	0	0	14	41	0	0	11	0	8	0	133
16:15	0	43	10	0	0	0	0	0	14	42	0	0	13	0	6	0	128
16:30	0	35	18	0	0	0	0	0	16	31	0	0	8	0	6	0	114
16:45	0	35	17	0	0	0	0	0	16	28	0	0	6	0	8	0	110
Total	0	155	62	0	0	0	0	0	60	142	0	0	38	0	28	0	485
17:00	0	47	11	0	0	0	0	0	16	34	0	0	5	0	6	0	119
17:15	0	20	13	0	0	0	0	0	10	29	0	0	10	0	6	0	88
Grand Total	0	292	107	0	0	0	0	0	119	284	0	0	75	0	53	1	931
Apprch %	0	73.2	26.8	0	0	0	0	0	29.5	70.5	0	0	58.1	0	41.1	0.8	
Total %	0	31.4	11.5	0	0	0	0	0	12.8	30.5	0	0	8.1	0	5.7	0.1	
Motorcycles	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	3
% Motorcycles	0	0	0.9	0	0	0	0	0	0	0	0	0	2.7	0	0	0	0.3
Cars & Light Goods	0	286	106	0	0	0	0	0	119	282	0	0	73	0	52	0	918
% Cars & Light Goods	0	97.9	99.1	0	0	0	0	0	100	99.3	0	0	97.3	0	98.1	0	98.6
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single-Unit Trucks	0	3	0	0	0	0	0	0	0	1	0	0	0	0	1	0	5
% Single-Unit Trucks	0	1	0	0	0	0	0	0	0	0.4	0	0	0	0	1.9	0	0.5
Articulated Trucks	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Articulated Trucks	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Bicycles on Road	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
% Bicycles on Road	0	0.3	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.1

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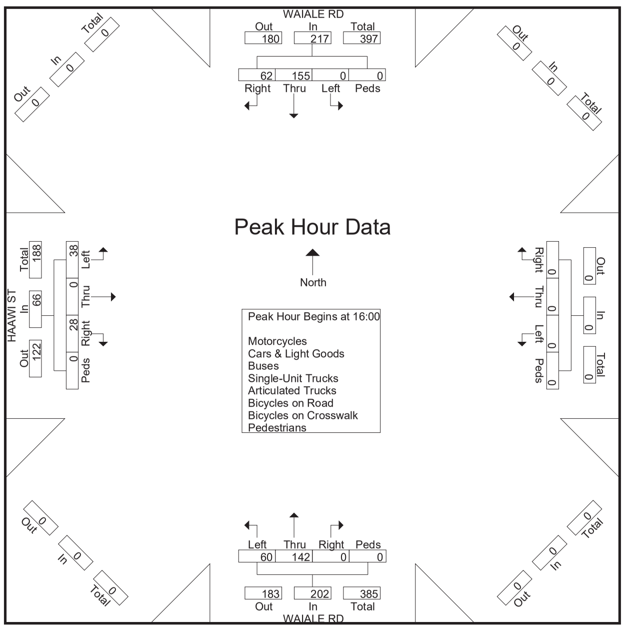
	WAIALE RD SOUTHBOUND					WESTBOUND					WAIALE RD NORTHBOUND					HAAWI ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	0	42	17	0	**59**	0	0	0	0	0	14	41	0	0	55	11	0	**8**	0	**19**	**133**
16:15	0	**43**	10	0	53	0	0	0	0	0	14	**42**	0	0	**56**	**13**	0	6	0	19	128
16:30	0	35	**18**	0	53	0	0	0	0	0	**16**	31	0	0	47	8	0	6	0	14	114
16:45	0	35	17	0	52	0	0	0	0	0	16	28	0	0	44	6	0	8	0	14	110
Total Volume	0	155	62	0	217	0	0	0	0	0	60	142	0	0	202	38	0	28	0	66	485
% App. Total	0	71.4	28.6	0		0	0	0	0		29.7	70.3	0	0		57.6	0	42.4	0		
PHF	.000	.901	.861	.000	.919	.000	.000	.000	.000	.000	.938	.845	.000	.000	.902	.731	.000	.875	.000	.868	.912



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File Name : Waiale Rd - Oluloa Dr
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				OLULOA DR WESTBOUND				WAIALE RD NORTHBOUND				KAOHU ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	0	56	12	0	1	2	1	1	17	46	0	0	6	0	11	0	153
06:45	1	71	30	0	6	2	0	0	24	51	0	0	3	0	14	0	202
Total	1	127	42	0	7	4	1	1	41	97	0	0	9	0	25	0	355
07:00	1	77	24	0	1	1	1	1	30	80	2	0	14	0	22	0	254
07:15	0	113	40	0	5	3	2	0	40	79	2	0	25	0	29	0	338
07:30	1	112	28	0	4	6	2	2	45	76	1	0	23	3	43	0	346
07:45	0	135	12	0	5	5	4	1	30	111	1	0	20	0	30	0	354
Total	2	437	104	0	15	15	9	4	145	346	6	0	82	3	124	0	1292
08:00	2	111	12	0	2	1	2	0	20	110	3	0	12	2	16	0	293
08:15	1	88	9	0	5	0	0	0	13	66	3	0	13	0	21	0	219
Grand Total	6	763	167	0	29	20	12	5	219	619	12	0	116	5	186	0	2159
Apprch %	0.6	81.5	17.8	0	43.9	30.3	18.2	7.6	25.8	72.8	1.4	0	37.8	1.6	60.6	0	
Total %	0.3	35.3	7.7	0	1.3	0.9	0.6	0.2	10.1	28.7	0.6	0	5.4	0.2	8.6	0	
Motorcycles	0	4	2	0	0	0	0	0	1	1	0	0	0	0	0	0	8
% Motorcycles	0	0.5	1.2	0	0	0	0	0	0.5	0.2	0	0	0	0	0	0	0.4
Cars & Light Goods	6	741	154	0	27	20	10	0	216	604	12	0	114	5	177	0	2086
% Cars & Light Goods	100	97.1	92.2	0	93.1	100	83.3	0	98.6	97.6	100	0	98.3	100	95.2	0	96.6
Buses	0	4	7	0	0	0	1	0	2	4	0	0	0	0	0	0	18
% Buses	0	0.5	4.2	0	0	0	8.3	0	0.9	0.6	0	0	0	0	0	0	0.8
Single-Unit Trucks	0	13	4	0	1	0	0	0	0	10	0	0	2	0	7	0	37
% Single-Unit Trucks	0	1.7	2.4	0	3.4	0	0	0	0	1.6	0	0	1.7	0	3.8	0	1.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	0	0.1
Bicycles on Road	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	3
% Bicycles on Road	0	0.1	0	0	3.4	0	8.3	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
% Bicycles on Crosswalk	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0.1
Pedestrians	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
% Pedestrians	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0.1

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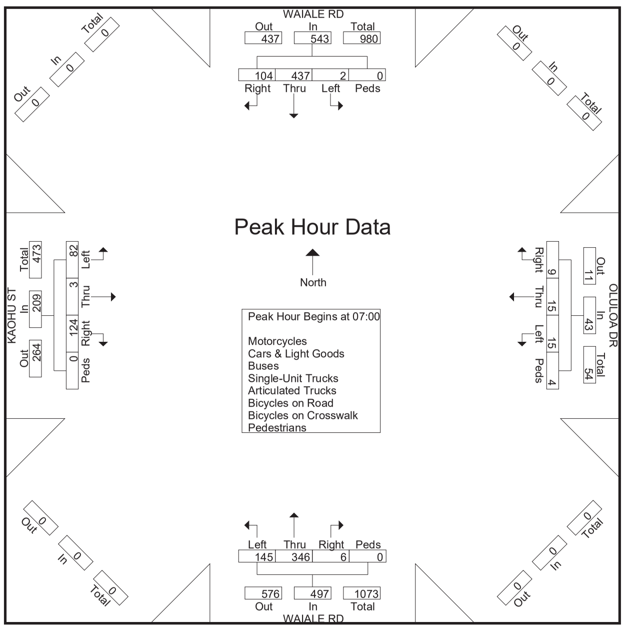
	WAIALE RD SOUTHBOUND					OLULOA DR WESTBOUND					WAIALE RD NORTHBOUND					KAOHU ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 07:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	**1**	77	24	0	102	1	1	1	1	4	30	80	**2**	0	112	14	0	22	0	36	254
07:15	0	113	**40**	0	**153**	**5**	3	2	0	10	40	79	2	0	121	**25**	0	29	0	54	338
07:30	1	112	28	0	141	4	**6**	2	**2**	14	**45**	76	1	0	122	23	**3**	**43**	0	**69**	346
07:45	0	**135**	12	0	147	5	5	**4**	1	**15**	30	**111**	1	0	**142**	20	0	30	0	50	**354**
Total Volume	2	437	104	0	543	15	15	9	4	43	145	346	6	0	497	82	3	124	0	209	1292
% App. Total	0.4	80.5	19.2	0		34.9	34.9	20.9	9.3		29.2	69.6	1.2	0		39.2	1.4	59.3	0		
PHF	.500	.809	.650	.000	.887	.750	.625	.563	.500	.717	.806	.779	.750	.000	.875	.820	.250	.721	.000	.757	.912



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				OLULOA DR WESTBOUND				WAIALE RD NORTHBOUND				KAOHU ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:30	3	107	11	0	2	2	1	5	17	98	4	0	27	5	42	0	324
15:45	1	108	14	0	5	1	1	0	26	95	6	0	16	2	16	0	291
Total	4	215	25	0	7	3	2	5	43	193	10	0	43	7	58	0	615
16:00	2	114	9	0	3	0	2	0	30	97	6	0	13	2	17	0	295
16:15	0	120	20	0	3	2	3	0	27	110	7	0	14	1	28	0	335
16:30	0	119	15	0	5	1	0	0	25	94	1	0	16	3	51	0	330
16:45	6	127	22	4	3	1	3	0	9	91	7	0	15	4	62	0	354
Total	8	480	66	4	14	4	8	0	91	392	21	0	58	10	158	0	1314
17:00	5	129	8	5	3	0	2	1	20	79	2	0	18	1	30	2	305
17:15	0	118	7	3	0	0	1	0	18	69	1	0	5	1	16	1	240
Grand Total	17	942	106	12	24	7	13	6	172	733	34	0	124	19	262	3	2474
Apprch %	1.6	87.5	9.8	1.1	48	14	26	12	18.3	78.1	3.6	0	30.4	4.7	64.2	0.7	
Total %	0.7	38.1	4.3	0.5	1	0.3	0.5	0.2	7	29.6	1.4	0	5	0.8	10.6	0.1	
Motorcycles	0	4	0	0	0	0	0	0	0	6	0	0	1	0	2	0	13
% Motorcycles	0	0.4	0	0	0	0	0	0	0	0.8	0	0	0.8	0	0.8	0	0.5
Cars & Light Goods	17	923	103	0	24	7	12	0	172	714	32	0	122	19	259	0	2404
% Cars & Light Goods	100	98	97.2	0	100	100	92.3	0	100	97.4	94.1	0	98.4	100	98.9	0	97.2
Buses	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
% Buses	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	0.1
Single-Unit Trucks	0	10	2	0	0	0	1	0	0	13	1	0	0	0	0	0	27
% Single-Unit Trucks	0	1.1	1.9	0	0	0	7.7	0	0	1.8	2.9	0	0	0	0	0	1.1
Articulated Trucks	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
% Articulated Trucks	0	0.2	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Road	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	3
% Bicycles on Road	0	0.1	0	0	0	0	0	0	0	0	2.9	0	0.8	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2
% Bicycles on Crosswalk	0	0	0	0	0	0	0	16.7	0	0	0	0	0	0	0	33.3	0.1
Pedestrians	0	0	0	12	0	0	0	5	0	0	0	0	0	0	0	2	19
% Pedestrians	0	0	0	100	0	0	0	83.3	0	0	0	0	0	0	0	66.7	0.8

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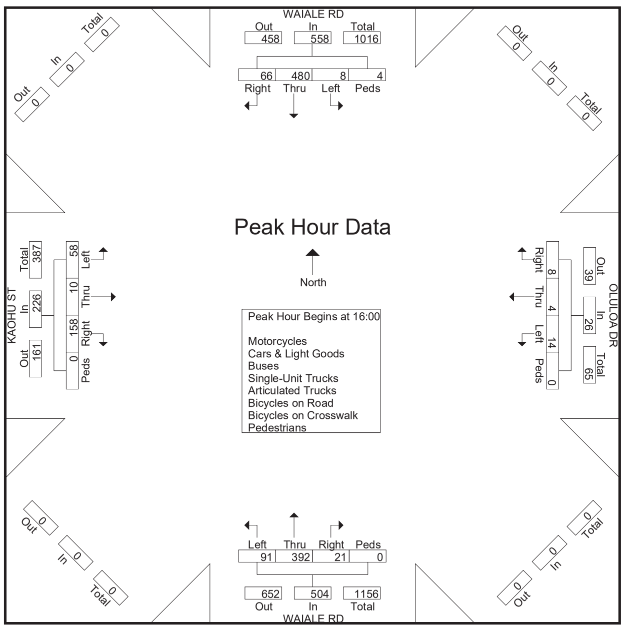
	WAIALE RD SOUTHBOUND					OLULOA DR WESTBOUND					WAIALE RD NORTHBOUND					KAOHU ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	2	114	9	0	125	3	0	2	0	5	**30**	97	6	0	133	13	2	17	0	32	295
16:15	0	120	20	0	140	3	**2**	**3**	0	**8**	27	**110**	**7**	0	**144**	14	1	28	0	43	335
16:30	0	119	15	0	134	**5**	1	0	0	6	25	94	1	0	120	**16**	3	51	0	70	330
16:45	**6**	**127**	**22**	**4**	**159**	3	1	3	0	7	9	91	7	0	107	15	**4**	**62**	0	**81**	**354**
Total Volume	8	480	66	4	558	14	4	8	0	26	91	392	21	0	504	58	10	158	0	226	1314
% App. Total	1.4	86	11.8	0.7		53.8	15.4	30.8	0		18.1	77.8	4.2	0		25.7	4.4	69.9	0		
PHF	.333	.945	.750	.250	.877	.700	.500	.667	.000	.813	.758	.891	.750	.000	.875	.906	.625	.637	.000	.698	.928



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WESTBOUND				WAIALE RD NORTHBOUND				KAUPO ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	0	81	2	0	0	0	0	0	6	137	0	0	11	0	10	2	249
06:45	0	110	4	0	0	0	0	0	5	181	0	0	17	0	6	1	324
Total	0	191	6	0	0	0	0	0	11	318	0	0	28	0	16	3	573
07:00	0	118	4	0	0	0	0	0	13	183	0	0	19	0	18	1	356
07:15	0	129	5	0	0	0	0	0	13	235	0	0	26	0	13	0	421
07:30	0	131	6	0	0	0	0	0	8	180	0	0	46	0	17	0	388
07:45	0	145	6	0	0	0	0	0	6	222	0	0	28	0	14	2	423
Total	0	523	21	0	0	0	0	0	40	820	0	0	119	0	62	3	1588
08:00	0	147	2	0	0	0	0	0	10	173	0	0	6	0	7	2	347
08:15	0	118	2	1	0	0	0	0	9	150	0	0	6	0	13	0	299
Grand Total	0	979	31	1	0	0	0	0	70	1461	0	0	159	0	98	8	2807
Apprch %	0	96.8	3.1	0.1	0	0	0	0	4.6	95.4	0	0	60	0	37	3	
Total %	0	34.9	1.1	0	0	0	0	0	2.5	52	0	0	5.7	0	3.5	0.3	
Motorcycles	0	4	0	0	0	0	0	0	0	5	0	0	2	0	0	0	11
% Motorcycles	0	0.4	0	0	0	0	0	0	0	0.3	0	0	1.3	0	0	0	0.4
Cars & Light Goods	0	933	30	0	0	0	0	0	66	1427	0	0	153	0	97	0	2706
% Cars & Light Goods	0	95.3	96.8	0	0	0	0	0	94.3	97.7	0	0	96.2	0	99	0	96.4
Buses	0	5	1	0	0	0	0	0	4	10	0	0	3	0	1	0	24
% Buses	0	0.5	3.2	0	0	0	0	0	5.7	0.7	0	0	1.9	0	1	0	0.9
Single-Unit Trucks	0	23	0	0	0	0	0	0	0	14	0	0	1	0	0	0	38
% Single-Unit Trucks	0	2.3	0	0	0	0	0	0	0	1	0	0	0.6	0	0	0	1.4
Articulated Trucks	0	12	0	0	0	0	0	0	0	2	0	0	0	0	0	0	14
% Articulated Trucks	0	1.2	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.5
Bicycles on Road	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	5
% Bicycles on Road	0	0.2	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	8	9
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	100	0.3

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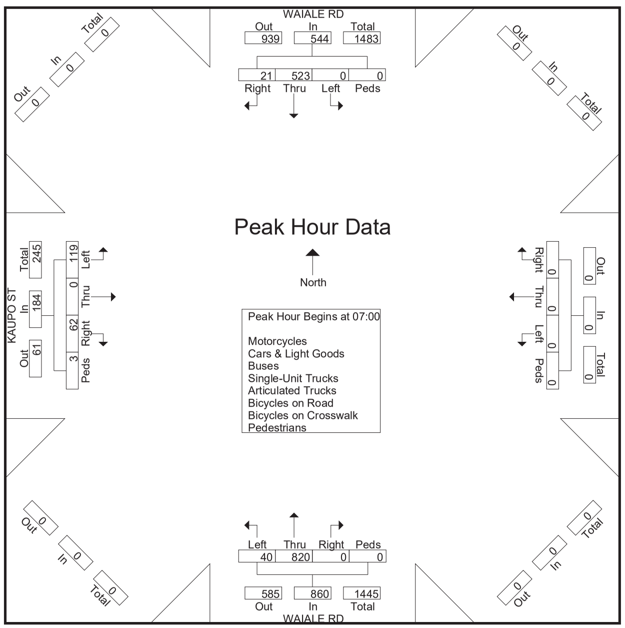
	WAIALE RD SOUTHBOUND					WESTBOUND					WAIALE RD NORTHBOUND					KAUPO ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	118	4	0	122	0	0	0	0	0	**13**	183	0	0	196	19	0	**18**	1	38	356
07:15	0	129	5	0	134	0	0	0	0	0	13	**235**	0	0	**248**	26	0	13	0	39	421
07:30	0	131	**6**	0	137	0	0	0	0	0	8	180	0	0	188	**46**	0	17	0	**63**	388
07:45	0	**145**	6	0	**151**	0	0	0	0	0	6	222	0	0	228	28	0	14	**2**	44	**423**
Total Volume	0	523	21	0	544	0	0	0	0	0	40	820	0	0	860	119	0	62	3	184	1588
% App. Total	0	96.1	3.9	0		0	0	0	0		4.7	95.3	0	0		64.7	0	33.7	1.6		
PHF	.000	.902	.875	.000	.901	.000	.000	.000	.000	.000	.769	.872	.000	.000	.867	.647	.000	.861	.375	.730	.939



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WESTBOUND				WAIALE RD NORTHBOUND				KAUPO ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:30	0	163	5	0	0	0	0	0	8	188	0	0	3	0	16	0	383
15:45	0	132	10	0	0	0	0	0	8	177	0	0	10	0	15	4	356
Total	0	295	15	0	0	0	0	0	16	365	0	0	13	0	31	4	739
16:00	0	173	8	0	0	0	0	0	11	201	0	0	6	0	8	2	409
16:15	0	155	5	0	0	0	0	0	11	191	0	0	15	0	9	0	386
16:30	0	168	2	0	0	0	0	0	9	174	0	0	8	0	10	7	378
16:45	0	179	13	0	0	0	0	0	20	171	0	0	8	0	11	3	405
Total	0	675	28	0	0	0	0	0	51	737	0	0	37	0	38	12	1578
17:00	0	171	14	0	0	0	0	0	7	143	0	0	12	0	8	8	363
17:15	0	173	5	0	0	0	0	0	17	121	0	0	10	0	6	10	342
Grand Total	0	1314	62	0	0	0	0	0	91	1366	0	0	72	0	83	34	3022
Apprch %	0	95.5	4.5	0	0	0	0	0	6.2	93.8	0	0	38.1	0	43.9	18	
Total %	0	43.5	2.1	0	0	0	0	0	3	45.2	0	0	2.4	0	2.7	1.1	
Motorcycles	0	2	0	0	0	0	0	0	0	5	0	0	1	0	0	0	8
% Motorcycles	0	0.2	0	0	0	0	0	0	0	0.4	0	0	1.4	0	0	0	0.3
Cars & Light Goods	0	1299	61	0	0	0	0	0	90	1335	0	0	70	0	81	0	2936
% Cars & Light Goods	0	98.9	98.4	0	0	0	0	0	98.9	97.7	0	0	97.2	0	97.6	0	97.2
Buses	0	2	0	0	0	0	0	0	0	9	0	0	0	0	0	0	11
% Buses	0	0.2	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0.4
Single-Unit Trucks	0	8	1	0	0	0	0	0	0	11	0	0	0	0	1	0	21
% Single-Unit Trucks	0	0.6	1.6	0	0	0	0	0	0	0.8	0	0	0	0	1.2	0	0.7
Articulated Trucks	0	2	0	0	0	0	0	0	1	5	0	0	1	0	1	0	10
% Articulated Trucks	0	0.2	0	0	0	0	0	0	1.1	0.4	0	0	1.4	0	1.2	0	0.3
Bicycles on Road	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
% Bicycles on Road	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.9	0.1
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	32
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94.1	1.1

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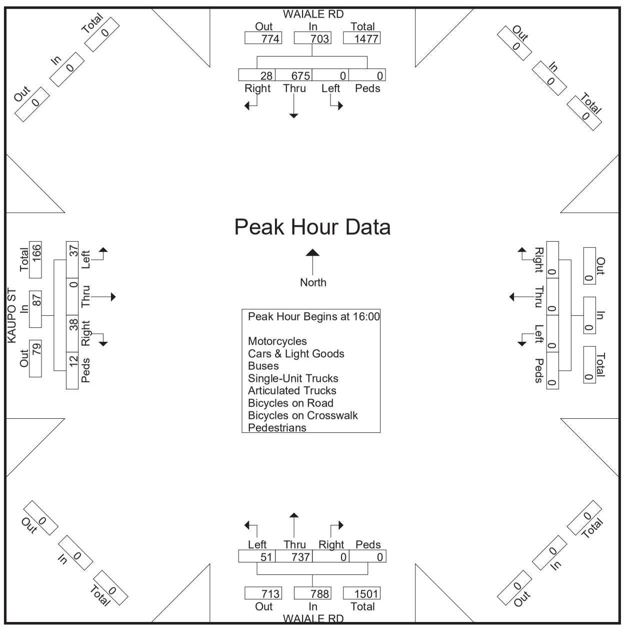
	WAIALE RD SOUTHBOUND					WESTBOUND					WAIALE RD NORTHBOUND					KAUPO ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:30 to 17:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	0	173	8	0	181	0	0	0	0	0	11	**201**	0	0	**212**	6	0	8	2	16	**409**
16:15	0	155	5	0	160	0	0	0	0	0	11	191	0	0	202	**15**	0	9	0	24	386
16:30	0	168	2	0	170	0	0	0	0	0	9	174	0	0	183	8	0	10	**7**	**25**	378
16:45	0	**179**	**13**	0	**192**	0	0	0	0	0	**20**	171	0	0	191	8	0	**11**	3	22	405
Total Volume	0	675	28	0	703	0	0	0	0	0	51	737	0	0	788	37	0	38	12	87	1578
% App. Total	0	96	4	0		0	0	0	0		6.5	93.5	0	0		42.5	0	43.7	13.8		
PHF	.000	.943	.538	.000	.915	.000	.000	.000	.000	.000	.638	.917	.000	.000	.929	.617	.000	.864	.429	.870	.965



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File Name : Waiale Rd - Kolokolo St
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WESTBOUND				WAIALE RD NORTHBOUND				KOKOLOLIO ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00	0	41	5	0	0	0	0	0	1	60	0	0	29	0	1	0	137
07:15	0	43	9	0	0	0	0	0	1	71	0	0	53	0	9	0	186
07:30	0	48	6	0	0	0	0	0	0	65	0	0	33	0	3	0	155
07:45	0	40	14	0	0	0	0	0	2	45	0	0	15	0	8	0	124
Total	0	172	34	0	0	0	0	0	4	241	0	0	130	0	21	0	602
08:00	0	50	14	0	0	0	0	0	3	25	0	0	5	0	1	0	98
08:15	0	29	5	0	0	0	0	0	1	27	0	0	5	0	2	0	69
08:30	0	24	5	0	0	0	0	0	1	33	0	0	8	0	0	0	71
08:45	0	19	5	0	0	0	0	0	1	22	0	0	9	0	2	0	58
Total	0	122	29	0	0	0	0	0	6	107	0	0	27	0	5	0	296
Grand Total	0	294	63	0	0	0	0	0	10	348	0	0	157	0	26	0	898
Apprch %	0	82.4	17.6	0	0	0	0	0	2.8	97.2	0	0	85.8	0	14.2	0	
Total %	0	32.7	7	0	0	0	0	0	1.1	38.8	0	0	17.5	0	2.9	0	
Motorcycles	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
% Motorcycles	0	0.7	0	0	0	0	0	0	0	0	0	0	0.6	0	0	0	0.3
Cars & Light Goods	0	282	63	0	0	0	0	0	10	332	0	0	155	0	25	0	867
% Cars & Light Goods	0	95.9	100	0	0	0	0	0	100	95.4	0	0	98.7	0	96.2	0	96.5
Buses	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Buses	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Single-Unit Trucks	0	5	0	0	0	0	0	0	0	10	0	0	1	0	1	0	17
% Single-Unit Trucks	0	1.7	0	0	0	0	0	0	0	2.9	0	0	0.6	0	3.8	0	1.9
Articulated Trucks	0	3	0	0	0	0	0	0	0	4	0	0	0	0	0	0	7
% Articulated Trucks	0	1	0	0	0	0	0	0	0	1.1	0	0	0	0	0	0	0.8
Bicycles on Road	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : Waiale Rd - Kolokolo St
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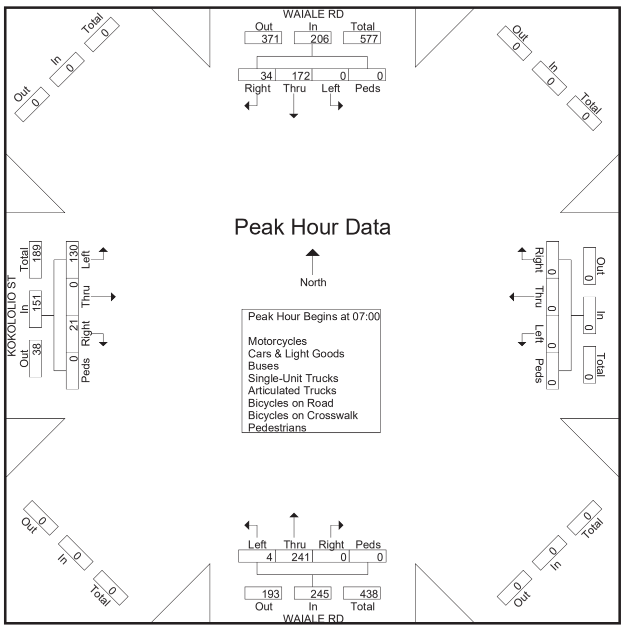
	WAIALE RD SOUTHBOUND					WESTBOUND					WAIALE RD NORTHBOUND					KOKOLOLIO ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	41	5	0	46	0	0	0	0	0	1	60	0	0	61	29	0	1	0	30	137
07:15	0	43	9	0	52	0	0	0	0	0	1	**71**	0	0	**72**	**53**	0	**9**	0	**62**	**186**
07:30	0	**48**	6	0	**54**	0	0	0	0	0	0	65	0	0	65	33	0	3	0	36	155
07:45	0	40	**14**	0	54	0	0	0	0	0	**2**	45	0	0	47	15	0	8	0	23	124
Total Volume	0	172	34	0	206	0	0	0	0	0	4	241	0	0	245	130	0	21	0	151	602
% App. Total	0	83.5	16.5	0		0	0	0	0		1.6	98.4	0	0		86.1	0	13.9	0		
PHF	.000	.896	.607	.000	.954	.000	.000	.000	.000	.000	.500	.849	.000	.000	.851	.613	.000	.583	.000	.609	.809



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File Name : Waiale Rd - Kolokolo St
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WESTBOUND				WAIALE RD NORTHBOUND				KOKOLOLIO ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
16:00	0	52	13	0	0	0	0	0	9	39	0	0	17	0	1	0	131
16:15	0	50	20	0	0	0	0	0	8	55	0	0	15	0	5	0	153
16:30	0	46	19	0	0	0	0	0	7	43	0	0	11	0	7	0	133
16:45	0	49	21	0	0	0	0	0	6	32	0	0	6	0	1	0	115
Total	0	197	73	0	0	0	0	0	30	169	0	0	49	0	14	0	532
17:00	0	48	19	0	0	0	0	0	5	27	0	0	9	0	4	0	112
17:15	0	54	14	0	0	0	0	0	4	33	0	1	18	0	3	0	127
17:30	0	37	14	0	0	0	0	0	8	29	0	0	7	0	0	0	95
17:45	0	33	13	0	0	0	0	0	7	15	0	0	0	0	2	0	70
Total	0	172	60	0	0	0	0	0	24	104	0	1	34	0	9	0	404
Grand Total	0	369	133	0	0	0	0	0	54	273	0	1	83	0	23	0	936
Apprch %	0	73.5	26.5	0	0	0	0	0	16.5	83.2	0	0.3	78.3	0	21.7	0	
Total %	0	39.4	14.2	0	0	0	0	0	5.8	29.2	0	0.1	8.9	0	2.5	0	
Motorcycles	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
% Motorcycles	0	0.3	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0.2
Cars & Light Goods	0	360	133	0	0	0	0	0	53	270	0	0	82	0	23	0	921
% Cars & Light Goods	0	97.6	100	0	0	0	0	0	98.1	98.9	0	0	98.8	0	100	0	98.4
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single-Unit Trucks	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3
% Single-Unit Trucks	0	0.5	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0.3
Articulated Trucks	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
% Articulated Trucks	0	1.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4
Bicycles on Road	0	2	0	0	0	0	0	0	1	1	0	0	1	0	0	0	5
% Bicycles on Road	0	0.5	0	0	0	0	0	0	1.9	0.4	0	0	1.2	0	0	0	0.5
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0.1

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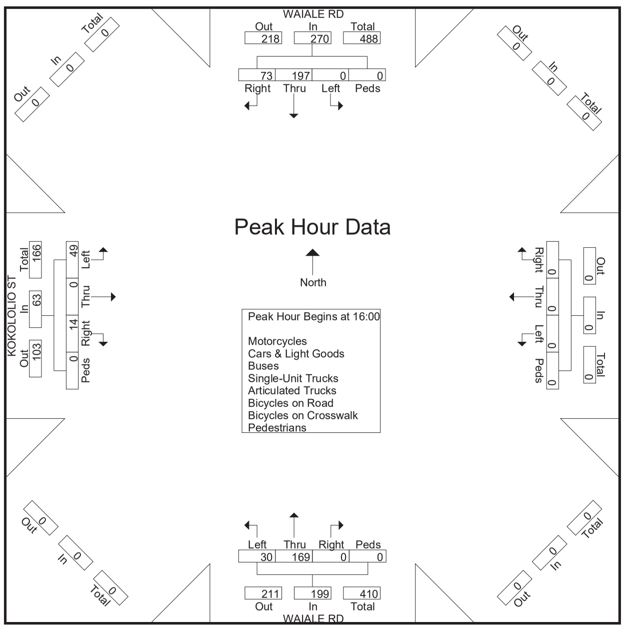
	WAIALE RD SOUTHBOUND					WESTBOUND					WAIALE RD NORTHBOUND					KOKOLOLIO ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	0	**52**	13	0	65	0	0	0	0	0	**9**	39	0	0	48	**17**	0	1	0	18	131
16:15	0	50	20	0	**70**	0	0	0	0	0	8	**55**	0	0	**63**	15	0	5	0	**20**	**153**
16:30	0	46	19	0	65	0	0	0	0	0	7	43	0	0	50	11	0	**7**	0	18	133
16:45	0	49	**21**	0	70	0	0	0	0	0	6	32	0	0	38	6	0	1	0	7	115
Total Volume	0	197	73	0	270	0	0	0	0	0	30	169	0	0	199	49	0	14	0	63	532
% App. Total	0	73	27	0		0	0	0	0		15.1	84.9	0	0		77.8	0	22.2	0		
PHF	.000	.947	.869	.000	.964	.000	.000	.000	.000	.000	.833	.768	.000	.000	.790	.721	.000	.500	.000	.788	.869



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File Name : Waiale Rd-Kuikahi Dr
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Groups Printed- Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD Southbound				KUIKAHI DR Westbound				WAIALE RD Northbound				KUIKAHI DR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	60	22	36	0	7	52	37	0	15	28	15	1	56	58	4	0	391
06:45 AM	54	22	34	0	10	46	50	0	8	45	12	1	66	91	6	0	445
Total	114	44	70	0	17	98	87	0	23	73	27	2	122	149	10	0	836
07:00 AM	71	22	36	0	8	55	49	0	16	46	30	1	69	104	6	1	514
07:15 AM	62	36	37	0	9	66	68	2	30	61	19	0	89	102	16	0	597
07:30 AM	57	31	34	0	12	68	75	0	31	60	18	0	75	85	23	0	569
07:45 AM	77	31	32	0	10	75	66	0	12	29	12	0	88	109	14	1	556
Total	267	120	139	0	39	264	258	2	89	196	79	1	321	400	59	2	2236
08:00 AM	74	20	45	0	14	71	70	0	2	27	13	0	61	90	3	0	490
08:15 AM	50	14	28	4	11	68	58	0	6	18	6	0	69	79	7	0	418
Grand Total	505	198	282	4	81	501	473	2	120	314	125	3	573	718	79	2	3980
Apprch %	51.1	20	28.5	0.4	7.7	47.4	44.7	0.2	21.4	55.9	22.2	0.5	41.8	52.3	5.8	0.1	
Total %	12.7	5	7.1	0.1	2	12.6	11.9	0.1	3	7.9	3.1	0.1	14.4	18	2	0.1	
Cars & Light Goods	486	188	273	0	80	480	466	0	116	303	122	0	565	702	75	0	3856
% Cars & Light Goods	96.2	94.9	96.8	0	98.8	95.8	98.5	0	96.7	96.5	97.6	0	98.6	97.8	94.9	0	96.9
Buses	5	0	1	0	0	3	4	0	2	5	0	0	4	5	2	0	31
% Buses	1	0	0.4	0	0	0.6	0.8	0	1.7	1.6	0	0	0.7	0.7	2.5	0	0.8
Single-Unit Trucks	11	9	8	0	1	17	3	0	2	5	2	0	3	10	1	0	72
% Single-Unit Trucks	2.2	4.5	2.8	0	1.2	3.4	0.6	0	1.7	1.6	1.6	0	0.5	1.4	1.3	0	1.8
Articulated Trucks	2	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	6
% Articulated Trucks	0.4	0.5	0	0	0	0.2	0	0	0	0	0	0	0.2	0	1.3	0	0.2
Bicycles on Road	1	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	4
% Bicycles on Road	0.2	0	0	0	0	0	0	0	0	0.3	0.8	0	0	0.1	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	33.3	0	0	0	0	0
Pedestrians	0	0	0	4	0	0	0	2	0	0	0	2	0	0	0	2	10
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	66.7	0	0	0	100	0.3

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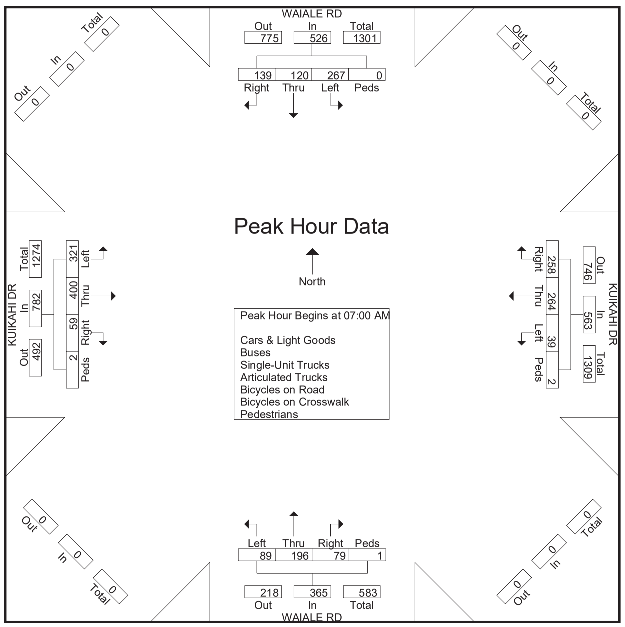
	WAIALE RD Southbound					KUIKAHI DR Westbound					WAIALE RD Northbound					KUIKAHI DR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	71	22	36	0	129	8	55	49	0	112	16	46	**30**	**1**					**1**		
07:15 AM	**62**	**36**	**37**	**0**	**135**	**9**	**66**	**68**	**2**	145	30	**61**	**19**	**0**	**110**	**89**	**102**	**16**	**0**	**207**	**597**
07:30 AM	57	31	34	0	122	**12**	68	**75**		**155**	**31**							**23**			
07:45 AM	**77**	**31**	**32**	**0**	**140**	10	**75**	**66**	**0**	**151**	**12**	**29**	**12**	**0**	**53**	**88**	**109**	14	1	**212**	556
Total Volume	267	120	139	0	526	39	264	258	2	563	89	196	79	1	365	321	400	59	2	782	2236
% App. Total	50.8	22.8	26.4	0		6.9	46.9	45.8	0.4		24.4	53.7	21.6	0.3		41	51.2	7.5	0.3		
PHF	.867	.833	.939	.000	.939	.813	.880	.860	.250	.908	.718	.803	.658	.250	.830	.902	.917	.641	.500	.922	.936



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD Southbound				KUIKAHI DR Westbound				WAIALE RD Northbound				KUIKAHI DR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	96	27	40	0	20	86	72	0	6	30	14	0	60	103	12	0	566
03:45 PM	72	21	28	0	23	94	79	1	20	44	20	2	57	105	9	0	575
Total	168	48	68	0	43	180	151	1	26	74	34	2	117	208	21	0	1141
04:00 PM	86	41	32	5	16	97	71	2	14	17	15	0	52	70	17	0	535
04:15 PM	82	26	26	2	15	101	80	1	12	30	12	0	64	103	16	0	570
04:30 PM	82	31	31	0	17	113	70	0	13	19	15	1	63	83	7	0	545
04:45 PM	94	27	29	1	18	92	55	2	11	23	26	2	50	83	15	3	531
Total	344	125	118	8	66	403	276	5	50	89	68	3	229	339	55	3	2181
05:00 PM	86	47	37	1	15	99	61	2	8	32	12	0	52	67	9	0	528
05:15 PM	76	36	47	1	11	82	71	0	6	26	9	0	66	57	8	1	497
Grand Total	674	256	270	10	135	764	559	8	90	221	123	5	464	671	93	4	4347
Apprch %	55.7	21.2	22.3	0.8	9.2	52.1	38.1	0.5	20.5	50.3	28	1.1	37.7	54.5	7.5	0.3	
Total %	15.5	5.9	6.2	0.2	3.1	17.6	12.9	0.2	2.1	5.1	2.8	0.1	10.7	15.4	2.1	0.1	
Motorcycles	3	0	1	0	1	0	1	0	1	0	0	0	1	3	0	0	11
% Motorcycles	0.4	0	0.4	0	0.7	0	0.2	0	1.1	0	0	0	0.2	0.4	0	0	0.3
Cars & Light Goods	669	251	268	0	134	759	554	0	89	218	123	0	449	662	92	0	4268
% Cars & Light Goods	99.3	98	99.3	0	99.3	99.3	99.1	0	98.9	98.6	100	0	96.8	98.7	98.9	0	98.2
Buses	0	1	0	0	0	0	1	0	0	1	0	0	9	1	0	0	13
% Buses	0	0.4	0	0	0	0	0.2	0	0	0.5	0	0	1.9	0.1	0	0	0.3
Single-Unit Trucks	2	2	1	0	0	4	1	0	0	2	0	0	4	5	0	0	21
% Single-Unit Trucks	0.3	0.8	0.4	0	0	0.5	0.2	0	0	0.9	0	0	0.9	0.7	0	0	0.5
Articulated Trucks	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Articulated Trucks	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	1	0	0	0	1	2	0	0	0	0	0	1	0	1	0	6
% Bicycles on Road	0	0.4	0	0	0	0.1	0.4	0	0	0	0	0	0.2	0	1.1	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	3
% Bicycles on Crosswalk	0	0	0	0	0	0	0	12.5	0	0	0	40	0	0	0	0	0.1
Pedestrians	0	0	0	10	0	0	0	7	0	0	0	3	0	0	0	4	24
% Pedestrians	0	0	0	100	0	0	0	87.5	0	0	0	60	0	0	0	100	0.6

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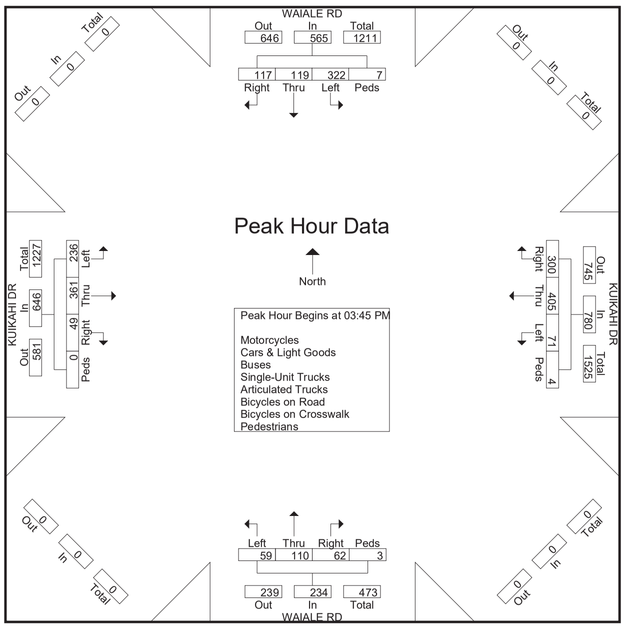
	WAIALE RD Southbound					KUIKAHI DR Westbound					WAIALE RD Northbound					KUIKAHI DR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	72	21	28	0	121	**23**	94	79	1	197	**20**	**44**	**20**	**2**	**86**	57	**105**	9	0	171	**575**
04:00 PM	**86**	**41**	**32**	**5**	**164**	16	97	71	**2**	186	14	17	15	0	46	52	70	**17**			
04:15 PM	**82**	**26**	**26**	**2**	**136**	**15**	**101**	**80**	**1**	**197**	**12**	**30**	**12**	**0**	**54**	**64**	**103**	**16**	**0**	**183**	570
04:30 PM	82	31	31	0	144	17	**113**			**200**	13	19	15	1	48	63	83	7	0	153	545
Total Volume	322	119	117	7	565	71	405	300	4	780	59	110	62	3	234	236	361	49	0	646	2225
% App. Total	57	21.1	20.7	1.2		9.1	51.9	38.5	0.5		25.2	47	26.5	1.3		36.5	55.9	7.6	0		
PHF	.936	.726	.914	.350	.861	.772	.896	.938	.500	.975	.738	.625	.775	.375	.680	.922	.860	.721	.000	.883	.967



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File Name : Waiale Rd - Nokekula St
Site Code :
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WESTBOUND				WAIALE RD NORTHBOUND				NOKEKULA ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	0	31	0	0	0	0	0	0	0	17	0	0	3	0	5	0	56
06:45	0	73	3	0	0	0	0	0	0	24	0	0	4	0	9	0	113
Total	0	104	3	0	0	0	0	0	0	41	0	0	7	0	14	0	169
07:00	0	49	1	0	0	0	0	0	1	30	0	0	10	0	6	0	97
07:15	0	72	0	0	0	0	0	0	2	32	0	0	13	0	5	0	124
07:30	0	60	2	0	0	0	0	0	1	42	0	0	7	0	3	0	115
07:45	0	50	2	0	0	0	0	0	0	41	0	0	1	0	2	0	96
Total	0	231	5	0	0	0	0	0	4	145	0	0	31	0	16	0	432
08:00	0	38	1	0	0	0	0	0	2	22	0	0	1	0	4	0	68
08:15	0	27	5	0	0	0	0	0	1	17	0	0	3	0	6	0	59
Grand Total	0	400	14	0	0	0	0	0	7	225	0	0	42	0	40	0	728
Apprch %	0	96.6	3.4	0	0	0	0	0	3	97	0	0	51.2	0	48.8	0	
Total %	0	54.9	1.9	0	0	0	0	0	1	30.9	0	0	5.8	0	5.5	0	
Motorcycles	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
% Motorcycles	0	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4
Cars & Light Goods	0	385	12	0	0	0	0	0	6	209	0	0	41	0	40	0	693
% Cars & Light Goods	0	96.2	85.7	0	0	0	0	0	85.7	92.9	0	0	97.6	0	100	0	95.2
Buses	0	2	2	0	0	0	0	0	1	2	0	0	0	0	0	0	7
% Buses	0	0.5	14.3	0	0	0	0	0	14.3	0.9	0	0	0	0	0	0	1
Single-Unit Trucks	0	7	0	0	0	0	0	0	0	10	0	0	1	0	0	0	18
% Single-Unit Trucks	0	1.8	0	0	0	0	0	0	0	4.4	0	0	2.4	0	0	0	2.5
Articulated Trucks	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	5
% Articulated Trucks	0	0.8	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0.7
Bicycles on Road	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0.3
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : Waiale Rd - Nokekula St
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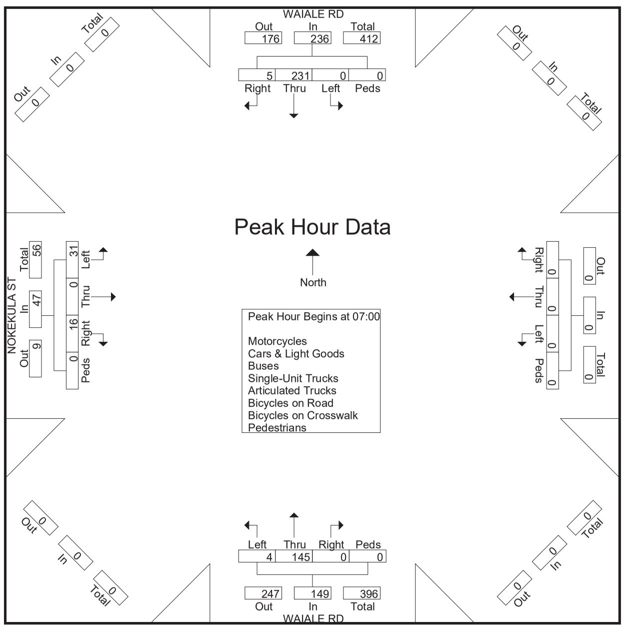
	WAIALE RD SOUTHBOUND					WESTBOUND					WAIALE RD NORTHBOUND					NOKEKULA ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 07:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	49	1	0	50	0	0	0	0	0	1	30	0	0	31	10	0	**6**	0	16	97
07:15	0	**72**	0	0	**72**	0	0	0	0	0	**2**	32	0	0	34	**13**	0	5	0	**18**	**124**
07:30	0	60	**2**	0	62	0	0	0	0	0	1	**42**	0	0	**43**	7	0	3	0	10	115
07:45	0	50	2	0	52	0	0	0	0	0	0	41	0	0	41	1	0	2	0	3	96
Total Volume	0	231	5	0	236	0	0	0	0	0	4	145	0	0	149	31	0	16	0	47	432
% App. Total	0	97.9	2.1	0		0	0	0	0		2.7	97.3	0	0		66	0	34	0		
PHF	.000	.802	.625	.000	.819	.000	.000	.000	.000	.000	.500	.863	.000	.000	.866	.596	.000	.667	.000	.653	.871



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File Name : Waiale Rd - Nokekula St
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WESTBOUND				WAIALE RD NORTHBOUND				NOKEKULA ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:30	0	45	6	0	0	0	0	0	4	47	0	0	2	0	4	0	108
15:45	0	33	7	0	0	0	0	0	4	56	0	0	1	0	1	0	102
Total	0	78	13	0	0	0	0	0	8	103	0	0	3	0	5	0	210
16:00	0	36	4	0	0	0	0	0	5	52	0	0	1	0	3	2	103
16:15	0	52	2	0	0	0	0	0	4	51	0	0	6	0	7	0	122
16:30	0	41	6	0	0	0	0	0	2	44	0	0	2	0	4	0	99
16:45	0	39	2	0	0	0	0	0	5	47	0	0	1	0	3	0	97
Total	0	168	14	0	0	0	0	0	16	194	0	0	10	0	17	2	421
17:00	0	40	6	0	0	0	0	0	3	41	0	0	1	0	2	0	93
17:15	0	40	5	0	0	0	0	0	7	47	0	0	3	0	2	0	104
Grand Total	0	326	38	0	0	0	0	0	34	385	0	0	17	0	26	2	828
Apprch %	0	89.6	10.4	0	0	0	0	0	8.1	91.9	0	0	37.8	0	57.8	4.4	
Total %	0	39.4	4.6	0	0	0	0	0	4.1	46.5	0	0	2.1	0	3.1	0.2	
Motorcycles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Motorcycles	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.1
Cars & Light Goods	0	318	38	0	0	0	0	0	34	379	0	0	17	0	26	0	812
% Cars & Light Goods	0	97.5	100	0	0	0	0	0	100	98.4	0	0	100	0	100	0	98.1
Buses	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Buses	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.1
Single-Unit Trucks	0	4	0	0	0	0	0	0	0	3	0	0	0	0	0	0	7
% Single-Unit Trucks	0	1.2	0	0	0	0	0	0	0	0.8	0	0	0	0	0	0	0.8
Articulated Trucks	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Articulated Trucks	0	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Bicycles on Road	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3
% Bicycles on Road	0	0.6	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.4
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.2

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File Name : Waiale Rd - Nokekula St
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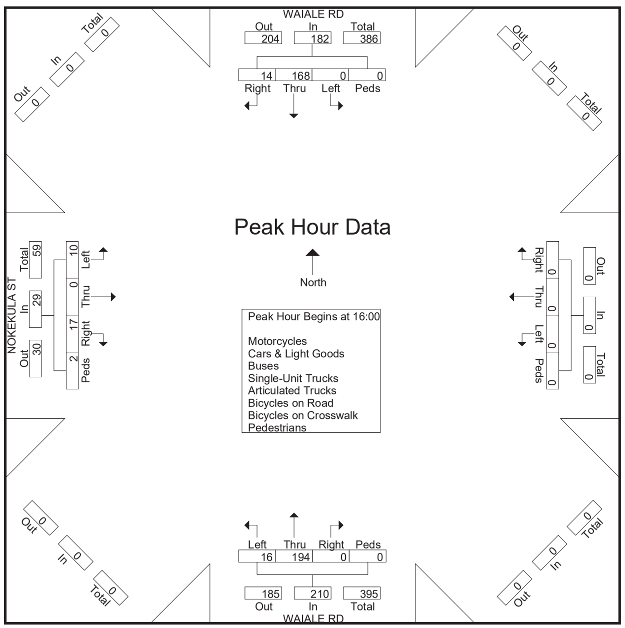
	WAIALE RD SOUTHBOUND					WESTBOUND					WAIALE RD NORTHBOUND					NOKEKULA ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	0	36	4	0	40	0	0	0	0	0	**5**	**52**	0	0	**57**	1	0	3	**2**	6	103
16:15	0	**52**	2	0	**54**	0	0	0	0	0	4	51	0	0	55	**6**	0	**7**	0	**13**	**122**
16:30	0	41	**6**	0	47	0	0	0	0	0	2	44	0	0	46	2	0	4	0	6	99
16:45	0	39	2	0	41	0	0	0	0	0	5	47	0	0	52	1	0	3	0	4	97
Total Volume	0	168	14	0	182	0	0	0	0	0	16	194	0	0	210	10	0	17	2	29	421
% App. Total	0	92.3	7.7	0		0	0	0	0		7.6	92.4	0	0		34.5	0	58.6	6.9		
PHF	.000	.808	.583	.000	.843	.000	.000	.000	.000	.000	.800	.933	.000	.000	.921	.417	.000	.607	.250	.558	.863



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File Name : Waiale Rd - Ohana Hana Lp
Site Code :
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WESTBOUND				WAIALE RD NORTHBOUND				OHANA HANA LOOP EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	0	31	0	0	0	0	0	0	1	14	0	0	1	0	3	0	50
06:45	0	74	0	0	0	0	0	0	1	19	0	0	4	0	4	0	102
Total	0	105	0	0	0	0	0	0	2	33	0	0	5	0	7	0	152
07:00	0	58	4	0	0	0	0	0	1	18	0	0	11	0	4	0	96
07:15	0	74	2	0	0	0	0	0	0	29	0	0	6	0	8	0	119
07:30	0	62	3	0	0	0	0	0	0	33	0	0	8	0	5	0	111
07:45	0	45	3	0	0	0	0	0	4	39	0	0	3	0	5	0	99
Total	0	239	12	0	0	0	0	0	5	119	0	0	28	0	22	0	425
08:00	0	44	1	0	0	0	0	0	0	19	0	0	4	0	2	0	70
08:15	0	30	2	0	0	0	0	0	0	17	0	0	1	0	5	0	55
Grand Total	0	418	15	0	0	0	0	0	7	188	0	0	38	0	36	0	702
Apprch %	0	96.5	3.5	0	0	0	0	0	3.6	96.4	0	0	51.4	0	48.6	0	
Total %	0	59.5	2.1	0	0	0	0	0	1	26.8	0	0	5.4	0	5.1	0	
Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Motorcycles	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Cars & Light Goods	0	405	15	0	0	0	0	0	7	176	0	0	38	0	36	0	677
% Cars & Light Goods	0	96.9	100	0	0	0	0	0	100	93.6	0	0	100	0	100	0	96.4
Buses	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3
% Buses	0	0.2	0	0	0	0	0	0	0	1.1	0	0	0	0	0	0	0.4
Single-Unit Trucks	0	6	0	0	0	0	0	0	0	9	0	0	0	0	0	0	15
% Single-Unit Trucks	0	1.4	0	0	0	0	0	0	0	4.8	0	0	0	0	0	0	2.1
Articulated Trucks	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
% Articulated Trucks	0	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7
Bicycles on Road	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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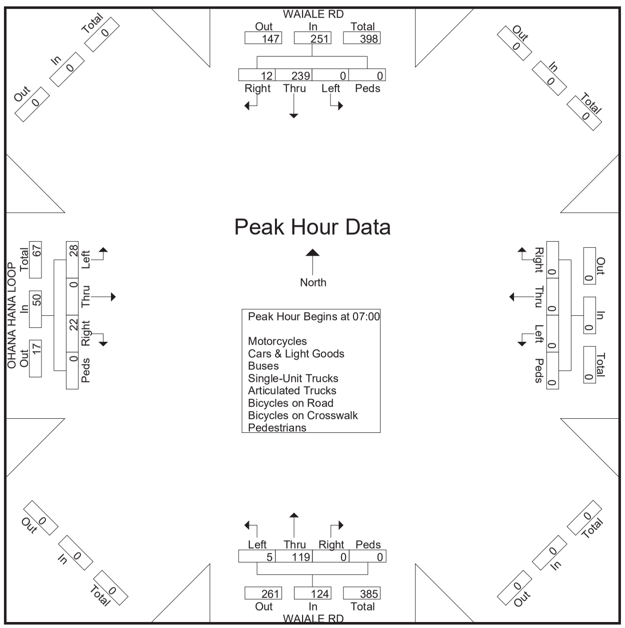
	WAIALE RD SOUTHBOUND					WESTBOUND					WAIALE RD NORTHBOUND					OHANA HANA LOOP EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 07:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	58	**4**	0	62	0	0	0	0	0	1	18	0	0	19	**11**	0	4	0	**15**	96
07:15	0	**74**	2	0	**76**	0	0	0	0	0	0	29	0	0	29	6	0	**8**	0	14	**119**
07:30	0	62	3	0	65	0	0	0	0	0	0	33	0	0	33	8	0	5	0	13	111
07:45	0	45	3	0	48	0	0	0	0	0	**4**	**39**	0	0	**43**	3	0	5	0	8	99
Total Volume	0	239	12	0	251	0	0	0	0	0	5	119	0	0	124	28	0	22	0	50	425
% App. Total	0	95.2	4.8	0		0	0	0	0		4	96	0	0		56	0	44	0		
PHF	.000	.807	.750	.000	.826	.000	.000	.000	.000	.000	.313	.763	.000	.000	.721	.636	.000	.688	.000	.833	.893



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WESTBOUND				WAIALE RD NORTHBOUND				OHANA HANA LOOP EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:30	0	40	3	0	0	0	0	0	2	51	0	0	3	0	0	1	100
15:45	0	32	2	0	0	0	0	0	4	58	0	0	3	0	1	0	100
Total	0	72	5	0	0	0	0	0	6	109	0	0	6	0	1	1	200
16:00	0	39	2	0	0	0	0	0	6	55	0	0	1	0	2	0	105
16:15	0	49	5	0	0	0	0	0	5	53	0	0	4	0	4	0	120
16:30	0	35	5	0	0	0	0	0	2	46	0	0	3	0	1	0	92
16:45	0	38	4	0	0	0	0	0	1	42	0	0	3	0	1	0	89
Total	0	161	16	0	0	0	0	0	14	196	0	0	11	0	8	0	406
17:00	0	41	3	0	0	0	0	0	2	49	0	0	0	0	1	0	96
17:15	0	39	3	0	0	0	0	0	2	44	0	0	6	0	0	0	94
Grand Total	0	313	27	0	0	0	0	0	24	398	0	0	23	0	10	1	796
Apprch %	0	92.1	7.9	0	0	0	0	0	5.7	94.3	0	0	67.6	0	29.4	2.9	
Total %	0	39.3	3.4	0	0	0	0	0	3	50	0	0	2.9	0	1.3	0.1	
Motorcycles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Motorcycles	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.1
Cars & Light Goods	0	306	26	0	0	0	0	0	24	394	0	0	23	0	10	0	783
% Cars & Light Goods	0	97.8	96.3	0	0	0	0	0	100	99	0	0	100	0	100	0	98.4
Buses	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Buses	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Single-Unit Trucks	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	6
% Single-Unit Trucks	0	1	0	0	0	0	0	0	0	0.8	0	0	0	0	0	0	0.8
Articulated Trucks	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Articulated Trucks	0	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Bicycles on Road	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Bicycles on Road	0	0.3	3.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.1

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Site Code :
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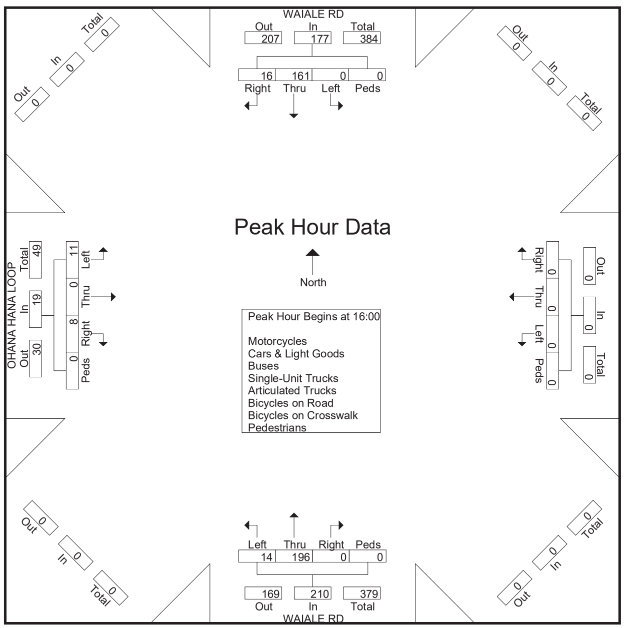
	WAIALE RD SOUTHBOUND					WESTBOUND					WAIALE RD NORTHBOUND					OHANA HANA LOOP EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	0	39	2	0	41	0	0	0	0	0	**6**	**55**	0	0	**61**	1	0	2	0	3	105
16:15	0	**49**	**5**	0	**54**	0	0	0	0	0	5	53	0	0	58	**4**	0	**4**	0	**8**	**120**
16:30	0	35	5	0	40	0	0	0	0	0	2	46	0	0	48	3	0	1	0	4	92
16:45	0	38	4	0	42	0	0	0	0	0	1	42	0	0	43	3	0	1	0	4	89
Total Volume	0	161	16	0	177	0	0	0	0	0	14	196	0	0	210	11	0	8	0	19	406
% App. Total	0	91	9	0		0	0	0	0		6.7	93.3	0	0		57.9	0	42.1	0		
PHF	.000	.821	.800	.000	.819	.000	.000	.000	.000	.000	.583	.891	.000	.000	.861	.688	.000	.500	.000	.594	.846



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File Name : Waiale Rd-Olomea St
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD Southbound				OLOMEA ST Westbound				WAIALE RD Northbound				MCCC DWY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	2	89	11	0	1	0	0	0	0	125	6	0	20	0	7	1	262
06:45 AM	5	93	8	0	0	0	2	0	3	157	7	0	35	0	12	1	323
Total	7	182	19	0	1	0	2	0	3	282	13	0	55	0	19	2	585
07:00 AM	4	111	30	0	6	1	4	0	4	185	6	0	30	0	9	1	391
07:15 AM	2	136	41	0	0	0	2	1	7	239	5	0	21	0	3	1	458
07:30 AM	1	139	50	0	0	0	0	0	4	267	1	0	39	0	3	1	505
07:45 AM	0	159	42	0	0	0	1	2	4	233	1	0	43	0	8	0	493
Total	7	545	163	0	6	1	7	3	19	924	13	0	133	0	23	3	1847
08:00 AM	0	111	19	0	0	0	1	0	3	157	1	0	17	0	1	0	310
08:15 AM	0	84	11	0	0	0	1	0	0	159	1	0	18	0	3	4	281
Grand Total	14	922	212	0	7	1	11	3	25	1522	28	0	223	0	46	9	3023
Apprch %	1.2	80.3	18.5	0	31.8	4.5	50	13.6	1.6	96.6	1.8	0	80.2	0	16.5	3.2	
Total %	0.5	30.5	7	0	0.2	0	0.4	0.1	0.8	50.3	0.9	0	7.4	0	1.5	0.3	
Motorcycles	0	3	0	0	0	0	0	0	0	3	0	0	0	0	1	0	7
% Motorcycles	0	0.3	0	0	0	0	0	0	0	0.2	0	0	0	0	2.2	0	0.2
Cars & Light Goods	14	883	209	0	7	1	11	0	21	1495	28	0	222	0	44	0	2935
% Cars & Light Goods	100	95.8	98.6	0	100	100	100	0	84	98.2	100	0	99.6	0	95.7	0	97.1
Buses	0	5	0	0	0	0	0	0	4	7	0	0	1	0	0	0	17
% Buses	0	0.5	0	0	0	0	0	0	16	0.5	0	0	0.4	0	0	0	0.6
Single-Unit Trucks	0	26	3	0	0	0	0	0	0	12	0	0	0	0	1	0	42
% Single-Unit Trucks	0	2.8	1.4	0	0	0	0	0	0	0.8	0	0	0	0	2.2	0	1.4
Articulated Trucks	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	6
% Articulated Trucks	0	0.4	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.2
Bicycles on Road	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	4
% Bicycles on Road	0	0.1	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
% Bicycles on Crosswalk	0	0	0	0	0	0	0	33.3	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	9	11
% Pedestrians	0	0	0	0	0	0	0	66.7	0	0	0	0	0	0	0	100	0.4

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File Name : Waiale Rd-Olomea St
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Start Date : 3/29/2022
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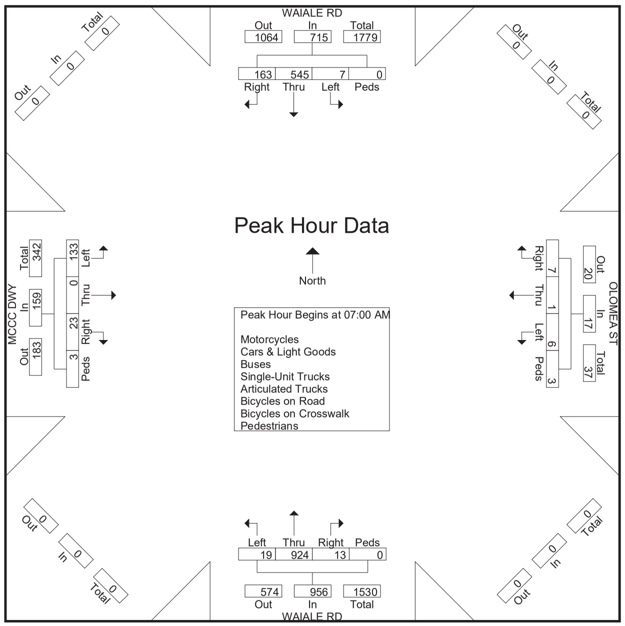
	WAIALE RD Southbound					OLOMEA ST Westbound					WAIALE RD Northbound					MCCC DWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**4**					**6**	**1**	**4**		**11**	4	185	**6**	0	195	30	0	**9**	**1**		
07:15 AM	**2**	**136**	**41**	**0**	**179**	**0**	**0**	**2**	**1**	**3**	**7**	**239**	**5**	**0**	**251**	**21**	**0**	**3**	**1**	**25**	**458**
07:30 AM	**1**	**139**	**50**	**0**	**190**	**0**	**0**	**0**	**0**	**0**	**4**	**267**	**1**	**0**	**272**	39	0	3	1	43	**505**
07:45 AM	0	**159**	42	0	**201**	0	0	1	**2**	3	4	233	1	0	238	**43**				**51**	493
Total Volume	7	545	163	0	715	6	1	7	3	17	19	924	13	0	956	133	0	23	3	159	1847
% App. Total	1	76.2	22.8	0		35.3	5.9	41.2	17.6		2	96.7	1.4	0		83.6	0	14.5	1.9		
PHF	.438	.857	.815	.000	.889	.250	.250	.438	.375	.386	.679	.865	.542	.000	.879	.773	.000	.639	.750	.779	.914



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File Name : Waiale Rd-Olomea St
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD Southbound				OLOMEA ST Westbound				WAIALE RD Northbound				MCCC DWY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	1	168	31	0	1	0	2	0	8	171	0	0	13	0	8	0	403
03:45 PM	1	163	37	0	1	0	2	0	8	182	0	0	25	0	7	2	428
Total	2	331	68	0	2	0	4	0	16	353	0	0	38	0	15	2	831
04:00 PM	1	153	55	0	1	0	12	1	7	166	1	0	18	0	7	4	426
04:15 PM	1	157	55	0	0	0	1	2	9	171	0	0	17	0	2	3	418
04:30 PM	2	165	66	0	1	1	4	1	8	143	1	0	15	0	4	4	415
04:45 PM	1	149	61	0	3	0	0	0	12	126	0	0	13	0	4	0	369
Total	5	624	237	0	5	1	17	4	36	606	2	0	63	0	17	11	1628
05:00 PM	0	153	48	0	0	0	0	1	9	129	0	0	17	0	2	1	360
05:15 PM	1	139	32	0	0	0	0	1	11	165	0	0	11	0	8	2	370
Grand Total	8	1247	385	0	7	1	21	6	72	1253	2	0	129	0	42	16	3189
Apprch %	0.5	76	23.5	0	20	2.9	60	17.1	5.4	94.4	0.2	0	69	0	22.5	8.6	
Total %	0.3	39.1	12.1	0	0.2	0	0.7	0.2	2.3	39.3	0.1	0	4	0	1.3	0.5	
Motorcycles	0	4	3	0	0	0	0	0	0	4	0	0	3	0	0	0	14
% Motorcycles	0	0.3	0.8	0	0	0	0	0	0	0.3	0	0	2.3	0	0	0	0.4
Cars & Light Goods	8	1236	380	0	7	1	21	0	67	1231	2	0	126	0	41	0	3120
% Cars & Light Goods	100	99.1	98.7	0	100	100	100	0	93.1	98.2	100	0	97.7	0	97.6	0	97.8
Buses	0	1	1	0	0	0	0	0	4	8	0	0	0	0	0	0	14
% Buses	0	0.1	0.3	0	0	0	0	0	5.6	0.6	0	0	0	0	0	0	0.4
Single-Unit Trucks	0	5	0	0	0	0	0	0	1	9	0	0	0	0	1	0	16
% Single-Unit Trucks	0	0.4	0	0	0	0	0	0	1.4	0.7	0	0	0	0	2.4	0	0.5
Articulated Trucks	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Articulated Trucks	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2
% Bicycles on Road	0	0	0.3	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0.1
Pedestrians	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	12	18
% Pedestrians	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	75	0.6

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File Name : Waiale Rd-Olomea St
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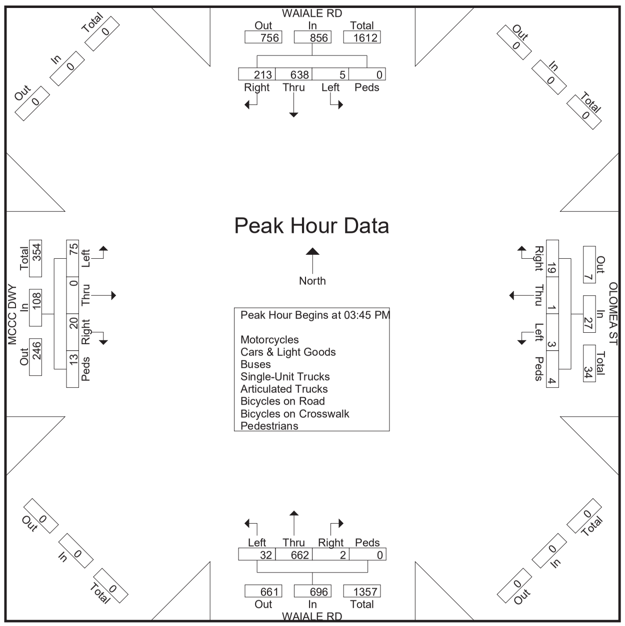
	WAIALE RD Southbound					OLOMEA ST Westbound					WAIALE RD Northbound					MCCC DWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	1	163	37	0	201	**1**	0	2	0	3	8	**182**			**190**	**25**		**7**		**34**	**428**
04:00 PM	1	153	55	0	209	1	0	**12**		**14**	7	166	**1**	0	174	18	0	7	**4**		
04:15 PM	**1**	**157**	**55**	**0**	**213**	**0**	**0**	**1**	**2**	3	**9**	**171**	**0**	**0**	**180**	**17**	**0**	**2**	**3**	**22**	**418**
04:30 PM	**2**	**165**	**66**	**0**	**233**	1	**1**	**4**	**1**	**7**	**8**	**143**	**1**	**0**	**152**	**15**	**0**	**4**	**4**	**23**	**415**
Total Volume	5	638	213	0	856	3	1	19	4	27	32	662	2	0	696	75	0	20	13	108	1687
% App. Total	0.6	74.5	24.9	0		11.1	3.7	70.4	14.8		4.6	95.1	0.3	0		69.4	0	18.5	12		
PHF	.625	.967	.807	.000	.918	.750	.250	.396	.500	.482	.889	.909	.500	.000	.916	.750	.000	.714	.813	.794	.985



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File Name : Waiale Rd-Waiinu Rd
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD Southbound				WAIINU RD Westbound				WAIALE RD Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	3	72	0	1	22	0	4	0	0	56	80	0	0	0	0	0	238
06:45 AM	7	83	0	0	27	0	11	0	0	69	121	0	0	0	0	0	318
Total	10	155	0	1	49	0	15	0	0	125	201	0	0	0	0	0	556
07:00 AM	16	115	0	0	29	0	16	0	0	101	118	0	0	0	0	0	395
07:15 AM	15	135	0	0	51	0	15	1	0	115	144	0	0	0	0	0	476
07:30 AM	15	155	0	1	37	0	18	1	0	123	181	0	0	0	0	0	531
07:45 AM	16	149	0	1	51	0	12	0	0	123	157	0	0	0	0	0	509
Total	62	554	0	2	168	0	61	2	0	462	600	0	0	0	0	0	1911
08:00 AM	4	87	0	0	42	0	10	2	0	90	85	0	0	0	0	0	320
08:15 AM	6	71	0	1	27	0	4	0	0	97	78	0	0	0	0	0	284
Grand Total	82	867	0	4	286	0	90	4	0	774	964	0	0	0	0	0	3071
Apprch %	8.6	91	0	0.4	75.3	0	23.7	1.1	0	44.5	55.5	0	0	0	0	0	
Total %	2.7	28.2	0	0.1	9.3	0	2.9	0.1	0	25.2	31.4	0	0	0	0	0	
Motorcycles	0	3	0	0	0	0	2	0	0	2	1	0	0	0	0	0	8
% Motorcycles	0	0.3	0	0	0	0	2.2	0	0	0.3	0.1	0	0	0	0	0	0.3
Cars & Light Goods	79	837	0	0	272	0	85	0	0	756	953	0	0	0	0	0	2982
% Cars & Light Goods	96.3	96.5	0	0	95.1	0	94.4	0	0	97.7	98.9	0	0	0	0	0	97.1
Buses	0	4	0	0	1	0	0	0	0	4	4	0	0	0	0	0	13
% Buses	0	0.5	0	0	0.3	0	0	0	0	0.5	0.4	0	0	0	0	0	0.4
Single-Unit Trucks	2	21	0	0	10	0	2	0	0	9	4	0	0	0	0	0	48
% Single-Unit Trucks	2.4	2.4	0	0	3.5	0	2.2	0	0	1.2	0.4	0	0	0	0	0	1.6
Articulated Trucks	1	0	0	0	3	0	0	0	0	1	1	0	0	0	0	0	6
% Articulated Trucks	1.2	0	0	0	1	0	0	0	0	0.1	0.1	0	0	0	0	0	0.2
Bicycles on Road	0	2	0	0	0	0	1	0	0	2	1	0	0	0	0	0	6
% Bicycles on Road	0	0.2	0	0	0	0	1.1	0	0	0.3	0.1	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	5
% Bicycles on Crosswalk	0	0	0	50	0	0	0	75	0	0	0	0	0	0	0	0	0.2
Pedestrians	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	3
% Pedestrians	0	0	0	50	0	0	0	25	0	0	0	0	0	0	0	0	0.1

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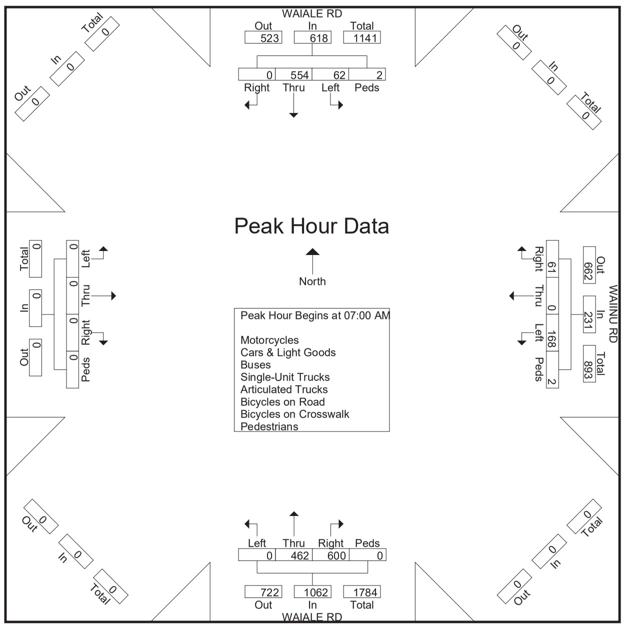
	WAIALE RD Southbound					WAIINU RD Westbound					WAIALE RD Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**16**																				
07:15 AM	**15**	**135**	**0**	**0**	**150**	**51**	0	15	**1**	**67**	0	115	144	0	259	0	0	0	0	0	476
07:30 AM	15	**155**	0	**1**	**171**	37	0	**18**				**123**	**181**	0	**304**	0	0	0	0	0	**531**
07:45 AM	16	149	0	1	166	51	0	12	0	63	0	123	157	0	280	0	0	0	0	0	509
Total Volume	62	554	0	2	618	168	0	61	2	231	0	462	600	0	1062	0	0	0	0	0	1911
% App. Total	10	89.6	0	0.3		72.7	0	26.4	0.9		0	43.5	56.5	0		0	0	0	0		
PHF	.969	.894	.000	.500	.904	.824	.000	.847	.500	.862	.000	.939	.829	.000	.873	.000	.000	.000	.000	.000	.900



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD Southbound				WAIINU RD Westbound				WAIALE RD Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	15	153	0	0	48	0	6	0	0	112	72	0	0	0	0	0	406
03:45 PM	11	146	0	0	52	0	13	0	0	121	87	0	0	0	0	0	430
Total	26	299	0	0	100	0	19	0	0	233	159	0	0	0	0	0	836
04:00 PM	10	154	0	0	54	0	17	0	0	123	75	0	0	0	0	0	433
04:15 PM	16	157	0	1	54	0	9	0	0	110	78	1	0	0	0	0	426
04:30 PM	18	165	0	0	68	0	16	0	0	91	77	0	0	0	0	0	435
04:45 PM	15	146	0	0	62	0	9	0	0	78	54	0	0	0	0	0	364
Total	59	622	0	1	238	0	51	0	0	402	284	1	0	0	0	0	1658
05:00 PM	12	135	0	0	63	0	10	1	0	85	64	1	0	0	0	0	371
05:15 PM	6	103	0	0	70	0	9	0	0	106	67	0	0	0	0	0	361
Grand Total	103	1159	0	1	471	0	89	1	0	826	574	2	0	0	0	0	3226
Apprch %	8.2	91.8	0	0.1	84	0	15.9	0.2	0	58.9	40.9	0.1	0	0	0	0	
Total %	3.2	35.9	0	0	14.6	0	2.8	0	0	25.6	17.8	0.1	0	0	0	0	
Motorcycles	0	7	0	0	1	0	1	0	0	5	2	0	0	0	0	0	16
% Motorcycles	0	0.6	0	0	0.2	0	1.1	0	0	0.6	0.3	0	0	0	0	0	0.5
Cars & Light Goods	102	1142	0	0	466	0	85	0	0	813	563	0	0	0	0	0	3171
% Cars & Light Goods	99	98.5	0	0	98.9	0	95.5	0	0	98.4	98.1	0	0	0	0	0	98.3
Buses	0	2	0	0	1	0	0	0	0	3	6	0	0	0	0	0	12
% Buses	0	0.2	0	0	0.2	0	0	0	0	0.4	1	0	0	0	0	0	0.4
Single-Unit Trucks	1	6	0	0	1	0	0	0	0	4	3	0	0	0	0	0	15
% Single-Unit Trucks	1	0.5	0	0	0.2	0	0	0	0	0.5	0.5	0	0	0	0	0	0.5
Articulated Trucks	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
% Articulated Trucks	0	0	0	0	0.2	0	1.1	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Road	0	2	0	0	1	0	2	0	0	1	0	0	0	0	0	0	6
% Bicycles on Road	0	0.2	0	0	0.2	0	2.2	0	0	0.1	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	0	0	0	1	0	0	0	2	0	0	0	0	4
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	100	0	0	0	0	0.1

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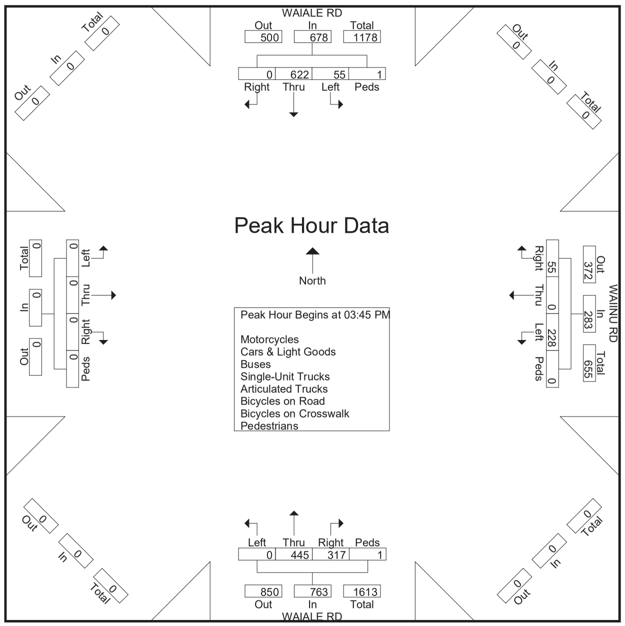
	WAIALE RD Southbound					WAIINU RD Westbound					WAIALE RD Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	11	146	0	0	157	52	0	13	0	65	0	121	**87**	0	**208**	0	0	0	0	0	430
04:00 PM	10	154	0	0	164	54	0	**17**				**123**									
04:15 PM	**16**	**157**	**0**	**1**	**174**	**54**	**0**	**9**	**0**	**63**	**0**	**110**	**78**	**1**	**189**	**0**	**0**	**0**	**0**	**0**	**426**
04:30 PM	**18**	**165**	0	0	**183**	**68**	0	16	0	**84**	0	91	77	0	168	0	0	0	0	0	**435**
Total Volume	55	622	0	1	678	228	0	55	0	283	0	445	317	1	763	0	0	0	0	0	1724
% App. Total	8.1	91.7	0	0.1		80.6	0	19.4	0		0	58.3	41.5	0.1		0	0	0	0		
PHF	.764	.942	.000	.250	.926	.838	.000	.809	.000	.842	.000	.904	.911	.250	.917	.000	.000	.000	.000	.000	.991



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WAIKO RD WESTBOUND				NORTHBOUND				WAIKO RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	28	0	9	0	0	12	10	0	0	0	0	0	5	22	0	0	86
06:45	66	0	22	0	0	10	7	0	0	0	0	0	11	24	0	0	140
Total	94	0	31	0	0	22	17	0	0	0	0	0	16	46	0	0	226
07:00	37	0	15	0	0	11	14	0	0	0	0	0	9	45	0	0	131
07:15	56	0	26	0	0	12	20	0	0	0	0	0	11	55	0	0	180
07:30	51	0	13	0	0	17	20	0	0	0	0	0	18	56	0	0	175
07:45	39	0	14	0	0	18	24	0	0	0	0	0	15	43	0	0	153
Total	183	0	68	0	0	58	78	0	0	0	0	0	53	199	0	0	639
08:00	20	0	23	0	0	11	13	0	0	0	0	0	4	17	0	0	88
08:15	22	0	14	0	0	18	14	0	0	0	0	0	6	15	0	0	89
Grand Total	319	0	136	0	0	109	122	0	0	0	0	0	79	277	0	0	1042
Apprch %	70.1	0	29.9	0	0	47.2	52.8	0	0	0	0	0	22.2	77.8	0	0	
Total %	30.6	0	13.1	0	0	10.5	11.7	0	0	0	0	0	7.6	26.6	0	0	
Motorcycles	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	4
% Motorcycles	0.6	0	0.7	0	0	0.9	0	0	0	0	0	0	0	0	0	0	0.4
Cars & Light Goods	304	0	134	0	0	106	109	0	0	0	0	0	76	273	0	0	1002
% Cars & Light Goods	95.3	0	98.5	0	0	97.2	89.3	0	0	0	0	0	96.2	98.6	0	0	96.2
Buses	2	0	0	0	0	1	0	0	0	0	0	0	2	2	0	0	7
% Buses	0.6	0	0	0	0	0.9	0	0	0	0	0	0	2.5	0.7	0	0	0.7
Single-Unit Trucks	7	0	1	0	0	1	12	0	0	0	0	0	0	2	0	0	23
% Single-Unit Trucks	2.2	0	0.7	0	0	0.9	9.8	0	0	0	0	0	0	0.7	0	0	2.2
Articulated Trucks	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	5
% Articulated Trucks	1.3	0	0	0	0	0	0.8	0	0	0	0	0	0	0	0	0	0.5
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	1.3	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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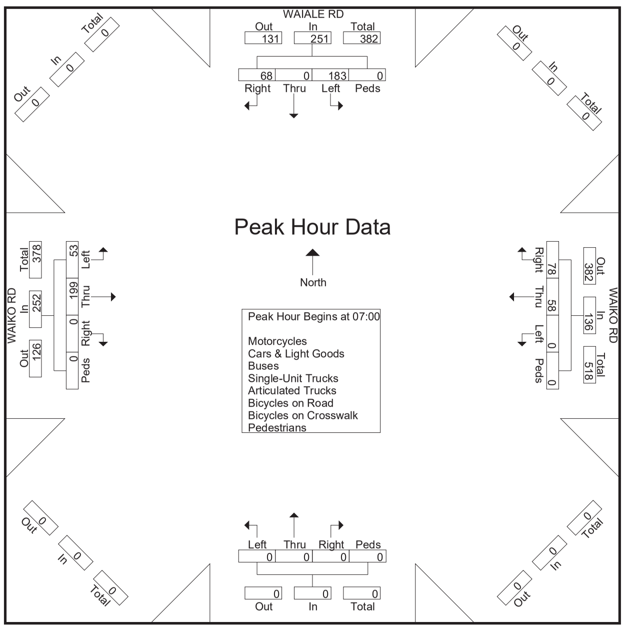
	WAIALE RD SOUTHBOUND					WAIKO RD WESTBOUND					NORTHBOUND					WAIKO RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	37	0	15	0	52	0	11	14	0	25	0	0	0	0	0	9	45	0	0	54	131
07:15	**56**	0	**26**	0	**82**	0	12	20	0	32	0	0	0	0	0	11	55	0	0	66	**180**
07:30	51	0	13	0	64	0	17	20	0	37	0	0	0	0	0	**18**	**56**	0	0	**74**	175
07:45	39	0	14	0	53	0	**18**	**24**	0	**42**	0	0	0	0	0	15	43	0	0	58	153
Total Volume	183	0	68	0	251	0	58	78	0	136	0	0	0	0	0	53	199	0	0	252	639
% App. Total	72.9	0	27.1	0		0	42.6	57.4	0		0	0	0	0		21	79	0	0		
PHF	.817	.000	.654	.000	.765	.000	.806	.813	.000	.810	.000	.000	.000	.000	.000	.736	.888	.000	.000	.851	.888



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIALE RD SOUTHBOUND				WAIKO RD WESTBOUND				NORTHBOUND				WAIKO RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:30	34	0	12	0	0	24	40	0	0	0	0	0	14	19	0	0	143
15:45	24	0	7	0	0	24	47	0	0	0	0	0	15	21	0	0	138
Total	58	0	19	0	0	48	87	0	0	0	0	0	29	40	0	0	281
16:00	34	0	8	0	0	35	50	0	0	0	0	0	13	15	0	0	155
16:15	45	0	12	0	0	25	40	0	0	0	0	0	15	21	0	0	158
16:30	31	0	6	0	0	25	39	0	0	0	0	0	7	22	0	0	130
16:45	30	0	9	0	0	21	39	0	0	0	0	0	7	22	0	0	128
Total	140	0	35	0	0	106	168	0	0	0	0	0	42	80	0	0	571
17:00	30	0	13	0	0	25	32	0	0	0	0	0	15	17	0	0	132
17:15	25	0	12	0	0	19	30	0	0	0	0	0	16	21	0	0	123
Grand Total	253	0	79	0	0	198	317	0	0	0	0	0	102	158	0	0	1107
Apprch %	76.2	0	23.8	0	0	38.4	61.6	0	0	0	0	0	39.2	60.8	0	0	
Total %	22.9	0	7.1	0	0	17.9	28.6	0	0	0	0	0	9.2	14.3	0	0	
Motorcycles	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
% Motorcycles	0	0	0	0	0	0.5	0.3	0	0	0	0	0	0	0	0	0	0.2
Cars & Light Goods	247	0	79	0	0	196	315	0	0	0	0	0	101	157	0	0	1095
% Cars & Light Goods	97.6	0	100	0	0	99	99.4	0	0	0	0	0	99	99.4	0	0	98.9
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single-Unit Trucks	4	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	8
% Single-Unit Trucks	1.6	0	0	0	0	0.5	0.3	0	0	0	0	0	1	0.6	0	0	0.7
Articulated Trucks	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Articulated Trucks	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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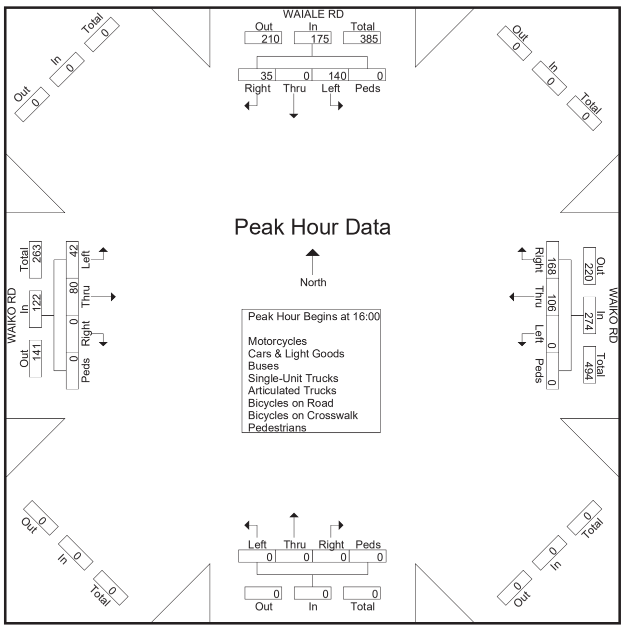
	WAIALE RD SOUTHBOUND					WAIKO RD WESTBOUND					NORTHBOUND					WAIKO RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	34	0	8	0	42	0	**35**	**50**	0	**85**	0	0	0	0	0	13	15	0	0	28	155
16:15	**45**	0	**12**	0	**57**	0	25	40	0	65	0	0	0	0	0	**15**	21	0	0	**36**	**158**
16:30	31	0	6	0	37	0	25	39	0	64	0	0	0	0	0	7	**22**	0	0	29	130
16:45	30	0	9	0	39	0	21	39	0	60	0	0	0	0	0	7	22	0	0	29	128
Total Volume	140	0	35	0	175	0	106	168	0	274	0	0	0	0	0	42	80	0	0	122	571
% App. Total	80	0	20	0		0	38.7	61.3	0		0	0	0	0		34.4	65.6	0	0		
PHF	.778	.000	.729	.000	.768	.000	.757	.840	.000	.806	.000	.000	.000	.000	.000	.700	.909	.000	.000	.847	.903



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APPENDIX B
LEVEL OF SERVICE CRITERIA

LEVEL OF SERVICE (LOS) CRITERIA

VEHICULAR LEVEL OF SERVICE FOR SIGNALIZED INTERSECTIONS (HCM 6th Edition)

Level of service for vehicles at signalized intersections is directly related to delay values and is assigned on that basis. Level of Service is a measure of the acceptability of delay values to motorists at a given intersection. The criteria are given in the table below.

Level-of Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec./veh.)
A	< 10.0
B	>10.0 and ≤ 20.0
C	>20.0 and ≤ 35.0
D	>35.0 and ≤ 55.0
E	>55.0 and ≤ 80.0
F	> 80.0

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

VEHICULAR LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 6th Edition)

The level of service criteria for vehicles at unsignalized intersections is defined as the average control delay, in seconds per vehicle.

LOS delay threshold values are lower for two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections than those of signalized intersections. This is because more vehicles pass through signalized intersections, and therefore, drivers expect and tolerate greater delays. While the criteria for level of service for TWSC and AWSC intersections are the same, procedures to calculate the average total delay may differ.

Level of Service Criteria for Two-Way Stop-Controlled Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	> 50

APPENDIX C

LOS WORKSHEETS

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APPENDIX C

LOS WORKSHEETS

Existing Conditions – AM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] %	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kamehameha Ave														
102	L2	153	2.0	161	2.0	0.736	16.7	LOS C	9.3	237.0	1.00	1.37	1.54	18.9
7	T1	217	2.0	228	2.0	0.736	14.0	LOS B	9.3	237.0	1.00	1.37	1.54	17.7
25	R2	102	2.0	107	2.0	0.736	14.0	LOS B	9.3	237.0	1.00	1.37	1.54	17.7
Approach		472	2.0	497	2.0	0.736	14.9	LOS B	9.3	237.0	1.00	1.37	1.54	18.1
East: WB Maui Lani Parkway														
19	L2	85	2.0	89	2.0	0.606	9.7	LOS A	6.0	151.5	0.90	1.01	1.11	20.1
336	T1	213	2.0	224	2.0	0.606	7.0	LOS A	6.0	151.5	0.90	1.01	1.11	18.8
24	R2	160	2.0	168	2.0	0.606	7.0	LOS A	6.0	151.5	0.90	1.01	1.11	18.8
Approach		458	2.0	482	2.0	0.606	7.5	LOS A	6.0	151.5	0.90	1.01	1.11	19.0
North: SB Kamehameha Ave														
15	L2	268	2.0	282	2.0	0.775	11.4	LOS B	10.9	275.6	0.96	1.16	1.33	19.7
2	T1	157	2.0	165	2.0	0.775	8.7	LOS A	10.9	275.6	0.96	1.16	1.33	18.4
40	R2	256	2.0	269	2.0	0.775	8.7	LOS A	10.9	275.6	0.96	1.16	1.33	18.4
Approach		681	2.0	717	2.0	0.775	9.8	LOS A	10.9	275.6	0.96	1.16	1.33	18.9
West: EB Maui Lani Parkway														
30	L2	225	2.0	237	2.0	0.716	10.7	LOS B	8.8	222.5	0.96	1.12	1.26	19.9
464	T1	248	2.0	261	2.0	0.716	8.0	LOS A	8.8	222.5	0.96	1.12	1.26	18.5
78	R2	102	2.0	107	2.0	0.716	8.0	LOS A	8.8	222.5	0.96	1.12	1.26	18.5
Approach		575	2.0	605	2.0	0.716	9.1	LOS A	8.8	222.5	0.96	1.12	1.26	19.0
All Vehicles		2186	2.0	2301	2.0	0.775	10.2	LOS B	10.9	275.6	0.95	1.16	1.31	18.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AUSTIN, TSUTSUMI & ASSOCIATES, INC. | Licence: PLUS / 1PC | Processed: Friday, July 29, 2022 11:44:21 AM
Project: N:\2022\22-519 Puunani Homestead TIAR Ph II TIAR\1. Existing\Kam - MLP RAB Existing AM.sip9

HCM 6th AWSC
2: Waiale Rd & Kaohu St/Oluloa Dr

Intersection	
Intersection Delay, s/veh	75.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	88	3	133	16	16	10	153	364	6	2	467	111
Future Vol, veh/h	88	3	133	16	16	10	153	364	6	2	467	111
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	96	3	145	17	17	11	166	396	7	2	508	121
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	13.6	13.4	72.1	106.4
HCM LOS	B	B	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	30%	0%	100%	0%	38%	0%
Vol Thru, %	70%	0%	0%	2%	38%	81%
Vol Right, %	0%	100%	0%	98%	24%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	517	6	88	136	42	580
LT Vol	153	0	88	0	16	2
Through Vol	364	0	0	3	16	467
RT Vol	0	6	0	133	10	111
Lane Flow Rate	562	7	96	148	46	630
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.029	0.01	0.222	0.294	0.11	1.137
Departure Headway (Hd)	6.857	5.989	8.772	7.543	9.261	6.65
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	534	601	412	479	389	548
Service Time	4.557	3.689	6.472	5.243	7.261	4.65
HCM Lane V/C Ratio	1.052	0.012	0.233	0.309	0.118	1.15
HCM Control Delay	72.8	8.7	14	13.4	13.4	106.4
HCM Lane LOS	F	A	B	B	B	F
HCM 95th-tile Q	15.2	0	0.8	1.2	0.4	20.5

HCM 6th TWSC
3: Waiale Rd & Waiinu Rd

Intersection	
Int Delay, s/veh	42.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	168	61	462	600	62	554
Future Vol, veh/h	168	61	462	600	62	554
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	145	-	-	-	-
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	183	66	502	652	67	602

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1566	830	0	0	1156	0
Stage 1	830	-	-	-	-	-
Stage 2	736	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 122	370	-	-	604	-
Stage 1	428	-	-	-	-	-
Stage 2	474	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 101	369	-	-	603	-
Mov Cap-2 Maneuver	~ 101	-	-	-	-	-
Stage 1	427	-	-	-	-	-
Stage 2	395	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 350.4	0	1.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	101	369	603	-
HCM Lane V/C Ratio	-	-	1.808	0.18	0.112	-
HCM Control Delay (s)	-	-	$ 471.5	16.9	11.7	0
HCM Lane LOS	-	-	F	C	B	A
HCM 95th %tile Q(veh)	-	-	14.8	0.6	0.4	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	57.7											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	133	0	23	6	1	7	19	924	13	7	545	163
Future Vol, veh/h	133	0	23	6	1	7	19	924	13	7	545	163
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	145	0	25	7	1	8	21	1004	14	8	592	177

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1758	1763	684	1765	1844	1014	772	0	0	1021	0	0
Stage 1	700	700	-	1056	1056	-	-	-	-	-	-	-
Stage 2	1058	1063	-	709	788	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 66	84	449	65	75	290	843	-	-	680	-	-
Stage 1	430	441	-	272	302	-	-	-	-	-	-	-
Stage 2	272	300	-	425	402	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 60	77	448	58	69	289	841	-	-	678	-	-
Mov Cap-2 Maneuver	~ 60	77	-	58	69	-	-	-	-	-	-	-
Stage 1	404	430	-	255	284	-	-	-	-	-	-	-
Stage 2	249	282	-	393	392	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 674.7	48.4	0.2	0.1
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	841	-	-	60	448	98	678	-	-
HCM Lane V/C Ratio	0.025	-	-	2.409	0.056	0.155	0.011	-	-
HCM Control Delay (s)	9.4	0	-	$ 789.1	13.5	48.4	10.4	-	-
HCM Lane LOS	A	A	-	F	B	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	14.3	0.2	0.5	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	7.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	107	56	36	739	470	19
Future Vol, veh/h	107	56	36	739	470	19
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	61	39	803	511	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1406	525	535	0	-	0
Stage 1	525	-	-	-	-	-
Stage 2	881	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	153	552	1033	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	405	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	142	550	1030	-	-	-
Mov Cap-2 Maneuver	142	-	-	-	-	-
Stage 1	551	-	-	-	-	-
Stage 2	404	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	66.3	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1030	-	142	550	-	-
HCM Lane V/C Ratio	0.038	-	0.819	0.111	-	-
HCM Control Delay (s)	8.6	0	94.5	12.4	-	-
HCM Lane LOS	A	A	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	5.2	0.4	-	-

HCM 6th Signalized Intersection Summary
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	321	400	59	39	264	258	89	196	79	267	120	139
Future Volume (veh/h)	321	400	59	39	264	258	89	196	79	267	120	139
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	0.99		0.98	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	401	435	59	42	287	43	97	213	71	290	130	111
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	508	593	80	268	361	304	389	261	87	405	263	224
Arrive On Green	0.21	0.37	0.37	0.03	0.19	0.19	0.06	0.20	0.20	0.15	0.28	0.28
Sat Flow, veh/h	1781	1612	219	1781	1870	1577	1781	1336	445	1781	927	791
Grp Volume(v), veh/h	401	0	494	42	287	43	97	0	284	290	0	241
Grp Sat Flow(s),veh/h/ln	1781	0	1830	1781	1870	1577	1781	0	1782	1781	0	1718
Q Serve(g_s), s	13.0	0.0	18.2	1.5	11.4	1.8	3.3	0.0	11.9	9.5	0.0	9.1
Cycle Q Clear(g_c), s	13.0	0.0	18.2	1.5	11.4	1.8	3.3	0.0	11.9	9.5	0.0	9.1
Prop In Lane	1.00		0.12	1.00		1.00	1.00		0.25	1.00		0.46
Lane Grp Cap(c), veh/h	508	0	674	268	361	304	389	0	348	405	0	487
V/C Ratio(X)	0.79	0.00	0.73	0.16	0.80	0.14	0.25	0.00	0.82	0.72	0.00	0.50
Avail Cap(c_a), veh/h	735	0	916	465	576	485	577	0	503	436	0	487
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	21.3	24.2	30.0	26.1	22.8	0.0	30.0	20.1	0.0	23.3
Incr Delay (d2), s/veh	3.7	0.0	2.0	0.3	4.0	0.2	0.3	0.0	6.8	5.1	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	7.8	0.6	5.4	0.7	1.4	0.0	5.6	4.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	0.0	23.3	24.5	34.0	26.3	23.2	0.0	36.8	25.2	0.0	24.1
LnGrp LOS	C	A	C	C	C	C	C	A	D	C	A	C
Approach Vol, veh/h		895			372			381			531	
Approach Delay, s/veh		22.7			32.0			33.4			24.7	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.7	21.2	6.4	34.7	8.8	28.1	20.0	21.0				
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0				
Max Green Setting (Gmax), s	13.0	22.0	11.0	39.0	13.0	22.0	26.0	24.0				
Max Q Clear Time (g_c+I1), s	11.5	13.9	3.5	20.2	5.3	11.1	15.0	13.4				
Green Ext Time (p_c), s	0.1	1.1	0.0	3.3	0.1	1.1	1.0	1.4				
Intersection Summary												
HCM 6th Ctrl Delay			26.7									
HCM 6th LOS			C									

HCM 6th TWSC
7: Waiale Rd & Kokololio St

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	128	21	4	236	182	36
Future Vol, veh/h	128	21	4	236	182	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	139	23	4	257	198	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	483	218	237	0	-	0
Stage 1	218	-	-	-	-	-
Stage 2	265	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	542	822	1330	-	-	-
Stage 1	818	-	-	-	-	-
Stage 2	779	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	540	822	1330	-	-	-
Mov Cap-2 Maneuver	540	-	-	-	-	-
Stage 1	815	-	-	-	-	-
Stage 2	779	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1330	-	540	822	-	-
HCM Lane V/C Ratio	0.003	-	0.258	0.028	-	-
HCM Control Delay (s)	7.7	0	14	9.5	-	-
HCM Lane LOS	A	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	1	0.1	-	-

Intersection						
Int Delay, s/veh	3.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	73	78	17	168	172	30
Future Vol, veh/h	73	78	17	168	172	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	79	85	18	183	187	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	423	204	220	0	-	0
Stage 1	204	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	588	837	1349	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	579	837	1349	-	-	-
Mov Cap-2 Maneuver	579	-	-	-	-	-
Stage 1	818	-	-	-	-	-
Stage 2	817	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.9	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1349	-	689	-	-
HCM Lane V/C Ratio	0.014	-	0.238	-	-
HCM Control Delay (s)	7.7	0	11.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.9	-	-

Intersection						
Int Delay, s/veh	1.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	17	4	152	245	5
Future Vol, veh/h	33	17	4	152	245	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	36	18	4	165	266	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	442	269	271	0	-	0
Stage 1	269	-	-	-	-	-
Stage 2	173	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	573	770	1292	-	-	-
Stage 1	776	-	-	-	-	-
Stage 2	857	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	571	770	1292	-	-	-
Mov Cap-2 Maneuver	571	-	-	-	-	-
Stage 1	774	-	-	-	-	-
Stage 2	857	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1292	-	626	-	-
HCM Lane V/C Ratio	0.003	-	0.087	-	-
HCM Control Delay (s)	7.8	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

HCM 6th TWSC
10: Waiale Rd & Ohana Hana Loop

Intersection						
Int Delay, s/veh	1.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	23	5	127	249	13
Future Vol, veh/h	30	23	5	127	249	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	33	25	5	138	271	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	426	278	285	0	-	0
Stage 1	278	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	585	761	1277	-	-	-
Stage 1	769	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	583	761	1277	-	-	-
Mov Cap-2 Maneuver	636	-	-	-	-	-
Stage 1	766	-	-	-	-	-
Stage 2	880	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1277	-	685	-	-
HCM Lane V/C Ratio	0.004	-	0.084	-	-
HCM Control Delay (s)	7.8	-	10.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

HCM 6th TWSC
11: E Waiko Rd & Waiale Rd

Intersection						
Int Delay, s/veh	7.2					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	201	58	79	199	74
Future Vol, veh/h	53	201	58	79	199	74
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	58	218	63	86	216	80

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	149	0	-	0	440	106
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	334	-
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	1432	-	-	-	574	948
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	725	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1432	-	-	-	548	948
Mov Cap-2 Maneuver	-	-	-	-	548	-
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	725	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	16.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1432	-	-	-	619
HCM Lane V/C Ratio	0.04	-	-	-	0.479
HCM Control Delay (s)	7.6	0	-	-	16.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2.6

Intersection						
Int Delay, s/veh	2.6					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	108	744	403	54	36	93
Future Vol, veh/h	108	744	403	54	36	93
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	145	-	-	50	0	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	117	809	438	59	39	101

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	498	0	-	0	1482	439
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	1043	-
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	1066	-	-	-	138	618
Stage 1	-	-	-	-	650	-
Stage 2	-	-	-	-	339	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1065	-	-	-	123	617
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	339	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	21.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1065	-	-	-	123	617
HCM Lane V/C Ratio	0.11	-	-	-	0.318	0.164
HCM Control Delay (s)	8.8	-	-	-	47.4	12
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0.4	-	-	-	1.3	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	263	165	350	43	174	95	189	423	13	39	400	96
Future Volume (veh/h)	263	165	350	43	174	95	189	423	13	39	400	96
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	376	179	83	47	189	11	205	460	0	42	435	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	404	518	437	330	254	214	367	692		316	574	
Arrive On Green	0.18	0.28	0.28	0.04	0.14	0.14	0.10	0.37	0.00	0.04	0.31	0.00
Sat Flow, veh/h	1493	1870	1579	1781	1870	1573	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	376	179	83	47	189	11	205	460	0	42	435	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1579	1781	1870	1573	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	14.0	5.9	3.1	1.7	7.5	0.5	5.7	15.8	0.0	1.2	16.1	0.0
Cycle Q Clear(g_c), s	14.0	5.9	3.1	1.7	7.5	0.5	5.7	15.8	0.0	1.2	16.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	404	518	437	330	254	214	367	692		316	574	
V/C Ratio(X)	0.93	0.35	0.19	0.14	0.74	0.05	0.56	0.66		0.13	0.76	
Avail Cap(c_a), veh/h	404	518	437	581	487	410	743	1217		803	1217	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.2	22.2	21.2	26.7	31.9	28.9	16.7	20.2	0.0	17.7	24.0	0.0
Incr Delay (d2), s/veh	27.5	0.1	0.1	0.1	1.6	0.0	0.5	2.3	0.0	0.1	4.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	2.5	1.1	0.7	3.4	0.2	2.1	6.6	0.0	0.5	7.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	22.4	21.3	26.8	33.5	28.9	17.1	22.6	0.0	17.7	28.4	0.0
LnGrp LOS	D	C	C	C	C	C	B	C		B	C	
Approach Vol, veh/h		638			247			665	A		477	A
Approach Delay, s/veh		39.5			32.1			20.9			27.4	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	34.4	8.2	26.3	12.8	29.6	19.0	15.4
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	24.0	50.0	14.0	20.0	24.0	50.0	14.0	20.0
Max Q Clear Time (g_c+I1), s	3.2	17.8	3.7	7.9	7.7	18.1	16.0	9.5
Green Ext Time (p_c), s	0.0	5.9	0.0	0.6	0.2	5.5	0.0	0.5

Intersection Summary		
HCM 6th Ctrl Delay		29.7
HCM 6th LOS		C

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive
10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	160	70	234	61	201	15	385	365	289	496	13
Future Volume (veh/h)	33	160	70	234	61	201	15	385	365	289	496	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	36	174	11	254	66	82	16	418	0	314	539	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	356	271	261	419	456	612	297	565		448	798	731
Arrive On Green	0.03	0.13	0.13	0.15	0.24	0.24	0.02	0.30	0.00	0.14	0.43	0.43
Sat Flow, veh/h	1968	2067	1738	1781	1870	1579	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	36	174	11	254	66	82	16	418	0	314	539	6
Grp Sat Flow(s),veh/h/ln	1968	2067	1738	1781	1870	1579	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	1.2	6.1	0.4	8.8	2.1	2.6	0.5	15.3	0.0	8.6	17.7	0.2
Cycle Q Clear(g_c), s	1.2	6.1	0.4	8.8	2.1	2.6	0.5	15.3	0.0	8.6	17.7	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	356	271	261	419	456	612	297	565		448	798	731
V/C Ratio(X)	0.10	0.64	0.04	0.61	0.14	0.13	0.05	0.74		0.70	0.68	0.01
Avail Cap(c_a), veh/h	520	814	718	601	983	1056	707	1474		637	1474	1303
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	31.4	27.7	22.0	22.6	15.1	18.2	23.9	0.0	15.8	17.6	11.1
Incr Delay (d2), s/veh	0.1	0.9	0.0	1.4	0.1	0.0	0.0	4.0	0.0	0.8	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	3.1	0.2	3.7	0.9	0.9	0.2	6.9	0.0	3.1	7.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.1	32.3	27.7	23.4	22.6	15.1	18.2	27.9	0.0	16.5	19.7	11.1
LnGrp LOS	C	C	C	C	C	B	B	C		B	B	B
Approach Vol, veh/h		221			402			434	A		859	
Approach Delay, s/veh		31.2			21.6			27.6			18.5	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.9	29.0	16.2	15.0	6.4	38.5	7.7	23.6
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	19.0	60.0	19.0	30.0	19.0	60.0	9.0	40.0
Max Q Clear Time (g_c+I1), s	10.6	17.3	10.8	8.1	2.5	19.7	3.2	4.6
Green Ext Time (p_c), s	0.3	5.7	0.5	0.6	0.0	8.0	0.0	0.4

Intersection Summary		
HCM 6th Ctrl Delay		22.7
HCM 6th LOS		C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St
10/07/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	153	88	18	617	687	62
Future Volume (veh/h)	153	88	18	617	687	62
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	166	13	20	671	747	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	263	234	315	1180	946	802
Arrive On Green	0.15	0.15	0.02	0.63	0.51	0.51
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	166	13	20	671	747	40
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	4.3	0.3	0.2	10.3	16.3	0.6
Cycle Q Clear(g_c), s	4.3	0.3	0.2	10.3	16.3	0.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	263	234	315	1180	946	802
V/C Ratio(X)	0.63	0.06	0.06	0.57	0.79	0.05
Avail Cap(c_a), veh/h	1077	958	774	3392	2676	2268
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.9	18.2	8.1	5.3	10.1	6.2
Incr Delay (d2), s/veh	2.5	0.1	0.1	0.4	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.1	0.1	2.5	5.3	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.4	18.3	8.2	5.7	11.6	6.2
LnGrp LOS	C	B	A	A	B	A
Approach Vol, veh/h	179			691	787	
Approach Delay, s/veh	22.1			5.8	11.3	
Approach LOS	C			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	6.2	31.1	12.3	37.3
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	2.2	18.3	6.3	12.3
Green Ext Time (p_c), s	0.0	6.8	0.5	5.6

Intersection Summary		
HCM 6th Ctrl Delay		10.2
HCM 6th LOS		B

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	13	6	75	7	48	4	558	67	143	624	6
Future Volume (veh/h)	20	13	6	75	7	48	4	558	67	143	624	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	14	2	82	8	32	4	607	69	155	678	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	198	101	180	214	19	45	420	867	99	459	1123	952
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.01	0.53	0.53	0.08	0.60	0.60
Sat Flow, veh/h	842	886	1578	952	165	397	1781	1649	187	1781	1870	1585
Grp Volume(v), veh/h	36	0	2	122	0	0	4	0	676	155	678	4
Grp Sat Flow(s),veh/h/ln	1728	0	1578	1514	0	0	1781	0	1837	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.1	3.4	0.0	0.0	0.1	0.0	15.8	2.0	13.0	0.1
Cycle Q Clear(g_c), s	1.0	0.0	0.1	4.4	0.0	0.0	0.1	0.0	15.8	2.0	13.0	0.1
Prop In Lane	0.61		1.00	0.67		0.26	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	298	0	180	278	0	0	420	0	965	459	1123	952
V/C Ratio(X)	0.12	0.00	0.01	0.44	0.00	0.00	0.01	0.00	0.70	0.34	0.60	0.00
Avail Cap(c_a), veh/h	793	0	691	752	0	0	847	0	2253	754	2294	1944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	0.0	22.4	24.3	0.0	0.0	7.0	0.0	10.2	7.5	7.1	4.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.4	0.0	0.0	0.0	0.0	2.0	0.2	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.5	0.0	0.0	0.0	0.0	5.5	0.5	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.9	0.0	22.4	24.7	0.0	0.0	7.0	0.0	12.1	7.7	8.3	4.6
LnGrp LOS	C	A	C	C	A	A	A	A	B	A	A	A
Approach Vol, veh/h		38			122			680			837	
Approach Delay, s/veh		22.9			24.7			12.1			8.1	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	9.6	36.0	11.5	5.3	40.3	11.5
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	14.0	70.0	25.0	14.0	70.0	25.0
Max Q Clear Time (g_c+I1), s	4.0	17.8	3.0	2.1	15.0	6.4
Green Ext Time (p_c), s	0.1	12.2	0.1	0.0	12.3	0.4

Intersection Summary	
HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
17: Kuikahi Dr & Kehalani Mauka Pkwy

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	148	57	48	103	32
Future Vol, veh/h	28	148	57	48	103	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	275	-	-	-	275	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	30	161	62	52	112	35

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	114	0	-	0	309	88
Stage 1	-	-	-	-	88	-
Stage 2	-	-	-	-	221	-
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	1475	-	-	-	683	970
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	816	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1475	-	-	-	669	970
Mov Cap-2 Maneuver	-	-	-	-	669	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	816	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1475	-	-	-	669	970
HCM Lane V/C Ratio	0.021	-	-	-	0.167	0.036
HCM Control Delay (s)	7.5	-	-	-	11.5	8.8
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6	0.1

APPENDIX C

LOS WORKSHEETS

Existing Conditions – PM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kamehameha Ave														
102	L2	102	2.0	107	2.0	0.509	10.6	LOS B	4.5	113.6	0.95	1.04	1.11	19.9
7	T1	127	2.0	134	2.0	0.509	7.9	LOS A	4.5	113.6	0.95	1.04	1.11	18.6
25	R2	70	2.0	74	2.0	0.509	7.9	LOS A	4.5	113.6	0.95	1.04	1.11	18.6
Approach		299	2.0	315	2.0	0.509	8.8	LOS A	4.5	113.6	0.95	1.04	1.11	19.0
East: WB Maui Lani Parkway														
19	L2	74	2.0	78	2.0	0.802	14.5	LOS B	11.9	303.3	1.00	1.34	1.54	19.4
336	T1	294	2.0	309	2.0	0.802	11.8	LOS B	11.9	303.3	1.00	1.34	1.54	18.1
24	R2	276	2.0	291	2.0	0.802	11.8	LOS B	11.9	303.3	1.00	1.34	1.54	18.1
Approach		644	2.0	678	2.0	0.802	12.1	LOS B	11.9	303.3	1.00	1.34	1.54	18.2
North: SB Kamehameha Ave														
15	L2	180	2.0	189	2.0	0.774	11.7	LOS B	10.8	273.8	0.98	1.19	1.36	19.7
2	T1	169	2.0	178	2.0	0.774	9.0	LOS A	10.8	273.8	0.98	1.19	1.36	18.4
40	R2	299	2.0	315	2.0	0.774	9.0	LOS A	10.8	273.8	0.98	1.19	1.36	18.4
Approach		648	2.0	682	2.0	0.774	9.7	LOS A	10.8	273.8	0.98	1.19	1.36	18.8
West: EB Maui Lani Parkway														
30	L2	315	2.0	332	2.0	0.806	11.9	LOS B	12.3	313.4	1.00	1.20	1.40	19.6
464	T1	269	2.0	283	2.0	0.806	9.2	LOS A	12.3	313.4	1.00	1.20	1.40	18.3
78	R2	122	2.0	128	2.0	0.806	9.2	LOS A	12.3	313.4	1.00	1.20	1.40	18.3
Approach		706	2.0	743	2.0	0.806	10.4	LOS B	12.3	313.4	1.00	1.20	1.40	18.9
All Vehicles		2297	2.0	2418	2.0	0.806	10.5	LOS B	12.3	313.4	0.99	1.22	1.39	18.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AUSTIN, TSUTSUMI & ASSOCIATES, INC. | Licence: PLUS / 1PC | Processed: Friday, July 29, 2022 11:46:56 AM
Project: N:\2022\22-519 Puunani Homestead TIAR Ph II TIAR\1. Existing\Kam - MLP RAB Existing PM.sip9

Intersection	
Intersection Delay, s/veh	64.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	10	164	15	4	8	90	389	21	8	498	69
Future Vol, veh/h	60	10	164	15	4	8	90	389	21	8	498	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	11	178	16	4	9	98	423	23	9	541	75
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	13.9	12.8	48.6	100.9
HCM LOS	B	B	E	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	19%	0%	100%	0%	56%	1%
Vol Thru, %	81%	0%	0%	6%	15%	87%
Vol Right, %	0%	100%	0%	94%	30%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	479	21	60	174	27	575
LT Vol	90	0	60	0	15	8
Through Vol	389	0	0	10	4	498
RT Vol	0	21	0	164	8	69
Lane Flow Rate	521	23	65	189	29	625
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	0.937	0.036	0.148	0.368	0.07	1.123
Departure Headway (Hd)	6.715	5.902	8.546	7.345	9.093	6.469
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	541	610	422	494	396	562
Service Time	4.415	3.602	6.246	5.045	7.093	4.52
HCM Lane V/C Ratio	0.963	0.038	0.154	0.383	0.073	1.112
HCM Control Delay	50.3	8.8	12.7	14.3	12.8	100.9
HCM Lane LOS	F	A	B	B	B	F
HCM 95th-tile Q	11.8	0.1	0.5	1.7	0.2	20.1

Intersection	
Int Delay, s/veh	69.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	228	55	445	317	55	622
Future Vol, veh/h	228	55	445	317	55	622
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	145	-	-	-	-
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	248	60	484	345	60	676

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1455	659	0	0	831	0
Stage 1	659	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 143	464	-	-	801	-
Stage 1	515	-	-	-	-	-
Stage 2	444	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 126	463	-	-	799	-
Mov Cap-2 Maneuver	~ 126	-	-	-	-	-
Stage 1	514	-	-	-	-	-
Stage 2	391	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 422.1	0	0.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	126	463	799	-
HCM Lane V/C Ratio	-	-	1.967	0.129	0.075	-
HCM Control Delay (s)	-	-	$ 520.6	13.9	9.9	0
HCM Lane LOS	-	-	F	B	A	A
HCM 95th %tile Q(veh)	-	-	19.9	0.4	0.2	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

4: Waiale Rd & Olomea St/Waimaluhia Ln

Intersection												
Int Delay, s/veh	11.8											
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations												
Traffic Vol, veh/h	75	0	20	3	1	19	32	662	2	5	638	213
Future Vol, veh/h	75	0	20	3	1	19	32	662	2	5	638	213
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	82	0	22	3	1	21	35	720	2	5	693	232

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1624	1617	812	1624	1732	724	928	0	0	725	0	0
Stage 1	822	822	-	794	794	-	-	-	-	-	-	-
Stage 2	802	795	-	830	938	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	82	103	379	82	88	426	737	-	-	878	-	-
Stage 1	368	388	-	381	400	-	-	-	-	-	-	-
Stage 2	378	399	-	364	343	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 72	93	378	72	80	425	735	-	-	875	-	-
Mov Cap-2 Maneuver	~ 72	93	-	72	80	-	-	-	-	-	-	-
Stage 1	337	382	-	349	367	-	-	-	-	-	-	-
Stage 2	330	366	-	339	338	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	198.3	22.3	0.5	0.1
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	735	-	-	72	378	233	875	-	-
HCM Lane V/C Ratio	0.047	-	-	1.132	0.058	0.107	0.006	-	-
HCM Control Delay (s)	10.1	0	-	247.1	15.1	22.3	9.1	-	-
HCM Lane LOS	B	A	-	F	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	6.2	0.2	0.4	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

5: Waiale Rd & Kaupo St

Intersection						
Int Delay, s/veh	1.4					
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations						
Traffic Vol, veh/h	29	30	42	604	528	22
Future Vol, veh/h	29	30	42	604	528	22
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	32	33	46	657	574	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1338	589	601	0	-	0
Stage 1	589	-	-	-	-	-
Stage 2	749	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	169	508	976	-	-	-
Stage 1	554	-	-	-	-	-
Stage 2	467	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	155	507	973	-	-	-
Mov Cap-2 Maneuver	155	-	-	-	-	-
Stage 1	511	-	-	-	-	-
Stage 2	466	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.2	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	973	-	155	507	-	-
HCM Lane V/C Ratio	0.047	-	0.203	0.064	-	-
HCM Control Delay (s)	8.9	0	34.1	12.6	-	-
HCM Lane LOS	A	A	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	236	361	49	71	405	300	59	110	62	322	119	117
Future Volume (veh/h)	236	361	49	71	405	300	59	110	62	322	119	117
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	295	392	49	77	440	74	64	120	44	350	129	90
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	415	616	77	358	517	437	331	170	62	436	252	175
Arrive On Green	0.15	0.38	0.38	0.05	0.28	0.28	0.04	0.13	0.13	0.16	0.25	0.25
Sat Flow, veh/h	1781	1630	204	1781	1870	1582	1781	1304	478	1781	1025	715
Grp Volume(v), veh/h	295	0	441	77	440	74	64	0	164	350	0	219
Grp Sat Flow(s),veh/h/ln	1781	0	1833	1781	1870	1582	1781	0	1782	1781	0	1740
Q Serve(g_s), s	7.6	0.0	13.7	2.1	15.5	2.5	2.1	0.0	6.1	11.0	0.0	7.6
Cycle Q Clear(g_c), s	7.6	0.0	13.7	2.1	15.5	2.5	2.1	0.0	6.1	11.0	0.0	7.6
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.27	1.00		0.41
Lane Grp Cap(c), veh/h	415	0	693	358	517	437	331	0	232	436	0	427
V/C Ratio(X)	0.71	0.00	0.64	0.22	0.85	0.17	0.19	0.00	0.71	0.80	0.00	0.51
Avail Cap(c_a), veh/h	816	0	1027	556	645	545	536	0	614	436	0	600
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	17.8	17.0	23.9	19.1	24.7	0.0	29.0	21.3	0.0	22.7
Incr Delay (d2), s/veh	2.3	0.0	1.0	0.3	8.9	0.2	0.3	0.0	3.9	10.4	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	5.6	0.9	7.8	0.9	0.9	0.0	2.8	5.8	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	0.0	18.7	17.3	32.7	19.3	25.0	0.0	32.9	31.6	0.0	23.6
LnGrp LOS	B	A	B	B	C	B	C	A	C	C	A	C
Approach Vol, veh/h		736			591			228			569	
Approach Delay, s/veh		18.3			29.0			30.7			28.6	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	15.1	7.3	32.3	7.0	23.1	14.3	25.2
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	11.0	24.0	11.0	39.0	11.0	24.0	26.0	24.0
Max Q Clear Time (g_c+I1), s	13.0	8.1	4.1	15.7	4.1	9.6	9.6	17.5
Green Ext Time (p_c), s	0.0	0.8	0.1	3.0	0.1	1.1	0.8	1.7

Intersection Summary			
HCM 6th Ctrl Delay			25.4
HCM 6th LOS			C

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	52	15	32	179	174	65
Future Vol, veh/h	52	15	32	179	174	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	57	16	35	195	189	71

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	490	225	260	0	-	0
Stage 1	225	-	-	-	-	-
Stage 2	265	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	537	814	1304	-	-	-
Stage 1	812	-	-	-	-	-
Stage 2	779	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	521	814	1304	-	-	-
Mov Cap-2 Maneuver	521	-	-	-	-	-
Stage 1	788	-	-	-	-	-
Stage 2	779	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	1.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1304	-	521	814	-	-
HCM Lane V/C Ratio	0.027	-	0.108	0.02	-	-
HCM Control Delay (s)	7.8	0	12.7	9.5	-	-
HCM Lane LOS	A	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0.1	-	-

Intersection						
Int Delay, s/veh	2.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	45	33	70	166	135	54
Future Vol, veh/h	45	33	70	166	135	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	49	36	76	180	147	59

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	509	177	206	0	-	0
Stage 1	177	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	524	866	1365	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	727	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	492	866	1365	-	-	-
Mov Cap-2 Maneuver	492	-	-	-	-	-
Stage 1	801	-	-	-	-	-
Stage 2	727	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	2.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1365	-	602	-	-
HCM Lane V/C Ratio	0.056	-	0.141	-	-
HCM Control Delay (s)	7.8	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.5	-	-

Intersection						
Int Delay, s/veh	1.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	20	19	225	155	13
Future Vol, veh/h	12	20	19	225	155	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	13	22	21	245	168	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	462	175	182	0	-	0
Stage 1	175	-	-	-	-	-
Stage 2	287	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	558	868	1393	-	-	-
Stage 1	855	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	549	868	1393	-	-	-
Mov Cap-2 Maneuver	549	-	-	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	762	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1393	-	713	-	-
HCM Lane V/C Ratio	0.015	-	0.049	-	-
HCM Control Delay (s)	7.6	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations						
Traffic Vol, veh/h	13	9	16	231	159	16
Future Vol, veh/h	13	9	16	231	159	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	14	10	17	251	173	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	467	182	190	0	-	0
Stage 1	182	-	-	-	-	-
Stage 2	285	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	554	861	1384	-	-	-
Stage 1	849	-	-	-	-	-
Stage 2	763	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	547	861	1384	-	-	-
Mov Cap-2 Maneuver	613	-	-	-	-	-
Stage 1	839	-	-	-	-	-
Stage 2	763	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1384	-	695	-	-
HCM Lane V/C Ratio	0.013	-	0.034	-	-
HCM Control Delay (s)	7.6	-	10.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection						
Int Delay, s/veh	4.4					
Movement	**EBL**	**EBT**	**WBT**	**WBR**	**SBL**	**SBR**
Lane Configurations						
Traffic Vol, veh/h	49	94	125	198	135	34
Future Vol, veh/h	49	94	125	198	135	34
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	53	102	136	215	147	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	351	0	-	0	452	244
Stage 1	-	-	-	-	244	-
Stage 2	-	-	-	-	208	-
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	1208	-	-	-	565	795
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	827	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1208	-	-	-	538	795
Mov Cap-2 Maneuver	-	-	-	-	538	-
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	827	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	14.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1208	-	-	-	575
HCM Lane V/C Ratio	0.044	-	-	-	0.319
HCM Control Delay (s)	8.1	0	-	-	14.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.4

HCM 6th TWSC
12: Kuikahi Dr & Kehalani Village Center Dr

Intersection						
Int Delay, s/veh	4					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	111	528	496	104	59	131
Future Vol, veh/h	111	528	496	104	59	131
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	145	-	-	50	0	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	121	574	539	113	64	142

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	653	0	-	0	1356	540
Stage 1	-	-	-	-	540	-
Stage 2	-	-	-	-	816	-
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	934	-	-	-	165	542
Stage 1	-	-	-	-	584	-
Stage 2	-	-	-	-	435	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	933	-	-	-	143	541
Mov Cap-2 Maneuver	-	-	-	-	143	-
Stage 1	-	-	-	-	507	-
Stage 2	-	-	-	-	435	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	24.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	933	-	-	-	143	541
HCM Lane V/C Ratio	0.129	-	-	-	0.448	0.263
HCM Control Delay (s)	9.4	-	-	-	49.2	14
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0.4	-	-	-	2	1.1

HCM 6th Signalized Intersection Summary
13: Honoapiilani Hwy & Kehalani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	48	116	50	146	72	170	413	17	42	506	181
Future Volume (veh/h)	128	48	116	50	146	72	170	413	17	42	506	181
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	183	52	19	54	159	6	185	449	0	46	550	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	342	417	349	362	269	223	348	792		391	703	
Arrive On Green	0.12	0.22	0.22	0.04	0.14	0.14	0.09	0.42	0.00	0.04	0.38	0.00
Sat Flow, veh/h	1493	1870	1564	1781	1870	1552	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	183	52	19	54	159	6	185	449	0	46	550	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1564	1781	1870	1552	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	7.7	1.7	0.7	2.0	6.2	0.3	4.8	14.2	0.0	1.2	20.3	0.0
Cycle Q Clear(g_c), s	7.7	1.7	0.7	2.0	6.2	0.3	4.8	14.2	0.0	1.2	20.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	342	417	349	362	269	223	348	792		391	703	
V/C Ratio(X)	0.54	0.12	0.05	0.15	0.59	0.03	0.53	0.57		0.12	0.78	
Avail Cap(c_a), veh/h	426	479	401	603	479	398	739	1198		867	1198	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.8	24.2	23.8	26.5	31.3	28.7	15.7	17.1	0.0	14.4	21.5	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.1	0.8	0.0	0.5	1.4	0.0	0.0	4.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.8	0.3	0.8	2.8	0.1	1.7	5.7	0.0	0.4	8.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.3	24.3	23.9	26.6	32.0	28.7	16.2	18.4	0.0	14.4	25.6	0.0
LnGrp LOS	C	C	C	C	C	C	B	B		B	C	
Approach Vol, veh/h		254			219			634	A		596	A
Approach Delay, s/veh		23.5			30.6			17.8			24.8	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	39.0	8.4	22.4	11.9	35.3	14.6	16.2
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	24.0	50.0	14.0	20.0	24.0	50.0	14.0	20.0
Max Q Clear Time (g_c+I1), s	3.2	16.2	4.0	3.7	6.8	22.3	9.7	8.2
Green Ext Time (p_c), s	0.0	5.8	0.0	0.1	0.2	7.0	0.1	0.4

Intersection Summary	
HCM 6th Ctrl Delay	22.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	108	31	279	127	221	47	390	339	230	365	17
Future Volume (veh/h)	9	108	31	279	127	221	47	390	339	230	365	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	10	117	5	303	138	88	51	424	0	250	397	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	299	270	305	498	540	646	383	572		404	713	622
Arrive On Green	0.01	0.13	0.13	0.17	0.29	0.29	0.04	0.31	0.00	0.12	0.38	0.38
Sat Flow, veh/h	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1581
Grp Volume(v), veh/h	10	117	5	303	138	88	51	424	0	250	397	7
Grp Sat Flow(s),veh/h/ln	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1581
Q Serve(g_s), s	0.3	4.0	0.2	10.5	4.3	2.7	1.5	15.6	0.0	6.9	12.8	0.2
Cycle Q Clear(g_c), s	0.3	4.0	0.2	10.5	4.3	2.7	1.5	15.6	0.0	6.9	12.8	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	299	270	305	498	540	646	383	572		404	713	622
V/C Ratio(X)	0.03	0.43	0.02	0.61	0.26	0.14	0.13	0.74		0.62	0.56	0.01
Avail Cap(c_a), veh/h	506	810	762	637	978	1017	748	1467		635	1467	1260
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.2	30.6	26.2	21.2	20.9	14.2	17.0	23.8	0.0	16.2	18.6	14.1
Incr Delay (d2), s/veh	0.0	0.4	0.0	1.2	0.1	0.0	0.1	4.0	0.0	0.6	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.0	0.1	4.4	1.9	0.9	0.6	7.0	0.0	2.6	5.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.3	31.1	26.2	22.4	21.0	14.3	17.1	27.9	0.0	16.7	20.1	14.1
LnGrp LOS	C	C	C	C	C	B	B	C		B	C	B
Approach Vol, veh/h		132			529			475	A		654	
Approach Delay, s/veh		30.7			20.7			26.7			18.7	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	29.4	18.0	15.0	8.3	35.2	6.0	27.1
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	19.0	60.0	19.0	30.0	19.0	60.0	9.0	40.0
Max Q Clear Time (g_c+I1), s	13.9	17.6	12.5	6.0	3.5	14.8	2.3	6.3
Green Ext Time (p_c), s	0.3	5.8	0.5	0.4	0.0	5.5	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	22.3
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	31	57	695	563	125
Future Volume (veh/h)	95	31	57	695	563	125
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	103	1	62	755	612	73
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	235	209	408	1149	820	694
Arrive On Green	0.13	0.13	0.06	0.61	0.44	0.44
Sat Flow, veh/h	1781	1585	1781	1870	1870	1583
Grp Volume(v), veh/h	103	1	62	755	612	73
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1583
Q Serve(g_s), s	2.3	0.0	0.7	11.3	11.8	1.2
Cycle Q Clear(g_c), s	2.3	0.0	0.7	11.3	11.8	1.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	235	209	408	1149	820	694
V/C Ratio(X)	0.44	0.00	0.15	0.66	0.75	0.11
Avail Cap(c_a), veh/h	1233	1097	875	3884	3064	2594
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	16.3	7.0	5.4	10.2	7.2
Incr Delay (d2), s/veh	1.3	0.0	0.2	0.6	1.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.2	2.5	3.9	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.6	16.4	7.2	6.0	11.5	7.2
LnGrp LOS	B	B	A	A	B	A
Approach Vol, veh/h	104			817	685	
Approach Delay, s/veh	18.6			6.1	11.1	
Approach LOS	B			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	7.6	25.0	10.7	32.6
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	2.7	13.8	4.3	13.3
Green Ext Time (p_c), s	0.1	5.2	0.3	6.8

Intersection Summary	
HCM 6th Ctrl Delay	9.1
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	7	3	57	10	74	9	665	76	64	516	22
Future Volume (veh/h)	12	7	3	57	10	74	9	665	76	64	516	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	8	1	62	11	44	10	723	80	70	561	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	89	161	159	23	58	543	982	109	400	1191	1008
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.01	0.59	0.59	0.06	0.64	0.64
Sat Flow, veh/h	869	873	1585	725	230	576	1781	1654	183	1781	1870	1584
Grp Volume(v), veh/h	21	0	1	117	0	0	10	0	803	70	561	15
Grp Sat Flow(s),veh/h/ln	1741	0	1585	1531	0	0	1781	0	1837	1781	1870	1584
Q Serve(g_s), s	0.0	0.0	0.0	4.1	0.0	0.0	0.1	0.0	20.2	0.9	10.0	0.2
Cycle Q Clear(g_c), s	0.7	0.0	0.0	4.7	0.0	0.0	0.1	0.0	20.2	0.9	10.0	0.2
Prop In Lane	0.62		1.00	0.53		0.38	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	267	0	161	241	0	0	543	0	1091	400	1191	1008
V/C Ratio(X)	0.08	0.00	0.01	0.49	0.00	0.00	0.02	0.00	0.74	0.18	0.47	0.01
Avail Cap(c_a), veh/h	702	0	617	675	0	0	909	0	2003	689	2039	1727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	0.0	25.9	28.0	0.0	0.0	5.4	0.0	9.4	7.7	6.1	4.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	2.1	0.1	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.7	0.0	0.0	0.0	0.0	6.8	0.2	3.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.3	0.0	25.9	28.6	0.0	0.0	5.4	0.0	11.5	7.7	6.7	4.3
LnGrp LOS	C	A	C	C	A	A	A	A	B	A	A	A
Approach Vol, veh/h		22			117			813			646	
Approach Delay, s/veh		26.2			28.6			11.4			6.7	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.6	44.1		11.5	5.8	46.9		11.5
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0
Max Q Clear Time (g_c+I1), s	2.9	22.2		2.7	2.1	12.0		6.7
Green Ext Time (p_c), s	0.0	15.9		0.0	0.0	9.4		0.4

Intersection Summary	
HCM 6th Ctrl Delay	11.0
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
17: Kuikahi Dr & Kehalani Mauka Pkwy

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	95	137	60	60	24
Future Vol, veh/h	9	95	137	60	60	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	275	-	-	-	275	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	10	103	149	65	65	26

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	214	0	-	0	305	182
Stage 1	-	-	-	-	182	-
Stage 2	-	-	-	-	123	-
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	1356	-	-	-	687	861
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	902	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1356	-	-	-	682	861
Mov Cap-2 Maneuver	-	-	-	-	682	-
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1356	-	-	-	682	861
HCM Lane V/C Ratio	0.007	-	-	-	0.096	0.03
HCM Control Delay (s)	7.7	-	-	-	10.8	9.3
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0.1

APPENDIX C

LOS WORKSHEETS

Base Year Conditions WITHOUT Waiale Extension WITHOUT MAUI LANI PARKWAY Extension – AM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kamehameha Ave														
102	L2	178	2.0	187	2.0	1.046	73.1	LOS F	29.9	760.0	1.00	2.66	3.54	12.9
7	T1	219	2.0	231	2.0	1.046	70.4	LOS F	29.9	760.0	1.00	2.66	3.54	12.3
25	R2	103	2.0	108	2.0	1.046	70.4	LOS F	29.9	760.0	1.00	2.66	3.54	12.3
Approach		500	2.0	526	2.0	1.046	71.3	LOS F	29.9	760.0	1.00	2.66	3.54	12.5
East: WB Maui Lani Parkway														
19	L2	85	2.0	89	2.0	0.777	17.4	LOS C	10.7	270.9	1.00	1.43	1.62	18.9
336	T1	283	2.0	298	2.0	0.777	14.7	LOS B	10.7	270.9	1.00	1.43	1.62	17.7
24	R2	160	2.0	168	2.0	0.777	14.7	LOS B	10.7	270.9	1.00	1.43	1.62	17.7
Approach		528	2.0	556	2.0	0.777	15.1	LOS C	10.7	270.9	1.00	1.43	1.62	17.8
North: SB Kamehameha Ave														
15	L2	268	2.0	282	2.0	0.963	30.0	LOS D	25.3	642.3	1.00	1.99	2.41	17.0
2	T1	157	2.0	165	2.0	0.963	27.3	LOS D	25.3	642.3	1.00	1.99	2.41	16.0
40	R2	336	2.0	354	2.0	0.963	27.3	LOS D	25.3	642.3	1.00	1.99	2.41	16.0
Approach		761	2.0	801	2.0	0.963	28.3	LOS D	25.3	642.3	1.00	1.99	2.41	16.4
West: EB Maui Lani Parkway														
30	L2	318	2.0	335	2.0	0.992	35.0	LOS D	29.8	755.8	1.00	2.16	2.62	16.4
464	T1	335	2.0	353	2.0	0.992	32.2	LOS D	29.8	755.8	1.00	2.16	2.62	15.5
78	R2	136	2.0	143	2.0	0.992	32.2	LOS D	29.8	755.8	1.00	2.16	2.62	15.5
Approach		789	2.0	831	2.0	0.992	33.3	LOS D	29.8	755.8	1.00	2.16	2.62	15.9
All Vehicles		2578	2.0	2714	2.0	1.046	35.5	LOS E	29.9	760.0	1.00	2.06	2.53	15.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection	
Intersection Delay, s/veh	173.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	88	3	166	18	16	10	183	457	7	2	611	111
Future Vol, veh/h	88	3	166	18	16	10	183	457	7	2	611	111
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	96	3	180	20	17	11	199	497	8	2	664	121
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	15.4	15	173.5	238.6
HCM LOS	C	B	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	29%	0%	100%	0%	41%	0%
Vol Thru, %	71%	0%	0%	2%	36%	84%
Vol Right, %	0%	100%	0%	98%	23%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	640	7	88	169	44	724
LT Vol	183	0	88	0	18	2
Through Vol	457	0	0	3	16	611
RT Vol	0	7	0	166	10	111
Lane Flow Rate	696	8	96	184	48	787
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.309	0.013	0.221	0.365	0.118	1.462
Departure Headway (Hd)	7.344	6.475	9.558	8.31	10.618	7.153
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	501	556	378	435	340	512
Service Time	5.044	4.175	7.258	6.01	8.618	5.153
HCM Lane V/C Ratio	1.389	0.014	0.254	0.423	0.141	1.537
HCM Control Delay	175.3	9.3	14.9	15.7	15	238.6
HCM Lane LOS	F	A	B	C	B	F
HCM 95th-tile Q	27.6	0	0.8	1.6	0.4	36.6

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Waiale Rd														
7	T1	585	2.0	616	2.0	1.087	44.8	LOS F	101.9	2589.4	1.00	1.12	1.62	14.3
25	R2	760	2.0	800	2.0	1.087	44.8	LOS F	101.9	2589.4	1.00	1.12	1.62	14.3
Approach		1345	2.0	1416	2.0	1.087	44.8	LOS E	101.9	2589.4	1.00	1.12	1.62	14.3
East: WB Waiinu Rd														
19	L2	233	2.0	245	2.0	0.393	6.2	LOS A	2.9	74.4	0.82	0.78	0.82	20.4
24	R2	61	2.0	64	2.0	0.393	3.5	LOS A	2.9	74.4	0.82	0.78	0.82	19.0
Approach		294	2.0	309	2.0	0.393	5.6	LOS A	2.9	74.4	0.82	0.78	0.82	20.1
North: SB Waiale Rd														
15	L2	62	2.0	65	2.0	0.754	6.8	LOS A	10.2	259.6	0.85	0.75	0.96	20.6
2	T1	731	2.0	769	2.0	0.754	4.1	LOS A	10.2	259.6	0.85	0.75	0.96	19.1
Approach		793	2.0	835	2.0	0.754	4.3	LOS A	10.2	259.6	0.85	0.75	0.96	19.2
All Vehicles		2432	2.0	2560	2.0	1.087	26.8	LOS D	101.9	2589.4	0.93	0.95	1.31	16.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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HCM 6th TWSC
4: Waiale Rd & Olomea St/Waimaluhia Ln 10/07/2022

Intersection	
Int Delay, s/veh	190.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	144	0	23	6	1	7	19	1196	13	7	770	170
Future Vol, veh/h	144	0	23	6	1	7	19	1196	13	7	770	170
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	157	0	25	7	1	8	21	1300	14	8	837	185

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2303	2308	933	2310	2393	1310	1025	0	0	1317	0	0
Stage 1	949	949	-	1352	1352	-	-	-	-	-	-	-
Stage 2	1354	1359	-	958	1041	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 27	38	323	27	34	194	677	-	-	525	-	-
Stage 1	313	339	-	185	218	-	-	-	-	-	-	-
Stage 2	185	217	-	309	307	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 22	32	322	22	29	193	675	-	-	524	-	-
Mov Cap-2 Maneuver	~ 22	32	-	22	29	-	-	-	-	-	-	-
Stage 1	276	325	-	163	192	-	-	-	-	-	-	-
Stage 2	~ 156	191	-	274	295	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 2674.5	137.6	0.2	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	675	-	-	22	322	41	524	-	-
HCM Lane V/C Ratio	0.031	-	-	7.115	0.078	0.371	0.015	-	-
HCM Control Delay (s)	10.5	0	-	$ 3099	17.1	137.6	12	-	-
HCM Lane LOS	B	A	-	F	C	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	19.8	0.3	1.3	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
5: Waiale Rd & Kaupo St 10/07/2022

Intersection	
Int Delay, s/veh	51.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	130	71	50	988	674	40
Future Vol, veh/h	130	71	50	988	674	40
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	141	77	54	1074	733	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1940	758	779	0	-	0
Stage 1	758	-	-	-	-	-
Stage 2	1182	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 72	407	838	-	-	-
Stage 1	463	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 60	406	836	-	-	-
Mov Cap-2 Maneuver	~ 60	-	-	-	-	-
Stage 1	388	-	-	-	-	-
Stage 2	290	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 500.8	0.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	836	-	60	406	-	-
HCM Lane V/C Ratio	0.065	-	2.355	0.19	-	-
HCM Control Delay (s)	9.6	0	$ 765.6	15.9	-	-
HCM Lane LOS	A	A	F	C	-	-
HCM 95th %tile Q(veh)	0.2	-	14	0.7	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	414	544	87	72	350	320	125	290	122	332	233	169
Future Volume (veh/h)	414	544	87	72	350	320	125	290	122	332	233	169
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	518	591	90	78	380	91	136	315	117	361	253	157
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	510	632	96	187	374	315	264	308	115	289	317	197
Arrive On Green	0.25	0.40	0.40	0.05	0.20	0.20	0.07	0.24	0.24	0.12	0.30	0.30
Sat Flow, veh/h	1781	1585	241	1781	1870	1577	1781	1295	481	1781	1075	667
Grp Volume(v), veh/h	518	0	681	78	380	91	136	0	432	361	0	410
Grp Sat Flow(s),veh/h/ln	1781	0	1826	1781	1870	1577	1781	0	1777	1781	0	1742
Q Serve(g_s), s	26.0	0.0	37.5	3.6	21.0	5.1	6.0	0.0	25.0	13.0	0.0	22.8
Cycle Q Clear(g_c), s	26.0	0.0	37.5	3.6	21.0	5.1	6.0	0.0	25.0	13.0	0.0	22.8
Prop In Lane	1.00		0.13	1.00		1.00	1.00		0.27	1.00		0.38
Lane Grp Cap(c), veh/h	510	0	728	187	374	315	264	0	423	289	0	514
V/C Ratio(X)	1.02	0.00	0.94	0.42	1.02	0.29	0.52	0.00	1.02	1.25	0.00	0.80
Avail Cap(c_a), veh/h	510	0	728	354	374	315	264	0	423	289	0	514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.2	0.0	30.3	32.5	42.0	35.7	29.0	0.0	40.0	29.0	0.0	34.1
Incr Delay (d2), s/veh	44.0	0.0	19.3	1.5	50.6	0.5	1.7	0.0	49.3	137.4	0.0	8.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.2	0.0	20.1	1.6	14.9	2.0	2.7	0.0	16.6	16.5	0.0	10.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.3	0.0	49.5	33.9	92.6	36.2	30.8	0.0	89.3	166.4	0.0	42.7
LnGrp LOS	F	A	D	C	F	D	C	A	F	F	A	D
Approach Vol, veh/h		1199			549			568			771	
Approach Delay, s/veh		60.2			74.9			75.3			100.6	
Approach LOS		E			E			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.0	31.0	9.1	47.9	11.0	37.0	30.0	27.0
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	13.0	25.0	15.0	32.0	7.0	31.0	26.0	21.0
Max Q Clear Time (g_c+I1), s	15.0	27.0	5.6	39.5	8.0	24.8	28.0	23.0
Green Ext Time (p_c), s	0.0	0.0	0.1	0.0	0.0	1.4	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	75.7
HCM 6th LOS	E

HCM 6th TWSC
7: Waiale Rd & Kokololio St

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	131	21	4	372	339	39
Future Vol, veh/h	131	21	4	372	339	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	142	23	4	404	368	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	801	389	410	0	-	0
Stage 1	389	-	-	-	-	-
Stage 2	412	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	354	659	1149	-	-	-
Stage 1	685	-	-	-	-	-
Stage 2	669	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	353	659	1149	-	-	-
Mov Cap-2 Maneuver	353	-	-	-	-	-
Stage 1	682	-	-	-	-	-
Stage 2	669	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.4	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1149	-	353	659	-	-
HCM Lane V/C Ratio	0.004	-	0.403	0.035	-	-
HCM Control Delay (s)	8.1	0	21.9	10.7	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0	-	1.9	0.1	-	-

Intersection						
Int Delay, s/veh	3.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	78	17	282	341	32
Future Vol, veh/h	76	78	17	282	341	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	83	85	18	307	371	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	732	389	406	0	-	0
Stage 1	389	-	-	-	-	-
Stage 2	343	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	388	659	1153	-	-	-
Stage 1	685	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	381	659	1153	-	-	-
Mov Cap-2 Maneuver	381	-	-	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	719	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	16.3		0.5		0	
HCM LOS	C					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1153	-	485	-	-
HCM Lane V/C Ratio	0.016	-	0.345	-	-
HCM Control Delay (s)	8.2	0	16.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	1.5	-	-

Intersection						
Int Delay, s/veh	1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	17	4	264	413	6
Future Vol, veh/h	34	17	4	264	413	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	37	18	4	287	449	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	748	453	456	0	-	0
Stage 1	453	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	380	607	1105	-	-	-
Stage 1	640	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	378	607	1105	-	-	-
Mov Cap-2 Maneuver	378	-	-	-	-	-
Stage 1	637	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	14.6		0.1		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1105	-	432	-	-
HCM Lane V/C Ratio	0.004	-	0.128	-	-
HCM Control Delay (s)	8.3	0	14.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection						
Int Delay, s/veh	1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	23	5	238	417	13
Future Vol, veh/h	31	23	5	238	417	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	34	25	5	259	453	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	729	460	467	0	-	0
Stage 1	460	-	-	-	-	-
Stage 2	269	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	390	601	1094	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	776	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	388	601	1094	-	-	-
Mov Cap-2 Maneuver	491	-	-	-	-	-
Stage 1	633	-	-	-	-	-
Stage 2	776	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1094	-	533	-	-
HCM Lane V/C Ratio	0.005	-	0.11	-	-
HCM Control Delay (s)	8.3	-	12.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	272	0	13	77	128	0	47	29	319	33	87
Future Volume (veh/h)	69	272	0	13	77	128	0	47	29	319	33	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	75	296	0	14	84	88	0	51	2	347	36	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	399	431	0	294	150	157	330	210	8	668	367	377
Arrive On Green	0.07	0.23	0.00	0.02	0.18	0.18	0.00	0.12	0.12	0.21	0.43	0.43
Sat Flow, veh/h	1781	1870	0	1781	836	876	1781	1788	70	1781	845	869
Grp Volume(v), veh/h	75	296	0	14	0	172	0	0	53	347	0	73
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1713	1781	0	1858	1781	0	1714
Q Serve(g_s), s	1.4	6.1	0.0	0.3	0.0	3.9	0.0	0.0	1.1	6.4	0.0	1.1
Cycle Q Clear(g_c), s	1.4	6.1	0.0	0.3	0.0	3.9	0.0	0.0	1.1	6.4	0.0	1.1
Prop In Lane	1.00		0.00	1.00		0.51	1.00		0.04	1.00		0.51
Lane Grp Cap(c), veh/h	399	431	0	294	0	307	330	0	219	668	0	744
V/C Ratio(X)	0.19	0.69	0.00	0.05	0.00	0.56	0.00	0.00	0.24	0.52	0.00	0.10
Avail Cap(c_a), veh/h	506	1123	0	493	0	1028	976	0	2428	944	0	2240
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.7	14.9	0.0	14.0	0.0	15.9	0.0	0.0	17.0	10.5	0.0	7.1
Incr Delay (d2), s/veh	0.2	2.0	0.0	0.1	0.0	1.6	0.0	0.0	0.6	0.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.5	0.0	0.1	0.0	1.5	0.0	0.0	0.4	2.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.9	16.9	0.0	14.1	0.0	17.5	0.0	0.0	17.6	11.1	0.0	7.2
LnGrp LOS	B	B	A	B	A	B	A	A	B	B	A	A
Approach Vol, veh/h		371			186			53			420	
Approach Delay, s/veh		16.1			17.3			17.6			10.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	9.5	5.3	14.3	0.0	22.9	7.4	12.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	55.5	5.5	25.5	15.5	55.5	5.5	25.5
Max Q Clear Time (g_c+I1), s	8.4	3.1	2.3	8.1	0.0	3.1	3.4	5.9
Green Ext Time (p_c), s	0.7	0.3	0.0	1.6	0.0	0.5	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	22.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	153	990	10	9	564	63	28	3	26	39	1	121
Future Vol, veh/h	153	990	10	9	564	63	28	3	26	39	1	121
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	166	1076	11	10	613	68	30	3	28	42	1	132

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	682	0	0	1087	0	0	2148	2116	1082	2063	2053	614
Stage 1	-	-	-	-	-	-	1414	1414	-	634	634	-
Stage 2	-	-	-	-	-	-	734	702	-	1429	1419	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	911	-	-	642	-	-	35	51	264	~ 40	55	492
Stage 1	-	-	-	-	-	-	171	204	-	467	473	-
Stage 2	-	-	-	-	-	-	412	440	-	167	203	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	910	-	-	642	-	-	~ 21	41	264	~ 29	44	492
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 21	41	-	~ 29	44	-
Stage 1	-	-	-	-	-	-	140	167	-	382	465	-
Stage 2	-	-	-	-	-	-	296	433	-	120	166	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.2	$ 359.9	148.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	22	264	910	-	-	642	-	-	29	492
HCM Lane V/C Ratio	1.532	0.107	0.183	-	-	0.015	-	-	1.499	0.267
HCM Control Delay (s)	$ 644.7	20.3	9.8	-	-	10.7	-	-	$ 551.9	15
HCM Lane LOS	F	C	A	-	-	B	-	-	F	C
HCM 95th %tile Q(veh)	4.4	0.4	0.7	-	-	0	-	-	5	1.1

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	316	188	410	44	188	96	233	601	14	40	554	105
Future Volume (veh/h)	316	188	410	44	188	96	233	601	14	40	554	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	451	204	236	48	204	5	253	653	0	43	602	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	471	681	575	248	229	193	278	817		202	680	
Arrive On Green	0.27	0.36	0.36	0.03	0.12	0.12	0.10	0.44	0.00	0.03	0.36	0.00
Sat Flow, veh/h	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	451	204	236	48	204	5	253	653	0	43	602	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	38.4	11.7	16.8	3.5	16.1	0.4	13.0	45.4	0.0	2.3	45.4	0.0
Cycle Q Clear(g_c), s	38.4	11.7	16.8	3.5	16.1	0.4	13.0	45.4	0.0	2.3	45.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	471	681	575	248	229	193	278	817		202	680	
V/C Ratio(X)	0.96	0.30	0.41	0.19	0.89	0.03	0.91	0.80		0.21	0.88	
Avail Cap(c_a), veh/h	560	809	684	251	249	209	324	1046		212	872	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.9	34.1	35.7	55.2	64.9	58.0	33.6	36.6	0.0	32.7	44.8	0.0
Incr Delay (d2), s/veh	24.5	0.1	0.2	0.1	27.3	0.0	24.5	5.0	0.0	0.2	11.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.4	5.5	6.6	1.6	9.5	0.2	7.3	21.4	0.0	1.0	22.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.4	34.2	35.9	55.3	92.1	58.0	58.2	41.6	0.0	32.9	56.0	0.0
LnGrp LOS	E	C	D	E	F	E	E	D		C	E	
Approach Vol, veh/h		891			257			906	A		645	A
Approach Delay, s/veh		49.4			84.6			46.2			54.5	
Approach LOS		D			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	71.6	9.8	59.7	20.1	60.6	46.0	23.4
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	84.0	5.0	65.0	19.0	70.0	50.0	20.0
Max Q Clear Time (g_c+I1), s	4.3	47.4	5.5	18.8	15.0	47.4	40.4	18.1
Green Ext Time (p_c), s	0.0	9.8	0.0	1.3	0.1	7.3	0.6	0.1

Intersection Summary	
HCM 6th Ctrl Delay	52.9
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive 10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	255	110	320	94	298	27	491	481	381	614	17
Future Volume (veh/h)	54	255	110	320	94	298	27	491	481	381	614	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	59	277	20	348	102	204	29	534	0	414	667	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	359	324	319	343	487	689	271	640		444	918	836
Arrive On Green	0.04	0.16	0.16	0.14	0.26	0.26	0.03	0.34	0.00	0.18	0.49	0.49
Sat Flow, veh/h	1968	2067	1740	1781	1870	1579	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	59	277	20	348	102	204	29	534	0	414	667	8
Grp Sat Flow(s),veh/h/ln	1968	2067	1740	1781	1870	1579	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	2.8	14.8	1.1	16.0	4.8	9.5	1.2	29.8	0.0	17.3	32.0	0.3
Cycle Q Clear(g_c), s	2.8	14.8	1.1	16.0	4.8	9.5	1.2	29.8	0.0	17.3	32.0	0.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	359	324	319	343	487	689	271	640		444	918	836
V/C Ratio(X)	0.16	0.86	0.06	1.01	0.21	0.30	0.11	0.83		0.93	0.73	0.01
Avail Cap(c_a), veh/h	373	564	522	343	692	862	444	989		635	1285	1147
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.0	46.6	38.3	36.3	32.8	20.8	24.0	34.4	0.0	25.3	22.9	12.7
Incr Delay (d2), s/veh	0.2	2.5	0.0	52.1	0.1	0.1	0.1	6.6	0.0	13.7	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	7.9	0.5	7.0	2.2	3.6	0.5	14.3	0.0	8.6	14.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.2	49.2	38.3	88.5	32.9	20.9	24.1	40.9	0.0	39.0	25.3	12.7
LnGrp LOS	D	D	D	F	C	C	C	D		D	C	B
Approach Vol, veh/h		356			654			563	A		1089	
Approach Delay, s/veh		46.7			58.7			40.1			30.4	
Approach LOS		D			E			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.9	44.9	21.0	22.8	8.0	61.7	9.2	34.6
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	32.0	60.0	16.0	31.0	14.0	78.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	19.3	31.8	18.0	16.8	3.2	34.0	4.8	11.5
Green Ext Time (p_c), s	0.5	7.0	0.0	1.0	0.0	11.1	0.0	0.7

Intersection Summary		
HCM 6th Ctrl Delay		41.6
HCM 6th LOS		D

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St 10/07/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	153	88	18	795	945	62
Future Volume (veh/h)	153	88	18	795	945	62
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	166	7	20	864	1027	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	215	191	244	1359	1186	1005
Arrive On Green	0.12	0.12	0.02	0.73	0.63	0.63
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	166	7	20	864	1027	54
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	6.5	0.3	0.3	16.9	32.0	0.9
Cycle Q Clear(g_c), s	6.5	0.3	0.3	16.9	32.0	0.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	215	191	244	1359	1186	1005
V/C Ratio(X)	0.77	0.04	0.08	0.64	0.87	0.05
Avail Cap(c_a), veh/h	743	662	551	2342	1847	1566
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.7	27.9	12.0	5.0	10.7	5.0
Incr Delay (d2), s/veh	5.8	0.1	0.1	0.5	2.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.1	0.1	4.3	11.0	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.5	28.0	12.1	5.5	13.5	5.0
LnGrp LOS	D	C	B	A	B	A
Approach Vol, veh/h	173			884	1081	
Approach Delay, s/veh	36.2			5.6	13.1	
Approach LOS	D			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	6.6	51.6	13.7	58.2
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	12.3	34.0	8.5	18.9
Green Ext Time (p_c), s	0.0	11.5	0.4	8.7

Intersection Summary	
HCM 6th Ctrl Delay	11.9
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	13	6	101	8	54	4	730	112	183	841	6
Future Volume (veh/h)	20	13	6	101	8	54	4	730	112	183	841	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	14	2	110	9	43	4	793	118	199	914	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	182	100	214	204	17	54	312	974	145	337	1254	1062
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.01	0.61	0.61	0.06	0.67	0.67
Sat Flow, veh/h	838	740	1579	979	126	399	1781	1591	237	1781	1870	1585
Grp Volume(v), veh/h	36	0	2	162	0	0	4	0	911	199	914	5
Grp Sat Flow(s),veh/h/ln	1578	0	1579	1504	0	0	1781	0	1828	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.1	7.3	0.0	0.0	0.1	0.0	32.6	3.2	26.6	0.1
Cycle Q Clear(g_c), s	1.5	0.0	0.1	8.7	0.0	0.0	0.1	0.0	32.6	3.2	26.6	0.1
Prop In Lane	0.61		1.00	0.68		0.27	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	282	0	214	275	0	0	312	0	1119	337	1254	1062
V/C Ratio(X)	0.13	0.00	0.01	0.59	0.00	0.00	0.01	0.00	0.81	0.59	0.73	0.00
Avail Cap(c_a), veh/h	525	0	467	509	0	0	597	0	1513	519	1548	1312
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.3	0.0	31.7	35.3	0.0	0.0	9.0	0.0	12.7	14.7	9.0	4.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.8	0.0	0.0	0.0	0.0	3.8	0.6	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	3.3	0.0	0.0	0.0	0.0	12.5	2.0	9.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.3	0.0	31.7	36.0	0.0	0.0	9.0	0.0	16.5	15.4	11.1	4.6
LnGrp LOS	C	A	C	D	A	A	A	A	B	B	B	A
Approach Vol, veh/h		38			162			915			1118	
Approach Delay, s/veh		32.3			36.0			16.5			11.8	
Approach LOS		C			D			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.3	57.8		16.4	5.4	62.7		16.4				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0				
Max Q Clear Time (g_c+I1), s	5.2	34.6		3.5	2.1	28.6		10.7				
Green Ext Time (p_c), s	0.2	17.2		0.1	0.0	18.6		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			15.8									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	171	5	14	66	74	5	4	59	174	2	32
Future Vol, veh/h	28	171	5	14	66	74	5	4	59	174	2	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	186	5	15	72	80	5	4	64	189	2	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	152	0	0	191	0	0	410	431	189	425	393	112
Stage 1	-	-	-	-	-	-	249	249	-	142	142	-
Stage 2	-	-	-	-	-	-	161	182	-	283	251	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1429	-	-	1383	-	-	552	517	853	540	543	941
Stage 1	-	-	-	-	-	-	755	701	-	861	779	-
Stage 2	-	-	-	-	-	-	841	749	-	724	699	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1429	-	-	1383	-	-	517	500	853	484	526	941
Mov Cap-2 Maneuver	-	-	-	-	-	-	517	500	-	484	526	-
Stage 1	-	-	-	-	-	-	739	686	-	843	770	-
Stage 2	-	-	-	-	-	-	799	741	-	651	684	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.7	10.1	15.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	783	1429	-	-	1383	-	-	484	899
HCM Lane V/C Ratio	0.094	0.021	-	-	0.011	-	-	0.391	0.041
HCM Control Delay (s)	10.1	7.6	-	-	7.6	-	-	17.1	9.2
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	1.8	0.1

APPENDIX C

LOS WORKSHEETS

Base Year Conditions WITHOUT Waiale Extension WITHOUT MAUI LANI PARKWAY Extension – PM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kamehameha Ave														
102	L2	124	2.0	131	2.0	0.706	21.6	LOS C	8.2	207.8	1.00	1.35	1.53	18.2
7	T1	128	2.0	135	2.0	0.706	18.9	LOS C	8.2	207.8	1.00	1.35	1.53	17.0
25	R2	70	2.0	74	2.0	0.706	18.9	LOS C	8.2	207.8	1.00	1.35	1.53	17.0
Approach		322	2.0	339	2.0	0.706	20.0	LOS C	8.2	207.8	1.00	1.35	1.53	17.4
East: WB Maui Lani Parkway														
19	L2	74	2.0	78	2.0	1.098	72.6	LOS F	46.4	1177.5	1.00	3.33	4.34	12.9
336	T1	426	2.0	448	2.0	1.098	69.9	LOS F	46.4	1177.5	1.00	3.33	4.34	12.3
24	R2	276	2.0	291	2.0	1.098	69.9	LOS F	46.4	1177.5	1.00	3.33	4.34	12.3
Approach		776	2.0	817	2.0	1.098	70.1	LOS F	46.4	1177.5	1.00	3.33	4.34	12.4
North: SB Kamehameha Ave														
15	L2	180	2.0	189	2.0	1.080	63.3	LOS F	43.9	1114.8	1.00	3.08	3.91	13.6
2	T1	169	2.0	178	2.0	1.080	60.6	LOS F	43.9	1114.8	1.00	3.08	3.91	12.9
40	R2	448	2.0	472	2.0	1.080	60.6	LOS F	43.9	1114.8	1.00	3.08	3.91	12.9
Approach		797	2.0	839	2.0	1.080	61.2	LOS F	43.9	1114.8	1.00	3.08	3.91	13.1
West: EB Maui Lani Parkway														
30	L2	443	2.0	466	2.0	1.099	63.9	LOS F	55.8	1417.0	1.00	3.15	3.83	13.6
464	T1	379	2.0	399	2.0	1.099	61.2	LOS F	55.8	1417.0	1.00	3.15	3.83	12.9
78	R2	168	2.0	177	2.0	1.099	61.2	LOS F	55.8	1417.0	1.00	3.15	3.83	12.9
Approach		990	2.0	1042	2.0	1.099	62.4	LOS F	55.8	1417.0	1.00	3.15	3.83	13.2
All Vehicles		2885	2.0	3037	2.0	1.099	59.4	LOS F	55.8	1417.0	1.00	2.98	3.74	13.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	199.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	10	222	16	4	8	117	526	23	8	701	69
Future Vol, veh/h	60	10	222	16	4	8	117	526	23	8	701	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	11	241	17	4	9	127	572	25	9	762	75
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	18	15.1	174.5	295.3
HCM LOS	C	C	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	18%	0%	100%	0%	57%	1%
Vol Thru, %	82%	0%	0%	4%	14%	90%
Vol Right, %	0%	100%	0%	96%	29%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	643	23	60	232	28	778
LT Vol	117	0	60	0	16	8
Through Vol	526	0	0	10	4	701
RT Vol	0	23	0	222	8	69
Lane Flow Rate	699	25	65	252	30	846
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.32	0.042	0.15	0.497	0.077	1.593
Departure Headway (Hd)	7.509	6.692	9.59	8.359	11.154	7.254
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	489	538	376	434	323	507
Service Time	5.209	4.392	7.29	6.059	9.154	5.254
HCM Lane V/C Ratio	1.429	0.046	0.173	0.581	0.093	1.669
HCM Control Delay	180.4	9.7	14	19	15.1	295.3
HCM Lane LOS	F	A	B	C	C	F
HCM 95th-tile Q	27.7	0.1	0.5	2.7	0.2	43.6

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Waiale Rd														
7	T1	610	2.0	642	2.0	0.847	1.1	LOS A	18.2	461.2	0.77	0.22	0.77	19.3
25	R2	442	2.0	465	2.0	0.847	1.1	LOS A	18.2	461.2	0.77	0.22	0.77	19.3
Approach		1052	2.0	1107	2.0	0.847	1.1	LOS A	18.2	461.2	0.77	0.22	0.77	19.3
East: WB Waiinu Rd														
19	L2	328	2.0	345	2.0	0.532	8.6	LOS A	4.7	120.1	0.89	0.96	1.02	20.0
24	R2	55	2.0	58	2.0	0.532	5.9	LOS A	4.7	120.1	0.89	0.96	1.02	18.7
Approach		383	2.0	403	2.0	0.532	8.2	LOS A	4.7	120.1	0.89	0.96	1.02	19.8
North: SB Waiale Rd														
15	L2	55	2.0	58	2.0	0.983	26.1	LOS D	31.8	807.7	1.00	1.76	2.09	17.6
2	T1	884	2.0	931	2.0	0.983	23.4	LOS C	31.8	807.7	1.00	1.76	2.09	16.6
Approach		939	2.0	988	2.0	0.983	23.6	LOS C	31.8	807.7	1.00	1.76	2.09	16.6
All Vehicles		2374	2.0	2499	2.0	0.983	11.2	LOS B	31.8	807.7	0.88	0.95	1.33	18.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCM 6th TWSC
4: Waiale Rd & Olomea St/Waimaluhia Ln

Intersection												
Int Delay, s/veh	68											
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations												
Traffic Vol, veh/h	81	0	20	3	1	19	32	946	2	5	983	230
Future Vol, veh/h	81	0	20	3	1	19	32	946	2	5	983	230
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	0	22	3	1	21	35	1028	2	5	1068	250

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2316	2309	1196	2316	2433	1032	1321	0	0	1033	0	0
Stage 1	1206	1206	-	1102	1102	-	-	-	-	-	-	-
Stage 2	1110	1103	-	1214	1331	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 26	38	227	26	32	283	523	-	-	673	-	-
Stage 1	224	257	-	257	287	-	-	-	-	-	-	-
Stage 2	254	287	-	222	224	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 20	31	226	20	26	282	522	-	-	671	-	-
Mov Cap-2 Maneuver	~ 20	31	-	20	26	-	-	-	-	-	-	-
Stage 1	188	248	-	216	241	-	-	-	-	-	-	-
Stage 2	198	241	-	194	216	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 1545.3	59.7	0.4	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	522	-	-	20	226	90	671	-	-
HCM Lane V/C Ratio	0.067	-	-	4.402	0.096	0.278	0.008	-	-
HCM Control Delay (s)	12.4	0	-	$ 1921.3	22.6	59.7	10.4	-	-
HCM Lane LOS	B	A	-	F	C	F	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	11.4	0.3	1	0	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

HCM 6th TWSC
5: Waiale Rd & Kaupo St

Intersection						
Int Delay, s/veh	17					
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations						
Traffic Vol, veh/h	76	64	56	841	836	60
Future Vol, veh/h	76	64	56	841	836	60
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	83	70	61	914	909	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1981	945	977	0	-	0
Stage 1	945	-	-	-	-	-
Stage 2	1036	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 68	318	706	-	-	-
Stage 1	378	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 56	317	704	-	-	-
Mov Cap-2 Maneuver	~ 56	-	-	-	-	-
Stage 1	311	-	-	-	-	-
Stage 2	341	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	230.8	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	704	-	56	317	-	-
HCM Lane V/C Ratio	0.086	-	1.475	0.219	-	-
HCM Control Delay (s)	10.6	0	$ 408.8	19.5	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	0.3	-	7.5	0.8	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

HCM 6th Signalized Intersection Summary
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy

10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	286	496	73	116	612	390	103	222	109	440	251	188
Future Volume (veh/h)	286	496	73	116	612	390	103	222	109	440	251	188
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	358	539	75	126	665	170	112	241	103	478	273	180
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	312	704	98	294	674	571	185	357	152	266	293	193
Arrive On Green	0.14	0.44	0.44	0.06	0.36	0.36	0.06	0.29	0.29	0.05	0.28	0.28
Sat Flow, veh/h	1781	1606	224	1781	1870	1583	1781	1243	531	1781	1051	693
Grp Volume(v), veh/h	358	0	614	126	665	170	112	0	344	478	0	453
Grp Sat Flow(s),veh/h/ln	1781	0	1830	1781	1870	1583	1781	0	1774	1781	0	1744
Q Serve(g_s), s	17.0	0.0	34.6	5.4	43.0	9.4	5.4	0.0	20.9	6.0	0.0	30.9
Cycle Q Clear(g_c), s	17.0	0.0	34.6	5.4	43.0	9.4	5.4	0.0	20.9	6.0	0.0	30.9
Prop In Lane	1.00		0.12	1.00		1.00	1.00		0.30	1.00		0.40
Lane Grp Cap(c), veh/h	312	0	802	294	674	571	185	0	509	266	0	486
V/C Ratio(X)	1.15	0.00	0.77	0.43	0.99	0.30	0.60	0.00	0.68	1.79	0.00	0.93
Avail Cap(c_a), veh/h	312	0	802	491	674	571	185	0	552	266	0	529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.6	0.0	29.0	25.0	38.7	27.9	33.1	0.0	38.5	45.7	0.0	42.9
Incr Delay (d2), s/veh	96.6	0.0	4.4	1.0	31.0	0.3	5.5	0.0	3.0	372.4	0.0	22.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.6	0.0	16.1	2.4	25.4	3.7	2.6	0.0	9.6	32.9	0.0	16.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	135.2	0.0	33.4	26.0	69.7	28.2	38.5	0.0	41.4	418.1	0.0	65.4
LnGrp LOS	F	A	C	C	E	C	D	A	D	F	A	E
Approach Vol, veh/h		972			961			456			931	
Approach Delay, s/veh		70.9			56.7			40.7			246.5	
Approach LOS		E			E			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	41.0	11.5	59.5	11.0	40.0	21.0	50.0
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	6.0	38.0	21.0	40.0	7.0	37.0	17.0	44.0
Max Q Clear Time (g_c+I1), s	8.0	22.9	7.4	36.6	7.4	32.9	19.0	45.0
Green Ext Time (p_c), s	0.0	1.9	0.2	1.4	0.0	1.2	0.0	0.0

Intersection Summary		
HCM 6th Ctrl Delay		111.9
HCM 6th LOS		F

HCM 6th TWSC
7: Waiale Rd & Kokololio St

10/07/2022

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	15	32	357	332	70
Future Vol, veh/h	55	15	32	357	332	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	60	16	35	388	361	76

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	857	399	437	0	-	0
Stage 1	399	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	328	651	1123	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	637	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	315	651	1123	-	-	-
Mov Cap-2 Maneuver	315	-	-	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	637	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.3	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1123	-	315	651	-	-
HCM Lane V/C Ratio	0.031	-	0.19	0.025	-	-
HCM Control Delay (s)	8.3	0	19.1	10.7	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.1	-	-

Intersection						
Int Delay, s/veh	2.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	48	33	70	346	277	58
Future Vol, veh/h	48	33	70	346	277	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	52	36	76	376	301	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	861	333	364	0	-	0
Stage 1	333	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	326	709	1195	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	592	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	300	709	1195	-	-	-
Mov Cap-2 Maneuver	300	-	-	-	-	-
Stage 1	668	-	-	-	-	-
Stage 2	592	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	16.8		1.4		0	
HCM LOS	C					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1195	-	392	-	-
HCM Lane V/C Ratio	0.064	-	0.225	-	-
HCM Control Delay (s)	8.2	0	16.8	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.8	-	-

Intersection						
Int Delay, s/veh	0.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	20	19	403	295	14
Future Vol, veh/h	13	20	19	403	295	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	14	22	21	438	321	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	809	329	336	0	-	0
Stage 1	329	-	-	-	-	-
Stage 2	480	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	350	712	1223	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	622	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	342	712	1223	-	-	-
Mov Cap-2 Maneuver	342	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	622	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	12.8		0.4		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1223	-	499	-	-
HCM Lane V/C Ratio	0.017	-	0.072	-	-
HCM Control Delay (s)	8	0	12.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

HCM 6th TWSC
10: Waiale Rd & Ohana Hana Loop
10/07/2022

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	9	16	407	298	17
Future Vol, veh/h	14	9	16	407	298	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	15	10	17	442	324	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	809	333	342	0	-	0
Stage 1	333	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	350	709	1217	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	345	709	1217	-	-	-
Mov Cap-2 Maneuver	461	-	-	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	625	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1217	-	534	-	-
HCM Lane V/C Ratio	0.014	-	0.047	-	-
HCM Control Delay (s)	8	-	12.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 6th Signalized Intersection Summary
11: E Waiko Rd & Waiale Rd
10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	130	0	32	183	323	0	38	22	217	48	45
Future Volume (veh/h)	65	130	0	32	183	323	0	38	22	217	48	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	141	0	35	199	299	0	41	1	236	52	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	334	734	0	626	249	375	256	166	4	495	423	154
Arrive On Green	0.06	0.39	0.00	0.04	0.37	0.37	0.00	0.09	0.09	0.15	0.32	0.32
Sat Flow, veh/h	1781	1870	0	1781	674	1013	1781	1818	44	1781	1307	478
Grp Volume(v), veh/h	71	141	0	35	0	498	0	0	42	236	0	71
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1688	1781	0	1862	1781	0	1784
Q Serve(g_s), s	1.3	2.7	0.0	0.7	0.0	14.4	0.0	0.0	1.1	6.0	0.0	1.5
Cycle Q Clear(g_c), s	1.3	2.7	0.0	0.7	0.0	14.4	0.0	0.0	1.1	6.0	0.0	1.5
Prop In Lane	1.00		0.00	1.00		0.60	1.00		0.02	1.00		0.27
Lane Grp Cap(c), veh/h	334	734	0	626	0	624	256	0	170	495	0	577
V/C Ratio(X)	0.21	0.19	0.00	0.06	0.00	0.80	0.00	0.00	0.25	0.48	0.00	0.12
Avail Cap(c_a), veh/h	406	1384	0	738	0	1249	757	0	1378	732	0	1320
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.3	10.9	0.0	9.8	0.0	15.4	0.0	0.0	23.1	16.6	0.0	13.0
Incr Delay (d2), s/veh	0.3	0.1	0.0	0.0	0.0	2.4	0.0	0.0	0.7	0.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.0	0.0	0.2	0.0	5.3	0.0	0.0	0.5	2.3	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.6	11.1	0.0	9.9	0.0	17.8	0.0	0.0	23.9	17.3	0.0	13.1
LnGrp LOS	B	B	A	A	A	B	A	A	C	B	A	B
Approach Vol, veh/h		212			533			42			307	
Approach Delay, s/veh		11.3			17.3			23.9			16.3	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.7	9.5	6.6	26.0	0.0	22.2	7.8	24.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	40.5	5.5	40.5	15.5	40.5	5.5	40.5
Max Q Clear Time (g_c+I1), s	8.0	3.1	2.7	4.7	0.0	3.5	3.3	16.4
Green Ext Time (p_c), s	0.4	0.2	0.0	0.9	0.0	0.4	0.0	3.8

Intersection Summary	
HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Intersection												
Int Delay, s/veh	55											
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations												
Traffic Vol, veh/h	182	754	24	23	797	120	14	2	13	66	3	193
Future Vol, veh/h	182	754	24	23	797	120	14	2	13	66	3	193
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	198	820	26	25	866	130	15	2	14	72	3	210

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	997	0	0	846	0	0	2317	2276	833	2154	2159	867
Stage 1	-	-	-	-	-	-	1229	1229	-	917	917	-
Stage 2	-	-	-	-	-	-	1088	1047	-	1237	1242	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	694	-	-	791	-	-	26	40	369	~ 35	48	352
Stage 1	-	-	-	-	-	-	218	250	-	326	351	-
Stage 2	-	-	-	-	-	-	261	305	-	215	247	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	693	-	-	791	-	-	~ 7	28	369	~ 24	33	352
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 7	28	-	~ 24	33	-
Stage 1	-	-	-	-	-	-	156	179	-	233	339	-
Stage 2	-	-	-	-	-	-	101	295	-	146	176	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.2	$ 797.6	$ 362.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	8	369	693	-	-	791	-	-	24	352
HCM Lane V/C Ratio	2.174	0.038	0.285	-	-	0.032	-	-	3.125	0.596
HCM Control Delay (s)	$ 1433.3	15.1	12.3	-	-	9.7	-	-	$ 1296.1	29.2
HCM Lane LOS	F	C	B	-	-	A	-	-	F	D
HCM 95th %tile Q(veh)	3.2	0.1	1.2	-	-	0.1	-	-	9.4	3.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	62	165	51	184	74	225	609	18	44	715	229
Future Volume (veh/h)	165	62	165	51	184	74	225	609	18	44	715	229
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	236	67	29	55	200	5	245	662	0	48	777	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	287	428	358	297	246	204	282	984		325	887	
Arrive On Green	0.13	0.23	0.23	0.04	0.13	0.13	0.09	0.53	0.00	0.03	0.47	0.00
Sat Flow, veh/h	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	236	67	29	55	200	5	245	662	0	48	777	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	16.0	3.4	1.7	3.2	12.5	0.3	8.1	31.1	0.0	1.6	44.8	0.0
Cycle Q Clear(g_c), s	16.0	3.4	1.7	3.2	12.5	0.3	8.1	31.1	0.0	1.6	44.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	287	428	358	297	246	204	282	984		325	887	
V/C Ratio(X)	0.82	0.16	0.08	0.19	0.81	0.02	0.87	0.67		0.15	0.88	
Avail Cap(c_a), veh/h	287	469	392	321	312	259	338	1218		341	1078	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.9	36.9	36.3	42.8	50.6	45.3	25.2	20.8	0.0	17.7	28.3	0.0
Incr Delay (d2), s/veh	16.4	0.1	0.0	0.1	9.6	0.0	16.4	1.9	0.0	0.1	8.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	1.6	0.7	1.4	6.5	0.1	4.5	13.2	0.0	0.6	20.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.3	37.0	36.3	42.9	60.2	45.3	41.6	22.7	0.0	17.8	37.0	0.0
LnGrp LOS	D	D	D	D	E	D	D	C		B	D	
Approach Vol, veh/h		332			260			907	A		825	A
Approach Delay, s/veh		49.2			56.3			27.8			35.9	
Approach LOS		D			E			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	69.0	9.3	32.4	15.2	62.8	21.0	20.8				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	78.0	6.0	30.0	14.0	69.0	16.0	20.0				
Max Q Clear Time (g_c+I1), s	3.6	33.1	5.2	5.4	10.1	46.8	18.0	14.5				
Green Ext Time (p_c), s	0.0	10.5	0.0	0.3	0.1	10.0	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay			36.9									
HCM 6th LOS			D									

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	174	50	424	241	341	83	515	477	340	499	33
Future Volume (veh/h)	18	174	50	424	241	341	83	515	477	340	499	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	189	6	461	262	254	90	560	0	370	542	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	231	226	273	472	579	740	345	651		396	859	758
Arrive On Green	0.02	0.11	0.11	0.22	0.31	0.31	0.05	0.35	0.00	0.16	0.46	0.46
Sat Flow, veh/h	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	20	189	6	461	262	254	90	560	0	370	542	15
Grp Sat Flow(s),veh/h/ln	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	1.1	11.4	0.4	28.0	14.3	12.9	4.1	35.5	0.0	17.7	28.1	0.6
Cycle Q Clear(g_c), s	1.1	11.4	0.4	28.0	14.3	12.9	4.1	35.5	0.0	17.7	28.1	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	231	226	273	472	579	740	345	651		396	859	758
V/C Ratio(X)	0.09	0.84	0.02	0.98	0.45	0.34	0.26	0.86		0.93	0.63	0.02
Avail Cap(c_a), veh/h	269	406	425	472	706	848	458	882		479	1059	927
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	55.5	45.5	38.1	35.3	21.5	25.4	38.6	0.0	30.1	26.2	17.4
Incr Delay (d2), s/veh	0.2	3.1	0.0	35.1	0.2	0.1	0.1	9.1	0.0	21.7	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	6.2	0.2	17.3	6.7	4.9	1.7	17.6	0.0	9.7	12.6	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.9	58.6	45.5	73.2	35.5	21.6	25.6	47.7	0.0	51.8	27.9	17.5
LnGrp LOS	D	E	D	E	D	C	C	D		D	C	B
Approach Vol, veh/h		215			977			650	A		927	
Approach Delay, s/veh		57.4			49.7			44.6			37.3	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	50.3	33.0	18.9	10.9	64.4	7.5	44.4
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	26.0	60.0	28.0	25.0	14.0	72.0	5.0	48.0
Max Q Clear Time (g_c+I1), s	19.7	37.5	30.0	13.4	6.1	30.1	3.1	16.3
Green Ext Time (p_c), s	0.3	6.8	0.0	0.5	0.1	8.2	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	44.9
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	31	57	988	801	125
Future Volume (veh/h)	95	31	57	988	801	125
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	103	2	62	1074	871	98
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	198	176	336	1316	1057	895
Arrive On Green	0.11	0.11	0.05	0.70	0.57	0.57
Sat Flow, veh/h	1781	1585	1781	1870	1870	1584
Grp Volume(v), veh/h	103	2	62	1074	871	98
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1584
Q Serve(g_s), s	3.2	0.1	0.7	23.7	22.5	1.7
Cycle Q Clear(g_c), s	3.2	0.1	0.7	23.7	22.5	1.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	198	176	336	1316	1057	895
V/C Ratio(X)	0.52	0.01	0.18	0.82	0.82	0.11
Avail Cap(c_a), veh/h	902	802	661	2840	2240	1897
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	23.5	9.3	6.1	10.5	6.0
Incr Delay (d2), s/veh	2.1	0.0	0.3	1.3	1.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.3	5.5	7.5	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.0	23.5	9.6	7.4	12.2	6.0
LnGrp LOS	C	C	A	A	B	A
Approach Vol, veh/h	105			1136	969	
Approach Delay, s/veh	26.9			7.5	11.6	
Approach LOS	C			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	8.2	39.5	11.6	47.7
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	12.7	24.5	5.2	25.7
Green Ext Time (p_c), s	0.1	9.0	0.3	13.9

Intersection Summary	
HCM 6th Ctrl Delay	10.2
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	7	3	102	12	99	9	932	111	81	738	22
Future Volume (veh/h)	12	7	3	102	12	99	9	932	111	81	738	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	8	1	111	13	80	10	1013	118	88	802	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	173	94	246	174	21	92	390	1069	124	190	1275	1080
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.01	0.65	0.65	0.04	0.68	0.68
Sat Flow, veh/h	757	607	1585	784	136	594	1781	1644	192	1781	1870	1584
Grp Volume(v), veh/h	21	0	1	204	0	0	10	0	1131	88	802	15
Grp Sat Flow(s),veh/h/ln	1364	0	1585	1514	0	0	1781	0	1836	1781	1870	1584
Q Serve(g_s), s	0.0	0.0	0.1	12.9	0.0	0.0	0.2	0.0	59.4	1.7	25.3	0.3
Cycle Q Clear(g_c), s	1.0	0.0	0.1	13.9	0.0	0.0	0.2	0.0	59.4	1.7	25.3	0.3
Prop In Lane	0.62		1.00	0.54		0.39	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	266	0	246	287	0	0	390	0	1193	190	1275	1080
V/C Ratio(X)	0.08	0.00	0.00	0.71	0.00	0.00	0.03	0.00	0.95	0.46	0.63	0.01
Avail Cap(c_a), veh/h	387	0	375	409	0	0	604	0	1216	348	1275	1080
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.2	0.0	37.8	43.5	0.0	0.0	8.4	0.0	16.9	25.3	9.4	5.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	15.4	0.7	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	5.3	0.0	0.0	0.1	0.0	26.8	1.5	9.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.2	0.0	37.8	44.7	0.0	0.0	8.4	0.0	32.2	26.0	10.8	5.4
LnGrp LOS	D	A	D	D	A	A	A	A	C	C	B	A
Approach Vol, veh/h		22			204			1141			905	
Approach Delay, s/veh		38.2			44.7			32.0			12.2	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.6	74.7		21.4	6.3	78.0		21.4
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0
Max Q Clear Time (g_c+I1), s	3.7	61.4		3.0	2.2	27.3		15.9
Green Ext Time (p_c), s	0.1	7.3		0.0	0.0	15.3		0.5

Intersection Summary		
HCM 6th Ctrl Delay		25.3
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
17: Kuikahi Dr & Kehalani Mauka Pkwy

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	107	11	49	162	145	11	1	28	109	6	24
Future Vol, veh/h	9	107	11	49	162	145	11	1	28	109	6	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	116	12	53	176	158	12	1	30	118	7	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	334	0	0	128	0	0	520	582	122	519	509	255
Stage 1	-	-	-	-	-	-	142	142	-	361	361	-
Stage 2	-	-	-	-	-	-	378	440	-	158	148	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1225	-	-	1458	-	-	467	425	929	467	467	784
Stage 1	-	-	-	-	-	-	861	779	-	657	626	-
Stage 2	-	-	-	-	-	-	644	578	-	844	775	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1225	-	-	1458	-	-	432	406	929	436	446	784
Mov Cap-2 Maneuver	-	-	-	-	-	-	432	406	-	436	446	-
Stage 1	-	-	-	-	-	-	854	773	-	652	603	-
Stage 2	-	-	-	-	-	-	593	557	-	809	769	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	1	10.6	15.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	689	1225	-	-	1458	-	-	436	681
HCM Lane V/C Ratio	0.063	0.008	-	-	0.037	-	-	0.272	0.048
HCM Control Delay (s)	10.6	8	-	-	7.6	-	-	16.3	10.6
HCM Lane LOS	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	1.1	0.2

APPENDIX C

LOS WORKSHEETS

Base Year Conditions WITH Waiale Extension WITHOUT MAUI LANI PARKWAY Extension – AM Peak Hour

Intersection	
Intersection Delay, s/veh	91.2
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	858	574	543	827
Demand Flow Rate, veh/h	875	585	554	843
Vehicles Circulating, veh/h	565	793	1021	605
Vehicles Exiting, veh/h	883	782	419	773
Ped Vol Crossing Leg, #/h	31	0	4	0
Ped Cap Adj	0.996	1.000	1.000	1.000
Approach Delay, s/veh	97.3	51.6	112.8	98.0
Approach LOS	F	F	F	F

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	875	585	554	843
Cap Entry Lane, veh/h	775	615	487	744
Entry HV Adj Factor	0.980	0.981	0.981	0.981
Flow Entry, veh/h	858	574	543	827
Cap Entry, veh/h	757	603	478	730
V/C Ratio	1.133	0.952	1.137	1.132
Control Delay, s/veh	97.3	51.6	112.8	98.0
LOS	F	F	F	F
95th %tile Queue, veh	25	13	19	25

Intersection	
Intersection Delay, s/veh	173.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	88	3	166	18	16	10	183	457	7	2	611	111
Future Vol, veh/h	88	3	166	18	16	10	183	457	7	2	611	111
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	96	3	180	20	17	11	199	497	8	2	664	121
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	15.4	15	173.5	238.6
HCM LOS	C	B	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	29%	0%	100%	0%	41%	0%
Vol Thru, %	71%	0%	0%	2%	36%	84%
Vol Right, %	0%	100%	0%	98%	23%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	640	7	88	169	44	724
LT Vol	183	0	88	0	18	2
Through Vol	457	0	0	3	16	611
RT Vol	0	7	0	166	10	111
Lane Flow Rate	696	8	96	184	48	787
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.309	0.013	0.221	0.365	0.118	1.462
Departure Headway (Hd)	7.344	6.475	9.558	8.31	10.618	7.153
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	501	556	378	435	340	512
Service Time	5.044	4.175	7.258	6.01	8.618	5.153
HCM Lane V/C Ratio	1.389	0.014	0.254	0.423	0.141	1.537
HCM Control Delay	175.3	9.3	14.9	15.7	15	238.6
HCM Lane LOS	F	A	B	C	B	F
HCM 95th-tile Q	27.6	0	0.8	1.6	0.4	36.6

Intersection	
Intersection Delay, s/veh	56.8
Intersection LOS	F

Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	308	1462	862
Demand Flow Rate, veh/h	314	1492	879
Vehicles Circulating, veh/h	649	68	247
Vehicles Exiting, veh/h	911	1058	716
Ped Vol Crossing Leg, #/h	2	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	9.3	89.9	17.6
Approach LOS	A	F	C

Lane	Left	Left	Left
Designated Moves	LR	TR	LT
Assumed Moves	LR	TR	LT
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.250	4.250	4.250
Entry Flow, veh/h	314	1492	879
Cap Entry Lane, veh/h	811	1305	1127
Entry HV Adj Factor	0.981	0.980	0.981
Flow Entry, veh/h	308	1462	862
Cap Entry, veh/h	796	1279	1106
V/C Ratio	0.387	1.143	0.780
Control Delay, s/veh	9.3	89.9	17.6
LOS	A	F	C
95th %tile Queue, veh	2	38	8

Intersection												
Int Delay, s/veh	190.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	144	0	23	6	1	7	19	1196	13	7	770	170
Future Vol, veh/h	144	0	23	6	1	7	19	1196	13	7	770	170
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	157	0	25	7	1	8	21	1300	14	8	837	185

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2303	2308	933	2310	2393	1310	1025	0	0	1317	0	0
Stage 1	949	949	-	1352	1352	-	-	-	-	-	-	-
Stage 2	1354	1359	-	958	1041	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 27	38	323	27	34	194	677	-	-	525	-	-
Stage 1	313	339	-	185	218	-	-	-	-	-	-	-
Stage 2	185	217	-	309	307	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 22	32	322	22	29	193	675	-	-	524	-	-
Mov Cap-2 Maneuver	~ 22	32	-	22	29	-	-	-	-	-	-	-
Stage 1	276	325	-	163	192	-	-	-	-	-	-	-
Stage 2	~ 156	191	-	274	295	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 2674.5	137.6	0.2	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	675	-	-	22	322	41	524	-	-
HCM Lane V/C Ratio	0.031	-	-	7.115	0.078	0.371	0.015	-	-
HCM Control Delay (s)	10.5	0	-	$ 3099	17.1	137.6	12	-	-
HCM Lane LOS	B	A	-	F	C	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	19.8	0.3	1.3	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	51.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	130	71	50	988	674	40
Future Vol, veh/h	130	71	50	988	674	40
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	141	77	54	1074	733	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1940	758	779	0	-	0
Stage 1	758	-	-	-	-	-
Stage 2	1182	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 72	407	838	-	-	-
Stage 1	463	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 60	406	836	-	-	-
Mov Cap-2 Maneuver	~ 60	-	-	-	-	-
Stage 1	388	-	-	-	-	-
Stage 2	290	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 500.8	0.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	836	-	60	406	-	-
HCM Lane V/C Ratio	0.065	-	2.355	0.19	-	-
HCM Control Delay (s)	9.6	0	$ 765.6	15.9	-	-
HCM Lane LOS	A	A	F	C	-	-
HCM 95th %tile Q(veh)	0.2	-	14	0.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	321	431	87	136	287	320	133	383	235	332	284	117
Future Volume (veh/h)	321	431	87	136	287	320	133	383	235	332	284	117
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	401	468	87	148	312	91	145	416	232	361	309	112
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	474	494	92	245	395	333	303	287	160	311	414	150
Arrive On Green	0.20	0.32	0.32	0.08	0.21	0.21	0.07	0.26	0.26	0.13	0.32	0.32
Sat Flow, veh/h	1781	1533	285	1781	1870	1578	1781	1123	626	1781	1306	473
Grp Volume(v), veh/h	401	0	555	148	312	91	145	0	648	361	0	421
Grp Sat Flow(s),veh/h/ln	1781	0	1818	1781	1870	1578	1781	0	1749	1781	0	1780
Q Serve(g_s), s	16.3	0.0	29.1	6.2	15.4	4.7	5.8	0.0	25.0	13.0	0.0	20.7
Cycle Q Clear(g_c), s	16.3	0.0	29.1	6.2	15.4	4.7	5.8	0.0	25.0	13.0	0.0	20.7
Prop In Lane	1.00		0.16	1.00		1.00	1.00		0.36	1.00		0.27
Lane Grp Cap(c), veh/h	474	0	585	245	395	333	303	0	447	311	0	564
V/C Ratio(X)	0.85	0.00	0.95	0.60	0.79	0.27	0.48	0.00	1.45	1.16	0.00	0.75
Avail Cap(c_a), veh/h	600	0	595	367	402	339	303	0	447	311	0	564
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	32.3	28.4	36.5	32.3	25.4	0.0	36.4	27.1	0.0	29.9
Incr Delay (d2), s/veh	8.9	0.0	24.5	2.4	10.1	0.4	1.2	0.0	214.2	102.7	0.0	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	16.6	2.8	8.1	1.9	2.6	0.0	37.2	14.3	0.0	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.9	0.0	56.9	30.8	46.6	32.7	26.5	0.0	250.6	129.8	0.0	35.2
LnGrp LOS	C	A	E	C	D	C	C	A	F	F	A	D
Approach Vol, veh/h		956			551			793			782	
Approach Delay, s/veh		46.4			40.0			209.6			78.9	
Approach LOS		D			D			F			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	31.0	12.3	37.5	11.0	37.0	23.1	26.6				
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0				
Max Green Setting (Gmax), s	13.0	25.0	15.0	32.0	7.0	31.0	26.0	21.0				
Max Q Clear Time (g_c+I1), s	15.0	27.0	8.2	31.1	7.8	22.7	18.3	17.4				
Green Ext Time (p_c), s	0.0	0.0	0.2	0.3	0.0	1.8	0.8	0.8				
Intersection Summary												
HCM 6th Ctrl Delay			95.5									
HCM 6th LOS			F									

HCM 6th TWSC
7: Waiale Rd & Kokololio St

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	131	21	4	588	465	39
Future Vol, veh/h	131	21	4	588	465	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	142	23	4	639	505	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1173	526	547	0	-	0
Stage 1	526	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	212	552	1022	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	211	552	1022	-	-	-
Mov Cap-2 Maneuver	211	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	521	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	46	0.1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1022	-	211	552	-	-
HCM Lane V/C Ratio	0.004	-	0.675	0.041	-	-
HCM Control Delay (s)	8.5	0	51.5	11.8	-	-
HCM Lane LOS	A	A	F	B	-	-
HCM 95th %tile Q(veh)	0	-	4.2	0.1	-	-

Intersection						
Int Delay, s/veh	3.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	78	17	498	467	32
Future Vol, veh/h	76	78	17	498	467	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	83	85	18	541	508	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1103	526	543	0	-	0
Stage 1	526	-	-	-	-	-
Stage 2	577	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	234	552	1026	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	228	552	1026	-	-	-
Mov Cap-2 Maneuver	228	-	-	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	562	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27.4	0.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1026	-	324	-	-
HCM Lane V/C Ratio	0.018	-	0.517	-	-
HCM Control Delay (s)	8.6	0	27.4	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.1	-	2.8	-	-

Intersection						
Int Delay, s/veh	1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	17	4	481	540	6
Future Vol, veh/h	34	17	4	481	540	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	37	18	4	523	587	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1122	591	594	0	-	0
Stage 1	591	-	-	-	-	-
Stage 2	531	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	228	507	982	-	-	-
Stage 1	553	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	227	507	982	-	-	-
Mov Cap-2 Maneuver	227	-	-	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	590	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.1	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	982	-	278	-	-
HCM Lane V/C Ratio	0.004	-	0.199	-	-
HCM Control Delay (s)	8.7	0	21.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.7	-	-

HCM 6th TWSC
10: Waiale Rd & Ohana Hana Loop

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	23	5	454	543	13
Future Vol, veh/h	31	23	5	454	543	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	34	25	5	493	590	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1100	597	604	0	-	0
Stage 1	597	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	235	503	974	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	607	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	234	503	974	-	-	-
Mov Cap-2 Maneuver	369	-	-	-	-	-
Stage 1	547	-	-	-	-	-
Stage 2	607	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	974	-	416	-	-
HCM Lane V/C Ratio	0.006	-	0.141	-	-
HCM Control Delay (s)	8.7	-	15.1	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

HCM 6th Signalized Intersection Summary
11: E Waiko Rd & Waiale Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	256	0	20	70	128	0	267	45	319	167	79
Future Volume (veh/h)	65	256	0	20	70	128	0	267	45	319	167	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	278	0	22	76	80	0	290	41	347	182	73
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	353	383	0	257	142	149	419	396	56	540	650	261
Arrive On Green	0.06	0.21	0.00	0.03	0.17	0.17	0.00	0.25	0.25	0.18	0.51	0.51
Sat Flow, veh/h	1781	1870	0	1781	834	878	1781	1603	227	1781	1270	509
Grp Volume(v), veh/h	71	278	0	22	0	156	0	0	331	347	0	255
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1712	1781	0	1830	1781	0	1779
Q Serve(g_s), s	1.7	7.3	0.0	0.5	0.0	4.4	0.0	0.0	8.7	6.8	0.0	4.3
Cycle Q Clear(g_c), s	1.7	7.3	0.0	0.5	0.0	4.4	0.0	0.0	8.7	6.8	0.0	4.3
Prop In Lane	1.00		0.00	1.00		0.51	1.00		0.12	1.00		0.29
Lane Grp Cap(c), veh/h	353	383	0	257	0	291	419	0	452	540	0	910
V/C Ratio(X)	0.20	0.73	0.00	0.09	0.00	0.54	0.00	0.00	0.73	0.64	0.00	0.28
Avail Cap(c_a), veh/h	430	909	0	397	0	832	941	0	1934	748	0	1881
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.4	19.5	0.0	17.5	0.0	19.9	0.0	0.0	18.2	11.0	0.0	7.3
Incr Delay (d2), s/veh	0.3	2.6	0.0	0.1	0.0	1.5	0.0	0.0	2.3	1.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	3.2	0.0	0.2	0.0	1.7	0.0	0.0	3.6	2.4	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.6	22.1	0.0	17.6	0.0	21.4	0.0	0.0	20.5	12.3	0.0	7.5
LnGrp LOS	B	C	A	B	A	C	A	A	C	B	A	A
Approach Vol, veh/h		349			178			331			602	
Approach Delay, s/veh		21.0			21.0			20.5			10.2	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.9	17.5	5.9	15.3	0.0	31.4	7.7	13.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	55.5	5.5	25.5	15.5	55.5	5.5	25.5
Max Q Clear Time (g_c+I1), s	8.8	10.7	2.5	9.3	0.0	6.3	3.7	6.4
Green Ext Time (p_c), s	0.6	2.2	0.0	1.5	0.0	1.8	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	16.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	145	785	7	9	449	71	17	3	26	39	1	121
Future Vol, veh/h	145	785	7	9	449	71	17	3	26	39	1	121
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	158	853	8	10	488	77	18	3	28	42	1	132

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	566	0	0	861	0	0	1786	1759	857	1698	1686	489
Stage 1	-	-	-	-	-	-	1173	1173	-	509	509	-
Stage 2	-	-	-	-	-	-	613	586	-	1189	1177	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1006	-	-	781	-	-	63	85	357	73	94	579
Stage 1	-	-	-	-	-	-	234	266	-	547	538	-
Stage 2	-	-	-	-	-	-	480	497	-	229	265	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1005	-	-	781	-	-	42	71	357	57	78	578
Mov Cap-2 Maneuver	-	-	-	-	-	-	42	71	-	57	78	-
Stage 1	-	-	-	-	-	-	197	224	-	461	530	-
Stage 2	-	-	-	-	-	-	365	490	-	175	223	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.2	71.8	52.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	45	357	1005	-	-	781	-	-	57	578
HCM Lane V/C Ratio	0.483	0.079	0.157	-	-	0.013	-	-	0.763	0.228
HCM Control Delay (s)	144.5	15.9	9.2	-	-	9.7	-	-	171.4	13.1
HCM Lane LOS	F	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	1.8	0.3	0.6	-	-	0	-	-	3.3	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	316	188	410	44	188	96	233	601	14	40	554	105
Future Volume (veh/h)	316	188	410	44	188	96	233	601	14	40	554	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	451	204	236	48	204	5	253	653	0	43	602	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	471	681	575	248	229	193	278	817		202	680	
Arrive On Green	0.27	0.36	0.36	0.03	0.12	0.12	0.10	0.44	0.00	0.03	0.36	0.00
Sat Flow, veh/h	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	451	204	236	48	204	5	253	653	0	43	602	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	38.4	11.7	16.8	3.5	16.1	0.4	13.0	45.4	0.0	2.3	45.4	0.0
Cycle Q Clear(g_c), s	38.4	11.7	16.8	3.5	16.1	0.4	13.0	45.4	0.0	2.3	45.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	471	681	575	248	229	193	278	817		202	680	
V/C Ratio(X)	0.96	0.30	0.41	0.19	0.89	0.03	0.91	0.80		0.21	0.88	
Avail Cap(c_a), veh/h	560	809	684	251	249	209	324	1046		212	872	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.9	34.1	35.7	55.2	64.9	58.0	33.6	36.6	0.0	32.7	44.8	0.0
Incr Delay (d2), s/veh	24.5	0.1	0.2	0.1	27.3	0.0	24.5	5.0	0.0	0.2	11.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.4	5.5	6.6	1.6	9.5	0.2	7.3	21.4	0.0	1.0	22.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.4	34.2	35.9	55.3	92.1	58.0	58.2	41.6	0.0	32.9	56.0	0.0
LnGrp LOS	E	C	D	E	F	E	E	D		C	E	
Approach Vol, veh/h		891			257			906	A		645	A
Approach Delay, s/veh		49.4			84.6			46.2			54.5	
Approach LOS		D			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	71.6	9.8	59.7	20.1	60.6	46.0	23.4
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	84.0	5.0	65.0	19.0	70.0	50.0	20.0
Max Q Clear Time (g_c+I1), s	4.3	47.4	5.5	18.8	15.0	47.4	40.4	18.1
Green Ext Time (p_c), s	0.0	9.8	0.0	1.3	0.1	7.3	0.6	0.1

Intersection Summary	
HCM 6th Ctrl Delay	52.9
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	255	110	194	94	298	27	491	265	381	614	17
Future Volume (veh/h)	54	255	110	194	94	298	27	491	265	381	614	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	59	277	20	211	102	203	29	534	0	414	667	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	330	326	310	441	638	280	656		448	918	840
Arrive On Green	0.04	0.16	0.16	0.12	0.24	0.24	0.03	0.35	0.00	0.17	0.49	0.49
Sat Flow, veh/h	1968	2067	1740	1781	1870	1578	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	59	277	20	211	102	203	29	534	0	414	667	8
Grp Sat Flow(s),veh/h/ln	1968	2067	1740	1781	1870	1578	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	2.5	13.3	1.0	9.7	4.5	9.0	1.0	26.5	0.0	14.5	28.8	0.2
Cycle Q Clear(g_c), s	2.5	13.3	1.0	9.7	4.5	9.0	1.0	26.5	0.0	14.5	28.8	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	376	330	326	310	441	638	280	656		448	918	840
V/C Ratio(X)	0.16	0.84	0.06	0.68	0.23	0.32	0.10	0.81		0.92	0.73	0.01
Avail Cap(c_a), veh/h	394	628	577	383	771	916	476	1101		709	1431	1275
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.7	41.6	34.1	30.1	31.5	20.8	21.1	30.1	0.0	20.8	20.6	11.3
Incr Delay (d2), s/veh	0.2	2.2	0.0	3.6	0.1	0.1	0.1	5.2	0.0	9.0	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	7.0	0.4	4.4	2.1	3.3	0.4	12.4	0.0	6.6	12.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	43.8	34.1	33.7	31.6	20.9	21.2	35.3	0.0	29.8	22.9	11.3
LnGrp LOS	C	D	C	C	C	C	C	D		C	C	B
Approach Vol, veh/h		356			516			563	A		1089	
Approach Delay, s/veh		41.6			28.2			34.6			25.4	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.1	41.8	16.9	21.3	7.8	56.0	9.1	29.1
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	32.0	60.0	16.0	31.0	14.0	78.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	16.5	28.5	11.7	15.3	3.0	30.8	4.5	11.0
Green Ext Time (p_c), s	0.6	7.3	0.2	1.0	0.0	11.2	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	30.3
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	153	88	18	579	818	62
Future Volume (veh/h)	153	88	18	579	818	62
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	166	11	20	629	889	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	229	204	284	1279	1075	911
Arrive On Green	0.13	0.13	0.02	0.68	0.57	0.57
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	166	11	20	629	889	47
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	5.3	0.4	0.2	9.4	22.6	0.8
Cycle Q Clear(g_c), s	5.3	0.4	0.2	9.4	22.6	0.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	229	204	284	1279	1075	911
V/C Ratio(X)	0.72	0.05	0.07	0.49	0.83	0.05
Avail Cap(c_a), veh/h	911	811	666	2870	2264	1918
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.6	22.4	9.3	4.4	10.1	5.5
Incr Delay (d2), s/veh	4.3	0.1	0.1	0.3	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.1	0.1	2.3	7.4	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.8	22.5	9.4	4.7	11.8	5.5
LnGrp LOS	C	C	A	A	B	A
Approach Vol, veh/h	177			649	936	
Approach Delay, s/veh	28.5			4.9	11.5	
Approach LOS	C			A	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	6.4	39.7		12.6		46.1
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0
Max Green Setting (Gmax), s	14.0	71.0		30.0		90.0
Max Q Clear Time (g_c+I1), s	12.2	24.6		7.3		11.4
Green Ext Time (p_c), s	0.0	9.1		0.5		5.1

Intersection Summary	
HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd 10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	13	6	86	8	54	4	513	92	183	715	6
Future Volume (veh/h)	20	13	6	86	8	54	4	513	92	183	715	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	14	2	93	9	39	4	558	93	199	777	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	111	203	222	22	54	341	800	133	460	1102	934
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.01	0.51	0.51	0.08	0.59	0.59
Sat Flow, veh/h	867	863	1579	924	168	418	1781	1563	260	1781	1870	1585
Grp Volume(v), veh/h	36	0	2	141	0	0	4	0	651	199	777	4
Grp Sat Flow(s),veh/h/ln	1730	0	1579	1510	0	0	1781	0	1823	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.1	4.1	0.0	0.0	0.1	0.0	15.7	2.8	16.9	0.1
Cycle Q Clear(g_c), s	1.0	0.0	0.1	5.1	0.0	0.0	0.1	0.0	15.7	2.8	16.9	0.1
Prop In Lane	0.61		1.00	0.66		0.28	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	323	0	203	297	0	0	341	0	933	460	1102	934
V/C Ratio(X)	0.11	0.00	0.01	0.47	0.00	0.00	0.01	0.00	0.70	0.43	0.70	0.00
Avail Cap(c_a), veh/h	784	0	683	743	0	0	763	0	2208	744	2264	1919
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	0.0	22.0	24.1	0.0	0.0	8.1	0.0	10.7	8.1	8.3	4.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.4	0.0	0.0	0.0	0.0	2.0	0.2	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.8	0.0	0.0	0.0	0.0	5.6	0.7	5.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.4	0.0	22.0	24.5	0.0	0.0	8.1	0.0	12.7	8.3	10.1	4.9
LnGrp LOS	C	A	C	C	A	A	A	A	B	A	B	A
Approach Vol, veh/h		38			141			655			980	
Approach Delay, s/veh		22.4			24.5			12.7			9.7	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	35.6		12.4	5.3	40.1		12.4
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0
Max Q Clear Time (g_c+I1), s	4.8	17.7		3.0	2.1	18.9		7.1
Green Ext Time (p_c), s	0.2	11.6		0.1	0.0	15.2		0.5

Intersection Summary		
HCM 6th Ctrl Delay		12.2
HCM 6th LOS		B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
17: Kuikahi Dr & Kehalani Mauka Pkwy 10/07/2022

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	171	5	14	66	74	5	4	59	174	2	32
Future Vol, veh/h	28	171	5	14	66	74	5	4	59	174	2	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	186	5	15	72	80	5	4	64	189	2	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	152	0	0	191	0	0	410	431	189	425	393	112
Stage 1	-	-	-	-	-	-	249	249	-	142	142	-
Stage 2	-	-	-	-	-	-	161	182	-	283	251	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1429	-	-	1383	-	-	552	517	853	540	543	941
Stage 1	-	-	-	-	-	-	755	701	-	861	779	-
Stage 2	-	-	-	-	-	-	841	749	-	724	699	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1429	-	-	1383	-	-	517	500	853	484	526	941
Mov Cap-2 Maneuver	-	-	-	-	-	-	517	500	-	484	526	-
Stage 1	-	-	-	-	-	-	739	686	-	843	770	-
Stage 2	-	-	-	-	-	-	799	741	-	651	684	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.7	10.1	15.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	783	1429	-	-	1383	-	-	484	899
HCM Lane V/C Ratio	0.094	0.021	-	-	0.011	-	-	0.391	0.041
HCM Control Delay (s)	10.1	7.6	-	-	7.6	-	-	17.1	9.2
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	1.8	0.1

APPENDIX C

LOS WORKSHEETS

Base Year Conditions WITH Waiale Extension WITHOUT MAUI LANI PARKWAY Extension – PM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kamehameha Ave														
102	L2	178	2.0	187	2.0	1.046	73.1	LOS F	29.9	760.0	1.00	2.66	3.54	12.9
7	T1	219	2.0	231	2.0	1.046	70.4	LOS F	29.9	760.0	1.00	2.66	3.54	12.3
25	R2	103	2.0	108	2.0	1.046	70.4	LOS F	29.9	760.0	1.00	2.66	3.54	12.3
Approach		500	2.0	526	2.0	1.046	71.3	LOS F	29.9	760.0	1.00	2.66	3.54	12.5
East: WB Maui Lani Parkway														
19	L2	85	2.0	89	2.0	0.777	17.4	LOS C	10.7	270.9	1.00	1.43	1.62	18.9
336	T1	283	2.0	298	2.0	0.777	14.7	LOS B	10.7	270.9	1.00	1.43	1.62	17.7
24	R2	160	2.0	168	2.0	0.777	14.7	LOS B	10.7	270.9	1.00	1.43	1.62	17.7
Approach		528	2.0	556	2.0	0.777	15.1	LOS C	10.7	270.9	1.00	1.43	1.62	17.8
North: SB Kamehameha Ave														
15	L2	268	2.0	282	2.0	0.963	30.0	LOS D	25.3	642.3	1.00	1.99	2.41	17.0
2	T1	157	2.0	165	2.0	0.963	27.3	LOS D	25.3	642.3	1.00	1.99	2.41	16.0
40	R2	336	2.0	354	2.0	0.963	27.3	LOS D	25.3	642.3	1.00	1.99	2.41	16.0
Approach		761	2.0	801	2.0	0.963	28.3	LOS D	25.3	642.3	1.00	1.99	2.41	16.4
West: EB Maui Lani Parkway														
30	L2	318	2.0	335	2.0	0.992	35.0	LOS D	29.8	755.8	1.00	2.16	2.62	16.4
464	T1	335	2.0	353	2.0	0.992	32.2	LOS D	29.8	755.8	1.00	2.16	2.62	15.5
78	R2	136	2.0	143	2.0	0.992	32.2	LOS D	29.8	755.8	1.00	2.16	2.62	15.5
Approach		789	2.0	831	2.0	0.992	33.3	LOS D	29.8	755.8	1.00	2.16	2.62	15.9
All Vehicles		2578	2.0	2714	2.0	1.046	35.5	LOS E	29.9	760.0	1.00	2.06	2.53	15.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AUSTIN, TSUTSUMI & ASSOCIATES, INC. | Licence: PLUS / 1PC | Processed: Monday, September 26, 2022 8:39:03 AM
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Intersection	
Intersection Delay, s/veh	199.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	10	222	16	4	8	117	526	23	8	701	69
Future Vol, veh/h	60	10	222	16	4	8	117	526	23	8	701	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	11	241	17	4	9	127	572	25	9	762	75
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	18	15.1	174.5	295.3
HCM LOS	C	C	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	18%	0%	100%	0%	57%	1%
Vol Thru, %	82%	0%	0%	4%	14%	90%
Vol Right, %	0%	100%	0%	96%	29%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	643	23	60	232	28	778
LT Vol	117	0	60	0	16	8
Through Vol	526	0	0	10	4	701
RT Vol	0	23	0	222	8	69
Lane Flow Rate	699	25	65	252	30	846
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.32	0.042	0.15	0.497	0.077	1.593
Departure Headway (Hd)	7.509	6.692	9.59	8.359	11.154	7.254
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	489	538	376	434	323	507
Service Time	5.209	4.392	7.29	6.059	9.154	5.254
HCM Lane V/C Ratio	1.429	0.046	0.173	0.581	0.093	1.669
HCM Control Delay	180.4	9.7	14	19	15.1	295.3
HCM Lane LOS	F	A	B	C	C	F
HCM 95th-tile Q	27.7	0.1	0.5	2.7	0.2	43.6

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Waiale Rd														
7	T1	585	2.0	616	2.0	1.087	44.8	LOS F	101.9	2589.4	1.00	1.12	1.62	14.3
25	R2	760	2.0	800	2.0	1.087	44.8	LOS F	101.9	2589.4	1.00	1.12	1.62	14.3
Approach		1345	2.0	1416	2.0	1.087	44.8	LOS E	101.9	2589.4	1.00	1.12	1.62	14.3
East: WB Waiinu Rd														
19	L2	233	2.0	245	2.0	0.393	6.2	LOS A	2.9	74.4	0.82	0.78	0.82	20.4
24	R2	61	2.0	64	2.0	0.393	3.5	LOS A	2.9	74.4	0.82	0.78	0.82	19.0
Approach		294	2.0	309	2.0	0.393	5.6	LOS A	2.9	74.4	0.82	0.78	0.82	20.1
North: SB Waiale Rd														
15	L2	62	2.0	65	2.0	0.754	6.8	LOS A	10.2	259.6	0.85	0.75	0.96	20.6
2	T1	731	2.0	769	2.0	0.754	4.1	LOS A	10.2	259.6	0.85	0.75	0.96	19.1
Approach		793	2.0	835	2.0	0.754	4.3	LOS A	10.2	259.6	0.85	0.75	0.96	19.2
All Vehicles		2432	2.0	2560	2.0	1.087	26.8	LOS D	101.9	2589.4	0.93	0.95	1.31	16.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AUSTIN, TSUTSUMI & ASSOCIATES, INC. | Licence: PLUS / 1PC | Processed: Monday, September 26, 2022 8:35:26 AM
Project: N:\2022\22-519 Puunani Homestead TIAR Ph II TIAR\2. Base Year\2. WITH Waiale Ext WITHOUT MLP\Waiale - Waiinu RAB BY AM WITH Waiale Ext WITHOUT MLP.sip9

Intersection												
Int Delay, s/veh	68											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	81	0	20	3	1	19	32	946	2	5	983	230
Future Vol, veh/h	81	0	20	3	1	19	32	946	2	5	983	230
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	0	22	3	1	21	35	1028	2	5	1068	250

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2316	2309	1196	2316	2433	1032	1321	0	0	1033	0	0
Stage 1	1206	1206	-	1102	1102	-	-	-	-	-	-	-
Stage 2	1110	1103	-	1214	1331	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 26	38	227	26	32	283	523	-	-	673	-	-
Stage 1	224	257	-	257	287	-	-	-	-	-	-	-
Stage 2	254	287	-	222	224	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 20	31	226	20	26	282	522	-	-	671	-	-
Mov Cap-2 Maneuver	~ 20	31	-	20	26	-	-	-	-	-	-	-
Stage 1	188	248	-	216	241	-	-	-	-	-	-	-
Stage 2	198	241	-	194	216	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 1545.3	59.7	0.4	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	522	-	-	20	226	90	671	-	-
HCM Lane V/C Ratio	0.067	-	-	4.402	0.096	0.278	0.008	-	-
HCM Control Delay (s)	12.4	0	-	$ 1921.3	22.6	59.7	10.4	-	-
HCM Lane LOS	B	A	-	F	C	F	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	11.4	0.3	1	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	17					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	64	56	841	836	60
Future Vol, veh/h	76	64	56	841	836	60
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	83	70	61	914	909	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1981	945	977	0	-	0
Stage 1	945	-	-	-	-	-
Stage 2	1036	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 68	318	706	-	-	-
Stage 1	378	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 56	317	704	-	-	-
Mov Cap-2 Maneuver	~ 56	-	-	-	-	-
Stage 1	311	-	-	-	-	-
Stage 2	341	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	230.8	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	704	-	56	317	-	-
HCM Lane V/C Ratio	0.086	-	1.475	0.219	-	-
HCM Control Delay (s)	10.6	0	$ 408.8	19.5	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	0.3	-	7.5	0.8	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	194	376	73	222	506	390	118	314	229	440	307	132
Future Volume (veh/h)	194	376	73	222	506	390	118	314	229	440	307	132
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	242	409	74	241	550	195	128	341	227	478	334	130
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	291	502	91	335	611	517	255	351	233	169	418	163
Arrive On Green	0.11	0.33	0.33	0.11	0.33	0.33	0.06	0.33	0.33	0.05	0.33	0.33
Sat Flow, veh/h	1781	1541	279	1781	1870	1583	1781	1047	697	1781	1281	499
Grp Volume(v), veh/h	242	0	483	241	550	195	128	0	568	478	0	464
Grp Sat Flow(s),veh/h/ln	1781	0	1820	1781	1870	1583	1781	0	1744	1781	0	1780
Q Serve(g_s), s	10.1	0.0	27.6	10.0	31.8	10.7	5.4	0.0	36.5	6.0	0.0	27.0
Cycle Q Clear(g_c), s	10.1	0.0	27.6	10.0	31.8	10.7	5.4	0.0	36.5	6.0	0.0	27.0
Prop In Lane	1.00		0.15	1.00		1.00	1.00		0.40	1.00		0.28
Lane Grp Cap(c), veh/h	291	0	593	335	611	517	255	0	584	169	0	580
V/C Ratio(X)	0.83	0.00	0.81	0.72	0.90	0.38	0.50	0.00	0.97	2.83	0.00	0.80
Avail Cap(c_a), veh/h	364	0	641	468	725	614	255	0	584	169	0	580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.6	0.0	35.1	25.4	36.4	29.3	26.6	0.0	37.2	34.4	0.0	34.9
Incr Delay (d2), s/veh	12.5	0.0	7.5	3.2	12.8	0.5	1.5	0.0	30.3	838.2	0.0	7.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	13.4	4.5	16.6	4.2	2.4	0.0	20.3	41.3	0.0	12.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.1	0.0	42.6	28.7	49.2	29.8	28.2	0.0	67.5	872.6	0.0	42.7
LnGrp LOS	D	A	D	C	D	C	C	A	E	F	A	D
Approach Vol, veh/h		725			986			696			942	
Approach Delay, s/veh		41.4			40.3			60.3			463.8	
Approach LOS		D			D			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	44.0	16.5	43.0	11.0	43.0	16.4	43.1
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	6.0	38.0	21.0	40.0	7.0	37.0	17.0	44.0
Max Q Clear Time (g_c+I1), s	8.0	38.5	12.0	29.6	7.4	29.0	12.1	33.8
Green Ext Time (p_c), s	0.0	0.0	0.5	2.4	0.0	1.9	0.3	3.3

Intersection Summary	
HCM 6th Ctrl Delay	163.8
HCM 6th LOS	F

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	15	32	592	499	70
Future Vol, veh/h	55	15	32	592	499	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	60	16	35	643	542	76

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1293	580	618	0	-	0
Stage 1	580	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	180	514	962	-	-	-
Stage 1	560	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	170	514	962	-	-	-
Mov Cap-2 Maneuver	170	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	486	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.8	0.5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	962	-	170	514	-	-
HCM Lane V/C Ratio	0.036	-	0.352	0.032	-	-
HCM Control Delay (s)	8.9	0	37.2	12.2	-	-
HCM Lane LOS	A	A	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	0.1	-	-

Intersection						
Int Delay, s/veh	2.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	48	33	70	581	444	58
Future Vol, veh/h	48	33	70	581	444	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	52	36	76	632	483	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1299	515	546	0	-	0
Stage 1	515	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	178	560	1023	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	158	560	1023	-	-	-
Mov Cap-2 Maneuver	158	-	-	-	-	-
Stage 1	532	-	-	-	-	-
Stage 2	450	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.3	0.9	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1023	-	223	-	-
HCM Lane V/C Ratio	0.074	-	0.395	-	-
HCM Control Delay (s)	8.8	0	31.3	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.2	-	1.8	-	-

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	20	19	638	463	14
Future Vol, veh/h	13	20	19	638	463	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	14	22	21	693	503	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1246	511	518	0	-	0
Stage 1	511	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	192	563	1048	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	474	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	186	563	1048	-	-	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	582	-	-	-	-	-
Stage 2	474	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1048	-	313	-	-
HCM Lane V/C Ratio	0.02	-	0.115	-	-
HCM Control Delay (s)	8.5	0	18	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

HCM 6th TWSC
10: Waiale Rd & Ohana Hana Loop

10/07/2022

Intersection						
Int Delay, s/veh	0.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	9	16	642	465	17
Future Vol, veh/h	14	9	16	642	465	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	15	10	17	698	505	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1246	514	523	0	-	0
Stage 1	514	-	-	-	-	-
Stage 2	732	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	192	560	1043	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	189	560	1043	-	-	-
Mov Cap-2 Maneuver	325	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	476	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1043	-	389	-	-
HCM Lane V/C Ratio	0.017	-	0.064	-	-
HCM Control Delay (s)	8.5	-	14.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

HCM 6th Signalized Intersection Summary
11: E Waiko Rd & Waiale Rd

10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	119	0	52	163	323	0	283	33	217	219	41
Future Volume (veh/h)	55	119	0	52	163	323	0	283	33	217	219	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	129	0	57	177	287	0	308	32	236	238	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	263	622	0	546	213	345	364	389	40	391	663	111
Arrive On Green	0.05	0.33	0.00	0.05	0.33	0.33	0.00	0.23	0.23	0.13	0.42	0.42
Sat Flow, veh/h	1781	1870	0	1781	642	1041	1781	1666	173	1781	1561	262
Grp Volume(v), veh/h	60	129	0	57	0	464	0	0	340	236	0	278
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1683	1781	0	1839	1781	0	1823
Q Serve(g_s), s	1.5	3.4	0.0	1.4	0.0	17.7	0.0	0.0	12.1	6.5	0.0	7.2
Cycle Q Clear(g_c), s	1.5	3.4	0.0	1.4	0.0	17.7	0.0	0.0	12.1	6.5	0.0	7.2
Prop In Lane	1.00		0.00	1.00		0.62	1.00		0.09	1.00		0.14
Lane Grp Cap(c), veh/h	263	622	0	546	0	557	364	0	430	391	0	775
V/C Ratio(X)	0.23	0.21	0.00	0.10	0.00	0.83	0.00	0.00	0.79	0.60	0.00	0.36
Avail Cap(c_a), veh/h	316	1092	0	602	0	982	759	0	1073	564	0	1064
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.2	16.6	0.0	13.9	0.0	21.4	0.0	0.0	25.0	16.8	0.0	13.5
Incr Delay (d2), s/veh	0.4	0.2	0.0	0.1	0.0	3.3	0.0	0.0	3.3	1.5	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.4	0.0	0.6	0.0	7.1	0.0	0.0	5.4	2.6	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.6	16.8	0.0	14.0	0.0	24.7	0.0	0.0	28.3	18.3	0.0	13.8
LnGrp LOS	B	B	A	B	A	C	A	A	C	B	A	B
Approach Vol, veh/h		189			521			340			514	
Approach Delay, s/veh		16.7			23.6			28.3			15.9	
Approach LOS		B			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	20.7	7.8	27.6	0.0	34.0	7.9	27.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	40.5	5.5	40.5	15.5	40.5	5.5	40.5
Max Q Clear Time (g_c+I1), s	8.5	14.1	3.4	5.4	0.0	9.2	3.5	19.7
Green Ext Time (p_c), s	0.4	2.1	0.0	0.8	0.0	1.9	0.0	3.3

Intersection Summary			
HCM 6th Ctrl Delay			21.2
HCM 6th LOS			C

HCM 6th TWSC
12: Kuikahi Dr & Kehalani Village Center Dr

10/07/2022

Intersection	
Int Delay, s/veh	19

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	167	541	17	23	635	135	9	2	13	66	3	193
Future Vol, veh/h	167	541	17	23	635	135	9	2	13	66	3	193
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	182	588	18	25	690	147	10	2	14	72	3	210

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	838	0	0	606	0	0	1881	1849	597	1710	1711	691
Stage 1	-	-	-	-	-	-	961	961	-	741	741	-
Stage 2	-	-	-	-	-	-	920	888	-	969	970	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	796	-	-	972	-	-	54	74	503	72	91	445
Stage 1	-	-	-	-	-	-	308	335	-	408	423	-
Stage 2	-	-	-	-	-	-	325	362	-	305	331	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	795	-	-	972	-	-	22	56	503	~ 55	68	445
Mov Cap-2 Maneuver	-	-	-	-	-	-	22	56	-	~ 55	68	-
Stage 1	-	-	-	-	-	-	237	258	-	314	412	-
Stage 2	-	-	-	-	-	-	166	352	-	227	255	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	0.3	118.2	111.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	25	503	795	-	-	972	-	-	55	445
HCM Lane V/C Ratio	0.478	0.028	0.228	-	-	0.026	-	-	1.364	0.471
HCM Control Delay (s)	243.2	12.4	10.9	-	-	8.8	-	-	$ 368.7	20.1
HCM Lane LOS	F	B	B	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	1.5	0.1	0.9	-	-	0.1	-	-	6.7	2.5

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
13: Honoapiilani Hwy & Kehalani Pkwy

10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	62	165	51	184	74	225	609	18	44	715	229
Future Volume (veh/h)	165	62	165	51	184	74	225	609	18	44	715	229
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	236	67	29	55	200	5	245	662	0	48	777	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	287	428	358	297	246	204	282	984		325	887	
Arrive On Green	0.13	0.23	0.23	0.04	0.13	0.13	0.09	0.53	0.00	0.03	0.47	0.00
Sat Flow, veh/h	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	236	67	29	55	200	5	245	662	0	48	777	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	16.0	3.4	1.7	3.2	12.5	0.3	8.1	31.1	0.0	1.6	44.8	0.0
Cycle Q Clear(g_c), s	16.0	3.4	1.7	3.2	12.5	0.3	8.1	31.1	0.0	1.6	44.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	287	428	358	297	246	204	282	984		325	887	
V/C Ratio(X)	0.82	0.16	0.08	0.19	0.81	0.02	0.87	0.67		0.15	0.88	
Avail Cap(c_a), veh/h	287	469	392	321	312	259	338	1218		341	1078	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.9	36.9	36.3	42.8	50.6	45.3	25.2	20.8	0.0	17.7	28.3	0.0
Incr Delay (d2), s/veh	16.4	0.1	0.0	0.1	9.6	0.0	16.4	1.9	0.0	0.1	8.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	1.6	0.7	1.4	6.5	0.1	4.5	13.2	0.0	0.6	20.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.3	37.0	36.3	42.9	60.2	45.3	41.6	22.7	0.0	17.8	37.0	0.0
LnGrp LOS	D	D	D	D	E	D	D	C		B	D	
Approach Vol, veh/h		332			260			907	A		825	A
Approach Delay, s/veh		49.2			56.3			27.8			35.9	
Approach LOS		D			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	69.0	9.3	32.4	15.2	62.8	21.0	20.8
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	78.0	6.0	30.0	14.0	69.0	16.0	20.0
Max Q Clear Time (g_c+I1), s	3.6	33.1	5.2	5.4	10.1	46.8	18.0	14.5
Green Ext Time (p_c), s	0.0	10.5	0.0	0.3	0.1	10.0	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	36.9
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive

10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	174	50	257	241	341	83	515	243	340	499	33
Future Volume (veh/h)	18	174	50	257	241	341	83	515	243	340	499	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	189	7	279	262	247	90	560	0	370	542	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	238	285	386	471	632	373	689		417	874	773
Arrive On Green	0.02	0.12	0.12	0.16	0.25	0.25	0.05	0.37	0.00	0.15	0.47	0.47
Sat Flow, veh/h	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	20	189	7	279	262	247	90	560	0	370	542	16
Grp Sat Flow(s),veh/h/ln	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	0.9	8.8	0.3	13.0	12.1	11.0	3.1	26.8	0.0	12.1	21.6	0.5
Cycle Q Clear(g_c), s	0.9	8.8	0.3	13.0	12.1	11.0	3.1	26.8	0.0	12.1	21.6	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	257	238	285	386	471	632	373	689		417	874	773
V/C Ratio(X)	0.08	0.79	0.02	0.72	0.56	0.39	0.24	0.81		0.89	0.62	0.02
Avail Cap(c_a), veh/h	314	521	525	607	905	999	540	1131		623	1358	1182
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.4	42.7	34.9	30.1	32.3	21.2	18.6	28.2	0.0	19.9	19.8	13.1
Incr Delay (d2), s/veh	0.1	2.3	0.0	2.6	0.4	0.1	0.1	5.0	0.0	7.4	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	4.7	0.1	5.8	5.5	4.1	1.2	12.4	0.0	5.4	9.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.5	45.0	34.9	32.7	32.7	21.4	18.7	33.2	0.0	27.4	21.3	13.1
LnGrp LOS	D	D	C	C	C	C	B	C		C	C	B
Approach Vol, veh/h		216			788			650	A		928	
Approach Delay, s/veh		44.0			29.1			31.2			23.6	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.5	42.5	20.7	16.4	9.7	52.4	7.1	30.0
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	26.0	60.0	28.0	25.0	14.0	72.0	5.0	48.0
Max Q Clear Time (g_c+I1), s	4.1	28.8	15.0	10.8	5.1	23.6	2.9	14.1
Green Ext Time (p_c), s	0.5	7.8	0.7	0.6	0.1	8.4	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St

10/07/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	31	57	753	634	125
Future Volume (veh/h)	95	31	57	753	634	125
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	103	1	62	818	689	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	224	200	387	1200	892	755
Arrive On Green	0.13	0.13	0.06	0.64	0.48	0.48
Sat Flow, veh/h	1781	1585	1781	1870	1870	1583
Grp Volume(v), veh/h	103	1	62	818	689	81
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1583
Q Serve(g_s), s	2.5	0.0	0.7	13.2	14.4	1.3
Cycle Q Clear(g_c), s	2.5	0.0	0.7	13.2	14.4	1.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	224	200	387	1200	892	755
V/C Ratio(X)	0.46	0.01	0.16	0.68	0.77	0.11
Avail Cap(c_a), veh/h	1129	1005	809	3556	2806	2375
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.2	18.1	7.5	5.4	10.2	6.8
Incr Delay (d2), s/veh	1.5	0.0	0.2	0.7	1.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	2.9	4.7	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.7	18.1	7.7	6.1	11.7	6.9
LnGrp LOS	C	B	A	A	B	A
Approach Vol, veh/h	104			880	770	
Approach Delay, s/veh	20.6			6.2	11.2	
Approach LOS	C			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	7.8	28.6	11.0	36.4
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	2.7	16.4	4.5	15.2
Green Ext Time (p_c), s	0.1	6.1	0.3	7.9

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	7	3	78	12	99	9	697	90	81	571	22
Future Volume (veh/h)	12	7	3	78	12	99	9	697	90	81	571	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	8	1	85	13	72	10	758	95	88	621	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	187	98	219	165	28	90	486	971	122	352	1195	1012
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.01	0.60	0.60	0.06	0.64	0.64
Sat Flow, veh/h	796	707	1585	680	202	648	1781	1629	204	1781	1870	1584
Grp Volume(v), veh/h	21	0	1	170	0	0	10	0	853	88	621	15
Grp Sat Flow(s),veh/h/ln	1503	0	1585	1530	0	0	1781	0	1833	1781	1870	1584
Q Serve(g_s), s	0.0	0.0	0.0	7.1	0.0	0.0	0.2	0.0	26.7	1.4	13.7	0.3
Cycle Q Clear(g_c), s	0.7	0.0	0.0	8.2	0.0	0.0	0.2	0.0	26.7	1.4	13.7	0.3
Prop In Lane	0.62		1.00	0.50		0.42	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	284	0	219	282	0	0	486	0	1093	352	1195	1012
V/C Ratio(X)	0.07	0.00	0.00	0.60	0.00	0.00	0.02	0.00	0.78	0.25	0.52	0.01
Avail Cap(c_a), veh/h	566	0	520	569	0	0	791	0	1686	580	1719	1456
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	0.0	28.3	31.7	0.0	0.0	6.6	0.0	11.6	10.3	7.4	5.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	2.7	0.1	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	3.0	0.0	0.0	0.1	0.0	9.8	0.5	4.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.6	0.0	28.3	32.5	0.0	0.0	6.6	0.0	14.3	10.4	8.2	5.0
LnGrp LOS	C	A	C	C	A	A	A	A	B	B	A	A
Approach Vol, veh/h		22			170			863			724	
Approach Delay, s/veh		28.6			32.5			14.2			8.4	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.2	51.4		15.5	6.0	54.7		15.5
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0
Max Q Clear Time (g_c+I1), s	13.4	28.7		2.7	2.2	15.7		10.2
Green Ext Time (p_c), s	0.1	16.7		0.0	0.0	10.8		0.5

Intersection Summary	
HCM 6th Ctrl Delay	13.8
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
17: Kuikahi Dr & Kehalani Mauka Pkwy

10/07/2022

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	107	11	49	162	145	11	1	28	109	6	24
Future Vol, veh/h	9	107	11	49	162	145	11	1	28	109	6	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	116	12	53	176	158	12	1	30	118	7	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	334	0	0	128	0	0	520	582	122	519	509	255
Stage 1	-	-	-	-	-	-	142	142	-	361	361	-
Stage 2	-	-	-	-	-	-	378	440	-	158	148	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1225	-	-	1458	-	-	467	425	929	467	467	784
Stage 1	-	-	-	-	-	-	861	779	-	657	626	-
Stage 2	-	-	-	-	-	-	644	578	-	844	775	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1225	-	-	1458	-	-	432	406	929	436	446	784
Mov Cap-2 Maneuver	-	-	-	-	-	-	432	406	-	436	446	-
Stage 1	-	-	-	-	-	-	854	773	-	652	603	-
Stage 2	-	-	-	-	-	-	593	557	-	809	769	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	1	10.6	15.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	689	1225	-	-	1458	-	-	436	681
HCM Lane V/C Ratio	0.063	0.008	-	-	0.037	-	-	0.272	0.048
HCM Control Delay (s)	10.6	8	-	-	7.6	-	-	16.3	10.6
HCM Lane LOS	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	1.1	0.2

APPENDIX C

LOS WORKSHEETS

Base Year Conditions WITH Waiale Extension WITH MAUI LANI PARKWAY Extension – AM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kamehameha Ave														
102	L2	208	2.0	219	2.0	1.013	61.8	LOS F	26.4	671.4	1.00	2.45	3.20	13.8
7	T1	189	2.0	199	2.0	1.013	59.1	LOS F	26.4	671.4	1.00	2.45	3.20	13.1
25	R2	103	2.0	108	2.0	1.013	59.1	LOS F	26.4	671.4	1.00	2.45	3.20	13.1
Approach		500	2.0	526	2.0	1.013	60.3	LOS F	26.4	671.4	1.00	2.45	3.20	13.4
East: WB Maui Lani Parkway														
19	L2	85	2.0	89	2.0	0.768	16.6	LOS C	10.4	263.5	1.00	1.40	1.58	19.0
336	T1	296	2.0	312	2.0	0.768	13.9	LOS B	10.4	263.5	1.00	1.40	1.58	17.8
24	R2	147	2.0	155	2.0	0.768	13.9	LOS B	10.4	263.5	1.00	1.40	1.58	17.8
Approach		528	2.0	556	2.0	0.768	14.3	LOS B	10.4	263.5	1.00	1.40	1.58	18.0
North: SB Kamehameha Ave														
15	L2	248	2.0	261	2.0	0.937	27.6	LOS D	21.7	551.2	1.00	1.89	2.26	17.3
2	T1	142	2.0	149	2.0	0.937	24.8	LOS C	21.7	551.2	1.00	1.89	2.26	16.3
40	R2	318	2.0	335	2.0	0.937	24.8	LOS C	21.7	551.2	1.00	1.89	2.26	16.3
Approach		708	2.0	745	2.0	0.937	25.8	LOS D	21.7	551.2	1.00	1.89	2.26	16.7
West: EB Maui Lani Parkway														
30	L2	292	2.0	307	2.0	0.964	27.7	LOS D	25.9	658.0	1.00	1.89	2.27	17.3
464	T1	355	2.0	374	2.0	0.964	24.9	LOS C	25.9	658.0	1.00	1.89	2.27	16.3
78	R2	151	2.0	159	2.0	0.964	24.9	LOS C	25.9	658.0	1.00	1.89	2.27	16.3
Approach		798	2.0	840	2.0	0.964	25.9	LOS D	25.9	658.0	1.00	1.89	2.27	16.7
All Vehicles		2534	2.0	2667	2.0	1.013	30.2	LOS D	26.4	671.4	1.00	1.90	2.31	16.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	173.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	88	3	166	18	16	10	183	457	7	2	611	111
Future Vol, veh/h	88	3	166	18	16	10	183	457	7	2	611	111
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	96	3	180	20	17	11	199	497	8	2	664	121
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	15.4	15	173.5	238.6
HCM LOS	C	B	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	29%	0%	100%	0%	41%	0%
Vol Thru, %	71%	0%	0%	2%	36%	84%
Vol Right, %	0%	100%	0%	98%	23%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	640	7	88	169	44	724
LT Vol	183	0	88	0	18	2
Through Vol	457	0	0	3	16	611
RT Vol	0	7	0	166	10	111
Lane Flow Rate	696	8	96	184	48	787
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.309	0.013	0.221	0.365	0.118	1.462
Departure Headway (Hd)	7.344	6.475	9.558	8.31	10.618	7.153
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	501	556	378	435	340	512
Service Time	5.044	4.175	7.258	6.01	8.618	5.153
HCM Lane V/C Ratio	1.389	0.014	0.254	0.423	0.141	1.537
HCM Control Delay	175.3	9.3	14.9	15.7	15	238.6
HCM Lane LOS	F	A	B	C	B	F
HCM 95th-tile Q	27.6	0	0.8	1.6	0.4	36.6

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] %	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Waiale Rd														
7	T1	509	2.0	536	2.0	0.892	8.1	LOS A	19.3	491.4	1.00	1.00	1.27	18.7
25	R2	461	2.0	485	2.0	0.892	8.1	LOS A	19.3	491.4	1.00	1.00	1.27	18.7
Approach		970	2.0	1021	2.0	0.892	8.1	LOS A	19.3	491.4	1.00	1.00	1.27	18.7
East: WB Waiinu Rd														
19	L2	92	2.0	97	2.0	0.295	5.7	LOS A	2.1	52.5	0.75	0.68	0.75	20.7
24	R2	137	2.0	144	2.0	0.295	3.0	LOS A	2.1	52.5	0.75	0.68	0.75	19.3
Approach		229	2.0	241	2.0	0.295	4.1	LOS A	2.1	52.5	0.75	0.68	0.75	19.8
North: SB Waiale Rd														
15	L2	211	2.0	222	2.0	0.660	3.7	LOS A	7.4	187.6	0.54	0.25	0.54	20.8
2	T1	582	2.0	613	2.0	0.660	1.0	LOS A	7.4	187.6	0.54	0.25	0.54	19.4
Approach		793	2.0	835	2.0	0.660	1.7	LOS A	7.4	187.6	0.54	0.25	0.54	19.8
All Vehicles		1992	2.0	2097	2.0	0.892	5.1	LOS A	19.3	491.4	0.79	0.67	0.92	19.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AUSTIN, TSUTSUMI & ASSOCIATES, INC. | Licence: PLUS / 1PC | Processed: Monday, September 26, 2022 9:03:23 AM
Project: N:\2022\22-519 Puunani Homestead TIAR Ph II TIAR\2. Base Year\3. WITH Waiale Ext WITH MLP\Waiale - Waiinu RAB BY AM WITH Waiale Ext WITH MLP.sip9

Intersection												
Int Delay, s/veh	53.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	144	0	23	6	1	7	19	859	13	7	491	170
Future Vol, veh/h	144	0	23	6	1	7	19	859	13	7	491	170
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	157	0	25	7	1	8	21	934	14	8	534	185

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1634	1639	630	1641	1724	944	722	0	0	951	0	0
Stage 1	646	646	-	986	986	-	-	-	-	-	-	-
Stage 2	988	993	-	655	738	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 81	100	482	80	89	318	880	-	-	722	-	-
Stage 1	460	467	-	298	326	-	-	-	-	-	-	-
Stage 2	297	323	-	455	424	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 74	93	481	72	82	317	877	-	-	720	-	-
Mov Cap-2 Maneuver	~ 74	93	-	72	82	-	-	-	-	-	-	-
Stage 1	435	457	-	282	308	-	-	-	-	-	-	-
Stage 2	274	306	-	423	415	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 549.4	39.6	0.2	0.1
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	877	-	-	74	481	119	720	-	-
HCM Lane V/C Ratio	0.024	-	-	2.115	0.052	0.128	0.011	-	-
HCM Control Delay (s)	9.2	0	-	$ 635.1	12.9	39.6	10.1	-	-
HCM Lane LOS	A	A	-	F	B	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	14.4	0.2	0.4	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	9.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	130	71	50	651	395	40
Future Vol, veh/h	130	71	50	651	395	40
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	141	77	54	708	429	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1270	454	475	0	-	0
Stage 1	454	-	-	-	-	-
Stage 2	816	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	186	606	1087	-	-	-
Stage 1	640	-	-	-	-	-
Stage 2	435	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	170	604	1084	-	-	-
Mov Cap-2 Maneuver	170	-	-	-	-	-
Stage 1	586	-	-	-	-	-
Stage 2	434	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	59.1	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1084	-	170	604	-	-
HCM Lane V/C Ratio	0.05	-	0.831	0.128	-	-
HCM Control Delay (s)	8.5	0	85	11.8	-	-
HCM Lane LOS	A	A	F	B	-	-
HCM 95th %tile Q(veh)	0.2	-	5.7	0.4	-	-

HCM 6th Signalized Intersection Summary
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy

10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	267	485	87	178	313	102	133	318	300	121	242	91
Future Volume (veh/h)	267	485	87	178	313	102	133	318	300	121	242	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	334	527	88	193	340	24	145	346	292	132	263	85
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	494	558	93	270	563	476	295	245	207	207	355	115
Arrive On Green	0.15	0.36	0.36	0.10	0.30	0.30	0.07	0.26	0.26	0.07	0.26	0.26
Sat Flow, veh/h	1781	1562	261	1781	1870	1580	1781	932	786	1781	1350	436
Grp Volume(v), veh/h	334	0	615	193	340	24	145	0	638	132	0	348
Grp Sat Flow(s),veh/h/ln	1781	0	1823	1781	1870	1580	1781	0	1718	1781	0	1786
Q Serve(g_s), s	11.5	0.0	31.1	7.0	14.7	1.0	5.6	0.0	25.0	5.0	0.0	16.9
Cycle Q Clear(g_c), s	11.5	0.0	31.1	7.0	14.7	1.0	5.6	0.0	25.0	5.0	0.0	16.9
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.46	1.00		0.24
Lane Grp Cap(c), veh/h	494	0	651	270	563	476	295	0	452	207	0	470
V/C Ratio(X)	0.68	0.00	0.94	0.72	0.60	0.05	0.49	0.00	1.41	0.64	0.00	0.74
Avail Cap(c_a), veh/h	712	0	672	325	563	476	295	0	452	320	0	583
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.4	0.0	29.6	23.5	28.3	23.5	24.5	0.0	35.0	25.9	0.0	32.0
Incr Delay (d2), s/veh	1.6	0.0	21.8	5.8	1.8	0.0	1.3	0.0	197.3	3.3	0.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	17.2	3.3	6.8	0.4	2.4	0.0	35.1	2.3	0.0	7.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.0	0.0	51.5	29.3	30.2	23.6	25.8	0.0	232.3	29.1	0.0	35.9
LnGrp LOS	C	A	D	C	C	C	C	A	F	C	A	D
Approach Vol, veh/h		949			557			783			480	
Approach Delay, s/veh		40.4			29.6			194.1			34.0	
Approach LOS		D			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	31.0	13.1	39.9	11.0	31.0	18.4	34.6
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	13.0	25.0	12.0	35.0	7.0	31.0	26.0	21.0
Max Q Clear Time (g_c+I1), s	7.0	27.0	9.0	33.1	7.6	18.9	13.5	16.7
Green Ext Time (p_c), s	0.2	0.0	0.2	0.8	0.0	1.7	0.8	0.8

Intersection Summary			
HCM 6th Ctrl Delay			80.6
HCM 6th LOS			F

HCM 6th TWSC
7: Waiale Rd & Kokololio St

10/07/2022

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	131	21	4	588	465	39
Future Vol, veh/h	131	21	4	588	465	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	142	23	4	639	505	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1173	526	547	0	-	0
Stage 1	526	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	212	552	1022	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	211	552	1022	-	-	-
Mov Cap-2 Maneuver	211	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	521	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	46	0.1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1022	-	211	552	-	-
HCM Lane V/C Ratio	0.004	-	0.675	0.041	-	-
HCM Control Delay (s)	8.5	0	51.5	11.8	-	-
HCM Lane LOS	A	A	F	B	-	-
HCM 95th %tile Q(veh)	0	-	4.2	0.1	-	-

HCM 6th TWSC
8: Waiale Rd & Haawi St

Intersection						
Int Delay, s/veh	3.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	78	17	498	467	32
Future Vol, veh/h	76	78	17	498	467	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	83	85	18	541	508	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1103	526	543	0	-	0
Stage 1	526	-	-	-	-	-
Stage 2	577	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	234	552	1026	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	228	552	1026	-	-	-
Mov Cap-2 Maneuver	228	-	-	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	562	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27.4	0.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1026	-	324	-	-
HCM Lane V/C Ratio	0.018	-	0.517	-	-
HCM Control Delay (s)	8.6	0	27.4	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.1	-	2.8	-	-

HCM 6th TWSC
9: Waiale Rd & Nokekula Lp

Intersection						
Int Delay, s/veh	1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	17	4	481	540	6
Future Vol, veh/h	34	17	4	481	540	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	37	18	4	523	587	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1122	591	594	0	-	0
Stage 1	591	-	-	-	-	-
Stage 2	531	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	228	507	982	-	-	-
Stage 1	553	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	227	507	982	-	-	-
Mov Cap-2 Maneuver	227	-	-	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	590	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.1	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	982	-	278	-	-
HCM Lane V/C Ratio	0.004	-	0.199	-	-
HCM Control Delay (s)	8.7	0	21.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.7	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	23	5	454	543	13
Future Vol, veh/h	31	23	5	454	543	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	34	25	5	493	590	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1100	597	604	0	-	0
Stage 1	597	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	235	503	974	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	607	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	234	503	974	-	-	-
Mov Cap-2 Maneuver	369	-	-	-	-	-
Stage 1	547	-	-	-	-	-
Stage 2	607	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	974	-	416	-	-
HCM Lane V/C Ratio	0.006	-	0.141	-	-
HCM Control Delay (s)	8.7	-	15.1	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	256	0	20	70	128	0	267	45	319	167	79
Future Volume (veh/h)	65	256	0	20	70	128	0	267	45	319	167	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	278	0	22	76	80	0	290	41	347	182	73
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	353	383	0	257	142	149	419	396	56	540	650	261
Arrive On Green	0.06	0.21	0.00	0.03	0.17	0.17	0.00	0.25	0.25	0.18	0.51	0.51
Sat Flow, veh/h	1781	1870	0	1781	834	878	1781	1603	227	1781	1270	509
Grp Volume(v), veh/h	71	278	0	22	0	156	0	0	331	347	0	255
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1712	1781	0	1830	1781	0	1779
Q Serve(g_s), s	1.7	7.3	0.0	0.5	0.0	4.4	0.0	0.0	8.7	6.8	0.0	4.3
Cycle Q Clear(g_c), s	1.7	7.3	0.0	0.5	0.0	4.4	0.0	0.0	8.7	6.8	0.0	4.3
Prop In Lane	1.00		0.00	1.00		0.51	1.00		0.12	1.00		0.29
Lane Grp Cap(c), veh/h	353	383	0	257	0	291	419	0	452	540	0	910
V/C Ratio(X)	0.20	0.73	0.00	0.09	0.00	0.54	0.00	0.00	0.73	0.64	0.00	0.28
Avail Cap(c_a), veh/h	430	909	0	397	0	832	941	0	1934	748	0	1881
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.4	19.5	0.0	17.5	0.0	19.9	0.0	0.0	18.2	11.0	0.0	7.3
Incr Delay (d2), s/veh	0.3	2.6	0.0	0.1	0.0	1.5	0.0	0.0	2.3	1.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	3.2	0.0	0.2	0.0	1.7	0.0	0.0	3.6	2.4	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.6	22.1	0.0	17.6	0.0	21.4	0.0	0.0	20.5	12.3	0.0	7.5
LnGrp LOS	B	C	A	B	A	C	A	A	C	B	A	A
Approach Vol, veh/h		349			178			331			602	
Approach Delay, s/veh		21.0			21.0			20.5			10.2	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.9	17.5	5.9	15.3	0.0	31.4	7.7	13.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	55.5	5.5	25.5	15.5	55.5	5.5	25.5
Max Q Clear Time (g_c+I1), s	8.8	10.7	2.5	9.3	0.0	6.3	3.7	6.4
Green Ext Time (p_c), s	0.6	2.2	0.0	1.5	0.0	1.8	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	16.4
HCM 6th LOS	B

HCM 6th TWSC
12: Kuikahi Dr & Kehalani Village Center Dr

Intersection												
Int Delay, s/veh	7.9											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	145	785	7	9	449	71	17	3	26	39	1	121
Future Vol, veh/h	145	785	7	9	449	71	17	3	26	39	1	121
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	158	853	8	10	488	77	18	3	28	42	1	132

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	566	0	0	861	0	0	1786	1759	857	1698	1686	489
Stage 1	-	-	-	-	-	-	1173	1173	-	509	509	-
Stage 2	-	-	-	-	-	-	613	586	-	1189	1177	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1006	-	-	781	-	-	63	85	357	73	94	579
Stage 1	-	-	-	-	-	-	234	266	-	547	538	-
Stage 2	-	-	-	-	-	-	480	497	-	229	265	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1005	-	-	781	-	-	42	71	357	57	78	578
Mov Cap-2 Maneuver	-	-	-	-	-	-	42	71	-	57	78	-
Stage 1	-	-	-	-	-	-	197	224	-	461	530	-
Stage 2	-	-	-	-	-	-	365	490	-	175	223	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.2	71.8	52.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	45	357	1005	-	-	781	-	-	57	578
HCM Lane V/C Ratio	0.483	0.079	0.157	-	-	0.013	-	-	0.763	0.228
HCM Control Delay (s)	144.5	15.9	9.2	-	-	9.7	-	-	171.4	13.1
HCM Lane LOS	F	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	1.8	0.3	0.6	-	-	0	-	-	3.3	0.9

HCM 6th Signalized Intersection Summary
13: Honoapiilani Hwy & Kehalani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	316	188	410	44	188	96	233	601	14	40	554	105
Future Volume (veh/h)	316	188	410	44	188	96	233	601	14	40	554	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	451	204	236	48	204	5	253	653	0	43	602	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	471	681	575	248	229	193	278	817		202	680	
Arrive On Green	0.27	0.36	0.36	0.03	0.12	0.12	0.10	0.44	0.00	0.03	0.36	0.00
Sat Flow, veh/h	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	451	204	236	48	204	5	253	653	0	43	602	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	38.4	11.7	16.8	3.5	16.1	0.4	13.0	45.4	0.0	2.3	45.4	0.0
Cycle Q Clear(g_c), s	38.4	11.7	16.8	3.5	16.1	0.4	13.0	45.4	0.0	2.3	45.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	471	681	575	248	229	193	278	817		202	680	
V/C Ratio(X)	0.96	0.30	0.41	0.19	0.89	0.03	0.91	0.80		0.21	0.88	
Avail Cap(c_a), veh/h	560	809	684	251	249	209	324	1046		212	872	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.9	34.1	35.7	55.2	64.9	58.0	33.6	36.6	0.0	32.7	44.8	0.0
Incr Delay (d2), s/veh	24.5	0.1	0.2	0.1	27.3	0.0	24.5	5.0	0.0	0.2	11.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.4	5.5	6.6	1.6	9.5	0.2	7.3	21.4	0.0	1.0	22.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.4	34.2	35.9	55.3	92.1	58.0	58.2	41.6	0.0	32.9	56.0	0.0
LnGrp LOS	E	C	D	E	F	E	E	D		C	E	
Approach Vol, veh/h		891			257			906	A		645	A
Approach Delay, s/veh		49.4			84.6			46.2			54.5	
Approach LOS		D			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	71.6	9.8	59.7	20.1	60.6	46.0	23.4
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	84.0	5.0	65.0	19.0	70.0	50.0	20.0
Max Q Clear Time (g_c+I1), s	4.3	47.4	5.5	18.8	15.0	47.4	40.4	18.1
Green Ext Time (p_c), s	0.0	9.8	0.0	1.3	0.1	7.3	0.6	0.1

Intersection Summary	
HCM 6th Ctrl Delay	52.9
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	255	110	194	94	298	27	491	265	381	614	17
Future Volume (veh/h)	54	255	110	194	94	298	27	491	265	381	614	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	59	277	20	211	102	203	29	534	0	414	667	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	330	326	310	441	638	280	656		448	918	840
Arrive On Green	0.04	0.16	0.16	0.12	0.24	0.24	0.03	0.35	0.00	0.17	0.49	0.49
Sat Flow, veh/h	1968	2067	1740	1781	1870	1578	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	59	277	20	211	102	203	29	534	0	414	667	8
Grp Sat Flow(s),veh/h/ln	1968	2067	1740	1781	1870	1578	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	2.5	13.3	1.0	9.7	4.5	9.0	1.0	26.5	0.0	14.5	28.8	0.2
Cycle Q Clear(g_c), s	2.5	13.3	1.0	9.7	4.5	9.0	1.0	26.5	0.0	14.5	28.8	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	376	330	326	310	441	638	280	656		448	918	840
V/C Ratio(X)	0.16	0.84	0.06	0.68	0.23	0.32	0.10	0.81		0.92	0.73	0.01
Avail Cap(c_a), veh/h	394	628	577	383	771	916	476	1101		709	1431	1275
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.7	41.6	34.1	30.1	31.5	20.8	21.1	30.1	0.0	20.8	20.6	11.3
Incr Delay (d2), s/veh	0.2	2.2	0.0	3.6	0.1	0.1	0.1	5.2	0.0	9.0	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	7.0	0.4	4.4	2.1	3.3	0.4	12.4	0.0	6.6	12.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	43.8	34.1	33.7	31.6	20.9	21.2	35.3	0.0	29.8	22.9	11.3
LnGrp LOS	C	D	C	C	C	C	C	D		C	C	B
Approach Vol, veh/h		356			516			563	A		1089	
Approach Delay, s/veh		41.6			28.2			34.6			25.4	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.1	41.8	16.9	21.3	7.8	56.0	9.1	29.1				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	32.0	60.0	16.0	31.0	14.0	78.0	5.0	42.0				
Max Q Clear Time (g_c+I1), s	16.5	28.5	11.7	15.3	3.0	30.8	4.5	11.0				
Green Ext Time (p_c), s	0.6	7.3	0.2	1.0	0.0	11.2	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay			30.3									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	153	88	18	579	818	62
Future Volume (veh/h)	153	88	18	579	818	62
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	166	11	20	629	889	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	229	204	284	1279	1075	911
Arrive On Green	0.13	0.13	0.02	0.68	0.57	0.57
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	166	11	20	629	889	47
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	5.3	0.4	0.2	9.4	22.6	0.8
Cycle Q Clear(g_c), s	5.3	0.4	0.2	9.4	22.6	0.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	229	204	284	1279	1075	911
V/C Ratio(X)	0.72	0.05	0.07	0.49	0.83	0.05
Avail Cap(c_a), veh/h	911	811	666	2870	2264	1918
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.6	22.4	9.3	4.4	10.1	5.5
Incr Delay (d2), s/veh	4.3	0.1	0.1	0.3	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.1	0.1	2.3	7.4	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.8	22.5	9.4	4.7	11.8	5.5
LnGrp LOS	C	C	A	A	B	A
Approach Vol, veh/h	177			649	936	
Approach Delay, s/veh	28.5			4.9	11.5	
Approach LOS	C			A	B	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	6.4	39.7		12.6		46.1
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0
Max Green Setting (Gmax), s	14.0	71.0		30.0		90.0
Max Q Clear Time (g_c+I1), s	12.2	24.6		7.3		11.4
Green Ext Time (p_c), s	0.0	9.1		0.5		5.1
Intersection Summary						
HCM 6th Ctrl Delay			10.7			
HCM 6th LOS			B			

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	13	6	86	8	54	4	513	92	183	715	6
Future Volume (veh/h)	20	13	6	86	8	54	4	513	92	183	715	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	14	2	93	9	39	4	558	93	199	777	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	111	203	222	22	54	341	800	133	460	1102	934
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.01	0.51	0.51	0.08	0.59	0.59
Sat Flow, veh/h	867	863	1579	924	168	418	1781	1563	260	1781	1870	1585
Grp Volume(v), veh/h	36	0	2	141	0	0	4	0	651	199	777	4
Grp Sat Flow(s),veh/h/ln	1730	0	1579	1510	0	0	1781	0	1823	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.1	4.1	0.0	0.0	0.1	0.0	15.7	2.8	16.9	0.1
Cycle Q Clear(g_c), s	1.0	0.0	0.1	5.1	0.0	0.0	0.1	0.0	15.7	2.8	16.9	0.1
Prop In Lane	0.61		1.00	0.66		0.28	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	323	0	203	297	0	0	341	0	933	460	1102	934
V/C Ratio(X)	0.11	0.00	0.01	0.47	0.00	0.00	0.01	0.00	0.70	0.43	0.70	0.00
Avail Cap(c_a), veh/h	784	0	683	743	0	0	763	0	2208	744	2264	1919
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	0.0	22.0	24.1	0.0	0.0	8.1	0.0	10.7	8.1	8.3	4.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.4	0.0	0.0	0.0	0.0	2.0	0.2	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.8	0.0	0.0	0.0	0.0	5.6	0.7	5.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.4	0.0	22.0	24.5	0.0	0.0	8.1	0.0	12.7	8.3	10.1	4.9
LnGrp LOS	C	A	C	C	A	A	A	A	B	A	B	A
Approach Vol, veh/h		38			141			655			980	
Approach Delay, s/veh		22.4			24.5			12.7			9.7	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	35.6		12.4	5.3	40.1		12.4
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0
Max Q Clear Time (g_c+I1), s	4.8	17.7		3.0	2.1	18.9		7.1
Green Ext Time (p_c), s	0.2	11.6		0.1	0.0	15.2		0.5

Intersection Summary	
HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
17: Kuikahi Dr & Kehalani Mauka Pkwy

10/07/2022

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	171	5	14	66	74	5	4	59	174	2	32
Future Vol, veh/h	28	171	5	14	66	74	5	4	59	174	2	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	186	5	15	72	80	5	4	64	189	2	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	152	0	0	191	0	0	410	431	189	425	393	112
Stage 1	-	-	-	-	-	-	249	249	-	142	142	-
Stage 2	-	-	-	-	-	-	161	182	-	283	251	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1429	-	-	1383	-	-	552	517	853	540	543	941
Stage 1	-	-	-	-	-	-	755	701	-	861	779	-
Stage 2	-	-	-	-	-	-	841	749	-	724	699	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1429	-	-	1383	-	-	517	500	853	484	526	941
Mov Cap-2 Maneuver	-	-	-	-	-	-	517	500	-	484	526	-
Stage 1	-	-	-	-	-	-	739	686	-	843	770	-
Stage 2	-	-	-	-	-	-	799	741	-	651	684	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.7	10.1	15.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	783	1429	-	-	1383	-	-	484	899
HCM Lane V/C Ratio	0.094	0.021	-	-	0.011	-	-	0.391	0.041
HCM Control Delay (s)	10.1	7.6	-	-	7.6	-	-	17.1	9.2
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	1.8	0.1

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C

LOS WORKSHEETS

Base Year Conditions WITH Waiale Extension WITH MAUI LANI PARKWAY Extension – PM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kamehameha Ave														
102	L2	144	2.0	152	2.0	0.704	21.5	LOS C	8.2	207.8	1.00	1.34	1.52	18.2
7	T1	108	2.0	114	2.0	0.704	18.7	LOS C	8.2	207.8	1.00	1.34	1.52	17.0
25	R2	70	2.0	74	2.0	0.704	18.7	LOS C	8.2	207.8	1.00	1.34	1.52	17.0
Approach		322	2.0	339	2.0	0.704	19.9	LOS C	8.2	207.8	1.00	1.34	1.52	17.5
East: WB Maui Lani Parkway														
19	L2	74	2.0	78	2.0	1.138	87.0	LOS F	55.1	1399.1	1.00	3.76	4.95	11.9
336	T1	488	2.0	514	2.0	1.138	84.2	LOS F	55.1	1399.1	1.00	3.76	4.95	11.4
24	R2	254	2.0	267	2.0	1.138	84.2	LOS F	55.1	1399.1	1.00	3.76	4.95	11.4
Approach		816	2.0	859	2.0	1.138	84.5	LOS F	55.1	1399.1	1.00	3.76	4.95	11.5
North: SB Kamehameha Ave														
15	L2	166	2.0	175	2.0	1.071	63.0	LOS F	40.3	1023.1	1.00	2.98	3.83	13.6
2	T1	152	2.0	160	2.0	1.071	60.3	LOS F	40.3	1023.1	1.00	2.98	3.83	13.0
40	R2	418	2.0	440	2.0	1.071	60.3	LOS F	40.3	1023.1	1.00	2.98	3.83	13.0
Approach		736	2.0	775	2.0	1.071	60.9	LOS F	40.3	1023.1	1.00	2.98	3.83	13.1
West: EB Maui Lani Parkway														
30	L2	424	2.0	446	2.0	1.080	55.8	LOS F	52.2	1325.7	1.00	2.86	3.44	14.3
464	T1	393	2.0	414	2.0	1.080	53.0	LOS F	52.2	1325.7	1.00	2.86	3.44	13.6
78	R2	185	2.0	195	2.0	1.080	53.0	LOS F	52.2	1325.7	1.00	2.86	3.44	13.6
Approach		1002	2.0	1055	2.0	1.080	54.2	LOS F	52.2	1325.7	1.00	2.86	3.44	13.8
All Vehicles		2876	2.0	3027	2.0	1.138	60.7	LOS F	55.1	1399.1	1.00	2.98	3.76	13.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AUSTIN, TSUTSUMI & ASSOCIATES, INC. | Licence: PLUS / 1PC | Processed: Monday, September 26, 2022 9:01:23 AM
Project: N:\2022\22-519 Puunani Homestead TIAR Ph II TIAR\2. Base Year\3. WITH Waiale Ext WITH MLP\Kam - MLP RAB BY PM WITH Waiale Ext WITH MLP.sip9

Intersection	
Intersection Delay, s/veh	199.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	10	222	16	4	8	117	526	23	8	701	69
Future Vol, veh/h	60	10	222	16	4	8	117	526	23	8	701	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	11	241	17	4	9	127	572	25	9	762	75
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	18	15.1	174.5	295.3
HCM LOS	C	C	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	18%	0%	100%	0%	57%	1%
Vol Thru, %	82%	0%	0%	4%	14%	90%
Vol Right, %	0%	100%	0%	96%	29%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	643	23	60	232	28	778
LT Vol	117	0	60	0	16	8
Through Vol	526	0	0	10	4	701
RT Vol	0	23	0	222	8	69
Lane Flow Rate	699	25	65	252	30	846
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.32	0.042	0.15	0.497	0.077	1.593
Departure Headway (Hd)	7.509	6.692	9.59	8.359	11.154	7.254
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	489	538	376	434	323	507
Service Time	5.209	4.392	7.29	6.059	9.154	5.254
HCM Lane V/C Ratio	1.429	0.046	0.173	0.581	0.093	1.669
HCM Control Delay	180.4	9.7	14	19	15.1	295.3
HCM Lane LOS	F	A	B	C	C	F
HCM 95th-tile Q	27.7	0.1	0.5	2.7	0.2	43.6

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] %	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Waiale Rd														
7	T1	504	2.0	531	2.0	0.738	4.4	LOS A	9.6	245.1	0.87	0.79	0.99	19.2
25	R2	243	2.0	256	2.0	0.738	4.4	LOS A	9.6	245.1	0.87	0.79	0.99	19.2
Approach		747	2.0	786	2.0	0.738	4.4	LOS A	9.6	245.1	0.87	0.79	0.99	19.2
East: WB Waiinu Rd														
19	L2	158	2.0	166	2.0	0.399	6.0	LOS A	2.9	73.6	0.78	0.72	0.78	20.6
24	R2	161	2.0	169	2.0	0.399	3.3	LOS A	2.9	73.6	0.78	0.72	0.78	19.2
Approach		319	2.0	336	2.0	0.399	4.6	LOS A	2.9	73.6	0.78	0.72	0.78	19.9
North: SB Waiale Rd														
15	L2	265	2.0	279	2.0	0.833	6.5	LOS A	14.2	360.8	0.91	0.70	0.99	20.5
2	T1	674	2.0	709	2.0	0.833	3.8	LOS A	14.2	360.8	0.91	0.70	0.99	19.1
Approach		939	2.0	988	2.0	0.833	4.6	LOS A	14.2	360.8	0.91	0.70	0.99	19.4
All Vehicles		2005	2.0	2111	2.0	0.833	4.5	LOS A	14.2	360.8	0.87	0.73	0.95	19.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Int Delay, s/veh	11.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	81	0	20	3	1	19	32	634	2	5	603	230
Future Vol, veh/h	81	0	20	3	1	19	32	634	2	5	603	230
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	0	22	3	1	21	35	689	2	5	655	250

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1564	1557	783	1564	1681	693	908	0	0	694	0	0
Stage 1	793	793	-	763	763	-	-	-	-	-	-	-
Stage 2	771	764	-	801	918	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	91	113	394	91	95	443	750	-	-	901	-	-
Stage 1	382	400	-	397	413	-	-	-	-	-	-	-
Stage 2	393	413	-	378	350	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 80	102	393	80	86	442	748	-	-	898	-	-
Mov Cap-2 Maneuver	~ 80	102	-	80	86	-	-	-	-	-	-	-
Stage 1	352	394	-	366	380	-	-	-	-	-	-	-
Stage 2	345	380	-	353	345	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	182.2	21	0.5	0.1
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	748	-	-	80	393	250	898	-	-
HCM Lane V/C Ratio	0.047	-	-	1.101	0.055	0.1	0.006	-	-
HCM Control Delay (s)	10	0	-	223.6	14.7	21	9	-	-
HCM Lane LOS	B	A	-	F	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	6.3	0.2	0.3	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	64	56	529	456	60
Future Vol, veh/h	76	64	56	529	456	60
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	83	70	61	575	496	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1229	532	564	0	-	0
Stage 1	532	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	196	547	1008	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	494	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	178	545	1005	-	-	-
Mov Cap-2 Maneuver	178	-	-	-	-	-
Stage 1	535	-	-	-	-	-
Stage 2	493	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	28.3	0.8	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1005	-	178	545	-	-
HCM Lane V/C Ratio	0.061	-	0.464	0.128	-	-
HCM Control Delay (s)	8.8	0	41.6	12.6	-	-
HCM Lane LOS	A	A	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2.2	0.4	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	400	73	275	513	132	118	284	259	120	254	125
Future Volume (veh/h)	170	400	73	275	513	132	118	284	259	120	254	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	212	435	72	299	558	41	128	309	254	130	276	121
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	285	474	78	330	628	532	305	321	264	171	406	178
Arrive On Green	0.10	0.30	0.30	0.13	0.34	0.34	0.06	0.34	0.34	0.05	0.33	0.33
Sat Flow, veh/h	1781	1564	259	1781	1870	1583	1781	949	780	1781	1232	540
Grp Volume(v), veh/h	212	0	507	299	558	41	128	0	563	130	0	397
Grp Sat Flow(s),veh/h/ln	1781	0	1823	1781	1870	1583	1781	0	1729	1781	0	1772
Q Serve(g_s), s	9.3	0.0	30.9	12.9	32.5	2.0	5.4	0.0	36.8	5.6	0.0	22.3
Cycle Q Clear(g_c), s	9.3	0.0	30.9	12.9	32.5	2.0	5.4	0.0	36.8	5.6	0.0	22.3
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.45	1.00		0.30
Lane Grp Cap(c), veh/h	285	0	552	330	628	532	305	0	584	171	0	584
V/C Ratio(X)	0.74	0.00	0.92	0.91	0.89	0.08	0.42	0.00	0.96	0.76	0.00	0.68
Avail Cap(c_a), veh/h	354	0	634	403	715	605	305	0	586	171	0	585
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.9	0.0	38.7	26.9	36.2	26.0	25.5	0.0	37.4	29.8	0.0	33.3
Incr Delay (d2), s/veh	6.5	0.0	17.1	20.8	12.0	0.1	0.9	0.0	28.2	17.9	0.0	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	16.4	7.3	16.9	0.8	2.4	0.0	20.0	3.2	0.0	10.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.4	0.0	55.8	47.7	48.2	26.1	26.4	0.0	65.5	47.8	0.0	36.5
LnGrp LOS	C	A	E	D	D	C	C	A	E	D	A	D
Approach Vol, veh/h		719			898			691			527	
Approach Delay, s/veh		49.5			47.0			58.3			39.3	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	44.9	19.3	40.8	11.0	43.9	15.5	44.6
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	6.0	39.0	20.0	40.0	7.0	38.0	16.0	44.0
Max Q Clear Time (g_c+I1), s	7.6	38.8	14.9	32.9	7.4	24.3	11.3	34.5
Green Ext Time (p_c), s	0.0	0.1	0.4	2.0	0.0	2.2	0.3	2.8

Intersection Summary	
HCM 6th Ctrl Delay	49.0
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	15	32	592	499	70
Future Vol, veh/h	55	15	32	592	499	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	60	16	35	643	542	76

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1293	580	618	0	-	0
Stage 1	580	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	180	514	962	-	-	-
Stage 1	560	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	170	514	962	-	-	-
Mov Cap-2 Maneuver	170	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	486	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.8	0.5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	962	-	170	514	-	-
HCM Lane V/C Ratio	0.036	-	0.352	0.032	-	-
HCM Control Delay (s)	8.9	0	37.2	12.2	-	-
HCM Lane LOS	A	A	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	0.1	-	-

Intersection						
Int Delay, s/veh	2.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	48	33	70	581	444	58
Future Vol, veh/h	48	33	70	581	444	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	52	36	76	632	483	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1299	515	546	0	-	0
Stage 1	515	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	178	560	1023	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	158	560	1023	-	-	-
Mov Cap-2 Maneuver	158	-	-	-	-	-
Stage 1	532	-	-	-	-	-
Stage 2	450	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.3	0.9	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1023	-	223	-	-
HCM Lane V/C Ratio	0.074	-	0.395	-	-
HCM Control Delay (s)	8.8	0	31.3	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.2	-	1.8	-	-

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	20	19	638	463	14
Future Vol, veh/h	13	20	19	638	463	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	14	22	21	693	503	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1246	511	518	0	-	0
Stage 1	511	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	192	563	1048	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	474	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	186	563	1048	-	-	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	582	-	-	-	-	-
Stage 2	474	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1048	-	313	-	-
HCM Lane V/C Ratio	0.02	-	0.115	-	-
HCM Control Delay (s)	8.5	0	18	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

HCM 6th TWSC
10: Waiale Rd & Ohana Hana Loop

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	9	16	642	465	17
Future Vol, veh/h	14	9	16	642	465	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	15	10	17	698	505	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1246	514	523	0	-	0
Stage 1	514	-	-	-	-	-
Stage 2	732	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	192	560	1043	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	189	560	1043	-	-	-
Mov Cap-2 Maneuver	325	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	476	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1043	-	389	-	-
HCM Lane V/C Ratio	0.017	-	0.064	-	-
HCM Control Delay (s)	8.5	-	14.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

HCM 6th Signalized Intersection Summary
11: E Waiko Rd & Waiale Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	119	0	52	163	323	0	283	33	217	219	41
Future Volume (veh/h)	55	119	0	52	163	323	0	283	33	217	219	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	129	0	57	177	287	0	308	32	236	238	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	263	622	0	546	213	345	364	389	40	391	663	111
Arrive On Green	0.05	0.33	0.00	0.05	0.33	0.33	0.00	0.23	0.23	0.13	0.42	0.42
Sat Flow, veh/h	1781	1870	0	1781	642	1041	1781	1666	173	1781	1561	262
Grp Volume(v), veh/h	60	129	0	57	0	464	0	0	340	236	0	278
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1683	1781	0	1839	1781	0	1823
Q Serve(g_s), s	1.5	3.4	0.0	1.4	0.0	17.7	0.0	0.0	12.1	6.5	0.0	7.2
Cycle Q Clear(g_c), s	1.5	3.4	0.0	1.4	0.0	17.7	0.0	0.0	12.1	6.5	0.0	7.2
Prop In Lane	1.00		0.00	1.00		0.62	1.00		0.09	1.00		0.14
Lane Grp Cap(c), veh/h	263	622	0	546	0	557	364	0	430	391	0	775
V/C Ratio(X)	0.23	0.21	0.00	0.10	0.00	0.83	0.00	0.00	0.79	0.60	0.00	0.36
Avail Cap(c_a), veh/h	316	1092	0	602	0	982	759	0	1073	564	0	1064
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.2	16.6	0.0	13.9	0.0	21.4	0.0	0.0	25.0	16.8	0.0	13.5
Incr Delay (d2), s/veh	0.4	0.2	0.0	0.1	0.0	3.3	0.0	0.0	3.3	1.5	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.4	0.0	0.6	0.0	7.1	0.0	0.0	5.4	2.6	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.6	16.8	0.0	14.0	0.0	24.7	0.0	0.0	28.3	18.3	0.0	13.8
LnGrp LOS	B	B	A	B	A	C	A	A	C	B	A	B
Approach Vol, veh/h		189			521			340			514	
Approach Delay, s/veh		16.7			23.6			28.3			15.9	
Approach LOS		B			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	20.7	7.8	27.6	0.0	34.0	7.9	27.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	40.5	5.5	40.5	15.5	40.5	5.5	40.5
Max Q Clear Time (g_c+I1), s	8.5	14.1	3.4	5.4	0.0	9.2	3.5	19.7
Green Ext Time (p_c), s	0.4	2.1	0.0	0.8	0.0	1.9	0.0	3.3

Intersection Summary	
HCM 6th Ctrl Delay	21.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection												
Int Delay, s/veh	19											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	167	541	17	23	635	135	9	2	13	66	3	193
Future Vol, veh/h	167	541	17	23	635	135	9	2	13	66	3	193
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	182	588	18	25	690	147	10	2	14	72	3	210

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	838	0	0	606	0	0	1881	1849	597	1710	1711	691
Stage 1	-	-	-	-	-	-	961	961	-	741	741	-
Stage 2	-	-	-	-	-	-	920	888	-	969	970	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	796	-	-	972	-	-	54	74	503	72	91	445
Stage 1	-	-	-	-	-	-	308	335	-	408	423	-
Stage 2	-	-	-	-	-	-	325	362	-	305	331	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	795	-	-	972	-	-	22	56	503	~ 55	68	445
Mov Cap-2 Maneuver	-	-	-	-	-	-	22	56	-	~ 55	68	-
Stage 1	-	-	-	-	-	-	237	258	-	314	412	-
Stage 2	-	-	-	-	-	-	166	352	-	227	255	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	0.3	118.2	111.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	25	503	795	-	-	972	-	-	55	445
HCM Lane V/C Ratio	0.478	0.028	0.228	-	-	0.026	-	-	1.364	0.471
HCM Control Delay (s)	243.2	12.4	10.9	-	-	8.8	-	-	$ 368.7	20.1
HCM Lane LOS	F	B	B	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	1.5	0.1	0.9	-	-	0.1	-	-	6.7	2.5

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	62	165	51	184	74	225	609	18	44	715	229
Future Volume (veh/h)	165	62	165	51	184	74	225	609	18	44	715	229
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	236	67	29	55	200	5	245	662	0	48	777	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	287	428	358	297	246	204	282	984		325	887	
Arrive On Green	0.13	0.23	0.23	0.04	0.13	0.13	0.09	0.53	0.00	0.03	0.47	0.00
Sat Flow, veh/h	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	236	67	29	55	200	5	245	662	0	48	777	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	16.0	3.4	1.7	3.2	12.5	0.3	8.1	31.1	0.0	1.6	44.8	0.0
Cycle Q Clear(g_c), s	16.0	3.4	1.7	3.2	12.5	0.3	8.1	31.1	0.0	1.6	44.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	287	428	358	297	246	204	282	984		325	887	
V/C Ratio(X)	0.82	0.16	0.08	0.19	0.81	0.02	0.87	0.67		0.15	0.88	
Avail Cap(c_a), veh/h	287	469	392	321	312	259	338	1218		341	1078	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.9	36.9	36.3	42.8	50.6	45.3	25.2	20.8	0.0	17.7	28.3	0.0
Incr Delay (d2), s/veh	16.4	0.1	0.0	0.1	9.6	0.0	16.4	1.9	0.0	0.1	8.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	1.6	0.7	1.4	6.5	0.1	4.5	13.2	0.0	0.6	20.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.3	37.0	36.3	42.9	60.2	45.3	41.6	22.7	0.0	17.8	37.0	0.0
LnGrp LOS	D	D	D	D	E	D	D	C		B	D	
Approach Vol, veh/h		332			260			907	A		825	A
Approach Delay, s/veh		49.2			56.3			27.8			35.9	
Approach LOS		D			E			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	69.0	9.3	32.4	15.2	62.8	21.0	20.8				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	78.0	6.0	30.0	14.0	69.0	16.0	20.0				
Max Q Clear Time (g_c+I1), s	3.6	33.1	5.2	5.4	10.1	46.8	18.0	14.5				
Green Ext Time (p_c), s	0.0	10.5	0.0	0.3	0.1	10.0	0.0	0.3				

Intersection Summary		
HCM 6th Ctrl Delay		36.9
HCM 6th LOS		D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive

10/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	174	50	257	241	341	83	515	243	340	499	33
Future Volume (veh/h)	18	174	50	257	241	341	83	515	243	340	499	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	189	7	279	262	247	90	560	0	370	542	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	238	285	386	471	632	373	689		417	874	773
Arrive On Green	0.02	0.12	0.12	0.16	0.25	0.25	0.05	0.37	0.00	0.15	0.47	0.47
Sat Flow, veh/h	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	20	189	7	279	262	247	90	560	0	370	542	16
Grp Sat Flow(s),veh/h/ln	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	0.9	8.8	0.3	13.0	12.1	11.0	3.1	26.8	0.0	12.1	21.6	0.5
Cycle Q Clear(g_c), s	0.9	8.8	0.3	13.0	12.1	11.0	3.1	26.8	0.0	12.1	21.6	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	257	238	285	386	471	632	373	689		417	874	773
V/C Ratio(X)	0.08	0.79	0.02	0.72	0.56	0.39	0.24	0.81		0.89	0.62	0.02
Avail Cap(c_a), veh/h	314	521	525	607	905	999	540	1131		623	1358	1182
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.4	42.7	34.9	30.1	32.3	21.2	18.6	28.2	0.0	19.9	19.8	13.1
Incr Delay (d2), s/veh	0.1	2.3	0.0	2.6	0.4	0.1	0.1	5.0	0.0	7.4	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	4.7	0.1	5.8	5.5	4.1	1.2	12.4	0.0	5.4	9.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.5	45.0	34.9	32.7	32.7	21.4	18.7	33.2	0.0	27.4	21.3	13.1
LnGrp LOS	D	D	C	C	C	C	B	C		C	C	B
Approach Vol, veh/h		216			788			650	A		928	
Approach Delay, s/veh		44.0			29.1			31.2			23.6	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.5	42.5	20.7	16.4	9.7	52.4	7.1	30.0
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	26.0	60.0	28.0	25.0	14.0	72.0	5.0	48.0
Max Q Clear Time (g_c+I1), s	14.1	28.8	15.0	10.8	5.1	23.6	2.9	14.1
Green Ext Time (p_c), s	0.5	7.8	0.7	0.6	0.1	8.4	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St

10/07/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	31	57	753	634	125
Future Volume (veh/h)	95	31	57	753	634	125
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	103	1	62	818	689	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	224	200	387	1200	892	755
Arrive On Green	0.13	0.13	0.06	0.64	0.48	0.48
Sat Flow, veh/h	1781	1585	1781	1870	1870	1583
Grp Volume(v), veh/h	103	1	62	818	689	81
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1583
Q Serve(g_s), s	2.5	0.0	0.7	13.2	14.4	1.3
Cycle Q Clear(g_c), s	2.5	0.0	0.7	13.2	14.4	1.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	224	200	387	1200	892	755
V/C Ratio(X)	0.46	0.01	0.16	0.68	0.77	0.11
Avail Cap(c_a), veh/h	1129	1005	809	3556	2806	2375
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.2	18.1	7.5	5.4	10.2	6.8
Incr Delay (d2), s/veh	1.5	0.0	0.2	0.7	1.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	2.9	4.7	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.7	18.1	7.7	6.1	11.7	6.9
LnGrp LOS	C	B	A	A	B	A
Approach Vol, veh/h	104			880	770	
Approach Delay, s/veh	20.6			6.2	11.2	
Approach LOS	C			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	7.8	28.6	11.0	36.4
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	12.7	16.4	4.5	15.2
Green Ext Time (p_c), s	0.1	6.1	0.3	7.9

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	7	3	78	12	99	9	697	90	81	571	22
Future Volume (veh/h)	12	7	3	78	12	99	9	697	90	81	571	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	8	1	85	13	72	10	758	95	88	621	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	187	98	219	165	28	90	486	971	122	352	1195	1012
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.01	0.60	0.60	0.06	0.64	0.64
Sat Flow, veh/h	796	707	1585	680	202	648	1781	1629	204	1781	1870	1584
Grp Volume(v), veh/h	21	0	1	170	0	0	10	0	853	88	621	15
Grp Sat Flow(s),veh/h/ln	1503	0	1585	1530	0	0	1781	0	1833	1781	1870	1584
Q Serve(g_s), s	0.0	0.0	0.0	7.1	0.0	0.0	0.2	0.0	26.8	1.4	13.7	0.3
Cycle Q Clear(g_c), s	0.7	0.0	0.0	8.2	0.0	0.0	0.2	0.0	26.8	1.4	13.7	0.3
Prop In Lane	0.62		1.00	0.50		0.42	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	284	0	219	282	0	0	486	0	1093	352	1195	1012
V/C Ratio(X)	0.07	0.00	0.00	0.60	0.00	0.00	0.02	0.00	0.78	0.25	0.52	0.01
Avail Cap(c_a), veh/h	566	0	520	569	0	0	791	0	1685	580	1719	1456
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	0.0	28.3	31.7	0.0	0.0	6.6	0.0	11.6	10.3	7.4	5.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	2.7	0.1	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	3.0	0.0	0.0	0.1	0.0	9.8	0.5	4.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.6	0.0	28.3	32.5	0.0	0.0	6.6	0.0	14.3	10.4	8.2	5.0
LnGrp LOS	C	A	C	C	A	A	A	A	B	B	A	A
Approach Vol, veh/h		22			170			863			724	
Approach Delay, s/veh		28.6			32.5			14.2			8.4	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.2	51.4		15.5	6.0	54.7		15.5
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0
Max Q Clear Time (g_c+I1), s	3.4	28.8		2.7	2.2	15.7		10.2
Green Ext Time (p_c), s	0.1	16.7		0.0	0.0	10.8		0.5

Intersection Summary	
HCM 6th Ctrl Delay	13.8
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
17: Kuikahi Dr & Kehalani Mauka Pkwy

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	107	11	49	162	145	11	1	28	109	6	24
Future Vol, veh/h	9	107	11	49	162	145	11	1	28	109	6	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	116	12	53	176	158	12	1	30	118	7	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	334	0	0	128	0	0	520	582	122	519	509	255
Stage 1	-	-	-	-	-	-	142	142	-	361	361	-
Stage 2	-	-	-	-	-	-	378	440	-	158	148	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1225	-	-	1458	-	-	467	425	929	467	467	784
Stage 1	-	-	-	-	-	-	861	779	-	657	626	-
Stage 2	-	-	-	-	-	-	644	578	-	844	775	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1225	-	-	1458	-	-	432	406	929	436	446	784
Mov Cap-2 Maneuver	-	-	-	-	-	-	432	406	-	436	446	-
Stage 1	-	-	-	-	-	-	854	773	-	652	603	-
Stage 2	-	-	-	-	-	-	593	557	-	809	769	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	1	10.6	15.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	689	1225	-	-	1458	-	-	436	681
HCM Lane V/C Ratio	0.063	0.008	-	-	0.037	-	-	0.272	0.048
HCM Control Delay (s)	10.6	8	-	-	7.6	-	-	16.3	10.6
HCM Lane LOS	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	1.1	0.2

APPENDIX C

LOS WORKSHEETS

Future Year Conditions WITHOUT Waiale Extension WITHOUT MAUI LANI PARKWAY Extension – AM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kamehameha Ave														
102	L2	181	2.0	191	2.0	1.079	83.7	LOS F	33.5	851.5	1.00	2.87	3.85	12.1
7	T1	221	2.0	233	2.0	1.079	80.9	LOS F	33.5	851.5	1.00	2.87	3.85	11.6
25	R2	104	2.0	109	2.0	1.079	80.9	LOS F	33.5	851.5	1.00	2.87	3.85	11.6
Approach		506	2.0	533	2.0	1.079	81.9	LOS F	33.5	851.5	1.00	2.87	3.85	11.8
East: WB Maui Lani Parkway														
19	L2	85	2.0	89	2.0	0.780	17.5	LOS C	10.7	273.0	1.00	1.43	1.63	18.8
336	T1	286	2.0	301	2.0	0.780	14.8	LOS B	10.7	273.0	1.00	1.43	1.63	17.6
24	R2	160	2.0	168	2.0	0.780	14.8	LOS B	10.7	273.0	1.00	1.43	1.63	17.6
Approach		531	2.0	559	2.0	0.780	15.2	LOS C	10.7	273.0	1.00	1.43	1.63	17.8
North: SB Kamehameha Ave														
15	L2	268	2.0	282	2.0	0.967	30.9	LOS D	25.9	658.2	1.00	2.03	2.45	16.9
2	T1	157	2.0	165	2.0	0.967	28.1	LOS D	25.9	658.2	1.00	2.03	2.45	15.9
40	R2	339	2.0	357	2.0	0.967	28.1	LOS D	25.9	658.2	1.00	2.03	2.45	15.9
Approach		764	2.0	804	2.0	0.967	29.1	LOS D	25.9	658.2	1.00	2.03	2.45	16.3
West: EB Maui Lani Parkway														
30	L2	328	2.0	345	2.0	1.021	42.2	LOS F	34.7	882.0	1.00	2.42	2.98	15.6
464	T1	346	2.0	364	2.0	1.021	39.5	LOS F	34.7	882.0	1.00	2.42	2.98	14.8
78	R2	140	2.0	147	2.0	1.021	39.5	LOS F	34.7	882.0	1.00	2.42	2.98	14.8
Approach		814	2.0	857	2.0	1.021	40.6	LOS E	34.7	882.0	1.00	2.42	2.98	15.1
All Vehicles		2615	2.0	2753	2.0	1.079	40.1	LOS E	34.7	882.0	1.00	2.19	2.72	15.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: N:\2022\22-519 Puunani Homestead TIAR Ph II TIAR\3. Future Year\1. WITHOUT Waiale Ext WITHOUT MLP\Kam - MLP RAB FY AM WITHOUT Waiale Ext WITHOUT MLP.sip9

Intersection	
Intersection Delay, s/veh	176.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	88	3	166	18	16	10	185	462	8	2	613	111
Future Vol, veh/h	88	3	166	18	16	10	185	462	8	2	613	111
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	96	3	180	20	17	11	201	502	9	2	666	121
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	15.5	15.1	179.3	240.4
HCM LOS	C	C	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	29%	0%	100%	0%	41%	0%
Vol Thru, %	71%	0%	0%	2%	36%	84%
Vol Right, %	0%	100%	0%	98%	23%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	647	8	88	169	44	726
LT Vol	185	0	88	0	18	2
Through Vol	462	0	0	3	16	613
RT Vol	0	8	0	166	10	111
Lane Flow Rate	703	9	96	184	48	789
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.324	0.014	0.221	0.365	0.118	1.466
Departure Headway (Hd)	7.348	6.479	9.579	8.331	10.654	7.17
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	499	556	377	435	339	513
Service Time	5.048	4.179	7.279	6.031	8.654	5.17
HCM Lane V/C Ratio	1.409	0.016	0.255	0.423	0.142	1.538
HCM Control Delay	181.4	9.3	15	15.7	15.1	240.4
HCM Lane LOS	F	A	B	C	C	F
HCM 95th-tile Q	28.4	0	0.8	1.6	0.4	36.8

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Waiale Rd														
7	T1	593	2.0	624	2.0	1.102	51.4	LOS F	108.7	2760.6	1.00	1.20	1.71	13.7
25	R2	771	2.0	812	2.0	1.102	51.4	LOS F	108.7	2760.6	1.00	1.20	1.71	13.7
Approach		1364	2.0	1436	2.0	1.102	51.4	LOS F	108.7	2760.6	1.00	1.20	1.71	13.7
East: WB Waiinu Rd														
19	L2	224	2.0	236	2.0	0.381	6.2	LOS A	2.8	71.6	0.81	0.77	0.81	20.4
24	R2	61	2.0	64	2.0	0.381	3.4	LOS A	2.8	71.6	0.81	0.77	0.81	19.0
Approach		285	2.0	300	2.0	0.381	5.6	LOS A	2.8	71.6	0.81	0.77	0.81	20.1
North: SB Waiale Rd														
15	L2	62	2.0	65	2.0	0.751	6.5	LOS A	10.0	255.1	0.84	0.72	0.93	20.6
2	T1	734	2.0	773	2.0	0.751	3.8	LOS A	10.0	255.1	0.84	0.72	0.93	19.2
Approach		796	2.0	838	2.0	0.751	4.0	LOS A	10.0	255.1	0.84	0.72	0.93	19.3
All Vehicles		2445	2.0	2574	2.0	1.102	30.6	LOS D	108.7	2760.6	0.93	1.00	1.35	15.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection	
Int Delay, s/veh	198.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	144	0	23	6	1	7	19	1215	13	7	774	170
Future Vol, veh/h	144	0	23	6	1	7	19	1215	13	7	774	170
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	157	0	25	7	1	8	21	1321	14	8	841	185

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2328	2333	937	2335	2418	1331	1029	0	0	1338	0	0
Stage 1	953	953	-	1373	1373	-	-	-	-	-	-	-
Stage 2	1375	1380	-	962	1045	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 26	37	321	26	32	189	675	-	-	515	-	-
Stage 1	311	338	-	180	213	-	-	-	-	-	-	-
Stage 2	180	212	-	308	306	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 21	31	320	21	27	188	673	-	-	514	-	-
Mov Cap-2 Maneuver	~ 21	31	-	21	27	-	-	-	-	-	-	-
Stage 1	272	324	-	158	187	-	-	-	-	-	-	-
Stage 2	~ 151	186	-	273	293	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 2819	147.3	0.2	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	673	-	-	21	320	39	514	-	-
HCM Lane V/C Ratio	0.031	-	-	7.453	0.078	0.39	0.015	-	-
HCM Control Delay (s)	10.5	0	-	$ 3266.5	17.2	147.3	12.1	-	-
HCM Lane LOS	B	A	-	F	C	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	19.9	0.3	1.3	0	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	55.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	130	71	50	1007	678	40
Future Vol, veh/h	130	71	50	1007	678	40
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	141	77	54	1095	737	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1965	762	783	0	-	0
Stage 1	762	-	-	-	-	-
Stage 2	1203	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 69	405	835	-	-	-
Stage 1	461	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 57	404	833	-	-	-
Mov Cap-2 Maneuver	~ 57	-	-	-	-	-
Stage 1	384	-	-	-	-	-
Stage 2	283	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 540.3	0.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	833	-	57	404	-	-
HCM Lane V/C Ratio	0.065	-	2.479	0.191	-	-
HCM Control Delay (s)	9.6	0	$ 826.6	16	-	-
HCM Lane LOS	A	A	F	C	-	-
HCM 95th %tile Q(veh)	0.2	-	14.3	0.7	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	431	568	87	72	358	322	128	290	122	332	233	173
Future Volume (veh/h)	431	568	87	72	358	322	128	290	122	332	233	173
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	539	617	90	78	389	97	139	315	117	361	253	161
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	510	636	93	170	374	315	260	308	115	289	314	200
Arrive On Green	0.25	0.40	0.40	0.05	0.20	0.20	0.07	0.24	0.24	0.12	0.30	0.30
Sat Flow, veh/h	1781	1595	233	1781	1870	1577	1781	1295	481	1781	1064	677
Grp Volume(v), veh/h	539	0	707	78	389	97	139	0	432	361	0	414
Grp Sat Flow(s),veh/h/ln	1781	0	1828	1781	1870	1577	1781	0	1777	1781	0	1740
Q Serve(g_s), s	26.0	0.0	39.8	3.6	21.0	5.5	6.2	0.0	25.0	13.0	0.0	23.1
Cycle Q Clear(g_c), s	26.0	0.0	39.8	3.6	21.0	5.5	6.2	0.0	25.0	13.0	0.0	23.1
Prop In Lane	1.00		0.13	1.00		1.00	1.00		0.27	1.00		0.39
Lane Grp Cap(c), veh/h	510	0	729	170	374	315	260	0	423	289	0	514
V/C Ratio(X)	1.06	0.00	0.97	0.46	1.04	0.31	0.53	0.00	1.02	1.25	0.00	0.81
Avail Cap(c_a), veh/h	510	0	729	338	374	315	260	0	423	289	0	514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.2	0.0	30.9	32.9	42.0	35.8	29.1	0.0	40.0	29.0	0.0	34.2
Incr Delay (d2), s/veh	56.0	0.0	26.0	1.9	57.3	0.5	2.1	0.0	49.3	137.4	0.0	9.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.9	0.0	22.4	1.7	15.6	0.0	2.8	0.0	16.6	16.5	0.0	11.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	86.2	0.0	56.9	34.8	99.3	36.3	31.3	0.0	89.3	166.4	0.0	43.4
LnGrp LOS	F	A	E	C	F	D	C	A	F	F	A	D
Approach Vol, veh/h		1246			564			571			775	
Approach Delay, s/veh		69.6			79.5			75.2			100.7	
Approach LOS		E			E			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.0	31.0	9.1	47.9	11.0	37.0	30.0	27.0
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	13.0	25.0	15.0	32.0	7.0	31.0	26.0	21.0
Max Q Clear Time (g_c+I1), s	15.0	27.0	5.6	41.8	8.2	25.1	28.0	23.0
Green Ext Time (p_c), s	0.0	0.0	0.1	0.0	0.0	1.4	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	80.0
HCM 6th LOS	E

HCM 6th TWSC
7: Waiale Rd & Kokololio St

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	131	21	4	374	339	39
Future Vol, veh/h	131	21	4	374	339	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	142	23	4	407	368	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	804	389	410	0	-	0
Stage 1	389	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	352	659	1149	-	-	-
Stage 1	685	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	351	659	1149	-	-	-
Mov Cap-2 Maneuver	351	-	-	-	-	-
Stage 1	682	-	-	-	-	-
Stage 2	666	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.5	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1149	-	351	659	-	-
HCM Lane V/C Ratio	0.004	-	0.406	0.035	-	-
HCM Control Delay (s)	8.1	0	22.1	10.7	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0	-	1.9	0.1	-	-

Intersection						
Int Delay, s/veh	3.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	78	17	284	341	32
Future Vol, veh/h	76	78	17	284	341	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	83	85	18	309	371	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	734	389	406	0	-	0
Stage 1	389	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	387	659	1153	-	-	-
Stage 1	685	-	-	-	-	-
Stage 2	717	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	380	659	1153	-	-	-
Mov Cap-2 Maneuver	380	-	-	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	717	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.3	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1153	-	484	-	-
HCM Lane V/C Ratio	0.016	-	0.346	-	-
HCM Control Delay (s)	8.2	0	16.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	1.5	-	-

Intersection						
Int Delay, s/veh	1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	17	4	267	413	6
Future Vol, veh/h	34	17	4	267	413	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	37	18	4	290	449	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	751	453	456	0	-	0
Stage 1	453	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	378	607	1105	-	-	-
Stage 1	640	-	-	-	-	-
Stage 2	753	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	376	607	1105	-	-	-
Mov Cap-2 Maneuver	376	-	-	-	-	-
Stage 1	637	-	-	-	-	-
Stage 2	753	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1105	-	431	-	-
HCM Lane V/C Ratio	0.004	-	0.129	-	-
HCM Control Delay (s)	8.3	0	14.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection						
Int Delay, s/veh	1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	23	5	240	417	13
Future Vol, veh/h	31	23	5	240	417	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	34	25	5	261	453	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	731	460	467	0	-	0
Stage 1	460	-	-	-	-	-
Stage 2	271	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	389	601	1094	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	387	601	1094	-	-	-
Mov Cap-2 Maneuver	491	-	-	-	-	-
Stage 1	633	-	-	-	-	-
Stage 2	775	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1094	-	533	-	-
HCM Lane V/C Ratio	0.005	-	0.11	-	-
HCM Control Delay (s)	8.3	-	12.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	275	0	13	77	130	0	47	29	319	33	87
Future Volume (veh/h)	69	275	0	13	77	130	0	47	29	319	33	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	75	299	0	14	84	90	0	51	2	347	36	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	399	434	0	294	149	160	329	210	8	667	366	376
Arrive On Green	0.07	0.23	0.00	0.02	0.18	0.18	0.00	0.12	0.12	0.21	0.43	0.43
Sat Flow, veh/h	1781	1870	0	1781	826	885	1781	1788	70	1781	845	869
Grp Volume(v), veh/h	75	299	0	14	0	174	0	0	53	347	0	73
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1711	1781	0	1858	1781	0	1714
Q Serve(g_s), s	1.4	6.2	0.0	0.3	0.0	4.0	0.0	0.0	1.1	6.4	0.0	1.1
Cycle Q Clear(g_c), s	1.4	6.2	0.0	0.3	0.0	4.0	0.0	0.0	1.1	6.4	0.0	1.1
Prop In Lane	1.00		0.00	1.00		0.52	1.00		0.04	1.00		0.51
Lane Grp Cap(c), veh/h	399	434	0	294	0	309	329	0	218	667	0	743
V/C Ratio(X)	0.19	0.69	0.00	0.05	0.00	0.56	0.00	0.00	0.24	0.52	0.00	0.10
Avail Cap(c_a), veh/h	506	1120	0	492	0	1024	973	0	2421	941	0	2233
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.7	15.0	0.0	14.0	0.0	15.9	0.0	0.0	17.1	10.5	0.0	7.1
Incr Delay (d2), s/veh	0.2	2.0	0.0	0.1	0.0	1.6	0.0	0.0	0.6	0.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.5	0.0	0.1	0.0	1.5	0.0	0.0	0.4	2.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.9	16.9	0.0	14.0	0.0	17.5	0.0	0.0	17.6	11.1	0.0	7.2
LnGrp LOS	B	B	A	B	A	B	A	A	B	B	A	A
Approach Vol, veh/h		374			188			53			420	
Approach Delay, s/veh		16.1			17.3			17.6			10.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	9.5	5.3	14.4	0.0	23.0	7.4	12.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	55.5	5.5	25.5	15.5	55.5	5.5	25.5
Max Q Clear Time (g_c+I1), s	8.4	3.1	2.3	8.2	0.0	3.1	3.4	6.0
Green Ext Time (p_c), s	0.7	0.3	0.0	1.7	0.0	0.5	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

HCM 6th TWSC
12: Kuikahi Dr & Kehalani Village Center Dr

Intersection												
Int Delay, s/veh	26.4											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	159	1032	10	9	578	63	28	3	26	39	1	121
Future Vol, veh/h	159	1032	10	9	578	63	28	3	26	39	1	121
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	173	1122	11	10	628	68	30	3	28	42	1	132

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	697	0	0	1133	0	0	2223	2191	1128	2138	2128	629
Stage 1	-	-	-	-	-	-	1474	1474	-	649	649	-
Stage 2	-	-	-	-	-	-	749	717	-	1489	1479	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	899	-	-	617	-	-	31	45	249	~ 36	50	482
Stage 1	-	-	-	-	-	-	158	191	-	458	466	-
Stage 2	-	-	-	-	-	-	404	434	-	155	190	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	898	-	-	617	-	-	~ 19	36	249	~ 25	40	482
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 19	36	-	~ 25	40	-
Stage 1	-	-	-	-	-	-	128	154	-	370	458	-
Stage 2	-	-	-	-	-	-	288	427	-	109	153	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.2	$ 411.8	182.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	20	249	898	-	-	617	-	-	25	482
HCM Lane V/C Ratio	1.685	0.113	0.192	-	-	0.016	-	-	1.739	0.273
HCM Control Delay (s)	$ 739.3	21.3	10	-	-	10.9	-	-	$ 689.9	15.2
HCM Lane LOS	F	C	A	-	-	B	-	-	F	C
HCM 95th %tile Q(veh)	4.5	0.4	0.7	-	-	0	-	-	5.4	1.1

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
13: Honoapiilani Hwy & Kehalani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	319	188	410	44	188	96	233	611	14	40	557	108
Future Volume (veh/h)	319	188	410	44	188	96	233	611	14	40	557	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	456	204	231	48	204	5	253	664	0	43	605	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	474	685	579	247	229	192	275	817		194	680	
Arrive On Green	0.28	0.37	0.37	0.03	0.12	0.12	0.10	0.44	0.00	0.03	0.36	0.00
Sat Flow, veh/h	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	456	204	231	48	204	5	253	664	0	43	605	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	39.5	11.8	16.5	3.6	16.4	0.4	13.2	47.3	0.0	2.3	46.4	0.0
Cycle Q Clear(g_c), s	39.5	11.8	16.5	3.6	16.4	0.4	13.2	47.3	0.0	2.3	46.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	474	685	579	247	229	192	275	817		194	680	
V/C Ratio(X)	0.96	0.30	0.40	0.19	0.89	0.03	0.92	0.81		0.22	0.89	
Avail Cap(c_a), veh/h	551	797	674	249	245	206	329	1030		203	846	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.4	34.4	35.9	56.1	65.9	58.9	34.2	37.5	0.0	33.5	45.7	0.0
Incr Delay (d2), s/veh	26.2	0.1	0.2	0.1	28.4	0.0	25.5	5.6	0.0	0.2	12.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.0	5.6	6.6	1.6	9.7	0.2	7.5	22.4	0.0	1.0	23.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.6	34.4	36.0	56.2	94.4	59.0	59.8	43.1	0.0	33.7	57.7	0.0
LnGrp LOS	E	C	D	E	F	E	E	D		C	E	
Approach Vol, veh/h		891			257			917	A		648	A
Approach Delay, s/veh		50.8			86.5			47.7			56.1	
Approach LOS		D			F			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	72.6	9.8	60.9	20.4	61.4	47.1	23.6
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	84.0	5.0	65.0	20.0	69.0	50.0	20.0
Max Q Clear Time (g_c+I1), s	4.3	49.3	5.6	18.5	15.2	48.4	41.5	18.4
Green Ext Time (p_c), s	0.0	9.9	0.0	1.2	0.2	7.0	0.6	0.1

Intersection Summary	
HCM 6th Ctrl Delay	54.4
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	302	131	320	107	298	30	491	481	381	614	20
Future Volume (veh/h)	64	302	131	320	107	298	30	491	481	381	614	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	328	41	348	116	210	33	534	0	414	667	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	392	371	361	319	505	711	267	630		442	915	839
Arrive On Green	0.04	0.18	0.18	0.13	0.27	0.27	0.03	0.34	0.00	0.18	0.49	0.49
Sat Flow, veh/h	1968	2067	1742	1781	1870	1579	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	70	328	41	348	116	210	33	534	0	414	667	10
Grp Sat Flow(s),veh/h/ln	1968	2067	1742	1781	1870	1579	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	3.5	18.9	2.3	16.0	5.9	10.3	1.5	32.3	0.0	19.4	34.5	0.4
Cycle Q Clear(g_c), s	3.5	18.9	2.3	16.0	5.9	10.3	1.5	32.3	0.0	19.4	34.5	0.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	392	371	361	319	505	711	267	630		442	915	839
V/C Ratio(X)	0.18	0.88	0.11	1.09	0.23	0.30	0.12	0.85		0.94	0.73	0.01
Avail Cap(c_a), veh/h	392	526	491	319	644	829	422	921		589	1197	1078
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.4	48.8	39.2	37.4	34.6	21.3	26.2	37.5	0.0	28.7	24.7	13.5
Incr Delay (d2), s/veh	0.2	9.6	0.1	76.9	0.1	0.1	0.1	7.8	0.0	17.0	2.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	10.8	1.0	14.6	2.7	3.9	0.6	15.8	0.0	10.0	15.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.6	58.3	39.3	114.3	34.7	21.4	26.2	45.3	0.0	45.7	27.4	13.6
LnGrp LOS	D	E	D	F	C	C	C	D		D	C	B
Approach Vol, veh/h		439			674			567	A		1091	
Approach Delay, s/veh		53.4			71.7			44.2			34.3	
Approach LOS		D			E			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.9	47.1	21.0	26.9	8.4	65.6	10.0	37.9
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	32.0	60.0	16.0	31.0	14.0	78.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	21.4	34.3	18.0	20.9	3.5	36.5	5.5	12.3
Green Ext Time (p_c), s	0.5	6.8	0.0	1.0	0.0	10.9	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	48.4
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	153	88	18	798	965	62
Future Volume (veh/h)	153	88	18	798	965	62
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	166	6	20	867	1049	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	213	190	237	1370	1202	1018
Arrive On Green	0.12	0.12	0.02	0.73	0.64	0.64
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	166	6	20	867	1049	54
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	6.7	0.2	0.3	17.2	34.0	0.9
Cycle Q Clear(g_c), s	6.7	0.2	0.3	17.2	34.0	0.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	213	190	237	1370	1202	1018
V/C Ratio(X)	0.78	0.03	0.08	0.63	0.87	0.05
Avail Cap(c_a), veh/h	718	639	532	2262	1785	1512
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.8	28.9	12.6	5.0	10.8	4.9
Incr Delay (d2), s/veh	6.0	0.1	0.2	0.5	3.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.1	0.2	4.5	12.0	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	37.8	29.0	12.8	5.5	14.3	4.9
LnGrp LOS	D	C	B	A	B	A
Approach Vol, veh/h	172			887	1103	
Approach Delay, s/veh	37.5			5.6	13.8	
Approach LOS	D			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	6.7	53.8	13.9	60.5
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	12.3	36.0	8.7	19.2
Green Ext Time (p_c), s	0.0	11.8	0.4	8.8

Intersection Summary	
HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	13	6	101	8	55	4	733	112	187	858	6
Future Volume (veh/h)	20	13	6	101	8	55	4	733	112	187	858	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	14	2	110	9	44	4	797	118	203	933	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	181	100	214	203	17	55	301	976	145	335	1256	1064
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.01	0.61	0.61	0.06	0.67	0.67
Sat Flow, veh/h	836	737	1579	973	125	406	1781	1592	236	1781	1870	1585
Grp Volume(v), veh/h	36	0	2	163	0	0	4	0	915	203	933	5
Grp Sat Flow(s),veh/h/ln	1572	0	1579	1505	0	0	1781	0	1828	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.1	7.4	0.0	0.0	0.1	0.0	33.1	3.3	27.9	0.1
Cycle Q Clear(g_c), s	1.5	0.0	0.1	8.9	0.0	0.0	0.1	0.0	33.1	3.3	27.9	0.1
Prop In Lane	0.61		1.00	0.67		0.27	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	281	0	214	275	0	0	301	0	1121	335	1256	1064
V/C Ratio(X)	0.13	0.00	0.01	0.59	0.00	0.00	0.01	0.00	0.82	0.61	0.74	0.00
Avail Cap(c_a), veh/h	519	0	463	505	0	0	583	0	1500	514	1535	1301
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.5	0.0	31.9	35.6	0.0	0.0	9.3	0.0	12.8	15.1	9.2	4.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.8	0.0	0.0	0.0	0.0	4.0	0.7	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	3.3	0.0	0.0	0.0	0.0	12.8	2.1	10.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.6	0.0	31.9	36.3	0.0	0.0	9.3	0.0	16.7	15.8	11.5	4.6
LnGrp LOS	C	A	C	D	A	A	A	A	B	B	B	A
Approach Vol, veh/h		38			163			919			1141	
Approach Delay, s/veh		32.5			36.3			16.7			12.3	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.4	58.3		16.6	5.5	63.3		16.6
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0
Max Q Clear Time (g_c+I1), s	15.3	35.1		3.5	2.1	29.9		10.9
Green Ext Time (p_c), s	0.2	17.2		0.1	0.0	18.9		0.5

Intersection Summary	
HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	180	9	18	86	74	10	7	72	174	5	32
Future Vol, veh/h	28	180	9	18	86	74	10	7	72	174	5	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	196	10	20	93	80	11	8	78	189	5	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	173	0	0	206	0	0	454	474	201	477	439	133
Stage 1	-	-	-	-	-	-	261	261	-	173	173	-
Stage 2	-	-	-	-	-	-	193	213	-	304	266	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1404	-	-	1365	-	-	516	489	840	498	512	916
Stage 1	-	-	-	-	-	-	744	692	-	829	756	-
Stage 2	-	-	-	-	-	-	809	726	-	705	689	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1404	-	-	1365	-	-	479	471	840	434	494	916
Mov Cap-2 Maneuver	-	-	-	-	-	-	479	471	-	434	494	-
Stage 1	-	-	-	-	-	-	728	677	-	812	745	-
Stage 2	-	-	-	-	-	-	761	715	-	619	675	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.8	10.7	17.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	733	1404	-	-	1365	-	-	434	821
HCM Lane V/C Ratio	0.132	0.022	-	-	0.014	-	-	0.436	0.049
HCM Control Delay (s)	10.7	7.6	-	-	7.7	-	-	19.5	9.6
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	2.2	0.2

Intersection						
Int Delay, s/veh	1.8					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	416	10	16	156	20	65
Future Vol, veh/h	416	10	16	156	20	65
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, %	-5	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	452	11	17	170	22	71

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	463	0	662	458
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	204	-
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	-	-	1098	-	427	603
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	830	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1098	-	420	603
Mov Cap-2 Maneuver	-	-	-	-	420	-
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	816	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	12.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	547	-	-	1098	-
HCM Lane V/C Ratio	0.169	-	-	0.016	-
HCM Control Delay (s)	12.9	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-

APPENDIX C

LOS WORKSHEETS

Future Year Conditions WITHOUT Waiale Extension WITHOUT MAUI LANI PARKWAY Extension – PM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB Kamehameha Ave															
102	L2	All MCs	138	2.0	138	2.0	0.742	23.1	LOS C	8.8	224.1	1.00	1.28	1.58	16.8
7	T1	All MCs	137	2.0	137	2.0	0.742	20.4	LOS C	8.8	224.1	1.00	1.28	1.58	16.8
25	R2	All MCs	75	2.0	75	2.0	0.742	20.4	LOS C	8.8	224.1	1.00	1.28	1.58	16.8
Approach			349	2.0	349	2.0	0.742	21.5	LOS C	8.8	224.1	1.00	1.28	1.58	16.8
East: WB Maui Lani Parkway															
19	L2	All MCs	78	2.0	78	2.0	1.154	91.8	LOS F	52.9	1342.4	1.00	3.78	4.99	11.2
336	T1	All MCs	468	2.0	468	2.0	1.154	89.1	LOS F	52.9	1342.4	1.00	3.78	4.99	11.2
24	R2	All MCs	291	2.0	291	2.0	1.154	89.1	LOS F	52.9	1342.4	1.00	3.78	4.99	11.2
Approach			837	2.0	837	2.0	1.154	89.3	LOS F	52.9	1342.4	1.00	3.78	4.99	11.2
North: SB Kamehameha Ave															
15	L2	All MCs	189	2.0	189	2.0	1.121	76.2	LOS F	48.4	1228.8	1.00	3.41	4.37	12.1
2	T1	All MCs	178	2.0	178	2.0	1.121	73.5	LOS F	48.4	1228.8	1.00	3.41	4.37	12.1
40	R2	All MCs	492	2.0	492	2.0	1.121	73.5	LOS F	48.4	1228.8	1.00	3.41	4.37	12.1
Approach			859	2.0	859	2.0	1.121	74.1	LOS F	48.4	1228.8	1.00	3.41	4.37	12.1
West: EB Maui Lani Parkway															
30	L2	All MCs	476	2.0	476	2.0	1.112	67.1	LOS F	56.0	1423.0	1.00	3.28	3.86	12.7
464	T1	All MCs	407	2.0	407	2.0	1.112	64.3	LOS F	56.0	1423.0	1.00	3.28	3.86	12.7
78	R2	All MCs	181	2.0	181	2.0	1.112	64.3	LOS F	56.0	1423.0	1.00	3.28	3.86	12.7
Approach			1064	2.0	1064	2.0	1.112	65.6	LOS F	56.0	1423.0	1.00	3.28	3.86	12.7
All Vehicles			3109	2.0	3109	2.0	1.154	69.3	LOS F	56.0	1423.0	1.00	3.23	4.05	12.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	204.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	10	224	16	4	8	118	531	23	8	708	69
Future Vol, veh/h	60	10	224	16	4	8	118	531	23	8	708	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	11	243	17	4	9	128	577	25	9	770	75
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	18.1	15.2	180.2	302.8
HCM LOS	C	C	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	18%	0%	100%	0%	57%	1%
Vol Thru, %	82%	0%	0%	4%	14%	90%
Vol Right, %	0%	100%	0%	96%	29%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	649	23	60	234	28	785
LT Vol	118	0	60	0	16	8
Through Vol	531	0	0	10	4	708
RT Vol	0	23	0	224	8	69
Lane Flow Rate	705	25	65	254	30	853
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.334	0.042	0.15	0.501	0.077	1.61
Departure Headway (Hd)	7.537	6.719	9.624	8.391	11.231	7.279
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	487	536	375	432	321	503
Service Time	5.237	4.419	7.324	6.091	9.231	5.279
HCM Lane V/C Ratio	1.448	0.047	0.173	0.588	0.093	1.696
HCM Control Delay	186.2	9.7	14	19.2	15.2	302.8
HCM Lane LOS	F	A	B	C	C	F
HCM 95th-tile Q	28.4	0.1	0.5	2.7	0.2	44.4

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Waiale Rd														
7	T1	617	2.0	649	2.0	0.856	1.2	LOS A	19.1	484.7	0.80	0.23	0.80	19.3
25	R2	447	2.0	471	2.0	0.856	1.2	LOS A	19.1	484.7	0.80	0.23	0.80	19.3
Approach		1064	2.0	1120	2.0	0.856	1.2	LOS A	19.1	484.7	0.80	0.23	0.80	19.3
East: WB Waiinu Rd														
19	L2	332	2.0	349	2.0	0.546	9.0	LOS A	5.0	126.5	0.90	0.99	1.05	20.0
24	R2	55	2.0	58	2.0	0.546	6.2	LOS A	5.0	126.5	0.90	0.99	1.05	18.6
Approach		387	2.0	407	2.0	0.546	8.6	LOS A	5.0	126.5	0.90	0.99	1.05	19.8
North: SB Waiale Rd														
15	L2	55	2.0	58	2.0	0.999	29.9	LOS D	34.9	885.3	1.00	1.90	2.26	17.1
2	T1	894	2.0	941	2.0	0.999	27.2	LOS D	34.9	885.3	1.00	1.90	2.26	16.1
Approach		949	2.0	999	2.0	0.999	27.3	LOS D	34.9	885.3	1.00	1.90	2.26	16.2
All Vehicles		2400	2.0	2526	2.0	0.999	12.7	LOS B	34.9	885.3	0.90	1.01	1.42	18.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Int Delay, s/veh	71.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	81	0	20	3	1	19	32	958	2	5	996	230
Future Vol, veh/h	81	0	20	3	1	19	32	958	2	5	996	230
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	0	22	3	1	21	35	1041	2	5	1083	250

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2344	2337	1211	2344	2461	1045	1336	0	0	1046	0	0
Stage 1	1221	1221	-	1115	1115	-	-	-	-	-	-	-
Stage 2	1123	1116	-	1229	1346	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 25	37	222	25	30	278	516	-	-	665	-	-
Stage 1	220	252	-	252	283	-	-	-	-	-	-	-
Stage 2	250	283	-	218	220	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 19	30	221	19	24	277	515	-	-	663	-	-
Mov Cap-2 Maneuver	~ 19	30	-	19	24	-	-	-	-	-	-	-
Stage 1	184	243	-	211	236	-	-	-	-	-	-	-
Stage 2	193	236	-	190	212	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 1643.3	63.2	0.4	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	515	-	-	19	221	86	663	-	-
HCM Lane V/C Ratio	0.068	-	-	4.634	0.098	0.291	0.008	-	-
HCM Control Delay (s)	12.5	0	-	$ 2043.4	23.1	63.2	10.5	-	-
HCM Lane LOS	B	A	-	F	C	F	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	11.5	0.3	1.1	0	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	18.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	64	56	853	849	60
Future Vol, veh/h	76	64	56	853	849	60
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	83	70	61	927	923	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2008	959	991	0	-	0
Stage 1	959	-	-	-	-	-
Stage 2	1049	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 65	312	698	-	-	-
Stage 1	372	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 53	311	696	-	-	-
Mov Cap-2 Maneuver	~ 53	-	-	-	-	-
Stage 1	304	-	-	-	-	-
Stage 2	336	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	253.7	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	696	-	53	311	-	-
HCM Lane V/C Ratio	0.087	-	1.559	0.224	-	-
HCM Control Delay (s)	10.7	0	$ 450.5	19.9	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	0.3	-	7.7	0.8	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	297	515	73	116	657	391	109	222	109	440	251	201
Future Volume (veh/h)	297	515	73	116	657	391	109	222	109	440	251	201
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	371	560	75	126	714	171	118	241	103	478	273	192
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	305	701	94	275	669	566	182	364	155	272	291	204
Arrive On Green	0.14	0.43	0.43	0.06	0.36	0.36	0.06	0.29	0.29	0.05	0.28	0.28
Sat Flow, veh/h	1781	1615	216	1781	1870	1583	1781	1243	531	1781	1021	718
Grp Volume(v), veh/h	371	0	635	126	714	171	118	0	344	478	0	465
Grp Sat Flow(s),veh/h/ln	1781	0	1831	1781	1870	1583	1781	0	1774	1781	0	1740
Q Serve(g_s), s	17.0	0.0	36.9	5.4	44.0	9.6	5.7	0.0	20.9	6.0	0.0	32.1
Cycle Q Clear(g_c), s	17.0	0.0	36.9	5.4	44.0	9.6	5.7	0.0	20.9	6.0	0.0	32.1
Prop In Lane	1.00		0.12	1.00		1.00	1.00		0.30	1.00		0.41
Lane Grp Cap(c), veh/h	305	0	795	275	669	566	182	0	519	272	0	495
V/C Ratio(X)	1.22	0.00	0.80	0.46	1.07	0.30	0.65	0.00	0.66	1.76	0.00	0.94
Avail Cap(c_a), veh/h	305	0	795	469	669	566	182	0	548	272	0	523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.8	0.0	30.1	26.0	39.5	28.4	33.3	0.0	38.2	45.9	0.0	43.0
Incr Delay (d2), s/veh	123.9	0.0	5.8	1.2	54.1	0.3	7.9	0.0	2.8	354.6	0.0	24.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.6	0.0	17.5	2.4	30.1	3.7	2.9	0.0	9.6	32.4	0.0	17.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	163.7	0.0	35.9	27.2	93.5	28.7	41.2	0.0	41.0	400.5	0.0	67.5
LnGrp LOS	F	A	D	C	F	C	D	A	D	F	A	E
Approach Vol, veh/h		1006			1011			462			943	
Approach Delay, s/veh		83.0			74.3			41.0			236.3	
Approach LOS		F			E			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	42.0	11.6	59.4	11.0	41.0	21.0	50.0
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	6.0	38.0	21.0	40.0	7.0	37.0	17.0	44.0
Max Q Clear Time (g_c+I1), s	8.0	22.9	7.4	38.9	7.7	34.1	19.0	46.0
Green Ext Time (p_c), s	0.0	1.9	0.2	0.5	0.0	0.9	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	117.0
HCM 6th LOS	F

Intersection						
Int Delay, s/veh	1.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	15	32	364	332	70
Future Vol, veh/h	55	15	32	364	332	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	60	16	35	396	361	76

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	865	399	437	0	-	0
Stage 1	399	-	-	-	-	-
Stage 2	466	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	324	651	1123	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	632	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	311	651	1123	-	-	-
Mov Cap-2 Maneuver	311	-	-	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	632	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.5	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1123	-	311	651	-	-
HCM Lane V/C Ratio	0.031	-	0.192	0.025	-	-
HCM Control Delay (s)	8.3	0	19.3	10.7	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.1	-	-

Intersection						
Int Delay, s/veh	2.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	48	33	70	352	277	58
Future Vol, veh/h	48	33	70	352	277	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	52	36	76	383	301	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	868	333	364	0	-	0
Stage 1	333	-	-	-	-	-
Stage 2	535	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	323	709	1195	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	587	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	297	709	1195	-	-	-
Mov Cap-2 Maneuver	297	-	-	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	587	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.9	1.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1195	-	389	-	-
HCM Lane V/C Ratio	0.064	-	0.226	-	-
HCM Control Delay (s)	8.2	0	16.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.9	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	20	19	409	295	14
Future Vol, veh/h	13	20	19	409	295	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	14	22	21	445	321	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	816	329	336	0	-	0
Stage 1	329	-	-	-	-	-
Stage 2	487	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	347	712	1223	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	339	712	1223	-	-	-
Mov Cap-2 Maneuver	339	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	618	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1223	-	497	-	-
HCM Lane V/C Ratio	0.017	-	0.072	-	-
HCM Control Delay (s)	8	0	12.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	9	16	414	298	17
Future Vol, veh/h	14	9	16	414	298	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	15	10	17	450	324	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	817	333	342	0	-	0
Stage 1	333	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	346	709	1217	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	341	709	1217	-	-	-
Mov Cap-2 Maneuver	457	-	-	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	620	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1217	-	531	-	-
HCM Lane V/C Ratio	0.014	-	0.047	-	-
HCM Control Delay (s)	8	-	12.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	131	0	32	186	330	0	38	22	217	48	45
Future Volume (veh/h)	65	131	0	32	186	330	0	38	22	217	48	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	142	0	35	202	308	0	41	1	236	52	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	331	745	0	632	251	383	252	164	4	491	419	153
Arrive On Green	0.06	0.40	0.00	0.04	0.38	0.38	0.00	0.09	0.09	0.15	0.32	0.32
Sat Flow, veh/h	1781	1870	0	1781	668	1019	1781	1818	44	1781	1307	478
Grp Volume(v), veh/h	71	142	0	35	0	510	0	0	42	236	0	71
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1687	1781	0	1862	1781	0	1784
Q Serve(g_s), s	1.3	2.7	0.0	0.7	0.0	15.0	0.0	0.0	1.2	6.1	0.0	1.6
Cycle Q Clear(g_c), s	1.3	2.7	0.0	0.7	0.0	15.0	0.0	0.0	1.2	6.1	0.0	1.6
Prop In Lane	1.00		0.00	1.00		0.60	1.00		0.02	1.00		0.27
Lane Grp Cap(c), veh/h	331	745	0	632	0	635	252	0	168	491	0	573
V/C Ratio(X)	0.21	0.19	0.00	0.06	0.00	0.80	0.00	0.00	0.25	0.48	0.00	0.12
Avail Cap(c_a), veh/h	400	1364	0	741	0	1230	746	0	1358	721	0	1301
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.4	10.9	0.0	9.8	0.0	15.5	0.0	0.0	23.5	16.9	0.0	13.3
Incr Delay (d2), s/veh	0.3	0.1	0.0	0.0	0.0	2.4	0.0	0.0	0.8	0.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.0	0.0	0.2	0.0	5.5	0.0	0.0	0.5	2.4	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.7	11.0	0.0	9.8	0.0	17.9	0.0	0.0	24.3	17.6	0.0	13.4
LnGrp LOS	B	B	A	A	A	B	A	A	C	B	A	B
Approach Vol, veh/h		213			545			42			307	
Approach Delay, s/veh		11.2			17.4			24.3			16.7	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.8	9.5	6.6	26.6	0.0	22.3	7.8	25.4				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	15.5	40.5	5.5	40.5	15.5	40.5	5.5	40.5				
Max Q Clear Time (g_c+I1), s	8.1	3.2	2.7	4.7	0.0	3.6	3.3	17.0				
Green Ext Time (p_c), s	0.4	0.2	0.0	0.9	0.0	0.4	0.0	3.9				
Intersection Summary												
HCM 6th Ctrl Delay			16.3									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	70.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	188	784	24	23	861	120	14	2	13	66	3	193
Future Vol, veh/h	188	784	24	23	861	120	14	2	13	66	3	193
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	204	852	26	25	936	130	15	2	14	72	3	210

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1067	0	0	878	0	0	2431	2390	865	2268	2273	937
Stage 1	-	-	-	-	-	-	1273	1273	-	987	987	-
Stage 2	-	-	-	-	-	-	1158	1117	-	1281	1286	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	653	-	-	769	-	-	22	34	353	~ 29	40	321
Stage 1	-	-	-	-	-	-	205	238	-	298	325	-
Stage 2	-	-	-	-	-	-	239	283	-	203	235	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	652	-	-	769	-	-	~ 5	23	353	~ 19	27	321
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 5	23	-	~ 19	27	-
Stage 1	-	-	-	-	-	-	141	164	-	204	314	-
Stage 2	-	-	-	-	-	-	79	273	-	132	161	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	0.2	$ 1118.5	$ 483.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	6	353	652	-	-	769	-	-	19	321
HCM Lane V/C Ratio	2.899	0.04	0.313	-	-	0.033	-	-	3.947	0.654
HCM Control Delay (s)	$ 2014.6	15.6	13	-	-	9.8	-		$ 1738.7	35.1
HCM Lane LOS	F	C	B	-	-	A	-	-	F	E
HCM 95th %tile Q(veh)	3.4	0.1	1.3	-	-	0.1	-	-	9.9	4.3

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
13: Honoapiilani Hwy & Kehalani Pkwy

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	62	165	51	184	74	225	612	18	44	724	240
Future Volume (veh/h)	167	62	165	51	184	74	225	612	18	44	724	240
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	239	67	29	55	200	5	245	665	0	48	787	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	425	356	296	245	203	278	990		327	894	
Arrive On Green	0.13	0.23	0.23	0.04	0.13	0.13	0.08	0.53	0.00	0.03	0.48	0.00
Sat Flow, veh/h	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	239	67	29	55	200	5	245	665	0	48	787	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	16.0	3.5	1.8	3.2	12.6	0.3	8.1	31.4	0.0	1.6	45.8	0.0
Cycle Q Clear(g_c), s	16.0	3.5	1.8	3.2	12.6	0.3	8.1	31.4	0.0	1.6	45.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	284	425	356	296	245	203	278	990		327	894	
V/C Ratio(X)	0.84	0.16	0.08	0.19	0.82	0.02	0.88	0.67		0.15	0.88	
Avail Cap(c_a), veh/h	284	464	388	319	310	256	334	1208		341	1068	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.8	37.4	36.7	43.2	51.1	45.7	25.5	20.8	0.0	17.6	28.4	0.0
Incr Delay (d2), s/veh	18.9	0.1	0.0	0.1	10.1	0.0	18.2	1.9	0.0	0.1	9.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	1.6	0.7	1.4	6.6	0.1	4.7	13.4	0.0	0.7	21.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.7	37.5	36.8	43.3	61.1	45.8	43.7	22.7	0.0	17.7	37.6	0.0
LnGrp LOS	E	D	D	D	E	D	D	C		B	D	
Approach Vol, veh/h		335			260			910	A		835	A
Approach Delay, s/veh		51.9			57.1			28.3			36.4	
Approach LOS		D			E			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	70.0	9.4	32.5	15.2	63.7	21.0	20.8				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	78.0	6.0	30.0	14.0	69.0	16.0	20.0				
Max Q Clear Time (g_c+I1), s	3.6	33.4	5.2	5.5	10.1	47.8	18.0	14.6				
Green Ext Time (p_c), s	0.0	10.6	0.0	0.3	0.1	9.9	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay			37.8									
HCM 6th LOS			D									

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	210	60	424	304	341	107	515	477	340	499	41
Future Volume (veh/h)	21	210	60	424	304	341	107	515	477	340	499	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	23	228	10	461	330	257	116	560	0	370	542	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	263	322	451	591	755	347	644		394	838	743
Arrive On Green	0.02	0.13	0.13	0.21	0.32	0.32	0.06	0.34	0.00	0.16	0.45	0.45
Sat Flow, veh/h	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	23	228	10	461	330	257	116	560	0	370	542	19
Grp Sat Flow(s),veh/h/ln	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	1.3	14.4	0.6	28.0	19.5	13.5	5.6	37.3	0.0	19.1	30.0	0.9
Cycle Q Clear(g_c), s	1.3	14.4	0.6	28.0	19.5	13.5	5.6	37.3	0.0	19.1	30.0	0.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	244	263	322	451	591	755	347	644		394	838	743
V/C Ratio(X)	0.09	0.87	0.03	1.02	0.56	0.34	0.33	0.87		0.94	0.65	0.03
Avail Cap(c_a), veh/h	276	388	428	451	674	826	434	842		456	1011	889
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.8	57.0	44.6	39.1	37.8	21.8	26.7	40.9	0.0	32.8	28.6	19.0
Incr Delay (d2), s/veh	0.2	9.2	0.0	48.4	0.3	0.1	0.2	10.2	0.0	24.2	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	8.3	0.3	18.9	9.1	5.1	2.4	18.7	0.0	10.7	13.7	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	66.2	44.6	87.5	38.1	21.9	26.9	51.1	0.0	57.0	30.5	19.0
LnGrp LOS	D	E	D	F	D	C	C	D		E	C	B
Approach Vol, veh/h		261			1048			676	A		931	
Approach Delay, s/veh		63.9			55.9			46.9			40.8	
Approach LOS		E			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	26.4	51.9	33.0	22.0	12.5	65.7	7.9	47.1				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	26.0	60.0	28.0	25.0	14.0	72.0	5.0	48.0				
Max Q Clear Time (g_c+I1), s	21.1	39.3	30.0	16.4	7.6	32.0	3.3	21.5				
Green Ext Time (p_c), s	0.3	6.5	0.0	0.6	0.1	8.1	0.0	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			49.7									
HCM 6th LOS			D									

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	95	31	57	1011	812	125
Future Volume (veh/h)	95	31	57	1011	812	125
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	103	2	62	1099	883	99
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	196	174	332	1323	1067	904
Arrive On Green	0.11	0.11	0.05	0.71	0.57	0.57
Sat Flow, veh/h	1781	1585	1781	1870	1870	1584
Grp Volume(v), veh/h	103	2	62	1099	883	99
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1584
Q Serve(g_s), s	3.3	0.1	0.7	25.1	23.1	1.7
Cycle Q Clear(g_c), s	3.3	0.1	0.7	25.1	23.1	1.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	196	174	332	1323	1067	904
V/C Ratio(X)	0.53	0.01	0.19	0.83	0.83	0.11
Avail Cap(c_a), veh/h	888	790	651	2796	2206	1868
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	23.9	9.5	6.3	10.5	5.9
Incr Delay (d2), s/veh	2.2	0.0	0.3	1.4	1.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.3	5.9	7.7	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.5	23.9	9.7	7.7	12.2	6.0
LnGrp LOS	C	C	A	A	B	A
Approach Vol, veh/h	105			1161	982	
Approach Delay, s/veh	27.4			7.8	11.6	
Approach LOS	C			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	8.2	40.4	11.6	48.6
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	2.7	25.1	5.3	27.1
Green Ext Time (p_c), s	0.1	9.2	0.3	14.7

Intersection Summary	
HCM 6th Ctrl Delay	10.4
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑↱		↰	↑↱		↰	↑	↱
Traffic Volume (veh/h)	13	7	3	102	12	101	9	953	111	82	747	23
Future Volume (veh/h)	13	7	3	102	12	101	9	953	111	82	747	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	8	1	111	13	81	10	1036	118	89	812	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	175	89	246	173	21	93	384	1073	122	175	1277	1081
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.01	0.65	0.65	0.04	0.68	0.68
Sat Flow, veh/h	773	571	1585	781	135	599	1781	1649	188	1781	1870	1584
Grp Volume(v), veh/h	22	0	1	205	0	0	10	0	1154	89	812	16
Grp Sat Flow(s),veh/h/ln	1344	0	1585	1515	0	0	1781	0	1836	1781	1870	1584
Q Serve(g_s), s	0.0	0.0	0.1	13.0	0.0	0.0	0.2	0.0	62.9	1.7	26.0	0.3
Cycle Q Clear(g_c), s	1.1	0.0	0.1	14.1	0.0	0.0	0.2	0.0	62.9	1.7	26.0	0.3
Prop In Lane	0.64		1.00	0.54		0.40	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	264	0	246	287	0	0	384	0	1196	175	1277	1081
V/C Ratio(X)	0.08	0.00	0.00	0.71	0.00	0.00	0.03	0.00	0.97	0.51	0.64	0.01
Avail Cap(c_a), veh/h	380	0	372	406	0	0	597	0	1206	331	1277	1081
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.5	0.0	38.1	43.9	0.0	0.0	8.5	0.0	17.5	26.9	9.5	5.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	18.3	0.9	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	5.4	0.0	0.0	0.1	0.0	29.2	1.5	9.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	0.0	38.1	45.3	0.0	0.0	8.5	0.0	35.8	27.7	11.0	5.4
LnGrp LOS	D	A	D	D	A	A	A	A	D	C	B	A
Approach Vol, veh/h		23			205			1164			917	
Approach Delay, s/veh		38.5			45.3			35.6			12.5	
Approach LOS		D			D			D			B	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	9.6	75.4	21.6	6.3	78.8	21.6
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	14.0	70.0	25.0	14.0	70.0	25.0
Max Q Clear Time (g_c+I1), s	3.7	64.9	3.1	2.2	28.0	16.1
Green Ext Time (p_c), s	0.1	4.5	0.0	0.0	15.5	0.5

Intersection Summary	
HCM 6th Ctrl Delay	27.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	118	16	70	178	145	15	3	36	109	17	24
Future Vol, veh/h	9	118	16	70	178	145	15	3	36	109	17	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	128	17	76	193	158	16	3	39	118	18	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	351	0	0	145	0	0	603	660	137	602	589	272
Stage 1	-	-	-	-	-	-	157	157	-	424	424	-
Stage 2	-	-	-	-	-	-	446	503	-	178	165	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1208	-	-	1437	-	-	411	383	911	412	421	767
Stage 1	-	-	-	-	-	-	845	768	-	608	587	-
Stage 2	-	-	-	-	-	-	591	541	-	824	762	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1208	-	-	1437	-	-	365	360	911	373	395	767
Mov Cap-2 Maneuver	-	-	-	-	-	-	365	360	-	373	395	-
Stage 1	-	-	-	-	-	-	838	762	-	603	556	-
Stage 2	-	-	-	-	-	-	523	512	-	779	756	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.4	11.6	17.2
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	607	1208	-	-	1437	-	-	373	552
HCM Lane V/C Ratio	0.097	0.008	-	-	0.053	-	-	0.318	0.081
HCM Control Delay (s)	11.6	8	-	-	7.6	-	-	19.1	12.1
HCM Lane LOS	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	1.3	0.3

Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	251	11	75	376	16	41
Future Vol, veh/h	251	11	75	376	16	41
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, %	-5	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	273	12	82	409	17	45

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	285	0	852	279
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	573	-
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	-	-	1277	-	330	760
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	564	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1277	-	303	760
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	517	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	12.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	534	-	-	1277	-
HCM Lane V/C Ratio	0.116	-	-	0.064	-
HCM Control Delay (s)	12.6	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
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APPENDIX C

LOS WORKSHEETS

Future Year Conditions WITH Waiale Extension WITHOUT MAUI LANI PARKWAY Extension – AM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] %	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kamehameha Ave														
102	L2	181	2.0	191	2.0	1.079	83.7	LOS F	33.5	851.5	1.00	2.87	3.85	12.1
7	T1	221	2.0	233	2.0	1.079	80.9	LOS F	33.5	851.5	1.00	2.87	3.85	11.6
25	R2	104	2.0	109	2.0	1.079	80.9	LOS F	33.5	851.5	1.00	2.87	3.85	11.6
Approach		506	2.0	533	2.0	1.079	81.9	LOS F	33.5	851.5	1.00	2.87	3.85	11.8
East: WB Maui Lani Parkway														
19	L2	85	2.0	89	2.0	0.780	17.5	LOS C	10.7	273.0	1.00	1.43	1.63	18.8
336	T1	286	2.0	301	2.0	0.780	14.8	LOS B	10.7	273.0	1.00	1.43	1.63	17.6
24	R2	160	2.0	168	2.0	0.780	14.8	LOS B	10.7	273.0	1.00	1.43	1.63	17.6
Approach		531	2.0	559	2.0	0.780	15.2	LOS C	10.7	273.0	1.00	1.43	1.63	17.8
North: SB Kamehameha Ave														
15	L2	268	2.0	282	2.0	0.967	30.9	LOS D	25.9	658.2	1.00	2.03	2.45	16.9
2	T1	157	2.0	165	2.0	0.967	28.1	LOS D	25.9	658.2	1.00	2.03	2.45	15.9
40	R2	339	2.0	357	2.0	0.967	28.1	LOS D	25.9	658.2	1.00	2.03	2.45	15.9
Approach		764	2.0	804	2.0	0.967	29.1	LOS D	25.9	658.2	1.00	2.03	2.45	16.3
West: EB Maui Lani Parkway														
30	L2	328	2.0	345	2.0	1.021	42.2	LOS F	34.7	882.0	1.00	2.42	2.98	15.6
464	T1	346	2.0	364	2.0	1.021	39.5	LOS F	34.7	882.0	1.00	2.42	2.98	14.8
78	R2	140	2.0	147	2.0	1.021	39.5	LOS F	34.7	882.0	1.00	2.42	2.98	14.8
Approach		814	2.0	857	2.0	1.021	40.6	LOS E	34.7	882.0	1.00	2.42	2.98	15.1
All Vehicles		2615	2.0	2753	2.0	1.079	40.1	LOS E	34.7	882.0	1.00	2.19	2.72	15.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	176.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	88	3	166	18	16	10	185	462	8	2	613	111
Future Vol, veh/h	88	3	166	18	16	10	185	462	8	2	613	111
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	96	3	180	20	17	11	201	502	9	2	666	121
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	15.5	15.1	179.3	240.4
HCM LOS	C	C	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	29%	0%	100%	0%	41%	0%
Vol Thru, %	71%	0%	0%	2%	36%	84%
Vol Right, %	0%	100%	0%	98%	23%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	647	8	88	169	44	726
LT Vol	185	0	88	0	18	2
Through Vol	462	0	0	3	16	613
RT Vol	0	8	0	166	10	111
Lane Flow Rate	703	9	96	184	48	789
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.324	0.014	0.221	0.365	0.118	1.466
Departure Headway (Hd)	7.348	6.479	9.579	8.331	10.654	7.17
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	499	556	377	435	339	513
Service Time	5.048	4.179	7.279	6.031	8.654	5.17
HCM Lane V/C Ratio	1.409	0.016	0.255	0.423	0.142	1.538
HCM Control Delay	181.4	9.3	15	15.7	15.1	240.4
HCM Lane LOS	F	A	B	C	C	F
HCM 95th-tile Q	28.4	0	0.8	1.6	0.4	36.8

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Waiale Rd														
7	T1	593	2.0	624	2.0	1.102	51.4	LOS F	108.7	2760.6	1.00	1.20	1.71	13.7
25	R2	771	2.0	812	2.0	1.102	51.4	LOS F	108.7	2760.6	1.00	1.20	1.71	13.7
Approach		1364	2.0	1436	2.0	1.102	51.4	LOS F	108.7	2760.6	1.00	1.20	1.71	13.7
East: WB Waiinu Rd														
19	L2	224	2.0	236	2.0	0.381	6.2	LOS A	2.8	71.6	0.81	0.77	0.81	20.4
24	R2	61	2.0	64	2.0	0.381	3.4	LOS A	2.8	71.6	0.81	0.77	0.81	19.0
Approach		285	2.0	300	2.0	0.381	5.6	LOS A	2.8	71.6	0.81	0.77	0.81	20.1
North: SB Waiale Rd														
15	L2	62	2.0	65	2.0	0.751	6.5	LOS A	10.0	255.1	0.84	0.72	0.93	20.6
2	T1	734	2.0	773	2.0	0.751	3.8	LOS A	10.0	255.1	0.84	0.72	0.93	19.2
Approach		796	2.0	838	2.0	0.751	4.0	LOS A	10.0	255.1	0.84	0.72	0.93	19.3
All Vehicles		2445	2.0	2574	2.0	1.102	30.6	LOS D	108.7	2760.6	0.93	1.00	1.35	15.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection	
Int Delay, s/veh	198.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	144	0	23	6	1	7	19	1215	13	7	774	170
Future Vol, veh/h	144	0	23	6	1	7	19	1215	13	7	774	170
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	157	0	25	7	1	8	21	1321	14	8	841	185

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2328	2333	937	2335	2418	1331	1029	0	0	1338	0	0
Stage 1	953	953	-	1373	1373	-	-	-	-	-	-	-
Stage 2	1375	1380	-	962	1045	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 26	37	321	26	32	189	675	-	-	515	-	-
Stage 1	311	338	-	180	213	-	-	-	-	-	-	-
Stage 2	180	212	-	308	306	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 21	31	320	21	27	188	673	-	-	514	-	-
Mov Cap-2 Maneuver	~ 21	31	-	21	27	-	-	-	-	-	-	-
Stage 1	272	324	-	158	187	-	-	-	-	-	-	-
Stage 2	~ 151	186	-	273	293	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 2819	147.3	0.2	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	673	-	-	21	320	39	514	-	-
HCM Lane V/C Ratio	0.031	-	-	7.453	0.078	0.39	0.015	-	-
HCM Control Delay (s)	10.5	0		$ 3266.5	17.2	147.3	12.1	-	-
HCM Lane LOS	B	A	-	F	C	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	19.9	0.3	1.3	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	55.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	130	71	50	1007	678	40
Future Vol, veh/h	130	71	50	1007	678	40
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	141	77	54	1095	737	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1965	762	783	0	-	0
Stage 1	762	-	-	-	-	-
Stage 2	1203	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 69	405	835	-	-	-
Stage 1	461	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 57	404	833	-	-	-
Mov Cap-2 Maneuver	~ 57	-	-	-	-	-
Stage 1	384	-	-	-	-	-
Stage 2	283	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 540.3	0.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	833	-	57	404	-	-
HCM Lane V/C Ratio	0.065	-	2.479	0.191	-	-
HCM Control Delay (s)	9.6	0	$ 826.6	16	-	-
HCM Lane LOS	A	A	F	C	-	-
HCM 95th %tile Q(veh)	0.2	-	14.3	0.7	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	338	455	87	136	294	322	135	383	235	332	284	121
Future Volume (veh/h)	338	455	87	136	294	322	135	383	235	332	284	121
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	422	495	88	148	320	100	147	416	232	361	309	116
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	479	503	89	231	383	323	296	285	159	309	407	153
Arrive On Green	0.21	0.33	0.33	0.09	0.21	0.21	0.07	0.25	0.25	0.13	0.32	0.32
Sat Flow, veh/h	1781	1545	275	1781	1870	1577	1781	1123	626	1781	1292	485
Grp Volume(v), veh/h	422	0	583	148	320	100	147	0	648	361	0	425
Grp Sat Flow(s),veh/h/ln	1781	0	1820	1781	1870	1577	1781	0	1749	1781	0	1778
Q Serve(g_s), s	17.4	0.0	31.3	6.3	16.1	5.3	6.0	0.0	25.0	13.0	0.0	21.2
Cycle Q Clear(g_c), s	17.4	0.0	31.3	6.3	16.1	5.3	6.0	0.0	25.0	13.0	0.0	21.2
Prop In Lane	1.00		0.15	1.00		1.00	1.00		0.36	1.00		0.27
Lane Grp Cap(c), veh/h	479	0	592	231	383	323	296	0	444	309	0	560
V/C Ratio(X)	0.88	0.00	0.98	0.64	0.83	0.31	0.50	0.00	1.46	1.17	0.00	0.76
Avail Cap(c_a), veh/h	584	0	592	351	399	337	296	0	444	309	0	560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.2	0.0	32.9	29.1	37.5	33.2	25.8	0.0	36.7	27.3	0.0	30.3
Incr Delay (d2), s/veh	12.8	0.0	33.0	3.0	13.8	0.5	1.3	0.0	218.3	105.5	0.0	6.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	0.0	19.0	2.9	8.8	2.1	2.6	0.0	37.5	14.5	0.0	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.0	0.0	66.0	32.0	51.3	33.7	27.1	0.0	255.0	132.8	0.0	36.3
LnGrp LOS	D	A	E	C	D	C	C	A	F	F	A	D
Approach Vol, veh/h		1005			568			795			786	
Approach Delay, s/veh		53.4			43.2			212.8			80.6	
Approach LOS		D			D			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.0	31.0	12.4	38.0	11.0	37.0	24.2	26.2
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	13.0	25.0	15.0	32.0	7.0	31.0	26.0	21.0
Max Q Clear Time (g_c+I1), s	15.0	27.0	8.3	33.3	8.0	23.2	19.4	18.1
Green Ext Time (p_c), s	0.0	0.0	0.2	0.0	0.0	1.7	0.8	0.7

Intersection Summary			
HCM 6th Ctrl Delay			98.5
HCM 6th LOS			F

HCM 6th TWSC
7: Waiale Rd & Kokololio St

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	131	21	4	591	465	39
Future Vol, veh/h	131	21	4	591	465	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	142	23	4	642	505	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1176	526	547	0	-	0
Stage 1	526	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	211	552	1022	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	520	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	210	552	1022	-	-	-
Mov Cap-2 Maneuver	210	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	520	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	46.5	0.1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1022	-	210	552	-	-
HCM Lane V/C Ratio	0.004	-	0.678	0.041	-	-
HCM Control Delay (s)	8.5	0	52.1	11.8	-	-
HCM Lane LOS	A	A	F	B	-	-
HCM 95th %tile Q(veh)	0	-	4.2	0.1	-	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	78	17	500	467	32
Future Vol, veh/h	76	78	17	500	467	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	83	85	18	543	508	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1105	526	543	0	-	0
Stage 1	526	-	-	-	-	-
Stage 2	579	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	233	552	1026	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	227	552	1026	-	-	-
Mov Cap-2 Maneuver	227	-	-	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	560	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27.5	0.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1026	-	323	-	-
HCM Lane V/C Ratio	0.018	-	0.518	-	-
HCM Control Delay (s)	8.6	0	27.5	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.1	-	2.8	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	17	4	483	540	6
Future Vol, veh/h	34	17	4	483	540	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	37	18	4	525	587	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1124	591	594	0	-	0
Stage 1	591	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	227	507	982	-	-	-
Stage 1	553	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	226	507	982	-	-	-
Mov Cap-2 Maneuver	226	-	-	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	588	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.2	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	982	-	277	-	-
HCM Lane V/C Ratio	0.004	-	0.2	-	-
HCM Control Delay (s)	8.7	0	21.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.7	-	-

HCM 6th TWSC
10: Waiale Rd & Ohana Hana Loop

10/24/2023

Intersection						
Int Delay, s/veh	0.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	23	5	456	543	13
Future Vol, veh/h	31	23	5	456	543	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	34	25	5	496	590	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1103	597	604	0	-	0
Stage 1	597	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	234	503	974	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	233	503	974	-	-	-
Mov Cap-2 Maneuver	368	-	-	-	-	-
Stage 1	547	-	-	-	-	-
Stage 2	606	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	974	-	415	-	-
HCM Lane V/C Ratio	0.006	-	0.141	-	-
HCM Control Delay (s)	8.7	-	15.1	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

HCM 6th Signalized Intersection Summary
11: E Waiko Rd & Waiale Rd

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	259	0	20	70	130	0	267	45	319	167	79
Future Volume (veh/h)	65	259	0	20	70	130	0	267	45	319	167	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	282	0	22	76	81	0	290	41	347	182	73
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	354	387	0	256	142	152	418	396	56	539	649	260
Arrive On Green	0.06	0.21	0.00	0.03	0.17	0.17	0.00	0.25	0.25	0.18	0.51	0.51
Sat Flow, veh/h	1781	1870	0	1781	828	883	1781	1603	227	1781	1270	509
Grp Volume(v), veh/h	71	282	0	22	0	157	0	0	331	347	0	255
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1711	1781	0	1830	1781	0	1779
Q Serve(g_s), s	1.7	7.4	0.0	0.5	0.0	4.4	0.0	0.0	8.8	6.8	0.0	4.3
Cycle Q Clear(g_c), s	1.7	7.4	0.0	0.5	0.0	4.4	0.0	0.0	8.8	6.8	0.0	4.3
Prop In Lane	1.00		0.00	1.00		0.52	1.00		0.12	1.00		0.29
Lane Grp Cap(c), veh/h	354	387	0	256	0	294	418	0	452	539	0	909
V/C Ratio(X)	0.20	0.73	0.00	0.09	0.00	0.53	0.00	0.00	0.73	0.64	0.00	0.28
Avail Cap(c_a), veh/h	431	904	0	395	0	827	938	0	1925	744	0	1872
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.3	19.5	0.0	17.5	0.0	19.9	0.0	0.0	18.3	11.1	0.0	7.4
Incr Delay (d2), s/veh	0.3	2.6	0.0	0.1	0.0	1.5	0.0	0.0	2.3	1.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	3.3	0.0	0.2	0.0	1.8	0.0	0.0	3.6	2.4	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.6	22.2	0.0	17.6	0.0	21.4	0.0	0.0	20.6	12.3	0.0	7.5
LnGrp LOS	B	C	A	B	A	C	A	A	C	B	A	A
Approach Vol, veh/h		353			179			331			602	
Approach Delay, s/veh		21.0			20.9			20.6			10.3	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.9	17.5	5.9	15.4	0.0	31.4	7.7	13.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	55.5	5.5	25.5	15.5	55.5	5.5	25.5
Max Q Clear Time (g_c+I1), s	8.8	10.8	2.5	9.4	0.0	6.3	3.7	6.4
Green Ext Time (p_c), s	0.6	2.2	0.0	1.5	0.0	1.8	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	16.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
12: Kuikahi Dr & Kehalani Village Center Dr

Intersection												
Int Delay, s/veh	9.3											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	151	826	7	9	463	71	17	3	26	39	1	121
Future Vol, veh/h	151	826	7	9	463	71	17	3	26	39	1	121
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	164	898	8	10	503	77	18	3	28	42	1	132

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	581	0	0	906	0	0	1858	1831	902	1770	1758	504
Stage 1	-	-	-	-	-	-	1230	1230	-	524	524	-
Stage 2	-	-	-	-	-	-	628	601	-	1246	1234	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	993	-	-	751	-	-	56	76	336	65	85	568
Stage 1	-	-	-	-	-	-	217	250	-	537	530	-
Stage 2	-	-	-	-	-	-	471	489	-	213	249	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	992	-	-	751	-	-	37	63	336	49	70	567
Mov Cap-2 Maneuver	-	-	-	-	-	-	37	63	-	49	70	-
Stage 1	-	-	-	-	-	-	181	209	-	448	523	-
Stage 2	-	-	-	-	-	-	356	482	-	160	208	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.2	87.5	66.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	39	336	992	-	-	751	-	-	49	567
HCM Lane V/C Ratio	0.557	0.084	0.165	-	-	0.013	-	-	0.887	0.232
HCM Control Delay (s)	179.6	16.7	9.3	-	-	9.9	-	-	226.3	13.3
HCM Lane LOS	F	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	2	0.3	0.6	-	-	0	-	-	3.7	0.9

HCM 6th Signalized Intersection Summary
13: Honoapiilani Hwy & Kehalani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	319	188	410	44	188	96	233	611	14	40	557	108
Future Volume (veh/h)	319	188	410	44	188	96	233	611	14	40	557	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	456	204	231	48	204	5	253	664	0	43	605	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	474	685	579	247	229	192	275	817		194	680	
Arrive On Green	0.28	0.37	0.37	0.03	0.12	0.12	0.10	0.44	0.00	0.03	0.36	0.00
Sat Flow, veh/h	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	456	204	231	48	204	5	253	664	0	43	605	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	39.5	11.8	16.5	3.6	16.4	0.4	13.2	47.3	0.0	2.3	46.4	0.0
Cycle Q Clear(g_c), s	39.5	11.8	16.5	3.6	16.4	0.4	13.2	47.3	0.0	2.3	46.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	474	685	579	247	229	192	275	817		194	680	
V/C Ratio(X)	0.96	0.30	0.40	0.19	0.89	0.03	0.92	0.81		0.22	0.89	
Avail Cap(c_a), veh/h	551	797	674	249	245	206	329	1030		203	846	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.4	34.4	35.9	56.1	65.9	58.9	34.2	37.5	0.0	33.5	45.7	0.0
Incr Delay (d2), s/veh	26.2	0.1	0.2	0.1	28.4	0.0	25.5	5.6	0.0	0.2	12.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.0	5.6	6.6	1.6	9.7	0.2	7.5	22.4	0.0	1.0	23.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.6	34.4	36.0	56.2	94.4	59.0	59.8	43.1	0.0	33.7	57.7	0.0
LnGrp LOS	E	C	D	E	F	E	E	D		C	E	
Approach Vol, veh/h		891			257			917	A		648	A
Approach Delay, s/veh		50.8			86.5			47.7			56.1	
Approach LOS		D			F			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	72.6	9.8	60.9	20.4	61.4	47.1	23.6
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	84.0	5.0	65.0	20.0	69.0	50.0	20.0
Max Q Clear Time (g_c+I1), s	4.3	49.3	5.6	18.5	15.2	48.4	41.5	18.4
Green Ext Time (p_c), s	0.0	9.9	0.0	1.2	0.2	7.0	0.6	0.1

Intersection Summary	
HCM 6th Ctrl Delay	54.4
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	302	131	194	107	298	30	491	265	381	614	20
Future Volume (veh/h)	64	302	131	194	107	298	30	491	265	381	614	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	328	42	211	116	210	33	534	0	414	667	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	402	377	368	293	473	675	274	643		445	914	839
Arrive On Green	0.04	0.18	0.18	0.11	0.25	0.25	0.03	0.34	0.00	0.17	0.49	0.49
Sat Flow, veh/h	1968	2067	1742	1781	1870	1579	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	70	328	42	211	116	210	33	534	0	414	667	10
Grp Sat Flow(s),veh/h/ln	1968	2067	1742	1781	1870	1579	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	3.2	17.2	2.2	10.3	5.5	9.8	1.3	29.3	0.0	16.9	31.6	0.3
Cycle Q Clear(g_c), s	3.2	17.2	2.2	10.3	5.5	9.8	1.3	29.3	0.0	16.9	31.6	0.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	402	377	368	293	473	675	274	643		445	914	839
V/C Ratio(X)	0.17	0.87	0.11	0.72	0.25	0.31	0.12	0.83		0.93	0.73	0.01
Avail Cap(c_a), veh/h	409	574	534	349	704	870	446	1005		646	1307	1172
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.9	44.4	35.6	32.0	33.2	21.1	23.5	33.6	0.0	24.6	22.7	12.4
Incr Delay (d2), s/veh	0.2	6.2	0.1	5.7	0.1	0.1	0.1	6.3	0.0	12.9	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	9.5	0.9	4.9	2.5	3.7	0.6	14.0	0.0	8.3	13.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.1	50.5	35.7	37.7	33.3	21.2	23.6	39.9	0.0	37.5	25.1	12.4
LnGrp LOS	D	D	D	D	C	C	C	D		D	C	B
Approach Vol, veh/h		440			537			567	A		1091	
Approach Delay, s/veh		46.6			30.3			39.0			29.7	
Approach LOS		D			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	34.4	44.4	17.5	25.3	8.2	60.6	9.6	33.2
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	32.0	60.0	16.0	31.0	14.0	78.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	18.9	31.3	12.3	19.2	3.3	33.6	5.2	11.8
Green Ext Time (p_c), s	0.5	7.1	0.2	1.1	0.0	11.1	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	34.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St

10/24/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	153	88	18	582	839	62
Future Volume (veh/h)	153	88	18	582	839	62
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	166	10	20	633	912	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	224	199	278	1294	1095	928
Arrive On Green	0.13	0.13	0.02	0.69	0.59	0.59
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	166	10	20	633	912	49
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	5.4	0.3	0.2	9.5	23.8	0.8
Cycle Q Clear(g_c), s	5.4	0.3	0.2	9.5	23.8	0.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	224	199	278	1294	1095	928
V/C Ratio(X)	0.74	0.05	0.07	0.49	0.83	0.05
Avail Cap(c_a), veh/h	886	788	650	2790	2201	1865
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.4	23.2	9.6	4.3	10.1	5.3
Incr Delay (d2), s/veh	4.8	0.1	0.1	0.3	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.1	0.1	2.3	7.8	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	30.2	23.3	9.7	4.6	11.8	5.4
LnGrp LOS	C	C	A	A	B	A
Approach Vol, veh/h	176			653	961	
Approach Delay, s/veh	29.8			4.8	11.5	
Approach LOS	C			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	6.4	41.3	12.6	47.8
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	2.2	25.8	7.4	11.5
Green Ext Time (p_c), s	0.0	9.5	0.5	5.2

Intersection Summary	
HCM 6th Ctrl Delay	10.9
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	13	6	86	8	55	4	516	92	187	732	6
Future Volume (veh/h)	20	13	6	86	8	55	4	516	92	187	732	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	14	0	93	9	40	4	561	93	203	796	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	209	110	204	218	22	55	334	815	135	464	1117	947
Arrive On Green	0.13	0.13	0.00	0.13	0.13	0.13	0.01	0.52	0.52	0.08	0.60	0.60
Sat Flow, veh/h	866	854	1585	917	168	425	1781	1564	259	1781	1870	1585
Grp Volume(v), veh/h	36	0	0	142	0	0	4	0	654	203	796	4
Grp Sat Flow(s),veh/h/ln	1721	0	1585	1510	0	0	1781	0	1824	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	4.3	0.0	0.0	0.1	0.0	15.9	2.8	17.8	0.1
Cycle Q Clear(g_c), s	1.0	0.0	0.0	5.3	0.0	0.0	0.1	0.0	15.9	2.8	17.8	0.1
Prop In Lane	0.61		1.00	0.65		0.28	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	318	0	204	294	0	0	334	0	950	464	1117	947
V/C Ratio(X)	0.11	0.00	0.00	0.48	0.00	0.00	0.01	0.00	0.69	0.44	0.71	0.00
Avail Cap(c_a), veh/h	761	0	666	722	0	0	744	0	2146	737	2201	1865
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	0.0	24.8	0.0	0.0	8.2	0.0	10.6	8.1	8.4	4.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	0.0	0.0	1.9	0.2	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.9	0.0	0.0	0.0	0.0	5.6	0.8	5.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	0.0	0.0	25.3	0.0	0.0	8.2	0.0	12.6	8.3	10.2	4.8
LnGrp LOS	C	A	A	C	A	A	A	A	B	A	B	A
Approach Vol, veh/h		36			142			658			1003	
Approach Delay, s/veh		23.1			25.3			12.5			9.8	
Approach LOS		C			C			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	37.0		12.6	5.3	41.5		12.6				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0				
Max Q Clear Time (g_c+I1), s	4.8	17.9		3.0	2.1	19.8		7.3				
Green Ext Time (p_c), s	0.2	11.6		0.1	0.0	15.8		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			12.2									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
17: Kehalani Mauka Pkwy & Kuikahi Dr

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	180	9	18	86	74	10	7	72	174	5	32
Future Vol, veh/h	28	180	9	18	86	74	10	7	72	174	5	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	196	10	20	93	80	11	8	78	189	5	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	173	0	0	206	0	0	454	474	201	477	439	133
Stage 1	-	-	-	-	-	-	261	261	-	173	173	-
Stage 2	-	-	-	-	-	-	193	213	-	304	266	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1404	-	-	1365	-	-	516	489	840	498	512	916
Stage 1	-	-	-	-	-	-	744	692	-	829	756	-
Stage 2	-	-	-	-	-	-	809	726	-	705	689	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1404	-	-	1365	-	-	479	471	840	434	494	916
Mov Cap-2 Maneuver	-	-	-	-	-	-	479	471	-	434	494	-
Stage 1	-	-	-	-	-	-	728	677	-	812	745	-
Stage 2	-	-	-	-	-	-	761	715	-	619	675	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.8	10.7	17.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	733	1404	-	-	1365	-	-	434	821
HCM Lane V/C Ratio	0.132	0.022	-	-	0.014	-	-	0.436	0.049
HCM Control Delay (s)	10.7	7.6	-	-	7.7	-	-	19.5	9.6
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	2.2	0.2

HCM 6th TWSC
19: East Project Driveway & Kuikahi Drive/Kuikahi Dr

10/24/2023

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	416	10	16	156	20	65
Future Vol, veh/h	416	10	16	156	20	65
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, %	-5	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	452	11	17	170	22	71

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	463	0	662	458
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	204	-
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	-	-	1098	-	427	603
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	830	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1098	-	420	603
Mov Cap-2 Maneuver	-	-	-	-	420	-
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	816	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	12.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	547	-	-	1098	-
HCM Lane V/C Ratio	0.169	-	-	0.016	-
HCM Control Delay (s)	12.9	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB Kamehameha Ave															
102	L2	All MCs	138	2.0	138	2.0	0.742	23.1	LOS C	8.8	224.1	1.00	1.28	1.58	16.8
7	T1	All MCs	137	2.0	137	2.0	0.742	20.4	LOS C	8.8	224.1	1.00	1.28	1.58	16.8
25	R2	All MCs	75	2.0	75	2.0	0.742	20.4	LOS C	8.8	224.1	1.00	1.28	1.58	16.8
Approach			349	2.0	349	2.0	0.742	21.5	LOS C	8.8	224.1	1.00	1.28	1.58	16.8
East: WB Maui Lani Parkway															
19	L2	All MCs	78	2.0	78	2.0	1.154	91.8	LOS F	52.9	1342.4	1.00	3.78	4.99	11.2
336	T1	All MCs	468	2.0	468	2.0	1.154	89.1	LOS F	52.9	1342.4	1.00	3.78	4.99	11.2
24	R2	All MCs	291	2.0	291	2.0	1.154	89.1	LOS F	52.9	1342.4	1.00	3.78	4.99	11.2
Approach			837	2.0	837	2.0	1.154	89.3	LOS F	52.9	1342.4	1.00	3.78	4.99	11.2
North: SB Kamehameha Ave															
15	L2	All MCs	189	2.0	189	2.0	1.121	76.2	LOS F	48.4	1228.8	1.00	3.41	4.37	12.1
2	T1	All MCs	178	2.0	178	2.0	1.121	73.5	LOS F	48.4	1228.8	1.00	3.41	4.37	12.1
40	R2	All MCs	492	2.0	492	2.0	1.121	73.5	LOS F	48.4	1228.8	1.00	3.41	4.37	12.1
Approach			859	2.0	859	2.0	1.121	74.1	LOS F	48.4	1228.8	1.00	3.41	4.37	12.1
West: EB Maui Lani Parkway															
30	L2	All MCs	476	2.0	476	2.0	1.112	67.1	LOS F	56.0	1423.0	1.00	3.28	3.86	12.7
464	T1	All MCs	407	2.0	407	2.0	1.112	64.3	LOS F	56.0	1423.0	1.00	3.28	3.86	12.7
78	R2	All MCs	181	2.0	181	2.0	1.112	64.3	LOS F	56.0	1423.0	1.00	3.28	3.86	12.7
Approach			1064	2.0	1064	2.0	1.112	65.6	LOS F	56.0	1423.0	1.00	3.28	3.86	12.7
All Vehicles			3109	2.0	3109	2.0	1.154	69.3	LOS F	56.0	1423.0	1.00	3.23	4.05	12.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	204.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	10	224	16	4	8	118	531	23	8	708	69
Future Vol, veh/h	60	10	224	16	4	8	118	531	23	8	708	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	11	243	17	4	9	128	577	25	9	770	75
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	18.1	15.2	180.2	302.8
HCM LOS	C	C	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	18%	0%	100%	0%	57%	1%
Vol Thru, %	82%	0%	0%	4%	14%	90%
Vol Right, %	0%	100%	0%	96%	29%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	649	23	60	234	28	785
LT Vol	118	0	60	0	16	8
Through Vol	531	0	0	10	4	708
RT Vol	0	23	0	224	8	69
Lane Flow Rate	705	25	65	254	30	853
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.334	0.042	0.15	0.501	0.077	1.61
Departure Headway (Hd)	7.537	6.719	9.624	8.391	11.231	7.279
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	487	536	375	432	321	503
Service Time	5.237	4.419	7.324	6.091	9.231	5.279
HCM Lane V/C Ratio	1.448	0.047	0.173	0.588	0.093	1.696
HCM Control Delay	186.2	9.7	14	19.2	15.2	302.8
HCM Lane LOS	F	A	B	C	C	F
HCM 95th-tile Q	28.4	0.1	0.5	2.7	0.2	44.4

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Waiale Rd														
7	T1	617	2.0	649	2.0	0.856	1.2	LOS A	19.1	484.7	0.80	0.23	0.80	19.3
25	R2	447	2.0	471	2.0	0.856	1.2	LOS A	19.1	484.7	0.80	0.23	0.80	19.3
Approach		1064	2.0	1120	2.0	0.856	1.2	LOS A	19.1	484.7	0.80	0.23	0.80	19.3
East: WB Waiinu Rd														
19	L2	332	2.0	349	2.0	0.546	9.0	LOS A	5.0	126.5	0.90	0.99	1.05	20.0
24	R2	55	2.0	58	2.0	0.546	6.2	LOS A	5.0	126.5	0.90	0.99	1.05	18.6
Approach		387	2.0	407	2.0	0.546	8.6	LOS A	5.0	126.5	0.90	0.99	1.05	19.8
North: SB Waiale Rd														
15	L2	55	2.0	58	2.0	0.999	29.9	LOS D	34.9	885.3	1.00	1.90	2.26	17.1
2	T1	894	2.0	941	2.0	0.999	27.2	LOS D	34.9	885.3	1.00	1.90	2.26	16.1
Approach		949	2.0	999	2.0	0.999	27.3	LOS D	34.9	885.3	1.00	1.90	2.26	16.2
All Vehicles		2400	2.0	2526	2.0	0.999	12.7	LOS B	34.9	885.3	0.90	1.01	1.42	18.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Project: N:\2022\22-519 Puunani Homestead TIAR Ph II TIAR\3. Future Year\2. WITH Waiale Ext WITHOUT MLP\Waiale - Waiinu RAB FY PM WITH Waiale Ext WITHOUT MLP.sip9

HCM 6th TWSC
4: Waiale Rd & Olomea St/Waimaluhia Ln

10/24/2023

Intersection	
Int Delay, s/veh	71.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	81	0	20	3	1	19	32	958	2	5	996	230
Future Vol, veh/h	81	0	20	3	1	19	32	958	2	5	996	230
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	0	22	3	1	21	35	1041	2	5	1083	250

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2344	2337	1211	2344	2461	1045	1336	0	0	1046	0	0
Stage 1	1221	1221	-	1115	1115	-	-	-	-	-	-	-
Stage 2	1123	1116	-	1229	1346	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 25	37	222	25	30	278	516	-	-	665	-	-
Stage 1	220	252	-	252	283	-	-	-	-	-	-	-
Stage 2	250	283	-	218	220	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 19	30	221	19	24	277	515	-	-	663	-	-
Mov Cap-2 Maneuver	~ 19	30	-	19	24	-	-	-	-	-	-	-
Stage 1	184	243	-	211	236	-	-	-	-	-	-	-
Stage 2	193	236	-	190	212	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 1643.3	63.2	0.4	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	515	-	-	19	221	86	663	-	-
HCM Lane V/C Ratio	0.068	-	-	4.634	0.098	0.291	0.008	-	-
HCM Control Delay (s)	12.5	0		$ 2043.4	23.1	63.2	10.5	-	-
HCM Lane LOS	B	A	-	F	C	F	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	11.5	0.3	1.1	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	18.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	64	56	853	849	60
Future Vol, veh/h	76	64	56	853	849	60
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	83	70	61	927	923	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2008	959	991	0	-	0
Stage 1	959	-	-	-	-	-
Stage 2	1049	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 65	312	698	-	-	-
Stage 1	372	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 53	311	696	-	-	-
Mov Cap-2 Maneuver	~ 53	-	-	-	-	-
Stage 1	304	-	-	-	-	-
Stage 2	336	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	253.7	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	696	-	53	311	-	-
HCM Lane V/C Ratio	0.087	-	1.559	0.224	-	-
HCM Control Delay (s)	10.7	0	$ 450.5	19.9	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	0.3	-	7.7	0.8	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	204	395	73	222	551	391	125	314	229	440	307	145
Future Volume (veh/h)	204	395	73	222	551	391	125	314	229	440	307	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	255	429	74	241	599	207	136	341	226	478	334	13
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	285	544	94	343	646	547	329	338	224	152	561	22
Arrive On Green	0.11	0.35	0.35	0.11	0.35	0.35	0.06	0.32	0.32	0.05	0.31	0.31
Sat Flow, veh/h	1781	1554	268	1781	1870	1583	1781	1049	695	1781	1788	70
Grp Volume(v), veh/h	255	0	503	241	599	207	136	0	567	478	0	347
Grp Sat Flow(s),veh/h/ln	1781	0	1822	1781	1870	1583	1781	0	1744	1781	0	1858
Q Serve(g_s), s	10.8	0.0	29.2	10.1	36.3	11.6	6.1	0.0	38.0	6.0	0.0	18.6
Cycle Q Clear(g_c), s	10.8	0.0	29.2	10.1	36.3	11.6	6.1	0.0	38.0	6.0	0.0	18.6
Prop In Lane	1.00		0.15	1.00		1.00	1.00		0.40	1.00		0.04
Lane Grp Cap(c), veh/h	285	0	638	343	646	547	329	0	562	152	0	583
V/C Ratio(X)	0.90	0.00	0.79	0.70	0.93	0.38	0.41	0.00	1.01	3.15	0.00	0.59
Avail Cap(c_a), veh/h	343	0	638	470	698	591	329	0	562	152	0	583
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.6	0.0	34.4	25.2	37.1	29.0	26.7	0.0	39.9	35.0	0.0	34.1
Incr Delay (d2), s/veh	22.1	0.0	6.6	2.9	17.8	0.4	0.8	0.0	40.0	984.3	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	0.0	14.1	4.5	19.7	4.5	2.7	0.0	22.5	43.1	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.7	0.0	40.9	28.1	54.9	29.5	27.6	0.0	80.0	1019.4	0.0	35.7
LnGrp LOS	D	A	D	C	D	C	C	A	F	F	A	D
Approach Vol, veh/h		758			1047			703			825	
Approach Delay, s/veh		43.9			43.7			69.8			605.6	
Approach LOS		D			D			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	44.0	16.6	47.3	11.0	43.0	17.1	46.7
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	6.0	38.0	21.0	40.0	7.0	37.0	17.0	44.0
Max Q Clear Time (g_c+I1), s	8.0	40.0	12.1	31.2	8.1	20.6	12.8	38.3
Green Ext Time (p_c), s	0.0	0.0	0.5	2.2	0.0	2.0	0.3	2.4

Intersection Summary	
HCM 6th Ctrl Delay	188.3
HCM 6th LOS	F

Intersection						
Int Delay, s/veh	2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	15	32	599	499	70
Future Vol, veh/h	55	15	32	599	499	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	60	16	35	651	542	76

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1301	580	618	0	-	0
Stage 1	580	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	178	514	962	-	-	-
Stage 1	560	-	-	-	-	-
Stage 2	482	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	168	514	962	-	-	-
Mov Cap-2 Maneuver	168	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	482	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.3	0.5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	962	-	168	514	-	-
HCM Lane V/C Ratio	0.036	-	0.356	0.032	-	-
HCM Control Delay (s)	8.9	0	37.8	12.2	-	-
HCM Lane LOS	A	A	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	0.1	-	-

Intersection						
Int Delay, s/veh	2.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	48	33	70	587	444	58
Future Vol, veh/h	48	33	70	587	444	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	52	36	76	638	483	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1305	515	546	0	-	0
Stage 1	515	-	-	-	-	-
Stage 2	790	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	177	560	1023	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	447	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	157	560	1023	-	-	-
Mov Cap-2 Maneuver	157	-	-	-	-	-
Stage 1	531	-	-	-	-	-
Stage 2	447	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.5	0.9	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1023	-	222	-	-
HCM Lane V/C Ratio	0.074	-	0.397	-	-
HCM Control Delay (s)	8.8	0	31.5	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.2	-	1.8	-	-

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	20	19	644	463	14
Future Vol, veh/h	13	20	19	644	463	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	14	22	21	700	503	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1253	511	518	0	-	0
Stage 1	511	-	-	-	-	-
Stage 2	742	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	190	563	1048	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	471	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	184	563	1048	-	-	-
Mov Cap-2 Maneuver	184	-	-	-	-	-
Stage 1	582	-	-	-	-	-
Stage 2	471	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1048	-	311	-	-
HCM Lane V/C Ratio	0.02	-	0.115	-	-
HCM Control Delay (s)	8.5	0	18.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	9	16	649	465	17
Future Vol, veh/h	14	9	16	649	465	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	15	10	17	705	505	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1253	514	523	0	-	0
Stage 1	514	-	-	-	-	-
Stage 2	739	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	190	560	1043	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	472	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	187	560	1043	-	-	-
Mov Cap-2 Maneuver	323	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	472	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1043	-	387	-	-
HCM Lane V/C Ratio	0.017	-	0.065	-	-
HCM Control Delay (s)	8.5	-	14.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

HCM 6th Signalized Intersection Summary
11: E Waiko Rd & Waiale Rd

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	120	0	52	166	330	0	283	33	217	219	41
Future Volume (veh/h)	55	120	0	52	166	330	0	283	33	217	219	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	130	0	57	180	295	0	308	32	236	238	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	259	633	0	551	215	352	361	388	40	388	660	111
Arrive On Green	0.05	0.34	0.00	0.05	0.34	0.34	0.00	0.23	0.23	0.13	0.42	0.42
Sat Flow, veh/h	1781	1870	0	1781	638	1045	1781	1666	173	1781	1561	262
Grp Volume(v), veh/h	60	130	0	57	0	475	0	0	340	236	0	278
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1682	1781	0	1839	1781	0	1823
Q Serve(g_s), s	1.5	3.5	0.0	1.4	0.0	18.4	0.0	0.0	12.3	6.6	0.0	7.3
Cycle Q Clear(g_c), s	1.5	3.5	0.0	1.4	0.0	18.4	0.0	0.0	12.3	6.6	0.0	7.3
Prop In Lane	1.00		0.00	1.00		0.62	1.00		0.09	1.00		0.14
Lane Grp Cap(c), veh/h	259	633	0	551	0	567	361	0	428	388	0	771
V/C Ratio(X)	0.23	0.21	0.00	0.10	0.00	0.84	0.00	0.00	0.79	0.61	0.00	0.36
Avail Cap(c_a), veh/h	311	1074	0	605	0	966	750	0	1056	554	0	1046
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.3	16.6	0.0	13.9	0.0	21.6	0.0	0.0	25.5	17.1	0.0	13.9
Incr Delay (d2), s/veh	0.5	0.2	0.0	0.1	0.0	3.4	0.0	0.0	3.4	1.5	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.5	0.0	0.6	0.0	7.4	0.0	0.0	5.5	2.7	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.8	16.8	0.0	14.0	0.0	25.0	0.0	0.0	28.9	18.7	0.0	14.2
LnGrp LOS	B	B	A	B	A	C	A	A	C	B	A	B
Approach Vol, veh/h		190			532			340			514	
Approach Delay, s/veh		16.8			23.8			28.9			16.2	
Approach LOS		B			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	20.9	7.9	28.4	0.0	34.3	8.0	28.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	40.5	5.5	40.5	15.5	40.5	5.5	40.5
Max Q Clear Time (g_c+I1), s	8.6	14.3	3.4	5.5	0.0	9.3	3.5	20.4
Green Ext Time (p_c), s	0.4	2.1	0.0	0.8	0.0	1.9	0.0	3.4

Intersection Summary			
HCM 6th Ctrl Delay			21.6
HCM 6th LOS			C

HCM 6th TWSC
12: Kuikahi Dr & Kehalani Village Center Dr

10/24/2023

Intersection	
Int Delay, s/veh	25.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	173	571	17	23	699	135	9	2	13	66	3	193
Future Vol, veh/h	173	571	17	23	699	135	9	2	13	66	3	193
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	188	621	18	25	760	147	10	2	14	72	3	210

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	908	0	0	639	0	0	1996	1964	630	1825	1826	761
Stage 1	-	-	-	-	-	-	1006	1006	-	811	811	-
Stage 2	-	-	-	-	-	-	990	958	-	1014	1015	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	750	-	-	945	-	-	45	63	482	~ 59	77	405
Stage 1	-	-	-	-	-	-	291	319	-	373	393	-
Stage 2	-	-	-	-	-	-	297	336	-	288	316	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	749	-	-	945	-	-	16	46	482	~ 44	56	405
Mov Cap-2 Maneuver	-	-	-	-	-	-	16	46	-	~ 44	56	-
Stage 1	-	-	-	-	-	-	218	239	-	279	382	-
Stage 2	-	-	-	-	-	-	138	327	-	207	237	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.2	183.5	159.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	18	482	749	-	-	945	-	-	44	405
HCM Lane V/C Ratio	0.664	0.029	0.251	-	-	0.026	-	-	1.705	0.518
HCM Control Delay (s)	$ 385.4	12.7	11.4	-	-	8.9	-	-	$ 541.8	23.1
HCM Lane LOS	F	B	B	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	1.8	0.1	1	-	-	0.1	-	-	7.6	2.9

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
13: Honoapiilani Hwy & Kehalani Pkwy

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	62	165	51	184	74	225	612	18	44	724	240
Future Volume (veh/h)	167	62	165	51	184	74	225	612	18	44	724	240
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	239	67	29	55	200	5	245	665	0	48	787	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	425	356	296	245	203	278	990		327	894	
Arrive On Green	0.13	0.23	0.23	0.04	0.13	0.13	0.08	0.53	0.00	0.03	0.48	0.00
Sat Flow, veh/h	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	239	67	29	55	200	5	245	665	0	48	787	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	16.0	3.5	1.8	3.2	12.6	0.3	8.1	31.4	0.0	1.6	45.8	0.0
Cycle Q Clear(g_c), s	16.0	3.5	1.8	3.2	12.6	0.3	8.1	31.4	0.0	1.6	45.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	284	425	356	296	245	203	278	990		327	894	
V/C Ratio(X)	0.84	0.16	0.08	0.19	0.82	0.02	0.88	0.67		0.15	0.88	
Avail Cap(c_a), veh/h	284	464	388	319	310	256	334	1208		341	1068	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.8	37.4	36.7	43.2	51.1	45.7	25.5	20.8	0.0	17.6	28.4	0.0
Incr Delay (d2), s/veh	18.9	0.1	0.0	0.1	10.1	0.0	18.2	1.9	0.0	0.1	9.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	1.6	0.7	1.4	6.6	0.1	4.7	13.4	0.0	0.7	21.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.7	37.5	36.8	43.3	61.1	45.8	43.7	22.7	0.0	17.7	37.6	0.0
LnGrp LOS	E	D	D	D	E	D	D	C		B	D	
Approach Vol, veh/h		335			260			910	A		835	A
Approach Delay, s/veh		51.9			57.1			28.3			36.4	
Approach LOS		D			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	70.0	9.4	32.5	15.2	63.7	21.0	20.8
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	78.0	6.0	30.0	14.0	69.0	16.0	20.0
Max Q Clear Time (g_c+I1), s	3.6	33.4	5.2	5.5	10.1	47.8	18.0	14.6
Green Ext Time (p_c), s	0.0	10.6	0.0	0.3	0.1	9.9	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	37.8
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	210	60	257	304	341	107	515	243	340	499	41
Future Volume (veh/h)	21	210	60	257	304	341	107	515	243	340	499	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	23	228	11	279	330	251	116	560	0	370	542	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	275	335	374	494	651	371	681		409	847	753
Arrive On Green	0.02	0.13	0.13	0.15	0.26	0.26	0.06	0.36	0.00	0.15	0.45	0.45
Sat Flow, veh/h	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	23	228	11	279	330	251	116	560	0	370	542	20
Grp Sat Flow(s),veh/h/ln	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	1.0	11.2	0.5	13.4	16.4	11.5	4.2	28.3	0.0	12.8	23.3	0.7
Cycle Q Clear(g_c), s	1.0	11.2	0.5	13.4	16.4	11.5	4.2	28.3	0.0	12.8	23.3	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	239	275	335	374	494	651	371	681		409	847	753
V/C Ratio(X)	0.10	0.83	0.03	0.75	0.67	0.39	0.31	0.82		0.90	0.64	0.03
Avail Cap(c_a), veh/h	287	496	522	578	862	963	507	1077		592	1293	1130
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.5	44.0	34.3	30.7	34.2	21.5	19.7	30.1	0.0	21.2	22.0	14.5
Incr Delay (d2), s/veh	0.2	2.5	0.0	3.0	0.6	0.1	0.2	5.5	0.0	10.4	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	5.9	0.2	6.1	7.5	4.3	1.7	13.3	0.0	6.1	10.1	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.7	46.4	34.3	33.7	34.8	21.6	19.9	35.6	0.0	31.6	23.7	14.5
LnGrp LOS	D	D	C	C	C	C	B	D		C	C	B
Approach Vol, veh/h		262			860			676	A		932	
Approach Delay, s/veh		45.2			30.6			32.9			26.6	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.3	43.9	21.1	18.9	11.1	53.2	7.4	32.5
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	26.0	60.0	28.0	25.0	14.0	72.0	5.0	48.0
Max Q Clear Time (g_c+I1), s	14.8	30.3	15.4	13.2	6.2	25.3	3.0	18.4
Green Ext Time (p_c), s	0.4	7.6	0.7	0.7	0.1	8.4	0.0	1.9

Intersection Summary	
HCM 6th Ctrl Delay	31.2
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St

10/24/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	31	57	776	644	125
Future Volume (veh/h)	95	31	57	776	644	125
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	103	1	62	843	700	83
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	223	198	384	1207	903	764
Arrive On Green	0.13	0.13	0.06	0.65	0.48	0.48
Sat Flow, veh/h	1781	1585	1781	1870	1870	1583
Grp Volume(v), veh/h	103	1	62	843	700	83
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1583
Q Serve(g_s), s	2.6	0.0	0.7	13.9	14.8	1.4
Cycle Q Clear(g_c), s	2.6	0.0	0.7	13.9	14.8	1.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	223	198	384	1207	903	764
V/C Ratio(X)	0.46	0.01	0.16	0.70	0.78	0.11
Avail Cap(c_a), veh/h	1114	992	799	3511	2769	2345
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.5	18.4	7.5	5.5	10.3	6.8
Incr Delay (d2), s/veh	1.5	0.0	0.2	0.7	1.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.2	3.1	4.9	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.0	18.4	7.7	6.2	11.7	6.8
LnGrp LOS	C	B	A	A	B	A
Approach Vol, veh/h	104			905	783	
Approach Delay, s/veh	20.9			6.3	11.2	
Approach LOS	C			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	7.8	29.1	11.0	37.0
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	2.7	16.8	4.6	15.9
Green Ext Time (p_c), s	0.1	6.3	0.3	8.3

Intersection Summary	
HCM 6th Ctrl Delay	9.3
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	7	3	78	12	101	9	718	90	82	580	23
Future Volume (veh/h)	13	7	3	78	12	101	9	718	90	82	580	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	8	1	85	13	74	10	780	95	89	630	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	187	91	220	162	28	91	484	987	120	342	1207	1022
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.01	0.60	0.60	0.05	0.65	0.65
Sat Flow, veh/h	809	657	1585	672	200	659	1781	1635	199	1781	1870	1584
Grp Volume(v), veh/h	22	0	1	172	0	0	10	0	875	89	630	15
Grp Sat Flow(s),veh/h/ln	1465	0	1585	1531	0	0	1781	0	1834	1781	1870	1584
Q Serve(g_s), s	0.0	0.0	0.0	7.5	0.0	0.0	0.2	0.0	28.5	1.4	14.2	0.3
Cycle Q Clear(g_c), s	0.8	0.0	0.0	8.5	0.0	0.0	0.2	0.0	28.5	1.4	14.2	0.3
Prop In Lane	0.64		1.00	0.49		0.43	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	278	0	220	281	0	0	484	0	1107	342	1207	1022
V/C Ratio(X)	0.08	0.00	0.00	0.61	0.00	0.00	0.02	0.00	0.79	0.26	0.52	0.01
Avail Cap(c_a), veh/h	541	0	503	550	0	0	779	0	1631	561	1663	1408
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.5	0.0	29.2	32.8	0.0	0.0	6.6	0.0	11.8	10.9	7.5	5.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	3.0	0.1	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.2	0.0	0.0	0.1	0.0	10.6	0.5	4.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.6	0.0	29.2	33.6	0.0	0.0	6.6	0.0	14.8	11.0	8.2	5.0
LnGrp LOS	C	A	C	C	A	A	A	A	B	B	A	A
Approach Vol, veh/h		23			172			885			734	
Approach Delay, s/veh		29.6			33.6			14.7			8.5	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	9.3	53.5	15.9	6.0	56.8	15.9
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	14.0	70.0	25.0	14.0	70.0	25.0
Max Q Clear Time (g_c+I1), s	3.4	30.5	2.8	2.2	16.2	10.5
Green Ext Time (p_c), s	0.1	17.0	0.0	0.0	11.1	0.5

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	118	16	70	178	145	15	3	36	109	17	24
Future Vol, veh/h	9	118	16	70	178	145	15	3	36	109	17	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	128	17	76	193	158	16	3	39	118	18	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	351	0	0	145	0	0	603	660	137	602	589	272
Stage 1	-	-	-	-	-	-	157	157	-	424	424	-
Stage 2	-	-	-	-	-	-	446	503	-	178	165	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1208	-	-	1437	-	-	411	383	911	412	421	767
Stage 1	-	-	-	-	-	-	845	768	-	608	587	-
Stage 2	-	-	-	-	-	-	591	541	-	824	762	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1208	-	-	1437	-	-	365	360	911	373	395	767
Mov Cap-2 Maneuver	-	-	-	-	-	-	365	360	-	373	395	-
Stage 1	-	-	-	-	-	-	838	762	-	603	556	-
Stage 2	-	-	-	-	-	-	523	512	-	779	756	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.4	11.6	17.2
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	607	1208	-	-	1437	-	-	373	552
HCM Lane V/C Ratio	0.097	0.008	-	-	0.053	-	-	0.318	0.081
HCM Control Delay (s)	11.6	8	-	-	7.6	-	-	19.1	12.1
HCM Lane LOS	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	1.3	0.3

Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	251	11	75	376	16	41
Future Vol, veh/h	251	11	75	376	16	41
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, %	-5	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	273	12	82	409	17	45

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	285	0	852	279
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	573	-
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	-	-	1277	-	330	760
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	564	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1277	-	303	760
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	517	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	12.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	534	-	-	1277	-
HCM Lane V/C Ratio	0.116	-	-	0.064	-
HCM Control Delay (s)	12.6	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-

APPENDIX C

LOS WORKSHEETS

Future Year Conditions WITH Waiale Extension WITH MAUI LANI PARKWAY Extension – AM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] %	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kamehameha Ave														
102	L2	211	2.0	222	2.0	1.062	77.2	LOS F	31.6	803.6	1.00	2.75	3.67	12.6
7	T1	191	2.0	201	2.0	1.062	74.5	LOS F	31.6	803.6	1.00	2.75	3.67	12.0
25	R2	104	2.0	109	2.0	1.062	74.5	LOS F	31.6	803.6	1.00	2.75	3.67	12.0
Approach		506	2.0	533	2.0	1.062	75.6	LOS F	31.6	803.6	1.00	2.75	3.67	12.2
East: WB Maui Lani Parkway														
19	L2	85	2.0	89	2.0	0.770	16.6	LOS C	10.4	263.6	1.00	1.40	1.59	19.0
336	T1	299	2.0	315	2.0	0.770	13.9	LOS B	10.4	263.6	1.00	1.40	1.59	17.8
24	R2	147	2.0	155	2.0	0.770	13.9	LOS B	10.4	263.6	1.00	1.40	1.59	17.8
Approach		531	2.0	559	2.0	0.770	14.3	LOS B	10.4	263.6	1.00	1.40	1.59	18.0
North: SB Kamehameha Ave														
15	L2	248	2.0	261	2.0	0.940	28.0	LOS D	22.1	560.7	1.00	1.90	2.29	17.3
2	T1	142	2.0	149	2.0	0.940	25.3	LOS D	22.1	560.7	1.00	1.90	2.29	16.3
40	R2	321	2.0	338	2.0	0.940	25.3	LOS D	22.1	560.7	1.00	1.90	2.29	16.3
Approach		711	2.0	748	2.0	0.940	26.2	LOS D	22.1	560.7	1.00	1.90	2.29	16.6
West: EB Maui Lani Parkway														
30	L2	302	2.0	318	2.0	0.994	34.0	LOS D	30.7	780.7	1.00	2.13	2.58	16.5
464	T1	366	2.0	385	2.0	0.994	31.3	LOS D	30.7	780.7	1.00	2.13	2.58	15.6
78	R2	155	2.0	163	2.0	0.994	31.3	LOS D	30.7	780.7	1.00	2.13	2.58	15.6
Approach		823	2.0	866	2.0	0.994	32.3	LOS D	30.7	780.7	1.00	2.13	2.58	15.9
All Vehicles		2571	2.0	2706	2.0	1.062	35.4	LOS E	31.6	803.6	1.00	2.04	2.51	15.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	176.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	88	3	166	18	16	10	185	462	8	2	613	111
Future Vol, veh/h	88	3	166	18	16	10	185	462	8	2	613	111
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	96	3	180	20	17	11	201	502	9	2	666	121
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	15.5	15.1	179.3	240.4
HCM LOS	C	C	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	29%	0%	100%	0%	41%	0%
Vol Thru, %	71%	0%	0%	2%	36%	84%
Vol Right, %	0%	100%	0%	98%	23%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	647	8	88	169	44	726
LT Vol	185	0	88	0	18	2
Through Vol	462	0	0	3	16	613
RT Vol	0	8	0	166	10	111
Lane Flow Rate	703	9	96	184	48	789
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.324	0.014	0.221	0.365	0.118	1.466
Departure Headway (Hd)	7.348	6.479	9.579	8.331	10.654	7.17
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	499	556	377	435	339	513
Service Time	5.048	4.179	7.279	6.031	8.654	5.17
HCM Lane V/C Ratio	1.409	0.016	0.255	0.423	0.142	1.538
HCM Control Delay	181.4	9.3	15	15.7	15.1	240.4
HCM Lane LOS	F	A	B	C	C	F
HCM 95th-tile Q	28.4	0	0.8	1.6	0.4	36.8

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Waiale Rd														
7	T1	511	2.0	538	2.0	0.751	4.6	LOS A	10.2	258.3	0.88	0.81	1.02	19.2
25	R2	247	2.0	260	2.0	0.751	4.6	LOS A	10.2	258.3	0.88	0.81	1.02	19.2
Approach		758	2.0	798	2.0	0.751	4.6	LOS A	10.2	258.3	0.88	0.81	1.02	19.2
East: WB Waiinu Rd														
19	L2	161	2.0	169	2.0	0.408	6.1	LOS A	3.0	75.9	0.79	0.74	0.79	20.6
24	R2	161	2.0	169	2.0	0.408	3.3	LOS A	3.0	75.9	0.79	0.74	0.79	19.2
Approach		322	2.0	339	2.0	0.408	4.7	LOS A	3.0	75.9	0.79	0.74	0.79	19.9
North: SB Waiale Rd														
15	L2	265	2.0	279	2.0	0.845	7.0	LOS A	15.1	384.6	0.94	0.73	1.03	20.4
2	T1	684	2.0	720	2.0	0.845	4.2	LOS A	15.1	384.6	0.94	0.73	1.03	19.0
Approach		949	2.0	999	2.0	0.845	5.0	LOS A	15.1	384.6	0.94	0.73	1.03	19.4
All Vehicles		2029	2.0	2136	2.0	0.845	4.8	LOS A	15.1	384.6	0.90	0.76	0.99	19.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection												
Int Delay, s/veh	56.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	144	0	23	6	1	7	19	875	13	7	494	170
Future Vol, veh/h	144	0	23	6	1	7	19	875	13	7	494	170
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	157	0	25	7	1	8	21	951	14	8	537	185

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1654	1659	633	1661	1744	961	725	0	0	968	0	0
Stage 1	649	649	-	1003	1003	-	-	-	-	-	-	-
Stage 2	1005	1010	-	658	741	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 78	98	480	77	86	311	878	-	-	712	-	-
Stage 1	458	466	-	292	320	-	-	-	-	-	-	-
Stage 2	291	317	-	453	423	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 71	91	479	69	79	310	875	-	-	710	-	-
Mov Cap-2 Maneuver	~ 71	91	-	69	79	-	-	-	-	-	-	-
Stage 1	433	456	-	276	302	-	-	-	-	-	-	-
Stage 2	268	300	-	421	414	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 586.8	41	0.2	0.1
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	875	-	-	71	479	115	710	-	-
HCM Lane V/C Ratio	0.024	-	-	2.205	0.052	0.132	0.011	-	-
HCM Control Delay (s)	9.2	0	-	$ 678.5	12.9	41	10.1	-	-
HCM Lane LOS	A	A	-	F	B	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	14.7	0.2	0.4	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	9.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	130	71	50	667	398	40
Future Vol, veh/h	130	71	50	667	398	40
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	141	77	54	725	433	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1291	458	479	0	-	0
Stage 1	458	-	-	-	-	-
Stage 2	833	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	180	603	1083	-	-	-
Stage 1	637	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	164	601	1080	-	-	-
Mov Cap-2 Maneuver	164	-	-	-	-	-
Stage 1	582	-	-	-	-	-
Stage 2	426	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	64.5	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1080	-	164	601	-	-
HCM Lane V/C Ratio	0.05	-	0.862	0.128	-	-
HCM Control Delay (s)	8.5	0	93.2	11.9	-	-
HCM Lane LOS	A	A	F	B	-	-
HCM 95th %tile Q(veh)	0.2	-	6	0.4	-	-

HCM 6th Signalized Intersection Summary
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	281	512	87	178	321	104	135	318	300	121	242	94
Future Volume (veh/h)	281	512	87	178	321	104	135	318	300	121	242	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	351	557	88	193	349	23	147	346	291	132	263	87
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	498	573	91	257	563	476	287	242	204	206	349	116
Arrive On Green	0.16	0.36	0.36	0.10	0.30	0.30	0.07	0.26	0.26	0.07	0.26	0.26
Sat Flow, veh/h	1781	1576	249	1781	1870	1580	1781	933	785	1781	1341	444
Grp Volume(v), veh/h	351	0	645	193	349	23	147	0	637	132	0	350
Grp Sat Flow(s),veh/h/ln	1781	0	1825	1781	1870	1580	1781	0	1718	1781	0	1784
Q Serve(g_s), s	12.3	0.0	33.5	7.1	15.4	1.0	5.8	0.0	25.0	5.1	0.0	17.4
Cycle Q Clear(g_c), s	12.3	0.0	33.5	7.1	15.4	1.0	5.8	0.0	25.0	5.1	0.0	17.4
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.46	1.00		0.25
Lane Grp Cap(c), veh/h	498	0	664	257	563	476	287	0	446	206	0	465
V/C Ratio(X)	0.70	0.00	0.97	0.75	0.62	0.05	0.51	0.00	1.43	0.64	0.00	0.75
Avail Cap(c_a), veh/h	698	0	664	309	563	476	287	0	446	315	0	575
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.6	0.0	30.1	24.0	28.9	23.8	25.2	0.0	35.6	26.3	0.0	32.7
Incr Delay (d2), s/veh	1.9	0.0	27.9	8.1	2.1	0.0	1.5	0.0	204.8	3.3	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	19.5	3.5	7.2	0.4	2.6	0.0	35.7	2.3	0.0	8.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	0.0	58.0	32.1	31.0	23.9	26.7	0.0	240.4	29.7	0.0	37.1
LnGrp LOS	C	A	E	C	C	C	C	A	F	C	A	D
Approach Vol, veh/h		996			565			784			482	
Approach Delay, s/veh		44.8			31.1			200.3			35.1	
Approach LOS		D			C			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	31.0	13.2	41.0	11.0	31.1	19.2	35.0
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	13.0	25.0	12.0	35.0	7.0	31.0	26.0	21.0
Max Q Clear Time (g_c+I1), s	7.1	27.0	9.1	35.5	7.8	19.4	14.3	17.4
Green Ext Time (p_c), s	0.1	0.0	0.1	0.0	0.0	1.7	0.9	0.7

Intersection Summary	
HCM 6th Ctrl Delay	83.5
HCM 6th LOS	F

HCM 6th TWSC
7: Waiale Rd & Kokololio St

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	131	21	4	591	465	39
Future Vol, veh/h	131	21	4	591	465	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	142	23	4	642	505	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1176	526	547	0	-	0
Stage 1	526	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	211	552	1022	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	520	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	210	552	1022	-	-	-
Mov Cap-2 Maneuver	210	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	520	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	46.5	0.1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1022	-	210	552	-	-
HCM Lane V/C Ratio	0.004	-	0.678	0.041	-	-
HCM Control Delay (s)	8.5	0	52.1	11.8	-	-
HCM Lane LOS	A	A	F	B	-	-
HCM 95th %tile Q(veh)	0	-	4.2	0.1	-	-

Intersection						
Int Delay, s/veh	3.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	78	17	500	467	32
Future Vol, veh/h	76	78	17	500	467	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	83	85	18	543	508	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1105	526	543	0	-	0
Stage 1	526	-	-	-	-	-
Stage 2	579	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	233	552	1026	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	227	552	1026	-	-	-
Mov Cap-2 Maneuver	227	-	-	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	560	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27.5	0.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1026	-	323	-	-
HCM Lane V/C Ratio	0.018	-	0.518	-	-
HCM Control Delay (s)	8.6	0	27.5	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.1	-	2.8	-	-

Intersection						
Int Delay, s/veh	1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	17	4	483	540	6
Future Vol, veh/h	34	17	4	483	540	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	37	18	4	525	587	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1124	591	594	0	-	0
Stage 1	591	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	227	507	982	-	-	-
Stage 1	553	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	226	507	982	-	-	-
Mov Cap-2 Maneuver	226	-	-	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	588	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.2	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	982	-	277	-	-
HCM Lane V/C Ratio	0.004	-	0.2	-	-
HCM Control Delay (s)	8.7	0	21.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.7	-	-

HCM 6th TWSC

10: Waiale Rd & Ohana Hana Loop

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	23	5	456	543	13
Future Vol, veh/h	31	23	5	456	543	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	34	25	5	496	590	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1103	597	604	0	-	0
Stage 1	597	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	234	503	974	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	233	503	974	-	-	-
Mov Cap-2 Maneuver	368	-	-	-	-	-
Stage 1	547	-	-	-	-	-
Stage 2	606	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	974	-	415	-	-
HCM Lane V/C Ratio	0.006	-	0.141	-	-
HCM Control Delay (s)	8.7	-	15.1	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

HCM 6th Signalized Intersection Summary

11: E Waiko Rd & Waiale Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	259	0	20	70	130	0	267	45	319	167	79
Future Volume (veh/h)	65	259	0	20	70	130	0	267	45	319	167	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	282	0	22	76	81	0	290	41	347	182	73
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	354	387	0	256	142	152	418	396	56	539	649	260
Arrive On Green	0.06	0.21	0.00	0.03	0.17	0.17	0.00	0.25	0.25	0.18	0.51	0.51
Sat Flow, veh/h	1781	1870	0	1781	828	883	1781	1603	227	1781	1270	509
Grp Volume(v), veh/h	71	282	0	22	0	157	0	0	331	347	0	255
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1711	1781	0	1830	1781	0	1779
Q Serve(g_s), s	1.7	7.4	0.0	0.5	0.0	4.4	0.0	0.0	8.8	6.8	0.0	4.3
Cycle Q Clear(g_c), s	1.7	7.4	0.0	0.5	0.0	4.4	0.0	0.0	8.8	6.8	0.0	4.3
Prop In Lane	1.00		0.00	1.00		0.52	1.00		0.12	1.00		0.29
Lane Grp Cap(c), veh/h	354	387	0	256	0	294	418	0	452	539	0	909
V/C Ratio(X)	0.20	0.73	0.00	0.09	0.00	0.53	0.00	0.00	0.73	0.64	0.00	0.28
Avail Cap(c_a), veh/h	431	904	0	395	0	827	938	0	1925	744	0	1872
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.3	19.5	0.0	17.5	0.0	19.9	0.0	0.0	18.3	11.1	0.0	7.4
Incr Delay (d2), s/veh	0.3	2.6	0.0	0.1	0.0	1.5	0.0	0.0	2.3	1.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	3.3	0.0	0.2	0.0	1.8	0.0	0.0	3.6	2.4	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.6	22.2	0.0	17.6	0.0	21.4	0.0	0.0	20.6	12.3	0.0	7.5
LnGrp LOS	B	C	A	B	A	C	A	A	C	B	A	A
Approach Vol, veh/h		353			179			331			602	
Approach Delay, s/veh		21.0			20.9			20.6			10.3	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.9	17.5	5.9	15.4	0.0	31.4	7.7	13.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	55.5	5.5	25.5	15.5	55.5	5.5	25.5
Max Q Clear Time (g_c+I1), s	8.8	10.8	2.5	9.4	0.0	6.3	3.7	6.4
Green Ext Time (p_c), s	0.6	2.2	0.0	1.5	0.0	1.8	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	16.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
12: Kuikahi Dr & Kehalani Village Center Dr

Intersection												
Int Delay, s/veh	9.3											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	151	826	7	9	463	71	17	3	26	39	1	121
Future Vol, veh/h	151	826	7	9	463	71	17	3	26	39	1	121
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	164	898	8	10	503	77	18	3	28	42	1	132

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	581	0	0	906	0	0	1858	1831	902	1770	1758	504
Stage 1	-	-	-	-	-	-	1230	1230	-	524	524	-
Stage 2	-	-	-	-	-	-	628	601	-	1246	1234	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	993	-	-	751	-	-	56	76	336	65	85	568
Stage 1	-	-	-	-	-	-	217	250	-	537	530	-
Stage 2	-	-	-	-	-	-	471	489	-	213	249	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	992	-	-	751	-	-	37	63	336	49	70	567
Mov Cap-2 Maneuver	-	-	-	-	-	-	37	63	-	49	70	-
Stage 1	-	-	-	-	-	-	181	209	-	448	523	-
Stage 2	-	-	-	-	-	-	356	482	-	160	208	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.2	87.5	66.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	39	336	992	-	-	751	-	-	49	567
HCM Lane V/C Ratio	0.557	0.084	0.165	-	-	0.013	-	-	0.887	0.232
HCM Control Delay (s)	179.6	16.7	9.3	-	-	9.9	-	-	226.3	13.3
HCM Lane LOS	F	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	2	0.3	0.6	-	-	0	-	-	3.7	0.9

HCM 6th Signalized Intersection Summary
13: Honoapiilani Hwy & Kehalani Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	319	188	410	44	188	96	233	611	14	40	557	108
Future Volume (veh/h)	319	188	410	44	188	96	233	611	14	40	557	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	456	204	231	48	204	5	253	664	0	43	605	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	474	685	579	247	229	192	275	817		194	680	
Arrive On Green	0.28	0.37	0.37	0.03	0.12	0.12	0.10	0.44	0.00	0.03	0.36	0.00
Sat Flow, veh/h	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	456	204	231	48	204	5	253	664	0	43	605	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1581	1781	1870	1572	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	39.5	11.8	16.5	3.6	16.4	0.4	13.2	47.3	0.0	2.3	46.4	0.0
Cycle Q Clear(g_c), s	39.5	11.8	16.5	3.6	16.4	0.4	13.2	47.3	0.0	2.3	46.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	474	685	579	247	229	192	275	817		194	680	
V/C Ratio(X)	0.96	0.30	0.40	0.19	0.89	0.03	0.92	0.81		0.22	0.89	
Avail Cap(c_a), veh/h	551	797	674	249	245	206	329	1030		203	846	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.4	34.4	35.9	56.1	65.9	58.9	34.2	37.5	0.0	33.5	45.7	0.0
Incr Delay (d2), s/veh	26.2	0.1	0.2	0.1	28.4	0.0	25.5	5.6	0.0	0.2	12.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.0	5.6	6.6	1.6	9.7	0.2	7.5	22.4	0.0	1.0	23.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.6	34.4	36.0	56.2	94.4	59.0	59.8	43.1	0.0	33.7	57.7	0.0
LnGrp LOS	E	C	D	E	F	E	E	D		C	E	
Approach Vol, veh/h		891			257			917	A		648	A
Approach Delay, s/veh		50.8			86.5			47.7			56.1	
Approach LOS		D			F			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	72.6	9.8	60.9	20.4	61.4	47.1	23.6
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	84.0	5.0	65.0	20.0	69.0	50.0	20.0
Max Q Clear Time (g_c+I1), s	4.3	49.3	5.6	18.5	15.2	48.4	41.5	18.4
Green Ext Time (p_c), s	0.0	9.9	0.0	1.2	0.2	7.0	0.6	0.1

Intersection Summary	
HCM 6th Ctrl Delay	54.4
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	302	131	194	107	298	30	491	265	381	614	20
Future Volume (veh/h)	64	302	131	194	107	298	30	491	265	381	614	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	328	42	211	116	210	33	534	0	414	667	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	402	377	368	293	473	675	274	643		445	914	839
Arrive On Green	0.04	0.18	0.18	0.11	0.25	0.25	0.03	0.34	0.00	0.17	0.49	0.49
Sat Flow, veh/h	1968	2067	1742	1781	1870	1579	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	70	328	42	211	116	210	33	534	0	414	667	10
Grp Sat Flow(s),veh/h/ln	1968	2067	1742	1781	1870	1579	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	3.2	17.2	2.2	10.3	5.5	9.8	1.3	29.3	0.0	16.9	31.6	0.3
Cycle Q Clear(g_c), s	3.2	17.2	2.2	10.3	5.5	9.8	1.3	29.3	0.0	16.9	31.6	0.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	402	377	368	293	473	675	274	643		445	914	839
V/C Ratio(X)	0.17	0.87	0.11	0.72	0.25	0.31	0.12	0.83		0.93	0.73	0.01
Avail Cap(c_a), veh/h	409	574	534	349	704	870	446	1005		646	1307	1172
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.9	44.4	35.6	32.0	33.2	21.1	23.5	33.6	0.0	24.6	22.7	12.4
Incr Delay (d2), s/veh	0.2	6.2	0.1	5.7	0.1	0.1	0.1	6.3	0.0	12.9	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	9.5	0.9	4.9	2.5	3.7	0.6	14.0	0.0	8.3	13.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.1	50.5	35.7	37.7	33.3	21.2	23.6	39.9	0.0	37.5	25.1	12.4
LnGrp LOS	D	D	D	D	C	C	C	D		D	C	B
Approach Vol, veh/h		440			537			567	A		1091	
Approach Delay, s/veh		46.6			30.3			39.0			29.7	
Approach LOS		D			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.4	44.4	17.5	25.3	8.2	60.6	9.6	33.2
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	32.0	60.0	16.0	31.0	14.0	78.0	5.0	42.0
Max Q Clear Time (g_c+I1), s	18.9	31.3	12.3	19.2	3.3	33.6	5.2	11.8
Green Ext Time (p_c), s	0.5	7.1	0.2	1.1	0.0	11.1	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	34.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	153	88	18	582	839	62
Future Volume (veh/h)	153	88	18	582	839	62
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	166	10	20	633	912	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	224	199	278	1294	1095	928
Arrive On Green	0.13	0.13	0.02	0.69	0.59	0.59
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	166	10	20	633	912	49
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	5.4	0.3	0.2	9.5	23.8	0.8
Cycle Q Clear(g_c), s	5.4	0.3	0.2	9.5	23.8	0.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	224	199	278	1294	1095	928
V/C Ratio(X)	0.74	0.05	0.07	0.49	0.83	0.05
Avail Cap(c_a), veh/h	886	788	650	2790	2201	1865
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.4	23.2	9.6	4.3	10.1	5.3
Incr Delay (d2), s/veh	4.8	0.1	0.1	0.3	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.1	0.1	2.3	7.8	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	30.2	23.3	9.7	4.6	11.8	5.4
LnGrp LOS	C	C	A	A	B	A
Approach Vol, veh/h	176			653	961	
Approach Delay, s/veh	29.8			4.8	11.5	
Approach LOS	C			A	B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	6.4	41.3	12.6	47.8
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	14.0	71.0	30.0	90.0
Max Q Clear Time (g_c+I1), s	2.2	25.8	7.4	11.5
Green Ext Time (p_c), s	0.0	9.5	0.5	5.2

Intersection Summary	
HCM 6th Ctrl Delay	10.9
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	13	6	86	8	55	4	516	92	187	732	6
Future Volume (veh/h)	20	13	6	86	8	55	4	516	92	187	732	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	14	0	93	9	40	4	561	93	203	796	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	209	110	204	218	22	55	334	815	135	464	1117	947
Arrive On Green	0.13	0.13	0.00	0.13	0.13	0.13	0.01	0.52	0.52	0.08	0.60	0.60
Sat Flow, veh/h	866	854	1585	917	168	425	1781	1564	259	1781	1870	1585
Grp Volume(v), veh/h	36	0	0	142	0	0	4	0	654	203	796	4
Grp Sat Flow(s),veh/h/ln	1721	0	1585	1510	0	0	1781	0	1824	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	4.3	0.0	0.0	0.1	0.0	15.9	2.8	17.8	0.1
Cycle Q Clear(g_c), s	1.0	0.0	0.0	5.3	0.0	0.0	0.1	0.0	15.9	2.8	17.8	0.1
Prop In Lane	0.61		1.00	0.65		0.28	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	318	0	204	294	0	0	334	0	950	464	1117	947
V/C Ratio(X)	0.11	0.00	0.00	0.48	0.00	0.00	0.01	0.00	0.69	0.44	0.71	0.00
Avail Cap(c_a), veh/h	761	0	666	722	0	0	744	0	2146	737	2201	1865
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	0.0	24.8	0.0	0.0	8.2	0.0	10.6	8.1	8.4	4.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	0.0	0.0	1.9	0.2	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.9	0.0	0.0	0.0	0.0	5.6	0.8	5.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	0.0	0.0	25.3	0.0	0.0	8.2	0.0	12.6	8.3	10.2	4.8
LnGrp LOS	C	A	A	C	A	A	A	A	B	A	B	A
Approach Vol, veh/h		36			142			658			1003	
Approach Delay, s/veh		23.1			25.3			12.5			9.8	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.9	37.0		12.6	5.3	41.5		12.6
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0
Max Q Clear Time (g_c+I1), s	4.8	17.9		3.0	2.1	19.8		7.3
Green Ext Time (p_c), s	0.2	11.6		0.1	0.0	15.8		0.5

Intersection Summary		
HCM 6th Ctrl Delay		12.2
HCM 6th LOS		B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
17: Kehalani Mauka Pkwy & Kuikahi Dr

10/24/2023

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	180	9	18	86	74	10	7	72	174	5	32
Future Vol, veh/h	28	180	9	18	86	74	10	7	72	174	5	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	196	10	20	93	80	11	8	78	189	5	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	173	0	0	206	0	0	454	474	201	477	439	133
Stage 1	-	-	-	-	-	-	261	261	-	173	173	-
Stage 2	-	-	-	-	-	-	193	213	-	304	266	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1404	-	-	1365	-	-	516	489	840	498	512	916
Stage 1	-	-	-	-	-	-	744	692	-	829	756	-
Stage 2	-	-	-	-	-	-	809	726	-	705	689	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1404	-	-	1365	-	-	479	471	840	434	494	916
Mov Cap-2 Maneuver	-	-	-	-	-	-	479	471	-	434	494	-
Stage 1	-	-	-	-	-	-	728	677	-	812	745	-
Stage 2	-	-	-	-	-	-	761	715	-	619	675	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.8	10.7	17.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	733	1404	-	-	1365	-	-	434	821
HCM Lane V/C Ratio	0.132	0.022	-	-	0.014	-	-	0.436	0.049
HCM Control Delay (s)	10.7	7.6	-	-	7.7	-	-	19.5	9.6
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	2.2	0.2

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	416	10	16	156	20	65
Future Vol, veh/h	416	10	16	156	20	65
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, %	-5	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	452	11	17	170	22	71

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	463	0	662	458
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	204	-
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	-	-	1098	-	427	603
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	830	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1098	-	420	603
Mov Cap-2 Maneuver	-	-	-	-	420	-
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	816	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	12.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	547	-	-	1098	-
HCM Lane V/C Ratio	0.169	-	-	0.016	-
HCM Control Delay (s)	12.9	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C

LOS WORKSHEETS

Future Year Conditions WITH Waiale Extension WITH MAUI LANI PARKWAY Extension – PM Peak Hour

MOVEMENT SUMMARY

Site: 101 [Maui Lani Parkway/Kamehameha Avenue (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB Kamehameha Ave															
102	L2	All MCs	159	2.0	159	2.0	0.753	23.8	LOS C	9.0	228.9	1.00	1.30	1.60	16.7
7	T1	All MCs	116	2.0	116	2.0	0.753	21.1	LOS C	9.0	228.9	1.00	1.30	1.60	16.8
25	R2	All MCs	75	2.0	75	2.0	0.753	21.1	LOS C	9.0	228.9	1.00	1.30	1.60	16.8
Approach			349	2.0	349	2.0	0.753	22.3	LOS C	9.0	228.9	1.00	1.30	1.60	16.7
East: WB Maui Lani Parkway															
19	L2	All MCs	78	2.0	78	2.0	1.142	86.7	LOS F	50.9	1292.5	1.00	3.67	4.83	11.5
336	T1	All MCs	492	2.0	492	2.0	1.142	84.0	LOS F	50.9	1292.5	1.00	3.67	4.83	11.5
24	R2	All MCs	267	2.0	267	2.0	1.142	84.0	LOS F	50.9	1292.5	1.00	3.67	4.83	11.5
Approach			837	2.0	837	2.0	1.142	84.3	LOS F	50.9	1292.5	1.00	3.67	4.83	11.5
North: SB Kamehameha Ave															
15	L2	All MCs	175	2.0	175	2.0	1.081	63.4	LOS F	39.8	1011.0	1.00	2.98	3.82	13.0
2	T1	All MCs	160	2.0	160	2.0	1.081	60.7	LOS F	39.8	1011.0	1.00	2.98	3.82	13.0
40	R2	All MCs	460	2.0	460	2.0	1.081	60.7	LOS F	39.8	1011.0	1.00	2.98	3.82	13.0
Approach			795	2.0	795	2.0	1.081	61.3	LOS F	39.8	1011.0	1.00	2.98	3.82	13.0
West: EB Maui Lani Parkway															
30	L2	All MCs	456	2.0	456	2.0	1.101	62.5	LOS F	54.5	1383.5	1.00	3.14	3.65	13.1
464	T1	All MCs	422	2.0	422	2.0	1.101	59.8	LOS F	54.5	1383.5	1.00	3.14	3.65	13.1
78	R2	All MCs	199	2.0	199	2.0	1.101	59.8	LOS F	54.5	1383.5	1.00	3.14	3.65	13.1
Approach			1077	2.0	1077	2.0	1.101	61.0	LOS F	54.5	1383.5	1.00	3.14	3.65	13.1
All Vehicles			3058	2.0	3058	2.0	1.142	63.0	LOS F	54.5	1383.5	1.00	3.03	3.78	12.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	204.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	10	224	16	4	8	118	531	23	8	708	69
Future Vol, veh/h	60	10	224	16	4	8	118	531	23	8	708	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	11	243	17	4	9	128	577	25	9	770	75
Number of Lanes	1	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	18.1	15.2	180.2	302.8
HCM LOS	C	C	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	18%	0%	100%	0%	57%	1%
Vol Thru, %	82%	0%	0%	4%	14%	90%
Vol Right, %	0%	100%	0%	96%	29%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	649	23	60	234	28	785
LT Vol	118	0	60	0	16	8
Through Vol	531	0	0	10	4	708
RT Vol	0	23	0	224	8	69
Lane Flow Rate	705	25	65	254	30	853
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	1.334	0.042	0.15	0.501	0.077	1.61
Departure Headway (Hd)	7.537	6.719	9.624	8.391	11.231	7.279
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	487	536	375	432	321	503
Service Time	5.237	4.419	7.324	6.091	9.231	5.279
HCM Lane V/C Ratio	1.448	0.047	0.173	0.588	0.093	1.696
HCM Control Delay	186.2	9.7	14	19.2	15.2	302.8
HCM Lane LOS	F	A	B	C	C	F
HCM 95th-tile Q	28.4	0.1	0.5	2.7	0.2	44.4

MOVEMENT SUMMARY

Site: 101 [Waiale Rd/Waiinu Rd (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB Waiale Rd															
7	T1	All MCs	538	2.0	538	2.0	0.752	4.6	LOS A	10.1	256.9	0.88	0.72	1.02	19.2
25	R2	All MCs	259	2.0	259	2.0	0.752	4.6	LOS A	10.1	256.9	0.88	0.72	1.02	19.2
Approach			797	2.0	797	2.0	0.752	4.6	LOS A	10.1	256.9	0.88	0.72	1.02	19.2
East: WB Waiinu Rd															
19	L2	All MCs	169	2.0	169	2.0	0.410	6.1	LOS A	3.0	75.7	0.79	0.63	0.79	19.2
24	R2	All MCs	169	2.0	169	2.0	0.410	3.4	LOS A	3.0	75.7	0.79	0.63	0.79	19.2
Approach			339	2.0	339	2.0	0.410	4.7	LOS A	3.0	75.7	0.79	0.63	0.79	19.2
North: SB Waiale Rd															
15	L2	All MCs	279	2.0	279	2.0	0.846	6.9	LOS A	15.0	382.1	0.94	0.67	1.03	19.0
2	T1	All MCs	720	2.0	720	2.0	0.846	4.2	LOS A	15.0	382.1	0.94	0.67	1.03	19.0
Approach			999	2.0	999	2.0	0.846	5.0	LOS A	15.0	382.1	0.94	0.67	1.03	19.0
All Vehicles			2135	2.0	2135	2.0	0.846	4.8	LOS A	15.0	382.1	0.90	0.68	0.99	19.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Int Delay, s/veh	13

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	81	0	20	3	1	19	32	645	2	5	615	230
Future Vol, veh/h	81	0	20	3	1	19	32	645	2	5	615	230
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	3	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	0	22	3	1	21	35	701	2	5	668	250

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1589	1582	796	1589	1706	705	921	0	0	706	0	0
Stage 1	806	806	-	775	775	-	-	-	-	-	-	-
Stage 2	783	776	-	814	931	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 87	109	387	87	91	436	741	-	-	892	-	-
Stage 1	376	395	-	391	408	-	-	-	-	-	-	-
Stage 2	387	407	-	372	346	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 76	99	386	76	82	435	739	-	-	889	-	-
Mov Cap-2 Maneuver	~ 76	99	-	76	82	-	-	-	-	-	-	-
Stage 1	346	389	-	359	375	-	-	-	-	-	-	-
Stage 2	339	374	-	347	341	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	202.8	21.7	0.5	0.1
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	739	-	-	76	386	241	889	-	-
HCM Lane V/C Ratio	0.047	-	-	1.158	0.056	0.104	0.006	-	-
HCM Control Delay (s)	10.1	0	-	249.2	14.9	21.7	9.1	-	-
HCM Lane LOS	B	A	-	F	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	6.5	0.2	0.3	0	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
5: Waiale Rd & Kaupo St

10/24/2023

Intersection						
Int Delay, s/veh	3.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	64	56	540	468	60
Future Vol, veh/h	76	64	56	540	468	60
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	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	83	70	61	587	509	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1254	545	577	0	-	0
Stage 1	545	-	-	-	-	-
Stage 2	709	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	190	538	996	-	-	-
Stage 1	581	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	172	536	993	-	-	-
Mov Cap-2 Maneuver	172	-	-	-	-	-
Stage 1	526	-	-	-	-	-
Stage 2	487	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	29.6	0.8	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	993	-	172	536	-	-
HCM Lane V/C Ratio	0.061	-	0.48	0.13	-	-
HCM Control Delay (s)	8.9	0	43.9	12.7	-	-
HCM Lane LOS	A	A	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2.3	0.4	-	-

HCM 6th Signalized Intersection Summary
6: Waiale Rd & Kuikahi Dr/Maui Lani Pkwy

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	420	73	275	558	133	125	284	259	120	254	137
Future Volume (veh/h)	179	420	73	275	558	133	125	284	259	120	254	137
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	224	457	74	299	607	42	136	309	254	130	276	133
Peak Hour Factor	0.80	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	270	496	80	329	649	549	281	313	258	157	384	185
Arrive On Green	0.10	0.32	0.32	0.13	0.35	0.35	0.06	0.33	0.33	0.05	0.32	0.32
Sat Flow, veh/h	1781	1570	254	1781	1870	1583	1781	949	780	1781	1192	574
Grp Volume(v), veh/h	224	0	531	299	607	42	136	0	563	130	0	409
Grp Sat Flow(s),veh/h/ln	1781	0	1824	1781	1870	1583	1781	0	1729	1781	0	1766
Q Serve(g_s), s	9.9	0.0	33.1	13.3	37.0	2.1	6.0	0.0	38.2	5.8	0.0	24.1
Cycle Q Clear(g_c), s	9.9	0.0	33.1	13.3	37.0	2.1	6.0	0.0	38.2	5.8	0.0	24.1
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.45	1.00		0.33
Lane Grp Cap(c), veh/h	270	0	577	329	649	549	281	0	571	157	0	568
V/C Ratio(X)	0.83	0.00	0.92	0.91	0.94	0.08	0.48	0.00	0.99	0.83	0.00	0.72
Avail Cap(c_a), veh/h	328	0	618	394	697	590	281	0	571	157	0	568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.5	0.0	38.9	28.4	37.3	25.9	27.3	0.0	39.3	31.2	0.0	35.3
Incr Delay (d2), s/veh	13.9	0.0	18.6	22.0	19.3	0.1	1.3	0.0	33.9	28.8	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	17.8	7.6	20.3	0.8	2.7	0.0	21.5	3.8	0.0	11.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.4	0.0	57.5	50.4	56.6	25.9	28.6	0.0	73.2	60.0	0.0	39.7
LnGrp LOS	D	A	E	D	E	C	C	A	E	E	A	D
Approach Vol, veh/h		755			948			699			539	
Approach Delay, s/veh		53.0			53.3			64.5			44.6	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	45.0	19.7	43.3	11.0	44.0	16.1	46.9
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	6.0	39.0	20.0	40.0	7.0	38.0	16.0	44.0
Max Q Clear Time (g_c+I1), s	7.8	40.2	15.3	35.1	8.0	26.1	11.9	39.0
Green Ext Time (p_c), s	0.0	0.0	0.4	1.6	0.0	2.1	0.2	1.9

Intersection Summary		
HCM 6th Ctrl Delay		54.3
HCM 6th LOS		D

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	15	32	599	499	70
Future Vol, veh/h	55	15	32	599	499	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
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	60	16	35	651	542	76

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1301	580	618	0	-	0
Stage 1	580	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	178	514	962	-	-	-
Stage 1	560	-	-	-	-	-
Stage 2	482	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	168	514	962	-	-	-
Mov Cap-2 Maneuver	168	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	482	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.3	0.5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	962	-	168	514	-	-
HCM Lane V/C Ratio	0.036	-	0.356	0.032	-	-
HCM Control Delay (s)	8.9	0	37.8	12.2	-	-
HCM Lane LOS	A	A	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	0.1	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	48	33	70	587	444	58
Future Vol, veh/h	48	33	70	587	444	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	52	36	76	638	483	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1305	515	546	0	-	0
Stage 1	515	-	-	-	-	-
Stage 2	790	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	177	560	1023	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	447	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	157	560	1023	-	-	-
Mov Cap-2 Maneuver	157	-	-	-	-	-
Stage 1	531	-	-	-	-	-
Stage 2	447	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.5	0.9	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1023	-	222	-	-
HCM Lane V/C Ratio	0.074	-	0.397	-	-
HCM Control Delay (s)	8.8	0	31.5	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.2	-	1.8	-	-

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	20	19	644	463	14
Future Vol, veh/h	13	20	19	644	463	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	14	22	21	700	503	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1253	511	518	0	-	0
Stage 1	511	-	-	-	-	-
Stage 2	742	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	190	563	1048	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	471	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	184	563	1048	-	-	-
Mov Cap-2 Maneuver	184	-	-	-	-	-
Stage 1	582	-	-	-	-	-
Stage 2	471	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1048	-	311	-	-
HCM Lane V/C Ratio	0.02	-	0.115	-	-
HCM Control Delay (s)	8.5	0	18.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	9	16	649	465	17
Future Vol, veh/h	14	9	16	649	465	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	-	-
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	15	10	17	705	505	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1253	514	523	0	-	0
Stage 1	514	-	-	-	-	-
Stage 2	739	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	190	560	1043	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	472	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	187	560	1043	-	-	-
Mov Cap-2 Maneuver	323	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	472	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1043	-	387	-	-
HCM Lane V/C Ratio	0.017	-	0.065	-	-
HCM Control Delay (s)	8.5	-	14.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

HCM 6th Signalized Intersection Summary
11: E Waiko Rd & Waiale Rd

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	55	120	0	52	166	330	0	283	33	217	219	41
Future Volume (veh/h)	55	120	0	52	166	330	0	283	33	217	219	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	130	0	57	180	295	0	308	32	236	238	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	259	633	0	551	215	352	361	388	40	388	660	111
Arrive On Green	0.05	0.34	0.00	0.05	0.34	0.34	0.00	0.23	0.23	0.13	0.42	0.42
Sat Flow, veh/h	1781	1870	0	1781	638	1045	1781	1666	173	1781	1561	262
Grp Volume(v), veh/h	60	130	0	57	0	475	0	0	340	236	0	278
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1682	1781	0	1839	1781	0	1823
Q Serve(g_s), s	1.5	3.5	0.0	1.4	0.0	18.4	0.0	0.0	12.3	6.6	0.0	7.3
Cycle Q Clear(g_c), s	1.5	3.5	0.0	1.4	0.0	18.4	0.0	0.0	12.3	6.6	0.0	7.3
Prop In Lane	1.00		0.00	1.00		0.62	1.00		0.09	1.00		0.14
Lane Grp Cap(c), veh/h	259	633	0	551	0	567	361	0	428	388	0	771
V/C Ratio(X)	0.23	0.21	0.00	0.10	0.00	0.84	0.00	0.00	0.79	0.61	0.00	0.36
Avail Cap(c_a), veh/h	311	1074	0	605	0	966	750	0	1056	554	0	1046
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.3	16.6	0.0	13.9	0.0	21.6	0.0	0.0	25.5	17.1	0.0	13.9
Incr Delay (d2), s/veh	0.5	0.2	0.0	0.1	0.0	3.4	0.0	0.0	3.4	1.5	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.5	0.0	0.6	0.0	7.4	0.0	0.0	5.5	2.7	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.8	16.8	0.0	14.0	0.0	25.0	0.0	0.0	28.9	18.7	0.0	14.2
LnGrp LOS	B	B	A	B	A	C	A	A	C	B	A	B
Approach Vol, veh/h		190			532			340			514	
Approach Delay, s/veh		16.8			23.8			28.9			16.2	
Approach LOS		B			C			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.4	20.9	7.9	28.4	0.0	34.3	8.0	28.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	15.5	40.5	5.5	40.5	15.5	40.5	5.5	40.5				
Max Q Clear Time (g_c+I1), s	8.6	14.3	3.4	5.5	0.0	9.3	3.5	20.4				
Green Ext Time (p_c), s	0.4	2.1	0.0	0.8	0.0	1.9	0.0	3.4				
Intersection Summary												
HCM 6th Ctrl Delay			21.6									
HCM 6th LOS			C									

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
12: Kuikahi Dr & Kehalani Village Center Dr

10/24/2023

Intersection	
Int Delay, s/veh	25.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱		✣	↱		✣	↱
Traffic Vol, veh/h	173	571	17	23	699	135	9	2	13	66	3	193
Future Vol, veh/h	173	571	17	23	699	135	9	2	13	66	3	193
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	-	50	-	50	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	188	621	18	25	760	147	10	2	14	72	3	210

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	908	0	0	639	0	0	1996	1964	630	1825	1826	761
Stage 1	-	-	-	-	-	-	1006	1006	-	811	811	-
Stage 2	-	-	-	-	-	-	990	958	-	1014	1015	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	750	-	-	945	-	-	45	63	482	~ 59	77	405
Stage 1	-	-	-	-	-	-	291	319	-	373	393	-
Stage 2	-	-	-	-	-	-	297	336	-	288	316	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	749	-	-	945	-	-	16	46	482	~ 44	56	405
Mov Cap-2 Maneuver	-	-	-	-	-	-	16	46	-	~ 44	56	-
Stage 1	-	-	-	-	-	-	218	239	-	279	382	-
Stage 2	-	-	-	-	-	-	138	327	-	207	237	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.2	183.5	159.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	18	482	749	-	-	945	-	-	44	405
HCM Lane V/C Ratio	0.664	0.029	0.251	-	-	0.026	-	-	1.705	0.518
HCM Control Delay (s)	$ 385.4	12.7	11.4	-	-	8.9	-	-	$ 541.8	23.1
HCM Lane LOS	F	B	B	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	1.8	0.1	1	-	-	0.1	-	-	7.6	2.9

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
13: Honoapiilani Hwy & Kehalani Pkwy

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	62	165	51	184	74	225	612	18	44	724	240
Future Volume (veh/h)	167	62	165	51	184	74	225	612	18	44	724	240
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1567	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	239	67	29	55	200	5	245	665	0	48	787	0
Peak Hour Factor	0.70	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	425	356	296	245	203	278	990		327	894	
Arrive On Green	0.13	0.23	0.23	0.04	0.13	0.13	0.08	0.53	0.00	0.03	0.48	0.00
Sat Flow, veh/h	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	239	67	29	55	200	5	245	665	0	48	787	0
Grp Sat Flow(s),veh/h/ln	1493	1870	1564	1781	1870	1549	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	16.0	3.5	1.8	3.2	12.6	0.3	8.1	31.4	0.0	1.6	45.8	0.0
Cycle Q Clear(g_c), s	16.0	3.5	1.8	3.2	12.6	0.3	8.1	31.4	0.0	1.6	45.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	284	425	356	296	245	203	278	990		327	894	
V/C Ratio(X)	0.84	0.16	0.08	0.19	0.82	0.02	0.88	0.67		0.15	0.88	
Avail Cap(c_a), veh/h	284	464	388	319	310	256	334	1208		341	1068	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.8	37.4	36.7	43.2	51.1	45.7	25.5	20.8	0.0	17.6	28.4	0.0
Incr Delay (d2), s/veh	18.9	0.1	0.0	0.1	10.1	0.0	18.2	1.9	0.0	0.1	9.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	1.6	0.7	1.4	6.6	0.1	4.7	13.4	0.0	0.7	21.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.7	37.5	36.8	43.3	61.1	45.8	43.7	22.7	0.0	17.7	37.6	0.0
LnGrp LOS	E	D	D	D	E	D	D	C		B	D	
Approach Vol, veh/h		335			260			910	A		835	A
Approach Delay, s/veh		51.9			57.1			28.3			36.4	
Approach LOS		D			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	70.0	9.4	32.5	15.2	63.7	21.0	20.8
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	78.0	6.0	30.0	14.0	69.0	16.0	20.0
Max Q Clear Time (g_c+I1), s	3.6	33.4	5.2	5.5	10.1	47.8	18.0	14.6
Green Ext Time (p_c), s	0.0	10.6	0.0	0.3	0.1	9.9	0.0	0.3

Intersection Summary			
HCM 6th Ctrl Delay			37.8
HCM 6th LOS			D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: Honoapiilani Highway & Kuikahi Drive

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	210	60	257	304	341	107	515	243	340	499	41
Future Volume (veh/h)	21	210	60	257	304	341	107	515	243	340	499	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2067	2067	2067	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	23	228	11	279	330	251	116	560	0	370	542	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	275	335	374	494	651	371	681		409	847	753
Arrive On Green	0.02	0.13	0.13	0.15	0.26	0.26	0.06	0.36	0.00	0.15	0.45	0.45
Sat Flow, veh/h	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	23	228	11	279	330	251	116	560	0	370	542	20
Grp Sat Flow(s),veh/h/ln	1968	2067	1751	1781	1870	1585	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	1.0	11.2	0.5	13.4	16.4	11.5	4.2	28.3	0.0	12.8	23.3	0.7
Cycle Q Clear(g_c), s	1.0	11.2	0.5	13.4	16.4	11.5	4.2	28.3	0.0	12.8	23.3	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	239	275	335	374	494	651	371	681		409	847	753
V/C Ratio(X)	0.10	0.83	0.03	0.75	0.67	0.39	0.31	0.82		0.90	0.64	0.03
Avail Cap(c_a), veh/h	287	496	522	578	862	963	507	1077		592	1293	1130
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.5	44.0	34.3	30.7	34.2	21.5	19.7	30.1	0.0	21.2	22.0	14.5
Incr Delay (d2), s/veh	0.2	2.5	0.0	3.0	0.6	0.1	0.2	5.5	0.0	10.4	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	5.9	0.2	6.1	7.5	4.3	1.7	13.3	0.0	6.1	10.1	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.7	46.4	34.3	33.7	34.8	21.6	19.9	35.6	0.0	31.6	23.7	14.5
LnGrp LOS	D	D	C	C	C	C	B	D		C	C	B
Approach Vol, veh/h		262			860			676	A		932	
Approach Delay, s/veh		45.2			30.6			32.9			26.6	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.3	43.9	21.1	18.9	11.1	53.2	7.4	32.5
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	26.0	60.0	28.0	25.0	14.0	72.0	5.0	48.0
Max Q Clear Time (g_c+I1), s	14.8	30.3	15.4	13.2	6.2	25.3	3.0	18.4
Green Ext Time (p_c), s	0.4	7.6	0.7	0.7	0.1	8.4	0.0	1.9

Intersection Summary			
HCM 6th Ctrl Delay			31.2
HCM 6th LOS			C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Honoapiilani Hwy & Pilikana St

10/24/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	31	57	776	644	125
Future Volume (veh/h)	95	31	57	776	644	125
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	103	1	62	843	700	83
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	223	198	384	1207	903	764
Arrive On Green	0.13	0.13	0.06	0.65	0.48	0.48
Sat Flow, veh/h	1781	1585	1781	1870	1870	1583
Grp Volume(v), veh/h	103	1	62	843	700	83
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1583
Q Serve(g_s), s	2.6	0.0	0.7	13.9	14.8	1.4
Cycle Q Clear(g_c), s	2.6	0.0	0.7	13.9	14.8	1.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	223	198	384	1207	903	764
V/C Ratio(X)	0.46	0.01	0.16	0.70	0.78	0.11
Avail Cap(c_a), veh/h	1114	992	799	3511	2769	2345
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.5	18.4	7.5	5.5	10.3	6.8
Incr Delay (d2), s/veh	1.5	0.0	0.2	0.7	1.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.2	3.1	4.9	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.0	18.4	7.7	6.2	11.7	6.8
LnGrp LOS	C	B	A	A	B	A
Approach Vol, veh/h	104			905	783	
Approach Delay, s/veh	20.9			6.3	11.2	
Approach LOS	C			A	B	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.8	29.1		11.0		37.0
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0
Max Green Setting (Gmax), s	14.0	71.0		30.0		90.0
Max Q Clear Time (g_c+I1), s	2.7	16.8		4.6		15.9
Green Ext Time (p_c), s	0.1	6.3		0.3		8.3
Intersection Summary						
HCM 6th Ctrl Delay			9.3			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary
16: Honoapiilani Hwy & W Waiko Rd/E Waiko Rd

10/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	7	3	78	12	101	9	718	90	82	580	23
Future Volume (veh/h)	13	7	3	78	12	101	9	718	90	82	580	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	8	1	85	13	74	10	780	95	89	630	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	187	91	220	162	28	91	484	987	120	342	1207	1022
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.01	0.60	0.60	0.05	0.65	0.65
Sat Flow, veh/h	809	657	1585	672	200	659	1781	1635	199	1781	1870	1584
Grp Volume(v), veh/h	22	0	1	172	0	0	10	0	875	89	630	15
Grp Sat Flow(s),veh/h/ln	1465	0	1585	1531	0	0	1781	0	1834	1781	1870	1584
Q Serve(g_s), s	0.0	0.0	0.0	7.5	0.0	0.0	0.2	0.0	28.5	1.4	14.2	0.3
Cycle Q Clear(g_c), s	0.8	0.0	0.0	8.5	0.0	0.0	0.2	0.0	28.5	1.4	14.2	0.3
Prop In Lane	0.64		1.00	0.49		0.43	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	278	0	220	281	0	0	484	0	1107	342	1207	1022
V/C Ratio(X)	0.08	0.00	0.00	0.61	0.00	0.00	0.02	0.00	0.79	0.26	0.52	0.01
Avail Cap(c_a), veh/h	541	0	503	550	0	0	779	0	1631	561	1663	1408
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.5	0.0	29.2	32.8	0.0	0.0	6.6	0.0	11.8	10.9	7.5	5.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	3.0	0.1	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.2	0.0	0.0	0.1	0.0	10.6	0.5	4.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.6	0.0	29.2	33.6	0.0	0.0	6.6	0.0	14.8	11.0	8.2	5.0
LnGrp LOS	C	A	C	C	A	A	A	A	B	B	A	A
Approach Vol, veh/h		23			172			885			734	
Approach Delay, s/veh		29.6			33.6			14.7			8.5	
Approach LOS		C			C			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.3	53.5		15.9	6.0	56.8		15.9				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	14.0	70.0		25.0	14.0	70.0		25.0				
Max Q Clear Time (g_c+I1), s	3.4	30.5		2.8	2.2	16.2		10.5				
Green Ext Time (p_c), s	0.1	17.0		0.0	0.0	11.1		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			14.2									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	118	16	70	178	145	15	3	36	109	17	24
Future Vol, veh/h	9	118	16	70	178	145	15	3	36	109	17	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	275	-	-	275	-	-	-	-	-	275	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	128	17	76	193	158	16	3	39	118	18	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	351	0	0	145	0	0	603	660	137	602	589	272
Stage 1	-	-	-	-	-	-	157	157	-	424	424	-
Stage 2	-	-	-	-	-	-	446	503	-	178	165	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1208	-	-	1437	-	-	411	383	911	412	421	767
Stage 1	-	-	-	-	-	-	845	768	-	608	587	-
Stage 2	-	-	-	-	-	-	591	541	-	824	762	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1208	-	-	1437	-	-	365	360	911	373	395	767
Mov Cap-2 Maneuver	-	-	-	-	-	-	365	360	-	373	395	-
Stage 1	-	-	-	-	-	-	838	762	-	603	556	-
Stage 2	-	-	-	-	-	-	523	512	-	779	756	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.4	11.6	17.2
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	607	1208	-	-	1437	-	-	373	552
HCM Lane V/C Ratio	0.097	0.008	-	-	0.053	-	-	0.318	0.081
HCM Control Delay (s)	11.6	8	-	-	7.6	-	-	19.1	12.1
HCM Lane LOS	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	1.3	0.3

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	251	11	75	376	16	41
Future Vol, veh/h	251	11	75	376	16	41
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, %	-5	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	273	12	82	409	17	45

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	285	0	852	279
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	573	-
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	-	-	1277	-	330	760
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	564	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1277	-	303	760
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	517	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	12.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	534	-	-	1277	-
HCM Lane V/C Ratio	0.116	-	-	0.064	-
HCM Control Delay (s)	12.6	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-

APPENDIX D

SIGNAL WARRANTS

Weekday Kuikahi Drive/- 8-Hour Signal Warrant

Thursday, May 3, 2018

Condition A - Minimum volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kuikahi Drive						-			Keh Mauka Pkw			70 % Warrant			Minor 1 (NB)			Minor 1 (SB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes					Major Threshold	350	525	420	350	525	420			
	1						1			1					Minor Threshold	105	53	84	105	53	84			
							RT Reduction: 0%			RT Reduction: 100%														
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	60.17387218	2.6875	6.78488	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	120.3477444	5.375	13.5698	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	180.5216165	19.0625	48.2384	-	-	-	-	-	-	0	0	0
6:00	0.199	50.888	0.3537	1.5476	3.9796	3.2058	0.9375	0.75	1	2.5349	4.25	0	240.6954887	37.75	95.5814	-	-	-	-	-	-	0	0	0
6:15	0.199	50.888	0.3537	1.5476	3.9796	3.2058	0.9375	0.75	1	2.5349	4.25	0	268.8805216	57.3125	134.744	-	-	-	-	-	-	0	0	0
6:30	0.199	50.888	0.3537	1.5476	3.9796	3.2058	0.9375	0.75	12	30.419	4.25	0	325.3040581	76.875	169.117	-	-	-	-	-	-	0	0	0
6:45	0.199	50.888	0.3537	1.5476	3.9796	3.2058	0.9375	0.75	17	43.093	4.25	0	353.9816451	85.4375	178.799	-	-	-	1	-	-	1	0	0
7:00	1.037	49.53	2.25	4.5	12.542	18.5	2.5	1.75	18	44.697	1.25	0	395	89	179	-	-	-	1	-	-	2	0	0
7:15	12.444	59.195	2.25	4.5	19.708	18.5	2.5	1.75	18	39.908	1.25	0	385.1603619	90.4375	193.07	-	-	-	1	-	-	3	0	0
7:30	9.3333	36.242	2.25	4.5	19.708	16.818	2.5	1.75	18	43.101	1.25	0	347.0822201	83.875	191.65	-	-	-	-	-	-	4	0	0
7:45	5.1852	35.034	2.25	4.5	34.042	20.182	2.5	1.75	18	46.294	1.25	0	336.7500278	80.1875	189.573	-	-	-	-	-	-	0	0	0
8:00	0.7347	44.234	1.3061	5.7143	14.694	11.837	0.9375	0.75	22	55.767	4.25	0	314.0770677	72.625	179.233	-	-	-	-	-	-	0	0	0
8:15	0.7347	44.234	1.3061	5.7143	14.694	11.837	0.9375	0.75	14	35.488	4.25	0	323.4595865	62.5	148.814	-	-	-	-	-	-	0	0	0
8:30	0.7347	44.234	1.3061	5.7143	14.694	11.837	2.8125	0.75	15	38.023	4.25	0	*332.8421053*	56.5	133.605	-	-	-	-	-	-	0	0	0
8:45	0.7347	44.234	1.3061	5.7143	14.694	11.837	0.9375	0.75	13	32.953	4.25	0	342.2246241	44.625	108.256	-	-	-	-	-	-	0	0	0
9:00	1.0867	37.188	1.932	8.4524	21.735	17.509	2.8125	0.75	10	25.349	4.25	0	351.6071429	36.625	87.9767	-	-	-	-	-	-	0	0	0
9:15	1.0867	37.188	1.932	8.4524	21.735	17.509	0.9375	0.75	8	20.279	4.25	0	346.6555451	32.75	82.907	-	-	-	-	-	-	0	0	0
9:30	1.0867	37.188	1.932	8.4524	21.735	17.509	0.9375	0.75	5	12.674	4.25	0	341.7039474	39.625	95.5814	-	-	-	-	-	-	0	0	0
9:45	1.0867	37.188	1.932	8.4524	21.735	17.509	0.9375	0.75	5	12.674	4.25	0	336.7523496	46.625	113.326	-	-	-	-	-	-	0	0	0
10:00	1.0561	33.664	1.8776	8.2143	21.122	17.015	0.9375	0.75	8	20.279	4.25	0	331.8007519	52.5625	126	-	-	-	-	-	-	0	0	0
10:15	1.0561	33.664	1.8776	8.2143	21.122	17.015	2.8125	0.75	13	32.953	4.25	0	341.2034774	54.4375	126	-	-	-	-	-	-	0	0	0
10:30	1.0561	33.664	1.8776	8.2143	21.122	17.015	0.9375	0.75	12	30.419	4.25	0	350.606203	53.5625	128.535	-	-	-	1	-	-	1	0	0
10:45	1.0561	33.664	1.8776	8.2143	21.122	17.015	1.875	0.75	10	25.349	4.25	0	360.0089286	58.5	138.674	-	-	-	1	-	-	2	0	0
11:00	1.3163	30.924	2.3401	10.238	26.327	21.207	2.8125	0.75	8	20.279	4.25	0	369.4116541	57.5	136.14	-	-	-	1	-	-	3	0	0
11:15	1.3163	30.924	2.3401	10.238	26.327	21.207	0.9375	0.75	14	35.488	4.25	0	356.9943609	66.625	164.023	-	-	-	1	-	-	4	0	0
11:30	1.3163	30.924	2.3401	10.238	26.327	21.207	1.875	0.75	16	40.558	4.25	0	344.5770677	64.625	158.953	-	-	-	-	-	-	0	0	0
11:45	1.3163	30.924	2.3401	10.238	26.327	21.207	1.875	0.75	9	22.814	4.25	0	332.1597744	61.6875	153.884	-	-	-	-	-	-	0	0	0
12:00	1.1173	27.793	1.9864	8.6905	22.347	18.002	0.9375	0.75	19	48.163	4.25	0	319.7424812	73.5625	179.233	-	-	-	-	-	-	0	0	0
12:15	1.1173	27.793	1.9864	8.6905	22.347	18.002	0.9375	0.75	12	30.419	4.25	0	322.7368421	74.5	179.233	-	-	-	-	-	-	0	0	0
12:30	1.1173	27.793	1.9864	8.6905	22.347	18.002	0.9375	0.75	14	35.488	4.25	0	325.731203	68.5	164.023	-	-	-	-	-	-	0	0	0
12:45	1.1173	27.793	1.9864	8.6905	22.347	18.002	3.75	0.75	19	48.163	4.25	0	328.7255639	62.5	148.814	-	-	-	-	-	-	0	0	0
13:00	1.148	29.359	2.0408	8.9286	22.959	18.495	1.875	0.75	19	48.163	4.25	0	331.7199248	51.6875	128.535	-	-	-	-	-	-	0	0	0
13:15	1.148	29.359	2.0408	8.9286	22.959	18.495	0.9375	0.75	6	15.209	4.25	0	332.2969925	53.375	120.93	-	-	-	-	-	-	0	0	0
13:30	1.148	29.359	2.0408	8.9286	22.959	18.495	0.9375	0.75	8	20.279	4.25	0	332.8740602	69.8125	141.209	-	-	-	-	-	-	0	0	0
13:45	1.148	29.359	2.0408	8.9286	22.959	18.495	0.9375	0.75	11	27.884	4.25	0	333.4511278	76.6875	153.884	-	-	-	-	-	-	0	0	0
14:00	1.1939	27.793	2.1224	9.2857	23.878	19.235	6.5625	0.75	16	40.558	4.25	0	334.0281955	77.5	148.814	-	-	-	-	-	-	0	0	0
14:15	1.1939	27.793	2.1224	9.2857	23.878	19.235	9.375	0.75	14	35.488	4.25	0	346.0540414	70.6875	138.674	-	-	-	-	-	-	0	0	0
14:30	1.1939	27.793	2.1224	9.2857	23.878	19.235	2.8125	0.75	13	32.953	4.25	0	358.0798872	75.875	158.953	-	-	-	1	-	-	1	0	0
14:45	1.1939	27.793	2.1224	9.2857	23.878	19.235	3.75	0.75	9	22.814	4.25	0	370.1057331	96.375	191.907	-	-	-	1	-	-	2	0	0
15:00	1.3929	30.533	2.4762	10.833	27.857	22.44	3.75	0.75	12	30.419	4.25	0	382.1315789	99.4375	202.047	-	-	-	1	-	-	3	0	0
15:15	1.3929	30.533	2.4762	10.833	27.857	22.44	6.5625	0.75	22	55.767	4.25	0	417.0986442	96.4375	194.442	-	-	-	1	-	-	4	0	0
15:30	1.3929	30.533	2.4762	10.833	27.857	22.44	10.313	0.75	26	65.907	4.25	0	446.3952184	80.625	169.093	-	-	-	1	-	1	1	0	1
15:45	1.3929	30.533	2.4762	10.833	27.857	22.44	2.8125	0.75	13	32.953	4.25	0	489.41072	57.0625	136.14	-	-	-	1	-	1	2	0	2
16:00	0.9	30.411	4	17.5	41.439	36.25	3.75	0.75	9	22.814	4.25	0	539	54	126	-	1	-	1	1	1	3	1	3
16:15	2.7	29.089	4	17.5	46.619	24.922	3.75	0.75	9	30.419	4.25	0	529.9530475	51.1875	126	-	-	-	1	1	1	4	2	4
16:30	1.8	31.733	4	17.5	42.734	40.781	3.75	0.75	9	32.953	4.25	0	526.5765861	48.9375	103.186	-	-	-	-	1	1	0	3	1
16:45	3.6	27.767	4	17.5	49.209	43.047	3.75	0.75	9	22.814	4.25	0	509.4811973	38.125	72.7674	-	-	-	-	-	-	0	4	2
17:00	1.898	32.882	3.3741	14.762	37.959	30.578	0.9375	0.75	9	22.814	4.25	0	485.8120301	27.3125	52.4884	-	-	-	-	-	-	0	0	3
17:15	1.898	32.882	3.3741	14.762	37.959	30.578	7.5	0.75	3	7.6047	4.25	0	364.3590226	16.625	25.4244	-	-	-	-	-	-	0	0	4
17:30	1.898	32.882	3.3741	14.762	37.959	30.578	0.9375	0.75	1	2.5349	4.25	0	242.906015	5.375	13.5698	-	-	-	-	-	-	0	0	0
17:45	1.898	32.882	3.3741	14.762	37.959	30.578	0.9375	0.75	1	2.5349	4.25	0	121.4530075	2.6875	6.78488	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0

	A	B	A+B
Hours where condition met:	4	1	2
Signal Warranted?	No		
Notes			

10/7/2022

Weekday Kuikahi Drive/- 4-Hour Signal Warrant

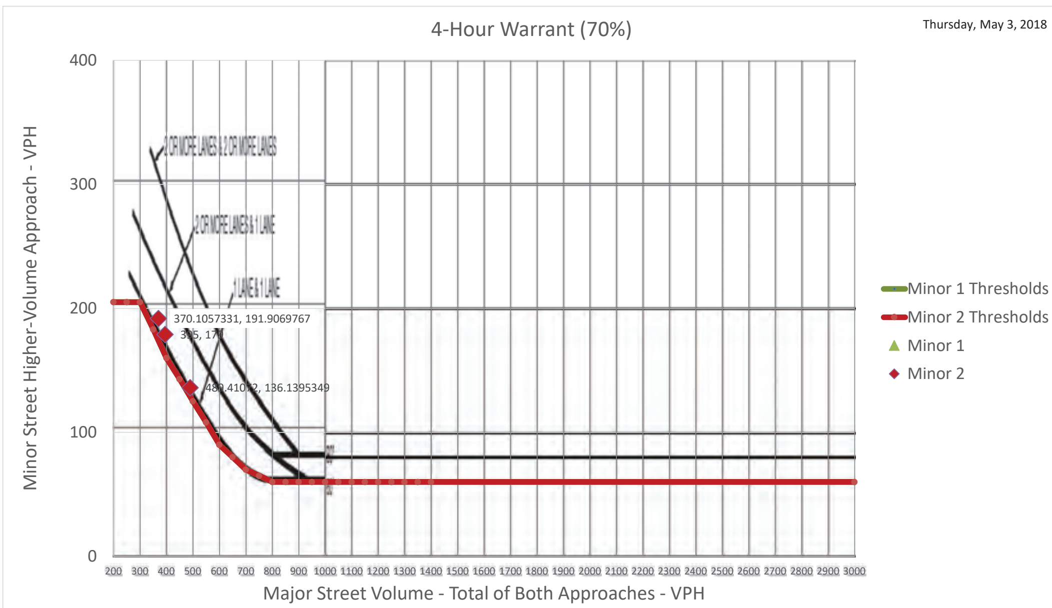
Thursday, May 3, 2018

	Kuikahi Drive						-			Keh Mauka Pkwy			70 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 0%			RT Reduction: 100%											
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
5:15	0	0	0	0	0	0	0	0	0	0	0	0	60.17387218	2.6875	6.78488						
5:30	0	0	0	0	0	0	0	0	0	0	0	0	120.3477444	5.375	13.5698						
5:45	0	0	0	0	0	0	0	0	0	0	0	0	180.5216165	19.0625	48.2384						
6:00	0.199	50.888	0.3537	1.5476	3.9796	3.2058	0.9375	0.75	1	2.5349	4.25	0	240.6954887	37.75	95.5814						
6:15	0.199	50.888	0.3537	1.5476	3.9796	3.2058	0.9375	0.75	1	2.5349	4.25	0	268.8805216	57.3125	134.744						
6:30	0.199	50.888	0.3537	1.5476	3.9796	3.2058	0.9375	0.75	12	30.419	4.25	0	325.3040581	76.875	169.117						
6:45	0.199	50.888	0.3537	1.5476	3.9796	3.2058	0.9375	0.75	17	43.093	4.25	0	353.9816451	85.4375	178.799						
7:00	1.037	49.53	2.25	4.5	12.542	18.5	2.5	1.75	18	44.697	1.25	0	395	89	179		1		1	1	1
7:15	12.444	59.195	2.25	4.5	19.708	18.5	2.5	1.75	18	39.908	1.25	0	385.1603619	90.4375	193.07		1		2	1	2
7:30	9.3333	36.242	2.25	4.5	19.708	16.818	2.5	1.75	18	43.101	1.25	0	347.0822201	83.875	191.65		1		3	1	3
7:45	5.1852	35.034	2.25	4.5	34.042	20.182	2.5	1.75	18	46.294	1.25	0	336.7500278	80.1875	189.573		1		4	1	4
8:00	0.7347	44.234	1.3061	5.7143	14.694	11.837	0.9375	0.75	22	55.767	4.25	0	314.0770677	72.625	179.233						
8:15	0.7347	44.234	1.3061	5.7143	14.694	11.837	0.9375	0.75	14	35.488	4.25	0	323.4595865	62.5	148.814						
8:30	0.7347	44.234	1.3061	5.7143	14.694	11.837	2.8125	0.75	15	38.023	4.25	0	*332.8421053*	56.5	133.605						
8:45	0.7347	44.234	1.3061	5.7143	14.694	11.837	0.9375	0.75	13	32.953	4.25	0	342.2246241	44.625	108.256						
9:00	1.0867	37.188	1.932	8.4524	21.735	17.509	2.8125	0.75	10	25.349	4.25	0	351.6071429	36.625	87.9767						
9:15	1.0867	37.188	1.932	8.4524	21.735	17.509	0.9375	0.75	8	20.279	4.25	0	346.6555451	32.75	82.907						
9:30	1.0867	37.188	1.932	8.4524	21.735	17.509	0.9375	0.75	5	12.674	4.25	0	341.7039474	39.625	95.5814						
9:45	1.0867	37.188	1.932	8.4524	21.735	17.509	0.9375	0.75	5	12.674	4.25	0	336.7523496	46.625	113.326						
10:00	1.0561	33.664	1.8776	8.2143	21.122	17.015	0.9375	0.75	8	20.279	4.25	0	331.8007519	52.5625	126						
10:15	1.0561	33.664	1.8776	8.2143	21.122	17.015	2.8125	0.75	13	32.953	4.25	0	341.2034774	54.4375	126						
10:30	1.0561	33.664	1.8776	8.2143	21.122	17.015	0.9375	0.75	12	30.419	4.25	0	350.606203	53.5625	128.535						
10:45	1.0561	33.664	1.8776	8.2143	21.122	17.015	1.875	0.75	10	25.349	4.25	0	360.0089286	58.5	138.674						
11:00	1.3163	30.924	2.3401	10.238	26.327	21.207	2.8125	0.75	8	20.279	4.25	0	369.4116541	57.5	136.14						
11:15	1.3163	30.924	2.3401	10.238	26.327	21.207	0.9375	0.75	14	35.488	4.25	0	356.9943609	66.625	164.023						
11:30	1.3163	30.924	2.3401	10.238	26.327	21.207	1.875	0.75	16	40.558	4.25	0	344.5770677	64.625	158.953						
11:45	1.3163	30.924	2.3401	10.238	26.327	21.207	1.875	0.75	9	22.814	4.25	0	332.1597744	61.6875	153.884						
12:00	1.1173	27.793	1.9864	8.6905	22.347	18.002	0.9375	0.75	19	48.163	4.25	0	319.7424812	73.5625	179.233						
12:15	1.1173	27.793	1.9864	8.6905	22.347	18.002	0.9375	0.75	12	30.419	4.25	0	322.7368421	74.5	179.233						
12:30	1.1173	27.793	1.9864	8.6905	22.347	18.002	0.9375	0.75	14	35.488	4.25	0	325.731203	68.5	164.023						
12:45	1.1173	27.793	1.9864	8.6905	22.347	18.002	3.75	0.75	19	48.163	4.25	0	328.7255639	62.5	148.814						
13:00	1.148	29.359	2.0408	8.9286	22.959	18.495	1.875	0.75	19	48.163	4.25	0	331.7199248	51.6875	128.535						
13:15	1.148	29.359	2.0408	8.9286	22.959	18.495	0.9375	0.75	6	15.209	4.25	0	332.2969925	53.375	120.93						
13:30	1.148	29.359	2.0408	8.9286	22.959	18.495	0.9375	0.75	8	20.279	4.25	0	332.8740602	69.8125	141.209						
13:45	1.148	29.359	2.0408	8.9286	22.959	18.495	0.9375	0.75	11	27.884	4.25	0	333.4511278	76.6875	153.884						
14:00	1.1939	27.793	2.1224	9.2857	23.878	19.235	6.5625	0.75	16	40.558	4.25	0	334.0281955	77.5	148.814						
14:15	1.1939	27.793	2.1224	9.2857	23.878	19.235	9.375	0.75	14	35.488	4.25	0	346.0540414	70.6875	138.674						
14:30	1.1939	27.793	2.1224	9.2857	23.878	19.235	2.8125	0.75	13	32.953	4.25	0	358.0798872	75.875	158.953						
14:45	1.1939	27.793	2.1224	9.2857	23.878	19.235	3.75	0.75	9	22.814	4.25	0	370.1057331	96.375	191.907		1		1	1	1
15:00	1.3929	30.533	2.4762	10.833	27.857	22.44	3.75	0.75	12	30.419	4.25	0	382.1315789	99.4375	202.047		1		2	1	2
15:15	1.3929	30.533	2.4762	10.833	27.857	22.44	6.5625	0.75	22	55.767	4.25	0	417.0986442	96.4375	194.442		1		3	1	3
15:30	1.3929	30.533	2.4762	10.833	27.857	22.44	10.313	0.75	26	65.907	4.25	0	446.3952184	80.625	169.093		1		4	1	4
15:45	1.3929	30.533	2.4762	10.833	27.857	22.44	2.8125	0.75	13	32.953	4.25	0	489.41072	57.0625	136.14		1		1	1	1
16:00	0.9	30.411	4	17.5	41.439	36.25	3.75	0.75	9	22.814	4.25	0	539	54	126		1		2	1	2
16:15	2.7	29.089	4	17.5	46.619	24.922	3.75	0.75	9	30.419	4.25	0	529.9530475	51.1875	126		1		3	1	3
16:30	1.8	31.733	4	17.5	42.734	40.781	3.75	0.75	9	32.953	4.25	0	526.5765861	48.9375	103.186				4		4
16:45	3.6	27.767	4	17.5	49.209	43.047	3.75	0.75	9	22.814	4.25	0	509.4811973	38.125	72.7674						
17:00	1.898	32.882	3.3741	14.762	37.959	30.578	0.9375	0.75	9	22.814	4.25	0	485.8120301	27.3125	52.4884						
17:15	1.898	32.882	3.3741	14.762	37.959	30.578	7.5	0.75	3	7.6047	4.25	0	364.3590226	16.625	25.4244						
17:30	1.898	32.882	3.3741	14.762	37.959	30.578	0.9375	0.75	1	2.5349	4.25	0	242.906015	5.375	13.5698						
17:45	1.898	32.882	3.3741	14.762	37.959	30.578	0.9375	0.75	1	2.5349	4.25	0	121.4530075	2.6875	6.78488						
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						

Hours Where Condition Met: 3

Signal Warranted? No


4-Hour Warrant (100%)
Thursday, May 3, 2018
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
370.1057331, 191.9069767
395, 179
489.41072, 136.1395349
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, May 3, 2018
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
370.1057331, 191.9069767
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Waiale Rd/Kaohu Street 8-Hour Signal Warrant

Monday, July 29, 2019

Condition A - Minimum volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Waiale Rd						Kaohu Street			Oluloa Street			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 0%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	73	4	4	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	178	7	9	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	313	18	17	-	-	-	-	-	-	0	0	0
6:00	4	25	0	0	40	4	2	0	2	3	0	1	497	30	22	-	-	-	-	-	-	0	0	0
6:15	7	39	1	0	56	2	2	0	1	4	1	0	637	73	27	-	-	-	-	-	-	0	0	0
6:30	14	37	0	0	66	18	3	0	8	2	5	1	802	141	34	-	1	1	-	-	-	0	1	1
6:45	22	55	3	1	74	29	5	0	7	2	2	1	953	202	39	1	1	1	-	-	-	1	2	2
7:00	35	71	1	1	79	26	18	1	28	6	2	1	1048	236	44	1	1	1	-	-	-	2	3	3
7:15	43	80	0	0	107	40	21	2	48	8	3	1	1031	220	38	1	1	1	-	-	-	3	4	4
7:30	47	84	1	3	114	37	21	5	46	5	5	3	942	171	32	1	1	1	-	-	-	4	1	1
7:45	21	118	4	1	120	15	23	1	22	7	1	2	837	111	23	-	1	-	-	-	-	0	2	2
8:00	16	83	1	0	85	11	15	0	16	0	1	2	753	89	18	-	1	-	-	-	-	0	3	3
8:15	16	85	1	2	67	10	3	2	17	1	4	1	720	80	21	-	-	-	-	-	-	0	4	4
8:30	20	70	2	0	79	10	3	1	8	2	0	2	694	71	18	-	-	-	-	-	-	0	0	0
8:45	15	98	4	1	70	7	1	0	23	4	1	0	667	80	19	-	-	-	-	-	-	0	0	0
9:00	5	70	0	0	79	9	7	0	15	5	0	1	653	85	18	-	-	-	-	-	-	0	0	0
9:15	12	59	0	3	71	10	6	0	7	3	0	0	675	91	12	-	-	-	-	-	-	0	0	0
9:30	12	53	4	0	78	7	2	1	18	1	2	2	709	95	11	-	-	-	-	-	-	0	0	0
9:45	12	77	2	5	78	7	12	1	16	3	0	1	738	98	11	-	-	-	-	-	-	0	0	0
10:00	24	67	1	1	79	13	12	1	15	0	0	0	759	104	11	-	1	-	-	-	-	0	1	0
10:15	11	84	1	2	80	11	10	1	6	2	0	0	741	118	16	-	-	-	-	-	-	0	2	0
10:30	18	65	1	1	90	8	9	1	14	3	1	1	745	134	20	-	-	1	-	-	-	0	3	1
10:45	19	81	1	1	83	17	13	2	20	3	1	0	726	135	18	-	-	1	-	-	-	0	4	2
11:00	20	65	2	4	63	13	15	0	27	5	0	0	714	139	16	-	-	1	-	-	-	0		3
11:15	18	78	2	0	79	16	13	0	20	6	0	0	754	139	13	-	1	1	-	-	-	0	1	4
11:30	22	57	0	2	73	10	11	0	14	3	0	0	756	130	10	-	1	1	-	-	-	0	2	1
11:45	11	62	4	1	103	9	13	1	25	0	0	2	799	134	10	-	1	1	-	-	-	0	3	2
12:00	23	65	2	0	102	15	16	0	26	1	1	0	816	116	9	-	1	-	-	-	-	0	4	3
12:15	23	70	5	1	88	8	6	0	18	1	0	2	829	97	10	-	1	-	-	-	-	0	1	4
12:30	23	69	3	4	87	21	12	0	17	3	0	0	846	95	10	-	1	-	-	-	-	0	2	0
12:45	9	96	4	5	86	7	5	0	16	0	0	1	850	101	10	-	1	-	-	-	-	0	3	0
13:00	21	70	2	1	120	6	5	2	16	2	1	0	865	108	12	-	1	-	-	-	-	0	4	0
13:15	27	80	4	2	89	10	9	1	12	2	1	0	885	150	16	1	1	1	-	-	-	1	1	1
13:30	25	71	1	0	100	14	7	0	28	3	0	0	910	223	21	1	1	1	-	-	-	2	2	2
13:45	24	77	3	0	100	18	11	2	15	2	1	0	924	238	19	1	1	1	-	-	-	3	3	3
14:00	31	82	0	0	104	23	16	8	41	5	2	0	938	233	17	1	1	1	-	-	-	4	4	4
14:15	25	77	3	0	117	15	29	5	61	5	1	2	917	193	18	1	1	1	-	-	-	1	1	1
14:30	26	83	3	0	100	13	19	1	30	1	0	0	897	118	14	-	1	-	-	-	-	2	2	2
14:45	16	93	2	0	111	14	5	2	16	1	0	0	917	128	18	-	1	1	-	-	-	3	3	3
15:00	17	79	1	2	115	5	11	2	12	5	1	2	931	140	18	-	1	1	-	-	-	4	4	4
15:15	19	75	3	0	117	3	8	0	12	1	0	3	946	153	17	1	1	1	-	-	-	1	1	1
15:30	20	107	2	2	109	5	20	3	37	4	0	1	989	181	15	1	1	1	-	-	-	2	2	2
15:45	23	96	3	3	116	9	15	3	17	0	0	1	1004	191	13	1	1	1	-	-	-	3	3	3
16:00	18	103	0	1	102	10	11	3	24	2	2	3	981	193	14	1	1	1	-	-	-	4	4	4
16:15	16	112	1	0	120	11	6	4	38	1	0	1	965	187	11	1	1	1	-	-	-	1	1	1
16:30	22	98	3	2	126	9	7	2	61	3	0	0	915	170	13	1	1	1	-	-	-	2	2	2
16:45	7	83	5	3	119	10	6	1	30	2	0	0	847	113	10	-	1	-	-	-	-	3	3	3
17:00	25	68	7	3	112	3	6	2	24	3	0	1	800	86	12	-	1	-	-	-	-	4	4	4
17:15	11	77	1	3	113	5	9	1	21	4	0	0	763	83	8	-	1	-	-	-	-	0	1	0
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17:45	17	78	1	2	78	4	1	0	9	1	3	0	684	76	13	-	-	-	-	-	-	0	3	0
18:00	22	63	2	1	86	7	8	3	18	0	0	0	657	82	11	-	-	-	-	-	-	0	4	0
18:15	15	68	4	1	78	5	6	3	14	5	1	0	476	53	11	-	-	-	-	-	-	0	0	0
18:30	12	55	4	3	75	3	4	0	10	1	2	0	305	30	5	-	-	-	-	-	-	0	0	0
18:45	16	66	5	1	53	12	5	1	10	1	1	0	153	16	2	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0

	A	B	A+B
Hours where condition met:	5	10	8
Signal Warranted?	Yes		
Notes			

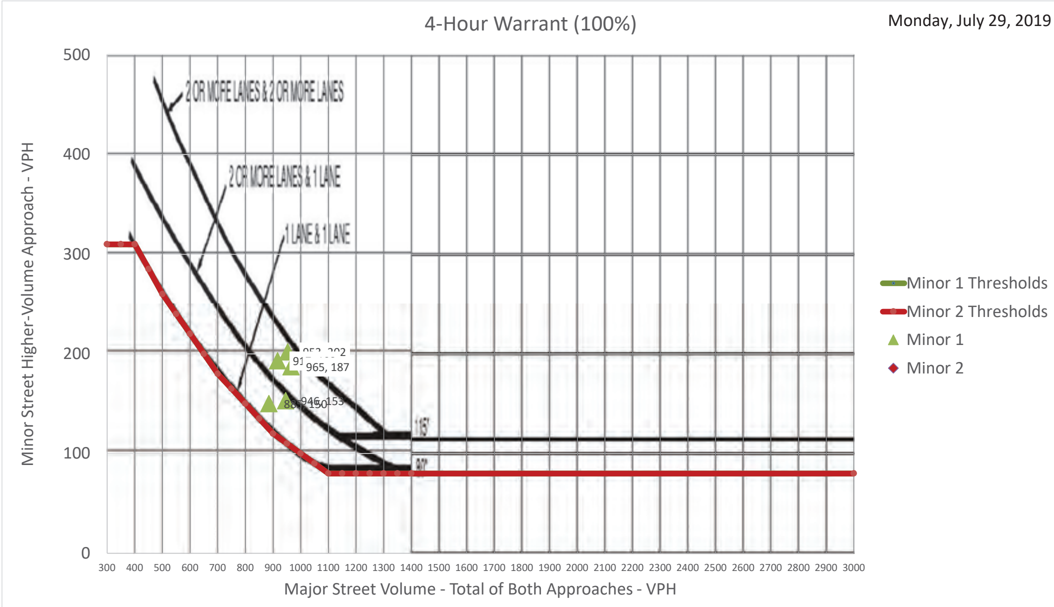
Weekday Waiale Rd/Kaohu Street 4-Hour Signal Warrant

Monday, July 29, 2019

	Waiale Rd	Kaohu Street	Oluloa Street	100 % Warrant
	Major Lanes	Minor 1 Lanes	Minor 2 Lanes	Major Threshold
	1	1	1	
		RT Reduction: 0%	RT Reduction: 0%	

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	73	4	4			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	178	7	9			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	313	18	17			0	0	0	0
6:00	4	25	0	0	40	4	2	0	2	3	0	1	497	30	22			0	0	0	0
6:15	7	39	1	0	56	2	2	0	1	4	1	0	637	73	27			0	0	0	0
6:30	14	37	0	0	66	18	3	0	8	2	5	1	802	141	34			0	0	0	0
6:45	22	55	3	1	74	29	5	0	7	2	2	1	953	202	39	1		1	0	1	1
7:00	35	71	1	1	79	26	18	1	28	6	2	1	1048	236	44	1		2	0	1	2
7:15	43	80	0	0	107	40	21	2	48	8	3	1	1031	220	38	1		3	0	1	3
7:30	47	84	1	3	114	37	21	5	46	5	5	3	942	171	32	1		4	0	1	4
7:45	21	118	4	1	120	15	23	1	22	7	1	2	837	111	23			0	0	0	0
8:00	16	83	1	0	85	11	15	0	16	0	1	2	753	89	18			0	0	0	0
8:15	16	85	1	2	67	10	3	2	17	1	4	1	720	80	21			0	0	0	0
8:30	20	70	2	0	79	10	3	1	8	2	0	2	694	71	18			0	0	0	0
8:45	15	98	4	1	70	7	1	0	23	4	1	0	667	80	19			0	0	0	0
9:00	5	70	0	0	79	9	7	0	15	5	0	1	653	85	18			0	0	0	0
9:15	12	59	0	3	71	10	6	0	7	3	0	0	675	91	12			0	0	0	0
9:30	12	53	4	0	78	7	2	1	18	1	2	2	709	95	11			0	0	0	0
9:45	12	77	2	5	78	7	12	1	16	3	0	1	738	98	11			0	0	0	0
10:00	24	67	1	1	79	13	12	1	15	0	0	0	759	104	11			0	0	0	0
10:15	11	84	1	2	80	11	10	1	6	2	0	0	741	118	16			0	0	0	0
10:30	18	65	1	1	90	8	9	1	14	3	1	1	745	134	20			0	0	0	0
10:45	19	81	1	1	83	17	13	2	20	3	1	0	726	135	18			0	0	0	0
11:00	20	65	2	4	63	13	15	0	27	5	0	0	714	139	16			0	0	0	0
11:15	18	78	2	0	79	16	13	0	20	6	0	0	754	139	13			0	0	0	0
11:30	22	57	0	2	73	10	11	0	14	3	0	0	756	130	10			0	0	0	0
11:45	11	62	4	1	103	9	13	1	25	0	0	2	799	134	10			0	0	0	0
12:00	23	65	2	0	102	15	16	0	26	1	1	0	816	116	9			0	0	0	0
12:15	23	70	5	1	88	8	6	0	18	1	0	2	829	97	10			0	0	0	0
12:30	23	69	3	4	87	21	12	0	17	3	0	0	846	95	10			0	0	0	0
12:45	9	96	4	5	86	7	5	0	16	0	0	1	850	101	10			0	0	0	0
13:00	21	70	2	1	120	6	5	2	16	2	1	0	865	108	12			0	0	0	0
13:15	27	80	4	2	89	10	9	1	12	2	1	0	885	150	16	1		1	0	1	1
13:30	25	71	1	0	100	14	7	0	28	3	0	0	910	223	21	1		2	0	1	2
13:45	24	77	3	0	100	18	11	2	15	2	1	0	924	238	19	1		3	0	1	3
14:00	31	82	0	0	104	23	16	8	41	5	2	0	938	233	17	1		4	0	1	4
14:15	25	77	3	0	117	15	29	5	61	5	1	2	917	193	18	1		1	0	1	1
14:30	26	83	3	0	100	13	19	1	30	1	0	0	897	118	14			2	0	0	2
14:45	16	93	2	0	111	14	5	2	16	1	0	0	917	128	18	1		3	0	1	3
15:00	17	79	1	2	115	5	11	2	12	5	1	2	931	140	18	1		4	0	1	4
15:15	19	75	3	0	117	3	8	0	12	1	0	3	946	153	17	1		1	0	1	1
15:30	20	107	2	2	109	5	20	3	37	4	0	1	989	181	15	1		2	0	1	2
15:45	23	96	3	3	116	9	15	3	17	0	0	1	1004	191	13	1		3	0	1	3
16:00	18	103	0	1	102	10	11	3	24	2	2	3	981	193	14	1		4	0	1	4
16:15	16	112	1	0	120	11	6	4	38	1	0	1	965	187	11	1		1	0	1	1
16:30	22	98	3	2	126	9	7	2	61	3	0	0	915	170	13	1		2	0	1	2
16:45	7	83	5	3	119	10	6	1	30	2	0	0	847	113	10			3	0	0	3
17:00	25	68	7	3	112	3	6	2	24	3	0	1	800	86	12			4	0	0	4
17:15	11	77	1	3	113	5	9	1	21	4	0	0	763	83	8			0	0	0	0
17:30	6	70	5	4	97	10	3	1	9	0	0	0	724	75	10			0	0	0	0
17:45	17	78	1	2	78	4	1	0	9	1	3	0	684	76	13			0	0	0	0
18:00	22	63	2	1	86	7	8	3	18	0	0	0	657	82	11			0	0	0	0
18:15	15	68	4	1	78	5	6	3	14	5	1	0	476	53	11			0	0	0	0
18:30	12	55	4	3	75	3	4	0	10	1	2	0	305	30	5			0	0	0	0
18:45	16	66	5	1	53	12	5	1	10	1	1	0	153	16	2			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	5
Signal Warranted?	Yes


4-Hour Warrant (100%)
Monday, July 29, 2019
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
953, 202
965, 187
946, 153
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Monday, July 29, 2019
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
953, 202
917, 193
965, 187
946, 153
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Waiale Road/Olomea Street 8-Hour Signal Warrant

Thursday, February 1, 2018

Condition A - Minimum volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

Waiale Road	Olomea Street	-	100 % Warrant	Minor 1 (EB)			Minor 1 (WB)			Combination
Major Lanes	Minor 1 Lanes	Minor 2 Lanes	Major Threshold	500	750	600	500	750	600	
1	1	1	Minor Threshold	150	75	120	150	75	120	
	RT Reduction: 100%	RT Reduction: 0%								

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A (EB)	B (EB)	A+B (EB)	A (WB)	B (WB)	A+B (WB)	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	129	17	0	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	288	38	0	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	502	62	0	-	-	-	-	-	-	0	0	0
6:00	0	70	0	0	56	3	17	0	0	0	0	0	817	92	0	-	1	-	-	-	-	0	1	0
6:15	1	79	0	0	75	4	21	0	0	0	0	0	1030	104	0	-	1	-	-	-	-	0	2	0
6:30	2	116	0	0	88	8	24	0	0	0	0	0	1305	114	0	-	1	-	-	-	-	0	3	0
6:45	4	199	0	0	100	12	30	0	0	0	0	0	1540	132	0	-	1	1	-	-	-	0	4	1
7:00	7	182	0	0	120	33	29	0	0	0	0	0	1681	144	0	-	1	1	-	-	-	0	1	2
7:15	6	254	0	0	129	45	31	0	0	0	0	0	1603	132	0	-	1	1	-	-	-	0	2	3
7:30	7	232	0	0	158	52	42	0	0	0	0	0	1416	132	0	-	1	1	-	-	-	0	3	4
7:45	8	253	0	0	158	37	42	0	0	0	0	0	1220	114	0	-	1	-	-	-	-	0	4	0
8:00	3	138	0	0	115	8	17	0	0	0	0	0	1069	103	0	-	1	-	-	-	-	0	1	0
8:15	7	141	0	0	86	13	31	0	0	0	0	0	1042	101	0	-	1	-	-	-	-	0	2	0
8:30	1	140	0	0	104	8	24	0	0	0	0	0	*990*	90	0	-	1	-	-	-	-	0	3	0
8:45	2	189	0	0	106	8	31	0	0	0	0	0	986	82	0	-	1	-	-	-	-	0	4	0
9:00	3	114	0	0	112	8	15	0	0	0	0	0	937	62	0	-	-	-	-	-	-	0	0	0
9:15	0	91	0	0	95	9	20	0	0	0	0	0	934	57	0	-	-	-	-	-	-	0	0	0
9:30	3	125	0	0	112	9	16	0	0	0	0	0	996	51	0	-	-	-	-	-	-	0	0	0
9:45	2	121	0	0	114	19	11	0	0	0	0	0	978	50	0	-	-	-	-	-	-	0	0	0
10:00	1	121	0	0	107	5	10	0	0	0	0	0	971	58	0	-	-	-	-	-	-	0	0	0
10:15	0	138	0	0	104	15	14	0	0	0	0	0	984	64	0	-	-	-	-	-	-	0	0	0
10:30	4	108	0	0	101	18	15	0	0	0	0	0	993	60	0	-	-	-	-	-	-	0	0	0
10:45	5	118	0	0	112	14	19	0	0	0	0	0	1005	55	0	-	-	-	-	-	-	0	0	0
11:00	2	119	0	0	101	25	16	0	0	0	0	0	1013	56	0	-	-	-	-	-	-	0	0	0
11:15	0	132	0	0	121	13	10	0	0	0	0	0	1051	55	0	-	-	-	-	-	-	0	0	0
11:30	6	113	0	0	106	18	10	0	0	0	0	0	1066	55	0	-	-	-	-	-	-	0	0	0
11:45	2	100	0	0	134	21	20	0	0	0	0	0	1097	55	0	-	-	-	-	-	-	0	0	0
12:00	4	123	0	0	128	30	15	0	0	0	0	0	1109	55	0	-	-	-	-	-	-	0	0	0
12:15	2	143	0	0	112	24	10	0	0	0	0	0	1107	53	0	-	-	-	-	-	-	0	0	0
12:30	4	126	0	0	123	21	10	0	0	0	0	0	1124	59	0	-	-	-	-	-	-	0	0	0
12:45	7	136	0	0	109	17	20	0	0	0	0	0	1166	62	0	-	-	-	-	-	-	0	0	0
13:00	2	131	0	0	129	21	13	0	0	0	0	0	1205	59	0	-	-	-	-	-	-	0	0	0
13:15	2	152	0	0	122	22	16	0	0	0	0	0	1263	76	0	-	1	-	-	-	-	0	1	0
13:30	4	149	0	0	134	29	13	0	0	0	0	0	1301	84	0	-	1	-	-	-	-	0	2	0
13:45	1	150	0	0	119	38	17	0	0	0	0	0	1309	90	0	-	1	-	-	-	-	0	3	0
14:00	7	157	0	0	138	39	30	0	0	0	0	0	1303	89	0	-	1	-	-	-	-	0	4	0
14:15	7	135	0	0	165	29	24	0	0	0	0	0	1285	74	0	-	-	-	-	-	-	0	0	0
14:30	5	144	0	0	147	28	19	0	0	0	0	0	1281	71	0	-	-	-	-	-	-	0	0	0
14:45	6	138	0	0	135	23	16	0	0	0	0	0	1326	72	0	-	-	-	-	-	-	0	0	0
15:00	5	166	0	0	118	34	15	0	0	0	0	0	1361	81	0	-	1	-	-	-	-	0	1	0
15:15	6	158	0	0	139	29	21	0	0	0	0	0	1399	89	0	-	1	-	-	-	-	0	2	0
15:30	5	162	0	0	160	42	20	0	0	0	0	0	1481	92	0	-	1	-	-	-	-	0	3	0
15:45	6	152	0	0	146	33	25	0	0	0	0	0	1505	100	0	-	1	-	-	-	-	0	4	0
16:00	5	172	0	0	153	31	23	0	0	0	0	0	1552	92	0	-	1	-	-	-	-	0	1	0
16:15	9	204	0	0	166	35	24	0	0	0	0	0	1555	104	0	-	1	-	-	-	-	0	2	0
16:30	6	178	0	0	170	39	28	0	0	0	0	0	1496	92	0	-	1	-	-	-	-	0	3	0
16:45	7	176	0	0	166	35	17	0	0	0	0	0	1408	79	0	-	1	-	-	-	-	0	4	0
17:00	5	158	0	0	159	42	35	0	0	0	0	0	1293	82	0	-	1	-	-	-	-	0	1	0
17:15	3	164	0	0	153	35	12	0	0	0	0	0	929	47	0	-	-	-	-	-	-	0	2	0
17:30	9	157	0	0	104	35	15	0	0	0	0	0	574	35	0	-	-	-	-	-	-	0	3	0
17:45	8	129	0	0	104	28	20	0	0	0	0	0	269	20	0	-	-	-	-	-	-	0	4	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0

	A	B	A+B
Hours where condition met:	0	7	1
Signal Warranted?	No		
Notes			

10/7/2022

Weekday Waiale Road/Olomea Street 4-Hour Signal Warrant

Thursday, February 1, 2018

Waiale Road | Olomea Street | -

100 % Warrant

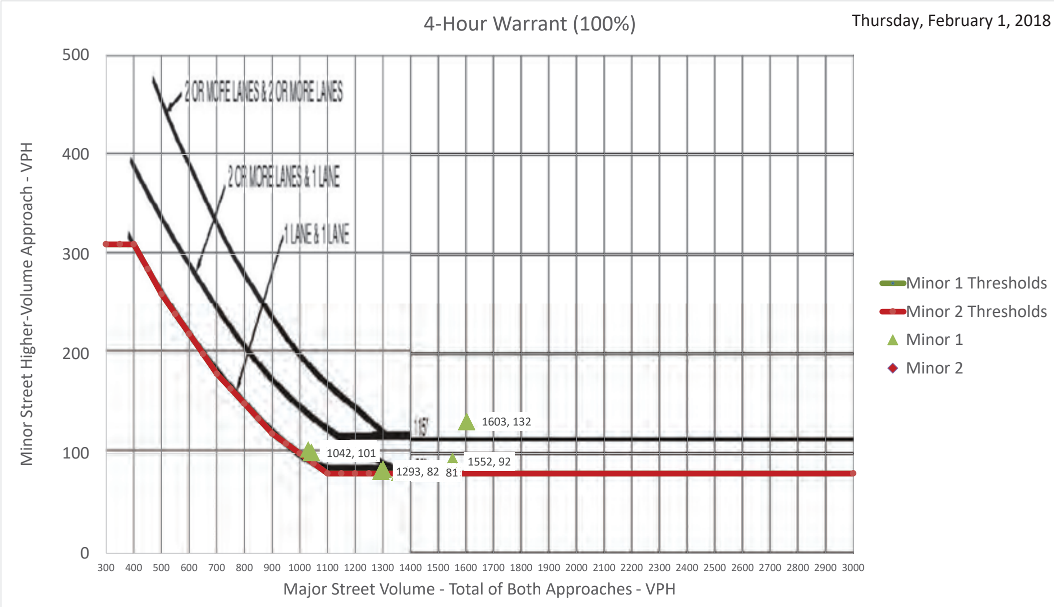
Major Lanes: 1 | Minor 1 Lanes: 1 | Minor 2 Lanes: 1 | Major Threshold

Minor 1 RT Reduction: 100% | Minor 2 RT Reduction: 0%

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	129	17	0			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	288	38	0			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	502	62	0			0	0	0	0
6:00	0	70	0	0	56	3	17	0	0	0	0	0	817	92	0			0	0	0	0
6:15	1	79	0	0	75	4	21	0	0	0	0	0	1030	104	0	1		1	0	1	1
6:30	2	116	0	0	88	8	24	0	0	0	0	0	1305	114	0	1		2	0	1	2
6:45	4	199	0	0	100	12	30	0	0	0	0	0	1540	132	0	1		3	0	1	3
7:00	7	182	0	0	120	33	29	0	0	0	0	0	1681	144	0	1		4	0	1	4
7:15	6	254	0	0	129	45	31	0	0	0	0	0	1603	132	0	1		1	0	1	1
7:30	7	232	0	0	158	52	42	0	0	0	0	0	1416	132	0	1		2	0	1	2
7:45	8	253	0	0	158	37	42	0	0	0	0	0	1220	114	0	1		3	0	1	3
8:00	3	138	0	0	115	8	17	0	0	0	0	0	1069	103	0	1		4	0	1	4
8:15	7	141	0	0	86	13	31	0	0	0	0	0	1042	101	0	1		1	0	1	1
8:30	1	140	0	0	104	8	24	0	0	0	0	0	990	90	0			2	0	0	2
8:45	2	189	0	0	106	8	31	0	0	0	0	0	986	82	0			3	0	0	3
9:00	3	114	0	0	112	8	15	0	0	0	0	0	937	62	0			4	0	0	4
9:15	0	91	0	0	95	9	20	0	0	0	0	0	934	57	0			0	0	0	0
9:30	3	125	0	0	112	9	16	0	0	0	0	0	996	51	0			0	0	0	0
9:45	2	121	0	0	114	19	11	0	0	0	0	0	978	50	0			0	0	0	0
10:00	1	121	0	0	107	5	10	0	0	0	0	0	971	58	0			0	0	0	0
10:15	0	138	0	0	104	15	14	0	0	0	0	0	984	64	0			0	0	0	0
10:30	4	108	0	0	101	18	15	0	0	0	0	0	993	60	0			0	0	0	0
10:45	5	118	0	0	112	14	19	0	0	0	0	0	1005	55	0			0	0	0	0
11:00	2	119	0	0	101	25	16	0	0	0	0	0	1013	56	0			0	0	0	0
11:15	0	132	0	0	121	13	10	0	0	0	0	0	1051	55	0			0	0	0	0
11:30	6	113	0	0	106	18	10	0	0	0	0	0	1066	55	0			0	0	0	0
11:45	2	100	0	0	134	21	20	0	0	0	0	0	1097	55	0			0	0	0	0
12:00	4	123	0	0	128	30	15	0	0	0	0	0	1109	55	0			0	0	0	0
12:15	2	143	0	0	112	24	10	0	0	0	0	0	1107	53	0			0	0	0	0
12:30	4	126	0	0	123	21	10	0	0	0	0	0	1124	59	0			0	0	0	0
12:45	7	136	0	0	109	17	20	0	0	0	0	0	1166	62	0			0	0	0	0
13:00	2	131	0	0	129	21	13	0	0	0	0	0	1205	59	0			0	0	0	0
13:15	2	152	0	0	122	22	16	0	0	0	0	0	1263	76	0			0	0	0	0
13:30	4	149	0	0	134	29	13	0	0	0	0	0	1301	84	0	1		1	0	1	1
13:45	1	150	0	0	119	38	17	0	0	0	0	0	1309	90	0	1		2	0	1	2
14:00	7	157	0	0	138	39	30	0	0	0	0	0	1303	89	0	1		3	0	1	3
14:15	7	135	0	0	165	29	24	0	0	0	0	0	1285	74	0			4	0	0	4
14:30	5	144	0	0	147	28	19	0	0	0	0	0	1281	71	0			0	0	0	0
14:45	6	138	0	0	135	23	16	0	0	0	0	0	1326	72	0			0	0	0	0
15:00	5	166	0	0	118	34	15	0	0	0	0	0	1361	81	0	1		1	0	1	1
15:15	6	158	0	0	139	29	21	0	0	0	0	0	1399	89	0	1		2	0	1	2
15:30	5	162	0	0	160	42	20	0	0	0	0	0	1481	92	0	1		3	0	1	3
15:45	6	152	0	0	146	33	25	0	0	0	0	0	1505	100	0	1		4	0	1	4
16:00	5	172	0	0	153	31	23	0	0	0	0	0	1552	92	0	1		1	0	1	1
16:15	9	204	0	0	166	35	24	0	0	0	0	0	1555	104	0	1		2	0	1	2
16:30	6	178	0	0	170	39	28	0	0	0	0	0	1496	92	0	1		3	0	1	3
16:45	7	176	0	0	166	35	17	0	0	0	0	0	1408	79	0			4	0	0	4
17:00	5	158	0	0	159	42	35	0	0	0	0	0	1293	82	0	1		1	0	1	1
17:15	3	164	0	0	153	35	12	0	0	0	0	0	929	47	0			2	0	0	2
17:30	9	157	0	0	104	35	15	0	0	0	0	0	574	35	0			3	0	0	3
17:45	8	129	0	0	104	28	20	0	0	0	0	0	269	20	0			4	0	0	4
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met: 7

Signal Warranted? Yes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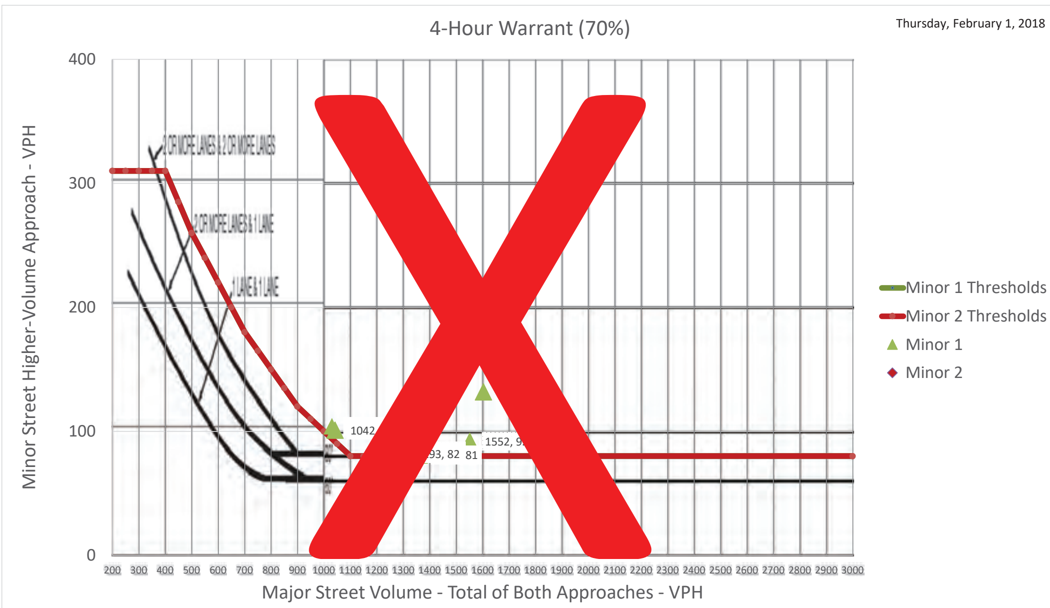
Thursday, February 1, 2018
500
400
300
200
100
0
Minor Street Higher-Volume Approach - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
1603, 132
1042, 101
1552, 92
1293, 82
81
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, February 1, 2018
400
300
200
100
0
Minor Street Higher-Volume Approach - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
1042
1552, 9
93, 82
81
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Appendix H

Archaeological Inventory Survey

SCS Project Number 607-1

ARCHAEOLOGICAL INVENTORY SURVEY REPORT ON 215.800 ACRES LOCATED IN WAIKAPU AHUPUA`A, WAILUKU DISTRICT, MAUI ISLAND, HAWAI`I [TMK (2) 3-5-02: 02 and 03]

Prepared by:
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October 2005

Prepared for:
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ABSTRACT

Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey on two parcels totaling 215.800 acres, which form one large land tract within Waikapu (and partially Wailuku) Ahupua`a, Wailuku District, Maui Island, Hawai`i [TMK (2) 3-5-02: 02 and 03]. Towne Development of Hawaii is developing the "Pu`unani" project in conjunction with Endurance Investors, LLC and the Association of II Wai Hui, LP.

Seven historic sites were documented during this Inventory Survey, two of which were previously recorded in the State Index of Historic Places (SIHP). All seven sites relate to historic sugarcane agriculture; the project area is 100 percent covered by abandoned cane land. Sites include two major concrete irrigation ditches; two lesser, more localized ditches; a reservoir; erosion-control earthen berms; and a cane-haul dirt road.

State Site Number 50-50-04-5197 represents the previously recorded Waihee Ditch, and State Site Number 50-50-04-5493 represents the previously recorded Waikapu Ditch. Five new sites were added to the SIHP during Inventory Survey. State Site Number 50-50-04-5729 represents a lesser, un-named, rock and mortar ditch. Likewise, State Site Number 50-50-04-5726 represents a second lesser, un-named, earthen ditch/drainage. Site 50-50-04-5727 is a large, un-named reservoir—the terminus of Waikapu Ditch. State Site Number 50-50-04-5728 is a sugar field erosion-control site comprised of 14 cross-slope, earthen berms of varying length that are positioned regularly throughout the project area. Finally, State Site Number 50-50-04-5730 represents "Old Waikapu Road", a cane-haul transport, dirt road that spans the border of parcels 02 and 03.

Excavation consisted of twenty-one backhoe-dug stratigraphic trenches evenly spread across the project area. Extensive pedestrian survey and this representative subsurface testing did not yield artifacts or cultural deposits.

All seven sites (all representing historic period sugarcane agriculture activities) were assessed as significant under Criterion D of Hawai`i's State Historic Preservation criteria. Based on the results of this project and depth of documentation, all seven sites have yielded all potential information important to this historic period and no additional archaeological mitigation is recommended within this project area.

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Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey on two parcels totaling 215.800 acres, which form one large land tract within Waikapu (and partially Wailuku) Ahupua`a, Wailuku District, Maui Island, Hawai`i [TMK (2) 3-5-02: 02 and 03]. Towne Development of Hawaii is developing the "Pu`unani" project in conjunction with Endurance Investors, LLC and the Association of II Wai Hui, LP. The Inventory Survey included historic background research and settlement pattern analysis prior to fieldwork, a complete pedestrian survey of the project area, representative subsurface testing via backhoe, and reporting (Figures 1 and 2).

Fieldwork, primarily consisting of systematic pedestrian survey, recordation, and representative subsurface backhoe testing, was conducted between August 16, 2005 and August 25, 2005 by SCS personnel Ian Bassford, B.A.; Randolph Ogg, B.A.; and Jon Wilson, B.A. The Principle Investigator for this project was Michael Dega, Ph.D.

Archaeological Inventory Survey of the project area was conducted to determine the presence/absence of archaeological deposits in surface and subsurface contexts through complete systematic survey and representative subsurface testing. The ultimate goals were to determine if historically significant archaeological sites occurred on the parcel and to provide recommendations to the State Historic Preservation Division (SHPD) concerning site mitigation during future land use of the project area.

ENVIRONMENTAL SETTING

LOCATION

The large survey area lies between coastal flats to the east and more mountainous terrain to the west along the medial reaches of the Maui isthmus between Wailuku and Mā`alaea (Figure 3). The project area is located between Wailuku (2 km north) and Waikapu to the south. Roughly ten percent of the project area (the northeast corner) lies within Wailuku Ahupua`a; the remainder is in the *ahupua`a* to the south—Waikapu (see Figure 1). The project area is composed of two adjacent parcels: TMK parcel 02 is located in the southeast quadrant of the project area and is less than half the size of parcel 03. The eastern perimeter of the project area abuts Honoapi`ilani Highway as it traverses from Wailuku toward Waikapu across the central Maui isthmus. The western border is defined by Wailuku Heights, an existing residential neighborhood. The northern boundary of the survey area is the curving Kuikahi Drive; the southern boundary is an arbitrary TMK line through abandoned cane lands (Figure 4).

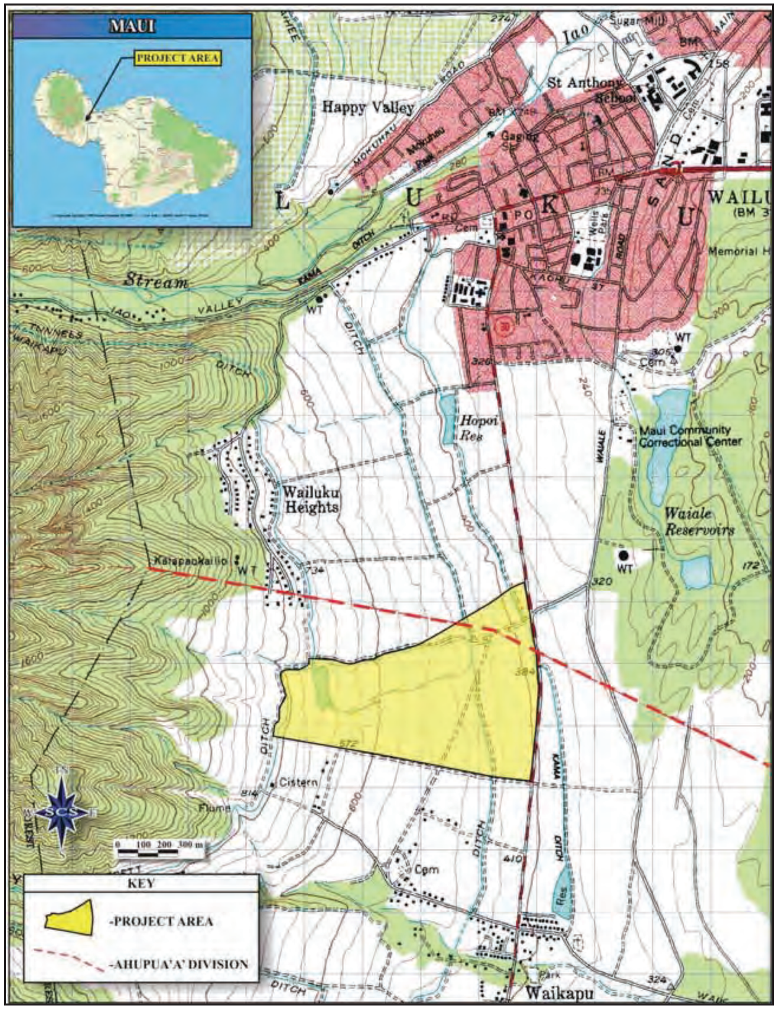

Figure 1: USGS Wailuku Quadrangle Map.

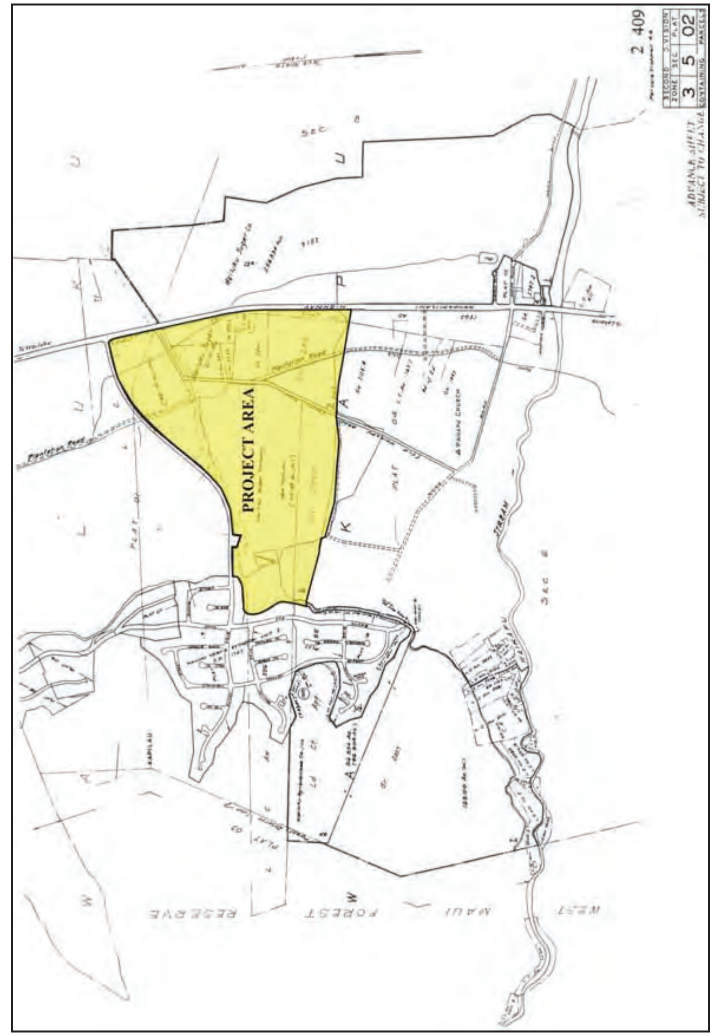

Figure 2: Tax Map Key [TMK] Showing Project Area.

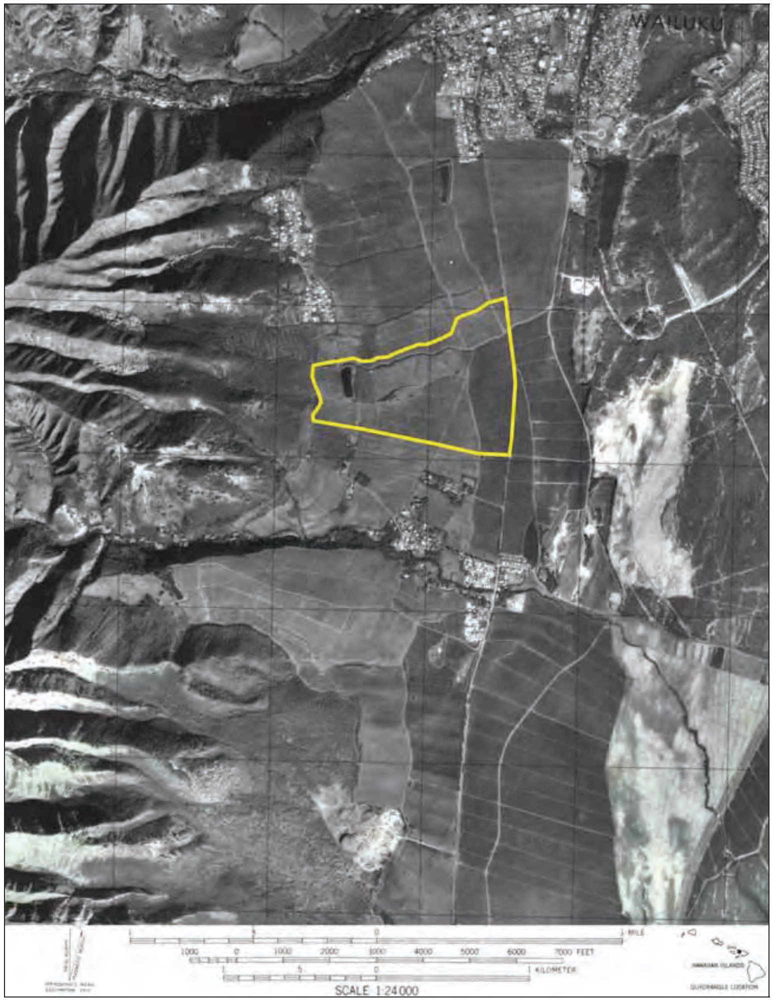

Figure 3: 1977 Aerial Photo of the Wailuku Region**.**

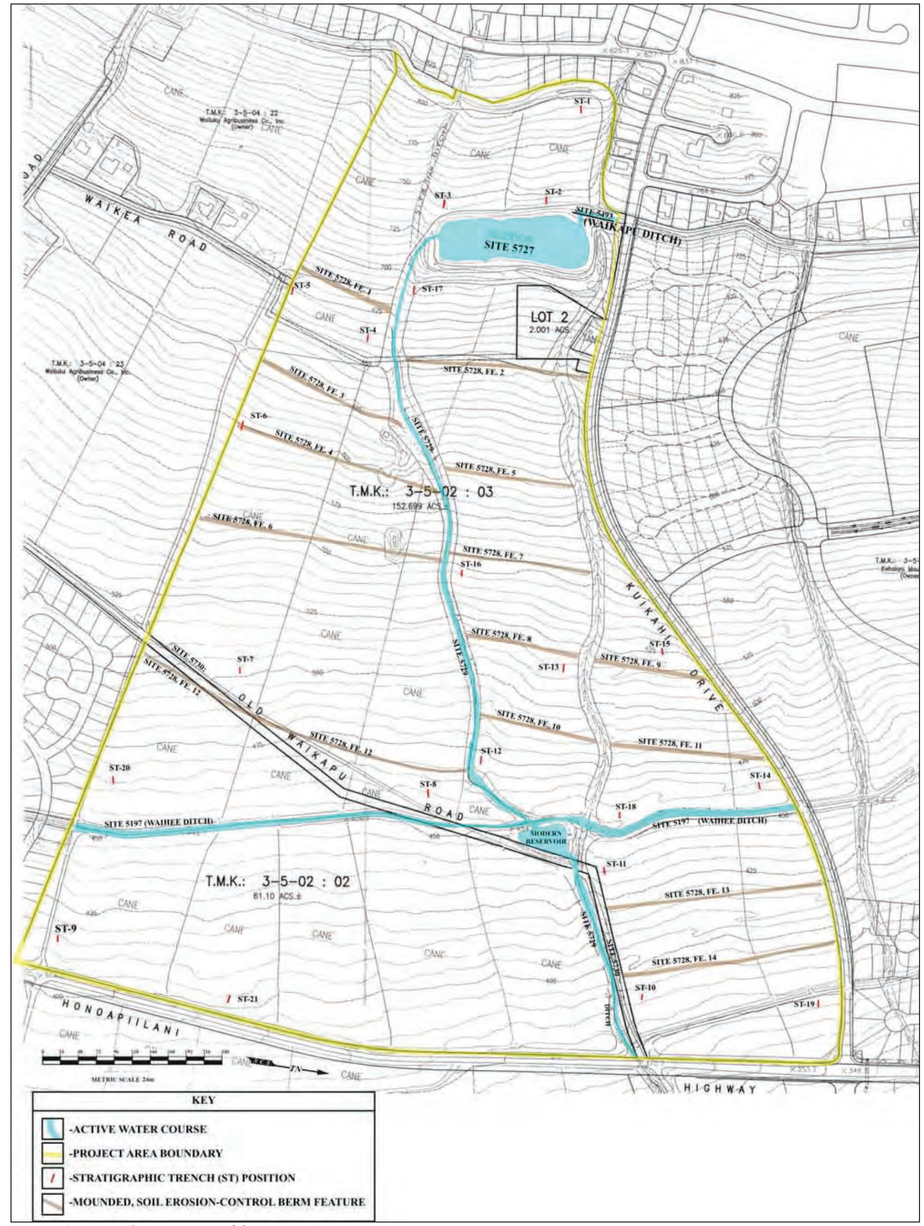

Figure 4: Plan View Map of the Project Area.

PROJECT AREA LANDFORM

Both archeological field survey and a review of geotechnical reports for the parcel reveal that the slightly sloping project area lies in locations previously utilized for the cultivation of now-abandoned sugar cane. According to Cavanaugh (1995:2), who conducted geotechnical studies on the 450-acre Kehalani Mauka Subdivision (the parcel that borders Kuikahi Drive to the north), "site topography slopes down moderately toward the east at a gradient of 10 percent." This accurately describes the slope of the current project area, which is steeper at its western (*mauka*) perimeter, and relatively flat near Honoapi`ilani Highway (Figure 5). Ground elevations range from approximately 115 meters (380 feet) above mean sea level (amsl) to 200 meters (660 feet) amsl. Various historic and modern dirt roads transect the surveyed area. As is discussed more below, project area exclusively consists of tilled zone, fill, and alluvial sediments. To the east, near the Maui Lani development, sandy matrices were identified. Sandy matrices were not identified in the current study area. Likewise, neither archaeological nor geotechnical subsurface testing detected any sandy matrices in areas immediately to the east of Honoapi`ilani Highway (Monahan 2003) or north of Kuikahi Drive during the Kehalani Mauka Subdivision (Dega 2004).

Figure 5: Distant Photograph of Project Area (lighter colored grass at center roughly defines boundaries). View to West.

Hydrology within the relatively dry project area is mostly in the form of historic irrigation modifications. Some of these modifications were the creation of a larger web of water conduits, drainages, and reservoirs, some built as early as 1905. No perennial streams run directly through the project area, and thus artificial ones had to be created for proper irrigation. By comparison, `Īao Stream runs west-east to the north of the proposed development while Waikapu Stream runs west-east to the south of the project area. Being located near these two major streams appears to have been beneficial for cultivation on the present parcel, at least during historic times. Several still-utilized irrigation ditches (*i.e*., Waihee Ditch, Site -5197) transect the project area, and a still-active larger reservoir is linked to one of these ditches. The remnant irrigation ditches and reservoir not only point to massive landscape modification in the area during historic times but also strongly infer the aridness of the area, which required large-scale water importation. The water table was not encountered in any of the 21 stratigraphic trenches excavated within the project area (maximum depth of 2.60 meters). Soil borings conducted during geotechnical analyses in a nearby project area failed to reveal the presence of the area's water table to at least 25 feet below the surface (Shimamoto 1995:4).

The project area has seen significant modern activity. A 25 meter high cinder/ soil pile has been consistently mined (or imported) via truck traffic into the western half of the project area from a dirt road linking Kuikahi Drive. Modern rubbish is scattered over the surface of each quadrant; nearly a dozen abandoned cars are located in the southeast quadrant. Land owners have a construction trailer and small, dirt parking lot at the northeast corner of parcel 03. Consistent, daily vehicle traffic across the parcel indicates the modern maintenance efforts related to the irrigation systems (necessary to serve locations outside of the project area).

VEGETATION AND SOILS

Vegetation in the project area is dominated by the presence abandoned cane that has been overtaken by non-native secondary growth shrubs and various introduced grasses (Figure 6). Several ironwood trees (*Casuarina glauca*) dot the landscape. *Haole koa (Leucaena leucocephala*) are fairly common especially bordering the eastern highway perimeter and near irrigation conduits. Native vegetation was not documented within the project area.

According to Foote *et al*. (1972:46–47, 100), soils in the project area fall into four sub-classifications of the `Īao soil series. These soils consist of well-drained soils on valley fill and alluvial fans that have developed from igneous rock and are nearly level to moderately sloping. The `Īao Series derivatives are similar to each other, yet primarily differ by the slope of the surface layer and inclusions of a higher content of cobblestones, such as in `Īao cobbly silty clay

Figure 6: Project Area Vegetation and Topography. View to Northeast.

(classified as both IbB and IbC). The IbC soil (7 to 15 percent slopes) is distributed along the Kuikahi Drive area; whereas the IbB soil forms the central region. Also occurring within the project area (in roughly equal percentages) are `Īao clay, on lesser slopes (IcB), and `Īao clay on steeper slopes (IcC). Figure 7 shows the project area distribution of these derivatives.

The presence of these soil types was confirmed through geotechnical studies in bordering parcels and archaeological testing during the current project. Important to emphasize again, no sandy sediment was identified in the project area. Sandy sediment (sand dunes) and mixed coastal-terrigenous sediments occur to the east of the current parcel (*i.e.*, Maui Lani).

The fairly homogenous nature of soils in the project area does provide contrast to soil regimes occurring more to the east (coastal-terrigenous and coastal) and to the north and south (dynamic stream valleys). The current project area occurs in a medial or intermediate environmental zone, both on a north-south and east-west axis. Along a north-south axis, the property lies in a very dry, open area between two perennial streams (`Īao and Waikapu). On an east-west axis, the project parcel lies above the influence of the coastal plain and below the wetter uplands. The current parcel thus lies in a fairly non-dynamic environmental zone that is practically surrounded on all sides by contrastingly vibrant areas (see Figure 5). That this

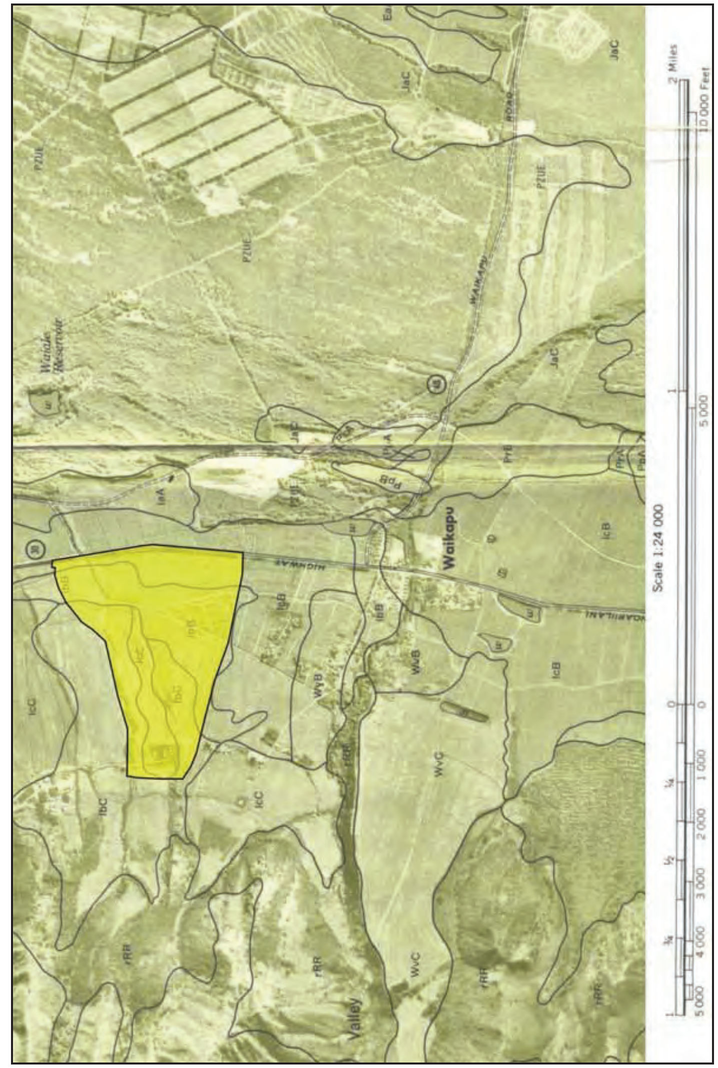

Figure 7: Project Area Soils and their Distribution [Adapted from Foote *et. al* (1972)].

intermediate area, occurring between more dynamic zones, required artificial controls is well-observed throughout the project area in the form of irrigation ditches and reservoirs.

CLIMATE

Rainfall in this intermediate environment is very modest. The project area receives an average annual rainfall of only 33 to 44 centimeters (Price 1983:63), with much of this rainfall occurring during the winter months (November–April). Seasonal variation in rainfall amount follows normal orographic patterns for leeward-type areas of Maui. The project area occurs just to the south of what may be considered the leeward-windward boundary. At higher elevations within Wailuku Ahupua`a, the amount of rainfall doubles and triples that of the project area. To the north, from `Īao Stream Valley area toward Waihee Valley, rainfall is much more intensive, with combined rainfall and geographic patterns being more conducive to traditional types of agricultural cultivation (*i.e.*, *lo`i*, sweet potato). The rainfall in this gently sloping project area drains downhill to the east and provides an additional water source for traditional Hawaiian agriculture in the lowland flats to the east of the project area (see Handy and Handy 1972).

TRADITIONAL AND HISTORIC SETTING

Wailuku District inhabits the eastern side of the West Maui Mountains (Mauna Kahalawai) and occupies the isthmus through the center of the island to coastal reaches in Kahukui and Mā`alaea. Wailuku, together with Waikapū, Waihee, and Waiehu, is one of the *Na Wai `Ehā*, or "the four waters," known for the occupancy of chiefly individuals (Kame`eleihiwa 1992; Pukui and Elbert 1992; and Creed 1993). Wailuku District and Wailuku Ahupua`a are frequently mentioned in historical texts and oral traditional accounts as being politically, ceremonially, and geographically important areas during traditional times (Cordy 1981, 1996; Kirch 1985). Wailuku was considered a "chiefly center" (Sterling 1998:90) with many of the chiefs and much of the area's population residing near or within portions of `Īao Valley and lower Wailuku. The many *heiau* constructed in the Wailuku area point to its ceremonial and religious importance during pre-Contact times. During historic times, after numerous battles in the area, the large concentration of Land Commission Awards granted in Wailuku, particularly in lower `Īao Valley, also attest to a sizeable population base and the importance of the lands for cultivation through time. More recent land use in the area included sugar cane cultivation and use of the land for pasture.

THE TRADITIONAL SETTING OF WAILUKU

Archaeological settlement data indicates that initial colonization and occupation of the Hawaiian Islands first occurred on the windward sides of the main islands, with populations

eventually settling into drier leeward areas at later periods (Kirch 1985). Archaeological dates for initial occupation of the Hawaiian Islands far pre-dates accepted ranges gleaned from palynological data. A more secure estimate for initial occupation of the islands is the A.D. 9th century (Athens 1997), if one is to lay more credibility with the pollen record than the archaeological record. In the Waihee and Waiehu areas of Wailuku, Kirch (1985:87) notes that "a number of coastal dune midden sites have been reported, and at least one of these contained pearl-shell fishhooks similar to those from the Bellows Site, eroding from the wave-cut midden." (The Bellows site, located on the windward coast of O`ahu, has yielded dates of occupation, albeit controversial, from A.D. 300 to 600 [Pearson *et al*. 1971], one of the earliest dated sites in the Hawaiian Islands. For the most part, these dates have now been diagnosed as very problematical and are no longer valid.) More recent research within Wailuku Ahupua`a indicates that the area was likely settled between *c*. A.D. 1100 (Kirch 1985:142) and A.D. 1200 (Fredericksen and Fredericksen 1996).

To the north of the current project area lies `Īao Valley, one of the most important locations in the area for prehistoric activity. Connolly (1974:5) states that the pre-Contact valley [`Īao] had a large population base with "most people residing in a settlement near `Īao Needle," just north of the project area. Supposedly, the subsistence base of this population consisted of fish and taro, with Kahului Harbor and the coast close by and *lo`i* systems lining `Īao Valley's stream banks. Prehistoric ditches or *`auwai* were utilized in taro cultivation (Connolly 1974:5). Sterling (1998:86) adds that two *`auwai* within the valley:

> have existed immemorially and were evidently constructed for the purpose of irrigating *kalo* on the plains which stretch away to the northward and southward of the [`Īao] river. Several minor *`auwai* have, since ancient times, tapped the river at different points lower down and spread the water through the lands in the gulch on either side of the river bed.

Handy in Sterling (1998:63) further notes that "From Waihee and Wailuku Valley, in ancient times, was the largest continuous area of wet taro cultivation in the islands." Cheever (1851:124) writes: "the whole valley of Wailuku, cultivated terrace after terrace, gleaming with running waters and standing pools, is a spectacle of uncommon beauty to one that has a position a little above it."

Recent archaeological research (Fredericksen and Fredericksen 1996:52) has revealed that habitation sites along what is now Lower Main Street in Wailuku, "are associated with the rich taro producing lands in the Lower `Īao River flood plain, and the extensive cultivation systems present in `Īao Valley." These habitation sites have been dated to the A.D. 15th through 17th centuries. The `Īao Valley area was not only renowned for its agricultural base during prehistoric times but its ceremonial and political base as well (see also Cordy 1996; Donham 1996).

No discussion of Wailuku is complete without mentioning the important *heiau* complex above `Īao Valley near its seaward terminus. During the mid to late 18th century, the Halekii-Pihana *heiau* complex was supposedly designed by a Hawaiian named Kiha (Sterling 1998:89). These monuments, designated as State Site Number 50-50-04-522 and occurring along the northwest flank of the current project area, are described as very important *heiau* within Hawaiian history. Yent (1983:7) notes the life cycle of the *ali`i* was represented here. It was the place where Kamehameha I's wife was born, Kahekili lived, and Kekaulike died. Thrum (1909:46) reported that Kamehameha I evoked his war god at Pihana Heiau after his warriors defeated Kalanikupuli's forces during the Battle of `Īao in 1790. The two *heiau* are primarily associated with Kahekili, who is connected with the Halekii-Pihana complex between *c*. A.D. 1765 and 1790, and Kamehameha, during his conquering of Maui in 1792 (Yent 1983:18). Halekii and Pihana Heiau are the only remaining pre-Contact Hawaiian structures of religious and historical importance in the Wailuku-Kahului area that are easily accessible to the public (Estioko-Griffin and Yent 1986:3). As stated, the area within and adjacent to the current project is known not only for its religious and/or ceremonial significance, but for its political prominence as well.

The Fredericksens' (1996:52) report states that politically, Wailuku [village] was known as a central settlement for high ranking chiefs and their retinue. The Wailuku area was also witness to many battles, from the Battles of `Īao and Sand Hills to the Battles of Kepaniwai and Kakanilua. The most famous battle was that of Kepaniwai where Kamehameha I, in July 1790, finally wrested control of Maui Island. Kamehameha I and his warriors landed at the Kawela portion of Kahului Bay and proceeded up `Īao and other valleys to score a decisive victory. Wailuku, meaning water of destruction, succinctly describes the area in which many of these major battles occurred. Of additional note is that in the Kauahea area of `Īao Valley (southeast of `Īao Stream below Pihana Heiau-supposedly within the current project area), warriors apparently dwelt and were "trained in war skills and there was a boxing site in the time of Kahekili" (Sterling 1998:89).

TRADITIONAL SETTING OF THE PROJECT AREA

Creed (1993) has written extensively on the traditional background of the Waikapu area, much of which directly applies to the open landscape of the current project area just to the north of Waikapu. Many classes of sites are found or may have existed in the Waikapu-Wailuku area during traditional times. Creed (1993:19–21) provides an extensive list, including some site types that would not apply to the current parcel due to its distance from major drainages, the coastline, and its open land classification. Traditional sites that would apply include agricultural sites (*kula* lands, *wauke* patches, *hala* trees, pigs, and potato patches), boundary walls, burials (sometimes located in habitation terraces), feather gathering areas (particularly in the mountains to the west), habitation loci, and *pohaku* (an adze stone marks the border between Wailuku and Waikapu). While populations were predominantly centered in `Īao Valley and Waikapu Valley, there was agricultural and habitation activity in the open grasslands of the current project area above the coastal flats. Much evidence for such activities has not yet been found through archaeological means, a situation that places much culpability on historic land use that may have erased or scattered this evidence. As such, there is much more evidence for historic activities occurring in the area.

HISTORIC SETTING OF THE PROJECT AREA

Current project area lands were first assigned to the district formerly known as Kula. Taken literally, *Kula* refers to open land or plains (Pukui and Elbert 1992:70). Kula District is known for its dry, arid lands being vacant of perennial streams. Kula was always an arid region, throughout its long, low seashore, vast stony *kula* lands, and broad uplands. There are exceptions in Wailuku as one proceeds along Īao Stream Valley and further to the west/northwest past Waihee and Waiehu. However, even the vast stony *kula* lands were utilized during traditional and historic times. Most evidence for such land utilization has come in the form historic records.

THE GREAT MāHELE

In 1848, during the late historic period, commissioners of the Great Māhele instigated an extreme modification to traditional land tenure on all islands that resulted in a division of lands and a system of private ownership. The Māhele was based upon the principles of western law. While a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian society to that of a market economy (Kuykendall Vol. I 1938:145 footnote 47 *et passim*; Daws 1968:111; Kame`eleihiwa 1992:169–170, 176). The dramatic shift from a redistributive economy to a market economy resulted in drastic changes to land tenure, among other things. Case in point, foreigners demanded private ownership of land to ensure their investments (Kuykendall Vol. I 1938: 145 *et passim*; Kame`eleihiwa 1992:178; Kelly 1998:4).

Once lands were made available and private ownership was instituted, native Hawaiians, including the *maka`āinana* (commoners), were able to claim land plots upon which they had been cultivating and living. Oftentimes, foreigners were simply just given lands by the *ali`i*. However, in the case of commoners, they would only make claims only if they had first been made aware of the foreign procedures (*kuleana* lands, land commission awards). These claims could not include any previously cultivated or currently fallow land, *okipu*, stream fisheries, or many other natural resources necessary for traditional survival (Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). Awarded parcels were labeled as Land Commission Awards (LCAs). If occupation could be established through the testimony of witnesses, the petitioners were issued a Royal Patent number and could then take possession of the property. Commoners claiming houselots in Honolulu, Hilo, and Lāhianā were required to pay commutation to the government before obtaining a Royal Patent for their awards (Chinen 1961:16).

Wailuku District was declared Crown Land during the Great Māhele and numerous Land Commission Awards, approximately 180, were awarded within Wailuku Ahupua`a while approximately 100 were awarded for Waikapu Ahupua`a (Creed 1993). A handful of foreigners (*i.e.*, Anthony Catalena, James Louzada, E. Bailey) gained control of large parcels of lands that would later be used for mass cultivation of sugarcane. Significantly, the majority of LCAs were awarded to Hawaiians, a gauge that can be used to measure pre-Contact settlement, since there was little overall change in traditional land use among Hawaiians prior to 1853 (Creed 1993:38).

During the Great Māhele of 1848, a total of three land claims were awarded in the current project area (Waihona `Aina 2005): LCA 433, 3201, and 3525—all of which are located in parcel 02, in the central area of the eastern border near Honoapi`ilani Highway (Figure 8). Table 1 summarizes archival research of these three LCAs.

Table 1: LCA and Land Grant Data for [TMK:(2) 3-5-02: 02].[1]

LCA No.	Awardee	Land Use	Comments
00433	William Crowningburgh and wife Maile	*lo`i* – 21 *`apana* – 4	Stream also on property. Crowningburgh surrounded this land with a fence and raised animals on the property. Plot of land was referred to as *Pili Pili* at the time.
03201	Wm. A. McLane	*`apana* – 2	One ditch on piece of land. Plot of land was referred to as A*wakamanu* at the time.
03525	Keliiolelo	*lo`i* – 3 *`apana* – 3 House lot –1	Stream on property. Plot of land was referred to as *Awakamanu* at the time.

[1] Source: Waihona Aina website (www.waihona.com), information obtained in September, 2005.

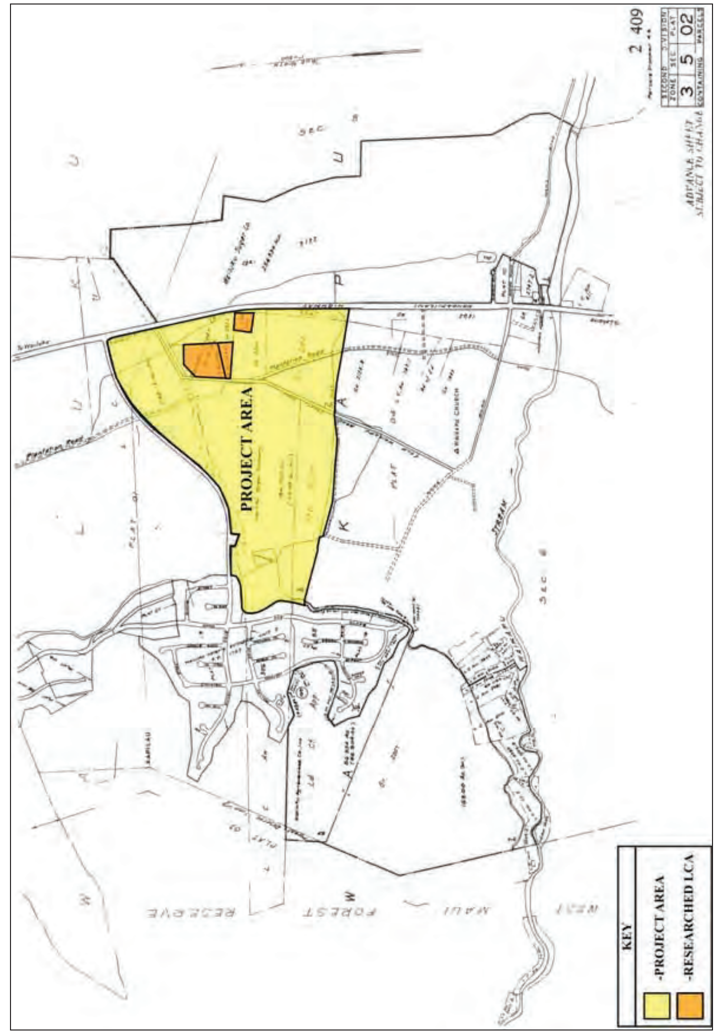

Figure 8: Adapted 1992 Tax Map Key with Researched LCAs Highlighted.

This LCA record keeps with the overall LCA pattern of the Waikapu-Wailuku area intimating taro cultivation in association with permanent residences. Such a pattern is historically documented from 1848, but likely extended deeper into the past. *Lo`*i (irrigated taro patches or planted terraces) and evidence of smaller, private land plot divisions, *`apana*, are no longer detectable within this surface or subsurface landscape.

Similarly, the Wailuku Ahupua`a parcel north of Kuikahi Drive predominantly lists among its LCA records ‘property for raising cattle’ and ‘pasture grounds for cattle’ (Dega 2004). There also is some mention of stone walls, *kalo* patches, and *lauhala* trees on the landscape. Perhaps the most significant structures on this adjacent land were built by the American Board of Commissioners for Foreign Missions (A.B.C.F.M.) which consisted of two house lots with adobe walls. The lots occurred “near pasture land,” a common theme for the area (Waihona `Aina 2005). In Waikapu, to the south, the LCAs reflect *lo`i* cultivation, *kula* lands, and house sites. However, much or all of the evidence related to such settlement of the Waikapu area has been effaced by late-historic and modern cultivation. The current project area is a prime example of this trend.

Land use in Wailuku and Waikapu Ahupua`a in the mid 19$^{th}$ and early 20$^{th}$ century was largely devoted to the sugar industry. During the 1860s, the sugar business was growing, with plantations and mills at Wailuku, Waihe`e, Waikapu, and Haiku. Many of the plantation camps associated with these mills were centered in the Pu`unene, Kahului, and Wailuku area (see Denham *et al*. 1992:16). Historic utilization of the Waikapu-Wailuku landscape within and near the project area focused on industrial-levels of cultivating sugar cane and pineapple. Water was channeled from traditional sources (*e.g.*, Waikapū Stream, western aquifers or springs) through plantation lands. Both local and imported workers operated on these plantation lands and the area maintained fair population density. Evidence for expansive landscape modifications to accommodate the industrial-level of production is very evident across the current subject parcel in the form of the north-south oriented known historic ditches. The significant amount of plastic and tubing and sheeting found within Layer I of excavations attests to even more recent utilization of the open landscape for cultivation. These former sugarcane lands are now being reclaimed through residential developments.

PREVIOUS ARCHAEOLOGY

IMMEDIATE VICINITY OF PROJECT AREA

Intensive research within the State Historic Preservation Division (SHPD) archives concluded that no previous archaeological study was conducted within the present project area. However, of primary importance for the present study are the results from three projects recently conducted within and bordering the 348-acre subdivision to the north (Figure 9). First, Archaeological Inventory Survey was conducted on approximately 100 acres of land that included five separate lots and a proposed road corridor in the Kehalani Mauka Subdivision (Dega 2003). Three historic sites were documented during this Inventory Survey. State Site Number 50-50-04-5473 has been assigned to Hopoi Reservoir. This reservoir predates Hopoi Camp and was present at least by 1922 (see Dega 2003). Occurring to the immediate east of Hopoi Reservoir and running north-south to Waikapu is Kama Ditch (State Site No. 50-50-04-5474), a water conduit carrying the precious commodity to dry southern lands. A single basalt adze (Site 50-50-04-5478) was recovered from the northern flank of Lot 21 along the eastern flank of the parcel. Extensive survey and testing in the area of the isolated find failed to produce additional artifacts or cultural deposits. Representative subsurface testing (18 trenches) on the lots only revealed highly homogenous soil matrices across the open, barren intermediate area.

A second SCS Inventory Survey Report dealing with these same Kehalani Mauka lands (Dega 2004) documented lots not surveyed in the first study. This survey recorded six additional sites, all historic. Similar to the present project area, a series of un-named, lesser ditches was found within Kehalani Mauka, represented by State Site Numbers 50-50-04-5490 and 50-50-04-5493. Waihee Ditch (Site -5197) flows from this former SCS project area into the present project area. Historic-modern roadways (50-50-04-5489), a historic surface artifact scatter (50-50-04-5491), and several plantation-era clearing mounds (50-50-04-5492).

In summary, the results of the Kehalani Mauka Subdivision Inventory Survey roughly duplicate the present project area’s findings. Aside from a lone traditional artifact (an adze)—which could remain despite a century of cultivation—larger traditional sites were destroyed during the sugar-era.

An Archaeological Assessment Report was published based on a negative results survey on Kehalani lands just to the east of Honoapi`ilani Highway (Monahan 2003). This survey did not produce any structures or artifact scatters. Trench excavation demonstrated a fairly consistent subsurface stratigraphy with a thick layer of dark brown silt (Layer II) inclusive of historical

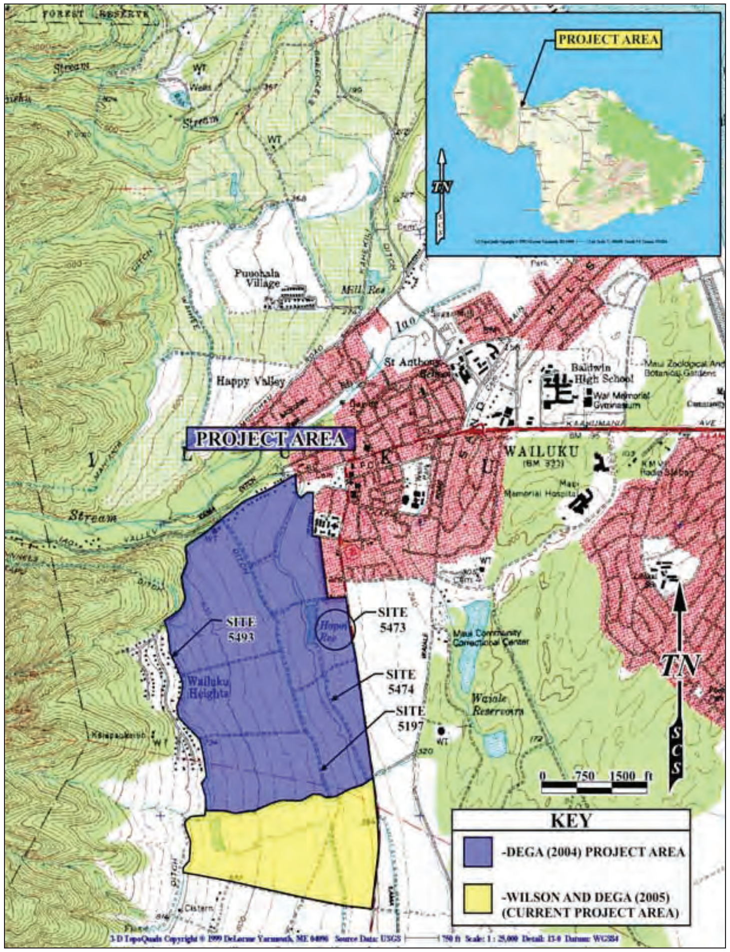

Figure 9: USGS Wailuku Quadrangle Map Showing Adjacent Areas of Archaeological Study.

garbage (*i.e.*, black plastic and rubber tubing, white plastic irrigation pipes, and black plastic sheeting) over an undisturbed very dark grayish-brown silty clay subsurface (Layer III). A dark brown, silty root mat-layer (Layer I) was present in some units. No undisturbed sandy deposits were encountered, although a few trenches close to the eastern boundary of the project area did contain thin lenses of yellowish-brown sand. These sand lenses were clearly introduced as recent fill.

GENERAL WAIKAPU AREA

In terms of general projects in the Wailuku-Waikapu environs, the earliest archaeological endeavors on Maui were undertaken by Thrum (1909), Stokes (1918), Emory (1921), and Walker (1931). None of their archaeological finds directly pertain to the current project area; however, their data allows for a deeper understanding of the traditional use of the Wailuku-Waikapu area.

In an area south of the project area, within open lands similar to what is being researched herein, Thrum mentions that two *heiau* may have possibly existed within the *ahupua`a* of Waikapū, but evidence of the two sites no longer remains (1909–1918:59). A group of approximately 45 house and shelter sites (State Sites 50-50-09-1441, the McGregor Point C-shaped structures, and 50-50-09-1287, the Mā`alaea Complex) was identified by Walker (1931) to the west of Mā`alaea. Chronology for these sites has yet to be determined (Creed 1993). Walker (1931:58) also described a *koa*, or fishing shrine, and two petroglyph fields with an associated *heiau* (State Site numbers 50-50-09-1169 and -1199) at Mā`alaea. The *koa* was not assigned a State Site number, nor has it been relocated.

Recent archaeological work in Waikapū Ahupua`a (Kennedy 1988, 1989; Folk and Hammatt 1989; Haun 1989; Brisbin *et al.* 1991; Donham 1991; Titchenal 1996) has revealed a low density of sites ranging in function from habitation to agriculture. Radiocarbon dating results in these studies have produced dates ranging from the A.D. 1100s to modern times. Together, their collective data suggests a "general trend toward development of large, densely settled populations between A.D. 1200 and about 1800, and the expansion and intensification of dryland field systems, particularly during the latter two centuries of this period" (Creed 1993:33).

Other recent archaeological work just to the south and/ or east of the current project area has been limited to two field inspections (Donham 1991, 1995) and near the eastern boundary line of the current project location, two archaeological Inventory Survey-level investigations

(Kennedy 1988, 1989; Buffum and Dega 2001). The conclusions offered by these few projects primarily indicate that any surface and/or subsurface features of cultural value that were once present within the area have most likely since been destroyed by intensive agricultural use of the land (*i.e.*, sugar cane and/or pineapple cultivation); this pattern was also confirmed by subsurface examination. As such, a broader background for Wailuku District is offered herein (see below).

WAILUKU DISTRICT OVERVIEW

The following section provides a brief overview of archaeological research in Wailuku District itself and is presented in two arbitrary sections: Upper Wailuku and Lower Wailuku District. Upper Wailuku is considered to be the lands above Kuihelani Highway while Lower Wailuku encompasses the lands below Kuihelani Highway and extends to Mā`alaea Bay in Waikapu Ahupua`a. The following district-specific research appears in its entirely as first published in Dega (2004).

UPPER WAILUKU DISTRICT

The majority of archaeological work is associated with the Pu`u One region in the northern most section of Wailuku District. Prior archaeological work in the Pu` One region indicates an emerging pre-Contact settlement pattern for this region. SCS (Dunn and Spear 1995) conducted research at the intersection of Naniloa and Waiale Roads where habitation features and a cultural layer interspersed with hearth and pit features were identified during a monitoring project. These features all occurred in sandy substrate. Radiocarbon dates submitted from these features yielded dates ranging from A.D. 1434 to A.D. 1807, dates suggesting pre-Contact sites and early historic land use. SCS (Burgett and Spear 1995) conducted Archaeological Inventory Survey in the sand hills along lower Main Street. One habitation site (50-50-04-4004) located in a remnant of a once larger cultural deposit was identified. Radiocarbon samples dated the site to A.D. 1420 and A.D. 1640, or to the early to mid-prehistoric time range.

SCS (Morawski and Spear 2001) conducted Archaeological Monitoring during the installation of a water pipeline and fire hydrants on Naniloa, Helenani, Leilani, Kainani, Naniluna, and Ka`ahumanu Highway roads with the town of Wailuku. During the research, a historic refuse dump was discovered, as were the remains of previously disturbed human burials. SCS (Buffum and Spear 2001; Zachman and Spear 2002) conducted Archaeological Monitoring at the Maui Medical Center. Due to extensive landscape modifications, no archaeological or traditional materials were identified during excavation.

Pantaleo and Sinoto (1996) conducted archaeological work at the Maui Lani Development to the east of the present project area. As of the 1996 publication, only one concentration of multiple burials was discovered while the remainder were isolated individual burials at the tip of the dune (at the highest elevations). A more contemporary report documenting additional burial finds at Maui Lani should aid in clarifying the overall results of that project. Research conducted by Fredericksen and Fredericksen (1997) indicated that this section of dunes was primarily used during prehistoric times as an interment area, a contention easily supported by the previous year's study. Habitation sites (several with associated burials) have been found mostly in the dune area associated with the Lower Main Street/Waiale Road Corridor. Conversely, studies east of this corridor have yielded only human burials (Fredericksen and Fredericksen 1998). Fredericksen and Fredericksen (1998) lists many of the archaeological studies conducted in the Lower Main Street/Waiale Road Corridor and Central Maui area.

LOWER WAILUKU DISTRICT

A limited number of archaeological projects have been conducted in this particular land section, much of which was disturbed during the massive sugar cane cultivation. The fair amount of archaeological work conducted along Lower Main Street is summarized elsewhere (see Morawski and Dega 2003). In comparison, Sinoto and Pantaleo (1992) conducted Archaeological Inventory Survey of a proposed location for the Kihei Gateway complex, on the *makai* side of the Piilani-Mokulele Highway junction. One historic site, the remains of concrete footings from a bridge across Waiakoa stream, was identified (Site 50-50-09-31).

SCS (Burgett and Spear 1997) conducted large-scale Archaeological Inventory Survey of the Puunene Bypass/Mokulele Highway improvements stretching across the majority of Wailuku District. Although no sites were identified, this absence may account for the lack of archaeological remains: extensive disturbance associated with prior sugar cane cultivation, highway and private construction activities, and little or no prehistoric occupation of the area. However, *lo`i* cultivation was reported to be intensively cultivated in this area (Handy and Handy 1972). The replacement of *lo`i* with sugar cane during historic times would be the most likely cause for the destruction of all traditional sites related to prehistoric cultivation in the area.

Fredericksen and Federicksen (1998) conducted archaeological research on 232 acres northeast of Puunene Avenue stretching to Haleakala Highway. No formalized traditional or prehistoric sites were discovered. Several sites consisting of volcanic-glass surface scatters were identified in the former sugar cane fields along with a historic irrigation ditch.

SETTLEMENT PATTERN

Archaeological investigations within the currently studied portion of Wailuku-Waikapū have revealed relatively little regarding traditional settlement patterns due to the dearth of supporting empirical evidence. Archival research and analyses of the generalized settlement pattern for Wailuku District have been the foremost sources for discerning an established settlement pattern for the current project area.

Archaeological evidence suggests that early settlement in the Hawaiian Islands occurred along windward shoreline areas between the A.D. 4th and 11th centuries. Pollen evidence suggests a settlement date of the A.D. 9th century (see Athens 1997). For the most part, these populations used local resources and seldom ventured into upland valleys. Cordy (in Creed 1993) suggests, however, that upper valley areas on windward coasts were likely populated before the A.D. 1100s. Coastal settlement was still dominant, but populations began exploiting and living in more upland *kula* zones. Greater population expansion to inland areas did not occur until the *c*. A.D. 12th century but continued through the 16th century. Large scale or intensive agricultural endeavors were implemented in association with habitation. Coastal lands were used for settlement and taro was cultivated in near-coastal reaches and in the uplands. Upland areas of Maui such as the Waiohuli-Kula area contained large garden enclosures, ceremonial structures, and permanent habitation sites by *c*. A.D. 1600.

Nearer the coast in intermediate lands such as the current project area (*c*. 60–85 meters amsl), taro was cultivated along stream courses, dryland taro was grown on *kula* lands such as the project area, and populations were settled. It is possible that the *kalo* patches described in the aforementioned LCA accounts originated during the "Expansion Period" of A.D. 1400 to 1600, perpetuating through historic times (Kirch 1985). However, most of the LCAs for the area describe almost no cultivation occurring in the area during the 1850s as pasture land and sugar cane cultivation were already dominating the use of the land (Creed 1993:74). Primary settlement and resource zones lay outside the current medial environmental zone in Wailuku proper, near perennial water sources (`Īao Valley, Waihee, Waiehu). The only substantial settlement along this medial isthmus zone between 300 and 600 feet amsl was at Waikapu, to the south of the current project area, near the base of Waikapu Stream Valley (see Creed 1993). As the current project area does not contain a perennial water source and is primarily open grassland, the area is considered to lie at the periphery of the more resource-rich zones in Wailuku.

Historic utilization of the Wailuku-Waikapu landscape was dominated by the cash cropping of sugar cane and pineapple, made possible by water channeled from traditional sources (*e.g*., Waikapu Stream) through plantation lands. Historic features associated with this period are represented as water features in the form of reservoirs (Hopoi Reservoir) and water channels (Waikapu Ditch, Waihee Ditch). This area was also an important transportation corridor linking both the south and north flanks of the Maui isthmus, with Honoapi`ilani Highway having been demarcated as a Government Road on area maps by 1882 (Creed 1993:20).

PROJECT AREA EXPECTATIONS

Prior to commencing archaeological fieldwork, a review of archival resources and the results of previous archaeological work conducted in the area was undertaken to assess possible findings during fieldwork. Based on previous archaeological work—primarily north and east of this intermediate landscape—and on LCA information, site patterns prior to intensive historic land alteration activities show systematic use of the terrain as taro planting areas, limited habitation, and divisions of pastureland. Previous archaeological investigations within this portion of the Wailuku-Waikapū corridor have revealed very little data to confirm these patterns, this not surprising considering the impact that long and intensive agricultural exploitation has had on the surface of the area and subsurface strata. Traditional site components expected prior to these land-altering activities consist of dryland taro patches, associated agricultural components such as *`auwai* and/or terracing, house sites, boundary walls, and pasture walls. Expectations for identifying such data sets were low, however, due to the aforementioned historic land uses.

Traditional sites that may once have been present within the current project area were not expected to remain unaltered. Given LCA testimony and general settlement patterns for this inland, intermediate area, land use patterns for the current project area were thought to be most obviously related to historic-period settlement and cultivation—but on a very limited scale. At present, an empirically-based chronology of this area has yet to be provided, given intensive historic land modifications and the lack of datable archaeological evidence. According to Creed (1993:77):

> . . . we have no carbon dates to indicate the possible beginnings for this wetland agriculture in Waikapū Valley. Moreover, this area has been in constant use for crops and habitations at least since the time of the *Māhele*, if not long before and modern uses may have destroyed all traces of prehistoric uses. However, the LCA records and early maps document the extent of the *lo`i* agriculture in the

> 1850s. The stream valley in its upper reaches may have some remnants of these *Māhele* period *lo`i* or *`auwai*.

Expectations for this project area rested on several assumptions, some of which were proven valid at the end of fieldwork. First, the project area, lying in an open, intermediate zone containing hard soil composed of silty clay with cobbles was not intensively occupied during traditional times. Traditional and early historic-period populations were focused elsewhere in areas such as Waikapu, `Īao Valley, Waihee Valley, and Waiehu Valley. Thus, there were low expectations for identifying larger, intact sites or deposits; they simply were not constructed in this area. Secondly, there was the possibility that sand sediment could be present along the eastern flank of the project area. The association of sand and traditional/historic burials and cultural deposits has been well documented (see Kirch 1985). Thus, if sandy deposits did occur along the eastern flank, cultural deposits could be present. Third, the area was heavily modified for industrial cultivation. Remnants of such modifications, such as fill strata, excavated areas, reservoirs, and earth mounds/ berms were expected throughout the project area. A cursory study of the USGS Wailuku Quadrangle Map showed that irrigation ditches crossed the current project area. Finally, based on the primarily negative results from other archaeological projects conducted along the intermediate Wailuku-Waikapu corridor, there were limited expectations for identifying intact traditional-period architectural structures or intact cultural deposits lying beneath the tilled surface. However, historic structures related to irrigation and were likely, considering they were previously documented near the parcel (see Dega 2003). In all, some of these expectations were met during the current study.

METHODOLOGY

FIELD METHODS

Fieldwork consisted of systematic pedestrian survey of the entire 215.800 acre parcel and mechanical subsurface testing across representative portions of the parcel. Written and photographic documentation occurred during each phase of research. First, 100 percent systematic pedestrian survey was conducted to assess the presence/absence of surface features and artifacts as well as to assess soil deposits amenable to testing. As visibility was moderate within fifty percent of the project area (*makai* half), and low-to-moderate in the *mauka* half, 100 percent surface survey was conducted by two to three crewmembers spaced closely together (5 meters apart), walking parallel along north-south transects. When any structures, artifacts, or intriguing topographical changes were identified, they were plotted on an overall site map and flagged. Surface artifact assemblages, surface features, or anomalies were assigned temporary

site numbers. Temporary site numbers were converted to State Site Numbers upon a cursory project review by SHPD following the completion of fieldwork.

After survey, the crew returned to each flagged location to fully investigate the area and assess excavation potential. Representative areas were demarcated for subsurface testing. All subsurface testing was done mechanically by backhoe. Following excavation each trench was thoroughly documented via stratigraphic layer profiles, soil analysis, photography, and location plotting on a project area map (see Figure 4). A vast area was tested with these intermittent trenches, however, excavation produced negative results in terms of subsurface cultural material of interest to the archaeological record.

While no cultural materials were collected from any trench, soil samples were taken from each trench and analyzed in the field. The results revealed a fairly homogenous soil matrix. None of the excavated soil was screened, but all trench walls were thoroughly inspected. Photographs were taken first of trench locations prior to excavation, secondly of at least one profile (or multiples) of each trench, and thirdly, overview shots were taken of the respective trench at the base of excavation. Representative photographs are offered in Appendix A.

LABORATORY METHODS

As the results of survey and excavation were negative in terms of collected artifact classes and samples, laboratory work was not necessary. Because none of the soils analyzed in the field were deemed to be associated with past habitation surfaces, traditional agricultural levels, or cultural deposits, no samples were submitted for specialized analysis (*e.g.*, radiocarbon, pollen, phytolith analysis). Subsurface charcoal was an extremely rare commodity, and when found it was in association with modern debris from modern agricultural activity or dumping. Drafting of stratigraphic profiles, mapping illustration, and section drawings, were the primary components to laboratory work. All field notes, maps, photographs, and artifacts pertaining to this project are being curated at the SCS laboratory in Honolulu.

ARCHAEOLOGICAL INVENTORY SURVEY RESULTS

A 100-percent pedestrian survey of the project area revealed the presence of a network of historic-period surface structures that are represented as the seven sites described below. The previously documented (Dega 2004) Waikapu Ditch (State Site No. 50-50-04-5493) and Waihee Ditch (State Site No. 50-50-04-5197) were subject to additional documentation during this survey. No traditional Hawaiian cultural material was found.

DITCHES

Four ditches are present within the project area. All four ditches originate outside of the project area and/ or extend beyond the project area's limits; no ditch exists as a segment contained strictly within the project area. Two of these ditches are of a larger historic context within Maui's sugarcane era. These are named ditches and some limited information regarding their construction and use appears within the historic record. It is important to note that up to as recently as 1983 (the publication of one series of USGS maps) two more of these significant, longer range water courses flowed into the project area. The Everett Ditch and Kama Ditch, however, have since been diverted or destroyed and no longer appear within the project area. Additionally, two lesser ditches served a more localized role within the project area. Only one lesser ditch, a possibly historic drainage from upslope, did not flow consistently at the time of survey.

State Site Number 50-50-04-5197 (Waihee Ditch)

FORM	Concrete water-course
FUNCTION:	Sugarcane irrigation
AGE:	Historic (1905–1907 construction)
DIMENSIONS:	Length: 960.00 m; Width: 2.40m; Depth: 1.70 m (within P. Area)
CONDITION:	Good
SURFACE ARTIFACTS:	None
EXCAVATION:	None
DESCRIPTION:	The Waihee Ditch is a flowing, concrete water conduit. Within the

project area, the ditch is U-shaped, having two vertical concrete sides, an open top, and a flat concrete bottom (Figure 10). Concrete cross-braces reinforce the relatively thin (0.10 m) concrete sides. The curving ditch flows into the project area from the north and roughly keeps a north-south orientation as it transects parcels 03 then 02 (see Figure 4). A smaller ditch (Site -5729) that serviced only the locality of the project area, flows into the Waihee ditch from the west (pictured in Figure 10).

Modern alterations and maintenance to the Waihee Ditch are evidenced within the project area in the form of fortifications, a watergate near a modern reservoir, and foot and car bridges over the ditch. Additionally, nearby surface deposits of freshwater clam shells and *kukui* nuts are evidence of modern maintenance in the form of regular cleaning of the ditch. These finds are also a testament to the Waihee Ditches length and volume (Figure 11), as neither of these species exists within the project area; they traveled here via the ditch from environments north and *mauka*. In terms of historic information regarding a single project area site, the most available for

Figure 10: Waihee Ditch (50-50-04-5197). View to South.

Figure 11: Waihee Ditch (50-50-04-5197) paralleling Old Waikapu Road (50-50-04-5730). View to South.

the area pertains to Waihee Ditch. This history is worth noting in detail as it lends to an understanding of project area utilization around the turn of the century.

According to Wilcox's *Sugar Water: Hawai`i's Plantation Ditches* (1996:124), the Waihee "Canal" was started in June 1905 and was completed in May 1907. The entire canal cost $160,000 to construct and was used by Wailuku Sugar Company (founded 1862) and HC&S. The Waihee Canal was built under the leadership of an engineer named James T. Taylor. The canal, or ditch as it is now known, represents a monumental effort to carry water to dry areas of Maui. Wilcox's research emphasizes this display of manpower for the purpose of sugar irrigation:

> this 50-mgd-capacity ditch tapped the Waihee stream at the 650 foot elevation, just below the Aliele falls. . . . Its 10.62 miles included twenty-two tunnels totaling 16,539 feet; thirty-nine flumes totaling 2764 feet; 35,549 feet of open, cement-lined ditch; and a 1253-foot-long, 3-foot-diameter siphon to cross Iao Valley. Ditch grade averaged 2/5 feet per 1000. The longest tunnel (2246 feet) was especially challenging, as much of it went through hard close-grained rock and it required compressed air and percussion drills. This tunnel took eighteen months to cut. The contract price for the labor ranged from 85 cents to $5 per foot, depending on the material cut, the location, and the length of the tunnel. (1996:124)

The Waihee Ditch represents the oldest securely dated site on the project area landscape. Three other ditches are also located within the project area: two lesser, more localized ditches run from west to east; the Waikapu Ditch parallels the Waihee Ditch as it enters the project area from the north.

State Site Number 50-50-04-5493 (Waikapu Ditch)

FORM	Concrete water-course
FUNCTION:	Sugarcane irrigation
AGE:	Historic (in use by 1913)
DIMENSIONS:	Length: 61.00 m; Width: 1.70m; Depth: 1.00 m (within P. Area)
CONDITION:	Good
SURFACE ARTIFACTS:	None
EXCAVATION:	None
DESCRIPTION:	The Waikapu Ditch is a flowing, concrete water conduit that taps

the Iao Stream at upper elevations within Iao Valley. Within the project area, the ditch is U-shaped, having two vertical concrete sides, an open top, and a flat concrete bottom (Figure 12)

Figure 12: Waikapu Ditch (50-50-04-5493) at point where it enters Project Area. View to South.

—and is very similar in appearance to Waihee ditch. The concrete sides of the ditch measure 0.20 m thick. The curving ditch flows into the *mauka* fifth of the project area from the north and roughly keeps a north-south orientation. Unlike, the Waihee Ditch, the Waikapu Ditch does not transect the project area, rather it enters and then ceases.

The Waikapu Ditch flows into the Site -5727 reservoir where it terminates (although this may not have been the historic termination point of this ditch). The out-flow of this reservoir is a smaller, localized ditch that runs *makai* (Site -5729) and does not resemble the Waikapu ditch. Modern alterations and maintenance to the Waikapu Ditch are evidenced within the project area in the form of fortifications and a car bridge over the ditch. Wilcox (1996:124-125) notes that the ditch was in use prior to 1913 and was built by Wailuku Sugar Company.

State Site Number 50-50-04-5729 (un-named ditch)

FORM	Rock and concrete mortar water-course
FUNCTION:	Sugarcane irrigation
AGE:	Likely historic
DIMENSIONS:	Length: 1200.00 m; Width: 0.90m; Depth: 0.75 m (within P. Area)
CONDITION:	Fair

SURFACE ARTIFACTS: None
EXCAVATION: None
DESCRIPTION: This un-named, flowing ditch was almost certainly built after Waihee and Waikapu Ditch construction. Site -5729 serves as a *mauka-makai* link between these two major sources of imported water. Site -5729 is constructed of basalt rock walls, specifically small boulders that are often welded together with concrete mortar (Figures 13 and 14). The walls of this U-shaped ditch are four to six courses high, and average 0.20 m thick. The bottom of the ditch is a concave, roughly-molded concrete basin. This construction material is an indicator of a localized irrigation effort, as the cost of labor and materials was a significantly smaller undertaking than the major ditches flowing in from the north. The origin of the Site -5729 ditch is the outflow of the Site -5727 reservoir (which gathers its water from the Waikapu Ditch terminus). Site -5929 then flows into the Waihee Ditch (Figure 15). The Site -5729 ditch is controlled by modern mechanisms in its flow into and out of the modern, smaller reservoir, and eventually downslope toward Honoapi`ilani Highway and out of the project area.

Figure 13: Site 50-50-04-5729 Ditch. View to West.

Figure 14: Site 50-50-04-5729 Ditch, Showing Rock and Mortar Construction of Side Walls. View to Northwest.

Figure 15: Site 50-50-04-5729 Ditch (at center) flowing into Waihee Ditch (50-50-04-5197). View to West.

State Site Number 50-50-04-5726 (un-named ditch)

FORM: Earthen berm ditch
FUNCTION: Sugarcane irrigation
AGE: Possibly historic
DIMENSIONS: Length: 215.00 m; Width: 7.00m; Depth: 2.50 m (within P. Area)
CONDITION: Fair
SURFACE ARTIFACTS: None
EXCAVATION: None
DESCRIPTION: This un-named, intermittently flowing ditch was possibly constructed within the historic sugar era. It is a wider U-shape than the other ditches, and is choked with thick introduced grasses that stand over two meters tall. Like the Site -5729 ditch, this is a localized irrigation effort. The possibility exists that this is not a sugar cane agriculture feature, but a modern widening of a natural watershed drainage. However, its earthen berm sides resemble the historic, machine-created berms (Site -5728) constructed on the project area as erosion control during the sugar era. This ditch / drainage runs downslope, approximately west to east.

State Site Number 50-50-04-5727 (un-named reservoir)

FORM: Rectangular reservoir
FUNCTION: Sugarcane irrigation
AGE: Likely historic
DIMENSIONS: Length: 229.00 m; Width: 76.00m; Depth: undetermined
CONDITION: Excellent (currently maintained)
SURFACE ARTIFACTS: None
EXCAVATION: None
DESCRIPTION: This un-named, large reservoir is currently active and maintained by modern pumping equipment and fencing (Figure 16). It is surrounded by machine-created earthen berms of the same construction seen elsewhere on the project area in association with historic agriculture. Waikapu Ditch flows from the north and empties into Site -5727 (see Figure12). Everett Ditch, flowing downslope from the *mauka* West Maui Mountains, also once terminated at this reservoir (however, this ditch no longer exists within the project area). The out-flow for Site -5727 is the Site -5729 localized, lesser ditch. The length of this reservoir is oriented north-south.

The size, construction, elevation, position, and shape of Site -5727 resembles that of Hopoi Reservoir (State Site 50-50-04-5473), a documented sugar era irrigation site. Hopoi Reservoir is located 1 kilometer northeast of the Site -5727 reservoir and the latter is likely of the same construction period as the former. Hopoi Reservoir, although empty and abandoned during

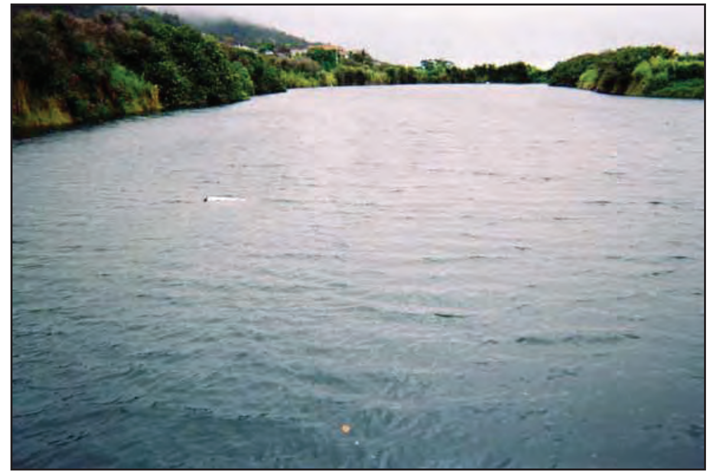

Figure 16: Site 50-50-04-5727 Reservoir. View to North.

initial recordation (see Dega 2004), also was a collection point of a known major water course (Kama Ditch, Site 50-50-04-5474).

Note: A smaller, modern reservoir is located within the *makai* third of the project area (Figure 17). A 1977 aerial map of the Kahului isthmus (see Figure 3) clearly shows the Site -5727 reservoir, and also shows that this smaller reservoir was not yet constructed.

State Site Number 50-50-04-5728 (erosion-control berms)

FORM: Earthen berms (n = 14)
FUNCTION: Sugarcane field erosion control
AGE: Likely historic
DIMENSION RANGE: Length: 132 to 456 m; Width: 5.0 to 17.0 m; Height: 1.0 to 1.8 m
CONDITION: Fair
SURFACE ARTIFACTS: None
EXCAVATION: ST-6
DESCRIPTION: Fourteen soil berms comprise Site -5728 (Figure 18). This historic method of machine-piled earthen mounds was used within cane fields to prevent topsoil erosion. As depicted by Figure 4, the positions of the fourteen berm segments vary slightly from a general north-south orientation. What is consistent, however, is that the position of each individual

Figure 17: Modern Reservoir at center of Project Area's Eastern Half**.**

Figure 18: Site 50-50-04-5728, Feature 13 (Erosion-control Berm). The contour of the berm running cross-slope can be seen as a mound in the dirt road. View to Northeast.

segment runs perpendicular to the sloping terrain within that specific locality of the project area. The mounded soil acted to block rainwater runoff, preserving both moisture and topsoil. To a lesser degree, it is possible that the berms also prevented some wind blown soil erosion, as some of the berms were mounded to a height of 1.80 m. State Site Number 50-50-04-5522 provides a documented case of such berms in the nearby former cane fields of Waiehu, Maui (Wilson and Dega 2004).

Stratigraphic Trench 6

One stratigraphic trench (ST-6) was backhoe excavated through a single soil berm segment of Site -5728. The Feature 4 berm ran north-south at the center of the project area's south perimeter (see Figure 4). ST-6 perpendicularly transected the Feature 4 berm with the intent to explore its interior construction and subsurface depth. A cross sectional profile of ST-6 (Figures 19 and 20) indicates Site -5728 berms are 100 percent made up of naturally occurring soils that have been machine mounded in the past. No imported rock or other substance was used in the construction of these berms. The soil disturbance extends into Layer II (to a maximum depth of 50 cmbs) as evidenced by the mounded subsurface contour in shown in Figure 20. This simply means that the plow mechanism that created these berms cut deeper into the natural landscape in this berm building effort than was generally used when tilling the surrounding fields. (The surrounding fields consistently display an undisturbed Layer II.) Subsurface content is explored further under the heading "Subsurface Testing."

State Site Number 50-50-04-5730 (Old Waikapu Road)

FORM	Dirt road
FUNCTION:	Probable cane-haul route
AGE:	Likely historic
DIMENSIONS:	Length: 945.00 m; Width: 3.50m
CONDITION:	Good
SURFACE ARTIFACTS:	None
EXCAVATION:	None
DESCRIPTION:	A dirt road that enters the project area from the eastern perimeter

(Honoapi`ilani Highway)—and then turns southwest before crossing the southern perimeter—forms the boundary between parcels 02 and 03. On a 1992 Tax Map Key the following words are printed in association with this road: "(Old Waikapu Road) County Road". At the time of survey, this road continued to see infrequent pedestrian and vehicle traffic—reserved for those transecting this undeveloped swath of land as a possible shortcut between paved roads. For this reason, this dirt road remains free of vegetation (Figure 21).

Figure 19: ST-6 (Photograph of North Wall) Profile Shows Subsurface Contour of Machine-mounded Site -5728, Feature 4 Berm. View to North.

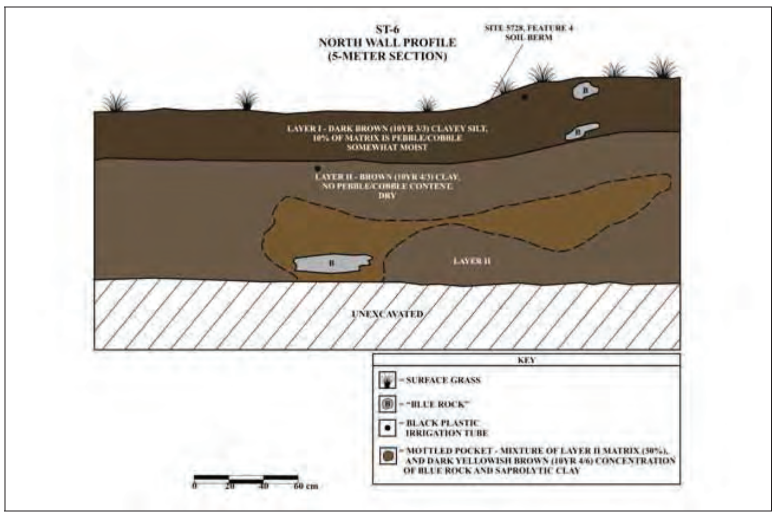

Figure 20: ST-6 Stratigraphic Profile.

Figure 21: "Old Waikapu Road" (50-50-04-5730). View to Southwest.

Exactly how old "Old" Waikapu Road is difficult to determine precisely. However it is safe to assume that this newly recorded State Site Number (50-50-04-5730) originated in the same sugar period as the other six sites within the project area. A Cultural Impact Assessment (CIA) within the same project area provides further detail backing a historic origin to the Old Waikapu Road. Author of the CIA, Kalei Tsuha, interviewed a local resident who, as a child in 1922, remembers traveling across the project area on this same road by horse (K. Tsuha, personal communication 9/25/05).

SUBSURFACE TESTING

Twenty-one stratigraphic trenches (STs) were mechanically excavated by backhoe to test for the presence/absence of subsurface cultural deposits in a variety of project area locations. Excavation took place over a three-day period, August 22–24, 2005. Of these trenches, only one (the previously described ST-6) revealed any kind of subsurface cultural material. ST-6 was placed through an existing soil berm in order to document construction technique of these historic agricultural features. ST-6 documented the subsurface extent of the Site -5728, Feature 4 soil berm (the base of which does extend into the otherwise undisturbed Layer II matrix) (see

Figure 20). None of the 21 trenches revealed any type of artifact, charcoal deposit, or midden deposit.

Testing was spread evenly across the project area with the intent of documenting soil stratigraphy trends by project area location. In total, 21 stratigraphic trenches (ST-1 through ST-21) were excavated and documented. The trenches averaged 7.86 m long, 0.70 m wide, and 1.58 m deep.

Calculating the above averages, an approximate area of 155 m^2 and volume of 183 m^3 of soil was excavated during testing. These sampling figures are primarily indicative of the limited positive results achieved for each trench; if significant cultural resources were documented during the project, it is likely that less geographic space would have been excavated as documentation and sampling of such cultural resources would have been more time consuming. In the amount of time allowed for the project, testing was geared toward obtaining the most information available to assess the presence/absence of subsurface cultural deposits (as it was fairly quickly determined that all surface sites were historic).

STRATIGRAPHIC TRENCH LAYER ANALYSIS

As expected, excavation within the former sugarcane fields resulted in a consistent stratigraphy of culturally sterile soils. Trenching revealed no more or less than two distinct layers in each ST. The variation between trenches was even less than expected, as in each, Layer I represented soil that had been disturbed by historic and modern agricultural practices, and Layer II represented undisturbed soil. The minimal variation between trenches was threefold: the thickness of Layer I varied by 41 centimeters at most; the soil color and qualities variety slightly in among some trenches; and the pebble, cobble, and or saprolytic rock content within Layer II somewhat varied. Otherwise, the project area is extremely homogenous in subsurface content. This can be credited primarily the effects of decades of agricultural use, and also the fact that the Iao Series soils existing here show only minor variation. The following two examples, ST-7 and ST-9, display the typical slight range of stratigraphic variation within the project area (Figure 22).

ST-9 is the standard project area stratigraphy. Layer I has a surface cover of thick, dried grass. Layer I is 65 cm deep and consists of a moderately moist, very dark grayish-brown (10YR 3/2) clayey silt, of which less than ten percent is pebble/ cobble. Layer I contains evidence of the modern agricultural practices in the form of plastics. Only two of the 21 STs excavated did not

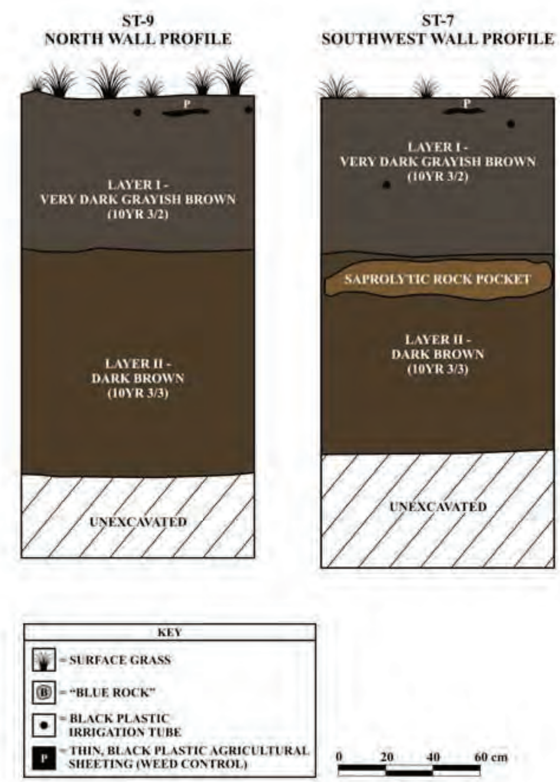

Figure 22: ST-9 and ST-7 Profiles Display Typical Subsurface Stratigraphy within Project Area.

contain either drip line irrigation tubing or black plastic weed-control sheeting in Layer I (see Appendix A). In the majority of STs, Layer I contained both of these plastics at varying depths.

Layer II, as evidenced in ST-9, was often a very compact, moderately dry, dark brown (10YR 3/3) clay, of zero pebble or cobble content. Often, however, a pocket of saprolytic (decomposing) rock or "blue" rock could be found in Layer II (as shown in the ST-7 profile). Layer II thickness remains undetermined as this layer proved too deep to find bedrock, even with the reach of a large backhoe. ST-20 was excavated to a maximum depth of 2.60 m in an unsuccessful attempt to reach bedrock. It is safe to assume that Layer II of the project area is at least 2.00 m thick, but probably much thicker.

DISCUSSION AND CONCLUSIONS

Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey on two parcels totaling 215.800 acres, which form one large land tract within Waikapu (and partially Wailuku) Ahupua`a, Wailuku District, Maui Island, Hawai`i [TMK (2) 3-5-02: 02 and 03]. Inventory Survey included archival research, systematic pedestrian survey of the project area, and representative subsurface testing. While the landscape did not yield traditional Hawaiian archaeological sites, it did reveal a network of irrigation systems in the form of ditches and a reservoir, erosion-control berms, and a historic dirt road—forming seven sites. Five of these sites are new additions to the State's rich historic record of turn-of-the century sugar industry in Hawai`i.

WATER CIRCUITRY

In his 2004 Inventory Survey Report of the Kehalani Mauka Development lands Dr. M. Dega initiated three hypotheses regarding historic water circuitry within this Wailuku / Waikapu landscape. Aside from the small area of land covered by the pre-existing Kuikahi Drive that acts to separate the two surveys—the 348.613 acres in Dega's study and the 215.800 to the south (the present survey) may be viewed as 564.413 contiguous acres for the archaeological record. This is not an arbitrary relationship, as the *ahupua`a* division separating these fields did not individualize their historic utilization. The following text is from *An Intermediate Zone Archaeology Inventory Survey [TMK (2) 3-5-001:portion of 001]* (Dega 2004:41–42):

> Several intriguing patterns emerge as one focuses upon the empirical, historic-period evidence at hand. One of these patterns is the direction in which the historic ditches have been constructed and utilized across the parcel. Case in point: three main ditches or canals run north-south, or [*perpendicular*] to the slope, across the project area and beyond. Waihee Ditch, Kama Ditch, and the westernmost ditch of Site T-24 (Site -5493) [*Waikapu Ditch*] are the most well-constructed on the parcel. These ditches were water conduits across these dry zones. Typically they could be used to water areas along their course or would simply empty into large retention basins (reservoirs) at selected points.
>
> However, there is also a network of ditches, mostly earthen berms and small channels, that run [*parallel*] to the slope on a west (upslope)-east (downslope) axis. These ditches are commonly non-formalized like the north-south ditches and tend to be more localized. Site T-16 (Site -5490), built on an east-west axis for instance, runs a total of 1,000 meters while the north-south Waihee Ditch runs for more than 16 kilometers. The important point is that there is a functional difference between the north-south oriented ditches and the east-west coursing ditches. The more formalized [and costly] north-south ditches are actually water conduits wherein water may be carried long distances to irrigate such water-poor locales as the present project area. The less conventional ditches situated on an east-west axis are simply drainages and do not fulfill an irrigation role on these dry parcels. These smaller ditches appear to be more naturally formed by erosion and were simply modified to accommodate excess water and sediment flow so as not to interfere with the main purpose of cultivation. This pattern appears valid for the present project area but requires additional information from other locales to be proven, negated, or amended.

Thus, we propose two hypotheses that remain to be examined:

1. All north-south canals or ditches along central Maui that run [*perpendicular*] to the slope are water conduits and inherently contain an irrigation function.

2. All east-west bearing canals or ditches along Central Maui that run [*parallel*] to the slope are only drainages that do not disseminate water for irrigation purposes but function to remove overflow so as not to curtail cultivation potential.

DISCUSSION POINTS

The current study provides a second example within the archaeological record confirming Dega's first hypothesis. Both the Waihee Ditch and Waikapu Ditch (numbered, but not named in Dega 2004) were identified as running north to south. These major irrigation conduits continue this flow direction into the current project area. These are large, long, costly, historic structures that were designed to carry stream waters great distances. These ditches run cross-slope within the project area.

The current project area findings expand upon, but do not necessarily confirm Dega's second hypothesis. Two lesser, localized ditches do indeed follow the same orientation as those in the Kehalani lands. Both of these lesser ditches run with the slope contour (perpendicularly linking the major ditches, at times). However, the hypothesis of a functional difference is not soundly reinforced. The Site -5726 ditch is a subtle, earthen feature that may have filled a drainage role rather than an irrigation role. But there is no proof that the more elaborately constructed Site -5729 ditch (stacked basalt boulders that are mortared with concrete) did not in fact serve as a *mauka* to *makai* irrigation artery. This ditch may have served as an outlet to the reservoir's (Site 5727) spill-over, however, this function should not exclude a dual purpose of localized irrigation.

Finally, like in Dega's (2004) study, four points contribute to the current project's lack of traditional Hawaiian cultural material. First, and most obviously for this location, historic impacts have dramatically altered the landscape so much as to erase larger archaeological traces of traditional-period activities. Second, the lack of traditional-period evidence suggests that these open lands were probably not intensively utilized during prehistoric times. The current project area may have not been selected as a habitation zone as it is an open area without perennial water resources—and more preferable lands were readily available. Third, the types of traditional activities conducted within and near the project area may not have left archaeological signatures. Fourth, as is the case for all archaeological projects, testing may have not coincided with the existing subsurface cultural materials. This is unlikely but always a possibility as 100 percent of any parcel is rarely ever fully excavated.

SIGNIFICANCE ASSESSMENT AND RECOMMENDATIONS

Seven archaeological sites were documented in the project area: Waihee Ditch (50-50-04-5197); Waikapu Ditch (50-50-04-5493); an un-named, lesser ditch (50-50-04-5729); a second un-named, lesser ditch (50-50-04-5726); a large, un-named reservoir (50-50-04-5727); a series of fourteen sugarcane-field erosion-control, soil berms (50-50-04-5728); and a County dirt road named "Old Waikapu Road" (50-50-04-5730).

These sites have been evaluated for significance according to the criteria established for the Hawai`i State Register of Historic Places. The five criteria are classified below:

Criterion A: Site is associated with events that have made a significant contribution to the broad patterns of our history

Criterion B: Site is associated with the lives of persons significant to our past

Criterion C: Site is an excellent site type; embodies distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual construction

Criterion D: Site has yielded or has the potential to yield information important in prehistory or history

Criterion E: Site has cultural significance to an ethnic group; examples include religious structures, burials, major traditional trails, and traditional cultural places

All seven of these historic sites have been assessed as significant under Criterion D.

Based upon the results of this Inventory Survey and the results of archaeological work on adjacent parcels that have also produced primarily negative results (see Dega 2003, 2004; Monahan 2003; Buffum and Dega 2001), it appears as though additional archaeological research on the subject parcels would not contribute a significant volume of additional data to the interpretation of the area or region, or to Hawaiian prehistory/history. Archaeological Monitoring is not recommended during construction within the project area. The seven sites documented herein have yielded their information to the historical record and no additional archaeological work is recommended.

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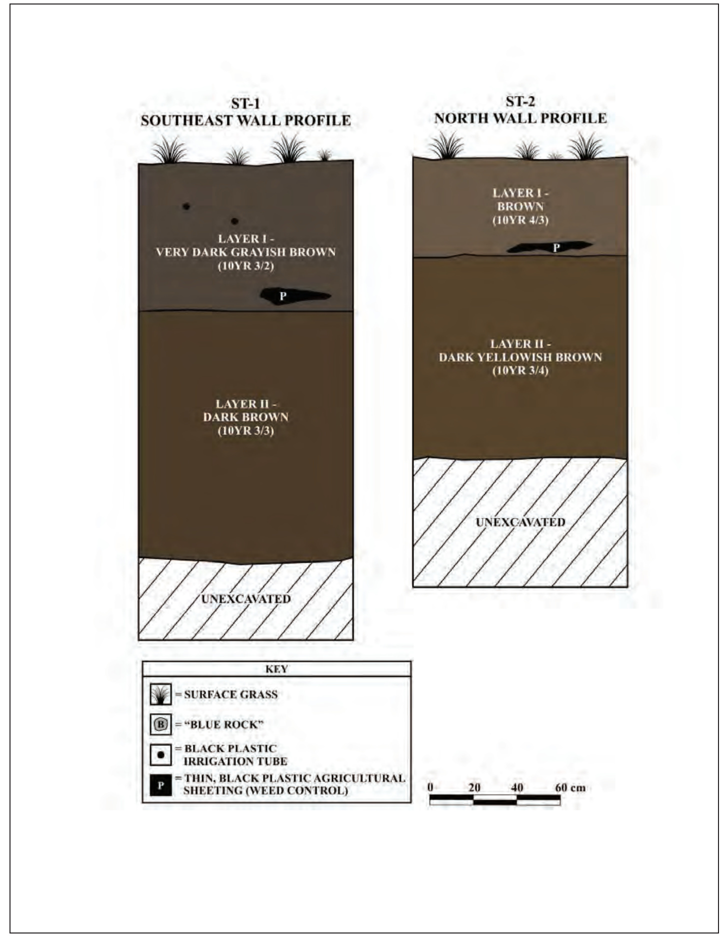
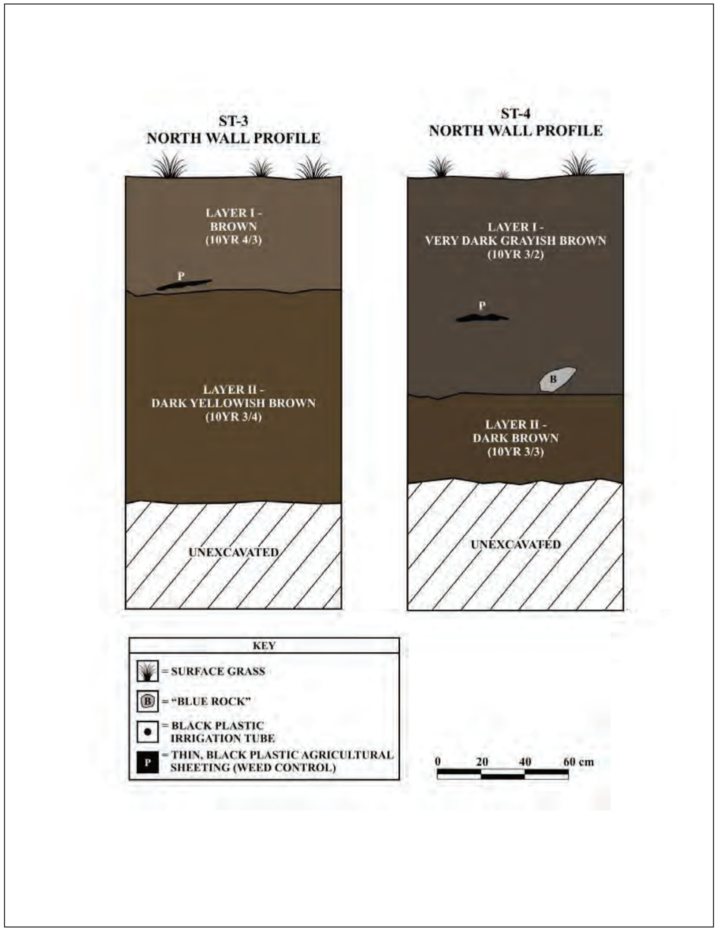
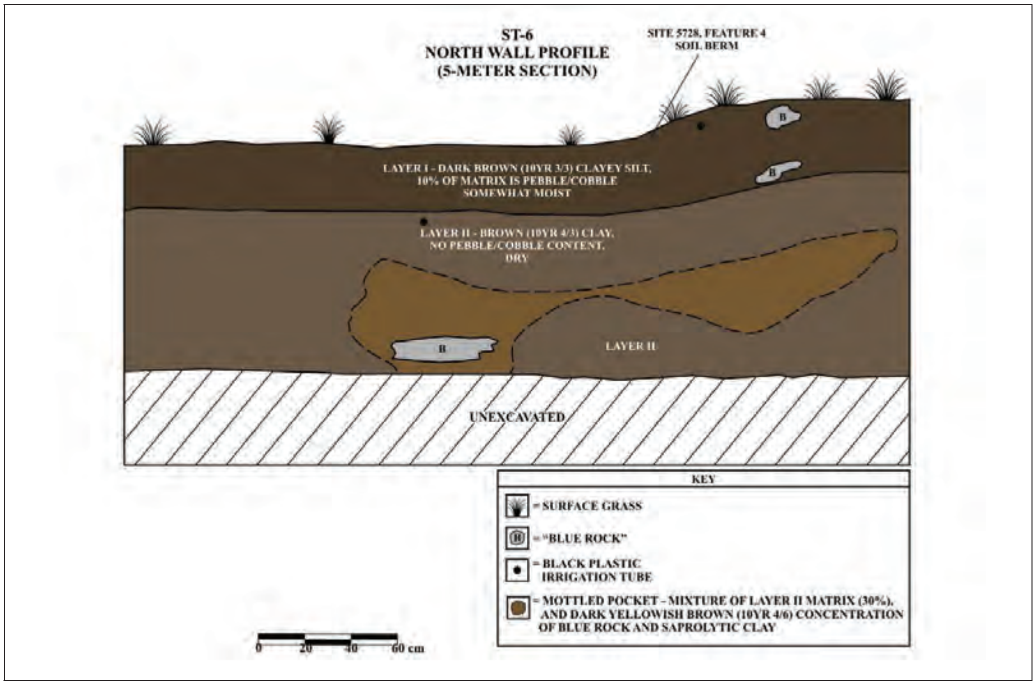
APPENDIX A: STRATIGRAPHIC PROFILES



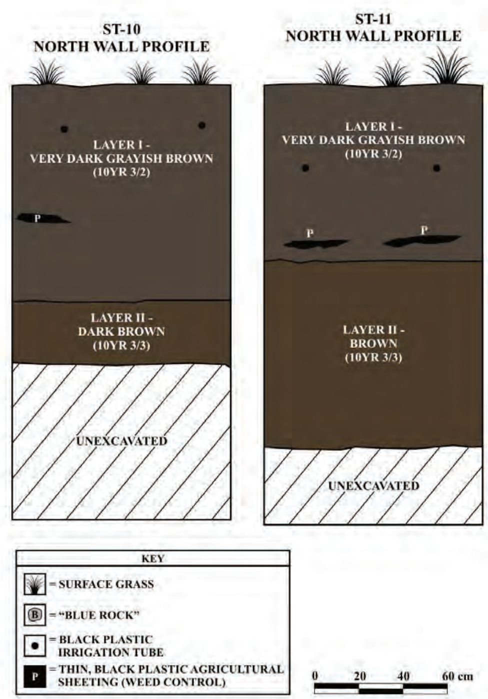

ST-3
NORTH WALL PROFILE
LAYER I -
BROWN
(10YR 4/3)
P
LAYER II -
DARK YELLOWISH BROWN
(10YR 3/4)
UNEXCAVATED
ST-4
NORTH WALL PROFILE
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
P
B
LAYER II -
DARK BROWN
(10YR 3/3)
UNEXCAVATED
KEY
= SURFACE GRASS
B = "BLUE ROCK"
= BLACK PLASTIC IRRIGATION TUBE
P = THIN, BLACK PLASTIC AGRICULTURAL SHEETING (WEED CONTROL)
0 20 40 60 cm

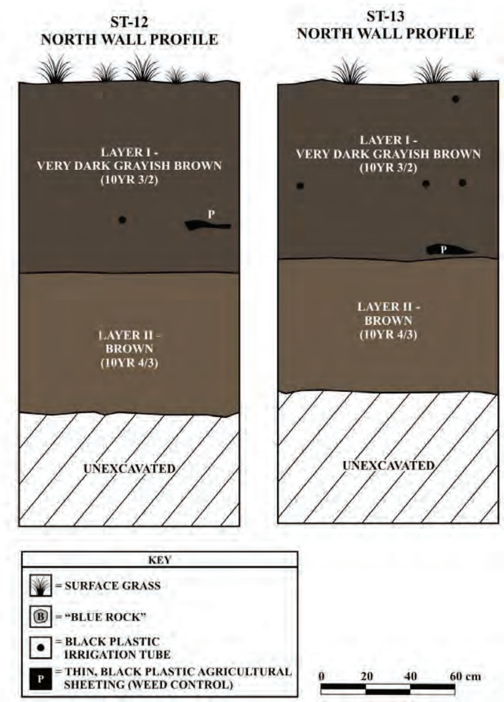

ST-5
NORTH WALL PROFILE
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
LAYER II -
BROWN
(10YR 3/3)
UNEXCAVATED
ST-7
SOUTHWEST WALL PROFILE
P
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
SAPROLYTIC ROCK POCKET
LAYER II -
DARK BROWN
(10YR 3/3)
UNEXCAVATED
KEY
= SURFACE GRASS
B = "BLUE ROCK"
= BLACK PLASTIC IRRIGATION TUBE
P = THIN, BLACK PLASTIC AGRICULTURAL SHEETING (WEED CONTROL)
0 20 40 60 cm

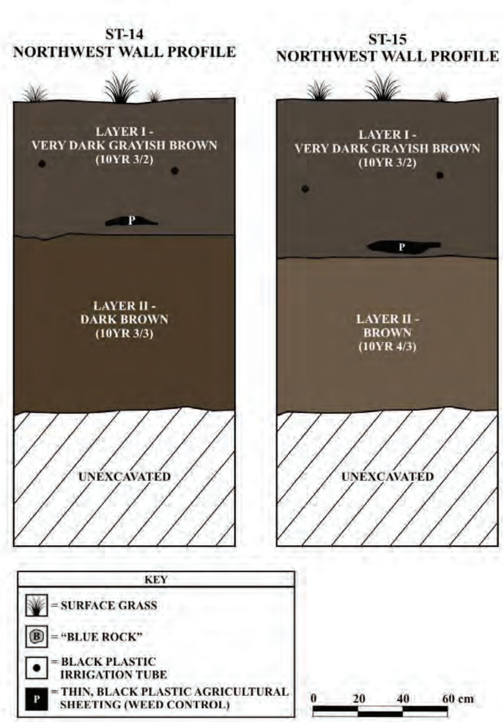


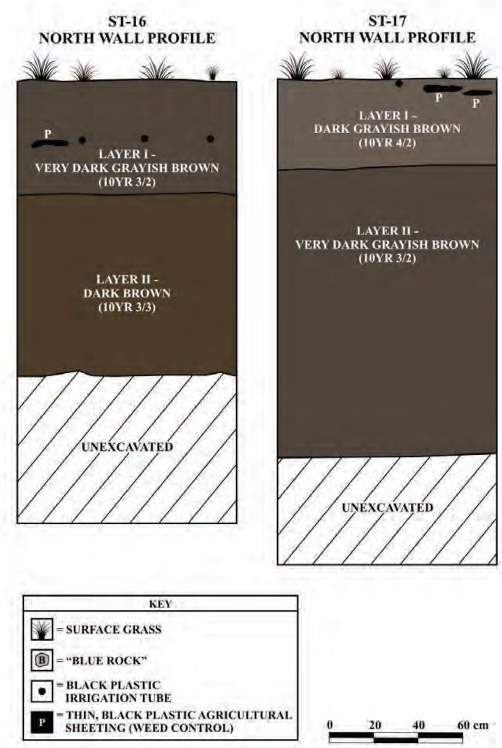
ST-6
NORTH WALL PROFILE
(5-METER SECTION)
SITE 5728, FEATURE 4
SOIL BERM
B
LAYER I - DARK BROWN (10YR 3/3) CLAYEY SILT,
10% OF MATRIX IS PEBBLE/COBBLE
SOMEWHAT MOIST
LAYER II - BROWN (10YR 4/3) CLAY,
NO PEBBLE/COBBLE CONTENT,
DRY
LAYER II
UNEXCAVATED
KEY
= SURFACE GRASS
B = "BLUE ROCK"
= BLACK PLASTIC IRRIGATION TUBE
= MOTTLED POCKET - MIXTURE OF LAYER II MATRIX (30%), AND DARK YELLOWISH BROWN (10YR 4/6) CONCENTRATION OF BLUE ROCK AND SAPROLYTIC CLAY
0 20 40 60 cm

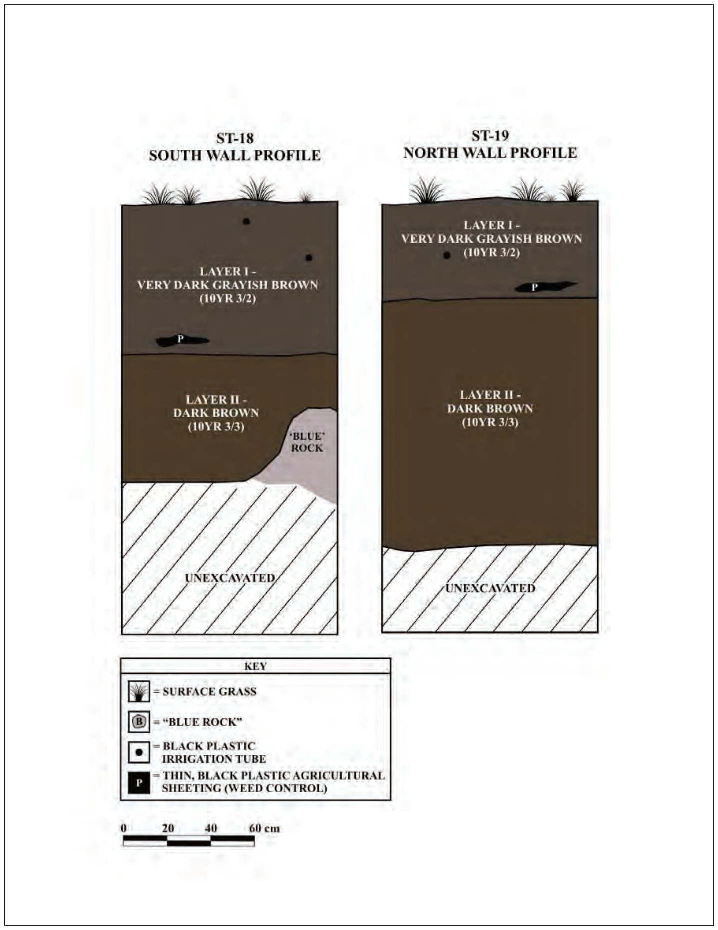
ST-8
WEST WALL PROFILE
LAYER I - VERY DARK GRAYISH BROWN (10YR 3/2)
LAYER II - DARK BROWN (10YR 3/3)
UNEXCAVATED
P
ST-9
NORTH WALL PROFILE
LAYER I - VERY DARK GRAYISH BROWN (10YR 3/2)
LAYER II - DARK BROWN (10YR 3/3)
UNEXCAVATED
P
KEY
= SURFACE GRASS
B = "BLUE ROCK"
= BLACK PLASTIC IRRIGATION TUBE
P = THIN, BLACK PLASTIC AGRICULTURAL SHEETING (WEED CONTROL)
0 20 40 60 cm


ST-10
NORTH WALL PROFILE
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
P
LAYER II -
DARK BROWN
(10YR 3/3)
UNEXCAVATED
ST-11
NORTH WALL PROFILE
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
P
P
LAYER II -
BROWN
(10YR 3/3)
UNEXCAVATED
KEY
= SURFACE GRASS
= "BLUE ROCK"
= BLACK PLASTIC IRRIGATION TUBE
= THIN, BLACK PLASTIC AGRICULTURAL SHEETING (WEED CONTROL)
0 20 40 60 cm

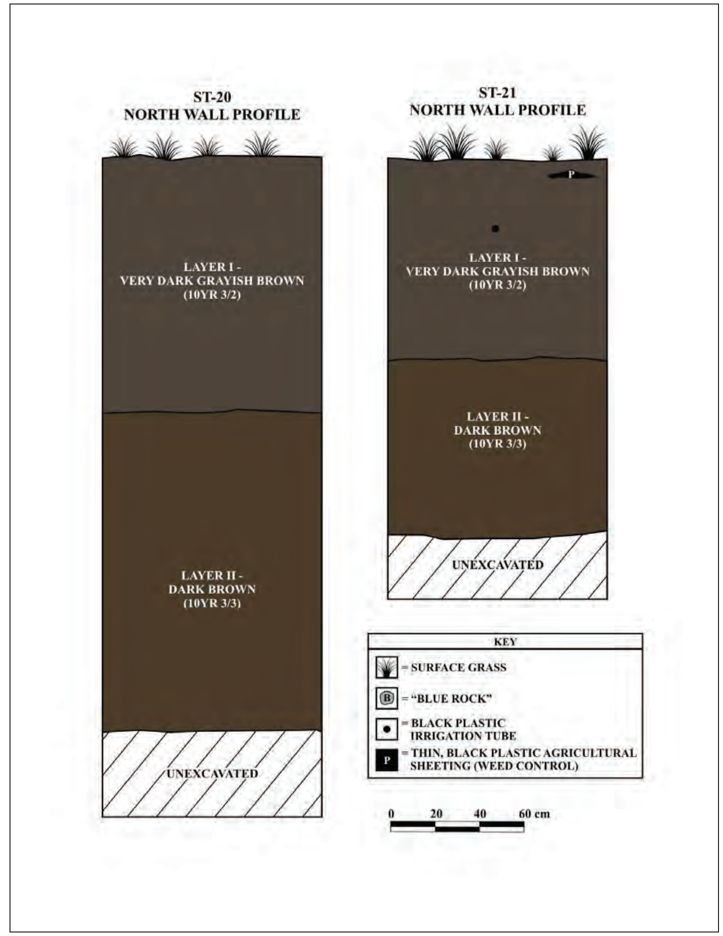

ST-12
NORTH WALL PROFILE
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
P
LAYER II -
BROWN
(10YR 4/3)
UNEXCAVATED
ST-13
NORTH WALL PROFILE
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
P
LAYER II -
BROWN
(10YR 4/3)
UNEXCAVATED
KEY
= SURFACE GRASS
= "BLUE ROCK"
= BLACK PLASTIC IRRIGATION TUBE
= THIN, BLACK PLASTIC AGRICULTURAL SHEETING (WEED CONTROL)
0 20 40 60 cm


ST-14
NORTHWEST WALL PROFILE
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
P
LAYER II -
DARK BROWN
(10YR 3/3)
UNEXCAVATED
ST-15
NORTHWEST WALL PROFILE
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
P
LAYER II -
BROWN
(10YR 4/3)
UNEXCAVATED
KEY
= SURFACE GRASS
B = "BLUE ROCK"
= BLACK PLASTIC IRRIGATION TUBE
P = THIN, BLACK PLASTIC AGRICULTURAL SHEETING (WEED CONTROL)
0
20
40
60 cm


ST-16
NORTH WALL PROFILE
P
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
LAYER II -
DARK BROWN
(10YR 3/3)
UNEXCAVATED
ST-17
NORTH WALL PROFILE
P
P
LAYER I -
DARK GRAYISH BROWN
(10YR 4/2)
LAYER II -
VERY DARK GRAYISH BROWN
(10YR 3/2)
UNEXCAVATED
KEY
= SURFACE GRASS
B = "BLUE ROCK"
= BLACK PLASTIC IRRIGATION TUBE
P = THIN, BLACK PLASTIC AGRICULTURAL SHEETING (WEED CONTROL)
0
20
40
60 cm


ST-18
SOUTH WALL PROFILE
ST-19
NORTH WALL PROFILE
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
P
LAYER II -
DARK BROWN
(10YR 3/3)
'BLUE'
ROCK
UNEXCAVATED
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
P
LAYER II -
DARK BROWN
(10YR 3/3)
UNEXCAVATED
KEY
= SURFACE GRASS
B = "BLUE ROCK"
= BLACK PLASTIC IRRIGATION TUBE
P = THIN, BLACK PLASTIC AGRICULTURAL SHEETING (WEED CONTROL)
0 20 40 60 cm

A: 10


ST-20
NORTH WALL PROFILE
ST-21
NORTH WALL PROFILE
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
LAYER II -
DARK BROWN
(10YR 3/3)
UNEXCAVATED
P
LAYER I -
VERY DARK GRAYISH BROWN
(10YR 3/2)
LAYER II -
DARK BROWN
(10YR 3/3)
UNEXCAVATED
KEY
= SURFACE GRASS
B = "BLUE ROCK"
= BLACK PLASTIC IRRIGATION TUBE
P = THIN, BLACK PLASTIC AGRICULTURAL SHEETING (WEED CONTROL)
0 20 40 60 cm

A: 11

(607)

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER

November 18, 2005

Michael Dega, Ph.D.
Scientific Consultant Services
711 Kapiolani Blvd. Suite 975
Honolulu, HI 96813

LOG NO: 2005.2398
DOC NO: 0511MK22

Dear Dr. Dega:

SUBJECT: Historic Preservation Review - 6E-42 - Archaeological Inventory Survey On 215.800 Acres for Towne Development of Hawaii and Endurance Investors, LLC
Waikapu Ahupua'a, Wailuku District, Maui
TMK (2) 3-5-002:002 and 003

Thank you for the opportunity to review this report which our staff received on October 14, 2005 (Wilson and Dega 2005, *Archaeological Inventory Survey Report on 215.800 Acres Located in Waikapu Ahupua'a, Wailuku District, Maui Island, Hawai'i [TMK (2) 3-5-02: 02 and 03])*...Scientific Consultant Services, Inc., ms.

The background section acceptably establishes the ahupua'a settlement pattern and predicts the likely site pattern in the project area. The historical information provided summarizes the history of the post-contact period land uses. The summary of previous archaeological work in the area provides a baseline for the current work. The subject parcel has formerly been utilized for commercial agriculture, and consists 100% of abandoned cane land. Three small Land Commission Awards are situated within the subject parcel, in an area through which a stream and/or ditch formally ran.

The survey has adequately covered the project area documenting five new historic properties in the project area, and re-identifying two previously identified historic properties. Previously identified sites, SIHP 50-50-04-5197 and -5493, consist of the Waihe'e and Waikapu Ditches. Newly identified SIHP sites 50-50-5729 and -5726 represent an unnamed rock and mortar ditch and an unnamed earthen ditch/drainage. A large unnamed reservoir, SIHP 50-50-04-5727, is situated at the terminus of the Waikapu Ditch (-5493). SIHP 50-50-04-5728 is a sugar field erosion control site, incorporating 14 earthen berms cross slope. These are clearly identified topographically. One additional site, SIHP 50-50-04-5730, the

"Old Waikapu Road" was identified as spanning the border of Parcels 002 and 003. Subsurface testing (twenty-one backhoe trenches) were also negative for evidence of cultural deposits. These were distributed evenly across the project area.

We concur that all seven sites are significant under Criterion "D" and have the potential to yield information important to understanding the history of the region. The sites have been adequately documented.

We also agree that no further archaeological mitigation is necessary.

We find this report to be acceptable. The historic preservation review process is concluded. Development of the project areas will have "no effect" on significant historic sites. As always, if you disagree with our comments or have questions, please contact Dr. Melissa Kirkendall (Maui/Lana'i SHPD 243-5169) as soon as possible to resolve these concerns.

Aloha,

Melanie A. Chinen

MELANIE A. CHINEN, Administrator
State Historic Preservation Division

MK: kf

c: Bert Ratte, DPWEM, County of Maui
Michael Foley, Director, Dept of Planning, 250 S. High Street, Wailuku, HI 96793
Maui Cultural Resources Commission, Dept. of Plng, 250 S. High St., Wailuku, HI 96793

SCIENTIFIC CONSULTANT SERVICES, Inc.
1347 Kapiolani Blvd., Suite 408 Honolulu, Hawai'i 96814

Darren Okimoto
DDC, LLC.
2005 Main Street
Wailuku, Hawaii 96793

September 9, 2020

Archaeological Field Inspection
DHHL Pu`unani Homestead
Waikapu, Maui
Portions of TMK: (2) 3-5-002:002 & 003

Dear Mr. Okimoto:

Thank you again for contacting Scientific Consultant Services, Inc. (SCS) regarding an archaeological field inspection for portions of the above noted parcels in Waikapu, Maui. This field inspection follows an archaeological inventory survey (AIS) of 215-acres, inclusive of the current field inspection area, in 2005 (Wilson and Dega 2005). This field inspection expressly sought to address the presence/absence of a famous Pōhāko'i stone, noted by many kupuna of the area and more recently, by Mr. Hōkūao Pellegrino, a descendant of the area. DDC, LLC. contacted SCS to conduct field survey in an attempt to locate the stone. The following presents background on the stone and the results of the survey.

Mr. Pellegrino, a cultural practitioner and cultural descendent of Waikapu Ahupua`a, Wailuku Moku, was interviewed about Waikapu in general and also about this important stone for the Cultural Impact Assessment (CIA). His excerpted script from the CIA interview is presented here:

> Near the Old Government Road that is adjacent to the western and northern boundaries of the project area, near the northwest corner of the current project area, there once was located a very important stone called Pōhāko'i. Pōhāko'i was first and foremost a hoana, or grinding stone used to file and finish ko'i (adzes – stone tool used for cutting and carving wood). Secondly, it was a commonly known palena 'āina (boundary marker) for the northern end of the Waikapū ahupua'a.
>
> Mr. Pellegrino says that Pōhāko'i is shown on approximately 60 historic maps of Waikapū. Some maps reference that site as the location of Pōhāko'i (the stone), but, adjacent to where the stone is located, there is reference to a Pōhāko'i as an 'ili also. However, Land Grant 2952, to David Crowningburg, and Land Commission Award 433, to William Crowningburg, both specified the ahupua'a boundary, as well as the 'ili, as Pōhāko'i. So, it was an important cultural site, not just for being a boundary marker and a grinding stone, but also for being a place name (i.e., the name of an 'ili). Pōhāko'i is such a significant site; it has been mentioned in mele [songs], in oli [chants], and historical mo'olelo [legends]. The exact location of Pōhāko'i (the stone) is not known and it is not known if Pōhāko'i remains in situ, or if it has been relocated. Pōhāko'i (the stone) is shown on almost every historic map of Waikapū [see Figure 8]. Pōhāko'i (the stone) is shown on most maps as on the Waikapū Ahupua'a boundary and sometimes it is shown more within Waikapū Ahupua'a, more along that William Crowningburg property boundary in the 'Ili of Pōhāko'i. So, if there is any archaeological work conducted in the, that would be a critical thing to look for in addition to former agricultural and irrigation sites.

ARCHAEOLOGICAL FIELD INSPECTION

Fieldwork was conducted on August 24, 2020 by SCS archaeologist Ian Bassford, B.A. and yourself, under the direction of project principal investigator Dr. Michael Dega. Fieldwork occurred over a large swath of the landscape to assess the presence/absence of the Pōhāko'i. The approximate surveyepd area is shown in Figures 1, 2, and 3.

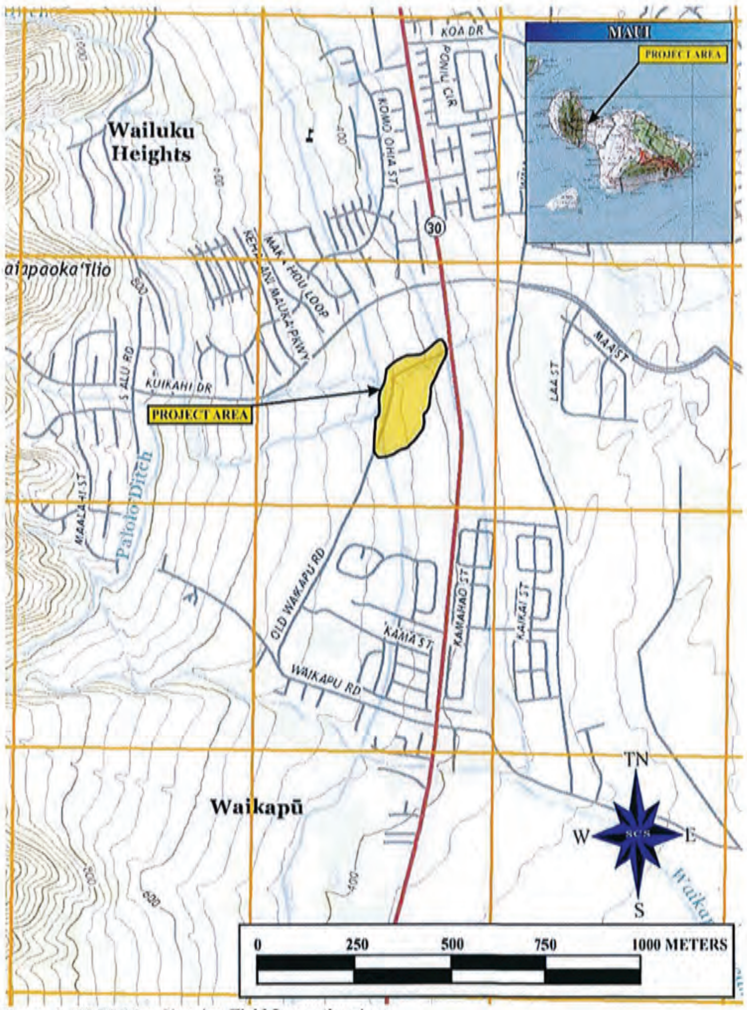


Figure 1. USGS Map Showing Field Inspection Area.

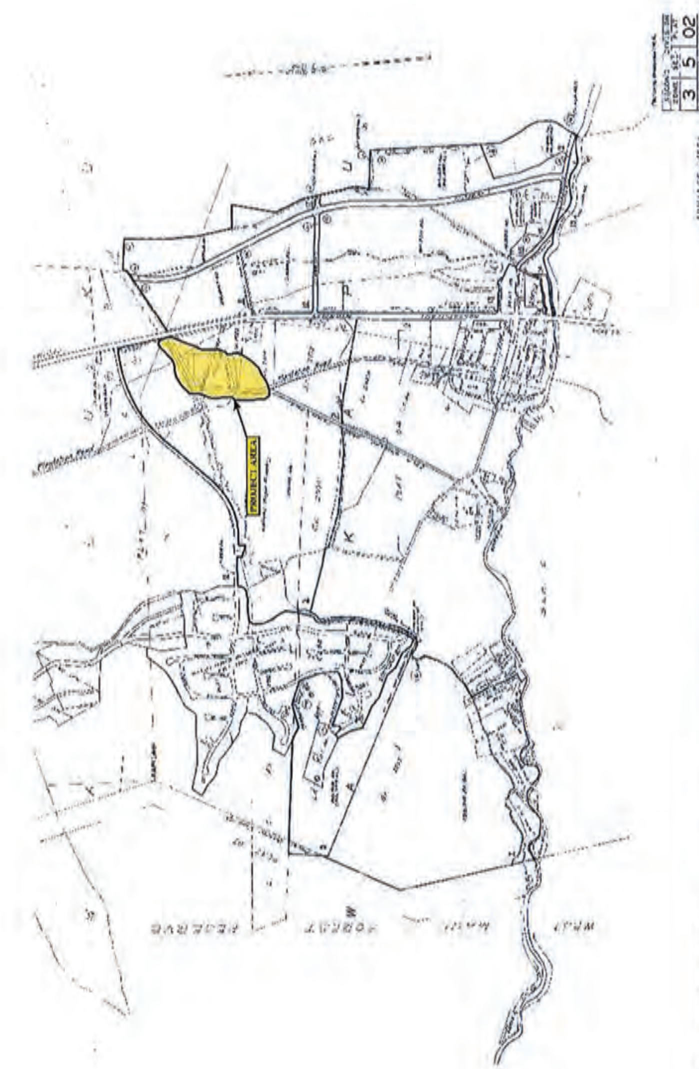


Figure 2. TMK Map Showing Field Inspection Location.

Figure 3: Aerial Photograph of Field Inspection Location.

Currently, the survey area is being utilized for small scale cattle ranching activities. Prior to current times, the area was subject to industrial-level sugar cane cultivation. Extensive modern agricultural clearing of this area has drastically altered the composition of the landscape. Clearing berms with rock stockpiles were apparent and various throughout the northern and central portions of the parcel. Rocks had been mechanically stockpiled from this entire area, thus creating a highly modified surface. Photographs provided at the end of this letter show the current state of the project area.

The survey area was entered from the south access point and proceeded along the west boundary of the property adjacent to an existing, active historic ditch (Waikapu Ditch. As the survey progressed to the north, more rock stockpiles were readily apparent. As the survey approached the northwest corner of the property, a retention basin was observed as well as a large, modern diversion ditch drainageway running mauka/makai. It was apparent that the area has been grubbed and graded several times in the past and historic mechanized clearing was extremely prevalent.

Inspection of the various rock embedded mounds associated with both the retention basin and well as diversion ditch failed to produce any evidence for the Pōhāko'i. There was no evidence for the rock among the rock piles or anywhere on the ground surface.

CONCLUSION

Both the AIS conducted of this survey area (2005; Wilson and Dega) and re-survey of this area in August 2020 did not reveal the presence of the Pōhāko'i stone. This is not surprising considered the massive landscape modifications that previously occurred in the survey area and surrounding environment. If the Pōhāko'i is present in this general area, it may have been previously relocated from its original position as noted by Mr. Pellegrino.

Future efforts at locating this important stone will occur during archaeological monitoring of the project area during any future ground altering activities associated with proposed development. Monitoring provides another avenue in hopes of potentially relocating, recovering, and preserving this potentially lost valuable cultural feature.

Thank you again for the opportunity to provide archaeological consultation on your project. Please feel free to contact me at (808) 597-1182 (mike@scshawaii.com) if you have any questions about this field inspection or the recommendations forwarded herein.

Best Regards,

Michael Dega, Ph.D.
Senior Archaeologist
Scientific Consultant Services, Inc.
1347 Kapiolani Blvd, Suite 408
Honolulu, HI 96814

PHOTOGRAPHS SHOWING FIELD INSPECTION SURVEY AREA

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Appendix I

Cultural Impact Assessment

FINAL— Cultural Impact Assessment for the Proposed Wailuku Residential Project, Wailuku and Waikapū Ahupuaʻa, Wailuku District, Island of Maui, Hawaiʻi

TMK: (2) 3-5-002:003 por.

Prepared For:

DDC2 LLC
2005 Main Street
Wailuku, HI 96793

January 2024

Keala Pono Archaeological Consulting, LLC ● 98-030 Hekaha St. Suite 31, Aiea, HI 96701 ● Phone 808.381.2361

FINAL— Cultural Impact Assessment for the Proposed Wailuku Residential Project, Wailuku and Waikapū Ahupuaʻa, Wailuku District, Island of Maui, Hawaiʻi

TMK: (2) 3-5-002:003 por.

Prepared For:

DDC2 LLC
2005 Main Street
Wailuku, HI 96793

Prepared By:

Cathleen A. Dagher, BA
and
Windy Keala McElroy, PhD

January 2024

Keala Pono Archaeological Consulting, LLC ● 98-030 Hekaha St. Suite 31, Aiea, HI 96701 ● Phone 808.381.2361

MANAGEMENT SUMMARY

Keala Pono Archaeological Consulting has prepared this Cultural Impact Assessment (CIA) in advance of the proposed Wailuku Residential Project. DDC2 LLC and the Department of Hawaiian Home Lands, the project proponent, are planning to construct up to 204 single-family house lots on approximately 77 acres of undeveloped land owned by Kuikahi Properties LLC. The subject property is located in Wailuku and Waikapū Ahupuaʻa, Wailuku District, on the island of Maui, Hawaiʻi on a portion of TMK: (2) 3-5-002:003.

The current study took the form of background research and an ethnographic survey consisting of four interviews which are included in this report. Community consultations were performed to obtain information about the cultural significance of the subject property and the surrounding area, as well as to address possible concerns of the community regarding the effects of the project on places of cultural and traditional importance.

The background research synthesizes traditional and historic accounts and land use for Wailuku and Waikapū Ahupuaʻa and the District of Wailuku. This illustrated that the region is remembered in ʻōlelo noʻeau, moʻolelo, and in a multitude of place names. It was a region that was important for its natural resources, extensive taro loʻi, and was an area favored by aliʻi. Māhele documents record three LCA kuleana lots within the project area and many in the adjacent environs. The area also played an important role during the historic era as sugarcane plantations covered the region.

Cultural resources in the form of four historic properties were identified during an archaeological inventory survey within the boundaries of the proposed project. Wilson and Dega (2005) documented SIHP 50-50-04-5197, a section of the Waiheʻe Ditch; SIHP 50-50-04-5728, an erosion-control site; four components of SIHP 50-50-04-5729, an unnamed ditch constructed of mortared rock; and SIHP 50-50-04-5730, a section of the "Old Waikapū Road." In addition, SIHP 50-50-04-5489, a segment of a historic-modern roadway, appears to be located just outside the northern boundary of the current project area (Wilson and Dega 2005).

No currently conducted traditional cultural practices were identified within the project area itself, and the interviewees were not opposed to the proposed development. Nevertheless, concerns were raised pertaining to effects that the proposed development may have on natural resources, cultural resources, and cultural practices within the project area and its surroundings. Recommendations and mitigations for the project include the following:

- Have an on-site archaeological monitor – one per earth-moving machine - during construction related ground alterations.
- Have an on-site cultural monitor during construction related ground alterations.
- Have an on-site cultural advisor, who is well vetted, respected, familiar with the project, and overall area, to inform community, SHPD, and developer of inadvertent findings of iwi kūpuna, during construction related ground alterations.
- Preserve and protect fresh water and all natural resources.
- Conduct an archaeological field inspection to determine presence/absence of Pōhākoʻi prior to the commencement of ground altering activities.*
- Keep access to the property open to allow the community to pule.
- Place signage that appropriately reflects the cultural and historical significance of the area.
- Keep access to freshwater resources (i.e., surface water and the Maui aquifer) open.
- Keep access to natural resources open.

*A previous archaeological survey attempted to locate Pōhākoʻi but did not find it.

Contents

Figures

Tables

INTRODUCTION

At the request of DDC2 LLC and the Department of Hawaiian Homelands (DHHL), Keala Pono Archaeological Consulting has prepared a Cultural Impact Assessment (CIA) for the proposed Wailuku Residential development, a residential subdivision comprised of up to 204 single-family house lots situated on approximately 77 acres of land. The project area consists of currently undeveloped land, owned by Kuikahi Properties LLC, within Wailuku and Waikapū Ahupuaʻa, Wailuku District, on the island of Maui, on a portion of TMK: (2) 3-5-002:003. This CIA was designed to identify any cultural resources or practices that may occur in the area, determine if the proposed project will affect those resources, and offer mitigation recommendations.

The report begins with a description of the project, a historical overview of land use, and a summary of previously conducted archaeological studies in the area. The next section presents methods and results of the ethnographic survey. Project results are summarized, and recommendations are made in the final section. Hawaiian words, flora and fauna, and technical terms are defined in a glossary. Also included in this report are appendices with documents relevant to the ethnographic survey, including full transcripts of the interviews.

Project Description and Environment

DDC2 LLC and the DHHL, the project proponent, are proposing to construct a residential subdivision comprised of up to 204 single-family house lots situated on approximately 77 acres (31.16 ha) of currently undeveloped land in Wailuku and Waikapū Ahupuaʻa, Wailuku District, on the Island of Maui, on a portion of TMK: (2) 3-5-002:003 (Figures 1 and 2).

The project area is approximately 2.4 miles (3.8 km) southwest of Kahului Harbor and roughly 4.5 miles (7.2 km) north of Māʻalaea Bay. Kuikahi Drive forms the north project area boundary, Honoapiʻilani Highway bounds the project area to the northeast, and the Department of Hawaiian Home Lands Puʻunani Homestead residential subdivision abuts the central-east side of the project area. Agricultural lands form the west and south boundaries and the Old Waikapū Road marks the southeastern boundary.

Soils within the project area and the adjacent lands are of the Iao Series, specifically, Iao cobbly silty clay, 3–7% slopes (IbB); Iao cobbly silty clay, 7–15% slopes (IbC); Iao clay, 3–7% slopes (IcB); and Iao clay, 7–15% slopes (IcC) (Foote et al. 1972:Sheet 100) (Figure 3). The well-drained soils of the Iao series were formed from eroded volcanic rock that develop on alluvial fans. These soils occur between 100 and 500 feet (30 and 152 m) above mean sea level (amsl) in areas receiving 25–40 inches (64–102 cm) of rainfall annually. Soils of the Iao Series are often used for the cultivation of sugarcane and also for residential development (Foote et al. 1972:46-47).

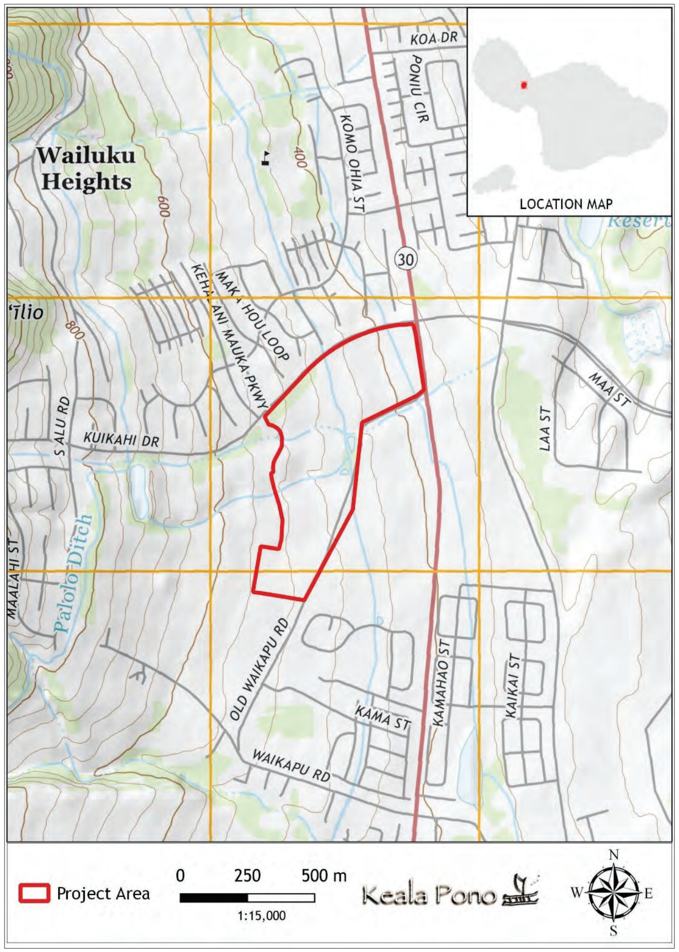

Figure 1. Wailuku Quadrangle Map showing project area location (USGS 2017).

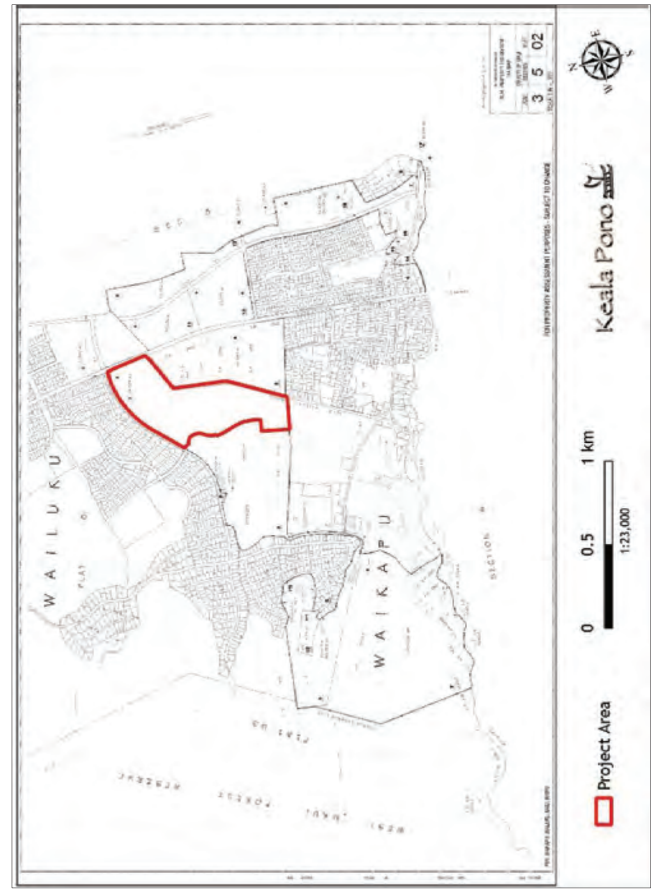

Figure 2. Project area on a TMK plat map for TMK: (2) 3-5-002:003 (State of Hawai'i 2008).

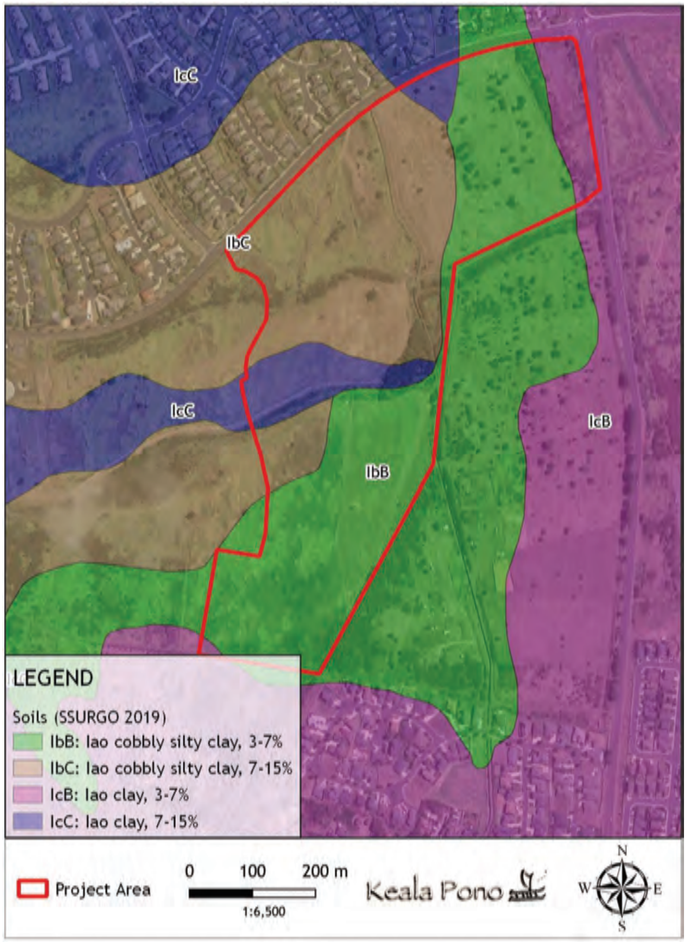

Figure 3. Soils in the vicinity of the project area (data from Foote et al. 1972).

CULTURAL AND HISTORICAL BACKGROUND

This chapter presents traditional and historic background information for the project region, including place names, Hawaiian proverbs and moʻolelo, land use, Māhele land tenure data, historic maps and photos, and a summary of previous archaeological research. In the attempt to record and preserve both the tangible (e.g., traditional and historic archaeological sites) and intangible (e.g., moʻolelo, ʻōlelo noʻeau, mele) culture, this research assists in the discussion of anticipated finds. Research was conducted at the Hawaiʻi State Library; the Hawaiʻi State Historic Preservation Division (SHPD) Kapolei library; and online on the Waihona Aina database; the Office of Hawaiian Affairs Kipuka database, Huapala, the Hawaiian Music and Hula Archives website; and the State of Hawaiʻi Department of Accounting and General Services (DAGS) website. Historical maps, archaeological reports, Māhele data, and historical reference books were among the materials examined.

Wailuku and Waikapū in the Pre-Contact Era

The project area is located within Wailuku and Waikapū Ahupuaʻa, within the modern District of Wailuku. Wailuku Ahupuaʻa is situated on the eastern flank of the West Maui Mountains and extends northeast to the coastline, east to Hāmākua District, and south to the District of Kula. Waikapū Ahupuaʻa, located immediately adjacent and south of Wailuku, extends across the isthmus of Central Maui to Kula, on the east, and to Māʻalaea Bay, on the south.

Traditionally, Wailuku and Waikapū Ahupuaʻa did not belong to a district and were referred to as Na Poko (Alexander 1891:106), with "…Na Poko in this case meaning a smaller division of land" (Coulter 1935 in Sterling 1998:3). Together, these two ahupuaʻa encompassed almost the entire isthmus so "as to cut off half of the lands in the district of Kula from access to the sea" (Alexander 1891:106). Waiheʻe and Waiehu were also independent ahupuaʻa that were referred to "in the Book of the Mahele as being in ʻPuali Komohana,ʼ i.e., West Isthmus" (Coulter 1935 in Sterling 1998:3) (Figure 4). During the Māhele of 1848, these four ahupuaʻa were grouped into the modern District of Wailuku (Lyons in Sterling 1998:3). Wailuku District is also known as Nā Wai ʻEhā or "the four waters," in reference to the streams within the four great valleys which cut far back into the slopes of West Maui and drain the eastward watershed of Puʻu Kukui and the ridges radiating from it.

Place Names

One often overlooked source of history is the information embedded in the Hawaiian landscape. Hawaiian place names "usually have understandable meanings, and the stories illustrating many of the place names are well known and appreciated...The place names provide a living and largely intelligible history" (Pukui et al. 1974:xii). There are a number of traditional Hawaiian sources that describe or name locations within Wailuku and Waikapū Ahupuaʻa and the adjacent lands. These provide insights into the manner in which these places were viewed and remembered. Place names for Waikapū and neighboring locations include names of ahupuaʻa, wahi pana, and various natural landforms that likely served as landmarks, including ridges, streams, gulches, mountain tops, springs, and coastlines. The names are presented here alphabetically in Table 1, and these doubtless do not exhaust the total. Sources consulted for these names include historical and contemporary maps, land award indices, the book *Place Names of Hawaiʻi* (Pukui et al. 1974), and archaeological and historical reports.

Figure 4. Map of Maui ahupuaʻa and moku (Maui Nui Ahupuaʻa Project n.d.).

Table 1. Traditional Place Names Near the Project Region

Place Name	Description	Notes	Sources
ʻĪao	Stream, valley, peak (aka Kukae-moku)	A former sacred place of interment for the aliʻi; *Lit.*, cloud supreme	Pukui et al. 1974:284
Kamaʻomaʻo	Plain	Located near Puʻunēnē; ghosts are believed to have wandered here. *Lit.*, the greenness	Pukui et al. 1974:81
Kepaniwai	Park	*Lit.*, the water dam (Wai-luku Stream was choked with human bodies after the slaughter there)	Pukui et al. 1974:109
Maui	Second largest island in the Hawaiian group	Epithet: Maui O Kama, Maui of Kama (a famous ancient chief, also called Kama-lālā-walu); the island was named for the demigod Māui	Pukui et al. 1974:148
Na Poko	Land section	A smaller division of land	Coulter 1935 in Sterling 1998:3; Alexander 1891:106
Nā Wai ʻEhā	Region	There are in this region four streams in succession from the different gorges of the mountain, significantly named, it is thought, from the events of battles which have transpired upon them	Cheever in Sterling 1998:63
Puali Komohana	Region	West Isthmus [of Maui]	Coulter 1935 in Sterling 1998:3
Puʻunēnē	Town, cinder pit	*Lit.*, goose will	Pukui et al. 1974:202
Waiheʻe	Land section, village, school, canal, point, reef, river, sugar company, farm, trail, park, canyon, water tunnels	*Lit.*, squid liquid (a mute, Ke-aka-o-Kū, the shadow of Kū, was told that his speech would be restored if he went to Kahiki to be married. On the way he was attacked by a huge squid which he killed and threw to Kaha-luʻu, Oʻahu. Slime flowed over the land; hence the name	Pukui et al. 1974:221–222
Waiehu	Land division, point, streams, village, beach, park	*Lit.*, water spray	Pukui et al. 1974:221
Waikapū	Land section, village, ditch, stream, park, sugar company, water tunnels, valley	Lit., water [of] the conch (a conch in a cave here could be heard everywhere in the Hawaiian Islands until it was stolen by a supernatural dog, Puapua-lenalena, yellow tail feathers)	Pukui et al. 1974:123
Wailuku	Land division, elementary school, quadrangle, heights, city, point, sugar company, stream	Site of the battle in the late 18th century in which the army of Ka-lani-ʻōpuʻu was nearly annihilated by Ka-hekili of Maui; see Ke-pani-wai; *Lit.*, water [of] destruction	Pukui et al. 1974:224

ʻŌlelo Noʻeau

Traditional proverbs and wise sayings, also known as ʻōlelo noʻeau, are another means by which the history of Hawaiian locales have been recorded. In 1983, Mary Kawena Pukui published a volume of close to 3,000 ʻōlelo noʻeau that she collected throughout the islands. The introductory chapter of that book reminds us that if we could understand these proverbs and wise sayings well, then we would understand Hawaiʻi well (Pukui 1983). ʻŌlelo noʻeau relevant to the area provide useful insight into the region's natural environment. Pukui (1983) cited six ʻōlelo noʻeau specific to Wailuku. They provide further insight to the traditional landscape and history of the region.

> Ahulau ka Piʻipiʻi i Kakanilua.
>
> *A slaughter of the Piʻipiʻi at Kakanilua*.
>
> In the battle between Kahekili of Maui and Kalaniʻōpuʻu of Hawaiʻi, on the sand dunes of Wailuku, Maui, there was a great slaughter of Hawaiʻi warriors who were called the Piʻipiʻi. Any great slaughter might be compared to the slaughter of the Piʻipiʻi. (Pukui 1983:26)

> Ke alanui pali o ʻAʻalaloa.
>
> *The cliff trail of ʻAʻalaloa.*
>
> A well-known trail from Wailuku to Lahaina. (Pukui 1983:181)

> Ke inu aku la paha aʻu ʻĀlapa i ka wai o Wailuku.
>
> *My ʻĀlapa warriors must now be drinking the water of Wailuku.*
>
> Said when an expected success has turned into a failure. This was a remark made by Kalaniōpuʻu to his wife Kalola and son Kiwalaʻō, in the belief that his selected warriors, the ʻĀlapa, were winning in their battle against Kahekili. Instead they were utterly destroyed. (Pukui 1983:184)

> Pili ka hanu o Wailuku.
>
> *Wailuku holds its breath*.
>
> Said of one who is speechless or petrified with either fear or extreme cold. There is a play on luku (destruction). Refers to Wailuku, Maui. (Pukui 1983:290)

> Wailuku i ka malu he kuawa.
>
> *Wailuku in the shelter of the valleys*.
>
> Wailuku, Maui, reposes in the shelter of the clouds and the valley. (Pukui 1983:291)

> Wehe i ka mākāhā i komo ka iʻa.
>
> *Open the sluice gate that the fish may enter*.
>
> This was uttered by Kaleopuʻupuʻu, priest of Kahekili, after the dedication of the heiau of Kaluli, at Puʻuohala on the north side of Wailuku, Maui. A second invasion from Kalaniōpuʻu of Hawaiʻi was expected, and the priest declared that they were now ready to trap the invaders, like fish inside a pond. The saying refers to the application of strategy to trap the enemy. (Pukui 1983:320)

Three ʻōlelo noʻeau were recorded by Pukui (1983) which pertain to Waikapū. Two refer to the winds and one names the four ahupuaʻa that make up the Na wai ʻehā:

> Ka makani kokololio o Waikapū.
>
> *The swift, gusty wind of Waikapū*.
>
> Waikapū is on Maui. (Pukui 1983:159)

> Waikapū i ka makani kokololio.
>
> *Waikapū of the gusty wind*.
>
> Refers to Waikapū, Maui. (Pukui 1983:319)

> Na wai ʻehā.
>
> *The four wai.*
>
> A poetic term for these places on Maui: Wailuku, Waiehu, Waiheʻe, Waikapū, each of which has a flowing water (wai). (Pukui 1983:251)

Makani, Ua, and Au (Wind, Rain, and Weather)

With their lives closely connected to the natural environment and physical surroundings, Hawaiian winds and rains were individually named and associated with a specific place, region or island. These wind and rain names can offer further insight to cultural traditions and beliefs of the area. The winds of Waikapū, Wailuku, Waiheʻe, and Waiehu are recognized in the chants and mele presented below.

> **The Four Winds**
>
> Wailuku's wind is the Makani-lawe-malie, the wind that takes it easy.
> Waiehu's wind is the Makani-hooʻeha-ili, the wind that hurts the skin.*
> Waikapu's wind is the Makani-ko-kololio, the gusty wind.
> Waihee's wind is the Makani-kili-ʻoʻopu.
>
> *Love disturbance, M.K. Pukui
> (Nuuhiwa in Sterling 1998:62)

> The kololio is from Waikapu.
> The iaiki is of Wailuku,
> The oopu is of Waihee
>
> (Kanepuu 1867 in Sterling 1998:7)

The wind name for Wailuku is Makani-lawe-malie, or "the wind that takes it easy" (Nuuhiwa in Sterling 1998:62). It is said that the aliʻi of the area spent much time surfing (Kamakau 1992:82).

Moʻolelo

Moʻolelo are stories, myths, traditions, legends, histories, or records that were circulated orally and are often associated with the naming of a particular place.

The island of Maui was named after the legendary demigod Māui (Pukui et al. 1974), known for his trickiness. Legends tell of how he stole fire, raised the sky and snared the sun, trapped winds, and changed landscapes. Among all of the moʻolelo, one of his biggest accomplishments was fishing land out of the ocean and creating the Hawaiian Islands. Earlier accounts share that the name of the island was once called Ihikapalaumaewa in ancient times, prior to Papa and Wākea and before their child Māui became famous (Sterling 1998:2).

The plains of Kamaʻomaʻo in Wailuku were a place of wandering souls:

> There are many who have died and have returned to say that they had no claim to an ʻaumakua [realm] (kuleanaʻole). These are the souls, it is said, who only wander upon the plain of Kamaʻomaʻo on Maui or on the plain at Puʻuokapolei on Oahu. Spiders and moths are their food. (Kamakau 1991:29)

Another moʻolelo concerns the appearance of foreigners in Wailuku in the mid-13th century, long before the first written record of foreigners arriving in the islands (Fornander 1969: 80–82). A chief named Wakalana governed the windward side of Maui and lived in Wailuku. At this time, a ship called Mamala came to Wailuku. The ship's captain was named Kaluikia-Manu, and other men and women on board were named Neleike, Malaea, Haakoa, and Hika. Nelieke later became Wakalana's wife, and together they bore fair skinned children with bright, shining eyes (Fornander 1969:81). Their descendants intermarried with other Hawaiians and many of them lived in Waimalu and Honouliuli on O'ahu. Fornander posits that the mo'olelo may refer to a Japanese fishing vessel that was blown off course, as Europeans were not near Hawaiian waters at that time (1969:81).

While there is some discussion over the origin of the name Waikapū, scholars agree that the name refers to a shell. According to Pukui et al. (1974: 223) and Kaualililehua (1872 in Sterling 1998:93), the name of this area refers to a conch shell located in a cave in Waikapū that could be heard across the Hawaiian Islands – until it was stolen by Puapua-lenalena, a dog with supernatural capabilities. Two additional sources cited in Sterling 1998:93 (G.W. Bates and the Henriques Collection) interpret "Waikapū" as "water of the conch or trumpet" but assert that it refers to the troops of Kamehameha I, the ali'i from the island of Hawai'i, who once assembled for battle by sounding the conch shell.

One account of this legend was presented by W.K. Kaualililehua. In this version, the conch was secreted away where no one could see, but it "sounded all the time." The sound was heard by "a prophet from Kauai [who] listened for it" and went in search of it. Puapualenalena, a dog with supernatural capabilities, had heard the call of the conch was also searching for its source. In Kaualililehua's version, Puapualenalena was perched on a cliff above the stream and across from the cave:

> The owners of the conch did not believe, perhaps, that any supernatural being would succeed in taking it away, so they tried to be a little careless. It was not taken, but on the day that Pualenalena did get it away, they had been utterly careless. After he took it, it sounded no more to this day. It used to be heard everywhere in these islands and was annoying to some people. From this conch, the whole of the place was named Waikapū (Water of the conch). This is the legend of how it received its name and is a place much visited by strangers who wish to see it [W.K. Kaualililehua (*Ka Nupepa Kuokoa* 1872 in Sterling 1998:93–94].

Alternative narratives suggest the naming of Waikapū was associated with battles fought in the area. According to Bates (in Sterling 1998:93), the forces of Kamehameha I once assembled for battle in Waikapū at the sounding of a conch. Cheever (in Sterling 1998:63) describes the region of Nā Wai 'Ehā as famous, and named for the battles that took place there. Kamakau (1992:85–86) provides additional information about the Waikapū area by recounting the 1776 battle of Ahulau ka Pi'ipi'i i Kakanilua. This battle was fought between the elite 'Ālapa warriors of Kalaniōpu'u, of Hawai'i Island, and the forces of Kahekili, ruler of Maui, which took place on the sand hills located southeast of Wailuku:

> In the year 1776 Ka-lani-'opu'u and the chiefs returned to war on Maui, and in the battle with Ka-hekili's forces at Wailuku were completely overthrown. The army landed at Keane'o'io, their double canoes extending to Makena at Honua'ula. There they ravaged the countryside, and many of the people of Honua'ula fled to the bush, When Ka-hekili heard of the fighting at Honua'ula he got his forces together—chiefs, fighting men, and left-handed warriors whose slingshots missed not a hair of the head or a blade of grass. Ka-lani'opu'u landed his forces before noon, a great multitude filling the land from Kiheipuko'a at Kealia to Kapa'ahu, all eager with the thought that the Alapa were to drink of the waters of Wailuku. The Alapa were led by Inaina, Kua'ana, Kane-ha'i-lua, and Keawe-hano. There were 800 of them, all expert spear-point breakers, every one of whose spears went straight to the mark, like arrows shot from a bow, to drink the blood of a victim. Across the plains of Pu'u'ainako and Kama'oma'o shone the feather cloaks of the soldiers,

> woven in the ancient pattern and colored like the hues of the rainbow in red, yellow, and green, with helmets on their heads whose arcs shone like a night in summer when the crescent lies within the moon…Said Ka-leo-pu'upu'u to Kahekili, "the fish have entered the sluice; draw in the net." Like a dark cloud hovering over the Alapa, rose the destroying host of Ka-hekili seaward of the sandhills of Kahalu'u, the "smoke head" (*po'ouahi*) and the "red coconut" (*niu'ula*) divisions. They slew the Alapa on the sandhills at the southeast of Kalua. There the dead lay in heaps strewn like *kukui* branches; the corpses lay heaped in death; they were slain like fish enclosed in a net. This great slaughter was called *Ahulau ka Pi'ipi'i Kakanilua.* (Kamakau 1992:85–86)

Pia Cockett (in Sterling 1998:94) provides an alternate account of how this area came to be named Waikapū: "This place, of the four Waters, Waikapu, should be Wai-kapu, and Wailuku, and Waiehu and Waihee. There was a sacred water in Waikapu, that was why it was so called."

According to a legend associated with the ali'i Kihapi'ilani, there is an "adze rock" which marked the boundary between Wailuku and Waikapū Ahupua'a:

> As Kihapiilani and his wife traveled on, they saw many people filling the road. At the stream of Wailuku (Waikapu?) the people were innumerable. Said the wife to the chief, "What are the people doing who are congesting the road?" Kihapiilani said, "It would seem it has something to do with adzes."
>
> When they arrived at this place, they decided to go from the place where it was so crowded with people. There was a huge rock directly above the stream of Waikapu, mauka of the road which still passes at this time. This adze rock is the boundary between Wailuku and Waikapu Ahupuaa and it remains there to this day. (Moses in Sterling 1998:94)

Mele

Traditionally, the Hawaiian language was often used to express many layers of meaning, as well as to display one's wit and to praise the land (Pukui et al. 1974:266). Pukui et al. (1974:267) further state, "…sayings that use place names describe emotional states or important events, but the largest proportion show aloha 'āina 'love for the land and the people of the land…" As shown in the songs presented below, mele were also used in this way. The following mele all speak of the streams and natural resources that the region is known for (Huapala 1997).

Na Wai 'Ehā O Maui - Words & music by Alice Namakelua

E Maui nui o Kama	Great Maui of Kama
'Āina ua kaulana	Famous land
O ka heke i'o no 'oe	You are truly superior
Ua lohe 'ia 'a puni ka honua	Heard around the earth
'Āina 'oe ua wehi	You are the land adorned
Ua 'ohu e ka roselani	Adorned by the rose
He pua ho'i nāu e lei	A flower for you to wear as an adornment
A e ha'aheo mau ai 'oe	And continue to wear in pride
Kaulana nā wai 'ehā	Famous are the four waters
He puana he inoa he ha'ina	A refrain, a name, an answer
Waikapū, Wailuku, Waiehu	Waikapū, Wailuku, Waiehu
A'o Waihe'e iho ia wai	Water descends in Waihe'e
He inoa nēia nou	This is a name chant for you
E Maui nui o Kama	Great Maui of Kama

Ha‘aheo ‘oe i ka roselani E ō mai i kou inoa	You are cherished with pride because of the rose Reply to your name

Source: “Aunty Alice Namakelua’s Lifetime Hawaiian Compositions” - Written April 6, 1940, for the Maui float in the Kamehameha Day Celebration in Honolulu. © 1973, Heinz-Guenther Gerhard Pink. Translated by Kanani Kamai.

No Na Wai ‘Ehā - Scott Hai

I Waikapū ke aloha Ka makani Kokololio Pili i ka poli nahenahe He ‘īnikiniki mālie	My love is at Waikapū The gusty wind named Kokololio Held close to the soft bosom Gently pinching
I Wailuku iho ‘oe I ka piko a‘o ‘Īao Lihilihi o ka pua rose He ‘īnikiniki mālie	You went down to Wailuku To the summit of ‘Īao Petals of the roses Gently pinching
I Waiehu iho ‘oe Ka makani Hō‘ehaili Me ka uhi wai a‘o uka He ‘īnikiniki mālie	You went down to Waiehu Hō‘ehaili, the wind that pierces the skin With the thick fog of the upland Gently pinching
I Waihe‘e kāua Ka makani Kili‘o‘opu Me ka wai a‘o Eleile He ‘īnikiniki mālie	We were at Waihe‘e The wind named Kili‘o‘opu And the water of Eleile Gently pinching
I Lahaina iho ‘oe Ka makani Kaua‘ula Me ka malu ulu a‘o Lele He ‘īnikiniki mālie	You went down to Lahaina Kaua‘ula, the strong mountain wind Amid the shade of the breadfruit trees of Lele Gently pinching
Ha‘ina mai ka puana No na wai ‘ehā E ho‘i no e pili He ‘īnikiniki mālie	Tell the refrain Of the four water Return and let us be together Gently pinching

Source: G. Cooke collection - Scott Hai was from Ke‘anae and moved to Waihe‘e about 1938–39. This is one of the many songs he composed to honor his island of Maui. Translation by Hawaiian Ass`n Center of Leeward Community College.

Waikapū (Forbidden Waters) - Words & music by James Kahele

Waikapū makani kokolo lio Makani houhou ‘ili ‘Ini‘iniki mālie	Waikapū has a swift blowing wind Wind that pierces the skin Gently pinching it
Wailuku makani lawe mālie Makani houhou‘ili ‘Ini‘iniki mālie	Wailuku has a gently blowing wind Wind that pierces the skin Gently pinching it
Wai‘ehu makani ho‘eha ‘ili Makani houhou ‘ili ‘Ini‘iniki mālie	Wai‘ehu has a wind that pricks the skin Wind that pierces the skin Gently pinching
Waihe‘e makani kili‘o‘opu Makani houhou ‘ili ‘Ini‘iniki mālie	Waihe‘e has a cool wind Wind that pierces the skin Gently pinching
Ha‘ina mai ana ka puana Makani houhou ‘ili ‘Ini‘iniki mālie	This ends my song Wind that pierces the skin Gently pinching

Source: King’s Hawaiian Melodies Copyright 1917, 43 Charles E. King - Translated by Mary Pukui.

Subsistence and Traditional Land Use

Traditionally, Wailuku was a gathering place and home to important chiefs and their attendants (‘Ī‘ī 1959:135). Handy et al. (1991:272) assert that there were five centers of population on the island of Maui, one of which was the part of West Maui, “where four deep valley streams watered four areas of taro land spreading fanwise to seaward: the Four Waters (Na-wai-‘eha) famed in song and story – Waihe‘e, Waiehu, Wailuku, and Waikapu.” Wailuku is the third of the four streams that flows from the uplands of Pu‘u Kukui’s ridges and down through ‘Īao Valley. Portions of the current city of Wailuku were built on old agricultural terraces.

> Along the broad stream bed of ‘Iao Valley, extending several miles up and inland, the carefully leveled and stone-encased terraces may be seen. In the lower section of the valley these broad terraces served, in 1934, as sites for Camps 6 and 10 of Wailuku Sugar Plantation, being utilized for houses, gardens, playgrounds, and roads. A little farther up, neat private homes and vegetable and flower gardens covered these old taro terraces; while at their upper limit the terraces were submerged in guava thickets. Here a few wild taros were found, but we saw no terraces in ‘Iao or Wailuku being used as flooded taro patches. It is significant that here, as at Waihe‘e, the old terraces were adapted to market gardening (Chinese bananas, vegetables, and flowers) by Japanese and Portuguese gardeners. (Handy et al. 1991:497)

The waters of Waikapū Stream were once diverted to feed lo‘i systems, and its overflow was discharged on the dry plains on the isthmus between East and West Maui (Handy et al. 1991:496). These abundant waters were later tapped for sugarcane irrigation (see Historic Wailuku section). Cheever commented on the lo‘i of Wailuku in the mid-19th century:

> As you get into the valley and vega of Wailuku, you see numerous remains of old kihapais, or cultivated lots, and divisions of land now waste, showing how much more extensive formerly was the cultivation, and proportionally numerous the people than now…The whole valley of Wailuku, cultivated terrace after terrace, gleaming with running waters and

> standing pools, is a spectacle of uncommon beauty to one that has a position a little above it. (Cheever 1851 in Sterling 1998:75)

The remnants of the extensive Waikapū loʻi system were still visible in the early 1930s, when E.S.C. Handy conducted his initial study of horticulture in the Hawaiian Islands (Handy et al. 1991:497). During his field surveys, Handy et al. (1991:497) found that Japanese farmers had resumed use of the abandoned Hawaiian loʻi to cultivate truck crops, lotus ponds, and Japanese dry taro.

The coastal region of West Maui, including the area east of Wailuku, as well as Māʻalaea supported a number of fishing villages. Given the abundance of taro, inhabitants of the upper reaches of Waikapū and Wailuku supplied these fishing settlements, including those along the dry coastal region of Kula, with poi as a supplement to their dietary staple of sweet potatoes (Sterling 1998:17). The inhabitants of coastal West Maui were also likely to have included breadfruit in their diet, as breadfruit thrived "in the lower inhabited areas of the great valleys from Olowalu through Waikapū" (Sterling 1998:17).

To the northwest of the project area is ʻĪao Valley, a fertile center of agriculture and sacred burial place of aliʻi (Pukui et al. 1974:55). The Halekiʻi-Pihana heiau complex was perched above the valley, signifying the importance of the area. ʻĪao Valley supported a large population that relied on the many loʻi systems that were situated along the stream banks. ʻAuwai fed these loʻi with an abundance of water from the streams:

> [ʻAuwai] have existed immemorially and were evidently constructed for the purpose of irrigating kalo on the plains which stretch away to the northward and southward of the [ʻĪao] river. Several minor ʻauwai have, since ancient times, tapped the river at different points lower down and spread the water through the lands in the gulch on either side of the river bed. (Sterling 1998:86)

In addition to agricultural cultivation, fishponds were constructed in the region, near Kahului. Two major ponds are thought to have been constructed around AD 1500 during the rule of Kiha-a-Piʻilani (Kamakau 1992:42; Pukui et al. 1974:83). The ponds were named Kanahā and Mauʻoni. Kiha-a-Piʻilani also built the ala loa, a trail that circled the entire island. Another source states that the fishponds were constructed by Kapiʻiohoʻokalani, an aliʻi of Oʻahu and Molokaʻi, and that the walls were built by men passing stones from one to another in a line that extended from Makawela to Kanahā (Puea-a-Makakaualii in Sterling 1998:87).

War and Conquest

The project region was wrought with warfare through much of its known history, including what some would term a '100 years' war. Many stories and accounts have been passed down. Reverend Cheever, in his book, *Life in the Sandwich Islands: or, The Heart of the Pacific, As It Was and Is*, wrote of how the various wars had an effect on how each stream in Wailuku was named:

> There are in this region four streams in succession from the different gorges of the mountain, significantly named, it is thought, from the events of battles which have transpired upon them. Waikapu—The water where the conch was blown, and the engagement began. Waiehu—The water where the combatants smoked with dust and perspiration. Wailuku—The water of destruction, where the battle began to be fierce and fatal. Waihee—The water of total rout and defeat, where the army melted away. (Cheever 1851:59)

One of the earliest battles was that between owls and men: "The owls retaliated against an act committed by a cruel man by flocking to Wailuku and descending upon him" (Silva n.d). Another

mention of this battle refers to the origin of the ahupuaʻa name: "The cruel man was punished, and the battle place still bears the name Wailuku, Water-of-killing" (Pukui and Curtis 1974:179).

In addition to the battles with owls, many battles were fought between chiefs. In the 16th century, the 15th mōʻī of Maui, Piʻilani, united the island's districts through war, and gave his daughter to marry the current mōʻī of Hawaiʻi Island. Due to this marriage, there was peace between the two kings of each island, until Piʻilani died and a rivalry sparked between his two sons, Lono-a-Piʻilani and Kiha-a-Piʻilani (Speakman 1978). The eldest son, Lono, had inherited Maui and he sought to kill his brother Kiha, who then escaped to Hāna and met a young chiefess, Koleamoku. They fell in love and secretly married, even though she had been promised to Lono. The couple moved to Hawaiʻi Island, where Kiha's sister was still living with ʻUmi, to avoid being captured by Lono. ʻUmi took the side of Kiha and launched a war with Maui. Lono was defeated and ʻUmi took partial control of the island of Maui, in Hāna, and peace was once again observed until the 17th century.

In the early 18th century, Kekaulike united the kingdom of Maui through war. While there were times of peace after this, things got worse for Maui by the end of the century with many wars with Hawaiʻi Island's king, Alapaʻi who was trying to gain control of it. Kekaulike perished when fleeing to Wailuku:

> When Ke-kau-like heard that the ruling chief of Hawaii was at Kohala on his way to war against Maui, he was afraid and fled to Wailuku in his double war canoe named Ke-aka-milo. He sailed with his wives and children…his officers, war leaders, chiefs, and fighting men, including warriors, spearmen, and counselors. Some went by canoe and some overland, and the fleet landed at Kapaʻahu at the pit of ʻAi-hakoʻko in Kula. Here on the shore the chiefs prepared a litter for Ke-kau-like and bore him upland to Halekii in Kukahua. There Ke-kau-like died, and sound of lamentation for the dead arose. (Kamakau 1992:69)

In an important battle, Kalaniʻōpuʻu was defeated in Wailuku (Kamakau 1992:85–91). It was in 1776 that Kalaniʻōpuʻu returned to war with Maui and was overthrown by Kahekili's army. It is said that Kalaniʻōpuʻu's forces "were slain like fish enclosed in a net," and the slaughter was known as *Ahulau ka Piʻipiʻi Kakanilua*, or Slaughter of the Piʻipiʻi at Kakanilua (Kamakau 1992:86). Unthwarted, however, Kalaniʻōpuʻu prepared for another assault. Kahahana, the aliʻi of Oʻahu and Molokaʻi, came to assist Kahekili. This battle was fought in the area between Wailuku and Waikapū. Again, Kalaniʻōpuʻu's forces were surrounded and killed.

Afflicted by war, Maui became impoverished, and Vancouver mentioned during his visit in 1793 that King Kahekili was having trouble finding enough provisions for his own ship (Speakman 1978). Kahekili was the last king of Maui and was able to rule Molokaʻi, Lānaʻi, and Oʻahu during his reign but was unable to conquer Hawaiʻi Island.

Foreigners increasingly visited Hawaiʻi after Captain Cook arrived at Kahului Bay in the late 18th century, and this was happening as Kamehameha I was rising to power. Kamehameha I, armed with a cannon he acquired by foreigners, went to battle in Wailuku.

> The bay from Kahului to Hopukoa was filled with war canoes. For two days there was constant fighting in which many of the most skillful warriors of Maui took part, but Kamehameha brought up the cannon, Lopaka, with men to haul it and the white men, John Young and Isaac Davis, to handle it; and there was a great slaughter. Had they fought face-to-face and hand-to-hand, as the custom was, they would have been equally matched. But the defensive was drawn up in a narrow pass in ʻIao, and the offensive advanced from below and drew up the cannon as far as far as Kawelowelo‘ula and shot from there into ʻIao and the hills about, and the men were routed. The victors pursued them and slew the as they scrambled up the cliffs. There was a great slaughter, but mostly among the

> commoners; no important chief was killed in the battle. "Clawed off the cliff" (Ka ʻuwaʻu-pali) and "The damming of the waters" (Ka-pani-wai) this battle was called. (Kamakau 1992:148–149)

After winning the battle on Maui, Kamehameha I moved on to conquer the remaining islands of Molokaʻi, Oʻahu, and Kauaʻi.

Historic Wailuku and Waikapū

In 1832, missionaries began arriving in Maui and established a girls' school in Wailuku. Around that time, the sugar industry was introduced, greatly affecting the landscape and daily life in the region. The Hungtai Sugar Works company, founded in 1828 by two Chinese merchants, was the first location of sugar production on the island. King Kamehameha III (Kauikeaouli) had a sugar mill built in Wailuku in the 1840s, which much of the initial sugar enterprise had developed around. The abundance of fresh water and accessible land in Wailuku allowed for the sugar plantations to develop and become profitable within a short time period. In addition, the mills built in the early 1960s were among the most advanced, being steam powered. The arrival of more than 100 foreign laborers to work on the plantations began to greatly change the population composition of the region, along with the decline in the Native Hawaiian population due to introduced diseases. The Wailuku Sugar Company was established in 1862 and later took over the Waiheʻe Plantation to the north. By 1867, 2,250 acres were planted with sugar in Wailuku. Much of the sugarcane cultivation took place in the western portion of Wailuku until 1876 when industry advancements enabled expansion to other dryer areas (Wilcox 1996; MacLennan 1997:102).

In the second half of the 19th century, the sugar industry in Hawaiʻi greatly expanded as a result of the 1876 Reciprocity Treaty between the U.S. and the Hawaiian Kingdom, which gave the U.S. market free access to Hawaiʻi's land for sugar and other products. A major player in the Hawaiian sugar business, Claus Spreckels, a German immigrant to the U.S., had first established an important sugar refinery in San Francisco. He initially opposed the 1876 Reciprocity Treaty between the U.S. and Hawaiʻi as he believed it would cause insurmountable competition in the industry. However, in order to keep up with potential competition, Spreckels traveled to Maui in 1878 where he later founded the Hawaiian Commercial & Sugar Company (HC&S). He purchased and leased 40,000 acres of eastern Wailuku, including the Wailuku Commons. After obtaining the Wailuku Commons in 1882, Spreckels gained water and transport rights for his crops, creating a thriving sugar plantation and town named for himself – Spreckelsville. HC&S was incorporated in 1884 by Spreckels.

Although people continued to live in Waikapū Valley, the abundance of fresh water and accessible land in Waikapū and Wailuku drew the attention of those in the sugar business. Sugar plantations developed there and become profitable within a short time period, with Waikapū Stream being one of the watercourses that supplied the thirsty crop (Handy et al. 1991). A network of irrigation ditches soon extended throughout the region, including the Waihee Ditch, Iao-Waikapu Ditch, South Waikapu Ditch, Kama Ditch, and Everett Ditch. The Waiheʻe Ditch runs through the project area and the Everett Ditch Everett Ditch connects to a reservoir just west of the project area. Plantation roads were constructed, many times alongside these ditches for maintenance, and several of these extend through the project area as well. With the rise of the sugar industry in Wailuku, Kahului, and continuing on further east to Spreckelsville and Pāʻia, it was apparent that a railroad was needed to transport sugar to be exported to the U.S. The Kahului Railroad was first organized under the partnership between Thomas H. Hobron, William O. Smith, and William H. Bailey. The sugar boom in Wailuku and Kahului also contributed to the increased use of Kahului Harbor as a major trade port. A small commercial landing was opened in 1879 for the purposes of the sugar trade. Soon thereafter, Spreckels began operating Oceanic Steamship Lines between Kahului and North America out of Kahului Harbor, making it the main shipping point for sugar from all of the Maui plantations.

Māhele Land Tenure

The change in the traditional land tenure system in Hawaiʻi began with the appointment of the Board of Commissioners to Quiet Land Titles by Kamehameha III in 1845. The Māhele took place during the first few months of 1848 when Kamehameha III and more than 240 of his chiefs worked out their interests in the lands of the Kingdom. This division of land was recorded in the Māhele Book. The King retained roughly a million acres as his own as Crown Lands, while approximately a million and a half acres were designated as Government Lands. The Konohiki Awards amounted to about a million and a half acres, however title was not awarded until the konohiki presented the claim before the Land Commission.

In the fall of 1850 legislation was passed allowing citizens to present claims before the Land Commission for parcels that they were cultivating within the Crown, Government, or Konohiki lands. By 1855 the Land Commission had made visits to all of the islands and had received testimony for about 12,000 land claims. Ultimately between 9,000 and 11,000 kuleana land claims were awarded to kamaʻāina totaling only about 30,000 acres and recorded in ten large volumes. The Waihona Aina Database (n.d.) identified 100 LCAs as claimed within the ahupuaʻa of Waikapū, three of which are located in the current project area. Table 2 identifies the LCAs within and adjacent to the subject property (OHA n.d.).

The locations of numerous kuleana lands within Wailuku and Waikapū are shown in Figures 5 and 6. Also depicted on Figure 5 are two rectangles, each labeled "Kalo Patch," one within the project area and another just to the south. What appears to be a road or ditch crosses the project area, leading to this southern kalo patch. Several roads are also visible within the project parcel, as well as a dashed line that indicates a bridge. The "Stone of Pohakoi" is also shown within the project boundaries on this map. This was a legendary grinding stone used in the finishing of koʻi, or adzes (see Previous Archaeology section). Pohakoi was also the name of an ʻili in the project vicinity (see Table 2). On Figure 6, the same features are illustrated, and the project area is within lands labeled as "Manu" and "Papakapu." "Humphreys 1838" is written in a small, enclosed area within the project lands, and "Pohakoi" is also depicted within the project boundaries.

Figure 7 is an early Hawaiian Government Survey map of Maui (Dodge and Alexander 1885) showing the project area and adjacent lands. The project area is primarily located within lands owned by the Wailuku Sugar Company, while a small portion in the southern part of the project area is within lands owned by Waikapu Sugar at that time. A historic photograph shows Waikapū Valley in the late 1880s (Figure 8). The photograph is facing mauka, or west, depicting the West Maui Mountains and a number of houses are situated adjacent to an agricultural ditch. The ditch may have originated as a traditional ʻauwai, as it is an unlined earthen channel.

Land Grants

The Hawaiian government also sold lands in an effort to generate income for the Kingdom. These were called Land Grants.

> At the time of the Mahele, some of the land was the King's own land which later became known as Ceded Lands. Other lands in the possession of aliʻi were returned to the King in exchange for Commutation of property the aliʻi kept. Some of these returned lands became Government lands and were sold by the government to generate income for the Kingdom, since the King gave up his traditional right to collect taxes and goods following the Mahele. (Waihona Aina Database n.d.)

Land grants in the immediate vicinity of the study area are listed in Table 3, three of which were located within the project area. However, not all lands were LCAs or Land Grants; some areas were

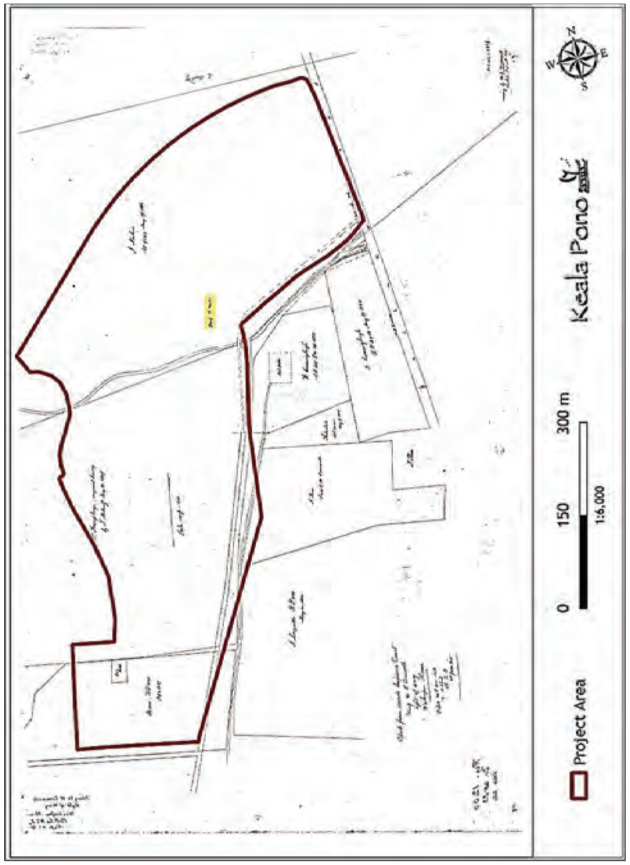

Figure 5. Early map of the project area showing roads, "kalo patches," and other features (Monsarrat 1875; Registered Map 1200). The "Stone of Pohakoi" is illustrated within the project area (highlighted).

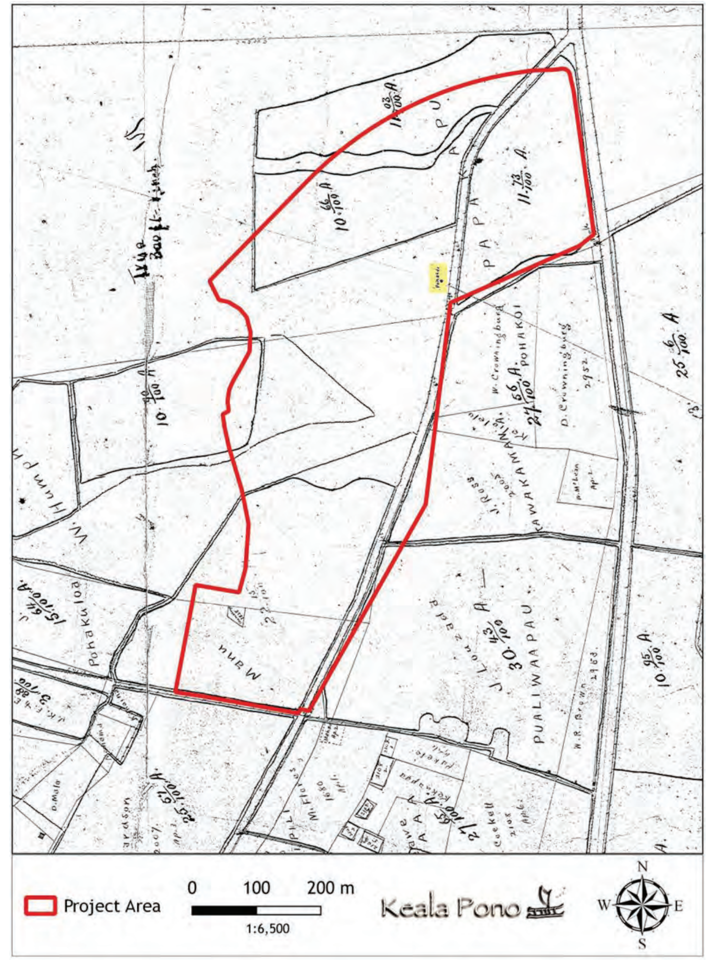

Figure 6. Portion of a map showing kuleana lands near the project area (Monsarrat 1882; Registered Map 0940). "Pohakoi" is illustrated within the project area (highlighted).

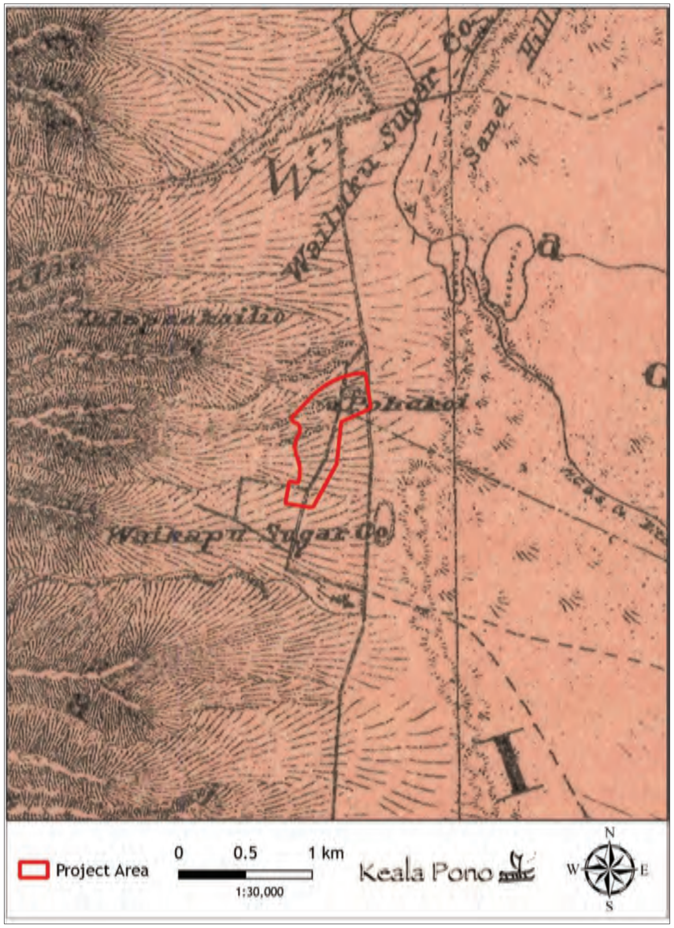

Figure 7. Hawaiian Government Survey map of Maui (Dodge and Alexander 1885) showing the project area and adjacent lands.

Figure 8. Historic photograph of Waikapū Valley (Gonsalves ca. 1888).

Table 2. LCAs Within and Adjacent to the Project Area*

Claimant	LCA / RP	Year	Acreage	ʻĀpana	ʻIli	Land Use
Crowningberg, William (Wilama)	433 / 1111	1852	5.93	1	Pohakoi	
Humphreys, William	**326 / 7659**	**1883**	**131.3**	**1**	**Awikiwiki, Puhiawaawa**	
M.I. Nowlein (Nowli)	**71/4549**	**1863**	**33.5**	**2**	**Papakapu and Kapoi**	
Keliiolelo	3525:2 / 3121	1856	1.66	1	Awakamanu	
Louzada, James	225/7658	1883	26;1	1	Pualinapao	Farmland
Manu	408/ 3540	1857	11.75	1	Pohakuloa	Taro loʻi
McLane, William	3201:2 / 2775	1856	5.45	2	Kapalaalaea, Awakamanu	
Nowlein, Michael J.	**71 / 4549**	**1863**	**303.5**	**3**	**Papakapu, Kapoi**	

*Parcels in bold are located within or partially within the project area.

Table 3. Land Grants Within and Adjacent to the Project Area*

Grantee	Land Grant	Year	Acreage	ʻIli
Cockett, Mrs. Beke	2108:6	1856	7.73	Kaaa
Crowningberg, David	2952	1864	7.4	
Humphreys, William	**1838**	**1855**	**0.15**	**Pohakuloa**
Richardson, John	**2070**	**1856**	**15.1**	
Ross, John	2005	1856	9.1	Awakamanu
	282	**1850**	**26**	

*Parcels in bold were located within or partially within the project area.

claimed by Kamehameha III for himself, as Crown Lands. These properties were to be passed down to his heirs.

The Project Area in the 20th Century

The turn of the century brought the most significant political changes to Maui and the rest of the Hawaiian Islands. Following the overthrow of the monarchy in 1893, the United States claimed the islands to be an annexed territory in 1898. To champion the Hawaiian people's rights, Prince Jonah Kūhiō Kalanianaʻole became a delegate to the United States Congress. Due to Prince Kūhiō's efforts, Congress passed the Hawaiian Homes Commission Act in 1921 which set aside land throughout the islands to be reserved for the Native Hawaiian population. An administrative body, The Hawaiian Homes Commission, was created, consisting of the Governor of Hawaiʻi and four appointed citizens, three of which must have half Hawaiian blood or more (Keesing 1936). The Commission has evolved so that today it is composed of nine members, at least four of which must have one quarter

Hawaiian blood or more (DHHL n.d.). Resulting from the Hawaiian Homes Commission Act, lands in the project vicinity are among the Hawaiian homestead properties designated as such.

The project area vicinity remained mostly unchanged in the early part of the 20th century. A 1955 map shows "light-duty" (double solid black line) and "unimproved" (double dashed black line) roads running through the project area (Figure 9). The latter follows the course of an intermittent stream (solid and dotted blue line) and leads from the Everett Ditch (the blue line to the west of the project area) to Honoapiʻilani Highway. Also shown are three ditches that extend through the project. One of these leads from Hopoi Reservoir to the north; another is the Waiheʻe Ditch, which parallels the Hopoi Ditch to the west; and the final ditch leads from an unnamed reservoir to the west in a perpendicular direction to the others. This latter ditch connects with the Waiheʻe Ditch. The sugarcane plantations in this region continued to operate in the later part of the 20th century, and residential tracts began to be developed in the area. Modern USGS maps name the ditch connecting to the unnamed reservoir to the west of the project as the Palolo Ditch (see Figure 1).

Previous Archaeological and Cultural Studies

As Maui's population continues to grow and lands continue to be developed, the body of archaeological projects and reports increases, as well. A brief summary of the archaeological projects conducted within a 0.5 km radius around the project area are shown on Figure 10 and listed in Table 4. The reports summarized below are based on availability at the SHPD library in Kapolei, Hawaiʻi. Previously identified archaeological sites with known locations are shown in Figure 11 (see Table 4). State Inventory of Historic Places (SIHP) numbers are prefixed by 50-50-04.

The earliest studies of archaeological sites, folklore, customs, and natural history in the Hawaiian Islands were conducted in the early 20th century by Thrum (1909), Stokes (1909–1916), and Walker (1931), under the auspices of the Bernice Pauahi Bishop Museum. According to Thrum (1909:44), the construction of the first heiau on Maui is attributed to the aliʻi Hua (also known as Hua-a-Pohukaina or Hua-a-Kapuaimanaku), whose reign occurred sometime before the 10th century (Sterling 1998:18).

Walker (1931) recorded a number of heiau in Wailuku during his study in the 1930s. These include Kaluli Heiau (Site 42), which was destroyed by the 1930s. Kaluli Heiau was initially recorded by Thrum as located in the cane field above Puohala Camp. Thrum noted that the heiau was repaired during the reign of Kahekili and under the kahuna Kaleopuʻupuʻu (Sterling 1998:75). Walker described Pihana Heiau (Site 43), which was built by Kahekili, as large and partially eroded by the time of his visit. Stokes initially described the structure in 1916, as situated on the top and upper reaches of a "high lime-sand-dune," 70 feet above the stream. Walker observed the heiau to include an open court measuring 90 by 166 feet, which appeared to have contained smaller enclosures located on one side. The side opposite the stream was undisturbed and measured 300 feet. Halekiʻi Heiau (Site 44) was located about 350 feet north-northwest of Pihana Heiau, on another sand dune (Sterling 1998:76). It was of similar construction to Pihana, but in better condition, and measured 300 by 150 feet (Sterling 1998:78).

Walker also identified nine heiau collectively referred to as Wailuku Heiau (Sites 45–54), which are said to have been consecrated by Liholiho (Kamehameha II) on his tour of the island in 1881. These include Keahuku Heiau (Site 45), Olokua Heiau (Site 46), Olopio Heiau (Site 47), Malena Heiau (Site 48), Pohakuokahi Heiau (Site 49), Lelemako Heiau (Site 50), Kawelowelo Heiau (Site 51), Kaulupala Heiau (Site 52), Palamaihiki Heiau (Site 53), and Oloolokalani Heiau (Site 54) (Sterling 1998:79). Of note is that Emory (cited in Sterling 1998:79), questioned where Walker obtained the names of Sites 45 through 54, as the names do not match those provided by Kamakau: Halulu-

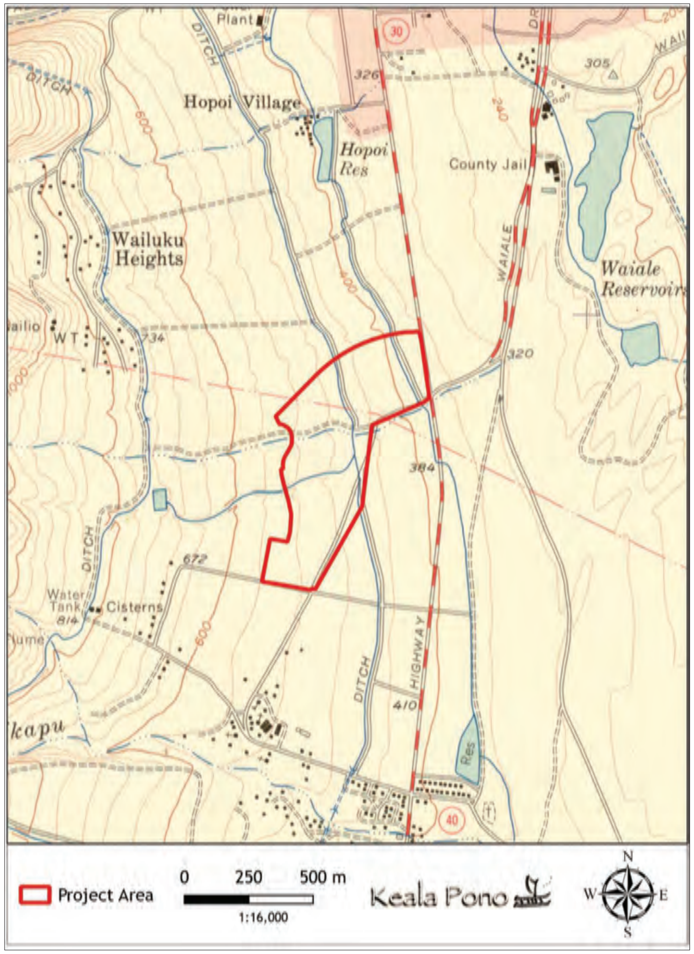

Figure 9. Portion of a 1955 map that shows a ditch and other features extending through the project area (USGS 2023).

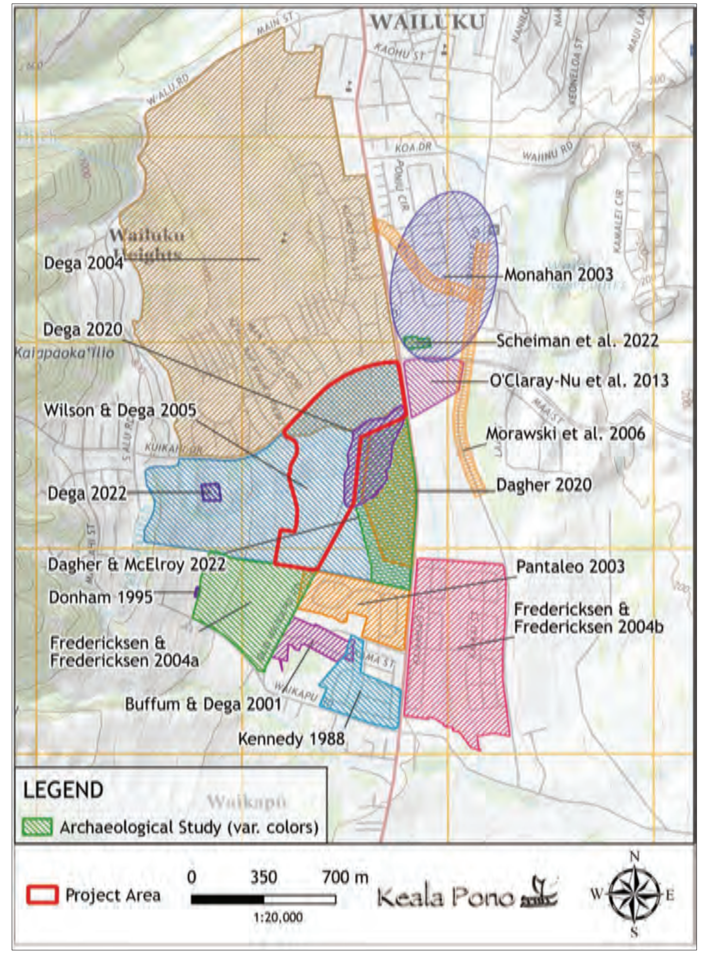

Figure 10. Previous archaeological studies within and near the project area.

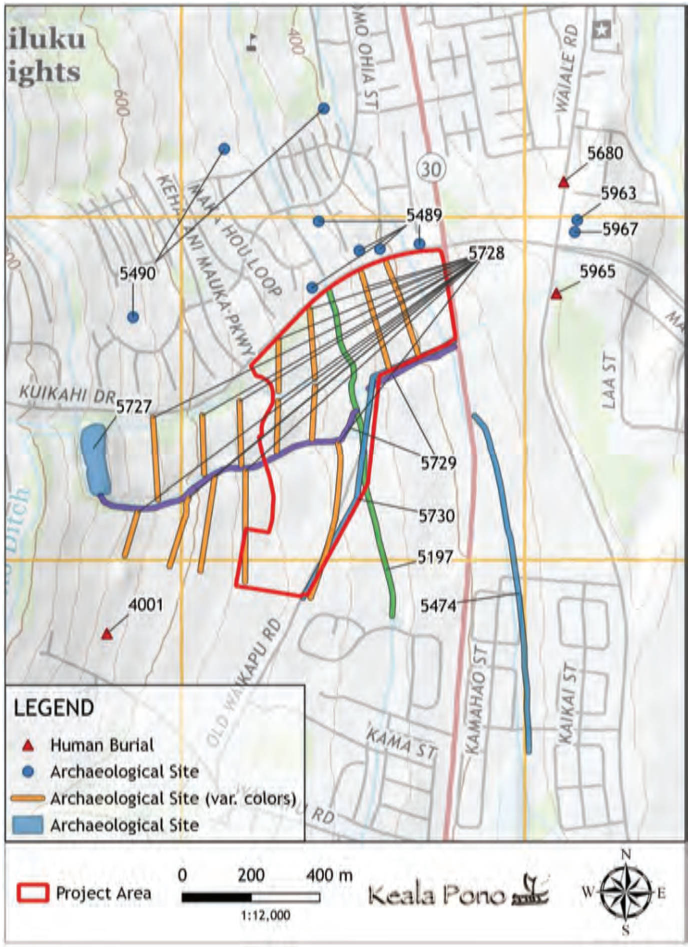

Figure 11. Archaeological sites within and near the project area.

Table 4. Previous Archaeological Research in the Vicinity of the Project Area

Author/Year	Location	Work Completed	Findings
Thrum 1909	Island-wide	Heiau Documentation	Noted two heiau in Waikapū, both destroyed.
Stokes 1916	Island-wide	Heiau Documentation	Documented Pihana Heiau.
Walker 1931	Island-wide	Archaeological survey	Noted Kaluli Heiau (Site 42), Pihana Heiau (Site 43), Halekii Heiau (Site 44), Keahuku Heiau (Site 45), Olokua Heiau (Site 46), Olopio Heiau (Site 47), Malena Heiau (Site 48), Pohakuokahi Heiau (Site 49), Lelemako Heiau (Site 50), Kawelowelo Heiau (Site 51), Kaulupala Heiau (Site 52), Palamaihiki Heiau (Site 53), Oloolokalani Heiau (Site 54). None of these are in proximity to the project area.
Kennedy 1988	Southeast of the Current Project	Reconnaissance Survey	No historic properties identified.
Donham 1995	Southwest of the Current Project	Field Inspection	Recorded SIHP 50-50-04-4001, the Richardson Family Cemetery.
Buffum and Dega 2001	South of the Current Project	Archaeological Inventory Survey	No historic properties identified.
Monahan 2003	Northeast of the Current Project	Archaeological Inventory Survey	No historic properties identified.
Pantaleo 2003	Southeast of the Current Project	Archaeological Inventory Survey	Recorded a section of Waiheʻe Ditch, SIHP 5197.
Dega 2004	West of the Current Project	Archaeological Inventory Survey	Documented two previously identified sites, the Hopoi Reservoir (SIHP 5473, not within 0.5 km of the current project area) and Kama Ditch (SIHP 5474), as well as several newly identified sites: an unnamed ditch (SIHP 5490), Waiheʻe Ditch (SIHP 5197), and roadways (SIHP 5489).
Fredericksen and Fredericksen 2004a	Southwest of the Current Project	Archaeological Inventory Survey	No historic properties identified.
Fredericksen and Fredericksen 2004b	Southeast of the Current Project	Archaeological Inventory Survey	Recorded the previously identified Kama Ditch, SIHP 5474.
Wilson and Dega 2005	West, East, and Partially Overlapping the Current Project	Archaeological Inventory Survey	Documented SIHP 5197, a section of Waiheʻe Ditch; SIHP 5726 and 5729, unnamed ditches; SIHP 5727, an unnamed reservoir; SIHP 5728, an erosion-control site; and SIHP 5730, Old Waikapu Road.
Morawski et al. 2006	North and East of the Current Project	Archaeological Monitoring	Recorded a human burial (SIHP 5680), a historic roadbed (SIHP 5963), a historic flume (SIHP 5967), and isolated and disturbed human remains (SIHP 5965).
O'Claray-Nu et al. 2013	East of the Current Project	Archaeological Inventory Survey	No historic properties identified.
Dagher 2020	East of the Current Project	Cultural Impact Assessment	Identified cultural practices associated with agriculture and access to water, and possibly other traditional activities.

Table 4. (continued)

Author/Year	Location	Work Completed	Findings
Dega 2020	East of the Current Project Area, included small portion of current project area	Archaeological Field Inspection	No historic properties identified.
Dagher and McElroy 2022	East of the Current Project	Addendum Cultural Impact Assessment	Highlighted the cultural significance of the area.
Dega 2022	West of the Current Project	Field Inspection	No historic properties identified.
Scheiman et al. 2022	North and Partially Overlapping the Current Project	Literature Review and Field Inspection	No historic properties identified.

koʻakoʻa, Wailehua, Pihana, Ka-uli, Malumalu-akua, Ke-ahu-ku, and Olopio. Note that Walker (1933) was unable to locate these heiau during his survey.

Although it has been said that Waikapū Valley contained "many temples and sites," most of their locations were not recorded (Ashdown 1970:58). Thrum (1917:59) reported two heiau that were in Waikapū. A large heiau was "below the road abreast of T. Everett's house" and a smaller heiau, possibly associated with the larger structure, was located below the Catholic Church. Another heiau was also said to have been at Māʻalaea, Puʻu Hele. These heiau are now believed to have been destroyed (Thrum 1917:59).

No archaeological studies were conducted near the current project area for many years, until modern compliance projects were initiated. The first of these occurred in 1988, where a preliminary archaeological survey of TMK: (2) 3-5-004:025 was carried out by (Kennedy 1988). No archaeological sites were identified.

A field inspection was conducted on a portion of TMK: (2) 3-5-004:022, during which the historic Richardson Family Cemetery (SIHP 50-50-04-4001) was documented (Donham 1995). The cemetery was located in LCA 920, which was awarded to Richardson and Company under Royal Patent 496 during the Māhele.

An archaeological inventory survey of an approximately 7.5 acre property, TMK: (2) 3-5-004:092, did not identify any archaeological sites (Buffum and Dega 2001). Another archaeological inventory survey did not identify any archaeological sites (Monahan 2003). This was located on TMK: (2) 3-5-001:061, 063,and 066, which appears to have been erroneously reported as as TMK: (2) 3-5-00: 017 (por.) (Monahan 2003).

A section of the historic plantation era Waiheʻe Ditch (SIHP 50-50-04-5197) was identified during an archaeological inventory survey of a portion of TMK: (2) 3-5-004:025 (Pantaleo 2003). The property that was surveyed is located immediately adjacent and south of the current project.

An archaeological inventory survey recorded several archaeological sites within a portion of TMK: (2) 3-5-001:001, which extends into the northern portion the current study area (Dega 2004). The survey documented the previously identified historic plantation era Hopoi Reservoir (SIHP 50-50-04-5473, not within 0.5 km of the current project area) and the historic plantation era Kama Ditch

(SIHP 50-50-04-5474). The newly identified sites near the current project were SIHP 50-50-04-5197, a section of the Waiheʻe Ditch; SIHP 50-50-04-5489, a historic/modern roadway; and SIHP 50-50-04-5490, a system of smaller historic ditches. Other sites were also documented that are farther away from the current project area.

An archaeological inventory survey of TMK: (2) 3-5-004:023, identified no historic properties (Fredericksen and Fredericksen 2004a). However, during an archaeological inventory survey of TMK: (2) 3-5-002:001 (por.) and TMK (2) 3-8-007:101, Fredericksen and Fredericksen (2004b) relocated the previously identified SIHP 50-50-04-5474, the historic plantation era Waikapu Reservoir and Kama Ditch.

An archaeological inventory survey on TMK: (2) 3-5-002: 002 and 003 included the current project area (Wilson and Dega 2005). The survey resulted in the identification of SIHP 50-50-04-5197, a segment of the Waiheʻe Ditch; SIHP 50-50-04-5729, an unnamed ditch constructed of mortared rock; SIHP 50-50-04-5726, an unnamed earthen ditch or drainage; SIHP 50-50-04-5727, an unnamed reservoir which served as the terminus of Waikapu Ditch; SIHP 50-50-04-5728, an erosion-control site; and SIHP 50-50-04-5730, "Old Waikapu Road." The sites were interpreted to be associated with historic plantation era activities. Within the current project area are SIHP 5197, 5728, 5729, and 5730. In addition, SIHP 5489 appears to be located just outside the northern boundary of the current project area. Note that SIHP 50-50-04-5726 is not shown on Figure 11 because an accurate location for this site could not be found. The Waikapu Ditch was also documented during this survey, but it is not near the current project area.

An archaeological monitoring program at the Kehalani Subdivision on TMK: (2) 3-5-002:001 (por.) and (2):3-5-001:017 (por.) resulted in the identification of several archaeological sites (Morawski et al. 2006). Near the current project are SIHP 50-50-04-5680, a complete, in situ human burial; SIHP 50-50-04-5963, a historic roadbed; SIHP 50-50-04-5965, an area comprised of isolated, disarticulated human skeletal remains; and SIHP 50-50-04-5967, a historic flume. Other sites were also documented that are farther away from the current project area. Traditional cultural deposits and surface architecture were not encountered during the archaeological monitoring program possibly because they were destroyed by historic agricultural activities and recent residential development. Additional sites outside of the project area boundary were also documented.

No new archaeological sites were identified during an archaeological inventory survey of a 15 acre parcel along Waiʻale Road (O'Claray-Nu et al. 2013). Stratigraphy consisted of soils from the Iao Series, and bedrock was encountered at 1.6–2.3 meters below the surface.

A Cultural Impact Assessment was completed for the Puʻunani Homestead Development, to the east of the current project (Dagher 2020). Consultation for the CIA included publishing a notice in the OHA newsletter *Ka Wai Ola*, as well as reaching out to 25 individuals. As a result of this effort, 12 individuals provided written responses, and two ethnographic interviews were conducted. The CIA found "evidence of cultural practices related to Hawaiian rights related to agricultural pursuits, access to resources (i.e., water), and possibly other customary activities" (Dagher 2020:60). Hōkūao Pellegrino, one of the interviewees, provided information about the Pōhākoʻi Stone noted on historic maps within the current project area (see Figures 5 and 6):

> ...[T]here once was located a very important stone called Pōhākoʻi. Pōhākoʻi was first and foremost a hoana, or grinding stone used to file and finish koʻi (adzes – stone tool used for cutting and carving wood). (Dagher 2020:48–49)

An archaeological field inspection was conducted for the DHHL Puʻunani Homestead project area within portions of TMK: (2) 3-5-002:002 and 003 (Dega 2020). The field inspection followed the Wilson and Dega (2005) archaeological inventory survey and the Cultural Impact Assessment described above (Dagher 2020). The field inspection was conducted with the express purpose of determining the presence/absence of the legendary Pōhāko‘i stone, mentioned by Hōkūao Pellegrino, a cultural practitioner and lineal descendant of the area, in the Cultural Impact Assessment (Dagher 2020). The location of the Pōhāko‘i stone was not identified during the field inspection (Dega 2020). Dega (2020) suggested the location of the Pōhāko‘i stone was not identified as the result of the extensive land alterations from previous agricultural clearing in the area. Both Dega (2020) and Pellegrino further suggested the Pōhāko‘i Stone may have been moved from its original location at an earlier point in time.

An addendum CIA was later prepared specifically for a water tank for the homestead (Dagher and McElroy 2022). This addendum CIA also highlighted the cultural significance of the Waikapū area. No historic properties were identified during a supplemental archaeological inventory survey carried out for the construction of the water tank (Dega 2022).

A literature review and archaeological field inspection was prepared for the Hawai‘i Regional Council of Carpenters New Maui Office Building Project located on TMK: (2) 3-5-001:063 (por.) (Scheiman et al. 2022). There were no archaeological sites identified during the archaeological field inspection.

Summary of Background Research

The project area is located in the ahupua‘a of Wailuku and Waikapū, storied places with long and intense histories. These areas are associated with legendary battles and it is said the streams here have been named for events that occurred during the various battles that took place. In 1776, the invading ‘Ālapa and Pi‘ipi‘i warriors of Kalaniōpu‘u, of Hawai‘i Island, were slaughtered by the forces of Kahekili, the ruling chief of Maui, on the sand hills just southeast of Wailuku. These areas are also associated with Kamehameha I and the battles he fought to gain control of and unify the Hawaiian Islands.

Of note is that during the pre-contact period, the ahupua‘a of Waikapū and Wailuku were independent of any district. The area was collectively known as Puali Komohana (West Isthmus) possibly because together these substantial land divisions extended over most of the isthmus and blocked a portion of the Kula District from ocean access.

The abundance of fresh water in Waikapū has been valued from the pre-contact period through the historic plantation era and today. The water from the famous four streams were used to irrigate the numerous lo‘i systems that supported a large population in Waikapū and Wailuku. Subsequently, the water from these streams was used to feed the vast sugarcane fields of the plantation era, which lasted over 100 years, formally ending in 1988. Portions of the extensive irrigation systems; the numerous ditches, infrastructure, equipment, and roadway corridors; as well as remnants of the villages where the plantation workers lived, still remain today and are documented in the archaeological record. Roads, ditches, lo‘i, bridges, and a legendary stone, Pōhāko‘i, are depicted within the project area on historic maps as early as 1875.

Archival research indicated that approximately 100 kuleana lands were claimed in the Ahupua‘a of Wailuku and another 100 were claimed in the Ahupua‘a of Waikapū during the Māhele. Three kuleana claims were awarded within the project area. A number of land grants ranging in size from less than an acre to hundreds of acres were purchased or leased in these regions following the Māhele. The project area is within three of these land grants. Remnants of cultivated fields and houses were observed and often noted during the 1800s and many were still visible when E.S.C. Handy conducted his initial horticulture research in the Hawaiian Islands in the 1930s. Evidence of traditional and early historic activities, in the form of ditches, roads, and human burials, continue to

be formally documented in archaeological projects conducted across Waikapū and Wailuku. Previous cultural impact assessments highlighted the cultural significance of the region.

In sum, many archaeological sites, most of which were associated with the historic period have been documented in the vicinity of the current project area; the sites in bold are located within the boundaries of the current project (see Figure 11):

- the Richardson Family Cemetery SIHP 50-50-04-4001
- **the Waihe‘e Ditch SIHP 50-50-04-5197**
- the Kama Ditch SIHP 50-50-04-5474
- **a historic/modern roadway SIHP 50-50-04-5489**
- a system of small historic ditches SIHP 50-50-04-5490
- a complete, in situ human burial SIHP 50-50-04-5680
- an unnamed earthen ditch, SIHP 50-50-04-5726
- a reservoir that served as the terminus of the Waikapu Ditch, SIHP 50-50-04-5727
- **an erosion-control complex associated with the historic plantation era, SIHP 50-50-04-5728**
- **an unnamed rock and mortar ditch, SIHP 50-50-04-5729**
- **the Old Waikapu Road, SIHP 50-50-04-5730**
- a historic roadbed SIHP 50-50-04-5963
- areas comprised of isolated, disarticulated human skeletal remains SIHP 50-50-04-5965
- a historic flume SIHP 50-50-04-5967

ETHNOGRAPHIC SURVEY

Not all information can be found in the archives, in textbooks, or at the library. Rather, it is through the stories, knowledge and experiences of our kamaʻāina and kūpuna, that hidden information is found. Through them we are able to better understand the past and plan for our future. With the goal to identify and understand the importance of, and potential impacts to, traditional Hawaiian and/or historic cultural resources and traditional cultural practices of the project area in Waikapū, ethnographic interviews were conducted with community members who are knowledgeable about the area.

Methods

This Cultural Impact Assessment was conducted through a multi-phase process between November and December 2023. Guiding documents for this work include The Hawaiʻi Environmental Council's Guidelines for Assessing Cultural Impacts (State of Hawaiʻi OEQC 2012), A Bill for Environmental Impact Statements, and Act 50 (State of Hawaiʻi). Key personnel involved with this study include Windy McElroy, PhD, Principal Investigator of Keala Pono Archaeological Consulting, and Cathleen Dagher, BA, Ethnographer.

Interviewees were selected because they met one or more of the following criteria: 1) was referred by Keala Pono Archaeological Consulting or DDC2 LLC; 2) had/has ties to the project area or vicinity; 3) is a known Hawaiian cultural resource person; 4) is a known Hawaiian cultural practitioner; or 5) was referred by other cultural resource professionals.

Interviews were conducted via telephone, videoconference, or email. The telephone and videoconference interviews were taped using a digital recorder. Prior to the interviews, each participant was provided with a USGS topographic map and TMK map identifying the subject property (see Figures 1 and 2), the Agreement to Participate (Appendix A), Consent Form (Appendix B), and briefed on the purpose of the CIA. Research categories were addressed in the form of open questions which allowed the interviewee to answer in the manner that he or she was most comfortable. Follow-up questions were asked based on the interviewee's responses or to clarify what was said.

Transcription was completed by listening to recordings and typing what was said. A copy of the edited transcript was sent to each interviewee for review, along with the Transcript Release Form. The Transcript Release Form provided space for clarifications, corrections, additions, or deletions to the transcript, as well as an opportunity to address any objections to the release of the document (Appendix C). When the forms were returned, transcripts were corrected to reflect any changes made by the interviewee.

A total of 23 potential interviewees were contacted, resulting in four interviews and one written response by email (Appendices D–H). The ethnographic analysis process consisted of examining each transcript and organizing information into research themes, or categories. Research topics include connections to the project lands, moʻolelo, history of the region, the natural environment, archaeological sites and cultural practices, changes over time, and concerns and recommendations for the project. Following the topical breakouts, the emails submitted by Wallette Pellegrino are reprinted in full. Edited transcripts of the interviews and written testimony are presented in their entirety, in the order in which the interviews were conducted, in Appendices D through H. A list of CIA participants is presented in Table 5.

Table 5. List of CIA Participants

Name	Affiliation	Participation
Foster Ampong	State recognized cultural descendant of Wailuku Ahupuaʻa, lineal and cultural descendant of Wailuku Moku	Completed videoconference interview.
Dr. Scott Fisher	Chair, MLIBC; Director of ʻĀina Stewardship, Hawaiian Islands Land Trust and life-long Maui resident	Completed videoconference interview.
Johanna Kamaunu	Aha Moku (Na Hono Aʻo Piʻilani) member, Wailuku Moku	Completed a phone interview and an email interview
Cody Pueo Pata	Kumu Hula, Hawaiian language and culture teacher, researcher, author, Hawaiian music recording artist	Completed videoconference interview.
Wallette Pellegrino	Cultural and lineal descendant of Waikapū Ahupuaʻa and Wailuku Moku, cultural practitioner, Waikapū Community Association member	Submitted statement letters voicing comments and concerns via email.

Consultant Background

The following section presents background information for each interviewee, in their own, unedited, words. This includes information on the interviewee's ʻohana and where the interviewee was born and raised. The participants are Johanna Kamaunu, Cody Pueo Pata, Foster Ampong, and Scott Fisher.

Johanna Kamaunu

Born Johanna Moanikeala Laimana in Honolulu, Hawaii at Kaimuki's 1107 29th Ave near Waialae Elementary School and Petrie Park. I would change my name due to marriage in 1982, Johanna M. Kamaunu when we married…

I was born and raised in Honolulu and I came back to Maui when my mother decided she wanted to come back to her ancestral property in Waiʻehu. Actually, we all came back sort of before that, but yeah, we pretty much gravitated back to Wailuku, Maui…[M]y father is from the Island of Hawaiʻi, so I have Moku o Keawe and Mokupuni o Maui in my genealogy. But um, he comes from Kaʻū, from Nīnole.

[M]y connection to this side is through my grandmother, my maternal grandmother Ruth Kaina AH NEE. She was born in Waiehu and till today our family still has the property there from the land commission award…So, my mother's Jane. Jane Leimomi AhNee. Her mother is Ruth Kaina. Her father is John Young Son AhNee. My grandmother has family ties to ʻĪao Valley and was left to the Mahi family up in ʻĪao Valley. Before passing her grandfather entrusted her to them. She was raised as their own family. The Mahi or Mahihelelima family has been there since the time of Kekaulike's arrival at ʻĪao. So, it's a long time. Grandma's mother is Kaiakea Kaina and her father is Kaaihue Kaina of Waiehu. Kaaihue and his brother Kaawa are heirs to the LCA for Kaawa of lands from Charles Kanaina. Charles Kanaina is father of King Lunalilo.

Even if I were not a descendant of Mahihelelima and Kalanikaleleiaiwi I would still feel drawn to the kuleana that emanated from this valley as in Waiehu where Kanaina provides land by LCA to Kaawa and in Waihee where Piimaiwaa receives his LCA, from lands held by Kealoha, Hawaii.

Cody Pueo Pata

My name is Cody, C-O-D-Y, Pueo, P-U-E-O, Pata, P-A-T-A. I was born in Sacramento, California in 1975. I grew up here in Maui, South Maui, Kīhei and in 2003 my family moved up to Pukalani and they've been Upcountry ever since…[M]y mom is pure haole. My dad is half Native American, quarter Hawaiian, quarter Filipino. Um, when I was 16…I entered hālau under Aunty Nona Mahilani Kaluhiokalani and her hula master is George Nāʻope. So that was '91 and then in 1992 Uncle George asked my family and me if I could enter training to become a kumu hula eventually and so my training was...I ended with all my teachers. I ended with on my hand seven of my teachers are represented, my seven named masters and so I learned from Aunty Nona Mahilani Kaluhiokalani directly, Uncle George directly, and one of my kupuna here on Maui is Aunty Diane Nāpua Amadeo. She was a master lei maker. She was very knowledgeable about Maui stories, about Maui place names and her mother and grandmother were the last priestesses of Pele, the Maui forms of Pele worship here on the island of Maui. Uncle George and Aunty Nona sent me to learn from Kumu Hula Keʻala Kūkona from 1995 to '98. From her I learned hula ʻauana and how to sing falsetto. Then from 1998 I was sent to Kumu Hula Jay Jay Ahulau Akiona in Kona to learn from him and his hula master Aunty Hilda Keanaʻāina, who was a graduate of ʻIolani Luahine and also one of his other masters for other practices was Aunty Eleanor Kaʻupu Makida and from her I learned the style of haku mele from her tradition called Alelo Maʻalea. And so my last teacher passed away in 2011, but over the course of my time with them I worked with them extensively. I lived with them for extended periods. Worked with them, worked for them and that's basically my training for the things I do today.

I graduated as a kumu hula in 2001 and I taught for one year alongside my Kumu Hula Aunty Nona until she passed away in September 2002. In 2003, January 2003, I opened my hālau and I just graduated a kumu hula 20 years later. She's been with me for 20 years. Her name is Kuʻulei Alcomindras-Palakiko.

Foster Ampong

Foster Robin Ampong… I was born in Wailuku in the late '50s. I grew up in Lahaina, primarily. And also in Waiheʻe and Waikapū. I went to school at Kamehameha III Elementary School in Lahaina. And I graduated from Lahainaluna High School.

My father is Puerto Rican-Filipino. So, I have heritage and lineage to my ancestors that come from the Philippines from the southern part of the islands called Cebu, which is part of...the Visayan group, from an island called Bohol.

My grandmother, on my dad's mother's side on my grandmother's side, she's Puerto Rican. Her family comes from Puerto Rico, the Island of Puerto Rico from a mountain province in the southwest called Cacao – the mountain region. And then my mother, who is Hawaiian, of course. Her lineage and my lineage…we've been here in the islands since time immemorial. And we have genealogy relations in all the islands throughout the last 1500 years. In my family I am the keeper of the oral history that was passed down to me in the customary fashion by my mother, her sisters, aunts, uncles in my childhood. Growing up. And then her family is Kimokeo ʻOhana of Lahaina. So, our family comes from Lahaina, but our ancestral identity spans…If you look at the chronology and the timeline in the last 500 years, my family comes from both the Big Island and the Maui lineage.

You know like how I explained to you how we identified with our elders you know as young children growing up in the islands. Here on Maui. We were taught that from a very young age. So, as you know a lot of the names are very long in Hawaiian…And so little kids sometimes we can't pronounce the 18, 25, 26 letter names…I'm presuming our parents

made it easier for us by saying Tutu Waikapū. Her Christian name was Emma Kaiu. Her maiden name was Waiau. So I didn't learn that until years later as an adult. But all my childhood, even in high school, and even after I graduated, whenever my family spoke about her, or recalled events and what have you and history they referred to her as Tutu Waikapū. And then in my adult years I learned that her given name…her Christian name was Emma Kaiu Waiau who married Moke Kalaluhi from Kahoma. Now she was born and raised in Kalapana, Kaimū more accurately, which is in the Puna Moku on the Big Island of Hawaiʻi. So, today folks know of that black sand beach that was in Kalapana.

Scott Fisher

My name is Scott Fisher. I work for the Hawaiʻi Land Trust. I'm the Director of ʻĀina Stewardship. And probably more relevant to this, I am the current Chair of the [Maui/Lānaʻi Islands] Burial Council…and I also have a farm out in Waikapū not too far from this property.

I was born in 1970. Born on Oʻahu, but that's only because my mom had complications in the pregnancy. Grew up on Maui. As far as schools…Kula Schools. Doris Todd. I graduated from Hawaiʻi Prep on the Big Island...I did my undergrad at Carver State. I have graduate degrees from Earlham College in Indiana. A PhD from University of New England in Australia. I also have a graduate degree from University of Idaho. And a graduate degree from Washington State University. And I'm currently working on a PhD in Earth and Ocean Science.

...My father's side of the family is all from…my moʻokūʻauhau specifically is from Kauaʻi. Although my grandmother grew up on Maui. My father grew up on Oʻahu. My family's been in the sugarcane industry. I'm the first generation out of sugar since 1865. Or 1861 when an uncle first got into it. For a time my grandfather worked in sugar. My father worked his whole life and his whole career in sugar...

Wallette Pellegrino

In response to being invited to participate in the CIA consultation process, Wallette Pellegrino submitted written statements. Rather than give her own personal background, Mrs. Pellegrino emphasized her roots in the land adjacent to the project area and her ties to the Waikapū community. Mrs. Pellegrino submitted two emails voicing her and the community's concerns pertaining to the proposed development.

Topical Breakouts

The following sections contain extended quotations from the interviews, organized by topic. Interviewees will provide information on connections to the project area, moʻolelo, the history of Wailuku and Waikapū, the natural environment, archaeological sites and cultural practices, and changes over time. They also shared their concerns and provide recommendations for the proposed Wailuku Residential Development.

Connections to Waikapū and Wailuku

I'm very familiar with not just with the nuance of the oral history but I lived it. I grew up with it and I'm still living with it today. [Foster Ampong]

And so, one of the things growing up that my mother's and father's generation and their parents' generation and their parents' parents' generation and back when they were conversing with us children a lot of times they would identify our elders in the family according to the ahupuaʻa that they lived in. For example, three years old, the kids are packing up. We're in Lahaina and the children are packed with extra clothes and food and what have you into the family car. And we're told that we're gonna go spend the next week or two at Tutu Waikapū's house. And so, us kids knew and identified our relatives and our tutus by Tutu Waikapū. And that was the same thing with Tutu Waihe'e, Tutu Waiehu, Tutu Pu'u Kali. All these different ahupua'as and 'ili 'āinas. Wherever these relatives lived that's how us kids identified and related to them. [Foster Ampong]

Growing up on Maui spending a lot of time in Wailuku. My family we were pretty active. So we would do hikes in Wailuku. There's a hike up to the cross. It's fairly famous. I don't know. It kind of seems to wax and wane in terms of popularity. It's been a little while since I was up there. I don't have a whole lot of direct connection to the land because most of the time that I was growing up it was...sugarcane...[Scott Fisher]

So I've um, I don't know how I get on these lists, but for when Maui things happen, I'm a resource for them just because I've been involved in these types of things I think, forever, alongside my teachers and masters and aunties and uncles. Now that they've all passed, I think it's passed to me, but in 2019 I was commissioned to write a book on place names of West Maui, Maui Komohana. So, those are the three moku around the mountain called 'E'eka, alternatively and more recently called Mauna Kahālāwai. So those three moku are Lahaina, Kā'anapali, and Wailuku. And the Wailuku Moku of course has the ahupua'a of Waikapū in it and so that's through my research perhaps, that's why I got in there. I also um, I worked for the County under Victorino's administration [Mike Victorino, former Maui County mayor] as the cultural advisor to Maui County in 2022 and in that work I wrote, co-authored the cultural impact report for what would become the Hālau of 'Ōiwi Art that will be found in the Ahupua'a of Wailuku in the Moku of Wailuku. I co-authored that with Kapua Pimentel, who is also one of the architect designers for the facility. [Cody Pueo Pata]

So, I just want to emphasize that most of what I know has either been shared with me by people who are knowledgeable or that I've read about in different sources of mo'olelo. But, my own empirical knowledge comes from the fact of being on the Burial Council for now 14 years and just how many burials have come up in that area…[Scott Fisher]

I don't know that I have any in particular other than I live in the area…Well, actually, I don't even live in Wailuku Town. I'm in Waihe'e. [Johanna Kamaunu]

I grew up in the Wailuku-Waikapū area…Well, actually, Waikapū, Wailuku, Waiehu, and Waihe'e these four ahupua'as I frequented and lived and have close family relationships in all four…You know, growing up, I had cousins, uncles, aunts, tutus that lived in these ahupua'as. And we would spend a lot of time with them. And so, not only did we visit our 'ohana in these ahupua'as when we were little, but we stayed for long periods of time. We lived with my family. [Foster Ampong]

To be honest with you, mostly just driving by. I've seen the adjacent land. They're actually doing some work on there right now. They have the windscreens up. So I've seen them working on that the adjacent property. [Scott Fisher]

So, my experience with the subject property…You know what at some point I've been on the property… Driving by the property…To my knowledge I haven't walked it recently. I probably have been here on a trip out with my dad when he was working for HC&S when it was still under sugarcane. It was all sugarcane while I was growing up. There was no real…Nothing really to see. [Scott Fisher]

Plus I've lived here as long as I have and I have access and resources to Wailuku Moku for all of my career…we moved here when I was, um, my late childhood… In high school all of us Kīhei kids at that time were bussed to Wailuku to Baldwin. [Cody Pueo Pata]

I'd qualify that by saying that I don't really have any special knowledge other than academic research. So, I do want to say I don't have mo'okū'auhau from this ahupua'a…I know…plenty of people I know and am friendly with who have been willing to share

information with me I guess. I would say that mainly it was my own personal readings and talking with friends and family who do have a better sense of this. [Scott Fisher]

So, in Wailuku and in Waikapū, I had tutus that I spent a lot of time with that I was sent to growing up, me and my siblings. And in Waikapū, my Tutu Waikapū actually comes from the Big Island. She was born and raised in Kaimū, Kalapana. And…she raised a family and she lived in Kahoma and Kanahā Valley in Lahaina. And she became a widow. She remarried and she was living now in Waikapū at that time. And so, I did not learn of her true name until I started doing more genealogy and started to receive all this information from my family. And that was maybe…that began in 1997. '96. 1996. And so, I was born in 1958. So, between 1958 and 1996, I knew Tutu Waikapū as Tutu Waikapū. And when anyone referred to her by her given name or by her Christian name, I had no clue who they were talking about. So this is the kind of thing that a lot of us here in the islands grow up with. And so, this is why I know oral history is so important. Because you don't see that documented too often. That aspect or that nuance of our history. So, when you ask me what is my affiliation? What is my connection? That's one way I can explain it. [Foster Ampong]

Mo'olelo

So, when it comes to stories and things like that, one of my teachers, Aunty Diane Nāpua Amadeo, told us some things about those specific places and then as a kumu hula, when we, in our lineage, we have forms of accessing data from the ka'ao. Mostly ka'ao, which are stories that seem kind of fantastical, but it's a way to encode data that gets passed on from generation to generation. So one of the mo'olelo of that place has to do with Puapualenalena that I was told and later on in my research as a kumu hula researching place names and even as a researcher, as an author, coming across the story of Kūapī'ei, who was a me'e [heroic character] from Kahului but with his interactions with the akua that resided at Hana'ula above Waikapū and those types of things. In the data that are encoded in those ka'ao, we have access to the way that we interpret those types of data, so yeah. [Cody Pueo Pata]

And so this information that I'm telling you that I'm sharing with you, this was handed down to me like I said earlier on in the interview in the traditional customary fashion of oral history. Generational knowledge. And so as kids we don't necessarily understand it in that context. And being kids, like for me like growing up all the stories and all the lessons and what have you that was taught to me I was more interested in surfing. And so even though I was growing up in Lahaina and I was being schooled and taught by my parents and my elders and the community and even attending Kamehameha III School and Lahainaluna School. All the experiences the stories that we share with one another the life experience…and the memories that we create as children in this world that becomes part of the oral family history. You add that with the generations that have been passed down, up and to your parents and to you. My mother had a lot of experience and a lot of generational and oral history passed down to her by her elders. Who happened to be not just her parents but uncles and aunts and tutus two, three generations ahead of her. [Foster Ampong]

There's other mo'olelo too, like…for the Moku of Wailuku, which means waters that destroy, another destruction type of story has to do with Kapoi and the owls that filled the air when he destroyed 'A'apueo's eggs. And in the story that Aunty Diane told us,…'A'apueo gathered the owls from Ni'ihau down to West Maui and they camped at Manawaipueo, just at the bottom of the Pali on the Lahaina side. And her husband is Pueokāia…he gathered all the owls from Hawai'i Island and east Maui and they camped at Lehuapueo, Lehu-a-pueo means multitude of owls, in Waikapū. So,…on the next day, the day of Lono, they camped on Kāne, the day of Lono, those owls filled the air and they flew over Kapoi mā and fought everybody and killed the chief, Kanēnēnuiakawaikalu and Kapoi and all those warriors, and that is what initially gave that moku and that region the name of Wailuku. [Cody Pueo Pata]

I mean moʻolelo for Wailuku, of course, is the ʻAʻāpueo…the story goes that…I've heard the name mentioned and it was, let me think, Hua a Pohukaina, who is sometimes described as a chief. Sometimes he's described as a kahuna. Probably both. But that he was traveling up in the uplands of Kula in the area that pretty much what we now call Pukalani and killed…the chick son of the pueo king. And so, in vengeance, he mustered an army of pueo and they grabbed rocks in their talons and flew down to Wailuku and dropped these rocks from the heights. And that's where we get the name "Wailuku." "Wai" of course being fresh water or in this case probably "stream" and "luku" means destruction. So, "water of destruction" or "stream of destruction." And that refers to that moʻolelo. [Scott Fisher]

My mother did this a lot. They all play ukulele. They all sing. They all did hula. And for my mother, she sang a lot about the different ahupuaʻas. And she sang a lot about Waiheʻe, Waiehu, Wailuku, Waikapū, Lahaina. [Foster Ampong]

Of course, also, less mythological and more historical is Kamehameha the Great landing at…what is now Kahului Harbor area and having his canoe, the Peleleu, fleet landing in the middle of Kahului Harbor all the way down to Kalaeʻiliʻili in Waiheʻe, at least according to one story. Those canoes lining the shoreline and then…his army marched up into ʻĪao and just before entering the valley, he gave this amazing, really well-known, well-documented exhortation where he tried to get his army motivated. And that is where his famous saying "Imua e nā pokiʻi a inu i ka wai ʻawaʻawa aʻohe hope e hoʻi mai ai." So, that is "Go forward my younger brothers and drink from the bitter waters. There is no turning back." So, one of the more famous quotes of Kamehameha that he said literally on the verge of battle with the army of Kalanikūpule, as they were traveling up ʻĪao Valley. Then, of course it turned into kind of a rout, a massacre, where the Maui army was destroyed. That also happened in ʻĪao Valley, above the Wailuku Stream….[Scott Fisher]

That's the famous incidents…Again, this is reading. This is not like someone had any special knowledge that they passed down to me. Although, in addition to that, ʻĪao Valley especially was an important site for the burial of monarchs or aliʻi. It's always been a very sacred area. What we call the ʻĪao Needle now, which should not be called ʻĪao Needle it's Kūkaemoku. Kūkaemoku was a kinolau or bodily manifestation of Kanaloa. So, kinolau of Kanaloa. That's kind of just off the top of my head. Moʻolelo that I can recall. [Scott Fisher]

So in that particular story, you see Manawaipueo, the owls of ʻAʻapueo coming from Manawainui around, you know, Māʻalaea side and then you have these owls that camped at Waikapū who then make their way towards the Wailuku area, the Wailuku Ahupuaʻa area. So that's a Kona storm system that would allow the waters to be that destructive so as to kill things. And the name of the chief was Kanēnēnuiakawaikalu, ka-wai-kalu is…still water in which the kalu grass grows and so those pondy areas would have been washed out. I think that's what…the destruction of that chief named after the goose of the wai kalu, you know who lives in wai kalu, probably talks about how those marshy areas were overflowed with the waters of destruction and the name of that battle was Kamaluakahēkuawa. So, Aunty Diane tells us that if you look up hēkuawa, kuawa, awāwa, and owāwa in the dictionary they basically all say valley or gulch. Something like that, but one of the ways she told us was that hēkuawa, kuawa, owāwa, awāwa, these are the shapes of the different types of the valleys that we have. Maluakahēkuawa means the high hanging cliffs are sheltered and so in this type of Kona storm and because owls are diurnal, we know that this took place, this storm event took place in the daytime. If one of the signs that this type of occurrence is going to happen is when these clouds that darken the sky, which are the owls that darken the sky. When those are visible during the daytime and when they descend below the hēkuawa and obscure the hēkuawa, and it's a Kona storm, then you have the risk of that type of destructive event. [Cody Pueo Pata]

…[A]s far as our family history goes for ʻĪao, I don't know where to begin with ʻĪao Valley and to share the stories in that place. It's always been um…how shall I say, as a child I

never take those things into consideration and now as a kupuna, that's all I can think about. So, um, how much of the past have we been able to maintain, embrace, and pass on to the next generation? I'm afraid to say, we haven't done very much. [Johanna Kamaunu]

We have also that connection with Kūapīʻei. So the Waikapū Stream didn't used to enter to Māʻalaea through Keālia. It used to enter intermittently through Kahului and so there was that young meʻe named Kūapīʻei and in his moʻolelo these akua came out from Waikapū and assisted him to build a heiau in the Kahului region. And they lived on top of Hanaʻula, which is the peak above Waikapū in the back of the valley, and they were Kāne and Kanaloa. And so in this particular moʻolelo the boy goes up there and he makes offerings to them, but it talks about connectivity between Hanaʻula, the water gathered at the back of Hanaʻula through Waikapū and how it intermixed and made its way to Kahului, which is one of the reasons why Kahului Harbor was easily made into a port. Because the old riverbed there had already eroded that harbor, that part of the harbor deeper than what a natural harbor would be. [Cody Pueo Pata]

History of Waikapū, Wailuku and Adjacent Lands

In terms of the "seat of power" I have been told that One Main Plaza at the intersection of Main Street and High Street that corner right there was the former kauhale of Kahekili. That's what someone mentioned to me. Other things than Wailuku being a very, very culturally rich area…[Scott Fisher]

[I]t's funny that recently I just completed a report and I was thinking how unfortunate that whenever we go back in history, especially Wailuku history, it always seems to start with Kahekili or Kamehameha and yet we don't go before that to see who the kings and the chiefs were. When I started to look at that, it was amazing even one and two generation prior.

I guess two or three main bits of information that I think are relevant is that...and I don't know the exact extent of…their former extent...but the Nā Wai ʻEhā, in general, and Wailuku in particular, having extensive loʻi kalo – taro patches. So at some point this was probably, prior to sugar, this was probably loʻi kalo. The land in question probably was loʻi kalo. Again that would need to be borne out by archaeological survey. It's my understanding that pretty much from Waiheʻe to Waikapū, past Waikapū, that there was kind of solid loʻi kalo. Where there were not kauhale there were loʻi kalo. [Scott Fisher]

Other things Wailuku Ahupuaʻa in Wailuku Moku had the highest concentration of heiau. So again, that's something to be aware of. That there are a lot of heiau in this ahupuaʻa, according to some of the literature. I think it might have been Kamakau who wrote that or one of the major historians wrote that. So, that was the second bit of information. [Scott Fisher]

So Aunty Diane said if it has a Hawaiian name, it has a Hawaiian story, so it has history. And so the ʻili where this project takes place, they all have Hawaiian names, they all have Hawaiian stories, those stories, those names…you folks have access to through your own research. [Cody Pata Pueo]

[W]e always have to go back to the history. We always have to check genealogy and look for heirs. And one of the main thing we look for is the Land Commission Awards. So, with your property I'm going to be looking for the Land Commission Awardees to see who they were. It's my belief that almost everyone is related. I can't say that they're all related, but at one time Namahana said they were all related. Um, Queen Kamāmalu said they were all related, so at this point in time I'm not sure, but I will say, I will dare say that many of us are related. And so, it's always interesting to me. [Johanna Kamaunu]

So, generally, you can kind of break things down into patterns of life and historical incidents. So the life pattern of course would have been taro in this area, as I mentioned earlier. And this area being kind of a high…a large number of heiau. It's possible that other areas on the island had similar…the three ahupuaʻa that seem to have the highest, at least according to this individual where I read it…read, not passed down orally…were Wailuku, Keʻanae, and Waiheʻe were the three largest numbers of heiau. But again that's not something I know empirically. It's just what I've read. [Scott Fisher]

…[Y]ou know when you look at the events that took place across the landscape, you only see the separate events, you don't see the genealogy behind those events. So, like the battle of Kakanilua…Even though it may have been a battle between Kalaniōpuʻu and Kahekili, in the end that's his brother-in-law right?...In the end of that battle Hawaiʻi warriors have lost all save two survivors. Kalaniōpu'u seeks pardon to leave and ends up its Kīwalaʻō that comes to Kahekili to ask for peace to leave Maui safely. And the thing is...Kalaniōpuʻu asks Kalola to go ask her brother for peace and she says, "Do you not remember we just tried to kill him?"…So, Kīwalaʻō decides to…he volunteers to go and the twins volunteer to go with him. I know it's not anything about the twins, but why are they there? The twins are Kahekili's half siblings. They are his, Kiwalao's, uncles and so they go with him to see Kahekili, their brother. I never really thought about that genealogy and how that worked out. [Johanna Kamaunu]

But, I cannot and I'm not going to even make an attempt at this time to try to recall. Especially verbatim what she was saying. But, there are stories out there…Yeah. [Foster Ampong]

Of course, you're not really getting close to it, but a little bit makai of the Honoapiʻilani Highway is where when Kalaniʻōpuʻu invaded Maui. The ʻĀlapa and the Piʻipiʻi, kind of the units, were invading Maui when they, I think this was in 1776, passed on the east side of this land. So, not particularly close, but in that same area. And that's where they were ambushed. It's a little bit closer to the reservoir. And that specifically, that information was Bob Hobdy who did a tremendous amount of research. And he thinks that incident happened where the ʻĀlapa and the Piʻipiʻi units were travelling and they were in the troughs of the dunes and then they were ambushed as they were getting closer to Wailuku. He thought it was closer to the reservoir…So not in the immediate build area…But, again there were only two people who survived that. It was a complete massacre. So that's another bit of information. Kind of a historical incident. [Scott Fisher]

So, as the story goes, Kīwalaʻo knows full well that he could be killed anywhere along the way. He doesn't have to make it all the way to Kahekili to ask for peace, but he decides to go anyway. But he does make it there and in the end he does get to Kahekili's side and now we're talking about someone who is victorious hat history treats as ruthless after one of the greatest battles of that time and they weep. The two come together without saying a word and cry. For a long time I wondered why he would do that and it's not until you uncover the genealogy that you start to see. Those 800, the Alapa and the Piipii, they were family and they were not just any family members, they were the promise of the future. And they were lost. [Johanna Kamaunu]

The Natural Environment

Something however is we have been so fortunate to inherit the names of our winds and rains, and so one of the main names…winds, resident winds, of that particular ahupuaʻa is the Kokololio. It's a gusty wind. [Cody Pueo Pata]

I'm not too certain…that it was a widely cultivated area for agriculture, but we do know that the region that was dry land was still managed for resources like pili and kalamālō grass and one of the ways to manage them is through controlled burns. And so we do have these chants, ancient chants and even chants that honor some of the more recent monarchy that talk about these fires being set and the way we can extract data from them. Through

the way that we extract data we know that these fires were lit when the Kona winds blew because if it was the regular wind that blows, you can imagine they're ceaseless right, and so the fire could spread, but when the Kona wind blows you know that it's going to blow so far until it stops so the fire can't backtrack. Some of these fires went from Waiōhuli area or even...Kaʻonoʻulu area in the Kula area up through Kamaʻomaʻo and terminated usually around Kakanilua. And it talks about...the benefits of course are the pili grass, maintaining…some of them even talks about how the women would come behind the fire and gather fish of the land. And so those could possibly be the ʻūhini, the type of locust that was here that was a food source. It could be maybe be birds perhaps that were burned in the fire. But the fire themselves did allow maintenance of that particular ecosystem so that larger bird populations could flourish within their own seasons and we know this because...I think it was one of the Baileys, I think it was in Waikapū…found large deposits of guano and so that tells you that birds were there in a place where people actively managed. And so, you would think that during these Kona systems, the kūpuna did it in a way that did not mess with the lifecycles of the birds, but enhanced the environment so the birds, the locusts, things like that could be the most productive. [Cody Pueo Pata]

Just from the place names I can tell it could have been the birds, those types of things. [Cody Puo Pata]

...Any story connected to the name, even…one of them might be Wawākamanu, which means...the shrieking of the birds, and that could refer to the bird colonies that were there, right? It could refer to that during when these birds were kulamanu-ing or when they were coming back to where they either next, or mate, or give birth. But the din of these birds were so loud that the place was named Wawākamanu. And in sugarcane times those places were destroyed, but through names like that we have the chance to restore them to...how they would be. So, I don't know if this particular project is in Wawākamanu, but that would be something…[Cody Pueo Pata]

Historically, as is well documented, this area in particular was part of the "bread basket of Maui." Plantings were successful so as to gain notoriety. This area is bare to the Sun. It's soil was dark, rich and moist. Mauka ladden clouds brought rains and water to the land. It is the perfect storm for growing food and the plants responded. I do not need to know the people who labored here did so with relish. What remains a testament to those who labored with their hands, bent back to the sun, is that the land existed, languished since their leaving unencumbered by the traipsing or modernity, had not been built over…til now. At Mauka Awe kalo, banana, uala, grew. At Kumuwiliwili the Lilikoi yellow fruit were prized & its vines became treasure troves in season while mango often carpeted the ground beneath its boughs. Lychee, papaya, star fruit trees filled in most the hillside. Kukui, ti, and the beautifully colored bird of paradise in the front yard are all vivid memories seen clearer today than the day they were made because they are mostly memories no longer visible as in its glory days and we took that all for granted. Iao was prolific, abundant "uluwehiwehi". How could this project property have been any less bountiful with the sun's favor greater here than in the valley? Covid shut down Maui for a time. It proved that the aina was rich, strong and resilient. Aina responded, greening well trodden paths and tourist sites especially the beaches. The most significant personally was the feeling of liberty, a freedom that can only be felt by those who lost it or never had it. Kanaka maoli of Maui are both of those people. Generational families who lived and still live closer to the project area THAN I did, they know it well. It is unfair to ferret out with such specificity in the project site for its existing cultural significance. Planning for and establishing their food security like most plans are often realized in the mind where they are a notable presence. [Johanna Kamaunu]

And then if they were not necessarily cultivating through active agriculture they could have been once managed for the kalamālō grass or the pili grass that was used for thatching for all of the homes in that particular ahupuaʻa right. And we know that below the road like where Kamokuʻilima was, and like the dunes of Kakanilua, that was the case because they were burned during those larger fires, but I don't know…I think Hōkūao [Pellegrino] would be a better one to ask how that place might have been managed. Just in looking at what I did before this interview…it looks like the ʻili were large. So the smaller the ʻili, the more resources were in that ʻili. The larger the ʻili, it means that the resources weren't necessarily as dense, so when it comes to the awarding in those ʻili, it looks like it went to only a few people as opposed to, you know, up to six people in a smaller ʻili, which means…during the Māhele times those lands may not have been used necessarily for kānaka or ʻōiwi based agriculture. [Cody Pueo Pata]

...Waikapū, if it's called Waiakapū or Waikapū, we were taught is in reference to Kihapū that was once kept in the back of that valley in a cave and from Kalapaakaʻilio, which is one of the boundary markers for that ahupuaʻa, descends down to Pōhākoʻi. From Kalapaakaʻilio, which means the ridge of the dog, we are told that dog is Puapualenalena, who hid there and watched the keepers, the stewards of Kihapū and learned their mannerisms and their habits, so when they finally fell asleep and he knew it was a safe time is when he went in and stole Kihapū and transported it to above Waipiʻo Valley on the Big Island. In that particular moʻolelo it sounds fantastical and from the way we're able to interpret data or extract data from these particular moʻolelo, we know that Puapualenalena is a dog from Niʻihau and it literally means that he has the fur around his rump is yellowish in color. And so when we're thinking about dogs in contexts like this, one thing we know is that they don't go too far when walking around without raising their leg to shishi on things. And so when it comes to Kihapū, it's said that the roar when it's blown is likened to the wing, the sound of the wings of Halulu, the great bird, the ocean bird, so in that context we can kind of see a storm system traveling from the northwest down to Maui, which is different than the Kona storms. But this particular storm system came and that the clouds ʻŌpua-pua-lenalena, the name of the dog is Puapualenalena, but ʻŌpua-pua-lenalena, the yellow tinged clouds that can signify different types of storms and so the way that this particular storm system came down that's memorialized through this kaʻao, or the systems memorialized by this cloud would come through the northwest or through that are of Maui and cause…enough rain to issue that roaring sound. [Cody Pueo Pata]

Well, the thing people don't realize is that we didn't just tell time by the moon. We made decisions by the moon. [Johanna Kamaunu]

Archaeological Sites and Cultural Practices

And of course, Kuihelani area has been a major, major topic of our Burial Council. Even though I mentioned that the area had extensive loʻi kalo, would be very, very prudent to expect and anticipate iwi kūpuna, as well, during the archaeological inventory survey. [Scott Fisher]

The whole Kakanilua, which is the sand dunes…so from Kamaʻomaʻo, the plains of Kamaʻomaʻo, which extend pretty much across the isthmus of Maui and...right below the Wailuku Town area…the old town area, the series of sand dunes on the south side of Makanipālua Sand Dune, across the ʻili of Kalua you have the Kakanilua Sand Dune complex which was always a burial ground and then during the times of Kalanikūpule and Kahekili mā, and even Kamehameha, battles were fought there, strategic battles were fought there so those remains were…are still quite apparent in those regions. So, during the construction of some of those areas in Maui Lani and the newer subdivisions, that is of course, stands out in my mind. Another…you know during that same series of conflicts, one of Maui's heroes, his name was ʻOulu, he was known for his sling, the maʻa. So, it said that um, the maʻa stones of Maui, you know, rained down on the warriors of Hawaiʻi and so, you know, you're looking at this large sand dune complex and I wonder if, you know, when people are doing…harvesting the sand for cement or whatever, if they come across stones that are the size of maʻa that could have been remnants…battle remnants from those particular fights and most…especially Maui's meʻe and ʻOulu. [Cody Pueo Pata]

I know there was a couple times we were traveling home from Waiehu…Waiheʻe and then we would stop. You know I don't know the plants too well, but I know that we stopped and gathered some kind of plant. My mother would gather it. There was an area there that they were familiar with. And like I said, I was young. I can't tell you definitively what it was and where. But, it was in the general area of this project. [Foster Ampong]

As far as some of the cultural practices, we were always farmers, planted kalo…[Johanna Kamaunu]

Um, not that I know of. I'm not familiar. But of course, I'm sure you've been told to ask Hōkūao Pellegrino [if there are any traditional sites or historically significant buildings in the area of the proposed project]. He would be the one to know more about that. [Cody Pueo Pata]

Up towards Wailuku Ahupuaʻa it does. ʻĪao Church, which was always important. My brother got married and my father's funeral. So, that was always significant to me. The Bailey House. And then more recent houses like the Court House and the former Maui Police Department Headquarters, which I think was still in use when I was really young. And then they more recently built the other one…the newer one down closer to the hospital. Other buildings of course as I mentioned at One Main Plaza there was supposedly the house of Kahekili. His compound. His kauhale. My understanding is that and I don't know the name of it but that ʻĪao Church was actually built on a heiau. But, I've never seen a footprint of it. No one's ever shown me the footprint, but from what I understand it's there. Lots of archaeological remains just below surface. There's an ʻauwai. I don't remember the name of that ʻauwai. Has a name. An ʻauwai that runs kind of next to ʻĪao Stream…from Wailuku Stream out towards kind of behind the Bailey House. The Hale Hōʻikeʻike. And then of course, the Pondiko Ouchi House, which has recently changed hands. Pondiko Ouchi was the manager of Wailuku Sugar. So, that was a C.W. Dickey house. [Scott Fisher]

But if I'm not mistaken…does one of the boundaries of your site...include Pōhākoʻi?...So if that's the case, Pōhākoʻi was a boundary marker and, I mean just from the name that does…and the record says that there was a stone, a large stone there. But, I don't think we know where the stone is…[Cody Pueo Pata]

I don't know if that area was a region of burials. I don't know. Usually…they're not necessarily inherited by people, but they're in the zone of wao kanaka. They could have been used as burial places as well, but with the abundance of sand dunes below. Here on Maui if you hear sand dunes, we automatically think iwi regardless of where the sand is going to be found. With the abundance of sand dunes and also cliff areas in the valley, I don't know if they prefer to bury in those places there or if there are easier places. There is an area…near that…I believe the ʻili's name is Pūʻalinapao, which means "marks left by digging" like this, you know with your hands. So, I don't know if that refers to a burial practice because pao also means dug, graves that are dug, or it could also mean it could have been an agricultural practice for things like sweet potatoes that didn't need to be dug real deep. [Cody Pueo Pata]

So that's just in the place name itself, we know that that type of practice took place there in that ʻili Pūʻalinapao. But what was the purpose of the pao, if it was burials or agriculture? I'm assuming agriculture. Because usually burials are not advertised so well, but sometimes they are. [Cody Pueo Pata]

It's as if they practiced…our genetic rearing. I don't know what you call it, but they married specifically for...what they could produce in the next generation and seems that in Maui, about five and six generations before Kahekili…with Kalanikauleleaiwi and then in Kekaulike's matings Maui gains Oʻahu and Hawaiʻi island leadership and allies by marriage. The aliʻi class were building the Kekaulike dynasty. They were trying to produce the best of the next generation and when Kekaulike comes along it's like the perfect foundation for creating a strong unifying dynasty. I don't know that people realize that. Kahekili and Kalola, Kalaniopu'u's wife, are brother and sister. [Johanna Kamaunu]

No. From what I've seen they're not. [Not on the project property.] There are Hawaiians, I guess they're leasing the land, but they're not using it for cultural practices. [Johanna Kamaunu]

Because there are probably burials in that area and there may be people who have their own local tradition, I think to my knowledge…I'll answer this way. To my knowledge no. Although, the presence of iwi kūpuna in that area may dramatically…the discovery or the discovery of people living in the area who have mo'olelo that talk about iwi kūpuna buried in there, it is possible. It is possible…without getting into details about the specific things we've gone over at the Burial Council over the years there are quite a number of iwi kūpuna in that general area. Just really can't emphasize that enough. Again, because the work has been done…on the east side of Honoapi'ilani Highway that's where they've been found, but I expect there will be others found in the same vicinity. [Sott Fisher]

As a skilled shepherd knows its flock and recognizes each one a kanaka would recognize such sights that to others may elude notice. Natural water ways long allowed to dry, not so noticeable paths still visible to the trained eye and the terrain, particular plants, or lack of plants, types of pohaku, clustering or scattered, etc. Such observations are refined in persons who walked it, worked it and lived in it daily, To the rest of the world it is not there. But in our eyes and mind we still see a lot more then is now visible. So, when you ask what is known as culturally significant I will say that the land speaks and tells its story if you know where and how to look for it even generations later. That is a cultural practice, observation. It is a skill and is still practiced today. Development would alter the topography literally and in that process eliminate whatever signs that time has left to us. You can proceed ignorant of that tradition and say it is the letter of the law. Or you could take a second look and third look, conduct investigations and research into that practice and have endless discoveries by following the spirit of the law to preserve and protect traditional and customary practices which include pule and observations, reading the land for its history and possibilities from the topography. [Johanna Kamaunu]

My suspicion is that at some point in the past there were lo'i kalo. So that would have…Not gathering in the traditional sense of the word, like gathering limu or gathering lā'ua lapa'au. But, I imagine that that was the primary use. And that along with those lo'i kalo there would have been within that context some lā'ua lapa'au that would have been gathered. But again I don't have any knowledge of that…no specific knowledge of that in particular. [Scott Fisher]

I don't even think there's any buildings on the property. To be honest with you. [Scott Fisher]

Change Through Time

Oh my gosh. You know there was all open space and green and today…I remember coming here once when they had the hydrofoil. Do you remember that? That was so long ago. [Johanna Kamaunu]

They had the hydrofoil that came interisland and Mā'alaea. And when I got off the boat… and it was all sugarcane. Sugarcane everywhere. Everywhere. Not a building in sight till Waikapu town. [Johanna Kamaunu]

I know there's a lot of housing in that area now…You know it used to be Waikapū and Wailuku were two…I could look down from my house in Kula and they looked like two different towns. And now they've kind of, like Kahului and Wailuku, they've kind of blended together, which is a bit unfortunate. [Scott Fisher]

I kind of eluded to this a little bit earlier. When I was younger from my vantage point from my house in Kula we could look down and of course Waikapū and Wailuku were distinct and separate. They were separated by about three miles or so of pretty much just agricultural land. Sugarcane, of course, was for most of my life that's what it was. So sugarcane separated Wailuku and Waikapū. And they were two distinct things and then they started…You know in the early 2000s, it seems…Well actually, in the 90s…80s and 90s you started to see an expansion of Wailuku Heights. And once Wailuku Heights expanded, then you have an expansion of Waikapū towards Wailuku and Wailuku towards Waikapū…In a word – urban growth. Higher density housing. Housing, in general. And so, that's been the main thing. [Scott Fisher]

In my own time there's been those developments, right, the new housing divisions, most especially and the commercial development in the upper regions of Waikapū, mauka of the highway, and then down along Waikō…on the north side of Waikō. All of that commercial development and then extending out towards the ahupua'a of Wailuku, that whole entire industrial area or that shopping area. The development of Maui Lani...all of those. All of that has taken place in my own time. That hundred year flood that happened…I think it was 2016, they were, you know, taking boulders and things like that from quarries and sand and whatever to kind of try to mitigate the damage of the flooding and crushing stones and things like that. That sticks out in my mind because that type of flooding hadn't occurred in a couple generations as far as what we know and so there's that type of desecration. [Cody Pueo Pata]

And then I think for a time, if I recall correctly… like for a time it may have been macadamia nuts. I can't remember if it was on this particular land. But I know that they planted a lot of trees in Wailuku. [Scott Fisher]

So as far as change, you know, I guess I could be more specific, writing about it. It's fine to just tell you what it means over the phone like this, but it's important to me that this gets understood. You're right, the change is significant. Do we want it? Do we need it? I would think, you know it hurts me every time I look up at that mountain and see more houses up there and I'm thinking this was once the breadbasket out there? We call this place Na Wai 'Eha anymore. [Johanna Kamaunu]

Well, I know that in this area it was at one time I know that…I don't know if this was original landowner or someone who was leasing the land but there was mainly pastoral. I saw cows in there. [laughs]…For the most part you know if I remember correctly the Waikapū end of that project area was where I saw animals. And the area closer to Wailuku was sugarcane. [Foster Ampong]

…[Too] many distractions over time and too many foreign influences...those skills and traditions are lost. [Johanna Kamaunu]

Oh, all the old churches are gone. There was a church in Waikapū that's gone. There...was a church down by, below the highway. Ah, I can't remember the name of that church, but that's gone, you know. Small, little, old Hawaiian churches. So reminiscent of that era, it's all gone. They're not there anymore. What else is missing? Let's see. The only reason I thought of the old churches is because the one church that's still standing is that big stone church on Honoapi'ilani Highway…One was right on the main highway. I think that was Saint Joseph's. I'm not sure. Um, was kind of across the street from Wailuku on 30. Somewhere around that area. [Johanna Kamaunu]

...Hawaiian newspapers talk about when that happened how Kanahā Pond dried up and how the people were able to take all the…had pyramids of salt that were able to raise up and harvest from there because the water had stopped flowing and was now directed to Kealia. [Cody Pata Pueo]

My grandmother taught at Waihe'e School when she was 19. My grandmother was born in 1901. Um, Waihe'e School had a celebration. I think it was a 120-year celebration and she was still living then, so she got invited to the school. We came down and she was thrilled to see how the school had changed over the years. Of course today, I don't think she would even recognize the school. It has changed so that all the old buildings are gone. All of the old buildings are gone. Nothing remains from that time period. Unfortunate. [Johanna Kamaunu

I started out years ago doing genealogy work so that helped me when I was on the Burial Council, but when it comes to iwi and knowing what the lay of the land was, that was really difficult. There's too many variances and you have to look at the law and how the law has changed over time and how people's...belief has changed over time. There was a time when someone is buried or they died and they'd leave a will they expect because it says in their will to be buried and left to eternal rest. They don't ever expect to be disturbed or removed, much less have their remains destroyed in the process and for some reason that doesn't seem to matter when it comes to development. I've always hoped that we could find…some kind of balance there, but other than not digging, there is no balance. [Johanna Kamaunu]

Concerns and Recommendations

So, it would, I don't know how anyone goes about putting that kind of a message into a report, but that's what my message would be, that it's unfortunate that with these projects that come forward...we're having to give up the landscape history, having to give up our identity. I use those words, they probably need some definition to them, but um, we are so much a part of the soil, the ʻāina, yeah, and gee, we separated from that ʻāina. I used to think it was a very Hawaiian thing, right, but I'm starting to realize, open spaces, they are a very human thing. Something that all humans need. [Johanna Kamaunu]

Yeah, it could continue to contribute to the degradation of these places or the eroding of those cultural practices, right. [Cody Pueo Pata]

If having running water for loʻi kalo is a cultural practice that could be impacted, then yes, it probably will. [Johanna Kamaunu]

And so when it comes to the type of construction done, knowing that the wind is gusty. Where is the dust going to blow? Who might it have the opportunity to affect? If there are chemicals sprayed in one property there, because the wind is gusty, we know it's going to travel. So how can…knowing the attributes of the winds and rains of that place inform and guide the construction process? So even if they're going to put up temporary fences they need to take into account the name of the wind is gusty. So what types of fence is going to be there? When they put fences in the community all over Maui, if you're not prepared for the wind, you're going to lose things, right? And so I would encourage the developers to take into account the environmental knowledge that we've been passed to inform the shape of house, the shape of community, the type of materials used, because the wind will take those things elsewhere. [Cody Pueo Pata]

But, I'm hoping that there can be an essence of the cultural practice remaining. In other words, like the affordable housing rental down by Longs, Kaulana Mahina is a moon calendar. The whole purpose of naming that building, that project for that is so that people start to look up at the moon. [Johanna Kamaunu]

Don't be kāpulu. Don't be messy. Don't be incompetent. Don't be lackadaisical. You know, kāpulu is real sloppy. You know sloppy work. [Foster Ampong]

Yeah. I don't know per se that there's this historical feature or this burial feature in any specific area. All I can say is that from my experience in the last…in my experience in my whole life especially in the last 20 years there definitely is a possibility that burials and historical sites may be encountered in this project. Which is why like all the other projects that I've been asked to share my manaʻo it's important that qualified archaeological monitors are part of this whole development. This whole plan. Not just in the AIS [archaeological inventory survey]. You know, if this land is going to be developed for

subdivision or homes, then I think every earth-moving machine on that project should have an arch monitor to monitor their activity. [Foster Ampong]

In other words, if they're running one excavator, all you need is only one arch monitor to watch that activity. But, if you're running three excavators and a backhoe and a bulldozer on the same project, but in different locales, then I would strongly suggest that an arch monitor is assigned and present at each of those machines. 'Cause I've seen other projects where they have one or two arch monitors for the project and they're running four or five machines that are scattered throughout the area of the project. And you know one monitor is on one side of the project and a machine is working on the opposite side, there's no way the arch monitor can cover both sides. One monitor. That's why I'm saying that you know arch monitors need to be present and need to be assigned to each earth moving machine that is operating. [Foster Ampong]

...I know I've said it a bunch of times. But, the likelihood of inadvertently coming across iwi is quite high. I'm always astonished where iwi kūpuna are found. Iwi kūpuna can be found anywhere. Considering the concentrations that are found in the Wailuku district, it's important that they be afforded a high priority level of protection. [Scott Fisher]

Well, let's just anticipate that they might come across iwi kūpuna. Again, especially since there's gonna be Hawaiian Homes, there I think there needs to be…Well, we should be sensitive at all times. I don't mean to sound…But for those maybe who will be living there it's especially important that it be done right. And again, it's important to do it right all the time. I don't mean to imply that it's only important to do it right when it's Hawaiian Homes…I think making a presentation to Burial Council to get other people… [Scott Fisher]

...I would say consult with those who have made an attempt to be recognized as cultural descendents so there is a plan when iwi are inadvertently discovered. Doing so will ensure they have a process in place that makes it easier for people who want to be recognized as cultural and lineal descendants to be recognized. It's oftentimes quite burdensome for people. We need more people that the landowner can consult with on what and how those iwi should be treated when they are discovered. Of course most times it's keep in place. [Scott Fisher]

I always hope that we will find a balance between building and the cultural practices. If there's some way, oh that's why I brought up Kaulana Mahina. The fact that it has that name. The fact that buildings are named after the phases of the moon. Their rec center is going to host information on how the moon calendar works. There's a lot of stuff that they're going to be doing there that's having to do with moon gazing and understanding the moon and how you can utilize the moon calendar in your own life. Those to me are significant ways of holding on to those traditions and remembering their significance. [Johanna Kamaunu]

1. Allow access and pule.
2. Utilize services and expertise of Maui cultural monitors.
3. Reporting
4. Signage appropriately reflecting significance of the area (Johanna Kamaunu)

Plant multiple and varied oasis of native fruit trees along drainage and retention basin areas. Consider these heirlooms of Na Wai Eha, the perfect storm of growing food.
The Sentinels: ulu, kukui, ohia ai, peʻa, niu [Johanna Kamaunu]

I think, here. And this is something I've been chewing on for a while now. I think that the developer should have retained an active cultural advisor. That is not only familiar with that area, but that has been vetted and…it would be nice if each development had a cultural advisor that could communicate with the community, as well as with the client, the

> developer, and with SHPD [the State Historic Preservation Division]. And the reason why I am saying that is that…For instance, yeah, there's Hawaiʻi Administrative Rules that govern what one does whenever they encounter an inadvertent discovery of human skeletal remains. And there's a notification process and there's a protocol and what have you.…I think it would behoove everyone if the developer had a cultural advisor that was respected and trusted by the community…So, I guess that what I'm trying to say is I hope whether it's Dowling or any other developer, I hope that they have a cultural advisor…that can communicate with the community. [Foster Ampong]

Summary of Ethnographic Survey

The interviewees have extensive knowledge of the ahupuaʻa of Waikapū and Wailuku and the surrounding area. Three of the four interviewees grew up on Maui and one of these individuals is recognized by the State of Hawaiʻi as a cultural descendant of Wailuku Ahupuaʻa and as a lineal and cultural descendant of Wailuku Moku. Two of the interviewees have served multiple terms on the MLIBC, and one of these individuals is the current Chair of the MLIBC. All four of the interviewees are knowledgeable about traditional cultural practices and cultural resources in Waikapū and Wailuku. Another contributor to the consultation process is a cultural and lineal descendant of Waikapū Ahupuaʻa and Wailuku Moku, as well as a cultural practitioner.

Through the consultation process the interviewees voiced their concerns and recommendations for the project. All four interviewees expressed concern that iwi kūpuna may be found on the property and wanted to ensure they would be protected, if encountered. Additional concerns expressed during the consultation process included:

- loss of cultural identities
- loss of connection to the land
- loss of the continuation and remembrance of cultural practices
- potential impacts to freshwater resources
- potential impacts to areas currently in loʻi kalo
- potential impacts of increased traffic use of Old Waikapū/Old Government Road impacting the cultural and historical integrity of the area (e.g., impacts to a neighborhood comprised of old homes, many over 100 years, to the associated rock walls, and to old trees).

The resounding recommendation was that an archaeological monitor, preferably one monitor per earth-moving machine, and an on-site cultural monitor should be present during construction related ground alterations. It was also recommended that a well-vetted and well-respected cultural advisor, who is familiar with the project and the overall area, be on site during ground disturbance. This individual would actively report to the community, the developer, and SHPD with information on the findings of human burials during the course of project-related ground altering activities. Additional recommendations are that the community be allowed to access the development, to pule on the property, and to install signage that appropriately reflects the cultural and historical significance of the area.

SUMMARY AND RECOMMENDATIONS

An examination of traditional and historic land use for Wailuku and Waikapū as demonstrated in moʻolelo, historic literature, archaeological investigations, and ethnographic interviews highlight the unique history of these areas. Both ahupuaʻa were lands rich in natural and cultural resources that sustained large populations and were attractive areas to the aliʻi, as well. The plentiful freshwater stream that flowed through the region supported an extremely productive agricultural area, with extensive loʻi systems in both ahupuaʻa. There are many moʻolelo of this area featuring significant Hawaiian individuals, ʻaumakua, and events associated with these areas. Many famous and legendary battles occurred in the region as well. Kahekili, the ruling chief of Maui, is said to have based his stronghold in Wailuku District and directed battles from the uplands of Waikapū. In addition, there are many mele and oli that describe the natural beauty and significant land formations of the region. The numerous place names associated with these areas not only carried information on significant places and events, but also contributed to a better understanding of the natural environment through metaphor.

During the historic era, sugarcane fields replaced the traditional taro loʻi systems. Throughout the region large tracts of land were acquired for the commercial production of sugarcane. However, obtaining sufficient water for this endeavor was a prominent and vexing issue. Ultimately, water from Waikapū Stream was one of the primary freshwater sources utilized for the purpose of irrigating the large expanses of sugarcane lands.

Cultural Resources, Practices, and Beliefs Identified

Archival research and ethnographic interviews compiled for the current study reveal that Wailuku and Waikapū Ahupuaʻa and their surroundings were culturally important locations associated with famous battles, legends, various cultural and natural resources, named people, along with a number of traditional activities. The cultural practices identified during the consultation process include the use of fresh water; taro farming; plant gathering; observing celestial bodies in informing decisions and to tell time; the interment of iwi kūpuna; and eugenics. None of these practices were identified as currently conducted in the project area. However, taro farming is an ongoing cultural practice currently conducted on lands in the vicinity of the project area.

With regard to cultural practices and beliefs, the findings of this study reflect the cultural significance of natural resources, especially clean, fresh water (i.e., surface water and the Maui aquifer) for use in traditional agriculture and for habitation purposes. Iwi kūpuna and Pōhākoʻi, a legendary grinding stone, are also cultural resources identified as potentially being located within the proposed project area, during the consultation process. The exact location of Pōhākoʻi is not currently known and to date, it has not been determined if Pōhākoʻi remains in situ or has been moved to another location. A previous archaeological survey attempted to locate Pōhākoʻi but did not find it.

Historic maps illustrate roads, ditches, loʻi, bridges, and the Pōhākoʻi Stone within the project area as early as 1875. In addition, archaeological sites associated with the historic plantation era were identified within the current project area during an archaeological inventory survey (Wilson and Dega 2005). These consist of SIHP 50-50-04-5197, a section of the Waiheʻe Ditch; SIHP 50-50-04-5728, an erosion-control site; four components of SIHP 50-50-04-5729, an unnamed ditch constructed of mortared rock; and SIHP 50-50-04-5730, a section of the "Old Waikapū Road." In addition, SIHP 50-50-04-5489, a segment of a historic-modern roadway, appears to be located just outside the northern boundary of the current project (Wilson and Dega 2005).

Potential Effects of the Proposed Project

Although no ongoing cultural practices were identified on the subject property, the proposed project does have the potential to affect natural and cultural resources such as fresh water, iwi kūpuna, and historic properties located within the project boundaries, as well as potentially affect water resources and natural and cultural resources in the wider area. Awareness of this should be at the forefront to prevent any adverse effects from occurring as a result of this development. Impacts identified by interviewees focused on those related to freshwater resources and iwi kūpuna. Impacts to lo‘i kalo and farming, freshwater resources, and the historical and cultural integrity of the adjacent lands were also concerns raised by those who participated in the consultation process.

Confidential Information Withheld

During the course of researching the present report and conducting the ethnographic survey program, one interviewee requested information be withheld in confidentiality.

Conflicting Information

No conflicting information was obvious in analyzing the ethnographic interviews. On the contrary, a number of themes were repeated and information was generally confirmed by independent sources. The interviewees emphasized both the historical and current cultural significance of the area.

Recommendations/Mitigations

Concerns voiced by the interviewees focused on the possibility of impacting natural and cultural resources. According to interviewees, the proposed development has the potential to impact any iwi kūpuna located on the subject property as well as possibly harm freshwater sources that support cultural practices conducted in the surrounding area. Recommendations and mitigations for the project include the following:

- Have an on-site archaeological monitor – one per earth-moving machine - during construction related ground alterations.
- Have an on-site cultural monitor during construction related ground alterations.
- Have an on-site cultural advisor, who is well vetted, respected, familiar with the project, and overall area, to inform community, SHPD, and developer of inadvertent findings of iwi kūpuna, during construction related ground alterations.
- Preserve and protect fresh water and all natural resources.
- Conduct an archaeological field inspection to determine presence/absence of Pōhāko‘i prior to the commencement of ground altering activities.
- Keep access to the property open to allow the community to pule.
- Place signage that appropriately reflects the cultural and historical significance of the area.
- Keep access to freshwater resources (i.e., surface water and the Maui aquifer) open.
- Keep access to natural resources open.

Summary and Conclusion

In sum, background research and ethnographic interviews identified the potential for cultural resources to be located within the proposed project area, as well as historical and cultural practices and resources in the surrounding environs. Previous archaeological studies identified historic sites on the subject property and nearby. Thus, a program of archaeological monitoring is recommended during all construction-related ground-altering activities associated with the Wailuku Residential development, with special care to look out for iwi kūpuna in subsurface contexts.

Water is critical in Waikapū and Wailuku, and the protection and replenishment of this resource should be an important consideration in project plans. The community should be kept informed on the inadvertent findings of iwi kūpuna and their concerns and recommendations should be considered during all phases of the proposed work. The area is clearly significant in both the past and present.

Glossary

ʻahupuaʻa Traditional Hawaiian land division usually extending from the uplands to the sea.

ʻāina Land.

akua God, goddess, spirit, ghost, devil, image.

ala loa Highway, belt road around island.

aliʻi Chief, chiefess, monarch.

aloha Love, affection, compassion, sympathy, kindness, greeting.

ʻāpana Piece, slice, section, part, land segment, lot, district.

au Current; to flow, as a current; weather.

ʻaumakua Family or personal gods. The plural form of the word is ʻaumākua.

ʻauwai Ditch, often for irrigated agriculture.

awāwa Velley, gulch, ravine.

banana The maiʻa, or *Musa* sp., whose fruit was eaten and leaves used traditionally as a wrapping for cooking food in earth ovens.

haku mele Composer, poet, one that speaks in proverbs; to compose a chant or song.

hālau Meeting house for hula instruction or long house for canoes.

heiau Place of worship and ritual in traditional Hawaiʻi.

hēkuawa, hekuawa Valley.

hewa Mistake, fault, mismanage; offended, annoyed; to do excessively.

hula The hula (traditional Hawaiian dance), a hula dancer; to dance the hula.

hula ʻauana Contemporary hula.

ʻili Traditional land division, usually a subdivision of an ahupuaʻa.

ʻiliʻāina Land area; a land section, next in importance to ahupuaʻa and usually a subdivision of an ahupuaʻa.

iwi Bone.

kaʻao Legend, tale; to tell a fanciful tale.

kahuna An expert in any profession, often referring to a priest, sorcerer, or magician.

kalamālō A type of grass that was used for house thatching in traditional Hawaiʻi.

kalo The Polynesian-introduced *Colocasia esculenta*, or taro, the staple of the traditional Hawaiian diet.

kamaʻāina Native-born.

kanaka Human, person, man, Hawaiian.

kanaka maoli A person of pure Hawaiian blood.

kapu Taboo, prohibited, forbidden.

kāpulu Careless, unclean, disgusting.

kauhale A group of houses that comprise the traditional Hawaiian homestead. Often included are a sleeping house, men's eating house, women's eating house, cooking house, and canoe house.

kīhāpai Small land division; cultivated garden, patch, orchard, or field; parish of a church.

koʻi Adze.

konohiki The overseer of an ahupuaʻa ranked below a chief; land or fishing rights under control of the konohiki; such rights are sometimes called konohiki rights.

kuawa Valley.

kukui The candlenut tree, or *Aleurites moluccana*, the nuts of which were eaten as a relish and used for lamp fuel in traditional times.

kuleana Right, title, property, portion, responsibility, jurisdiction, authority, interest, claim, ownership.

kumu hula Hula teacher/master.

kupuna Grandparent, ancestor; kūpuna is the plural form.

lāʻau lapaʻau Medicine.

lama The native tree, *Diospyros sandwicensis*, that had many uses in traditional Hawaiʻi. Fruit was eaten, wood was fashioned into fish traps and sacred structures within heiau. Lama wood was also crushed and used for medicinal purposes.

lilikoʻi An introduced vine, *Passiflora edulis*, with an edible fruit known as passion fruit.

limu Refers to all sea plants, such as algae and edible seaweed.

loʻi, loʻi kalo An irrigated terrace or set of terraces for the cultivation of taro.

lychee The tree *Litchi chinensis* native to China, Malaysia, and Vietnam known for its sweet, fleshy fruit.

maʻa Knowing thoroughly, experienced, familiar.

Māhele The 1848 division of land.

makai Toward the sea.

makani Wind, breeze.

manaʻo Thoughts, opinions, ideas.

mango Trees of the genus *Mangifera*, introduced to Hawaiʻi in the 19th Century and well known for their edible fruit.

mauka Inland, upland, toward the mountain.

mele Song, chant, or poem.

moku District, island.

monkeypod A large tree, *Samanea saman*, introduced to Hawaiʻi from tropical America.

moʻo Lizard, dragon, water spirit; narrow strip of land, smaller than an ʻili.

moʻokūauhau Genealogy.

moʻolelo A story, myth, history, tradition, legend, or record.

niu The Polynesian-introduced tree *Cocos nucifera*, or coconut.

ʻohana Family.

ʻōhiʻa ʻai	The mountain apple tree, *Eugenia malaccensis*, a forest tree that grows to 50 ft high.
ʻōiwi	Native; self; physique or appearance; to appear.
ʻōlelo noʻeau	Proverb, wise saying, traditional saying.
oli	Chant.
pali	Cliff, steep hill.
pao	To scoop out, gouge, undermine, peck, erode, or bore; to insert; to stoke; a pit or cave; a bridge arch.
papaya	The introduced plant *Carica papaya*, known for its edible fruit.
pea	Pear, avocado.
pili	A native grass, *Heteropogon contortus.*
pōhaku	Rock, stone.
poi	A staple of traditional Hawaiʻi, made of cooked and pounded taro mixed with water to form a paste.
pono	Correct, proper, good.
ponoʻole	Not pono.
pre-contact	Prior to A.D. 1778 and the first written records of the Hawaiian Islands made by Captain James Cook and his crew.
pueo	The Hawaiian short-eared owl, *Asio flammeus sandwichensis*, a common ʻaumakua.
pule	Prayer; to pray.
shishi	Urine.
star fruit	The fruit and tree known as carambola, native to Southeast Asia. The fruit are edible and star-shaped in cross-section.
sugarcane	The Polynesian-introduced *Saccharum officinarum*, or kō, a large grass traditionally used as a sweetener and for black dye.
ti (kī)	The plant *Cordyline terminalis*, whose leaves were traditionally used in house thatching, raincoats, sandals, whistles, and as a wrapping for food.
ua	Rain, rainy, to rain.
ʻuala	The sweet potato, or *Ipomoea batatas*, a Polynesian introduction.
ʻūhini	Locust, Long-horn grasshopper (*Tettigoniidae*), or cricket (*Grillidae*).
ʻukulele	String instrument of the guitar family, originating in 19th century Hawaiʻi. Lit. jumping flea.
ʻulu	The Polynesian-introduced tree *Artocarpus altilis*, or breadfruit.
wahi pana	Sacred places or legendary places that may or may not be kapu, or taboo.
wai	Water or liquid other than salt water.
wao kanaka	An inland region where people may live or occasionally frequent, usually below the wao akua.

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APPENDIX A: AGREEMENT TO PARTICIPATE

Wailuku Residential Project
Cathleen Dagher, Ethnographer, Keala Pono Archaeological Consulting

You are invited to participate in a Cultural Impact Assessment (CIA) for the Wailuku Residential project in Wailuku, on the Island of Maui (herein referred to as "the Project"). The Assessment is being conducted by Keala Pono Archaeological Consulting (Keala Pono), a cultural resource management firm, at the request of Dowling Company, Inc. and the Department of Hawaiian Home Lands. The ethnographer will explain the purpose of the Assessment, the procedures that will be followed, and the potential benefits and risks of participating. A brief description of the Assessment is written below. Feel free to ask the ethnographer questions if the procedures need further clarification. If you decide to participate, please sign the attached Consent Form. A copy of this form will be provided for you to keep.

Description of the Project

This CIA is being conducted to collect information about the Project in Wailuku and Waikapū Ahupua'a, through interviews with individuals who are knowledgeable about this area, and/or about information including (but not limited to) cultural practices and beliefs, mo'olelo, mele, or oli associated with this area. The goal of this Assessment is to identify and understand the importance of any traditional Hawaiian and/or historic cultural resources, or traditional cultural practices within the Project. This Assessment will also attempt to identify any effects that the proposed development may have on cultural resources present, or once present within the Project area.

Procedures

After agreeing to participate in the Assessment and signing the Consent Form, the ethnographer will digitally record your interview and it may be transcribed in part or in full. The transcript may be sent to you for editing and final approval. Data from the interview will be used as part of the ethno-historical report for this project and transcripts may be included in part or in full as an appendix to the report. The ethnographer may take notes and photographs and ask you to spell out names or unfamiliar words.

Discomforts and Risks

Possible risks and/or discomforts resulting from participation in this Assessment may include, but are not limited to the following: being interviewed and recorded; having to speak loudly for the recorder; providing information for reports which may be used in the future as a public reference; your uncompensated dedication of time; possible misunderstanding in the transcribing of information; loss of privacy; and worry that your comments may not be understood in the same way you understand them. It is not possible to identify all potential risks, although reasonable safeguards have been taken to minimize them.

Benefits

This Assessment will give you the opportunity to express your thoughts and opinions and share your knowledge, which will be considered, shared, and documented for future generations. Your sharing of knowledge may be instrumental in the preservation of cultural resources, practices, and information.

Confidentiality

Your rights of privacy, confidentiality and/or anonymity will be protected upon request. You may request, for example, that your name and/or sex not be mentioned in the Assessment material, such as in written notes, on tape, and in reports; or you may request that some of the information you provide remain off-the-record and not be recorded in any way. To ensure protection of your privacy, confidentiality and/or anonymity, you should immediately inform the ethnographer of your requests. The ethnographer will ask you to specify the method of protection and note it on the attached Consent Form.

Refusal/Withdrawal

At any time during the interview process, you may choose to not participate any further and ask ethnographer for the tape and/or notes. If the transcription of your interview is to be included in the report, you will be given an opportunity to review your transcript, and to revise or delete any part of the interview.

APPENDIX B: CONSENT FORM

Consent Form

I, ________________________, am a participant in the Cultural Impact Assessment (Assessment) for the Wailuku Residential project (herein referred to as “the Project”). I understand that the purpose of the Assessment is to conduct oral history interviews with individuals knowledgeable about the Project and the surrounding ahupuaʻa in an effort to identify and protect traditional cultural practices and cultural resources.

_______ I understand that Keala Pono Archaeological Consulting (Keala Pono) and/or Dowling Company, Inc. and the Department of Hawaiian Home Lands (the client) will retain the product of my participation (digital recording, transcripts of interviews, etc.) as part of their permanent collection and that these materials will only be used for scholarly, educational, and/or land management purposes.

_______ I hereby grant to Keala Pono and the client the right to use the property that is the product of my participation (e.g., my interview, written materials, and any other materials I provide) for the Assessment as stated above. By giving permission, I understand that I do not give up any copyright or performance rights that I may hold.

________ I also grant to Keala Pono and the client my consent for any photographs provided by me or taken of me in the course of my participation in the Assessment to be used, published, and copied by Keala Pono and/or the client and its assignees in any medium for purposes of the Assessment.

________ I agree that Keala Pono and the client may use my name, photographic image, biographical information, statements, and voice reproduction for this Assessment without further approval on my part.

_______ If transcriptions are to be included in the report, I understand that I will have the opportunity to review and edit my transcripts to ensure that they accurately depict what I meant to convey. I understand I have the power to delete any information I deem too sensitive and/or too personal for publication from the transcript. I also understand that if I do not return the revised transcripts after two weeks from the date of receipt, my signature below will indicate my release of information for the draft Assessment, although I will still have the opportunity to make revisions during the draft review process.

________ I further understand that not giving my consent to any portion of the above listed items will not prevent my manaʻo being included in the Assessment. For example, I may decline Keala Pono or their client permission to use my photographic image or biographical information but by signing this Consent Form, still grant my permission for my manaʻo to be included in the text of the Assessment.

By signing this consent form, I am acknowledging that I have been informed about the purpose of this Assessment, the procedure, how the data will be gathered, and how the data will be used. I understand that my participation is strictly voluntary, and that I may withdraw from participation at any time without consequence.

____

Consultant Signature **Date**

____

Print Name **Phone**

____

Address

Thank you for participating in this valuable study.

Appendix C: Transcript Release

Transcript Release

I,________________________, am a participant in the Cultural Impact Assessment for the Wailuku Residential project (herein referred to as "the Project") and was interviewed for the Assessment. I have reviewed the transcripts of the interview and agree that the transcript is complete and accurate except for those matters delineated below under the heading "CLARIFICATION, CORRECTIONS, ADDITIONS, DELETIONS."

I agree that Keala Pono Archaeological Consulting and/or Dowling Company, Inc. and the Department of Hawaiian Home Lands, may use and release my identity, biographical information, and other interview information, for the purpose of including such information in a report to be made public, subject to my specific objections, to release as set forth below under the heading "OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS."

CLARIFICATION, CORRECTIONS, ADDITIONS, DELETIONS:

OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS:

Participant Signature **Date**

Print Name **Phone**

Address

Appendix D: Interview Johanna Kamaunu

TALKING STORY WITH JOHANNA KAMAUNU (JK)
Ethnographer: Cathleen Dagher (CD)
Date: 12/4/2023

CD: Alright. And today is December 4, 2023 and I have Johanna Kamaunu on the phone and we're going to be talking about Waihuku and Waikapū Ahupua'a and traditional cultural practices and cultural resources in that area for the Wailuku Residential CIA. Okay. So hi Johanna.

JK: Okay.

CD: Hi. Can you hear me alright?

JK: Yes.

CD: Okay good. Alright, so would you please tell me about yourself, your name, when and where you were born, uh, where you grew up and where you went to school?

JK: Okay. My name is uh, when I was born I was Johanna Laimana. Today I am Johanna Kamaunu. I grew up in…I was born and raised in Honolulu and I came back to Maui when my mother decided she wanted to come back to her ancestral property in Wai'ehu. Actually, we all came back sort of before that, but yeah, we pretty much gravitated back to Wailuku, Maui.

CD: Okay. And where did you go to school?

JK: In Kāne'ohe.

CD: Oh, okay.

JK: Castle High School.

CD: Okay and you graduated in?

JK: '69.

CD: Oh okay. And then can you tell me a little bit about your family background?

JK: Uh, which side would you want to know?

CD: Oh, both! [laughs] but yeah…

JK: Okay, let's do Maui.

CD: Okay.

JK: Um, my connection to this side is through my grandmother, my maternal grandmother Ruth Kaina AH NEE. She was born in Waiehu and till today our family still has the property there from the land commission award. Um…when my mother decided to come back to Maui that is where she relocated to and um…we started to clear the land and everything, you know, when you start to clear the land in the beginning you think you can do everything until you meet the molasses or cane grass and then you can't do a thing. But um…my father took pity on us and had someone come in and clear the property for us so that we could start making a place for my mom.

CD: Nice.

JK: And um, ever since then the land has been an integral part of our family.

CD: Nice. Okay.

JK: I don't know, what else you want?

CD: Um, well, do you want to talk about your mother's maiden name and how far back her family goes?

JK: Oh okay. So, my mother's Jane. Jane Leimomi AhNee. Her mother is Ruth Kaina. Her father is John Young Son AhNee. My grandmother has family ties to 'Īao Valley and was left to the Mahi family up in 'Īao Valley. Before passing her grandfather entrusted her to them. She was raised as their own family. The Mahi or Mahihelelima family has been there since the time of Kekaulike's arrival at Iao.. So, it's a long time. Grandma's mother is Kalakea Kaina and her father is Kaaihue Kaina of Waiehu. Kaaihue and his brother Kaawa are heirs to the LCA for Kaawa of lands from Charles Kanaina. Charles Kanaina is father of King Lunalilo.

CD: Yeah.

JK: And it's seen a lot of change.

CD: Yeah.

JK: And um, it's funny that recently I just completed a report and I was thinking how unfortunate that whenever we go back in history, especially Wailuku history, it always seems to start with Kahekili or Kamehameha and yet we don't go before that to see who the kings and the chiefs were. When I started to look at that, it was amazing even one and two generation prior.

CD: Yeah.

JK: It's as if they practiced um, what do you call that, um…our genetic rearing. I don't know what you call it, but they married or mated specifically for um, what they could produce in the next generation and seems that in Maui, about five and six generations before Kahekili..uh with Kalanikauleleaiwi and then in Kekaulike's matings Maui gains Oahu and Hawaii island leadership and allies by marriage. The alii class were building the Kekaulike dynasty. They were trying to produce the best of the next generation and when Kekaulike comes along it's like the perfect foundation for creating a strong unifying dynasty. I don't know that people realize that. Kahekili and Kalola, Kalaniopu'u's wife, are brother and sister.

CD: Yeah.

JK: And the twins, Kamanawa and Kame'eiamoku they're also siblings. And then there is Mahihelelima. There is Opunui. There's so many! And I'm looking at that and thinking wow, check out this generation. No wonder they were acknowledged in history…you know when you look at the events that took place across the landscape, you only see separate events, you don't see the genealogy and backstories behind those events. So, like the battle of Kakanilua…

CD: Yeah.

JK: Even though it may have been a battle between Kalaniōpu'u and Kahekili, in the end that's brother-in-law right?

CD: Yeah.

JK: 'Kay. In the end of that battle Hawaii warriors have lost all save two survivors. Kalaniōpu'u seeks pardon to leave and ends up its Kīwala'ō that comes to Kahekili to ask for peace to leave Maui safely. The thing is, what's his name, Kalaniōpu'u asks Kalola to go ask her brother for peace and she says, "do you not remember we just tried to kill him?"

CD: Yeah. [laughs] Yeah, yeah.

JK: So, Kīwala'ō decides to…he volunteers to go and the twins volunteer to go with him. I know it's not anything about the twins, but why are they there? The twins are Kahekili's half siblings. They are his, Kiwalao's, uncles and so they go with him to see Kahekili, their brother. I never really thought about that genealogy and how that worked out.

CD: Yeah.

JK: So, as the story goes, Kīwala'o knows full well that he could be killed anywhere along the way. He doesn't have to make it all the way to Kahekili to ask for peace, but he decides to go anyway. But he does make it there and in the end he does get to Kahekili's side and now we're talking about someone who is victorious that history treats as ruthless after one of the greatest battles of that time and they weep. The two come together without saying a word and cry. For a long time I wondered why he would do that and it's not until you uncover the genealogy that you start to see. Those 800, the Alapa and the Piipii, they were family and they were not just any family members, they were the promise of the future. And they were lost.

CD: Yeah.

JK: They were all gone.

CD: Yeah.

JK: So, you know, it's stuff like that. It's Kekaulike's…I don't know what you call it. I still got to do more research on Kekaulike myself. This man is turning out to be an enigma. That's the best word for it. Cause there's so little written about him, you have to kind of figure it out by innuendos and other stories, right.

CD: Yeah, that's true.

JK: Anyway, um, so as far as our family history goes for Iao, I don't know where to begin with Iao Valley and to share the stories in that place. It's always been um…how shall I say, as a child I never take those things into consideration and now as a kupuna, that's all I can think about. So, um, how much of the past have we been able to maintain, embrace, and pass on to the next generation? I'm afraid to say, we haven't done very much.

CD: Yeah.

JK: So, it would, I don't know how anyone goes about putting that kind of a message into a report, but that's what my message would be, that it's unfortunate that with these projects that come forward, um, we're having to give up the landscape history, having to give up our identity. I use those words, they probably need some definition to them, but um, we are so much a part of the soil, the ʻāina, yeah, and gee, we separated from that ʻāina. I used to think it was a very Hawaiian thing, right, but I'm starting to realize, open spaces, they are a very human thing. Something that all humans need. Does that make sense?

CD: No, yeah, I understand that.

JK: So, I don't know where I'm going with this interview…

CD: Well, I'll help guide…actually we don't need to go quite that deep, I mean just in your…well we discussed your mother. Do you want to discuss your father's background a little bit? Where his family originated?

JK: Um, my father is from the island of Hawaiʻi, so I have Moku o Keawe and Mokupuni o Maui in my genealogy. But um, he comes from Kaʻū, from Ninole. My father, what should we say, he grew up at a time when they were phasing out Hawaiian in the schools. I think Pahala Elementary must have been one of the last schools trying to retain the language, what little they had of the culture back then.

CD: Was that in the 1930s?

JK: Would be around there. He was born in 1925.

CD: Oh, okay.

JK: Uh huh, so he seen a lot of change. Um, when we talk about puʻuhonua, it was something that came to us late in our family. My father was at that point in time when he started to recall his childhood, right. And he had grandchildren around to capture those moments and he talks about

this puʻuhonua. For him it's his puʻuhonua. To anybody else, it's the remnants of a school that was up on a hill on a lava flow near their home. That's along the coast in Ninole. And he would go up there at night and just gaze up into the stars. It was his escape. It was his safe place.

CD: Yeah.

JK: And you know, that has to be one of the greatest lessons my father ever taught us. About having those safe places. Um, you can go anywhere and not feel safe, but if you can go to a place in your mind that's safe, then you'll always have a safe place to go to. And so every once in a while when I record him, I like to think about that old school. The remnants of that old school up on the lava flow and him enjoying the night sky all by himself.

CD: Yeah. That's a good lesson, yeah.

JK: My mom…My mom was more um…she got raised in the 20th century, 21st century only because my grandmother decided to be a school teacher. My grandmother taught at Waiheʻe School when she was 19. My grandmother was born in 1901. Um, Waiheʻe School had a celebration. I think it was a 120-year celebration and she was still living then, so she got invited to the school. We came down and she was thrilled to see how the school had changed over the years. Of course today, I don't think she would even recognize the school. It has changed so that all the original old buildings are gone. All of the old buildings are gone. Nothing remains from that time period. Unfortunate.

CD: Yeah.

JK: And then with her teaching, I don't know how she ended up moving to Oʻahu, but she ended up going to Oʻahu and she ended up advancing in being a teacher…A 6th grade teacher. She retired as a 6th grade teacher from a Kapālama Elementary school.

CD: Wow.

JK: Yeah. My grandmother, after she retired from teaching got involved with Larry Kimura on his talk show and you know that's the only recording I have of my grandmother. She's being interviewed on that talk show and she's speaking Hawaiian.

CD: Nice.

[JK speaks about her grandmother's interview with Larry Kimura and how she doesn't speak Hawaiian but put her son in Hawaiian immersion school.]

JK: As far as some of the cultural practices, we were always farmers, planted kalo…

CD: Oh wait. Wait, we're skipping ahead. Let me ask you, what is your association to the subject property?

JK: I have…I don't know that I have any in particular other than I live in the area.

CD: Okay.

JK: Well, actually, I don't even live in Wailuku Town. I'm in Waihe'e.

CD: Okay. [laughs] And how have you acquired your special knowledge about the area?

JK: Uh, years of listening and talking story.

CD: Uh huh. To your family?

JK: Oh, all kūpuna.

CD: Yeah. Okay.

JK: Kūpuna always want to talk. All you have to do is be in the right place.

CD: [laughs]

CD: Okay. And then, can you share your mana'o relevant to the Wailuku and Waikapū Ahupua'a and the surrounding region? Um, personal stories, mo'olelo, mele, oli, place names, that kind of information?

JK: Oh my gosh. You know what, I think it might be better if I wrote it down and I sent it to you.

CD: Oh, you can do that.

JK: Okay.

CD: Actually, yeah that would be great.

JK: Yeah because it sounds like a lot here.

CD: Oh okay. Um, I'll just send you the questions in an email and then you can just take your time and answer it.

JK: Okay.

CD: Okay, alright.

JK: Okay, yeah that would work. Thank you. I feel like I'm having to shoot off straight off the head right now.

CD: Oh, oh you do…you'd rather I send you the whole questionnaire and just fill it in?

JK: Yeah.

[CD and JK continue to discuss sending the questionnaire via email. The recorder is turned off then turned back on]

JK: Okay, so on the burial council, now you have to look at…we're looking at how to protect iwi and sometimes that means we have to look at different means than what the law provides for, HRS 6E provides for. Anyway, we always have to go back to the history. We always have to check genealogy and look for heirs. And one of the main thing we look for is the Land Commission Awards. So, with your property I'm going to be looking for the Land Commission Awardees to see who they were. It's my belief that almost everyone is related. I can't say that they're all related, but at one time Namahana said they were all related. Um, Queen Kamāmalu said they were all related, so at this point in time I'm not sure, but I will say, I will dare say that many of us are related. And so, it's always interesting to me. I started out years ago doing genealogy work so that helped me when I was on the Burial Council, but when it comes to iwi and knowing what the lay of the land was, that was really difficult. There's too many variances and you have to look at the law and how the law has changed over time and how people's attitudes or…I shouldn't say attitudes, how their belief has changed over time. There was a time when someone is buried or they died and they'd leave a will they expect because it says in their will to be buried and left to eternal rest. They don't ever expect to be disturbed or removed, much less have their remains destroyed in the process and for some reason that doesn't seem to matter when it comes to development. I've always hoped that we could find some even…some kind of balance there, but other than not digging, there is no balance.

CD: Yeah.

JK: But, you know what, I tell you one property they did just that. They didn't dig. They built on top of the land so they avoided all those burial issues.

CD: Oh. Okay. Let's see, as far as you remember through your experiences, how has that area changed?

JK: In my lifetime?

CD: Yeah. Wailuku and Waikapū.

JK: Oh my gosh. You know there was all open space and green and today…I remember coming here once when they had the hydrofoil. Do you remember that? That was so long ago.

CD: No.

JK: They had the hydrofoil that came interisland and Mā'alaea. And when I got off the boat…

CD: Oh, you mean the ferry?

JK: …and it was all sugarcane. Sugarcane everywhere. Everywhere. Not a building in sight till Waikapu town. Um, I used to work for a mortgage company and we funded…not funded, our company made loans in a lot of these areas, you know? And I'm seeing all these places come up and I'm wondering how they managed to come up because they didn't meet the legal criteria insurance required.

CD: Oh.

JK: I meann in Kihei and Kahului it's all in flood zone areas, what the heck. And yet they were building it up. You know, so…

CD: Yeah.

[JK continues to speak about how these developments got approved.]

JK: So as far as change, you know, I guess I could be more specific, writing about it. It's fine to just tell you what it means over the phone like this, but it's important to me that this gets understood. You're right, the change is significant. Do we want it? Do we need it? I would think, you know it hurts me every time I look up at that mountain and see more houses up there and I'm thinking this was once the breadbasket out there? We call this place Na Wai Eha anymore.

CD: Yeah.

JK: There is no way that you can call this place a breadbasket today. And I don't think they're going to be happy until it's wall-to-wall buildings. And even then we don't know where that's going to go.

CD: Yeah.

JK: Don't let me get into the politics of this thing because [laughs]. I have issues with all of that.

CD: [laughs] Alright, well let me ask you the next question. Do you know of any traditional sites or historically significant buildings that are located either within that project area or in the surrounding area? That includes archaeological sites, cultural sites, um, even burials.

JK: Oh, all the old churches are gone. There was a church in Waikapū that's gone. There were…there was a church down by, below the highway. Ah, I can't remember the name of that church, but that's gone, you know. Small, little, old Hawaiian churches. So reminiscent of that era, it's all gone. They're not there anymore. What else is missing? Let's see. The only reason I thought of the old churches is because the one church that's still standing is that big stone church on Honoapi'ilani Highway.

CD: Oh yeah. Were those old churches you're talking about, was that Waikapū Road that they were on?

JK: No. One was right on the main highway. I think that was Saint Joseph's. I'm not sure. Um, was kind of across the street from Wailuku on 30. Somewhere around that area.

CD: Okay. Yeah.

JK: And then the other one, you know I'm not really sure, but even Vicky (Victoria Kaluna-Palafox)says she thinks it's further down by um, that road going to the dump. There was a church around there.

[CD and JK try to think of the road name and mention that sand was mined in that area.]
JK: But anyway, that's all in the past.

CD: And then, do you think the proposed development will affect any place of cultural significance or access to cultural significance?

JK: If having running water for lo'i kalo is a cultural practice that could be impacted, then yes, it probably will.

CD: So are there…are people still conducting traditional practices in that area? Are they still growing kalo in that area?

JK: No. From what I've seen they're not. (Not on the project property.) There are Hawaiians, I guess they're leasing the land, but they're not using it for cultural practices.

CD: Okay, okay. Um, are they gathering cultural resources from that area?

JK: Um, they're raising cattle and they have a church there in a tent.

(To correct and clarify that statement, belief in divinity is an intrinsic kanaka cultural practice so I should say yes. Their church is held outdoors close to the natural elements and aina, under a tent.)

CD: Oh, okay.

JK: I don't know if they're still there. They were a couple years ago.

CD: Okay. Um, while development continues, what could be done to lessen the adverse effects on cultural practices and cultural resources in the area?

JK: I've always wondered about that and I haven't found a solution yet. But, I'm hoping that there can be an essence of the cultural practice remaining. In other words, like the affordable housing rental down by Longs, Kaulana Mahina is a moon calendar. The whole purpose of naming that building, that project for that is so that people start to look up at the moon.

CD: Ahh. Oh, that's interesting. That's good.

JK: Well, the thing people don't realize is that we didn't just tell time by the moon. We made decisions by the moon. We…those decisions could be any number of things, but the more I look into calendars, lunar calendars of indigenous peoples, the Mayans always come to mind. They refined their numeric system and the lunar system to such a way that they could design the next generation. Design the DNA of the next generation. How's that?

CD: Wow.

JK: That's why I say, I wouldn't put it past the kings before Kekaulike doing the same thing. Is it an indigenous thing? Is it a human thing? You know? What is it? But it seems that it was important to…I shouldn't say it that way. I better watch my words. To create the next generation.

CD: Okay.

JK: It was significant to create the right people in the next generation but with a loss of discipline and that's what I think we have and too many distractions over time and too many foreign influences, um those skills and traditions are lost.

[CD and JK continue to discuss arranged couplings of ali'i to create the next generation.]

JK: This thing about mana and sacred or kapu, I have to question how those words are used. I don't think that our definition or explanation of those words are as accurate as we think they are. I think there's another side to those words that…

[JK gives an example using the words pono'ole and hewa.]

CD: So, are you aware of any concerns the community might have related to cultural practices in the vicinity of the project area or on the subject property?

JK: Well, besides there's nothing there, I suppose one would say that it's okay to go ahead and build, but if you put something there then there's never the chance to go back to the cultural practice. There's always the chance to go back to the cultural practice if the land is available, if the place is available.

CD: Okay. And then my last question is, do you know of any other kupuna, cultural, lineal descendants, or any other knowledgeable people that might like to come forward and share their mana'o about this area?

JK: Yeah, you probably would like to talk to Wayne Beckhart.

CD: Oh okay.

JK: Yeah, when I get his phone number, I'll text it to you.

CD: Okay.

JK: Wayne does genealogy work now in the family history center in the Mormon Church, but he's a kama'āina. He's a child of the land, so um, if anybody he should be able to help you with

that. Oh, maybe, um, who else would be better? Somebody…oh have you ever thought to ask the Carl Duarte's, Kainoa Horcajo?

CD: No.

JK: Oh, I don't have their information.

CD: Oh. It's Esther…how do you spell her last name?

JK: I'm sorry, it's the Dewey. Rose and John Dewey.

CD: Oh, Rose and John Duey, oh I'm sorry I have their contact information and I did contact Rose.

JK: Okay. She would be good. She definitely grew up in that area.

CD: Okay, okay. Well alright, is there anything else you would like to add?

JK. No. Other than I always hope, I always hope that we will find a balance between building and the cultural practices. If there's some way, oh that's why I brought up Kaulana Mahina. The fact that it has that name. The fact that that buildings are named after the phases of the moon. Their rec center is going to host information on how the moon calendar works. There's a lot of stuff that they're going to be doing there that's having to do with moon gazing and understanding the moon and how you can utilize the moon calendar in your own life. Those to me are significant ways of holding on to those traditions and remembering their significance.

CD: Okay. Alright, then that concludes our interview.

Reviewed and corrected by:

Johanna Kamaunu

12/23/23

Johanna Kamaunu volunteered to complete a written questionnaire. The questionnaire with her unedited responses is presented below. Please note Ms. Kamaunu did not provide answers to all of the questions.

1) To start please tell us about yourself…Name? Where/When you were born? Where you grew up? Where you went to school?

Born Johanna Moanikeala Laimana in Honolulu, Hawaii at Kaimuki's 1107 29th Ave near Waialae Elementary School and Petrie Park. I would change my name due to marriage in 1982, Johanna M. Kamaunu when we married in 19xx.

2) Could you tell us about your ‘ohana/family background?

Even if I were not a descendant of Mahihelelima and Kalanikaleleiaiwi I would still feel drawn to the kuleana that emanated from this valley as in Waiehu where Kanaina provides land by LCA to Kaawa and in Waihee where Piimaiwaa receives his LCA, from lands held by Kealoha, Hawaii.
Email to Kekai Robinson, Principal Kula o Piilani at Iao Valley
My grandmother shared an occasion where I believe she encounters your grandfather, Charlie's Keau, over arch stuff in this valley near where Ornellas lives. That is the James Kimo Mahi property, Kumuwiliwili. Further makai, is the John Mahi property, Mauka Awe. Stepping in front of the machinery she sharply upbraided in olelo all present with her protest about iwi. Having returned for a visit she was by herself, but got all fired up indignant when she saw them. This retired 6th grade teacher from Honolulu who left the valleys of Maui in the long ago days of her youth. I have this picture of her in my mind on that day, in that moment, that makes her more alive to me now than before. I picture her on the Mauka Awe swinging bridge spanning Iao stream that always had to be repaired after big water events. She is lost in thought flying through the years glimpsing shiny memories eyes scanning the trees and ridges. There were quite a few memories that day...she married on. So, the swollen stream of 2013 was not a fluke or a 50/100 year flooding. It happened more often before the 60's when there was more water in the streams. Almost hard to imagine....almost. 3) What is your association to the subject property (family land, work place, etc.)?

4) What are the ways you have acquired special knowledge of this area (from your ‘ohana, personal research, specific sources)?

5) Could you share your mana‘o relevant to the Wailuku and Waikapū area and the surrounding region (personal anecdotes, mo‘olelo, mele, oli, place names, etc.)?

This is way too much information to share simply for asking. If you want to really work at this with me I will give you some time, my time is valuable. I believe you know the work that goes into doing this. Be fair in reporting that the knowledge is here and the only ones to determine that value are those for whom it was meant to bless.

6) As far as you remember and your experiences, how has the area changed? Could you share how it was when you were young and how it’s different now?

7) Do you know of any traditional sites or historically significant buildings which are or were located on the Property site--for example: cultural sites, archaeological sites, historic structures and/or burials? Please elaborate.

8) Do you think the proposed development would affect any place of cultural significance or access to a place of cultural significance? Please elaborate.

The construction work would clear the land through a grading permit. How would a significant sight be recognized and by whom when in that state? As a skilled shepherd knows its flock and recognizes each one a kanaka would recognize such sights that to others may elude notice. Natural water ways long allowed to dry, not so noticeable paths still visible to the trained eye and the terrain, particular plants, or lack of plants, types of pohaku, clustering or scattered, etc. Such observations are refined in persons who walked it, worked it and lived in it daily, To the rest of the world it is not there. But in our eyes and mind we still see a lot more then is now visible. So, when you ask what is known as culturally significant I will say that the land speaks and tells its story if you know where and how to look for it even generations later. That is a cultural practice, observation. It is a skill and is still practiced today. Development would alter the topography literally and in that process eliminate whatever signs that time has left to us. You can proceed ignorant of that tradition and say it is the letter of the law. Or you could take a second look and third look, conduct investigations and research into that practice and have endless discoveries by following the spirit of the law to preserve and protect traditional and customary practices which include pule and observations, reading the land for its history and possibilities from the topography.

9) Are you aware of any traditional gathering practices at the Property area and/or within the surrounding areas both past and ongoing?

Historically, as is well documented, this area in particular was part of the “bread basket of Maui.” Plantings were successful so as to gain notoriety. This area is bare to the Sun. It’s soil was dark, rich and moist. Mauka ladden clouds brought rains and water to the land. It is the perfect storm for growing food and the plants responded. I do not need to know the people who labored here did so with relish. What remains a testament to those who labored with their hands, bent back to the sun, is that the land existed, languished since their leaving unencumbered by the traipsing or modernity, had not been built over…til now. At Mauka Awe kalo, banana, uala, grew. At Kumuwiliwili the Lilikoi yellow fruit were prized & its vines became treasure troves in season while mango often carpeted the ground beneath its boughs. Lychee, papaya, star fruit trees filled in most the hillside. Kukui, ti, and the beautifully colored bird of paradise in the front yard are all vivid memories seen clearer today than the day they were made because they are mostly memories no longer visible as in its glory days and we took that all for granted. Iao was prolific, abundant “uluwehiwehi". How could this project property have been any less bountiful with the sun's favor greater here than in the valley? Covid shut down Maui for a time. It proved that the aina was rich, strong and resilient. Aina responded, greening well trodden paths and tourist sites especially the beaches. The most significant personally was the feeling of liberty, a freedom that can only be felt by those who lost it or never had it. Kanaka maoli of Maui are both of those people. Generational families who lived and still live closer to the project area THAN I did, they know it well. It is unfair to ferret out with such specificity in the project site for its existing cultural significance. Planning for and establishing their food security like most plans are often realized in the mind where they are a notable presence.

10) While development of the area continues, what could be done to lessen the adverse effects on any current cultural practices in the area?

1. Allow access and pule.
2. Utilize services and expertise of Maui cultural monitors.
3. Reporting
4. Signage appropriately reflecting significance of the area

Plant multiple and varied oasis of native fruit trees along drainage and retention basin areas. Consider these heirlooms of Na Wai Eha, the perfect storm of growing food.
The Sentinels: ulu, kukui, ohia ai, pe‘a, niu

11) Are you aware of any other cultural concerns the community might have related to cultural practices within the Property site and its surrounding areas?

12) Do you know of any other kūpuna, kama‘āina, cultural/lineal descendants, or other knowledgeable people who might be willing to share their mana‘o of the Wailuku and Waikapū area?

APPENDIX E: INTERVIEW WITH CODY PUEO PATA

TALKING STORY WITH CODY PUEO PATA (CP)
Ethnographer: Cathleen Dagher (CD)
Date: 12/5/2023

CD: Today is Tuesday, December 5th, 2023...We’re going to be talking to Cody Pueo Pata about traditional cultural practices and cultural resources in Wailuku and Waikapū Ahupuaʻa for the Wailuku Residential Cultural Impact Assessment.

CD: Hi Pueo.

CP: Aloha.

CD: Aloha. So first, please state your full name.

CP: My name is Cody, C-O-D-Y, Pueo, P-U-E-O, Pata, P-A-T-A.

CD: And please tell me when and were you were born and where you grew up.

CP: I was born in Sacramento, California in 1975. I grew up here in Maui, South Maui, Kīhei and in 2003 my family moved up to Pukalani and they’ve been Upcountry ever since.

CD: Nice, and where did you go to school?

CP: I graduated from Baldwin class of ’93.

CD: And can you tell me about your family, their background?

CP: Sure, my mom is pure haole. My dad is half Native American, quarter Hawaiian, quarter Filipino. Um, when I was 16…I entered hālau under Aunty Nona Mahilani Kaluhiokalani and her hula master is George Nāʻope. So that was ’91 and then in 1992 Uncle George asked my family and me if I could enter training to become a kumu hula eventually and so my training was...I ended with all my teachers. I ended with on my hand seven of my teachers are represented, my seven named masters and so I learned from Aunty Nona Mahilani Kaluhiokalani directly, Uncle George directly, and one of my kupuna here on Maui is Aunty Diane Nāpua Amadeo. She was a master lei maker. She was very knowledgeable about Maui stories, about Maui place names and her mother and grandmother were the last priestesses of Pele, the Maui forms of Pele worship here on the island of Maui. Uncle George and Aunty Nona sent me to learn from Kumu Hula Keʻala Kūkona from 1995 to ’98. From her I learned hula ʻauana and how to sing falsetto. Then from 1998 I was sent to Kumu Hula Jay Jay Ahulau Akiona in Kona to learn from him and his hula master Aunty Hilda Keanaʻāina, who was a graduate of ʻIolani Luahine and also one of his other masters for other practices was Aunty Eleanor Kaʻupu Makida and from her I learned the style of haku mele from her tradition called Alelo Maʻalea. And so my last teacher passed away in 2011, but over the course of my time with them I worked with them extensively. I lived with them for extended periods. Worked with them, worked for them and that’s basically my training for the things I do today.

I graduated as a kumu hula in 2001 and I taught for one year alongside my Kumu Hula Aunty Nona until she passed away in September 2002. In 2003, January 2003, I opened my hālau and I just graduated a kumu hula 20 years later. She’s been with me for 20 years. Her name is Kuʻulei Alcomindras-Palakiko. So, there’s two of us now teaching.

CD: Wow. That's a remarkable story.

CP: Mahalo.

CD: And what is your association with the subject property?

CP: So I've um, I don't know how I get on these lists, but for when Maui things happen, I'm a resource for them just because I've been involved in these types of things I think, forever, alongside my teachers and masters and aunties and uncles. Now that they've all passed, I think it's passed to me, but in 2019 I was commissioned to write a book on place names of West Maui, Maui Komohana. So, those are the three moku around the mountain called ʻEʻeka, alternatively and more recently called Mauna Kahālāwai. So those three moku are Lahaina, Kāʻanapali, and Wailuku. And the Wailuku Moku of course has the ahupuaʻa of Waikapū in it and so that's through my research perhaps, that's why I got in there. I also um, I worked for the County under Victorino's administration [Mike Victorino, former Maui County mayor] as the cultural advisor to Maui County in 2022 and in that work I wrote, co-authored the cultural impact report for what would become the Hālau of ʻŌiwi Art that will be found in the Ahupua'a of Wailuku in the Moku of Wailuku. I co-authored that with Kapua Pimentel, who is also one of the architect designers for the facility.

CD: Wow.

CP: Plus I've lived here as long as I have and I have access and resources to Wailuku Moku for all of my career.

CD: When did you say you moved here?

CP: Um, we moved here when I was, um, my late childhood.

CD: Oh okay.

CP: We lived in Kīhei so a lot of my growing up time was there.

CD: Okay.

CP: In high school all of us Kīhei kids at that time were bussed to Wailuku to Baldwin.

CD: Okay. I guess you touched on this, but what are the ways you gained any special knowledge about this area? Did you get any from....well yeah, you just said. Do you want to reiterate that a little bit?

CP: So, when it comes to stories and things like that, one of my teachers, Aunty Diane Nāpua Amadeo, told us some things about those specific places and then as a kumu hula, when we, in our lineage, we have forms of accessing data from the kaʻao. Mostly kaʻao, which are stories that seem kind of fantastical, but it's a way to encode data that gets passed on from generation to generation. So one of the moʻolelo of that place has to do with Puapualenalena that I was told and later on in my research as a kumu hula researching place names and even as a researcher, as an author, coming across the story of Kūapīʻei, who was a meʻe [heroic character] from Kahului but with his interactions with the akua that resided at Hanaʻula above Waikapū and

those types of things. In the data that are encoded in those kaʻao, we have access to the way that we interpret those types of data, so yeah.

CD: Wow.

CP: There's a whole way that we do things.

CD: Wow. Okay. Um, can you share your manaʻo relevant to Wailuku and Waikapū?

CP: Oh goodness, yeah. It depends on what is needed. Like generally the moku? Well, what would be something specific because there's a lot, yeah?

CD: Oh let's see. Personal anecdotes, moʻolelo, mele, oli, you can go into place names a little bit, yeah.

CP: Yeah, so I mean, Waikapū, if it's called Waiakapū or Waikapū, we were taught is in reference to Kihapū that was once kept in the back of that valley in a cave and from Kalapaakaʻilio, which is one of the boundary markers for that ahupuaʻa, descends down to Pōhākoʻi. From Kalapaakaʻilio, which means the ridge of the dog, we are told that dog is Puapualenalena, who hid there and watched the keepers, the stewards of Kihapū and learned their mannerisms and their habits, so when they finally fell asleep and he knew it was a safe time is when he went in and stole Kihapū and transported it to above Waipiʻo Valley on the Big Island. In that particular moʻolelo it sounds fantastical and from the way we're able to interpret data or extract data from these particular moʻolelo, we know that Puapualenalena is a dog from Niʻihau and it literally means that he has the fur around his rump is yellowish in color. And so when we're thinking about dogs in contexts like this, one thing we know is that they don't go too far when walking around without raising their leg to shishi on things. And so when it comes to Kihapū, it's said that the roar when it's blown is likened to the wing, the sound of the wings of Halulu, the great bird, the ocean bird, so in that context we can kind of see a storm system traveling from the northwest down to Maui, which is different than the Kona storms. But this particular storm system came and that the clouds ʻŌpua-pua-lenalena, the name of the dog is Puapualenalena, but ʻŌpua-pua-lenalena, the yellow tinged clouds that can signify different types of storms and so the way that this particular storm system came down that's memorialized through this kaʻao, or the systems memorialized by this cloud would come through the northwest or through that are of Maui and cause enough of…enough rain to issue that roaring sound. There's other moʻolelo too, like the…for the Moku of Wailuku, which means waters that destroy, another destruction type of story has to do with Kapoi and the owls that filled the air when he destroyed ʻAʻapueo's eggs. And in the story that Aunty Diane told us, um…ʻAʻapueo gathered the owls from Niʻihau down to West Maui and they camped at Manawaipueo, just at the bottom of the Pali on the Lahaina side. And her husband is Pueokāia. His…he gathered all the owls from Hawaiʻi Island and east Maui and they camped at Lehuapueo, Lehu-a-pueo means multitude of owls, in Waikapū. So, when um…on the next day, the day of Lono, they camped on Kāne, the day of Lono, those owls filled the air and they flew over Kapoi mā and fought everybody and killed the chief, Kanēnēnuiakawaikalu and Kapoi and all those warriors, and that is what initially gave that moku and that region the name of Wailuku.

CP: So in that particular story, you see Manawaipueo, the owls of ʻAʻapueo coming from Manawainui around, you know, Māʻalaea side and then you have these owls that camped at Waikapū who then make their way towards the Wailuku area, the Wailuku Ahupuaʻa area. So that's a Kona storm system that would allow the waters to be that destructive so as to kill things.

And the name of the chief was Kanēnēnuiakawaikalu, ka-wai-kalu is water in which…still water in which the kalu grass grows and so those pondy areas would have been washed out. I think that's what that…the destruction of that chief named after the goose of the wai kalu, you know who lives in wai kalu, probably talks about how those marshy areas were overflowed with the waters of destruction and the name of that battle was Kamaluakahēkuawa. So, Aunty Diane tells us that if you look up hēkuawa, kuawa, awāwa, and owāwa in the dictionary they basically all say valley or gulch. Something like that, but one of the ways she told us was that hēkuawa, kuawa, owāwa, awāwa, these are the shapes of the different types of the valleys that we have. Maluakahēkuawa means the high hanging cliffs are sheltered and so in this type of Kona storm and because owls are diurnal, we know that this took place, this storm event took place in the daytime. If one of the signs that this type of occurrence is going to happen is when these clouds that darken the sky, which are the owls that darken the sky. When those are visible during the daytime and when they descend below the hēkuawa and obscure the hēkuawa, and it's a Kona storm, then you have the risk of that type of destructive event.

CD: Wow, that's fascinating. That's everything, that's history, that's the weather, that's…amazing that's really all encompassing. Okay, so as far as you remember in your experiences, how has the Wailuku and Waikapū area changed?

CP: In my own time there's been those developments, right, the new housing divisions, most especially and the commercial development in the upper regions of Waikapū, mauka of the highway, and then down along Waikō…on the north side of Waikō. All of that commercial development and then extending out towards the ahupuaʻa of Wailuku, that whole entire industrial area or that shopping area. The development of Maui Lani, um, all of those. All of that has taken place in my own time. That hundred year flood that happened…I think it was 2016, they were, you know, taking boulders and things like that from quarries and sand and whatever to kind of try to mitigate the damage of the flooding and crushing stones and things like that. That sticks out in my mind because that type of flooding hadn't occurred in a couple generations as far as what we know and so there's that type of desecration. The whole Kakanilua, which is the sand dunes on the…so from Kamaʻomaʻo, the plains of Kamaʻomaʻo, which extend pretty much across the isthmus of Maui and up above uh, gosh, right below the Wailuku Town area, the main…the old town area, the series of sand dunes on the south side of Makanipālua Sand Dune, across the ʻili of Kalua you have the Kakanilua Sand Dune complex which was always a burial ground and then during the times of Kalanikūpule and Kahekili mā, and even Kamehameha, battles were fought there, strategic battles were fought there so those remains were…are still quite apparent in those regions. So, during the construction of some of those areas in Maui Lani and the newer subdivisions, that is of course, stands out in my mind. Another…you know during that same series of conflicts, one of Maui's heroes, his name was ʻOulu, he was known for his sling, the maʻa. So, it said that um, the maʻa stones of Maui, you know, rained down on the warriors of Hawaiʻi and so, you know, you're looking at this large sand dune complex and I wonder if, you know, when people are doing…harvesting the sand for cement or whatever, if they come across stones that are the size of maʻa that could have been remnants…battle remnants from those particular fights and most…especially Maui's meʻe and ʻOulu.

We have also that connection with Kūapīʻei. So the Waikapū Stream didn't used to enter to Māʻalaea through Keālia. It used to enter intermittently through Kahului and so there was that young meʻe named Kūapīʻei and in his moʻolelo these akua came out from Waikapū and assisted him to build a heiau in the Kahului region. And they lived on top of Hanaʻula, which is the peak above Waikapū in the back of the valley, and they were Kāne and Kanaloa. And so in this

particular moʻolelo the boy goes up there and he makes offerings to them, but it talks about connectivity between Hanaʻula, the water gathered at the back of Hanaʻula through Waikapū and how it intermixed and made its way to Kahului, which is one of the reasons why Kahului Harbor was easily made into a port. Because the old riverbed there had already eroded that harbor, that part of the harbor deeper than what a natural harbor would be.

CD: Wow. So that was an actual event, the rerouting of the stream?

CP: No, the rerouting of the stream was done by Spreckels.

CD: Oh, I see.

CP: So that…and there are newspaper articles that I reference in the cultural impact report of the H.O.A. about the Native Hawaiian…or the Hawaiian newspapers talk about when that happened how Kanahā Pond dried up and how the people were able to take all the…had pyramids of salt that were able to raise up and harvest from there because the water had stopped flowing and was now directed to Kealia.

CD: I see. Okay, um, do you know of any traditional sites or historically significant buildings in the area of the proposed project? No, no traditional sites...

CP: Um, not that I know of. I'm not familiar. But of course, I'm sure you've been told to ask Hōkūao Pellegrino. He would be the one to know more about that.

CD: Okay.

CP: But if I'm not mistaken, there's…does one of the boundaries of your site, um, include Pōhākoʻi?

CD: That I don't know.

CP: So if that's the case, Pōhākoʻi was a boundary marker and, I mean just from the name that does…and the record says that there was a stone, a large stone there. But, I don't think we know where the stone is…

CD: No.

CP: …It might have been [inaudible] or something like that so. And then I don't know…I'm not too certain that people…that it was a widely cultivated area for agriculture, but we do know that the region that was dry land was still managed for resources like pili and kalamālō grass and one of the ways to manage them is through controlled burns. And so we do have these chants, ancient chants and even chants that honor some of the more recent monarchy that talk about these fires being set and the way we can extract data from them. Through the way that we extract data we know that these fires were lit when the Kona winds blew because if it was the regular wind that blows, you can imagine they're ceaseless right, and so the fire could spread, but when the Kona wind blows you know that it's going to blow so far until it stops so the fire can't backtrack. Some of these fires went from Waiōhuli area or even um, Kaʻonoʻulu area in the Kula area up through Kamaʻomaʻo and terminated usually around Kakanilua. And it talks about so, the benefits of course are the pili grass, maintaining…some of them even talks about how the women would come behind the fire and gather fish of the land. And so those could possibly be the ʻūhini, the type of locust that was here that was a food source. It could be maybe be birds perhaps that were burned in the fire. But the fire themselves did allow maintenance of that particular ecosystem so that larger bird populations could flourish within their own seasons and we know this because um, I think it was one of the Baileys, I think it was in Waikapū…found large deposits of guano and so that tells you that birds were there in a place where people actively managed. And so, you would think that during these Kona systems, the kūpuna did it in a way that did not mess with the lifecycles of the birds, but enhanced the environment so the birds, the locusts, things like that could be the most productive.

CD: Wow, okay. Do you think the proposed development will affect any place of cultural significance or access to a place of traditional gathering?

CP: So Aunty Diane said if it has a Hawaiian name, it has a Hawaiian story, so it has history. And so the ʻili where this project takes place, they all have Hawaiian names, they all have Hawaiian stories, those stories, those names, um…you folks have access to through your own research.

CD: Okay.

CP: Um, but in that aspect, it will affect those. Any story connected to the name, even the…one of them might be Wawākamanu, which means, you know, the shrieking of the birds, and that could refer to the bird colonies that were there, right? It could refer to that during when these birds were kulamanu-ing or when they were coming back to where they either next, or mate, or give birth. But the din of these birds were so loud that the place was named Wawākamanu. And in sugarcane times those places were destroyed, but through names like that we have the chance to restore them to, um, how they would be. So, I don't know if this particular project is in Wawākamanu, but that would be something that um, you know. Pōhākoʻi...

CD: Sorry, your voice is fading in and out.

CP: Oh gosh, sorry it might be [call cut out]…

CD: See.

CP: Let me close my window…I have my microphone set for hula, so because it's so loud I have to adjust the microphone for this particular meeting.

CD: Thank you. Okay, I was going to ask you something. I forgot what I was going to say. Oh, so you would say yes, it could impact areas of cultural significance and access to those areas?

CP: Yeah, it could continue to contribute to the degradation of these places or the eroding of those cultural practices, right. And then if they were not necessarily cultivating through active agriculture they could have been once managed for the kalamālō grass or the pili grass that was used for thatching for all of the homes in that particular ahupuaʻa right. And we know that below the road like where Kamokuʻilima was, and like the dunes of Kakanilua, that was the case because they were burned during those larger fires, but I don't know…I think Hōkūao would be a better one to ask how that place might have been managed. Just in looking at what I did before this interview, it doesn't look like there were large…it looks like the ʻili were large. So the smaller the ʻili, the more resources were in that ʻili. The larger the ʻili, it means that the resources weren't necessarily as dense, so when it comes to the awarding in those ʻili, it looks like it went

to only a few people as opposed to, you know, up to six people in a smaller ʻili, which means they might not…during the Māhele times those lands may not have been used necessarily for kānaka or ʻōiwi based agriculture.

CD: Okay.

CP: But I'm not saying that wasn't the case, it's just what I'm extrapolating from maps and then the original Māhele awards.

CD: Okay. Um, are you aware of any traditional gathering practices either on that property or within that vicinity?

CP: Just from the place names I can tell it could have been the birds, those types of things. I don't know if that area was a region of burials. I don't know. Usually…again you have these…they're not necessarily inherited by people, but they're in the zone of wao kanaka. They could have been used as burial places as well, but with the abundance of sand dunes below. Here on Maui if you hear sand dunes, we automatically think iwi regardless of where the sand is going to be found. With the abundance of sand dunes and also cliff areas in the valley, I don't know if they prefer to bury in those places there or if there are easier places. There is an area…there is an area near that…I believe the ʻili's name is Pūʻalinapao, which means "marks left by digging" like this, you know with your hands. So, I don't know if that refers to a burial practice because pao also means dug, graves that are dug, or it could also mean it could have been an agricultural practice for things like sweet potatoes that didn't need to be dug real deep.

CD: Hmmm.

CP: So that's just in the place name itself, we know that that type of practice took place there in that ʻili Pūʻalinapao. But what was the purpose of the pao, if it was burials or agriculture? I'm assuming agriculture. Because usually burials are not advertised so well, but sometimes they are.

CD: Okay, okay. While development of the area continues, what could be done to lessen the adverse effects on cultural practices?

CP: Allowing cultural practitioners who access the space or who have knowledge of the space to inform development so that any open space or opportunities can be identified so that those practices can continue to be cultivated in that region.

CD: Okay. And are you aware of any cultural concerns the community might have related to cultural practices related to the property or the surrounding area?

CP: I'm not too certain just off the top of my head because I don't know what contemporary practitioners do in that space. I can't speak on that. Hōkūao might know people who do. Something however is we have been so fortunate to inherit the names of our winds and rains, and so one of the main names…winds, resident winds, of that particular ahupuaʻa is the Kokololio. It's a gusty wind.

CD: Okay.

CP: And so when it comes to the type of construction done, knowing that the wind is gusty. Where is the dust going to blow? Who might it have the opportunity to affect? If there are chemicals sprayed in one property there, because the wind is gusty, we know it's going to travel. So how can…knowing the attributes of the winds and rains of that place inform and guide the construction process? So even if they're going to put up temporary fences they need to take into account the name of the wind is gusty. So what types of fence is going to be there? When they put fences in the community all over Maui, if you're not prepared for the wind, you're going to lose things, right? And so I would encourage the developers to take into account the environmental knowledge that we've been passed to inform the shape of house, the shape of community, the type of materials used, because the wind will take those things elsewhere.

CD: You know. I've heard you speak before…oh I've lost you. I've heard you speak before and you did mention the wind and how from the names of the winds, I guess you knew which direction it was coming from, whether they had the potential to blow trees over, so where to build for shelter, like which direction, yeah? Okay. And then besides Hōkūao are there any other kūpunas or knowledgeable people that you suggest we speak with?

CP: Oh, Hōkūao's mother is really good. He has also Uncle Bill who is really knowledgeable, but I think that Uncle Bill might be more maʻa to Wailuku Ahupuaʻa, but because of his age, he probably has more knowledge of Waikapū as well.

CD: Oh okay. I'm losing you. I'm losing you again. I'm losing your voice.

CP: Another one would be Uncle Bobby Pahia.

CD: Alright. And is Hōkūao's Uncle Bill, is his name Pellegrino also?

CP: No. Uncle Bill, gosh, it's escaping me right now and I know him. It's a Spanish last name. Let me see if I can find it.

CD: Okay.

CP: And that's Aunty Wallette Pellegrino's brother.

CD: Oh, okay.

CP: So Aunty Wallette is Hōkūao's mom.

CD: Right, okay.

CP: Gosh, it's going to take me a different time to uh…

CD: No worries, you can let me know. Alright, so I guess that concludes my questions. Do you have anything that you would like to add?

CP: Um, honoring…or honoring place names is important to me but also honoring people, especially kānaka maoli, residents of those Māhele awards is something to take into consideration. The resident wind is of course Kokololio, but you have intermittent winds or winds that are not necessarily from there which include the different types of Kona, Kona Pehu are those types of winds. Being able to honor a sense of place and history, so from that area it

does overlook regions of Kakanilua and Kamokuʻilima, which were the battlegrounds between Kahekili men and Kalaniʻōpuʻu's men. So, ensuring that the violence toward culture, place, and practice, is at a minimum and that extraction is veered away from through contribution. So, "do you contribute more than you consume?" is what I would ask the developer and not in their values, but from the standpoint of the community. When the community views your work and they ask…and the question is asked "does this property or development contribute to Maui more than it consumes?," if the community says "yes," that's when the developer can be sure that it's that way. Not by the developer's standards because I can always be biased to myself, right.

CD: Okay. Alright, thank you.

APPENDIX F: STATEMENT LETTERS FROM WALLETTE PELLEGRINO

In lieu of participating in an interview, Wallette Pellegrino provided the following statement, via an email dated December 11, 2023:

> Mahalo e Cathy for sending me the info. I'll look it over in detail.
>
> One concern many in our West Waiko neighborhood have is abt the possible use of Old Waikapū or Old Government Road as a thoroughfare for the new subdivision projects. If that were to happen, excessive traffic would come down West Waiko Rd to get to Honoapiilani Highway for easier traffic routing to Kihei and Lahaina and further east to Kuihelani Highway.
>
> West Waiko is a neighborhood of old homes, many over 100 years, whose properties are surrounded by old style rock walls, kipapa style, and on which many old trees still exist. I'm not sure that counts as historical or cultural but they have been part of the community for a long time. Many in Waikapu were angered by the butchering of the heritage Monkeypod trees adjacent to the DHHL project off Honoapiilani Highway. There was no community input. Although the excuse was that DHHL will replace the Monkeypods with native trees, I will be long gone and never able to see the tree-lined drive which was there before I was born 83 years ago. So sad.
>
> Thanks for inviting me to comment.
>
> Wallette Pellegrino

In a subsequent email, dated December 12, 2023, Mrs. Pellegrino added the following comment:

> Mahalo, Cathy. Also wanted to mention the importance of the auwai which flows down W Waiko from the triangle at Old Govt Rd.
>
> The ditch flows above ground and also below ground in different sections. If West Waiko was widened to improve the road and curves to accommodate traffic from the new subdivisions, we risk the potential of impacting kalo farmers who tap off the ditch for water for their lo'i and other agriculture. That would be disastrous. And again the old stone walls and old vegetation would be affected too.
>
> Thank you.

APPENDIX G: INTERVIEW WITH FOSTER AMPONG

TALKING STORY WITH FOSTER AMPONG (FA)
Ethnographer: Cathleen Dagher (CD)
Date: 12/14/2023

CD: Okay. Today is December 14, 2023. It's a Thursday. I'm interviewing Foster Ampong to discuss traditional cultural practices and cultural resources in the Waikapū and Wailuku area for the Wailuku Residential Development…Okay. So. Hi Foster.

FA: Hi.

CD: Hi. So, can you please tell me about yourself – your name, when and where and when you were born, where you grew up, and then, where you went to school.

FA: Okay. So, I was born in Wailuku in the late '50s. I grew up in Lahaina, primarily. And also in Waihe'e and Waikapū. I currently reside in Waiehu.

CD: Okay. And then, could you state your full name for me, please?

FA: Foster Robin Ampong.

CD: And where did you go to school?

FA: I went to school at Kamehameha III Elementary School in Lahaina. And I graduated from Lahainaluna High School.

CD: Okay. Can you tell me about your family and their background?

FA: My family on my father's side is…My father is Puerto Rican-Filipino. So, I have heritage and lineage to my ancestors that come from the Philippines from the southern part of the islands called Cebu, which is part of the Visayan race – I mean not race, but the Visayan group, from an island called Bohol.

CD: Wow.

FA: My grandmother, on my dad's mother's side on my grandmother's side, she's Puerto Rican. Her family comes from Puerto Rico, the Island of Puerto Rico from a mountain province in the southwest called Cacao - the mountain region. And then my mother, who is Hawaiian, of course. Her lineage and my lineage…we've been here in the islands since time immemorial. And we have genealogy relations in all the islands throughout the last 1500 years. In my family I am the keeper of the oral history that was passed down to me in the customary fashion by my mother, her sisters, aunts, uncles in my childhood. Growing up. And then her family is Kimokeo 'Ohana of Lahaina. So, our family comes from Lahaina, but our ancestral identity spans…If you look at the chronology and the timeline in the last 500 years, my family comes from both the Big Island and the Maui lineage.

CD: Okay. And then, what is you association to this project area or to Wailuku and Waikapū Ahupua'a?

FA: My association primarily because I grew up part of my life I grew up in the Wailuku-Waikapū area. To give you an idea, my family…Okay. So, us kids, us children when we're little from the time we're born and as our parents and our uncles and aunts and tutus are raising us…

[interview briefly interrupted].

CD: Okay then.

FA: Alright.

CD: So, I'm sorry. Could you answer that again? What is you association to the subject property or Wailuku and Waikapū?

FA: Well, in Waikapū and Wailuku…Well, actually, Waikapū, Wailuku, Waiehu, and Waihe'e these four ahupua'as I frequented and lived and have close family relationships in all four. And that's because our families come from…You know, growing up, I had cousins, uncles, aunts, tutus that lived in these ahupua'as. And we would spend a lot of time with them. And so, not only did we visit our 'ohana in these ahupua'as when we were little, but we stayed for long periods of time. We lived with my family.

CD: Okay.

FA: And so, one of the things growing up that my mother's and father's generation and their parents' generation and their parents' parents' generation and back when they were conversing with us children a lot of times they would identify our elders in the family according to the ahupua'a that they lived in. For example, three years old, the kids are packing up. We're in Lahaina and the children are packed with extra clothes and food and what have you into the family car. And we're told that we're gonna go spend the next week or two at Tutu Waikapū's house. And so, us kids knew and identified our relatives and our tutus by Tutu Waikapū. And that was the same thing with Tutu Waihe'e, Tutu Waiehu, Tutu Pu'u Kali. All these different ahupua'as and 'ili 'āinas. Wherever these relatives lived that's how us kids identified and related to them.

So, in Wailuku and in Waikapū, I had tutus that I spent a lot of time with that I was sent to growing up, me and my siblings. And in Waikapū, my Tutu Waikapū actually comes from the Big Island. She was born and raised in Kaimū, Kalapana. And she grew up…she raised a family and she lived in Kahoma and Kanahā Valley in Lahaina. And she became a widow. She remarried and she was living now in Waikapū at that time. And so, I did not learn of her true name until I started doing more genealogy and started to receive all this information from my family. And that was maybe…that began in 1997. '96. 1996. And so, I was born in 1958. So, between 1958 and 1996, I knew Tutu Waikapū as Tutu Waikapū. And when anyone referred to her by her given name or by her Christian name, I had no clue who they were talking about. So this is the kind of thing that a lot of us here in the islands grow up with. And so, this is why I know oral history is so important. Because you don't see that documented too often. That aspect or that nuance of our history. So, when you ask me what is my affiliation? What is my connection? That's one way I can explain it. And this is…you know, Cathy, I'm going through right now I am dealing with the FEMA, Army Corps.

CD: Oh.

FA: Yeah and the State and the County because of what happened in Lahaina. One of the things that we're…what's happening is this oral history documentation that somebody put into the archaeological treatment plan for Lahaina. And so, I can see that in some cases when folks refer to our oral history…I'm very familiar with not just with the nuance of the oral history but I lived it. I grew up with it and I'm still living with it today. And as you know, Hawai'i, Maui, Lahaina, or Wailuku doesn't matter what ahupua'a or what moku or district. Today we live in a multi-cultural community. That's not just Hawaiians. And that's why in the beginning of our interview here I identified with my three ethnic backgrounds. With my three cultures. So, I carry three cultures with me, at least. I carry a minimum of three cultures and I'm speaking as far as ethnicity is concerned.

Filipino, Puerto Rican, Hawaiian. However, there's other cultures that are also infused into each of us that lives and grew up here in the islands. And so, as an ethnographer…or interviewer, it's really important you know. And there's a lot of folks that never were born and grew up in the islands. And so they don't have the types of connections that we who grew up in the islands have. That's not to say that they're less than or that I'm trying to marginalize them. No. I am not. I'm simply stating a fact. And so Waikapū, yes I have close affiliation. I have stories. I have issues. I have a lot. And it's not just ancient Hawaiian or wa kahiko. These are stories that you know span from my lifetime '50s, '60s, '70s, '80s, '90s, up into the 2000s. And then I also carry my parents and my other relatives who precede me one or two generations. So, that might have been a very long winded way of answering your question.

CD: [laughs] No. That's really very interesting. And this is the first I've heard of that where you call your grandma Tutu Waikapū. That's an interesting way and a really strong way of connecting you to that area.

[FA asks CD if she is familiar with the ahupua'a sign project and goes on to explain that it was started in 2018, by Vernon Kalanikau. FA discuss the importance of this project. FA also identifies the locations of the signs demarcating the ahupua'a boundaries of Waikapū and Wailuku and the ahupua'a adjacent to them.]

FA: You'll see…signs that was put up that shows the boundaries of the ahupua'as…Part of that project entails doing a lot of research and trying to pinpoint the actual boundary, physical boundaries, of where is Waikapū and where is Wailuku. And so one of the signs is really close to the Pu'unani project. So, you'll see on the highway the sign that says on one side traveling into Wailuku from Waikapū you'll see the sign that says Ahupua'a of Wailuku. So you're entering Wailuku. Now if you're coming back the other way from out of Wailuku towards Waikapū on that opposite side of that sign you'll see Waikapū.

[FA gives the locations of the signs identifying the ahupua'a boundaries of Wailuku and Waiehu. To date, the boundaries of four ahupua'a have been identified and have signage demarcating the boundaries.]

FA:…One of the things is and this is why we're not shying away anymore from doing cultural impact assessments. Is we need to come out and we need to share just so our culture, our identity doesn't get washed out. You know. I mean not everybody is going to agree with us of course.

CD: Yeah.

FA: But, you know the research and the sources that we gather information from we try very hard to go to the families and the folks that live in these areas, that grew up in these areas, that come from these areas. And because a lot of them do have oral histories. And sometimes the information you gather from oral interviews from these oral histories doesn't match up with what the County or the State has in their records.

CD: Yeah.

FA: You know. Okay. I'll shut up.

CD: [laughs] What are the ways you have acquired your special knowledge of this area?

FA: Try repeat that?

CD: What are the ways you have acquired your special knowledge about this area?

FA: Wow. Like I said, history…See, like Kimokeo ‘Ohana of Lahaina. A lot of…Okay. So…More so now because…I've been holding informal classes, so to say. So, we get together. We have lunch. We got to the beach. [FA shares a personal story he does not want made public]

[Some technical difficulties with the videoconference occurred and FA and CD were disconnected]

CD: Okay. We're resuming the Wailuku Residential CIA interview with Foster Ampong after some kind of glitch with the internet. I'm going to re-ask that last question. What are the ways you have acquired special knowledge about this area?

FA: From my family. Growing up. Living here in the islands.

CD: Did you want to expand on that?

FA: Pretty much…I mean everything that…You know like how I explained to you how we identified with our elders you know as young children growing up in the islands. Here on Maui. We were taught that from a very young age. So, as you know a lot of the names are very long in Hawaiian.

CD: [laughs] Yeah.

FA: And so little kids sometimes we can't pronounce the 18, 25, 26 letter names. And so…I'm presuming our parents made it easier for us by saying Tutu Waikapū. Her Christian name was Emma Kaiu. Her maiden name was Waiau. So I didn't learn that until years later as an adult. But all my childhood, even in high school, and even after I graduated, whenever my family spoke about her, or recalled events and what have you and history they referred to her as Tutu Waikapū. And then in my adult years I learned that her given name…her Christian name was Emma Kaiu Waiau who married Moke Kalaluhi from Kahoma. Now she was born and raised in Kalapana, Kaimū more accurately, which is in the Puna Moku on the Big Island of Hawai‘i. So, today folks know of that black sand beach that was in Kalapana.

CD: Yeah.

FA: You saw a lot of the tourist brochures and what have you. Our family house is right there across from the black sand beach. And it is still there today. Even though Pele has erupted several times and the lava has come in and took out a lot of familiar areas and sacred areas of Kalapana, my family's home was one of the few homes that was not consumed by Pele's lava.

CD: Wow.

FA: You know, multiple flows. And so I have a cousin that still lives on the family land there. And so this information that I'm telling you that I'm sharing with you, this was handed down to me like I said earlier on in the interview in the traditional customary fashion of oral history. Generational knowledge. And so as kids we don't necessarily understand it in that context. And being kids, like for me like growing up all the stories and all the lessons and what have you that was taught to me I was more interested in surfing. And so even though I was growing up in Lahaina and I was being schooled and taught by my parents and my elders and the community and even attending Kamehameha III School and Lahainaluna School. All the experiences the stories that we share with one another the life experience that we…and the memories that we create as children in this world that becomes part of the oral family history. You add that with the generations that have been passed down, up and to your parents and to you. My mother had a lot of experience and a lot of generational

and oral history passed down to her by her elders. Who happened to be not just her parents but uncles and aunts and tutus two, three generations ahead of her. And so, I hope that answers that question.

CD: Yeah. That was an excellent answer. Could you share your mana‘o relevant to the Wailuku and Waikapū area and the surrounding region?

FA: Well, I know that in this area it was at one time I know that…I don't know if this was original landowner or someone who was leasing the land but there was mainly pastoral. I saw cows in there. [laughs]

CD: Huh.

FA: And for the most part it was fallow. Yeah? I'm trying to think. Okay. So. You know you have to travel through that area to get from Lahaina to Waiehu and to ‘Īao Valley. I can't recall right away the families that lived in Waikapū and Wailuku in the close vicinity right off the top of my head. But I do know…mostly I have older siblings that would be more familiar with it. In fact, I just reconnected with an older sister and just by spending time together we were able to trigger each other's memories. And one of the places we were talking about was Waikapū. This area. But right now. Cathy, I can't recall anything or…

CD: Oh.

FA: I don't want to convey something I'm not 100 percent sure about.

CD: Alright. Can you think of any mo‘olelo or any mele or place names or anything from that area that you can share?

FA: Mmmm. Not off the top of my head.

CD: Okay.

FA: But, no. I know there is because I remember my tutu….A lot of folks…My mother did this a lot. They all play ukulele. They all sing. They all did hula. And for my mother, she sang a lot about the different ahupua‘as. And she sang a lot about Waihe‘e, Waiehu, Wailuku, Waikapū, Lahaina.

CD: Huh.

FA: But, I cannot and I'm not going to even make an attempt at this time to try to recall. Especially verbatim what she was saying. But, there are stories out there…Yeah.

CD: Okay. As far as you remember and your experiences, how has this area changed?

FA: For the most part you know if I remember correctly the Waikapū end of that project area was where I saw animals. And the area closer to Wailuku was sugarcane.

CD: Okay. So, you mean the area where you saw the animals, that's where you saw the cows?

FA: Yeah.

CD: Okay.

FA: Yeah. That was more closer to Waikapū.

CD: Okay. And then the Wailuku side was in sugarcane?

FA: Yeah. That was sugarcane. Yeah. That was sugarcane.

CD: Do you know of any traditional sites or historically significant buildings which are located either on that property or in the surrounding area? That can be archaeological sites, historic structures, burials, cultural sites. Those kinds of things.

FA: No.

CD: Okay. Do you think the proposed development would affect any place of cultural significance or access to a place of cultural significance?

FA: It may if those features or burials are discovered. Yeah. I don't know per se that there's this historical feature or this burial feature in any specific area. All I can say is that from my experience in the last…in my experience in my whole life especially in the last 20 years there definitely is a possibility that burials and historical sites may be encountered in this project. Which is why like all the other projects that I've been asked to share my mana'o it's important that qualified archaeological monitors are part of this whole development. This whole plan. Not just in the AIS [archaeological inventory survey]. You know, if this land is going to be developed for subdivision or homes, then I think every earth-moving machine on that project should have an arch monitor to monitor their activity.

CD: Okay.

FA: In other words, if they're running one excavator, all you need is only one arch monitor to watch that activity. But, if you're running three excavators and a backhoe and a bulldozer on the same project, but in different locales, then I would strongly suggest that an arch monitor is assigned and present at each of those machines. 'Cause I've seen other projects where they have one or two arch monitors for the project and they're running four or five machines that are scattered throughout the area of the project. And you know one monitor is on one side of the project and a machine is working on the opposite side, there's no way the arch monitor can cover both sides. One monitor. That's why I'm saying that you know arch monitors need to be present and need to be assigned to each earth moving machine that is operating. I cannot give you a yes and a no to that question.

CD: Okay. I understand. Are you aware of any traditional gathering practices at the property within the surrounding area? Either in the past people went there to gather certain resources or they're going there now to gather certain resources?

FA: Yeah. In the past. I know there was a couple times we were traveling home from Waiehu…Waiheʻe and then we would stop. You know I don't know the plants too well, but I know that we stopped and gathered some kind of plant. My mother would gather it. There was an area there that they were familiar with. And like I said, I was young. I can't tell you definitively what it was and where. But, it was in the general area of this project.

CD: Okay. What about hunting activity in that area?

FA: Umm. No. No.

CD: Okay. While development of the area continues, what could be done to lessen the adverse effects on any current cultural practices in the area?

FA: Can you repeat that again?

CD: While development of the area continues, what could be done to lessen the adverse effects on any current cultural practices in the area? So, you know what could be done to mitigate any adverse effects to any cultural practices people may be doing there…if they are still going there to gather resources?

FA: What can be done?

CD: It's asking about mitigation practices. Kind of like what you just said about the archaeological monitors…because we don't really know what kind of cultural resources may be there. So, we want to be prepared.

FA: I think, here. And this is something I've been chewing on for a while now. I think that the developer should have retained an active cultural advisor. That is not only familiar with that area, but that has been vetted and…See, Cathy, it would be nice if each development had a cultural advisor that could communicate with the community, as well as with the client, the developer, and with SHPD [the State Historic Preservation Division]. And the reason why I am saying that is that…For instance, yeah, there's Hawaiʻi Administrative Rules that govern what one does whenever they encounter an inadvertent discovery of human skeletal remains. And there's a notification process and there's a protocol and what have you.…I think it would behoove everyone if the developer had a cultural advisor that was respected and trusted by the community.

CD: Okay. Would that be different from a cultural monitor? Or would it…

FA: Yeah. Yeah.

CD: Okay. The cultural monitor would report to that person? And then that person would be like a liaison?

[FA recounts a recent incident that occurred on an archaeological project on Maui]

FA: So, I guess that what I'm trying to say is I hope whether it's Dowling or any other developer, I hope that they have a cultural advisor…that can communicate with the community. So, in other words, if Mike Dega's company or Trevor's or whoever are hired to be the field arch you know, I like talking to the horse's mouth if there's an inadvertent discovery [of human skeletal remains]. I don't want to go through what we went through at Waikō 'cause it…It was shitty. Okay?

CD: Yeah.

FA: Vernon and I have said this many times, we can tell you how not to do you know the arch work and the consultation just by Waikō. So, let me try to summarize my thoughts here. What I think.

CD: Okay.

FA: Don't be kāpulu.

CD: What does that mean exactly?

FA: Don't be messy. Don't be incompetent. Don't be lackadaisical. You know, kāpulu is real sloppy. You know sloppy work.

CD: So, I'm not really quite clear on what you're saying. You'd like a cultural monitor in the field with the archaeologist but also a cultural advisor who also comes out to the field periodically…

FA: Yeah. And okay, with Nico Fuentes, with Mike Dega, we work with them. So, they're the field archaeologists. They know how to communicate.

CD: Okay.

FA: Okay, so like Vernon and I. We're recognized cultural descendants. Maui Lani. Waikō. Kulu Kai. And so, we've always communicated and got along well with the archs. When things got messy and kāpulu, is when some other person would be thrown into the mix. If Ian's doing the fieldwork or Nico and his team are doing the fieldwork, then shouldn't it be them that we get our notification and our information from and not from a second or third party?

CD: I see. Yeah. Okay.

FA: Yeah…Diplomacy…I hope I make that clear.

CD: Yeah. It's all about the communication. An open flow communicating what's happening in the field with community.

[FA relates that he has come to know and to better understand some of the developers on Maui]

FA: And you know this, Cathy, there's some people that are just [sighs] not helping protect iwi kūpuna.

CD: Yeah.

FA: And if I know that there is a burial then of course I'm going to say something so it's protected…I know it's a hard thing to say that…I'll leave it at that. I'll leave it at that.

CD: Okay.

FA: I can only give you five more minutes.

CD: Okay. I only have two more questions. Are you aware of any other cultural concerns the community might have related to cultural practices within the vicinity of the project area or its surrounding area? Do you want me to say it again?

FA: Yeah.

CD: Are you aware of any other cultural concerns the community might have related to cultural practices within the vicinity of the proposed project or its surrounding area?

FA: Yes. Maui Lani Complex.

CD: Oh.

[FA mentions some nearby projects and advises that one Native Hawaiian organization may make a big fuss about the currently proposed residential development]

FA: So, the answer to that question of yours has to be a yes.

CD: Okay. And then, do you know of any other kūpuna, cultural or lineal descendants, kama'āina who might also be interested in sharing their mana'o about this project?

FA: I know several dozen but none of them have expressed any interest.

CD: Okay.

FA: Yeah.

CD: Okay. Those are all of my questions. So, thank you, Foster.

FA: Oh. Okay. So, we pau this?

CD: Yeah.

FA: Oh. Okay.

CD: Yeah. Thanks.

[FA and CD discuss reviewing and sending the consultation materials to each other]

CD: Thank you…Alright enjoy the rest of you day.

APPENDIX H: INTERVIEW WITH SCOTT FISHER

TALKING STORY WITH SCOTT FISHER (SF)

Ethnographer: Cathleen Dagher (CD)
Date: 12/19/2023

CD: Okay. So, today is December 19th 2023 and I'm having a Zoom interview with Scott Fisher regarding the Wailuku Residential Development. We're going to be talking about traditional cultural practices and cultural resources. Okay. So. Hi Scott.

SF: Hi, Cathy. How you doing?

CD: Good. Please tell me about yourself. State your full name.

SF: My name is Scott Fisher. Do you want my job title or what I'm…?

CD: Yeah. I would love to your title. Yeah...

SF: I work for the Hawai'i Land Trust. I'm the Director of 'Āina Stewardship. And probably more relevant to this, I am the current Chair of the [Maui/Lāna'i Islands] Burial Council.

CD: Oh. Congratulations. I didn't know that.

SF: Thanks. Yeah. So, I'm the current Chair of the Burial Council and I also have a farm out in Waikapū not too far from this property.

CD: Okay. Please tell me where and when you were born, where you grew up, and where you went to school.

SF: Yep. Sure. I was born in 1970. Born on O'ahu, but that's only because my mom had complications in the pregnancy. Grew up on Maui. As far as schools…Kula Schools. Doris Todd. I graduated from Hawai'i Prep on the Big Island. Do you want colleges as well?

CD: Oh. Sure.

SF: Okay. Well, I did my undergrad at Carver State. I have graduate degrees from *Earlham College* in Indiana. A PhD from University of New England in Australia. I also have a graduate degree from University of Idaho. And a graduate degree from Washington State University. And I'm currently working on a PhD in Earth and Ocean Science.

CD: Wow, Scott. That's pretty impressive. [laughs]

SF: [laughs] Well. You know. You've got to do something with your time. Right?...As you can tell I enjoy learning.

CD. Yeah. That's good. Um. And then, can you tell me about your family background?

SF: My family background? Let's see. My father's side of the family is all from…my mo'okū'auhau specifically is from Kaua'i. Although my grandmother grew up on Maui. My father grew up on O'ahu. My family's been in the sugarcane industry. I'm the first generation out of sugar since 1865. Or 1861 when an uncle first got into it. For a time my grandfather worked in sugar. My father worked his whole life and his whole career in sugar. Going back. So. Yeah. Anyway.

CD: Okay.

SF: Sugarcane…Which is how partially I know this land because my dad managed…managed…well after Wailuku Sugar went out…So I joined him on his work out in the field. He was a manager. I mean he had different positions at different times. I think he was in charge of harvests when he passed away in 1992. Okay. So.

CD. Okay. Alright. My next question is what is your association to the subject property…with the project area?

SF: Yeah. To be honest with you, mostly just driving by. I've seen the adjacent land. They're actually doing some work on there right now. They have the windscreens up. So I've seen them working on that the adjacent property. This…I mean I'm assuming you're just starting the cultural…I mean the archaeological inventory survey? [SF inquires as to the status of the archaeological inventory survey (AIS). SF and CD discuss the CIA/AIS process.]

SF: So, my experience with the subject property…You know what at some point I've been on the property. [SF inquires as to who is the current landowner. CD identifies landowner, developer, etc.] Full disclosure then, Everett Dowling is also on the Burial Council with me.

CD: Oh. Okay.

SF: I guess that was more important than may have seemed initially…Driving by the property…To my knowledge I haven't walked it recently. I probably have been here on a trip out with my dad when he was working for HC&S when it was still under sugarcane. It was all sugarcane while I was growing up. There was no real…Nothing really to see. But. Yeah. That's about it.

CD: Alright. What about in the adjacent lands? Because the CIA covers the whole ahupuaʻa.

SF: Exactly. Adjacent lands…Growing up on Maui spending a lot of time in Wailuku. My family we were pretty active. So we would do hikes in Wailuku. There's a hike up to the cross. It's fairly famous. I don't know. It kind of seems to wax and wane in terms of popularity. It's been a little while since I was up there. I don't have a whole lot of direct connection to the land because most of the time that I was growing up it was either sugarcane and...And then I think for a time, if I recall correctly…Well, let's just say this, I'm not sure if HC&S took over…Let me qualify…let me kind of just change and qualify things by saying my understanding is that when HC&S took over Wailuku Sugar's lands it may have just been Haleakalā side of the Honoapiʻilani Highway. Up mauka I'm not sure if…I think Wailuku Sugar Wailuku/Water Company kept hold of it and they were going to do some kind of agriculture up there. Seems like for a time it may have been macadamia nuts. I can't remember if it was on this particular land. But I know that they planted a lot of trees in Wailuku.

CD: Okay.

SF: That was under…his name was Knox…I know his kids but…I'm trying to remember…Roger Knox was his father…Anyway Knox was the manager of Wailuku Sugar at the time.

CD: Okay. You kind of touched on this, but I need to ask what are the ways you have acquired special knowledge about this area?

SF: Yeah. I guess I'd qualify that by saying that I don't really have any special knowledge other than academic research. So, I do want to say I don't have moʻokūʻauhau from this ahupuaʻa…I know…plenty of people I know and am friendly with who have been willing to share information

with me I guess. I would say that mainly it was my own personal readings and talking with friends and family who do have a better sense of this.

CD: Okay.

SF: Although again as I say friends and family I don't have any lineal ties to this land. So, I do want to be clear about that.

CD: Could you share your manaʻo relevant to the Wailuku and Waikapū area?

SF: I guess two or three main bits of information that I think are relevant is that...and I don't know the exact extent of…their former extent...but the Nā Wai ʻEhā, in general, and Wailuku in particular, having extensive loʻi kalo - taro patches. So at some point this was probably, prior to sugar, this was probably loʻi kalo. The land in question probably was loʻi kalo. Again that would need to be borne out by archaeological survey. It's my understanding that pretty much from Waiheʻe to Waikapū, past Waikapū, that there was kind of solid loʻi kalo. Where there were not kauhale there were loʻi kalo.

Other things Wailuku Ahupuaʻa in Wailuku Moku had the highest concentration of heiau. So again, that's something to be aware of. That there are a lot of heiau in this ahupuaʻa, according to some of the literature. I think it might have been Kamakau who wrote that or one of the major historians wrote that. So, that was the second bit of information.

Of course, you're not really getting close to it, but a little bit makai of the Honoapiʻilani Highway is where when Kalaniʻōpuʻu invaded Maui. The ʻĀlapa and the Piʻipiʻi, kind of the units, were invading Maui when they, I think this was in 1776, passed on the east side of this land. So, not particularly close, but in that same area. And that's where they were ambushed. It's a little bit closer to the reservoir. And that specifically, that information was Bob Hobdy who did a tremendous amount of research. And he thinks that incident happened where the ʻĀlapa and the Piʻipiʻi units were travelling and they were in the troughs of the dunes and then they were ambushed as they were getting closer to Wailuku. He thought it was closer to the reservoir. So that was his…So not in the immediate build area…But, again there were only two people who survived that. It was a complete massacre. So that's another bit of information. Kind of a historical incident.

So, generally, you can kind of break things down into patterns of life and historical incidents. So the life pattern of course would have been taro in this area, as I mentioned earlier. And this area being kind of a high…a large number of heiau. It's possible that other areas on the island had similar…For some reason, well not for some reason but, the three ahupuaʻa that seem to have the highest, at least according to this individual where I read it…read, not passed down orally…were Wailuku, Keʻanae, and Waiheʻe were the three largest numbers of heiau. But again that's not something I know empirically. It's just what I've read.

In terms of the "seat of power" I have been told that One Main Plaza at the intersection of Main Street and High Street that corner right there was the former kauhale of Kahekili. That's what someone mentioned to me. Other things than Wailuku being a very, very culturally rich area, I know there's a lot of housing in that area now. I guess…You know it used to be Waikapū and Wailuku were two…I could look down from my house in Kula and they looked like two different towns. And now they've kind of, like Kahului and Wailuku, they've kind of blended together, which is a bit unfortunate.

CD: What about moʻolelo? Do you know of any for that area?

SF: I mean moʻolelo for Wailuku, of course, is the ʻAʻāpueo…being the…the story goes that…I've heard the name mentioned and it was, let me think, Hua a Pohukaina, who is sometimes described as a chief. Sometimes he's described as a kahuna. Probably both. But that he was traveling up in the uplands of Kula in the area that pretty much what we now call Pukalani and killed the son of…the chick son of the pueo king. And so, in vengeance, he mustered an army of pueo and they grabbed rocks in their talons and flew down to Wailuku and dropped these rocks from the heights. And that's where we get the name "Wailuku." "Wai" of course being fresh water or in this case probably "stream" and "luku" means destruction. So, "water of destruction" or "stream of destruction." And that refers to that moʻolelo.

Of course, also, less mythological and more historical is Kamehameha the Great landing at the…what is now Kahului Harbor area and having his canoe, the Peleleu, fleet landing in the middle of Kahului Harbor all the way down to Kalaeʻiliʻili in Waiheʻe, at least according to one story. Those canoes lining the shoreline and then he…his army marched up into ʻĪao and just before entering the valley, he gave this amazing, really well-known, well-documented exhortation where he tried to get his army motivated. And that is where his famous saying "Imua e nā pokiʻi a inu i ka wai ʻawaʻawa aʻohe hope e hoʻi mai ai." So, that is "Go forward my younger brothers and drink from the bitter waters. There is no turning back." So, one of the more famous quotes of Kamehameha that he said literally on the verge of battle with the army of *Kalanikūpule, as they were traveling up* ʻĪao Valley. Then, of course it turned into kind of a rout, a massacre, where the Maui army was destroyed. That also happened in ʻĪao Valley, above the Wailuku Stream….

That's the famous incidents…I don't have any direct…Again, this is reading. This is not like someone had any special knowledge that they passed down to me. Although, in addition to that, ʻĪao Valley especially was an important site for the burial of monarchs or aliʻi. It's always been a very sacred area. What we call the ʻĪao Needle now, which should not be called ʻĪao Needle it's Kūkaemoku. Kūkaemoku was a kinolau or bodily manifestation of Kanaloa. So, kinolau of Kanaloa. That's kind of just off the top of my head. Moʻolelo that I can recall.

CD: Okay.

SF: Cathy, are you there?

CD: I'm here. Can you hear me?

SF: Yeah.

CD: Okay. As far as you remember and your experience, how has the area changed?

SF: I kind of eluded to this a little bit earlier. When I was younger from my vantage point from my house in Kula we could look down and of course Waikapū and Wailuku were distinct and separate. They were separated by about three miles or so of pretty much just agricultural land. Sugarcane, of course, was for most of my life that's what it was. So sugarcane separated Wailuku and Waikapū. And they were two distinct things and then they started…You know in the early 2000s, it seems…Well actually, in the 90s…80s and 90s you started to see an expansion of Wailuku Heights. And once Wailuku Heights expanded, then you have an expansion of Waikapū towards Wailuku and Wailuku towards Waikapū…In a word – urban growth. Higher density housing. Housing, in general. And so, that's been the main thing. And of course, Kuihelani area has been a major, major topic of our Burial Council. Even though I mentioned that the area had extensive loʻi kalo, would be very, very prudent to expect and anticipate iwi kūpuna, as well, during the archaeological inventory survey. That's been the main change, though.

CD: Okay. Do you know of any traditional sites or historically significant buildings which are located either on the subject property or just in that general area?

SF: Depends on how you define the "general area." Up towards Wailuku Ahupuaʻa it does. ʻĪao Church, which was always important. My brother got married and my father's funeral. So, that was always significant to me. The Bailey House. And then more recent houses like the Court House and the former Maui Police Department Headquarters, which I think was still in use when I was really young. And then they more recently built the other one…the newer one down closer to the hospital. Other buildings of course as I mentioned at One Main Plaza there was supposedly the house of Kahekili. His compound. His kauhale. My understanding is that and I don't know the name of it but that ʻĪao Church was actually built on a heiau. But, I've never seen a footprint of it. No one's ever shown me the footprint, but from what I understand it's there. Lots of archaeological remains just below surface. There's an ʻauwai. I don't remember the name of that ʻauwai. Has a name. An ʻauwai that runs kind of next to ʻĪao Stream…from Wailuku Stream out towards kind of behind the Bailey House. The Hale Hōʻikeʻike. And then of course, the Pondiko Ouchi House, which has recently changed hands. Pondiko Ouchi was the manager of Wailuku Sugar. So, that was a C.W. Dickey house.

CD: Okay.

SF: There are no historic structures I'm aware of in the immediate area of the…

CD: I'm sorry. Say that again.

SF: No historic structures in the immediate vicinity…

CD: Okay.

SF: I don't even think there's any buildings on the property. To be honest with you.

CD: Okay. Do you think the proposed development would affect any place of cultural significance or access to a place of cultural significance?

SF: Because there are probably burials in that area and there may be people who have their own local tradition, I think to my knowledge…I'll answer this way. To my knowledge no. Although, the presence of iwi kūpuna in that area may dramatically…the discovery or the discovery of people living in the area who have moʻolelo that talk about iwi kūpuna buried in there, it is possible. It is possible. It is a…without getting into details about the specific things we've gone over at the Burial Council over the years there are quite a number of iwi kūpuna in that general area. Just really can't emphasize that enough. Again, because the work has been done on the…on the east side of Honoapiʻilani Highway that's where they've been found, but I expect there will be others found in the same vicinity.

CD: And what about traditional gathering practices?

SF: My suspicion is that at some point in the past there were loʻi kalo. So that would have…Not gathering in the traditional sense of the word, like gathering limu or gathering lāʻua lapaʻau. But, I imagine that that was the primary use. And that along with those loʻi kalo there would have been within that context some lāʻua lapaʻau that would have been gathered. But again I don't have any knowledge of that…no specific knowledge of that in particular.

CD: Okay. While development of the area continues, what could be done to lessen the adverse effects on current cultural practices in the area?

SF: I would…Well, let's just anticipate that they might come across iwi kūpuna. Again, especially since there's gonna be Hawaiian Homes, there I think there needs to be…Well, we should be sensitive at all times. I don't mean to sound…But for those maybe who will be living there it's especially important that it be done right. And again, it's important to do it right all the time. I don't mean to imply that it's only important to do it right when it's Hawaiian Homes…I think making a presentation to Burial Council to get other people…Michele Hoʻopiʻi is the Wailuku representative. She would be a good one to consult with. I don't know if you've reached out to her yet.

CD: Oh. Okay.

SF: What's that?

CD: Oh. I said, Oh okay.

SF: Yeah. Michele Hoʻopiʻi is currently the representative from Wailuku. So definitely want to reach out to her. And she has a pretty extensive network of people that she reaches out to who have ties to Wailuku. Noelani Ahia is another person. She has ties to Wailuku. She's been recognized as a cultural descendant. She was able to demonstrate her family ties to the land. So, I would say consult with those who have made an attempt to be recognized as cultural descendents so there is a plan when iwi are inadvertently discovered. Doing so will ensure they have a process in place that makes it easier for people who want to be recognized as cultural and lineal descendants to be recognized. It's oftentimes quite burdensome for people. We need more people that the landowner can consult with on what and how those iwi should be treated when they are discovered. Of course most times it's keep in place.

CD: Okay. And are you aware of any concerns…cultural concerns the community might have regarding this project?

SF: Yeah. Iwi kūpuna.

CD: Okay.

SF: Yeah. I know I've said it a bunch of times. But, the likelihood of inadvertently coming across iwi is quite high. I'm always astonished where iwi kūpuna are found. Iwi kūpuna can be found anywhere. Considering the concentrations that are found in the Wailuku district, it's important that they be afforded a high priority level of protection.

CD: Okay. You've already kind of answered this, but is there anyone else that you would recommend we speak with?

SF: Yeah. Okay. I'll give you three. I'll give you more than that. Hōkūao Pellegrino, Wallette and Victor Pellegrino. Those three would be very, very important because they live in the area and they probably have some of the deepest knowledge. Foster Ampong. Noelani Ahia. Of course on the Burial Council there's Michele Hoʻopiʻi. There's six. And Keʻeaumoku Kapu…Johanna and Kaniloa Kamaunu. I don't know how many of them you've already reached out to or plan to reach out to but, these are people who have deep roots. Clare Apana. Another person who has roots. She lives in Wailuku…So, those are all people who…What is that nine or so?

CD: Yeah. Okay.

SF: Yeah. But, these are all people who have far deeper and greater knowledge of iwi kūpuna than I do. Not iwi kūpuna but of the area than I do.

CD: Okay. Is there anything else that you would like to add?

SF: No. That's about it. It's not my land. So, I just want to emphasize that most of what I know has either been shared with me by people who are knowledgeable or that I've read about in different sources of moʻolelo. But, my own empirical knowledge comes from the fact of being on the Burial Council for now 14 years and just how many burials have come up in that area…been discovered. Yeah. So. Thank you, Cathy. Great. Appreciate it.

CD: Yeah. Thank you, Scott. I appreciate it.

SF: Anytime. Yeah. I look forward to getting the thing when it comes out.

CD: Okay. Awesome.

SF: Thanks so much.

CD: Enjoy the rest of your day. Aloha.

SF: Thanks you, too.

Appendix J

Economic and Fiscal Impact of the Wailuku Single-Family Residential Subdivision

Report to

DDC2 LLC

Covering the

ECONOMIC AND FISCAL IMPACTS OF THE WAILUKU SINGLE-FAMILY RESIDENTIAL SUBDIVISION

Wailuku, Maui, Hawaii

December 2023

JOHN CHILD & COMPANY
APPRAISERS & CONSULTANTS

JOHN CHILD & COMPANY
APPRAISERS & CONSULTANTS

Karen Char, MAI, CRE
Paul D. Cool, MAI, CRE
Shelly H. Tanaka, MAI, AI-GRS
Cooper Borge

January 9, 2024

Email

Mr. Everett R. Dowling
DDC2 LLC
2005 Main Street
Wailuku, Hawaii 96793

Dear Mr. Dowling:

Re: Economic and Fiscal Impacts of the Wailuku Single-Family Residential Subdivision

At your request, John Child & Company has estimated the economic and fiscal impacts of the proposed Wailuku Single-Family Residential Subdivision. This letter summarizes the study background, objectives, intended use and user, effective date of report, scope of work, Wailuku Single-Family Residential Subdivision, housing units, development schedule, projected direct, indirect, and induced expenditures from infrastructure and building construction, projected employment earnings, and economic and fiscal impacts to the state of Hawaii and the county of Maui.

STUDY BACKGROUND

DDC2 LLC proposes to purchase and develop the Wailuku Single-Family Residential Subdivision site (Wailuku Subdivision) for Department of Hawaiian Homelands (DHHL). The Wailuku Subdivision is a 77.00-acre portion of tax map key 2-3-5-2-3 fronting Kuikahi Drive, Wailuku, Maui. The development site is owned by Kuikahi Properties LLC.

Wailuku Subdivision is currently in State Land Use agriculture and County agriculture zoning districts. However, if developed together with DHHL, DHHL can use its authority under the Hawaiian Homes Commission Act, 1920, to use the lands not subject to State land use and Maui County zoning requirements. DDC2 LLC proposes to develop 204 Hawaiian homestead residential homes and vacant lots contingent on DHHL purchasing the site.

The subdivision will use DHHL (State) funds. Therefore, the State requires an environmental assessment.

In this regard, you have asked us to estimate the economic and fiscal impacts of the proposed Wailuku Single-Family Residential Subdivision under the hypothetical condition that it is developed as proposed.

STUDY OBJECTIVES

The objectives of our assistance are to estimate the economic and fiscal impacts of the Wailuku Single-Family Residential Subdivision to the State of Hawaii and County of Maui in terms of:

- Projected direct, indirect, and induced expenditures from infrastructure and building construction
- Projected employment earnings
- Economic and fiscal impacts to the State of Hawaii and County of Maui.

INTENDED USE AND USER

The intended use of our assistance is to provide projections of economic and fiscal impacts that can be used in the Environmental Assessment being prepared by G70.

As a result, our report is intended for insertion in the Environmental Assessment. In accepting this report, DDC2 LLC (Client) specifically agrees that our assistance is not intended for any other purpose or users and is not to be relied upon by any third parties for any purpose, whatsoever.

EFFECTIVE DATE OF REPORT

The effective date of this report is December 8, 2023.

SCOPE OF WORK

The scope of work to complete this assignment is outlined as follows:

1. Obtained the Wailuku Single-Family Residential Subdivision plan, infrastructure and building construction and other costs, impact fees, and phasing.
2. Reviewed the "Hawaii State Input-Output Study: 2012 Benchmark Report" prepared by the State of Hawaii Department of Business, Economic Development & Tourism (DBEDT) and updates.
3. Projected the direct, indirect, and induced expenditures from infrastructure and building construction.
4. Projected jobs and employment earnings.
5. Estimated the economic and fiscal impacts of the Wailuku Single-Family Residential Subdivision to the State of Hawaii and the County of Maui.

EXTRAORDINARY ASSUMPTION AND STUDY CONDITIONS

Because the project does not exist, this assignment is based on the cost and timing projections provided by the Client.

The complete study conditions are included in Section I of the accompanying report.

WAILUKU SINGLE-FAMILY RESIDENTIAL SUBDIVISION

The Wailuku Subdivision is a 77.00-acre portion of tax map key 2-3-5-2-3 fronting Kuikahi Drive, Wailuku, Maui. The subdivision conceptual site plan is shown in Exhibit I-A of the accompanying report.

HOUSING UNITS

The 204-lot subdivision is proposed to be improved with 173 developer-built single family homes and 31 vacant lots. The minimum lot size is 7,500㎡. The developer-built single-family homes range from 2 bedrooms/1 bath single-story with 752㎡ net livable area to 5 bedrooms/3 bath, two-story with 1,676㎡ net livable area. The majority are 4 and 5 bedroom homes with at least 1,604㎡ net livable area.

The vacant lots will be leased to beneficiaries who will construct their own homes by 1) being an owner-builder, 2) hiring their own contractor, or 3) partnering with Habitat for Humanity.

DEVELOPMENT SCHEDULE

The subdivision with 173 housing units and 31 vacant lots is being planned. The subdivision plans are to be completed and submitted to the State and County reviewing agencies by the end of 2024 or beginning of 2025. The homes are planned to be constructed and sold by 2029.

PROJECTED DIRECT, INDIRECT, AND INDUCED EXPENDITURES FROM INFRASTRUCTURE AND BUILDING CONSTRUCTION

Infrastructure and building construction result in direct, indirect, and induced expenditures to the State of Hawaii and County of Maui. Type I output measures the direct and indirect expenditures. The direct expenditure is the cost. The indirect expenditure is a percentage of the cost. A type I output of 1.45 means the direct output is 100% of the cost, and the indirect output is 45% of the cost. Type II output also measures induced expenditures. By comparison, a type II output of 2.07 means 100% of the direct expenditure, 45% is indirect expenditure and 62% is induced expenditure.

The total lot count and average sales prices and absorption are projected as follows:

	Turn-key	Self-help	Vacant Lot	Other	Total
Lot count	173		31		204
Gross acres					77
Gross density (lots / acre)					2.65
Land Acquisition					$5,200,000
Cost/lot					$25,490
Average sales price / unit	$578,903	n/a	n/a	n/a	$578,903
Average square feet / unit	1,520	n/a	n/a	n/a	1,520
Average sales price / square foot	$381	n/a	n/a	n/a	$381
Average cost / unit	$550,119	n/a	n/a	n/a	$550,119
Average cost / square foot	$362	n/a	n/a	n/a	$362
Monthly absorption	7	n/a	n/a	n/a	7

The analysis is in 2023 dollars using 2017 multipliers.

Direct construction costs of the proposed infrastructure and homes totaling $132,863,000 (in 2023 dollars) are projected to have an impact of indirect expenditures of $59,788,219 and induced expenditures of $82,374,879 that total about $275,026,000 over the life of the development, shown as follows:

Direct construction costs	$132,863,000
Indirect expenditures	59,788,219
Induced expenditures	82,374,879
Total, rounded	$275,026,000

PROJECTED EMPLOYMENT EARNINGS

The level of direct construction cost will generate 0.367 construction jobs for each direct construction dollar. The construction costs total $132,863,000 in 2023 dollars would generate about 0.367 direct earnings from jobs, about $47,032,000. About 0.44 in indirect earnings or about $62,795,000, and 0.66 in induced income, or about $84,581,000, totaling about $194,400,000, shown as follows:

Direct construction earnings	$47,032,000
Indirect earnings	62,795,000
Induced earnings	84,581,000
Total, rounded	$194,400,000

ECONOMIC AND FISCAL IMPACTS TO THE STATE OF HAWAII AND THE COUNTY OF MAUI

The proposed Wailuku Subdivision will have positive economic and fiscal impacts to the State of Hawaii and County of Maui during and after construction. The client and DHHL will be responsible for the construction costs.

The residents are expected to be existing residents of Maui. Incremental expenditures associated with use of roads, schools, parks and State and County services are projected to be negligible. The client and DHHL intend to request exemptions of fees that have historically been granted for DHHL properties. However, the project budget anticipates a DOE assessment of $1,096,092 to be paid to the State.

Fees and assessments for site development during construction are budgeted as follows:

State of Hawaii:	
DOE assessment	$1,096,092
County of Maui	
CoM permit fees	$95,248
Water meter & installation fees	2,571,223
Maui Electric fees	1,283,052
Subtotal	3,949,523
Total	$5,045,615

The County of Maui will charge the CoM permit fees and water development fee. However, it will exempt the park assessment in-lieu fee.

It is also expected to exempt real property taxes for the first eight years. Because the sales occur in 2028-2029, real property taxes will not be assessed until 2036-2037. The projected sales price ranges from $387,000 to $619,000, and the median home price is $578,903 in 2023 dollars. Assuming that each property is subject to real property taxes based on the median sales price of $578,903 and homeowner's exemption of $300,000, the median taxable assessment is $278,903. At $1.90 per thousand, the annual real property tax averages $530 per housing unit. The annual real property tax for the 204-lot subdivision will be about $108,000.

The Wailuku Subdivision will be served by existing infrastructure and will not require expansion of any public services or facilities. Students in the Wailuku Subdivision will be attending nearby existing public schools: Puu Kukui Elementary, Maui Waena Intermediate, and Maui High School. Residents will be serviced by nearby police and fire stations and existing parks and recreation facilities. No additional expenditures are required by the State of Hawaii or County of Maui.

* * * * *

We appreciate having the opportunity to prepare this report for you Please contact us if you have any questions.

Sincerely,

JOHN CHILD & COMPANY, INC.

Karen Char, MAI, CRE
President
Certified General Appraiser License No. 184
State of Hawaii
Expires December 31, 2025

I - STUDY BACKGROUND

This section presents the study background, study objectives, intended use and user, effective date of report, scope of work, Wailuku Single-Family Residential Subdivision, housing units, development schedule, and extraordinary assumptions and study conditions.

STUDY BACKGROUND

DDC2 LLC proposes to purchase and develop the Wailuku Single-Family Residential Subdivision site (Wailuku Subdivision) for Department of Hawaiian Homelands (DHHL). The Wailuku Subdivision is a 77.00-acre portion of tax map key 2-3-5-2-3 fronting Kuikahi Drive, Wailuku, Maui. The development site is owned by Kuikahi Properties LLC.

Wailuku Subdivision is currently in State Land Use agriculture and County agriculture zoning districts. However, if developed together with DHHL, DHHL can use its authority under the Hawaiian Homes Commission Act, 1920, to use the lands not subject to State land use and Maui County zoning requirements. DDC2 LLC proposes to develop 204 Hawaiian homestead residential homes and vacant lots contingent on DHHL purchasing the site.

The subdivision will use DHHL (State) funds. Therefore, the State requires an environmental assessment.

In this regard, you have asked us to estimate the economic and fiscal impacts of the proposed Wailuku Single-Family Residential Subdivision under the hypothetical condition that it is developed as proposed.

STUDY OBJECTIVES

The objectives of our assistance are to estimate the economic and fiscal impacts of the Wailuku Single-Family Residential Subdivision to the State of Hawaii and County of Maui in terms of:

- Projected direct, indirect, and induced expenditures from infrastructure and building construction
- Projected employment earnings
- Economic and fiscal impacts to the State of Hawaii and County of Maui.

INTENDED USE AND USER

The intended use of our assistance is to provide projections of economic and fiscal impacts that can be used in the Environmental Assessment being prepared by G70.

As a result, our report is intended for insertion in the Environmental Assessment. In accepting this report, DDC2 LLC (Client) specifically agrees that our assistance is not intended for any other purpose or users and is not to be relied upon by any third parties for any purpose, whatsoever.

EFFECTIVE DATE OF REPORT

The effective date of this report is December 8, 2023.

SCOPE OF WORK

The scope of work to complete this assignment is outlined as follows:

1. Obtained the Wailuku Single-Family Residential Subdivision plan, infrastructure and building construction and other costs, impact fees, and phasing.

2. Reviewed the "Hawaii State Input-Output Study: 2012 Benchmark Report" prepared by the State of Hawaii Department of Business, Economic Development & Tourism (DBEDT) and updates.

3. Projected the direct, indirect, and induced expenditures from infrastructure and building construction.

4. Projected jobs and employment earnings.

5. Estimated the economic and fiscal impacts of the Wailuku Single-Family Residential Subdivision to the State of Hawaii and the County of Maui.

WAILUKU SINGLE-FAMILY RESIDENTIAL SUBDIVISION

The Wailuku Subdivision is a 77.00-acre portion of tax map key 2-3-5-2-3 fronting Kuikahi Drive, Wailuku, Maui. The subdivision conceptual site plan is shown in Exhibit I-A.

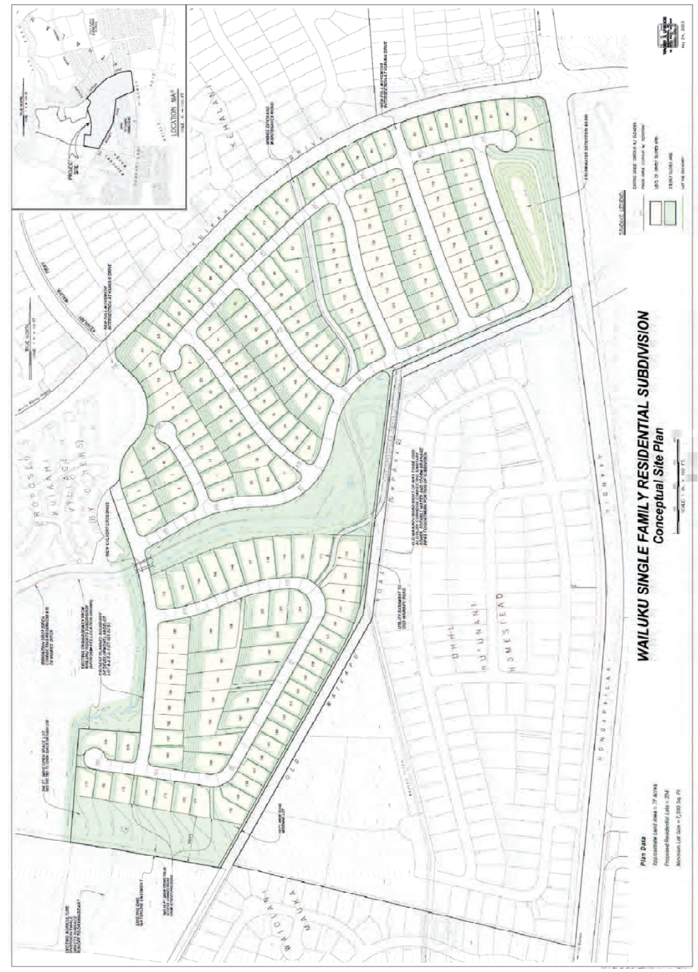
HOUSING UNITS

The 204-lot subdivision is proposed to be improved with 173 developer-built single family homes and 31 vacant lots. The minimum lot size is 7,500sf. The developer-built single-family homes range from 2 bedrooms/1 bath single-story with 752sf net livable area to 5 bedrooms/3 bath, two-story with 1,676sf net livable area. The majority are 4 and 5 bedroom homes with at least 1,604sf net livable area.

The vacant lots will be leased to beneficiaries who will construct their own homes by 1) being an owner-builder, 2) hiring their own contractor, or 3) partnering with Habitat for Humanity.

The proposed housing units are described by type, unit mix, and areas in Exhibit I-B.

CONCEPTUAL SITE PLAN



Source: DDC2 LLC.

HOUSING UNITS

Bedrooms, Baths, Stories, Mix, Proposed Price

Model	Bedrooms	Bathrooms	Stories	Units	Mix	Proposed price by model
Lililehua	2	1	1	12	6.9%	$4,642,800
Ilima	3	2	1	27	15.6%	13,797,000
Mokihana	4	3	2	35	20.2%	20,951,000
Lehua	4	3	2	40	23.1%	24,236,000
Lokelani	5	3	2	59	34.1%	36,523,360
Total housing sales				173	100.0%	$100,150,160
Average price						
Median price						

Bedrooms, Net Living, Garage/Carport, Patio/Lanai and Total Areas

		Area (square feet)			
Model	Bedrooms	Net living	Garage/ carport	Patio/lanai	Total
Lililehua	2	752	416	51	1,219
Ilima	3	1,211	494	79	1,784
Mokihana	4	1,604	459	55	2,118
Lehua	4	1,655	457	79	2,191
Lokelani	5	1,676	472	26	2,174

Source: John Child & Company based on Developer's Development Proposal (Option 2 only).

DEVELOPMENT SCHEDULE

The subdivision with 173 housing units and 31 vacant lots is being planned. The subdivision plans are to be completed and submitted to the State and County reviewing agencies by the end of 2024 or beginning of 2025. The homes are planned to be constructed and sold by 2029.

EXTRAORDINARTY ASSUMPTIONS AND STUDY CONDITIONS

The study conditions that are the basis of the analyses, opinions, and conclusions of this report are as follows:

Extraordinary Assumptions

An extraordinary assumption is "an assignment specific assumption as of the effective date regarding uncertain information used in an analysis which, if found to be false, could alter the appraiser's opinions or conclusions."

Because the project does not exist, this assignment is based on the cost assumptions, projections and timing provided by the Client. The assignment results could change if the assumptions or projections change.

Subdivision Description

The description of the subdivision is based on the Conceptual Plan shown in Exhibit I-A.

Housing Units

The housing unit descriptions were provided by the Client as described in Exhibit I-B.

Prior Assignment Disclosure

Within the past three years, we have provided real estate appraisal and/or appraisal review services relating to an ownership interest in the property that is the subject of this report and have informed the client prior to acceptance of this assignment.

Basis of Analyses, Opinions, and Conclusions

The analyses, opinions, and conclusions of this report rely on data and information provided by others. The information is believed to be reliable; however, no responsibility is assumed for the accuracy of information provided by others.

The analyses, opinions, and conclusions assume:

1. No hidden or unapparent surface or subsurface conditions of the property, structures, soils, subsoils, geological formations, ground water, or drainage conditions exist that would render the property more or less valuable.

2. Existing improvements comply with all applicable public and private zoning codes, regulations and covenants, unless stated otherwise.

3. The client has provided us with all significant, relevant information covering the property that is the subject of this report.

No responsibility is assumed for matters legal in nature affecting the property or its title, which is assumed to be good and merchantable.

Properties in Hawaii typically include a reservation in favor of the State of Hawaii of all mineral and metallic mines. Our analyses, opinions, and conclusions assume these reservations do not have an impact on the value or use of the property.

Any drawings, maps, photographs, and similar exhibits accompanying this report are included to assist the reader in visualizing the property. No responsibility is assumed for the accuracy of these exhibits.

Hazardous Substances

Unless otherwise stated, the existence of hazardous substances (actual, alleged or threatened discharge, disposal, seepage, migration, release, growth, infestation, spread or escape of molds, mildews, fungi and/or spores, or any materials, goods or products containing, harboring or nurturing these substances) that could be present on the property, or other environmental conditions that could impact the property, were not brought to the attention of the appraisers nor observed during the site visit.

The appraisers are not trained or qualified to detect hazardous substances or conditions even if these hazards, or evidence of potential presence of these hazards, are visible on the property.

Therefore, this report assumes no hazardous substance or condition exists that would impact the analyses, opinions or conclusions. If a hazardous substance or condition exists, it could have a negative effect on the value of the property.

Archaeological or Historically Significant Conditions

The appraisers are not trained or qualified to recognize archaeological or historically significant conditions, even if these conditions are visible on the property.

Unless otherwise stated, archaeological or historically significant conditions that could be present on the property were not identified nor observed during the site visit. The report assumes no archaeological or historically significant condition exists that would impact the analyses, opinions or conclusions of this report. If an archaeological or historically significant condition exists, it could impact the use or value of the property and affect the results of this assignment.

Endangered Species

The appraisers are not trained or qualified to recognize endangered flora or fauna qualified for protection under the Endangered Species Act of 1973, even if visible on the property.

Unless otherwise stated, the presence of endangered flora or fauna was not identified, and the report assumes no endangered species are present on the property. The presence of endangered species could impact the value of the property.

Americans With Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) became effective January 26, 1992. Unless otherwise stated, this report was not based on any specific compliance survey and analysis of this property to determine whether or not it is in conformity with the various detailed requirements of the ADA. A survey of the property together with a detailed analysis of the requirements of the ADA could reveal that the property is not in compliance with one or more of the requirements of the ADA. If so, it could have a negative effect on the value of the property.

Terms of Assignment

We have no obligation to update our report because of events and transactions occurring subsequent to the effective date of the report.

Neither our fees nor payment were contingent upon the results of the report.

Use of Report

This report is valid only if presented in whole, with the letter of transmittal and signed certification.

This report or any portion of this report may not be reproduced or published without the prior written consent of John Child & Company, and then only with proper qualification.

The contents of this report or portions of this report, the identity of the appraisers or any reference to John Child & Company, the Appraisal Institute, the Counselors of Real Estate, or the American Society of Appraisers, or to their respective designations may not be disseminated to the public through advertising media, public relations media, news media, sales media, or any other public means of communication.

Limitation on Liability

John Child & Company shall not be liable to Client or to any third party (including without limitation lenders and other persons to whom Client may show this report for the purposes of obtaining credit, insurance or any other benefit or promise) in the event that the use or value of the subject property is or becomes different from the use or value estimates, analyses, opinions or conclusions in this report unless it is established by clear and convincing evidence that John Child & Company acted in bad faith or willfully and recklessly failed to exercise an appropriate standard of care in the community while performing this assignment. In any event, John Child & Company's liability to Client or to any third party shall be limited to the amount of the fees to complete this assignment.

This report may not be shown to any third party without our consent and without receiving a written acknowledgement from any person to whom it is shown that such person has read, understands and agrees to be bound.

II – ECONOMIC AND FISCAL IMPACTS

This section summarizes the economic and fiscal impacts of the Wailuku Single-Family Residential Subdivision in terms of the projected direct, indirect, and induced expenditures from infrastructure and building construction, projected employment earnings, and economic and fiscal impacts to the State of Hawaii and the County of Maui.

PROJECTED DIRECT, INDIRECT, AND INDUCED EXPENDITURES FROM INFRASTRUCTURE AND BUILDING CONSTRUCTION

Infrastructure and building construction result in direct, indirect, and induced expenditures to the State of Hawaii and County of Maui. Type I output measures the direct and indirect expenditures. The direct expenditure is the cost. The indirect expenditure is a percentage of the cost. A type I output of 1.45 means the direct output is 100% of the cost, and the indirect output is 45% of the cost. Type II output also measures induced expenditures. By comparison, a type II output of 2.07 means 100% of the direct expenditure, 45% is indirect expenditure and 62% is induced expenditure.

The analysis is in 2023 dollars using 2017 multipliers. Direct construction costs of the proposed infrastructure and homes totaling $132,863,000 (in 2023 dollars) are projected to have an impact of indirect expenditures of $59,788,219 and induced expenditures of $82,374,879 that total about $275,026,000 over the life of the development, shown as follows:

Direct construction costs	$132,863,000
Indirect expenditures	59,788,219
Induced expenditures	82,374,879
Total, rounded	$275,026,000

PROJECTED EMPLOYMENT EARNINGS

The level of direct construction cost will generate 0.367 construction jobs for each direct construction dollar. The construction costs total $132,863,000 in 2023 dollars would generate about 0.367 direct earnings from jobs, about $47,032,000. About 0.44 in indirect earnings or about $62,795,000, and 0.66 in induced income, or about $84,581,000, totaling about $194,400,000, shown as follows:

Direct construction earnings	$47,032,000
Indirect earnings	62,795,000
Induced earnings	84,581,000
Total, rounded	$194,400,000

ECONOMIC AND FISCAL IMPACTS TO THE STATE OF HAWAII AND THE COUNTY OF MAUI

The proposed Wailuku Subdivision will have positive economic and fiscal impacts to the State of Hawaii and County of Maui during and after construction. The client and DHHL will be responsible for the construction costs.

The residents are expected to be existing residents of Maui. Incremental expenditures associated with use of roads, schools, parks and State and County services are projected to be negligible.

The client and DHHL intend to request exemptions of fees that have historically been granted for DHHL properties. However, the project budget anticipates a DOE assessment of $1,096,092 to be paid to the State.

Fees and assessments for site development during construction are budgeted as follows:

State of Hawaii:	
DOE assessment	$1,096,092
County of Maui	
CoM permit fees	$95,248
Water meter & installation fees	2,571,223
Maui Electric fees	1,283,052
Subtotal	3,949,523
Total	$5,045,615

The County of Maui will charge the CoM permit fees and water development fee. However, it will exempt the park assessment in-lieu fee.

It is also expected to exempt real property taxes for the first eight years. Because the sales occur in 2028-2029, real property taxes will not be assessed until 2036-2037. The projected sales price ranges from $387,000 to $619,000, and the median home price is $578,903 in 2023 dollars. Assuming that each property is subject to real property taxes based on the median sales price of $578,903 and homeowner's exemption of $300,000, the median taxable assessment is $278,903. At $1.90 per thousand, the annual real property tax averages $530 per housing unit. The annual real property tax for the 204-lot subdivision will be about $108,000.

The Wailuku Subdivision will be served by existing infrastructure and will not require expansion of any public services or facilities. Students in the Wailuku Subdivision will be attending nearby existing public schools: Puu Kukui Elementary, Maui Waena Intermediate, and Maui High School. Residents will be serviced by nearby police and fire stations and existing parks and recreation facilities. No additional expenditures are required by the State of Hawaii or County of Maui.

CERTIFICATION

We certify, to the best of our knowledge and belief:

- Reported statements of fact are true and correct.
- Reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions and are our unbiased professional analyses, opinions, and conclusions.
- We have no present or prospective interest in the property that is the subject of this report, and we have no personal interest or bias with respect to the parties involved.
- Within the past three years, we have provided real estate appraisal and/or appraisal review services relating to an ownership interest in the property that is the subject of this report and have informed the client prior to acceptance of this assignment.
- Our engagement was not contingent upon developing or reporting predetermined results.
- Our compensation is not contingent on the reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value estimate, the attainment of a stipulated result, or the occurrence of a subsequent event and is not contingent on an action or event resulting from the analyses, opinions or conclusions in, or use of, this report.
- The reported analysis, opinions, and conclusions were developed, and the report has been prepared, in conformity with the requirements of the Code of Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute, and the Appraisal Foundation's Uniform Standards of Professional Appraisal Practice (USPAP).
- The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives, and to the requirements relating to review by duly authorized representatives of the State of Hawaii, Counselors of Real Estate, and the American Society of Appraisers.
- As of the date of this report, Karen Char, MAI, has completed the continuing education program for Designated Members of the Appraisal Institute.
- ASA has a mandatory recertification program. Karen Char, ASA is currently certified under this program.
- The undersigned personally visited the real estate that is the subject of this report.
- No one other than the undersigned prepared the analysis, opinions, and conclusions in this report.

JOHN CHILD & COMPANY, INC.

Karen Char, MAI, CRE, ASA
President
Certified General Appraiser License No. 184
State of Hawaii
Expires December 31, 2025

SCOPE OF PROFESSIONAL SERVICES

Background

John Child & Company is a professional corporation that specializes in real estate appraisal and consulting and business valuation. It is the only company in Hawaii with expertise and professional designations in both real estate appraisals and business valuations.

John Child & Company was established by John F. Child, Jr. in 1937. The Company was the first firm to specialize in market research in Hawaii. Since 1937, the Company has provided critical knowledge of real estate market conditions and trends gained from the strength of its market research. As a result, its clients have confidence that John Child & Company real estate appraisal and business valuation assignments are based on competent analysis and careful documentation, and its consulting assignments focus on the key issues and provide sound alternatives.

The Company's professional team members' past and current local, regional, and national leadership positions in their professional organizations help to establish and promote the highest standards of professional practice and ethics for the industry.

Real Estate Appraisal and Consulting

The Company's real estate consulting and appraisal practice includes a range of specialized services covering real estate in Hawaii and the Pacific area. Professional services include:

- Valuation of real estate
- Litigation support
- Arbitration
- Market rent analysis
- Highest and best use studies
- Market and financial feasibility analyses
- Economic and fiscal impact assessments
- Purchase price allocation.

Its assignments include all types of real estate interests such as fee simple, leasehold, leased fee, and other partial rights and fractional interests. Its assignments cover a variety of land uses and property types such as:

- Office buildings and commercial property
- Industrial property
- Telecommunications facilities
- Hotels and resort properties
- Agricultural, conservation, and vacant land
- Conservation easements
- Shopping centers and retail facilities
- Residential developments (single family, multifamily, and condominium)

- Master-planned and mixed-use projects
- Golf courses
- Healthcare facilities
- Redevelopment projects
- Special-purpose property
- Timeshare properties.

Business Valuation

The Company's business valuation practice focuses on the valuation of closely-held businesses, including controlling and minority interests in corporations, partnerships, limited liability companies, and family limited partnerships. Its business valuation practice provides assistance in:

- Estate planning
- Tax reporting
- Mergers, acquisitions, and sales
- Stock transfers and redemptions
- Financial reporting
- Internal accounting
- Litigation support.

REPRESENTATIVE ASSIGNMENTS

The Company has provided real estate appraisal and consulting and business valuations for more than 80 years.

Real Estate Appraisal and Consulting

The Company's real estate appraisal and consulting practice covers a variety of properties and property interests. Real estate interests include fee simple, leasehold, leased fee, and other partial rights and fractional interests. Representative projects are listed as follows:

Redevelopment

Aloha Tower	Kakaako Redevelopment Plan	Pawaa Redevelopment Masterplan
Honolulu Waterfront Master Development Plan	Kakaako Waterfront Park	Puck's Alley/Moiliili Gateway
	Kapalama Development Complex	

Resorts

Hualalai	Kiahuna Plantation	Princeville
Ka'anapali North Beach	Ko Olina	Turtle Bay
Kapalua	Makena	Waikoloa Beach Resort
Kauai Lagoons	Manini'owali	Wailea Resort
Ka'upulehu	Mauna Kea	

Hotels

Embassy Suites Ka'anapali
Four Seasons Resort Hualalai
Halekulani Hotel
Hilton Hawaiian Village
Hotel Hana Maui
Hyatt Regency Maui
Hyatt Regency Waikiki
Kahala Hilton
Kea Lani Hotel
Koa Kea Hotel
King Kamehameha Kona Beach Hotel
Kona Village
Maui Marriott
Maui Prince
Princeville Hotel
Sheraton Kauai Resort
Sheraton Waikiki
W Hotel
Wailea Beach Resort
Waikiki Resort Hotel

Shopping Centers

Ala Moana
Aloha Tower Marketplace
Coconut Grove
Downtown Kihei (proposed)
Ewa Pointe Marketplace
Hawaii Kai Shopping Center
Hawaii Kai Towne Center
Kahala Mall Center
Kamehameha Shopping Center
Keauhou Shopping Center
Keeaumoku Shopping Center
King's Village
Koko Marina
Kukui Mall
Lanihau Center
Mililani
Nimitz Business Center
Pearl City
Pearl City Shops
Pearl Kai Center
Piilani Shopping Center
Princeville
Royal Hawaiian
Wailea Shopping Village
Windward City
Windward Mall

Golf Courses

Asahi Kanko Olomana Course
Dunes at Maui Lani
Hawaii Country Club
Hawaii Kai Golf Course
Ka'anapali
Kauai Lagoons (Kiele and Lagoons)
Ko Olina
Mid-Pac Country Club
Pearl Country Club
Princeville (Makai and Prince)
Sandalwood Golf Course
Silversword Golf Course
Waikapu Country Club
Waikele Golf Course
Waikoloa (Kings)
Waikoloa Village (two proposed)
Wailea (Blue, Emerald, and Gold)

Office Buildings

1164 Bishop
Aina Haina Professional Building
Ala Moana Building
Ala Moana Pacific Center
Amfac Towers
ANA Kalakaua Center
Arcade Building
C. Brewer Building
Castle Professional Center
Commerce Tower
Davies Pacific Center
Financial Plaza of the Pacific
Grosvenor Center
Harbor Court
Hawaii National Bank
Hawaiian Life Building
HMSA Building
James Campbell Building
Kailua Professional Center I and II
Leilehua Building
Pan Am Building
Waialae Building
Waikiki Bank of Hawaii Building
Waikiki Trade Center

Industrial Properties

Airport Industrial Subdivision
Airport Trade Center
Barbers Point
Bougainville
Bougainville Commercial Center
Campbell Industrial Park
Ewa Drum & Varona Village
Halawa Center
Halawa Industrial Subdivision
Hawaii Business Center
Honokohau Harbor
Iwilei & Iwilei Business Center
Kalaeloa
Kapolei Business Park
Kona Industrial Subdivision
La Tour Plaza
Lihue Industrial Park
Makalapua Business Center
Manana
Mapunapuna
Mill Town
Panasonic/Technics Center
Pier 38 Domestic Commercial Fishing Village
Sand Island Business Park
Waiau
Waikele Storage Park
Waipahu
Waipio Business Center

Residential

Discovery Bay
Ewa by Gentry
Harbor Court
Honolulu Park Place
Imperial Plaza
Kalele Kai
Kamaole Heights
Kamehame Ridge
Ko Olina Fairways
Lahaina Residential
Makakilo
Maui Eldorado
Mawaena Kai
Mililani
Napili Kai
Nauru Tower
One Archer Lane
Royal Capitol Plaza
Royal Kuhio
The Kahala Beach
The Kalia, Inc.
Uplands at Mauna Kea
Victoria Tower
Village Park
Vineyard Court
Wailea Golf Vistas
Wailea Pualani Estate
Yacht Harbor Tower

Healthcare

Adventist Health
Arcadia Retirement Residence
Castle Medical Center
Clinical Laboratories of Hawaii
Diagnostic Laboratories Services
Hale Mahaolu
Hawaii Health Care Systems Corporation
Kahuku Medical Center
Kapiolani Medical Center for Women and Children
Kauai Care Center
Pali Momi Medical Center
Palolo Chinese Home
Ponds at Punalu'u
Queen's Health Systems
Regency at Hualalai
Roselani Place
St. Francis Healthcare Systems
Straub Hospital & Clinic
Waianae Coast Comprehensive Health Care Center
Wilcox

Agricultural, Conservation, and Conservation Easements

Campbell Palehua and Kahe Ranch
Dunbar Ranch
Galbraith Trust Lands
Hana Ranch
Honouliuli Forest Reserve
Kainalu Ranch
Kalauao Valley
Kanepuu Conservation Easement
Kaupo Ranch Wai'u and Nu'u Lands
Kealia Pond
Kona Forest Unit Access
Kuamo'o Point
Kukaiau Ranch Conservation Easement
Lipoa Point
Maka'alae Conservation Easement
May's Landing
McCandless Ranch Conservation Easement
Moanalua Valley
Palmyra Atoll
Paradise Park
Ponoholo Ranch
Pupukea Property Conservation Easement
Pu'u O Hoku Ranch
Turtle Bay
Ulupalakua Ranch Conservation Easements
Waikapuna
Waimea Valley
Wao Kele O Puna

Special Purpose

Cemeteries/Memorial Parks
Chinese Cultural Plaza
Churches
Convents
Condominium and Residential
Lease-to-Fee Conversions
Hawaii Newspaper Agency Building
Hawaiian Home Land Claims
Kapaa Land Fill
Kaumalapau Harbor
NAS Barbers Point Electrical Distribution System
Oahu Club
Outrigger Canoe Club
Quarries
Schools
State of Hawaii Airports
Telecommunications sites
Tokai University
Visitor attractions
Wedding chapels

Business Valuation

The Company's business valuation practice focuses on closely-held businesses in Hawaii. Business valuation assignments typically estimate the market value of controlling and minority interests in closely-held corporations, limited liability companies, and partnerships.

These assignments are prepared to assist in estate planning and estate and gift tax reporting to the Internal Revenue Service, litigation, mergers, stock repurchase/redemptions, and acquisitions.

Valuations of closely-held businesses include:

Corporations

Aala Produce, Inc.
Advanced Fresh Concepts Food Service
Dowling Company, Inc.
Finance Investment, Ltd.
Gay & Robinson, Inc.
Industrial Investors, Inc.
Jas W. Glover Holding Company, Ltd.
K. Inouye Properties, Inc.
Loyalty Development Company, Inc.
Loyalty Enterprises, Ltd.
Palani Ranch Company, Inc.
Ponoholo Ranch Limited
Royal Phoenix Corporation
Sen Plex Corporation
SSFM Engineers

Limited Partnerships and Limited Liability Companies

Aaron Properties Partners of Hilo
Baruch Bakar and Beth-El
BFFP Incorporated
Caroline J. Robinson LLC
CGB Partners
Fernandez Properties
Hawaii Aina Management
Honolulu Open Medical Imaging, LLC
J.L.P. Robinson LLC
K.J.L. Associates
KSM Associates LLC
KVH Partners
Kaha Kai LLC
Kamali'i Family Limited Partnership
Lanihau Properties LLC
Leong Brothers
Livingston Family Limited Partnership
Loyalty Associates
Loyalty Investments
Maui Quest, LLC
MLB Inc.
Pawaa Court LLC
Pohaku Koloa
Robinson Kunia Land LLC
Royal Phoenix
SCF Limited Partnership
Second City
Taihook Associates
Taira Family Limited Partnership
The Mark A. Robinson Trusts

CLIENTS

The Company provides professional services to a range of clients representing private, non-profit, and public interests. Selected clients in private industry, non-profit organizations, and public agencies are listed.

PRIVATE INDUSTRY

Attorneys

Ashford & Wriston
Bendet Fidell
Cades Schutte
Carsmith Ball
Case & Lynch
Case Lombardi & Pettit
Chun Kerr
Cox Wooten Lerner Griffin & Hansen
Crockett & Nakamura
Damon Key Leong Kupchack Hastert
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Tom Petrus & Miller
Torkildson Katz Moore Hetherington & Harris
Tsugawa Biehl Lau & Muzzi
Van Buren & Shimizu
Wagner Choi Verbrugge
Watanabe Ing

Banks/Lenders

American Savings Bank
Bank of Hawaii
Central Pacific Bank
Citibank, N.A.
First Hawaiian Bank
Hawaii National Bank
The Chuo Mitsui Trust & Banking Co., Ltd.
The Industrial Bank of Japan, Ltd.
The Long-Term Credit Bank of Japan, Ltd.
Wells Fargo Bank

Closely Held Corporations/Limited Partnerships/Family Trusts

Baruch Bakar and Beth-el Associate
BFFP Incorporated
Caroline J. Robinson LLC
Gay & Robinson
Hawaii Aina Management Co. LL
Jas. W. Glover Holding Company, Ltd.
J.L.P. Robinson LLC
Kaha Kai LLC
Kamalii Family Limited Partnership
K.J.L. Associates
KVH Partners and CGB Partners
Knudsen Trusts
Lanihau Properties, LLC
Leong Brothers
Livingston Family Limited Partnership
Loyalty Development
Loyalty Investments
Maui Quest LLC
MLB, Inc.
Norman & Amy Hirohata-Goto LLC
Nua Family Limited Partnership
Palani Ranch
Pawaa Court LLC
Pohaku Koloa LLC

Closely Held Corporations/Limited Partnerships/Family Trusts, Continued

- Ponoholo Ranch, Limited
- Royal Phoenix Corporation
- SCF Limited Partnership
- Second City Property Management Inc.
- Sen Plex Corp.
- Sheridan Ing Marital Trust
- Taira Family Limited Partnership
- The Mark A. Robinson Trusts
- WBL, Inc.

Developers/Landowners

- A&B Properties, Inc.
- Aloha Tower Associates
- Bedford Properties, Inc. (fka Kaiser National Housing Corporation Development Company)
- Cuzco Development U.S.A. LLC
- Dowling Company, Inc.
- Elleair Hawaii, Inc.
- Finance Realty
- Gentry Companies
- Hana Ranch Partners
- Hanalei Land Company
- Haseko (Hawaii), Inc.
- Hemmeter/Tokyu Waterfront Joint Venture
- James Campbell Company
- Kaneohe Ranch
- Kapolei Property Development, LLC
- Krausz Properties
- McCandless Land & Cattle Company
- MW Group, Ltd.
- Niu Pia Farms
- Pauahi Management Corp.
- Queen Emma Land Company
- Sam Koo Pacific, LLC
- Tesoro Hawaii Corporation
- Ulupalakua Ranch Inc.

Resort Operators/Owners

- Alpha U.S.A., Inc.
- Kapalua Land Company, Ltd.
- Kaupulehu Makai Venture (Hualalai Resort)
- Namalu LLC (Makena Resort)
- Princeville Development Company
- Shinwa International
- Turtle Bay Resort
- Wailea Resort Company, Inc.

Retailers

- 7-Eleven (Hawaii), Inc.
- Kyotaru International
- McDonald's Restaurants of Hawaii
- Safeway, Inc.
- Sears Holding Corporation

Trust Companies and Trusts

- Bank of Hawaii Trust Department
- First Hawaiian Trust
- Hawaiian Trust Co., Ltd.
- Knudsen Trusts
- Lili'uokalani Trust
- Mark A. Robinson Trusts

NON-PROFIT ORGANIZATIONS

- Adventist Health
- Bobby Benson Center
- Castle Medical Center
- Chaminade College
- Hawaii Health Systems Corporation
- Hawaii Opera Theatre
- Hawaii Pacific Health
- Hawaii Pacific University
- Honolulu Community Action Program, Inc. (HCAP)
- Iolani School
- Japan Association of Real Estate Appraisers

NON-PROFIT ORGANIZATIONS, Continued

- Kahuku Medical Center
- Kamehameha Schools
- KCAA Pre-Schools of Hawaii
- Manoa Valley Theatre
- Maui Coastal Land Trust
- National Tropical Botanical Garden
- Pacific Buddhist Academy
- Punahou School
- Queen's Health Systems
- Segull Schools, Inc.
- The Fathers of the Sacred Hearts
- The Sisters of the Sacred Hearts
- St. Francis Healthcare Systems of Hawaii
- The Nature Conservancy
- The Trust for Public Land
- Young Women's Christian Association (YWCA)

PUBLIC AGENCIES

Bank Regulatory Agencies

- Federal Depository Insurance Corporation (FDIC)
- Federal Home Loan Bank Board (FHLBB)

City & County of Honolulu

- Honolulu Authority for Rapid Transportation
- Honolulu Public Transit Authority
- Department of Housing and Community Development
- Department of Design and Construction
- Department of the Corporation Counsel

County of Hawaii

- Department of Finance
- Department of Public Works

County of Kauai

- Department of Water

Federal Agencies

- Internal Revenue Service
- National Business Center, Appraisal Services Directorate
- U.S. Attorney General
- U.S. Department of Agriculture, Forest Service
- U.S. Department of Agriculture, Natural Resource Conservation Service
- U.S. Department of the Army
- U.S. Department of the Navy
- U.S. Department of Interior, Fish & Wildlife Service

Utilities

- Aloha Solar Energy Fund
- Citizens Utilities Company - Kauai Electric
- D.R. Fortress
- Eurus Energy America Corporation
- Hawaiian Electric Industries (HEI, Inc.)
- Pacific Resources, Inc.

State of Hawaii

Attorney General	Hawaii Community Development Authority
Department of Hawaiian Home Lands	Hawaii Housing Finance and Development Corporation
Department of Land & Natural Resources	Office of Hawaiian Affairs
Department of Transportation	

PROFESSIONAL TEAM QUALIFICATIONS

The professional team has a wide range of real estate experience gained through a variety of field experience, professional accomplishments, training, and education. Team members have earned their reputation for quality work and professional service.

Professional Designations

Team members hold designations earned from the major professional organizations. Team members have earned the MAI designation from the Appraisal Institute, the CRE (Counselor of Real Estate) from The Counselors of Real Estate, and ASA (Accredited Senior Appraiser) from the American Society of Appraisers.

State Certification

Members of the professional team are Certified General Appraisers under the State of Hawaii license and certification program.

Other Qualifications and Training

Professional team members are qualified as expert witnesses in the courts of Hawaii; actively participate in and serve as arbitrators and review appraisers; and continue to attend courses, seminars and workshops to strengthen their own specialized appraisal skills and education.

Professional Team Members

Professional team members include:

- Karen Char, MAI, CRE, ASA, President
- Paul D. Cool, MAI, CRE, Vice President
- Shelly H. Tanaka, MAI, AI-GRS, Vice President
- Cooper Borge, Real Estate Analyst.

The education and professional experiences of team members are outlined in their accompanying resumes.

KAREN CHAR, MAI, CRE, ASA
President

As President of John Child & Company, Karen is responsible for developing and managing the Company's professional practice that includes real estate appraisal and consulting and business valuation. She specializes in complex real estate and business valuation assignments.

Karen originally joined the Company in 1973 and has 50 years of professional experience. She has served in elected and appointed national and international leadership positions in the Counselors of Real Estate and the Appraisal Institute. In 2010 she received the prestigious "James Felt Creative Counseling Award" from The Counselors of Real Estate. In 2022 she had the honor of receiving the "Greeley Key Award for Innovation" from the Hawaii State Bar Association.

Education

- Master of Business Administration, University of Hawaii, 1972
- Bachelor of Business Administration, University of Hawaii, 1970
- Punahou School, 1967
- Successfully completed various courses, workshops, and seminars sponsored by the Appraisal Institute and The Counselors of Real Estate

Professional Associations

- Member, The Counselors of Real Estate (CRE designation)
  - Recipient, 2010 James Felt Creative Counseling Award
  - Chief Delegate to the Pan Pacific Congress of Real Estate Appraisers, Valuers, and Counselors: New Zealand, 2000; Singapore, 1998; Sydney, 1996; Yokohama, 1994; Speaker: New Zealand, 1988 and Korea, 1990
  - Member, National Board of Governors, 1995 - 2000
  - National Vice President, 1997
  - Vice Chair, National Ethics & Professional Practice Committee, 1995; Member, 1993 - 1998 and 2000 - 2002
  - Member, National Finance Committee, 1995 - 1997
  - Member, International Task Force (fka International Activities Committee), 1992 - 1999
  - Member, National Communications Committee, 1993 - 1995, 2001; National Public Relations, 1998 - 2001, Technology Committee, 2001
  - Chair, Honolulu Convention Committee, 1992

- Member, Appraisal Institute (MAI designation)
  - Member (representing Region VII, Arizona, Hawaii, Southern California, and Southern Nevada), National Appellate Division (serves as National Ethics Appeal Board), 1997 - 1999
  - Vice Chair, National Admissions Committee of the General Appraisal Board, 1991
  - Governing Councilor, 1986 - 1988
  - Vice Chair, National Bylaws Committee, 1986 - 1989
  - Vice Chair, Organizing Committee, Pan Pacific Congress of Real Estate Appraisers, Valuers and Counselors, Honolulu, 1986
  - Member, National Bylaws Committee, 1985
  - Member, National Admissions Committee, 1982 – 1990
  - Chairman, National Evaluation Report Subcommittee, 1982

- Member, Appraisal Institute, (continued)
  - President, 1986; Vice President, 1985; Secretary, 1984; Honolulu Chapter No. 15
  - Grader, National Board of Examiners, 1982 - 1983
  - Admissions Chairman, Southwest Region, 1983

- Accredited Senior Appraiser, American Society of Appraisers, (ASA designation, specializing in business valuation)

Other Real Estate and Charitable Associations and Community Activities

- Recipient, "Greeley Key Award for Innovation" from the Hawaii State Bar Association, 2022
- Nonlawyer Member, Magistrate Judge Merit Selection Panel, District of Hawaii, 2018
- Director, Board of Directors, Hawaii Women's Legal Foundation, 2002 to present
- Vice President and Director, Board of Directors, Hawaii Opera Theatre, 2004 to 2020
- Author, "Creative Counseling: Preserving the Hawaii Opera Theatre" *Real Estate Issues*, Volume 36, November 1, 2011; 41-45
- President, Hawaii Chapter of the National Association of Office and Industrial Properties (NAIOP Hawaii), 1998
  - Member, Board of Directors, 1996 - 1998
  - Chair, Leasehold Issues Committee, 1996 - 1997
  - Responsible for writing NAIOP's reports as follows:
    - *Ground Lease Renegotiation Issues and Practical Alternatives*, September, 1996
    - *Lease Rent Arbitration and USPAP*, January, 1997

Professional Experience

- President, John Child & Company, Inc., 1984 to present
- Senior Manager, Peat, Marwick, Mitchell & Co. (now known as KPMG), 1979 - 1984
- Appraiser, John Child & Company, Inc., 1973 - 1978

Professional Designations

- The Appraisal Institute conducts a voluntary program of continuing education for its designated members. Members who meet the standards of this program are awarded periodic educational certification. Karen Char, MAI is certified under this program.

- The American Society of Appraisers conducts a mandatory program of recertification through continuing education and/or participation in professional activities every five years. Karen Char, ASA, is certified under this program.

State Certification

- Certified General Appraiser, State of Hawaii, License Number CGA-184, expiring December 31, 2025.

Court Testimony

- Qualified as an expert witness in the valuation of real property and closely-held businesses in the Courts of the State of Hawaii.

Appendix K

Hawai‘i Wildlife Management Organization Memo for the Wailuku SFR Subdivision Project

HAWAI'I WILDFIRE MANAGEMENT ORGANIZATION
65-1279 Kawaihae Rd. Ste 211 Kamuela, HI 96743 hawaiiwildfire.org 808.885.0900

To: DDC2 LLC
2005 Main Street
Wailuku, Maui, Hawaii 96793
Attn: **Everett Dowling**

Please accept this as Hawaii Wildfire Management Organization's DEA Peer Review on Wildfire Risk and Prevention for the Wailuku SFR Subdivision Project and recommended risk reduction/mitigation measures.

Thank you for prioritizing wildfire risk reduction and safety.

Please let us know if you have any questions.

Aloha,

Elizabeth Pickett
Co-Executive Director
Hawaii Wildfire Management Organization

Project Name: Wailuku SFR Subdivision Project
Site Location: TMK: (2) 3-5-002:003 (por.) at 101 Kuikahi Drive in Wailuku
Size: Approximately 77 acres
Review Date: April 20, 2024

1. Wildfire Risk Assessment of Site Location

The key factors to consider for wildfire risk include environmental conditions, such as typical weather patterns and vegetation, as well as wildfire ignition history.

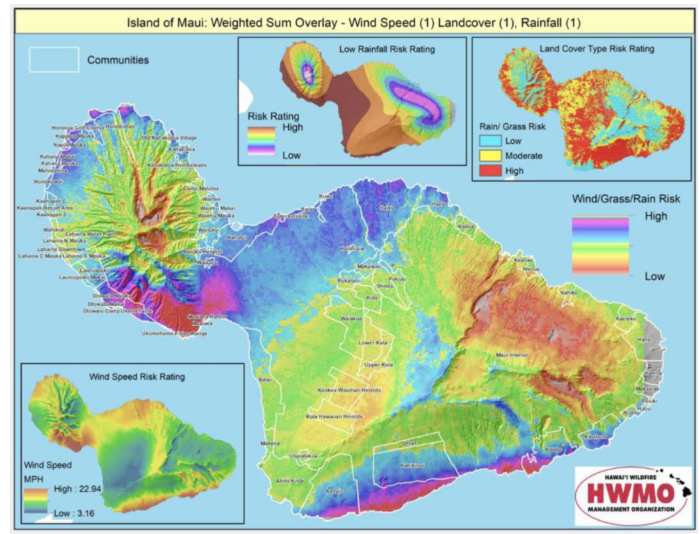

Figure 1. Wildfire risk assessment for Maui County based on a equal weighting analysis of low precipitation, vegetative fuels/ landcover, and high winds.

Environmental Conditions

The typical weather patterns in the area include seasonal fluctuations in wind and precipitation. Periods of low precipitation, maximum wind speeds, and the density and types of vegetation contribute to a GIS analysis yielding a moderate to high wildfire threat. This threat fluctuates throughout the year, so this rating represents the portions of the year with highest risk conditions. Vegetation in the area is diverse, with undeveloped wildland areas containing several vegetative fuel types. Extreme weather events and hazardous conditions are always possible and not unheard of across all areas of Hawaii, however historical events that have led to extreme fire behavior and rapid spread have not, to date, impacted the area in question.

Wildfire History:
There have been documented wildfires in the vicinity of the proposed development. Across Hawaii as a whole, places with highest levels of population and human use experience the most fire incidents due to human activities. While numerous in the area, the firefighting response has been adequate to keep these fires small and quickly contained. Figures 2 and 3 below demonstrate the wildfire history across Maui County. Note the high number of incidents and ignitions in the Wailuku area. High numbers of ignitions are a strong predictor of future ignition events.

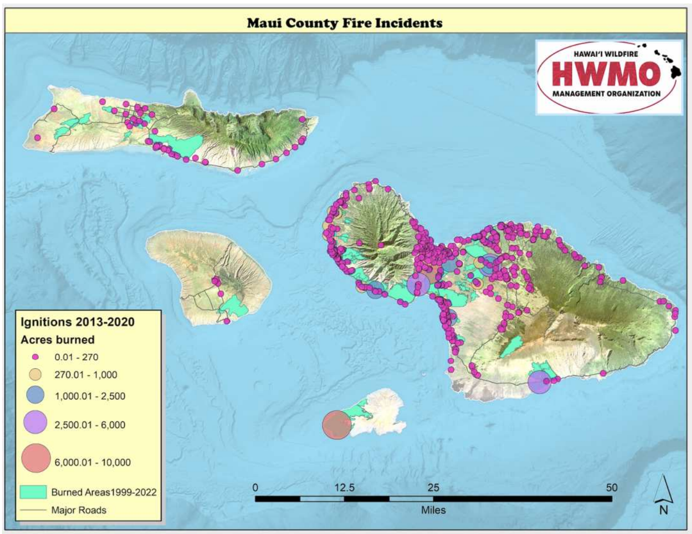

Figure 2. Maui County Wildfire Incidents 2013-2020.

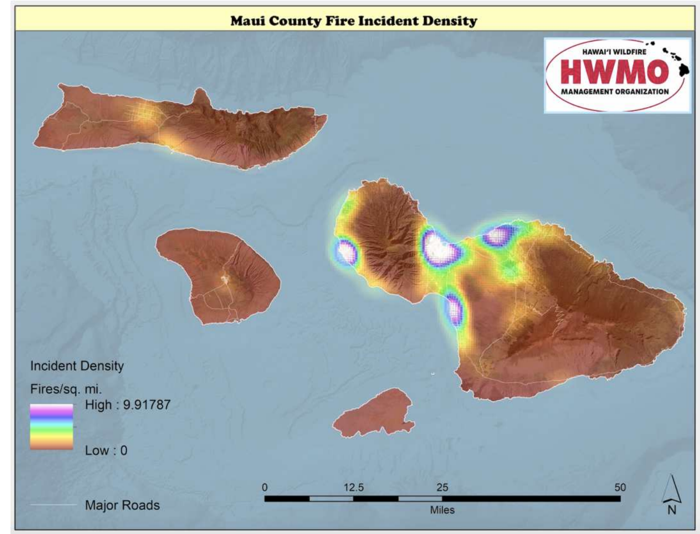

Figure 3. Maui County Wildfire Ignition Density map.

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2. Design and Planning Considerations

Embers represent the largest ignition threat to structures. However, once a structure ignites, direct flame contact and superheated air pose additional sources of spread that can lead to urban conflagration.

The overall design strategy should limit the potential for embers to drift onto, settle, and ignite structures, and should provide adequate protection against structure to structure ignition through adequate setbacks, spacing, and defensible space.

A. Building Design and Materials:

Recommendation A1. Ensure building materials resist ignition, to include the following:

- ***Ignition-Resistant Materials:*** Use ignition-resistant materials for roofs, walls, windows, and other critical building components.

- ***Debris Accumulation-Avoidant Design:*** Minimize features where embers can accumulate, such as overhanging eaves and open soffits.

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B. Site Layout and Infrastructure:

Recommendation B1. Ensure secondary ingress/egress.
There are two permanent ingress/egress options for the Project, and a secondary emergency-only access road location identified on a portion of Old Waikapu Road. HWMO recommends that future ROW must include a provision for emergency evacuation use to the width and condition of road necessary and recommended.

This additional permanent ingress/egress is an important measure to ensure residents in the community are not left vulnerable to evacuation traffic, or worse, blockage of the one egress with no alternative. Please note that ingress/egress options serve emergency responders' ability to access needs for suppressing fires and responding to emergencies, as well as resident evacuation.

All ingress/egress must be two lanes wide to allow for bidirectional flow (community egress/ emergency response ingress, and to allow continued flow in the event of a stalled vehicle), and be graded or maintained in adequate condition for 2wd vehicles to pass without issue.

Recommendation B2. Mitigate potential risk of conflagration by ensuring adequate spacing between buildings, and between buildings and vegetation to prevent fire spread:

- ***Building Separation and Setbacks:*** The best practice layout is to have a setback distance of 30 feet (approximately 9 meters) from surrounding vegetation and structures.
- ***Defensible Space:*** Create accessible, noncombustible areas between buildings and between the subdivision and adjacent large tracts of unmanaged vegetation by removing flammable vegetation, converting vegetated areas to a use than ensures it stays consistently maintained, and/or by hardening with pavement, gravel, or other non-combustible material.

Recommendation B3. Conduct baseline emergency evacuation route planning.
Developing a baseline evacuation route plan for the subdivision will aid safety of residents and emergency response planning for responders.

C. Vegetation Management

The project site is located in an area that was prioritized for vegetative fuels management by diverse participants in a multi-partner collaborative vegetative fuels prioritization mapping and planning project that took place in 2019[1]. See figure 4 below.

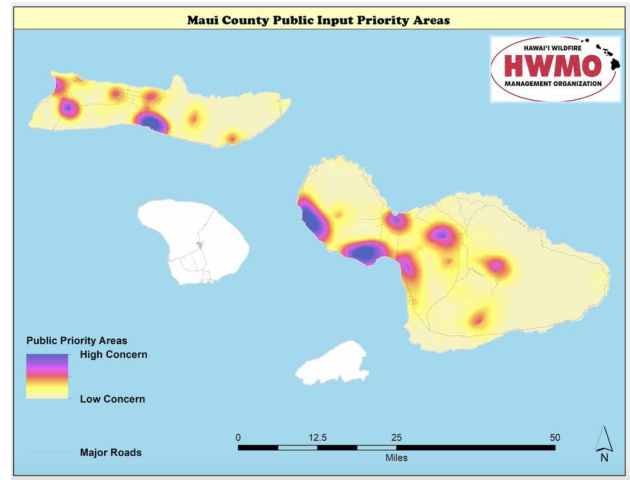

Figure 4. Vegetation management priorities determined by a multi-partner collaborative process held in 2018, published in 2019 by HWMO, highlights Wailuku and north-central Maui as an area for prioritized risk reduction.

Most of the vegetation management concerns are addressed through the development of adequate defensible space- in undeveloped vegetated areas, under powerlines, and around residential lots. The highest hazard posed by vegetation risk is the area that abuts undeveloped land. For this reason, it will be very important to ensure an adequate buffer (30'-100', is recommended, minimum) as defensible space.

However, some additional guidance is provided for vegetation management within the developed area:

[1]https://static1.squarespace.com/static/5254fbe2e4b04bbc53b57821/t/5dc678007cdf127e9982c0ef/1573287946858/Maui_compressed.pdf

Recommendation C1. The proposed park and other open space areas must have vegetative fuels maintenance plans for interim and long-term sustained fuels management and risk reduction.

Recommendation C2. Ensure vegetation management under any above-ground power lines is planned with accountability measures in place.

Recommendation C3. All subdivision, residential, and open space plantings should be low-flammability, drought tolerant plants that can maintain their leaves and hydration during dry periods.

Recommendation C4. Minimize the use of trees or shrubs within 30' of structures.

Recommendation C5. Keep the area from 0' to 5' around all structures clear of vegetation and all combustible materials.

Recommendation C6. Implement a maintenance plan for removing dead plants, leaves, and debris around and in between buildings.

D. Wildfire/Emergency Preparedness and Community Engagement

A comprehensive community wildfire emergency plan fosters community involvement and engagement, promotes a sense of unity and collective responsibility for wildfire safety. A best practice measure is to ensure that residents are provided information on evacuation routes, as well as resources available to them to maintain wildfire risk reduction measures and best practices to reduce structural ignitability, manage vegetation, and be prepared in case of emergency.

Recommendation D1. Provide residents with the pre-developed evacuation routes and information pertaining to wildfire risk reduction, including wildfire evacuation readiness, the management of homes and yards for wildfire ignition resistance, and encouragement to participate in Hawaii's Firewise Communities Program.

3. Conclusion

The Wailuku SFR Project is in the centralized portion of Maui, which regionally has undergone significant transformation from historical plantation agricultural use to becoming a primary housing zone. This transition not only meets the demand for housing but also presents an opportunity to address the issue of fallow undeveloped lands, which currently serves as potential fuel sources for wildfires.

The proposed Project can aim to mitigate the risks associated with wildfires within the localized area, which is designated as moderate to high-risk wildfire, through a combination of strategic planning and implementation of best management practices for wildfire prevention and response. By carefully designing the Project's site layout and landscaping, incorporating fire-resistant building materials, providing multiple points of access (ingress/egress), and implementing defensible space measures, the Project should aim to enhance this community's resilience to wildfires.

Moreover, the development of the Project, through proper design, can potentially contribute to reducing the overall risk of wildfire ignition and spread in the area by utilizing currently fallow lands and implementing best management practices at a localized scale. This dual benefit underscores the importance of sustainable development practices in wildfire-prone regions.

The Project should strive to incorporate best management practices for wildfire prevention, evacuation, and response, as it is crucial to recognize the inherent unpredictability of extreme weather events and large complex incidents. It should be also noted that despite the implementation of proactive measures, there is no absolute guarantee of safety from wildfires. However, by adhering to these best practices, the Project can maximize the chances of human and structural survival in the event of a wildfire, while also minimizing the ecological impact on the surrounding landscape.