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April 27, 2009

Ms. Katherine Puana Kealoha, Esq., Director
State of Hawai'i
Office of Environmental Quality Control
235 S. Beretania St., Suite 702
Honolulu, HI 96813

Subject: **Final Environmental Assessment**
Finding of No Significant Impact
Mohouli Heights Senior Neighborhood Project
TMK: (3) 2-4-01:177, Waiākea South Hilo, Island of Hawai'i

Dear Ms. Kealoha:

The County of Hawai'i, Office of Housing and Community Development, has not received any substantive comments regarding the Draft Environmental Assessment prepared for the subject project during the 30-day comment period which ended on April 7, 2009. As such, we have determined that the subject project will not have a significant environment effect. Based on the foregoing, the Office of Housing and Community Development has issued a Finding of No significant Impact (FONSI) for the subject project. Please publish a notice of this finding in your next edition of *The Environmental Notice*.

We have enclosed a .pdf copy of the publication form/project summary and the Final Environmental Assessment on CD, as well as two hard copies of the Final Environmental Assessment (per OEQC instructions). Please call Jeremy McComber at 808/961-8379 if you have any questions. Thank you.

Stephen J. Arnett
Housing Administrator

Enclosures

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FINAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

MOHOULI HEIGHTS SENIOR NEIGHBORHOOD PROJECT

Waiakea, South Hilo, Island of Hawaii

APRIL, 2009

PREPARED FOR:

HAWAII ISLAND COMMUNITY DEVELOPMENT CORPORATION

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1. Introduction

1.1 Purpose

The County of Hawaii has obtained management jurisdiction of approximately 15.948 acres of land in Waiakea, South Hilo, Hawaii, Tax Map Key: (3) 2-4-001: 177, by way of Governor's Executive Order No. 4224 for the purpose of providing affordable rental housing for the elderly and related uses. The County Council of the County of Hawaii, by way of Resolution No. 709-08, authorized the Director of Finance to negotiate a sevety-five year lease with the Hawaii Island Community Development Corporation (HICDC), a non-profit Hawaii corporation, for the development of senior housing in accordance with the requirements of Executive Order No. 4224. The subject property is currently undeveloped and no development has previously occurred on the site. The proposed project is envisioned as an integrated series of senior residences focused around a central activity core. The complex would contain approximately 160 residential units in multi-unit structures. Most of the units would be one bedroom units although studio and two bedroom units may be considered depending on the demand and financing available. The units will be developed in 30-40 unit clusters incrementally over a five year time frame.

The HICDC intends to utilize a combination of subsidies to ensure the financial feasibility of the proposed project including nominal land cost from the County, Department of Housing and Urban Development (HUD) grants and rental subsidies and Low Income Housing Tax Credit equity funds. The use of County land and federal funds triggers the environmental review requirements of Chapter 343, Hawaii Revised Statutes (HRS) and the Code of Federal Regulations 24 CFR, part 58. The purpose of this Environmental Assessment is to comply with both of these requirements.

1.2 Identification of Proposing Agency

Mr. Keith Kato is the Executive Director of the Hawaii Island Community Development Corporation doing business at 100 Pauahi Street, Suite 204, Hilo, Hawaii 96720.

1.3 Identification of Approving Agency

In accordance with Chapter 343, HRS, the Mayor of the County of Hawaii, or an authorized representative, is the appropriate accepting authority of the Environmental Assessment. In addition, the County of Hawaii is the "Responsible Entity" that will carry out the federal environmental review requirements of CFR 24 Part 58.

1.4 Technical Description

The Hawaii Island Community Development Corporation (HICDC) is proposing to develop a 160 unit elderly housing project on approximately 15 acres of land identified as TMK No. (3) 2-4-001: 177. The subject property is situated on the northwest corner of Komohana Street and Mohouli Street at an elevation of approximately 300 feet above sea level. (See Figure 1 Location Map, Figure 2 Tax Plat Map and Figure 3 Project Area Overview)

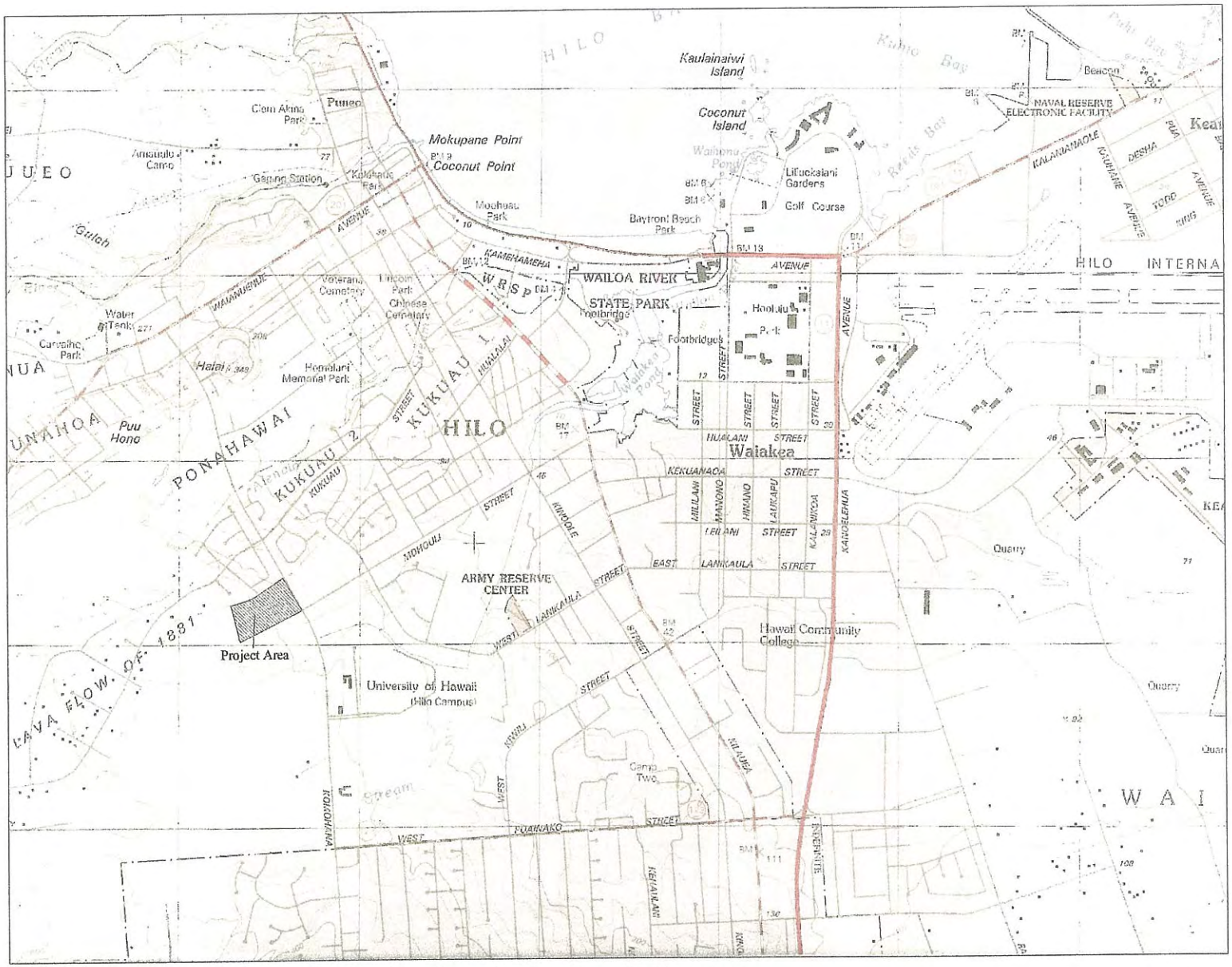

Figure 1. Portion of USGS Hilo Quadrangle showing Project Area

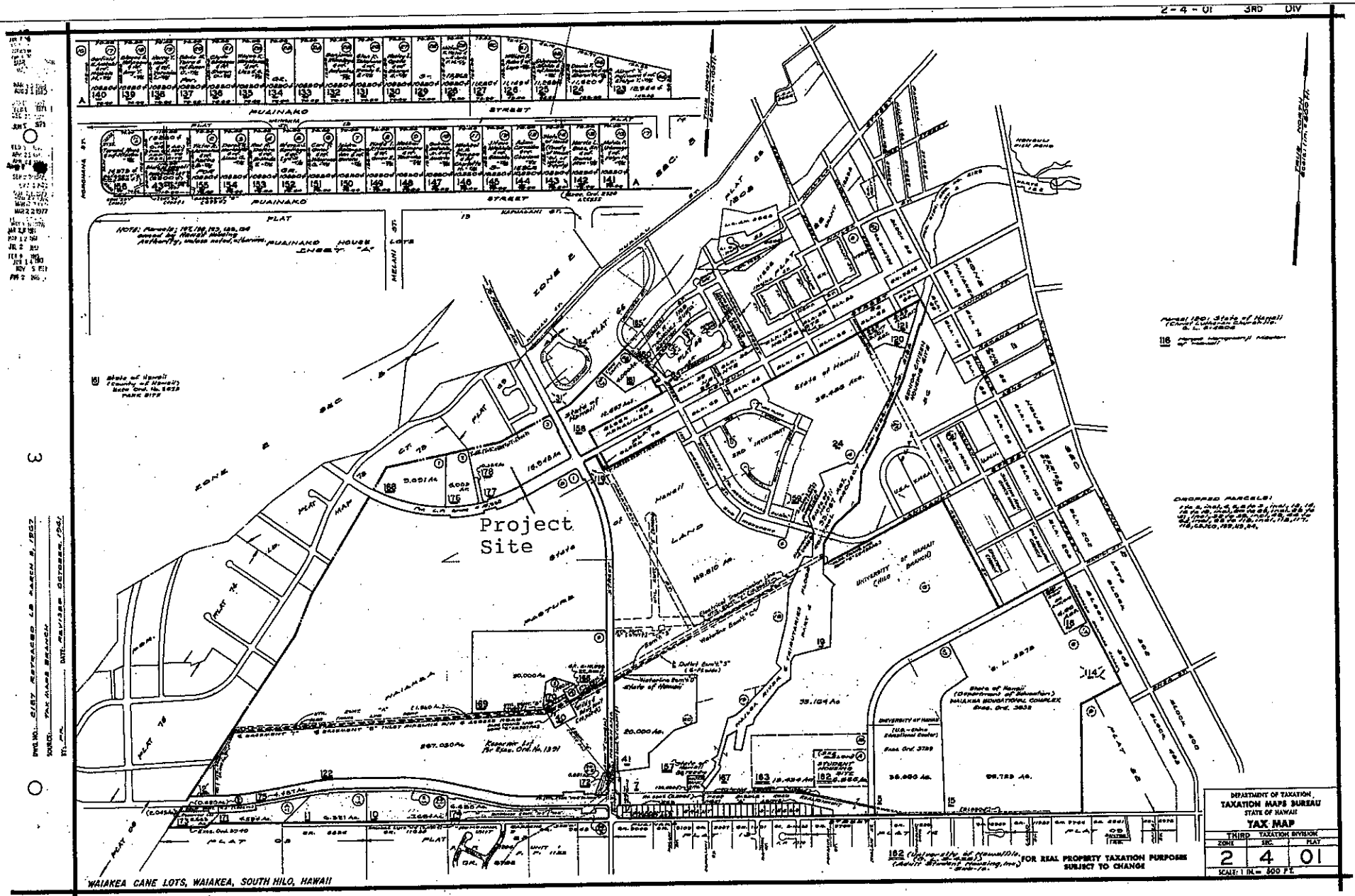

Figure 2. Tax Plat Map

Figure 3. Project Area Overview (from Google Earth)

The proposed project is envisioned as an integrated series of senior residences focused around a central activity core. The central core will be composed of one or more structures that contain spaces for activities to provide essential services for the residents of the project. These mayinclude a transit center for easy pick up and drop off, beauty/barber shop, small convenience retail space, visiting doctor office, office space for visiting agencies, activity rooms, mini theatre, central kitchen and eating area and exercise room. Exterior features may also include raised garden plots, potting shed, exercise path, fenced dog run, barbecue areas, outdoor eating and lounging areas.

The complex would contain approximately 160 residential units in single story multi-unit structures. Most of the units would be one bedroom units although studio and two bedroom units may be considered depending on the demand and financing available. The units will be developed in 30-40 unit clusters incrementally over a five year time frame with an estimated cost of approximately 20 million dollars.

Access to the project will be from Mohouli Street through a fifty foot wide roadway parcel that is on the western boundary of the project site identified as Tax Map Key (3) 2-4-001: 178. This roadway will be shared with the Hawaii County Fire Administration Support Complex which is proposed for the adjacent parcel to the west on Tax Map Key (3) 2-4-001: 176. The area is served by all necessary utilities and improvements including electricity, roads, water and sewer system.

1.5 Project Background

1.5.1 Need for the Project

The housing needs of the elderly population have been documented in a number of different studies and reports including the County of Hawaii's 2005 to 2009 Consolidated Plan. In addressing the housing needs in the County of Hawaii the Plan states:

"Hawaii County is currently in a Housing Crisis.

- There are 1919 on the County's Section 8 wait list.
- 6,000 +\- Hawaii County households lack affordable or adequate housing.
- The 'GAP' between market prices and affordable prices is $150,000 to $200,000 or more.
- The 'GAP' is widening; market prices are rising; affordable prices are declining as interest rates rise;
- 1,000 +\- additional families every 2-3 years will lack affordable housing.

"Therefore, the County plans to utilize its Federal HOME, ADDI and a portion of its CDBG funds for housing for families earning less the 80% of the median income."

The County of Hawaii's 2005 to 2009 Consolidated Plan established the County's general priorities for the ensuing five-year period (2005-2009) for the CDBG and HOME program funds. The priorities were based on consultation with agencies, public hearings and the data collected. Consistent with the need to address housing for families earning less than 80% of

the median income, the priority need level for elderly (1 to 2 person) households earning less than 80% of the median family income is rated "High". One of the County's Consolidated Plan Goals from 2005 to 2009 will be to construct 92 affordable rental units for the elderly.

The County of Hawaii has experienced a substantial growth in their population for those 45 to 60 years of age. As this age group moves into their senior years, there will be a large mass of people in need of senior housing opportunities. This is especially true for the South Hilo District which already has 39.1% of all of the elderly residents in the County of Hawaii. A market study prepared for the 2020 Kinoole Senior Residences Project in 2004 indicated that there are approximately 3,993 single and two person elderly households living within the South Hilo District with annual household incomes under $25,000/year. The proposed 160-unit elderly housing project will address approximately 4% of the potential demand from this low and very low income target group. (Nishimura, October, 2004)

1.5.2 Land Use Designations

The subject property is situated within the State Land Use Agricultural District. The County General Plan Land Use Pattern Allocation Guide Map (LUPAG) designation for the project area is Medium Density Urban. The County zoning designation for the property is Agricultural one acre (A-1a). The project area is not situated within the County's Special Management Area (SMA). The subject property is designated as ceded land which is held as a public land trust by the State of Hawaii.

Although the proposed project is consistent with the County General Plan designation of Medium Density Urban, the proposed project will require a State Land Use Boundary Amendment from Agriculture to Urban as well as a change of zone from Agriculture one acre to Multiple-Family Residential. The State of Hawaii and the County of Hawaii have both determined that the use of the subject property for the development of affordable senior housing is appropriate.

1.5.3 Listing of Permits and Approvals

Federal	None
State of Hawaii	
Department of Health	Underground Injection Control-Approval of Drywells, NPDES Permit
County of Hawaii	
County Council/Mayor	State Land Use Boundary Amendment and Change of Zone
Department of Water Supply	Approval of Project Construction Plans

Department of Public Works	Building Permit/Construction Plans, Grading and Grubbing Permit
Planning Department	Plan Approval, Approval of Construction Plans

1.6 Agency and Public Consultation

The following public and private organizations and individuals were consulted during the preparation of this environmental assessment:

United States Fish and Wildlife Services, Division of Ecological Services
State of Hawaii, Department of Land and Natural Resources, Historic Preservation Division
State of Hawaii, Dept. of Land and Natural Resources, Division of Forestry and Wildlife
State of Hawaii, Department of Health
State of Hawaii, Department of Transportation
State of Hawaii, Office of Hawaiian Affairs
State of Hawaii, Department of Hawaiian Home Lands
County of Hawaii, Planning Department
County of Hawaii, Department of Public Works
County of Hawaii, Department of Environmental Management
County of Hawaii, Department of Water Supply
County of Hawaii, Police Department
County of Hawaii, Fire Department

An article describing the proposed project was published in the March 7, 2009, edition of the Hawaii Tribune Herald. In response to the publicity received from the Hawaii Tribune Herald article, three letters of interest were received from elderly individuals expressing their desire to obtain units within the project. These letters expressed their support for the project but contained confidential income information that was not intended for inclusion in a public document such as the subject Environmental Assessment. As such, these letters have not been included in this document.

2. ENVIRONMENTAL SETTING

2.1 Physical Environment

2.1.1 Geology and Hazards

Environmental Setting

The project area is located on the lower northeastern slopes of Mauna Loa and consists of the Kau volcanic series (Stems and Macdonald, 1946). The Kau volcanic series consists mainly of basaltic lava flows.

The volcanic hazard as assessed by the United States Geological Survey for the project area is "3" on a scale of ascending risk 9 to 1 (Heliker 1990). Zone "3" includes the lower slopes of Mauna Loa which are "gradationally less hazardous than Zone 2 because of greater distance from recently active vents and/or because the topography makes it less likely that flows will cover these areas."

The island of Hawaii is one of the most seismically active areas in the world and has experienced more than twenty large earthquakes (magnitude 6 or larger) over the past 166 years. (Wyss and Koyanagi, 1992) Magnitude 6 earthquakes can be expected to cause structural damage to non-reinforced buildings. The Building Code rating for the entire island of Hawaii is seismic Zone 4 which has the highest risk for seismic activity.

Impacts and Mitigation Measures

The proposed elderly housing project will not expose the residents or the general public to any additional hazard risk that does not already exist for the entire city of Hilo. The volcanic hazard risk is relatively low and the same as any other alternative site that could be utilized for the same purpose in the city of Hilo. The Hawaii County Building Code requires that all new structures be designed to resist forces to seismic Zone 4 standards.

2.1.2 Soils

Environmental Setting

The soils of the project area are classified as Keaukaha extremely rocky muck with 6 to 20 percent slopes (rKFD) and pahoehoe lava flows (rLW) by the U.S. Department of Agriculture Soil Conservation Service (SCS) Soil Survey. (U.S. Soil Conservation Service 1973) The Keaukaha soil series consists of well drained thin organic soils overlying pahoehoe lava bedrock. The Agricultural Capability Subclass rating this soil is VIIs which includes soils having very severe limitations that make them unsuited for cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

Impacts and Mitigation Measures

Most of this undeveloped project site was covered by the 1881 lava flow and is characterized by rocky soils with secondary growth consisting of ohia trees and uluhe ferns. As such, the potential for soil erosion is negligible. In addition, all construction activities will comply with the applicable requirements of the State Department of Health and the Department of Public Works.

2.1.3 Climate

Environmental Setting

Hawaii's climate is generally characterized as mild with uniform temperatures, moderate humidity, and two identifiable seasons. The "summer" season, between May and October is generally warmer and drier. The "winter" season, between October and April is cooler and wetter. The project area is situated along the "windward" side of the Island of Hawaii which is exposed to northeasterly trade winds that causes relatively high rainfall (over 150 inches annually). The average monthly minimum temperature in Hilo ranges from the mid 60's to 70 degrees Fahrenheit while the average monthly maximum temperature ranges from the high 70's to the high 80's. (University of Hawaii Press, 1983)

Impacts

The climatic conditions of the area will not have a significant impact on the proposed project.

2.1.4 Hydrology and Drainage

Environmental Setting

A portion of the subject property is situated within Flood Zone "A" (special flood hazard areas inundated by 100-year flood, no base flood elevation determined) as well as Flood Zone "X" (areas determined to be outside the 500 year flood plain) according to the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA) dated September 16, 1988, (Panel No. 155166 0880C). It should be noted, however, that the County of Hawaii has a pending request for a map revision with FEMA which would eliminate all Flood Zone "A" designations from the subject property.

The proposed project is not located within one mile of a listed Wild and Scenic River and will not have an effect on the natural, free flowing or scenic qualities of a river in the National Wild and Scenic Rivers System.

Impacts and Mitigation Measures

Development of the proposed project has the potential to increase surface runoff. The proposed project will adhere to County and State requirements for disposing of runoff and addressing drainage concerns. As such, the use of the subject property for an elderly housing project is not anticipated to have any significant adverse impact on hydrology and drainage.

2.1.5 Water Quality

Environmental Setting

The Waiakea Pond is the closest water body to the project area and is situated approximately 1.3 miles east of the subject property. The nearest coastal waters are situated approximately 1.5 miles northeast of the project site. The project area is not situated within or adjacent to a wetland identified by the U.S. Department of Interior, Fish and Wildlife Service nor in an area designated by the U.S. Environmental Protection Agency as being supported by a sole source aquifer.

Impacts

The proposed project is not expected to have any direct impact on any streams, wetlands, aquifer resource or marine waters.

2.1.6 Flora and Fauna

Environmental Setting

The vegetation of the subject property is characterized as 'Ohi'a/Uluhe Forest which are typically found on the lower slopes of the Puna and Hilo Districts. This vegetation type occur on young lava flows and shallow soils and is composed of an understory of dense uluhe fern with scattered 'ohi'a trees. Although a botanical survey was not conducted on the subject property, a survey was conducted for the U.S. Department of Agriculture's (USDA) Pacific Basin Agricultural Research Center project located approximately 2,000 feet south of this project area within a similar 'Ohi'a/Uluhe Forest. The botanical survey conducted by Char & Associates is included as Appendix D in the Final Environmental Assessment for the USDA project by SSFM International dated, October, 2002. The findings of the botanical survey included the following:

> "A total of 100 plant species was inventoried on the 30-acre project site. Of these, 76 (76%) are introduced or alien; the majority of the plants occur within the ruderal vegetation. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's arrival in the islands in 1778. One plant (1%) the ti (*Cordyline fruticosa*), is originally of Polynesian introduction. Twnty-three species (23%) are native. Of the natives, 17 are indigenous, that is , they are native to the Hawaiian Islands and elsewhere, and 6 are endemic, that is, they are native only to the Hawaiian Islands. These endemic species are: 'ohi'a, 'ama'u (*Sadleria pallida*), hapu'u (*Cibotium glaucum*), wahine noho mauna (*Adenophorus tamariscinus*), nenaieau, and 'ahaniu or 'uki (*Machaerina marisciudes sap.meyenii*),
>
> "None of the plants found during the field studies is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999; Wagner et al, 1999.) All of the plants can be found in similar vegetation types throughout the Hilo and Puna districts.

"Two earlier botanical studies on nearby areas recorded similar findings. The first study (Char 1992) was for the UHH research and technology lots located makai of the project site. The second study (Char 1996) was for a 0.6 MG reservoir and water line alignment located mauka of the project site, near Puloku Street (Sunrise Estates Subdivision)." native terrestrial or aquatic species.

A survey of avian and terrestrial mammalian species prepared by Rana Productions, Ltd., was included as Appendix E of the Final Environmental Assessment prepared for the USDA project. All of the avian and mammalian species detected on site are alien to the Hawaiian Islands. No species listed as endangered, threatened, proposed, or as a candidate for listing under the U.S. Fish and Wildlife Service or the State of Hawaii's endangered species program were observed on the project site.

Pre-assessment comments received from the United States Department of the Interior Fish and Wildlife Service stated the following:

"We have reviewed the information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program and the Hawaii GAP Program. Land cover information indicates that the proposed project area has classifications of open ohia forest and native uluhe shrubland. The federally threatened Newell's shearwater (*Puffinus auricularis newelli*), federally endangered Hawaiian petrel (*Pterodroma phaeopygia sandwichenis*), Hwaiian hoary bat (*Lasiurus cinereus semotus*), and Hawaiian hawk (*Buteo solitarius*) have been observed in the project vicinity. There is no federally designated critical habitat located in the vicinity of the project." (Letter dated December 9, 2008, included in Appendix 1)

Impacts and Mitigation Measures

Based on the findings of previous botantical, avian and terrestrial mammalian surveys conducted in the vicinity on property with similar characteristics, it is unlikely that any candidate, proposed, or listed threatened or endangered species as set forth in the Endangered Species Act of 1973, as amended are present on the subject property. In the unlikely event that potential listed species may be present in the area, the developer will comply with recommendations offered by the U.S. Fish and Wildlife Service which will help avoid and minimize potential project impacts. These recommendations include the following:

"Outdoor lighting can result in seabird disorientation, fallout, and injury or mortality. Potential impacts to seabirds can be minimized by: 1) shielding outdoor lights associated with the project, particularly when used during each year's peak fledging period (September 15 through December 15); 2) avoiding night-time construction; and 3) providing all project staff with information regarding seabird fallout.

"To avoid impacts to the endangered Hawaiian hoary bat, woody plants suitable for bat roosting should not be removed or trimmed during the bat birthing and pup rearing season (April to August). If this avoidance measure can not be implemented, bat surveys should be conducted and, if this species is found, our office should be contacted for further assistance."

2.1.7 Air Quality

Environmental Setting

The air quality of the subject area is affected by pollutants derived from the volcanic emissions from the ongoing Kilauea emption. Other sources of air pollutants to a limited degree include vehicle exhaust emissions along the neighboring streets. In general, however, the ambient air quality of the project area meets all federal and state standards as evidenced by its designation as an "attainment" area by the State Department of Health, Clean Air Branch.

Impacts and Mitigation Measures

Short tern impacts will result from the construction activity involved with developing the subject property including dust and exhaust from machinery and vehicles. Given the temporary nature of the construction time period, the potential impacts of these construction activities should be minimal. In addition, the developer of the property will comply with all applicable state and County requirements, including the requirements to utilize best management practices to minimize dust impact and comply with provisions of Hawaii Administrative Rules, Chapter 11-60.1, "Air Pollution Control," and Section 11-60.1-33, Fugitive Dust.

2.1.8 Noise

Environmental Setting

Existing noise levels at the project site are typical of a residential district with ambient noise derived primarily from traffic on Mohouli and KomohanaStreet. Based on a general inspection of the project area, the site is not subject to current or projected noise levels that exceed 65 DNL (day-night average sound level, in decibels). Although the project site is situated less than 3 miles from the Hilo International Airport, it is not within the existing or projected 55 DNL noise contours for the airport. (Wilson Okamoto & Associates, Inc., October, 2002

Impacts and Mitigation Measures

Temporary noise impacts will occur from construction activities for the development of the elderly housing project and are unavoidable. Mitigation measures can be taken, however, to minimize noise impacts including the use of mufflers and implementing construction curfew periods. All project activities must comply with the Administrative Rules of the Department of Health, Chapter 11-46, on "Community Noise Control".

The Department of Housing and Urban Development (HUD) noise standards applicable to housing and other noise sensitive uses indicates that noise levels below 65 DNL are "acceptable" with no mitigation required.

2.1.9 Scenic Resources

Environmental Setting

The predominant scenic views in the vicinity of the project area include views of Hilo Bay as well as views of Mauna Kea and Mauna Loa. Given the existing topography as well as the low profile of the single story construction, these views will not be adversely affected by the development of the project site for an elderly housing project.

Impacts

The open space and scenic resources in the vicinity of the project area will not be adversely affected by the development of the elderly housing project.

2.2 Social, Cultural and Economic Setting

2.2.1 Socio-Economic Characteristics

Setting

Hawaii County's population increased by more than 56,000 persons between 1980 and 2000. Between 1980 and 1990, Hawaii Island's population increased by 30.7 percent, and increased by 23.6 percent between 1990 and 2000. The April 1, 2000 population figure for Hawaii County was 148,677 according to census figures compiled by the County of Hawaii, Department of Research and Development. (County of Hawaii, Department of Research and Development, April, 2001)

Statistics compiled by the Hawaii County Office of Aging indicate that the elderly population (60 years and over) has grown tremendously during the 30 year period between 1970 and the year 2000. (See Appendix 2) There were 26,122 persons over the age of 60 in the year 2000 which was a 195% increase over the 1970 figure of 8,858. The elderly population accounted for 17.6 percent of the total population in 2000 compared to only 13.9 percent of the population in 1970. There were 10,213 elderly individuals (39.1% of the County's elderly population) residing in South Hilo in 2000 which was the highest total of any other district on the island.

The South Hilo district had a population of 47,386 in 2000 which represented approximately 32 percent of the total population for Hawaii Island. The City of Hilo is the largest population center on the island with the main offices of the county government, branch offices of federal and state agencies located there. The island's major deep draft harbor and international airport are also located in Hilo. In addition to industrial, commercial and social service activities, the University of Hawaii at Hilo and Hawaii Community College and affiliated research programs play an important role in Hilo's economy.

Hilo and the rest of the east Hawaii communities are adjusting to the loss of the sugar industry in the mid 1990's. Industrial activities that remain include quarrying, construction material manufacturing and fabrication, storage, wholesaling facilities, garment

manufacturing, processing and packaging of agricultural products and supportive services to businesses. Although the district enjoys some economic benefit from tourism, much of it is indirect through the spin-offs from the primary tourism activity in West Hawaii.

Impacts

The proposed project will help address a portion of the demand for low income elderly rental units on the island of Hawaii and in particular, this section of the South Hilo district. A market study prepared for the 2020 Kinoole Senior Residences Project in 2004 indicated that there are approximately 3,993 single and two person elderly households living within the South Hilo District with annual household incomes under $25,000/year. The proposed 160-unit elderly housing project will address approximately 4% of the potential demand from this low and very low income target group. (Nishimura, October, 2004) The proposed action will not generate growth but rather addresses an existing need in the community.

The proposed project is not located in a neighborhood that suffers from adverse human healthor environmental conditions, nor will it be situated in a neighborhood that is predominantly low income or of a minority population. No adverse impacts on low income or minority persons are anticipated from the proposed project.

2.2.2 Adjacent Land Uses

Existing Setting

The project area is predominantly residential in character although there are other vacant properties in the adjoining area. Adjacent properties to the north and east are primarily developed as single family residential subdivisions. The vacant parcel adjacent and to the west of the subject property is being proposed for use as a Fire Administration Support Complex by the County of Hawaii. The proposed facility will include a Fire Administration Building, Emergency Dispatch Building, Fire Preparation and Training Building, Museum, Covered Training area, Warehouse Fire Station and Radio Tower for emergency dispatch use. Vacant property to the south is designated for use by the University of Hawaii at Hilo. Other land uses in the within a ½ mile radius of the subject property include the University Park which houses a number of research and technical support facilities for the astronomical observatories on Mauna Kea as well as the U.S. Department of Agriculture Pacific Basin Agricultural Research Center.

The proposed project is not situated within an FAA-designated civilian airport Runway Clear Zone (RCZ), within a military airfield Clear Zone (CZ) or Accident potential Zone (APZ). The closest airport is the Hilo International Airport situated approximately 2.5 miles east of the project site.

The proposed project is not situated within one mile of a NPL ("Superfund") site, nor within 2,000 feet of a CERCLIS site, nor adjacent to any other known or suspected sites contaminated with toxic chemicals or radioactive materials.

Impacts and Mitigation Measures

The proposed elderly housing project will be consistent with other uses already established within the general area. The proposed project will not expose either people or buildings to hazards from aircraft, explosive or flammable operations, toxic chemicals or radioactive materials. Any impacts on the surrounding properties due to noise and other disturbances caused by the construction activity will be mitigated through careful construction management practices and compliance with state and county regulations.

2.3 Public Facilities and Services

2.3.1 Roads

Existing Setting

Access to the project site would be from Mohouli Street through a 50 foot roadway right-of-way identified as Tax Map Key (3) 2-4-001: 178 which is situated on the western boundary of the subject property. This roadway would also provide access to the Hawaii County Fire Administration Support Complex which is proposed on the adjacent property. The subject property is situated on the southwest corner of Mohouli Street and Komohana Street. Mohouli Street and Komohana Street are two-lane County roadways classified as major collectors.

A traffic impact analysis report prepared for the proposed project by M&E Pacific, Inc. included an analysis of the roadways and intersections in the vicinity that would be affected by project generated traffic. These include the Komohana Street and Kukuau Street intersections with Mohouli Street, and the Komohana Street/Kukuau intersection. The traffic impact analysis report stated the following:

> "The proposed Mohouli Heights Senior Neighborhood Project is forecast to generate less than 20 trips during the morning and afternoon commuter peak hours, a relatively small number of trips. This additional traffic in itself would not require mitigating measures. However, traffic on Komohana Street is already congested during the morning peak hour and the Mohouli Street intersection is in need of mitigation." (The complete traffic impact analysis report is included as Appendix 3.)

Impacts

The proposed 160-unit elderly housing project is forecast to generate less than 20 trips during the morning and afternoon peak hours and is not anticipated to have any significant adverse impact on the roads and traffic circulation in the area. In a letter dated April 2, 2009, the State Department of Transportation stated that the "DOT does not anticipate any adverse, significant impacts to State transportation facilities resulting from the proposed project."

2.3.2 Water System

Existing Setting

Water is available from an existing 12-inch waterline within Komohana Street and an existing 12-inch waterline within Mohouli Street. The Department of Water Supply has indicated that, "Prior to issuing a water commitment for the proposed project, the Department would request estimated maximum daily water usage calculations preprared by a professional engineer licensed in the State of Hawaii for review and approval, showing the estimated water demand for the proposed non-residential uses of the subject parcel. Unless otherwise approved by the Manager, the estimated average daily usage for each residential unit shall be 400 gallons per day (GPD) or a maximum daily usage of 600 GPD." (Letter dated February 11, 2008, included in Appendix 1)

Impacts

The proposed project will not have a significant adverse impact on the existing Department of Water Supply system serving the subject location and the developer will comply with the requirements for obtaining water service.

2.3.3 Protective Services

Existing Setting

There are two existing fire stations within two miles of the subject property. The police station is situated approximately one mile away and the hospital is situated approximately two miles away.

Impacts

The proposed project is well situated in close proximity to protective service providers and will not create an additional burden on these operations.

2.3.4 Power and Communication Systems

Setting

The project area is served by Hawaii Electric Light Company's (HELCO) power lines from existing roadways fronting the property. Telephone and cable T.V. service is also available to the project site.

Impacts

The proposed action will not have any significant adverse impact on the power and communication systems serving the region.

2.3.5 Wastewater

Setting

The County has an existing wastewater system serving the adjacent Sunrise Ridge Subdivision. Comments received from the Department of Environmental Management, Wastewater Division has stated that, "Existing County sewer collection systems are installed on Kahikini and Ohukea Streets within the Sunrise Ridge Subdivision. However a Sewer Study would be required to be performed in accordance with the Design Standards of the Department of Wastewater Management, City and County of Honolulu to confirm that the existing sewer collection system is capable of accepting additional sewage from the proposed development." (Memorandum dated November 7, 2008, included in Appendix 1)

Impacts and Mitigation Measures

The developer will prepare a sewer study to determine whether the existing sewer collection system is capable of accepting additional sewage from the proposed development. In the event that the County system will not accommodate the proposed project, a system meeting with the requirements of the State Department of Health will be provided.

2.3.6 Solid Waste

Setting

There is no collection system for solid waste in the County of Hawaii. Businesses rely on private firms to collect and dispose of waste at the County's Hilo landfill which is situated approximately 2.5 miles east of the project site.

Impacts

A private commercial rubbish hauler will be utilized for the proposed elderly housing project. All waste generated by the proposed project will be disposed at appropriate sites designated by the Department of Environmental Management.

2.4 Archaeology, Historic and Cultural Resources

Setting

An archaeological assessment was prepared on the subject property by Haun and Associates in October, 2008. The objective of the survey was to satisfy historic preservation regulatory review requirements of the Department of Land and Natural Resources-Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules (2003). The findings of the archaeological assessment are provided as follows: "No archaeological sites or features were identified by the survey and no Land Commission Awards are present within the parcel based on review on tax maps. No further archaeological work is recommended based on the negative survey results." The archaeological assessment was submitted to the State Historic Preservation Division for review on October 25, 2008. No response from the State Historic Preservation Division has been received to date. (The complete archaeological assessment report is included as Appendix 4.)

A Cultural Impact Assessment was prepared for the Draft Environmental Assessment, Hilo International Airport Project No. AH1011-03 by Wilson, Okamoto & Associates in February, 2002. The Cultural Impact Assessment provides a historical perspective of the natural landscape and traditional land use patterns of the ahupua'a of Waiakea which includes the project site. The ahupua'a is over 95,000 acres in size and extends along the coast from the west side of Hilo Bay to the Puna district boundary and inland to approximately the 6,000 foot elevation. In describing the ahupua'a of Waiakea, the Cultural Impact Assessment states the following:

> "The lands of Waiakea were productive, and the resources of the different environmental and ecological zones were utilized to support the native population. Along the coast, fishponds were constructed to raise and harvest fish, an important source of protein. Inland the decomposed lava and consistent rainfall created fertile lands for growing kalo and other food crops. Hala groves provided an abundance of lau hala for weaving and house thatching. The forest, which extended within a few miles of the coast, provided timber, an array of occupational and medicinal trees and plants, as well as a number of bird species."

The archaeological assessment prepared by Haun and Associates for the subject property provides additional background information regarding the land use and settlement pattern established for the Hilo area and describes it as follows:

> "McEldowney (1979) used limited site inventory and historic documentary evidence to develop a traditional Hawaiian land use and settlement pattern model for the Hilo area. The model consists of five elevation-defined zones: Coastal Settlement, Upland Agricultural, Lower Forest, Rainforest, and Sub-Alpine or Montane. The Coastal Settlement Zone extended approximately 0.5 miles inland from the shoreline between sea level and 50 ft elevation. The zone was the most densely populated with both permanent and temporary habitations, high status chiefly residences, and *heiau*. Settlements were concentrated at Hilo Bay and sheltered bays and coves.
>
> "The Upland Agricultural Zone was situated between approximately 50 ft and 1,500 ft elevation. Settlement in the zone consisted of scattered residences among economically beneficial trees and agricultural plots of dryland taro and bananas. Lava tubes were utilized for shelter. A pattern of shifting cultivation is believed to have converted the original forest cover to parkland of grass and scattered groves of trees, Wetland cultivation of taro occurred along streams.
>
> "The Lower Forest Zone ranged from 1,500 ft to 2,500 ft elevation. Timber and other forest resources such as medicinal plants, *olona*, and birds were gathered from the zone. Site types consisted of temporary habitations, trials (sic) shrines, and minor agricultural features in forest clearings and along streams. Sites in the Rainforest Zone (2,500-5,000 ft elevation) and Sub-alpine or Montane Zone (5,000-9,000 ft) were limited to trails and associated temporary habitations. These zones were used for intra-island travel and gathering of valued resoiurces including hardwoods, birds, and stone for tool making.
>
> "The project area is situated within the lowere portion of McEldowney's Upland Agricultural Zone where scattered residences and agricultural plots were situated in prehistoric to early

historic times. Historic site types in the project area vicinity likely included plantation agriculture-related features and residences."

Cultural Impact Assessments prepared as part of the FEA for the USDA Pacific Basin Agricultural Research Center project located approximately 2,000 feet south of this project area and the DEA prepared for the County's Fire Administration Support Complex on the adjacent property both reported that community informants did not identify any cultural concerns in regards to cultural properties, sites or practices, nor did they disclose any potential negative cultural impacts.

Impacts and Mitigation Measures

No archaeological sites or features were identified by the archaeological survey of the subject property and the project area is not known as an area utilized for cultural practices. As such, the proposed action is anticipated to have "no effect" on significant historic sites or cultural activities. In the event that iwi kūpuna or Native Hawaiian cultural or traditional deposits are found during the construction of the project, work will cease and the appropriate agencies will be contacted pursuant to applicable law.

3. SUMMARY OF POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MEASURES

3.1 Short Term Impacts

Construction Activity

Impacts: Short term impacts will result from the proposed construction of the 30-unit elderly housing project including increased noise levels, dust and exhaust from machinery.

Mitigation: Given the relative short construction time period involved in developing the 30 unit elderly housing project, the potential impacts of the construction activities should be minimal. In addition, the developer will comply with all applicable state and County requirements.

3.2 Long Term Impacts

Seismic Hazards:

Impacts: The island of Hawaii is one of the most seismically active areas in the world and has and magnitude 6 earthquakes can be expected to cause structural damage to non-reinforced buildings.

Mitigation: The proposed project will be designed and constructed in compliance with the Hawaii County Building Code which requires that all new structures be designed to resist forces to seismic Zone 4 standards.

Drainage:

Impacts: County requirements stipulate that, all development generated runoff be disposed on site and cannot be directed toward any adjacent properties.

Mitigation: The developer will construct drainage improvements meeting with the approval of the Department of Public Works.

Federally listed threatened/endangerd species:

Impacts: The federally threatened Newell's shearwater (*Puffinus auricularis newelli*), federally endangered Hawaiian petrel (*Pterodroma phaeopygia sandwichenis*), Hwaiian hoary bat (*Lasiurus cinereus semotus*), and Hawaiian hawk (*Buteo solitarius*) have been observed in the project vicinity.

Mitigation: The developer will comply with recommendations offered by the U.S. Fish and Wildlife Service which will help avoid and minimize potential project impacts. These recommendations include the following:

"Outdoor lighting can result in seabird disorientation, fallout, and injury or mortality. Potential impacts to seabirds can be minimized by: 1) shielding outdoor lights associated with the project, particularly when used during each year's peak fledging period (September 15 through December 15); 2) avoiding night-time construction; and 3) providing all project staff with information regarding seabird fallout.

"To avoid impacts to the endangered Hawaiian hoary bat, woody plants suitable for bat roosting should not be removed or trimmed during the bat birthing and pup rearing season (April to August). If this avoidance measure can not be implemented, bat surveys should be conducted and, if this species is found, our office should be contacted for further assistance."

Archaeological and Cultural Deposits:

Impacts: Archaeological or cultural deposits may be uncovered and encountered during the construction of the project.

Mitigation: In the event that iwi kūpuna or Native Hawaiian cultural or traditional deposits are found during the construction of the project, work will cease and the appropriate agencies will be contacted pursuant to applicable law.

4. ALTERNATIVES

4.1 No Action Alternative

The no action alternative would result in the property remaining vacant and unproductive. The County acquired the subject property through Governor's Executive Order No. 4224 for the purpose of providing affordable rental housing for the elderly and related uses. The County could request an amendment to the Executive Order to allow other public purpose uses or could entertain other development proposals to address the elderly rental population but either option would delay development of the property for several years.

4.2 Alternative Sites

The proposed elderly housing project could be constructed on other sites within the South Hilo district. Although other feasible sites may be available, they will likely have similar constraints and it is unlikely that the impacts generated for this site will be significantly less at any other site in the district.

5. DETERMINATION, FINDINGS AND REASONS FOR SUPPORTING DETERMINATION

5.1 Significance Criteria

According to the Department of Health Rules (11-200-12), an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long-term effects. In making the determination, the Rules establish "Significance Criteria" to be used as a basis for identifying whether significant environmental impact on the environment if it meets anyone of the following thirteen criteria.

1. **Involves an irrevocable commitment to loss or destruction of any natural or cultural resources.**

   The proposed project involves the development of a 160-unit elderly housing project on a 15.948-acre parcel which is undeveloped with no previous development on the site. The property has not been identified as having any existing natural or cultural resources that will be destroyed or irrevocably lost by the proposed action. In the event that iwi kūpuna or Native Hawaiian cultural or traditional deposits are found during the construction of the project, work will cease and the appropriate agencies will be contacted pursuant to applicable law.

2. **Curtails the range of beneficial uses of the environment.**

   The project site has remained vacant and has not been utilized for the entire time period that the property has been under State ownership (since 1959). The development of the subject site for a 160-unit elderly housing project is consistent with the other land uses already established in the surrounding area and will not curtail the range of beneficial uses of the environment.

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

   The proposed action is consistent with the Environmental Policies established in Chapter 344, HRS, and the National Environmental Policy Act.

4. **Substantially affects the economic or social welfare of the community or state.**

   The proposed action will have a positive impact on the economic and social welfare of the community. The 160-unit elderly housing project for low and very low income seniors will address only a small portion of the demand for such units. There are approximately 3,993 single and two person elderly households living within the South Hilo District with annual household incomes under $25,000/year. The proposed 160-unit

elderly housing project will address approximately 4% of the potential demand from this low and very low income target group.

5. **Substantially affects public health.**

   The proposed action will not have any substantial impact on public health. Potential noise, air, water and drainage impacts will be addressed through careful construction management practices and compliance with federal, state and County requirements.

6. **Involves substantial secondary impacts, such as population changes or effects on public facilities.**

   The proposed project will not have any substantial secondary impacts because it is not a generator of growth. Rather, the proposed action will address an existing need in the community to provide affordable housing for our growing elderly population.

7. **Involves a substantial degradation of environmental quality.**

   The proposed 160-unit elderly housing project is consistent with the other uses already established in the project area. The project area is predominantly residential in character although there are other vacant properties in the adjoining area. Adjacent properties to the north and east are primarily developed as single family residential subdivisions.

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

   As stated previously, the proposed action will not have any substantial secondary impacts. The proposed action does not involve a commitment for larger actions and will not induce other actions having a cumulative effect on the environment.

9. **Substantially affects a rare, threatened or endangered species or its habitat.**

   The project area is not known as a habitat area for any candidate, proposed, or listed threatened or endangered species. In the unlikely event that potential listed species may be present in the area, the developer will comply with recommendations offered by the U.S. Fish and Wildlife Service will help avoid and minimize potential project impacts. As such, the proposed action will not have any substantial adverse effect on any rare~ threatened or endangered species or its habitat.

10. **Detrimentally affects air or water quality or ambient noise levels.**

    Short term impacts will result from the proposed action including increased noise levels, dust and exhaust from machinery involved in the construction of project improvements. The project will not result in long-term adverse effects to air or water quality or ambient noise levels. The developer will comply with all applicable state and County requirements.

11. **Affects or is likely to suffer damage by being located in an environmentally sensitive area, such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters.**

    The project site is not situated in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters.

12. **Substantially affects scenic vistas and view planes identified in county or state plans or studies.**

    Given the existing topography as well as the low profile of the single story construction, scenic vistas and view planes will not be adversely affected by the development of the proposed 160-unit elderly housing project.

13. **Requires substantial energy consumption.**

    The proposed project will not require substantial energy consumption,

5.2 Findings

Based on the foregoing information presented, it is determined that the proposed 160-unit elderly housing project will not have a significant effect. As such, a determination of a Finding of No Significant Impact for the proposed action is appropriate.

5.3 Reasons Supporting Determination

The nature and scale of the proposed action is such that no significant environmental effects are anticipated. Potential impacts, if any, can be mitigated through careful construction management practices and compliance with all governmental requirements including those of the State Department of Health and the County Department of Public Works. In addition, the developer will comply with recommendations offered by the U.S. Fish and Wildlife Service pertaining to migratory birds and bats as well as the Office of Hawaiian Affairs pertaining to iwi kūpuna or Native Hawaiian cultural or traditional deposits which will help avoid and minimize potential project impacts.

REFERENCES

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Nishimura, Brian T., Planning Consultant, "Market Study-2020 Kinoole Senior Residences", Prepared for the Hawaii Island Community Development Corporation, February, 2004.

Rana Productions, Ltd., A Survey of Avian and Terrestrial Mammalian Species of the USDA Pacific Basin Agricultural Research Center Site, South Hilo District, Hawaii, December, 2001.

Stearns, H.T. and Macdonald G.A. 1946. *Geology and Ground-Water Resources of the Island of Hawaii.* Bulletin 9, Hawaii Division of Hydrography. Advertiser Publishing Co., Ltd. Honolulu.

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Wilson Okamoto & Associates, Inc. 2002. *Hilo International Airport Draft Environmental Assessment, State of Hawaii, Department of Transportation, Airports Division.* Honolulu.

Wilson Okamoto & Associates, Inc. 2002. *Cultural Impact Assessment, Hilo International Airport Improvements.* Honolulu.

APPENDIX 1 – REPRODUCTION OF COMMENTS AND RESPONSES MADE DURING THE PRE-ASSESSMENT CONSULTATION PERIOD

1. United States Department of the Interior, Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, December 9, 2008.
   Response: Brian T. Nishimura, January 9, 2009
2. State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife, November 10, 2008.
3. State of Hawaii, Department of Health, Acting District Environmental Health Program Chief, November 7, 2008.
   Response: Brian T. Nishimura, January 9, 2009.
4. State of Hawaii, Department of Transportation, Director of Transportation, November 12, 2008.
   Response: Brian T. Nishimura, January 9, 2009
5. State of Hawaii, Office of Hawaiian Affairs, December 5, 2008.
   Response: Brian T. Nishimura, January 9, 2009
6. County of Hawaii, Department of Water Supply, November 24,, 2008.
   Response: Brian T. Nishimura, January 9, 2009
7. County of Hawaii, Department of Environmental Management, November 10, 2008.
   Response: Brian T. Nishimura January 9, 2009
8. County of Hawaii, Fire Department, November 18, 2008.
   Response: Brian T. Nishimura, January 9, 2009
9. County of Hawaii, Planning Department, November 24, 2008.
   Response: Brian T. Nishimura, January 9, 2009
10. County of Hawaii, Police Department, November 7, 2008.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2009-TA-0032

DEC 09 2008

Mr. Brian T. Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221

Subject: Species List for the Pre-Environmental Assessment of the Proposed Mohouli Heights Senior Neighborhood Project, Hilo, Hawaii

Dear Mr. Nishimura:

Thank you for your letter dated November 3, 2008, received on November 10, 2008, soliciting our comments and recommendations to assist you in the preparation of a Draft Environmental Assessment (DEA). The proposed project is an affordable elderly housing project on 15 acres of undeveloped land at Waiakea, South Hilo, Hawaii [TMK (3) 2-4-001: portion of 168]. We are providing a list of threatened and endangered species that may occur in the proposed project area to help you identify potential impacts to listed species pursuant to section 7 of the Endangered Species Act 1973, as amended, [16 U.S.C. 1531-1544].

We have reviewed the information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program and the Hawaii GAP Program. Land cover information indicates that the proposed project area has classifications of open ohia forest and native uluhe shrubland. The federally threatened Newell's shearwater (*Puffinus auricularis newelli*), federally endangered Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*), Hawaiian hoary bat (*Lasiurus cinereus semotus*), and Hawaiian hawk (*Buteo solitarius*) have been observed in the project vicinity. There is no federally designated critical habitat located in the vicinity of the project.

We offer the following recommendations to help avoid and minimize project impacts to listed species. Outdoor lighting can result in seabird disorientation, fallout, and injury or mortality. Potential impacts to seabirds can be minimized by: 1) shielding outdoor lights associated with the project, particularly when used during each year's peak fledging period (September 15 through December 15); 2) avoiding night-time construction; and 3) providing all project staff with information regarding seabird fallout.

To avoid impacts to the endangered Hawaiian hoary bat, woody plants suitable for bat roosting should not be removed or trimmed during the bat birthing and pup rearing season (April to

August). If this avoidance measure can not be implemented, bat surveys should be conducted and, if this species is found, our office should be contacted for further assistance.

We hope this information assists you in determining potential impacts to listed species and avoiding and minimizing these impacts. If you have any additional questions, please contact Aaron Nadig, Fish and Wildlife Biologist, Consultation and Technical Assistance Program (phone: 808/792-9400; fax: 808/792-9581).

Sincerely,

Christa Russell

for Patrick Leonard
Field Supervisor

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 9, 2009

Mr. Patrick Leonard, Field Supervisor
United States Department of the Interior
Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Blvd., Room 3-122, Box 50088
Honolulu, Hawaii 96850

Subject: Pre-Environmental Assessment Consultation
Mohouli Heights Senior Neighborhood Project
Hawaii Island Community Development Corporation (HICDC)
TMK: (3) 2-4-001: 177

Dear Mr. Leonard:

This is to acknowledge receipt of your letter dated December 9, 2008, providing comments on the above-described matter. Thank you for providing a list of threatened and endangered species that may occur in the proposed project area. Please be advised that the Draft Environmental Assessment (DEA) will address concerns raised in your comment letter by incorporating the recommendations provided to help avoid and minimize project impacts to listed species as mitigation measures that the developer will comply with.

Thank you for taking the time to comment on the proposed project. Your assistance in the Environmental Assessment process is greatly appreciated.

Sincerely,

Brian T. Nishimura, Planning Consultant

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL ST., ROOM 325
HONOLULU, HAWAII 96813
TEL (808) 587-0166 FAX (808) 587-0160

November 10, 2008

Mr. Brian T. Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221

Dear Mr. Nishimura:

Subject: Pre-Environmental Assessment Consultation, Hawaii Island Community Development Corporation (HICDC), Proposed Mohouli Heights Senior Neighborhood Project, TMK: 2-4-01: por. 168, (lot 3) Waiakea, South Hilo, Hawaii.

Department of Land and Natural Resources, Division of Forestry and Wildlife appreciates the opportunity to comment on your subject request. The property located on the northwest corner of Komohana Street and Mohouli Street in Hilo will not impact any of our management areas. Therefore, we have no objections to this project. Thank you for the opportunity to comment on your proposed project.

Sincerely yours,

Paul J. Conry
Administrator

LINDA LINGLE
GOVERNOR

CHIYOME LEINAALA FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 916
HILO, HAWAII 96721-0916

November 7, 2008

Mr. Brian T. Nishimura, Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221

Dear Mr. Nishimura:

Subject: Pre-Environmental Assessment Consultation
Applicant: Hawaii Island Community Development Corporation (HICDC)
Proposed Mohouli Heights Senior Neighborhood Project
Tax Map Key: (3) 2-4-01:portion of 168, (Lot 3) Waiakea, South Hilo, Hawaii

Underground Injection Systems (Ph. 586-4258) which receive wastewater or storm runoffs from the proposed development need to address the requirements of Chapter 23, Hawaii State Department of Health Administrative Rules, Title 11, "Underground Injection Control."

The applicant would need to meet the requirements of our Department of Health Air Pollution Rules, Chapter 60.1, Title 11, State of Hawaii for fugitive dust control. If there is need to discuss these requirements, please contact our Clean Air Branch staff at Ph. 933-0401.

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of the subject document on November 5, 2008. The CWB has reviewed the limited information contained in the subject document and offers the following comments:

1. The Army Corps of Engineers should be contacted at (808) 438-9258 for this project. Pursuant to Federal Water Pollution Control Act (commonly known as the "Clean Water Act" (CWA)), Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters...". The term "discharge" is defined in CWA,

Subsections 502(16), 502(12), and 502(6); Title 40, Code of Federal Regulations, Section 122.2, and Hawaii Administrative Rules (HAR), Chapter 11-54.

2. In accordance with HAR, Sections 11-55-04 and 11-55-34.05, the Director of Health may require the submittal of an individual permit application or a Notice of Intent (NOI) for general permit coverage authorized under the National Pollutant Discharge Elimination System (NPDES).

   a. An application for an NPDES individual permit is to be submitted at least 180 days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

   b. An NOI to be covered by an NPDES general permit is to be submitted at least 30 days before the commencement of the respective activity. A separate NOI is needed for coverage under each NPDES general permit. The NOI forms may be picked up at our office or downloaded from our website at: http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

      i. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi). [HAR, Chapter 11-55, Appendix B]

      ii. Construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the commencement of the construction activities. [HAR, Chapter 11-55, Appendix C]

      iii. Discharges of treated effluent from leaking underground storage tank remedial activities. [HAR, Chapter 11-55, Appendix D]

      iv. Discharges of once through cooling water less than one (1) million gallons per day. [HAR, Chapter 11-55, Appendix E]

v. Discharges of hydrotesting water. [HAR, Chapter 11-55, Appendix F]

vi. Discharges of construction dewatering effluent. [HAR, Chapter 11-55, Appendix G]

vii. Discharges of treated effluent from petroleum bulk stations and terminals. [HAR, Chapter 11-55, Appendix H]

viii. Discharges of treated effluent from well drilling activities. [HAR, Chapter 11-55, Appendix I]

ix. Discharges of treated effluent from recycled water distribution systems. [HAR, Chapter 11-55, Appendix J]

x. Discharges of storm water from a small municipal separate storm sewer system. [HAR, Chapter 11-55, Appendix K]

xi. Discharges of circulation water from decorative ponds or tanks. [HAR, Chapter 11-55, Appendix L]

2. In accordance with HAR, Section 11-55-38, the applicant for an NPDES permit is required to either submit a copy of the new NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD. If applicable, please submit a copy of the request for review by SHPD or SHPD's determination letter for the project.

3. Any discharges related to project construction or operation activities, with or without a Section 401 WQC or NPDES permit coverage, shall comply with the applicable State Water Quality Standards as specified in HAR, Chapter 11-54.

Hawaii Revised Statutes, Subsection 342D-50(a) requires that "[n]o person, including any public body, shall discharge any water pollutants into state waters, or cause or allow any water pollutant to enter state waters except in compliance with this chapter, rules adopted pursuant to this chapter, or a permit or variance issued by the director."

If you have any questions, please contact Mr. Alec Wong, Supervisor of the Engineering Section, CWB, at (808) 586-4309.

Construction activities must comply with the provisions of Hawaii Administrative Rules, Chapter 11-46, "Community Noise Control."

a. The contractor must obtain a noise permit if the noise levels from the construction activities are expected to exceed the allowable levels of the rules.

b. Construction equipment and on-site vehicles requiring an exhaust of gas or air must be equipped with mufflers.

c. The contractor must comply with the requirements pertaining to construction activities as specified in the rules and the conditions issued with the permit.

Should there be any questions on this matter, please contact the Department of Health at 933-0917.

We recommend that you review all of the Standard Comments on our website: http://hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

The subject project is located within or near proximity to the County sewer system. All wastewater generated shall be disposed into the County sewer system.

Sincerely,

NEWTON INOUYE
Acting District Environmental Health Program Chief

WORD:HICDC-MOHOULI HEIGHTS SENIOR NEIGHBORHOOD PROJECT.at

BRIAN T. NISHIMURA, PLANNING CONSULTANT
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January 9, 2009

Newton Inouye, Acting District Environmental Health Program Chief
State of Hawaii
Department of Health
PO Box 916
Hilo, Hawaii 96721-0916

Subject: Pre-Environmental Assessment Consultation Comments
Mohouli Heights Senior Neighborhood Project
Applicant: Hawaii Island Community Development Corporation (HICDC)
TMK: (3) 2-4-001: 177

Dear Mr. Inouye:

This is to acknowledge receipt of comments received from your department regarding the subject matter in a letter dated November 7, 2008. Thank you for identifying potential regulatory requirements relating to environmental health concerns. The developer intends to comply with all appropriate requirements of the State Department of Health.

Thank you again for your department's comments during the pre-environmental assessment consultation period. Should you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

IN REPLY REFER TO:

STP 8.3050

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

November 12, 2008

Mr. Brian T. Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221

Dear Mr. Nishimura:

Subject: Hawaii Island Community Development Corporation (HICDC)
Proposed Mohouli Heights Senior Neighborhood Project
Pre-Environmental Assessment Consultation
TMK: 2-4-01: portion of 168, (lot 3) Waiakea, South Hilo, Hawaii

Thank you for your letter requesting our comments concerning the subject project.

It is our understanding that the proposed approximately 15-acre senior residence development is located on the northwest corner of Komohana Street and Mohouli Street in the South Hilo area of the Big Island. The plan calls for up to 160 residential units in multi-unit structures around a central seniors' activity core. The project will be located near other residential, institutional and commercial developments, and the project would contribute its share of the cumulative traffic on Komohana Street. While Komohana Street is under County jurisdiction, it intersects Puanaiko Street, which is under State jurisdiction (Highway Route 2000), to the South.

We request that a Traffic Impact Analysis Report (TIAR) be prepared and that the TIAR reflect the subject project's impact to the highway facility. We will defer further comments until such time that a Draft Environmental Assessment with accompanying TIAR is submitted for our review. The TIAR must be approved by the DOT Highways Division.

We appreciate the opportunity to provide our comments. Please contact Mr. David Shimokawa of the Statewide Transportation Planning office at (808) 587-2356 if there are any questions.

Very truly yours,

BRENNON T. MORIOKA, PH.D., P.E.
Director of Transportation

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 9, 2009

Brennon T. Morioka,PH.D., P.E., Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Subject: Pre-Assessment Consultation
Mohouli Heights Senior Neighborhood Project
Applicant: Hawaii Island Community Development Corporation
TMK: (3) 2-4-001: 177

Dear Dr.Morioka:

Thank you for providing your comments regarding the subject matter in your letter dated November 12, 2008. Please be advised that your comments regarding the preparation of a Traffic Impact Analysis Report (TIAR) is acknowledged and has been completed. A copy of the Draft EA along with the TIAR will be submitted for your review.

Thank you for your assistance in providing your comments. Should you have any questions regarding this transmittal, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD08/3469B

December 5, 2008

Brian T. Nishimura, Planning Consultant
101 Aupuni Street, Suite 217
Hilo, HI 96720-4221

RE: Pre-consultation for the Environmental Assessment for the proposed Mohouli Heights Senior Neighborhood Project, TMK: (3) 2-4-01: por. 168 (lot 3).

Aloha e Brian T. Nishimura,

The Office of Hawaiian Affairs (OHA) is in receipt of the above-mentioned letter dated November 3, 2008. The Hawai'i Island Community Development Corporation is proposing to develop an affordable elderly rental housing project on approximately 15 acres of land at Waiākea, South Hilo, Hawai'i Island. The project may include a transit center, beauty/barber shop, small convenience retail space, doctor office, office space, mini theatre and 160 residential units.

Chapter 343 of the Hawaii Revised Statues (HRS) requires that the Draft EA include a Cultural Impact Assessment (CIA). The CIA shall include information relating to the traditional and customary practices and beliefs of the area's Native Hawaiians, and the community should be involved in this assessment. Consideration must also be afforded to any individuals accessing the project area for constitutionally protected traditional and customary purposes, in accordance with the Hawai'i State Constitution, Article XII, section 7.

OHA requests clarification whether an archaeological inventory survey for the project will be submitted to the State Historic Preservation Division for review and approval. If so, OHA should be allowed the opportunity to comment on the criteria assigned to any cultural or archaeological sites identified within the archaeological inventory survey.

We request the applicant's assurances that should iwi kūpuna or Native Hawaiian cultural or traditional deposits be found during the construction of the project, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

In addition, OHA recommends that the applicant use native vegetation in its landscaping plan for subject parcel. Landscaping with native plants furthers the traditional Hawaiian concept of mālama ʻāina and creates a more Hawaiian sense of place.

Further, OHA notes that the subject land is designated as Section 5(b) Ceded Lands, which hold a considerable amount of sentimental, historical and legal significance for Native Hawaiians and OHA. These lands were illegally taken from the Hawaiian Kingdom after the 1893 overthrow and later transferred ("ceded") by the United States government to the State of Hawai'i upon statehood. Today, the state holds the Ceded Lands corpus in trust for Native Hawaiians and the general public. OHA is supposed to receive a portion of all revenues generated on these lands. We request that the Ceded Lands status of the project site be clearly represented in the Draft EA.

Thank you for the opportunity to comment. If you have further questions, please contact Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

ʻO wau iho nō me ka ʻoiaʻiʻo,

Clyde W. Nāmuʻo
Administrator

C: OHA Hilo CRC Office

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 9, 2009

Mr. Clyde W. Nāmu'o, Administrator
State of Hawai'i
Office of Hawaiian Affairs
711 Kapi'olani Boulevard, Suite 500
Honolulu, Hawai'i 96813

Subject: Pre-Assessment Consultation Comments
Mohouli Heights Senior Neighborhood Project
Applicant: Hawaii Island Community Development Corporation (HICDC)
TMK: (3) 2-4-001: 177 (new number)

Dear Mr. Nāmu'o:

Thank you for your letter dated December 5, 2008, responding to our request for pre-assessment comments on the subject matter.

Please be advised that the Draft Environmental Assessment (DEA) will address concerns raised in your comment letter as follows:

1. Cultural Impact Assessment – The DEA will include a cultural impact assessment.
2. Archaeological Inventory Survey – The DEA includes an Archaeological Assessment prepared by Haun & Associates which was transmitted to the State Historic Preservation Division for their review. The State Historic Preservation Division has not provided any comments to date. The Archaeological Assessment did not identify any archaeological sites or features on the property.
3. Iwi kūpuna or Native Hawaiian cultural or traditional deposits – The DEA has addressed your concern to protect any inadvertent discovery of archaeological or cultural resources on the subject property. One of the mitigation measures identified is to ensure that the contractor will be advised that should any iwi kūpuna or Native Hawaiian cultural or traditional deposits are found during the construction of the project, work will cease and the appropriate agencies will be contacted pursuant to applicable law.
4. Use of native vegetation for landscaping – The recommendation to utilize native vegetation in the landscaping plan for the subject property will be passed on to the landscape architect and will be incorporated to the extent feasible.
5. Ceded lands – The DEA acknowledges that the subject property is designated as ceded land which is held as a public land trust by the State of Hawaii.

Thank you for taking the time to provide your comments. Your assistance in the Environmental Assessment process is greatly appreciated.

Sincerely,

Brian T. Nishimura, Planning Consultant

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

November 24, 2008

Brian T. Nishimura, Planning Consultant
101 Aupuni Street, Suite 217
Hilo, HI 96720-4221

PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
MOHOULI HEIGHTS SENIOR NEIGHBORHOOD PROJECT
TAX MAP KEY 2-4-001:177 (LOT 3 OF SUBDIVISION APPLICATION NO. 08-000713)

We have reviewed your Pre-Environmental Assessment Consultation letter, dated November 3, 2008. Please see the attached letter, dated February 11, 2008, to the State Department of Land and Natural Resources regarding the subject project. We have no further comments to add at this time.

Should there be any questions, please contact Mr. Finn McCall of our Water Resources and Planning Branch at 961-8070, extension 255.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

FM:dfg

... Water brings progress...

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

February 11, 2008

State of Hawai'i
Department of Land and Natural Resources
Land Division
P. O. Box 621
Honolulu, HI 96809

REQUEST FOR SET ASIDE FOR ELDERLY, AFFORDABLE RENTAL HOUSING AND RELATED PURPOSES
TAX MAP KEY 2-4-001:168 (PORTION)

We have reviewed your memorandum regarding the subject request and have the following comments.

Water can be made available from an existing 12-inch waterline within Komohana Street and an existing 12-inch waterline within Mohouli Street, both fronting the subject parcel.

Prior to issuing a water commitment for the proposed project, the Department would request estimated maximum daily water usage calculations prepared by a professional engineer licensed in the State of Hawai'i for review and approval, showing the estimated water demand for the proposed non-residential uses of the subject parcel. Unless otherwise approved by the Manager, the estimated average daily usage for each residential unit shall be 400 gallons per day (GPD) or a maximum daily usage of 600 GPD.

After review of the calculations, the Department will determine the water commitment deposit amount, facilities charges due, and any water system improvements required for final approval. Pursuant to Rule 5 of the Department's Rules and Regulations, if the water requirements for the project exceed 120,000 GPD, the developer may be required to enter into a Water Development Agreement with the Water Board.

Please be informed that any meter(s) serving the proposed project will require the installation of a reduced pressure type backflow prevention assembly within five feet of the meter on private property. The Department must inspect and approve the installation before water service can be activated.

Should there be any questions, please contact Mr. Finn McCall of our Water Resources and Planning Branch at 961-8070, extension 255.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

FM:dfg

... Water brings progress...

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 9, 2009

Milton Pavao, P.E., Manager
County of Hawaii
Department of Water Supply
345 Kekuanaoa Street, Suite 20
Hilo, Hawaii 96720

Subject: Pre-Environmental Assessment Consultation Comments
Mohouli Heights Senior Neighborhood Project
Applicant: Hawaii Island Community Development Corporation (HICDC)
TMK: (3) 2-4-001: 177

Dear Mr. Pavao:

This is to acknowledge receipt of comments received from your department regarding the subject matter in a letter dated November 24, 2008. Thank you for confirming the availability of water and the process for obtaining water service. The developer intends to comply with all Department of Water Supply requirements which apply to the proposed project.

Thank you again for your department's comments during the pre-environmental assessment consultation period. Should you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

Harry Kim
Mayor

Bobby Jean Leithead Todd
Director

Nelson Ho
Deputy Director

County of Hawaii

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street • Hilo, Hawai`i 96720-4252
(808) 961-8083 • Fax (808) 961-8086
http://co.hawaii.hi.us/directory/dir_envmng.htm

November 10, 2008

Mr. Brian T. Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, HI 96720-4221

Subject: Pre-Environmental Assessment Consultation
Applicant: Hawai`i Island Community Development Corporation (HICDC)
Proposed Mohouli Heights Senior Neighborhood Project
TMK: (3) 2-4-01:portion of 168, (lot 3) Waiakea, South Hilo, Hawaii

Dear Mr. Nishimura,

Please find enclosed comments from our Wastewater Division regarding the subject project.

Thank you for allowing us the opportunity to review and comment on this project. If you have additional questions relating to the comment, please contact Dora Beck, WWD Chief, at 961-8513 or Lyle Hirota, WWD Deputy Chief, at 961-8333.

Sincerely,

Bobby Jean Leithead Todd
DIRECTOR

cc: WWD
DPW Bldg. Division – David Yamamoto

enclosures

11/26/6

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WASTEWATER DIVISION

COUNTY OF HAWAII –108 RAILROAD AVENUE – HILO, HI 96720
HILO (808) 961-8338 FAX (808) 961-8644

MEMORANDUM

November 7, 2008

To: Bobby Jean Leithead Todd, Director

From: Dora Beck, P.E., Division Chief DB

Subject: **Pre-Environmental Assessment Consultation**
Hawai`i Island Community Development Corporation (HICDC)
TMK 2-1-001:168 Lot 3

The Wastewater Division (WWD) has reviewed the Pre-Environmental Assessment Consultation letter from Brian T. Nishimura, Planning Consultant dated November 3, 2008 and provides the following comments.

1. Real Property Tax Map information indicates that TMK 2-1-001:168 Lot 3 is now identified as TMK 2-1-001:177. A copy of a portion of the map is attached for reference.

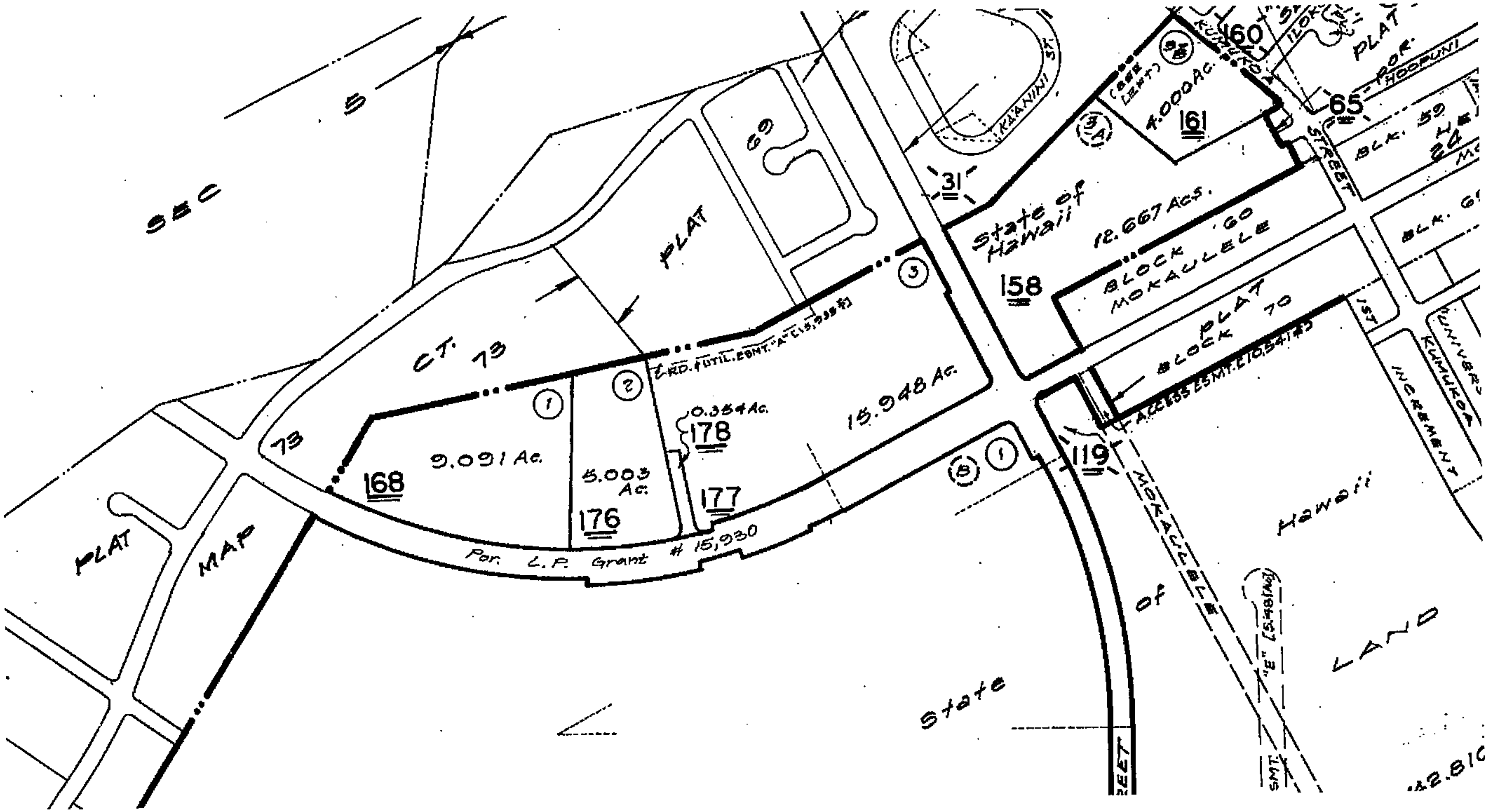
2. Real Property Tax Map information also indicates that a Road and Utility Easement for TMK 2-4-001:176 is provided on the North portion of the property connecting to Kahikini St.

3. The County of Hawai`i Building Division is also in the process of designing a new Fire Station on TMK 2-4-001:176 and it is recommended that they be consulted regarding plans for development of the property.

4. Existing County sewer collection systems are installed on Kahikini and Ohukea Streets within the Sunrise Ridge Subdivision. However a Sewer Study would be required to be performed in accordance with the Design Standards of the Department of Wastewater Management, City and County of Honolulu to confirm that the existing sewer collection system is capable of accepting additional sewage from the proposed development.

Should there be any comment or questions on the above please contact Lyle Hirota at 961-8333 (lhirota@co.hawaii.hi.us) or you may contact me at 961-8513 (dbeck@co.hawaii.hi.us).

cc: David Yamamoto, Construction Manager – Building Division


SEC 5
PLAT
69
CT. 73
73
168
9.091 Ac.
176
5.003 Ac.
178
0.354 Ac.
177
15.948 Ac.
Por. L.P. Grant # 15,930
PLAT MAP
State of Hawaii
158
12.667 Acs.
BLOCK 60 MOKAULELE
PLAT BLOCK 70
161
4.000 Ac.
160
65
31
119
KAANINI ST.
STREET
1ST
INCREMENT
KUMUKOA
BLK. 59
BLK. 24
POR. HOOPUNI
PLAT
Hawaii
of
LAND
State
MOKAULELE
"E" [5,481Af]
SMT.

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 9, 2009

Dora Beck, P.E., Division Chief
County of Hawaii
Department of Environmental Management
Wastewater Division
108 Railroad Ave.
Hilo, Hawaii 96720-4252

Subject: Pre-Environmental Assessment Consultation
Mohouli Heights Senior Neighborhood Project
Hawaii Island Community Development Corporation (HICDC)
TMK: (3) 2-4-001: 177

Dear Ms. Beck:

This is to acknowledge receipt of your memorandum to Bobby Jean Leithead Todd, Director, dated November 7, 2008 regarding the above-described matter. We acknowledge the information regarding the new tax map key number, the road and utility easement and the new Fire Department facilities proposed for the adjacent property. With regard to your comments involving the existing County sewer collection systems, the Developer will provide the necessary study to confirm that the existing sewer collection system is capable of accepting additional sewage from the proposed development.

Thank you for taking the time to provide your comments during the pre-assessment consultation process. Should you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

Harry Kim
Mayor

Darryl J. Oliveira
Fire Chief

Glen P.I. Honda
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 981-8394 • Fax (808) 981-2037

November 18, 2008

Mr. Brian T. Nishimura,
Planning Consultant
101 Aupuni Street
Suite 217
Hilo, Hawaii 96720-4221

SUBJECT: PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
APPLICANT: HAWAII ISLAND COMMUNITY DEVELOPMENT COPORATION
PROPOSED MOHOULI HEIGHTS SENIOR NEIGHBORHOOD PROJECT
TMK: (3) 2-4-01:PORTION OF 168, (LOT 3) WAIAKEA, SOUTH HILO

In regards to the above-mentioned pre-environmental assessment consultation, the following shall be in accordance:

Fire apparatus access roads shall be in accordance with UFC Section 10.207:

"**Fire Apparatus Access Roads**

"**Sec. 10.207.** (a) **General.** Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.

"(b) **Where Required.** Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access as measured by an unobstructed route around the exterior of the building.

"**EXCEPTIONS:** 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.

"2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).

"3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

"More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

"For high-piled combustible storage, see Section 81.109.

"(c) **Width.** The unobstructed width of a fire apparatus access road shall meet the requirements of the appropriate county jurisdiction.

"(d) **Vertical Clearance.** Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

"**EXCEPTION:** Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

"(e) **Permissible Modifications.** Vertical clearances or widths required by this section may be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

"(f) **Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities." (20 tons)

"(g) **Turning Radius.** The turning radius of a fire apparatus access road shall be as approved by the chief." (45 feet)

"(h) **Turnarounds.** All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

"(i) **Bridges.** When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

"(j) **Grade.** The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief." (15%)

"(k) **Obstruction.** The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

"(l) **Signs.** When required by the fire chief, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both."

Water supply shall be in accordance with UFC Section 10.301(c):

"(c) **Water Supply.** An approved water supply capable of supplying required fire flow for fire protection shall be provided to all premises upon which buildings or portions of buildings are hereafter constructed, in accordance with the respective county water requirements. There shall be provided, when required by the chief, on-site fire hydrants and mains capable of supplying the required fire flow.

"Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

"The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be protected as set forth by the respective county water requirements. All hydrants shall be accessible to the fire department apparatus by roadways meeting the requirements of Section 10.207.

DARRYL OLIVEIRA
Fire Chief

JCP:lpc

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 9, 2009

Daryryl Oliveira, Fire Chief
County of Hawaii
Fire Department
25 Aupuni Street, Suite 103
Hilo, Hawaii 96720-2037

Subject: Pre-Environmental Assessment Consultation Comments
Mohouli Heights Senior Neighborhood Project
Applicant: Hawaii Island Community Development Corporation (HICDC)
TMK: (3) 2-4-001: 177

Dear Mr. Oliveira:

This is to acknowledge receipt of comments received from your department regarding the subject matter in a letter dated November 18, 2008. Thank you for providing the applicable requirements pertaining to fire apparatus access roads and water supply. The developer intends to comply with all appropriate requirements which apply to the proposed project.

Thank you again for your department's comments during the pre-environmental assessment consultation period. Should you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

Harry Kim
Mayor

Christopher J. Yuen
Director

Brad Kurokawa, ASLA
LEED® AP
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-4224
(808) 961-8288 • FAX (808) 961-8742

November 24, 2008

Mr. Brian T. Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720

Dear Mr. Nishimura:

Subject: **Pre-Consultation for Draft Environmental Assessment**
Project: **Mohouli Heights Senior Neighborhood Project**
TMK: **3) 2-4-001:168; Waiakea Cane Lots, Waiakea, South Hilo , Hawaii**

Thank you for your letter dated November 3, 2008, requesting comments from this office regarding the preparation of a Draft Environmental Assessment.

The subject property is zoned A-1a (Agricultural-1 acre minimum lot size) and maintains a lot size of approximately 15.948 acres. The property is situated within the State Land Use Agricultural District. The parcel was recently subdivided and a separate tax map key number has been assigned to the subject parcel, lot 3 (TMK: (3) 2-4-001:177).

This particular property was set aside for the development of affordable senior housing by the Hawaii Island Community Development Corporation (HICDC). Pursuant to County of Hawaii Resolution 709-08, effective on August 13, 2008, the Director of Finance was authorized to negotiate a lease with HICDC for the purpose of planning, developing, and operating affordable rental housing for senior citizens.

Please note that the appropriate Land Use Designations must still be obtained and all other Planning Department requirements, such as Final Plan Approval, must be met.

Mr. Brian T. Nishimura
Planning Consultant
November 24, 2008

If you have any further questions or if you need further assistance, please feel free to contact this office.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

BJM:cs
P:\wpwin60\Bethany\General Zoning Inquiries\preconsultdraftea24001168.doc

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 9, 2009

Daryn Arai, Acting Director
County of Hawaii
Planning Department
101 Pauahi Street, Suite 3
Hilo, Hawaii 96720-3043

Subject: Pre-Environmental Assessment Consultation Comments
Mohouli Heights Senior Neighborhood Project
Applicant: Hawaii Island Community Development Corporation (HICDC)
TMK: (3) 2-4-001: 177

Dear Mr. Arai:

This is to acknowledge receipt of comments received from your department regarding the subject matter in a letter dated November 24, 2008. Thank you for confirming the zoning and land use designations for the subject property. The developer intends to comply with all appropriate land use regulations which apply to the proposed project.

Thank you again for your department's comments during the pre-environmental assessment consultation period. Should you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

Harry Kim
Mayor

Lawrence K. Mahuna
Police Chief

Harry S. Kubojiri
Deputy Police Chief

County of Hawaii
POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-8865

November 7, 2008

Mr. Brian T. Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221

Dear Mr. Nishimura:

Subject: Pre-Environmental Assessment Consultation
Applicant: Hawaii Island Community Development Corporation (HICDC)
Proposed Mohouli Heights Senior Neighborhood Project
Tax Map Key (3) 2-4-01: Portion of 168 (lot 3), Waiakea, South Hilo, HI

Staff has reviewed the above-mentioned consultation request and does not have any comments or objections to offer at this time.

Thank you for allowing us the opportunity to comment.

Sincerely,

SAMUEL THOMAS
MAJOR
AREA I OPERATIONS

LM/lli

APPENDIX 2 – HAWAII COUNTY OFFICE OF AGING, ELDERLY STATISTICS

Hawaii County's 30-years Elderly (60+) Population Growth by District **APPENDIX 2**

District	1970	*Percent*	1980	*Percent*	decennial %change	1990	*Percent*	decennial %change	2000	*Percent*	decennial %change	30 years % change
So. Hilo	4,296	48.50%	6,526	48.01%	51.91%	9,223	44.44%	41.33%	10,213	39.10%	10.73%	137.73%
Puna Mauka	690	7.79%	1,144	8.42%	65.80%	2,099	10.11%	83.48%	2,957	11.32%	40.88%	328.55%
Puna Makai	291	3.29%	588	4.33%	102.06%	998	4.81%	69.73%	1,319	5.05%	32.16%	353.26%
Ka'u	481	5.43%	637	4.69%	32.43%	881	4.24%	38.30%	1,180	4.52%	33.94%	145.32%
So. Kona	681	7.69%	867	6.38%	27.31%	1,186	5.71%	36.79%	1,509	5.78%	27.23%	121.59%
No. Kona	617	6.97%	1,460	10.74%	136.63%	3,179	15.32%	117.74%	4,575	17.51%	43.91%	641.49%
So. Kohala	244	2.75%	550	4.05%	125.41%	944	4.55%	71.64%	1,635	6.26%	73.20%	570.08%
No. Kohala	467	5.27%	583	4.29%	24.84%	767	3.70%	31.56%	1,068	4.09%	39.24%	128.69%
Hamakua	753	8.50%	919	6.76%	22.05%	1,122	5.41%	22.09%	1,285	4.92%	14.53%	70.65%
No. Hilo	338	3.82%	318	2.34%	-5.92%	356	1.72%	11.95%	381	1.46%	7.02%	12.72%
Total	8,858	100%	13,592	100%	53.44%	20,755	100%	52.70%	26,122	100%	25.86%	194.90%
County Gen. Pop. Total	63,468		92,053		45.04%	120,317		30.70%	148,677		23.57%	134.26%

30-years Elderly (60+) Population Growth by County

	1970	*Percent*	1980	*Percent*	decennial %change	1990	*Percent*	decennial %change	2000	*Percent*	decennial %change	30 years % change
State Gen. Pop. Total	769,913		964,691		25.30%	1,108,229		14.88%	1,211,537		9.32%	57.36%
State 60+ Total	67,488		113,994		68.91%	173,733		52.41%	207,001		19.15%	206.72%
Kauai County 60+	4,231	6.27%	6,125	5.37%	44.76%	8,877	5.11%	44.93%	10,468	5.06%	17.92%	147.41%
Maui County 60+	6,415	9.51%	10,407	9.13%	62.23%	15,611	8.99%	50.00%	19,436	9.39%	24.50%	202.98%
Honolulu 60+	47,984	71.10%	83,820	73.53%	74.68%	128,490	73.96%	53.29%	150,910	72.90%	17.45%	214.50%
Hawaii County 60+	8,858	13.13%	13,592	11.92%	53.44%	20,755	11.95%	52.70%	26,122	12.62%	25.86%	194.90%

Compiled & tabulated by Lito M. Asuncion, Hawaii County Office of Aging

APPENDIX 3 – TRAFFIC IMPACT ANALYSIS REPORT, MOHOULI HEIGHTS SENIOR NEIGHBORHOOD PROJECT

Traffic Impact Analysis Report

for

Hawai'i Island Community Development Corporation
Mohouli Heights Senior Neighborhood Project
Hilo, Island of Hawai'i, Hawai'i

Tax Map Key Number *(3)2-4-001: 177*

DECEMBER 2008

Prepared for:

Hawai'i Island Community Development Corporation
100 Pauahi Street, Suite 204
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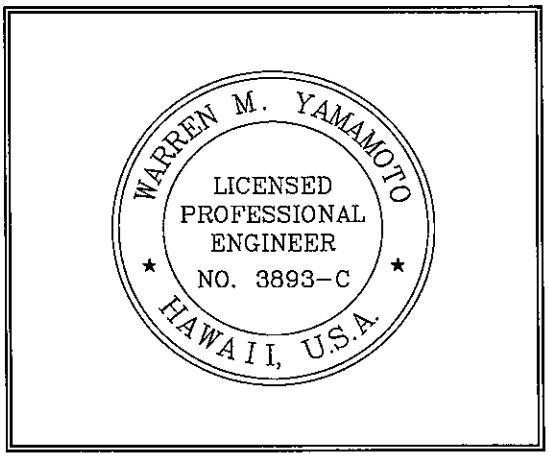
Hawai'i Island Community Development Corporation
Mohouli Heights Senior Neighborhood Project

Hilo, Island of Hawai'i, Hawai'i

Traffic Impact Analysis Report

TMK: (3)2-4-001: 177

December 2008



Expiration Date:
April 30, 2010

This work was prepared by me or under my direct supervision.

Signature
M & E Pacific, Inc.
METCALF&EDDY | AECOM

16 DEC 2008
Date

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TRAFFIC IMPACT ANALYSIS REPORT
for the
HAWAII ISLAND COMMUNITY DEVELOPMENT CORPORATION
MOHOULI HEIGHTS SENIOR NEIGHBORHOOD PROJECT

The Hawai'i Island Community Development Corporation (HICDC) is proposing an elderly affordable housing project in Hilo, Hawai'i. This report documents a study that was conducted to identify the traffic impacts of the proposed project and to recommend any mitigating measures.

PROJECT DESCRIPTION

The County of Hawai'i is proposing to develop the Mohouli Heights Senior Neighborhood Project, an elderly affordable housing project, in Hilo, Hawai'i. The project site is on a 15.948 acre site on Mohouli Street, *mauka* of Komohana Street, as shown on **Figure 1**. The proposed project site is identified as Tax Map Key (3)2-4-001: 177.

The proposed project would include 160 residential units in multi-unit structures around a central seniors' activity core. It would be developed in 5 phases of 32 units each. Construction of the first phase is expected to begin in 2010 with each phase taking one year to complete. The proposed project is expected to be fully occupied by 2015. Since this project is not expected to generate more that 50 trips per hour, it does not meet the concurrency requirements of Hawai'i County Ordinance No. 07 99, and only the 2015 forecast year was analyzed.

Access to the project site would be from Mohouli Street through a 50 foot roadway right of way identified as Tax Map Key (3)2-4-001: 178 that is on the western boundary of the site. This roadway would be shared with the Hawai'i County Fire Administration Support Complex.

Other roadways in the area include Komohana Street and Kukuau Street. The major intersections in the vicinity that would be affected by project generated traffic include the Komohana Street and Kukuau Street intersections with Mohouli Street, and the Komohana Street/Kukuau intersection. **Figure 1** shows the project site in relationship to the three study intersections.

EXISTING CONDITIONS

A survey of the existing roadway and traffic conditions was made in December 2007 and October 2008.

Existing Roadways

The roadways of interest in the project area are Mohouli Street, Komohana Street, and Kukuau Street. Mohouli Street and Komohana Street are two-lane County roadways classified as major collectors while Kukuau Street is a minor collector roadway.

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 about 2002. The newer section of roadway has wide 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 and Ainako with an alternate access route to the south and west sections of Hilo.

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.

Kukuau Street is a two-lane County collector road. The older roadway section *makai* of Komohana Street runs through a residential neighborhood and intersects with Kapiolani 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.

The Komohana Street/Mohouli Street intersection is signalized with protected left-turn movements on the Mohouli Street approaches and protected/permitted left turns on the Komohana Street approaches. The northbound Komohana Street and eastbound Mohouli Street approaches have separate left-turn, through and right-turn lanes. The southbound Komohana Street and westbound Mohouli Street approaches have separate left-turn and shared through/right-turn lanes.

The Komohana Street/Kukuau Street intersection has stop sign controls on the Kukuau Street approaches. Both Komohana Street approaches and the Kukuau Street westbound approach have separate left-turn and shared through/right-turn lanes. The Kukuau Street eastbound approach has a single shared lane.

The Mohouli Street/Kukuau Street intersection has stop sign controls on the Kukuau Street approaches. Both Mohouli Street approaches have separate left-turn and shared through/right-turn lanes while the Kukuau Street approaches are single shared lanes.

Traffic Volumes

Traffic turning movement counts were taken at the three study intersections on December 11-13, 2007, for another study to determine existing traffic conditions. Traffic counts were taken at the Komohana Street/Mohouli Street intersection on October 9, 2008, for this study. The traffic counts were taken during the morning (6:30 to 8:30 AM) and afternoon (3:30 to 5:30 PM) peak periods. Traffic turning movement counts require a traffic surveyor to observe traffic flow and record the movements of each vehicle crossing the intersection as through or turning movements by 15 minute intervals. The worksheets for the 2007 and 2008 traffic count are included in **Appendix A**.

The 2007 and 2008 traffic volumes for the morning and afternoon peak hours are shown on **Figure 2**, with volumes rounded to the nearest five vehicles per hour (vph) except for volumes less than five. The year 2008 traffic volumes are for the most part equal to or lower than the year 2007 traffic volumes. For this reason, it was assumed that the traffic volumes counted in 2007 at all three intersections were applicable for 2008 and used in this study.

The main direction of travel in the morning peak is northbound on Komohana Street and *makai* bound on Mohouli Street. The main directions of travel reverse in the afternoon peak hour. The morning northbound traffic flow on Komohana Street is currently constrained by the backup of traffic from the Ponohawai Street intersection, the next signalized intersection to the north.

The traffic volumes on the Kukuau Street approaches can be described as light. The main direction of travel in the morning is *makai* bound out of the subdivision. The afternoon direction of travel shifts to *mauka* bound into the subdivision. The current traffic operations at the three study intersections are discussed in the **Level of Service Analysis** section.

The State of Hawai'i Department of Transportation (State DOT) used to take traffic counts every two years at selected roadway sections on Hawai'i under their previous counting program. One of these count stations is at the Puainako Street/Komohana Street intersection (Station 18-Z), about one-half mile south of the Mohouli Street intersection. Five daily traffic volumes were available for the ten year period from 1994 to 2004, with data for the year 2000 not reported. The data shown on **Figure 3** gives the historical trend of daily traffic at this location on the north leg of Komohana Street and the *makai* leg of Puainako Street. The graph shows a gradual increase in traffic from 1994 to 2004. Daily two-way traffic volumes on Komohana Street increased 14.8% in 10 years for an annual compound growth rate of 1.39%, while daily traffic on Puainako Street increased 7.0% for an annual rate of 0.7%.

The pattern of hourly traffic volumes on Komohana Street on June 16, 2004, is shown in tabular and graph form on **Figure 4**. The morning northbound traffic flow has a steep one hour peak at 7:00 AM, and remains at a lower but relatively stable level until 6:00 PM. The southbound traffic shows a small morning peak, a moderate midday peak, and a high afternoon peak at 4:00 PM.

The State DOT also took a one time traffic count at the Komohana Street/Mohouli Street intersection on July 23, 2002. The pattern of hourly traffic volumes on Mohouli Street Street is shown in tabular and graph form on **Figure 5**. There is a sharp *makai* bound peak in the morning and a sharp *mauka* bound peak in the afternoon.

PROPOSED ROADWAY IMPROVEMENTS

The County of Hawai'i recently installed traffic signals at the Mohouli Street/Kumukoa Street intersection one block east of Komohana Street.

The County of Hawai'i has included the improvement (widening) of Mohouli Street from Komohana Street to Kino'ole Street in the FY 2008-2013 Financially Constrained Statewide Transportation Improvement Program (STIP). The design is programmed for FY 2009 and construction in FY 2013. Projects listed in FYs 2012 and 2013 are considered for information only.

The State DOT is also pursuing the realignment and widening of Puainako Street from Komohana Street to Kanoelehua Avenue. Their efforts are being expended in a general *mauka* to *makai* direction. The first phase involves the realignment of Puainako Street between Komohana Street and Kawili Street to the north so that the new roadway would be north of the residences lining the existing roadway, which would become a local street. The STIP shows right-of-way acquisition programmed in FY 2013. Future phases would involve widening Puainako Street *makai* of Kawili Street.

TRAFFIC FORECASTS

The proposed project is scheduled for full occupancy in 2015. During the eight year period from the 2007 traffic count date to full occupancy, ambient traffic on the area roadways can be expected to increase due to regional growth and new projects in the area. The traffic that would be generated from the proposed project was added to the ambient traffic forecast to obtain the total with project traffic forecasts for the three study forecast years.

Ambient Traffic Forecast

Ambient traffic on the study area roadways will increase due to regional growth in the adjoining areas and new projects in the study area. A two step process was used to develop the ambient traffic forecasts. The first step developed a background traffic forecast based on regional traffic growth and committed projects. The second step added traffic which would be generated by proposed development on the University of Hawai'i at Hilo (UHH) and the Hawai'i County Fire Administration Support Complex.

The existing traffic volumes shown on **Figure 2** were increased by 11.7% to represent the background regional growth. This number represents the 1.39% annual growth rate observed in traffic on Komohana Street as shown on **Figure 3** over an eight year period. The 2015 background traffic forecast volumes are shown on **Figure 6**, with volumes rounded to the nearest five vph except for volumes less than five.

Traffic which would be generated onto Komohana Street by three proposed UHH projects as forecast by their traffic studies were included:

- China-U.S. Center
- U.S. Department of Agriculture Pacific Basin Agricultural Research Center
- UH-Hilo Ka Haka 'Ula O Ke'elikolani Hawaiian Language Building

These traffic forecast volumes were then distributed along Komohana Street, Mohouli Street and Kukuau Street in proportion to the existing traffic volumes. The results of the forecasts are shown on **Figure 7** with volumes not rounded. The UHH Mauka Lands

parcel across Mohouli Street from the proposed project site consists of 118 acres for the University Park Expansion, 122 acres for the Hawai'i Community College (HCC) Komohana Campus, and 28 acres for other University-related functions. A traffic study was prepared for the HCC campus which assumed full development in 2025. This parcel was assumed not to be developed by 2015 and not included in this analysis.

The proposed Hawai'i County Fire Administration Support Complex would be developed on the adjacent property west of the proposed project. It would be developed in three phases with expected openings in 2010, 2017 and 2027. Only the first phase would be operational by 2015 and is forecast to generate 48 trips in the 2010-2015 morning peak, and 62 trips in the afternoon peak. The traffic assignment for the first project phase was taken from the traffic impact analysis report prepared for the fire complex and is shown on **Figure 8**. This project would utilize the existing roadway parcel (Tax Map Key (3)2-4-001: 178) accessing Mohouli Street which would be developed as a County dedicated road.

The 2015 UHH projects generated traffic forecasts (**Figure 7**) and 2015 fire complex generated traffic forecasts (**Figure 8**) were added to the 2015 background traffic forecasts (**Figure 6**) to obtain the 2015 ambient traffic forecast shown on **Figure 9**. The traffic operations for the ambient forecast conditions at the three study intersections and project access roadway are discussed in the **Level of Service Analysis** section.

Project Generated Traffic

The traditional three-step process of trip generation, trip distribution, and trip assignment was used to forecast future traffic that would be generated by the proposed project. The trip generation step forecasts the number of new trips that would be produced in each of the two study periods. The trip distribution step allocates these new trips by direction of travel. Finally, the trip assignment step assigns the trips to the specific turning movements at the study intersections.

The trip generation step forecasts the volume of vehicle trips that would be generated by the proposed project during the morning and afternoon peak periods. The trip generation rates for a Senior Adult Housing-Attached (Land Use Code 252) as found in the ITE Trip Generation report were used for the proposed project. The ITE report describes this land use as:

> "Senior adult housing consists of apartment-like residential units, including retirement communities, age-restricted housing and active adult communities. Attached senior adult housing may include limited social or recreational services, but typically lack centralized dining or medical facilities. Residents in these communities live independently, are typically active (requiring little or no medical supervision) and may or may not be retired."

The trip generation analysis is summarized on **Table 1**. The 160 retirement units are forecast to generate 13 trips in the morning peak and 18 trips in the afternoon peak when project is fully occupied in 2015. The Trip Generation report also provides information on the percentage of inbound and outbound trips in each peak hour.

The trip distribution step divides the generated trips by directions of travel to/from the project site. The proportion of trips to each of the four major travel corridors in the study area were based on the volume of existing trips entering and leaving the residential areas on Kukuau Street and are summarized on **Table 1**. The resultant number of trips to each study corridor is small (4 or less) since the proposed project is not expected to generate many trips. The combined total volumes may not add up to the sum of the individual components of generated trips due to rounding.

The project generated traffic volumes were assigned to the study area network based on the directions of travel and the access routes. The results of the traffic assignment analysis are shown on **Figure 10**, with the volumes not rounded. The number of trips which are assigned to the Komohana Street south corridor is five or less in both peak hours, which would indicate that the project would not have any significant impact on traffic operations on Puainako Street.

Total Forecast Volumes

The project generated traffic assignment volumes from **Figure 10** were added to the ambient traffic forecasts from **Figure 9** to obtain the total with project traffic forecasts shown on **Figure 11**. The traffic volumes are rounded to the nearest five vph except for volumes less than five.

LEVEL OF SERVICE ANALYSIS

The concept of level of service is used to quantify the quality of traffic flow on roadway facilities. The Transportation Research Board (TRB) has developed procedures to calculate level of service value(s) by measuring traffic volumes against the capacities of different types of roadway facilities. Their Highway Capacity Manual 2000 (HCM2000) describes the various procedures developed for freeways, highways, signalized and unsignalized intersections, etc.

The Komohana Street/Mohouli Street intersection is currently signalized. The methodology for analyzing signalized intersections calculates the levels of service for individual movements, approaches and the intersection as a whole based on the average stopped delay per vehicle. The results range from level of service A (best with average delays less than ten seconds) to F (worst with average delays longer than 80 seconds), described as follows:

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds/Vehicle)
A	< 10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	> 80.1

The County of Hawai'i considers levels of service A to D as acceptable for signalized intersections, with levels of service E and F indicating the need for mitigating measures. For signalized intersections, the major streets can be designed to have a higher level of service than the minor streets or turning lanes. Level of service E conditions are sometimes tolerated for minor traffic movements such as left-turn movements if they maintain acceptable levels of service on the major street.

The Komohana Street/Mohouli Street traffic signal presently runs on a cycle in the morning peak and is fully actuated in the afternoon peak. The northbound through traffic flow on Komohana Street is delayed in the morning peak by the traffic queue that forms from the Ponohawai Street signal to the north. The capacity for the northbound through movement was reduced from 1,500 to 1,200 vph to replicate the effects of this queuing.

The level of service analysis for this intersection is shown on **Table 2**. It is operating at a minimally acceptable level of service D in the morning peak. The two approaches with the highest volumes, Komohana Street northbound, and Mohouli Street eastbound, are operating at level of service E, indicating the possible need for mitigating measures. The northbound through movement is operating at level of service F due to the backup of traffic from the next traffic signal. The primary reasons for these poor levels of service are the high volumes of vehicles on a single lane of traffic.

The intersection is operating at level of service E in the afternoon peak due to two problem movements. The high volumes of left turns from the westbound approach of Mohouli Street are operating at level of service F and require more green time or an additional traffic lane. The high volumes of southbound through vehicles on Komohana Street are operating at level of service E.

The intersection level of service is forecast to decrease to F in the 2015 AM peak hour with the increase in ambient traffic on the current roadway system as the current problem movements would only worsen. Although there are no roadway improvements

planned for this intersection by 2015, the impact of widening Komohana Street to four lanes was analyzed as a mitigating measure. If Komohana Street were widened to four lanes, the intersection level of service would improve from F to D, northbound through movement would improve from F to D, Mohouli Street eastbound through movement would improve from F to E, and Mohouli Street westbound left-turn movement would improve from E to C.

The intersection is forecast to continue operating at level of service E in the 2015 PM peak without any roadway improvements. If Komohana Street were widened to four lanes as a mitigating measure, the intersection level of service would improve from E to D, southbound through movement would improve from E to D, and Mohouli Street westbound left-turn movement would improve from F to E.

The widening of Komohana Street is planned but not programmed, meaning it would take at least 10 years to be implemented unless special funding were made available.

For both peak periods, the small amount of traffic generated by the proposed project has little impact on traffic operations as evidenced by the small increases in delay with no changes in levels of service between the ambient and total with project forecasts. Only three movements show changes in level of service from E to F with the project since the ambient forecast delay value is on the threshold between changes in levels of service.

The two study intersections on Kukuau Street are currently unsignalized. The procedure used for analyzing unsignalized intersections calculates vehicle delays and levels of service based on the distribution of gaps in traffic on the major street and driver judgment in selecting gaps through which to execute turns. For two-way stop intersections where only the minor street traffic is controlled by a stop sign, levels of service are calculated for the critical turning movements including outbound movements from the stop-controlled approach, and left turns from the major street to the minor street. The procedure does not calculate an overall intersection level of service.

The Highway Capacity Manual defines the relationship between level of service and delay (in seconds/vehicle) for unsignalized intersections as shown below:

LEVEL OF SERVICE	DELAY (Seconds/Vehicle)
A	< 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	> 50.1

The County of Hawai'i considers levels of service A to D as acceptable for unsignalized intersections. Level of service F (with average delays longer than 50 seconds) is considered undesirable for unsignalized intersections and would indicate the possible need for mitigation. Level of service F conditions could be tolerated if the delays are not much higher than 60 seconds, traffic queues are short, and there are no reasonable mitigating measures available.

Table 3 summarizes the unsignalized intersection level of service analysis for the two study intersections on Kukuau Street. All four approaches of the Mohouli Street/Kukuau Street intersection approaches are currently operating at acceptable levels of service in both peak hours. The increase in ambient traffic would cause the level of service on the Kukuau Street eastbound approach to change from C to a minimally acceptable D in the AM peak hour, while all the other approaches in both peak hours would remain unchanged at acceptable levels of service in both 2015 peak hours. The proposed project would generate small volumes of traffic such that it would not cause any changes from the ambient forecast conditions in both peak hours.

The traffic exiting the Kukuau Street approaches at Komohana Street are currently operating at level of service E in the morning peak, indicating the possible existing need for mitigation. The same traffic movements in the afternoon peak are operating at an acceptable level of service D. Since the high traffic volumes on Komohana Street occur

for only a short period of the day and there are no reasonable mitigating actions, the existing traffic operations could be tolerated.

With the increase in ambient traffic to 2015, the outbound movements from Kukuau Street are forecast to operate at levels of service F in the AM peak and level E in the afternoon peak. The small number of trips generated by the proposed project and driving though this intersection would not have any noticeable effect, as indicated by no changes in levels of service between the ambient and total forecast conditions.

Widening Komohana Street to four lanes would improve traffic operations on that street but would not necessarily improve traffic operations on Kukuau Street. During the AM peak hour, the westbound through movement on Kukuau Street would improve from level of service D to C. However, the left-turn movement from that approach and the outbound movement from the eastbound approach would remain at level of service F, albeit with lower, more reasonable levels of delays. During the PM peak hour, the westbound through and eastbound approach would remain unchanged while the westbound left turn movement would improve from level of service F to D. Traffic mitigation measures would be required at this intersection. Traffic signals could be warranted at this intersection in the future.

The proposed project access roadway intersection on Mohouli Street is expected to be stop sign controlled. This roadway would be shared with the County of Hawai'i's Fire Administration Support Complex, which is expected to become operational in about 2010. With only the fire complex generated trips in the 2015 ambient traffic forecasts, the roadway is forecast to have level of service B for the outbound right-turn movement and level of service C for the left-turn movement in both peak hours. The small number of trips generated by the proposed project would not cause changes in the above levels of service. Hence, mitigating measures are not foreseen at this intersection.

CONCLUSIONS

The proposed Mohouli Heights Senior Neighborhood Project is forecast to generate less than 20 trips during the morning and afternoon commuter peak hours, a relatively small number of trips. This additional traffic in itself would not require mitigating measures. However, traffic on Komohana Street is already congested during the morning peak hour and the Mohouli Street intersection is in need of mitigation.

Roadway improvements would be needed to accommodate the future growth in ambient traffic. Komohana Street would have to be widened to four lanes by 2015 to accommodate the future traffic growth.

The currently unsignalized intersection at Mohouli Street/Kukuau Street would not require mitigation in the future due to the increases in ambient traffic. The currently unsignalized intersection Komohana Street/Kukuau Street would require mitigation in the future due to the increases in ambient traffic. Traffic signals may be warranted at this intersection in the future as a mitigating measure.

The future development of the UHH Mauka Lands will significantly increase traffic volumes in the study area. The traffic impacts in this area should be reevaluated when the UHH Mauka Lands development proposals become more defined.

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Figures

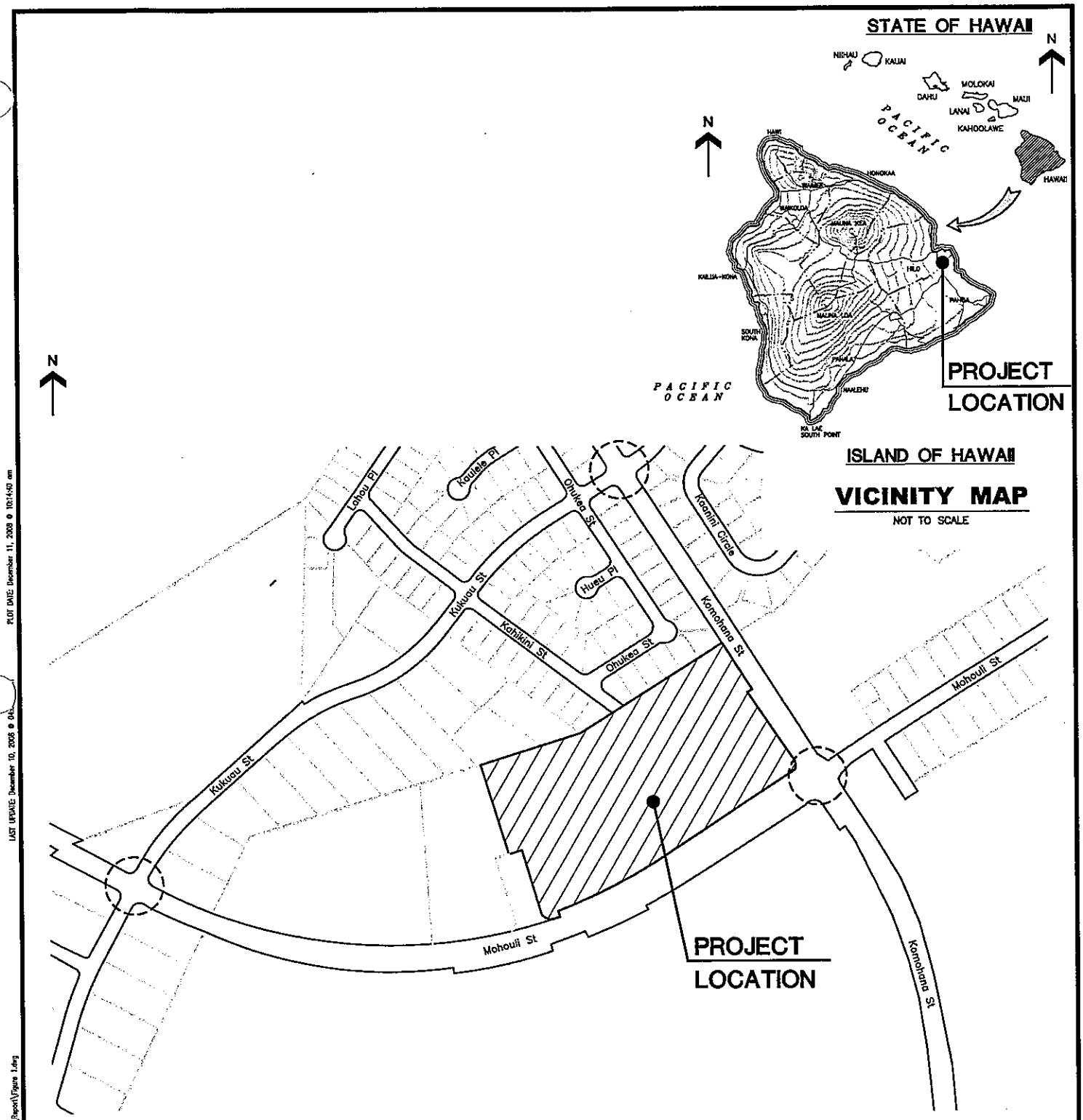

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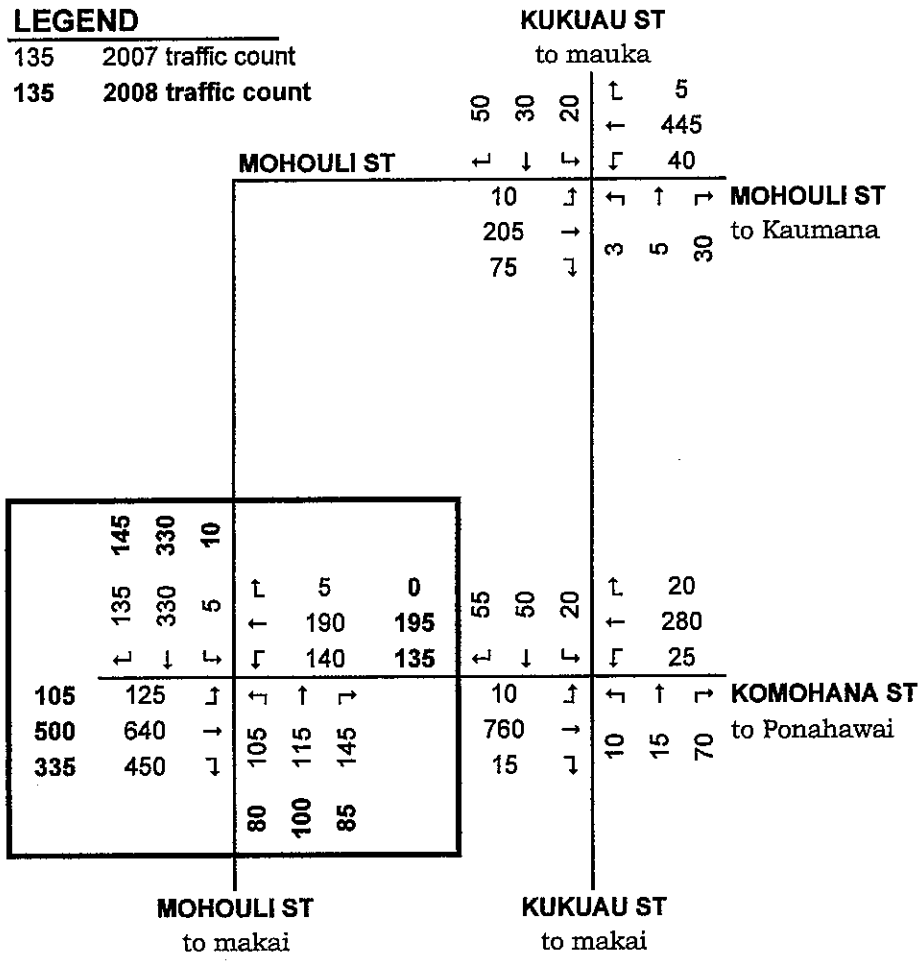
Figure 1
Location Map
Traffic Impact Analysis Report
HICDC Mohouli Heights Senior Neighborhood Project TIAR
December 2008



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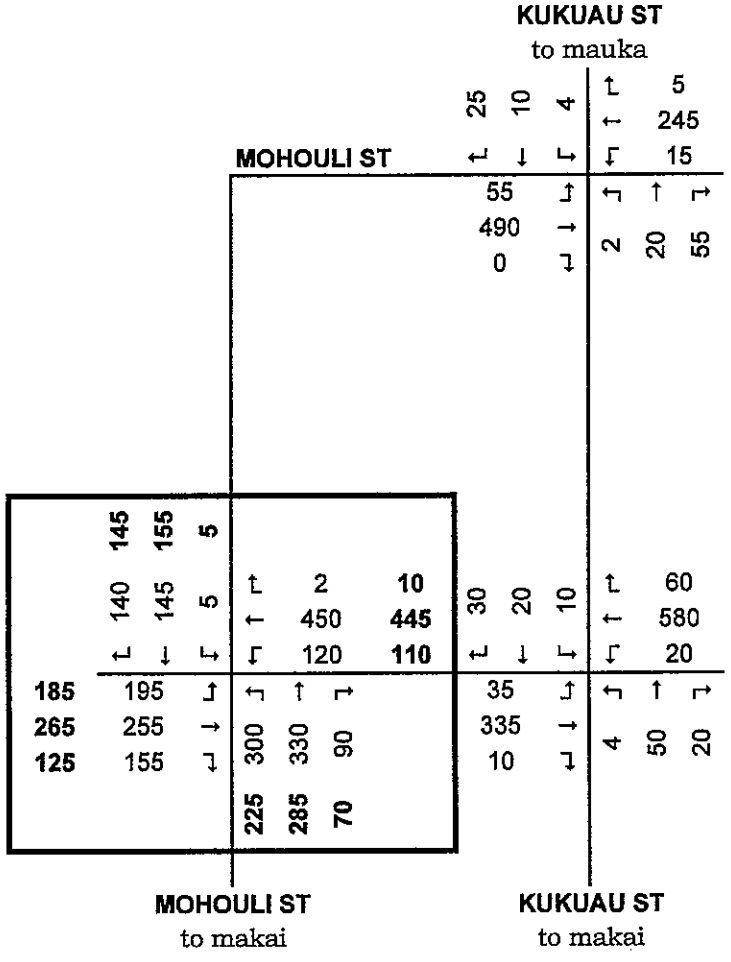
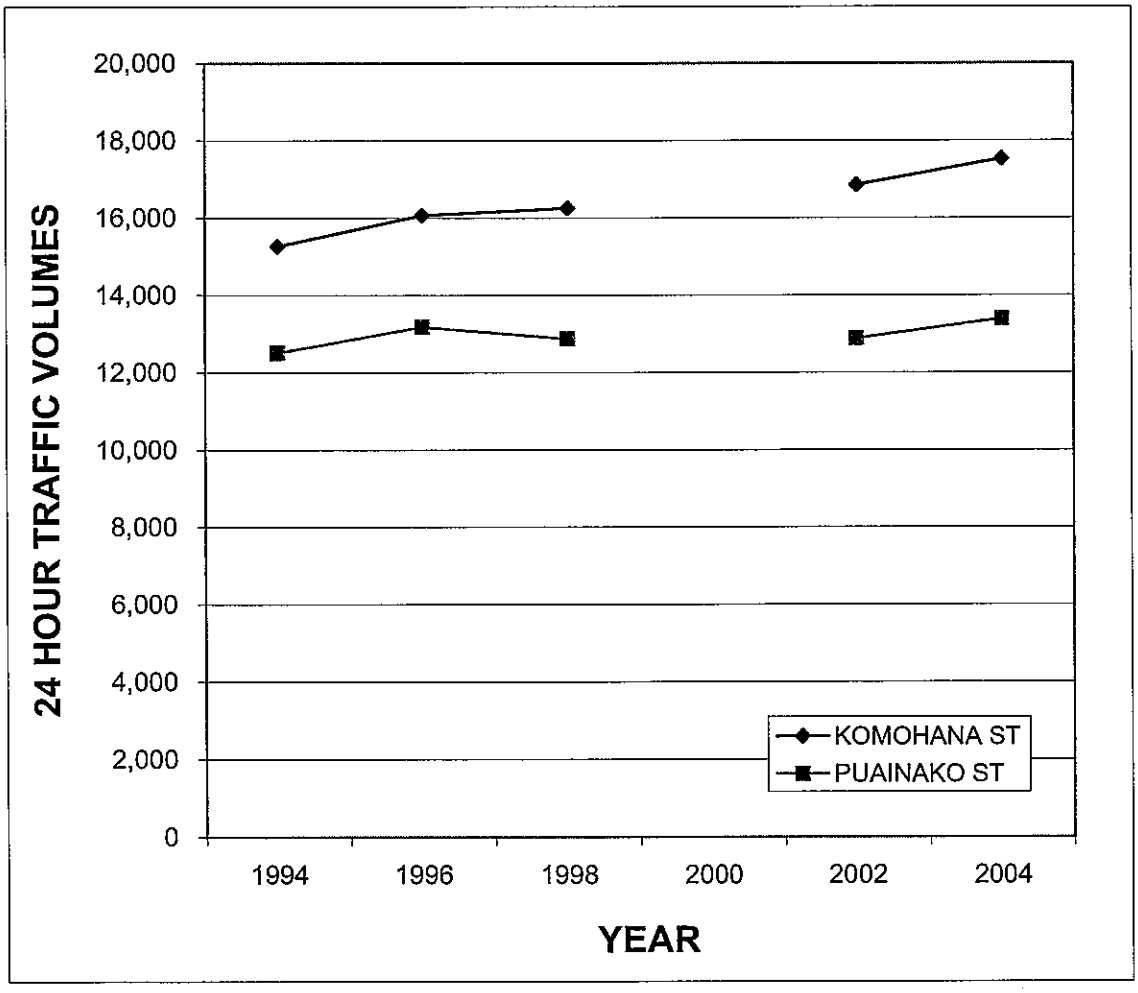


PM PEAK HOUR

EXISTING 2007-2008 TRAFFIC VOLUMES
FIGURE 2

TWO-WAY DAILY TRAFFIC VOLUMES		
YEAR	Komohana North of Puainako	Puainako Makai of Komohana
1994	15,259	12,502
1996	16,060	13,179
1998	16,251	12,863
2000		
2002	16,850	12,885
2004	17,522	13,386

Source: State of Hawaii Department of Transportation
Station 18-Z Puainako St at Komohana St



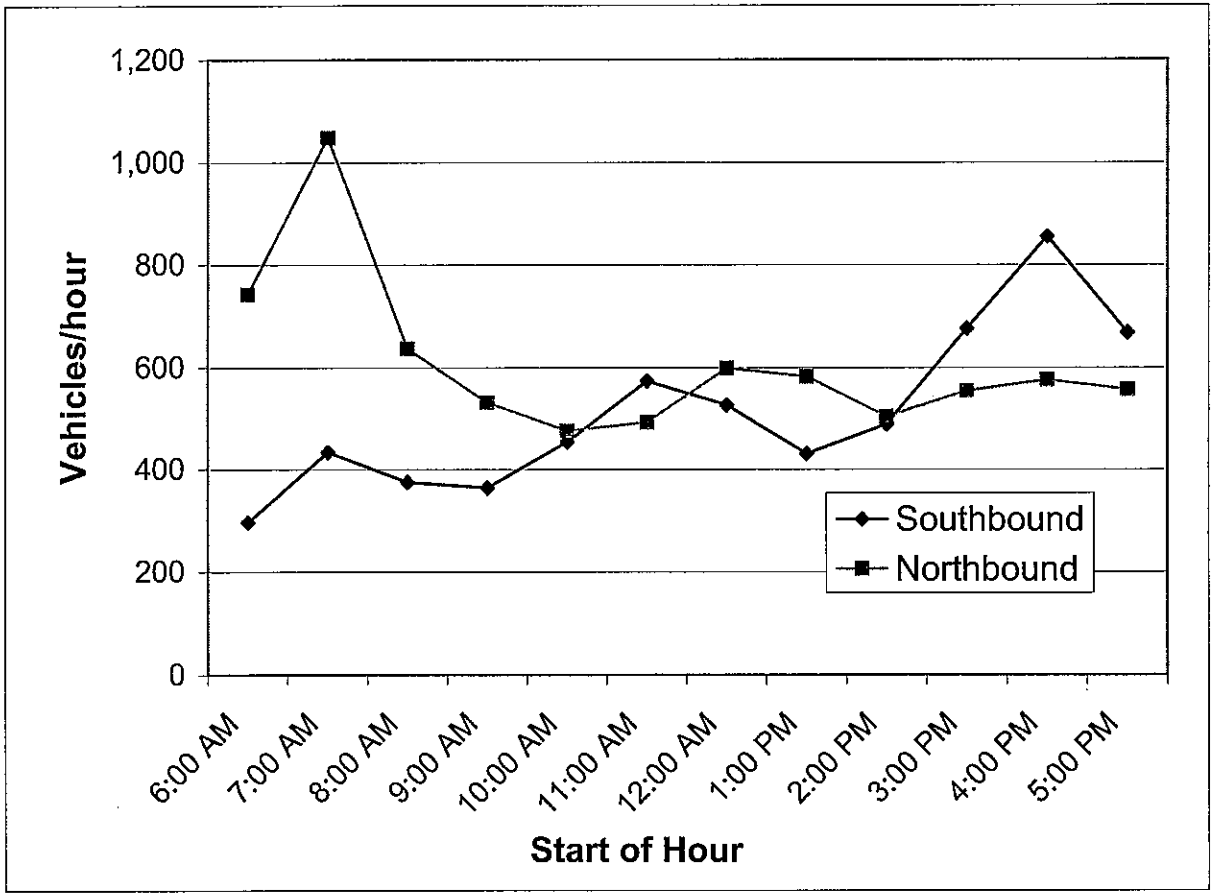
HISTORICAL TREND IN DAILY TRAFFIC VOLUMES ON KOMOHANA STREET AT PUAINAKO STREET
FIGURE 3

HOURLY TRAFFIC VOLUMES ON KOMOHANA STREET

North of Puainako Street (station 18-Z) June 16, 2004

Start of Hour	Vehicles/Hour South Bound	North Bound
6:00 AM	296	743
7:00 AM	434	1,048
8:00 AM	375	637
9:00 AM	364	531
10:00 AM	454	476
11:00 AM	574	493
12:00 AM	527	599
1:00 PM	431	583
2:00 PM	490	504
3:00 PM	677	555
4:00 PM	855	576
5:00 PM	669	557

Source: State of Hawaii
Department of Transportation



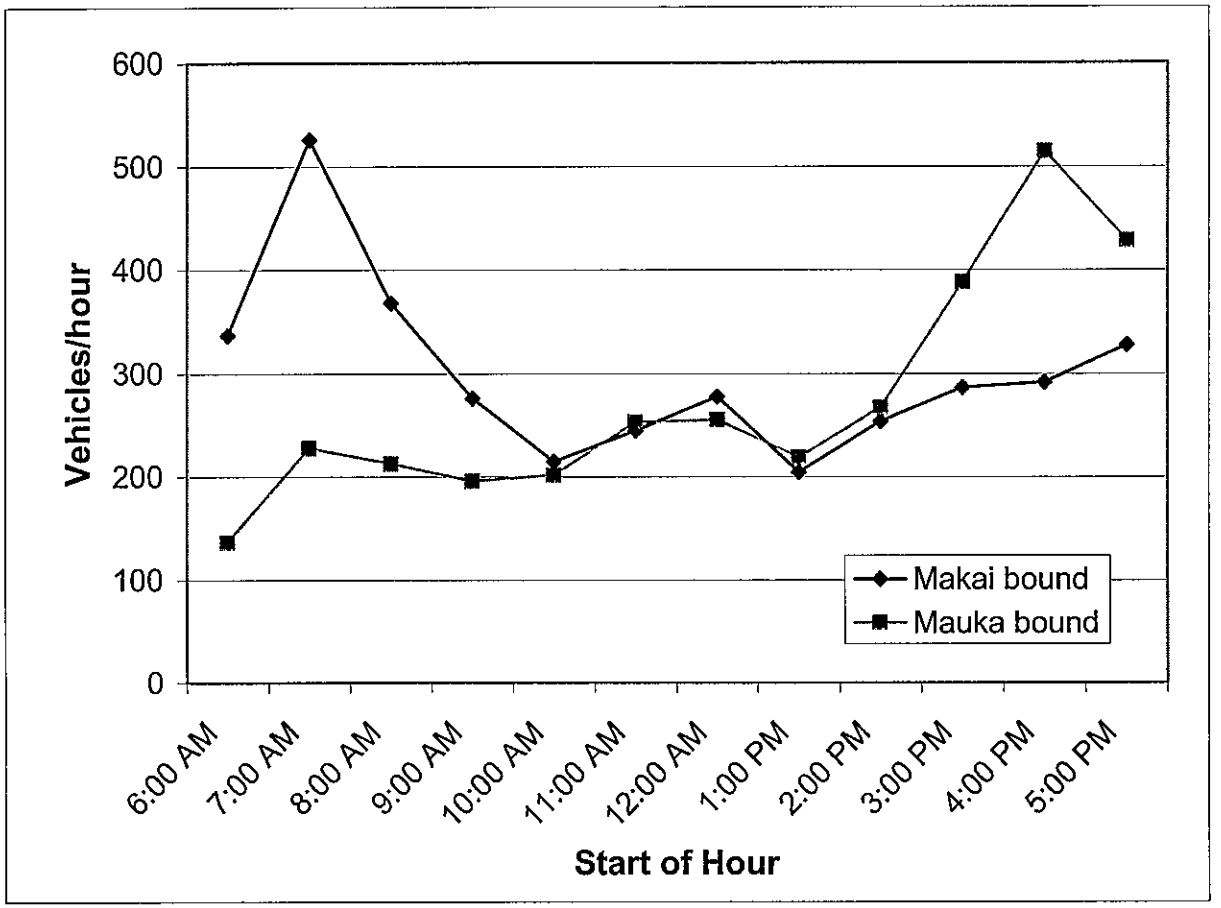
HOURLY TRAFFIC VOLUMES ON KOMOHANA STREET NORTH OF PUAINAKO STREET
FIGURE 4

HOURLY TRAFFIC VOLUMES ON MOHOULI STREET

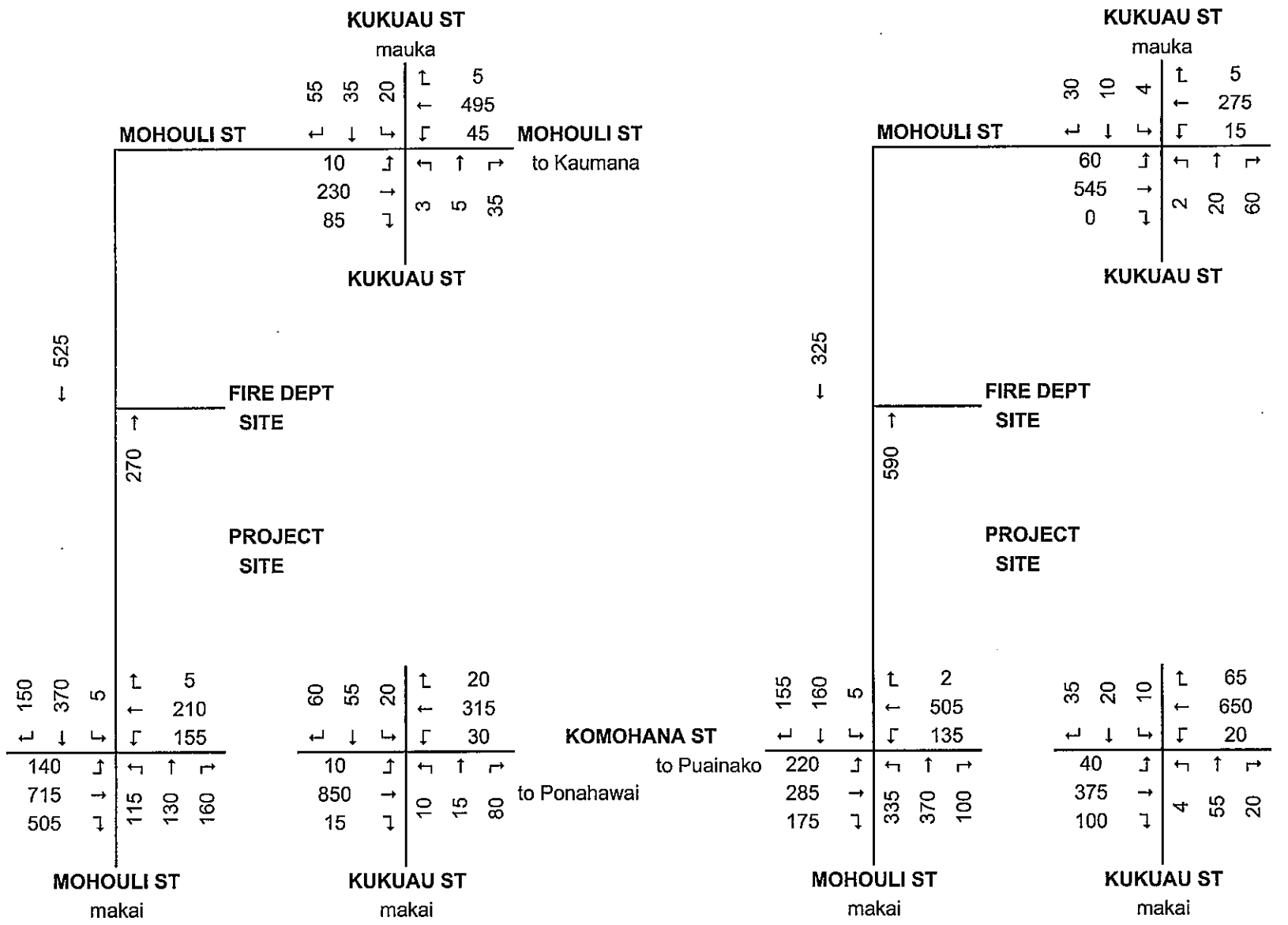
Mauka of Komohana Street (station 19-D) July 23, 2002

Start of Hour	Vehicles/Hour Makai Bound	Mauka Bound
6:00 AM	337	137
7:00 AM	526	228
8:00 AM	368	213
9:00 AM	276	196
10:00 AM	215	202
11:00 AM	245	253
12:00 AM	278	255
1:00 PM	205	219
2:00 PM	254	267
3:00 PM	287	388
4:00 PM	292	515
5:00 PM	328	428

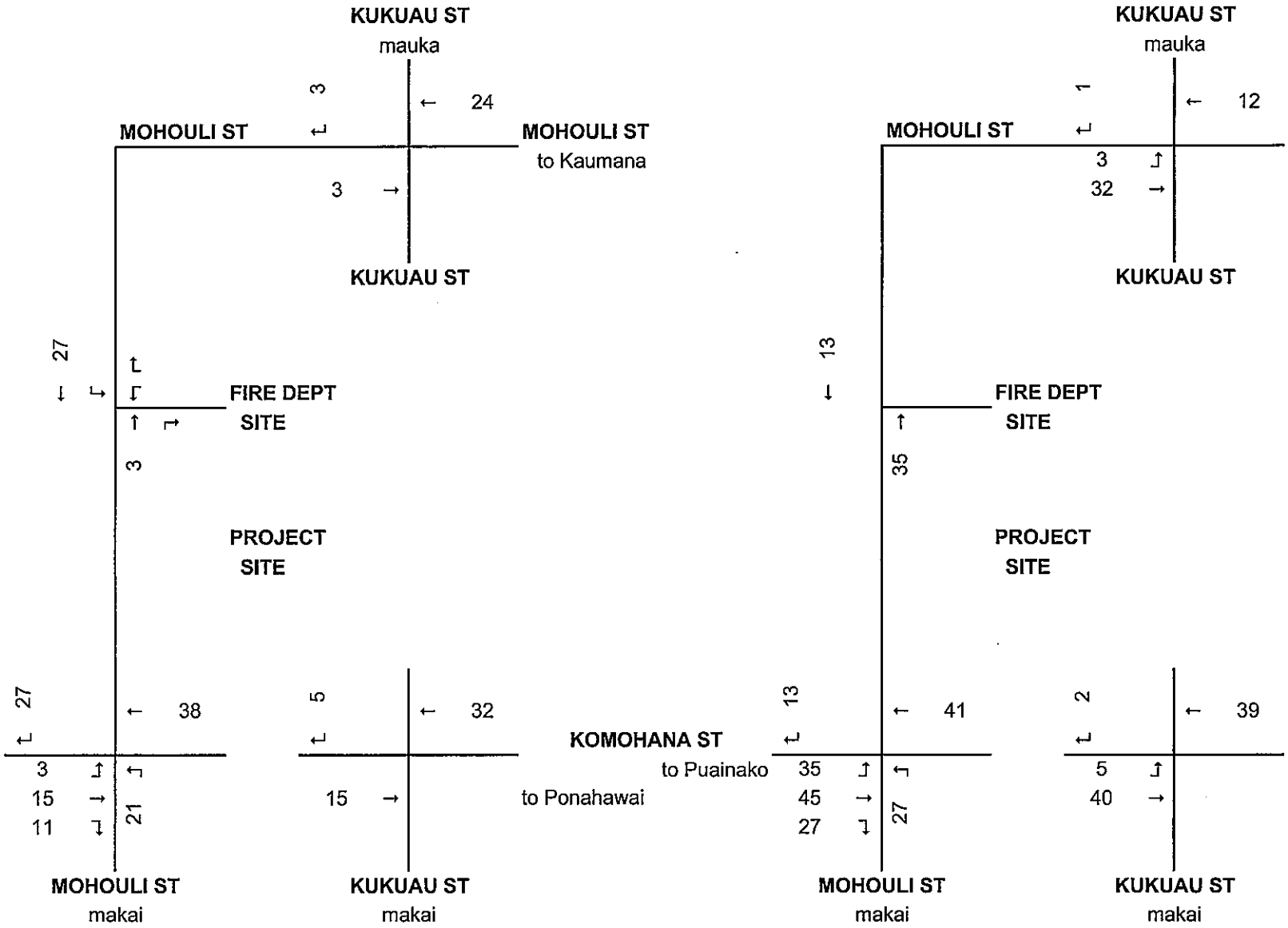
Source: State of Hawaii
Department of Transportation



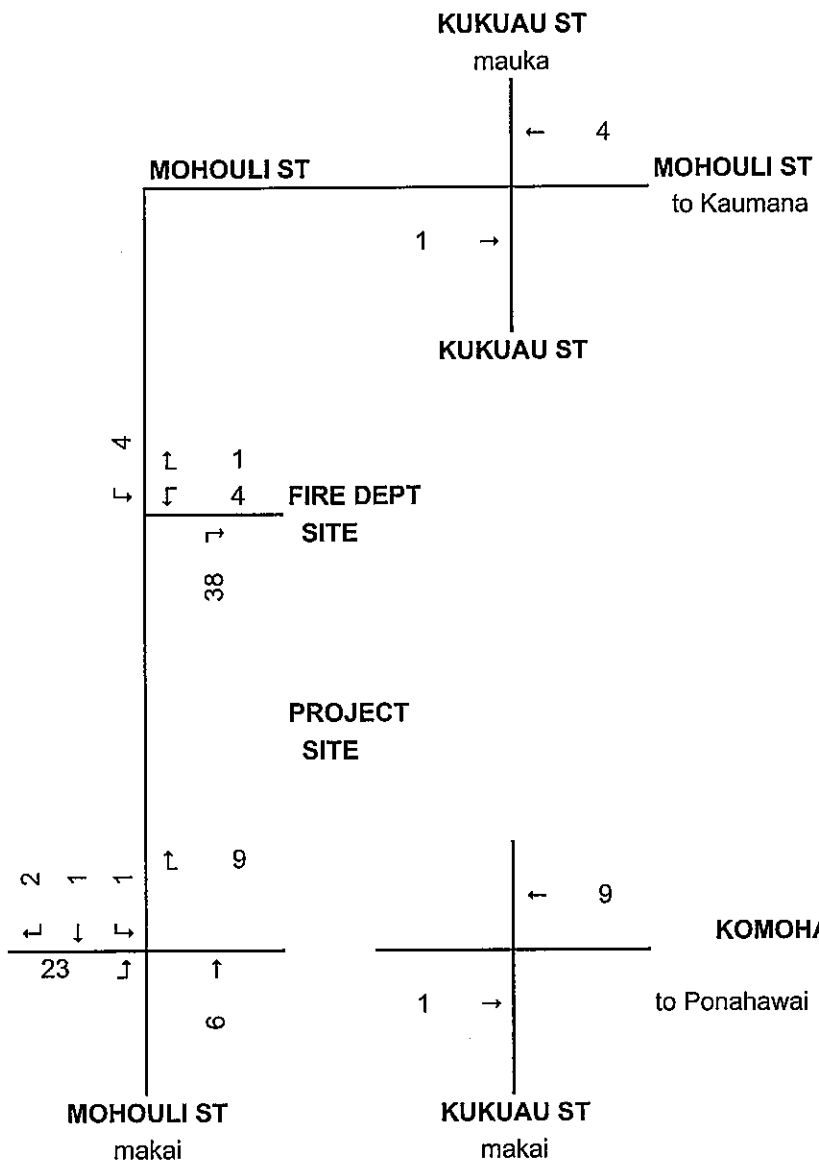
HOURLY TRAFFIC VOLUMES ON MOHOULI STREET MAUKA OF KOMOHANA STREET
FIGURE 5



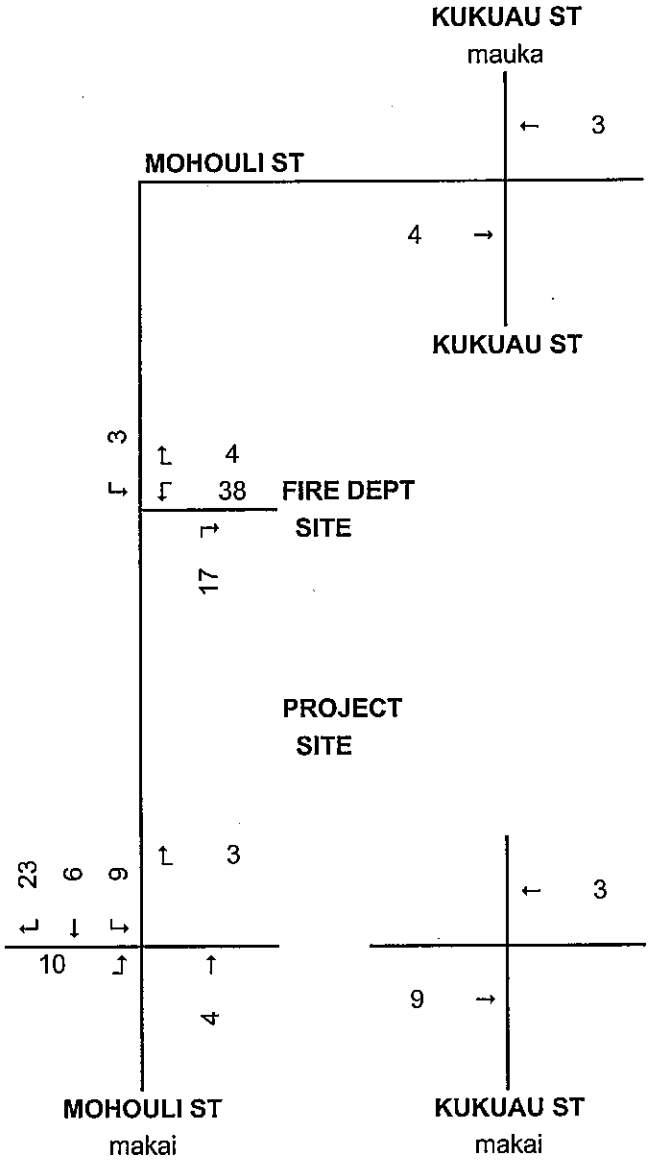
2015 BACKGROUND TRAFFIC FORECAST
FIGURE 6



2015 UHH PROJECTS GENERATED TRAFFIC FORECAST
FIGURE 7

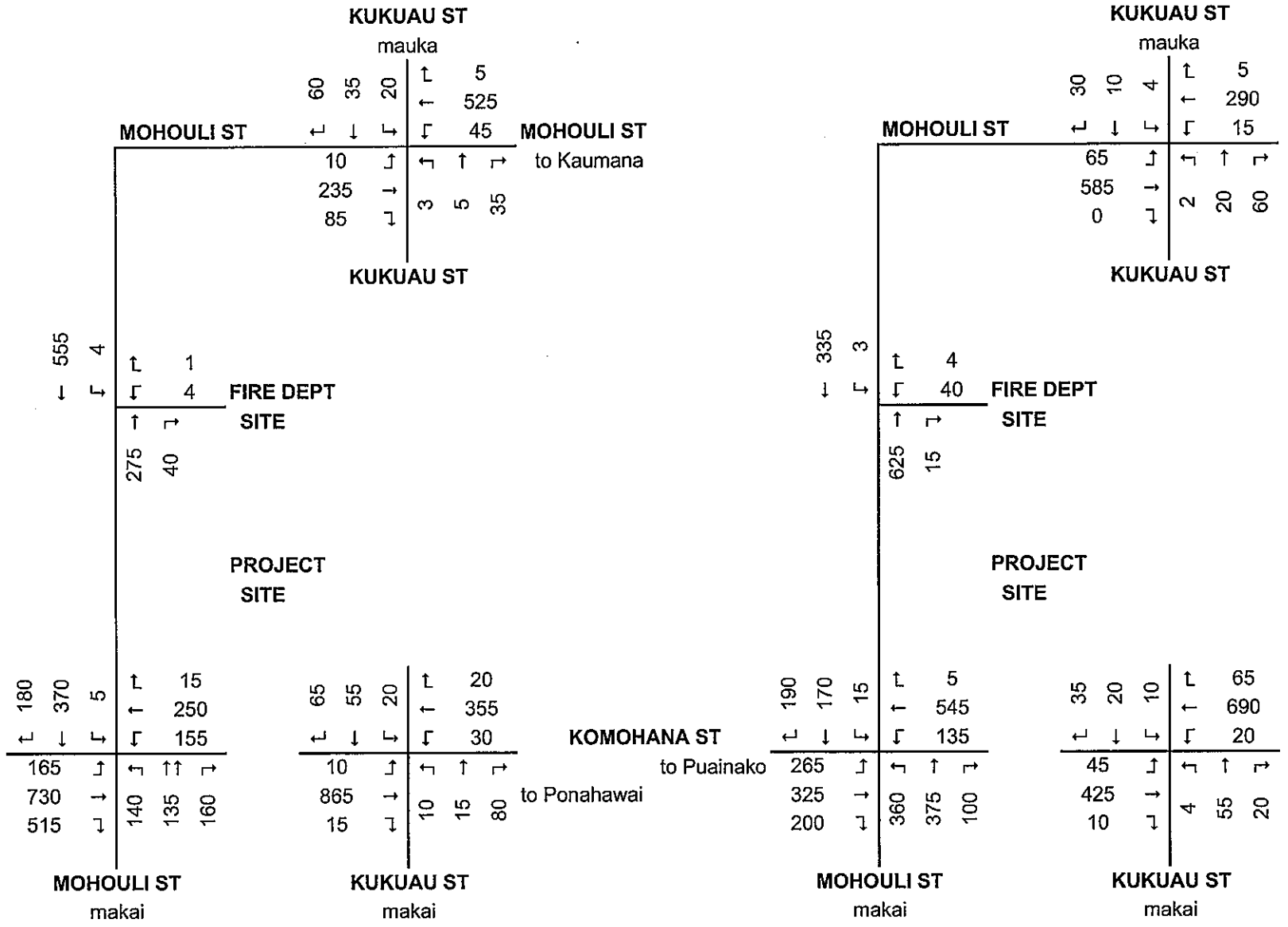


AM PEAK HOUR

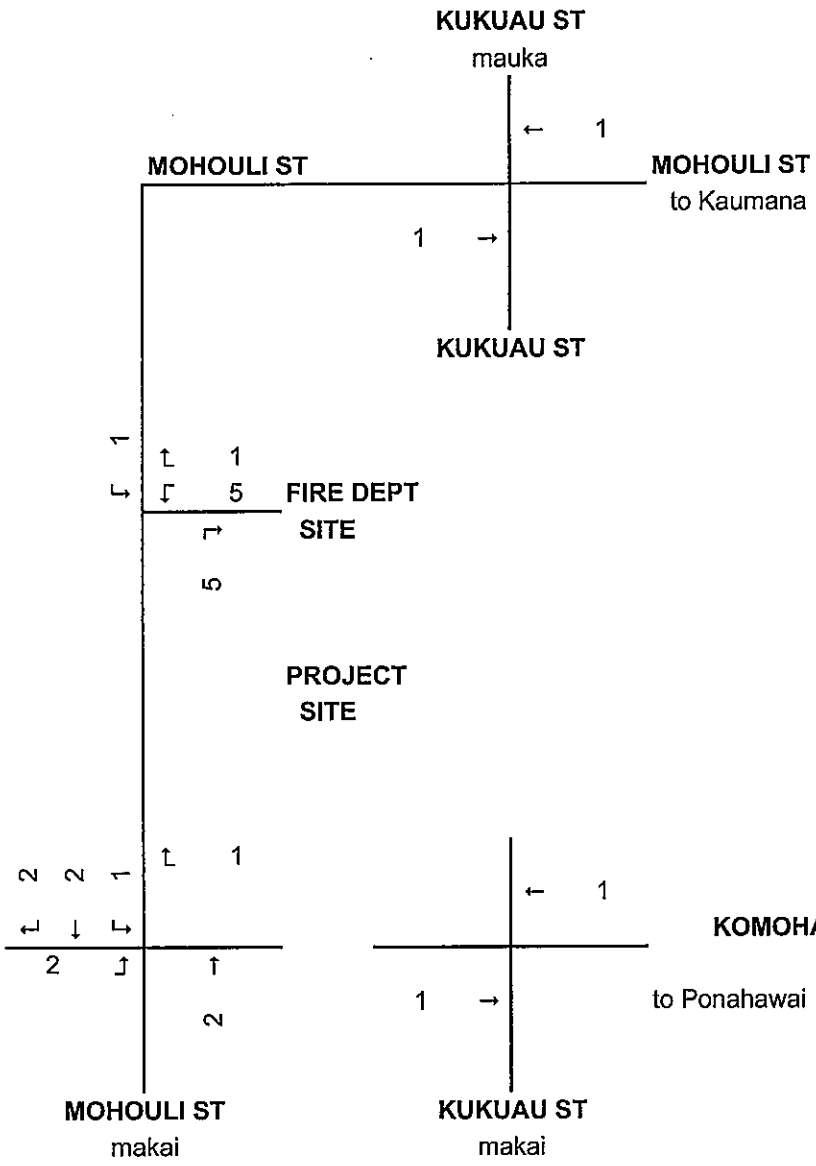


PM PEAK HOUR

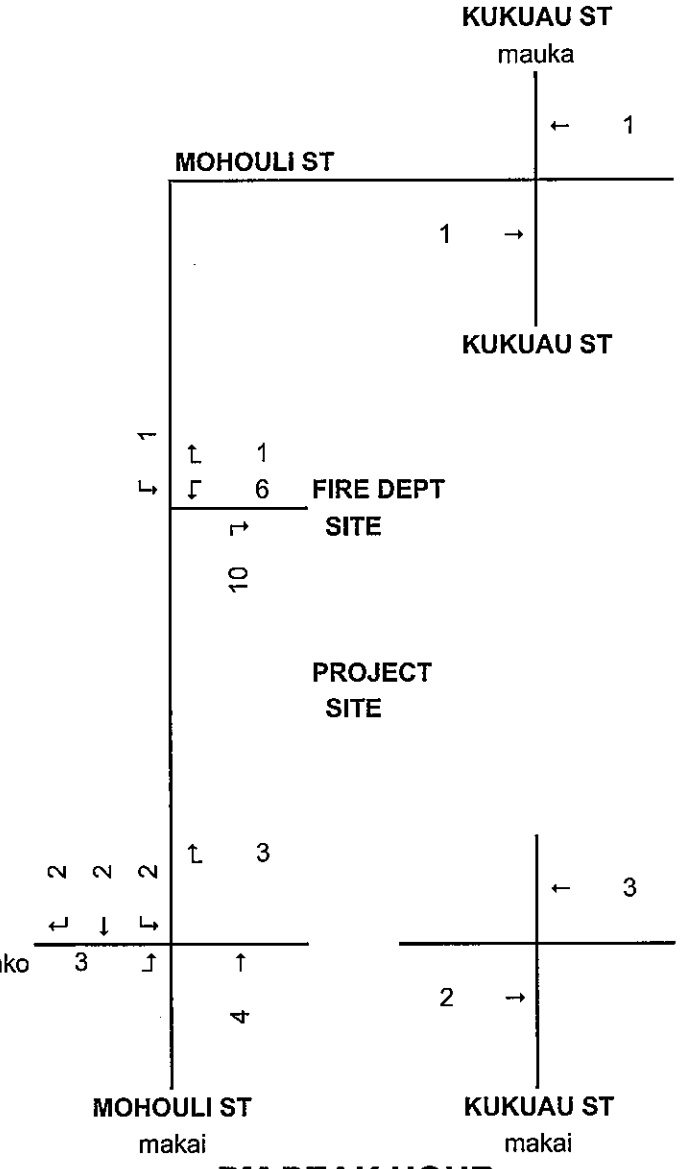
2015 FIRE SUPPORT FACILITY TRAFFIC FORECAST
FIGURE 8



2015 AMBIENT TRAFFIC FORECAST
FIGURE 9

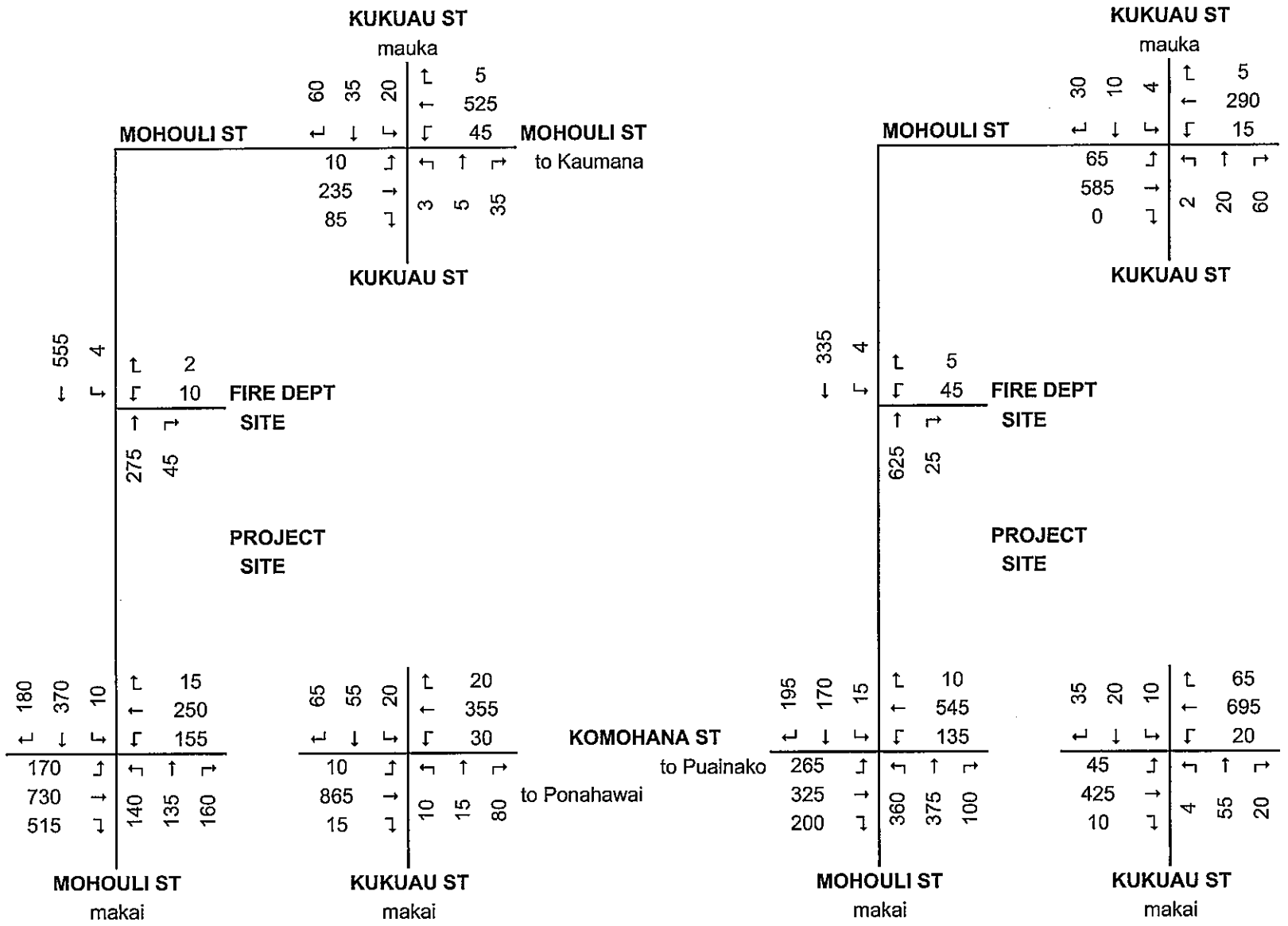


AM PEAK HOUR



PM PEAK HOUR

2015 PROJECT GENERATED TRAFFIC FORECAST
FIGURE 10



2015 TOTAL WITH PROJECT FORECAST
FIGURE 11

Tables

TABLE 1
TRIP GENERATION AND TRIP DISTRIBUTION ANALYSIS

TRIP GENERATION ANALYSIS			TRIP DISTRIBUTION Direction of Travel			
			Mohouli Mauka	Mohouli Makai	Komohana North	Komohana South
Phases 1 to 5, 160 units						
AM PEAK HOUR	T = 0.08X					
	T =	13	20%	30%	20%	30%
	45% in	6	1	2	1	2
			20%	30%	20%	30%
	55% out	7	1	2	1	2
PM PEAK HOUR	T = 0.11X					
	T =	18	5%	40%	25%	30%
	61% in	11	1	4	3	3
			10%	32%	25%	33%
	39% out	7	1	2	2	2

TABLE 2
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

INTERSECTION	2007 EXISTING		2015 with existing lanes				2015 with 4-lane Komohana			
			Ambient		Total		Ambient		Total	
Approach/Movement	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
AM PEAK HOUR										
KOMOHANA ST/MOHOULI ST	D	53.6	F	83.7	F	83.6	D	46.8	D	47.1
Mohouli St Eastbound	E	55.2	E	69.7	E	70.1	E	62.2	E	63.1
Left Turn	E	61.3	F	87.5	F	87.5	D	48.0	D	48.1
Through	E	64.4	F	80.6	F	81.2	E	78.6	F	80.1
Right Turn	C	26.7	D	39.9	D	39.9	B	19.5	B	19.5
Mohouli St Westbound	D	51.8	E	62.6	E	62.6	C	33.7	C	33.7
Left Turn	F	92.0	F	94.4	F	94.4	D	46.4	D	46.4
Through/Right Turn	D	35.3	D	46.7	D	46.7	C	27.4	C	27.4
Komohana St Northbound	E	61.9	F	>100	F	>100	D	45.9	D	46.0
Left Turn	B	13.2	C	21.1	C	21.2	E	59.0	E	59.9
Through	F	96.0	F	>100	F	>100	D	47.0	D	47.0
Right Turn	C	22.2	D	35.5	D	35.5	D	39.4	D	39.4
Komohana St Southbound	C	24.9	E	57.0	E	57.0	D	41.5	D	41.5
Left Turn	C	27.6	F	95.7	F	95.7	E	55.9	E	55.9
Through/Right Turn	C	22.9	C	34.2	C	34.3	C	33.0	C	33.0
PM PEAK HOUR										
KOMOHANA ST/MOHOULI ST	E	69.2	E	57.9	E	58.7	D	46.1	D	46.4
Mohouli St Eastbound	C	28.0	D	50.8	D	51.0	C	34.4	C	34.6
Left Turn	D	53.2	D	54.9	D	55.0	D	53.6	D	53.7
Through	C	32.7	E	57.8	E	58.1	D	42.0	D	42.1
Right Turn	C	21.1	D	42.6	D	42.7	C	24.2	C	24.2
Mohouli St Westbound	F	>100	E	62.4	E	62.8	D	46.6	D	46.6
Left Turn	F	>100	E	69.0	E	69.0	E	70.1	E	70.1
Through/Right Turn	C	28.3	E	57.0	E	57.9	C	27.9	C	28.1
Komohana St Northbound	C	29.5	D	46.3	D	47.4	D	45.5	D	46.1
Left Turn	C	32.6	E	79.5	F	82.2	E	67.1	E	68.6
Through	C	28.8	C	29.1	C	29.1	C	33.7	C	33.7
Right Turn	C	25.8	C	26.4	C	26.4	C	34.1	C	34.1
Komohana St Southbound	E	63.8	E	68.8	E	70.2	D	51.9	D	52.3
Left Turn	C	20.9	C	25.6	C	25.6	D	50.2	D	50.2
Through/Right Turn	E	75.0	E	79.4	F	81.0	D	52.3	D	52.8

TABLE 3
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

INTERSECTION/PEAK HOUR Approach/Movement	EXISTING		2015 Ambient		2015 Total	
	LOS	Delay	LOS	Delay	LOS	Delay
MOHOULI ST/ KUKUAU ST						
AM PEAK HOUR						
Kukuau St Westbound	B	12.4	B	13.9	B	14.0
Kukuau St Eastbound	C	18.9	D	27.1	D	27.2
Mohouli St Northbound LT	A	8.4	A	8.7	A	8.7
Mohouli St Southbound LT	A	7.8	A	8.2	A	7.9
PM PEAK HOUR						
Kukuau St Westbound	C	17.4	C	22.3	C	22.3
Kukuau St Eastbound	C	15.1	C	18.6	C	18.6
Mohouli St Northbound LT	A	8.0	A	8.1	A	8.1
Mohouli St Southbound LT	A	8.7	A	9.1	A	9.1

	2007 EXISTING		2015 with 2-lane Komohana Ambient		2015 with 2-lane Komohana Total		2015 with 4-lane Komohana Ambient		2015 with 4-lane Komohana Total	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
KOMOHANA ST/ KUKUAU ST										
AM PEAK HOUR										
Kukuau St Westbound Thru	C	21.6	D	29.2	D	29.3			C	20.5
Kukuau St Westbound LT	E	44.0	F	92.9	F	93.5			F	69.1
Kukuau St Eastbound	E	44.0	F	>100	F	>100			F	60.0
Komohana St Northbound LT	A	7.9	A	8.2	A	8.2			A	8.2
Komohana St Southbound LT	A	9.6	B	10.2	B	10.2			B	10.2
PM PEAK HOUR										
Kukuau St Westbound Thru	D	27.4	E	44.9	E	45.4			E	45.0
Kukuau St Westbound LT	D	32.3	F	50.7	F	51.2			D	30.2
Kukuau St Eastbound	D	27.3	E	47.0	E	47.7			E	37.1
Komohana St Northbound LT	A	9.0	A	9.5	A	9.5			A	9.6
Komohana St Southbound LT	A	8.1	A	8.3	A	8.3			A	8.4

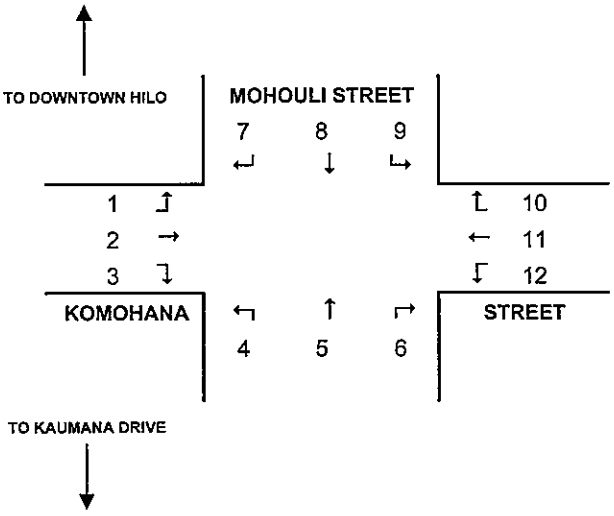
INTERSECTION/PEAK HOUR Approach/Movement	EXISTING		2015 Ambient		2015 Total	
	LOS	Delay	LOS	Delay	LOS	Delay
MOHOULI ST/ PROJECT ACCESS						
AM PEAK HOUR	NA					
Project Access RT			B	10.1	B	10.1
Project Access LT			C	17.7	C	18.1
Mohouli St Eastbound LT			A	8.0	A	8.0
PM PEAK HOUR	NA					
Project Access RT			B	13.3	B	13.4
Project Access LT			C	23.3	C	24.3
Mohouli St Eastbound LT			A	9.1	A	9.1

Appendix A

Traffic Turning Movement Counts

TRAFFIC TURNING MOVEMENT COUNT
COUNTY OF HAWAII FIRE ADMINISTRATION BUILDING

LOCATION: Komohana Street/Mohouli Street
DATE: December 11, 2007, Tuesday
TIME: 6:30a-8:30a / 3:30p-5:30p
WEATHER: Clear
RECORDER: Robert Miguel (1-6)/Carole Darby (7-12)

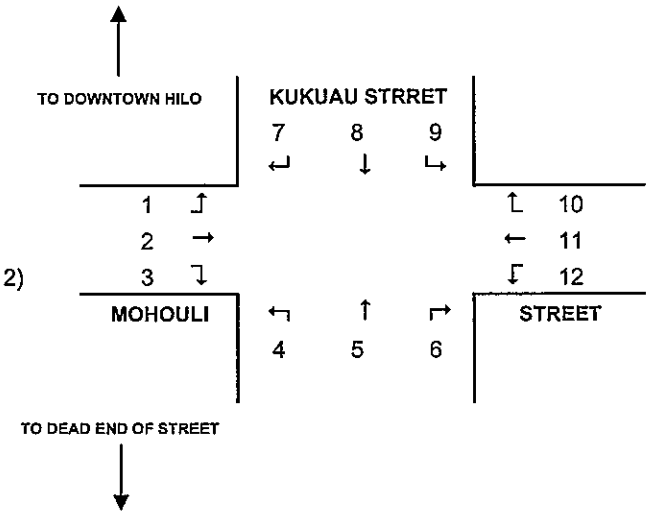


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:30-6:45a	15	38	0	0	72	37	18	18	10	44	118	24	394
6:45-7:00a	20	39	0	0	89	70	19	12	16	52	127	25	469
7:00-7:15a	25	52	1	1	81	36	20	24	23	103	141	31	538
7:15-7:30a	31	47	0	1	67	31	37	31	23	115	171	22	576
7:30-7:45a	46	40	2	1	89	31	47	40	29	136	162	36	659
7:45-8:00a	37	51	3	3	93	35	43	21	29	97	167	34	613
8:00-8:15a	39	60	1	3	82	37	25	36	33	66	124	20	526
8:15-8:30a	20	38	0	0	50	23	24	24	19	45	98	17	358
6:30-8:30a	233	365	7	9	623	300	233	206	182	658	1108	209	4133
7:00-8:00a	139	190	6	6	330	133	147	116	104	451	641	123	2386
PHF	0.92			0.895			0.791			0.909			

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
3:30-3:45p	31	121	1	1	46	31	32	65	37	41	94	36	536
3:45-4:00p	26	93	1	3	39	21	26	56	42	33	99	42	481
4:00-4:15p	30	111	1	1	41	28	26	80	50	36	85	43	532
4:15-4:30p	25	101	0	1	36	40	23	55	56	39	60	38	474
4:30-4:45p	27	122	1	4	29	31	18	100	92	40	72	67	603
4:45-5:00p	35	117	1	0	42	35	26	87	76	35	57	48	559
5:00-5:15p	31	111	0	0	39	35	24	87	76	42	67	40	552
5:15-5:30p	17	98	1	0	23	31	20	75	59	35	51	37	447
3:30-5:30p	222	874	6	10	295	252	195	605	488	301	585	351	4184
4:15-5:15p	118	451	2	5	146	141	91	329	300	156	256	193	2188
PHF	0.933			0.948			0.857			0.845			

TRAFFIC TURNING MOVEMENT COUNT
COUNTY OF HAWAII FIRE ADMINISTRATION BUILDING

LOCATION: Kukuau Street/Mohouli Street
DATE: December 12, 2007, Wednesday
TIME: 6:30a-8:30a / 3:30p-5:30p
WEATHER: Clear
RECORDER: Robert Miguel (1-6)/Carole Darby (7-12)

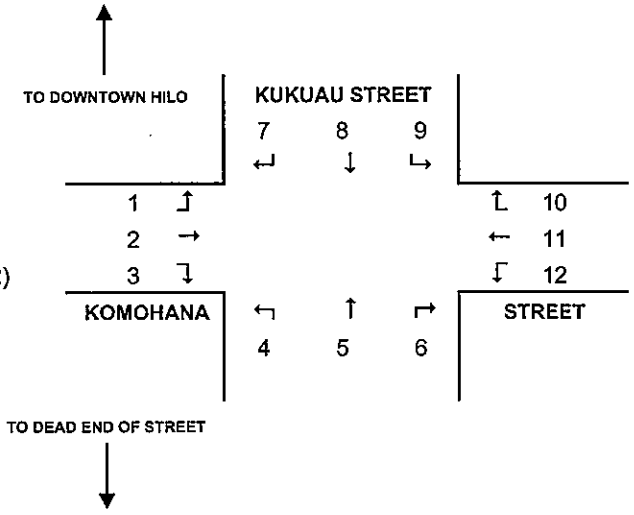


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:30-6:45a	7	108	0	1	2	7	0	0	2	0	33	0	160
6:45-7:00a	2	155	1	2	1	9	4	1	1	1	35	3	215
7:00-7:15a	3	126	0	3	6	9	6	4	2	0	39	4	202
7:15-7:30a	14	130	2	8	9	15	5	1	0	0	56	1	241
7:30-7:45a	14	99	0	5	8	14	8	1	1	2	54	4	210
7:45-8:00a	9	89	3	4	7	13	10	0	0	1	58	2	196
8:00-8:15a	5	88	1	2	5	10	4	4	0	1	66	6	192
8:15-8:30a	3	73	3	4	5	6	5	3	0	0	42	5	149
6:30-8:30a	57	868	10	29	43	83	42	14	6	5	383	25	1565
7:00-8:00a	40	444	5	20	30	51	29	6	3	3	207	11	849
PHF	0.837									0.921			

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
3:30-3:45p	4	67	1	2	6	8	5	6	1	1	79	6	186
3:45-4:00p	1	55	0	0	4	4	11	4	0	1	86	13	179
4:00-4:15p	2	55	4	0	2	5	5	4	0	1	93	6	177
4:15-4:30p	1	46	3	1	3	5	8	4	0	1	108	12	192
4:30-4:45p	2	56	1	0	1	6	14	7	0	0	143	18	248
4:45-5:00p	3	65	2	2	2	6	14	4	2	0	119	13	232
5:00-5:15p	5	65	3	2	2	6	15	2	0	0	124	9	233
5:15-5:30p	5	61	1	0	3	7	14	6	0	0	104	13	214
3:30-5:30p	23	470	15	7	23	47	86	37	3	4	856	90	1661
4:30-5:30p	15	247	7	4	8	25	57	19	2	0	490	53	927
PHF	0.921									0.843			

TRAFFIC TURNING MOVEMENT COUNT
COUNTY OF HAWAII FIRE ADMINISTRATION BUILDING

LOCATION: Kukuau Street/Komohana Street
DATE: December 13, 2007, Thursday
TIME: 6:30a-8:30a / 3:30p-5:30p
WEATHER: Clear
RECORDER: Robert Miguel (1-6)/Carole Darby (7-12)

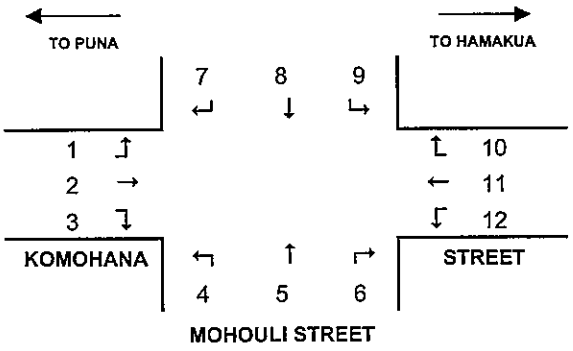


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:30-6:45a	1	42	2	3	8	5	2	1	1	1	127	0	193
6:45-7:00a	1	57	2	6	3	5	10	1	1	1	149	0	236
7:00-7:15a	2	70	4	3	11	9	8	4	3	3	173	2	292
7:15-7:30a	11	74	1	7	10	13	18	3	1	6	188	4	336
7:30-7:45a	9	63	8	6	13	18	22	5	2	4	190	1	341
7:45-8:00a	3	71	5	5	15	14	22	3	2	4	210	4	358
8:00-8:15a	10	75	6	7	5	6	6	5	1	2	170	2	295
8:15-8:30a	2	72	6	6	5	2	3	1	0	7	111	5	220
6:30-8:30a	39	524	34	43	70	72	91	23	11	28	1318	18	2271
7:00-8:00a	25	278	18	21	49	54	70	15	8	17	761	11	1327
PHF	0.933									0.905			

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
3:30-3:45p	6	161	10	2	7	6	5	12	1	4	104	5	323
3:45-4:00p	5	129	10	6	7	4	7	10	2	5	105	9	299
4:00-4:15p	4	153	13	1	3	4	6	4	2	1	89	4	284
4:15-4:30p	2	125	15	3	7	8	4	9	1	5	68	7	254
4:30-4:45p	6	165	17	2	5	5	7	16	0	2	90	10	325
4:45-5:00p	7	146	15	2	7	7	4	10	2	1	102	7	310
5:00-5:15p	7	145	14	3	1	8	6	17	1	2	75	10	289
5:15-5:30p	7	102	14	2	7	4	5	11	3	6	80	10	251
3:30-5:30p	44	1126	108	21	44	46	44	89	12	26	713	62	2335
4:15-5:15p	22	581	61	10	20	28	21	52	4	10	335	34	1178
PHF	0.883									0.861			

TRAFFIC TURNING MOVEMENT COUNT
MOHOULI SENIOR HOUSING PROJECT

LOCATION: Komohana Street / Mohouli Street
DATE: Tuesday, October 7, 2008
TIME: 6:00a-8:30a / 2:00p-5:30p
WEATHER: Clear
RECORDER: Carole Darby

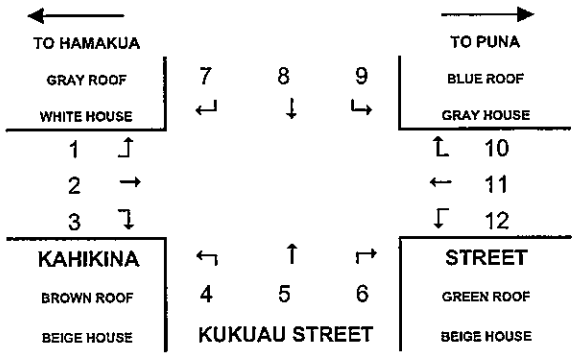


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:00-6:15a	8	61	20	7	3	13	22	21	0	0	29	7	191
6:15-6:30a	7	72	31	5	13	12	22	42	1	0	18	6	229
6:30-6:45a	8	86	36	13	19	27	27	54	0	1	29	19	319
6:45-7:00a	11	99	72	20	17	23	45	80	2	0	42	18	429
7:00-7:15a	23	123	95	22	14	13	33	78	1	0	43	33	478
7:15-7:30a	30	125	108	14	26	25	31	107	4	0	48	47	565
7:30-7:45a	24	123	96	19	33	21	36	95	3	0	44	38	532
7:45-8:00a	26	152	79	28	22	19	44	84	0	0	55	35	544
8:00-8:15a	25	102	53	19	19	19	32	45	2	0	47	16	379
8:15-8:30a	20	116	43	15	10	20	13	32	0	0	28	13	310
6:00-8:30a	182	1059	633	162	176	192	305	638	13	1	383	232	3976
7:15-8:15a	105	502	336	80	100	84	143	331	9	0	194	136	2020
PHF	0.92			0.90			0.85			0.92			

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
2:00-2:15p	23	69	31	22	50	26	23	35	0	2	69	15	365
2:15-2:30p	21	87	48	30	34	23	20	32	1	0	76	19	391
2:30-2:45p	33	88	50	29	33	15	16	28	0	2	70	30	394
2:45-3:00p	23	67	24	27	47	27	23	39	2	1	74	27	381
3:00-3:15p	34	63	25	22	49	12	31	25	0	1	74	27	363
3:15-3:30p	35	75	32	28	57	30	25	41	1	0	95	38	457
3:30-3:45p	34	55	31	32	64	30	37	32	0	1	96	37	449
3:45-4:00p	40	70	33	37	47	18	27	36	0	1	111	25	445
4:00-4:15p	36	62	35	37	62	19	35	31	2	5	120	41	485
4:15-4:30p	40	63	40	53	54	23	46	42	2	3	105	15	486
4:30-4:45p	48	67	22	70	88	18	29	33	0	2	128	38	543
4:45-5:00p	59	74	30	64	79	9	33	51	1	1	91	17	509
5:00-5:15p	52	49	47	74	73	21	26	22	2	0	102	18	486
5:15-5:30p	33	55	28	36	52	18	22	26	1	1	87	12	371
2:00-5:30p	511	944	476	561	789	289	393	473	12	20	1298	359	6125
4:00-5:00p	183	266	127	224	283	69	143	157	5	11	444	111	2023
PHF	0.88			0.82			0.90			0.84			

TRAFFIC TURNING MOVEMENT COUNT
MOHOULI SENIOR HOUSING PROJECT

LOCATION: Kukuau Street / Kahikina Street
DATE: Thursday, October 9, 2008
TIME: 6:00a-8:30a / 2:00p-5:30p
WEATHER: Clear
RECORDER: Carole Darby



TIME	MOVEMENT NUMBER												
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:00-6:15a	0	0	0	0	5	0	0	0	0	1	0	0	6
6:15-6:30a	0	1	0	0	4	0	0	5	0	0	0	0	10
6:30-6:45a	3	0	0	0	9	0	0	2	0	0	0	0	14
6:45-7:00a	0	0	0	0	6	0	0	2	0	1	0	0	9
7:00-7:15a	4	0	0	1	7	0	1	1	0	0	0	0	14
7:15-7:30a	0	0	0	0	16	0	0	5	1	1	0	0	23
7:30-7:45a	2	0	0	1	20	0	1	9	1	1	0	0	35
7:45-8:00a	2	0	1	0	13	0	2	5	2	0	0	0	25
8:00-8:15a	0	0	1	1	8	0	0	7	0	1	0	0	18
8:15-8:30a	1	0	0	1	9	0	0	8	0	0	1	0	20
6:00-8:30a	12	1	2	4	97	0	4	44	4	5	1	0	174
7:15-8:15a	4	0	2	2	57	0	3	26	4	3	0	0	101
PHF				0.70									

TIME	MOVEMENT NUMBER												
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
2:00-2:15p	1	0	1	0	6	0	2	6	1	1	0	0	18
2:15-2:30p	1	0	1	0	1	1	0	0	0	0	0	0	4
2:30-2:45p	1	0	0	0	5	1	0	4	1	0	0	0	12
2:45-3:00p	1	1	3	1	4	1	1	9	1	3	0	1	26
3:00-3:15p	1	0	1	1	3	0	0	8	0	1	0	0	15
3:15-3:30p	0	0	0	0	6	0	1	10	1	0	0	0	18
3:30-3:45p	2	0	0	1	6	0	0	10	1	2	0	0	22
3:45-4:00p	1	0	0	0	11	0	2	19	0	2	0	0	35
4:00-4:15p	3	1	1	1	5	1	0	17	0	0	0	0	29
4:15-4:30p	0	0	0	0	5	0	0	18	3	1	0	0	27
4:30-4:45p	1	0	1	0	14	0	0	18	2	2	0	0	38
4:45-5:00p	1	0	1	0	7	0	2	12	1	0	0	0	24
5:00-5:15p	0	0	0	0	9	0	3	24	2	0	0	0	38
5:15-5:30p	0	0	0	2	15	0	2	15	0	2	0	0	36
2:00-5:30p	13	2	9	6	97	4	13	170	13	14	0	1	342
3:45-4:45p	5	1	2	1	35	1	2	72	5	5	0	0	129
PHF				0.66			0.94						

Appendix B

Signalized Intersection
Level of Service (LOS) Calculations

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E
Analysis Period/Year: EX AM W/LOW 2007
Comment: 2007 EXISTING AM W/LOWER NB THRUPU

Site Information

Jurisdiction/Date: 11/28/2008
EB/WB Street: MOHOULI ST
NB/SB Street: KOMOHANA S

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	6	330	133	104	116	147	123	641	451	139	190	6
RTOR volume (veh/h)			25			10			50			0
Peak-hour factor	.8	.8	.8	.9	.9	.9	.92	.92	.92	.91	.91	.91
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R		L		TR			
WB			L	LTR	TR			
NB	L	LTR	R					
SB	L	LTR						
Green (s)	11	56	3	6	32			
Yellow + All red (s)	3	6	1	4	6			

Cycle (s): 128 | Lost time per cycle (s): 15 | Critical v/c Ratio: .959

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	TR		L	T	R	L	TR	
No. of lanes	1	1	1	1	1		1	1	1	1	1	
Flow rate (veh/h)	8	413	135	116	281		134	697	436	153	215	
Capacity (veh/h)	41	466	606	138	562		626	643	804	248	811	
Adjusted saturation flow (veh/h)	1770	1863	1583	1770	1711		1770	1471	1583	1770	1854	
v/c ratio	.181	.886	.223	.836	.501		.214	1.083	.542	.615	.266	
g/C ratio	.023	.25	.383	.078	.328		.57	.438	.508	.57	.438	
Average back of queue (veh)	.3	17	3.4	5	8.6		2.4	36.4	11.4	4	5.1	
Uniform delay (s)	61.3	46.2	26.7	58.2	34.6		13.2	36	21.4	23.1	22.9	
Incremental delay (s)	0	18.2	0	33.8	.7		0	60	.8	4.5	0	
Initial queue delay (s)	0	0	0	0	0		0	0	0	0	0	
Delay (s)	61.3	64.4	26.7	92	35.3		13.2	96	22.2	27.6	22.9	
LOS	E	E	C	F	D		B	F	C	C	C	
Approach delay (s)/LOS	55.2 / E			51.8 / D			61.9 / E			24.9 / C		
Intersection delay (s)/ LOS	53.6 / D											

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E
Analysis Period/Year: AMB AM W/ LOW 2015
Comment: 2015 AMB AM W/LOWER NB THRUPU

Site Information

Jurisdiction/Date: 11/29/2008
EB/WB Street: MOHOULI ST
NB/SB Street: KOMOHANA S

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	7	370	180	138	134	162	166	730	514	156	250	15
RTOR volume (veh/h)			40			20			50			0
Peak-hour factor	.9	.9	.9	.9	.9	.9	.92	.92	.92	.91	.91	.91
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R		L		TR			
WB			L	LTR	TR			
NB	L	LTR	R					
SB	L	LTR						
Green (s)	16	81	5	15	47			
Yellow + All red (s)	3	6	1	4	6			

Cycle (s): 184 | Lost time per cycle (s): 18 | Critical v/c Ratio: 1.048

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	TR		L	T	R	L	TR	
No. of lanes	1	1	1	1	1		1	1	1	1	1	
Flow rate (veh/h)	8	411	156	153	307		180	793	504	171	291	
Capacity (veh/h)	48	476	594	202	617		549	647	792	194	813	
Adjusted saturation flow (veh/h)	1770	1863	1583	1770	1719		1770	1471	1583	1770	1847	
v/c ratio	.162	.864	.262	.759	.497		.329	1.226	.637	.882	.358	
g/C ratio	.027	.255	.375	.114	.359		.56	.44	.5	.56	.44	
Average back of queue (veh)	.4	23.2	5.8	8.7	13		5.1	62.5	20.5	9.3	10.4	
Uniform delay (s)	87.5	65.4	39.9	79	46.1		21.1	51.5	33.8	61.4	34.2	
Incremental delay (s)	0	15.2	0	15.4	.6		0	114.9	1.7	34.3	0	
Initial queue delay (s)	0	0	0	0	0		0	0	0	0	0	
Delay (s)	87.5	80.6	39.9	94.4	46.7		21.1	166.4	35.5	95.7	34.2	
LOS	F	F	D	F	D		C	F	D	F	C	
Approach delay (s)/LOS	69.7 / E			62.6 / E			104 / F			57 / E		
Intersection delay (s)/ LOS	83.7 / F											

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 11/29/2008
Agency or Company: M&E | EB/WB Street: MOHOULI ST
Analysis Period/Year: TOT AM W/ LOW 2015 | NB/SB Street: KOMOHANA S
Comment: 2015 TOTAL AM W/LOWER NB THRUPUT

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	8	372	182	138	136	162	168	730	514	156	250	16
RTOR volume (veh/h)			40			20			50			0
Peak-hour factor	.9	.9	.9	.9	.9	.9	.92	.92	.92	.91	.91	.91
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R		L		TR			
WB			L	LTR	TR			
NB	L	LTR	R					
SB	L	LTR						
Green (s)	16	81	5	15	47			
Yellow + All red (s)	3	6	1	4	6			

Cycle (s): 184 | Lost time per cycle (s): 18 | Critical v/c Ratio: 1.051

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	TR		L	T	R	L	TR	
No. of lanes	1	1	1	1	1		1	1	1	1	1	
Flow rate (veh/h)	9	413	158	153	309		183	793	504	171	292	
Capacity (veh/h)	48	476	594	202	617		548	647	792	194	813	
Adjusted saturation flow (veh/h)	1770	1863	1583	1770	1720		1770	1471	1583	1770	1846	
v/c ratio	.185	.869	.266	.759	.501		.333	1.226	.637	.882	.36	
g/C ratio	.027	.255	.375	.114	.359		.56	.44	.5	.56	.44	
Average back of queue (veh)	.5	23.4	5.9	8.7	13.1		5.2	62.5	20.5	9.3	10.5	
Uniform delay (s)	87.5	65.5	39.9	79	46.1		21.2	51.5	33.8	61.4	34.3	
Incremental delay (s)	0	15.7	0	15.4	.6		0	114.9	1.7	34.3	0	
Initial queue delay (s)	0	0	0	0	0		0	0	0	0	0	
Delay (s)	87.5	81.2	39.9	94.4	46.7		21.2	166.4	35.5	95.7	34.3	
LOS	F	F	D	F	D		C	F	D	F	C	
Approach delay (s)/LOS	70.1	/	E	62.6	/	E	103.9	/	F	57	/	E
Intersection delay (s)/ LOS	83.6	/	F									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 11/29/2008
Agency or Company: M&E | EB/WB Street: MOHOULI ST
Analysis Period/Year: AMB AM W/4 L 2015 | NB/SB Street: KOMOHANA S
Comment: 2015 AMBIENT AM W/4 LANES

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	7	370	180	138	134	162	166	730	514	156	250	15
RTOR volume (veh/h)			40			20			50			0
Peak-hour factor	.8	.8	.8	.9	.9	.9	.92	.92	.92	.91	.91	.91
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R		L		TR			
WB			L	LTR	TR			
NB	L	TR	R					
SB	L	TR						
Green (s)	15	29	8	8	28			
Yellow + All red (s)	5	6	1	5	6			

Cycle (s): 111 | Lost time per cycle (s): 18 | Critical v/c Ratio: .799

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	TR		L	T	R	L	TR	
No. of lanes	1	1	1	1	1		1	2	1	1	2	
Flow rate (veh/h)	9	463	175	153	307		180	793	504	171	291	
Capacity (veh/h)	128	470	699	271	635		239	927	613	239	919	
Adjusted saturation flow (veh/h)	1770	1863	1583	1770	1719		1770	3547	1583	1770	3517	
v/c ratio	.069	.984	.25	.566	.483		.755	.856	.822	.717	.317	
g/C ratio	.072	.252	.441	.153	.369		.135	.261	.387	.135	.261	
Average back of queue (veh)	.3	19.1	3.6	4.8	7.8		6.3	14.6	16.3	5.8	4	
Uniform delay (s)	48	41.3	19.5	43.6	26.9		46.2	39	30.6	46	33	
Incremental delay (s)	0	37.3	0	2.8	.5		12.8	8	8.8	9.9	0	
Initial queue delay (s)	0	0	0	0	0		0	0	0	0	0	
Delay (s)	48	78.6	19.5	46.4	27.4		59	47	39.4	55.9	33	
LOS	D	E	B	D	C		E	D	D	E	C	
Approach delay (s)/LOS	62.2	/	E	33.7	/	C	45.9	/	D	41.5	/	D
Intersection delay (s)/ LOS	46.8	/	D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E
Analysis Period/Year: TOT AM W/4 L / 2015
Comment: 2015 TOT AM W/4 LANES

Site Information

Jurisdiction/Date: 11/29/2008
EB/WB Street: MOHOULI ST
NB/SB Street: KOMOHANA S

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	8	372	182	138	136	162	168	730	514	156	250	16
RTOR volume (veh/h)			40			20			50			0
Peak-hour factor	.8	.8	.8	.9	.9	.9	.92	.92	.92	.91	.91	.91
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R		L		TR			
WB			L	LTR	TR			
NB	L	TR	R					
SB	L	TR						
Green (s)	15	29	8	8	28			
Yellow + All red (s)	5	6	1	5	6			

Cycle (s): 111 | Lost time per cycle (s): 18 | Critical v/c Ratio: .802

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	TR		L	T	R	L	TR	
No. of lanes	1	1	1	1	1		1	2	1	1	2	
Flow rate (veh/h)	10	465	178	153	309		183	793	504	171	292	
Capacity (veh/h)	128	470	699	271	635		239	927	613	239	918	
Adjusted saturation flow (veh/h)	1770	1863	1583	1770	1720		1770	3547	1583	1770	3515	
v/c ratio	.078	.99	.254	.566	.486		.764	.856	.822	.717	.318	
g/C ratio	.072	.252	.441	.153	.369		.135	.261	.387	.135	.261	
Average back of queue (veh)	.3	19.4	3.7	4.8	7.9		6.4	14.6	16.3	5.8	4	
Uniform delay (s)	48.1	41.4	19.5	43.6	26.9		46.3	39	30.6	46	33	
Incremental delay (s)	0	38.7	0	2.8	.5		13.6	8	8.8	9.9	0	
Initial queue delay (s)	0	0	0	0	0		0	0	0	0	0	
Delay (s)	48.1	80.1	19.5	46.4	27.4		59.9	47	39.4	55.9	33	
LOS	D	F	B	D	C		E	D	D	E	C	
Approach delay (s)/LOS	63.1	/	E	33.7	/	C	46	/	D	41.5	/	D
Intersection delay (s)/ LOS	47.1			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E
Analysis Period/Year: EX PM / 2007
Comment: 2007 EXISTING PM

Site Information

Jurisdiction/Date: 1/27/2008
EB/WB Street: MOHOULI ST
NB/SB Street: KOMOHANA S

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	5	146	141	300	329	91	193	256	156	118	451	2
RTOR volume (veh/h)			25			10			50			0
Peak-hour factor	.95	.95	.95	.86	.86	.86	.85	.85	.85	.93	.93	.93
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R			L		TR		
WB				L	LTR	TR		
NB	L	LTR	LTR					
SB	L		LTR					
Green (s)	10	5	30	3	12	30		
Yellow + All red (s)	1	4	6	1	4	6		

Cycle (s): 112 | Lost time per cycle (s): 13 | Critical v/c Ratio: .758

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	TR		L	T	R	L	TR	
No. of lanes	1	1	1	1	1		1	1	1	1	1	
Flow rate (veh/h)	5	154	122	349	477		227	301	125	127	487	
Capacity (veh/h)	47	499	650	253	742		319	649	551	503	499	
Adjusted saturation flow (veh/h)	1770	1863	1583	1770	1808		1770	1863	1583	1770	1862	
v/c ratio	.111	.308	.188	1.38	.642		.711	.464	.226	.252	.977	
g/C ratio	.027	.268	.411	.143	.411		.464	.348	.348	.411	.268	
Average back of queue (veh)	.2	4	2.6	24	13		6.4	7.8	2.9	2.7	20	
Uniform delay (s)	53.2	32.7	21.1	48	26.4		25.4	28.4	25.8	20.9	40.7	
Incremental delay (s)	0	0	0	193.8	1.9		7.2	.4	0	0	34.3	
Initial queue delay (s)	0	0	0	0	0		0	0	0	0	0	
Delay (s)	53.2	32.7	21.1	241.8	28.3		32.6	28.8	25.8	20.9	75	
LOS	D	C	C	F	C		C	C	C	C	E	
Approach delay (s)/LOS	28	/	C	118.5	/	F	29.5	/	C	63.8	/	E
Intersection delay (s)/ LOS	69.2			/			E					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E
Analysis Period/Year: AMB PM 2015
Comment: 2015 AMBIENT PM

Site Information

Jurisdiction/Date: 11/29/2008
EB/WB Street: MOHOULI ST
NB/SB Street: KOMOHANA S

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	15	168	192	362	373	101	263	325	200	134	544	5
RTOR volume (veh/h)			40			20			40			0
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R			L		TR		
WB				L	LTR	TR		
NB	L	LTR	LTR					
SB	L		LTR					
Green (s)	8	10	44	16	17	22		
Yellow + All red (s)	1	4	6	1	4	6		

Cycle (s): 139 | Lost time per cycle (s): 13 | Critical v/c Ratio: .843

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	TR		L	T	R	L	TR	
No. of lanes	1	1	1	1	1		1	1	1	1	1	
Flow rate (veh/h)	16	177	160	381	478		277	342	168	141	578	
Capacity (veh/h)	204	295	410	433	561		295	777	661	474	589	
Adjusted saturation flow (veh/h)	1770	1863	1583	1770	1813		1770	1863	1583	1770	1860	
v/c ratio	.078	.6	.39	.88	.852		.937	.44	.255	.298	.981	
g/C ratio	.115	.158	.259	.245	.309		.496	.417	.417	.417	.317	
Average back of queue (veh)	.6	7	5.4	17	20.2		12.7	10	4.5	3.7	28.3	
Uniform delay (s)	54.9	54.4	42.5	50.5	45		43.5	28.9	26.4	25.6	47.1	
Incremental delay (s)	0	3.4	.1	18.5	12		36	.2	0	0	32.3	
Initial queue delay (s)	0	0	0	0	0		0	0	0	0	0	
Delay (s)	54.9	57.8	42.6	69	57		79.5	29.1	26.4	25.6	79.4	
LOS	D	E	D	E	E		E	C	C	C	E	
Approach delay (s)/LOS	50.8 / D			62.4 / E			46.3 / D			68.8 / E		
Intersection delay (s)/ LOS	57.9 / E											

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E
Analysis Period/Year: TOT PM 2015
Comment: 2015 TOTAL PM

Site Information

Jurisdiction/Date: 11/29/2008
EB/WB Street: MOHOULI ST
NB/SB Street: KOMOHANA S

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	17	170	194	362	377	101	266	325	200	134	544	8
RTOR volume (veh/h)			40			20			40			0
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R			L		TR		
WB				L	LTR	TR		
NB	L	LTR	LTR					
SB	L		LTR					
Green (s)	8	10	44	16	17	22		
Yellow + All red (s)	1	4	6	1	4	6		

Cycle (s): 139 | Lost time per cycle (s): 13 | Critical v/c Ratio: .846

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	TR		L	T	R	L	TR	
No. of lanes	1	1	1	1	1		1	1	1	1	1	
Flow rate (veh/h)	18	179	162	381	482		280	342	168	141	581	
Capacity (veh/h)	204	295	410	433	561		295	777	661	474	588	
Adjusted saturation flow (veh/h)	1770	1863	1583	1770	1813		1770	1863	1583	1770	1859	
v/c ratio	.088	.607	.395	.88	.859		.948	.44	.255	.298	.988	
g/C ratio	.115	.158	.259	.245	.309		.496	.417	.417	.417	.317	
Average back of queue (veh)	.7	7.1	5.5	17	20.5		13.1	10	4.5	3.7	28.7	
Uniform delay (s)	55	54.5	42.5	50.5	45.2		43.8	28.9	26.4	25.6	47.2	
Incremental delay (s)	0	3.6	.2	18.5	12.7		38.4	.2	0	0	33.8	
Initial queue delay (s)	0	0	0	0	0		0	0	0	0	0	
Delay (s)	55	58.1	42.7	69	57.9		82.2	29.1	26.4	25.6	81	
LOS	D	E	D	E	E		F	C	C	C	F	
Approach delay (s)/LOS	51 / D			62.8 / E			47.4 / D			70.2 / E		
Intersection delay (s)/ LOS	58.7 / E											

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 11/29/2008
Agency or Company: M&E | EB/WB Street: MOHOULI ST
Analysis Period/Year: AMB PM W/4L 2015 | NB/SB Street: KOMOHANA S
Comment: 2015 AMBIENT PM W/4 LANES

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	15	168	192	362	373	101	263	325	200	134	544	5
RTOR volume (veh/h)			40			20			40			0
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R			L		TR		
WB				L	LTR	TR		
NB	L	LTR	TR					
SB	L		TR					
Green (s)	16	4	23	5	21	23		
Yellow + All red (s)	1	5	6	1	5	6		

Cycle (s): 116 | Lost time per cycle (s): 12 | Critical v/c Ratio: .709

Intersection Performance

	EB			WB		NB			SB	
Lane group configuration	L	T	R	L	TR	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	1	2
Flow rate (veh/h)	16	177	160	381	478	277	342	168	141	578
Capacity (veh/h)	76	369	614	412	766	320	978	437	244	702
Adjusted saturation flow (veh/h)	1770	1863	1583	1770	1813	1770	3547	1583	1770	3542
v/c ratio	.207	.479	.26	.925	.624	.864	.35	.386	.578	.823
g/C ratio	.043	.198	.388	.233	.422	.181	.276	.276	.138	.198
Average back of queue (veh)	.5	5.4	3.7	15.2	13.2	10.6	4.9	4.7	4.7	11.1
Uniform delay (s)	53.6	41.2	24.2	43.5	26.3	46.1	33.7	34	46.8	44.5
Incremental delay (s)	0	.8	0	26.6	1.6	21	0	.1	3.4	7.8
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	53.6	42	24.2	70.1	27.9	67.1	33.7	34.1	50.2	52.3
LOS	D	D	C	E	C	E	C	C	D	D
Approach delay (s)/LOS	34.4 / C			46.6 / D		45.5 / D			51.9 / D	
Intersection delay (s)/ LOS	46.1 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 11/29/2008
Agency or Company: M&E | EB/WB Street: MOHOULI ST
Analysis Period/Year: TOT PM W/4L 2015 | NB/SB Street: KOMOHANA S
Comment: 2015 TOTAL PM W/4 LANES

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	17	170	194	362	377	101	266	325	200	134	544	8
RTOR volume (veh/h)			40			20			40			0
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R			L		TR		
WB				L	LTR	TR		
NB	L	LTR	TR					
SB	L		TR					
Green (s)	16	4	23	5	21	23		
Yellow + All red (s)	1	5	6	1	5	6		

Cycle (s): 116 | Lost time per cycle (s): 12 | Critical v/c Ratio: .714

Intersection Performance

	EB			WB		NB			SB	
Lane group configuration	L	T	R	L	TR	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	1	2
Flow rate (veh/h)	18	179	162	381	482	280	342	168	141	581
Capacity (veh/h)	76	369	614	412	766	320	978	437	244	702
Adjusted saturation flow (veh/h)	1770	1863	1583	1770	1813	1770	3547	1583	1770	3539
v/c ratio	.235	.485	.264	.925	.629	.874	.35	.386	.578	.828
g/C ratio	.043	.198	.388	.233	.422	.181	.276	.276	.138	.198
Average back of queue (veh)	.6	5.5	3.8	15.2	13.3	10.8	4.9	4.7	4.7	11.2
Uniform delay (s)	53.7	41.2	24.2	43.5	26.4	46.2	33.7	34	46.8	44.6
Incremental delay (s)	0	.9	0	26.6	1.7	22.4	0	.1	3.4	8.2
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	53.7	42.1	24.2	70.1	28.1	68.6	33.7	34.1	50.2	52.8
LOS	D	D	C	E	C	E	C	C	D	D
Approach delay (s)/LOS	34.6 / C			46.6 / D		46.1 / D			52.3 / D	
Intersection delay (s)/ LOS	46.4 / D									

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Appendix C

Unsignalized Intersection
Level of Service (LOS) Calculations

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	12/25/200
Agency or Company	M&E	Major Street	MOHOULI ST
Analysis Period/Year	EX AM 2007	Minor Street	KUKUAU ST
Comment	2007 EXISTING AM		

Site Information

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			LTR			LTR		
Lane 2	L			L								
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	11	207	3	40	444	5	3	6	29	20	30	51
PHF	.84	.84	.84	.92	.92	.92	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	13	246	4	43	483	5	3	7	32	22	33	57
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	LTR	42	527	.08	<1	12.4	B	12.4
	2								B
	3								
EB	1	LTR	112	369	.303	1	18.9	C	18.9
	2								C
	3								
		①	13	1070	.012	<1	8.4	A	
		④	43	1310	.033	<1	7.8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	M&E	Major Street	MOHOULI ST
Analysis Period/Year	AMB AM 2015	Minor Street	KUKUAU ST
Comment	2015 AMBIENT AM		

Site Information

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			LTR			LTR		
Lane 2	L			L								
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	11	233	84	45	525	6	3	6	34	22	34	59
PHF	.84	.84	.84	.92	.92	.92	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	13	277	100	49	571	7	3	7	38	24	38	66
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	LTR	48	451	.106	<1	13.9	B	13.9
	2								B
	3								
EB	1	LTR	128	289	.444	2	27.1	D	27.1
	2								D
	3								
		①	13	991	.013	<1	8.7	A	
		④	49	1176	.042	<1	8.2	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	M&E	Major Street	MOHOULI ST
Analysis Period/Year	TOT AM 2015	Minor Street	KUKUAU ST
Comment	2015 TOTAL AM		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			LTR			LTR		
Lane 2	L			L								
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	11	234	84	45	526	6	3	6	34	22	34	59
PHF	.84	.84	.84	.92	.92	.92	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	13	279	100	49	572	7	3	7	38	24	38	66
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	LTR	48	450	.107	<1	14	B	14
	2								B
	3								
EB	1	LTR	128	288	.445	2	27.2	D	27.2
	2								D
	3								
		①	13	990	.013	<1	8.7	A	
		④	49	1174	.042	<1	8.2	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	12/25/200
Agency or Company	M&E	Major Street	MOHOULI ST
Analysis Period/Year	EX PM 2007	Minor Street	KUKUAU ST
Comment	2007 EXISTING PM		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			LTR			LTR		
Lane 2	L			L								
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	53	490	0	15	247	7	2	19	57	4	8	25
PHF	.84	.84	.84	.92	.92	.92	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	63	583	0	16	268	8	2	21	63	4	9	28
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	LTR	86	375	.229	1	17.4	C	17.4
	2								C
	3								
EB	1	LTR	41	399	.103	<1	15.1	C	15.1
	2								C
	3								
		①	63	1281	.049	<1	8	A	
		④	16	986	.017	<1	8.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	M&E	Major Street	MOHOULI ST
Analysis Period/Year	AMB PM 2015	Minor Street	KUKUAU ST
Comment	2015 AMBIENT PM		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			LTR			LTR		
Lane 2	L			L								
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	64	583	0	17	289	6	2	22	61	4	11	29
PHF	.84	.84	.84	.92	.92	.92	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	76	694	0	18	314	7	2	24	68	4	12	32
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	LTR	94	301	.312	1	22.3	C	22.3 C
	2								
	3								
EB	1	LTR	48	313	.153	1	18.6	C	18.6 C
	2								
	3								
		①	76	1234	.062	<1	8.1	A	
		④	18	897	.021	<1	9.1	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	M&E	Major Street	MOHOULI ST
Analysis Period/Year	TOT PM 2015	Minor Street	KUKUAU ST
Comment	2015 TOTAL PM		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			LTR			LTR		
Lane 2	L			L								
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	64	584	0	17	290	6	2	22	61	4	11	29
PHF	.84	.84	.84	.92	.92	.92	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	76	695	0	18	315	7	2	24	68	4	12	32
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	LTR	94	301	.313	1	22.3	C	22.3 C
	2								
	3								
EB	1	LTR	48	312	.154	1	18.6	C	18.6 C
	2								
	3								
		①	76	1232	.062	<1	8.1	A	
		④	18	896	.021	<1	9.1	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	AECOM	Major Street	KOMOHANA ST
Analysis Period/Year	EX AM 2007	Minor Street	KUKUAU ST
Comment	2007 EXISTING AM		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			TR			LTR		
Lane 2	L			L			L					
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	11	761	17	25	278	18	8	15	70	21	49	54
PHF	.94	.94	.94	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	12	810	18	28	309	20	9	17	78	23	54	60
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	TR	95	311	.306	1	21.6	C	23.6
	2	L	9	101	.089	<1	44	E	C
	3								
EB	1	LTR	137	223	.615	4	44	E	44
	2								E
	3								
		①	12	1246	.009	<1	7.9	A	
		④	28	812	.034	<1	9.6	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	AECOM	Major Street	KOMOHANA ST
Analysis Period/Year	AMB AM 2015	Minor Street	KUKUAU ST
Comment	2015 AMBIENT AM		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			TR			LTR		
Lane 2	L			L			L					
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	11	865	17	28	354	22	12	17	78	22	56	66
PHF	.94	.94	.94	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	12	920	18	31	393	24	13	19	87	24	62	73
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	TR	106	253	.42	2	29.2	D	36.1
	2	L	13	53	.243	1	92.9	F	E
	3								
EB	1	LTR	159	164	.972	7	119	F	119
	2								F
	3								
		①	12	1136	.01	<1	8.2	A	
		④	31	726	.043	<1	10.2	B	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	AECOM	Major Street	KOMOHANA ST
Analysis Period/Year	TOT AM 2015	Minor Street	KUKUAU ST
Comment	2015 TOTAL AM		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)		TR			TR			TR			LTR	
Lane 2		L			L			L				
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	11	866	17	28	355	22	12	17	78	22	56	66
PHF	.94	.94	.94	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	12	921	18	31	394	24	13	19	87	24	62	73
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	TR	106	252	.421	2	29.3	D	36.3
	2	L	13	53	.245	1	93.5	F	E
	3								
EB	1	LTR	159	163	.975	7	120.1	F	120.1
	2								F
	3								
		①	12	1135	.01	<1	8.2	A	
		④	31	726	.043	<1	10.2	B	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	AECOM	Major Street	KOMOHANA ST
Analysis Period/Year	TOT AM 4LANE 2015	Minor Street	KUKUAU ST
Comment	2015 TOTAL AM W/4LANES		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)		TR			TR			TR			LTR	
Lane 2		T			T			L				
Lane 3		L			L							
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	11	866	17	28	355	22	12	17	78	22	56	66
PHF	.94	.94	.94	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	12	921	18	31	394	24	13	19	87	24	62	73
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	TR	106	337	.315	1	20.5	C	25.8
	2	L	13	69	.189	1	69.1	F	D
	3								
EB	1	LTR	159	212	.75	5	60	F	60
	2								F
	3								
		①	12	1130	.01	<1	8.2	A	
		④	31	719	.043	<1	10.2	B	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	AECOM	Major Street	KOMOHANA ST
Analysis Period/Year	EX PM 2007	Minor Street	KUKUAU ST
Comment	2007 EXISTING PM		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			TR			LTR		
Lane 2	L			L			L					
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	34	335	10	22	581	61	4	52	21	10	20	28
PHF	.94	.94	.94	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	36	356	11	24	646	68	4	58	23	11	22	31
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	TR	81	240	.337	1	27.4	D	27.6
	2	L	4	136	.029	<1	32.3	D	D
	3								
EB	1	LTR	64	224	.285	1	27.3	D	27.3
	2								D
	3								
		①	36	935	.039	<1	9	A	
		④	24	1197	.02	<1	8.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	AECOM	Major Street	KOMOHANA ST
Analysis Period/Year	AMB PM 2015	Minor Street	KUKUAU ST
Comment	2015 AMBIENT PM		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			TR			LTR		
Lane 2	L			L			L					
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	44	423	11	22	690	67	4	56	22	11	22	36
PHF	.94	.94	.94	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	47	450	12	24	767	74	4	62	24	12	24	40
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	TR	86	173	.498	2	44.9	E	45.1
	2	L	4	83	.048	<1	50.7	F	E
	3								
EB	1	LTR	76	158	.48	2	47	E	47
	2								E
	3								
		①	47	842	.056	<1	9.5	A	
		④	24	1105	.022	<1	8.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	AECOM	Major Street	KOMOHANA ST
Analysis Period/Year	TOT PM 2015	Minor Street	KUKUAU ST
Comment	2015 TOTAL PM		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			TR			LTR		
Lane 2	L			L			L					
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	44	425	11	22	693	67	4	56	22	11	22	36
PHF	.94	.94	.94	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	47	452	12	24	770	74	4	62	24	12	24	40
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	TR	86	172	.501	2	45.4	E	45.7
	2	L	4	82	.049	<1	51.2	F	
	3								E
EB	1	LTR	76	157	.484	2	47.7	E	47.7
	2								
	3								E
		①	47	840	.056	<1	9.5	A	
		④	24	1103	.022	<1	8.3	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/25/200
Agency or Company	AECOM	Major Street	KOMOHANA ST
Analysis Period/Year	TOT PM 4LANES 2015	Minor Street	KUKUAU ST
Comment	2015 TOTAL PM W/4LANES		

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	TR			TR			TR			LTR		
Lane 2	T			T			L					
Lane 3	L			L								
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	44	425	11	22	693	67	4	56	22	11	22	36
PHF	.94	.94	.94	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	47	452	12	24	770	74	4	62	24	12	24	40
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	TR	86	173	.498	2	45	E	44.3
	2	L	4	147	.027	<1	30.2	D	
	3								E
EB	1	LTR	76	186	.408	2	37.1	E	37.1
	2								
	3								E
		①	47	834	.056	<1	9.6	A	
		④	24	1098	.022	<1	8.4	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/28/200
Agency or Company	M&E PACIFIC	Major Street	MOHOULI STREET
Analysis Period/Year	AMB AM 2015	Minor Street	PROJECT ACCESS
Comment	2015 AMBIENT AM		

Input Data

Lane Configuration	WB	EB	SB	NB
Lane 1 (curb)	TR	T	R	
Lane 2		L	L	
Lane 3				

	WB			EB			SB			NB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		274	38	4	553		4		1			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		304	42	4	614		4		1			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
SB	1	R	1	713	.001	<1	10.1	B	16.2
	2	L	4	287	.014	<1	17.7	C	C
	3								
NB	1								
	2								
	3								
		①							
		④	4	1207	.004	<1	8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/28/200
Agency or Company	M&E PACIFIC	Major Street	MOHOULI STREET
Analysis Period/Year	TOT AM 2015	Minor Street	PROJECT ACCESS
Comment	2015 TOTAL AM		

Input Data

Lane Configuration	WB	EB	SB	NB
Lane 1 (curb)	TR	T	R	
Lane 2		L	L	
Lane 3				

	WB			EB			SB			NB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		274	43	4	553		9		2			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		304	48	4	614		10		2			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
SB	1	R	2	711	.003	<1	10.1	B	16.7
	2	L	10	286	.035	<1	18.1	C	C
	3								
NB	1								
	2								
	3								
		①							
		④	4	1201	.004	<1	8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/28/200
Agency or Company	M&E PACIFIC	Major Street	MOHOULI STREET
Analysis Period/Year	AMB PM 2015	Minor Street	PROJECT ACCESS
Comment	2015 AMBIENT PM		

Input Data

Lane Configuration	WB	EB	SB	NB
Lane 1 (curb)	TR	T	R	
Lane 2		L	L	
Lane 3				

	WB			EB			SB			NB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		624	17	3	337		38		4			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		693	19	3	374		42		4			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
SB	1	R	4	436	.009	<1	13.3	B	22.5
	2	L	42	238	.176	1	23.3	C	C
	3								
NB	1								
	2								
	3								
		①							
		④	3	883	.004	<1	9.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	11/28/200
Agency or Company	M&E PACIFIC	Major Street	MOHOULI STREET
Analysis Period/Year	TOT PM 2015	Minor Street	PROJECT ACCESS
Comment	2015 TOTAL PM		

Input Data

Lane Configuration	WB	EB	SB	NB
Lane 1 (curb)	TR	T	R	
Lane 2		L	L	
Lane 3				

	WB			EB			SB			NB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		624	27	4	337		44		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		693	30	4	374		49		6			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
SB	1	R	6	433	.014	<1	13.4	B	23.1
	2	L	49	235	.208	1	24.3	C	C
	3								
NB	1								
	2								
	3								
		①							
		④	4	874	.005	<1	9.1	A	

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APPENDIX 4 – ARCHAEOLOGICAL ASSESSMENT, PORTION OF TMK: (3) 2-4-01: 168, LAND OF WAIAKEA SOUTH HIO DISTRICT ISLAND OF HAWAII

ARCHAEOLOGICAL ASSESSMENT

PORTION OF TMK: (3) 2-4-01:168

LAND OF WAIAKEA

SOUTH HILO DISTRICT

ISLAND OF HAWAI'I

By:

Alan E. Haun, Ph.D.

Prepared for:

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Hilo, Hawaii 96720-4221

October 2008

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Introduction

At the request of Mr. Brian Nishimura, Haun & Associates has prepared an archaeological assessment for a 15.9-acre portion of TMK: (3) 2-4-01:168 located in the Land of Waiakea, South Hilo District, Island of Hawai'i (*Figure 1* and *2*). The objective of the survey was to satisfy historic preservation regulatory review requirements of the Department of Land and Natural Resources-Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules (2003).

No archaeological sites or features were identified during the survey, therefore the project is documented as an archaeological assessment pursuant to Chapter 13-284-5(5A). As required, this report contains a description of the project area, field methods and background research.

Project Area Description

The project area consists of a roughly rectangular-shaped 15.9-acre portion of the 30.396-acre TMK: (3) 2-4-01:168 (see *Figure* 2). The parcel is bordered on the northeast by Komohana Street, on the southeast east by the inland end of Mohouli Street, by a housing development to the northwest and by undeveloped land to the southwest. The southeastern end of Kahaikini Street terminates along the northwestern side of the parcel. The parcel is densely vegetated with *uluhe* (false staghorn fern - *Dicranopteris linearis* Underw.), *waiawi 'ula'ula* (strawberry guava – *Psidium cattleianum* sabine), *ohia* (*Metrosideros collina* Forst.) and *hapu'u* (Hawaiian tree fern - *Cibotium splendens* Krajina - *Figure 3*).

The project area ranges in elevation from c. 275 to 350 ft, with the terrain sloping slightly to moderately to the northeast. The surface throughout the parcel is comprised of Pahoehoe lava flows, defined as a miscellaneous land type by Sato et al. (1973). This land type is described below:

> This lava has a billowy, glassy surface that is relatively smooth. In some areas however, the surface is rough and broken and there are hummocks and pressure domes. (Sato et al. 1973:34).

The surface lava in the project area was derived from two flows from Mauna Kea volcano (*Figure 4* from Wolfe and Morris 2001). The entire project area was likely once covered with lava deposited from 750 to 1,500 year ago (k3 on *Figure 4*). A subsequent lava flow deposited during 1880 and 1881 (k5) has flowed over the inland portion of the parcel. The rainfall in the vicinity of the project area ranges from 150 to 155 inches per year (Juvik and Juvik 1998:57).

Field Methods

The field work portion of the project was conducted on October 6, 2008 by Dr. Alan Haun and Field Archaeologist Shane Rumsey, M.A. The field work portion of the project required 2 labor days to complete. The project area was subjected to 100% surface examination with the surveyors spaced at 10.0 m intervals. The transected were oriented in a north-northwest by south-southeast direction, parallel to Mohouli Street. No archaeological sites or features were identified and no cultural remains were recovered for analysis.

Background Research

The project area is situated in the *ahupua'a* of Waiakea in South Hilo District. The *ahupua'a* is one of the largest in the district covering over 95,000 acres. The *ahupua'a* extends along the coast from the west side of Hilo Bay to the Puna District boundary and inland to approximately 6,000 ft elevation. Much of the following is summarized from *Hilo Bay: A Chronological History* (Kelly et al. 1981), an extensive compendium of historical information about Hilo including Waiakea.

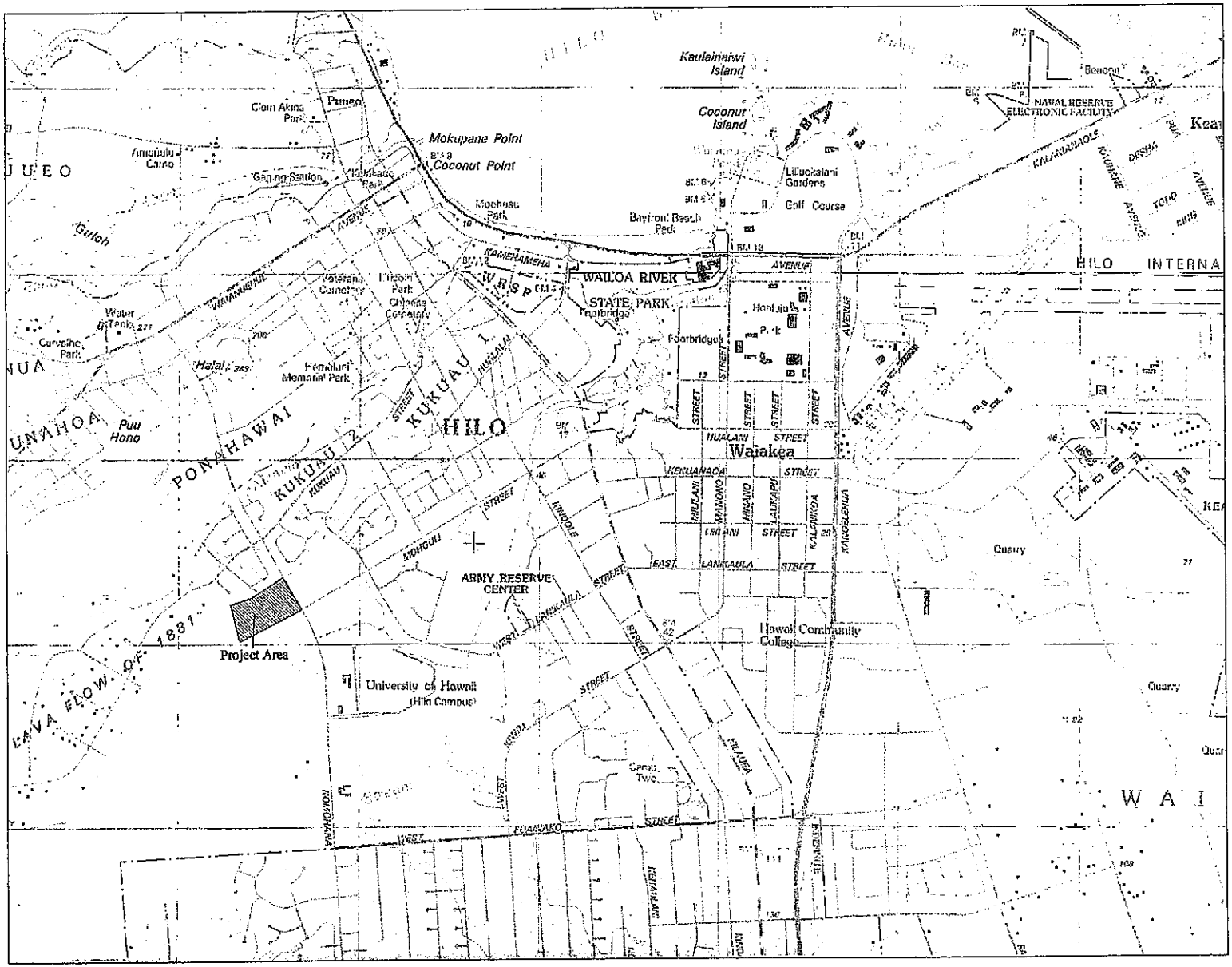

Figure 1. Portion of USGS Hilo Quadrangle showing Project Area

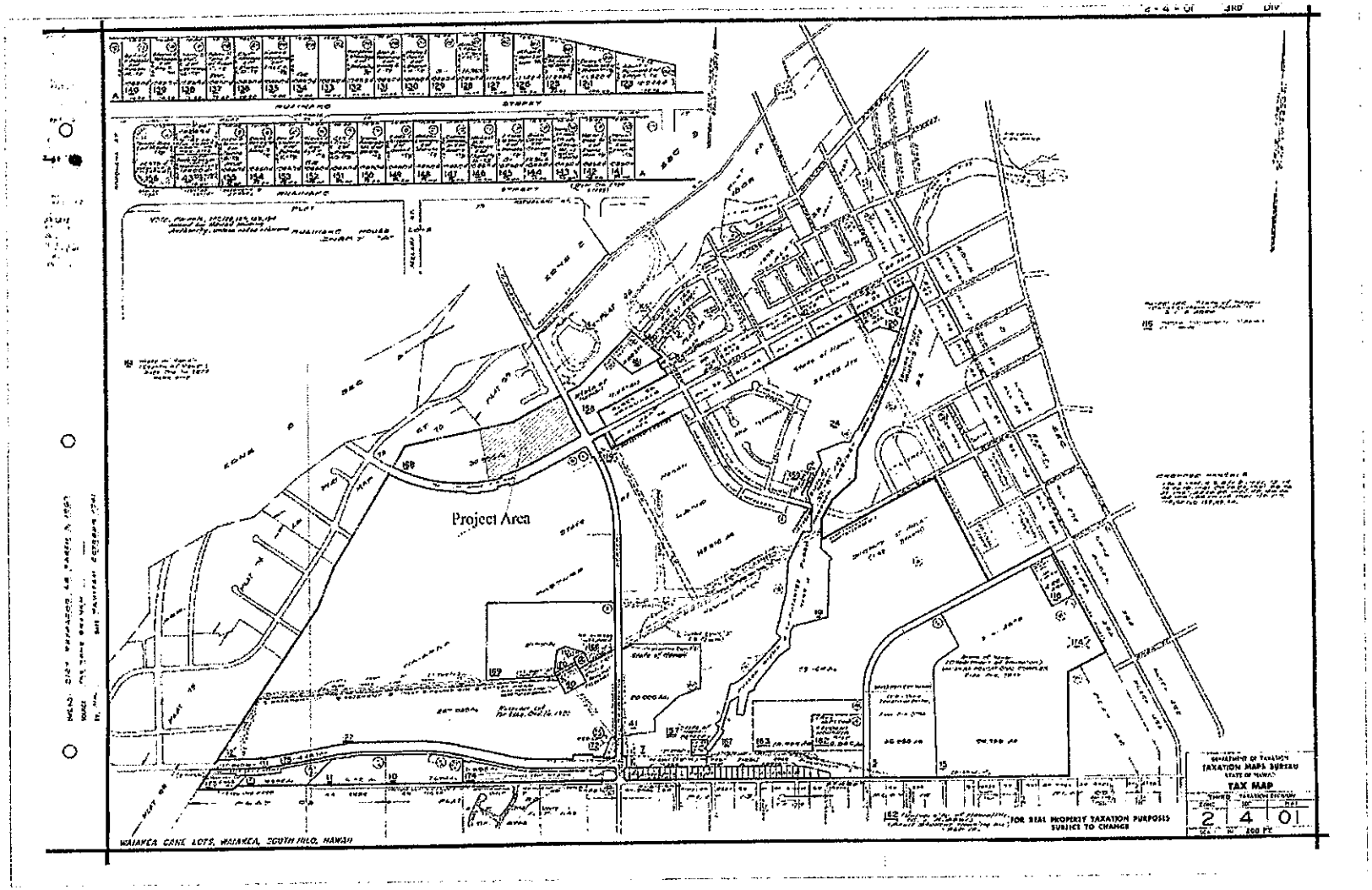

Figure 2. Tax Map Key 2-4-01 showing Project Area

Figure 3. Project Area Overview (from Google Earth)

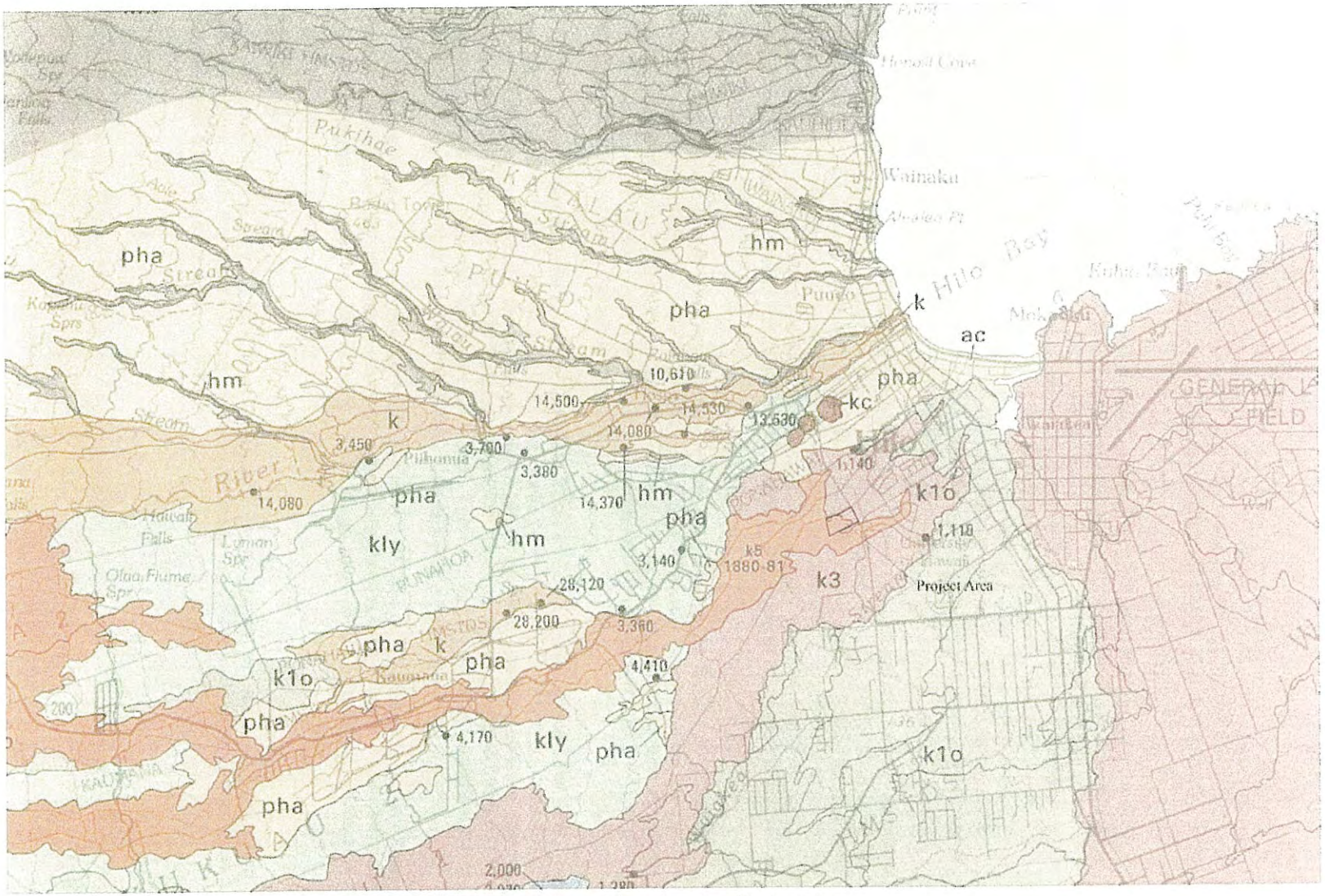

Figure 4. Portion of Wolfe and Morris (2001) Sheet 2 Lava Map showing Project Area

Hawaiian traditional and legendary accounts attest to the longstanding importance of Waiakea. The chief of the Hilo region, Kulukulu'a, who resided in Waiakea, was the first conquest of 'Umi-a-Liloa in his campaign to unify the districts of Hawaii Island. Hilo with its large bay, fishponds, wet taro fields, and abundant freshwater was a population center for commoners and royalty. Kamehameha I and his court resided in Hilo in the 1890s. In preparation for his planned invasion of Kauai in 1802, Kamehameha built a canoe fleet at Hilo, reportedly consisting of 800 vessels.

In 1824, a missionary station was established in Waiakea. Soon after, churches and schools were established. Whalers began stopping at Hilo in the mid-1820s. In the 1830s, a sawmill was built, and two stores were opened. By the end of the decade, a sugar cane plantation and mill were established on Ponahawai lands. By 1857, there were three sugar cane mills in the Hilo area. Large tracts of land were put in cane cultivation and sugar cane was also grown by individuals around their houses. A sugar mill was established in Waiakea at the inland end of Waiakea Fishpond in the late 1870s. By 1880, 1,400 acres of sugar cane were in cultivation and by the end of the decade over 5,600 acres were cultivated. In the 1900s, the population of Hilo grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments.

McEldowney (1979) used limited site inventory and historic documentary evidence to develop a traditional Hawaiian land use and settlement pattern model for the Hilo area. The model consists of five elevation-defined zones: Coastal Settlement, Upland Agricultural, Lower Forest, Rainforest, and Sub-Alpine or Montane. The Coastal Settlement Zone extended approximately 0.5 miles inland from the shoreline between sea level and 50 ft elevation. The zone was the most densely populated with both permanent and temporary habitations, high status chiefly residences, and *heiau*. Settlements were concentrated at Hilo Bay and sheltered bays and coves.

The Upland Agricultural Zone was situated between approximately 50 ft and 1,500 ft elevation. Settlement in the zone consisted of scattered residences among economically beneficial trees and agricultural plots of dryland taro and bananas. Lava tubes were utilized for shelter. A pattern of shifting cultivation is believed to have converted the original forest cover to parkland of grass and scattered groves of trees. Wetland cultivation of taro occurred along streams.

The Lower Forest Zone ranged from 1,500 ft to 2,500 ft elevation. Timber and other forest resources such as medicinal plants, *olona*, and birds were gathered from the zone. Site types consisted of temporary habitations, trials, shrines, and minor agricultural features in forest clearings and along streams. Sites in the Rainforest Zone (2,500-5,000 ft elevation) and Sub-alpine or Montane Zone (5,000-9,000 ft) were limited to trails and associated temporary habitations. These zones were used for intra-island travel and gathering of valued resources including hardwoods, birds, and stone for tool making.

The project area is situated within the lower portion of McEldowney's Upland Agricultural Zone where scattered residences and agricultural plots were situated in prehistoric to early historic times. Historic site types in the project area vicinity likely included plantation agriculture-related features and residences.

FINDINGS

No archaeological sites or features were identified by the survey and no Land Commission Awards are present within the parcel based on review on tax maps. No further archaeological work is recommended based on the negative survey results.

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