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AUG - 8 2021

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July 21, 2021

Mary Alice Evans, Director
State of Hawai'i Office of Planning and Sustainable Development
235 South Beretania Street
Honolulu, HI 96813

Dear Ms. Evans:

Subject: **Draft Environmental Assessment (DEA)**
Applicant: **Hawai'i Island Community Development Corporation**
Project: **Hale Ola O Mohouli**
TMKs: **(3) 2-4-001:168, South Hilo District, Island of Hawai'i**

With this letter, the Planning Department hereby transmits electronically via the OEQC website, the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) and online submittal form for the proposed Hale Ola O Mohouli Project located on the subject parcel on the Island of Hawai'i. Please publish the DEA-AFONSI in the next available edition of the Environmental Notice.

Simultaneously with this letter, the applicant will provide one paper copy of the DEA-AFONSI to the state library nearest the subject property, one paper copy to the Hawai'i Document Center, and electronic or paper copies to agencies, citizen groups, and individuals that may be affected by the proposed action in accordance with HAR Section 11-200.1-5(e)(1).

The Planning Department, as approving agency, anticipates that the proposed action is not likely to have a significant effect and therefore is issuing a notice of an Anticipated Finding of No Significant Impact for the Draft EA, subject to the public review provisions of HAR Section 11-200.1-20.

If you have any questions regarding this letter, please contact Tracie-Lee Camero of our Planning Department staff at (808) 961-8166.

Sincerely,

for ZENDO KERN
Planning Director

TC:jaa
\\coh01\planning\public\wpwin60\CH343\2021\Hale Ola O Mohouli\HaleOlaOMohouliDEA to OEQC.doc

cc (via email): Ron Terry, Geometrician, Environmental Consultant, <rterry@hawaii.rr.com>

Keith Kato, Hawai'i Island Community Development Corporation, Applicant, <keith.hicdc@gmail.com>

From: webmaster@hawaii.gov
To: HI Office of Environmental Quality Control
Subject: New online submission for The Environmental Notice
Date: Friday, July 23, 2021 1:06:03 PM

Action Name

DRAFT ENVIRONMENTAL ASSESSMENT

Type of Document/Determination

Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)

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

South Hilo, Hawaiʻi

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

TMK (3) 2-4-001:168

Action type

Agency

Other required permits and approvals

State Land Use District Boundary Amendment from Agricultural to Urban by Windward Planning Commission and Hawaii County Council; 201H Exemption of County Zone (Windward Planning Commission and Hawaiʻi County Council); National Pollutant Discharge Elimination System Permit (State DOH); Grading, Grubbing and Driveway Permits (County DPW); Building Permits and Plan Approval (County DPW and Planning)

Proposing/determining agency

Hawaiʻi County Planning Department

Agency contact name

Tracie-Lee Camero

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United States
Map It

Was this submittal prepared by a consultant?

Yes

Consultant

Geometrician Associates LLC

Consultant contact name

Ron Terry

Consultant contact email

rterry@hawaii.rr.com

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Consultant address

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Hilo, HI 96720
United States
Map It

Action summary

HICDC, a non-profit dedicated to developing affordable housing, proposes to construct up to 90 units of affordable housing on a 9.091-acre government property in Hilo. Land use designations will be changed to State Land Use Urban and County zoning of multi-family residential. The site's vegetation is lightly disturbed native ʻōhiʻa forest on the 1881 lava flow. Surveys have determined that no historic properties, cultural sites or uses, or threatened or endangered plant species are present on the property. Mitigation includes landscaping, construction of a fence adjacent to residential properties, timing of vegetation clearing to avoid impacts to listed vertebrate species, and NPDES and grading permits with BMPs. Traffic impacts will be minor and within the capacity of the existing intersection.

Reasons supporting determination

Chapter 11-200.1-13, Hawaiʻi Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

(a) In considering the significance of potential environmental effects, agencies shall consider and evaluate the sum of effects of the Proposed Project on the quality of the environment.

(b) In determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a Proposed Project, the expected impacts, and the proposed mitigation measures. In most instances, an action shall be determined to have a significant effect on the environment if it may:

1. Irrevocably commit a natural, cultural, or historic resource. No valuable natural or cultural resource would be committed or lost. A common native vegetation type and several common native plants are present, but no rare, threatened or endangered species or unique native ecosystems would be adversely affected. An archaeological survey has determined that no historic sites are present on the property or would be affected. No valuable cultural resources and practices such as forest access, fishing, gathering, hunting, or access to ceremonial sites would be affected in any way.

2. Curtail the range of beneficial uses of the environment. No restriction of beneficial uses would occur by construction and occupation of affordable rental housing on the property.

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

The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The Proposed Project is environmentally beneficial and all adverse impacts are minor, and it is thus consistent with all elements of the State's long-term environmental policies.

4. Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State. The Proposed Project would have highly beneficial and no substantial adverse effects on the economic or social welfare of the Big Island community or the State of Hawai'i.

5. Have a substantial adverse effect on public health. The Proposed Project would not affect public health and safety in any adverse way. Wastewater will be disposed of in conformance with State Department of Health regulations.

6. Involve adverse secondary impacts, such as population changes or effects on public facilities. The scale and context of the Proposed Project would not produce any major secondary impacts, such as population changes or effects on public facilities.

7. Involve a substantial degradation of environmental quality. The Proposed Project is minor and environmentally benign, and thus it would not contribute to environmental degradation.

8. Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions. The adverse effects of the Proposed Project involve very limited and temporary disturbance to traffic, air quality, noise, and visual quality during construction. During construction, there is at least a small potential for noise, traffic and dust impacts from the affordable rental housing development to acccumulate with those of the proposed adjacent Fire and Police Dispatch Center and the Wailani Mixed Use Project, under the scenario of two or more more being constructed at the same time. These impacts are mitigable and can be handled by construction-phase measures that can easily be implemented by the Hawai'i County Department of Public Works, which is monitoring traffic in this area. Although traffic on Mohouli and Komohana Street would clearly rise as a result of all three projects, with the vast majority being attributed to the Wailani project, traffic analysis has demonstrated that with the extension of Ponahawai Street by Wailani, traffic impacts at Mohouli Street would not be severe and level of service would remain acceptable.

9. Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat. Thorough survey has determined that no endangered plant species are present. Other than the endangered Hawaiian hoary bat and the recently delisted Hawaiian hawk, island wide-ranging species that will experience no adverse impacts due to mitigation in the form of timing of vegetation removal and/or survey, no rare, threatened or endangered species of fauna are known to exist on or near the property, and none would be affected by any project activities.

10. Have a substantial adverse effect on air or water quality or ambient noise levels. No substantial effects to air, water, or ambient noise would occur. Brief, temporary effects would occur during construction and would be mitigated. Contractors will be required to consult with DOH per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH would then review the proposed activity, location, equipment, project purpose and timetable in order to decide whether a permit is necessary and what conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers, will be necessary. Dust will be controlled per State regulations through extensive BMPs. Erosion and sedimentation impacts will be avoided by implementation of Best Management Practices during grading.

11. Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters. Although the Proposed Project is located in an area with volcanic and seismic risk, the entire Island of Hawai'i shares this risk. The facilities are not imprudent to construct and will employ design and construction standards appropriate to the seismic zone. The property is not located in a flood zone or any other hazardous area, and it would not affect any such area. Due to the elevation of the property at approximately 350 feet

above sea level, there is no risk to the Proposed Project from sea level rise. The project has adapted to climate change by accounting for the potential for larger storms, through minimizing hard surfaces that generate runoff in heavy rainfall.

12. Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies. No scenic sites or views are located nearby or would be affected in any way.. All exterior lighting will be shielded and designed with the proper spectra to protect dark skies and transiting seabirds.

13. Require substantial energy consumption or emit substantial greenhouse gases. Construction would involve unavoidable small but non-negligible carbon emissions. Occupation of the housing would entail greenhouse gas emissions that would be essentially the same regardless of where the residents live, leading to no net increase. Carbon emissions as a result of construction and operation of the Proposed Project would be considered negligible and are not expected to contribute significantly to global climate change.

Attached documents (signed agency letter & EA/EIS)

- Draft-EA-Hale-Ola-O-Mohouli-Affordable-Housing-Project.pdf
- Transm-Draft-EA-Hale-Ola-O-Mohouli-to-Planning-July-23-2021.pdf

Action location map

- Mohouli-Affordable-Property.zip

Authorized individual

Tracie-Lee Camero

Authorization

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

Hale Ola O Mohouli Affordable Housing Project

Draft Environmental Assessment

TMK (3rd) 2-4-001:168
South Hilo District, Hawai‘i Island, State of Hawai‘i

August 2021

Prepared for:
County of Hawai‘i
Planning Department
101 Pauahi Street, Suite 3
Hilo, Hawai‘i 96720

DRAFT ENVIRONMENTAL ASSESSMENT

Hale Ola O Mohouli Affordable Housing Project

TMK (3rd) 2-4-001:168
South Hilo District, Hawai‘i Island, State of Hawai‘i

APPLICANT:

Hawaii Island Community Development Corporation
100 Pauahi Street, Suite 20
Hilo, Hawai‘i 96720

APPROVING AGENCY:

County of Hawai‘i
Planning Department
101 Pauahi Street, Suite 3
Hilo, Hawai‘i 96720

CONSULTANT:

Geometrician Associates LLC
10 Hina Street
Hilo Hawai‘i 96720

CLASS OF ACTION:

Use of County Land and County Funds

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

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SUMMARY OF THE PROPOSED PROJECT, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The Hawaii Island Community Development Corporation (HICDC) is a non-profit dedicated to developing affordable housing that has assisted in the development of elderly, low-income and transitional housing throughout the Island of Hawai‘i. HICDC proposes to construct up to 90 units of affordable housing on a 9.091-acre State property in Hilo that was transferred via Executive Order (EO) to the County of Hawai‘i for affordable housing purposes. The property is designated in the County General Plan for Medium Density Urban uses but is currently within the State Land Use Agricultural District and County Zoned for agriculture. HICDC has submitted a State Land Use Boundary Amendment which is currently in process. HICDC intends to utilize the Section 201H, Hawai‘i Revised Statutes (HRS) process obtain the County zoning of RM-4 (multi-family residential, 4,000 square feet minimum per building site), matching uses *makai* of the project site. The vegetation is lightly disturbed native ‘ōhi‘a forest on the 1881 lava flow. Primary access to the property will occur from Kupuna Place to Mohouli Street, via an easement on the adjacent parcel, TMK (3) 2-4-001:176, which is currently being developed as a Fire and Police Dispatch Center.

Surveys have determined that no historic properties, cultural sites or uses, or threatened or endangered plant species are present on the property. Mitigation includes landscaping, construction of a fence adjacent to residential properties, timing of vegetation clearing and/or surveys to avoid impacts to listed vertebrate species, NPDES and grading permits with Best Management Practices during construction to avoid erosion and sedimentation, and precautionary conditions related to inadvertent finds of cultural materials. Traffic impacts will be minor and within the capacity of the existing intersection. There will be no noticeable change to the traffic level of service on Mohouli Street or other roads.

PART 1: PROJECT DESCRIPTION, PURPOSE AND NEED AND ENVIRONMENTAL ASSESSMENT PROCESS

1.1 Project Description and Location

The Hawaii Island Community Development Corporation (HICDC) is a non-profit dedicated to developing affordable housing that has assisted in the development of elderly, low-income and transitional housing throughout the Island of Hawai‘i. HICDC proposes to construct up to 90 units of affordable rental housing in Hilo, Island of Hawai‘i. The 9.091-acre property on which the facilities would be built, TMK (3) 2-4-001:168, is a State property that was transferred via Executive Order (EO) 4531 for Affordable Housing Purposes to the County of Hawai‘i. The vegetation is lightly disturbed native ‘ōhi‘a forest on the 1881 lava flow. Primary access to the property will occur from Kupuna Place to Mohouli Street, via an easement on the adjacent parcel, TMK (3) 2-4-001:176, which is currently being developed as a Fire and Police Dispatch Center (Figures 1-4).

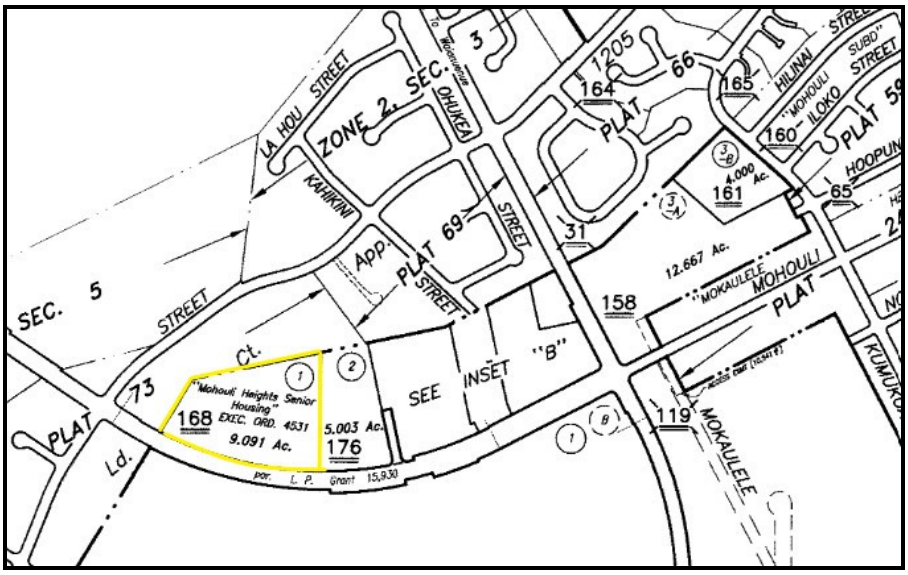
The development concept for the Proposed Project is to provide affordable rentals for seniors and families. One method of achieving this is to create pocket neighborhoods where clusters of units are arranged around central greens. Under this concept, the units would typically be single-family dwellings, duplexes, and up to four-plex structures not exceeding two stories in height. An illustration of this development type for this site is shown in Figure 4. This concept is dependent on securing the necessary funding and may be altered if appropriate funding is not secured, but in any case, the project will consist of no more than 90 residential units. The Proposed Project would remove existing vegetation, grade using onsite material by balancing cut and fill, install utilities (including connection to the municipal wastewater system), install a border fence on the western side of the property, create residential spaces, construct buildings, and provide accessways, parking and landscaping for each building.

The property is designated in the County General Plan for Medium Density Urban uses but is currently within the State Land Use Agricultural District, with a County Zoning of A-1a (agriculture, minimum lot size one acre). After the EA process is complete, HICDC intends to pursue a reclassification of the property to the State Land Use Agricultural District and utilize the Section 201H, Hawai‘i Revised Statutes (HRS) process in a request filed with the County Office of Housing and Community Development (OHCD). This law was enacted to provide a process whereby an affordable housing project may be granted exemptions from any statutes, ordinances and rules of any governmental agency relating to planning, zoning and construction standards that do not negatively affect the health and safety of the general public. HICDC seeks to obtain County zoning of RM-4 (multi-family residential, 4,000 square feet minimum per building site). This 201H filing also requests the elimination of the loading zone requirement (which HICDC has found is generally not needed at apartments, where loading trucks can utilize the parking lot); a reduction in the minimum separation between main buildings from 15 to 10 feet consistent with the Building Code (to accommodate a mix with more single-family residence, to meet demand); and the elimination of the requirement that neighboring lots adjacent to a County sewer line connect to the sewer line, in order to not unreasonably burden adjacent properties that already have conforming systems.

Figure 1. Location Map

Base Map © Google Earth North ↑

Figure 2. TMK Map



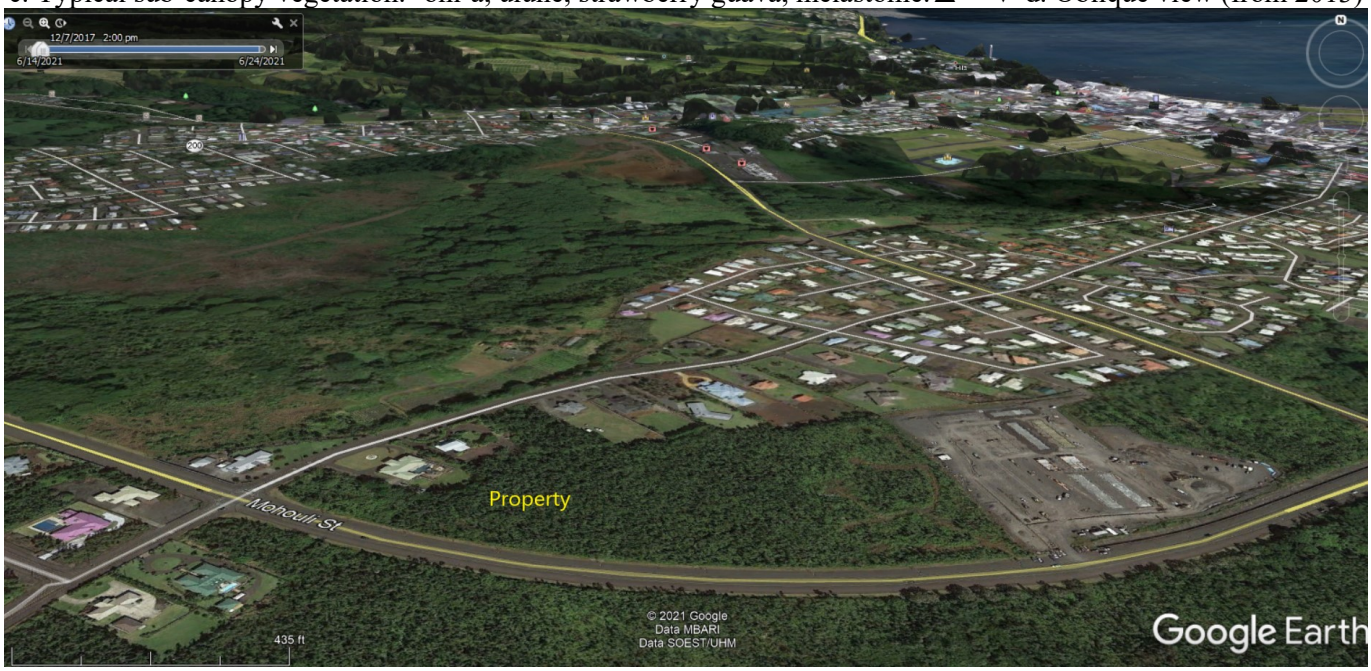
Source: Hawai‘i County Real Property Tax Maps Plat 2-4-1

Figure 3. Project Site Photos

a. View from Mohouli Street, looking *makai* ▲ ▼ b. Canopy vegetation in less disturbed forest

Figure 3. Project Site Photos

c. Typical sub-canopy vegetation: ‘ōhi‘a, uluhe, strawberry guava, melastome.▲ ▼ d. Oblique view (from 2013)



Site Plan

0 40' 80'

97 units total

ROSS CHAPIN ARCHITECTS
Post Office Box 230 • Langley, Washington 98260
T: (360) 929-9007 • E: ross@rosschapin.com • W: rosschapin.com

Hawaii Island Community Land Development Corporation

HALE OLA O MOHOULI

Hilo, Hawaii

26 January 2021

2.1 Site Plan

v1.36

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1.2 Purpose and Need

The purpose of the Proposed Project is to meet a portion of the demand for affordable rental housing in East Hawai‘i. Since 1991, HICDC has been providing housing for low and moderate income residents on the Island of Hawai‘i. Until recently, home construction on the Big Island had outpaced population growth, albeit skewed to upper income levels. Since shortly after the start of the coronavirus pandemic, the demand for housing has skyrocketed – partly fueled by mainland retirees and tech workers fleeing crowded urban areas – and the affordable housing crisis has worsened. The Proposed Project would answer the need for additional affordable rental housing in East Hawai‘i at a centrally located site supplied with existing utility infrastructure, within a mile or two of shopping, schools, and job centers.

A Market Study prepared for this project by Collier's International (Appendix 5 contains preliminary findings) reviewed the need for affordable housing for households with incomes 60% of the median income and below. The area of coverage was Hilo and its secondary market areas from Wainaku to Pepe‘ekeo and Kea‘au to Kurtistown, as well as specifically for the project site. The analysis concluded that after accounting for available affordable housing units there remains a large demand:

Unmet Housing Demand for All Households 60% AMI and below

Hilo Primary Trade Area	5,152 units
Secondary Trade Area	1,266 units
Total	6,418 units

Unmet Housing Demand for Senior Households 60% AMI and below

Hilo Primary Trade Area	842 units
Secondary Trade Area	56 units
Total	1,098 units

Demand for Affordable Units at Hale Ola O Mohouli

Total 60% AMI and below	373-708 units
Senior Units	62-117 units

This indicates that there is a substantial need for affordable housing such as that proposed.

1.3 Environmental Assessment Process

This Environmental Assessment (EA) discusses possible impacts the Proposed Project may have on the environment and presents mitigative strategies for any potential adverse impacts the Proposed Project may generate. This Environmental Assessment (EA) is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200.1, of the Hawai‘i Administrative Rules (HAR), is the basis for the environmental impact process in the State of Hawai‘i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria. Part 4 of this document states the anticipated finding that no significant impacts are expected to occur; Part 5 lists each criterion and presents the preliminary findings for each made by the applicant in close consultation with the County of

Hawai‘i Planning Department, the approving agency. If, after considering comments to the Draft EA, the approving agency concludes that no significant impacts would be expected to occur, then the agency will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to proceed to other appropriate approval and permit processes. If the agency concludes that significant impacts are expected to occur as a result of the Proposed Project, then an Environmental Impact Statement (EIS) will be prepared.

1.4 Public Involvement and Agency Coordination

The following agencies and organizations were consulted by letter/email on April 20, 2021 as part of development of the Environmental Assessment.

Federal:
U.S. Fish and Wildlife Service

State:
Department of Health
Department of Land and Natural Resources
Office of Hawaiian Affairs
University of Hawai‘i at Hilo

County:
County Council
Department of Environmental Management
Department of Public Works
Department of Water Supply
Finance Department
Fire Department
Planning Department
Police Department

Private:
Sierra Club
Nearby Property Owners: Ching, Goodwin, Julian, Martins, Okuda, Otis, Park, Sabnani, Sugai
Hawai‘i Island Chamber of Commerce

A sample of the early consultation letter and responses received are contained in Appendix 1a.

1.5 Cost and Schedule

Assuming the property is granted the requested land use designation changes, HICDC will finalize design, secure financing and apply for Plan Approval to the Planning Department, and then apply for a grading and grubbing permit and various building permits. The estimated cost for the Proposed Project is $47 million. The project is expected to be ready for construction in late 2022 and completed mid-2024.

PART 2: ALTERNATIVES

2.1 No Action Alternative

Under the No Action Alternative, the County of Hawai‘i would not construct the affordable rental housing project on this or any other site in the area. The benefits provided by the expansion of housing opportunities would not be realized, but there would be no disturbance of the existing ground surface or vegetation, and no impacts to neighbors or area traffic. The No Action Alternative provides a baseline for comparing the impacts of the Proposed Project.

2.2 Alternative Locations Affordable Housing Project

The property was designated by the State Department of Land and Natural Resources as a site for affordable rentals and has been turned over to the County of Hawai‘i for such development. HICDC monitors the availability of suitable affordable housing sites throughout the County of Hawai‘i that could be similarly conveyed. The only other government-owned and currently available site within central Hilo that has necessary access to the County sewer system is a 0.34-acre site on Puainako Street *makai* of Komohana Street (TMK 3-2-4-1:156). That site is smaller than needed and has significant slopes unsuitable for the proposed development concept, and it is not being considered further. No other suitable sites have been identified; therefore, no alternative sites have been advanced in this Environmental Assessment.

2.3 Alternative Strategies Involving Existing Facilities

In some cities, existing structures such as commercial and market housing complexes can simply be renovated and converted to affordable rental housing. This can be an economical solution that utilizes existing materials and land in an efficient manner. However, in order to be cost-effectively converted, the complexes need to be in reasonably good condition and have the utility and other infrastructure necessary for housing consistent with modern codes and regulations. To HICDC’s knowledge, no existing sites meet these conditions. HICDC therefore does not consider any such actions as worthy of consideration at this time, and therefore it has not advanced in this Environmental Assessment as an alternative.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Basic Geographic Setting

The location for the Proposed Project is referred to throughout this EA as the *property* (see Figures 1-4). The term *project area* is used to describe the general environs of this part of Hilo. The property is a vacant forest of ʻōhiʻa with significant invasion by alien plants and is bordered by Mohouli Street on the south, by the developing Fire and Police Dispatch Center on the east, by residences on agriculturally zoned lots that are part of Sunrise Estates on the north and west.

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

The climate in the area is warm and moist, with a high average annual rainfall of about 135 inches and a mean annual temperature of approximately 75 degrees Fahrenheit (Giambelluca et al 2013; UH Hilo-Geography 1998). The property is located at about 350 feet in elevation above mean sea level. The underlying geology is a Mauna Loa lava flow dated from 1881 (Wolfe and Morris 1996). On May 1, 1880, an eruption began in Mokuʻāweoweo, the summit crater of Mauna Loa, and lasted a few days. The following November, the eruption resumed, this time from vents along the Northeast Rift Zone. Lava streamed down the mountain toward Hilo Town, the main flow following what was then Kūkūau Gulch. The flow reached the property in late June, 1881, completely covering it, and then continued *makai*. The eruption lasted till August 11, stopping just short of a mile from Hilo Bay.

Despite the recent age of the lava flow, the area has developed soil due to the rapid vegetation of the lava and buildup of organic material. The soil on the property is Keaukaha highly decomposed plant material, 6 to 20 percent slopes. This soil occurs in undulating to rolling topography of the underlying pahoehoe lava. Rock outcrops occupy about 25 percent of the area. In a representative profile, the surface layer is very dark brown muck about eight inches thick and underlain by pahoehoe lava bedrock. This soil is strongly acidic. The soil above the lava is rapidly permeable. The pahoehoe lava is very slowly permeable, but water moves rapidly through the cracks. Runoff is medium and the erosion hazard is slight. In places, roots are matted over the pahoehoe lava or extend a few feet into the cracks. The suitability of the soil as a source of both topsoil and road fill is poor: pahoehoe lava at a depth of less than 10 inches. Permeability is about 3 to 20 inches per hour, reaction is roughly 1 to 5.5 pH, shrink-swell potential is high, and corrosivity for both uncoated steel and concrete is moderate. The agricultural capability subclass rating for this soils is Vlls (limited mainly because it is shallow, droughty or stony), which includes soils that have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland or wildlife. Additionally, the property is not prime or unique farmland and is not designated as Agricultural Lands of Importance to the State of Hawaiʻi (ALISH). As such, conversion of the property to urban uses as part of the Proposed Project will not be detrimental to the island's agricultural resource base, nor will it have an adverse impact on the overall agricultural productivity of the region and the island.

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the U.S. Geological Survey in this area of Hilo is 3 on a scale of ascending risk 9 to 1 (Heliker 1990:23). The hazard risk is based on the fact that Mauna Loa is an active volcano. Volcanic hazard zone 3 areas have had 1 to 5 percent of their land area covered by lava flows or ash since the year 1800, but are at lower risk than zone 2 areas because of their greater distance from recently active vents and/or because the local topography makes it less likely that flows would cover these areas.

The Island of Hawai‘i experiences high seismic activity and is at risk from major earthquake damage (USGS 2000), especially to structures that are poorly designed or built. In October of 2006, two damaging earthquakes of magnitude 6.7 and 6.0 struck the west side of Hawai‘i Island, and a 6.9-magnitude quake shook Kilauea in May 2018. These earthquakes caused no known damage to the property or nearby facilities. The property is undulating, with no surrounding steep slopes, and does not appear to be subject to subsidence, landslides or other forms of mass wasting. No lava tube caves were observed, but underground voids of various sizes are likely because of the pahoehoe substrate.

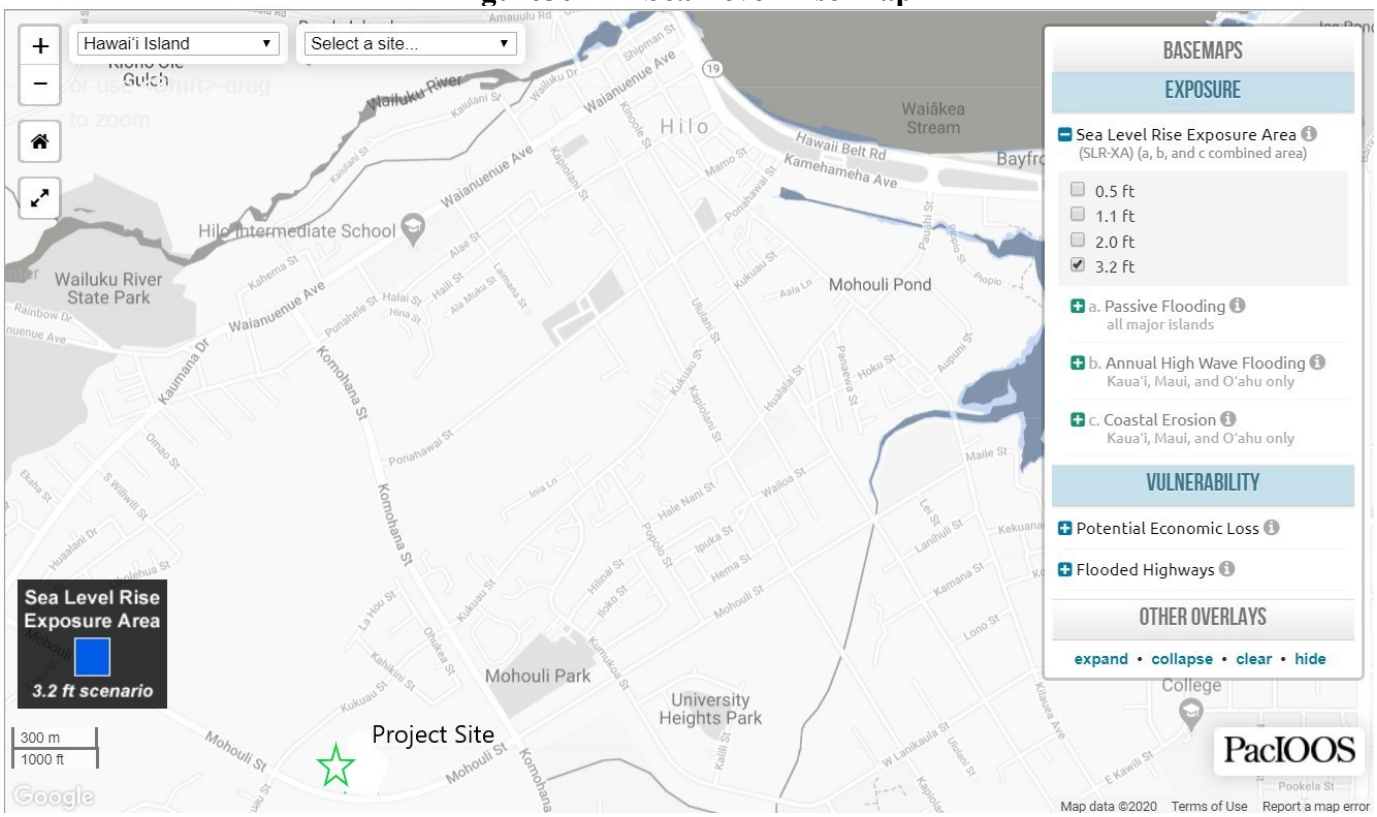
Impacts and Mitigation Measures

Geologic conditions impose no constraints on the Proposed Project. Most of the surface of Hawai‘i Island is subject to eventual lava inundation, and any facilities in Hilo face risk. The utilization of the area for affordable rental housing is not imprudent to undertake, and given the need, the State, County and HICDC have determined that it is sensible to construct housing here. Project design will take the seismic setting into account and will include geotechnical investigations for voids in the lava and mitigate appropriately. No other mitigation measures are expected to be required.

There is a scientific consensus that the earth is warming due to manmade increases in greenhouse gases in the atmosphere, according to the United Nations’ Intergovernmental Panel on Climate Change (UH Manoa Sea Grant 2014). Global mean air temperatures are projected to increase by at least 2.7°F by the end of the century. This will be accompanied by the warming of ocean waters, expected to be highest in tropical and subtropical seas of the Northern Hemisphere. For Hawai‘i, where warming air temperatures are already quite apparent, not only is the equable climate at risk but also agriculture, ecosystems, the visitor industry and public health. Guidance to federal agencies for addressing climate change issues in environmental reviews was released in August 2016 by the Council on Environmental Quality (US CEQ 2016). The guidance urged that when addressing climate change, agencies should consider: 1) the potential effects of a project on climate change as indicated by assessing greenhouse gas emissions in a qualitative, or if reasonable, quantitative way; and 2) the effects of climate change on a project and its environmental impacts. It recommends that agencies consider the short- and long-term effects and benefits in the alternatives and mitigation analysis in terms of climate change effects and resiliency to the effects of a changing climate. The State of Hawai‘i in Hawai‘i Revised Statutes §226-109 encourages a similar analysis, and both Act 17 of the 2018 Hawai‘i Legislature and Title 11, Chapter 200.1 now require analysis of sea-level rise and greenhouse gases in environmental impact statements.

In terms of precipitation, wet and dry season contrasts will increase, and wet tropical areas in particular are likely to experience more frequent and extreme precipitation. In general, rainfall in Hawai‘i has been variable in the recent past with some years drier and some wetter than average. The El Niño Southern

Figure56 Sea Level Rise Map



Oscillation (i.e., periodic variation in winds and sea surface temperatures in the Pacific, the warming phase of sea temperature known as El Niño and the cooling phase as La Niña) will likely continue to dominate precipitation patterns from year to year in the tropical Pacific. Climate change-related increases in air temperatures will lead to more evaporation and more moisture in the air. As a result, the variability in El Niño-related precipitation will probably increase, making rainfall predictions difficult. However, it is very likely that warmer temperatures and larger and more frequent tropical storms and hurricanes will affect the Hawaiian Islands in the future. Project design will direct surface runoff into seepage pits of sufficient disposal capacity to accommodate reasonably expected increase in runoff.

Due to the elevation of the property at a minimum of 350 feet above sea level, there is no risk to the Proposed Project from sea level rise (Figure 5). Construction of the facilities would involve unavoidable small but non-negligible carbon emissions. Occupation of the housing would entail greenhouse gas emissions that would be essentially the same regardless of where the residents live, leading to no net increase. The Proposed Project would not be expected to contribute significantly to global climate change.

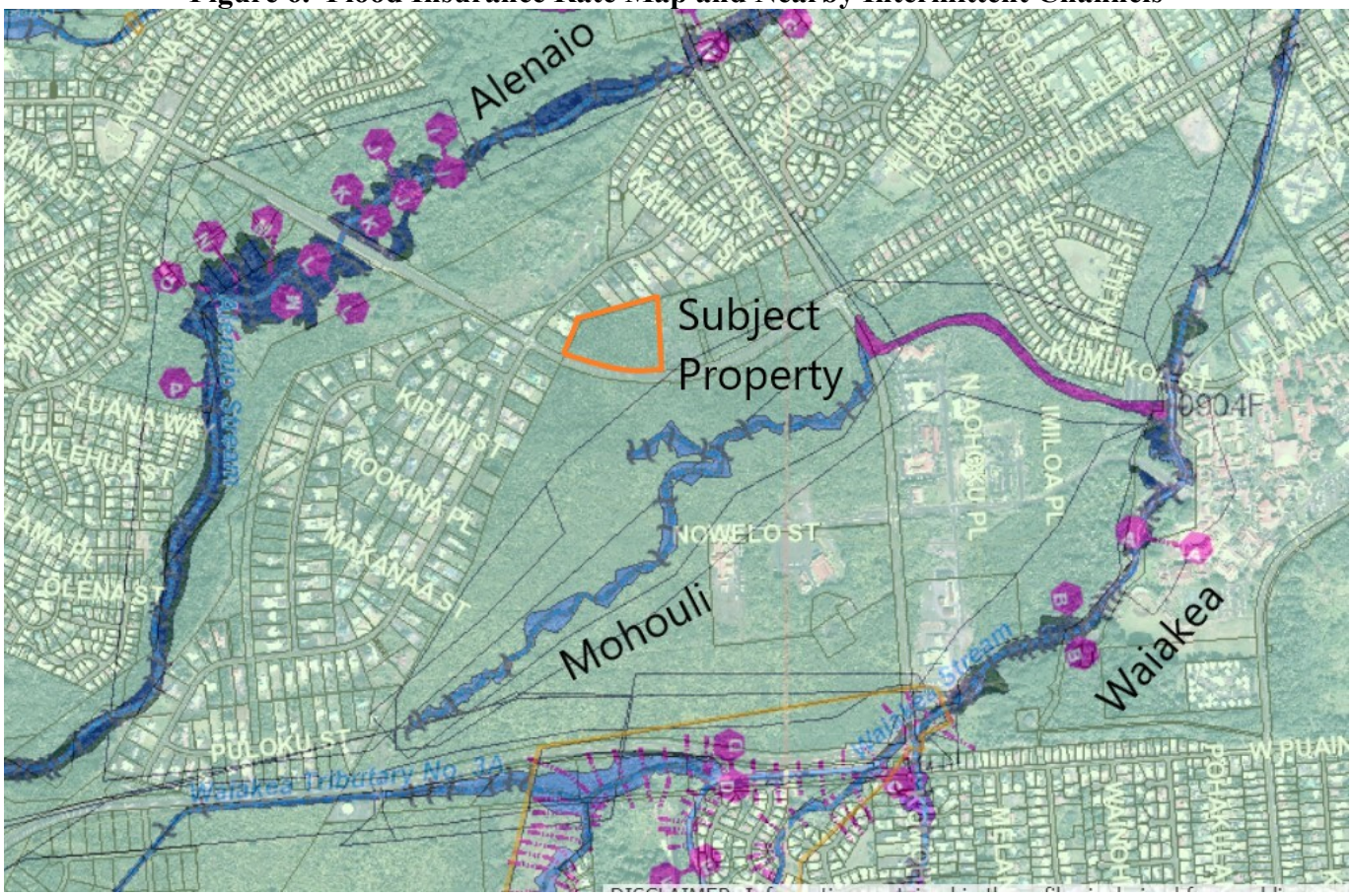
3.1.2 Drainage, Water Features and Water Quality

Existing Environment

No stream, lakes or other water bodies are present on or near the property. The intermittent Alenaio Stream is approximately 1,500 feet to the north, the main branch of Waiakea Stream is 3,000 feet to the south, and a drainage area associated with the land south of Mohouli Street is about 500 feet to the south (Figure 7). Alenaio Stream empties into the Wailoa River, an estuary that connects to Hilo Bay. Because of the recent lava, no active drainageways are present on the property, and excess rainfall drains directly into the ground.

The Flood Insurance Rate Map (FIRM) 1551660903F (9/29/2017) shows that the entire project site is in Flood Zone X, outside of the 0.2% annual chance floodplain (sometimes known as the 500-year floodplain) (Figure 6). Hilo Bay has been struck by several highly destructive tsunami in historic times. Maps printed by the Hawai‘i County Civil Defense Agency locate the property well *mauka* of the area that should be evacuated during a tsunami warning.

Figure 6. Flood Insurance Rate Map and Nearby Intermittent Channels



Source: adapted from DLNR Flood Insurance Rate Maps at http://gis.hawaiinfip.org/fhat/

Impacts and Mitigation Measures

Landclearing and construction activities would occur in an area greater than one acre and thus will require a National Pollutant Discharge Elimination System (NPDES) permit to ensure that erosion and sedimentation impacts to adjacent waters will be minimized. Plans submitted as part of the application for this permit and a County grading permit will specify practices to minimize the potential for sedimentation, erosion and pollution of coastal waters. HICDC will ensure that its contractor performs all earthwork and grading in conformance with:

(a) "Storm Drainage Standards," County of Hawai‘i, October, 1970, and as revised.
(b) Applicable standards and regulations of Chapter 27, "Flood Control," and Chapter 10, "Erosion and Sedimentation Control," of the Hawai‘i County Code.
(c) Conditions of an NPDES permit.

Chapter 27 and the County's Storm Drainage Standards require that all increases in runoff due to a project's development must be captured and disposed of. Rainfall runoff for the site after development will be calculated by the project engineers using the Storm Drainage Standards. Drainage structures will be designed and constructed to capture and retain the increase in rainfall runoff generated by the development. Drainage structures may include lava sumps, seepage drains, structures not requiring underground injection control permits, and/or drywells. A typical seepage drain structure has a percolation rate of 2 cubic feet per second (cfs), whereas a typical drywell structure has a percolation rate of 6 cfs. The type, number and placement of these structures will be determined during final design.

3.1.3 Flora, Fauna and Ecosystems

Existing Environment

The property was surveyed by Ron Terry, Ph.D., on portions of three days in December 2020. The objectives of the botanical survey component of the survey were to: 1) describe the vegetation; 2) list all species encountered; and 3) identify the locations of any individual plants of rare, threatened or endangered (RTE) species. Plant species were identified in the field and, as necessary, collected and keyed out in the laboratory. Special attention was given to the possible presence of any federally listed (USFWS 2021) threatened or endangered plant species, although the habitat did not indicate a high potential for their presence. The faunal portion of the survey consisted of visual/auditory faunal surveys both during and apart from the botanical survey, covering birds, mammals, reptiles, and amphibians. Also considered during the survey was the general value of the habitat for native birds and the Hawaiian hoary bat. The field survey did not include invertebrates, which require highly specialized techniques by entomologists or other taxa experts, because of the general lack of potential RTE invertebrate species. There are no lakes, ponds or intermittent or permanent streams, and thus aquatic fauna would not be present.

The vegetation of the property consists primarily of low to medium-stature forest (20-30 feet) dominated by the natives ‘ōhi‘a lehua (*Metrosideros polymorpha* var. *incana*) and the mat-forming fern, uluhe (*Dicranopteris linearis*). The entire site is also lightly to moderately infested with various invasive trees and shrubs, notably Asian melastome (*Melastoma candidum*) and strawberry guava (*Psidium*

cattleianum), with lesser numbers of albizia (*Falcataria moluccana*), octopus tree (*Schefflera actinophylla*), gunpowder tree (*Trema orientalis*), wax myrtle (*Morella cerifera*), *Melochia umbellata*, and other non-natives. The interior of the property appears never to have been mechanically disturbed. The roadside fringes of the property are managed for weeds and experience heavy sunlight. They are thus dominated by invasives such as strawberry guava, *Crotalaria* spp., and a variety of weedy trees, shrubs, herbs and ferns, as shown in the photos in Figure 3, above.

Table 1 is a list of species found on the property. ‘Ōhi‘a and uluhe are by far the most abundant natives. Two native epiphytes – the whisk fern moa (*Psilotum nudum*) and the pakahakaha fern (*Lepisorus thunbergianus*) – are scattered but also fairly common. Only a few spindly pukiawe (*Leptecophylla tameiameiae*) are present, remnants of hardy shrubs that probably colonized the 1881 lava flow in abundance in the first few decades but have become shaded out with the growth of ‘ōhi‘a trees and especially strawberry guava and Asian melastome. The Hawaiian sumac or neneleau (*Rhus sandwicensis*), which favors disturbed light gaps, is present in a few locations on the edges of the property, as is the common, almost weedy native herb ‘uhaloa (*Waltheria indica*). Of the 51 species detected, six are indigenous (native to the Hawaiian Islands and elsewhere), while only two – ‘ōhi‘a and neneleau – are endemic (found only in the Hawaiian Islands). Each of the indigenous plants is very common throughout the Hawaiian Islands and elsewhere, and no rare or unusual native plant species were present. One common Polynesian introduction was also present: ti (*Cordyline fruticosa*).

During the December 2020 botanical survey and in subsequent dedicated observations, several species of birds, all non-native, were observed: Japanese white-eye (*Zosterops japonicus*), northern cardinal (*Cardinalis cardinalis*), spotted dove (*Streptopelia chinensis*), zebra dove (*Geopelia striata*) and house finch (*Carpodacus mexicanus*). The Japanese white-eye was the most abundantly observed bird. A previous (2009) two-day bird survey by ornithologist Phillip Bruner (Appendix F in Hawai‘i County DPW 2009) of the Fire Administration Complex, directly next door and with the same vegetation, also noted barn owl (*Tyto alba*) and hwamei (*Garrulax canorus*). A subsequent survey of that site by Geometrician Associates in 2020 observed various birds, including three species not noted in the 2009 survey: domestic chickens (*Gallus gallus domesticus*), common myna (*Acridotheres tristis*) and saffron finch (*Sicalis flaveola*). Additional observations would undoubtedly reveal more species of non-native birds.

Although the property is covered with native forest that is only moderately degraded, the low elevation – and thus prevalence of mosquitos and avian malaria – reduces the value of habitat for native birds. One fairly common native bird that is increasingly returning to low elevations after having developed some resistance to this disease that plagues the lowlands is the Hawai‘i ‘amakihi (*Chlorodrepanis virens*). This bird was not observed in either 2009 or 2020, but could occasionally be present.

The formerly federally-endangered Hawaiian hawk or ‘io (*Buteo solitarius*) – which remains listed by the State of Hawai‘i – occurs throughout the island of Hawai‘i from sea level to 8,530 feet in elevation. Although no hawks were observed the surveys for this project, they are frequently observed in a variety of habitats in the South Hilo District and indeed throughout East Hawai‘i. They generally prefer ‘ōhi‘a forest habitat but are known from both native and non-native forests and even range into farmland and towns to forage. Hawks nest in tall trees within their large territories from early March through the end of September. Most nesting occurs in native ‘ōhi‘a trees but non-native trees, including eucalyptus,

ironwood, mango, coconut palm and macadamia may also be used. The low to medium-stature forest on and around the property does not offer optimal nest sites for Hawaiian hawks. Given this vegetation, there is a small but not negligible possibility that hawks could nest on or near the property. If nests were present on or very near the property, any grading, tree removal or other construction activities might disturb nesting, although the context adjacent to housing and highways somewhat reduces the likelihood of both nests and disturbance potential.

As with all of the island of Hawaiʻi, several RTE seabirds may overfly, roost, nest, or utilize resources in the general project area of urban Hilo, including the endangered Hawaiian petrel (*Pterodroma sandwichensis*), the endangered band-rumped storm petrel (*Oceanodroma castro*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*). Although they may fly over various locations in South Hilo on their way to and from mountain nesting areas and the open ocean, no suitable nesting habitat for any of these seabirds is present in lowland Hilo. The primary cause of mortality in these species in Hawaiʻi is thought to be predation by alien mammalian species at the nesting colonies. Collision with man-made structures is another significant cause. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with manmade structures and, if not killed outright, may become easy targets of predatory mammals.

The threatened Hawaiian goose or nēnē (*Branta sandvicensis*) has become very common on many Hawaiian islands and can be found at elevations ranging from sea level to sub-alpine areas above 7,000 feet. Historically, flocks moved between high-elevation feeding habitats and lowland nesting areas. Nests consist of a shallow scrape lined with plant material and down. Breeding pairs usually return to the previous year's nest site, typically in dense vegetation. Nēnē have an extended breeding season, and nesting may occur in all months except May, June, and July, meaning that even if nēnē were present then they would not be nesting. The dense forest, lack of water bodies, and absence of grass make the property extremely unsuitable habitat for nēnē foraging or nesting.

It is highly likely that endangered Hawaiian hoary bats (*Lasiurus cinereus semotus*), the only native Hawaiian land mammals, at least occasionally utilize the property for feeding and perhaps roosting. They have been found throughout the island of Hawaiʻi. Bats may forage for flying insects on the property on a seasonal basis and may also roost in trees and large shrubs. Bats are often visible while they are feeding on flying insects near dusk and dawn at various locations around the island of Hawaiʻi. Their presence can also be verified by ultrasound detectors or radar. If a bat is detected during a night's study, this merely indicates that they were present in the area. Determination of bat populations or usage patterns requires much more sophisticated, long term studies. Conversely, the absence of bat detections does not indicate an absence of bats, which may have been absent for only a night, a week, or a season, or may have been present but undetected. No bats were observed in our surveys, which mostly took place in full daylight and did not use any detection equipment. For the purposes of this assessment, it is assumed that Hawaiian hoary bats are present at least some of the time, as they have been frequently seen and detected by ultrasound and radar in young ʻōhiʻa forests. Hawaiian hoary bats are vulnerable to disturbance during the summer pupping season and require special mitigation measures.

Only one non-native mammal was observed on the property – a domestic cat (*Felis catus*) – although there were also signs of use by feral pigs (*Sus scrofa*). It is likely that small Indian mongooses (*Herpestes a. auropunctatus*), mice (*Mus* spp.), rats (*Rattus* spp.), and domestic dogs (*Canis f. familiaris*) are also sometimes present. None of these alien mammals have conservation value and all are deleterious to native flora and fauna.

There are no native terrestrial reptiles or amphibians in Hawai‘i. No reptiles were seen but there are probably various species of skink (Family: Scincidae) and gecko (Gekkonidae) present. The highly invasive coqui frogs (*Eleutherodactylus coqui*) was heard chirping at several locations. It is possible that bufo toads (*Bufo marinus*) and perhaps other amphibians are also present.

No invertebrate survey was undertaken as part of the survey, but in general, RTE native invertebrates on the Island of Hawai‘i tend to be associated with either high-elevation, older substrate rainforests (e.g., various *Drosophila*); coastal dry shrubland (e.g., various *Hylaeus*); the summit of Mauna Kea (*Nysius wekiuicola*); extremely dry, disturbed ‘a‘a flows (*Manduca blackburnii*); or aquatic settings (various *Megalagrion*). Young, lowland ‘ōhi‘a forests are not a likely setting for any threatened or endangered invertebrates. Nonetheless, some of Hawai‘i’s unique native invertebrates are associated with lava tube and cave ecosystems (Howarth 2002; Mitchell et al 2005). The roots of ‘ōhi‘a trees provide energy and nutrients for a rich ecosystem for various native insects. The island of Hawai‘i has at least 49 obligate, cave/void-adapted species (Slay et al 2018). New underground species are still being found, but information on their distribution and abundance is sparse and difficult to obtain. Although no true cave openings were observed on the property (some may remain hidden in the uluhe), small lava tubes, collapses, voids and cracks are omnipresent in pahoehoe flows such as those that cover the property. Similar habitat is present over many hundreds of square miles on the windward side of the island, and the property does not represent essential habitat for this interesting cave fauna. In summary, it is unlikely that any RTE invertebrates would be expected from this property.

Impacts and Mitigation Measures

Because of the low elevation as well as the lack of diversity and presence of invasives in the property’s vegetation, the Proposed Project would have no significant adverse impacts to native vegetation, RTE species or animal habitat. The following measures will help avoid impacts to RTE fauna:

- To minimize impacts to the endangered Hawaiian hoary bat, trees taller than 15 feet will not be removed or trimmed during the bat birthing and pup rearing season (June 1 through September 15), unless bat monitoring studies by a qualified biologist using methods acceptable to regulatory agencies determine that no bat roosting is occurring in the affected area. If bat roosts are found in the affected trees, all landclearing activity will cease until the expiration of the pupping season**.**

Table 1 Plant Species Observed on Project Site

Scientific Name	Family	Common Name	Life Form	Status*
Arundina graminifolia	Orchidaceae	Bamboo Orchid	Herb	A
Ardisia elliptica	Myrsinaceae	Shoe Button Tree	Tree	A
Buddleia asiatica	Buddleiaceae	Buddleia	Shrub	A
Canavalia cathartica	Fabaceae	Maunaloa	Vine	A
Castilleja arvensis	Scrophulariaceae	Indian Paintbrush	Herb	A
Chamaecrista nictitans	Fabaceae	Partridge Pea	Herb	A
Citharexylum spinosum	Verbenaceae	Fiddlewood	Tree	A
Clusia rosea	Clusiaceae	Autograph Tree	Tree	A
Cordyline fruticose	Agavaceae	Ti	Shrub	PI
Crotalaria micans	Fabaceae	Rattlepod	Shrub	A
Crotalaria retusa	Fabaceae	Rattlepod	Shrub	A
Filicium decipiens	Sapindaceae	Fern Tree	Tree	A
Cyperus polystachyos	Cyperaceae	Pycreus	Herb	I
Desmodium cajanifolium	Fabaceae	Desmodium	Shrub	A
Desmodium triflorum	Fabaceae	Tick Clover	Herb	A
Dicranopteris linearis	Gleicheniaceae	Uluhe	Fern	A
Emilia fosbergii	Asteraceae	Pualele	Herb	A
Eragrostis pectinacean	Poaceae	Carolina Lovegrass	Herb	A
Hyptis pectinata	Lamiaceae	Hyptis	Vine	A
Lepisorus thunbergianus	Polypodiaceae	Pakahakaha	Fern	I
Leptecophylla tameiameiae	Ericaceae	Pukiawe	Shrub	I
Lygodium japonicum	Schizaeaceae	Japanese Climbing Fern	Fern	A
Megathyrus maximus	Poaceae	Guinea Grass	Herb	A
Melastoma candidum	Melastomataceae	Asian Melastome	Shrub	A
Melinis minutiflora	Poaceae	Molasses Grass	Herb	A
Melochia umbellata	Sterculiaceae	Melochia	Tree	A
Metrosideros polymorpha	Myrtaceae	‘Ōhi‘a	Tree	E
Mimosa pudica	Fabaceae	Sleeping Grass	Herb	A
Morella cerifera	Myricaceae	Wax Myrtle	Tree	A
Nephrolepis multiflora	Nephrolepidaceae	Sword Fern	Fern	A
Paraserianthes falcataria	Fabaceae	Albizia	Tree	A
Paspalum conjugatum	Poaceae	Hilo Grass	Herb	A
Persea americana	Lauraceae	Avocado	Tree	A
Polygala paniculate	Polygalaceae	Milkwort	Herb	A
Phaius tankervilleae	Orchidaceae	Chinese Ground Orchid	Herb	A
Phlebodium aureum	Polypodiaceae	Golden Polypody	Fern	A
Phyllanthus debilis	Euphorbiaceae	Niruri	Herb	A
Phymatosorus grossus	Polypodiaceae	Maile Scented Fern	Fern	A
Polygala paniculata	Polygalaceae	Rootbeer Plant	Herb	A
Psilotum nudum	Psilotaceae	Moa	Fern Ally	I
Psidium cattleianum	Myrtaceae	Strawberry Guava	Tree	A
Rhus sandwicensis	Anacardiaceae	Neneleau	Shrub	E
Sacciolepis indica	Poaceae	Glenwood Grass	Herb	A
Spathoglottis plicata	Orchidaceae	Malayan Ground Orchid	Herb	A

Table 1, continued				
Scientific Name	**Family**	**Common Name**	**Life Form**	**Status***
Spermacoce assurgens	Rubiaceae	Buttonweed	Herb	A
Schefflera actinophylla	Araliaceae	Octopus Tree	Tree	A
Schizachyrium condensatum	Poaceae	Beardgrass	Herb	A
Stachytarpheta sp.	Verbenaceae	Jamaican Vervain	Herb	A
Trema orientalis	Ulmaceae	Gunpowder Tree	Tree	A
Tridax procumbens	Asteraceae	Coat Buttons	Herb	A
Waltheria indica	Malvaceae	ʻUhaloa	Herb	I

A=Alien E=Endemic I=Indigenous PI=Polynesian Introduced. END=Federal and State Listed Endangered
Notes: Also observed unknown non-native species in Iridaceae.

- To minimize impacts to Hawaiian hawks, the applicant will avoid earthmoving within 100 meters of tall trees or any tree cutting during the breeding season for Hawaiian hawks (March through the end of September). If this time period cannot be avoided, the applicant will arrange for a hawk nest search to be conducted by a qualified biologist. If hawk nests are present on or near the project site, all landclearing activity will cease until the expiration of the breeding season
- Outdoor lighting may attract endangered seabirds, which may become disoriented by the lighting, resulting in birds being downed. To avoid potential seabird downing through interaction with outdoor lighting, no construction or unshielded equipment lighting will be used after dark between the months of April and October. All permanent lighting will be kept to minimum necessary levels, with shielded lights so as to lower the ambient glare, in conformance with the Hawaiʻi County Outdoor Lighting Ordinance (Hawaiʻi County Code Chapter 9, Article 14). Furthermore, all exterior lighting will consist of blue-deficient lighting such as filtered LED lights or amber LED lights, with a Correlated Color Temperature (CCT) of 2700 Kelvin. This will not only reduce the risk that threatened or endangered seabirds may be attracted to and then disoriented by lighting, but will also assist in protecting dark skies.
- Although not expected on the site, pre-construction will include another verification that there are no Hawaiian goose or nēnē (*Branta sandvicensis*) individuals or nests that could be disturbed by construction activity. If present, standard minimization measures will be instituted, and construction will not proceed until they have left the area; if necessary, resource agencies will be contacted.

In an email of May 19, 2021 (see Appendix 1a), neighboring property resident Tim Keller stated concern that feral pigs, chickens and rats displaced by the loss of habitat would relocate to his yard. However, it is more likely that the conversion from forest to urban uses where feral animals are more easily controlled would reduce the number of feral animals transiting from the property to neighboring residences.

An issue for construction in properties with ʻōhiʻa trees has recently surfaced. Two species of fungus called *Ceratocystis lukuohia and C. huliohia* produce a disease that is new to science and apparently new to Hawaiʻi – Rapid ʻŌhiʻa Death (ROD) (Hawaiʻi DOFAW 2017). This disease has killed hundreds of thousands of ʻōhiʻa trees across more than 34,000 acres of the Big Island. It was first discovered in Lower Puna. The property contains a number of ʻōhiʻa trees. Projects that harm or relocate ʻōhiʻa trees can spread the disease, and certain mitigation measures are recommended, although it is important to

recognize that treatment protocols are evolving. The following mitigation protocol is proposed and has been supplied to DOFAW for comment as part of the Draft EA review process:

- Prior to clearing the edges of the property, any isolated ʻōhiʻa trees on the boundary will be identified. Any such trees that are not planned for removal on the edges will be protected from disturbance entirely or cut and chipped or buried to ensure that they do not present a ready target for ROD infection that could spread to other trees;
- Treat any unavoidable scars on ʻōhiʻa trees that result from clearing to prevent infestation of the fungus; and
- Stack all removed ʻōhiʻa trees and dispose of by burying or chipping; do not remove from project site. Decontaminate boots and work tools before and after working in an area with ʻōhiʻa trees.

A final biological concern on the Big Island is related to clearing and the the movement of products such as scrap wood, rock fill and building materials, which can spread of invasive species, particularly little fire ants and coqui frogs. Both are rampant in the general area, although no fire ants were observed on the property itself during field reconnaissance. It is unlikely that fill material will be required to brought in; if so, it will be inspected for fire ants. Any material removed from the site to areas without fire ants or coquis will be inspected, and if necessary, treated.

3.1.4 Air Quality, Scenic Resources and Noise

Environmental Setting

Air quality in Hilo is generally excellent, although vog from Kilauea volcano is occasionally blown into this part of the island when this volcano is erupting. Even during eruptions, the persistent trade winds keep the project area relatively free of vog for most of the year. Motor vehicles provide another very minor source of air pollution, and combustion-derived air pollution in the entire State of Hawaiʻi is minimal. Hawaiʻi Island, like the rest of the state, meets the standards set by the Clean Air Act (CAA) and State of Hawaiʻi law (HRS Chapter 342B), and is within an attainment area. Ambient concentrations of air pollution are regulated by both federal and State of Hawaiʻi ambient air quality standards (AAQS). The National AAQS, as well as the State standards that are defined in Chapter 11-59 of the Hawaiʻi Administrative Rules, are set at levels that protect public health with a margin of safety, and are subject to periodic review and revision.

The property is not an area considered significant for its scenic character in the Hawaiʻi County General Plan, and no other scenic resources exist, aside from the low to medium-stature ʻōhiʻa forest, which has some scenic and open space value (see photographs in Figure 3).

Noise on the property is low to moderate and derived mainly from motor vehicles on Mohouli Street, with very minor noise from adjacent residences.

Impacts and Mitigation Measures

On-site mobile and stationary construction equipment will emit air pollutants from engine exhaust. The largest of this equipment is usually diesel-powered. Nitrogen oxides emissions from diesel engines can be relatively high compared to gasoline powered equipment, but the standard for nitrogen dioxide is set on an annual basis and is not likely to be violated by short-term construction equipment emissions. Carbon monoxide emissions from diesel engines, on the other hand, are low and should be relatively insignificant compared to vehicular emissions on nearby roadways. Another source of air quality impacts are uncontrolled fugitive dust emissions. State of Hawai‘i Air Pollution Control Regulations at Chapter 11-60, HAR, prohibit visible emissions of fugitive dust from construction activities at the property boundary, and thus an effective dust control plan for the project construction phase is essential. In addition, a neighbor has expressed concern about potential dust issues (see email from Tim Keller, Appendix 1a). Dust will be controlled by the following:

- The contractor will establish frequent watering program to keep bare-dirt surfaces in construction areas of the property from becoming significant sources of dust.
- If there any particularly dust-prone or dust-sensitive areas, wind screens will be installed.

Operationally, the Proposed Project would not measurably affect air quality or itself be subject to air quality effects.

During construction, there is potential for minor impacts to noise during construction because of excavation, grading, compressors, vehicle and equipment engine operation, and construction of new infrastructure, impacting nearby sensitive noise receptors on the margins of the development. Mitigation measures will be implemented to avoid or minimze noise impacts including limitation of working hours.

Operationally, the housing will produce low to moderate noise levels typical of multi-family housing. The increase in vehicular traffic from residents, visitors, and onsite work-related traffic operation of the facility will slightly increase traffic noise. All increases are expected to be modest and in a context of already moderate levels. No exceedances of DOH’s “maximum permissible” property-line noise levels would be expected. In terms of noise impacts to future residents from adjacent uses, the Fire and Police Dispatch Center is likely to have completed construction before affordable rental housing residents move in. The operating facility will not generate any substantial noise and will not impact the affordable rental housing units. Aside from this, adjacent property is all zoned for agriculture but currently utilized as large-lot residences and would not constitute a source of nuisance noise.

The removal of the low to medium-stature ‘ōhi‘a forest and conversion to multi-family housing involves some loss of open space and scenery. The project will, however, match the urbanization of the general area that is occurring up and down the north side of Mohouli Street from Komohana Street to Kūkūau Street, including several senior housing facilities, the Fire and Police Dispatch Center, and the Sunrise Estates subdivision. No impacts to scenic areas identified in the Hawaii County General Plan would occur.

3.1.5 Hazardous Substances, Toxic Waste and Hazardous Conditions

A Phase I Environmental Site Assessment (ESA) was conducted for the property site by Myounghee Noh and Associates (MNA). The Phase I ESA is attached to this EA as Appendix 4. A Phase I ESA aims to identify *recognized environmental conditions* (REC) that exist on or near the property and have the potential to impact the project site. The term recognized environmental conditions means the presence or likely presence of any hazardous substances or petroleum products that indicates an existing release, a past release, or a material threat of a release into structures on the site or into the ground, groundwater, or surface water of the site. The Phase I ESA included site reconnaissance, interviews with land owners and managers, and research using a variety of State and federal databases.

No RECs were identified. No RECs were noted during historic aerial photograph or topographic map review, and site reconnaissance in October and November, 2016 found no indication of illegal dumping or other RECs. One propane aboveground storage tank (AST) was located on a property to the west. The AST was in good condition, and there was no stressed vegetation, and therefore, the AST is not considered a REC. Records indicated two hazardous waste sites, one current and one former, located ¾ mile away from the subject property: 600 Wailoa Street, where the Lanakila Homes Phase 3B-4 site was identified as having heavy metal and lead contaminated soils and is managed with controls. Due to the distance of this site from the property, it is not considered a REC. At a location on Kaumana Drive there had been a HELCO Pole-Mounted Transformer No. 20938 at Pole No. 7. It was identified as having petroleum contamination in the soil. The contaminated soil was removed, and a No Further Action letter was issued on June 5, 2012. Due to the distance of this site from the property, this is not considered an REC. State and federal records were searched, and no records were identified for the property of National Priorities List (NPL) sites, federal Resource Conservation and Recovery Act (RCRA) CORRACTS (RCRA Facilities that are undergoing "corrective action") and Non-CORRACTS Treatment Storage Disposal Facilities, Delisted NPL sites, federal or state Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites, federal CERCLIS No Further Remedial Action Planned (NFRAP) sites, landfill or solid waste disposal sites, State Leaking Underground Storage Tank (UST) list sites, State Voluntary Cleanup sites, federal RCRA Generator sites, State registered UST sites, Institutional Controls/Engineering Controls registries, federal Emergency Response Notification System (ERNS) list sites, or federal or State Brownfields sites.

Impacts and Mitigation Measures

No impacts would be expected as the site is properly prepared for the project and the housing facilities are constructed. Although it is unlikely that any potentially hazardous, toxic or radioactive material would be found on the property, reasonable precautions would be undertaken by the applicant and its contractors in the context of the project construction Best Management Practices for the appropriate response and remediation should any hazardous, toxic, or radioactive material be encountered during construction.

3.2 Socioeconomic and Cultural

3.2.1 Socioeconomic Characteristics

The Proposed Project would provide much-needed affordable rental housing for the residents of Hilo and vicinity. Population as measured in the 2010 U.S. Census (the most recent U.S. census) for Hilo, a Census Designated Place (CCD), was 43,263 (U.S. Census Bureau 2010a). Table 2 provides information on the socioeconomic characteristics of the State of Hawai‘i, the County of Hawai‘i, and Hilo CDP, from the U.S. Census Bureau.

The great majority of the population in Hilo is non-white, and it is one of the most diverse populations in the U.S. Hilo also skews slightly elderly compared to the State as a whole. Other areas of the County are older, but a large portion of this population, particularly in West Hawai‘i, is retired Mainland immigrants. Several segments of the population that typically exhibit disadvantaged measures of social welfare are disproportionately represented in the population of Hilo as compared to the State of Hawai‘i. Median family income is much less than the State as a whole. More than 17 percent of individuals have income below the poverty level, almost double the statewide rate. Similar patterns hold for households receiving welfare, food stamps, and disability payments.

Table 2. Selected Socioeconomic Characteristics

Description	State of Hawai‘i	County of Hawai‘i	Hilo CDP
Total Population	1,360,301	185,079	43,263
Median age (years)	37.2	40.9	40.5
Total housing units	519,508	82,324	15,483
Older than 65 years	19.0%	21.9%	20.3%
Median Household Income[2]	$81,275	$62,409	$63,283
Individuals below poverty level[2]	9.3%	13.1%	17.1%
Race and Hispanic Origin			
White alone	24.7%	33.7%	19.7%
Black or African American	1.6%	0.6%	0.8%
American Indian or Alaska Native	0.3%	0.5%	0.1%
Asian alone	38.6%	22.2%	32.4%
Native Hawaiian/Pacific Islander	5.9%	8.5%	10.3%
Two or More Races	23.6%	29.5%	32.0%
Hispanic or Latino (of any race)	8.9%	11.6%	11.8%

Source: U.S. Census Bureau 2010a, 2010b, and 2010c
[2]Source: U.S. Census Bureau 2019
*Estimates for CCDs have a high margin of error due to small population and sample size.

Impacts and Mitigation Measures

The Proposed Project is not expected to affect population size or demographics. Having adequate affordable rental housing is critically important for promoting a healthful and socially just environment for the population of Hilo and East Hawai‘i. The primary impact on socioeconomic conditions would be to provide much-needed affordable rental housing for the residents of Hilo. As discussed in Section 1.1,

HICDC has submitted a State Land Use Boundary Amendment to reclassify the property to the State Land Use Urban District and intends to utilize the Section 201H, HRS process to exempt the current County zoning to obtain a zoning of RM-4 (multi-family residential, 4,000 square feet minimum per building site). This extends a cluster of affordable multi-family housing from an area *makai* and is compatible with nearby uses, which are primarily single-family residential uses. Maps and a detailed discussion of consistency with land use designations is contained in Section 3.6.

Along with those beneficial social effects, motorists, pedestrians and bicyclists on Mohouli Street may experience slightly greater traffic, and residents within the agriculturally zoned residential lots of Kūkūau Street may be slightly impacted through having a multi-family housing as neighbors in area that previously was forested and had no active human use.

In response to concerns expressed by adjacent residents during early development phases of the proposal, the applicant will build a fence within the portion of the property that abuts the Kūkūau Street lots in order to reduce access and visual concerns.

3.2.2 Cultural Resources

This section utilizes a variety of previous studies concerning Hilo and more specifically Waiākea Ahupuaʻa (in which the property is located), particularly McEldowney (1979), Kelly (1981) and Maly (1996), as well as the archaeological survey prepared for the site (Appendix 3).

Traditional Cultural Background

The earliest historical knowledge of Hilo comes from legends written by Kamakau (1961) of a 16th century chief ʻUmi-a-Liloa (son of Liloa), who at that time ruled the entire island of Hawaiʻi. Descendants of Umi and his sister-wife were referred to as "Kona" chiefs, controlling Kaʻū, Kona, and Kohala, while descendants of Umi and his Maui wife were "Hilo" chiefs, controlling Hāmākua, Hilo, and Puna (Kelly 1981:1). According to Kamakau (1961), both sides fought over control of the island, desiring access to resources such as feathers, *māmaki* tapa, and canoes on the Hilo side, and *wauke* tapa, and warm lands and waters on the Kona side (c.f. Kelly 1981:3). Kepā Maly (1996) conducted historical research for the lands of Wainaku, Pōnahawai, Waiākea, and Piʻihonua. He evaluated the significance of the use of the Hawaiian word *wai* in the place names: Pōnahawai, Waiākea, Wainaku, and Wailuku (River). According to Maly, the word *wai* (water) has strong metaphorical associations with the Hawaiian concept of wealth (*waiwai*), stressing its cultural importance (Maly 1996:A-2). In this context, the importance of Hilo can be better understood, with its copious streams that fed taro pondfields and its numerous fishponds.

Sometime near the end of the 16th century or early in the 17th century, the lands of Hilo were divided into *ahupuaʻa,* which till today retain their original names (Kelly 1981:3). These include the *ahupuaʻa* of Puʻuʻeo, Piʻihonua, Punahoa, Pōnahawai Kūkūau and Waiākea (where the property is located). The design of these land divisions was such that residents could have access to all that they needed to live, with ocean resources at the coast, and agricultural and forest resources in the interior. However, only Piʻihonua and Waiākea provided access to the full range of resources stretching from the sea up to 6,000 feet along the slopes of Mauna Kea (Kelly 1981:5).

Waiākea, which translates as "broad waters" (Pukui et al. 1976:220) is home to the Wailoa River and portions of Hilo, Reed's, Kuhio, and Puhi Bays. Historically, the ocean resources of Hilo Bay were vital to everyday subsistence. Kamakau describes various fishing techniques as follows:

> "… with basket traps; with hook and line… by drugging. A man could also fish with his hands, or with crab or shrimp nets, or with a pole from a ledge or the seashore or catch fish in tide pools with a scoop net, or go along the seashore with a net, or set a fishline; or search for fish with a small basket trap or draw a net over sandy spots in the sea or up onto the shore; or drive fish into nets by splashing; or with a pole. But these were not expert ways of fishing; they were just for the taking of fish to make living more pleasurable…" (Kamakau 1976:59-60 cited in Kelly et al. 1981:16-17),

Marine-based subsistence was also strongly linked to social organization. Strict *kapu* were enforced, which dictated when and where certain varieties of fish such as *'ōpelu* and *aku* could be caught. A dedicated *aku* fishing ground or *ko'a* known as Maka-o-Kū was located on the shore of the Waiākea peninsula, near present day Coconut Island (Maly 1996). Theoretically, access rights to fishing areas and ocean resources were defined by *ahupua'a* boundaries, with residents of a specific *ahupua'a* only taking fish within their own land division. However, in the case of Waiākea Ahupua'a, the Waiākea fishery extended straight across Hilo Bay, allowing residents of the adjacent *ahupua'a* only limited rights in the fishery (Kelly et al. 1981).

Extensive fishponds were developed in the vicinity of Hilo Bay, including the royal fishponds, five spring-fed inland ponds whose yield was reserved solely for the highest of *ali'i*. The largest of these royal ponds, known as Waiākea, was located a mile southwest of the property in the Wailoa River. Religious ritual accompanied the creation and maintenance of the royal ponds, which according to a historic account from 1823, were surrounded by small huts for their caretakers (Kelly et al. 1981).

In addition to marine resources, farming was essential to the residents of Waiākea. Wet taro was cultivated on mounds built into the existing marshlands along the Wailoa River behind the sand dunes of Hilo Bay using the *kipikipi* method, which made a landscape of raised islands and ditches (Maly 1996). According to historical accounts in by Handy and Handy (1972) dry taro was planted wherever there was enough soil on the lava fields of Waiākea and on the slopes between the rivers.

Post-European Contact

Captain George Vancouver, an early European explorer who met with Kamehameha I at Waiākea in 1794, recorded that Kamehameha was there preparing for his invasion of the neighbor islands, and that Hilo was an important center because his *Peleleu* fleet of 800 canoes were being built there (Moniz n.d.; Tolleson 2001). The people of Hilo had long prepared for Kamehameha's arrival and collected a large number of hogs and a variety of plant foods to feed the ruler and his retinue. Kelly et al. (1981) surmised that the people of Hilo had actually prepared for a year prior to Kamehameha's visit and expanded their fields into the open lands behind Hilo to accommodate the increased number of people who would be present. It was during this early Historic Period that Waiākea Ahupua'a became part of Kamehameha I's personal land holdings (Moniz n.d.).

In addition to providing valuable subsistence resources, the protected waters and sandy shores of Hilo Bay offered a calm and safe landfall for ships involved in whaling and the sandalwood trade. The sandalwood trade was initiated in the 1790s but did not become successful until 1812; Kamehameha held the monopoly on the trade and oversaw its management by his chiefs until his death. Thereafter, King Liholiho's favored chiefs mismanaged the trade, which lead to the depletion of the forests and the end of the sandalwood trade by 1830 (Kelly et al 1981). According to Kelly et al. (1981), historic accounts about whaling suggest that Hilo Bay was not a preferred port for the whalers due to the missionary influence and the resultant lack of liquor and women; sailors preferred Honolulu and Lahaina as ports-of-call.

At the end of the 1830s, industrial development was on the rise in Hilo, despite the decline in whaling and the end of the sandalwood trade. In a letter written in 1840, Reverend Titus Coan remarked on the conditions in Hilo:

> "Industry is increasing. Our ports and places of trade begin to put on the air of activity and life. Temporal improvements and comforts are fast increasing at Hilo, that is, near the station. Two stores of goods are opened here, and three sugar-mills have recently gone into operation near us. Sugar-cane is being planted to a considerable extent; business assumes more tone and energy, and many of the people are approximating towards industry and competence. Probably the amount of cloth worn by the people has increased ten or twenty fold during four years past. Labor is in better demand and wages are rising continually" (Kelly et. al.1981:49).

A period of great socio-political change began with the arrival of the first missionaries to Waiākea in 1824, culminating in 1848 with the formal land division known as the Great *Māhele*. The introduction of new spiritual concepts combined with an increased involvement in international trade and global politics led to a shift in settlement patterns from traditionally dispersed Hawaiian villages to more concentrated urban population centers. A fateful event occurred on the evening of November 7, 1837, when a large tsunami hit Hilo Bay. Reverend Coan described the scene as follows:

> "… we heard a heavy sound as of a falling mountain upon the beach. This noise was followed by loud wailing and cries of distress, extending for miles around the shores of the bay… House furniture, calabashes, fuel, timber, canoes, food, clothing, everything floated wild upon the flood. The waters rushed up valleys, carried away fish-ponds, and swept over many plantations of food" (Maly 1996:18).

After the tsunami, Hilo underwent a major religious revival that lasted from 1837 until 1840 and included mass conversions and meetings of up to 10,000 worshippers. Other events that had a profound effect on the demography of Hilo was the measles epidemic of 1848, which claimed one third of the population of the island, followed by an outbreak of smallpox in 1853; later outbreaks of plague and leprosy caused the population to dwindle further (McEldowney 1979).

Pressure from foreign investors, combined with the above-described demographic and socioeconomic changes, resulted in a shift from traditional land tenure to a system of private land ownership that culminated in the formal land division known as the *Māhele ʻĀina* or Great *Mahele* of 1848. During the *Māhele ʻĀina* all the lands of Hawaiʻi were classified into one of three categories: Crown Lands (for the

occupant of the throne), Konohiki Lands (to be divided among 245 chiefs) and Government Lands. Conditions of the *Māhele ʻĀina* also afforded native tenants the right to claim, and acquire title to, parcels that they actively lived on or cultivated for a living (Maly 1996). These *kuleana* claims were essentially transfers of ownership from the *aliʻi nui* (high chief) or *konohiki* (lesser chief/overseer), who had been awarded ownership of the *ahupuaʻa* by Kamehameha III, to the commoners. The Board of Commissioners oversaw the program and administered the *kuleana* as Land Commission Awards (LCAw.).

Historically, the entire *ahupuaʻa* of Waiākea was treated as personal land by Kamehameha I, who then passed it on to his son Liholiho. Waiākea was later inherited by chiefess Kaunuohua, a grand-daughter of Keawemauhili and *kahu* of Alexander Liholiho (Kameʻeleihiwa 1992), who later relinquished the *ahupua'a* during the *Māhele ʻĀina.* As a result of the *Māhele*, Waiākea Ahupuaʻa was set aside as Crown Lands for Kamehameha III. In addition, twenty-six *kuleana* claims were registered within Waiākea for house lots and cultivation. Most were located along major inland roads or fishponds near Hilo Bay, (Devereux et. al. 1997; Moniz n.d.). No *kuleana* were located on or near the property.

Waiākea and the Heyday of Sugar Cane

Following the *Māhele,* the population of Hilo grew and the scattered upland habitations gave way to sugar cultivation (McEldowney 1979:37). In Waiākea, Kamehameha IV leased large portions of Waiākea to outside interests for pasture and sugar cane cultivation (Moniz 1992). In 1861 S. Kipi leased the Crown Lands of Waiākea for the rate of $600 dollars per year to be used as pasture for five years (Kelly et al. 1981; Maly 1996). In 1874 the first lease for sugar cane cultivation in Waiākea was granted to Rufus A. Lyman for a term of 25 years. The lease granted him all the privileges of the land including the use of the fishponds and the cutting of firewood (Maly 1996).

This lease was eventually transferred to the Waiakea Mill Company, founded by Alexander Young and Theo H. Davis, and the Waiakea Sugar Plantation was established in 1879. The Waiakea Mill Company started with about 350 acres of cultivated lands they had acquired from Lyman. In 1888 the company acquired a 30-year lease that increased their land holdings in Waiākea Ahupuaʻa. When the lease ran out in 1918, the acreage under cultivation had increased to nearly 7,000; but without a lease the *ahupuaʻa* fell under the homesteading laws, which required the government to lease the land to individual growers. Waiakea Mill Company was expected to grind the crop for the independent growers under a contract that gave the company 40 percent of the proceeds from the sale of the refined sugar. Contractual and legal problems, combined with a declining sugar market and the devastating *tsunami* of 1946, led the Waiakea Mill Company to cease operation in 1947, and offer its property under General Lease 2741 to private cultivators for the purpose of growing cane (Maly 1996). During its 68 years of operation, the Waiakea Mill Company was a major force in shaping the economic and social growth of Hilo, and certainly left its mark on both the cultural and physical landscapes of the area.

A plantation railroad system connected the sugar cane fields with the mill at Wailoa Stream, about a half mile southwest of the property. The railroad in Hilo was in operation from 1899 until 1946. The railroad's primary business centered on the transport of raw sugar from the mills to the harbor and hauling plantation freight while the transport of passengers was merely a secondary interest. On April 18, 1899 the Republic of Hawaiʻi and the Hilo Railroad Company (HRC) reached an agreement for the HRC to

"build and operate a railroad in, from between and through the districts of Hilo, Puna, Hāmākua, Kohala, Kona, and Kau" (Kelly et al. 1981:303). This rather liberal agreement granted the following to the HRC, subject to the approval of the Minister of the Interior: Government lands for the HRC to build their stations, depots and other structures; a free right of way across Government Lands and roads; and free use of water for the construction of the railroad (Kelly et al. 1981).

Six experienced Honolulu businessmen who hoped to recreate their success on O‘ahu in the cultivation and transport of sugar cane were behind the HRC venture on the island of Hawai‘i. In the fall of 1899, the HRC began building its tracks from its terminus in Waiākea 8.3 miles south to the Olaa Sugar Company Mill near Kea‘au, Puna District (Kelly et al. 1981). The investors behind the HRC chose this route as their first rail service because they were also backing the Olaa Sugar enterprise. Interestingly, the first product transported by rail from Olaa Sugar Company was not sugar, but rather timber that had been recently cleared from forests in the area and supplied to the HRC as 35,000 railroad ties (Kelly et al 1981).

In 1900, a small wharf was constructed along the eastern bank of the Wailoa River for the landing of material necessary to build the tracks, buildings and railroad cars. The first locomotive made landfall on May 15, 1900, and rail service from Hilo to Kea‘au began on June 18, 1900. The Wailoa River railroad wharf was expanded in 1901 and a large warehouse was built to store up to 15,000 bags of sugar (Kelly et al 1981). By the end of 1901, HRC had completed construction of more than 35 miles of railroad line, which included 25.1 miles from Waiākea to Kapoho and a 5-mile branch to Pāhoa. In 1902, a new sugar warehouse, with a 35,000 bag capacity, was built on the eastern shore of the Wailoa River. In 1903, a new railroad wharf was built north of the mouth of the Wailoa River in Hilo Bay and the railroad line from Waiākea to Hilo Town was completed, including two bridges over the Wailoa River.

The HRC ran mostly deficits during 1901-1905, but the advent of trans-Pacific steamship service in Hilo Bay promised to make the venture profitable. In 1906, the HRC directors paid to put together a proposal to construct a breakwater in order to accommodate the steamships and presented it to the U.S. Army Corps of Engineers. The HRC was able to secure the appropriation for the breakwater in 1907 by making assurances to the U.S. government that they would construct a railroad north of Hilo, in addition to wharf facilities (Kelly et al. 1981). Breakwater construction began in 1908 and the HRC hauled most of the rock from Puna to Hilo for the breakwater project, which compensated for the decline in the sugar industry and resulted in increased revenue for the years 1908-1910. From 1909 to 1913, the HRC laid track from Hilo northward to the district of Hāmākua and southward through Puna. This expansion was funded by $4.5 million worth of stocks and bonds with annually rising interest rates that the HRC could not afford to pay. The HRC's failure to meet their bond interest obligations resulted in foreclosure in 1916. Later that year, the Hilo Railroad Company was reorganized as the Hawaii Consolidated Railway (HCR) under the leadership of businessmen who represented the companies that ran the sugar plantations along the railroad. Hilo's railroad history helped shape much of the economic activity and land use of East Hawai‘i, but did not leave any traces on or near the property.

Existing Cultural Resources and Practices

The property consists of a low to medium-stature, moderately degraded ‘ōhi‘a forest on a geologically recent (1881) lava flow. It does not contain many natural features that might be important in gathering or ritual, such as caves, springs, *pu‘u*, etc., although the ‘ōhi‘a trees could provide some gathering resources

and have symbolic value. In general, with the possible exception of ʻōhiʻa, the vegetation does not contain the quality and quantity or resources that would be important for native gathering. The location about a mile away from the setting for the historical events of Hilo associated with royal residences, battles and visits, fishponds and intensive farming, and sugarcane mills and railroads – particularly considering that the entire surface of the area was covered by lava in the 1881 eruption – avoids association with significant cultural sites. The property does not currently support any known traditional resource uses. Archaeological studies (most relevantly, Appendix 2), cultural studies of Waiakea (e.g., Maly 1992), and consultation with OHA and neighbors during the EA early consultation process did not indicate any cultural sites or practices.

Cultural Resources: Impacts and Mitigation Measures

The Proposed Project will not have an adverse effect on any cultural resources or practices. The site currently has no uses and few resources. Cultural use of lehua and liko from the ʻōhiʻa, which is more or less on hold currently because of concerns about Rapid ʻŌhiʻa Death, would not be affected, because there is abundant ʻōhiʻa in the forests above Hilo that is protected by its status within the Conservation District. There do not appear to be any valued cultural, historical, or natural resources on the property, and no known exercise of traditional and customary native Hawaiian rights. Therefore, no such resources would be affected or impaired by the proposed action, and there is no need for any action for bodies approving land use designation changes or other discretionary approvals to take measures to reasonably protect native Hawaiian rights.

The Office of Hawaiian Affairs, State Historic Preservation Division, and other parties were supplied a link to the Draft EA, which has also been made available to agencies and the general public, in order to help finalize this finding.

3.2.3 Archaeology and Historic Properties

The entire parcel is completely covered by pahoehoe lava from the 1880 to 1881 flow. Any historic properties that may have been present were covered and destroyed in 1881 due to the complete coverage and thickness of the lava flow. Since 1881, the property has grown shrubs and then trees but has never been used for farming, grazing or other activities. Two prior archaeological studies have been conducted in the immediate vicinity of the property, neither of which identified any historic properties. An archaeological field inspection was completed for the property on August 6, 2020 (Appendix 3). The field inspection found no historic properties of any kind. The recommended determination of effect for the proposed project was "no historic properties affected." The field inspection report was submitted in January 2021 to the State Historic Preservation Division (SHPD) for review as part of the State Land Use Boundary Amendment permit process, pursuant to Chapter 6E, Hawaiʻi Revised Statutes. By letter of January 15, 2021 (see Appendix 3), SHPD concurred with the findings of the inspection.

3.3 Infrastructure

3.3.1 Utilities and Public Services

Existing Facilities and Services

Electrical power to the site is supplied by Hawaiian Electric, a privately owned utility company, via its island-wide distribution network, with poles and lines on Mohouli Street. Telephone and cable TV/Internet service are available from Hawaiian Telcom and Spectrum Cable.

There is a 12-inch waterline fronting the property within the Mohouli Street right-of-way and also a 12-inch line within the Kupuna Street right-of-way. The project would connect both lines through the property and provide ample fire flow. The Department of Water Supply (DWS) has indicated that water will be available for the project and has provided conditions for granting a water commitment (see letter of June 10, 2021 in Appendix 1a). In keeping with recommendations provided by the State Commission on Water Resources Management (see letter of May 19, 2021 in Appendix 1a), information about the project has been supplied to the Planning Department and DWS for incorporation into the County's Water Use and Development Plan; water efficient practices and fixtures are an integral part of project design; stormwater will be handled appropriately onsite; landscape irrigation will be minimal, because of the climate of the area; and water uses will be calculated by an engineer to ensure adequate evaluation of the project's impact upon water use and resources. No impact to public trust water would be expected.

Wastewater will be conveyed to the County wastewater system by installation of a sewer line along the north property lines of parcels TMK: 2-4-1: 176 and 177 that will tie into the sewer manhole on parcel 177. Drainage improvements will consist of swales and underground connections to drywells that will be spaced within the property to capture project generated run-off. Solid waste will be collected on site and removed periodically by private haulers. Medical, government, social service, and recreational services and facilities are located nearby at various locations within central Hilo.

Impacts and Mitigation Measures

All necessary utilities and services are available for the project. No adverse impact upon the ability of the utilities to supply services is expected. No adverse effect to medical, government, social service, and recreational services would occur as a result of the housing, which is expected to be occupied almost entirely with existing East Hawai‘i residents who already utilize such services.

In summary, the Proposed Project would require extension and upgrade of existing facilities but would not have any substantial impact on existing utilities or public services.

3.3.2 Roadways and Traffic

A Traffic Impact Assessment Report (TIAR) for the Proposed Project was conducted by AECOM Technical Services, Inc. The report is attached as Appendix 2 and summarized below.

Existing Facilities

As shown in Figure 4, the proposed facility's access is via an easement over parcel 2-4-001:176 to the intersection of Kupuna Place at Mohouli Street, which currently provides access to the Mohouli Senior Residences and the Adult Day Center. Kupuna Place intersects Mohouli Street at an unsignalized "T"-intersection with STOP-sign control on the Kupuna Place leg of the intersection. Vehicles turning in and out of Kupuna Place are fully accommodated. The Kupuna Place approach is configured with a single lane, although there is sufficient width so that right-turning and left-turning vehicles can move concurrently. There is a refuge in the painted Mohouli Street median for vehicles turning left out of Kupuna Place onto Mohouli Street. The eastbound Mohouli Street approach is a single-lane approach with a median left-turn lane for traffic turning into Kupuna Place. The westbound Mohouli Street approach is configured with a through lane and an exclusive right-turn lane.

There are no sidewalks along Mohouli Street between Komohana Street and Kūkūau Street, but the wide, paved shoulders are used by pedestrians as sidewalks and by bicyclists as bike lanes. There are sidewalks along the internal roadways within the Mohouli Senior Residences, including on Kupuna Place. There are no crosswalks across the approaches at the Kupuna Place/Mohouli Street intersection. At this time, the property is not served by fixed public transit routes.

Major streets of interest in the area include Mohouli Street, Komohana Street, and Kūkūau Street. These streets all function to transmit traffic from the *mauka* neighborhoods of Hilo back and forth to the major centers of downtown Hilo and Waiakea.

Impacts and Mitigation Measures

Hale Ola O Mohouli will add up to 90 affordable residential units utilizing Kupuna Place at Mohouli Street as the primary access. This intersection currently provides access to 184 residential units at the Mohouli Senior Residences as well as Adult Day Center. It will also provide access for the Fire and Police Dispatch Center, which will soon be in construction according to the Hawai'i County Department of Public Works (DPW). Traffic from all three facilities must be considered – along with the natural growth in traffic in the general area – in order to evaluate the performance of this intersection in the future. The additional traffic from Hale Ola O Mohouli may also have some impact on other intersections in the area, particularly the nearby ones of Mohouli Street at Komohana Street, and Mohouli Street at Kūkūau Street.

To calculate effects, traffic data was collected and analyzed from each of these intersections. Vehicular turning movement, bicycle, and pedestrian counts were conducted at the Mohouli Street/Kupuna Place intersection during several AM and PM peak traffic periods in October 2020. Potentially atypical conditions due to COVID-19 related restrictions necessitated use of alternative methods for establishing base condition traffic volumes. Base traffic turning movement volumes at the Mohouli Street/Komohana

Street and the Mohouli Street/Kūkūau Street intersections were obtained from a 2011 TIAR for the first increments of senior housing. State Department of Transportation (HDOT) link traffic volumes on Mohouli Street and on Komohana Street for years 2016, 2017, 2018, and 2019 were obtained and used to adjust the traffic turning movement counts to an estimate of what the base traffic volumes would be without the effects of COVID-19. These HDOT counts were also used to help estimate future ambient traffic growth rates.

Details of the traffic analysis are found in Appendix 2. In summary, the proposed Hale Ola O Mohouli development is projected to generate 48 vehicles per hour (vph) during the AM peak hour with 10 vph inbound and 38 vph outbound. In the PM peak hour, it is expected to generate 68 vph, with 44 vph inbound and 24 vph outbound. The additional generated traffic is forecasted to have minor impacts on intersection operations at the intersections in the vicinity. Assisting in reducing traffic impacts to minimal levels is a proposed driveway at the *mauka* end of the property, which will be restricted to right-in/right-out movements. This will help handle many inbound trips and also *mauka*-bound outbound trips, and will reduce the number of vehicles entering and existing at Kupuna Place (see Figure 3). The existing roadway infrastructure would be able to accommodate traffic generated by the proposed Hale Ola O Mohouli development.

The TIAR recommended the following improvements:

- Implement the proposed right-in/right-out driveway on Mohouli Street. As part of the implementation, restripe part of the wide paved shoulder on westbound Mohouli Street as a right-turn only lane into the Hale Ola O Mohouli development. *This recommendation is carried through in the design of the facility and will be coordinated with the Hawai'i County DPW*.
- Assure that future major developments occurring in the area with traffic impacts to the segment of Mohouli Street between Komohana Street and Kūkūau Street provide an evaluation of traffic signal warrants for the Mohouli Street/Kupuna Place intersection. *The Hawai'i County DPW has been tasked through Special Permit conditions for Fire and Police Dispatch Center to regularly monitor traffic in this area and particularly at the intersection of Mohouli Street and Kupuna Place*.

With these improvements and monitoring, no significant traffic impacts would be expected to occur. The Hawai'i County Police Department provided an initial review of the project during early consultation and wrote a letter of April 28, 2021 (see Appendix 1a) indicating no comments at this time. They have been provided a link to the Draft EA.

In an email of May 19, 2021 (see Appendix 1a), neighboring property resident Tim Keller stated concern that having a right-in/right out *mauka* driveway to the housing complex would funnel traffic west onto Mohouli and then north onto Kūkūau Street, increasing the traffic in his neighborhood because of motorists bound to *makai* destinations in Hilo. While it is likely that some *mauka*-bound traffic will exit the *mauka* driveway, effects to Kūkūau Street are unlikely. The absence of a signal on Kūkūau Street at Komohana Street, and the presence of a signal at Mohouli Street, makes it counterintuitive to utilize a roundabout route through Kūkūau Street to access *makai* destinations in Hilo. Therefore, no significant increase in traffic to Kūkūau Street between Mohouli Street and Komohana Street is thus expected.

3.4 Secondary and Cumulative Impacts

The Proposed Project will not involve any substantial secondary or cumulative impacts, such as population changes or effects on other public facilities. HICDC expects that the great majority of residents of Hale Ola O Mohouli will be existing residents on the Island of Hawai‘i, and likely East Hawai‘i, based on the substantial local need and previous affordable housing projects. The jobs generated by construction and maintenance of the facility are very likely to be filled by local labor. Thus, no significant net influx of population to East Hawai‘i would be expected. Traffic can be considered a secondary impact of facility development, and it has been fully evaluated through a Traffic Impact Assessment Report (TIAR), as discussed above in Section 3.3.2.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. The Proposed Project will have very limited and temporary construction period impacts, such as noise, traffic, dust and sedimentation. Three other projects are known to be in planning in the vicinity. Directly adjacent is the Fire and Police Dispatch Center, which, as previously discussed, the Hawai‘i County DPW expects will soon be in construction. About 1,000 feet away on the land extending from the current terminus of Ponahawai Street between Komohana and the Mohouli Streets is the proposed Wailani mixed-use project. In planning since 2009, and scheduled to begin construction soon, the residential/commercial project is situated on a 171-acre parcel of land between Komohana Street and Mohouli Street. The design, which has varied widely over the decade of planning, currently calls for up to 700 residential units and a maximum commercial floor space of 420,000 square feet. Ponahawai Street would be extended to Mohouli Street to deal with traffic, and streets would have curbs, gutters and sidewalks to provide an urban and walkable feel. Finally, a Portuguese Cultural Center is planned for the corner of Komohana and Ponahawai Streets. The roughly 6,000 square foot facility would serve as a museum, performance space and dining hall and would also include a garden and stone oven. Fundraising is underway, but the timing of construction is currently not set. The scale of the project has recently been downsized.

During construction, there is at least a small potential for noise, traffic and dust impacts from the four projects to acccumulate, under the scenario of two or more more being constructed at the same time. These impacts are mitigable and can be handled by construction-phase measures that can easily be implemented by the Hawai‘i County DPW in coordination with the HICDC and other parties involved in construction. As discussed above, permanent traffic levels on Mohouli and Komohana Street would clearly rise as a result of all four projects – with most attributable to the Wailani project – but would be largely mitigated by the built-in mitigation of the extension of Ponahawai Street to Mohouli Street. Traffic impacts would not be severe and level of service would remain acceptable.

3.5 Required Permits and Approvals

The following permits and approvals would be required:

- State Land Use District Boundary Amendment from Agricultural to Urban by Windward Planning Commission and Hawai‘i County Council
- 201H Exemption of County Zone (Windward Planning Commission and Hawai‘i County Council)
- National Pollutant Discharge Elimination System Permit (State DOH)

- Grading, Grubbing and Driveway Permits (County DPW)
- Building Permits and Plan Approval (County DPW and Planning)

3.6 Consistency with Government Plans and Policies

3.6.1 Hawai‘i State Plan

Adopted in 1978 and last revised in 1991 (Hawai‘i Revised Statutes, Chapter 226, as amended), the Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State's long-run growth and development activities. The three themes that express the basic purpose of the *Hawai‘i State Plan* are individual and family self-sufficiency, social and economic mobility and community or social well-being. The Proposed Project would promote these goals by providing affordable rental housing, thereby enhancing quality-of-life, self-sufficiency, and community, economic and social well-being.

3.6.2 Hawai‘i State Land Use Law

Chapter 205 HRS classifies all land in the State of Hawai‘i into one of four land use categories – Urban, Rural, Agricultural, or Conservation. The property is currently in the State Land Use Agricultural District (Figure 7a). HICDC has filed a petition with the County of Hawai‘i to reclassify the property to the Urban District. The process will involve a public hearing before the Windward Planning Commission, which will provide a recommendation to the Hawai‘i County Council, which must pass an Ordinance to amend the District Boundary.

The State Land Use Boundary Amendment request is in conformance with the appropriate standards. A brief summary of conformance to standards related to effects on the health and safety of the general public, as expressed in Chapter 15-15, HRS, Section 18, follows:

> It shall include lands characterized by "city-like" concentrations of people, structures, streets, urban level of services and other related land uses; it shall take into consideration the following specific factors:

- Proximity to centers of trading and employment except where the development would generate new centers of trading and employment.

Discussion: The property is within the developed area of Hilo. In the immediate vicinity there are hundreds of residential units to the north, and east, including the Sunrise Estates/Ridge residential subdivisions. Furthermore, the LUPAG Map designation of Medium Density Urban supports the requested State Land Use Designation.

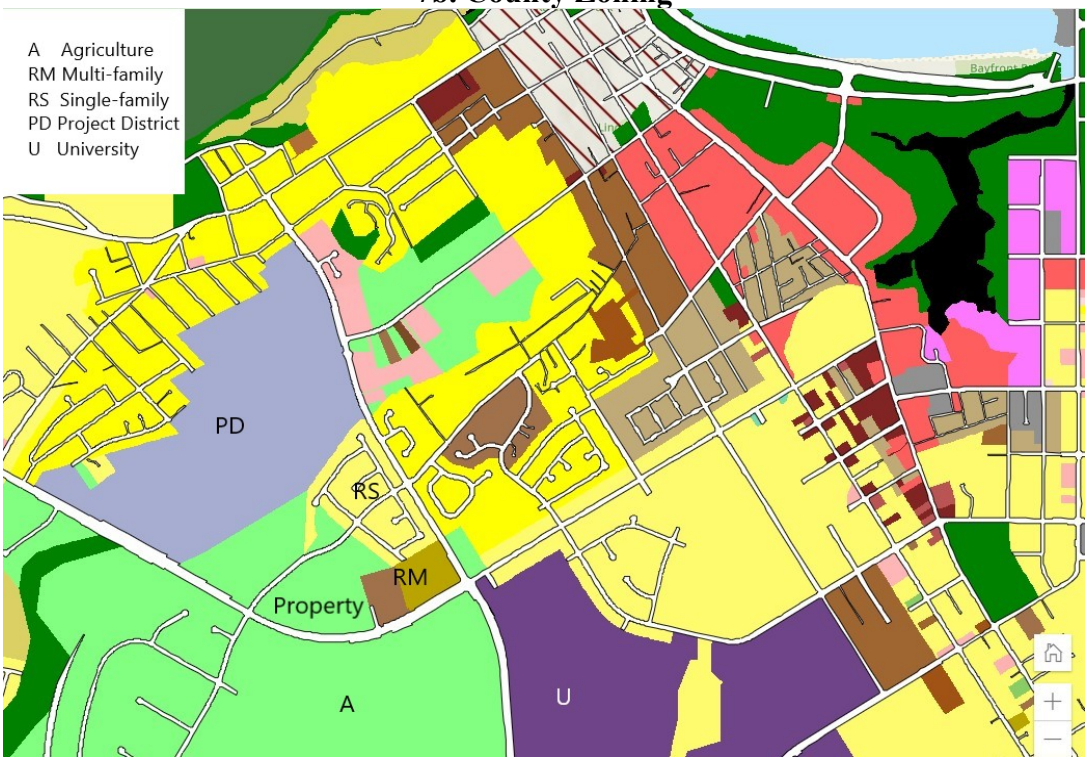
- Availability of basic services such as schools, parks, wastewater systems, solid waste disposal, drainage, water transportation systems, public utilities, and police and fire protection; and sufficient reserve areas for foreseeable urban growth.

Figure 7. Land Use Designations of Property and Vicinity

7a. State Land Use District

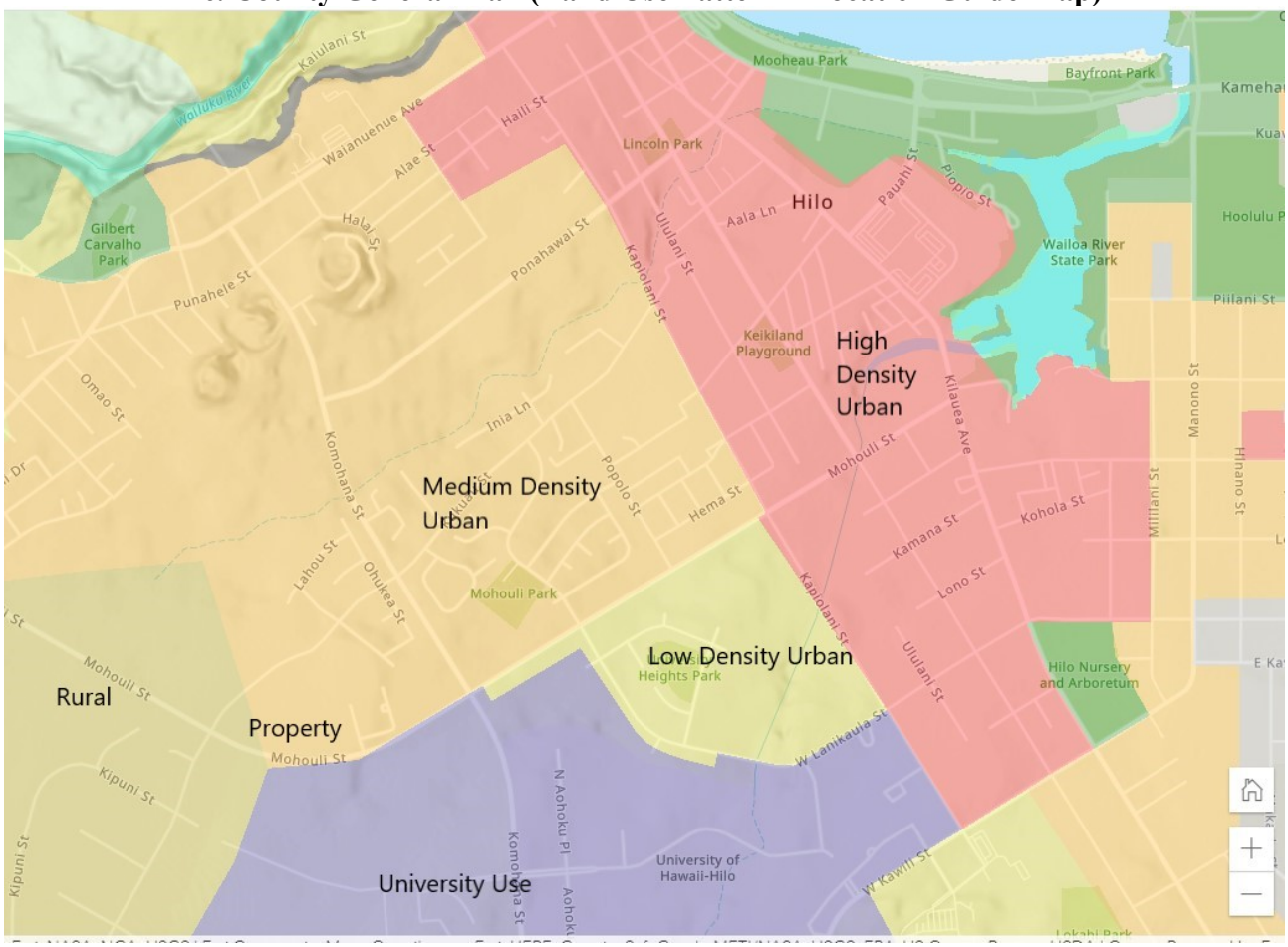
Source: Land Use Commission. https://luc.hawaii.gov/maps/land-use-district-boundary-maps/state-of-hawaii-land-use-district-boundaries-map/ Acc. 7/21. Note: not all recently approved amendments are depicted in the map.

7b. County Zoning



Source: County of Hawai‘i. https://www.arcgis.com/home/item.html?id=e81bcaf8da9a4140a09aa922ef918ea4 Acc. 7/21

Figure 7. Land Use Designations of Property and Vicinity
7c. County General Plan (Land Use Pattern Allocation Guide Map)



Source: County of Hawai‘i. https://www.arcgis.com/home/item.html?id=073ebcf44e0343e5be9c765c65ff39f8 Acc. 7/21

Discussion: As the property is part of the urban area of Hilo, it is already being serviced. A Fire Station, Police Station, Library, Post Office and public school are all located within two miles of the site. In addition, there are many recreational facilities in the general area.

- It shall include lands with satisfactory topography, drainage, and reasonably free from the danger of any flood, tsunami unstable soil condition, and other adverse environmental effects

Discussion: There are no serious topographic, drainage, or soil conditions making the property unsuitable to urban development.

- Land contiguous with existing urban areas shall be given more consideration than non-contiguous land, particularly when indicated for future urban use on state or county general plans or county community plans or development plans.

Discussion: The property is adjacent to the Sunrise Estates subdivision which is urban in character. Within 500 feet of the site are the Mohouli senior housing complex and the Harry and Jeanette Weinberg Adult Day Center.

- It shall include lands in appropriate locations for new urban concentrations and shall give consideration to areas of urban growth as shown on the state and county community plans or development plans.

Discussion: The property's LUPAG Map designation of Medium Density Urban supports the requested State Land Use Designation.

- It may include lands which do not conform to the standards in paragraphs (1) to (5) when surrounded by or adjacent to existing urban development; and only when those lands represent a minor portion of this district.

Discussion: The subject parcel substantially conforms to above criteria and in addition is adjacent to existing urban development.

- It shall not include lands, the urbanization of which will contribute toward scattered spot urban development, necessitating unreasonable investment in public infrastructure or support services.

Discussion: Placing the subject parcel in the Urban district does not represent spot development, as it is adjacent to urban development, supplied with all necessary utilities and services for urban use, and is designated for urban uses in the General Plan.

3.6.3 Hawai‘i County Zoning

The property is currently zoned Agriculture A-1a (minimum lot size one acre) (see Figure 7b). As discussed in Sections 1.1 and 3.6.2, HICDC intends to utilize the Section 201H, HRS process in a request filed with the County OHCD. HICDC seeks, among other exemptions, to exempt the current County zoning to obtain a zoning of RM-4 (multi-family residential, 4,000 square feet minimum per building site). The process will involve a public hearing before the Windward Planning Commission, which will provide a recommendation to the Hawai‘i County Council, which must pass a resolution to permit the 201H exemptions. In that all necessary services and facilities are available, and the General Plan designates the area for Medium Density urban uses, and the property is adjacent to existing urban zoning, the property is suitable for residential zoning and there will be no effects on the health and safety of the general public.

3.6.4 Hawai‘i County General Plan

The *General Plan* for the County of Hawai‘i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The plan was adopted by ordinance in 1989 and revised in 2005 (Hawai‘i County Planning Department). The *General Plan* itself is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai‘i.

Most relevant to the proposed project are the following Goal and Policies, and Courses of Action of particular chapters of the General Plan:

LAND USE

14.1.2 GOALS

(a) Designate and allocate land uses in appropriate proportions and mix and in keeping with the social, cultural, and physical environments of the County.
(b) Protect and encourage the intensive and extensive utilization of the County's important agricultural lands.
(c) Protect and preserve forest, water, natural and scientific reserves and open areas.

14.1.3 POLICIES

(a) Zone urban types of uses in areas with ease of access to community services and employment centers and with adequate public utilities and facilities.
(b) Promote and encourage the rehabilitation and use of urban areas that are serviced by basic community facilities and utilities.
(c) Allocate appropriate requested zoning in accordance with the existing or projected needs of neighborhood, community, region and County.
(j) Encourage urban development within existing zoned areas already served by basic infrastructure, or close to such areas, instead of scattered development.

The Hawai‘i County General Plan Land Use Pattern Allocation Guide (LUPAG) component of the General Plan is a graphic representation of the Plan's goals, policies, and standards as well as of the physical relationship between land uses. It also establishes the basic urban and non-urban form for areas within the planned public and cultural facilities, public utilities and safety features, and transportation corridors. The property is within an area classified as Medium Density Urban (Figure 7c).

Discussion: The need for affordable rental housing is critical and the Proposed Project is in keeping with the social, cultural, and physical environment. The area is not identified as important agricultural lands or lands valuable for conservation. The area has ease of access to community services and employment centers along with adequate public utilities and facilities. The property has adequate infrastructure in terms of water, proximity to wastewater lines, electric utilities and transportation facilities, and does not represent scattered development. The proposed use for multi-family housing is consistent with the property's medium density designation in the LUPAG.

HOUSING

9.2 GOALS

(a) Attain safe, sanitary, and livable housing for the residents of the County of Hawaii.
(b) Attain a diversity of socio-economic housing mix throughout the different parts of the County.
(d) Create viable communities with affordable housing and suitable living environments.
(f) Seek sufficient production of new affordable rental and fee-simple housing in the County in a variety of sizes to satisfactorily accommodate the needs and desires of families and individuals.
(h) Make affordable housing available in reasonable proximity to employment centers.

9.3 POLICIES

(a) Encourage a volume of construction and rehabilitation of housing sufficient to meet growth needs and correct existing deficiencies.

(c) Encourage corporations and nonprofit organizations to participate in Federal, State and private programs to provide new and rehabilitated housing for low and moderate income families.

(j) Initiate and participate in activities with the private sector including the provision of leadership and expertise to neighborhoods and nonprofit organizations in the development of housing and community development projects.

Discussion: The Proposed Project would provide additional affordable rental housing in an area with high demand, near sources of employment and services.

HISTORIC SITES

6.2 GOALS

(a) Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawai‘i.

(b) Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.

Discussion: The Proposed Project has involved appropriate archaeological survey to determine the presence and significance of historic sites, of which there are none. Therefore the action satisfies relevant goals, policies, and courses of action for historic sites in Hawai‘i County.

NATURAL BEAUTY

7.2 GOALS

(a) Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.

(b) Protect scenic vistas and view planes from becoming obstructed.

(c) Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

7.3 POLICIES

(a) Increase public pedestrian access opportunities to scenic places and vistas.

(d) Access easement to public or private lands that have natural or scenic value shall be provided or acquired for the public.

(i) Do not allow incompatible construction in areas of natural beauty.

Discussion: The Proposed Project does not involve scenic areas or vantages and would not be inconsistent with the natural beauty of the Hilo area. Therefore the action is consistent with relevant goals, policies, and courses of action of the Natural Beauty section of the Hawai‘i County General Plan.

NATURAL RESOURCES

8.2 GOALS

(a) Protect and conserve the natural resources from undue exploitation, encroachment and damage.

(b) Provide opportunities for recreational, economic, and educational needs without despoiling or endangering natural resources.

(c) Protect and promote the prudent use of Hawaii's unique, fragile, and significant environmental and natural resources.

(e) Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.

8.3 POLICIES

(b) Encourage a program of collection and dissemination of basic data concerning natural resources.

(h) Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.

(i) Encourage an overall conservation ethic in the use of Hawaii's resources by protecting, preserving, and conserving the critical and significant natural resources of the County of Hawaii.

(u) Ensure that activities authorized or funded by the County do not damage important natural resources.

Discussion: Although the Proposed Project would involve lightly invaded native 'ōhi'a forest, the loss of roughly nine acres is miniscule in comparison to the thousands of acres of nearly identical 'ōhi'a forest mauka of Hilo on the 1881 lava flow, most of which has near-certain guarantees of protection because of its classification in the Conservation District. The Proposed Project is thus not inconsistent with the goals, standards and policies of the Natural Resources chapter of the Hawai'i County General Plan. It should be noted that the property is not within the Special Management Area (SMA).

PART 4: DETERMINATION

Based on the information to this point, the applicant expects that the Hawai'i County Planning Department will determine that the proposed project will not significantly alter the environment. It is therefore anticipated that an Environmental Impact Statement is not warranted and that the Department will issue a Finding of No Significant Impact (FONSI). A final determination will be made by the Department after consideration of comments on the Draft EA.

PART 5: FINDINGS AND REASONS

Chapter 11-200.1-13, Hawai'i Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

> (a) In considering the significance of potential environmental effects, agencies shall consider and evaluate the sum of effects of the Proposed Project on the quality of the environment.
>
> (b) In determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a Proposed Project, the expected impacts, and the proposed mitigation measures. In most instances, an action shall be determined to have a significant effect on the environment if it may:

1. *Irrevocably commit a natural, cultural, or historic resource.* No valuable natural or cultural resource would be committed or lost. A common native vegetation type and several common native plants are present, but no rare, threatened or endangered species or unique native ecosystems would be adversely affected. An archaeological survey has determined that no historic sites are present on the property or

would be affected. No valuable cultural resources and practices such as forest access, fishing, gathering, hunting, or access to ceremonial sites would be affected in any way.

2. *Curtail the range of beneficial uses of the environment.* No restriction of beneficial uses would occur by construction and occupation of affordable rental housing on the property.

3. *Conflict with the State's environmental policies or long-term environmental goals established by law*. The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The Proposed Project is environmentally beneficial and all adverse impacts are minor, and it is thus consistent with all elements of the State's long-term environmental policies.

4. *Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State.* The Proposed Project would have highly beneficial and no substantial adverse effects on the economic or social welfare of the Big Island community or the State of Hawai‘i.

5. *Have a substantial adverse effect on public health.* The Proposed Project would not affect public health and safety in any adverse way. Wastewater will be disposed of in conformance with State Department of Health regulations.

6. *Involve adverse secondary impacts, such as population changes or effects on public facilities*. The scale and context of the Proposed Project would not produce any major secondary impacts, such as population changes or effects on public facilities.

7. *Involve a substantial degradation of environmental quality*. The Proposed Project is minor and environmentally benign and would not contribute to environmental degradation.

8. *Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions.* The adverse effects of the Proposed Project involve very limited and temporary disturbance to traffic, air quality, noise, and visual quality during construction. During construction, there is at least a small potential for noise, traffic and dust impacts from the affordable rental housing development to acccumulate with those of the proposed adjacent Fire and Police Dispatch Center, Portuguese Cultural Center and the Wailani Mixed Use Project, under the scenario of two or more more being constructed at the same time. These impacts are mitigable and can be handled by construction-phase measures that can easily be implemented by the Hawai‘i County Department of Public Works, which is monitoring traffic in this area. Although traffic on Mohouli and Komohana Street would clearly rise as a result of all three projects, with the vast majority being attributed to the Wailani project, traffic analysis has demonstrated that with the extension of Ponahawai Street by Wailani, traffic impacts at Mohouli Street would not be severe and level of service would remain acceptable.

9. *Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat.* Thorough survey has determined that no endangered plant species are present. Other than the endangered Hawaiian hoary bat and the recently federally delisted Hawaiian hawk, island wide-ranging species that will experience no adverse impacts due to mitigation in the form of timing of vegetation removal and/or

survey, no rare, threatened or endangered species of fauna are known to exist on or near the property, and none would be affected by any project activities.

10. *Have a substantial adverse effect on air or water quality or ambient noise levels.* No substantial effects to air, water, or ambient noise would occur. Brief, temporary effects would occur during construction and would be mitigated. Contractors will be required to consult with DOH per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH would then review the proposed activity, location, equipment, project purpose and timetable in order to decide whether a permit is necessary and what conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers, will be necessary. Dust will be controlled per State regulations through extensive BMPs. Erosion and sedimentation impacts will be avoided by implementation of Best Management Practices during grading.

11. *Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.* Although the Proposed Project is located in an area with volcanic and seismic risk, the entire Island of Hawai‘i shares this risk. The facilities are not imprudent to construct and will employ design and construction standards appropriate to the seismic zone. The property is not located in a floodplain or any other hazardous area, and it would not affect any such area. Due to the elevation of the property at approximately 350 feet above sea level, there is no risk to the Proposed Project from sea level rise. The project has adapted to climate change by accounting for the potential for larger storms, through minimizing hard surfaces that generate runoff in heavy rainfall.

12. *Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies.* No scenic sites or views are located nearby and none would be affected in any way. All exterior lighting will be shielded and designed with the proper spectra to protect dark skies and transiting seabirds.

13. *Require substantial energy consumption or emit substantial greenhouse gases*. Construction would involve unavoidable small but non-negligible carbon emissions. Occupation of the housing would entail greenhouse gas emissions that would be essentially the same regardless of where the residents live, leading to no net increase. Carbon emissions as a result of construction and operation of the Proposed Project would be considered negligible and are not expected to contribute significantly to global climate change.

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Hale Ola O Mohouli Affordable Housing Project

Draft Environmental Assessment

APPENDIX 1a

Comments in Response to Early Consultation

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geometrician
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April 20, 2021

Dear Neighbor or Agency/Organization Official:

Subject: Early Consultation for Environmental Assessment for Affordable Housing Project, TMK (3) 2-4-001:168 (9.091 acres), South Hilo District, Island of Hawai‘i

Our firm is in the process of preparing an Environmental Assessment (EA) for a proposed activity proposing use of government land, in compliance with Chapter 343, Hawai‘i Revised Statues (HAR), and Title 11, Chapter 200.1, Hawai‘i Administrative Rules (HAR).

The property is State land under Executive Order to the County of Hawai‘i that is under lease to the Hawai‘i Island Community Development Corporation (HICDC) for affordable housing uses. The exact nature of the 90-unit maximum affordable housing and the layout of the facilities on the property have not yet been determined, but there is sufficient information to examine environmental impacts and designate mitigation measures to avoid, reduce or compensate for any impacts. The property is currently within the State Land Use Agricultural District and is zoned by the County of Hawai‘i for Agriculture. As such, the affordable housing project will require a State Land Use District Boundary Amendment and Change of Zone.

The property is situated in a growing urban neighborhood of Hilo near three elderly housing projects and an adult day center, the planned Fire and Police Dispatch Center, and the Sunrise Estates subdivision. The property is forested land on the 1881 lava flow, and an archaeological survey has determined that no historic sites are present. The EA will include a biological survey, a Traffic Impact Assessment Report, and various other evaluations. I would appreciate your comments on any special environmental conditions or impacts related to the project. Please contact me at (808) 969-7090 or email to rterry@hawaii.rr.com if you have any questions or require clarification. Kindly indicate whether you wish to receive notice of EA availability when it has been completed.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Location Map

Base Map © Google Earth North ↑

Mitchell D. Roth
Mayor

Paul K. Ferreira
Police Chief

Kenneth Bugado Jr.
Deputy Police Chief

County of Hawai`i

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

April 28, 2021

Mr. Ron Terry, Principal
Geometrician Associates, LLC
10 Hina Street
Hilo, HI 96720

Dear Mr. Terry:

SUBJECT: EARLY CONSULTATION AND ENVIRONMENTAL ASSESSMENT FOR AFFORDABLE HOUSING PROJECT, TMK (3) 2-4-001:168 (9.091 ACRES), SOUTH HILO DISTRICT, ISLAND OF HAWAII

Staff has reviewed the above-referenced documents and has no comments at this time.

If you have any questions, please contact Captain Reed Mahuna, Commander of the South Hilo Division, at (808) 961-2214 or via e-mail at reed.mahuna@hawaiicounty.gov.

Sincerely,

JAMES B. O'CONNOR
ASSISTANT CHIEF
AREA I OPERATIONS

RM:lli/21HQ0389

Mitchell D. Roth
Mayor

Lee E. Lord
Managing Director

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

County of Hawai'i
PLANNING DEPARTMENT

Zendo Kern
Director

Jeffrey W. Darrow
Deputy Director

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

June 1, 2021

Mr. Ron Terry
Principal
Geometrician Associates
10 Hina Street
Hilo, HI 96720

Dear Mr. Terry:

SUBJECT: Request for Early Environmental Assessment Comments for an Affordable Housing Project
Applicant: Hawai'i Island Community Development Corporation
Tax Map Key: (3) 2-4-001:168

This is in response to your letter receieved by this office on April 23, 2021, requesting early consultation for an Environmental Assessment (EA) that is being prepared in accordance with the County's requirements for a State Land Use Boundary Amendment and Change of Zone Application. According to your letter, the applicant is planning to build a 90-unit maximum, affordable housing project to be situated on the subject parcel.

Land Use Designations

For your information, the subject parcel is located within the County's Agricultural (A-1a) zoning district and the State Land Use Agricultural district. The General Plan Land Use Pattern Allocation Guide (LUPAG) map identifies the area as Medium Density Urban. The subject parcel is 9.091 acres in size and is not located within the County's Special Management Area (SMA). The current landowner of record is the State of Hawai'i.

Permitting History

- On October 23, 2020, the applicant, Hawai'i Island Community Development Corporation (HICDC), submitted a State Land Use Boundary Amendment (SLU 20-000054) for the subject property to reclassify the State Land Use Boundary from Agriculture to Urban.

- The applicant also plans to rezone the subject property via a HRS 201H application process from Agricultural with a minimum lot size of 1 acre (A-1a) to Multiple Family Residential with a minimum land area of 4,000 square feet (RM-4) zoning district. The reclassification of the State Land Use District and Zoning District would allow for the applicant to develop the Hale Ola O Mohouli Affordable Housing Project.

- On January 6, 2021, the applicant requested a deferral of the State Land Use Boundary Amendment (SLU 20-000054) pending the completion of an Environmental Assessment.

Thank you for the opportunity to comment and please also provide us with a copy of the Draft Environmental Assessment for our review and comment.

If you have any questions, please feel free to contact Tracie-Lee Camero at (808) 961-8166.

Sincerely,

ZENDO KERN for
Planning Director

TC:jaa
\\COH01\planning\public\wpwin60\Tracie\Letters\DEA\LGeometricianAssociatesLLC-PreEA Comments-24001168.doc

From: Tim Keller <lazyk51@yahoo.com>
Sent: Wednesday, May 19, 2021 12:28 PM
To: rterry@hawaii.rr.com
Subject: EA FOR TMK (3) 2-4-001:168 AFFORDABLE HOUSING HILO

Mr. Terry

Sorry for the late response, but we just returned from a month long trip to the mainland.

In response to your letter dated April 20, 2021 for comments on any environmental conditions or impacts, we have a few commnets.

1. Control measures in the prevention of any potential Rapid Ohia Death (ROD) spread onto our properties while clearing land.

2. Dust control measures to minimize dust clouds flowing onto our property which would impact cost of pool maintenance during your construction project.

3. Pest Control: mitigating ferral pigs and rodents migration onto our property due to loss of habitat. Note: the pigs have already dug up our back yard and we have had to pay to hire someone to trap pigs. The rats and chickens as well will be looking for new homes.

4. Traffic Management Plan: While we know you have said a traffic study was conducted and the plan was to have one way traffic out of the new road leading on to Mohouli. We take issue with this finding/recommendation. For one, merging traffic onto a limited visability road due to curvature of the road is an accident waiting to happen. Plus you have alot of walkers and bike rides that use the shoulder. the flow of that traffic would head to an already intersection to cross (Mohouli and Kukuau) especially during key traffic times, 7-9AM, 11AM-1PM AND 3-6PM Rush Hour traffic. You also now have added traffic turning onto Kukuau to cut through subdivision to head to town. We have neighbors on both sides of us with young children and speeding vehicles passing by our house is already a problem and it will only get worse with the additional traffic.

Lovina Sabnani and Tim Keller
847 Kukuau St.
Hilo, HI 96720

Mitchell D. Roth
Mayor

Lee E. Lord
Managing Director

Kazuo S.K.L. Todd
Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

May 18, 2021

Ron Terry, Principal
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawai'i 96721

Dear Mr. Ron Terry:

SUBJECT: Early Consultation for Environmental Assessment for Affordable Housing Project TMK (3) 2-4-001:168 (9.091 acres), South Hilo District, Island of Hawai'i

We are in receipt of your letter dated April 20, 2021 in regards Early Consultation for Environmental Assessment for Affordable Housing Project.

The Hawai'i Fire Department would like to receive notice of EA availability.

If you should have any questions, please feel free to contact my office at (808)932-2911.

Mahalo,

KAZUO S.K.L. TODD
Fire Chief

KV/ds

DAVID Y. IGE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

May 21, 2021

Geometrician Associates, LLC
Attention: Mr. Ron Terry
P.O. Box 396
Hilo, Hawaii 96721

via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessment for **Affordable Housing Project** located at South Hilo District, Island of Hawaii; TMK: (3) 2-4-001:168 (9.091 acres) on behalf of Hawaii Island Community Development Corporation (**HICDC**)

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

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

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON

KAMANA BEAMER, PH.D.
MICHAEL G. BUCK
ELIZABETH A. CHAR, M.D.
NEIL J. HANNAHS
WAYNE K. KATAYAMA
PAUL J. MEYER

M. KALEO MANUEL
DEPUTY DIRECTOR

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

May 19, 2021

REF: RFD.5658.8

TO: Mr. Russell Tsuji, Administrator
Land Division

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

SUBJECT: Early Consultation for Environmental Assessment for Affordable Housing Project, South Hilo (Hawaii Island Community Development Corporation)

FILE NO.: RFD.5658.8
TMK NO.: (3) 2-4-001:168

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

Our comments related to water resources are checked off below.

[X] 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

[ ] 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

[ ] 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.

[X] 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EAP as having high water efficiency can be found at http://www.epa.gov/watersense.

[X] 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/

[X] 6. We recommend the use of alternative water sources, wherever practicable.

[ ] 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program.

[X] 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at

http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf.

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

☐ 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.

☐ 11. A Well Construction Permit(s) is (are) are required before the commencement of any well construction work.

☐ 12. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

☐ 13. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 14. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☐ 15. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a steam channel.

☐ 16. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.

☐ 17. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☐ 18. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☒ OTHER: Planning - The proposed water source(s) and projected water demands for the project, both potable and non-potable, should be identified and the calculations used to estimate demands should be provided. A discussion of the potential impacts on water resources and other public trust uses of water should be included, and any proposed mitigation measures described. Water conservation and efficiency measures to be implemented should also be discussed.

If you have any questions, please contact Neal Fujii of the Commission staff at 587-0216.

DAVID Y. IGE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 26, 2021

MEMORANDUM

FROM:

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

TO:

~~FROM:~~ Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation for Environmental Assessment for **Affordable Housing Project**
LOCATION: South Hilo District, Island of Hawaii; TMK: (3) 2-4-001:168 (9.091 acres)
APPLICANT: Geometrician Associates, LLC on behalf of Hawaii Island Community Development Corporation (**HICDC**)

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **May 20, 2021.**

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.

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

Signed: CSC
Print Name: Carty S. Chang, Chief Engineer
Division: Engineering Division
Date: May 12, 2021

Attachments
cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Early Consultation for Environmental Assessment for Affordable Housing Project
Location: South Hilo District, Island of Hawaii
TMK(s): (3) 2-4-001:168 (9.091 acres)
Applicant: Geometrician Associates, LLC on behalf of Hawaii Island Community Development Corporation (HICDC)

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

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) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4896.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: May 12, 2021

5/14/21

DAVID Y. IGE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 26, 2021

MEMORANDUM

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

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation for Environmental Assessment for **Affordable Housing Project**
LOCATION: South Hilo District, Island of Hawaii; TMK: (3) 2-4-001:168 (9.091 acres)
APPLICANT: Geometrician Associates, LLC on behalf of Hawaii Island Community Development Corporation (**HICDC**)

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **May 20, 2021.**

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.

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

Signed: [signature]
Print Name: GORDON C. HEIT
Division: Land Division
Date: 5/11/21

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

75 Aupuni Street, Room 204
Hilo, Hawaii 96720
PHONE: (808) 961-9590
FAX: (808) 961-9599

May 11, 2021

MEMORANDUM

TO: Russell Y. Tsuji, Administrator

FROM: Gordon C. Heit, Hawaii District Land Agent

SUBJECT: Early Consultation for Environmental Assessment for Affordable Housing Project

LOCATION: Waiakea, South Hilo, Island of Hawaii,
TMK: (3) 2-1-001:168

APPLICANT: Hawaii Island Community Development Corporation (HICDC)

Pursuant to your request for comments on the above matter, we offer the following:

The property identified by TMK: (3) 2-1-001:168 is currently encumbered under Executive Order No's. 4531 to the County of Hawaii for Elderly and/or Affordable Rental Housing and Related Purposes. The project described is consistent with the executive order and the Hawaii District Land Office has no objection to the proposed project.

Please contact me should you have any questions.

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

June 10, 2021

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, HI 96721

Dear Mr. Terry:

Subject: Pre-Environmental Assessment for Affordable Housing Project
South Hilo District, Island of Hawai'i
Tax Map Key 2-4-001:168

This is in response to your Pre -Environmental Assessment letter dated April 20, 2021.

Please be informed that there is an existing 12-inch waterline along Mohouli Street fronting the subject parcel or an existing 12-inch waterline along Kupuna Place.

Prior to issuing a water commitment for the proposed project, the Department will request estimated maximum daily water usage calculations, prepared by a professional engineer licensed in the State of Hawai'i, for review and approval. After review of the calculations, the Department will determine a water commitment deposit amount, prevailing facilities charge (subject to change) to be paid, and any water system improvements required for final approval.

Construction plans showing the proposed water system improvements must also be submitted for review and approval.

Please be informed that the existing 12-inch waterlines within both roadways are adequate to provide 2,000 gallons per minute for fire protection, as required per the Department's Water System Standards.

Any meter(s) serving the proposed project will require the installation of a reduced principle type backflow prevention assembly within five (5) feet of the meter on private property. The Department must inspect and approve the installation prior to commencement of water service.

We have no additional comments on any special environmental conditions.

Should there be any questions, please contact Mr. Ryan Quitoriano of our Water Resources and Planning Branch at 961-8070, extension 256.

Sincerely yours,

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

RQ:dfg

copy – Mr. Keith Kato, Hawai'i Island Community Development Corporation

Hale Ola O Mohouli Affordable Housing Project

Draft Environmental Assessment

APPENDIX 2

Traffic Impact Assessment Report

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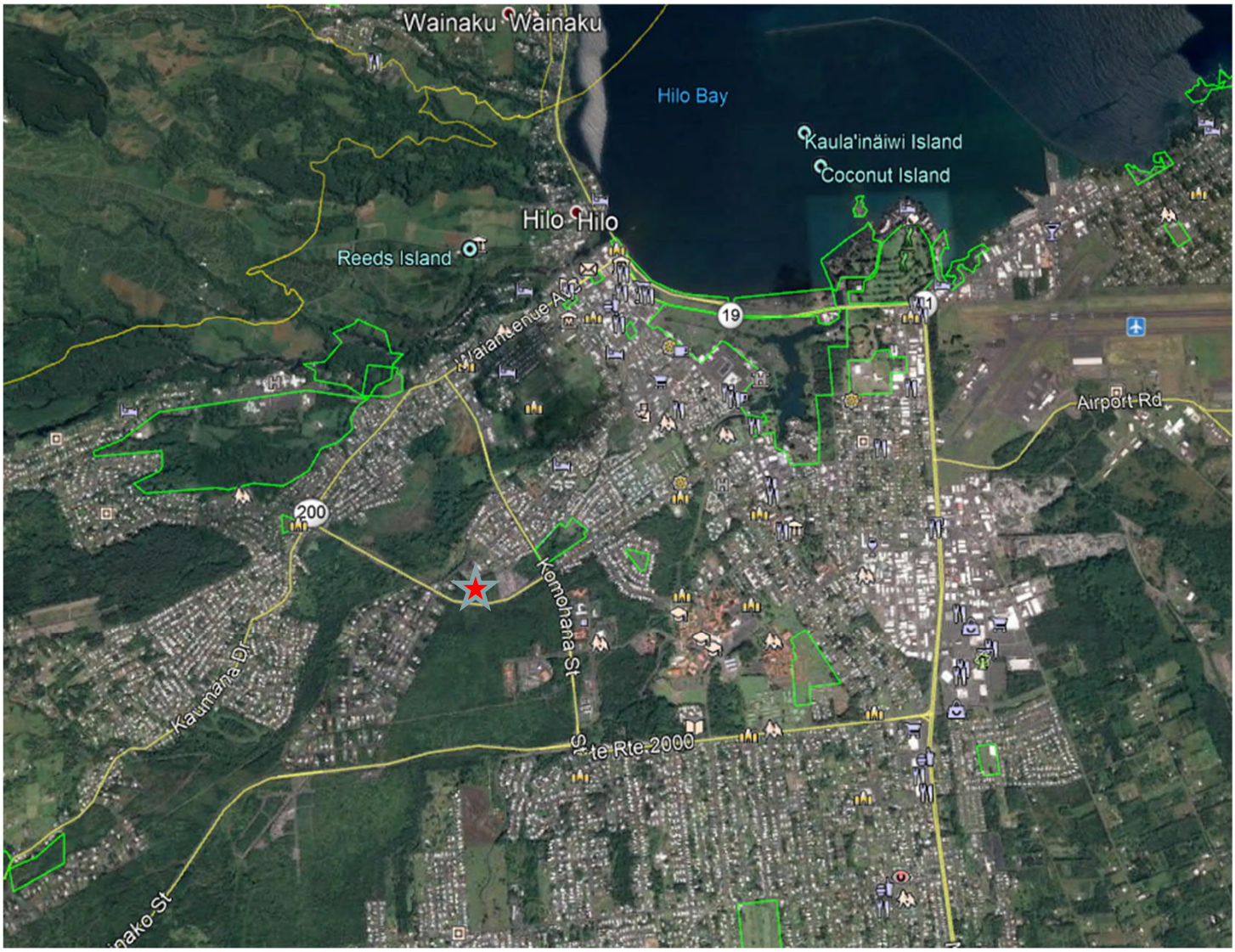
Transportation Impact Assessment Report

Hale Ola O Mohouli Affordable Residential Hilo, Hawai‘i

November 2020



AECOM Technical Services, Inc.
1001 Bishop Street, Suite 1600
Honolulu, Hawai‘i 96813
Ph. (808) 521-5031

Project Reference: 60644974

Transportation Impact Assessment Report

Hale Ola o Mohouli Affordable Residential Development

Hilo, Hawai‘i

November 2020

Prepared for:

Hawai‘i Island Community Development Corporation
100 Pauahi Street, Suite 204
Hilo, Hawai‘i 96720
(808) 987-6750

Prepared by:

AECOM Technical Services, Inc.
1001 Bishop Street, Suite 1600
Honolulu, Hawai‘i 96813
(808) 521-5031

Project Reference: 60644974

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1.0 INTRODUCTION

Hawai‘i Island Community Development Corporation is proposing to expand the existing Mohouli Senior Residences in Hilo, Hawai‘i. Hale Ola O Mohouli will add up to 90 affordable residential uses.

The existing Mohouli Senior Residences has 184 residential units and at Adult Day Care Center.

The proposed development site is located on Mohouli Street between Komohana Street and Kukuau Street. Figure 1 illustrates the project location.

This transportation impact analysis report (TIAR) documents existing transportation conditions, projects future conditions in the vicinity of the proposed development with and without the proposed housing development and assesses the transportation impacts of the proposed action. It summarizes the transportation issues identified and proposes recommendations to address those issues.

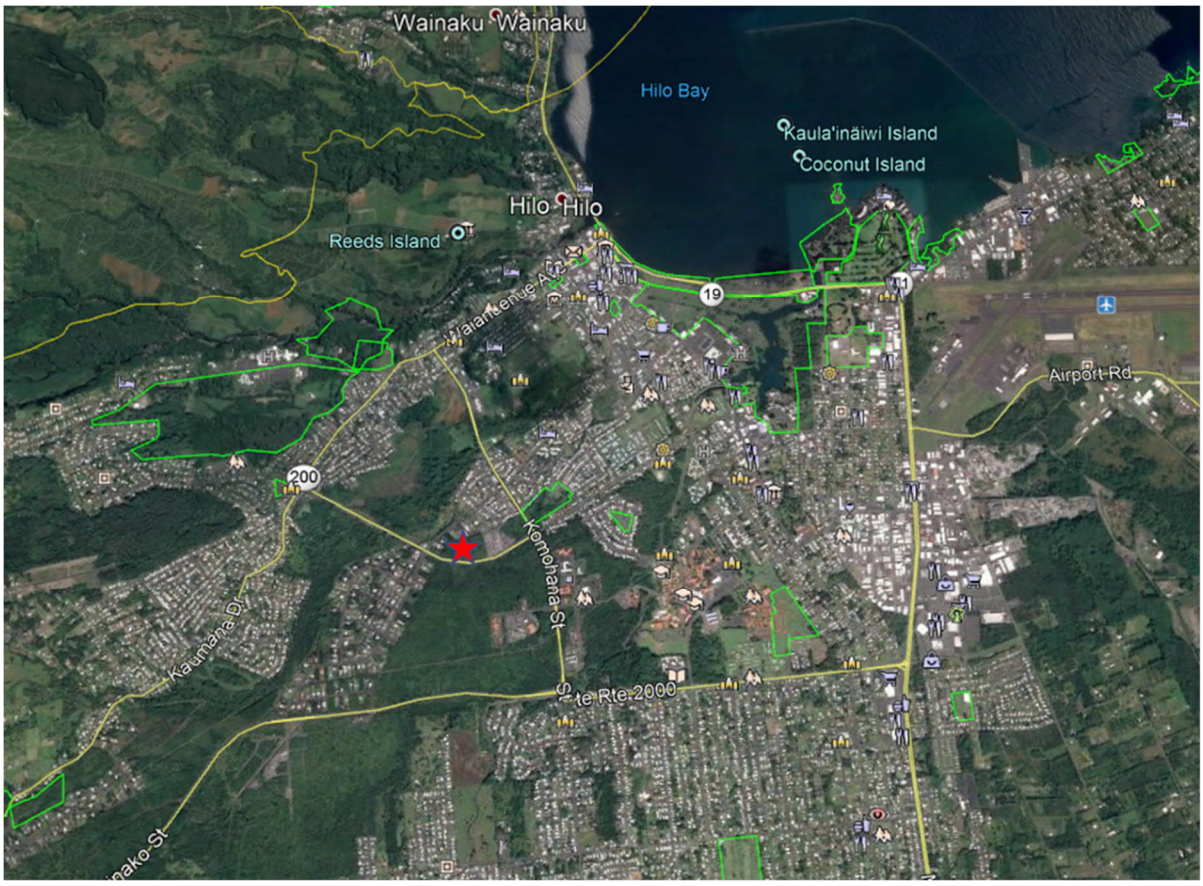

Figure 1 Project Site Location

2.0 EXISTING CONDITIONS

2.1 Site Description

The proposed Hale Ola O Mohouli affordable residential development will be on parcel TMK (3) 2-4-001:168 located on Mohouli Street between Komohana Street and Kukuau Street. The currently vacant site is located between existing single-family residential development on Kukuau Street and the future County of Hawai‘i Fire Department Dispatch Center.

Access to the site is proposed via a right-in/right-out driveway with direct access to Mohouli Street and via a driveway that would connect to existing Kupuna Place. Kupuna Place provides access to Mohouli Street for the existing Mohouli Senior Residences and will also provide access for the future County of Hawai‘i Fire Department Dispatch Center. The Hale Ola O Mohouli driveway will connect to Kupuna Place via an easement that crosses the future County of Hawai‘i Fire Department Dispatch Center site. A conceptual site plan is shown in Figure 2.

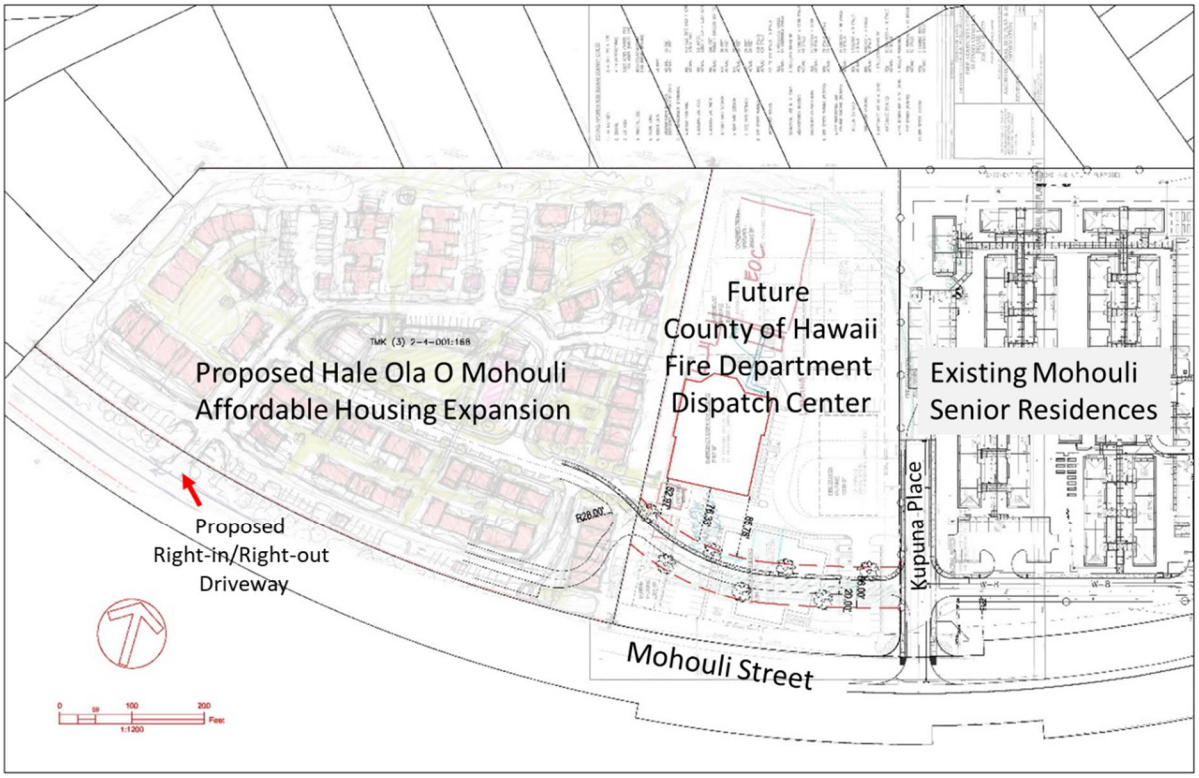

Figure 2 Hale Ola O Mohouli Conceptual Site Plan

2.2 Roadway Conditions

Key roadways in this study are Mohouli Street, Komohana Street, Kukuau Street, and Kupuna Place.

2.2.1 Roadway Descriptions

Mohouli Street

Mohouli Street provides mauka to makai access between Kaumana Drive and Kilauea Street. The older portion of the roadway, makai of Komohana Street, runs through a residential neighborhood and has a posted speed limit of 35 miles per hour (mph).

The roadway was extended mauka from Komohana Street to the Kaumana Drive/Ainako Avenue intersection in 2002. The newer section of roadway has wide paved shoulders that could be used to widen Mohouli Street to four lanes and has a posted speed limit of 45 mph. The lands adjoining this section of roadway are currently mostly vacant. The new section of roadway provides residents of Kaumana Drive and Ainako Avenue with an alternate access route to the south and west sections of Hilo.

Figure 3 and Figure 4 illustrate the newer segment of Mohouli Street in the vicinity of the Kupuna Place access to the existing Mohouli Senior Residences.

Figure 3 Mohouli Street Looking Makai Toward Komohana Street

Figure 4 Mohouli Street Looking Mauka Toward Kukuau Street

Komohana Street

Komohana Street runs in a general north to south direction between Waianuenue Avenue and Ainaola Drive. The portion of roadway south of Puainako Street generally passes through residential areas while the northern section adjoins vacant lands. The posted speed limit is 45 mph. Komohana Street serves as a commuter route for residents in the south and west sections of Hilo to reach downtown Hilo, Hilo Hospital, and Hilo High School. Figure 5 illustrates Komohana Street at Mohouli Street looking north.

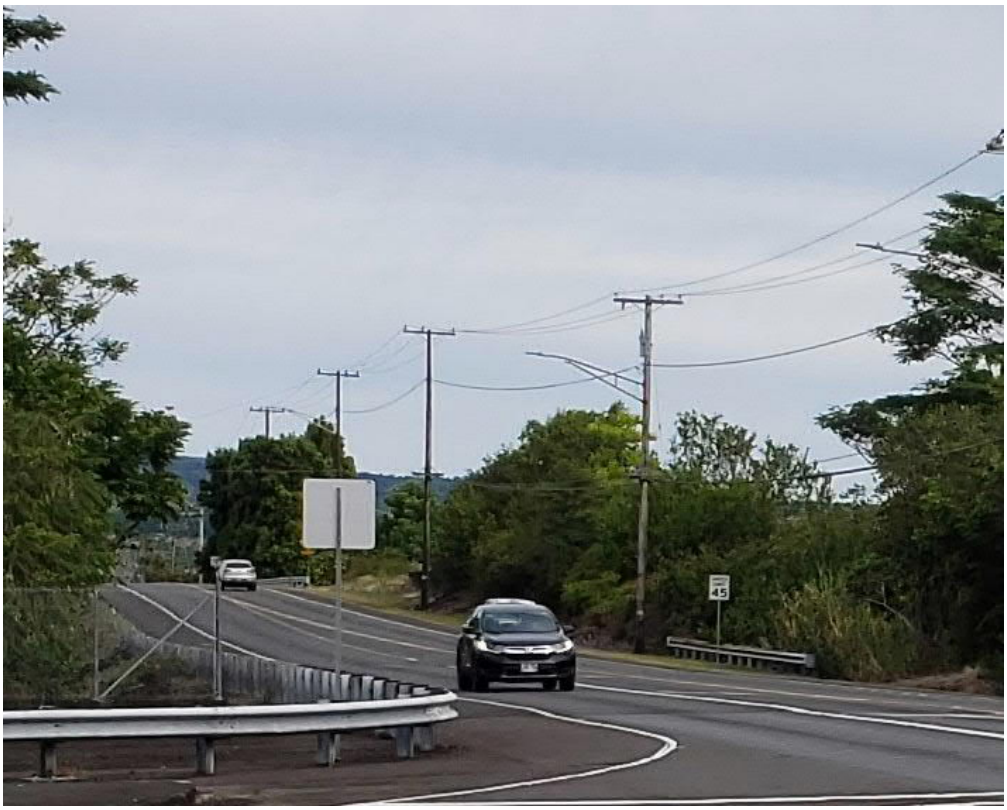

Figure 5 Komohana Street at Mohouli Street Looking North

Kukuau Street

Kukuau Street is a two-lane County minor collector road. The older roadway section, makai of Komohana Street, runs through a residential neighborhood and intersects with Kapiʻolani Street. The newer roadway, mauka of Komohana Street, provides access to a mauka residential subdivision. The extension of Mohouli Street created a new intersection on this roadway. The posted speed limit on Kukuau Street is 35 mph in the vicinity of Mohouli Street. Figure 6 shows Kukuau Street at Mohouli Street looking north.

Figure 6 Kukuau Street Approach to Mohouli Street Looking North

Kupuna Place

Kupuna Place provides access to Mohouli Street for the existing Mohouli Senior Residences Figure 7 shows Kupuna Place at its intersection with Mohouli Street.

Figure 7 Kupuna Place

2.2.2 Intersection Conditions

Traffic data was collected at the Mohouli Street/Kupuna Place intersection and updated at the Mohouli Street/Komohana Street and Mohouli Street/Kukuau Street intersections:

Mohouli Street/Kupuna Place

Kupuna Place intersects Mohouli Street at an unsignalized “T”-intersection with STOP-sign control on the Kupuna Place leg of the intersection.

The Kupuna Place approach is configured with a single lane, although there is sufficient width so that right-turning and left-turning vehicles can move concurrently. There is a refuge in the painted Mohouli Street median for vehicles turning left out of Kupuna Place onto Mohouli Street.

The eastbound Mohouli Street approach is a single-lane approach with a median left-turn lane for traffic turning int Kupuna Place. The westbound Mohouli Street approach is configured with a through lane and an exclusive right-turn lane.

There are no crosswalks across the approaches to this intersection.

Figure 8 is a photograph of the Kupuna Place approach to the intersection.

Figure 8 Mohouli Street/Kupuna Place Intersection

Mohouli Street/Komohana Street

The Mohouli Street/Komohana Street intersection is a four-legged, signalized intersection located east of the Mohouli Street/Kupuna Place intersection. Figure 9 shows the intersection configuration.

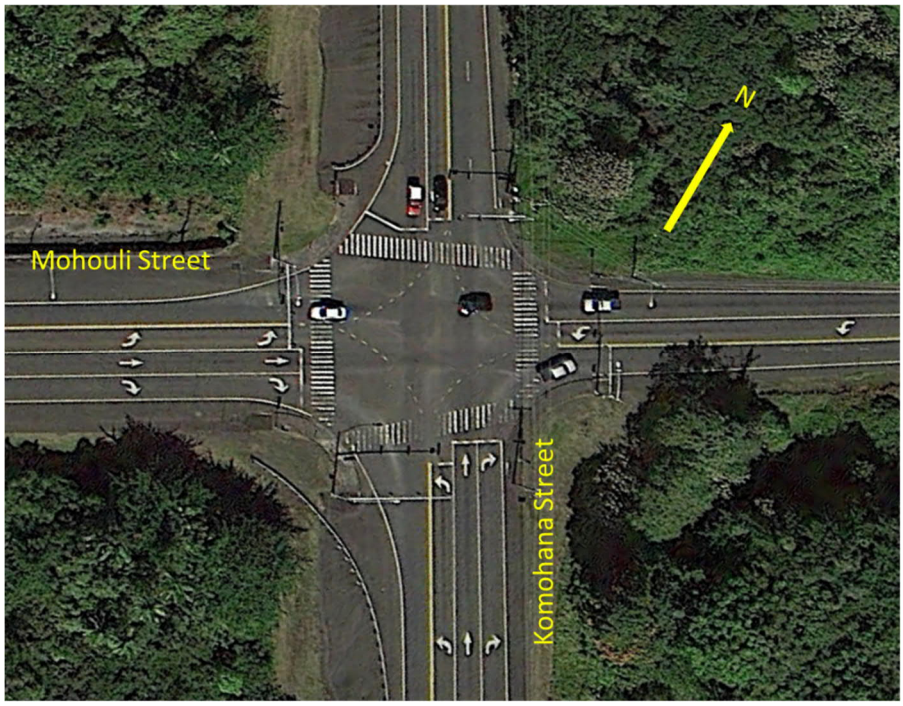

Figure 9 Mohouli Street/Komohana Street Intersection

All intersection approaches are configured with a single through lane and exclusive left-turn lanes. The eastbound Mohouli Street and northbound Komohana Street approaches also have exclusive right-turn lanes. The westbound Mohouli Street and southbound Komohana Street approaches have shared through/right-turn lanes.

The westbound, southbound, and northbound approaches have protected/permissive left-turn turn signal phasing, while the eastbound approach has protected left-turn signal phasing.

There are crosswalks and pedestrian signals on all intersection approaches.

Mohouli Street/Kukuau Street

The Mohouli Street/Kukuau Street intersection is a four-legged, unsignalized intersection with a STOP-sign control on the Kukuau Street intersection approaches. Figure 10 shows the intersection configuration.

Both Mohouli Street approaches are configured with exclusive left-turn lanes and shared through/right-turn lanes. The Kukuau Street approaches are configured a shared left-through-right lanes, although there are wide, paved shoulders that would allow right-turning vehicles to bypass vehicles waiting to turn left or proceed straight through the intersection.

There are crosswalks across all approaches of the intersection.

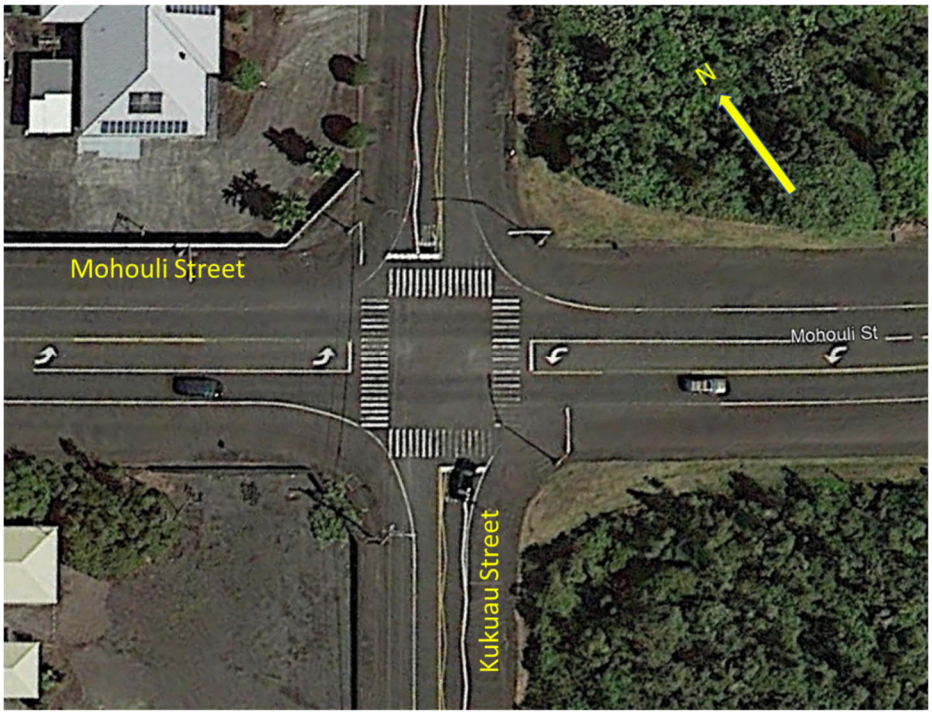

Figure 10 Mohouli Street/Kukuau Street Intersection

2.3 Pedestrian and Bicycle Conditions

2.3.1 Pedestrian Facilities

The intersections on Mohouli Street at Komohana Street and Kukuau Street have crosswalks across all approaches.

The Mohouli Street/Kupuna Place intersection does not have crosswalks.

There are no sidewalks along Mohouli Street between Komohana Street and Kukuau Street. There are wide, paved shoulders and it was observed that they are used by pedestrians as sidewalks.

There are sidewalks along the internal roadways within the Mohouli Senior Residences, including on Kupuna Place.

2.3.2 Bicycle Facilities

There are no designated bicycle facilities along Mohouli Street, Komohana Street, or Kukuau Street in the vicinity of the proposed Hale Ola O Mohouli site. However, as noted previously, the roadways in the area have wide, paved shoulders that are utilized by bicyclists as well as pedestrians.

2.4 Public Transit Conditions

The public transit service on the island of Hawai‘i is provided by the County’s Hele-On Bus system.

Figure 11 illustrates the closest existing transit service routes in the vicinity of the Hale Ola O Mohouli site. At this time, the site is not served by fixed transit routes.

It was observed that the senior daycare located within the existing Mohouli Senior Residences provides shuttle bus service to some of its participants.

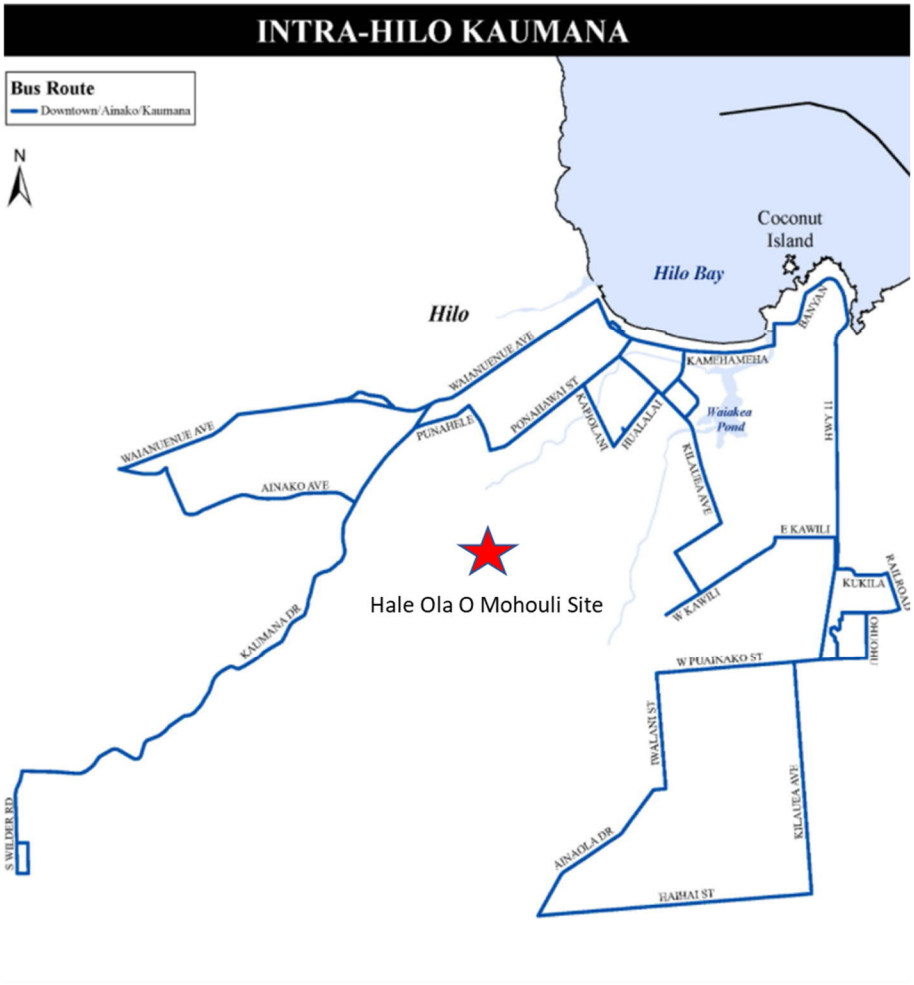

Figure 11 Hele-On Bus Route for Intra-Hilo Kaumana Route

2.5 Transportation Conditions

2.5.1 Volume Data Collection and Adjustment

Due potentially atypical conditions due to COVID-19 related restrictions, alternative methods for establishing base condition traffic volumes were used.

Base traffic turning movement volumes at the Mohouli Street/Komohana Street and the Mohouli Street/Kukuau Street intersections were obtained from the Traffic Impact Analysis Report for Hawaii Island Community Development Corporation Mohouli Heights Senior Neighborhood Project, September 2011.

Vehicular turning movement, bicycle, and pedestrian counts were conducted at the Mohouli Street/Kupuna Place intersection. These counts were conducted for the AM and PM peak periods on Tuesday, October 20, 2020 and Wednesday, October 21, 2020 from 6:00 AM to 8:30 AM for the AM peak period and 3:15 PM to 5:30 PM for the PM peak period.

State of Hawaii Department of Transportation (HDOT) link traffic volumes on Mohouli Street and on Komohana Street for years 2016, 2017, 2018, and 2019 were obtained and used to adjust the traffic turning movement counts to an estimate of what the base traffic volumes would be without the effects of COVID-19. These HDOT counts were also used to help estimate future ambient traffic growth rates.

Figure 12 summarizes the adjusted Year 2020 peak hour traffic turning movement volumes at the Mohouli Street/Komohana Street, the Mohouli Street/Kupuna Place, and the Mohouli Street/Kukuau Street intersections. The weekday AM peak hour was estimated to occur from 7:00 AM to 8:00 AM and the PM peak hour was determined to occur from 3:15 PM to 4:15 PM.

The traffic count summary sheets from the 2011 study, the recently counted Mohouli Street/Kupuna Place intersection, and the HDOT counts are included in Appendix A.

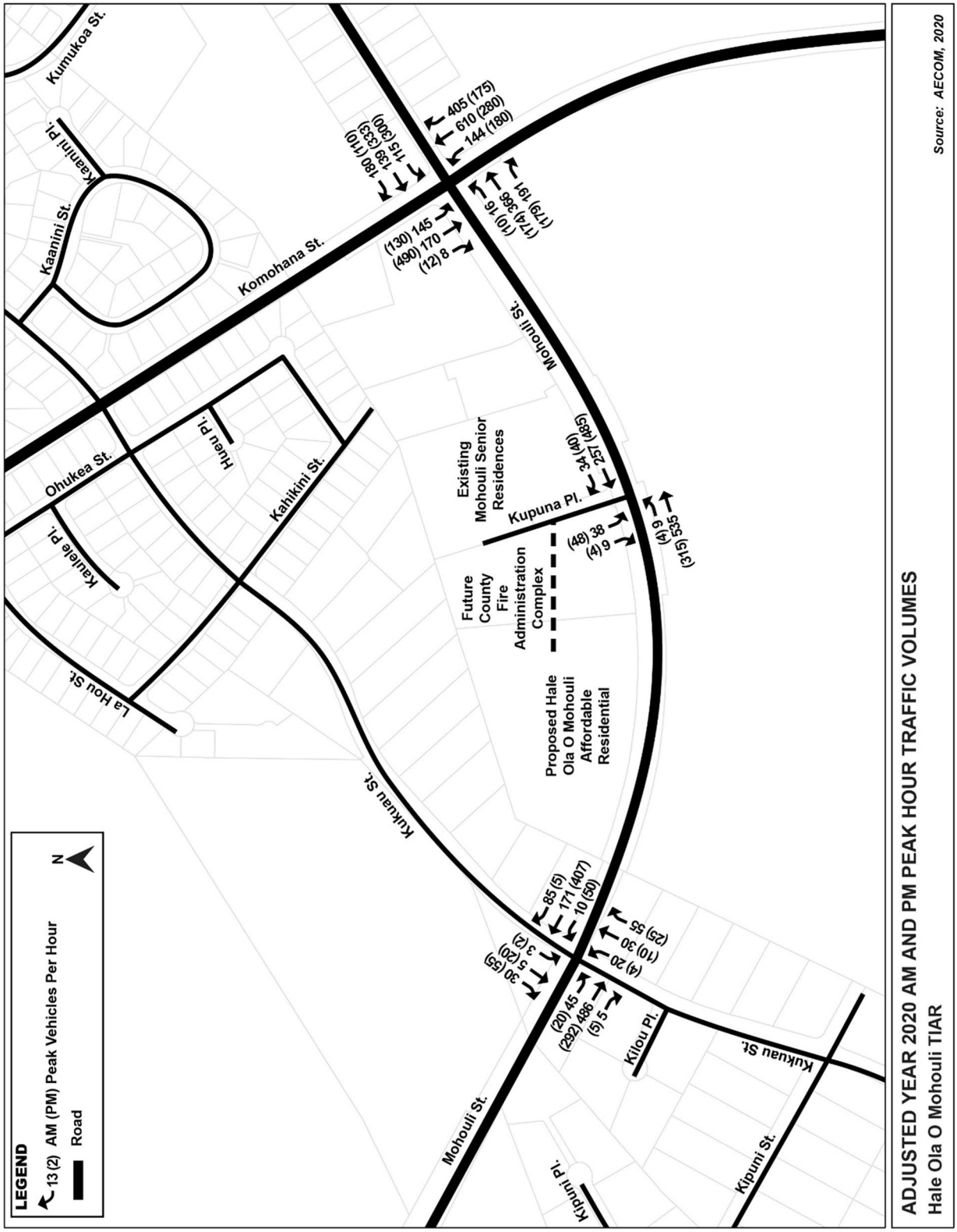

Figure 12 Adjusted Year 2020 AM and PM Peak Hour Traffic Volumes

2.5.2 Existing Bicycle and Pedestrian Volumes

Low pedestrian and bicycle volumes were observed. Both the pedestrian and bicyclists were observed using the paved shoulders on Mohouli Street.

During the AM peak hour 1 bicycle and 7 pedestrians were observed. Most of the pedestrians observed appeared to be walking for exercise or were walking a pet.

During the PM peak hour 1 bicycle and 0 pedestrians were observed. A greater number of pedestrians were observed later with the largest number, 13, occurring from 4:30 PM to 5:30 PM. As in the AM peak hour, most of the pedestrians observed appeared to be walking for exercise or were walking a pet.

The pedestrian and bicycle counts are included in Appendix A with the traffic count summary sheets. There are separate worksheets for the pedestrian and bicycle counts.

2.5.3 Existing Intersection Operations

The three intersections were analyzed using the adjusted Year 2020 peak hour turning movement volumes and existing intersection configurations. Table 1 summarizes the calculated intersection delay and level of service (LOS) for the weekday AM and PM commuter peak hour time periods.

The intersections were analyzed using the unsignalized intersection capacity methods described in the Highway Capacity Manual, Sixth Edition (HCM) through the Synchro/SimTraffic software. The Synchro analysis worksheets are included in Appendix B.

As shown in Table 1, the key turning movements at each intersection operate at acceptable levels of service (LOS) for peak hour conditions. The left-turn movement from Kupuna Place to eastbound Mohouli Street reflects analyses conducted assuming a vehicle having to execute the turn in one maneuver. As noted previously, there is a median left-turn refuge area that allows vehicles to complete the left-turn maneuver in a two-step process, making the left-turn movement much easier. Assuming that vehicles must complete the left-turn in one maneuver results in a conservatively high delay.

LOS for unsignalized intersections is a qualitative index based on a quantitative performance measure such as intersection delay to express the relative level of traffic operations. Definitions of LOS are included in Appendix C.

Table 1 Adjusted Existing Weekday Peak Hour Intersection Operations

Intersection/Movement	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
Mohouli/Kukuau				
EB Mohouli LT	7.9	A	8.3	A
WB Mohouli LT	8.5	A	8.0	A
NB Kukuau Combined	20.4	C	14.8	B
SB Kukuau Combined	12.3	B	15.3	C
Mohouli/Kupuna				
EB Mohouli LT	7.9	A	8.7	A
SB Kupuna LT	18.1	C	18.7	C
SB Kupuna RT	9.8	A	11.0	B
Mohouli/Komohana	33.6	C	36.6	D

Notes: Delay is seconds/vehicle
Analyses performed using Synchro Version 11 and summarized consistent with HCM, 6th Edition, parameters

3.0 FUTURE CONDITIONS

3.1 Proposed Development

The proposed Hale Ola O Mohouli development proposes up to 90 affordable residential units on parcel TMK (3) 2-4-001:168 located on Mohouli Street between Komohana Street and Kukuau Street. A conceptual site plan is shown in Figure 2 of this report.

Access to the site is proposed via a right-in/right-out driveway with direct access to Mohouli Street and via a driveway that would connect to existing Kupuna Place. Kupuna Place provides access to Mohouli Street for the existing Mohouli Senior Residences and will also provide access for the future County of Hawai‘i Fire Department Dispatch Center. The Hale Ola O Mohouli driveway will connect to Kupuna Place via an easement that crosses the future County of Hawai‘i Fire Department Dispatch Center site. Assumed project time frame is five years in the future.

3.2 Future Roadway Conditions

3.2.1 Roadways

No changes to Mohouli Street, Komohana Street, Kupuna Place, or Kukuau Street are anticipated within the time frame of this study. Mohouli Street, in the vicinity of the proposed project, has wide paved shoulders that would enable widening in the future if justified by background traffic growth.

3.2.2 Intersections

No changes to the existing intersections of Mohouli Street/Komohana Street, Mohouli Street/Kupuna Place, or Mohouli Street/Kukuau Street are anticipated within the time frame of this study.

3.3 Future Pedestrian, Bicycle, and Public Transit Conditions

3.3.1 Pedestrian Facilities

No changes to the existing pedestrian facilities at the locations evaluated in this study are assumed.

3.3.2 Bicycle Facilities

As noted previously, bicyclists traveling along Mohouli Street either share the road with vehicular traffic or use the wide paved shoulders. No changes are assumed for within the time frame of this study.

3.3.3 Public Transit

Hele-On bus routes documented in the existing conditions section of this report are assumed to remain the same within the time frame of this evaluation.

3.4 Projected Year 2025 Peak Hour Background Traffic

Background traffic refers to traffic unrelated to the proposed Hale Ola O Mohouli affordable housing development. Background traffic was projected for Year 2025 conditions based on an assumed five-year time frame for the proposed development.

There are two main components to the background traffic volumes:

- growth in traffic on Mohouli Street, Komohana Street, and Kukuau Street;
- traffic generated by the future County of Hawaii Fire Department Dispatch Center.

3.4.1 Ambient Traffic Growth

Table 2 compares peak hour traffic volumes counted from 2007 to 2020 at the intersections evaluated in this study. As shown, traffic volumes have remained relatively consistent over the past 10 plus years on Mohouli Street and Komohana Street. With the exception of the 2020 counts, the traffic volume data are pre-COVID-19.

Table 2 Comparison of Peak Hour Traffic Volumes

Roadway Segment	AM Peak Hour			PM Peak Hour		
	Eastbound	Westbound	Total	Eastbound	Westbound	Total
Mohouli: Kukuau - Kupuna (2007 count)	498	290	788	272	545	817
Mohouli: Kukuau - Kupuna (2009 count)	558	325	893	322	485	807
Mohouli: Kukuau - Kupuna (2020 count)	495	242	737	315	457	772
Mohouli: Kupuna-Komohana (2007 count)	470	245	715	290	527	817
Mohouli: Kupuna-Komohana (2009 count)	535	255	790	300	485	785
Mohouli: Kupuna-Komohana (2020 count)	516	261	777	345	482	827
	Northbound	Southbound	Total	Northbound	Southbound	Total
Komohana: South of Mohouli (2007 count)	1,215	430	1,645	605	890	1,495
Komohana: South of Mohouli (2009 count)	1,135	455	1,590	615	930	1,545
Komohana: South of Mohouli (2019 HDOT)	1,102	435	1,537	618	867	1,485

Note: AM Peak Hour: 7:00 AM - 8:00 AM, PM Peak Hour: 4:00 - 5:00 PM (varies slightly)
Counts 2007, 2009, and 2019 are prior to COVID-19 conditions

Based on the historic traffic data, it is judged that current background traffic growth will be based on new projects occurring in the vicinity of the proposed Hale Ola O Mohouli

affordable residential project. Many large projects were previously expected to occur by 2020 but have not. If they do proceed, an update of their entitlements will likely be needed.

Therefore, growth in the year 2025 peak hour forecast of traffic at the intersections evaluated in this study is based on likely projects that will occur in the immediate vicinity of the Hale Ola O Mohouli project.

A project that meets that criterion is the future County of Hawaii Fire Department Dispatch Center located on the parcel adjacent to the Hale Ola O Mohouli project. Traffic from the Fire Dispatch project will be added to the adjusted existing year 2020 traffic to forecast the year 2025 background traffic.

3.4.2 Future County of Hawaii Fire Department Dispatch Center

Forecast of traffic generated by the County of Hawaii Fire Department Dispatch Center was obtained from a previous study entitled Traffic Impact Analysis Report, County of Hawaii Fire Administration Support Complex, February 2008. This is considered a conservatively high estimate of traffic generated as the land use assumed in the report contained more than just a dispatch center.

Figure 13 illustrates the projected Year 2025 peak hour turning movement volumes for the background traffic.

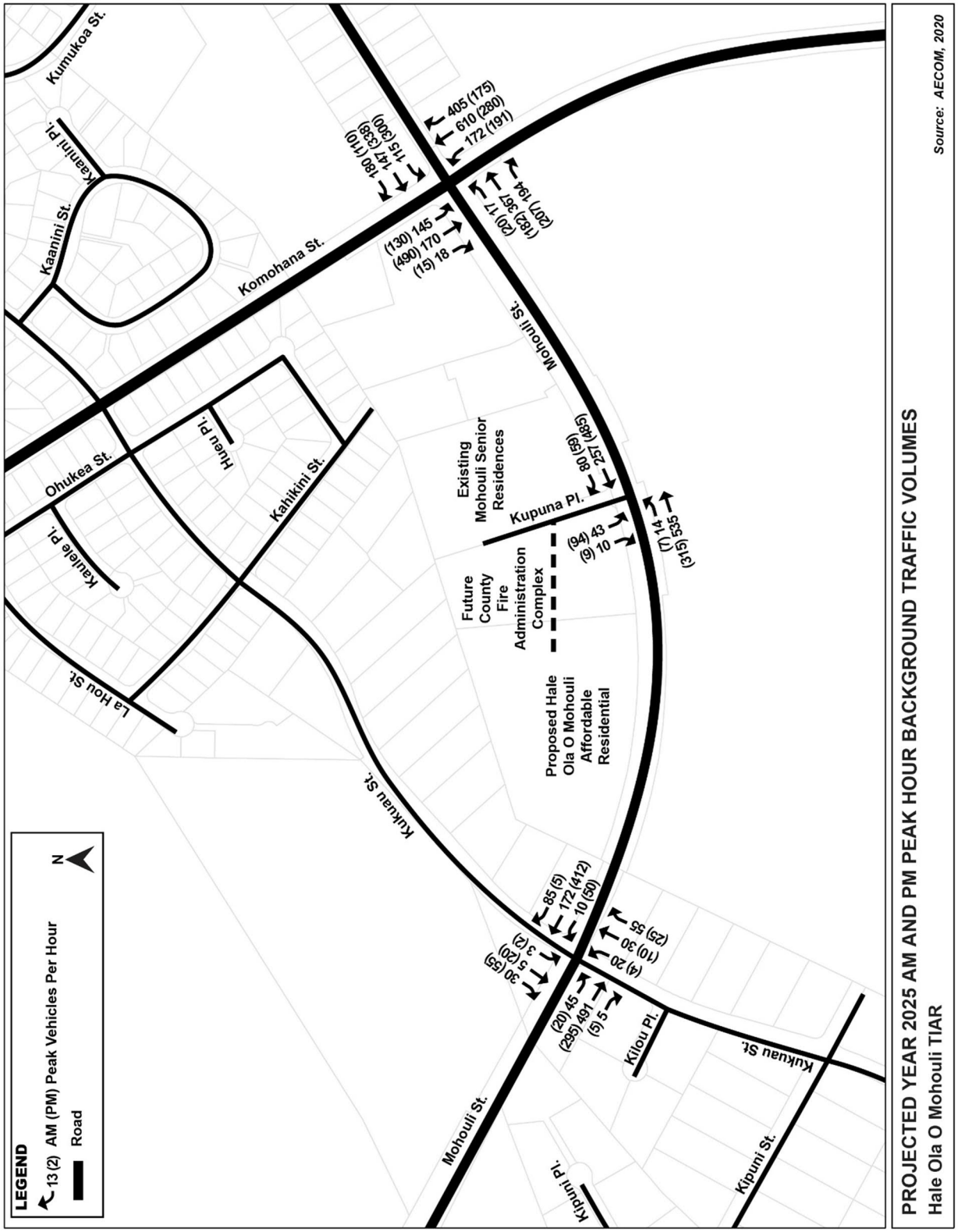

Figure 13 Projected Year 2025 AM and PM Peak Hour Background Traffic Volumes

3.5 Vehicular Trips Generated by Hale Ola O Mohouli Affordable Residential Development

Table 3 summarizes the land use and estimated vehicular volumes that would be generated by the proposed Hale Ola O Mohouli development. The vehicular volume is based on the trip generation rates documented in the Institute of Transportation (ITE) publication, Trip Generation, 10th Edition. Equations for AM and PM peak hours of adjacent street traffic was used in this calculation.

The trip generation equations for Category 210 (Apartment) was used to estimate the vehicular traffic generated by the site. The index used as a predictor was the maximum number of dwelling units proposed.

Table 3 Projected Trip Generation by Hale Ola O Mohouli Affordable Residential Development

Land Use	Intensity	ITE Category	AM Peak Hour		PM Peak Hour	
			In	Out	In	Out
Multi-family Residential	90 D.U.	210	10	38	44	24

Notes: AM and PM peak hour traffic volumes are in vehicles per hour. Trip Generation is the estimation of vehicular traffic based on equations documented in the Institute of Transportation Engineers' publication, Trip Generation, 10th Edition.

For Category 220 -Apartment, the trip generation equations are:

AM: T = 0.49 (X) + 3.73 (20% Entering/80% Exiting)
PM: T = 0.55 (X) + 17.65 (65% Entering/35% Exiting)

where T - traffic volumes (vehicles per hour), X = dwelling units

D.U. - dwelling units

3.6 Projected Year 2025 Traffic Volumes

3.6.1 Hale Ola O Mohouli Trip Distribution and Assignment

The projected Year 2025 vehicular volumes generated by the Hale Ola O Mohouli project summarized in Table 3 were directionally distributed and assigned to the roadway network.

The directional distribution of turns onto and from Mohouli Street was based on the traffic turning movement conducted October 20-21, 2020.

Turning movements at the Mohouli Street/Komohana Street and Mohouli Street/Kukuau Street intersections utilized the turning movement patterns in the adjusted existing turning movements.

The resulting projected Year 2025 traffic volumes generated by the proposed Hale Ola O Mohouli development are summarized in Figure 14.

3.6.2 Projected Year 2025 Peak Hour Traffic Volumes

The projected traffic volumes generated by the proposed Hale Ola O Mohouli development summarized in figure x were combined with the projected Year 2025 background traffic summarized in Figure y to obtain the total Year 2025 peak hour traffic volumes.

The total projected Year 2025 peak hour traffic volumes are summarized in Figure 15.

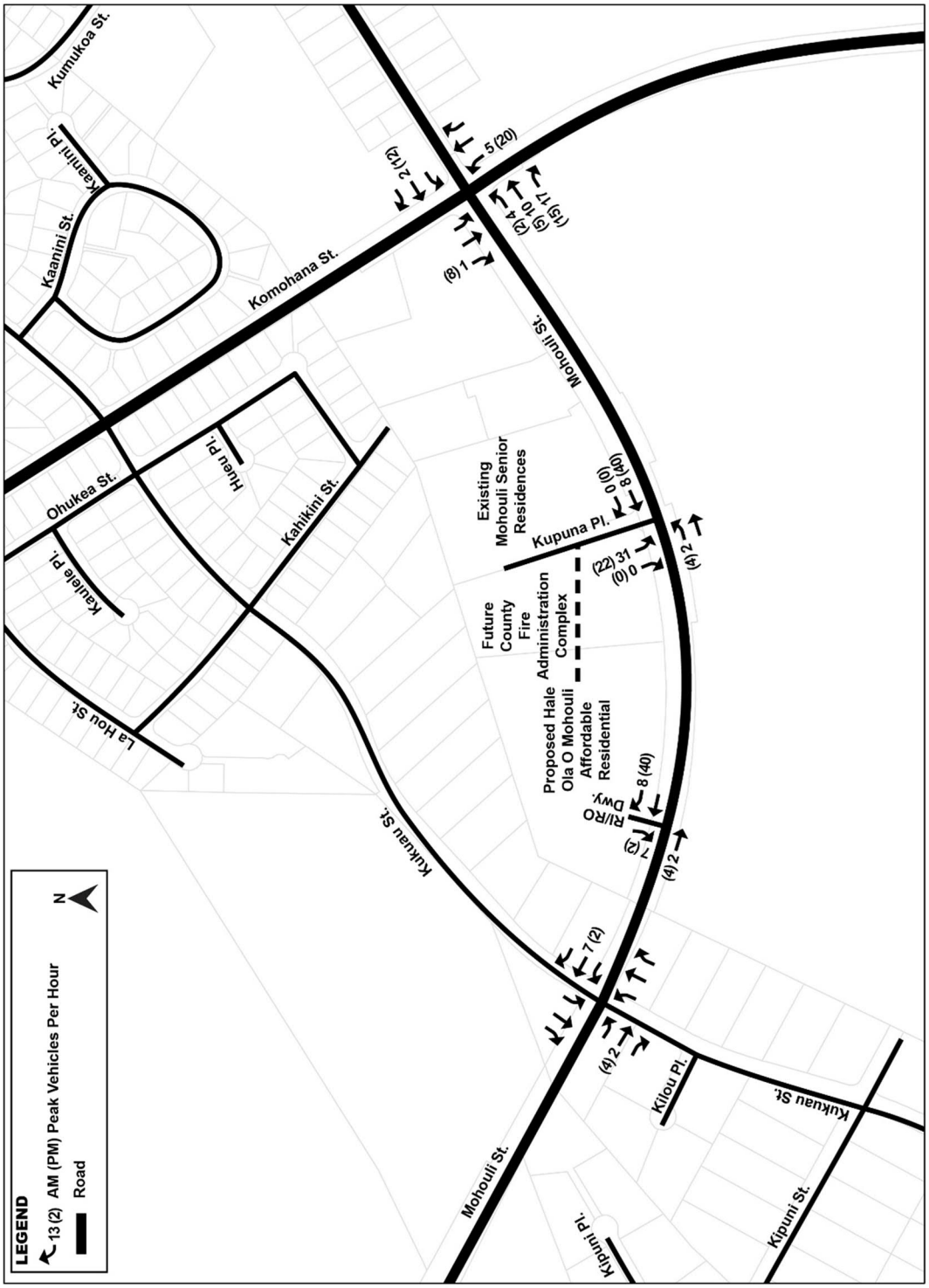

Figure 14 Projected Year 2025 AM and PM Peak Hour Hale Ola O Mohouli Generated Traffic Volumes

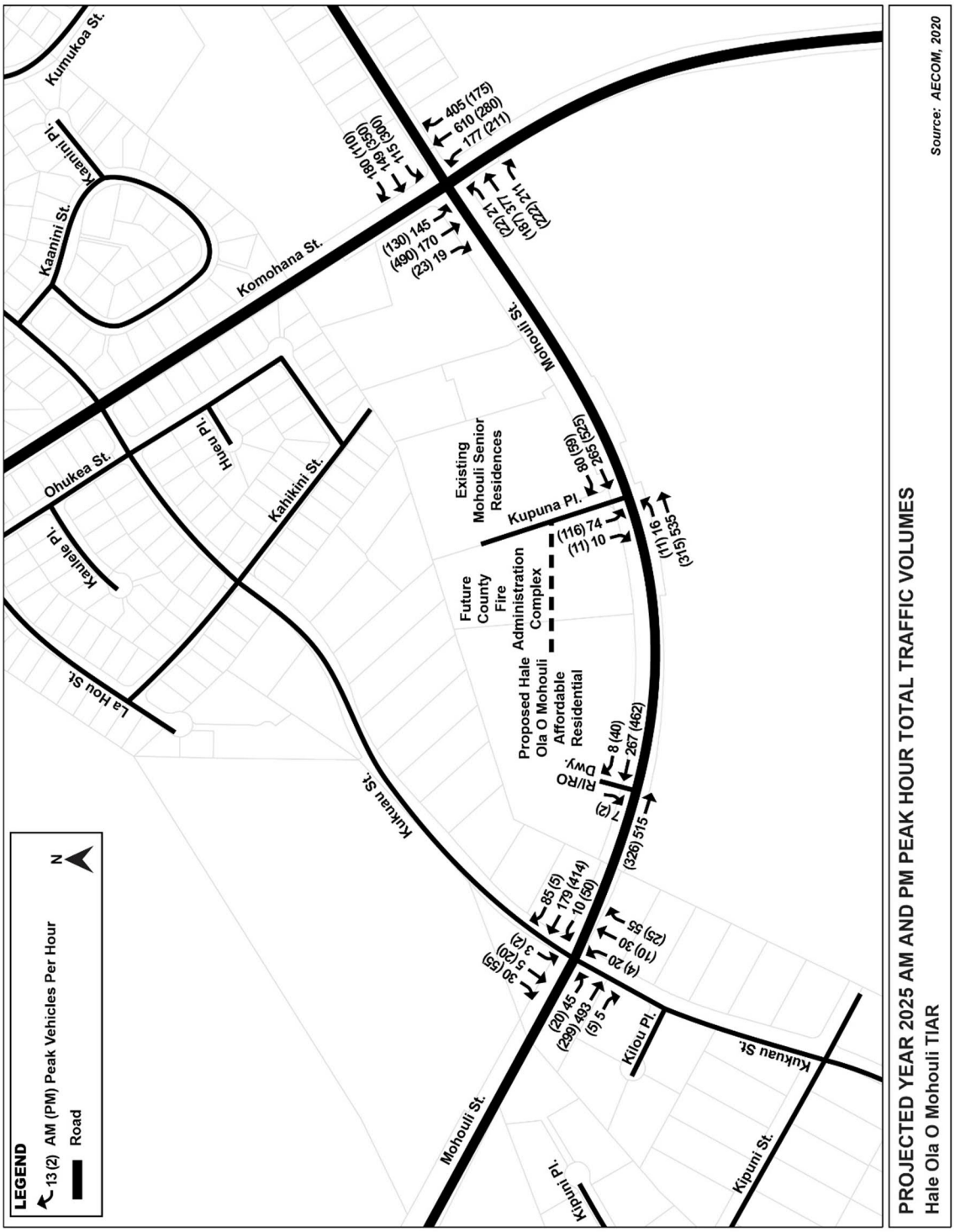

Figure 15 Projected Year 2025 AM and PM Peak Hour Total Traffic Volumes

3.8 Projected Year 2025 Peak Hour Intersection Operations

The projected Year 2025 AM and PM peak hour traffic volumes with and without the proposed Hale Ola O Mohouli development were used to evaluate future intersection operations. The signalized and unsignalized HCM 6th Edition methods as implemented by the Synchro analysis software was used. Table 4 summarizes the results of the existing 2020, year 2025 without project, and year 2025 with project intersection analyses for AM and PM peak hour conditions.

Table 4 Year 2020 and Projected Year 2025 Peak Hour Intersection Operations Summary

Intersection/Movement	AM Peak Hour						PM Peak Hour					
	Existing		2025 w/o Project		2025 w/Project		Existing		2025 w/o Project		2025 w/Project	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Mohouli/Kukuau												
EB Mohouli LT	7.9	A	7.9	A	7.9	A	8.3	A	8.3	A	8.3	A
WB Mohouli LT	8.5	A	8.5	A	8.5	A	8.0	A	8.1	A	8.1	A
NB Kukuau Combined	20.4	C	20.6	C	20.9	C	14.8	B	14.9	B	15.0	C
SB Kukuau Combined	12.3	B	12.4	B	12.5	B	15.3	C	15.4	C	15.5	C
Hale Ola O Mohouli RI/RO												
SB RI/RO RT	na	na	na	na	9.9	A	na	na	na	na	11.4	B
Mohouli/Kupuna												
EB Mohouli LT	7.9	A	8.1	A	8.1	A	8.7	A	8.7	A	8.8	A
SB Kupuna LT	18.1	C	18.7	C	21.1	C	18.7	C	22.1	C	26.6	D
SB Kupuna RT	9.8	A	9.8	A	9.9	A	11.0	B	11.7	B	12.1	B
Mohouli/Komohana	33.6	C	33.7	C	38.6	D	36.6	D	36.8	D	38.6	D

Notes:
Delay is in seconds/vehicle
Analyses performed using Synchro Version 11 and summarized consistent with HCM 6th Edition parameters
na = not applicable

As shown, the Hale Ola O Mohouli affordable residential development has relatively small traffic impacts at the intersections evaluated. The added traffic does contribute to a slight increase in overall intersection delay at the Mohouli Street/Komohana Street intersection, and because the overall intersection delay due to current and projected background traffic volumes at this intersection are near the threshold for LOS C, the slight increase in delay moves this intersection to LOS D, usually considered acceptable to urban peak hour conditions.

4.0 SUMMARY AND RECOMMENDATIONS

4.1 Summary

The proposed Hale Ola O Mohouli development is a proposed affordable residential development that expands the existing Mohouli Senior Residences in Hilo. It will contain up to 90 multi-family residential units and is located on Mohouli Street between Komohana Street and Kukuau Street.

The proposed Hale Ola O Mohouli development is projected to generate 48 vehicles per hour (vph) during the AM peak hour with 10 vph inbound and 38 vph outbound. In the PM peak hour, it is expected to generate 68 vph with 44 vph inbound and 24 vph outbound.

The additional traffic generated by the proposed Hale Ola O Mohouli development is forecasted to have minor impacts on intersection operations at the intersections in the vicinity of the proposed development. A proposed driveway with traffic movements restricted to right-in/right-out movements will be effective in reducing traffic activity on Kupuna Place.

The existing roadway infrastructure would be able to accommodate traffic generated by the proposed Hale Ola O Mohouli development.

4.2 Evaluation of Traffic Signal Warrants at Kupuna Place

The projected Year 2025 peak hour turning movements were used to evaluate the need for a traffic signal at the Mohouli Street/Kupuna Place intersection. Currently, this intersection operates as a two-way STOP-sign controlled intersection with the STOP-sign on the Kupuna Place approach.

Figure 16 and Figure 17 show graphic evaluations of the peak hour traffic signal warrant as documented in the Manual on Uniform Control Devices (MUTCD), 2009 as revised, for the projected year 2025 AM peak hour and the 2025 PM peak hour time periods..

As shown, in Figure 17, the projected year 2025 PM peak hour volumes are closer to warranting a traffic signal at the Mohouli Street/Kupuna Place intersection than the projected year 2025 AM peak hour volume. Even for the projected year 2025 PM peak hour, the peak hour traffic signal warrant in not satisfied.

The projected year 2025 PM peak hour traffic on Mohouli Street is 910 vehicles per hour. To satisfy the peak hour traffic warrant, this volume would need to increase to approximately 1,000 vehicles per hour, a 10 percent increase. Given the fairly stable traffic volume level on Mohouli Street between year 2007 and year 2020, it is anticipated that this 10 percent increase would require growth over a substantial number of years or would be caused by a dramatic increase in development in the vicinity of the intersection.

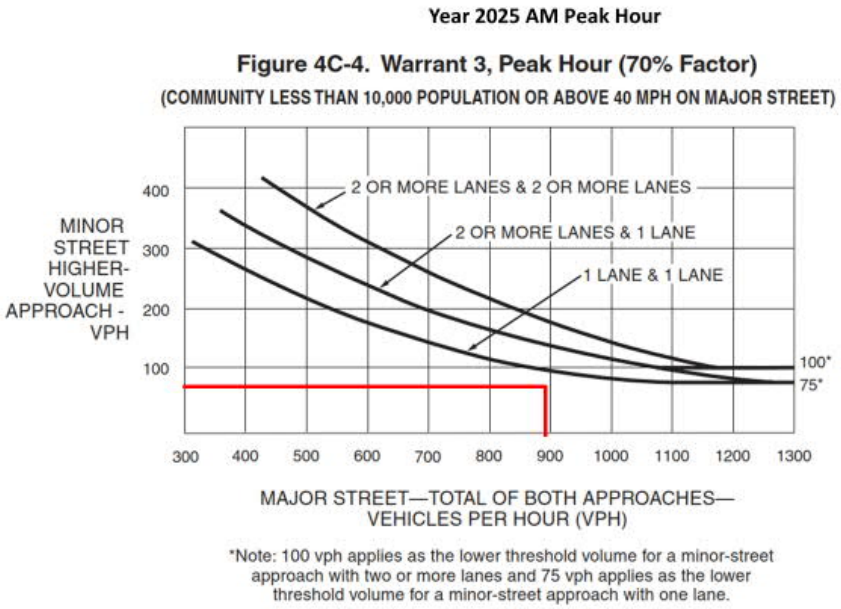

Figure 16 2025 AM Peak Hour Traffic Signal Warrant-Mohouli/Kupuna Intersection

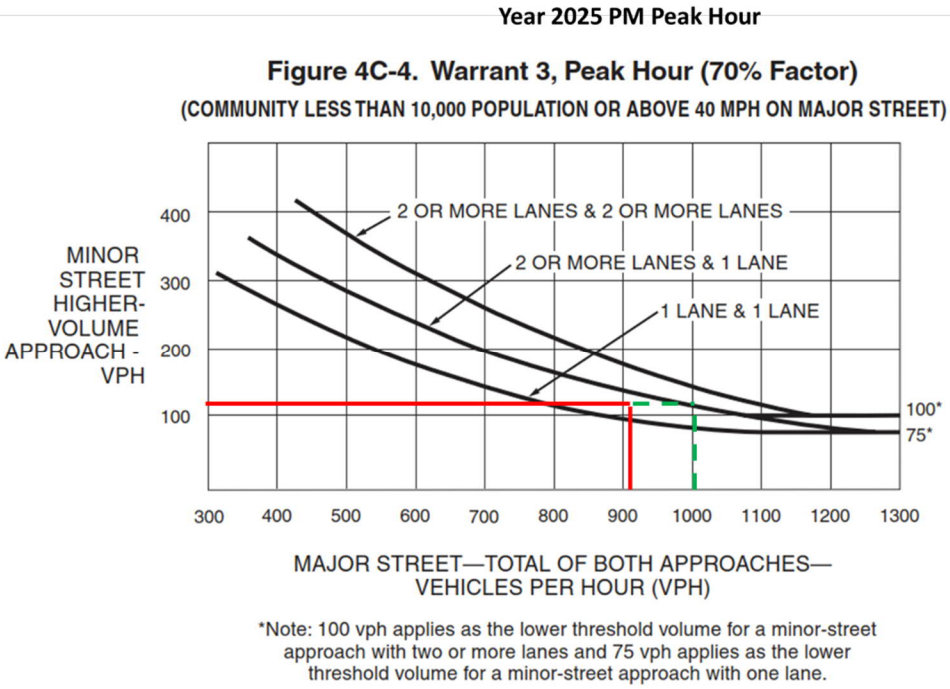

Figure 17 2025 PM Peak Hour Traffic Signal Warrant-Mohouli/Kupuna Intersection

4.3 Recommendations

The following improvements are recommended for the proposed Hale Ola O Mohouli development:

- Implement the proposed right-in/right-out driveway on Mohouli Street. As part of the implementation, restripe part of the wide paved shoulder on westbound Mohouli Street as a right-turn only lane into the Hale Ola O Mohouli development;
- Assure that future major development occurring in the area with traffic impacts to the segment of Mohouli Street between Komohana Street and Kukuau Street provide an evaluation of traffic signal warrant for the Mohouli Street/Kupuna Place intersection.

5.0 REFERENCES

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Appendix A

Traffic Count Data

Raw Vehicle Turning Movement Traffic Count Worksheets

File Name: C:\Users\jefferson.young\Documents\Kupuna_Mohouli\Kupuna_Mohouli AM Peak.ppd
Start Date: 10/21/2020
Start Time: 6:00:00 AM
Site Code: 00000000
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	KUPUNA PL From North				MOHOULI ST From East				KUPUNA PL From South				MOHOULI ST From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
06:00 AM	0	0	0	0	1	17	0	0	0	0	0	0	0	49	0	0
06:15 AM	2	0	3	0	3	21	0	0	0	0	0	0	0	59	1	0
06:30 AM	1	0	3	0	3	28	0	0	0	0	0	0	0	92	1	0
06:45 AM	0	0	2	0	6	32	0	0	0	0	0	0	0	120	0	0
07:00 AM	0	0	6	0	3	49	0	0	0	0	0	0	0	119	1	0
07:15 AM	1	0	9	0	10	39	0	0	0	0	0	0	0	133	3	0
07:30 AM	2	0	5	0	3	70	0	0	0	0	0	0	0	124	2	0
07:45 AM	3	0	7	0	9	78	0	0	0	0	0	0	0	113	0	0
08:00 AM	1	0	5	0	9	52	0	0	0	0	0	0	0	94	2	0
08:15 AM	1	0	6	0	6	53	0	0	0	0	0	0	0	83	1	0
AM Peak Hour 7:00-8:00 AM	6	0	27	0	25	236	0	0	0	0	0	0	0	489	6	0

Vehicle Count

File Name: C:\Users\jefferson.young\Documents\Kupuna_Mohouli\Kupuna_Mohouli AM Peak.ppd
Start Date: 10/21/2020
Start Time: 6:00:00 AM
Site Code: 00000000
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	KUPUNA PL From North				MOHOULI ST From East				KUPUNA PL From South				MOHOULI ST From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
AM Peak Hour 7:00-8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Bicycle Count

File Name: C:\Users\jefferson.young\Documents\Kupuna_Mohouli\Kupuna_Mohouli AM Peak.ppd
Start Date: 10/21/2020
Start Time: 6:00:00 AM
Site Code: 00000000
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	KUPUNA PL From North				MOHOULI ST From East				KUPUNA PL From South				MOHOULI ST From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
06:15 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
06:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0
06:45 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	3	1	0
07:00 AM	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak Hour 7:00-8:00 AM	3	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0

Pedestrian Count

File Name: C:\Users\jefferson.young\Documents\Kupuna_Mohouli\Kupuna_Mohouli PM Peak.ppd
Start Date: 10/20/2020
Start Time: 3:15:00 PM
Site Code: 00000000
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	KUPUNA PL From North				MOHOULI ST From East				KUPUNA PL From South				MOHOULI ST From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
03:15 PM	3	0	4	0	9	117	0	0	0	0	0	0	0	84	0	0
03:30 PM	3	0	6	0	4	112	0	0	0	0	0	0	0	75	3	0
03:45 PM	3	0	8	0	9	100	0	0	0	0	0	0	0	88	1	0
04:00 PM	1	0	12	0	7	91	0	0	0	0	0	0	0	98	3	0
04:15 PM	0	0	5	0	8	109	0	0	0	0	0	0	0	78	0	0
04:30 PM	1	0	9	0	11	120	0	0	0	0	0	0	0	69	0	0
04:45 PM	1	0	7	0	2	134	0	0	0	0	0	0	0	67	0	0
05:00 PM	1	0	6	0	6	96	0	0	0	0	0	0	0	83	0	0
05:15 PM	1	0	3	0	3	113	0	0	0	0	0	0	0	72	0	0
	3	0	33	0	28	454	0	0	0	0	0	0	0	312	3	0

Vehicle Count

File Name: C:\Users\jefferson.young\Documents\Kupuna_Mohouli\Kupuna_Mohouli PM Peak.ppd
Start Date: 10/20/2020
Start Time: 3:15:00 PM
Site Code: 00000000
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	KUPUNA PL From North				MOHOULI ST From East				KUPUNA PL From South				MOHOULI ST From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0

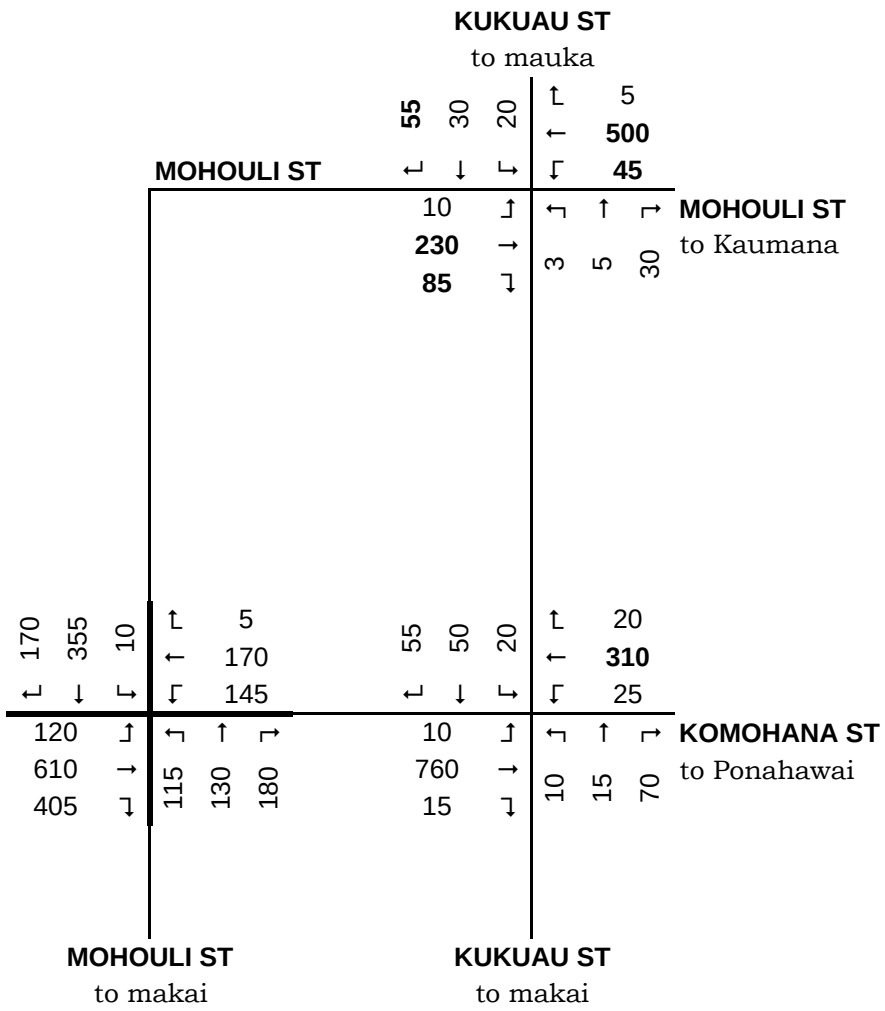
Bicycle Count

File Name: C:\Users\jefferson.young\Documents\Kupuna_Mohouli\Kupuna_Mohouli PM Peak.ppd
Start Date: 10/20/2020
Start Time: 3:15:00 PM
Site Code: 00000000
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

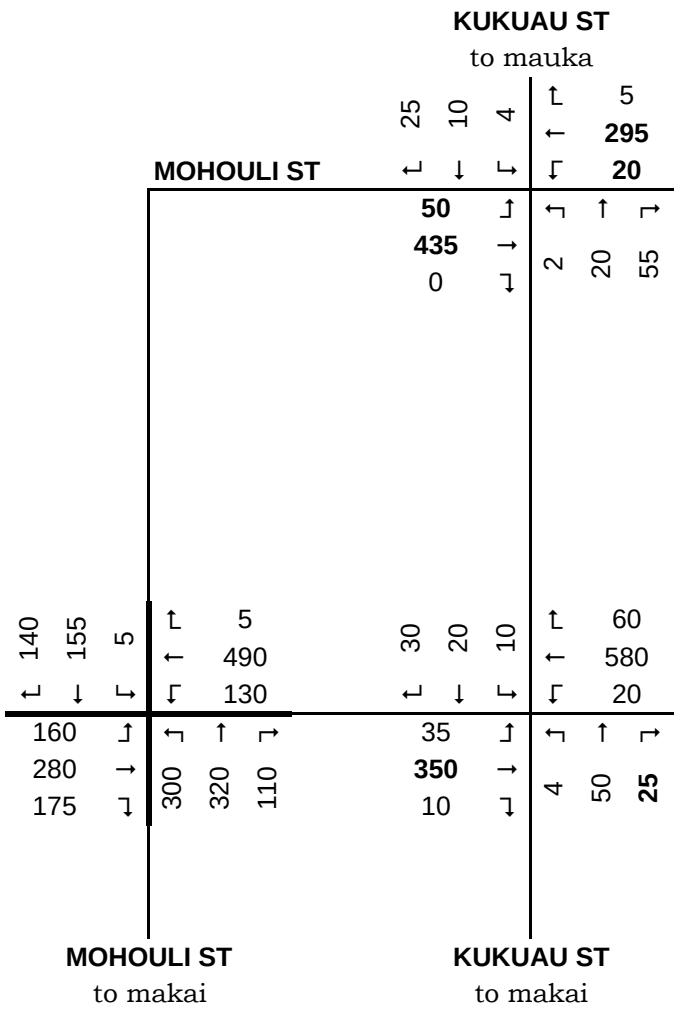
	KUPUNA PL From North				MOHOULI ST From East				KUPUNA PL From South				MOHOULI ST From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
04:45 PM	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
05:15 PM	0	0	0	0	1	2	0	0	0	0	0	0	0	2	0	0
	2	0	0	0	0	3	0	0	0	0	0	0	0	4	0	0

Pedestrian Count

Traffic Count Data from TIAR for Mohouli Heights Senior Neighborhood Project - September 2011



AM PEAK HOUR



PM PEAK HOUR

EXISTING 2009 TRAFFIC VOLUMES
FIGURE 2

State of Hawaii Department of Transportation Traffic Count Station Data

HDOT RIMS Traffic Station Analyzer (v44)

Log Out Print RS

Run Date: 26-OCT-20

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71194000144
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 14-DEC-16

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

Final AADT: 14500
Route No: 1940

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	354	916	1,270
AM - K FACTOR(%)			8.01
AM - D(%)	27.87	72.13	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM	07:00 AM to 08:00 AM	
AM - PEAK HR VOLUME	354	927	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:15 PM to 5:15 PM		
PM - PEAK HR VOLUME	810	536	1,346
PM - K FACTOR(%)			8.49
PM -D(%)	60.18	39.82	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:30 PM to 5:30 PM	4:15 PM to 5:15 PM	
PM - PEAK HR VOLUME	812	536	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	354	440	1,270
AM - K FACTOR(%)			8.01
AM - D(%)	27.87	72.13	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:15 PM to 5:15 PM		
PM - PEAK HR VOLUME	810	812	1,346
PM - K FACTOR(%)			8.49
PM -D(%)	60.18	39.82	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	1:45 PM to 2:45 PM		
PEAK HR VOLUME	483	563	1,046
DIRECTIONAL PEAK			
PEAK HR TIME	2:00 PM to 3:00 PM	1:15 PM to 2:15 PM	
PEAK HR VOLUME	506	574	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	2,080	3,841	5,921
AM 12-HR PERIOD (00:00-12:00)	2,333	4,235	6,568
PM 6-HR PERIOD (12:00-18:00)	3,442	2,975	6,417
PM 12-HR PERIOD (12:00-24:00)	4,986	4,299	9,285
24-HR PERIOD (12:00-24:00)	7,319	8,534	15,853
D%	46.17	53.83	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	15	10	25
12:15 - 12:30	5	10	15
12:30 - 12:45	6	8	14
12:45 - 01:00	6	5	11
01:00 - 01:15	12	3	15
01:15 - 01:30	7	5	12
01:30 - 01:45	5	3	8
01:45 - 02:00	6	4	10
02:00 - 02:15	4	4	8
02:15 - 02:30	7	3	10
02:30 - 02:45	7	5	12
02:45 - 03:00	1	9	10
03:00 - 03:15	3	0	3
03:15 - 03:30	7	4	11
03:30 - 03:45	4	9	13
03:45 - 04:00	11	10	21
04:00 - 04:15	5	19	24
04:15 - 04:30	4	14	18
04:30 - 04:45	13	25	38
04:45 - 05:00	18	23	41
05:00 - 05:15	20	20	40
05:15 - 05:30	28	39	67
05:30 - 05:45	26	73	99
05:45 - 06:00	33	89	122

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	62	84	146
06:15 - 06:30	42	137	179
06:30 - 06:45	71	167	238
06:45 - 07:00	75	195	270
07:00 - 07:15	67	199	266
07:15 - 07:30	96	229	325
07:30 - 07:45	93	256	349
07:45 - 08:00	81	243	324
08:00 - 08:15	84	188	272
08:15 - 08:30	78	176	254
08:30 - 08:45	81	168	249
08:45 - 09:00	90	187	277
09:00 - 09:15	81	129	210
09:15 - 09:30	81	133	214
09:30 - 09:45	82	127	209
09:45 - 10:00	98	149	247
10:00 - 10:15	100	143	243
10:15 - 10:30	97	134	231
10:30 - 10:45	97	139	236
10:45 - 11:00	84	147	231
11:00 - 11:15	123	128	251
11:15 - 11:30	94	138	232
11:30 - 11:45	129	113	242
11:45 - 12:00	94	132	226

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	139	106	245
12:15 - 12:30	107	117	224
12:30 - 12:45	113	124	237
12:45 - 01:00	96	130	226
01:00 - 01:15	107	118	225
01:15 - 01:30	93	137	230
01:30 - 01:45	96	135	231
01:45 - 02:00	110	165	275
02:00 - 02:15	126	137	263
02:15 - 02:30	113	123	236
02:30 - 02:45	134	138	272
02:45 - 03:00	133	101	234
03:00 - 03:15	148	126	274
03:15 - 03:30	154	120	274
03:30 - 03:45	161	84	245
03:45 - 04:00	161	124	285
04:00 - 04:15	169	109	278
04:15 - 04:30	177	147	324
04:30 - 04:45	216	119	335
04:45 - 05:00	219	148	367
05:00 - 05:15	198	122	320
05:15 - 05:30	179	127	306
05:30 - 05:45	131	97	228
05:45 - 06:00	162	121	283

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	155	105	260
06:15 - 06:30	131	106	237
06:30 - 06:45	110	115	225
06:45 - 07:00	107	77	184
07:00 - 07:15	92	79	171
07:15 - 07:30	92	80	172
07:30 - 07:45	76	73	149
07:45 - 08:00	61	77	138
08:00 - 08:15	84	70	154
08:15 - 08:30	91	74	165
08:30 - 08:45	59	61	120
08:45 - 09:00	63	52	115
09:00 - 09:15	64	52	116
09:15 - 09:30	53	47	100
09:30 - 09:45	27	34	61
09:45 - 10:00	38	34	72
10:00 - 10:15	39	35	74
10:15 - 10:30	30	34	64
10:30 - 10:45	36	28	64
10:45 - 11:00	31	29	60
11:00 - 11:15	29	18	47
11:15 - 11:30	42	15	57
11:30 - 11:45	18	22	40
11:45 - 12:00	16	7	23

HDOT RIMS Traffic Station Analyzer (v44)

Log Out Print RS

Run Date: 26-OCT-20

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71194000144
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 15-DEC-16

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

Final AADT: 14500
Route No: 1940

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	330	965	1,295
AM - K FACTOR(%)			8.04
AM - D(%)	25.48	74.52	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	07:15 AM to 08:15 AM	
AM - PEAK HR VOLUME	343	965	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:30 PM to 5:30 PM		
PM - PEAK HR VOLUME	777	521	1,298
PM - K FACTOR(%)			8.06
PM -D(%)	59.86	40.14	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:30 PM to 5:30 PM	4:00 PM to 5:00 PM	
PM - PEAK HR VOLUME	777	534	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	330	461	1,295
AM - K FACTOR(%)			8.04
AM - D(%)	25.48	74.52	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:30 PM to 5:30 PM		
PM - PEAK HR VOLUME	777	777	1,298
PM - K FACTOR(%)			8.06
PM -D(%)	59.86	40.14	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	2:00 PM to 3:00 PM		
PEAK HR VOLUME	517	513	1,030
DIRECTIONAL PEAK			
PEAK HR TIME	2:00 PM to 3:00 PM	09:15 AM to 10:15 AM	
PEAK HR VOLUME	517	576	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	2,053	3,809	5,862
AM 12-HR PERIOD (00:00-12:00)	2,324	4,205	6,529
PM 6-HR PERIOD (12:00-18:00)	3,471	3,081	6,552
PM 12-HR PERIOD (12:00-24:00)	5,169	4,403	9,572
24-HR PERIOD (12:00-24:00)	7,493	8,608	16,101
D%	46.54	53.46	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	12	9	21
12:15 - 12:30	15	12	27
12:30 - 12:45	11	10	21
12:45 - 01:00	10	8	18
01:00 - 01:15	7	6	13
01:15 - 01:30	7	3	10
01:30 - 01:45	8	5	13
01:45 - 02:00	6	6	12
02:00 - 02:15	6	3	9
02:15 - 02:30	4	3	7
02:30 - 02:45	3	5	8
02:45 - 03:00	7	7	14
03:00 - 03:15	9	4	13
03:15 - 03:30	5	4	9
03:30 - 03:45	3	9	12
03:45 - 04:00	7	10	17
04:00 - 04:15	6	14	20
04:15 - 04:30	9	10	19
04:30 - 04:45	12	27	39
04:45 - 05:00	12	33	45
05:00 - 05:15	9	23	32
05:15 - 05:30	29	39	68
05:30 - 05:45	32	64	96
05:45 - 06:00	42	82	124

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	44	107	151
06:15 - 06:30	47	116	163
06:30 - 06:45	75	155	230
06:45 - 07:00	71	168	239
07:00 - 07:15	81	192	273
07:15 - 07:30	70	244	314
07:30 - 07:45	97	260	357
07:45 - 08:00	95	243	338
08:00 - 08:15	68	218	286
08:15 - 08:30	72	179	251
08:30 - 08:45	78	178	256
08:45 - 09:00	82	183	265
09:00 - 09:15	65	142	207
09:15 - 09:30	82	126	208
09:30 - 09:45	93	139	232
09:45 - 10:00	86	166	252
10:00 - 10:15	101	145	246
10:15 - 10:30	94	117	211
10:30 - 10:45	88	138	226
10:45 - 11:00	111	107	218
11:00 - 11:15	111	127	238
11:15 - 11:30	116	119	235
11:30 - 11:45	123	110	233
11:45 - 12:00	103	130	233

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	117	118	235
12:15 - 12:30	134	118	252
12:30 - 12:45	107	109	216
12:45 - 01:00	94	128	222
01:00 - 01:15	115	134	249
01:15 - 01:30	119	147	266
01:30 - 01:45	116	138	254
01:45 - 02:00	98	150	248
02:00 - 02:15	112	113	225
02:15 - 02:30	114	158	272
02:30 - 02:45	144	115	259
02:45 - 03:00	147	127	274
03:00 - 03:15	152	140	292
03:15 - 03:30	171	117	288
03:30 - 03:45	171	131	302
03:45 - 04:00	154	116	270
04:00 - 04:15	179	135	314
04:15 - 04:30	169	131	300
04:30 - 04:45	176	147	323
04:45 - 05:00	196	121	317
05:00 - 05:15	198	111	309
05:15 - 05:30	207	142	349
05:30 - 05:45	143	108	251
05:45 - 06:00	138	127	265

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	171	102	273
06:15 - 06:30	108	128	236
06:30 - 06:45	132	93	225
06:45 - 07:00	123	96	219
07:00 - 07:15	118	81	199
07:15 - 07:30	105	68	173
07:30 - 07:45	80	52	132
07:45 - 08:00	89	72	161
08:00 - 08:15	83	65	148
08:15 - 08:30	76	54	130
08:30 - 08:45	53	58	111
08:45 - 09:00	58	46	104
09:00 - 09:15	76	45	121
09:15 - 09:30	54	43	97
09:30 - 09:45	41	51	92
09:45 - 10:00	32	59	91
10:00 - 10:15	36	46	82
10:15 - 10:30	51	47	98
10:30 - 10:45	38	23	61
10:45 - 11:00	38	24	62
11:00 - 11:15	38	25	63
11:15 - 11:30	52	17	69
11:30 - 11:45	31	15	46
11:45 - 12:00	15	12	27

HDOT RIMS Traffic Station Analyzer (v44)

Log Out Print RS

Run Date: 26-OCT-20

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71194000144
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 31-JUL-17

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

Final AADT: 16700
Route No: 1940

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM		
AM - PEAK HR VOLUME	347	994	1,341
AM - K FACTOR(%)			7.79
AM - D(%)	25.88	74.12	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM	08:00 AM to 09:00 AM	
AM - PEAK HR VOLUME	347	994	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:15 PM to 6:15 PM		
PM - PEAK HR VOLUME	913	588	1,501
PM - K FACTOR(%)			8.72
PM -D(%)	60.83	39.17	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:15 PM to 6:15 PM	4:45 PM to 5:45 PM	
PM - PEAK HR VOLUME	913	594	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:15 AM to 09:15 AM		
AM - PEAK HR VOLUME	379	423	1,358
AM - K FACTOR(%)			7.89
AM - D(%)	25.88	74.12	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:15 PM to 6:15 PM		
PM - PEAK HR VOLUME	913	913	1,501
PM - K FACTOR(%)			8.72
PM -D(%)	60.83	39.17	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	09:00 AM to 112:00 AM		
PEAK HR VOLUME	423	719	1,142
DIRECTIONAL PEAK			
PEAK HR TIME	0:45 PM to 1:45 PM	09:00 AM to 112:00 AM	
PEAK HR VOLUME	535	719	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	1,861	3,769	5,630
AM 12-HR PERIOD (00:00-12:00)	2,134	4,030	6,164
PM 6-HR PERIOD (12:00-18:00)	3,618	3,360	6,978
PM 12-HR PERIOD (12:00-24:00)	5,885	5,166	11,051
24-HR PERIOD (12:00-24:00)	8,019	9,196	17,215
D%	46.58	53.42	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	32	22	54
12:15 - 12:30	32	14	46
12:30 - 12:45	24	20	44
12:45 - 01:00	21	11	32
01:00 - 01:15	13	14	27
01:15 - 01:30	7	12	19
01:30 - 01:45	14	8	22
01:45 - 02:00	8	6	14
02:00 - 02:15	5	9	14
02:15 - 02:30	11	5	16
02:30 - 02:45	7	4	11
02:45 - 03:00	9	6	15
03:00 - 03:15	2	4	6
03:15 - 03:30	3	5	8
03:30 - 03:45	8	4	12
03:45 - 04:00	4	3	7
04:00 - 04:15	5	3	8
04:15 - 04:30	5	6	11
04:30 - 04:45	9	7	16
04:45 - 05:00	7	13	20
05:00 - 05:15	5	18	23
05:15 - 05:30	13	17	30
05:30 - 05:45	12	25	37
05:45 - 06:00	17	25	42

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	14	20	34
06:15 - 06:30	23	46	69
06:30 - 06:45	40	55	95
06:45 - 07:00	33	80	113
07:00 - 07:15	38	96	134
07:15 - 07:30	42	157	199
07:30 - 07:45	70	202	272
07:45 - 08:00	72	166	238
08:00 - 08:15	75	209	284
08:15 - 08:30	83	253	336
08:30 - 08:45	89	266	355
08:45 - 09:00	100	266	366
09:00 - 09:15	107	194	301
09:15 - 09:30	103	189	292
09:30 - 09:45	99	163	262
09:45 - 10:00	114	173	287
10:00 - 10:15	86	178	264
10:15 - 10:30	97	147	244
10:30 - 10:45	98	167	265
10:45 - 11:00	96	149	245
11:00 - 11:15	114	162	276
11:15 - 11:30	71	131	202
11:30 - 11:45	93	141	234
11:45 - 12:00	104	159	263

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	121	128	249
12:15 - 12:30	115	155	270
12:30 - 12:45	122	114	236
12:45 - 01:00	129	125	254
01:00 - 01:15	147	136	283
01:15 - 01:30	134	133	267
01:30 - 01:45	125	121	246
01:45 - 02:00	106	162	268
02:00 - 02:15	128	156	284
02:15 - 02:30	100	151	251
02:30 - 02:45	132	160	292
02:45 - 03:00	127	162	289
03:00 - 03:15	131	123	254
03:15 - 03:30	135	164	299
03:30 - 03:45	124	134	258
03:45 - 04:00	135	125	260
04:00 - 04:15	149	128	277
04:15 - 04:30	158	122	280
04:30 - 04:45	205	132	337
04:45 - 05:00	192	144	336
05:00 - 05:15	213	139	352
05:15 - 05:30	213	158	371
05:30 - 05:45	254	153	407
05:45 - 06:00	223	135	358

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	223	142	365
06:15 - 06:30	161	123	284
06:30 - 06:45	175	108	283
06:45 - 07:00	155	144	299
07:00 - 07:15	149	117	266
07:15 - 07:30	138	123	261
07:30 - 07:45	139	111	250
07:45 - 08:00	123	88	211
08:00 - 08:15	104	80	184
08:15 - 08:30	100	83	183
08:30 - 08:45	103	77	180
08:45 - 09:00	82	64	146
09:00 - 09:15	69	57	126
09:15 - 09:30	94	72	166
09:30 - 09:45	73	65	138
09:45 - 10:00	58	41	99
10:00 - 10:15	44	45	89
10:15 - 10:30	56	40	96
10:30 - 10:45	45	54	99
10:45 - 11:00	48	45	93
11:00 - 11:15	28	32	60
11:15 - 11:30	33	42	75
11:30 - 11:45	40	25	65
11:45 - 12:00	27	28	55

HDOT RIMS Traffic Station Analyzer (v44)

Log Out Print RS

Run Date: 26-OCT-20

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71194000144
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 31-JUL-17

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

Final AADT: 16700
Route No: 1940

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM		
AM - PEAK HR VOLUME	347	994	1,341
AM - K FACTOR(%)			7.79
AM - D(%)	25.88	74.12	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM	08:00 AM to 09:00 AM	
AM - PEAK HR VOLUME	347	994	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:15 PM to 6:15 PM		
PM - PEAK HR VOLUME	913	588	1,501
PM - K FACTOR(%)			8.72
PM -D(%)	60.83	39.17	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:15 PM to 6:15 PM	4:45 PM to 5:45 PM	
PM - PEAK HR VOLUME	913	594	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:15 AM to 09:15 AM		
AM - PEAK HR VOLUME	379	423	1,358
AM - K FACTOR(%)			7.89
AM - D(%)	25.88	74.12	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:15 PM to 6:15 PM		
PM - PEAK HR VOLUME	913	913	1,501
PM - K FACTOR(%)			8.72
PM -D(%)	60.83	39.17	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	09:00 AM to 112:00 AM		
PEAK HR VOLUME	423	719	1,142
DIRECTIONAL PEAK			
PEAK HR TIME	0:45 PM to 1:45 PM	09:00 AM to 112:00 AM	
PEAK HR VOLUME	535	719	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	1,861	3,769	5,630
AM 12-HR PERIOD (00:00-12:00)	2,134	4,030	6,164
PM 6-HR PERIOD (12:00-18:00)	3,618	3,360	6,978
PM 12-HR PERIOD (12:00-24:00)	5,885	5,166	11,051
24-HR PERIOD (12:00-24:00)	8,019	9,196	17,215
D%	46.58	53.42	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	32	22	54
12:15 - 12:30	32	14	46
12:30 - 12:45	24	20	44
12:45 - 01:00	21	11	32
01:00 - 01:15	13	14	27
01:15 - 01:30	7	12	19
01:30 - 01:45	14	8	22
01:45 - 02:00	8	6	14
02:00 - 02:15	5	9	14
02:15 - 02:30	11	5	16
02:30 - 02:45	7	4	11
02:45 - 03:00	9	6	15
03:00 - 03:15	2	4	6
03:15 - 03:30	3	5	8
03:30 - 03:45	8	4	12
03:45 - 04:00	4	3	7
04:00 - 04:15	5	3	8
04:15 - 04:30	5	6	11
04:30 - 04:45	9	7	16
04:45 - 05:00	7	13	20
05:00 - 05:15	5	18	23
05:15 - 05:30	13	17	30
05:30 - 05:45	12	25	37
05:45 - 06:00	17	25	42

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	14	20	34
06:15 - 06:30	23	46	69
06:30 - 06:45	40	55	95
06:45 - 07:00	33	80	113
07:00 - 07:15	38	96	134
07:15 - 07:30	42	157	199
07:30 - 07:45	70	202	272
07:45 - 08:00	72	166	238
08:00 - 08:15	75	209	284
08:15 - 08:30	83	253	336
08:30 - 08:45	89	266	355
08:45 - 09:00	100	266	366
09:00 - 09:15	107	194	301
09:15 - 09:30	103	189	292
09:30 - 09:45	99	163	262
09:45 - 10:00	114	173	287
10:00 - 10:15	86	178	264
10:15 - 10:30	97	147	244
10:30 - 10:45	98	167	265
10:45 - 11:00	96	149	245
11:00 - 11:15	114	162	276
11:15 - 11:30	71	131	202
11:30 - 11:45	93	141	234
11:45 - 12:00	104	159	263

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	121	128	249
12:15 - 12:30	115	155	270
12:30 - 12:45	122	114	236
12:45 - 01:00	129	125	254
01:00 - 01:15	147	136	283
01:15 - 01:30	134	133	267
01:30 - 01:45	125	121	246
01:45 - 02:00	106	162	268
02:00 - 02:15	128	156	284
02:15 - 02:30	100	151	251
02:30 - 02:45	132	160	292
02:45 - 03:00	127	162	289
03:00 - 03:15	131	123	254
03:15 - 03:30	135	164	299
03:30 - 03:45	124	134	258
03:45 - 04:00	135	125	260
04:00 - 04:15	149	128	277
04:15 - 04:30	158	122	280
04:30 - 04:45	205	132	337
04:45 - 05:00	192	144	336
05:00 - 05:15	213	139	352
05:15 - 05:30	213	158	371
05:30 - 05:45	254	153	407
05:45 - 06:00	223	135	358

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	223	142	365
06:15 - 06:30	161	123	284
06:30 - 06:45	175	108	283
06:45 - 07:00	155	144	299
07:00 - 07:15	149	117	266
07:15 - 07:30	138	123	261
07:30 - 07:45	139	111	250
07:45 - 08:00	123	88	211
08:00 - 08:15	104	80	184
08:15 - 08:30	100	83	183
08:30 - 08:45	103	77	180
08:45 - 09:00	82	64	146
09:00 - 09:15	69	57	126
09:15 - 09:30	94	72	166
09:30 - 09:45	73	65	138
09:45 - 10:00	58	41	99
10:00 - 10:15	44	45	89
10:15 - 10:30	56	40	96
10:30 - 10:45	45	54	99
10:45 - 11:00	48	45	93
11:00 - 11:15	28	32	60
11:15 - 11:30	33	42	75
11:30 - 11:45	40	25	65
11:45 - 12:00	27	28	55

HDOT RIMS Traffic Station Analyzer (v44)

Log Out Print RS

Run Date: 26-OCT-20

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71194000144
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 01-AUG-17

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

Final AADT: 16700
Route No: 1940

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM		
AM - PEAK HR VOLUME	383	1,097	1,480
AM - K FACTOR(%)			8.65
AM - D(%)	25.88	74.12	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM	08:00 AM to 09:00 AM	
AM - PEAK HR VOLUME	383	1,097	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:15 PM to 6:15 PM		
PM - PEAK HR VOLUME	862	520	1,382
PM - K FACTOR(%)			8.07
PM -D(%)	62.37	37.63	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:30 PM to 6:30 PM	3:00 PM to 4:00 PM	
PM - PEAK HR VOLUME	882	533	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM		
AM - PEAK HR VOLUME	383	430	1,480
AM - K FACTOR(%)			8.65
AM - D(%)	25.88	74.12	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	5:15 PM to 6:15 PM		
PM - PEAK HR VOLUME	862	882	1,382
PM - K FACTOR(%)			8.07
PM -D(%)	62.37	37.63	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	09:00 AM to 112:00 AM		
PEAK HR VOLUME	412	752	1,164
DIRECTIONAL PEAK			
PEAK HR TIME	0:45 PM to 1:45 PM	09:00 AM to 112:00 AM	
PEAK HR VOLUME	503	752	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	2,028	3,948	5,976
AM 12-HR PERIOD (00:00-12:00)	2,317	4,221	6,538
PM 6-HR PERIOD (12:00-18:00)	3,510	3,168	6,678
PM 12-HR PERIOD (12:00-24:00)	5,742	4,835	10,577
24-HR PERIOD (12:00-24:00)	8,059	9,056	17,115
D%	47.09	52.91	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	32	16	48
12:15 - 12:30	50	19	69
12:30 - 12:45	26	12	38
12:45 - 01:00	19	14	33
01:00 - 01:15	11	9	20
01:15 - 01:30	6	16	22
01:30 - 01:45	11	7	18
01:45 - 02:00	7	6	13
02:00 - 02:15	11	5	16
02:15 - 02:30	1	4	5
02:30 - 02:45	11	6	17
02:45 - 03:00	6	5	11
03:00 - 03:15	6	7	13
03:15 - 03:30	7	3	10
03:30 - 03:45	2	5	7
03:45 - 04:00	6	3	9
04:00 - 04:15	5	7	12
04:15 - 04:30	4	9	13
04:30 - 04:45	6	7	13
04:45 - 05:00	7	14	21
05:00 - 05:15	6	16	22
05:15 - 05:30	15	14	29
05:30 - 05:45	17	29	46
05:45 - 06:00	17	40	57

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	22	20	42
06:15 - 06:30	32	44	76
06:30 - 06:45	40	66	106
06:45 - 07:00	44	95	139
07:00 - 07:15	51	103	154
07:15 - 07:30	54	150	204
07:30 - 07:45	77	218	295
07:45 - 08:00	82	209	291
08:00 - 08:15	91	244	335
08:15 - 08:30	90	270	360
08:30 - 08:45	96	294	390
08:45 - 09:00	106	289	395
09:00 - 09:15	102	174	276
09:15 - 09:30	116	196	312
09:30 - 09:45	84	201	285
09:45 - 10:00	110	181	291
10:00 - 10:15	106	140	246
10:15 - 10:30	102	148	250
10:30 - 10:45	86	161	247
10:45 - 11:00	108	160	268
11:00 - 11:15	116	150	266
11:15 - 11:30	109	158	267
11:30 - 11:45	97	131	228
11:45 - 12:00	107	146	253

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	130	133	263
12:15 - 12:30	113	119	232
12:30 - 12:45	124	108	232
12:45 - 01:00	110	125	235
01:00 - 01:15	151	127	278
01:15 - 01:30	115	131	246
01:30 - 01:45	127	148	275
01:45 - 02:00	94	174	268
02:00 - 02:15	117	143	260
02:15 - 02:30	90	156	246
02:30 - 02:45	104	126	230
02:45 - 03:00	123	149	272
03:00 - 03:15	142	132	274
03:15 - 03:30	120	139	259
03:30 - 03:45	136	136	272
03:45 - 04:00	136	126	262
04:00 - 04:15	170	114	284
04:15 - 04:30	182	135	317
04:30 - 04:45	222	126	348
04:45 - 05:00	163	121	284
05:00 - 05:15	210	118	328
05:15 - 05:30	180	142	322
05:30 - 05:45	234	135	369
05:45 - 06:00	217	105	322

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	231	138	369
06:15 - 06:30	200	121	321
06:30 - 06:45	171	117	288
06:45 - 07:00	170	146	316
07:00 - 07:15	173	78	251
07:15 - 07:30	151	100	251
07:30 - 07:45	105	112	217
07:45 - 08:00	103	87	190
08:00 - 08:15	114	79	193
08:15 - 08:30	108	79	187
08:30 - 08:45	81	73	154
08:45 - 09:00	68	62	130
09:00 - 09:15	83	52	135
09:15 - 09:30	61	48	109
09:30 - 09:45	58	52	110
09:45 - 10:00	62	49	111
10:00 - 10:15	45	29	74
10:15 - 10:30	41	36	77
10:30 - 10:45	50	36	86
10:45 - 11:00	32	45	77
11:00 - 11:15	37	28	65
11:15 - 11:30	31	36	67
11:30 - 11:45	35	36	71
11:45 - 12:00	22	28	50

HDOT RIMS Traffic Station Analyzer (v44)

Log Out Print RS

Run Date: 26-OCT-20

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71194000144
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 28-NOV-18

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

Final AADT: 16500
Route No: 1940

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM		
AM - PEAK HR VOLUME	445	1,124	1,569
AM - K FACTOR(%)			8.93
AM - D(%)	28.36	71.64	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM	07:00 AM to 08:00 AM	
AM - PEAK HR VOLUME	445	1,124	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:15 PM to 5:15 PM		
PM - PEAK HR VOLUME	916	571	1,487
PM - K FACTOR(%)			8.46
PM -D(%)	61.6	38.4	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:30 PM to 5:30 PM	3:45 PM to 4:45 PM	
PM - PEAK HR VOLUME	932	614	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 AM to 08:00 AM		
AM - PEAK HR VOLUME	445	458	1,569
AM - K FACTOR(%)			8.93
AM - D(%)	28.36	71.64	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:15 PM to 5:15 PM		
PM - PEAK HR VOLUME	916	932	1,487
PM - K FACTOR(%)			8.46
PM -D(%)	61.6	38.4	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	1:30 PM to 2:30 PM		
PEAK HR VOLUME	620	654	1,274
DIRECTIONAL PEAK			
PEAK HR TIME	1:00 PM to 2:00 PM	1:30 PM to 2:30 PM	
PEAK HR VOLUME	622	654	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	2,346	4,172	6,518
AM 12-HR PERIOD (00:00-12:00)	2,637	4,597	7,234
PM 6-HR PERIOD (12:00-18:00)	4,155	3,404	7,559
PM 12-HR PERIOD (12:00-24:00)	5,733	4,610	10,343
24-HR PERIOD (12:00-24:00)	8,370	9,207	17,577
D%	47.62	52.38	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	18	4	22
12:15 - 12:30	8	11	19
12:30 - 12:45	8	8	16
12:45 - 01:00	11	6	17
01:00 - 01:15	6	1	7
01:15 - 01:30	4	1	5
01:30 - 01:45	5	4	9
01:45 - 02:00	3	3	6
02:00 - 02:15	7	2	9
02:15 - 02:30	4	5	9
02:30 - 02:45	8	6	14
02:45 - 03:00	6	6	12
03:00 - 03:15	3	5	8
03:15 - 03:30	5	5	10
03:30 - 03:45	6	17	23
03:45 - 04:00	4	7	11
04:00 - 04:15	3	10	13
04:15 - 04:30	16	13	29
04:30 - 04:45	14	24	38
04:45 - 05:00	17	34	51
05:00 - 05:15	20	31	51
05:15 - 05:30	29	43	72
05:30 - 05:45	40	65	105
05:45 - 06:00	46	114	160

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	48	108	156
06:15 - 06:30	51	123	174
06:30 - 06:45	80	165	245
06:45 - 07:00	99	201	300
07:00 - 07:15	107	236	343
07:15 - 07:30	103	300	403
07:30 - 07:45	107	312	419
07:45 - 08:00	128	276	404
08:00 - 08:15	106	221	327
08:15 - 08:30	87	173	260
08:30 - 08:45	81	194	275
08:45 - 09:00	86	198	284
09:00 - 09:15	89	131	220
09:15 - 09:30	98	154	252
09:30 - 09:45	96	152	248
09:45 - 10:00	104	187	291
10:00 - 10:15	94	139	233
10:15 - 10:30	116	127	243
10:30 - 10:45	90	144	234
10:45 - 11:00	123	146	269
11:00 - 11:15	104	119	223
11:15 - 11:30	106	125	231
11:30 - 11:45	125	107	232
11:45 - 12:00	118	134	252

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	133	120	253
12:15 - 12:30	131	135	266
12:30 - 12:45	131	160	291
12:45 - 01:00	142	154	296
01:00 - 01:15	138	157	295
01:15 - 01:30	161	132	293
01:30 - 01:45	160	154	314
01:45 - 02:00	163	177	340
02:00 - 02:15	132	166	298
02:15 - 02:30	165	157	322
02:30 - 02:45	155	122	277
02:45 - 03:00	165	147	312
03:00 - 03:15	150	125	275
03:15 - 03:30	201	136	337
03:30 - 03:45	187	133	320
03:45 - 04:00	193	154	347
04:00 - 04:15	201	147	348
04:15 - 04:30	187	165	352
04:30 - 04:45	217	148	365
04:45 - 05:00	253	140	393
05:00 - 05:15	259	118	377
05:15 - 05:30	203	93	296
05:30 - 05:45	174	136	310
05:45 - 06:00	154	128	282

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	181	139	320
06:15 - 06:30	148	89	237
06:30 - 06:45	107	92	199
06:45 - 07:00	104	86	190
07:00 - 07:15	119	79	198
07:15 - 07:30	87	71	158
07:30 - 07:45	96	61	157
07:45 - 08:00	76	66	142
08:00 - 08:15	106	76	182
08:15 - 08:30	69	54	123
08:30 - 08:45	49	43	92
08:45 - 09:00	45	34	79
09:00 - 09:15	45	38	83
09:15 - 09:30	42	27	69
09:30 - 09:45	35	37	72
09:45 - 10:00	32	41	73
10:00 - 10:15	29	34	63
10:15 - 10:30	37	34	71
10:30 - 10:45	26	39	65
10:45 - 11:00	32	20	52
11:00 - 11:15	30	17	47
11:15 - 11:30	47	14	61
11:30 - 11:45	24	6	30
11:45 - 12:00	12	9	21

HDOT RIMS Traffic Station Analyzer (v44)

Log Out Print RS

Run Date: 26-OCT-20

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71194000144
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 29-NOV-18

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

Final AADT: 16500
Route No: 1940

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	417	1,162	1,579
AM - K FACTOR(%)			8.89
AM - D(%)	26.41	73.59	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:00 AM to 09:00 AM	07:15 AM to 08:15 AM	
AM - PEAK HR VOLUME	421	1,162	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:15 PM to 5:15 PM		
PM - PEAK HR VOLUME	947	569	1,516
PM - K FACTOR(%)			8.54
PM -D(%)	62.47	37.53	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:30 PM to 5:30 PM	4:00 PM to 5:00 PM	
PM - PEAK HR VOLUME	949	597	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 AM to 08:15 AM		
AM - PEAK HR VOLUME	417	479	1,579
AM - K FACTOR(%)			8.89
AM - D(%)	26.41	73.59	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	4:15 PM to 5:15 PM		
PM - PEAK HR VOLUME	947	949	1,516
PM - K FACTOR(%)			8.54
PM -D(%)	62.47	37.53	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	2:00 PM to 3:00 PM		
PEAK HR VOLUME	686	639	1,325
DIRECTIONAL PEAK			
PEAK HR TIME	2:00 PM to 3:00 PM	09:00 AM to 112:00 AM	
PEAK HR VOLUME	686	641	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	2,410	4,305	6,715
AM 12-HR PERIOD (00:00-12:00)	2,721	4,731	7,452
PM 6-HR PERIOD (12:00-18:00)	4,118	3,369	7,487
PM 12-HR PERIOD (12:00-24:00)	5,703	4,600	10,303
24-HR PERIOD (12:00-24:00)	8,424	9,331	17,755
D%	47.45	52.55	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	12	7	19
12:15 - 12:30	13	12	25
12:30 - 12:45	10	5	15
12:45 - 01:00	6	5	11
01:00 - 01:15	6	5	11
01:15 - 01:30	9	2	11
01:30 - 01:45	5	4	9
01:45 - 02:00	4	2	6
02:00 - 02:15	7	4	11
02:15 - 02:30	4	6	10
02:30 - 02:45	3	4	7
02:45 - 03:00	11	5	16
03:00 - 03:15	5	6	11
03:15 - 03:30	3	5	8
03:30 - 03:45	9	10	19
03:45 - 04:00	5	10	15
04:00 - 04:15	9	15	24
04:15 - 04:30	13	13	26
04:30 - 04:45	7	24	31
04:45 - 05:00	16	33	49
05:00 - 05:15	26	30	56
05:15 - 05:30	29	49	78
05:30 - 05:45	44	69	113
05:45 - 06:00	55	101	156

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	49	88	137
06:15 - 06:30	48	144	192
06:30 - 06:45	73	191	264
06:45 - 07:00	112	195	307
07:00 - 07:15	100	256	356
07:15 - 07:30	114	299	413
07:30 - 07:45	93	295	388
07:45 - 08:00	102	307	409
08:00 - 08:15	108	261	369
08:15 - 08:30	111	212	323
08:30 - 08:45	91	181	272
08:45 - 09:00	111	195	306
09:00 - 09:15	86	146	232
09:15 - 09:30	108	159	267
09:30 - 09:45	89	172	261
09:45 - 10:00	110	164	274
10:00 - 10:15	106	144	250
10:15 - 10:30	98	130	228
10:30 - 10:45	118	150	268
10:45 - 11:00	105	145	250
11:00 - 11:15	122	124	246
11:15 - 11:30	134	114	248
11:30 - 11:45	100	119	219
11:45 - 12:00	122	114	236

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	136	122	258
12:15 - 12:30	131	129	260
12:30 - 12:45	88	148	236
12:45 - 01:00	103	135	238
01:00 - 01:15	107	125	232
01:15 - 01:30	118	148	266
01:30 - 01:45	141	149	290
01:45 - 02:00	116	153	269
02:00 - 02:15	139	152	291
02:15 - 02:30	155	152	307
02:30 - 02:45	202	175	377
02:45 - 03:00	190	160	350
03:00 - 03:15	193	136	329
03:15 - 03:30	180	145	325
03:30 - 03:45	229	114	343
03:45 - 04:00	211	134	345
04:00 - 04:15	185	165	350
04:15 - 04:30	198	146	344
04:30 - 04:45	247	125	372
04:45 - 05:00	241	161	402
05:00 - 05:15	261	137	398
05:15 - 05:30	200	132	332
05:30 - 05:45	186	122	308
05:45 - 06:00	161	104	265

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	160	128	288
06:15 - 06:30	155	120	275
06:30 - 06:45	148	94	242
06:45 - 07:00	111	82	193
07:00 - 07:15	81	71	152
07:15 - 07:30	113	64	177
07:30 - 07:45	78	55	133
07:45 - 08:00	74	77	151
08:00 - 08:15	74	66	140
08:15 - 08:30	71	56	127
08:30 - 08:45	73	41	114
08:45 - 09:00	48	44	92
09:00 - 09:15	45	40	85
09:15 - 09:30	46	46	92
09:30 - 09:45	34	30	64
09:45 - 10:00	39	45	84
10:00 - 10:15	25	41	66
10:15 - 10:30	25	33	58
10:30 - 10:45	30	30	60
10:45 - 11:00	30	14	44
11:00 - 11:15	27	19	46
11:15 - 11:30	50	14	64
11:30 - 11:45	27	10	37
11:45 - 12:00	21	11	32

HDOT RIMS Traffic Station Analyzer (v44)

Log Out Print RS

Run Date: 26-OCT-20

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71194000144
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 19-SEP-19

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

Final AADT: 17200
Route No: 1940

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM		
AM - PEAK HR VOLUME	442	1,164	1,606
AM - K FACTOR(%)			9.13
AM - D(%)	27.52	72.48	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:45 to 07:45 AM	07:00 to 08:00 AM	
AM - PEAK HR VOLUME	459	1,164	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:15 to 05:15 PM		
PM - PEAK HR VOLUME	938	629	1,567
PM - K FACTOR(%)			8.9
PM -D(%)	59.86	40.14	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:15 to 05:15 PM	04:00 to 05:00 PM	
PM - PEAK HR VOLUME	938	650	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM		
AM - PEAK HR VOLUME	442	1,164	1,606
AM - K FACTOR(%)			9.13
AM - D(%)	27.52	72.48	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:15 to 05:15 PM		
PM - PEAK HR VOLUME	938	629	1,567
PM - K FACTOR(%)			8.9
PM -D(%)	59.86	40.14	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM		
PEAK HR VOLUME	806	598	1,404
DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM	02:30 to 03:30 PM	
PEAK HR VOLUME	806	632	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	2,376	4,099	6,475
AM 12-HR PERIOD (00:00-12:00)	2,684	4,525	7,209
PM 6-HR PERIOD (12:00-18:00)	4,108	3,467	7,575
PM 12-HR PERIOD (12:00-24:00)	5,757	4,633	10,390
24-HR PERIOD (12:00-24:00)	8,441	9,158	17,599
D%	47.96	52.04	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	11	7	18
12:15 - 12:30	8	7	15
12:30 - 12:45	7	4	11
12:45 - 01:00	7	3	10
01:00 - 01:15	7	3	10
01:15 - 01:30	6	1	7
01:30 - 01:45	9	2	11
01:45 - 02:00	3	2	5
02:00 - 02:15	5	1	6
02:15 - 02:30	4	6	10
02:30 - 02:45	6	7	13
02:45 - 03:00	9	6	15
03:00 - 03:15	8	5	13
03:15 - 03:30	3	4	7
03:30 - 03:45	9	10	19
03:45 - 04:00	5	12	17
04:00 - 04:15	9	11	20
04:15 - 04:30	6	10	16
04:30 - 04:45	18	27	45
04:45 - 05:00	22	36	58
05:00 - 05:15	19	30	49
05:15 - 05:30	35	45	80
05:30 - 05:45	41	82	123
05:45 - 06:00	51	105	156

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	50	119	169
06:15 - 06:30	57	170	227
06:30 - 06:45	91	189	280
06:45 - 07:00	119	181	300
07:00 - 07:15	117	257	374
07:15 - 07:30	120	317	437
07:30 - 07:45	103	293	396
07:45 - 08:00	102	297	399
08:00 - 08:15	100	210	310
08:15 - 08:30	107	195	302
08:30 - 08:45	91	155	246
08:45 - 09:00	88	162	250
09:00 - 09:15	96	144	240
09:15 - 09:30	90	149	239
09:30 - 09:45	92	158	250
09:45 - 10:00	107	157	264
10:00 - 10:15	92	127	219
10:15 - 10:30	104	130	234
10:30 - 10:45	95	144	239
10:45 - 11:00	121	119	240
11:00 - 11:15	104	116	220
11:15 - 11:30	113	100	213
11:30 - 11:45	109	96	205
11:45 - 12:00	108	114	222

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	125	116	241
12:15 - 12:30	121	113	234
12:30 - 12:45	132	141	273
12:45 - 01:00	94	154	248
01:00 - 01:15	117	127	244
01:15 - 01:30	109	145	254
01:30 - 01:45	122	131	253
01:45 - 02:00	143	171	314
02:00 - 02:15	122	131	253
02:15 - 02:30	153	163	316
02:30 - 02:45	178	158	336
02:45 - 03:00	196	153	349
03:00 - 03:15	193	144	337
03:15 - 03:30	170	177	347
03:30 - 03:45	247	124	371
03:45 - 04:00	213	146	359
04:00 - 04:15	206	156	362
04:15 - 04:30	207	192	399
04:30 - 04:45	221	134	355
04:45 - 05:00	271	168	439
05:00 - 05:15	239	135	374
05:15 - 05:30	191	138	329
05:30 - 05:45	176	126	302
05:45 - 06:00	162	124	286

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	187	122	309
06:15 - 06:30	145	113	258
06:30 - 06:45	137	96	233
06:45 - 07:00	129	94	223
07:00 - 07:15	101	71	172
07:15 - 07:30	104	62	166
07:30 - 07:45	93	56	149
07:45 - 08:00	75	57	132
08:00 - 08:15	77	53	130
08:15 - 08:30	66	61	127
08:30 - 08:45	55	52	107
08:45 - 09:00	63	42	105
09:00 - 09:15	35	30	65
09:15 - 09:30	42	31	73
09:30 - 09:45	37	34	71
09:45 - 10:00	44	39	83
10:00 - 10:15	40	27	67
10:15 - 10:30	33	32	65
10:30 - 10:45	38	30	68
10:45 - 11:00	32	15	47
11:00 - 11:15	21	19	40
11:15 - 11:30	37	10	47
11:30 - 11:45	40	12	52
11:45 - 12:00	18	8	26

HDOT RIMS Traffic Station Analyzer (v44)

Log Out Print RS

Run Date: 26-OCT-20

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71194000144
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 20-SEP-19

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

Final AADT: 17200
Route No: 1940

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM		
AM - PEAK HR VOLUME	435	1,102	1,537
AM - K FACTOR(%)			8.59
AM - D(%)	28.3	71.7	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM	07:00 to 08:00 AM	
AM - PEAK HR VOLUME	451	1,102	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:00 to 05:00 PM		
PM - PEAK HR VOLUME	867	618	1,485
PM - K FACTOR(%)			8.29
PM -D(%)	58.38	41.62	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:30 to 05:30 PM	03:30 to 04:30 PM	
PM - PEAK HR VOLUME	882	637	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM		
AM - PEAK HR VOLUME	435	1,102	1,537
AM - K FACTOR(%)			8.59
AM - D(%)	28.3	71.7	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:00 to 05:00 PM		
PM - PEAK HR VOLUME	867	618	1,485
PM - K FACTOR(%)			8.29
PM -D(%)	58.38	41.62	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM		
PEAK HR VOLUME	757	600	1,357
DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM	09:30 to 10:30 AM	
PEAK HR VOLUME	757	643	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	2,364	4,156	6,520
AM 12-HR PERIOD (00:00-12:00)	2,682	4,553	7,235
PM 6-HR PERIOD (12:00-18:00)	4,068	3,433	7,501
PM 12-HR PERIOD (12:00-24:00)	5,837	4,831	10,668
24-HR PERIOD (12:00-24:00)	8,519	9,384	17,903
D%	47.58	52.42	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	13	9	22
12:15 - 12:30	8	10	18
12:30 - 12:45	10	5	15
12:45 - 01:00	11	8	19
01:00 - 01:15	9	8	17
01:15 - 01:30	10	5	15
01:30 - 01:45	3	4	7
01:45 - 02:00	5	4	9
02:00 - 02:15	5	2	7
02:15 - 02:30	6	5	11
02:30 - 02:45	5	4	9
02:45 - 03:00	6	7	13
03:00 - 03:15	6	1	7
03:15 - 03:30	5	3	8
03:30 - 03:45	7	5	12
03:45 - 04:00	7	13	20
04:00 - 04:15	4	9	13
04:15 - 04:30	9	12	21
04:30 - 04:45	20	22	42
04:45 - 05:00	29	31	60
05:00 - 05:15	21	30	51
05:15 - 05:30	27	44	71
05:30 - 05:45	43	69	112
05:45 - 06:00	49	87	136

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	38	117	155
06:15 - 06:30	59	157	216
06:30 - 06:45	83	194	277
06:45 - 07:00	84	210	294
07:00 - 07:15	95	228	323
07:15 - 07:30	102	306	408
07:30 - 07:45	107	316	423
07:45 - 08:00	131	252	383
08:00 - 08:15	111	208	319
08:15 - 08:30	65	178	243
08:30 - 08:45	93	132	225
08:45 - 09:00	107	180	287
09:00 - 09:15	100	127	227
09:15 - 09:30	83	132	215
09:30 - 09:45	113	145	258
09:45 - 10:00	105	166	271
10:00 - 10:15	125	145	270
10:15 - 10:30	116	187	303
10:30 - 10:45	92	126	218
10:45 - 11:00	103	151	254
11:00 - 11:15	123	149	272
11:15 - 11:30	96	102	198
11:30 - 11:45	117	124	241
11:45 - 12:00	116	124	240

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	138	124	262
12:15 - 12:30	151	133	284
12:30 - 12:45	95	123	218
12:45 - 01:00	106	133	239
01:00 - 01:15	116	120	236
01:15 - 01:30	141	131	272
01:30 - 01:45	135	153	288
01:45 - 02:00	139	147	286
02:00 - 02:15	170	146	316
02:15 - 02:30	146	150	296
02:30 - 02:45	173	167	340
02:45 - 03:00	165	168	333
03:00 - 03:15	192	144	336
03:15 - 03:30	197	138	335
03:30 - 03:45	203	150	353
03:45 - 04:00	212	168	380
04:00 - 04:15	210	154	364
04:15 - 04:30	194	165	359
04:30 - 04:45	218	146	364
04:45 - 05:00	245	153	398
05:00 - 05:15	222	137	359
05:15 - 05:30	197	129	326
05:30 - 05:45	141	127	268
05:45 - 06:00	162	127	289

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	130	112	242
06:15 - 06:30	158	128	286
06:30 - 06:45	161	104	265
06:45 - 07:00	114	104	218
07:00 - 07:15	88	77	165
07:15 - 07:30	91	76	167
07:30 - 07:45	92	75	167
07:45 - 08:00	90	59	149
08:00 - 08:15	68	52	120
08:15 - 08:30	73	58	131
08:30 - 08:45	76	51	127
08:45 - 09:00	95	47	142
09:00 - 09:15	60	50	110
09:15 - 09:30	51	51	102
09:30 - 09:45	60	52	112
09:45 - 10:00	40	46	86
10:00 - 10:15	48	55	103
10:15 - 10:30	39	43	82
10:30 - 10:45	60	46	106
10:45 - 11:00	34	37	71
11:00 - 11:15	33	22	55
11:15 - 11:30	55	21	76
11:30 - 11:45	25	17	42
11:45 - 12:00	28	15	43

Appendix B

Intersection Operations Analysis – Synchro Worksheets

Adjusted Year 2020 Peak Hour Worksheets

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	486	5	10	171	85	20	30	55	3	5	30
Future Vol, veh/h	45	486	5	10	171	85	20	30	55	3	5	30
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	150	-	-	150	-	-	-	-	-	-	-	-
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	49	528	5	11	186	92	22	33	60	3	5	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	278	0	0	533	0	0	902	929	531	929	885	232
Stage 1	-	-	-	-	-	-	629	629	-	254	254	-
Stage 2	-	-	-	-	-	-	273	300	-	675	631	-
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	1285	-	-	1035	-	-	259	268	548	248	284	807
Stage 1	-	-	-	-	-	-	470	475	-	750	697	-
Stage 2	-	-	-	-	-	-	733	666	-	444	474	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1285	-	-	1035	-	-	236	255	548	192	270	807
Mov Cap-2 Maneuver	-	-	-	-	-	-	236	255	-	192	270	-
Stage 1	-	-	-	-	-	-	452	457	-	722	689	-
Stage 2	-	-	-	-	-	-	690	659	-	353	456	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.3	20.4	12.3
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	347	1285	-	-	1035	-	-	533
HCM Lane V/C Ratio	0.329	0.038	-	-	0.011	-	-	0.077
HCM Control Delay (s)	20.4	7.9	-	-	8.5	-	-	12.3
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.4	0.1	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	486	5	10	171	85	20	30	55	3	5	30
Future Vol, veh/h	45	486	5	10	171	85	20	30	55	3	5	30
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	150	-	-	150	-	-	-	-	-	-	-	-
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	49	528	5	11	186	92	22	33	60	3	5	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	278	0	0	533	0	0	902	929	531	929	885	232
Stage 1	-	-	-	-	-	-	629	629	-	254	254	-
Stage 2	-	-	-	-	-	-	273	300	-	675	631	-
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	1285	-	-	1035	-	-	259	268	548	248	284	807
Stage 1	-	-	-	-	-	-	470	475	-	750	697	-
Stage 2	-	-	-	-	-	-	733	666	-	444	474	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1285	-	-	1035	-	-	236	255	548	192	270	807
Mov Cap-2 Maneuver	-	-	-	-	-	-	236	255	-	192	270	-
Stage 1	-	-	-	-	-	-	452	457	-	722	689	-
Stage 2	-	-	-	-	-	-	690	659	-	353	456	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.3	20.4	12.3
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	347	1285	-	-	1035	-	-	533
HCM Lane V/C Ratio	0.329	0.038	-	-	0.011	-	-	0.077
HCM Control Delay (s)	20.4	7.9	-	-	8.5	-	-	12.3
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.4	0.1	-	-	0	-	-	0.3

HCM 6th Signalized Intersection Summary
6: Komohana Street & Mohouli Street

11/13/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	366	191	115	139	180	144	610	405	145	170	8
Future Volume (veh/h)	16	366	191	115	139	180	144	610	405	145	170	8
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	17	398	208	125	151	196	157	663	440	158	185	9
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	109	530	449	252	205	266	586	748	634	225	690	34
Arrive On Green	0.06	0.28	0.28	0.06	0.28	0.28	0.07	0.40	0.40	0.06	0.39	0.39
Sat Flow, veh/h	1781	1870	1585	1781	739	959	1781	1870	1585	1781	1769	86
Grp Volume(v), veh/h	17	398	208	125	0	347	157	663	440	158	0	194
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1698	1781	1870	1585	1781	0	1855
Q Serve(g_s), s	0.8	17.4	9.7	4.5	0.0	16.7	4.7	29.7	20.8	4.8	0.0	6.4
Cycle Q Clear(g_c), s	0.8	17.4	9.7	4.5	0.0	16.7	4.7	29.7	20.8	4.8	0.0	6.4
Prop In Lane	1.00		1.00	1.00		0.56	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	109	530	449	252	0	472	586	748	634	225	0	723
V/C Ratio(X)	0.16	0.75	0.46	0.50	0.00	0.74	0.27	0.89	0.69	0.70	0.00	0.27
Avail Cap(c_a), veh/h	109	530	449	252	0	472	586	748	634	225	0	723
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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.1	29.4	26.6	23.4	0.0	29.5	14.6	25.1	22.4	21.0	0.0	18.7
Incr Delay (d2), s/veh	3.0	9.4	3.4	6.8	0.0	9.8	1.1	14.6	6.2	16.8	0.0	0.9
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	0.4	8.6	3.9	2.2	0.0	7.6	1.9	14.8	8.1	2.8	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.1	38.8	30.0	30.2	0.0	39.3	15.7	39.7	28.6	37.8	0.0	19.6
LnGrp LOS	D	D	C	C	A	D	B	D	C	D	A	B
Approach Vol, veh/h		623			472			1260			352	
Approach Delay, s/veh		36.0			36.9			32.8			27.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	40.5	9.5	30.0	10.9	39.6	10.0	29.5
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	5.5	36.0	5.0	25.5	6.4	35.1	5.5	25.0
Max Q Clear Time (g_c+I1), s	6.8	31.7	6.5	19.4	6.7	8.4	2.8	18.7
Green Ext Time (p_c), s	0.0	2.3	0.0	1.5	0.0	1.0	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	33.6
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	292	5	50	407	5	4	10	25	2	20	55
Future Vol, veh/h	20	292	5	50	407	5	4	10	25	2	20	55
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	150	-	-	150	-	-	-	-	-	-	-	-
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	22	317	5	54	442	5	4	11	27	2	22	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	447	0	0	322	0	0	958	919	320	936	919	445
Stage 1	-	-	-	-	-	-	364	364	-	553	553	-
Stage 2	-	-	-	-	-	-	594	555	-	383	366	-
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	1113	-	-	1238	-	-	237	271	721	245	271	613
Stage 1	-	-	-	-	-	-	655	624	-	517	514	-
Stage 2	-	-	-	-	-	-	491	513	-	640	623	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1113	-	-	1238	-	-	191	254	721	217	254	613
Mov Cap-2 Maneuver	-	-	-	-	-	-	191	254	-	217	254	-
Stage 1	-	-	-	-	-	-	642	612	-	507	491	-
Stage 2	-	-	-	-	-	-	405	490	-	593	611	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.9	14.8	15.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	411	1113	-	-	1238	-	-	433
HCM Lane V/C Ratio	0.103	0.02	-	-	0.044	-	-	0.193
HCM Control Delay (s)	14.8	8.3	-	-	8	-	-	15.3
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-	-	0.7

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	315	485	40	48	4
Future Vol, veh/h	4	315	485	40	48	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	300	-
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	4	342	527	43	52	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	570	0	-	0	877	527
Stage 1	-	-	-	-	527	-
Stage 2	-	-	-	-	350	-
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	1002	-	-	-	319	551
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	713	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1002	-	-	-	318	551
Mov Cap-2 Maneuver	-	-	-	-	318	-
Stage 1	-	-	-	-	590	-
Stage 2	-	-	-	-	713	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	18
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1002	-	-	-	318	551
HCM Lane V/C Ratio	0.004	-	-	-	0.164	0.008
HCM Control Delay (s)	8.6	-	-	-	18.5	11.6
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0.6	0

HCM 6th Signalized Intersection Summary
6: Komohana Street & Mohouli Street

11/13/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	174	179	300	333	110	180	280	175	130	490	12
Future Volume (veh/h)	10	174	179	300	333	110	180	280	175	130	490	12
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	11	189	195	326	362	120	196	304	190	141	533	13
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	109	530	449	382	373	124	325	748	634	445	709	17
Arrive On Green	0.06	0.28	0.28	0.06	0.28	0.28	0.07	0.40	0.40	0.06	0.39	0.39
Sat Flow, veh/h	1781	1870	1585	1781	1344	446	1781	1870	1585	1781	1818	44
Grp Volume(v), veh/h	11	189	195	326	0	482	196	304	190	141	0	546
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1790	1781	1870	1585	1781	0	1862
Q Serve(g_s), s	0.5	7.3	9.0	5.0	0.0	24.0	6.0	10.5	7.4	4.2	0.0	22.8
Cycle Q Clear(g_c), s	0.5	7.3	9.0	5.0	0.0	24.0	6.0	10.5	7.4	4.2	0.0	22.8
Prop In Lane	1.00		1.00	1.00		0.25	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	109	530	449	382	0	497	325	748	634	445	0	726
V/C Ratio(X)	0.10	0.36	0.43	0.85	0.00	0.97	0.60	0.41	0.30	0.32	0.00	0.75
Avail Cap(c_a), veh/h	109	530	449	382	0	497	325	748	634	445	0	726
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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.9	25.7	26.4	31.0	0.0	32.1	18.4	19.3	18.4	15.3	0.0	23.7
Incr Delay (d2), s/veh	1.9	1.9	3.0	21.0	0.0	33.4	8.1	1.6	1.2	1.9	0.0	7.1
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	0.3	3.3	3.6	6.5	0.0	14.2	2.9	4.5	2.7	1.8	0.0	10.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.8	27.6	29.4	51.9	0.0	65.5	26.5	21.0	19.6	17.2	0.0	30.7
LnGrp LOS	D	C	C	D	A	E	C	C	B	B	A	C
Approach Vol, veh/h		395			808			690			687	
Approach Delay, s/veh		28.9			60.1			22.2			28.0	
Approach LOS		C			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	40.5	9.5	30.0	10.9	39.6	10.0	29.5
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	5.5	36.0	5.0	25.5	6.4	35.1	5.5	25.0
Max Q Clear Time (g_c+I1), s	6.2	12.5	7.0	11.0	8.0	24.8	2.5	26.0
Green Ext Time (p_c), s	0.0	2.2	0.0	1.3	0.0	2.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	36.6
HCM 6th LOS	D

Year 2025 Peak Hour Background without Project

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	491	5	10	172	85	20	30	55	3	5	30
Future Vol, veh/h	45	491	5	10	172	85	20	30	55	3	5	30
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	150	-	-	150	-	-	-	-	-	-	-	-
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	49	534	5	11	187	92	22	33	60	3	5	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	279	0	0	539	0	0	909	936	537	936	892	233
Stage 1	-	-	-	-	-	-	635	635	-	255	255	-
Stage 2	-	-	-	-	-	-	274	301	-	681	637	-
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	1284	-	-	1029	-	-	256	265	544	245	281	806
Stage 1	-	-	-	-	-	-	467	472	-	749	696	-
Stage 2	-	-	-	-	-	-	732	665	-	440	471	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1284	-	-	1029	-	-	233	252	544	189	267	806
Mov Cap-2 Maneuver	-	-	-	-	-	-	233	252	-	189	267	-
Stage 1	-	-	-	-	-	-	449	454	-	721	688	-
Stage 2	-	-	-	-	-	-	689	658	-	350	453	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.3	20.6	12.4
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	343	1284	-	-	1029	-	-	529
HCM Lane V/C Ratio	0.333	0.038	-	-	0.011	-	-	0.078
HCM Control Delay (s)	20.6	7.9	-	-	8.5	-	-	12.4
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.4	0.1	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	535	257	80	43	10
Future Vol, veh/h	14	535	257	80	43	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	300	-
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	582	279	87	47	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	366	0	-	0	891	279
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	612	-
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	1193	-	-	-	313	760
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	541	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1193	-	-	-	309	760
Mov Cap-2 Maneuver	-	-	-	-	309	-
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	541	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	17
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1193	-	-	-	309	760
HCM Lane V/C Ratio	0.013	-	-	-	0.151	0.014
HCM Control Delay (s)	8.1	-	-	-	18.7	9.8
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	0.5	0

HCM 6th Signalized Intersection Summary
6: Komohana Street & Mohouli Street

11/13/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	367	194	115	147	180	172	610	405	145	170	18
Future Volume (veh/h)	17	367	194	115	147	180	172	610	405	145	170	18
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	18	399	211	125	160	196	187	663	440	158	185	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	109	530	449	251	212	260	581	748	634	225	627	68
Arrive On Green	0.06	0.28	0.28	0.06	0.28	0.28	0.08	0.40	0.40	0.06	0.38	0.38
Sat Flow, veh/h	1781	1870	1585	1781	765	937	1781	1870	1585	1781	1659	179
Grp Volume(v), veh/h	18	399	211	125	0	356	187	663	440	158	0	205
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1702	1781	1870	1585	1781	0	1838
Q Serve(g_s), s	0.9	17.5	9.9	4.5	0.0	17.2	5.7	29.7	20.8	4.9	0.0	7.0
Cycle Q Clear(g_c), s	0.9	17.5	9.9	4.5	0.0	17.2	5.7	29.7	20.8	4.9	0.0	7.0
Prop In Lane	1.00		1.00	1.00		0.55	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	109	530	449	251	0	473	581	748	634	225	0	694
V/C Ratio(X)	0.17	0.75	0.47	0.50	0.00	0.75	0.32	0.89	0.69	0.70	0.00	0.30
Avail Cap(c_a), veh/h	109	530	449	251	0	473	581	748	634	225	0	694
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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.1	29.4	26.7	23.4	0.0	29.7	14.9	25.1	22.4	21.2	0.0	19.6
Incr Delay (d2), s/veh	3.2	9.5	3.5	6.9	0.0	10.6	1.5	14.6	6.2	16.8	0.0	1.1
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	8.7	3.9	2.2	0.0	7.9	2.3	14.8	8.1	2.9	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.3	38.9	30.2	30.3	0.0	40.3	16.4	39.7	28.6	38.0	0.0	20.7
LnGrp LOS	D	D	C	C	A	D	B	D	C	D	A	C
Approach Vol, veh/h		628			481			1290			363	
Approach Delay, s/veh		36.1			37.7			32.5			28.2	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	40.5	9.5	30.0	12.0	38.5	10.0	29.5
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	5.5	36.0	5.0	25.5	7.5	34.0	5.5	25.0
Max Q Clear Time (g_c+I1), s	6.9	31.7	6.5	19.5	7.7	9.0	2.9	19.2
Green Ext Time (p_c), s	0.0	2.3	0.0	1.5	0.0	1.0	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	33.7
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	295	5	50	412	5	4	10	25	2	20	55
Future Vol, veh/h	20	295	5	50	412	5	4	10	25	2	20	55
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	150	-	-	150	-	-	-	-	-	-	-	-
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	22	321	5	54	448	5	4	11	27	2	22	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	453	0	0	326	0	0	968	929	324	946	929	451
Stage 1	-	-	-	-	-	-	368	368	-	559	559	-
Stage 2	-	-	-	-	-	-	600	561	-	387	370	-
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	1108	-	-	1234	-	-	233	268	717	241	268	608
Stage 1	-	-	-	-	-	-	652	621	-	513	511	-
Stage 2	-	-	-	-	-	-	488	510	-	637	620	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1108	-	-	1234	-	-	187	251	717	214	251	608
Mov Cap-2 Maneuver	-	-	-	-	-	-	187	251	-	214	251	-
Stage 1	-	-	-	-	-	-	639	609	-	503	489	-
Stage 2	-	-	-	-	-	-	402	488	-	590	608	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.9	14.9	15.4
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	406	1108	-	-	1234	-	-	429
HCM Lane V/C Ratio	0.104	0.02	-	-	0.044	-	-	0.195
HCM Control Delay (s)	14.9	8.3	-	-	8.1	-	-	15.4
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-	-	0.7

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	315	485	59	94	9
Future Vol, veh/h	7	315	485	59	94	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	300	-
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	8	342	527	64	102	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	591	0	-	0	885	527
Stage 1	-	-	-	-	527	-
Stage 2	-	-	-	-	358	-
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	985	-	-	-	315	551
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	985	-	-	-	312	551
Mov Cap-2 Maneuver	-	-	-	-	312	-
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	707	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	21.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	985	-	-	-	312	551
HCM Lane V/C Ratio	0.008	-	-	-	0.327	0.018
HCM Control Delay (s)	8.7	-	-	-	22.1	11.7
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	1.4	0.1

HCM 6th Signalized Intersection Summary
6: Komohana Street & Mohouli Street

11/13/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	182	207	300	338	110	191	280	175	130	490	15
Future Volume (veh/h)	20	182	207	300	338	110	191	280	175	130	490	15
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	198	225	326	367	120	208	304	190	141	533	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	109	530	449	428	418	137	302	663	562	420	584	18
Arrive On Green	0.06	0.28	0.28	0.09	0.31	0.31	0.11	0.35	0.35	0.07	0.32	0.32
Sat Flow, veh/h	1781	1870	1585	1781	1350	441	1781	1870	1585	1781	1806	54
Grp Volume(v), veh/h	22	198	225	326	0	487	208	304	190	141	0	549
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1791	1781	1870	1585	1781	0	1861
Q Serve(g_s), s	1.1	7.6	10.7	7.9	0.0	23.2	6.8	11.3	7.9	4.7	0.0	25.5
Cycle Q Clear(g_c), s	1.1	7.6	10.7	7.9	0.0	23.2	6.8	11.3	7.9	4.7	0.0	25.5
Prop In Lane	1.00		1.00	1.00		0.25	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	109	530	449	428	0	555	302	663	562	420	0	602
V/C Ratio(X)	0.20	0.37	0.50	0.76	0.00	0.88	0.69	0.46	0.34	0.34	0.00	0.91
Avail Cap(c_a), veh/h	109	530	449	428	0	555	302	663	562	420	0	602
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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.2	25.8	26.9	25.7	0.0	29.4	20.9	22.4	21.3	18.2	0.0	29.2
Incr Delay (d2), s/veh	4.1	2.0	4.0	12.1	0.0	17.6	12.1	2.3	1.6	2.2	0.0	20.5
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	0.6	3.5	4.3	3.7	0.0	11.9	3.5	5.0	3.0	2.0	0.0	13.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.3	27.9	30.9	37.9	0.0	47.0	33.0	24.7	22.9	20.4	0.0	49.8
LnGrp LOS	D	C	C	D	A	D	C	C	C	C	A	D
Approach Vol, veh/h		445			813			702			690	
Approach Delay, s/veh		30.2			43.3			26.7			43.7	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	36.4	12.4	30.0	14.0	33.6	10.0	32.4
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	6.7	31.9	7.9	25.5	9.5	29.1	5.5	27.9
Max Q Clear Time (g_c+I1), s	6.7	13.3	9.9	12.7	8.8	27.5	3.1	25.2
Green Ext Time (p_c), s	0.0	2.1	0.0	1.4	0.0	0.5	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	36.8
HCM 6th LOS	D

Year 2025 Peak Hour with Project

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	493	5	10	179	85	20	30	55	3	5	30
Future Vol, veh/h	45	493	5	10	179	85	20	30	55	3	5	30
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	150	-	-	150	-	-	-	-	-	-	-	-
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	49	536	5	11	195	92	22	33	60	3	5	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	287	0	0	541	0	0	919	946	539	946	902	241
Stage 1	-	-	-	-	-	-	637	637	-	263	263	-
Stage 2	-	-	-	-	-	-	282	309	-	683	639	-
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	1275	-	-	1028	-	-	252	262	542	241	277	798
Stage 1	-	-	-	-	-	-	465	471	-	742	691	-
Stage 2	-	-	-	-	-	-	725	660	-	439	470	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1275	-	-	1028	-	-	229	249	542	186	263	798
Mov Cap-2 Maneuver	-	-	-	-	-	-	229	249	-	186	263	-
Stage 1	-	-	-	-	-	-	447	453	-	714	683	-
Stage 2	-	-	-	-	-	-	682	653	-	349	452	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.3	20.9	12.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	339	1275	-	-	1028	-	-	522
HCM Lane V/C Ratio	0.337	0.038	-	-	0.011	-	-	0.079
HCM Control Delay (s)	20.9	7.9	-	-	8.5	-	-	12.5
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.4	0.1	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑	↱		↱
Traffic Vol, veh/h	0	551	267	8	0	7
Future Vol, veh/h	0	551	267	8	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	-	-
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	0	599	290	9	0	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	290
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	749
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	749
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	749
HCM Lane V/C Ratio	-	-	-	0.01
HCM Control Delay (s)	-	-	-	9.9
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	0

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	535	265	80	74	10
Future Vol, veh/h	16	535	265	80	74	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	300	-
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	17	582	288	87	80	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	375	0	-	0	904	288
Stage 1	-	-	-	-	288	-
Stage 2	-	-	-	-	616	-
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	1183	-	-	-	307	751
Stage 1	-	-	-	-	761	-
Stage 2	-	-	-	-	539	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1183	-	-	-	303	751
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	539	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1183	-	-	-	303	751
HCM Lane V/C Ratio	0.015	-	-	-	0.265	0.014
HCM Control Delay (s)	8.1	-	-	-	21.1	9.9
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	1	0

HCM 6th Signalized Intersection Summary
6: Komohana Street & Mohouli Street

11/13/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	187	222	300	350	110	211	280	175	130	490	23
Future Volume (veh/h)	22	187	222	300	350	110	211	280	175	130	490	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	24	203	241	326	380	120	229	304	190	141	533	25
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	109	530	449	422	422	133	296	663	562	420	573	27
Arrive On Green	0.06	0.28	0.28	0.09	0.31	0.31	0.11	0.35	0.35	0.07	0.32	0.32
Sat Flow, veh/h	1781	1870	1585	1781	1363	430	1781	1870	1585	1781	1772	83
Grp Volume(v), veh/h	24	203	241	326	0	500	229	304	190	141	0	558
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1793	1781	1870	1585	1781	0	1855
Q Serve(g_s), s	1.2	7.9	11.6	7.9	0.0	24.0	7.5	11.3	7.9	4.7	0.0	26.2
Cycle Q Clear(g_c), s	1.2	7.9	11.6	7.9	0.0	24.0	7.5	11.3	7.9	4.7	0.0	26.2
Prop In Lane	1.00		1.00	1.00		0.24	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	109	530	449	422	0	556	296	663	562	420	0	600
V/C Ratio(X)	0.22	0.38	0.54	0.77	0.00	0.90	0.77	0.46	0.34	0.34	0.00	0.93
Avail Cap(c_a), veh/h	109	530	449	422	0	556	296	663	562	420	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	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.2	25.9	27.3	25.9	0.0	29.7	21.3	22.4	21.3	18.2	0.0	29.5
Incr Delay (d2), s/veh	4.6	2.1	4.5	12.9	0.0	20.1	17.8	2.3	1.6	2.2	0.0	23.0
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	3.6	4.6	3.8	0.0	12.6	4.2	5.0	3.0	2.0	0.0	14.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.8	28.0	31.8	38.8	0.0	49.8	39.1	24.7	22.9	20.4	0.0	52.5
LnGrp LOS	D	C	C	D	A	D	D	C	C	C	A	D
Approach Vol, veh/h		468			826			723			699	
Approach Delay, s/veh		30.8			45.5			28.8			46.0	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	36.4	12.4	30.0	14.0	33.6	10.0	32.4
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	6.7	31.9	7.9	25.5	9.5	29.1	5.5	27.9
Max Q Clear Time (g_c+I1), s	6.7	13.3	9.9	13.6	9.5	28.2	3.2	26.0
Green Ext Time (p_c), s	0.0	2.1	0.0	1.5	0.0	0.3	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	38.6
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	299	5	50	414	5	4	10	25	2	20	55
Future Vol, veh/h	20	299	5	50	414	5	4	10	25	2	20	55
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	150	-	-	150	-	-	-	-	-	-	-	-
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	22	325	5	54	450	5	4	11	27	2	22	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	455	0	0	330	0	0	974	935	328	952	935	453
Stage 1	-	-	-	-	-	-	372	372	-	561	561	-
Stage 2	-	-	-	-	-	-	602	563	-	391	374	-
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	1106	-	-	1229	-	-	231	265	713	239	265	607
Stage 1	-	-	-	-	-	-	648	619	-	512	510	-
Stage 2	-	-	-	-	-	-	486	509	-	633	618	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1106	-	-	1229	-	-	185	248	713	212	248	607
Mov Cap-2 Maneuver	-	-	-	-	-	-	185	248	-	212	248	-
Stage 1	-	-	-	-	-	-	635	607	-	502	488	-
Stage 2	-	-	-	-	-	-	400	487	-	586	606	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.9	15	15.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	402	1106	-	-	1229	-	-	426
HCM Lane V/C Ratio	0.105	0.02	-	-	0.044	-	-	0.196
HCM Control Delay (s)	15	8.3	-	-	8.1	-	-	15.5
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-	-	0.7

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑	↱		↱
Traffic Vol, veh/h	0	326	462	40	0	2
Future Vol, veh/h	0	326	462	40	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	-	-
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	0	354	502	43	0	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	502
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	569
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	569
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	569
HCM Lane V/C Ratio	-	-	-	0.004
HCM Control Delay (s)	-	-	-	11.4
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	315	525	59	116	11
Future Vol, veh/h	11	315	525	59	116	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	300	-
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	12	342	571	64	126	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	635	0	-	0	937	571
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	366	-
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	948	-	-	-	294	520
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	948	-	-	-	290	520
Mov Cap-2 Maneuver	-	-	-	-	290	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	702	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	25.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	948	-	-	-	290	520
HCM Lane V/C Ratio	0.013	-	-	-	0.435	0.023
HCM Control Delay (s)	8.8	-	-	-	26.6	12.1
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	2.1	0.1

HCM 6th Signalized Intersection Summary
6: Komohana Street & Mohouli Street

11/13/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	187	222	300	350	110	211	280	175	130	490	23
Future Volume (veh/h)	22	187	222	300	350	110	211	280	175	130	490	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	24	203	241	326	380	120	229	304	190	141	533	25
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	109	530	449	422	422	133	296	663	562	420	573	27
Arrive On Green	0.06	0.28	0.28	0.09	0.31	0.31	0.11	0.35	0.35	0.07	0.32	0.32
Sat Flow, veh/h	1781	1870	1585	1781	1363	430	1781	1870	1585	1781	1772	83
Grp Volume(v), veh/h	24	203	241	326	0	500	229	304	190	141	0	558
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1793	1781	1870	1585	1781	0	1855
Q Serve(g_s), s	1.2	7.9	11.6	7.9	0.0	24.0	7.5	11.3	7.9	4.7	0.0	26.2
Cycle Q Clear(g_c), s	1.2	7.9	11.6	7.9	0.0	24.0	7.5	11.3	7.9	4.7	0.0	26.2
Prop In Lane	1.00		1.00	1.00		0.24	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	109	530	449	422	0	556	296	663	562	420	0	600
V/C Ratio(X)	0.22	0.38	0.54	0.77	0.00	0.90	0.77	0.46	0.34	0.34	0.00	0.93
Avail Cap(c_a), veh/h	109	530	449	422	0	556	296	663	562	420	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	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.2	25.9	27.3	25.9	0.0	29.7	21.3	22.4	21.3	18.2	0.0	29.5
Incr Delay (d2), s/veh	4.6	2.1	4.5	12.9	0.0	20.1	17.8	2.3	1.6	2.2	0.0	23.0
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	3.6	4.6	3.8	0.0	12.6	4.2	5.0	3.0	2.0	0.0	14.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.8	28.0	31.8	38.8	0.0	49.8	39.1	24.7	22.9	20.4	0.0	52.5
LnGrp LOS	D	C	C	D	A	D	D	C	C	C	A	D
Approach Vol, veh/h		468			826			723			699	
Approach Delay, s/veh		30.8			45.5			28.8			46.0	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	36.4	12.4	30.0	14.0	33.6	10.0	32.4
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	6.7	31.9	7.9	25.5	9.5	29.1	5.5	27.9
Max Q Clear Time (g_c+I1), s	6.7	13.3	9.9	13.6	9.5	28.2	3.2	26.0
Green Ext Time (p_c), s	0.0	2.1	0.0	1.5	0.0	0.3	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	38.6
HCM 6th LOS	D

Appendix C

Intersection Level of Service Definitions

Highway Capacity Manual 2010

Signalized intersection level of service (LOS) is defined in terms of a weighted average control delay for the entire intersection. Control delay quantifies the increase in travel time that a vehicle experiences due to the traffic signal control as well as provides a surrogate measure for driver discomfort and fuel consumption. Signalized intersection LOS is stated in terms of average control delay per vehicle (in seconds) during a specified time period (e.g., weekday PM peak hour). Control delay is a complex measure based on many variables, including signal phasing and coordination (i.e., progression of movements through the intersection and along the corridor), signal cycle length, and traffic volumes with respect to intersection capacity and resulting queues. Table 1 summarizes the LOS criteria for signalized intersections, as described in the *Highway Capacity Manual 2010* (Transportation Research Board, 2010).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤10	Free Flow
B	>10 – 20	Stable Flow (slight delays)
C	>20 – 35	Stable flow (acceptable delays)
D	>35 – 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 – 80	Unstable flow (intolerable delay)
F[1]	>80	Forced flow (congested and queues fail to clear)

Source: *Highway Capacity Manual 2010*, Transportation Research Board, 2010.

1. If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0 LOS F is assigned to the individual lane group. LOS for overall approach or intersection is determined solely by the control delay.

Unsignalized intersection LOS criteria can be further reduced into three intersection types: all-way stop, two-way stop, and roundabout control. All-way stop and roundabout control intersection LOS is expressed in terms of the weighted average control delay of the overall intersection or by approach. Two-way stop-controlled intersection LOS is defined in terms of the average control delay for each minor-street movement (or shared movement) as well as major-street left-turns. This approach is because major-street through vehicles are assumed to experience zero delay, a weighted average of all movements results in very low overall average delay, and this calculated low delay could mask deficiencies of minor movements. Table 2 shows LOS criteria for unsignalized intersections.

Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F[1]	>50

Source: *Highway Capacity Manual 2010*, Transportation Research Board, 2010.

1. If the volume-to-capacity (v/c) ratio exceeds 1.0, LOS F is assigned an individual lane group for all unsignalized intersections, or minor street approach at two-way stop-controlled intersections. Overall intersection LOS is determined solely by control delay.

Hale Ola O Mohouli Affordable Housing Project

Draft Environmental Assessment

APPENDIX 3

Archaeological Field Inspection Report

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DAVID Y. IGE
GOVERNOR OF HAWAII

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

ROBERT K. MASUDA
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AQUATIC RESOURCES
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BUREAU OF CONVEYANCES
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CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

January 15, 2021

IN REPLY REFER TO:
Project No. 2020PR00010
Doc. No. 2101SN11
Archaeology

Tracie-Lee Camero
County of Hawaii – Planning Department
101 Pauahi Street, Suite 3
Hilo, HI 96720
tracie-lee.camero@hawaiicounty.gov

Dear Ms. Camero:

SUBJECT: **Chapter 6E-42 Historic Preservation Review**
State Land Use Boundary Amendment Application for Hale Ola O Mohouli
COR-20-136782 - Hawai'i Island Community Development Corp.
Waiākea Ahupua'a, South Hilo District, Island of Hawai'i
TMK: (3) 2-4-001:168

This letter provides the State Historic Preservation Division's (SHPD's) review of the subject County of Hawaii State Land Use Boundary Amendment application received by our office on January 6, 2021. The submittal included a site map, the State Land Use (SLU) Boundary Amendment Application, a Department of Planning letter, and photos of the proposed project area. The project area consists of the entire 9.09-acre parcel.

The applicant, Hawaii Island Community Development Corporation (HICDC), is requesting a State Land Use District Boundary amendment to change the SLU designation from Agriculture (A-1a) to Urban (RM-4). HICDC intends to develop the site as a "Pocket Neighborhood" development with small-scale residential units surrounding common areas.

Our records indicate that this project area has been subject to an archaeological inventory survey (AIS). No historic properties were identified during the AIS and the negative findings were presented in an archaeological assessment (AA) report (Haun 2008). SHPD accepted the Haun (2008) AA report in a letter dated May 11, 2016 (Log No. 2008.5033, Doc. No. 0811MD24). The proposed project area has been subject to previous grubbing and grading permit reviews, resulting in determinations of no historic properties affected (e.g., Log No. 2014.05227, Doc. No. 1412SN02; Log No. 2015.03678, Doc. No. 1511SN04). The SHPD has no new information or records of any known significant historic properties within or near the proposed project area.

Based on the information provided above, the **SHPD has no objections** to the proposed amendment to the SLU boundary application (COR-20-136782). However, SHPD requests the opportunity to review future permit applications involving ground disturbing activities.

Please contact Sean Naleimaile at (808) 933-7651 or at sean.p.naleimaile@hawaii.gov for any questions or concerns regarding this letter.

Aloha,

Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: County of Hawaii Planning Department, planning@hawaiicounty.gov
Keith Kato-HICDC, keith.hicdc@gmail.corn

ASM affiliates
Archaeology • History • Ethnography • Architectural History

August 6, 2020

ASM Project No. 35220.00

Keith Kato
Executive Director
Hawaii Island Community Development Corporation
100 Pauahi Street #204
Hilo, Hawaii 96720
email: keith.hicdc@gmail.com *via email*

Subject: Field Inspection of the Hale Ola of Mohouli project area, TMK: (3) 2-4-001:168, Waiākea Ahupuaʻa, South Hilo, Island of Hawaiʻi.

Dear Keith:

As requested, ASM Affiliates (ASM) conducted an archaeological field inspection of the proposed Hale Ola o Mohouli project area, which comprises a 9.091-acre parcel (TMK: (3) 2-4-001:168) located in Waiakea Ahupuaʻa, South Hilo, Island of Hawaiʻi (Figures 1, 2, and 3). The purpose of the field inspection was to determine if historic properties exist within the subject parcel and to make recommendations regarding any additional HRS Chapter 6E requirements with respect to developing the parcel. This report summarizes the geological context of the subject parcel, the relevant findings from prior archaeological studies, details the findings from the current field inspection, and provides recommendations based on our findings.

Geological Context

The subject parcel is located entirely on the 1880-1881 Hilo Lava Flow. Between May, 1880 and August, 1881, a series of eruptions on Mauna Loa sent lava flows down through the subject parcel, nearly reaching Hilo Bay (Figures 4 and 5). Kauahikaua et al. (2019) describe the route taken by the lava. On May 1, 1880, an eruption began in Mokuʻāweoweo, the summit crater of Mauna Loa, and lasted a few days. The following November, the eruption resumed, this time from vents along the Northeast Rift Zone. Lava streamed down the mountain toward Hilo Town, the main flow following what was then Kūkūau Gulch. The flow reached the subject parcel in late June, 1881, completely covering it, and continued *makai*. The eruption continued until August 11, stopping just short of a mile from Hilo Bay. The young lava and little soil development (Figure 6) on the subject parcel and surrounding area was unsuitable for farming, or even grazing, and remained undeveloped (Figure 7) until the construction of the Mohouli Heights Senior Neighborhood project beginning in 2012. Due to this lava flow, there is a low likelihood of archaeological sites or deposits predating 1881 on the subject parcel, and the land use history of the parcel suggests that few, if any, historic properties post-dating the eruption will be encountered.

Prior Archaeological Studies

Two prior archaeological studies have been conducted in the immediate vicinity of the subject parcel, neither of which identified any historic properties. An archaeological inventory survey (Robins et al. 1996) was conducted for the Mohouli Street Extension project, which included the road right of way adjacent to the subject parcel. No historic properties of any kind were identified during the that study. A second archaeological inventory survey (Haun 2008) was conducted for the Mohouli Heights Senior Neighborhood project area, which is located between the subject parcel and Komohana Street (now TMKs (3) 2-4- 011: 177, 178, 184, 185, 186, and 187). The survey covered 15.9 acres and did not identify any historic properties.

Field Inspection Methods and Results

On July 29, 2020, Johnny Dudoit, B.A. and Olivia Crabtree, under the supervision of Benjamin Barna, Ph.D. (Principal Investigator) conducted a field inspection of the entire ground surface of the subject parcel. The ground surface was primarily pāhoehoe bedrock covered with a very thin layer of decomposed leaf litter, which is consistent with the USDA's mapped soil data (Figure 6). Vegetation was relatively thick (Figures 8 thorough 13) and was dominated by guava (*Psidium* sp.) saplings and scattered *ʻōhiʻa* (*Metrosideros polymorpha*), with an understory of *uluhe* (*Dicranopteris linearis*). Introduced species typical of disturbed roadsides are present along Mohouli Extension. Despite the vegetation, it was possible to inspect the ground surface for lava tube entrances (none were noted) and surface features. No historic properties of any kind were observed.

Summary and Recommendations

As a result of the current field inspection, no historic properties of any kind were identified on the subject parcel. Our recommended determination of effect for the proposed project is "no historic properties affected." Should you have any question or concerns, please don't hesitate to contact me directly.

Sincerely,

Benjamin Barna, Ph.D.
Senior Archaeologist

References Cited

Haun, A. E.
2008 *Archaeological Assessment, Portion of TMK: (3) 2-4-01:168, Land of Waiakea, South Hilo District, Island of Hawaiʻi.* Haun & Associates. Prepared for Brian Nishimura, Hilo.

Kauahikaua, J., B. Gaddis, K. u. Kanahele, K. Hon, and W. Valerie
2019 *The Lava Flow that Came to Hilo—The 1880–81 Eruption of Mauna Loa Volcano, Island of Hawaiʻi.* United States Geological Survey Scientific Investigations Report 2019–5129.

Lawrence, W. R.
1881 *Map showing end of lava flow near Hilo, Hawaii, Aug. 24, 1881*. Hawaii Government Survey Registered Map No. 919.

Robins, J., W. Fortini, and R. Spear
1996 *An Archaeological Inventory Survey of the Proposed Mohouli Connector Road, Ahupuaʻa of Kukuau 1 and 2, Ponahawai, and Punahoa, South Hilo District, Island of Hawaiʻi.* Scientific Consultant Services, Inc. Report SCS-085-2. Prepared for Youngki Hahn, Ph.D.

Sherrod, D., J. Sinton, S. Watkins, and K. Brunt
2007 *Geologic Map of the State of Hawaiʻi*. U.S. Department of the Interior, U.S. Geological Survey. Open-File Report 2007-1089. Electronic document, http://pubs.usgs.gov/of/2007/1089, accessed Apr 27, 2018.

Soil Survey Staff
2020 Web Soil Survey. *United State Deparment of Agriculture, Natural Resources Conservation Service*. Electronic document, http://websoilsurvey.nrcs.usda.gov.

USAAF (United States Army Air Forces)
1940 *Hilo and Mauna Loa in Distance, Hawaii, T.H.* National Archives and Records Administration Aerial Photograph 18-AA-37-026. Airscapes-Hawaiian Islands. Electronic document, https://catalog.archives.gov, accessed May 18, 2018.

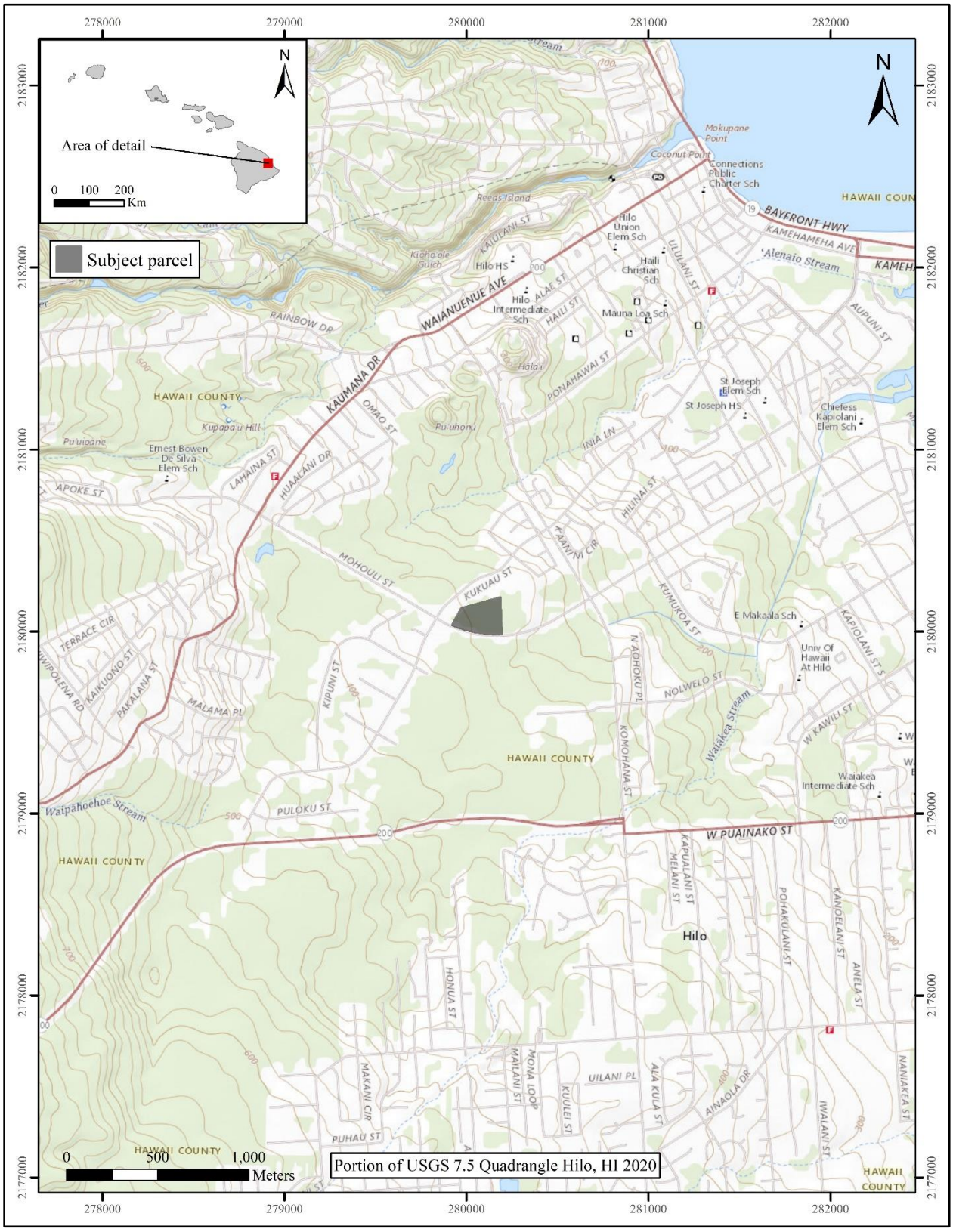

Figure 1. Subject parcel location.

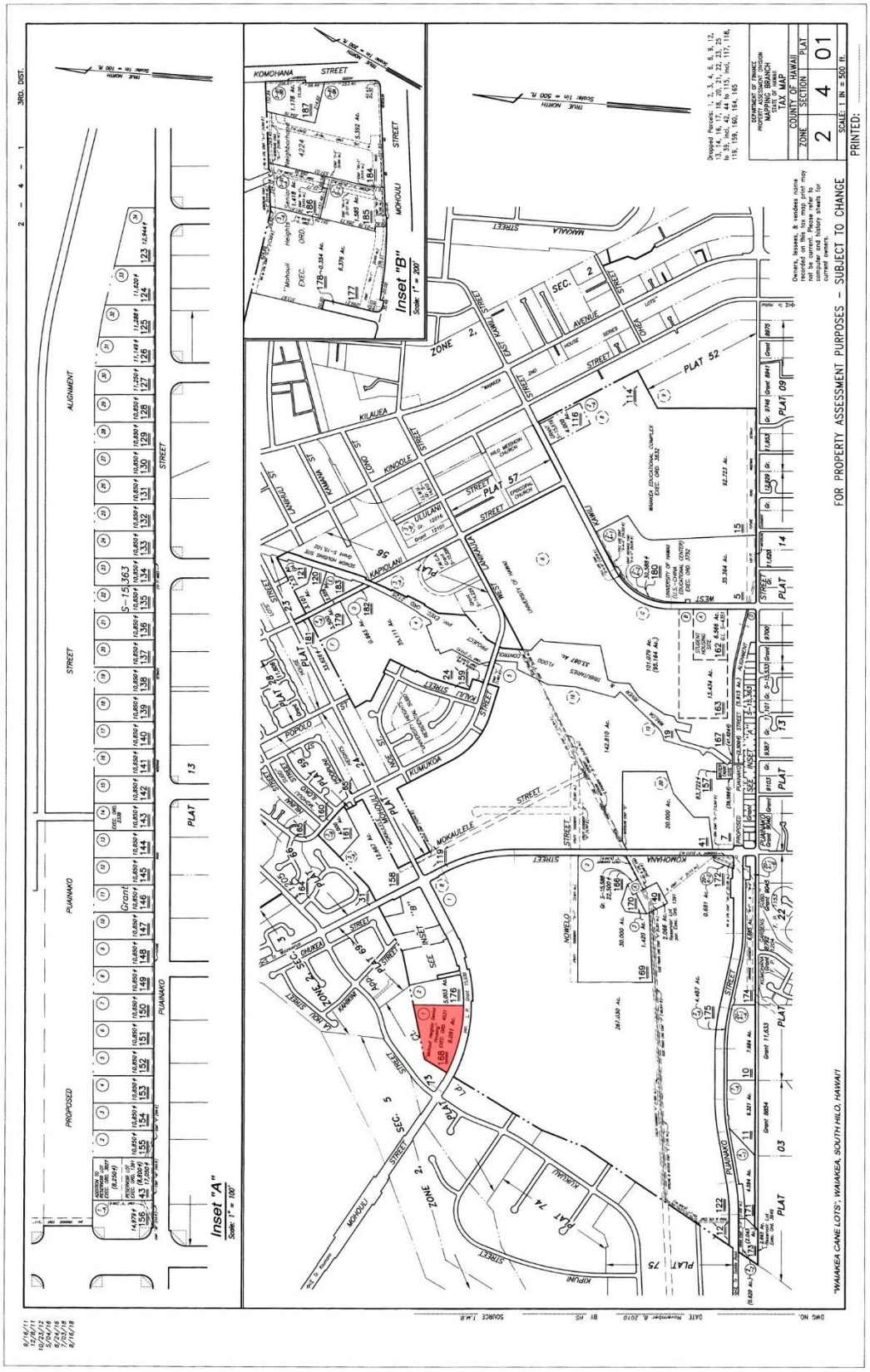

Figure 2. Tax Map Key Plat (3) 2-4-001 with the subject parcel indicated.

Figure 3. Recent satellite imagery of the subject parcel.

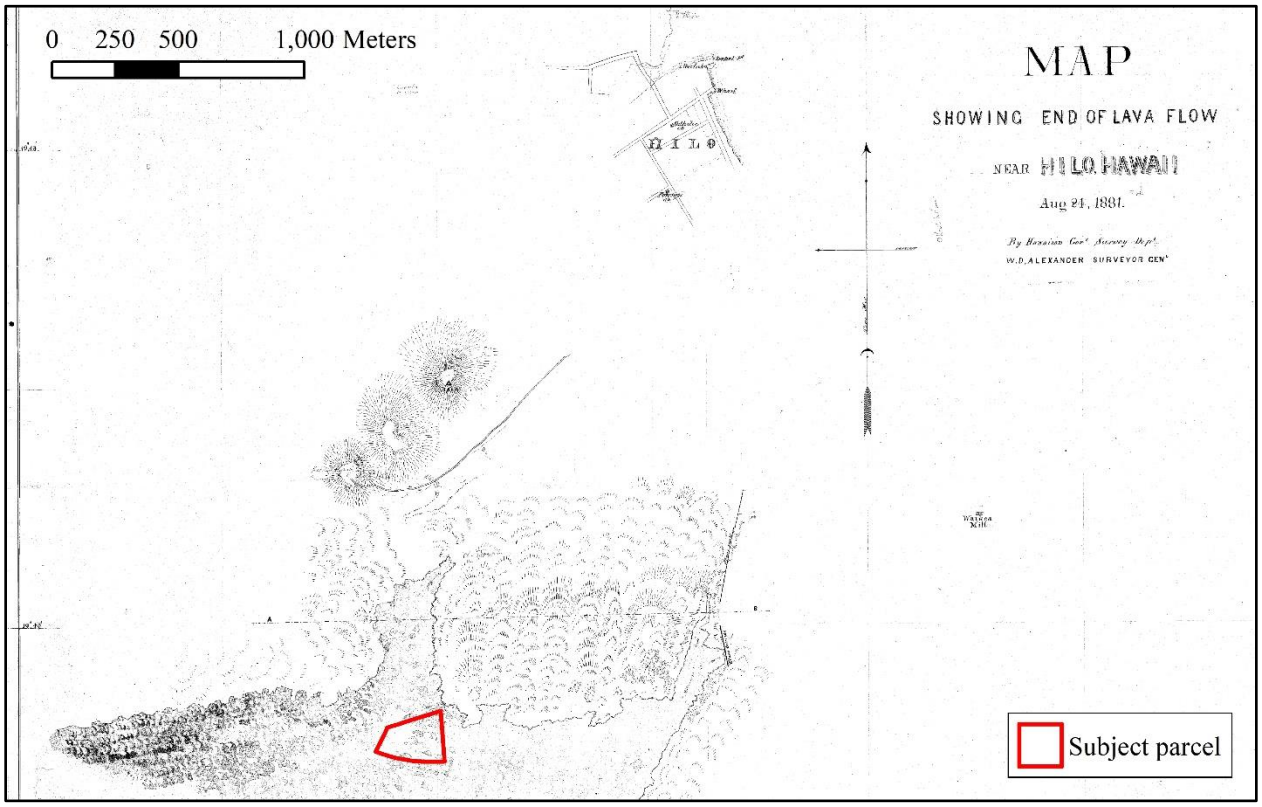

Figure 4. Portion of Registered Map 919 with the subject parcel indicated (Lawrence 1881).

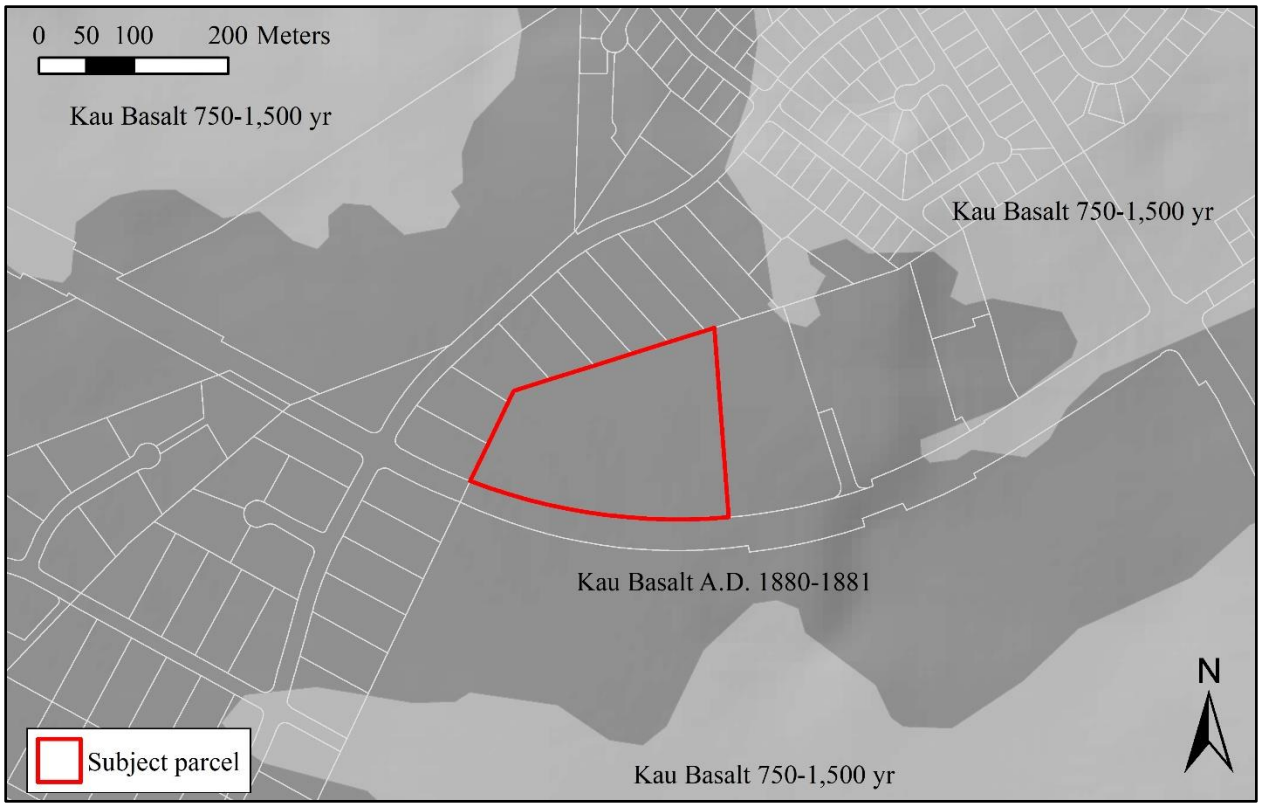

Figure 5. Geology in the vicinity of the subject parcel (Sherrod et al. 2007).

Figure 6. Mapped soils in the vicinity of the subject parcel (Soil Survey Staff 2020).

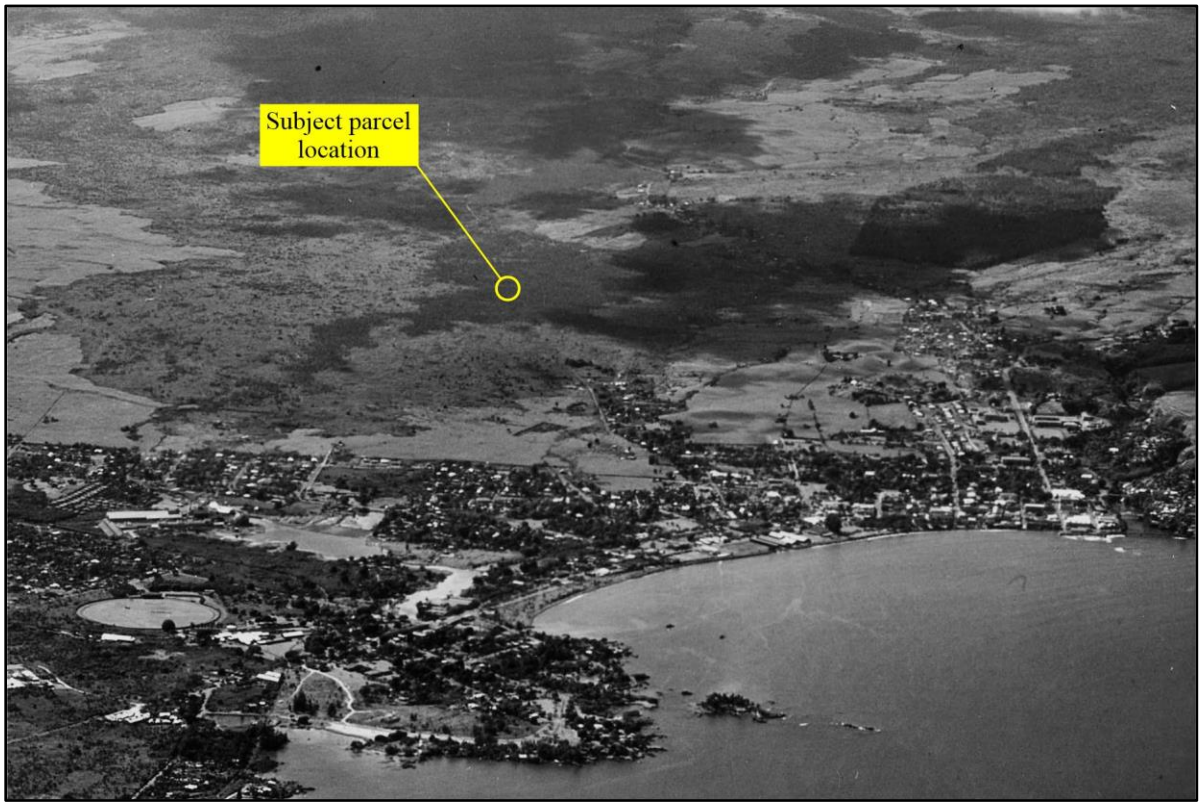

Figure 7. Portion of a 1940 aerial photograph of Hilo (USAAF 1940).

Figure 8. Subject parcel, view to the northwest.

Figure 9. Subject parcel, view to the northeast.

Figure 10. Subject parcel, view to the north.

Figure 11. Subject parcel, view to the northeast.

Figure 12. Subject parcel, view to the northeast.

Figure 13. Subject parcel, view to the northeast.

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Hale Ola O Mohouli Affordable Housing Project

Draft Environmental Assessment

APPENDIX 4

Phase I Environmental Site Assessment

Note: Appendices not included. Available upon request to HICDC

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PHASE I
ENVIRONMENTAL SITE ASSESSMENT REPORT
FOR
MOHOULI STREET, TMK (3) 2-4-001:168
HILO, HAWAII 96720

MNA PROJECT 2271_3

DECEMBER 21, 2016

Myounghee Noh & Associates

Environmental Studies and Consulting Services

200 Kohola Street, Hilo, Hawaii, USA 96720 • 808.935.8727
99-1046 Iwaena Street, Suite 210A, Aiea, Hawaii, USA 96701 • 808.484.9214

This Phase I ESA report is prepared for:

County of Hawaii
Office of Housing and Community Development
50 Wailuku Drive
Hilo, Hawaii 96720

PHASE I
ENVIRONMENTAL SITE ASSESSMENT REPORT
FOR
MOHOULI STREET, TMK (3) 2-4-001:168
HILO, HAWAII 96720

TMK (3) 2-4-001:168
9.091 acres

MNA Job No. 2271_3

December 21, 2016

I declare that, to the best of my professional knowledge and belief, I meet the definition of *Environmental professional* as defined in §312.10 of 40 CFR 312.

I have the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the subject *property*. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR 312.

Jessica Walsh
Environmental Professional

Myounghee Noh & Associates, L.L.C.
Environmental Studies and Consulting Services
200 Kohola Street, Hilo, HI 96720
Tel (808) 935-8727
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APPENDICES

Appendix A Environmental Data Resources Report and Maps
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CONTRIBUTORS

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Site Assessors	Phillip Cabanila, Herbertson Santos
Report Writer	Jessica Walsh, Graham Knopp
Drafter/Illustrator	Herbertson Santos
QA Review	Myounghee Noh

LIST OF ABBREVIATIONS

AST	Aboveground Storage Tank
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CESQG	Conditionally Exempt Small Quantity Generators
COH	County of Hawaii
CORRACTS	RCRA Facilities that are undergoing "corrective action"
EC	Engineering Control
EDR	Environmental Data Resources, Inc.
EPA	Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
HDOH	Hawaii Department of Health
HEER	Hazard Evaluation and Emergency Response
HELCO	Hawaii Electric and Light Company
HFD	County of Hawaii Fire Department
IC	Institutional Control
LQG	Large Quantity Generator
LUST	Leaking Underground Storage Tank
MNA	Myounghee Noh & Associates, L.L.C.
NFRAP	No Further Remedial Action Planned
NLR	No Longer Regulated Generators
NPL	National Priorities List
OHCD	Office of Housing and Community Development
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
SHWB	Solid and Hazardous Waste Branch
SQG	Small Quantity Generator
TMK	Tax Map Key
TSD	Treatment, Storage, and Disposal
USGS	United States Geological Survey
UIC	Underground Injection Control
UST	Underground Storage Tank
VRP	Voluntary Response Program

EXECUTIVE SUMMARY

Myounghee Noh & Associates, L.L.C. (MNA), was retained in October 2016 to conduct a Phase I Environmental Site Assessment (ESA) for the subject property located in Hilo, Island of Hawaii, and identified by four Tax Map Keys (TMK), Island 3, Zone 2, Section 4, Plat 001, and Parcel 168. The subject property was owned by the State of Hawaii. This Phase I ESA was completed for the County of Hawaii Office of Housing and Community Development for the potential acquisition of the property through an Executive Order from the Governor for development as senior housing.

The purpose of this Phase I ESA is to identify *recognized environmental conditions* (REC) at the subject property, with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and petroleum products. A Phase I ESA consists of four parts. Three of those parts are intended to collect information that will aid in the identification of REC at the subject property. The information generating parts of the Phase I ESA consists of a review of state, federal, and local environmental records; a site reconnaissance visit; and interviews with key site personnel and other individuals with knowledge regarding the subject property. The fourth part of a Phase I ESA is a report that documents the collection of information about the subject property and evaluation of that information towards making a determination of the presence of REC at the subject property.

The subject property was located in Hilo, in eastern Hawaii, approximately 1½ miles southwest of Hilo Bay and Waiakea Pond. The subject property was an unimproved vacant vegetated lot with no structures or roads present.

FINDINGS

No records of NPL sites, Federal RCRA CORRACTS and Non-CORRACTS Treatment Storage Disposal Facilities, Delisted National Priority List sites, Federal CERCLIS sites, Federal CERCLIS NFRAP sites, landfill or solid waste disposal sites, State Leaking Underground Storage Tank List sites, State Voluntary Cleanup sites, Federal RCRA Generator sites, State registered UST sties, Institutional Controls/Engineering Controls registries, Federal ERNS list sites, Federal or State Brownfields sites were identified at the subject property or in the area surrounding the subject property.

Information provided as part of the User Questionnaire completed by Alan Rudo, project manager with the County of Hawaii Office of Housing and Community Development, did not indicate any RECs. MNA conducted an interview with Gordon C. Heit, Land Agent for the State of Hawaii Department of Land and Natural Resources Land Division, owner and manager of the subject property. This interview did not indicate any RECs. Based on a review of historic aerial photographs and topographic maps, no RECs were identified.

MNA requested records for review regarding the subject property, adjoining properties, and surrounding area from the State of Hawaii Department of Health (HDOH) Solid and Hazardous Waste Branch (SHWB) and the County of Hawaii Fire Department (HFD). SHWB and HFD responded that they had no records regarding the subject. MNA reviewed HDOH Hazard Evaluation and Emergency Response (HEER) Office publicly available files and sources online. No sites or incidents were listed for the subject or adjoining properties.

Limitations/Data Gaps/Deviations

MNA encountered limitations in this Phase I ESA. During the site reconnaissance, there was limited access to the subject property due to the dense and impenetrable vegetation. The vegetation made it difficult to thoroughly inspect the ground surface and much of the interior of the subject property. There were no indications of illegal dumping, and therefore this is considered a minor data gap, as it is not anticipated that illegal dumpsites are hidden by the vegetation.

There were no deviations from the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM International, 2013).

Non-REC

Subject Property

During the site reconnaissance, MNA observed no evidence of REC.

Surrounding Area

During the site reconnaissance, MNA observed one propane aboveground storage tank (AST) located on the adjoining property to the west, TMK (2) 2-4-073:008. The AST was in good condition, and there was no stressed vegetation. Therefore, the AST is not considered a REC.

EDR identified two hazardous waste sites located ¾ mile away from the subject property:

600 Wailoa Street. Located ¾ mile and downgradient from the subject property was the Lanakila Homes Phase 3B-4 site. The site was identified as having heavy metal and lead contaminated soils present, and managed with controls. Due to the distance and proximity of this site from the subject property, it is not considered a REC.

Non-Geocoded Location on Kaumana Drive. The HELCO Pole-Mounted Transformer No. 20938 at Pole No. 7 was identified as having petroleum contamination in the soil. The contaminated soil was removed, and a No Further Action letter was issued on 05 June 2012. Due to the distance of this site from the subject property, this is not considered a REC.

MNA reviewed the *Final Environmental Assessment for Fire Administration Support Complex, Waiakea, South Hilo, Island of Hawaii, TMK (3) 2-4-001:176 & 178 (Previously Parcel 168 [portion])*, dated June 2009, which made no mention of hazardous materials or petroleum products at the adjoining property to the east (M&E Pacific, Inc., 2009). The proposed Fire Administration Support Complex would include administration, dispatch, and preparation/training buildings, warehouse, fire station, museum, open and covered training areas, site infrastructure, and paved access and parking areas. The use would include all operations and trainings. While the EA indicated no existing condition or impact from the construction or use of the facility related to hazardous materials or petroleum products that could impact the subject property, MNA notes that should the facility be constructed and used as outlined in the EA, mock fire training including staging fires of burning materials and associated suppression techniques could impact air quality in the immediate vicinity of the facility, including the subject property.

RECOGNIZED ENVIRONMENTAL CONDITIONS

MNA performed a *Phase I Environmental Site Assessment* in conformance with the scope and limitations of ASTM E 1527-13 of the subject property identified as TMK (3) 2-4-001:168 in Hilo, Island of Hawaii. Any exceptions to, or deletions from, this practice are described in Section 7.0 of this report. This assessment has not revealed evidence of *recognized environmental conditions* based on existing conditions at the time of this Phase I site assessment; however, should the Fire Administration Support Complex be constructed on the adjoining property to the east and used as outlined in the EA, mock fire training including staging fires of burning materials and associated suppression techniques could impact air quality in the immediate vicinity of the facility, including the subject property.

1.0 INTRODUCTION

This report presents the results of a Phase I Environmental Site Assessment (ESA) conducted during October and November 2016 for the subject property identified by the Tax Map Key (TMK) of Island 3, Zone 2, Section 4, Plat 001, and Parcel 168 [TMK (3) 2-4-001:168] in Hilo, Island of Hawaii. The location of the subject property is identified in Figure 1.

This Phase I ESA was conducted by Myounghee Noh & Associates, L.L.C., herein referred to as MNA, for the County of Hawaii (COH) Office of Housing and Community Development (OHCD). At the time of this Phase I ESA, the subject property was owned and operated by the State of Hawaii.

1.1 PURPOSE

The purpose of this Phase I ESA is to identify any *recognized environmental conditions* (RECs) at the subject property, with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and petroleum products. This practice is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner defense to CERCLA liability, "all appropriate inquiry into the previous ownership and uses of the site consistent with good commercial or customary practice." The term *recognized environmental condition* denotes the presence, or likely presence, of any hazardous substances or petroleum products on the property under conditions that indicate an existing release, a past release, or a material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property (ASTM International, 2013).

This report is part of the Phase I ESA conducted for the subject property. The assessment was conducted in accordance with the practices described in Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM International, 2013).

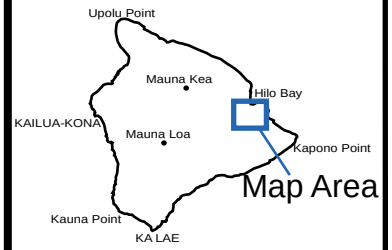
1.2 DETAILED SCOPE OF SERVICES

A Phase I ESA has four components: records review, site reconnaissance, interview, and report. MNA conducted this ESA using information sources with the potential to identify past or current releases of hazardous substances or petroleum products into the subject property. Adjoining properties were also evaluated for their potential to impact the subject property. Per the ASTM International Phase I ESA Standard, adjoining properties include parcels touching the subject property as well as those properties across a roadway (ASTM International, 2013).

1.2.1 Site History

Where available and as needed, MNA researched historical and current topographic maps, tax records, fire insurance maps, and aerial photographs to identify previous and current uses of the property, adjoining properties, and the surrounding area.

Figure 1. Site Location Map



Phase I ESA
Mohouli Street, Hilo, Hawaii
TMK (3) 2-4-001:168

MNA Project No. 2271_3

Myounghee Noh & Associates, L.L.C.

1.2.2 Regulatory Records

MNA examined government records with respect to environmental conditions, citations, complaints, and permits at the subject property, at adjoining properties, and within the surrounding area. MNA utilized a records search provided by Environmental Data Resources, Inc. (EDR), to review records from the following federal and state programs:

- National Priorities List (NPL)
- Delisted NPL
- Resource Conservation and Recovery Act (RCRA) facilities that are undergoing "corrective action" (CORRACTS)
- RCRA-Treatment, Storage, & Disposal (TSD)
- Comprehensive Environmental Response, Compensation & Liability Information System (CERCLIS) List
- CERCLIS No Further Remedial Action Planned (NFRAP) List
- Federal and Hawaii State Brownfields
- Hawaii Solid Waste & Landfill
- Leaking Underground Storage Tank (LUST)
- RCRA-Violators/Enforcement
- Underground Storage Tank (UST)
- Emergency Response Notification System (ERNS)
- RCRA – Generators, including those No Longer Regulated (NLR)
- Hawaii Sites of Interest
- Hawaii Releases
- Federal and Hawaii State Land Use Controls
- Hawaii Voluntary Cleanup Sites
- Tribal Lands

Additionally, MNA requested state environmental case files from the Hawaii Department of Health (HDOH) and County of Hawaii Fire Department (HFD).

1.2.3 Site Reconnaissance

MNA performed a site reconnaissance to obtain information indicating the likelihood of contamination, to interview available site personnel, and to conduct a brief assessment of the adjoining properties. During the site reconnaissance, MNA looked for a variety of indicators of environmental hazards including, but not limited to, stained surface soil, dead or stressed vegetation, hazardous substances, aboveground and underground storage tanks, disposal areas, groundwater wells, drywells, and sumps. Sampling and testing of soil, surface water, or groundwater were not part of this assessment.

1.2.4 Site Geology and Hydrogeology

MNA reviewed published information for the property and surrounding area on surface and subsurface conditions such as topography, drainage, surface water bodies, subsurface geology, and groundwater. MNA used this information to assess the potential for migration and impact of the subject property by releases of hazardous substances or petroleum products at off-site properties.

1.2.5 Data Evaluation and Reporting

MNA evaluated the information collected, and prepared this report as part of the assessment. Section 2 presents the site background information; Section 3 user provided information; Section 4 information collected from records review; Section 5 site reconnaissance; Section 6 interviews; Section 7 data gaps; Section 8 key findings and opinion; and Section 9 conclusion.

1.3 SIGNIFICANT ASSUMPTIONS

The conclusion presented in this report is based upon the assumption that reasonably ascertainable and relevant information pertaining to the environmental condition of the subject property was made available to MNA during the assessment. Information obtained from government agencies and other resources is presumed to be accurate and updated. Additionally, information collected in interviews is collected in "good faith" and believed to be true and accurate to the best knowledge of the interviewee.

1.4 LIMITATIONS AND EXCEPTIONS

The Phase I ESA provides a "snapshot" of the property conditions at the time of the assessment. Findings, opinions, and conclusions apply to property conditions existing at the time of the investigation and those reasonably foreseeable. They do not apply to conditions at, or changes to, the property, of which MNA is not aware, could not reasonably be aware, and has not had the opportunity to evaluate.

This report is based upon visual observations of the subject property and its vicinity, interpretation of the available historical and regulatory information and documents reviewed, and interviews of individuals with knowledge of the subject or surrounding property. MNA cannot ensure the accuracy of the historical or regulatory information. This report is intended exclusively for the purpose outlined and applies only to the subject property.

This Phase I ESA excludes asbestos, lead paint, and investigation of geotechnical concerns. No surface or subsurface sampling was involved.

1.5 SPECIAL TERMS AND CONDITIONS

This Phase I ESA was conducted and prepared by MNA for the exclusive use of the COH OHCD. This report shall not be relied upon or transferred to any other party without written authorization from COH OHCD.

1.6 USER RELIANCE

This report is an instrument of service of MNA, which summarizes its findings and opinions with respect to *recognized environmental conditions* at the subject property. Findings and opinions are predicated on information that MNA obtained on the dates and from individuals stated herein, from public records reviewed, a site reconnaissance, and ancillary Phase I ESA activities. This assessment relies upon the accuracy and completeness of the information provided. The information obtained for this assessment is used without extraordinary verification. It is possible that other information exists and is discovered, or environmental conditions change subsequent to the submittal of this Phase I ESA report, to which MNA shall not be held responsible for exclusion.

2.0 SITE DESCRIPTION

This section contains location and legal description; site and vicinity general characteristics; current subject property use; structures, roads, and other improvements; past subject property use; and current and past use of adjoining properties.

2.1 LOCATION AND LEGAL DESCRIPTION

The subject property is located at TMK (3) 2-3-001:168 in Hilo, Island of Hawaii. According to the County of Hawaii tax records, there is no physical address assigned, and the parcel is zoned as agricultural (County of Hawaii, 2016). Mohouli Street borders the property to the south, and the intersection of Mohouli and Kukuau Streets is approximately 300 feet west of the subject property. A TMK map is presented in Figure 2.

2.2 SITE AND VICINITY GENERAL CHARACTERISTICS

The subject property is located in Hilo, in eastern Hawaii, approximately 1½ miles southwest of Hilo Bay and Waiakea Pond. The subject property was an unimproved vacant vegetated lot with no structures or roads present.

The subject property is located adjacent to Mohouli Street. Vacant lands are located nearby to the south southwest. Residential areas are present to the north, south, and east.

2.3 GEOLOGY

The Island of Hawaii is of volcanic origin and was accumulated by the combination of Kohala, Mauna Kea, Mauna Loa, Kilauea, and Hualalai volcanoes. The island is comprised of numerous thin, extremely permeable tholeiitic (relatively rich in silica and iron) basalt lava flows (Stearns, 1985).

Hawaii, the youngest and largest Hawaiian Island, is larger than all the other Hawaiian Islands combined. Hazlett and Hyndman (1996) describe the island as follows:

> It [Hawaii Island] sprawls over an area the size of Connecticut, spanning 90 miles from north to south and 80 miles from east to west. Five large volcanoes coalesce to make the visible part of the Big Island; a sixth lies buried beneath the surface. The southern part of the island is still volcanically active and building out along much of the coastline. To the north, volcanism is in the waning stages. Of all the Hawaiian Islands, the Big Island shows the greatest diversity of rocks and landscapes (Hazlett & Hyndman, 1996).

The subject property is located on the lower southeastern slopes of the Mauna Loa volcano, an active shield volcano Mauna Loa and the second youngest of the five Hawaiian volcanoes. Mauna Loa volcano is the largest volcano on the Island of Hawaii, making up 50.5% of the land area of the island (Morgan, 1996). The USGS Geological Survey geologic map of Hawaii Island indicates that the subject property is underlain by lavas from a relatively recent Mauna Loa flor from 1880 (Wolfe, E.W. & Morris, J., 1996).

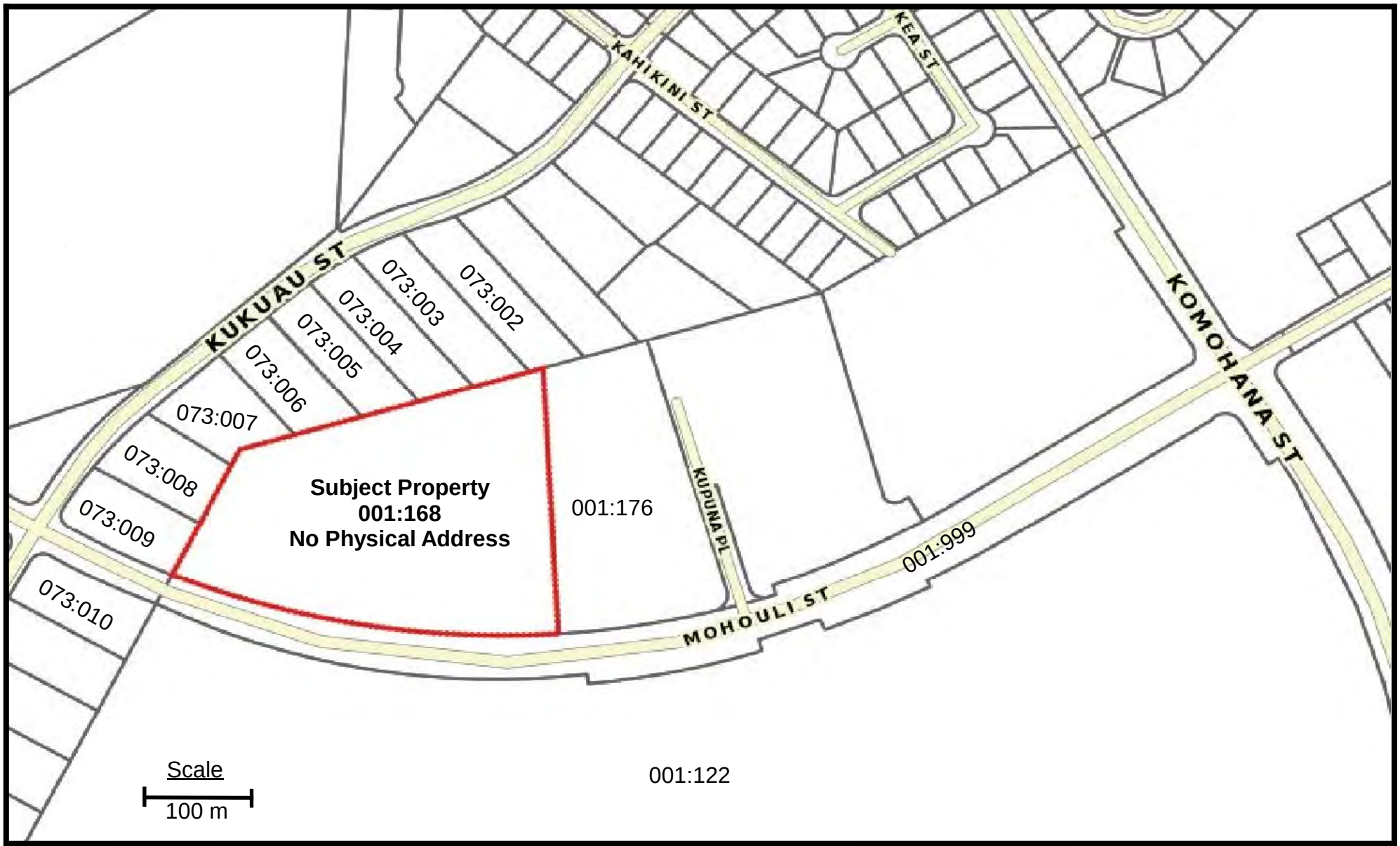
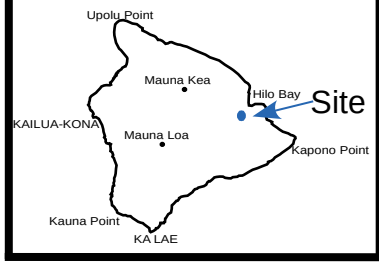


Figure 2. TMK Map



Phase I Environmental Site Assessment
TMK (3) 2-4-001:168
Mohouli Street, Hilo, Hawaii

MNA Project No. 2271_3

Myounghee Noh & Associates, L.L.C.

The United States Department of Agriculture Natural Resources Conservation Service classifies the soil at the subject property as Keaukaha highly decomposed plant material, 2 to 10 percent slopes (series 652, national map unit symbol 2klld), composed primarily of highly decomposed organic material over pahoehoe lava flows, with a depth to bedrock of 4 to 14 inches. This soil is described as well drained with a low to moderately low capacity to transmit water (0.00 to 0.06 in/hr) (United States Department of Agriculture, 2016). The land capability classification for this soil is 7s, indicating that this soil has very severe limitations that make it unsuited for cultivation and that restrict its use mainly to grazing, forestland, or wildlife. The "s" subclass indicates that his soil is made up of soils that have soil limitation within the rooting zone, such as shallowness of the rooting zone, stones, low moisture-holding capacity, low fertility that is difficult to correct, and salinity or sodium content.

2.4 HYDROLOGY AND HYDROGEOLOGY

The HDOH Safe Drinking Water Branch established an Underground Injection Control (UIC) line to serve as a boundary between drinking water and non-drinking water portions of aquifers. Areas above (mountain side) the UIC line are within drinking water portions of the aquifer, while areas below (ocean side) the UIC are in non-drinking water portions of the underlying aquifer. The subject property is above the UIC in a drinking water portion of the aquifer (Hawaii Department of Health Safe Drinking Water Branch, 2014).

The hydraulic gradient of the basal groundwater within the basaltic formation is, in general, from mountain areas to the shoreline. According to the Mink and Lau (1990), the subject property is located above the Hilo aquifer and described the hydrogeology and aquifer as follows:

> Average annual rainfall starts at 120 inches at the coast, increases to a maximum of 300 inches, then decays to 20 inches on the upper slopes of Mauna Loa. Despite the extraordinary rainfall, perennial streams do not exist south of Wailuku River. Rain easily infiltrates into the permeable basalt.
>
> A voluminous basal lens extends at least 4 miles inland of the coast, beyond which high-level water has been encountered. As the groundwater in the vicinity of the subject property is basal, it can be found at a depth roughly corresponding to its elevation, or about 350 feet bgs (below ground surface). The flux of groundwater in this basal lens is enormous; the fresh water springs at Hilo-Waiakea have been measured at 150 million gallons per day. The gradient is about 5 feet per mile, and the permeability of the basalt is probably at least 5,000 feet per day (Mink & Lau, 1990). Information for the Hilo aquifer is provided in Table 1 (Mink & Lau, 1990).

The Federal Emergency Management Agency (FEMA) flood map for the area (1551660880C September 16, 1988, revised December 21, 2006) indicates that a flood area traverses the midsection of the subject property. This area, comprising about 50-60% of the entire property, is designated special flood hazard area Zone A, areas with a 1% annual chance of flooding inundation, but without base flood elevation determined (Federal Emergency Management Agency, 1988). This flood area is part of the Mohouli area drainage, which is confluent with the Alenaio Flood Control Channel near the University of Hawaii at Hilo campus.

Table 1. Hilo Aquifer Classification System

Aquifer Code	**80401111**
Island Code	8–Hawaii
Aquifer Sector	04–Northeast Mauna Loa
Aquifer System	01–Hilo
Aquifer Type, hydrogeology	1–Basal
Aquifer Condition	1–Unconfined
Aquifer Type, geology	1–Flank, Horizontally extensive lavas
Status Code	**11111**
Development Stage	1–Currently used
Utility	1–Drinking
Salinity (in mg/L Cl^-)	1–Fresh (<250)
Uniqueness	1–Irreplaceable
Vulnerability to Contamination	1–High

mg/L Cl^--milligrams per liter of chloride

2.5 CURRENT USE OF THE SUBJECT PROPERTY

The subject property was owned by the State of Hawaii. There are no structures on the subject property. It is vacant, unused, and vegetated land.

2.6 STRUCTURES, ROADS, AND OTHER IMPROVEMENTS

No structures, roads, or other improvements had been made to the subject property. No electrical, telephone, sewer, or water service was connected at the subject property. The subject property is accessed from Mohouli Street, along the southern border where storm water drainage was observed along the street. A site map is presented in Figure 3.

2.7 PAST USES OF THE SUBJECT PROPERTY

Information regarding past uses of the subject property was obtained from a review of tax records (County of Hawaii, 2016), historic topographic maps and aerial photographs, and interviews. According to the County of Hawaii Real Property Tax Office, the State of Hawaii owns the subject property, and has since 1949. The County of Hawaii does not have property tax records on the subject property prior to 1949. Table 2 summarizes available information regarding the historical use and users of the subject property.

2.8 CURRENT AND PAST USES OF ADJOINING PROPERTIES

Information regarding past uses of the adjoining properties was obtained from review of tax records (County of Hawaii, 2016), historic topographic maps and aerial photographs (Environmental Data Resources, Inc., 2016) and interviews. The property use information is summarized in Table 3.

Table 2. Users and Primary Uses of Subject Property

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
TMK (3) 2-4-001:168; Mohouli Street, Hilo			
2008-Present	State of Hawaii	9.091	Undeveloped
2008	**0.354 acres from TMK (3) 2-4-001:178 6.373 acres from TMK (3) 2-4-001:177 5.003 acres from TMK (3) 2-4-001:176**		
2000-2008	State of Hawaii	30.396	Undeveloped
2000	**30.396 acres from TMK (3) 2-4-001:122**		
1979-1999	State of Hawaii	318.668	Undeveloped
1979	**0.517 acres to TMK (3) 2-4-001:166**		
1968-1979	State of Hawaii	319.205	Undeveloped
1968	**319.205 acres from TMK (3) 2-4-001:041**		
1967-1968	State of Hawaii	499.827	Undeveloped
1967	**0.493 acres to TMK (3) 2-4-001:119 8.588 acres dropped into a road 6.199 acres to TMK (3) 2-4-024:072 1.667 acres dropped into a road**		
1965-1967	State of Hawaii	516.774	Undeveloped
1965	**6.621 acres to TMK (3) 2-4-024:024 6.021 acres to TMK (3) 2-4-001:019 1.2 acres from TMK (3) 2-4-001:023**		
1950-1965	State of Hawaii	526.716	Undeveloped
1950	**10.205 acres to TMK (3) 2-4-023:131 19.095 acres to TMK (3) 2-4-024:148**		
1949-1950	State of Hawaii	556.016	Undeveloped
1949	**46.344 acres to TMK (3) 2-4-023:053 30.950 acres from TMK (3) 2-4-001:027 13.640 acres from TMK (3) 2-4-001:038 1.880 acres from TMK (3) 2-4-001:042 50.000 acres from TMK (3) 2-4-001:039 7.313 acres from TMK (3) 2-4-001:049 0.313 acres to TMK (3) 2-4-001:052**		
1949	State of Hawaii	498.890	Undeveloped

TMK - Tax Map Key

Table 3. Users and Primary Uses of Adjoining Properties

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
TMK (3) 2-4-001:176; Mohouli Street, Hilo Adjoining property to the East			
2008-Present	State of Hawaii	5.003	Undeveloped
2008	**5.003 acres from TMK (3) 2-4-001:168**		
2000-2008	State of Hawaii	30.396	Undeveloped
2000	**30.396 acres from TMK (3) 2-4-001:122**		
1979-1999	State of Hawaii	318.668	Undeveloped
1979	**0.517 acres to TMK (3) 2-4-001:166**		
1968-1979	State of Hawaii	319.205	Undeveloped
1968	**319.205 acres from TMK (3) 2-4-001:041**		
1967-1968	State of Hawaii	499.827	Undeveloped
1967	**0.493 acres to TMK (3) 2-4-001:119 8.588 acres dropped into a road 6.199 acres to TMK (3) 2-4-024:072 1.667 acres dropped into a road**		
1965-1967	State of Hawaii	516.774	Undeveloped
1965	**6.621 acres to TMK (3) 2-4-024:024 6.021 acres to TMK (3) 2-4-001:019 1.2 acres from TMK (3) 2-4-001:023**		
1950-1965	State of Hawaii	526.716	Undeveloped
1950	**10.205 acres to TMK (3) 2-4-023:131 19.095 acres to TMK (3) 2-4-024:148**		
1949-1950	State of Hawaii	556.016	Undeveloped
1949	**46.344 acres to TMK (3) 2-4-023:053 30.950 acres from TMK (3) 2-4-001:027 13.640 acres from TMK (3) 2-4-001:038 1.880 acres from TMK (3) 2-4-001:042 50.000 acres from TMK (3) 2-4-001:039 7.313 acres from TMK (3) 2-4-001:049 0.313 acres to TMK (3) 2-4-001:052**		
1949	State of Hawaii	498.890	Undeveloped
TMK (3) 2-4-073:002; 807 Kukuau Street, Hilo Adjoining property to the Northeast			
2002-Present	Julian, William S. Trust Julian, Catherine C. Trust	1.256	Residential
1994-2002	Chu, Yih-Horng Che, Huei-Mei C.	1.256	Residential
1991-1994	Yamanaka, Melvin I. Yamanaka, Della M.	1.256	Residential
1991	Sunrise Estates Joint Venture	1.256	Residential
1991	**1.256 Acres from TMK (3) 2-4-008:014**		
1990-1991	HSC, Inc.	180.812	Undeveloped
1990	Chiaki Matsuo	180.812	Undeveloped

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1986-1990	Auto Import of Hawaii, Inc.	180.812	Undeveloped
1986	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc.	180.812	Undeveloped
1982-1986	Kukuau Development Corporation	180.812	Undeveloped
1982	**193.451 acres to TMK (3) 2-4-008:026** **0.361 acres from TMK (3) 2-4-069:039** **Area revised to 373.902**		
1980-1982	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Vacant
1980	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. John Stratton Tolmie Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Vacant
1978-1980	Geo Richardson Trust Fay Linger Robert Richardson Trust Hawaiian Trust Co., Ltd.	373.235	Vacant
1951-1978	Robert Richardson Julius Richardson Trust Geo Richardson Trust Thomas Guard	373.235	Vacant
1951	**34.170 acres to TMK (3) 2-4-008:015**		
1951	Akana Richardson Estate Kinoole Development Co., Ltd.	407.405	Vacant
TMK (3) 2-4-073:003; 815 Kukuau Street, Hilo Adjoining property to the North			
2006-Present	Martins, David Roy Martins, Demetra Leslie	1.220	Undeveloped
1992-2006	Martins, David R. Martins, DeMetra L.	1.220	Undeveloped
1991-1992	Sunrise Estates Joint Venture	1.220	Undeveloped
1991	**1.220 Acres from TMK (3) 2-4-008:014**		

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1990-1991	HSC, Inc.	180.812	Undeveloped
1990	Chiaki Matsuo	180.812	Undeveloped
1986-1990	Auto Import of Hawaii, Inc.	180.812	Undeveloped
1986	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc.	180.812	Undeveloped
1982-1986	Kukuau Development Corporation	180.812	Undeveloped
1982	**193.451 acres to TMK (3) 2-4-008:026** **0.361 acres from TMK (3) 2-4-069:039** **Area revised to 373.902**		
1980-1982	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1980	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. John Stratton Tolmie Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1978-1980	Geo Richardson Trust Fay Linger Robert Richardson Trust Hawaiian Trust Co., Ltd.	373.235	Undeveloped
1951-1978	Robert Richardson Julius Richardson Trust Geo Richardson Trust Thomas Guard	373.235	Undeveloped
1951	**34.170 acres to TMK (3) 2-4-008:015**		
1951	Akana Richardson Estate Kinoole Development Co., Ltd.	407.405	Undeveloped
TMK (3) 2-4-073:004; 817 Kukuau Street, Hilo Adjoining property to the North			
2003-Present	Okuda, Chad Tatsuo Okuda, Tiffanie Wang	1.129	Residential
1992-2003	Abe, Nathan N. Abe, Tracy M. T.	1.129	Residential

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1992	Taniguchi, Bary K. Abe, Tracy M. T.	1.129	Residential
1991-1992	Sunrise Estates Joint Venture	1.129	Residential
1991	**1.129 Acres from TMK (3) 2-4-008:014**		
1990-1991	HSC, Inc.	180.812	Undeveloped
1990	Chiaki Matsuo	180.812	Undeveloped
1986-1990	Auto Import of Hawaii, Inc.	180.812	Undeveloped
1986	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc.	180.812	Undeveloped
1982-1986	Kukuau Development Corporation	180.812	Undeveloped
1982	**193.451 acres to TMK (3) 2-4-008:026** **0.361 acres from TMK (3) 2-4-069:039** **Area revised to 373.902**		
1980-1982	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1980	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. John Stratton Tolmie Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1978-1980	Geo Richardson Trust Fay Linger Robert Richardson Trust Hawaiian Trust Co., Ltd.	373.235	Undeveloped
1951-1978	Robert Richardson Julius Richardson Trust Geo Richardson Trust Thomas Guard	373.235	Undeveloped
1951	**34.170 acres to TMK (3) 2-4-008:015**		
1951	Akana Richardson Estate Kinoole Development Co., Ltd.	407.405	Undeveloped
TMK (3) 2-4-073:005; 825 Kukuau Street, Hilo Adjoining property to the North			

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1996-Present	Park, Myoung N.	1.005	Residential
1991-1996	Gutierrez, Jose G. Gutierrez, Yolanda S.	1.005	Residential
1991	Four Real Partnership	1.005	Residential
1991	Sunrise Estates Joint Venture	1.005	Residential
1991	**1.005 Acres from TMK (3) 2-4-008:014**		
1990-1991	HSC, Inc.	180.812	UndevelopedUndeveloped
1990	Chiaki Matsuo	180.812	Undeveloped
1986-1990	Auto Import of Hawaii, Inc.	180.812	Undeveloped
1986	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc.	180.812	Undeveloped
1982-1986	Kukuau Development Corporation	180.812	Undeveloped
1982	**193.451 acres to TMK (3) 2-4-008:026** **0.361 acres from TMK (3) 2-4-069:039** **Area revised to 373.902**		
1980-1982	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1980	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. John Stratton Tolmie Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1978-1980	Geo Richardson Trust Fay Linger Robert Richardson Trust Hawaiian Trust Co., Ltd.	373.235	Undeveloped
1951-1978	Robert Richardson Julius Richardson Trust Geo Richardson Trust Thomas Guard	373.235	Undeveloped
1951	**34.170 acres to TMK (3) 2-4-008:015**		

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1951	Akana Richardson Estate Kinoole Development Co., Ltd.	407.405	Undeveloped
TMK (3) 2-4-073:006; Kukuau Street, Hilo Adjoining property to the North			
2004-Present	Goodwin, James Yun Lun Goodwin, Joy Hatsue Yamashita	1.000	Undeveloped
1991-2004	Tavares, Marion R. Tavares, Laura G.	1.000	Undeveloped
1991	Sunrise Estates Joint Venture	1.000	Undeveloped
1991	**1.000 Acres from TMK (3) 2-4-008:014**		
1990-1991	HSC, Inc.	180.812	Undeveloped
1990	Chiaki Matsuo	180.812	Undeveloped
1986-1990	Auto Import of Hawaii, Inc.	180.812	Undeveloped
1986	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc.	180.812	Undeveloped
1982-1986	Kukuau Development Corporation	180.812	Undeveloped
1982	**193.451 acres to TMK (3) 2-4-008:026 0.361 acres from TMK (3) 2-4-069:039 Area revised to 373.902**		
1980-1982	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1980	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. John Stratton Tolmie Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1978-1980	Geo Richardson Trust Fay Linger Robert Richardson Trust Hawaiian Trust Co., Ltd.	373.235	Undeveloped

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1951-1978	Robert Richardson Julius Richardson Trust Geo Richardson Trust Thomas Guard	373.235	Undeveloped
1951	**34.170 acres to TMK (3) 2-4-008:015**		
1951	Akana Richardson Estate Kinoole Development Co., Ltd.	407.405	Undeveloped
TMK (3) 2-4-073:007; 833 Kukuau Street, Hilo Adjoining property to the North			
2014-Present	Sugai, Brian T. Trust Wang-Sugai, Ning Trust	1.000	Residential
2014	Sugai, Brian Tadashi Wang-Sugai, Ning Wang	1.000	Residential
2009-2014	Tseng, Trust	1.000	Residential
2004-2009	Tseng, Raymond Chi-Jen Tseng, Rose Yun Li	1.000	Residential
2001-2004	Van Der Hel, Cornelis Pieter Karow, Vena Mae	1.000	Residential
1992-2001	Paradis, Edward F. Paradis, Yasuko	1.000	Residential
1992	Young, Mary J.	1.000	Residential
1991-1992	Sunrise Estates Joint Venture	1.000	Residential
1991	**1.000 Acres from TMK (3) 2-4-008:014**		
1990-1991	HSC, Inc.	180.812	Undeveloped
1990	Chiaki Matsuo	180.812	Undeveloped
1986-1990	Auto Import of Hawaii, Inc.	180.812	Undeveloped
1986	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc.	180.812	Undeveloped
1982-1986	Kukuau Development Corporation	180.812	Undeveloped
1982	**193.451 acres to TMK (3) 2-4-008:026 0.361 acres from TMK (3) 2-4-069:039 Area revised to 373.902**		
1980-1982	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1980	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. John Stratton Tolmie Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1978-1980	Geo Richardson Trust Fay Linger Robert Richardson Trust Hawaiian Trust Co., Ltd.	373.235	Undeveloped
1951-1978	Robert Richardson Julius Richardson Trust Geo Richardson Trust Thomas Guard	373.235	Undeveloped
1951	**34.170 acres to TMK (3) 2-4-008:015**		
1951	Akana Richardson Estate Kinoole Development Co., Ltd.	407.405	Undeveloped
TMK (3) 2-4-073:008; 847 Kukuau Street, Hilo Adjoining property to the West			
2008-Present	Sabnani, Lovina Hariram	1.002	Residential
2000-2008	Palea, Fredrick L. Fergerstrom-Palea, Cindy-Lu	1.002	Residential
1995-2002	Takase, Glenn M. Takase, Kayleen K.	1.002	Residential
1992-1995	Kubota, Peter K. Sonomura, Julann M. K.	1.002	Residential
1991-1992	Sunrise Estates Joint Venture	1.002	Residential
1991	**1.002 Acres from TMK (3) 2-4-008:014**		
1990-1991	HSC, Inc.	180.812	Undeveloped
1990	Chiaki Matsuo	180.812	Undeveloped
1986-1990	Auto Import of Hawaii, Inc.	180.812	Undeveloped
1986	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc.	180.812	Undeveloped
1982-1986	Kukuau Development Corporation	180.812	Undeveloped
1982	**193.451 acres to TMK (3) 2-4-008:026 0.361 acres from TMK (3) 2-4-069:039 Area revised to 373.902**		

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1980-1982	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1980	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. John Stratton Tolmie Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1978-1980	Geo Richardson Trust Fay Linger Robert Richardson Trust Hawaiian Trust Co., Ltd.	373.235	Undeveloped
1951-1978	Robert Richardson Julius Richardson Trust Geo Richardson Trust Thomas Guard	373.235	Undeveloped
1951	**34.170 acres to TMK (3) 2-4-008:015**		
1951	Akana Richardson Estate Kinoole Development Co., Ltd.	407.405	Undeveloped
TMK (3) 2-4-073:009; 851 Kukuau Street, Hilo Adjoining property to the West			
2002-Present	Deetman, Louis J/Helena C. Trust	1.027	Undeveloped
2000-2002	Deetman, Louis J. F. Deetman, Helena C.	1.027	Undeveloped
2000	Deetman, Louis J. F.	1.027	Undeveloped
1992-2000	Deetman, Louis J. F. Deetman, Helena C.	1.027	Undeveloped
1992	T G Exchange, Inc.	1.027	Undeveloped
1992	Meyer, Waltraud	1.027	Undeveloped
1991-1992	Sunrise Estates Joint Venture	1.027	Undeveloped
1991	**1.027 Acres from TMK (3) 2-4-008:014**		
1990-1991	HSC, Inc.	180.812	Undeveloped
1990	Chiaki Matsuo	180.812	Undeveloped
1986-1990	Auto Import of Hawaii, Inc.	180.812	Undeveloped

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1986	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc.	180.812	Undeveloped
1982-1986	Kukuau Development Corporation	180.812	Undeveloped
1982	**193.451 acres to TMK (3) 2-4-008:026** **0.361 acres from TMK (3) 2-4-069:039** **Area revised to 373.902**		
1980-1982	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1980	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. John Stratton Tolmie Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1978-1980	Geo Richardson Trust Fay Linger Robert Richardson Trust Hawaiian Trust Co., Ltd.	373.235	Undeveloped
1951-1978	Robert Richardson Julius Richardson Trust Geo Richardson Trust Thomas Guard	373.235	Undeveloped
1951	**34.170 acres to TMK (3) 2-4-008:015**		
1951	Akana Richardson Estate Kinoole Development Co., Ltd.	407.405	Undeveloped
TMK (3) 2-4-073:010; Kukuau Street, Hilo Adjoining property to the Southwest			
2015-Present	Ching, Creighton Lowell Trust	1.002	Undeveloped
1991-2015	Ching, Creighton L.	1.002	Undeveloped
1991	Sunrise Estates Joint Venture	1.002	Undeveloped
1991	**1.002 Acres from TMK (3) 2-4-008:014**		
1990-1991	HSC, Inc.	180.812	Undeveloped
1990	Chiaki Matsuo	180.812	Undeveloped

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1986-1990	Auto Import of Hawaii, Inc.	180.812	Undeveloped
1986	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc.	180.812	Undeveloped
1982-1986	Kukuau Development Corporation	180.812	Undeveloped
1982	**193.451 acres to TMK (3) 2-4-008:026** **0.361 acres from TMK (3) 2-4-069:039** **Area revised to 373.902**		
1980-1982	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. JT Trading Co., Ltd. Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1980	Siegfred Kagawa GEK, Inc. Katco, Inc. Kasons, Inc. John Stratton Tolmie Auto Imports of Hawaii, Inc. Farms & Ranches, Inc. Sea Gifts Corporation	373.235	Undeveloped
1978-1980	Geo Richardson Trust Fay Linger Robert Richardson Trust Hawaiian Trust Co., Ltd.	373.235	Undeveloped
1951-1978	Robert Richardson Julius Richardson Trust Geo Richardson Trust Thomas Guard	373.235	Undeveloped
1951	**34.170 acres to TMK (3) 2-4-008:015**		
1951	Akana Richardson Estate Kinoole Development Co., Ltd.	407.405	Undeveloped
TMK (3) 2-4-001:122; Komohana Street, Hilo Adjoining property to the South			
2001-Present	State of Hawaii	267.030	Undeveloped
2001	**30.000 acres to TMK (3) 2-4-:001:169** **1.42 acres to TMK (3) 2-4-001:170** **Area revised to 323.470 acres** **17.77 acres from TMK (3) 2-4-001:012** **4.594 acres to TMK (3) 2-4-001:171**		

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
2000-2001	State of Hawaii	281.174	Undeveloped
2000	**30.396 acres to TMK (3) 2-4-001:168 7.118 acres dropped into a road**		
1979-1999	State of Hawaii	318.668	Undeveloped
1979	**0.517 acres to TMK (3) 2-4-001:166**		
1968-1979	State of Hawaii	319.205	Undeveloped
1968	**319.205 acres from TMK (3) 2-4-001:041**		
1967-1968	State of Hawaii	499.827	Undeveloped
1967	**0.493 acres to TMK (3) 2-4-001:119 8.588 acres dropped into a road 6.199 acres to TMK (3) 2-4-024:072 1.667 acres dropped into a road**		
1965-1967	State of Hawaii	516.774	Undeveloped
1965	**6.621 acres to TMK (3) 2-4-024:024 6.021 acres to TMK (3) 2-4-001:019 1.2 acres from TMK (3) 2-4-001:023 1.500 acres from Lanikaula Street**		
1950-1965	State of Hawaii	526.716	Undeveloped
1950	**10.205 acres to TMK (3) 2-4-023:131 19.095 acres to TMK (3) 2-4-024:148**		
1949-1950	State of Hawaii	556.016	Undeveloped
1949	**46.344 acres to TMK (3) 2-4-023:053 30.950 acres from TMK (3) 2-4-001:027 13.640 acres from TMK (3) 2-4-001:038 1.880 acres from TMK (3) 2-4-001:042 50.000 acres from TMK (3) 2-4-001:039 7.313 acres from TMK (3) 2-4-001:049 0.313 acres to TMK (3) 2-4-001:052**		
1949	State of Hawaii	498.890	Undeveloped

TMK - Tax Map Key

3.0 USER PROVIDED INFORMATION

User provided information was obtained by having a representative of the County (future landowner and manager of the subject property), Alan Rudo with the COH OHCD, complete a "User Questionnaire" administered by MNA. The information in the following sections was obtained from the questionnaire.

3.1 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

Mr. Rudo was unaware of any environmental cleanup liens or use limitations for the subject property.

3.2 SPECIALIZED KNOWLEDGE

Mr. Rudo was unaware of any past releases, specific chemicals, spills or other chemical releases, or environmental cleanups that have taken place at the subject property. Mr. Rudo was not aware of any obvious indicators that point to the presence or likely presence of contamination at the subject property.

3.3 VALUATION REDUCTION

The land is being transferred under the Governor's Executive Order, from the State of Hawaii Department of Land and Natural Resources (DLNR) to the COH OHCD. There will be no financial transaction.

3.4 REASON FOR PERFORMING THE PHASE I ESA

The purpose of this Phase I ESA is to identify any *recognized environmental conditions* at the subject property, within the scope of ASTM Standard 1527-13, for due diligence related to the potential transfer of property ownership from DLNR to COH OHCD and for lease to a non-profit organization for development of senior housing.

4.0 RECORDS REVIEW

Under ASTM 1527-13, records are to be reviewed by the environmental professional who may help identify RECs in connection with the subject property.

4.1 STANDARD ENVIRONMENTAL RECORD SOURCES

MNA used Environmental Data Resources, Inc. (EDR), to search standard federal and state government databases for hazardous substance or petroleum product releases that could impact the subject property. A copy of the EDR report is provided in Appendix A.

ASTM E 1527-13 specifies a minimum search distance for specific environmental record sources. The following sources are specified for <u>incidents or sites within one mile of the subject property</u>:

- Federal NPL site list
- Federal RCRA CORRACTS TSD facilities list
- State Sites of Interest

The following sources are specified for <u>incidents or sites within ½ mile of the subject property</u>:

- Federal Delisted NPL site list
- Federal CERCLIS list
- Federal CERCLIS NFRAP site list
- Federal RCRA non-CORRACTS TSD facilities list
- State Brownfield Sites
- State Hazardous Waste Sites
- State landfill and/or solid waste disposal site list
- State leaking UST list
- State voluntary cleanup program sites

The following sources are for <u>incidents on the subject and adjoining properties</u>:

- Federal RCRA generators list
- State registered UST list

Finally, the following are for incidents for the subject property:

- Federal ERNS list
- Federal Institutional Controls (IC) and Engineering (EC) Registries
- State IC and EC Registries
- State releases list

The following subsections summarize the results of the EDR records review for the datasets listed above (Environmental Data Resources, Inc., 2016).

4.1.1 Federal National Priorities List

The NPL, maintained by the United States Environmental Protection Agency (EPA), is a list of highly contaminated sites that have been identified by Superfund Amendments and Reauthorization Act of 1986. There were no NPL sites identified within one mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.2 Federal RCRA CORRACTS TSD Facilities List

The RCRA CORRACTS TSD facilities list maintained by the EPA contains generators, transporters, treaters, storers, and disposers of hazardous waste that have reported violations and are subject to corrective actions. No RCRA CORRACTS TSD facilities were identified within one mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.3 Delisted NPL Site List

This site list, maintained by the EPA, contains delisted NPL sites. No delisted NPL sites were identified within ½ mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.4 Federal CERCLIS List

The CERCLIS list, maintained by the EPA, contains sites that are either proposed to be or are on the NPL list, as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. No federal CERCLIS sites were identified within ½ mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.5 Federal CERCLIS NFRAP Site List

The CERCLIS NFRAP list, maintained by the EPA, contains designated CERCLA sites that, to the best of the EPA's knowledge, assessment has been completed and has determined that no further steps will be taken to list the sites on the NPL. No CERCLIS NFRAP sites were identified within ½ mile of the subject property the subject property (Environmental Data Resources, Inc., 2016).

4.1.6 Federal RCRA non-CORRACTS TSD Facilities List

The RCRA non-CORRACTS TSD facilities list, maintained by the EPA, contains RCRA permitted facilities that treat, store, or dispose of hazardous waste. No RCRA TSD facilities listed were identified within ½ mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.7 State Brownfield Sites

The State Brownfield Sites database, maintained by the HDOH HEER Office, is an inventory of state designated brownfield sites. Under the Small Business Liability Relief and Brownfields Revitalization Act, a brownfield is defined as "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." The EPA provides grants and loans to state and local governments for the assessment, cleanup, and redevelopment of these properties. Properties located on the state brownfield list may have received federal funding under this program or be designated a brownfield for state administration or funding purposes. No state brownfield sites were identified within ½ mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.8 State Hazardous Waste Sites

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 are identified along with sites where cleanup will be paid for by responsible parties. No state hazardous waste sites were identified within ½ mile of the subject property (Environmental Data Resources, Inc., 2016). One state hazardous waste site was identified at greater than ½ mile, at 600 Wailoa Street, located just over ¾ mile east northeast and downgradient from the subject property. The site, Lanakila Homes Phase 3B-4 was identified as having heavy metal lead soil contamination that was managed with controls.

Another state hazardous waste site was identified at a non-geocoded location on Kaumana Drive. The site, identified as HELCO Pole-Mounted Transformer No. 20938 at Pole No. 7 was identified as having total petroleum hydrocarbons at levels lower than 50 milligrams per kilogram (mg/kg), and was issued a No Further Action (NFA) letter on 05 June 2012. The closest location of Kaumana Drive in proximity of the subject property is ¾ mile upgradient. Please refer to Section 8.2 for determination of impact of these sites on the subject property.

4.1.9 State Landfill/Solid Waste Disposal Sites

The HDOH records contain an inventory of permitted landfills in the State of Hawaii. No permitted solid waste landfills, incinerators, or transfer stations were identified within ½ mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.10 State LUST List

The state LUST list, maintained by the HDOH Solid and Hazardous Waste Branch (SHWB), maintains an inventory of sites with LUSTs. EDR identified no LUST facilities within ½ mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.11 State Voluntary Cleanup Sites

The state voluntary cleanup sites list, maintained by the HDOH HEER Office, contains sites participating in the state's Voluntary Response Program (VRP). No facilities participating in the state VRP were identified within ½ mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.12 Federal RCRA Generators List

The RCRA Generators list, maintained by the EPA, contains small and large quantity generators of RCRA hazardous waste. The determination of generator size is used to establish the risk that the facility poses to public health and the environment and consequently, the amount of regulation and reporting required. Large Quantity Generators (LQG) are facilities that generate more than a 1,000 kg/month of hazardous waste and/or more than 1 kg/month of acute hazardous waste. Small Quantity Generators (SQG) are facilities that generate less than 1,000 kg/month but more than 100 kg/month of hazardous waste and/or less than 1 kg/month of acute hazardous waste.

Conditionally Exempt Small Quantity Generators (CESQG) are facilities that generate less than 100 kg/month of hazardous waste and/or less than 1 kg/month of acute hazardous waste. The EPA also maintains the RCRA NLR list. This list contains facilities that were once on the RCRA generators list, but are no longer in business, no longer in business at the listed address, or are no longer generating hazardous waste substances in quantities that require reporting. No SQG, LQG, or CESQG were identified on the subject or adjoining properties (Environmental Data Resources, Inc., 2016).

4.1.13 State Registered UST List

The HDOH SHWB maintains a database of known UST. EDR identified no UST facilities within ½ mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.14 Federal ICs and ECs Registries

Federal ICs and ECs sites are federally listed sites that are required to implement institutional controls or engineering controls. Because the sites may continue to be impacted by past use, future use of the property may be restricted in order to protect human health and the environment. Land use controls can be either ICs or ECs. Institutional controls are limitations on how the property may be used such as limiting use to industrial activities. Engineering controls are physical structures or devices located on the property that contain or limit exposure to contamination. Engineering controls need to be maintained or protected to be effective. No Federal ICs or ECs were identified within one mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.15 State ICs and ECs Registries

These sites are state listed sites that have either state-required institutional controls or engineering controls in place. Because the sites may continue to be impacted by past use, future use of the property may be restricted in order to protect human health and the environment. Land Use Controls can be either ICs or ECs. ICs are limitations on how the property may be used such as limiting use to industrial activities. ECs are physical structures or devices located on the property that contain or limit exposure to contamination. ECs need to be maintained or protected to be

effective. No State IC or EC were identified within one mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.16 Federal ERNS List

The ERNS list, maintained by the EPA, contains CERCLA hazardous substance releases or spills, as maintained at the National Response Center. No incidents were identified on the subject property (Environmental Data Resources, Inc., 2016).

4.1.17 State Releases List

The HDOH HEER Office maintains a database of known releases to the environment of hazardous material or petroleum products. No release incidents were identified within ⅛ mile of the subject property (Environmental Data Resources, Inc., 2016).

4.1.18 U.S. Brownfields

U.S. Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence of a hazardous substance, pollutant, or contaminant. No U.S. Brownfields sites were identified within one mile of the subject property (Environmental Data Resources, Inc., 2016).

4.2 ADDITIONAL RECORD SOURCES

MNA reviewed additional environmental records as needed and available. Additional record sources filed by the HDOH SHWB were requested. MNA reviewed HDOH HEER Office online records for the subject and adjoining properties, and an Environmental Assessment that was completed in 2009 for the subject property.

4.2.1 Subject Property

MNA requested records for review from the HDOH SHWB on 12 October 2016 and HFD on 13 October 2016. HDOH SHWB and HFD responded that they had no records on file for the subject property.

MNA reviewed publicly available information posted on the HDOH HEER Office website, http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/public-records, and found that the subject property was not listed on the HEER Sites of Interest Lookup Spreadsheet or the HEER Emergency Response Lookup Spreadsheet. MNA reviewed the HDOH Environmental Health Warehouse (http://eha-web.doh.hawaii.gov/ehw/), and found that there were no sites of interest shown on the subject property.

MNA reviewed the *Final Environmental Assessment for Fire Administration Support Complex, Waiakea, South Hilo, Island of Hawaii, TMK (3) 2-4-001:176 & 178 (Previously Parcel 168 [portion])*, dated June 2009, which made no mention of hazardous materials or petroleum products at the subject property (M&E Pacific, Inc., 2009).

4.2.2 Surrounding Properties

MNA requested records for review from the HDOH SHWB on 12 October 2016 and HFD on 13 October 2016. HDOH SHWB and HFD responded that they had no records on file for the adjoining properties.

MNA reviewed publicly available information posted on the HDOH HEER Office website, http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/public-records, and found that the adjoining properties were not listed on the HEER Sites of Interest Lookup Spreadsheet or the HEER Emergency Response Lookup Spreadsheet. MNA reviewed the HDOH Environmental Health Warehouse (http://eha-web.doh.hawaii.gov/ehw/), and found that there were no sites of interest shown on the adjoining properties.

MNA reviewed the *Final Environmental Assessment for Fire Administration Support Complex, Waiakea, South Hilo, Island of Hawaii, TMK (3) 2-4-001:176 & 178 (Previously Parcel 168 [portion])*, dated June 2009, which made no mention of hazardous materials or petroleum products at the adjoining property to the east (M&E Pacific, Inc., 2009). The proposed Fire Administration Support Complex would include administration, dispatch, and preparation/training buildings, warehouse, fire station, museum, open and covered training areas, site infrastructure, and paved access and parking areas. The use would include all operations and trainings. Please refer to Section 8.2 for determination of impact of these sites on the subject property.

4.3 HISTORICAL USE INFORMATION ON THE SUBJECT PROPERTY

MNA reviewed historical use information for the subject property, including aerial photographs and United States Geological Survey (USGS) topographic maps. No fire insurance maps were available.

4.3.1 Historical Aerial Photographs

Aerial photographs of the subject, adjoining, and surrounding properties were provided by EDR (Environmental Data Resources, Inc., 2016). Photographs from the years 1954, 1975, 1977, 1985, 1992, and 2000 were reviewed. Table 4 provides the details for those photos.

Table 4. Aerial Photograph Details

Date	Image Type	Approximate Scale
2000	C	1”:500’
1992	C	
1985	C	
1977	B/W	
1975	C	
1954	B/W	

B/W - Black and white photograph
C - Color

For the reviewed aerial photographs, the following observations were made:

<u>1954</u>: No building structures were visible on the subject and adjoining properties. The surrounding area was undeveloped and covered in vegetation. No roads were observable on the map in the area surrounding the subject property. A few building structures were observed approximately 1,500 feet northeast of the subject property.

<u>1975</u>: No building structures were visible on the subject and adjoining properties. The surrounding area was undeveloped and covered in vegetation. Roadways were evident to the northeast of the subject property, with the alignment of the current day Komohana and Kukuau Streets. More buildings were observed approximately 1,000-1,500 feet northeast of the subject property.

1977: No change from the 1975 photo, except that a roadway with the alignment of current day Mohouli Street is evident.

1985: The development to the northeast has grown, with structures now present on the west side of Komohana Street, within 1,000 feet of the subject property. A structure and possibly agricultural fields are depicted north of (on the opposite side of) Kukuau Street. Apparent residential development is visible approximately 2,000 feet to the northwest of the subject property.

1992: No change from the 1985 photo.

2000: Residential development to the northeast and southwest has increased to within 500 feet of the subject property in both directions along Kukuau Street.

MNA reviewed historical aerial imagery available on Google Earth. Photographs from the years 2000, 2010, 2011, 2012, 2013, and 2014 were reviewed. For the reviewed aerial photographs, the following observations were made:

2000: No building structures were visible on the subject and adjoining properties east, south, and west. The surrounding area was undeveloped and covered in vegetation. Residential structures on the adjoining properties to the north were evident.

2010: No building structures were visible on the subject and adjoining properties to the east and south. Increased residential development is visible to the north and west, along Kukuau Street.

2011: Two photos were available for 2011, from March and June, both under moderate cloud cover. No change from the 2010 photo.

2012: Four photos were available for 2012, from May, June, November, and December. One change is evident on TMK (2) 2-4-001:177, to the east of the subject property. The parcel was graded and active construction/development is evident in the photos.

2013: Two photos were available for 2013, from January and April. No change from the 2012 photo is shown in the January photo. The April photo was taken under thick cloud cover, and the subject property and surrounding area are not visible.

2014: Six photos were available for 2014, from August. Two of the photos were taken under thick cloud cover, and subject property and surrounding area are not visible. In the other four photos, development at parcel 177 appears to be nearing completion. The development is the Mohouli Elderly Care Facility.

4.3.2 Historical Topographic Maps

USGS topographic maps that cover the subject property and vicinity were reviewed. Maps were available for the years 1917, 1932, 1963, 1981, 1995, and 2013 (Environmental Data Resources, Inc., 2016). A copy of the historical topographic maps provided by EDR is included in Appendix A. The maps of the subject property and surrounding area depicted the following:

1917: The subject property was depicted to lie within the lava flow of 1881. No structures are depicted on the subject property or in the surrounding area. Hilo town is visible,

approximately 1.5 miles northeast. A railroad is shown approximately 1.5 miles to the south of the subject property.

1932: No change at the subject property or surrounding area from the 1917 map.

1963: More building structures were observed within ½ mile of the subject property to the east. The railroad south of the subject property is no longer present; instead there is residential development in this area.

1981: No change at the subject property or surrounding area from the 1963 map.

1995: Kukuau Street is depicted extending laterally north of the subject property. Multiple scattered structures are present north and west of the subject property.

2013: No significant changes at the subject property or surrounding area from the 1995 except that Mohouli Street is depicted and borders the subject property to the south.

4.3.3 Sanborn Fire Insurance Map

No Sanborn Fire Insurance maps were available for the subject property.

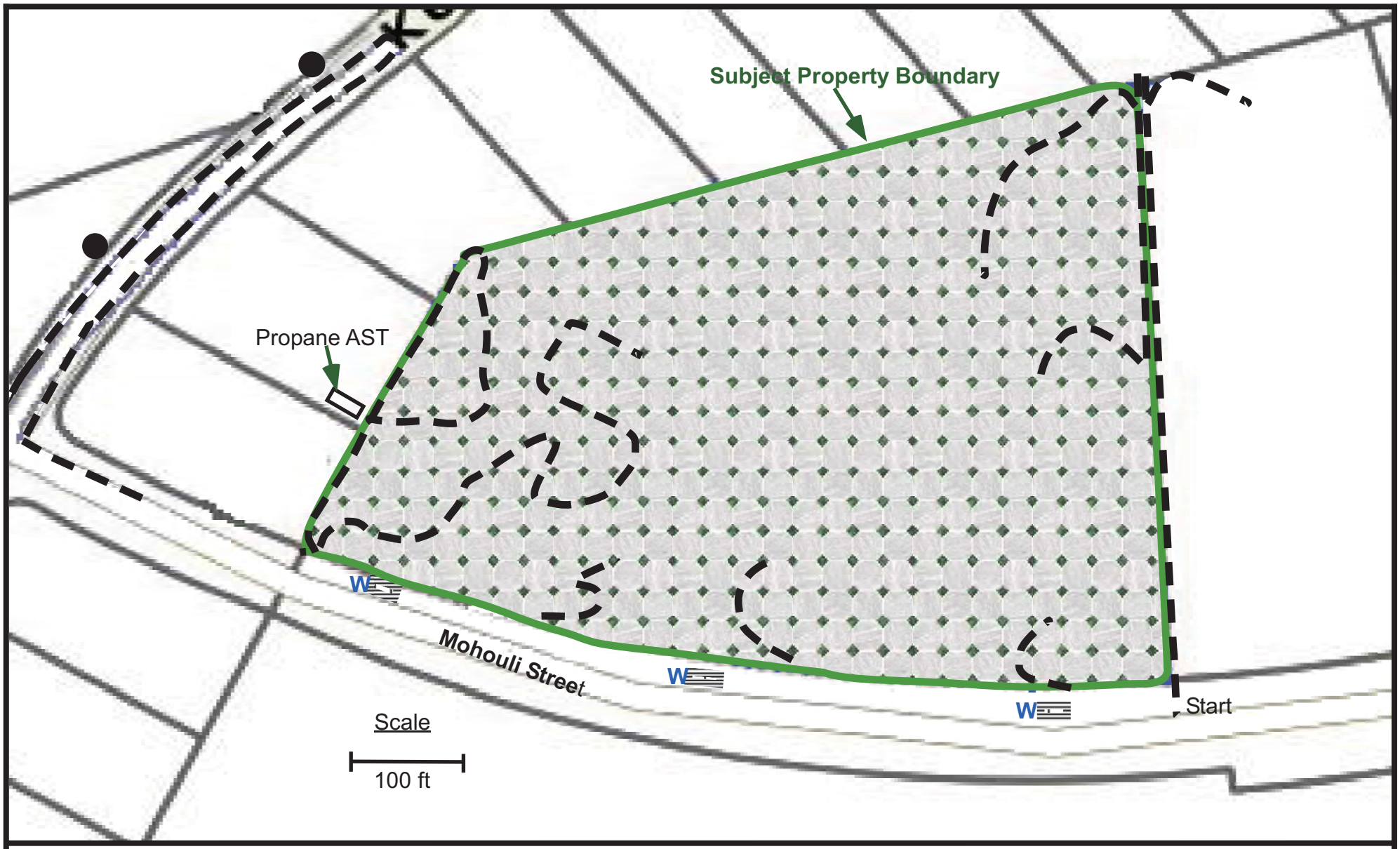


Figure 3. Site Map

Path Walked
Water drainage
Thick Vegetation
Transformer Pole

Phase I Environmental Site Assessment
TMK (3) 2-4-001:168
Mohouli Street, Hilo, Hawaii

MNA Project No. 2271_3

Myounghee Noh & Associates, L.L.C.

5.0 SITE RECONNAISSANCE

The site reconnaissance was conducted by Phillip Cabanila and Herbertson Santos of MNA on 06 December 2016. The site reconnaissance focused on identifying *recognized environmental conditions* with the ability to impact the subject property. A site map of the subject property is presented in Figure 3.

5.1 METHODOLOGY AND LIMITING CONDITIONS

The site reconnaissance was conducted by visually inspecting the subject property and adjoining properties on foot. MNA looked for a variety of environmental hazard indicators including, but not limited to, stained surface soil, dead or stressed vegetation, hazardous substances, aboveground and underground storage tanks, disposal areas, groundwater wells, drywells, and sumps. Inspection of wastewater system or building materials was not part of this assessment. Figure 3 presents the path walked. Photographs from the site reconnaissance are presented in Appendix B.

5.2 GENERAL SITE SETTING

The subject property is located in the town of Hilo, uphill towards the Kaumana area, on the north side of Mohouli Street, west of Komohana Street and east of Kukuau Street (Photograph 1). The immediate surroundings of the subject property are residential and agricultural properties. The subject property was adjoined on the north and west by residential properties and was adjoined on the east by forest land owned by the State of Hawaii. Mohouli Street runs along the southern border of the subject property.

5.3 EXTERIOR OBSERVATIONS

At the time of the site reconnaissance, there were no structures observed on the subject property. No transformers were observed on the subject or adjoining properties. The subject property was observed to be undeveloped land with thick vegetation (Photographs 1-7).

Along the Mohouli Street, three storm water drainages were observed. The drainages were indicated by yellow markers placed directly to the east of each runoff drain area (Photographs 3-4). MNA personnel observed the runoff areas were constructed using asphalt and concrete, with a metal grate covering the drainage (Photograph 4). At the time of the site reconnaissance, no standing surface water was observed around or within the runoff access areas.

Trails cut through the vegetation were previously cut along the east and wet boundaries of the subject property (Photographs 6-7 and 11). These were utilized as access points by MNA personnel to observe the northeast and northwest corners of the subject property. The property corners were marked with survey stakes and flagging tape (Photographs 1-2, 8-9, and 12).

The adjoining property to the east of the subject property was undeveloped land, with thick vegetation, similar to the subject property (Photograph 14). Residential properties to the north and west of the subject property were observed (Photograph 15). No RECs were identified on the adjoining properties.

5.4 INTERIOR OBSERVATIONS

No structures were observed on the subject property; therefore, no interior observations were warranted.

5.5 HAZARDOUS SUBSTANCES AND PETROLEUM PRODUCTS

Hazardous substances and petroleum products were not observed on the subject property during the site reconnaissance. Small amounts of household debris were observed on the southern boundary of the subject property (Photograph 5).

5.6 ABOVE GROUND AND UNDERGROUND STORAGE TANKS

One above-ground storage tank (AST) containing propane was observed on parcel (2) 2-4-073:008, to the west of the subject property. The AST was observed to be in good condition (Photograph 13), with no stressed vegetation.

MNA did not observe any indications of underground storage tanks (USTs) or ASTs or associated accessories, such as vent pipes, fill ports, or dispensers, on the subject property.

6.0 INTERVIEWS

MNA interviewed Gordon C. Heit, the District Land Agent with the State of Hawaii Department of Land and Natural Resources Land Division, the agency responsible for managing the subject property. The interview was administered by Jessica Walsh of MNA, via email. MNA attempted to interview the Hilo Police Department, but they said that they did not have the time to comply with the request. During the site reconnaissance, MNA attempted to interview those present at the residential adjoining properties, but no one was available at the time. MNA called the County of Hawaii Department of Public Works for an interview, but they had not returned the phone call at the time of this writing.

6.1 Gordon C. Heit, DLNR

On 03 November 2016 MNA interviewed Gordon Heit. Mr. Heit is the current District Land Agent with the State of Hawaii DLNR. The State of Hawaii is the owner of the subject property. He indicated that he didn't know of any specific chemicals present or once present at the subject property. Mr. Heit stated that the adjoining property to the east, parcel 176, is under Executive Order 4223 to the County of Hawaii for public safety and related purposes. An Environmental Assessment was completed by the County of Hawaii Fire Department as a requirement to the issuance of Executive Order 4223.

Mr. Heit indicated that he had no knowledge of any spills, chemical releases, environmental cleanups, environmental cleanup liens, engineering controls, land use restrictions, or institutional controls at the site.

7.0 DATA GAPS AND DEVIATIONS

MNA encountered a data gap during this Phase I ESA; MNA was unable to thoroughly inspect the ground surface and much of the interior of the subject property due to the presence of dense vegetation. There were no indications of illegal dumping, except for a few small trashes (Photograph 5), and therefore this is considered a minor data gap, as it is not anticipated that illegal dumpsites are hidden by the vegetation.

There were no deviations from the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM International, 2013).

8.0 KEY FINDINGS AND OPINION

This section evaluates the key findings of this assessment and makes a determination as to the presence RECs, if any.

8.1 Subject Property

No records of NPL sites, Federal RCRA CORRACTS and Non-CORRACTS Treatment Storage Disposal Facilities, Delisted National Priority List sites, Federal or state CERCLIS sites, Federal CERCLIS NFRAP sites, landfill or solid waste disposal sites, State Leaking Underground Storage Tank List sites, State Voluntary Cleanup sites, Federal RCRA Generator sites, State registered UST sties, Institutional Controls/Engineering Controls registries, Federal ERNS list sites, Federal or State Brownfields sites were identified at the subject property.

Information provided as part of the interview conducted or user questionnaire did not indicate any RECs. No *recognized environmental conditions* were identified on the subject property based on the historic aerial photograph or topographic map review. During the site reconnaissance, MNA observed no indication of REC.

8.2 Surrounding Area

No records of NPL sites, Federal RCRA CORRACTS and Non-CORRACTS Treatment Storage Disposal Facilities, Delisted National Priority List sites, Federal CERCLIS sites, Federal CERCLIS NFRAP sites, landfill or solid waste disposal sites, State Leaking Underground Storage Tank List sites, State Voluntary Cleanup sites, Federal RCRA Generator sites, State registered UST sties, Institutional Controls/Engineering Controls registries, Federal ERNS list sites, Federal or State Brownfields sites were identified in the area surrounding the subject property.

Information provided as part of the interview conducted or user questionnaire did not indicate any RECs. No *recognized environmental conditions* were identified in the surrounding area based on the historic aerial photograph or topographic map review.

8.2.1 Non- REC

During the site reconnaissance, MNA observed one propane aboveground storage tank (AST) located on the adjoining property to the west, TMK (2) 2-4-073:008. The AST was in good condition, and there was no stressed vegetation. Therefore, the AST is not considered a REC.

EDR identified two hazardous waste sites located ¾ mile away from the subject property:

<u>600 Wailoa Street</u>. Located ¾ mile and downgradient from the subject property was the Lanakila Homes Phase 3B-4 site. The site was identified as having heavy metal and lead contaminated soils present, and managed with controls. Due to the distance and proximity of this site from the subject property, it is not considered a REC.

<u>Non-Geocoded Location on Kaumana Drive</u>. The HELCO Pole-Mounted Transformer No. 20938 at Pole No. 7 was identified as having petroleum contamination in the soil. The contaminated soil was removed, and a No Further Action letter was issued on 05 June 2012. Due to the distance of this site from the subject property, this is not considered a REC.

MNA reviewed the *Final Environmental Assessment for Fire Administration Support Complex, Waiakea, South Hilo, Island of Hawaii, TMK (3) 2-4-001:176 & 178 (Previously Parcel 168*

[portion]), dated June 2009, which made no mention of hazardous materials or petroleum products at the adjoining property to the east (M&E Pacific, Inc., 2009). The proposed Fire Administration Support Complex would include administration, dispatch, and preparation/training buildings, warehouse, fire station, museum, open and covered training areas, site infrastructure, and paved access and parking areas. The use would include all operations and trainings. While the EA indicated no existing condition or impact from the construction or use of the facility related to hazardous materials or petroleum products that could impact the subject property, MNA notes that should the facility be constructed and used as outlined in the EA, mock fire training including staging fires of burning materials and associated suppression techniques could impact air quality in the immediate vicinity of the facility, including the subject property.

9.0 CONCLUSION

MNA performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM E 1527-13 of the subject property identified as TMK (3) 2-4-001:168 in Hilo, Island of Hawaii. Any exceptions to, or deletions from, this practice are described in Section 7.0 of this report. This assessment has not revealed evidence of *recognized environmental conditions* based on existing conditions at the time of this Phase I site assessment; however, should the Fire Administration Support Complex be constructed on the adjoining property to the east and used as outlined in the EA, mock fire training including staging fires of burning materials and associated suppression techniques could impact air quality in the immediate vicinity of the facility, including the subject property.

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Hale Ola O Mohouli Affordable Housing Project

Draft Environmental Assessment

APPENDIX 5

Market Study Preliminary Findings

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Residential Rental Demand Study
Hale Ola O Mohouli, Hilo, HI
PRELIMINARY FINDINGS

Prepared for:

Hawaii Island Community Development Corporation

Prepared by:

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January 15, 2021

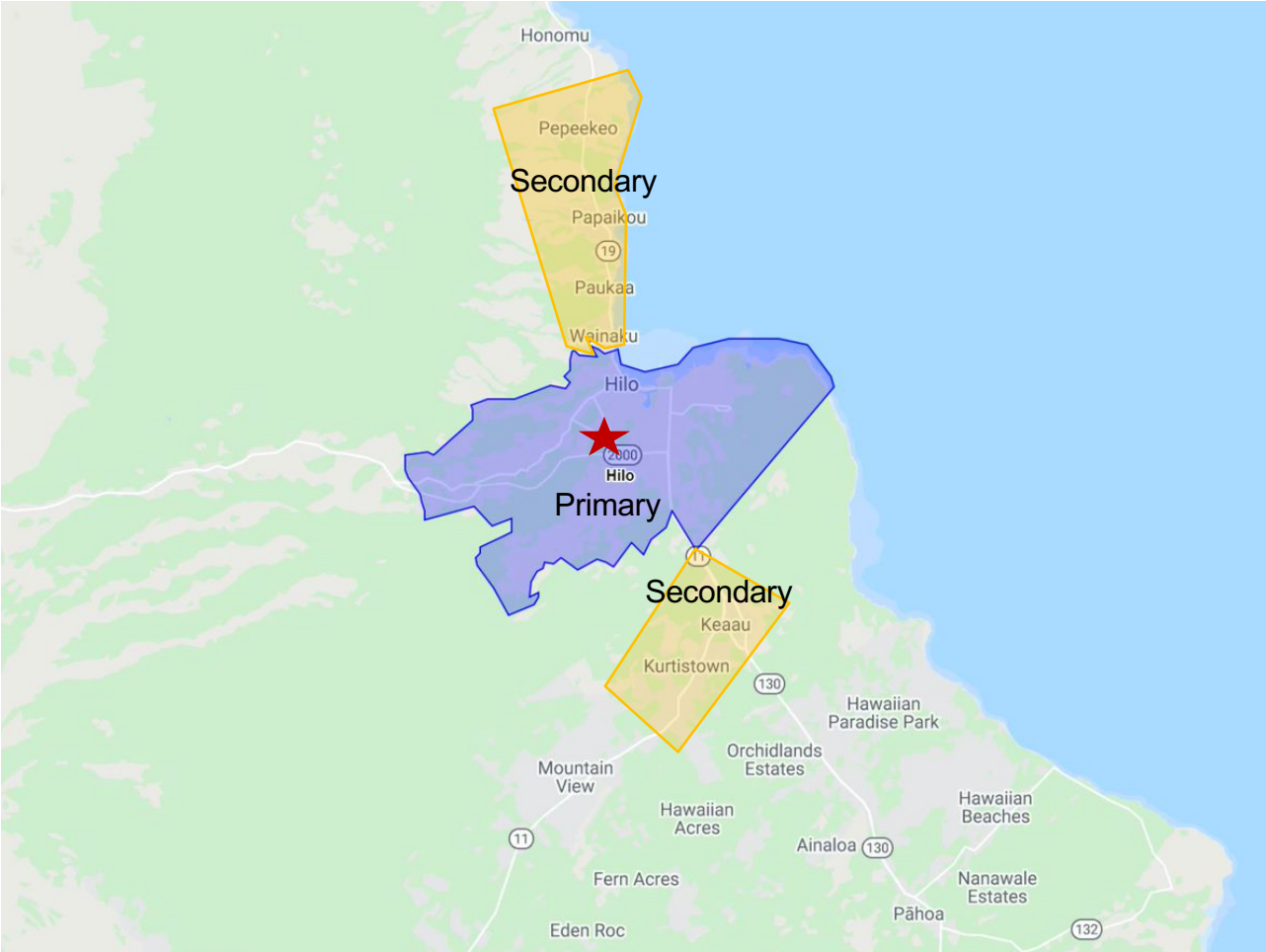
SUMMARY OF FINDINGS

DRAFT REPORT

In order to determine the demand for residential rentals, we analyzed the potential trade area that the target market or renters would likely come from. We then analyzed the demographics of households in this trade as well as the existing rental inventory to estimate the potential demand for additional rental units for the Hale Ola O Mohouli project (the "Property") in Hilo.

TARGET TRADE AREA

Colliers identified the primary trade area as the City of Hilo where the Property is located. While there is likely enough demand within the primary trade area, we also examined secondary trade areas just outside of Hilo. Theses trade areas extended north to Pepeekeo and south to Kurtistown.



MARKET INVENTORY

The target market for Hale Ole O Mohouli are low-income family and elderly households. We examined the State affordable housing inventory in the trades areas as of October 2020. While this inventory includes apartment projects over 15 units for low-income residents (30% to 60% AMI), there may also be individual-owned properties under Section 8 which are not accounted for in our supply analysis. These projects have no vacancies with waiting lists as long as seven years.

There are 1,001 low-income housing units in the primary trade area and an additional 264 in the secondary trade area. Elderly units account for about 38% of these units. One-bedroom and two-bedroom units make up nearly 80% of the total units.

AFFORDABLE HOUSING INVENTORY								
Project	**Location**	**Units**	**Type**	**Studios**	**1BR**	**2BR**	**3BR**	**4BR+**
PRIMARY TRADE AREA								
Haili Elderly	Hilo	36	E	0	36	0	0	0
Kamana Elderly	Hilo	62	E	0	61	0	0	0
Kinoole Senior Residences	Hilo	30	E	0	30	0	0	0
Mohouli Hts Senior	Hilo	182	E	0	182	0	0	0
Hale Olaloa	Hilo	50	E(PH)	20	30	0	0	0
Pomaikai Homes	Hilo	20	E(PH)	10	10	0	0	0
E Komo Mai	Hilo	45	F	0	35	10	0	0
Hale Hoaloha	Hilo	81	F	0	12	30	30	9
Hale Ulu Hoi - Laukapu	Hilo	18	F	0	18	0	0	0
Hilo Maile Terrace	Hilo	24	F	0	0	18	6	0
Hilo Val Hala	Hilo	103	F	0	32	71	0	0
Lanakila Homes	Hilo	190	F	0	16	78	82	14
Lincoln Courtside	Hilo	36	F	0	0	36	0	0
Riverside Apts	Hilo	74	F	0	12	56	6	0
Kauhale O'Hanakahi	Hilo	20	F(PH)					
Punahele Homes	Hilo	30	F(PH)	0	0	30	0	0
	Total	**1,001**		**30**	**474**	**329**	**124**	**23**
				3.0%	*47.4%*	*32.9%*	*12.4%*	*2.3%*
	Total Elderly	380		30	349	0	0	0
	Total Family	621		0	125	329	124	23
SECONDARY TRADE AREA								
Lokahi Ka'u	Honokaa	40	E	24	16	0	0	0
Kulaimano Elderly Hsg	Pepeekeo	50	E	0	50	0	0	0
Kauhale Olu	Pepeekeo	124	F	0	73	26	26	0
Weinberg Kea'au Elderly	Keeau	20	E	0	19	1	0	0
Hale Aloha O Puna	Keeau	30	E (PH)	18	12	0	0	0
	Total	**264**		**42**	**170**	**27**	**26**	**0**
				15.9%	*64.4%*	*10.2%*	*9.8%*	*0.0%*
	Total Elderly	140		42	97	1	0	0
	Total Family	124		0	73	26	26	0
TOTAL		**1,265**		**72**	**644**	**356**	**150**	**23**
				5.7%	*50.9%*	*28.1%*	*11.9%*	*1.8%*

Target Households

Colliers used the 202 Hawaii County HUD income guidelines for housing to assess which households could be considered renters versus homeowners. based on an area median income ("AMI") of $75,200, a household with 100% AMI can afford to pay about $1,752 per month in housing expense which is equivalent to a mortgage payment (plus property taxes, insurance, and maintenance fees) for a $228,000 home with a 5% down payment and a 3.0% interest rate.

The median condo price for South Hilo was $169,000 as of November 2020. This price can fluctuate due to limited inventory being sold. Households with incomes of 70% of AMI and higher would be able to afford a home at this price. In general, households with incomes below this threshold would be considered renters. However, one of the hurdles to home ownership among island residents is the large down payment needed for Hawaii's high cost housing market. Thus, households in this income bracket and higher could also be considered in the rental pool.

The target households with AMI below 60% would be considered renters. There are approximately 6,350 households in the primary trade area in this category and an additional 1,530 in the secondary trade area.

An analysis of the senior/elderly population is provided on the next page.

TRADE AREA HOUSING AFFORDABILITY					
Percent of HUD AMI $75,200	Below 30%	30% to 60%	60% to 80%	**80% to 100%**	**TOTAL Below 60%**
Annual HH Income	Less than $22,600	$22,600 to $45,100	$45,100 to $60,200	$60,200 to $75,200	
Households (2020)					
Primary	3,365	2,985	1,709	1,770	6,350
Secondary	944	586	348	358	1,530
Total	4,308	3,572	2,057	2,129	7,880
Affordable Rent Guidelines (2020 Monthly Rents including utilities)					
0BR	$438	$438 to $876	$876 to $1,168	$1,168 to $1,460	$438 to $876
1BR	$469	$469 to $938	$938 to $1,251	$1,251 to $1,563	$469 to $938
2BR	$562	$562 to $1,125	$1,125 to $1,500	$1,500 to $1,875	$562 to $1,125
3BR	$649	$649 to $1,299	$1,299 to $1,733	$1,733 to $2,166	$649 to $1,299
Max Monthly Rent					
30% of monthly income	$565	$565 to $1,128	$1,128 to $1,505	$1,505 to $1,880	
Max Home Purchase Price (1) *Hilo Median Condo Price (November 2020) (3): $169,000*					
30% of monthly income			$141K to $228K	$228K to $314K	

(1) Based on a 30-year mortgage with a 3.00% interest rate, with 30% of gross household income available for payment of mortgage principal, interest, maintenance fees, real property tax and insurance.

(2) Source: Title Guaranty Hawaii

SENIOR HOUSING

Utilizing census data for household income categories by age (over 65 years), there is an estimated 1,361 elderly renter households in the primary trade areas with an additional 200 in the secondary market. By median household income, there are about 1,222 households with incomes equal to less than 60% AMI in the primary trade area, plus 520 in the secondary trade area.

ELDERLY POPULATION DEMOGRAPHICS			
Trade Area	PRIMARY	SECONDARY	TOTAL
POPULATION (1)			
Total 60 and over (2020)	11,705	2,068	13,773
60 - 64	3,210		3,210
65 - 74	6,390	1,325	7,715
75 - 84	3,443	380	3,823
85 and older	1,872	363	2,235
HOUSEHOLDER 65 YEARS AND OLDER (2)			
RENTER-OCCUPIED			
Total	1,361	200	1,561
1-person household	895	121	1,016
2-or-more-person household	466	79	545
MEDIAN HOUSEHOLD INCOME CATEGORY (2)			
Total	1,222	520	1,742
Less than $25,000	202	329	531
$25,000 to $44,999	1,020	191	1,211

(1) Source: U.S. Census Bureau, Census Summary File 1. Esri current and 5 year forecasts.
(2) U.S. Census Bureau (2015-2019). American Community Survey 5-year estimates. Retrieved from <https://censusreporter.org>

MARKET DEMAND

After accounting for existing rental inventory and vacancies, it is evident that there is existing/pent-up demand for rental housing in the trade areas. For the primary trade area, there appears to be a a residual demand for households with less than 60% AMI of 5,349 units after accounting for the affordable housing inventor units. For the secondary trade area, there appears to be an additional shortage of 1,266 units to serve renters. Senior/Elderly demand accounts for an estimated 842 of these units in the primary trade area.

Although there is a shortage of units in the trade area, it is not reasonable to assume that the Property would capture all of this demand as residents could be housed in multi-family scenarios or other Section 8 housing. Thus, we have assumed the site can capture a certain amount (capture rate) of this demand. We have assumed rather conservative capture rates considering the systemic shortage of affordable housing throughout the Big Island and the state.

Based on our analysis, the total potential demand for Hale Ola O Mohouli is between 280 to 573 units for the primary and secondary trade areas. Of these units, the potential demand for senior housing is between 45 and 92 units.

PROJECTED MARKET DEMAND		
	Below 60% AMI	
	TOTAL	Elderly (Renters) (1)
PRIMARY MARKET		
Households (Demand)	6,350	1,222
Existing Family Housing Units	621	
Existing Elderly Units	380	380
Planned Inventory Units (2021-2023)	0	0
Residual Demand (HH)	5,349	842
Project Capture Rate		
5.0%	267	42
7.0%	374	59
10.0%	535	84
SECONDARY MARKET		
Households (Demand)	1,530	520
Existing Family Housing Units	0	0
Existing Elderly Units	264	264
Planned Inventory Units (2021-2023)	0	0
Residual Demand (HH)	1,266	256
Project Capture Rate		
1.0%	13	3
2.0%	25	5
3.0%	38	8
TOTAL PROJECT DEMAND	280 to 573	**45 to 92**

(1) Householders 65 years and older with incomes less than $45,000.

(2) U.S. Census Bureau (2015-2019). American Community Survey 5-year estimates. Retrieved from <https://censusreporter.org>