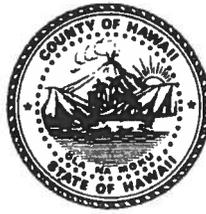


William P. Kenoi
Mayor



Stephen J. Arnett
Housing Administrator

Susan Akiyama
Assistant Housing Administrator

County of Hawai'i

Office of Housing and Community Development

50 Wailuku Drive • Hilo, Hawai'i 96720 • (808) 961-8379 • Fax (808) 961-8685
KONA: 74-5044 Ane Keohokalole Highway • Kailua-Kona, Hawai'i 96740
(808) 323-4305 • Fax (808) 323-4301

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OFFICE OF ENVIRONMENTAL QUALITY CONTROL

August 30, 2012

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

Draft

Subject: ~~XXXX~~ **Environmental Assessment
Finding of No Significant Impact
Mohouli Heights Senior Neighborhood Project
TMK: (3) 2-4-001:184 (Formerly (3) 2-4-001:177)
Waiākea South Hilo, Island of Hawai'i**

Dear Ms. Kealoha:

With this letter, the Office of Housing and Community Development (OHCD) hereby transmits the ~~XXXX~~ draft environmental assessment and anticipated finding of no significant impact (DEA-AFONSI) for the Mohouli Heights Senior Neighborhood Hilo Adult Day Center Project situated at (3) 2-4-001:184 (formerly (3) 2-4-001:177) in the District of South Hilo on the island of Hawai'i for publication in the next available edition of the Environmental Notice.

Enclosed is a completed OEQC Publication Form, two copies of the DEA-AFONSI, and Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the



EQUAL HOUSING OPPORTUNITY
"HAWAII COUNTY IS AN EQUAL OPPORTUNITY
PROVIDER AND EMPLOYER"

August 30, 2012

Ms. Katherine Puana Kealoha

Page 2

summary of the action in a text file by electronic mail to your office.

If there are any questions, please contact Alan Rudo at (808) 961-8379. Thank you.


A _____
Stephen J. Arnett
Housing Administrator

Enclosures

**NEPA Action EA/EIS
Publication Form**

**Project Name: Mohouli Heights Senior Neighborhood Hilo Adult Day Center Project
(Supplemental DEA and Anticipated FONSI)**

Island: Hawaii

District: South Hilo

TMK: (3) 2-4-1: 184 (formerly 177)

Permits:

Applicant or Proposing

Agency: Hawaii Island Community Development Corporation (HICDC)

Address: 100 Pauahi Street, Suite 204, Hilo, Hawaii 96720

Contact Person: Keith Kato

Telephone: (808) 969-1158 ext. 105

Approving

Agency: County of Hawaii, Office of Housing and Community Development

Address: 50 Wailuku Drive, Hilo, Hawaii 96720

Contact Person: Alan Rudo

Telephone: (808) 961- 8379

Consultant: Brian T. Nishimura, Planning Consultant

Address: 101 Aupuni Street, Suite 217, Hilo, Hawaii 96720

Contact Person: Brian Nishimura

Telephone: (808) 935-7692

Status:

Comment period: 30 days

Comment deadline: October 23, 2012

Send comments to: Brian T. Nishimura, Planning Consultant

Summary:

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 seventy-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 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 HICDC previously completed a Final Environmental Assessment to develop the affordable elderly housing project on the subject 15 acre site. The Final Environmental Assessment was completed in April, 2009 and a Finding of No Significant Impact was issued by the Hawaii County Office of Housing and Community Development on April 27, 2009. The HICDC began construction on the first phase of the elderly housing project which will include 60 one-bedroom rental units for low income seniors in March 2012.

HICDC is proposing to construct a new facility for the Hilo Adult Day Center in the next phase of the project and this supplemental assessment will address the impacts from the proposed facility because this use was not included in the environmental assessment completed in 2009. The Hawaii Island Community Development Corporation is working with Hawaii Island Adult Care, Inc. to relocate the existing Hilo Adult Day Center from the former Hilo Hospital Building to the Mohouli project site. The facility will be approximately 8,000 square feet in size with an operational capacity for 80 clients. The proposed facility will be situated on tax map key no. (3) 2-4-01: 184 which was subdivided from parcel 177 to separate the Phase I portion of the Mohouli Heights Senior Neighborhood Project for financing purposes.

The Hilo Adult Day Center offers a safe and supportive environment for elders and adults who are frail, physically and/or mentally challenged and for persons with Alzheimer's disease. The Center is open from Monday through Friday, 7:00 a.m. to 5:00 p.m. and Saturdays, 8:00 a.m. to 4:00 p.m. The Center offers a variety of supervised, structured group activities designed to promote independence, mental stimulation, physical activity and enjoyment. Clients participate in a wide range of fun and stimulating social, recreational, and educational activities according to their individual abilities, needs and interests. Nutritious light breakfast, lunch and snack are provided daily.

Revised February 2012

**SUPPLEMENTAL DRAFT ENVIRONMENTAL ASSESSMENT AND
ANTICIPATED FINDING OF NO SIGNIFICANT IMPACT**

**MOHOULI HEIGHTS SENIOR NEIGHBORHOOD
HILO ADULT DAY CENTER PROJECT**

Waiakea, South Hilo, Island of Hawaii

JUNE, 2012

PREPARED FOR:

HAWAII ISLAND COMMUNITY DEVELOPMENT CORPORATION

100 Pauahi Street, Suite 204
Hilo, Hawaii 96720

PREPARED BY:

BRIAN T. NISHIMURA, PLANNING CONSULTANT

101 AUPUNI STREET
SUITE 217
HILO, HAWAII 96720-4221

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

APPENDIX - TRAFFIC IMPACT ANALYSIS REPORT, MOHOULI HEIGHTS SENIOR NEIGHBORHOOD PROJECT, First Revision, September 2011

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

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 seventy-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 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. (See attached Project Area Map)

The HICDC previously completed a Final Environmental Assessment to develop the affordable elderly housing project on the subject 15 acre site. The Final Environmental Assessment was completed in April, 2009 and a Finding of No Significant Impact was issued by the Hawaii County Office of Housing and Community Development on April 27, 2009. The HICDC began construction on the first phase of the elderly housing project which will include 60 one-bedroom rental units for low income seniors in March 2012.

HICDC is proposing to construct a new facility for the Hilo Adult Day Center in the next phase of the project and this supplemental assessment will address the impacts from the proposed facility because this use was not included in the environmental assessment completed in 2009. The Hawaii Island Community Development Corporation is working with Hawaii Island Adult Care, Inc. to relocate the existing Hilo Adult Day Center from the former Hilo Hospital Building to the Mohouli project site. The facility will be approximately 8,000 square feet in size with an operational capacity for 80 clients. The proposed facility will be situated on tax map key no. (3) 2-4-01: 184 which was subdivided from parcel 177 to separate the Phase I portion of the Mohouli Heights Senior Neighborhood Project for financing purposes. (See attached Subdivision Map and Site Plan)

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 as well as potential federal, state and private funding sources. The use of County land and potential federal and state funding 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.

PROJECT AREA MAP



Figure 1. Portion of USGS Hilo Quadrangle showing Project Area

SUBDIVISION MAP



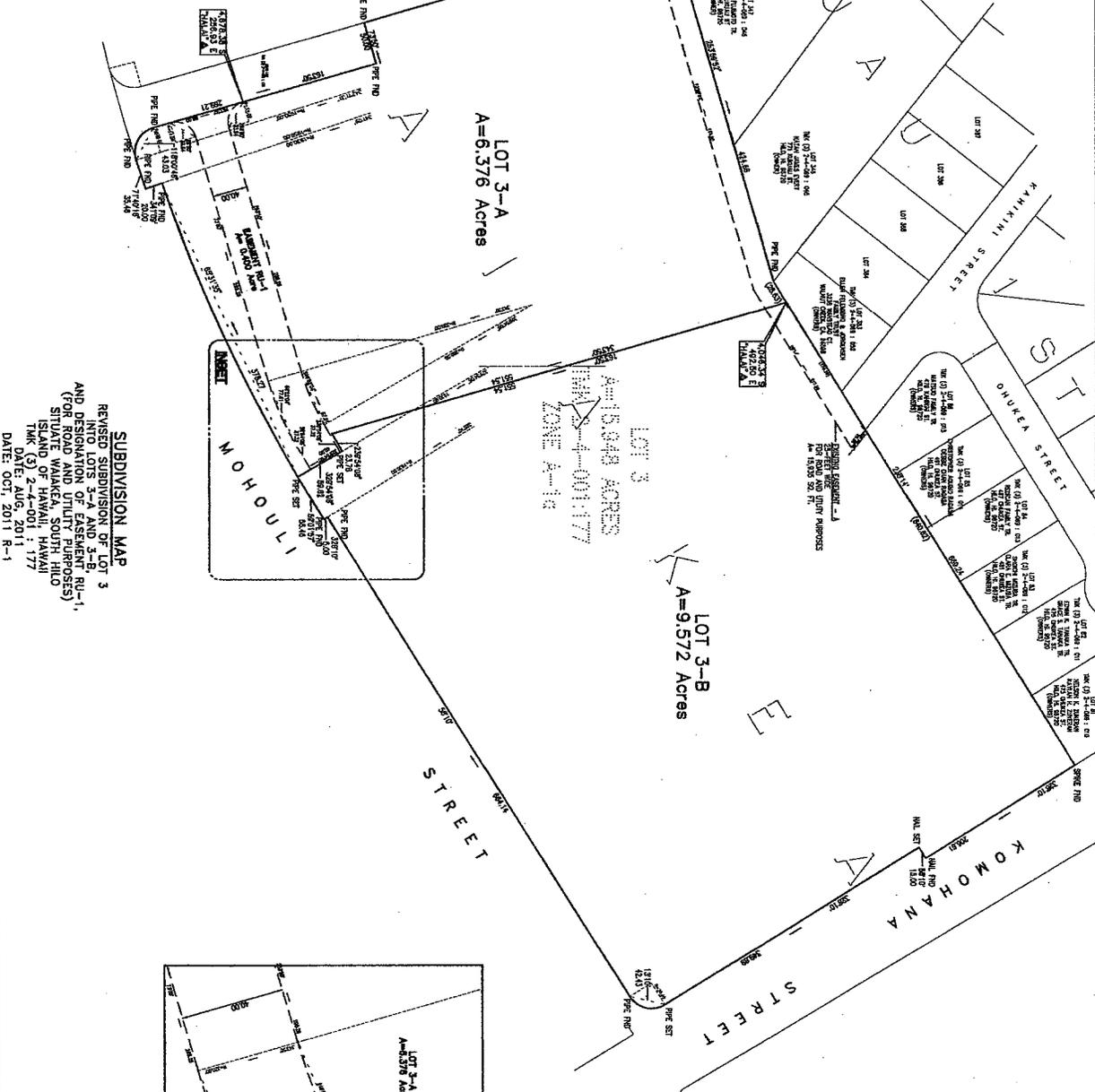
This work was prepared by me in accordance with the provisions of the Hawaii Statutes, Chapter 461, and the Rules of the Board of Professional Engineers, Chapter 461-10, Hawaii Administrative Rules.

Signature
 Date: April 20, 2012

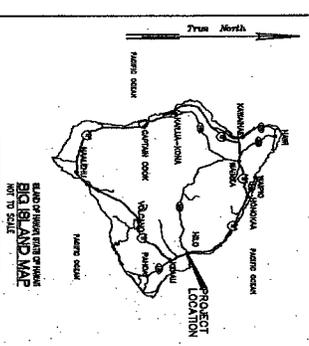
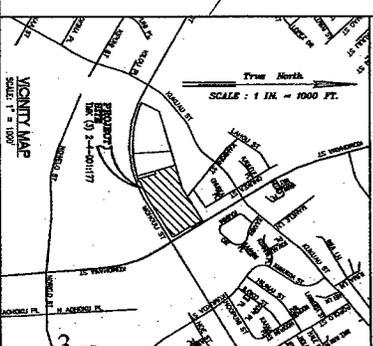
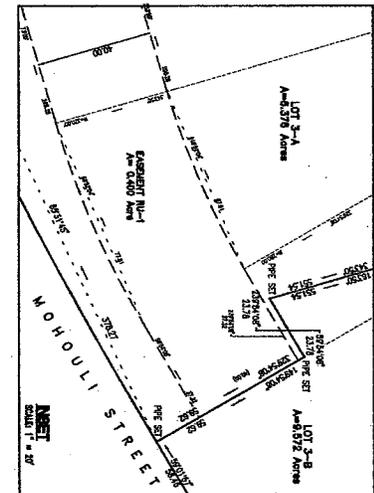
OWNER: COUNTY OF HAWAII
 PROJECT: HAWAII STATE COLLEGE CAMPUS IMPROVEMENT PROJECT

SCALE: 1" = 60'

True North
 SCALE: 1 IN. = 60 FT.



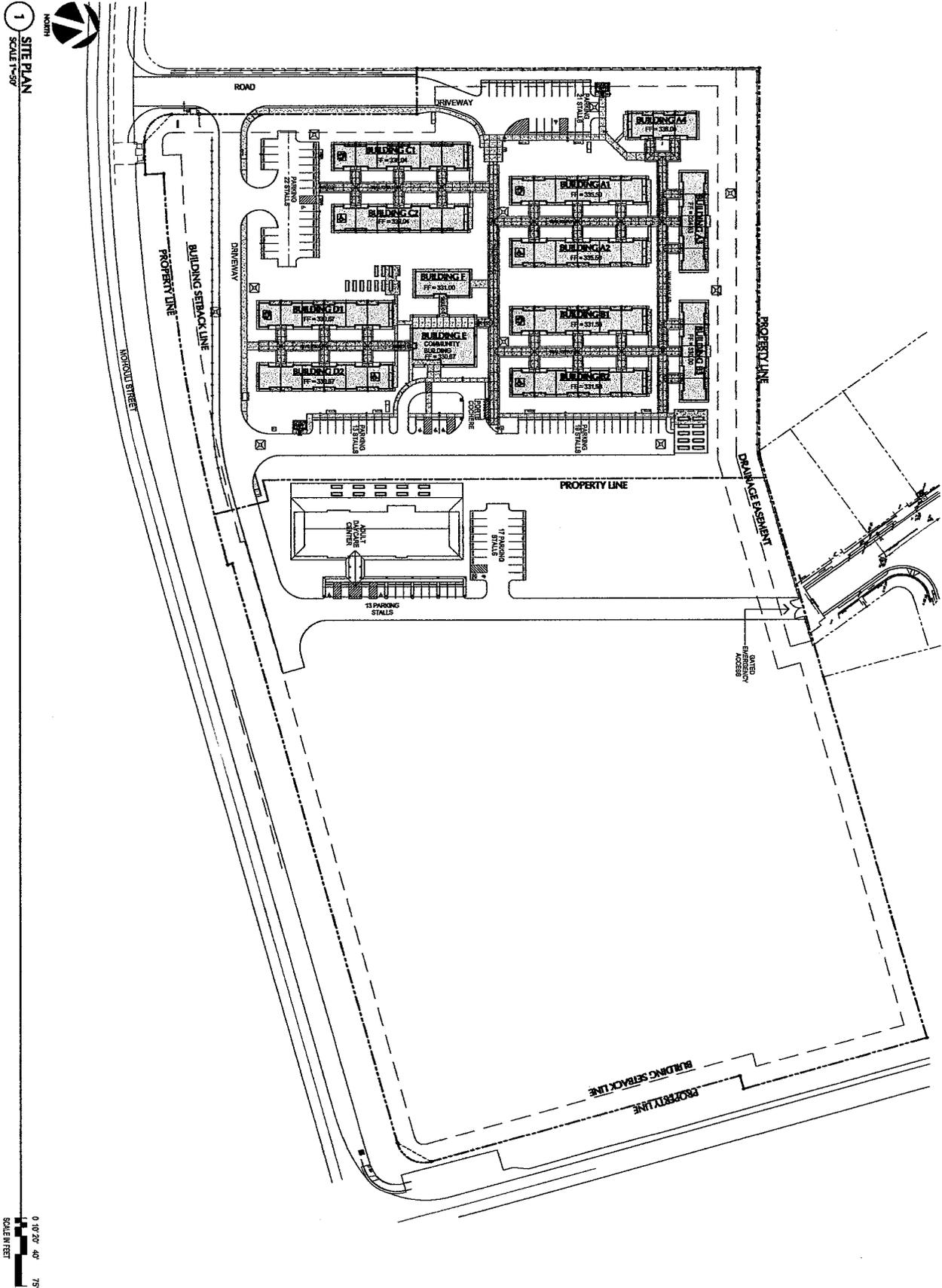
SUBDIVISION MAP
 REVISED SUBDIVISION OF LOT 3
 INTO LOTS 3-A AND 3-B
 AND DESIGNATION OF EASEMENT RU-1,
 (FOR ROAD AND UTILITY PURPOSES)
 SITUATED IN PAKIAI, SOUTH MAUI
 COUNTY, HAWAII
 DATE: AUG 2011
 DATE: OCT 2011 R-1



Engineering Partners, Inc.
 Professional Engineers
 100 S. Wai'anae Blvd., Suite 4120
 Wai'anae, HI 96792
 Tel: (808) 833-7300
 Fax: (808) 833-7300
 www.epartners.com

DATE: 04.20.12
 SHEET: 4 OF 4

SITE PLAN



1 SITE PLAN
SCALE 1"=50'



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 is working with Hawaii Island Adult Care, Inc. to relocate the existing Hilo Adult Day Center from the former Hilo Hospital Building to the Mohouli project site. The facility will be approximately 8,000 square feet in size with an operational capacity for 80 clients. The proposed facility will be situated on tax map key no. (3) 2-4-01: 184 which was subdivided from parcel 177 to separate the Phase I portion of the Mohouli Heights Senior Neighborhood Project for financing purposes. 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 attached Floor Plan)

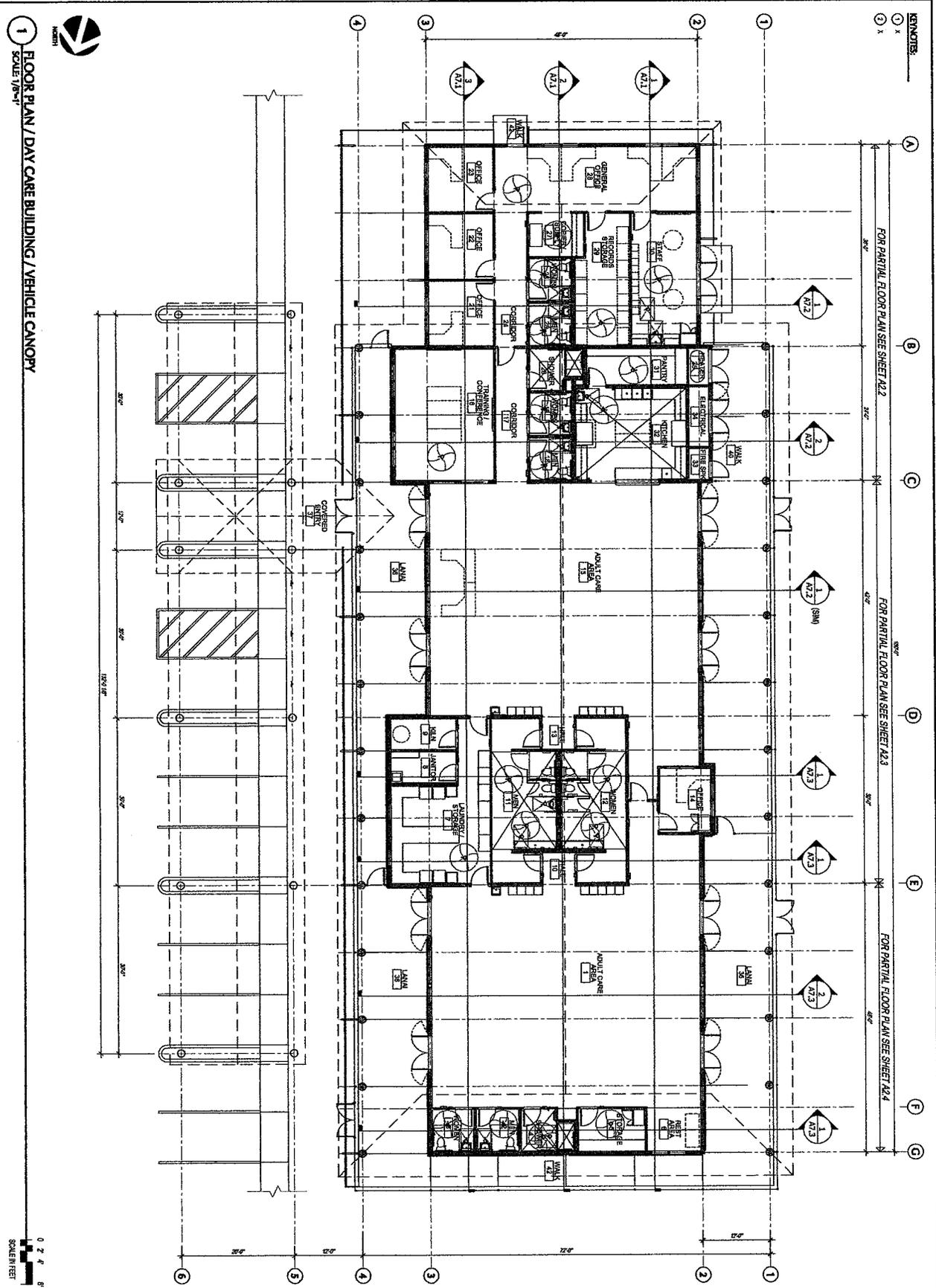
The Hilo Adult Day Center offers a safe and supportive environment for elders and adults who are frail, physically and/or mentally challenged and for persons with Alzheimer's disease. The Center is open from Monday through Friday, 7:00 a.m. to 5:00 p.m. and Saturdays, 8:00 a.m. to 4:00 p.m. The Center offers a variety of supervised, structured group activities designed to promote independence, mental stimulation, physical activity and enjoyment. Clients participate in a wide range of fun and stimulating social, recreational, and educational activities according to their individual abilities, needs and interests. Nutritious light breakfast, lunch and snack are provided daily.

The proposed adult day center will be integrated as part of a central activity core composed of structures that contain spaces for activities to provide essential services for the residents of the project. These may include 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. There will be a symbiotic relationship between the adult day center and the senior rental project that will allow a sharing of facilities and amenities that will be beneficial to both projects.

The estimated cost of the proposed project is 7 million dollars. Subject to funding availability, HICDC intends to construct the facility within the next three years.

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.

FLOOR PLAN



	FLEMING & ASSOCIATES, LLC ARCHITECTS 377 HAWAIIAN BLVD. HILO, HAWAII
	BOB DAVIS REGISTERED PROFESSIONAL ARCHITECT LICENSE NO. 11027 11027 OAK STREET HILO, HAWAII 96720 TEL: 937-5333 FAX: 937-5333
PROJECT NO. 11027/02 PROJECT NAME: 5F SHEET COMMENTS: FLOOR PLAN	DATE: 1/18/2012 SHEET: A2.1
CONSULTANTS: REVISIONS:	HILO ADULT DAY CARE CENTER HILO ADULT DAY CARE CENTER, LLP MOHON STREET HILO, HAWAII TAX MAP KEY: (3) 2-4-1-177

1.5 Project Background

1.5.1 Need for the Project

The County of Hawaii's population based on the 2010 census was 185,079, an increase of 24 percent since 2000. The population of the South Hilo District was 47,386 in 2000 and the 2010 census population was 50,927 which represent a 7.5% increase over the ten year time period.

The State's Housing Policy Study, 2006: Housing Issues for Senior Citizens (2006 Study) found that in 1990, 13.9% of the population in the State was over 62 years of age. In 2000, the percentage had grown to 15.3% and in 2010 it was forecast to be 18.9%. (The actual 2010 census data indicated that those 60 and older represented 21.8% of the Hawaii County population.) This growth in the elderly population is projected to continue at a rate of over two percent per year as compared to the overall population growth rate of one percent per year.

The 2011 Hawaii Housing Planning Study reported that there were approximately 34,123 households with elderly members (at least one member 60 years or older) residing in the County of Hawaii. This amounts to 41% of all families in the County.

Additional statistics compiled from *Hawaii's Older Adults: Demographic Profile* published by the University of Hawaii at Manoa, Center on the Family, and the State Executive Office on Aging further support the obvious trend that the elderly segment of our population is growing larger and additional services will be required to support this segment of the population.

- People in Hawaii have a longer life expectancy than those across the nation, 79.8 years vs. 76.9 years.
- Hawaii's (state) total population is expected to grow by 21.0% between 2000 and 2030. However, the number of adults 60 years and older will increase by 93.8% and those 85 years and older will increase by 174.7%.
- By 2030, people aged 60 and older are projected to increase to more than one fourth (27.4%), and the oldest-old population (aged 85 and over) is expected to grow to 3.3% of the state's population.

With the tremendous growth in the elderly population in the County of Hawaii, the Hilo Adult Day Center provides an essential service to address the needs of this segment of the population. The Center also provides respite for caregivers/families, and the opportunity to continue their employment without worries about their loved ones. There are 105 participants enrolled with daily attendance ranging from 60 to 78. Over 70% of the participants are over 80 years old and over 50% have some kind of dementia or Alzheimer's disease. Without the services provided by the Hilo Adult Day Center it is estimated that approximately 40% of the participants would be in a care home or nursing home because it would be too difficult for family members to care for them at home. This is a tremendous

cost savings for government funding since approximately 90% of the people in nursing homes and care homes rely on Medicaid to pay the bill.

The existing Hilo Adult Day Center is situated at the old Hilo Memorial Hospital which was constructed in 1924. The facility is being leased on a month to month basis and the construction of a new functional and modern facility will be essential to ensure that these services will continue to be available for the community. In a letter dated January 12, 2012, The County of Hawaii, Office of Aging describes the problem as follows:

“The Hilo Adult Day Center has a long history of excellence in the provision of support services for frail elderly and their caregivers and their current location has served them and community well for over thirty years. However, the building is rapidly deteriorating and we are concerned that a possible earthquake or other circumstance could render the building unsafe leaving over a hundred needy clients and families without the support they need to keep these individuals at home.”

1.5.2 Land Use Designations

The subject property is situated within the State Land Use Urban 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 Multi-Family Residential Four Thousand (RM-4). 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.

The proposed project is consistent with the State Land Use District Urban designation as well as the County General Plan designation of Medium Density Urban. 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 and related uses 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	
Department of Water Supply	Approval of Project Construction Plans
Department of Public Works	Building Permit/Construction Plans, Grading and Grubbing Permit

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
Sunrise Estates Community Association
Sunrise Ridge Community Association

Members of the Sunrise Estates Community Association and the Sunrise Ridge Community Association were invited to a public informational meeting held on January 12, 2012 in which a status update was provided on the first phase of the Mohouli Heights Senior Neighborhood Project was provided along with a presentation on the proposed Hilo Adult Day Center facility. Additional information was also presented to the Sunrise Estates Community Association at their annual board meeting held on February 9, 2012. Although questions were raised regarding the proposed Adult Day Center facility during these meetings, there were no adverse comments provided regarding the proposed facility. In addition, the Hawaii County Council's Finance Committee heard public testimony in support of the proposed Adult Day Center facility during deliberations on a resolution seeking \$7 million for construction funding from the State Legislature during its meeting held on March 8, 2012.

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 and adult day care 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

The subject property is situated within 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), Map No. 1551660880, effective: July 17, 2009 .

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.

There were no pre-assessment comments received from the United States Department of the Interior Fish and Wildlife Service for the supplemental assessment involving the adult care facility. Prior comments received for the senior housing project 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 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.” (Letter dated December 9, 2008, included in Appendix 1)

Impacts and Mitigation Measures

Based on the findings of previous botanical, 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.”

It should be noted that vegetation on the Phase I project area as well as the proposed site for the Adult Care Facility has been cleared and was completed prior to March 31, 2012 to avoid impacts to the endangered Hawaiian hoary bat as recommended by the U.S. Fish and Wildlife Service.

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 term 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 Komohana Street. 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 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 and adult care facility.

Impacts

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

2.2 Social, Cultural and Economic Setting

2.2.1 Socio-Economic Characteristics

Setting

The County of Hawaii's population based on the 2010 census was 185,079, an increase of 24 percent since 2000. The population of the South Hilo District was 47,386 in 2000 and the 2010 census population was 50,927 which represent a 7.5% increase over the ten year time period.

The State's Housing Policy Study, 2006: Housing Issues for Senior Citizens (2006 Study) found that in 1990, 13.9% of the population in the State was over 62 years of age. In 2000, the percentage had grown to 15.3% and in 2010 it was forecast to be 18.9%. (The actual 2010 census data indicated that those 60 and older represented 21.8% of the Hawaii County population.) This growth in the elderly population is projected to continue at a rate of over two percent per year as compared to the overall population growth rate of one percent per year.

The 2011 Hawaii Housing Planning Study reported that there were approximately 34,123 households with elderly members (at least one member 60 years or older) residing in the County of Hawaii. This amounts to 41% of all families in the County.

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

With the tremendous growth in the elderly population in the County of Hawaii, the Hawaii Island Adult Care provides an essential service to address the needs of this segment of the population. The existing Adult Day Center is situated at the old Hilo Memorial Hospital which was constructed in 1924. The facility is being leased on a month to month basis and the construction of a new functional and modern facility will be essential to ensure that these services will continue to be available for the community. The proposed action will not generate growth but rather would enable the existing service provider to address the uncertainty caused by the physical deficiencies of the existing facility to ensure that the long-term needs of the community are met.

The proposed project is not located in a neighborhood that suffers from adverse human health or 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 adjacent parcel to the west is currently being developed as the first phase of the Mohouli Heights Senior Neighborhood project which will have 60 one-bedroom apartment units for low income senior residents. In addition, the parcel situated to the west of the senior housing project 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 adult day center facility 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 senior housing project. This roadway would also provide access to the Hawaii County Fire Administration Support Complex which is proposed west of the senior housing project. 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, previously prepared for the elderly housing project by M&E Pacific, Inc. in 2008 was updated to include an analysis of the impact of adding the proposed adult day center facility. The updated report was prepared by AECOM in September, 2011 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 is forecast to generate less than 100 trips during the morning and afternoon commuter peak hours, which is considered to

be a relatively small number of trips. This additional traffic in itself would not require mitigating measures beyond those roadway improvements proposed by the Wailani Center. The Wailani Center project is adding additional traffic lanes at the Komohana Street/Mohouli Street intersection to accommodate the future growth in ambient traffic. The traffic forecast generated by Wailani Center project also identified the need for traffic mitigation at the currently unsignalized Komohana Street/Kukuau Street intersection. Traffic signals may be warranted at this intersection in the future as a mitigation measure.

“The currently unsignalized intersection at Mohouli Street/Kukuau Street will not require mitigation in the future due to the increases in ambient traffic. The project access roadway intersection on Mohouli Street can remain stop sign controlled.” (The complete traffic impact analysis report is included as Appendix 3.)

Impacts

The proposed 160-unit elderly housing and adult day center project is forecast to generate less than 100 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 February 17, 2012, the State Department of Transportation stated that the “DOT does not anticipate any significant adverse impacts to the State transportation facilities.” In a letter dated February 6, 2012, the Hawaii County Police Department stated, “Staff, upon reviewing the provided documents, does not anticipate any significant impact to traffic and/or public safety concerns.”

2.3.2 Water System

Existing Setting

Water is available from an existing 12-inch waterline within within Mohouli Street. Phase I of the elderly housing project will connect to the 12-inch waterline from Mohouli Street and will be extended into the access roadway.

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. The sewer main will be extended from Kahikini Street through a road and utility easement to service the first phase of the elderly housing project. Comments received from the Department of Environmental Management, Wastewater Division has stated that, "Connection of the Adult Day Care Facility to the sewer main is feasible via a sewer manhole within the Road and Utility Easement provided that a sewer study be submitted and accepted by the Wastewater Division which evaluates and confirms that the existing collection system is capable of accepting additional wastewater flows from the proposed development." (Memorandum dated February 7, 2012, 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 existing sewer collection system, as installed, is not capable of accepting the additional wastewater flows from the proposed development, the developer will evaluate alternative options for wastewater treatment and disposal including upgrading the wastewater collection system. The applicant will evaluate these options to determine the financial feasibility of the various alternatives.

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 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 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.”

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 adult day center facility including increased noise levels, dust and exhaust from machinery.

Mitigation: Given the relative short construction time period involved in developing the adult day center facility, 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/endangered species:

Impacts: 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.

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 leave the existing Hilo Adult Day Center in a tenuous situation because they are on a month to month lease utilizing an aging facility built in 1924. The building is rapidly deteriorating and the facility is vulnerable to a possible earthquake or other circumstance that could render the building unsafe.

4.2 Alternative Sites

The proposed adult day center facility 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 incorporating an adult day center facility as part of a 160-unit elderly housing project on 15.948-acres of land. The first phase of the elderly housing project providing 60 one bedroom apartment units is currently under construction and the proposed adult day center facility will be built in the next phase of the project. 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 and adult day center facility 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 2011 Hawaii Housing Planning Study reported that there were

approximately 34,123 households with elderly members (at least one member 60 years or older) residing in the County of Hawaii. This amounts to 41% of all families in the County. With the tremendous growth in the elderly population in the County of Hawaii, the Hawaii Island Adult Care provides an essential service to address the needs of this segment of the population.

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 adult day care services for our growing elderly population.

7. Involves a substantial degradation of environmental quality.

The proposed elderly housing and adult day center facility 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. Detrimentially 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 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 adult day center and 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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APPENDIX 1 – REPRODUCTION OF COMMENTS MADE DURING THE PRE-ASSESSMENT CONSULTATION PERIOD

1. State of Hawaii, Office of Hawaiian Affairs, January 30, 2012.
2. County of Hawaii, Office of Aging, January 30, 2012.
3. State of Hawaii, Department of Health, District Environmental Health Program Chief, February 15, 2012.
4. State of Hawaii, Department of Transportation, Director of Transportation, February 17, 2012.
5. State of Hawaii, Department of Hawaiian Home Lands, Chairman, Hawaiian Homes Commission, February 2, 2012.
6. County of Hawaii, Department of Environmental Management, February 8, and July 17, 2012. Response Letter from Brian T. Nishimura, Planning Consultant, July 24, 2012
7. County of Hawaii, Fire Department, February 9, 2012.
8. County of Hawaii, Planning Department, February 16, 2012.
9. County of Hawaii, Police Department, February 6, 2012..



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
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HRD11/3469C

January 30, 2012

Brian T. Nishimura, Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii'i 96720-4221

**Re: Pre-Draft Environmental Assessment Consultation
Hawaii'i Island Community Development Corporation Adult Day Care Facility
Hilo, Island of Hawaii'i**

Aloha e Brian T. Nishimura,

The Office of Hawaiian Affairs (OHA) is in receipt of your January 20, 2012 letter requesting comments ahead of a draft environmental assessment (DEA) which will be prepared to support a proposal by the Hawaii'i Island Community Development Corporation (HICDC) to develop an adult care facility as a component of the larger Mohouli Heights Senior Neighborhood Project in Hilo on the Island of Hawaii'i. The HICDC will begin the construction of residential units, which is considered to be "Phase 1" of the Mohouli Heights Senior Neighborhood Project (project) which will be made available as rentals to the elderly upon completion.

The proposed adult care facility is considered to be the next phase of the project and will be developed on 8,000 square feet of land on a separate tax map key parcel which is immediately adjacent to the residential units. The HICDC has previously prepared an environmental assessment with a "finding of no significant impact" determination which supported construction of an integrated series of residential rental units focused around a central activity core on a 15.948-acre parcel, which was subsequently subdivided into two separate tax map key parcels.

OHA has no specific comments to offer ahead of the DEA at this time. Please send one electronic copy of the DEA to OHA attn: Compliance Program when it is available. Should you have any questions or concerns, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

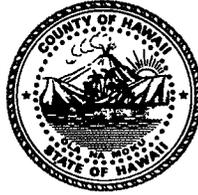
A handwritten signature in black ink, appearing to be "Richard Pezzulo".

Richard Pezzulo
Interim Chief Executive Officer

RP:kl

C: OHA, East Hawaii'i Community Outreach Coordinator

William P. Kenoi
Mayor



Alan R. Parker
Executive on Aging

County of Hawai'i

OFFICE OF AGING

Aging and Disability Resource Center, 1055 Kino'ole Street, Suite 101, Hilo, Hawai'i 96720-3872
Phone (808) 961-8600 • Fax (808) 961-8603 • Email: hcoa@hawaiiantel.net
West Hawai'i Civic Center, 74-5044 Ane Keohokālole Highway, Kailua-Kona 96740
Phone (808) 323-4390 • Fax (808) 323-4398

January 30, 2012

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

Subject: Pre-Environmental Assessment Consultation
Applicant: Hawaii Island Community Development Corporation (HICDC)
Proposed Adult Day Care Facility within the Mohouli Heights Senior
Neighborhood Project
Tax Map Key (3) 2-4-01: 184 (formerly part of 177) Waiakea, South Hilo,
Hawaii

The Hawaii County Office of Aging is very supportive of the plans to relocate the Hilo Adult Day Center to be part of the Mohouli Heights Senior Neighborhood Project.

The Hilo Adult Day Center has a long history of excellence in the provision of support services for frail elderly and their caregivers and their current location has served them and community well for over thirty years. However, the building is rapidly deteriorating and we are concerned that a possible earthquake or other circumstance could render the building unsafe leaving over a hundred needy clients and families without the support they need to keep these individuals at home.

The planned location is certainly an ideal one as it is less than a mile from our Aging and Disability Resource Center and very centrally located.

Thank you for allowing me to make comments on this very exciting prospect for the Hilo Adult Day Center as well as for our entire aging services network and community.

Sincerely Yours,

Alan R. Parker
Executive on Aging





**STATE OF HAWAII
DEPARTMENT OF HEALTH**

P.O. BOX 916
HILO, HAWAII 96721-0916
February 15, 2012

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 Corporation (HICDC)
Proposed Adult Day Care Facility Within the Mohouli Heights Senior
Neighborhood Project
Tax Map Key (3) 2-4-01:184 (formerly part of 177) Waiakea, South Hilo, Hawaii

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. Wastewater Branch supports the sewer requirements made by the County for the proposed project.

Dispensing site locations and food preparation areas would need to meet the requirements of Chapter 12, Food Establishment Sanitation Code. The applicant may call Ph. 933-0917 to discuss the content of this communication.

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 Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of the subject document on January 23, 2012. 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/individual-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/general-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]
3. 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.
 4. 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."

1. 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.
2. Construction equipment and on-site vehicles requiring an exhaust of gas or air must be equipped with mufflers.
3. 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.

Brian T. Nishimura, Planning Consultant
February 15, 2012
Page 4 of 4

The same website also features a Healthy Community Design Smart Growth Checklist (Checklist) created by Built Environment Working Group (BEWG) of the Hawaii State Department of Health. The BEWG recommends that state and county planning departments, developers, planners, engineers and other interested parties apply the healthy built environment principles in the Checklist whenever they plan or review new developments or redevelopments projects. We also ask you to share this list with others to increase community awareness on healthy community design.



Newton Inouye
District Environmental Health Program Chief
Hawaii District Health Office

WORD:Pre-EnvAssessmentConsult-HICDCAAdultDayCareMohouliHts.my

NEIL ABERCROMBIE
GOVERNOR



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

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
JADE T. BUTAY
FORD N. FUCHIGAMI
RANDY GRUNE
JADINE URASAKI

IN REPLY REFER TO:
STP 8.0748

February 17, 2012

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)
Pre-Environmental Assessment Consultation

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project.

DOT understands that HICDC previously completed a Final Environmental Assessment (FEA) to develop an affordable elderly housing project. HICDC is now proposing to include an adult day care center into the project. As such HICDC is preparing the subject pre-environmental assessment consultation.

Given the location and the nature of the project, DOT does not anticipate any significant adverse impacts to the State transportation facilities.

DOT appreciates the opportunity to provide comments. If there are any other questions, please contact Mr. Elton Teshima of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7978.

Very truly yours,

A handwritten signature in black ink, appearing to read "Glenn M. Okimoto".

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

NEIL ABERCROMBIE
GOVERNOR
STATE OF HAWAII



ALBERT "ALAPAKI" NAHALE-A
CHAIRMAN
HAWAIIAN HOMES COMMISSION

MICHELLE K. KAUHANE
DEPUTY TO THE CHAIRMAN

M. WAIALEALE SARSONA
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

P. O. BOX 1879
HONOLULU, HAWAII 96805

February 2, 2012

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 Adult Day Care Facility within the
Mohouli Heights Senior Neighborhood Project
Tax Map Key: (3) 2-4-01:184 (formerly part of 177) Waiakea,
South Hilo, Hawaii

Thank you for the opportunity to review the Pre-Environmental Assessment Consultation for Applicant Hawaii Island Community Development Corporation (HICDC) Proposed Adult Day Care Facility within the Mohouli Heights Senior Neighborhood Project.

The Department of Hawaiian Home Lands has no comment to offer at this time. If you have any questions, please contact our Planning Office (808) 620-9480.

Me ke aloha,

Albert "Alapaki" Nahale-a, Chairman
Hawaiian Homes Commission



William P. Kenoi
Mayor

William T. Takaba
Managing Director

Dora Beck, P.E.
Acting Director

Hunter Bishop
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street • Hilo, Hawai'i 96720

(808) 961-8083 • Fax (808) 961-8086

http://co.hawaii.hi.us/directory/dir_envmng.htm

February 8, 2012

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

RE: Pre-EA Consultation
Applicant: Hawai'i Island community Development Corporation (HICDC)
Proposed Adult Day Care Facility within the Mohouli Heights Senior Neighborhood
Project
TMK: (3)2-4-01:184 (formerly part of 177) Waiākea, South Hilo, Hawai'i

Dear Mr. Nishimura,

Please find enclosed comments from our Wastewater Division.

Thank you for allowing us to review and comment on this project.

Sincerely,

Dora Beck, P.E.
ACTING DIRECTOR

enclosure

cc: WWD



DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WASTEWATER DIVISION

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

MEMORANDUM

February 7, 2012

To: Dora Beck, P.E., Acting Director

Via: Lyle Hirota, P.E., Deputy Division Chief 

From: Riz Mangaoang, P.E., Civil Engineer

Subject: **Pre-Environmental Assessment Consultation**
Hawai'i Island Community Development Corporation (HICDC)
Proposed Adult Day Care Facility
TMK 2-4-001:184 (formerly part of 177)

The Wastewater Division (WWD) has reviewed the Pre-Environmental Assessment Consultation letter from Brian T. Nishimura, Planning Consultant dated January 20, 2012 and provides the following comments.

1. Real Property Tax Map information indicates that a Road and Utility Easement for TMKs 2-4-001:177 and 2-4-001:184 is provided on the North portion of the property connecting to Kahikini St.
2. Construction of Phase I of the Mohouli Senior Center is anticipated to begin in March 2012 which includes the extension of the sewer main from Kahikini Street and within the Road and Utility Easement described above to the elderly housing project.
 - a. Connection of the Adult Day Care Facility to the sewer main is feasible via a sewer manhole within the Road and Utility Easement provided that a sewer study be submitted and accepted by the Wastewater Division which evaluates and confirms that the existing collection system is capable of accepting additional wastewater flows from the proposed development.
3. Plans for a new Fire Administration Support Complex are proposed by the County of Hawai'i Building Division on TMK 2-4-001:176 which includes sewer connection. The Wastewater Division notes that a sewer study previously completed for the Fire Administration Support Complex indicated that the existing sewer infrastructure would not be able to support multiple developments in the area without upgrades to the system. As such, it is recommended that HICDC consult with the Building Division regarding improvements to the existing sewer infrastructure as sewer capacity reservations for project developments are not provided. Connection to the public sewer system is based on available capacity and is provided on a first-come first-served basis.

cc: David Yamamoto, P.E., Building Division Chief
Lyle Hirota, P.E., Deputy Division Chief
Toni Nakatani, EST III

William P. Kenoi
Mayor

William T. Takaba
Managing Director



Dora Beck, P. E.
Acting Director

Handwritten mark

County of Hawai'i
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
25 Aupuni Street • Hilo, Hawai'i 96720
(808) 961-8083 • Fax (808) 961-8086
http://co.hawaii.hi.us/directory/dir_envmng.htm

MEMORANDUM

DATE : July 17, 2012

TO : Stephen J. Arnett
Housing Administrator

FROM : Dora Beck, P.E. *DB*
Acting Director

SUBJECT: SUPPLEMENTAL DRAFT ENVIRONMENTAL ASSESSMENT
MOHOULI SENIOR NEIGHBORHOOD PROJECT
TAX MAP KEY: (3) 2-4-001:177

Please see the enclosed comments from our Wastewater Division relating to the subject Supplemental DEA.

Thank you for allowing us to comment on this project.

enclosure

cc: WWD

RECEIVED
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COUNTY OF HAWAII
OHOD



**DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WASTEWATER DIVISION**

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

MEMORANDUM

Date: July 17, 2012

To: Dora Beck, P.E., Acting Director

Via: Lyle Hirota, P.E., Acting WWD Chief 

From: Riz Mangaoang, P.E., Acting Deputy WWD Chief

Subject: Supplemental Draft Environmental Assessment
Mohouli Senior Neighborhood Project
Tax Map Key: (3) 2-4-001:184 (formerly part of 177)

Reference: (a) Pre-Environmental Assessment Memorandum dated February 7, 2012

The Wastewater Division (WWD) has received the Supplemental Draft Environmental Assessment for the proposed Mohouli Adult Day Center. The WWD provides the following comments:

- As per Reference (a), extension of the sewer main from Kahikini Street via the Road & Utility Easement within TMKs 2-4-001:177 & 2-4-001:184, will permit connection of the proposed Mohouli Adult Day Center to County sewer. A copy of reference (a) is provided as an attachment herein for convenience.
- In the event that the existing sewer collection system, as installed, is not capable of accepting the additional wastewater flows from the proposed development, upgrading of the wastewater collection system should be considered in lieu of installation of a wastewater treatment and disposal system meeting State Department of Health requirements as indicated in Section 2.3.5 of the Supplemental Draft Environmental Assessment.
 - The WWD notes that as the new Wastewater Treatment and Disposal System would not be a portion of the Publicly Owned Treatment Works (POTW) and would be serving a privately run facility, operation and maintenance of the facility would be the responsibility of the developer.
 - The WWD also advises that as the development is above the Underground Injection Control line, it is unlikely that disposal of treated wastewater could be accomplished with the use of Injection Wells which may require the use of additional land area for effluent disposal if a private Wastewater Treatment facility is utilized.

ATTACHMENT

cc: Lyle Hirota, P.E., Acting WWD Chief
David Yamamoto, P.E., DPW – Building Division Chief

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

July 24, 2012

Ms. Dora Beck, P.E., Acting Director
County of Hawaii
Department of Environmental Management
25 Aupuni Street
Hilo, Hawaii 96720

Subject: Supplemental Draft Environmental Assessment
Mohouli Senior Neighborhood Project
TMK: (3) 2-4-1: 184

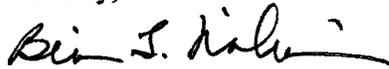
Dear Ms. Beck:

This is in response to comments received from your Wastewater Division regarding the subject supplemental Draft Environmental Assessment. The responses to the comments provided from the Wastewater Division in their February 7, 2012 and July 17, 2012 memos are provided as follows:

1. February 7, 2012 - 2.a.: The applicant will comply with the requirement to submit a sewer study to the Wastewater Division which will evaluate and confirm whether the existing collection system is capable of accepting additional wastewater flows from the proposed development.
2. February 7, 2012 - 3.: The applicant will consult with the Building Division regarding the plans for the Fire Administration Support Complex as well as plans to improve the existing sewer infrastructure.
3. July 17, 2012: In the event that the existing sewer collection system, as installed, is not capable of accepting the additional wastewater flows from the proposed development, the applicant will evaluate alternative options for wastewater treatment and disposal including upgrading the wastewater collection system. The applicant will evaluate these options to determine the financial feasibility of the various alternatives.

Thank you for taking the time to comment on the proposed project.

Sincerely,



Brian T. Nishimura, Planning Consultant

William P. Kenoi
Mayor



Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

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

February 9, 2012

Brian T. Nishimura
Planning Consultant
101 Aupuni Street
Suite 217
Hilo, Hawai'i 96720

SUBJECT: PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
APPLICANT: HAWAI'I ISLAND COMMUNITY DEVELOPMENT CORPORATION (HICDC)
PROJECT: PROPOSED ADULT DAY CARE FACILITY WITHIN THE MOHOULI HEIGHTS SENIOR NEIGHBORHOOD PROJECT
TMK (3) 2-4-01:184 (FORMERLY PART OF 177) WAIAKEA

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

NFPA 1, UNIFORM FIRE CODE, 2006 EDITION

Note: NFPA 1, Hawai'i State Fire Code with County amendments. County amendments are identified with a preceding "C~" of the reference code.

Chapter 18 Fire Department Access and Water Supply

18.1 General. Fire department access and water supplies shall comply with this chapter.

For occupancies of an especially hazardous nature, or where special hazards exist in addition to the normal hazard of the occupancy, or where access for fire apparatus is unduly difficult, or areas where there is an inadequate fire flow, or inadequate fire hydrant spacing, and the AHJ may require additional safeguards including, but not limited to, additional fire appliance units, more than one type of appliance, or special systems suitable for the protection of the hazard involved.



18.2.3.1 Required Access.

18.2.3.1.1 Approved fire department access roads shall be provided for every facility, building, or portion of a building hereafter constructed or relocated.

18.2.3.1.2 Fire Department access roads shall consist of roadways, fire lanes, parking lots lanes, or a combination thereof.

18.2.3.1.3* When not more than two one- and two-family dwellings or private garages, carports, sheds, agricultural buildings, and detached buildings or structures 400ft² (37 m²) or less are present, the requirements of 18.2.3.1 through 18.2.3.2.1 shall be permitted to be modified by the AHJ.

18.2.3.1.4 When fire department access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, the AHJ shall be authorized to require additional fire protection features.

18.2.3.2 Access to Building.

18.2.3.2.1 A fire department access road shall extend to within in 50 ft (15 m) of at least one exterior door that can be opened from the outside and that provided access to the interior of the building.

18.2.3.2.1.1 When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.2 shall be permitted to be increased to 300 feet.

18.2.3.2.2 Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 ft (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility.

18.2.3.2.2.1 When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.2 shall be permitted to be increased to 450 ft (137 m).

Brian T. Nishimura
February 9, 2012
Page 5

18.2.3.4.4 Dead Ends. Dead-end fire department access roads in excess of 150 ft (46 m) in length shall be provided with approved provisions for the fire apparatus to turn around.

18.2.3.4.5 Bridges.

18.2.3.4.5.1 When a bridge is required to be used as part of a fire department access road, it shall be constructed and maintained in accordance with county requirements.

18.2.3.4.5.2 The bridge shall be designed for a live load sufficient to carry the imposed loads of fire apparatus.

18.2.3.4.5.3 Vehicle load limits shall be posted at both entrances to bridges where required by the AHJ.

18.2.3.4.6 Grade.

C~18.2.3.4.6.1 The maximum gradient of a Fire department access road shall not exceed 12 percent for unpaved surfaces and 15 percent for paved surfaces. In areas of the FDAR where a Fire apparatus would connect to a Fire hydrant or Fire Department Connection, the maximum gradient of such area(s) shall not exceed 10 percent.

18.2.3.4.6.2* The angle of approach and departure for any means of fire department access road shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m) or the design limitations of the fire apparatus of the fire department, and shall be subject to approval by the AHJ.

18.2.3.4.6.3 Fire department access roads connecting to roadways shall be provided with curb cuts extending at least 2 ft (0.61 m) beyond each edge of the fire lane.

18.2.3.4.7 Traffic Calming Devices. The design and use of traffic calming devices shall be approved the AHJ.

18.2.3.5 Marking of Fire Apparatus Access Road.

18.2.4.2.4 Public officers acting within their scope of duty shall be permitted to access restricted property identified in 18.2.4.2.1.

18.2.4.2.5 Locks, gates, doors, barricades, chains, enclosures, signs, tags, or seals that have been installed by the fire department or by its order or under its control shall not be removed, unlocked, destroyed, tampered with, or otherwise vandalized in any manner.

18.3 Water Supplies and Fire Hydrants

18.3.1* A water supply approved by the county, capable of supplying the required fire flow for fire protection shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ. For on-site fire hydrant requirements see section 18.3.3.

EXCEPTIONS:

1. When facilities or buildings, or portions thereof, are completely protected with an approved automatic fire sprinkler system the provisions of section 18.3.1 may be modified by the AHJ.
2. When water supply requirements cannot be installed due to topography or other conditions, the AHJ may require additional fire protection as specified in section 18.3.2 as amended in the code.
3. When there are not more than two dwellings, or two private garage, carports, sheds and agricultural. Occupancies, the requirements of section 18.3.1 may be modified by AHJ.

18.3.2* Where no adequate or reliable water distribution system exists, approved reservoirs, pressure tanks, elevated tanks, fire department tanker shuttles, or other approved systems capable of providing the required fire flow shall be permitted.

18.3.3* The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be provided on a fire apparatus access

Commercial buildings requiring a minimum fire flow of 2000gpm per the Department of Water standards shall double the minimum water supply reserved for firefighting.

Fire Department Connections (FDC) to alternative water supplies shall comply with 18.3.8 (1)-(6) of *this code*.

NOTE: In that water catchment systems are being used as a means of water supply for firefighting, such systems shall meet the following requirements:

- (1) In that a single water tank is used for both domestic and firefighting water, the water for domestic use shall not be capable of being drawn from the water reserved for firefighting;
- (2) Minimum pipe diameter sizes from the water supply to the Fire Department Connection (FDC) shall be as follows:
 - (a) 4" for C900 PVC pipe;
 - (b) 4" for C906 PE pipe;
 - (c) 3" for ductile Iron;
 - (d) 3' for galvanized steel.
- (3) The Fire Department Connection (FDC) shall:
 - (a) be made of galvanized steel;
 - (b) have a gated valve with 2-1/2 inch, National Standard Thread male fitting and cap;
 - (c) be located between 8 ft and 16 ft from the Fire department access. The location shall be approved by the AHJ;
 - (d) not be located less than 24 inches, and no higher than 36 inches from finish grade, as measured from the center of the FDC orifice;
 - (e) be secure and capable of withstanding drafting operations. Engineered stamped plans may be required;
 - (f) not be located more than 150 feet of the most remote part, but not less than 20 feet, of the structure being protected;
 - (g) also comply with section 13.1.3 and 18.2.3.4.6.1 of *this code*;
- (4) Commercial buildings requiring a fire flow of 2000gpm shall be provided with a second FDC. Each FDC shall be independent of each other, with each FDC being capable of flowing 500gpm by engineered design standards. The second FDC shall be located in an area approved by the AHJ with the idea of multiple Fire apparatus'

William P. Kenoi
Mayor



BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

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

County of Hawai'i
PLANNING DEPARTMENT

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

February 16, 2012

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: Adult Day Care Facility within the Mohouli Heights Senior Neighborhood Project
TMK: (3) 2-4-001:184; Waiakea Cane Lots, Waiakea, South Hilo, Hawai'i

Thank you for your letter dated January 20, 2012, requesting comments from this office regarding the preparation of a Draft Environmental Assessment.

This particular property was set aside for the development of affordable senior housing by the Hawaii Island Community Development Corporation (HICDC). On October 24, 2011, this office issued Final Plan Approval for a 60-unit senior housing complex and community building. In addition, Final Subdivision for a two lot subdivision was issued on November 7, 2011, which separated the senior housing complex from the subject parcel. The HICDC is now proposing to include an adult day care center in the next phase of the project on the subject property. The facility will be approximately 8,000 square feet in size with an operational capacity for 80 clients.

The subject property consists of 9.572 acres and is zoned Multiple-Family Residential (RM-4) by the County. The property is situated within the State Land Use Urban District. In addition, the Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG) Map designates the parcel as Medium Density Urban. The subject parcel is not located within the Special Management Area (SMA).

Mr. Brian T. Nishimura
Planning Consultant
February 16, 2012
Page 2

Please note that Section 25-5-38 of the Hawai'i County Code (Zoning) states that Plan approval shall be required for all new buildings and additions to existing buildings in the RM district.

We have no further comments to offer, at this time. However, please keep us informed and provide our department with a copy of the Draft Environmental Assessment for our review.

If you have any questions or if you need further assistance, please feel free to contact Bethany Morrison of this office at 961-8138.

Sincerely,

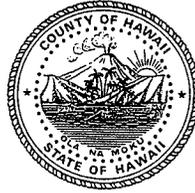


BJ LEITHEAD TODD
Planning Director

BJM:cs

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William P. Kenoi
Mayor



Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai'i

POLICE DEPARTMENT

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

February 6, 2012

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

Dear Mr. Nishimura:

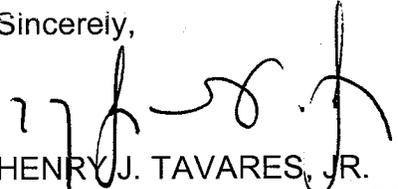
**SUBJECT: PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
APPLICANT: HAWAII ISLAND COMMUNITY DEVELOPMENT
CORPORATION PROPOSED ADULT DAY CARE FACILITY WITHIN
THE MOHOULI HEIGHTS SENIOR NEIGHBORHOOD PROJECT
TAX MAP KEY: (3) 2-4-01:184 (FORMERLY PART OF 177)
WAIAKEA, SOUTH HILO, HAWAII**

Staff, upon reviewing the provided documents, does not anticipate any significant impact to traffic and/or public safety concerns.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact Captain Robert Wagner of our S. Hilo Patrol Division at 961-2214.

Sincerely,


HENRY J. TAVARES, JR.
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

RW:lli
120037

**APPENDIX 2 – TRAFFIC IMPACT ANALYSIS REPORT, MOHOULI HEIGHTS
SENIOR NEIGHBORHOOD PROJECT, First Revision, September 2011**

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

First Revision

SEPTEMBER 2011

Prepared for:

Hawai'i Island Community Development Corporation
100 Pauahi Street, Suite 204
Hilo, Hawai'i 96720

Prepared by:

AECOM

1001 Bishop Street Suite 1600
Honolulu, Hawai'i 96813

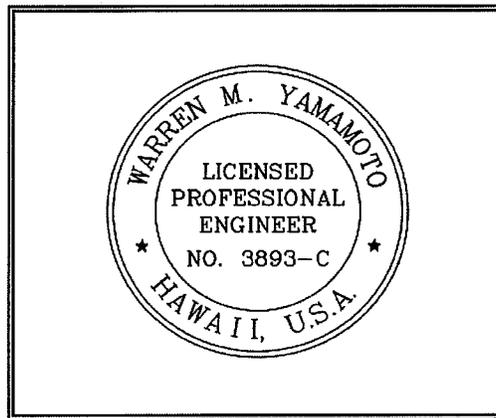
Hawai'i Island Community Development Corporation
Mohouli Heights Senior Neighborhood Project
Hilo, Island of Hawai'i, Hawai'i

Traffic Impact Analysis Report

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

First Revision

September 2011



Expiration Date:
April 30, 2012

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



Signature

September 8, 2011

Date

AECOM

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TRAFFIC IMPACT ANALYSIS REPORT
for the
HAWAI'I ISLAND COMMUNITY DEVELOPMENT CORPORATION
MOHOULI HEIGHTS SENIOR NEIGHBORHOOD PROJECT
FIRST REVISION

The Hawai'i Island Community Development Corporation (HICDC) is proposing an elderly affordable housing project in Hilo, Hawai'i. A Traffic Impact Analysis Report, prepared in December 2008, identified the traffic impacts of the proposed project and recommended mitigating measures. The HICDC is proposing to include an adult day care center to the project. This First Revision report documents a study that was conducted to identify the traffic impacts of the redefined project and to recommend any mitigating measures.

PROJECT DESCRIPTION

The HICDC is proposing to develop the Mohouli Heights Senior Neighborhood Project, an elderly affordable housing project and adult day care center, in Hilo, Hawai'i. The 15.948-acre project site is 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 up to 150 residential units in multi-unit structures around a central seniors' activity core. It would be developed in two or three phases. Construction of the first phase with 60 units is expected to begin in the summer of 2012 and be completed by the end of 2013. The remaining one or two phases would be completed by 2017 for a total of 120 to 150 residential units, respectively. The adult day care center would be relocated from the former Hilo Hospital Building and would be ready for use in 2013 with an estimated enrollment of 100. There would also be 20 to 25 employees on-site depending on the attendance level for the day. The proposed project does not require rezoning and does not meet the concurrency requirements of

County of Hawai'i Ordinance No. 07-99. The study analyzed 2017 as the only forecast year.

Access to the project site would be from Mohouli Street through a 50-foot roadway right-of-way (ROW) 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 County of Hawai'i Fire Administration Support Complex. An emergency access will be provided through a gated connection to Kahakini Street. Vehicular and pedestrian access will be blocked and opened only for emergency situations.

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, project access roadway, and Kukuau Street intersections with Mohouli Street, and the Komohana Street/Kukuau Street intersection. **Figure 1**, Location Map, shows the project site in relationship to the four study intersections.

EXISTING CONDITIONS

A survey of the existing roadway and traffic conditions was made in September 2009 and August 2011.

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 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 Drive and Ainako Avenue 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, Hilo Hospital, and Hilo High School.

Kukuau Street is a two-lane County minor collector road. The older roadway section, *makai* of Komohana Street, runs through a residential neighborhood and intersects with 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 have separate left-turn and shared through/right-turn lanes. The Kukuau Street westbound approach has a shared through/left-turn lane and separate right-turn lane. The Kukuau Street westbound approach also 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

The current morning and afternoon peak hour traffic volumes are shown in **Figure 2** with volumes rounded to the nearest five vehicles per hour (vph). 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 at 15 minute intervals. The worksheets for these three traffic counts intersections are included in **Appendix A**. The traffic counts for the Komohana Street/Mohouli Street intersection were taken in 2009, while those for the two Kukuau Street intersections were done in 2007 for another study. Traffic counts were not taken at the two study intersections of Kukuau Street in 2009 since they serve stable neighborhoods and little traffic change was expected at these intersections from the traffic counts taken in December 2007. The 2007 volumes were adjusted slightly to match with the current (2009) traffic volumes at the adjoining intersections. The adjusted volumes are shown in bold in **Figure 2**.

The 2009 and 2007 traffic counts are still timely for 2011 given the small amount of land use changes in the area. The U.S. Department of Transportation Federal Highway Administration has issued a paper "Growth Factor for 2008 – 2010" that shows that traffic volumes on rural roadways across the State of Hawai'i have decreased from 2008 to 2010. Also, the high fuel prices experienced in 2011 have caused a yet undetermined decrease in auto travel.

Traffic turning movement counts were taken at the Komohana Street/Mohouli Street intersection in December 2007, October 2008, and September 2009 for this and other studies. The morning and afternoon peak hour traffic volumes for each year's counts

are shown on **Figure 3**. During the morning peak, the northbound volumes declined from 2007 to 2008 and then returned to the 2007 level in 2009. The southbound volumes stayed level or declined slightly. Both northbound and southbound volumes in the afternoon peak remained steady from 2007 to 2008 and increased slightly in 2009.

The main directions of travel in the morning peak are 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, which is 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 four study intersections are discussed in the **Level of Service Analysis** section.

The State of Hawai'i Department of Transportation (HDOT) used to take traffic counts every two years at selected roadway sections on the island of Hawai'i under their previous counting program. One of these count stations is at the Puainako Street/Komohana Street intersection (Station 18-Z), about a 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 4** gives the historical trend of daily traffic at this location on the north leg of Komohana Street and the *makai* leg of Puainako Street before the *mauka* extension of Puainako Street was completed. 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%. This growth rate has decreased in recent years based on the observations discussed for the Mohouli Street intersection.

HDOT presently takes traffic counts on State and County roadways around the island. The patterns of hourly traffic volumes at two locations on Komohana Street in 2009, north of Puainako Street and south of Waianuenue Avenue, are shown in tabular and graph form on **Figure 5**. 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 steep peak is due in part to the one-way traffic pattern implemented on Waianuenue Avenue from 7:00 to 7:45 AM. This one-way pattern forces traffic going to the Hilo Hospital and Hilo High School to travel northbound on Komohana Street to reach Waianuenue Avenue. The southbound traffic shows a small morning peak, a moderate midday peak, and a high afternoon peak at 4:00 PM.

The HDOT 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 is shown in tabular and graph form on **Figure 6**. There is a sharp *makai* bound peak in the morning and a sharp *mauka* bound peak in the afternoon.

PROPOSED ROADWAY IMPROVEMENTS

The FY 2011-2014 Statewide Transportation Improvement Program (STIP) does not include any improvements in the immediate vicinity of the proposed project. The HDOT is pursuing the realignment and widening of Puainako Street from Komohana Street to Kanoelehua Avenue about a half mile south of the project site. Their efforts are being expended in a generally *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, which would be north of residences lining the existing roadway, would become a local street. The STIP shows pre-ROW work in FY 2013 and right-of-way acquisition programmed in FY 2014. The second phase would involve widening Puainako Street *makai* of Kawili Street. This project would not affect traffic volumes within the study area.

The County of Hawai'i approved the Wailani Center project in 2010. The development is a large mixed-use project which includes a medical office, commercial retail and business (technology) park facilities, and single family, multi-family and elderly residential units. The project will be developed in three phases through 2030 and is required to implement mitigating traffic improvements as the project develops. The Wailani Center project site is about a half mile north of the Mohouli Heights Senior Neighborhood project location, between Komohana Street and Mohouli Street; therefore, its traffic improvements would have an impact on this project. The first phase of the Wailani Center project, scheduled for occupancy in about 2015, is required to widen Komohana Street to four through lanes at the Mohouli Street intersection and add a second left-turn lane on the westbound approach of Mohouli Street. These improvements were included in the ambient and total with project forecast analyses of this study.

TRAFFIC FORECASTS

The proposed project is scheduled for full occupancy in 2017. During the eight-year period from the 2009 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 one study forecast year.

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 multi-step process was used to develop the different components of the ambient traffic forecasts:

1. Background traffic forecast based on regional traffic growth and several committed projects.
2. Traffic which would be generated by proposed development at the University of Hawai'i at Hilo (UHH).

3. Traffic which would be generated by the County of Hawai'i Fire Administration Support Complex.
4. Traffic which would be generated by the Wailani Center.

1. Background traffic forecast - The existing traffic volumes shown on **Figure 2** were increased by 8.3% to represent the background regional growth. This number represents a 1.0% annual growth rate over an eight-year period. This 1.0% growth rate is lower than the 1.4% annual traffic growth rate previously observed on Komohana Street from 1994 to 2004, but higher than the projected population growth for Hilo. The current County of Hawai'i General Plan forecasts that population in the South Hilo District will increase from 46,273 in 2005 to 49,791 in 2020, a 7.6% increase in 15 years. The 7.6% population growth rate for South Hilo represents an annual 0.5% growth rate and is lower than the 36% island wide growth rate forecast in the General Plan.

The traffic, which would be generated by three County-approved projects on Ponohawai Street, was also included in the background traffic forecast. These projects are forecast to generate totals of 29 and 35 trips per hour in the morning and afternoon peak hours, respectively. Only six or less vehicles per hour (vph) would be added in each direction of travel on Komohana Street.

The two components of background traffic were combined to form the 2017 background traffic forecast volumes shown on **Figure 7**, with volumes rounded to the nearest five vph, except for volumes less than five.

2. UHH traffic forecast - Traffic which would be generated onto Komohana Street by three proposed UHH projects as forecast by their traffic studies were included in this study:

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

Although plans for the China-U.S. Center are changing, the new project is expected to generate a similar magnitude of trips as initial trips. The traffic forecast volumes from these three projects 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 8** with volumes not rounded. The UHH Mauka Lands parcel across Mohouli Street from the project site was assumed not to be developed by 2017 and is not included in this analysis.

3. County of Hawai'i Fire Administration Support Complex traffic forecast - The proposed County of Hawai'i Fire Administration Support Complex would be developed on the adjacent property west of the proposed project. It was to be developed in three phases with expected openings in 2010, 2017, and 2027, but has been deferred indefinitely due to lack of funding. For this study, it was assumed that the second phase would be operational by 2017; a forecast based on this assumption suggests that 48 trips will be generated during the morning peak and 62 trips will be generated during the afternoon peak. The traffic assignment for the second phase of the project was taken from the traffic impact analysis report prepared for the County of Hawai'i Fire Administration Support Complex and is shown on **Figure 9**. 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.

4. Wailani Center traffic forecast - The first project phase of this proposed mixed-use project is scheduled for occupancy in about 2015 and would include 100,000 square feet (sf) of medical office buildings and 100,000 sf of commercial center (retail) space. It is forecast to generate 400 hourly trips in the morning peak and 1,000 hourly trips in the afternoon peak. The traffic assignment for the first project phase was taken from the traffic impact analysis report prepared for the Wailani Center and is shown on **Figure 10**. The first project phase would access Komohana Street only and will not generate additional traffic on the mauka portion of Mohouli Street.

The project generated traffic assignment forecasts for UHH (**Figure 8**), the Fire Administration Support Complex (**Figure 9**) and Wailani Center (**Figure 10**) were added to the 2017 background traffic forecasts (**Figure 7**) to obtain the 2017 ambient traffic forecast shown on **Figure 11**. 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. Separate analyses were conducted for the two project components: elderly residences and adult day care center.

The trip generation step forecasts the volume of vehicle trips that would be generated by the proposed residential component 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 Institute for Traffic Engineers' (ITE) Trip Generation (Seventh Edition, 2003) 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.”

Since the proposed project could include 120 to 150 retirement units, the higher number of units was assumed for this analysis. The 150 multi-family units are forecast to generate 12 trips in the morning peak and 17 trips in the afternoon peak when project is fully occupied in 2017. The Trip Generation report also provides information on the percentage of inbound and outbound trips in each peak hour. The trip generation analysis is summarized on **Table 1**.

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 (four 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 three-step forecast process was also conducted for the adult day care center. The Trip Generation report does not have trip rate information for adult day care centers. A traffic count was taken at the entrance to the current day care center site at the former Hilo Hospital building on Tuesday, August 9, 2011, to develop a trip rate data. During the morning peak hour from 7:30 to 8:30 AM, there were 38 inbound and 26 outbound trips. During the afternoon peak hour from 3:00 to 4:00 PM, there were 29 inbound and 37 outbound trips. These results include vehicle trips to drop-off/pick-up attendees and by commuting employees. The number of inbound and outbound trips for attendees was relatively balanced in each time period. The imbalance in total number of trips was caused by more inbound employee trips in the morning and more outbound employee trips in the afternoon. The trip rates derived from these traffic counts are based on the 71 attendees present that day and summarized in a format similar to that of the Trip Generation report in the table on the following page.

	Number of Trips		Trips per Attendee	Percentage Distribution (%)	
	Inbound	Outbound		Inbound	Outbound
AM Peak Hour (7:30 AM to 8:30 AM)	38	26	0.90	59	41
PM Peak Hour (3:00 PM to 4:00 PM)	29	37	0.93	44	56

Although the current day care center enrollment is 100 attendees, daily attendance range from 62 to 79 since the attendees have different daily attendance schedules. The higher attendance value of 79 was used for this analysis. The trip generation analysis summarized on **Table 1** shows that the adult day care center will generate considerably more trips than the elderly residences.

Trip distribution factors were developed based on the following information provided by the adult day care operator:

- Attendee residences location distribution.
- Approximately half of the drivers dropping off attendees are retired. These drivers usually come from home and return to home after both morning drop-offs and afternoon pick-ups.
- The other half of drivers are working and travel between their residence, the day care center, and their work location. The trip distribution for these worker trips were the same trip distribution factors used for the elderly residential units.

The resultant trip distribution factors and analysis are shown on **Table 1**.

The project generated traffic volumes for both components were assigned to the study area network based on the directions of travel and the access routes. Slightly more than half of the adult day care center generated trips (45+ vph during both peak hours) would utilize the south leg of Komohana Street and would travel to/from Puainako Street. This volume of traffic would not have any significant impact on the traffic

operations of Puainako Street. The results of the traffic assignment analysis are shown on **Figure 12**, with the volumes not rounded.

Total Forecast Volumes

The project generated traffic assignment volumes from **Figure 12** were added to the ambient traffic forecasts from **Figure 11** to obtain the total with project traffic forecasts shown on **Figure 13**. The traffic volumes are rounded to the nearest five vph except for volumes less than five. The traffic operations for the total with project forecast conditions at the three study intersections and project access roadway are discussed in the **Level of Service Analysis** section.

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 (HCM 2000) describes the various procedures developed for freeways, highways, signalized and unsignalized intersections, etc.

The SYNCHRO computer software program was used to analyze the traffic operations for the 2009 current volumes and 2017 ambient and total with project forecasts. SYNCHRO is a computer software program used to model, optimize, and analyze traffic signal timings in a roadway network. It also analyzes unsignalized intersections. The program's mathematical calculations are based on the HCM 2000 and include the effects of traffic signal coordination and traffic actuation.

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) as described in the following table:

SIGNALIZED INTERSECTION LEVEL OF SERVICE	
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 may 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 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 through lanes of the two approaches with the highest volumes, Komohana Street northbound and Mohouli Street eastbound, are operating at levels of service D and E, respectively, indicating the possible need for mitigating measures. The primary reasons for these poor levels of service are the high volumes of vehicles on single lanes of traffic.

The intersection is operating at level of service D in the afternoon peak due to three 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 left-turn movement from the northbound approach of

Komohana Street is operating at level of service E. The high volumes of southbound through vehicles on Komohana Street are also operating at level of service E.

The intersection is forecast to improve to level of service C in the 2017 ambient forecast AM peak hour with the proposed intersection widening. All of the movements are forecast to operate at level of service D or better, indicating acceptable conditions. The intersection is forecast to continue operating at level of service D in the 2017 ambient PM peak with the proposed roadway improvements. The Komohana Street southbound through movement would improve from level of service E to D, and the Mohouli Street westbound left-turn movement would improve from level of service F to E. The level of service E on two left-turn movements could be tolerated since they help maintain the acceptable level of service for the intersection.

For the morning peak period, the relatively small amount of traffic generated by the proposed project would have 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 two movements show changes from level of service C to D with the project since the ambient forecast delay value is on the threshold between changes in levels of service. During the PM peak hour, the Komohana Street southbound through movement (and approach) changes from level of service D to E 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 streets 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 HCM 2000 defines the relationship between level of service and delay (in seconds/vehicle) for unsignalized intersections as shown in the following table:

UNSIGNALIZED INTERSECTION LEVEL OF SERVICE	
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.

The traffic exiting the Kukuau Street eastbound approach at Komohana Street is currently operating at level of service F in both peak periods, indicating the possible existing need for mitigation. The traffic exiting from the westbound approach at Komohana Street is currently operating at level of service C and E in the morning and afternoon peak periods, respectively. 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 2017, the outbound movements from both Kukuau Street approaches are forecast to operate at levels of service F in both peak periods with very high levels of delay. Traffic mitigation measures would be required at this intersection. Traffic signals could be warranted at this intersection in the future. The traffic impact analysis report for the Wailani Center calls for extensive improvements on Komohana Street to accommodate its future traffic, including widening Komohana Street to four lanes and identifying the possible need for traffic signals at this intersection. These improvements would reinforce the need for mitigating measures at this intersection to help traffic exit from Kukuau Street.

The small number of trips generated by the proposed project and driving through this intersection would not have any noticeable effect, as indicated by no changes in levels of service between the ambient and total forecast conditions. Traffic mitigation measures would be required for either forecast scenario.

All four 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 2017 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. This indicates that the proposed project would not have an adverse traffic impact on this intersection.

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 deferred indefinitely. This study assumed that the second phase of the project would become operational in about 2017. With only the fire complex generated trips in the 2017 ambient traffic forecasts, the roadway is forecast to operate at 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 in the morning peak hour. The outbound left-turn movement is forecast to change from level of service C to D during afternoon peak hours, which is considered minimally acceptable. Hence, mitigating measures may be unnecessary at this intersection.

CONCLUSIONS

The proposed Mohouli Heights Senior Neighborhood is forecast to generate less than 100 trips during the morning and afternoon commuter peak hours, which is considered to be a relatively small number of trips. This additional traffic in itself would not require mitigating measures beyond those roadway improvements proposed by the Wailani Center. The Wailani Center project is adding additional traffic lanes at the Komohana Street/Mohouli Street intersection to accommodate the future growth in ambient traffic. The traffic forecast generated by Wailani Center project also identified the need for traffic mitigation at the currently unsignalized Komohana Street/Kukuau Street intersection. Traffic signals may be warranted at this intersection in the future as a mitigating measure.

The currently unsignalized intersection at Mohouli Street/Kukuau Street will not require mitigation in the future due to the increases in ambient traffic. The project access roadway intersection on Mohouli Street can remain stop sign controlled.

References

References

1. *Hawai'i Island Community Development Corporation Mohouli Heights Senior Neighborhood Project Traffic Impact Analysis Report*, M&E Pacific, Inc., December 2008
2. Statewide Transportation Improvement Program, FFY 2011 through FFY 2014 (FFY 2015-2016 Informative only), State of Hawai'i Department of Transportation, revised December 2010.
3. *Letter to Peter Hoffman, Chairman of County Council of Hawai'i re: Change of Zone Application (REZ 06-000038)* Guy Nakao, County of Hawai'i Planning Commission, dated July 23, 2007.
4. *Letter to Peter Hoffman, Chairman of County Council of Hawai'i re: Change of Zone Application (REZ 06-000047)* Malulani, Inc., County of Hawai'i Planning Commission, dated July 23, 2007.
5. *Letter to Peter Hoffman, Chairman of County Council of Hawai'i re: Change of Zone Application (REZ 06-000063)* Guy Miller., County of Hawai'i Planning Commission, dated May 21, 2007.
6. *County of Hawai'i General Plan, Appendix A*, County of Hawai'i, 2005.
7. *Traffic Impact Analysis Report for China-U.S. Center at UH-Hilo*, Phillip Rowell and Associates, April 2002.
8. *Traffic Impact Analysis Report for U.S. Department of Agriculture Pacific Basin Agricultural Research Center at UH-Hilo*, Phillip Rowell and Associates, April 2002 draft.
9. *Traffic Impact Analysis Report for the University of Hawai'i at Hilo Ka Haka 'Ula O Ke'elikolani Hawaiian Language Building*, SSFM International Inc., September 2007.
10. *University of Hawai'i at Hilo University Park Expansion Master Plan*, PBR Hawai'i, December 2005 draft.
11. *County of Hawai'i Fire Administration Support Complex*, M&E Pacific, Inc., February 2008.
12. *Traffic Impact Analysis Report for Wailani Center*, AECOM, December 2009.
13. *Trip Generation*, Seventh Edition, Institute of Transportation Engineers, 2003.

References

14. *Highway Capacity Manual*, Transportation Research Board, National Research Council, Washington, D.C., 2000 Edition.
15. Synchro Studio 7, Trafficware Ltd.

Figures

↑ 135	↓ 330	↔ 5	↑ 5
↓ 125	↑ 640	↔ 105	↑ 190
↓ 450	↑ 115	↔ 145	↑ 140

MOHOULI ST
to makai

December 2007

↑ 145	↓ 330	↔ 10	↑ 0
↓ 105	↑ 500	↔ 80	↑ 195
↓ 335	↑ 100	↔ 85	↑ 135

MOHOULI ST
to makai

October 2008

↑ 170	↓ 355	↔ 10	↑ 5
↓ 120	↑ 610	↔ 115	↑ 170
↓ 405	↑ 130	↔ 180	↑ 145

MOHOULI ST
to makai

September 2009

KOMOHANA ST

AM PEAK HOUR

↑ 140	↓ 145	↔ 5	↑ 2
↓ 195	↑ 255	↔ 300	↑ 450
↓ 155	↑ 330	↔ 90	↑ 120

MOHOULI ST
to makai

December 2007

↑ 145	↓ 155	↔ 5	↑ 10
↓ 185	↑ 265	↔ 225	↑ 445
↓ 125	↑ 285	↔ 70	↑ 110

MOHOULI ST
to makai

October 2008

↑ 140	↓ 155	↔ 5	↑ 5
↓ 160	↑ 280	↔ 300	↑ 490
↓ 175	↑ 320	↔ 110	↑ 130

MOHOULI ST
to makai

September 2009

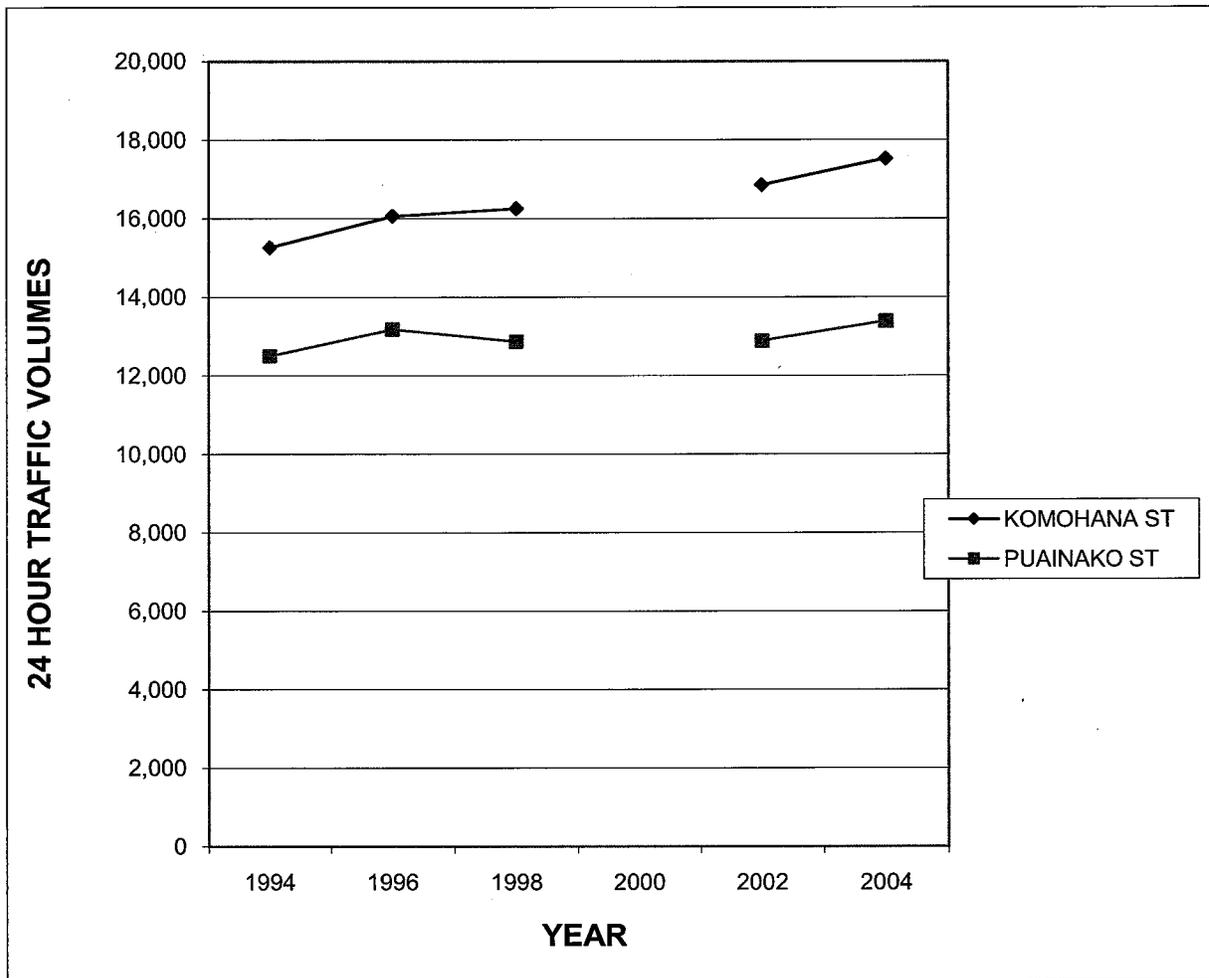
KOMOHANA ST

PM PEAK HOUR

**COMPARISON OF TRAFFIC VOLUMES
AT KOMOHANA STREET/MOHOULI STREET INTERSECTION
FIGURE 3**

TWO-WAY DAILY TRAFFIC VOLUMES		
YEAR	Komohana	Puainako
	North of Puainako St.	Makai of Komohana St.
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



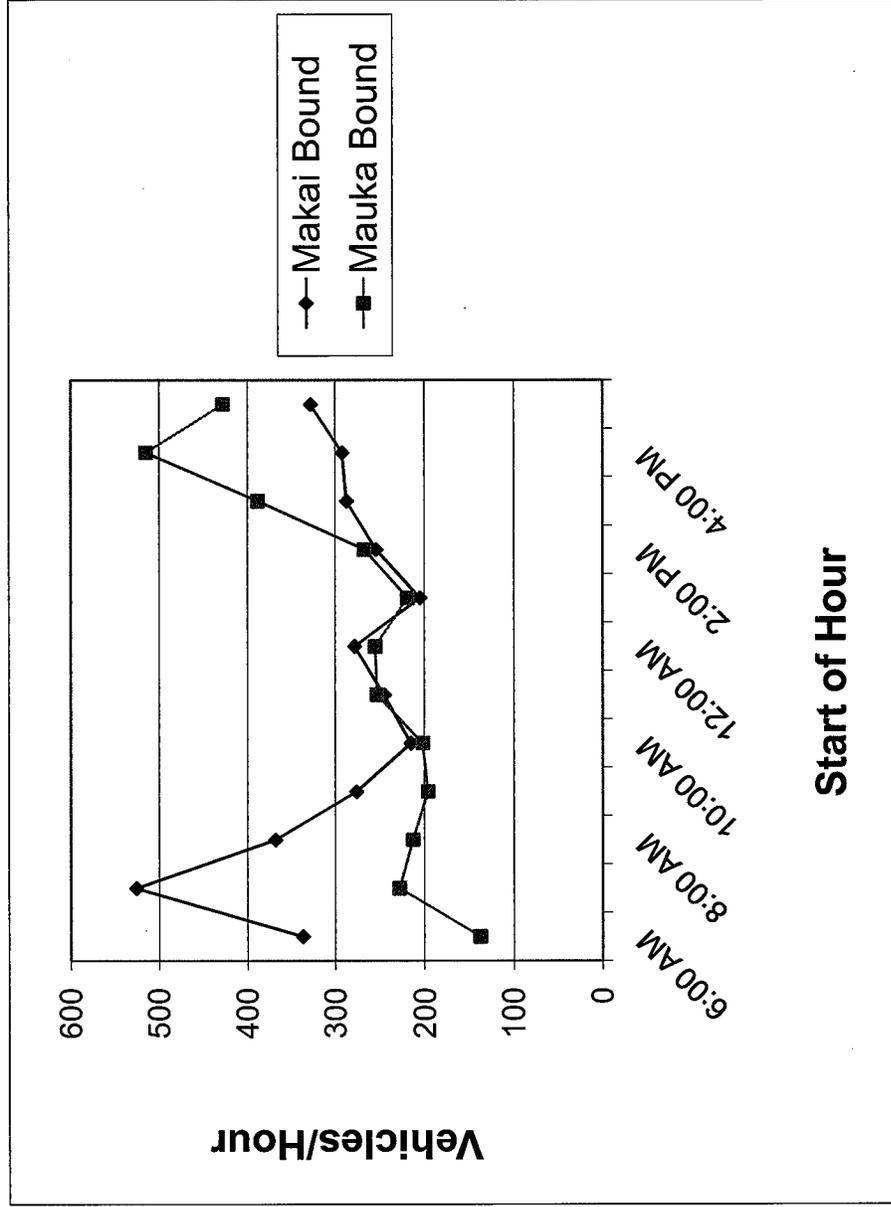
**HISTORICAL TREND IN DAILY TRAFFIC VOLUMES
 ON KOMOHANA STREET AT PUAINAKO STREET
 FIGURE 4**

HOURLY TRAFFIC VOLUMES ON MOHOULI STREET

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

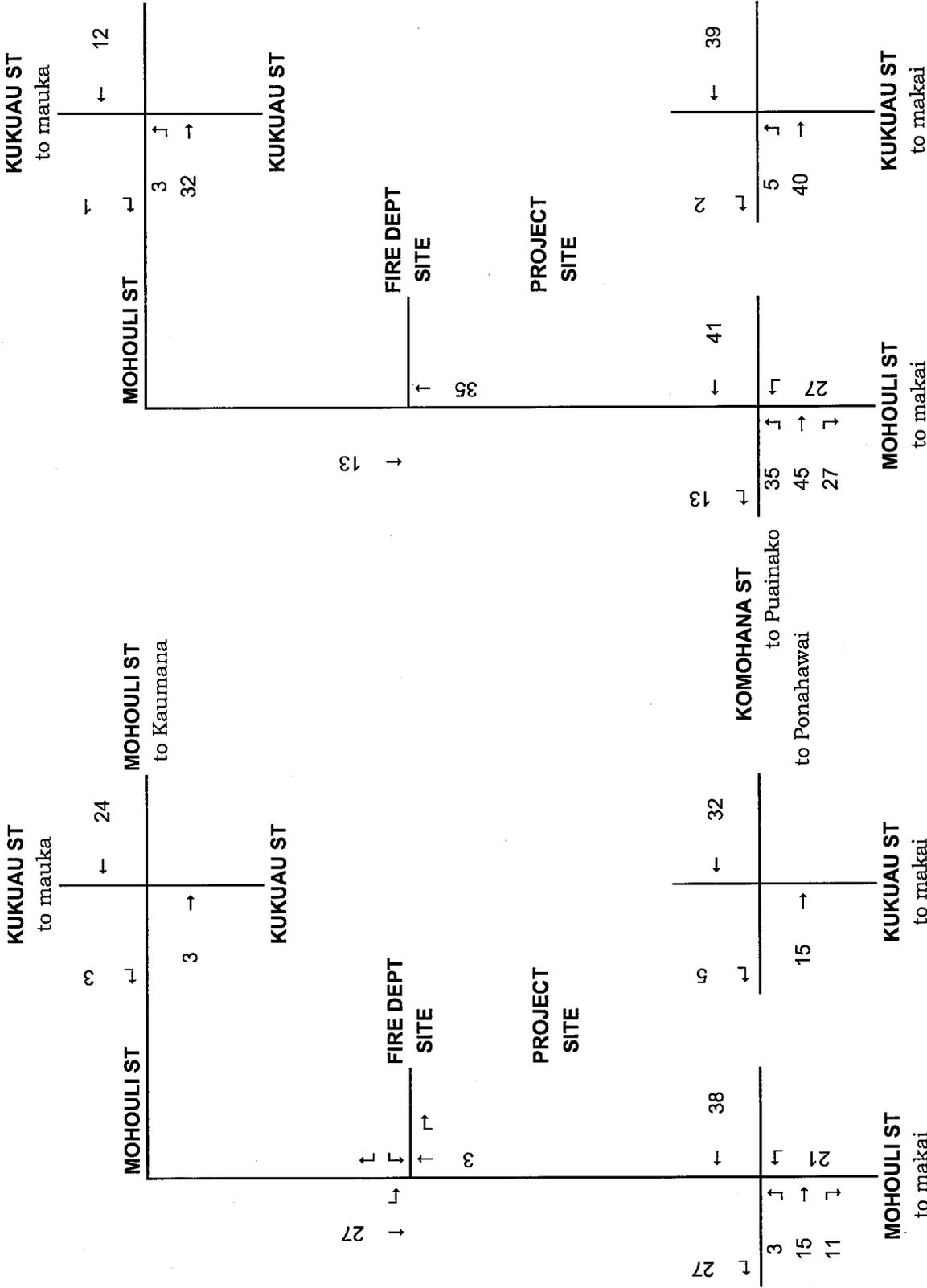
Source: State of Hawaii Department of Transportation

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



HOURLY TRAFFIC VOLUMES ON MOHOULI STREET MAUKA OF KOMOHANA STREET

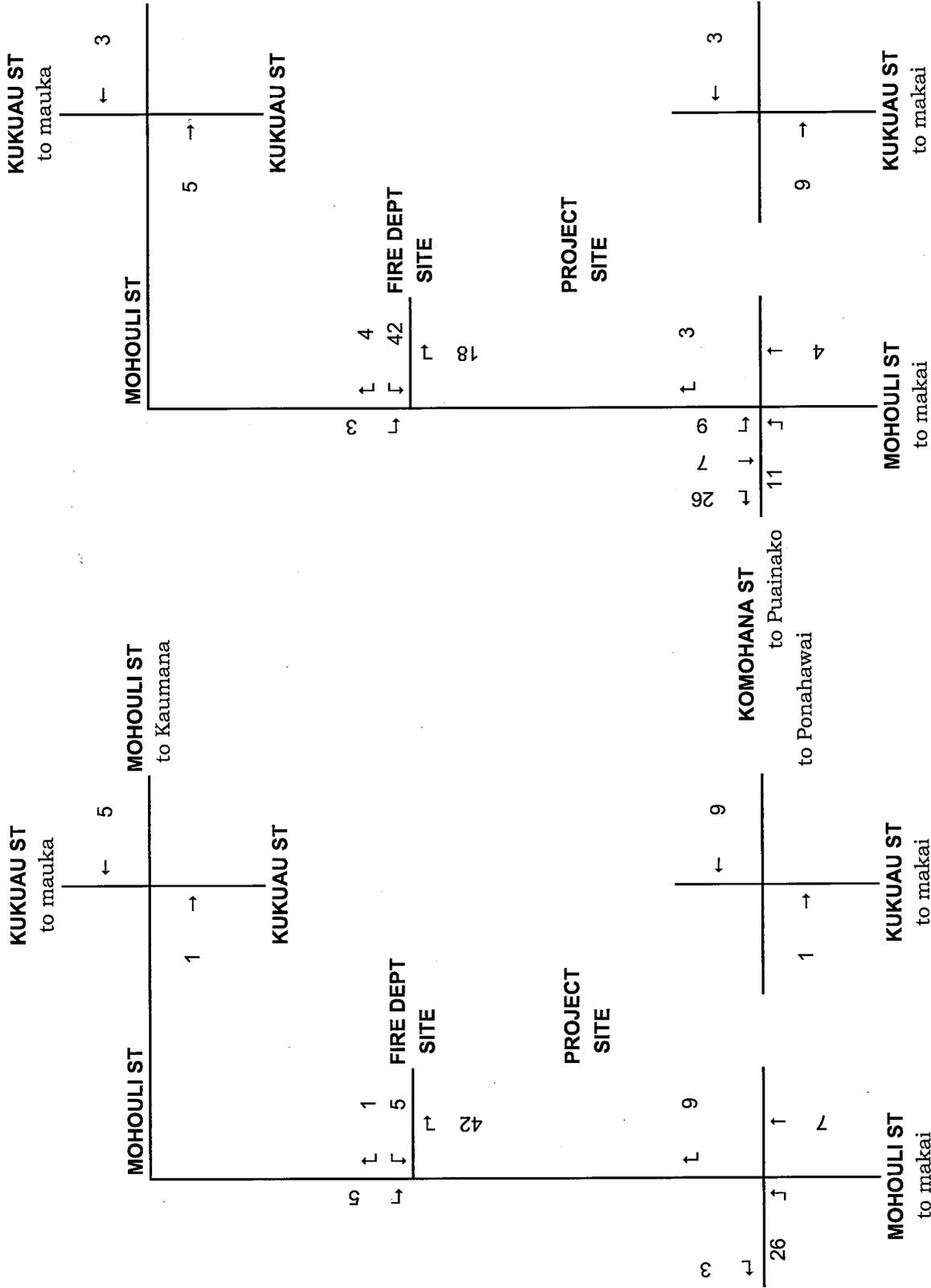
FIGURE 6



AM PEAK HOUR

PM PEAK HOUR

**2017 UHH PROJECTS GENERATED TRAFFIC FORECAST
FIGURE 8**

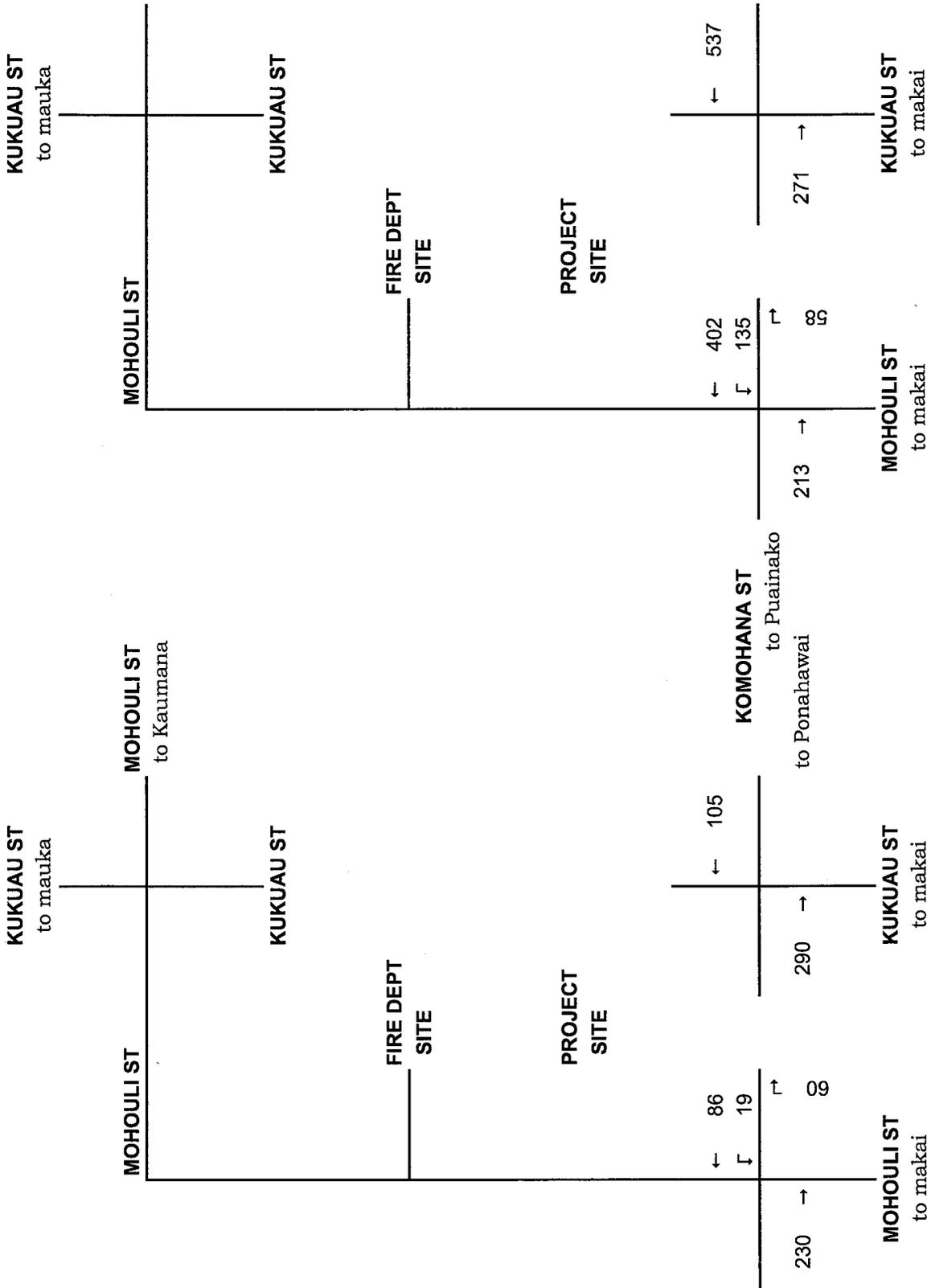


AM PEAK HOUR

PM PEAK HOUR

2017 FIRE ADMINISTRATION SUPPORT COMPLEX (PHASE 2) TRAFFIC FORECAST

FIGURE 9



PM PEAK HOUR

AM PEAK HOUR

**2017 WAILANI (PHASE 1) TRAFFIC FORECAST
FIGURE 10**

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	
150 MULTI-FAMILY RESIDENTIAL UNITS						
AM PEAK HOUR	$T = 0.08X$					
	$T =$	12	20%	30%	20%	30%
	45% in	5	1	2	1	2
	55% out	7	20%	30%	20%	30%
			1	2	1	2
PM PEAK HOUR	$T = 0.11X$					
	$T =$	17	5%	40%	25%	30%
	61% in	10	1	4	3	3
	39% out	6	10%	32%	25%	33%
			1	2	2	2
100 ADULT DAY CARE ENROLLMENT = 79 ATTENDANCE						
AM PEAK HOUR	$T = 0.90X$					
	$T =$	71	11%	20%	5%	64%
	59% in	42	5	8	2	27
	41% out	29	16%	25%	12%	47%
			5	7	3	14
PM PEAK HOUR	$T = 0.93.X$					
	$T =$	73	16%	25%	12%	47%
	44% in	32	5	8	4	15
	56% out	41	11%	20%	5%	64%
			5	8	2	26

**TABLE 2
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS**

INTERSECTION Approach/Movement	2009 EXISTING		2017			
	LOS	Delay	Ambient		Total	
			LOS	Delay	LOS	Delay
AM PEAK HOUR						
KOMOHANA ST/MOHOULI ST	D	35.9	C	29.1	C	29.6
Mohouli St Eastbound	D	52.7	C	34.4	D	35.2
Left Turn	E	59.8	D	42.0	D	43.1
Through	E	64.3	D	44.2	D	45.4
Right Turn	C	28.1	B	16.6	B	17.2
Mohouli St Westbound	D	42.1	C	30.3	C	30.9
Left Turn	E	78.9	D	53.3	D	53.5
Through/Right Turn	C	28.4	C	22.1	C	23.0
Komohana St Northbound	C	28.0	C	26.9	C	27.1
Left Turn	B	16.3	B	16.2	B	17.0
Through	D	42.8	C	34.7	D	35.0
Right Turn	A	9.1	B	14.9	B	15.4
Komohana St Southbound	C	27.3	C	28.3	C	28.9
Left Turn	C	33.1	D	36.5	D	36.6
Through/Right Turn	C	22.5	C	23.9	C	24.8
PM PEAK HOUR						
KOMOHANA ST/MOHOULI ST	D	46.5	D	40.6	D	44.3
Mohouli St Eastbound	C	22.3	C	20.2	C	20.5
Left Turn	D	48.6	D	45.6	D	47.0
Through	C	34.4	C	32.1	C	32.2
Right Turn	A	8.0	A	7.3	A	8.2
Mohouli St Westbound	D	51.7	D	52.2	D	53.6
Left Turn	F	93.1	E	69.8	E	71.5
Through/Right Turn	C	22.8	D	40.5	D	42.0
Komohana St Northbound	D	38.4	C	31.2	C	32.7
Left Turn	E	75.9	E	64.0	E	66.8
Through	D	37.2	C	27.8	C	28.2
Right Turn	A	5.9	A	5.1	A	5.2
Komohana St Southbound	E	60.0	D	46.2	E	55.0
Left Turn	C	22.7	D	37.0	D	38.3
Through/Right Turn	E	69.8	D	48.7	E	59.6

**TABLE 3
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS) ANALYSIS**

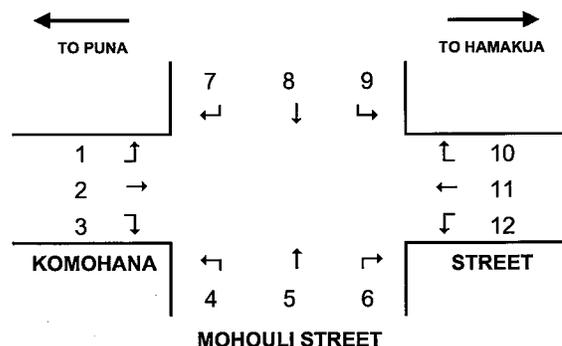
PEAK HOUR/INTERSECTION Approach/Movement	2009 Existing		2017			
			Ambient		Total	
	LOS	Delay	LOS	Delay	LOS	Delay
AM PEAK HOUR						
KOMOHANA ST/ KUKUAU ST						
Kukuau St Eastbound L/Th	F	66.5	F	>100	F	>100
Kukuau St Eastbound RT	B	11.0	F	>100	F	>100
Kukuau St Westbound	C	25.0	F	>100	F	>100
Komohana St Northbound LT	A	8.3	A	8.9	A	8.9
Komohana St Southbound LT	B	10.2	B	14.1	B	14.2
MOHOULI ST/ KUKUAU ST						
Kukuau St Eastbound	C	22.2	D	26.8	D	27.3
Kukuau St Westbound	B	13.3	B	14.4	B	14.6
Mohouli St Northbound LT	A	8.6	A	8.8	A	8.8
Mohouli St Southbound LT	A	8.7	A	8.2	A	8.2
MOHOULI ST/ PROJECT ACCESS						
Project Access LT		NA	C	17.2	C	22.4
Project Access RT			B	10.3	B	10.4
Mohouli St Eastbound LT			A	8.1	A	8.2
PM PEAK HOUR						
KOMOHANA ST/ KUKUAU ST						
Kukuau St Eastbound L/Th	F	56.1	F	>100	F	>100
Kukuau St Eastbound RT	C	15.6	E	36.2	E	36.8
Kukuau St Westbound	E	42.8	F	>100	F	>100
Komohana St Northbound LT	A	9.6	B	13.8	B	13.9
Komohana St Southbound LT	A	8.4	B	10.1	B	10.1
MOHOULI ST/ KUKUAU ST						
Kukuau St Eastbound	C	15.2	C	17.0	C	17.2
Kukuau St Westbound	C	15.8	C	17.5	C	17.7
Mohouli St Northbound LT	A	8.1	A	8.2	A	8.2
Mohouli St Southbound LT	A	8.4	A	8.6	A	8.6
MOHOULI ST/ PROJECT ACCESS						
Project Access LT		NA	C	22.4	D	29.5
Project Access RT			B	11.8	B	12.0
Mohouli St Eastbound LT			A	9.0	A	9.2

Appendix A

Traffic Turning Movement Counts

TRAFFIC TURNING MOVEMENT COUNT WAILANI LLC TIAR

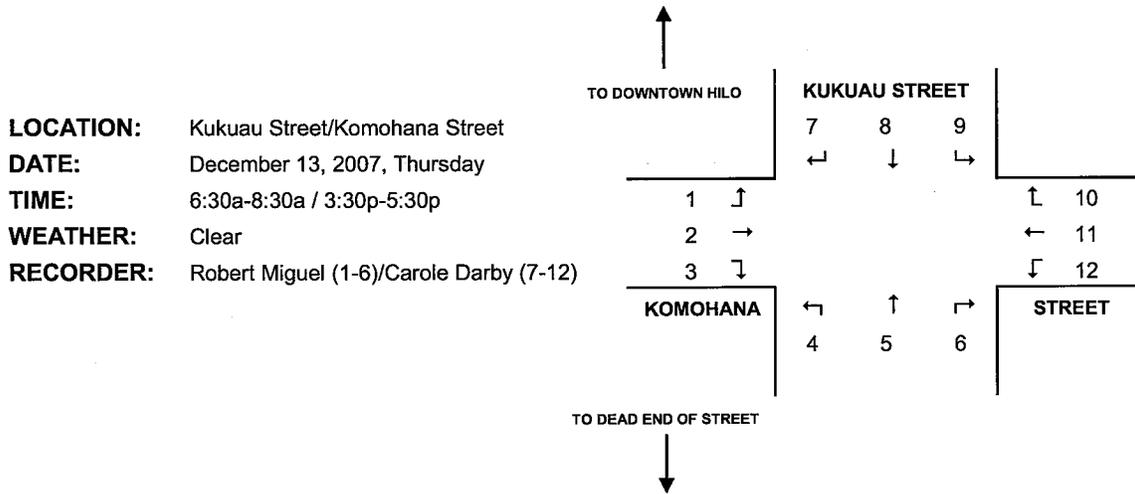
LOCATION: Komohana Street / Mohouli Street
DATE: Wednesday, September 9, 2009
TIME: 6:30a-8:30a / 3:30p-5:30p
WEATHER: Clear / Cloudy
RECORDER: Carole Darby



TIME PERIOD	MOVEMENT NUMBER												TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	
6:30-6:45a	20	116	47	15	17	21	40	58	1	0	39	12	386
6:45-7:00a	19	142	65	11	20	21	63	67	0	0	42	32	482
7:00-7:15a	33	144	98	21	24	25	50	82	2	0	39	25	543
7:15-7:30a	30	159	121	23	27	52	28	99	2	1	46	38	626
7:30-7:45a	31	169	116	36	37	48	46	82	4	4	34	42	649
7:45-8:00a	27	136	68	37	43	54	45	92	1	1	53	42	599
8:00-8:15a	29	118	52	19	27	35	25	74	1	0	80	22	482
8:15-8:30a	17	81	37	22	19	13	27	60	3	1	44	22	346
6:30-8:30a	206	1065	604	184	214	269	324	614	14	7	377	235	4113
7:00-8:00a	121	608	403	117	131	179	169	355	9	6	172	147	2417
PHF	0.896			0.797			0.966			0.846			

TIME PERIOD	MOVEMENT NUMBER												TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	
3:30-3:45p	38	96	37	46	67	36	44	43	0	3	104	41	555
3:45-4:00p	38	62	33	36	58	22	42	36	4	5	113	31	480
4:00-4:15p	43	75	39	40	61	22	45	30	2	2	122	39	520
4:15-4:30p	29	69	34	56	79	36	25	36	0	1	116	28	509
4:30-4:45p	39	72	45	98	76	21	42	48	1	0	121	31	594
4:45-5:00p	44	81	45	83	75	22	36	42	3	4	126	36	597
5:00-5:15p	46	59	52	61	90	30	38	30	1	1	127	35	570
5:15-5:30p	40	62	40	44	71	21	36	34	1	0	101	18	468
3:30-5:30p	317	576	325	464	577	210	308	299	12	16	930	259	4293
4:15-5:15p	158	281	176	298	320	109	141	156	5	6	490	130	2270
PHF	0.904			0.932			0.83			0.943			

TRAFFIC TURNING MOVEMENT COUNT

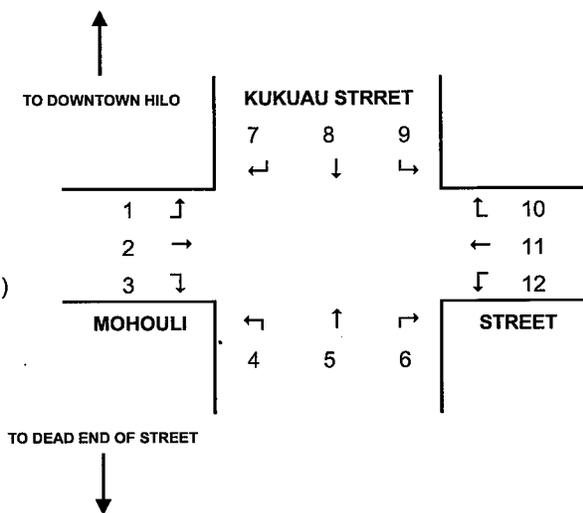


TIME PERIOD	MOVEMENT NUMBER												TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	
6:30-6:45a	1	42	2	3	8	5	2	1	1	1	127	0	193
6:45-7:00a	1	57	2	6	3	5	10	1	1	1	149	0	236
7:00-7:15a	2	70	4	3	11	9	8	4	3	3	173	2	292
7:15-7:30a	11	74	1	7	10	13	18	3	1	6	188	4	336
7:30-7:45a	9	63	8	6	13	18	22	5	2	4	190	1	341
7:45-8:00a	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												TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	
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

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												TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	
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												TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	
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						

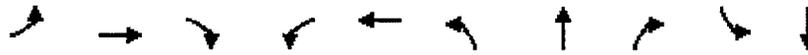
Appendix B

*Existing Traffic
Level of Service (LOS) Calculations*

Timings

3: mohouli & Komohana

7/31/2011



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↑	↗	↖	↗	↖	↑	↗	↖	↗
Volume (vph)	10	355	170	115	130	120	610	405	145	170
Turn Type	Prot		custom	Prot		pm+pt		Perm	pm+pt	
Protected Phases	7			3		5	2		1	6
Permitted Phases		4	4		8	2	2	2	6	6
Detector Phase	7	4	4	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.5	32.5	32.5	9.5	32.5	9.5	32.5	32.5	9.5	32.5
Total Split (s)	10.0	37.4	37.4	17.0	44.4	10.9	56.0	56.0	13.3	58.4
Total Split (%)	8.1%	30.2%	30.2%	13.7%	35.9%	8.8%	45.3%	45.3%	10.8%	47.2%
Yellow Time (s)	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.7	4.5
All-Red Time (s)	0.3	1.0	1.0	0.3	1.0	0.3	1.0	1.0	0.3	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.5	5.5	4.8	5.5	4.8	5.5	5.5	4.0	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	5.8	28.6	28.6	11.4	42.9	57.8	50.9	50.9	63.5	53.0
Actuated g/C Ratio	0.05	0.24	0.24	0.10	0.36	0.48	0.42	0.42	0.53	0.44
v/c Ratio	0.13	0.87	0.43	0.74	0.52	0.22	0.84	0.51	0.69	0.23
Control Delay	59.8	64.3	28.1	78.9	28.4	16.3	42.8	9.1	33.1	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.8	64.3	28.1	78.9	28.4	16.3	42.8	9.1	33.1	22.5
LOS	E	E	C	E	C	B	D	A	C	C
Approach Delay		52.7			42.1		28.0			27.3
Approach LOS		D			D		C			C

Intersection Summary

Cycle Length: 123.7
 Actuated Cycle Length: 119.8
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 35.9
 Intersection Capacity Utilization 81.7%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service D

Splits and Phases: 3: mohouli & Komohana

↖ ø1	↑ ø2	↗ ø3	ø4
13.9 s	58 s	17 s	37.4 s
↖ ø5	↓ ø6	↗ ø7	ø8
10.9 s	58.4 s	10 s	44.4 s

HCM Unsignalized Intersection Capacity Analysis

6: kukuau & Komohana

7/31/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↘	↖↗		↘	↖↗	
Volume (veh/h)	20	50	55	10	15	75	10	760	15	25	310	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	54	60	11	16	82	11	826	16	27	337	22
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		4			4			4			4	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1113				
pX, platoon unblocked												
vC, conflicting volume	945	1366	279	1206	1369	521	409			892		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	945	1366	279	1206	1369	521	409			892		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	57	91	85	87	82	99			96		
cM capacity (veh/h)	134	128	659	71	127	459	1099			724		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	76	60	27	82	11	551	292	27	225	134
Volume Left	22	0	11	0	11	0	0	27	0	0
Volume Right	0	60	0	82	0	0	16	0	0	22
cSH	129	659	96	459	1099	1700	1700	724	1700	1700
Volume to Capacity	0.59	0.09	0.28	0.18	0.01	0.32	0.17	0.04	0.13	0.08
Queue Length 95th (ft)	74	7	26	16	1	0	0	3	0	0
Control Delay (s)	66.5	11.0	56.3	14.5	8.3	0.0	0.0	10.2	0.0	0.0
Lane LOS	F	B	F	B	A			B		
Approach Delay (s)	42.1		25.0		0.1			0.7		
Approach LOS	E		C							

Intersection Summary		
Average Delay		5.9
Intersection Capacity Utilization	55.5%	ICU Level of Service
Analysis Period (min)		15
		B

HCM Unsignalized Intersection Capacity Analysis

20: kukuau st & mohouli st

7/31/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Volume (veh/h)	20	30	55	3	5	30	10	230	85	45	500	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	33	60	3	5	33	11	250	92	49	543	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	951	1008	546	1035	965	296	549			342		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	951	1008	546	1035	965	296	549			342		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	86	89	98	98	96	99			96		
cM capacity (veh/h)	216	228	537	160	242	743	1021			1217		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	114	41	11	342	49	549
Volume Left	22	3	11	0	49	0
Volume Right	60	33	0	92	0	5
cSH	322	476	1021	1700	1217	1700
Volume to Capacity	0.35	0.09	0.01	0.20	0.04	0.32
Queue Length 95th (ft)	39	7	1	0	3	0
Control Delay (s)	22.2	13.3	8.6	0.0	8.1	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	22.2	13.3	0.3		0.7	
Approach LOS	C	B				

Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			51.1%	ICU Level of Service		A
Analysis Period (min)			15			

Timings
3: mohouli & Komohana

7/31/2011

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NET	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	5	155	140	300	320	160	280	175	130	490
Turn Type	Prot		custom	Prot		pm+pt		Perm	pm+pt	
Protected Phases	7			3		5	2		1	6
Permitted Phases		4	4		8	2	2	2	6	6
Detector Phase	7	4	4	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	27.0	27.0	4.0	4.0	1.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.5	32.5	32.5	9.5	32.5	5.8	32.5	32.5	9.5	32.5
Total Split (s)	9.5	32.5	32.5	24.2	47.2	11.6	35.1	35.1	13.2	36.7
Total Split (%)	9.0%	31.0%	31.0%	23.0%	45.0%	11.0%	33.4%	33.4%	12.6%	35.0%
Yellow Time (s)	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.7	4.5
All-Red Time (s)	0.3	1.0	1.0	0.3	1.0	0.3	1.0	1.0	0.3	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.5	5.5	4.8	5.5	4.8	5.5	5.5	4.0	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effect Green (s)	5.5	27.0	27.0	19.4	49.3	37.5	30.0	30.0	41.5	31.2
Actuated g/C Ratio	0.05	0.26	0.26	0.18	0.47	0.36	0.29	0.29	0.40	0.30
v/c Ratio	0.05	0.35	0.30	1.00	0.55	0.93	0.57	0.32	0.39	0.97
Control Delay	48.6	34.4	8.0	93.1	22.8	75.9	37.2	5.9	22.7	69.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.6	34.4	8.0	93.1	22.8	75.9	37.2	5.9	22.7	69.8
LOS	D	C	A	F	C	E	D	A	C	E
Approach Delay		22.3			51.7		38.4			60.0
Approach LOS		C			D		D			E

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Natural Cycle: 105
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 46.5
 Intersection Capacity Utilization 91.2%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service F

Splits and Phases: 3: mohouli & Komohana

φ1	φ2	φ3	φ4
13.2 s	35.1 s	24.2 s	32.5 s
φ5	φ6	φ7	φ8
11.5 s	36.7 s	9.5 s	47.2 s

HCM Unsignalized Intersection Capacity Analysis

6: kukuau & Komohana

7/31/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	20	30	4	50	25	35	350	10	20	580	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	22	33	4	54	27	38	380	11	22	630	65
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		4			4			4			4	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1113				
pX, platoon unblocked	0.90	0.90		0.90	0.90	0.90				0.90		
vC, conflicting volume	1290	1274	763	1247	1301	486	746			441		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1267	1249	763	1219	1279	375	746			326		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	84	91	95	58	95	95			98		
cM capacity (veh/h)	69	134	371	93	128	556	826			1066		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	33	33	59	27	38	391	22	696				
Volume Left	11	0	4	0	38	0	22	0				
Volume Right	0	33	0	27	0	11	0	65				
cSH	102	371	125	556	826	1700	1066	1700				
Volume to Capacity	0.32	0.09	0.47	0.05	0.05	0.23	0.02	0.41				
Queue Length 95th (ft)	31	7	53	4	4	0	2	0				
Control Delay (s)	56.1	15.6	57.2	11.8	9.6	0.0	8.4	0.0				
Lane LOS	F	C	F	B	A		A					
Approach Delay (s)	35.9		42.8		0.8		0.3					
Approach LOS	E		E									
Intersection Summary												
Average Delay			5.1									
Intersection Capacity Utilization			67.9%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

20: kukuau st & mohouli st.

7/31/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↖	↗		↖	↗	
Volume (veh/h)	4	10	25	2	20	55	50	435	0	20	295	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	11	27	2	22	60	54	473	0	22	321	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1019	948	323	978	951	473	326			473		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1019	948	323	978	951	473	326			473		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	96	96	99	91	90	96			98		
cM capacity (veh/h)	172	244	718	203	243	591	1234			1089		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	42	84	54	473	22	326
Volume Left	4	2	54	0	22	0
Volume Right	27	60	0	0	0	5
cSH	394	416	1234	1700	1089	1700
Volume to Capacity	0.11	0.20	0.04	0.28	0.02	0.19
Queue Length 95th (ft)	9	19	3	0	2	0
Control Delay (s)	15.2	15.8	8.1	0.0	8.4	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	15.2	15.8	0.8		0.5	
Approach LOS	C	C				

Intersection Summary		
Average Delay		2.6
Intersection Capacity Utilization	41.1%	ICU Level of Service
Analysis Period (min)		15
		A

Appendix C

*Ambient Forecast
Level of Service (LOS) Calculations*

Timings

3: mohouli & Komohana

7/31/2011

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	10	385	215	145	150	160	905	450	175	315
Turn Type	Prot		custom	Prot		pm+pt		Perm	pm+pt	
Protected Phases	7			3		5	2		1	6
Permitted Phases		4	4		8	2	2	2	6	6
Detector Phase	7	4	4	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.5	32.5	32.5	9.5	32.5	9.5	25.0	25.0	9.5	25.0
Total Split (s)	9.5	32.5	32.5	11.0	34.0	13.9	34.5	34.5	12.0	32.6
Total Split (%)	10.6%	36.1%	36.1%	12.2%	37.8%	15.4%	38.3%	38.3%	13.3%	36.2%
Yellow Time (s)	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.7	4.5
All-Red Time (s)	0.3	1.0	1.0	0.3	1.0	0.3	1.0	1.0	0.3	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.5	5.5	4.8	5.5	4.8	5.5	5.5	4.0	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	5.5	23.6	23.6	6.2	32.8	38.4	29.1	29.1	37.2	27.7
Actuated g/C Ratio	0.06	0.27	0.27	0.07	0.38	0.44	0.34	0.34	0.43	0.32
v/c Ratio	0.10	0.82	0.46	0.64	0.63	0.36	0.83	0.67	0.75	0.32
Control Delay	42.0	44.2	16.6	53.3	22.1	16.2	34.7	14.9	36.5	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	44.2	16.6	53.3	22.1	16.2	34.7	14.9	36.5	23.9
LOS	D	D	B	D	C	B	C	B	D	C
Approach Delay		34.4			30.3		26.9			28.3
Approach LOS		C			C		C			C

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 86.8
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 29.1
 Intersection Capacity Utilization 77.4%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 3: mohouli & Komohana

ø1	ø2	ø3	ø4
12 s	32.5 s	11 s	32.5 s
ø5	ø6	ø7	ø8
13.9 s	32.6 s	9.5 s	34 s

HCM Unsignalized Intersection Capacity Analysis

6: kukuau & Komohana

8/6/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↖	↗		↖	↗	
Volume (veh/h)	20	50	55	10	15	75	10	1030	15	25	490	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	54	60	11	16	82	11	1120	16	27	533	22
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		4			4			4			4	
Right turn flare (veh)			2			1						
Median type								None			None	
Median storage (veh)								1113				
Upstream signal (ft)												
pX, platoon unblocked	0.64	0.64		0.64	0.64	0.64				0.64		
vC, conflicting volume	1847	1855	643	1864	1858	1228	604			1186		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2039	2052	643	2064	2056	1077	604			1012		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	86	0	46	48	99			94		
cM capacity (veh/h)	6	30	435	0	30	157	933			423		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	136	109	11	1136	27	554
Volume Left	22	11	11	0	27	0
Volume Right	60	82	0	16	0	22
cSH	26	12	933	1700	423	1700
Volume to Capacity	5.23	8.99	0.01	0.67	0.06	0.33
Queue Length 95th (ft)	Err	Err	1	0	5	0
Control Delay (s)	Err	Err	8.9	0.0	14.1	0.0
Lane LOS	F	F	A		B	
Approach Delay (s)	Err	Err	0.1		0.7	
Approach LOS	F	F				

Intersection Summary		
Average Delay	1239.8	
Intersection Capacity Utilization	89.1%	ICU Level of Service E
Analysis Period (min)	15	

HCM Unsignalized Intersection Capacity Analysis

20: kukuau st & mohouli st

7/31/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↖		↗	↖	
Volume (veh/h)	20	30	60	3	5	30	10	255	85	50	570	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	33	65	3	5	33	11	277	92	54	620	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1065	1122	622	1155	1079	323	625			370		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1065	1122	622	1155	1079	323	625			370		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	83	87	97	97	95	99			95		
cM capacity (veh/h)	179	194	487	126	206	718	956			1189		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	41	11	370	54	625
Volume Left	22	3	11	0	54	0
Volume Right	65	33	0	92	0	5
cSH	283	422	956	1700	1189	1700
Volume to Capacity	0.42	0.10	0.01	0.22	0.05	0.37
Queue Length 95th (ft)	50	8	1	0	4	0
Control Delay (s)	26.8	14.4	8.8	0.0	8.2	0.0
Lane LOS	D	B	A		A	
Approach Delay (s)	26.8	14.4	0.3		0.7	
Approach LOS	D	B				

Intersection Summary	
Average Delay	3.6
Intersection Capacity Utilization	55.1%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

23: mohouli & project access

7/31/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↗		↙	↗
Volume (veh/h)	5	570	315	40	5	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	620	342	43	5	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			854			
pX, platoon unblocked	0.99				0.99	0.99
vC, conflicting volume	386				995	364
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	374				989	352
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1172				269	684

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	5	620	386	5	1
Volume Left	5	0	0	5	0
Volume Right	0	0	43	0	1
cSH	1172	1700	1700	269	684
Volume to Capacity	0.00	0.36	0.23	0.02	0.00
Queue Length 95th (ft)	0	0	0	2	0
Control Delay (s)	8.1	0.0	0.0	18.6	10.3
Lane LOS	A			C	B
Approach Delay (s)	0.1		0.0	17.2	
Approach LOS				C	

Intersection Summary					
Average Delay			0.2		
Intersection Capacity Utilization			40.0%	ICU Level of Service	A
Analysis Period (min)			15		

Timings
3: mohouli & Komohana

8/13/2011

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	15	175	190	350	350	220	565	205	275	980
Turn Type	Prot		custom	Prot		pm+pt		Perm	pm+pt	
Protected Phases	7			3		5	2		1	6
Permitted Phases		4	4		8	2	2	2	6	6
Detector Phase	7	4	4	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.5	32.5	32.5	9.5	32.5	9.5	32.5	32.5	9.5	32.5
Total Split (s)	9.5	32.5	32.5	15.4	38.4	13.3	34.1	34.1	13.0	33.8
Total Split (%)	10.0%	34.2%	34.2%	16.2%	40.4%	14.0%	35.9%	35.9%	13.7%	35.6%
Yellow Time (s)	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.7	4.5
All-Red Time (s)	0.3	1.0	1.0	0.3	1.0	0.3	1.0	1.0	0.3	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.5	5.5	4.8	5.5	4.8	5.5	5.5	4.0	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effect Green (s)	5.5	20.3	20.3	10.7	32.3	38.1	28.8	28.8	39.1	28.5
Actuated g/C Ratio	0.06	0.23	0.23	0.12	0.36	0.43	0.32	0.32	0.44	0.32
v/c Ratio	0.15	0.45	0.40	0.92	0.86	0.93	0.53	0.34	0.80	0.95
Control Delay	45.6	32.1	7.3	69.8	40.5	64.0	27.8	5.1	37.0	48.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	32.1	7.3	69.8	40.5	64.0	27.8	5.1	37.0	48.7
LOS	D	C	A	E	D	E	C	A	D	D
Approach Delay		20.2			52.2		31.2			46.2
Approach LOS		C			D		C			D

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 88.9
 Natural Cycle: 95
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 40.6
 Intersection Capacity Utilization 88.5%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service E

Splits and Phases: 3: mohouli & Komohana

ø1	ø2	ø3	ø4
13.3 s	34.1 s	15.4 s	32.5 s
ø5	ø6	ø7	ø8
19.0 s	33.8 s	9.5 s	38.4 s

HCM Unsignalized Intersection Capacity Analysis

6: kukuau & Komohana

8/7/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↖	↗		↖	↗	
Volume (veh/h)	10	20	30	4	50	25	40	675	10	20	1210	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	22	33	4	54	27	43	734	11	22	1315	71
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		4			4			4			4	
Right turn flare (veh)						1						
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1113				
pX, platoon unblocked	0.75	0.75		0.75	0.75	0.75				0.75		
vC, conflicting volume	2342	2326	1451	2296	2355	839	1436			795		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2627	2606	1451	2566	2646	615	1436			555		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	78	0	0	92	90			97		
cM capacity (veh/h)	0	15	147	0	14	337	453			726		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	33	33	86	43	745	22	1386
Volume Left	11	0	4	43	0	22	0
Volume Right	0	33	27	0	11	0	71
cSH	0	147	1	453	1700	726	1700
Volume to Capacity	Err	0.22	168.36	0.10	0.44	0.03	0.82
Queue Length 95th (ft)	Err	20	Err	8	0	2	0
Control Delay (s)	Err	36.2	Err	13.8	0.0	10.1	0.0
Lane LOS	F	E	F	B		B	
Approach Delay (s)	Err		Err	0.8		0.2	
Approach LOS	F		F				

Intersection Summary							
Average Delay			Err				
Intersection Capacity Utilization			101.2%		ICU Level of Service		G
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

20: kukuau st & mohouli st

8/7/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	10	25	2	20	60	55	490	0	20	335	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	11	27	2	22	65	60	533	0	22	364	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1139	1062	367	1092	1065	533	370			533		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1139	1062	367	1092	1065	533	370			533		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	95	96	99	89	88	95			98		
cM capacity (veh/h)	137	208	678	167	207	547	1189			1035		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	42	89	60	533	22	370
Volume Left	4	2	60	0	22	0
Volume Right	27	65	0	0	0	5
cSH	341	376	1189	1700	1035	1700
Volume to Capacity	0.12	0.24	0.05	0.31	0.02	0.22
Queue Length 95th (ft)	11	23	4	0	2	0
Control Delay (s)	17.0	17.5	8.2	0.0	8.6	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	17.0	17.5	0.8		0.5	
Approach LOS	C	C				

Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			44.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 23: mohouli & project access

8/7/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑	↶		↵	↶
Volume (veh/h)	3	350	560	20	40	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	380	609	22	43	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			854			
pX, platoon unblocked	0.76				0.76	0.76
vC, conflicting volume	630				1007	620
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	357				851	342
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				83	99
cM capacity (veh/h)	914				250	533

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	3	380	630	43	4
Volume Left	3	0	0	43	0
Volume Right	0	0	22	0	4
cSH	914	1700	1700	250	533
Volume to Capacity	0.00	0.22	0.37	0.17	0.01
Queue Length 95th (ft)	0	0	0	15	1
Control Delay (s)	9.0	0.0	0.0	22.4	11.8
Lane LOS	A			C	B
Approach Delay (s)	0.1		0.0	21.4	
Approach LOS				C	

Intersection Summary					
Average Delay			1.0		
Intersection Capacity Utilization			40.7%	ICU Level of Service	A
Analysis Period (min)			15		

Appendix D

*Total With Project Forecast
Level of Service (LOS) Calculations*

Timings
3: mohouli & Komohana

8/11/2011

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	15	395	230	145	160	185	905	450	175	315
Turn Type	Prot		custom	Prot		pm+pt		Perm	pm+pt	
Protected Phases	7			3		5	2		1	6
Permitted Phases		4	4		8	2	2	2	6	6
Detector Phase	7	4	4	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.5	32.5	32.5	9.5	32.5	9.5	25.0	25.0	9.5	25.0
Total Split (s)	9.5	32.5	32.5	11.0	34.0	14.9	34.5	34.5	12.0	31.6
Total Split (%)	10.6%	36.1%	36.1%	12.2%	37.8%	16.6%	38.3%	38.3%	13.3%	35.1%
Yellow Time (s)	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.7	4.5
All-Red Time (s)	0.3	1.0	1.0	0.3	1.0	0.3	1.0	1.0	0.3	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.5	5.5	4.8	5.5	4.8	5.5	5.5	4.0	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	5.5	23.9	23.9	6.2	33.1	39.2	29.1	29.1	36.4	26.9
Actuated g/C Ratio	0.06	0.27	0.27	0.07	0.38	0.45	0.33	0.33	0.42	0.31
v/c Ratio	0.14	0.84	0.48	0.64	0.64	0.41	0.83	0.68	0.75	0.33
Control Delay	43.1	45.4	17.2	53.5	23.0	17.0	35.0	15.4	36.6	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	45.4	17.2	53.5	23.0	17.0	35.0	15.4	36.6	24.8
LOS	D	D	B	D	C	B	D	B	D	C
Approach Delay		35.2			30.9		27.1			28.9
Approach LOS		D			C		C			C

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 87.1
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 29.6
 Intersection Capacity Utilization 77.9%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 3: mohouli & Komohana

φ1	φ2	φ3	φ4
12.5 s	34.5 s	11.5 s	32.5 s
φ5	φ6	φ7	φ8
14.9 s	31.6 s	8.5 s	34 s

HCM Unsignalized Intersection Capacity Analysis

6: kukuau & Komohana

8/11/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↗		↔	↗	↖	↕		↖	↕	↗
Volume (veh/h)	20	50	60	10	15	75	10	1035	15	25	490	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	54	65	11	16	82	11	1125	16	27	533	22
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		4			4			4			4	
Right turn flare (veh)			2			1						
Median type								None			None	
Median storage veh												
Upstream signal (ft)								1113				
pX, platoon unblocked	0.64	0.64		0.64	0.64	0.64				0.64		
vC, conflicting volume	1853	1861	643	1869	1864	1233	604			1191		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2047	2060	643	2072	2064	1086	604			1021		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	85	0	45	48	99			94		
cM capacity (veh/h)	6	30	435	0	30	156	933			420		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	141	109	11	1141	27	554
Volume Left	22	11	11	0	27	0
Volume Right	65	82	0	16	0	22
cSH	26	12	933	1700	420	1700
Volume to Capacity	5.37	9.10	0.01	0.67	0.06	0.33
Queue Length 95th (ft)	Err	Err	1	0	5	0
Control Delay (s)	Err	Err	8.9	0.0	14.2	0.0
Lane LOS	F	F	A		B	
Approach Delay (s)	Err	Err	0.1		0.7	
Approach LOS	F	F				

Intersection Summary						
Average Delay			1260.4			
Intersection Capacity Utilization			89.4%	ICU Level of Service		E
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

20: kukuau st & mohouli st

8/11/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↖	↗		↖	↗	
Volume (veh/h)	20	30	60	3	5	30	10	260	85	50	575	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	33	65	3	5	33	11	283	92	54	625	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1076	1133	628	1166	1090	329	630			375		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1076	1133	628	1166	1090	329	630			375		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	83	86	97	97	95	99			95		
cM capacity (veh/h)	176	191	483	123	203	713	952			1183		

Direction Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	41	11	375	54	630
Volume Left	22	3	11	0	54	0
Volume Right	65	33	0	92	0	5
cSH	279	417	952	1700	1183	1700
Volume to Capacity	0.43	0.10	0.01	0.22	0.05	0.37
Queue Length 95th (ft)	51	8	1	0	4	0
Control Delay (s)	27.3	14.6	8.8	0.0	8.2	0.0
Lane LOS	D	B	A		A	
Approach Delay (s)	27.3	14.6	0.2		0.6	
Approach LOS	D	B				

Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			55.3%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

23: mohouli & project access

8/11/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↗		↙	↗
Volume (veh/h)	10	595	315	80	35	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	647	342	87	38	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			854			
pX, platoon unblocked	0.97				0.97	0.97
vC, conflicting volume	429				1054	386
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	392				1039	347
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				84	98
cM capacity (veh/h)	1127				245	673

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	11	647	429	38	11
Volume Left	11	0	0	38	0
Volume Right	0	0	87	0	11
cSH	1127	1700	1700	245	673
Volume to Capacity	0.01	0.38	0.25	0.16	0.02
Queue Length 95th (ft)	1	0	0	14	1
Control Delay (s)	8.2	0.0	0.0	22.4	10.4
Lane LOS	A			C	B
Approach Delay (s)	0.1		0.0	19.8	
Approach LOS				C	

Intersection Summary					
Average Delay			0.9		
Intersection Capacity Utilization			41.3%	ICU Level of Service	A
Analysis Period (min)			15		

Timings
3: mohouli & Komohana

8/11/2011

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	20	185	220	350	365	240	565	205	275	980
Turn Type	Prot		custom	Prot		pm+pt		Perm	pm+pt	
Protected Phases	7			3		5	2		1	6
Permitted Phases		4	4		8	2	2	2	6	6
Detector Phase	7	4	4	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.5	32.5	32.5	9.5	32.5	9.5	32.5	32.5	9.5	32.5
Total Split (s)	9.5	32.5	32.5	15.4	38.4	14.3	34.1	34.1	13.0	32.8
Total Split (%)	10.0%	34.2%	34.2%	16.2%	40.4%	15.1%	35.9%	35.9%	13.7%	34.5%
Yellow Time (s)	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.7	4.5
All-Red Time (s)	0.3	1.0	1.0	0.3	1.0	0.3	1.0	1.0	0.3	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.5	5.5	4.8	5.5	4.8	5.5	5.5	4.0	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	5.5	21.0	21.0	10.7	33.0	39.1	28.8	28.8	38.1	27.5
Actuated g/C Ratio	0.06	0.23	0.23	0.12	0.37	0.44	0.32	0.32	0.43	0.31
v/c Ratio	0.20	0.46	0.45	0.93	0.88	0.95	0.54	0.34	0.81	1.00
Control Delay	47.0	32.2	8.2	71.5	42.0	66.8	28.2	5.2	38.3	59.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.0	32.2	8.2	71.5	42.0	66.8	28.2	5.2	38.3	59.6
LOS	D	C	A	E	D	E	C	A	D	E
Approach Delay		20.5			53.6		32.7			55.0
Approach LOS		C			D		C			E

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 89.5
 Natural Cycle: 105
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 44.3
 Intersection Capacity Utilization 90.6%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service E

Splits and Phases: 3: mohouli & Komohana

13.3 s	34.1 s		15.4 s		32.5 s				
14.3 s	32.8 s		9.5 s		38.4 s				

HCM Unsignalized Intersection Capacity Analysis

6: kukuau & Komohana

8/11/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↗		↔	↗	↖	↕		↖	↕	
Volume (veh/h)	10	20	30	4	50	25	40	680	10	20	1220	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	22	33	4	54	27	43	739	11	22	1326	71
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		4			4			4			4	
Right turn flare (veh)						1						
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1113				
pX, platoon unblocked	0.75	0.75		0.75	0.75	0.75				0.75		
vC, conflicting volume	2358	2342	1461	2312	2372	845	1447			800		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2650	2628	1461	2588	2668	622	1447			562		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	78	0	0	92	90			97		
cM capacity (veh/h)	0	14	145	0	13	334	449			722		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	33	33	86	43	750	22	1397
Volume Left	11	0	4	43	0	22	0
Volume Right	0	33	27	0	11	0	71
cSH	0	145	0	449	1700	722	1700
Volume to Capacity	Err	0.22	179.20	0.10	0.44	0.03	0.82
Queue Length 95th (ft)	Err	21	Err	8	0	2	0
Control Delay (s)	Err	36.8	Err	13.9	0.0	10.1	0.0
Lane LOS	F	E	F	B		B	
Approach Delay (s)	Err		Err	0.8		0.2	
Approach LOS	F		F				

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization		101.7%	ICU Level of Service
Analysis Period (min)		15	G

HCM Unsignalized Intersection Capacity Analysis

20: kukuau st & mohouli st

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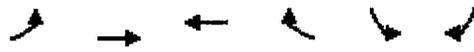
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	10	25	2	20	60	55	495	0	20	340	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	11	27	2	22	65	60	538	0	22	370	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1149	1073	372	1103	1076	538	375			538		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1149	1073	372	1103	1076	538	375			538		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	95	96	99	89	88	95			98		
cM capacity (veh/h)	134	205	674	164	204	543	1183			1030		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	42	89	60	538	22	375
Volume Left	4	2	60	0	22	0
Volume Right	27	65	0	0	0	5
cSH	337	371	1183	1700	1030	1700
Volume to Capacity	0.13	0.24	0.05	0.32	0.02	0.22
Queue Length 95th (ft)	11	23	4	0	2	0
Control Delay (s)	17.2	17.7	8.2	0.0	8.6	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	17.2	17.7	0.8		0.5	
Approach LOS	C	C				

Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			44.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 23: mohouli & project access

8/11/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←	↑	→	←	←	←
Volume (veh/h)	10	335	560	60	85	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	364	609	65	92	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			854			
pX, platoon unblocked	0.72				0.72	0.72
vC, conflicting volume	674				1027	641
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	355				845	310
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				61	98
cM capacity (veh/h)	868				237	527

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	11	364	674	92	11
Volume Left	11	0	0	92	0
Volume Right	0	0	65	0	11
cSH	868	1700	1700	237	527
Volume to Capacity	0.01	0.21	0.40	0.39	0.02
Queue Length 95th (ft)	1	0	0	44	2
Control Delay (s)	9.2	0.0	0.0	29.5	12.0
Lane LOS	A			D	B
Approach Delay (s)	0.3		0.0	27.7	
Approach LOS				D	

Intersection Summary					
Average Delay			2.6		
Intersection Capacity Utilization			44.5%	ICU Level of Service	A
Analysis Period (min)			15		

**APPENDIX 3 – 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:

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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* Krajinina - *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.

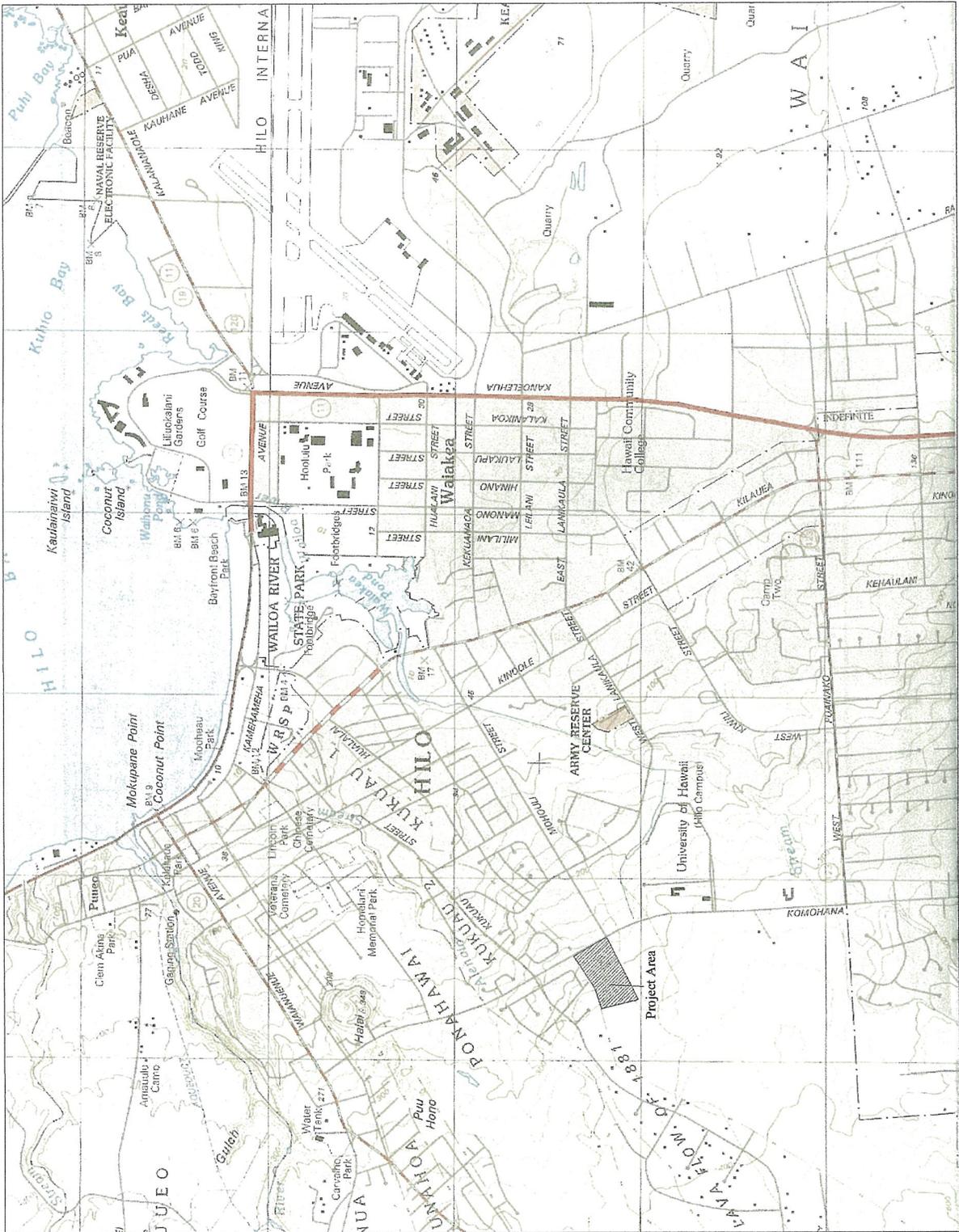


Figure 1. Portion of USGS Hilo Quadrangle showing Project Area

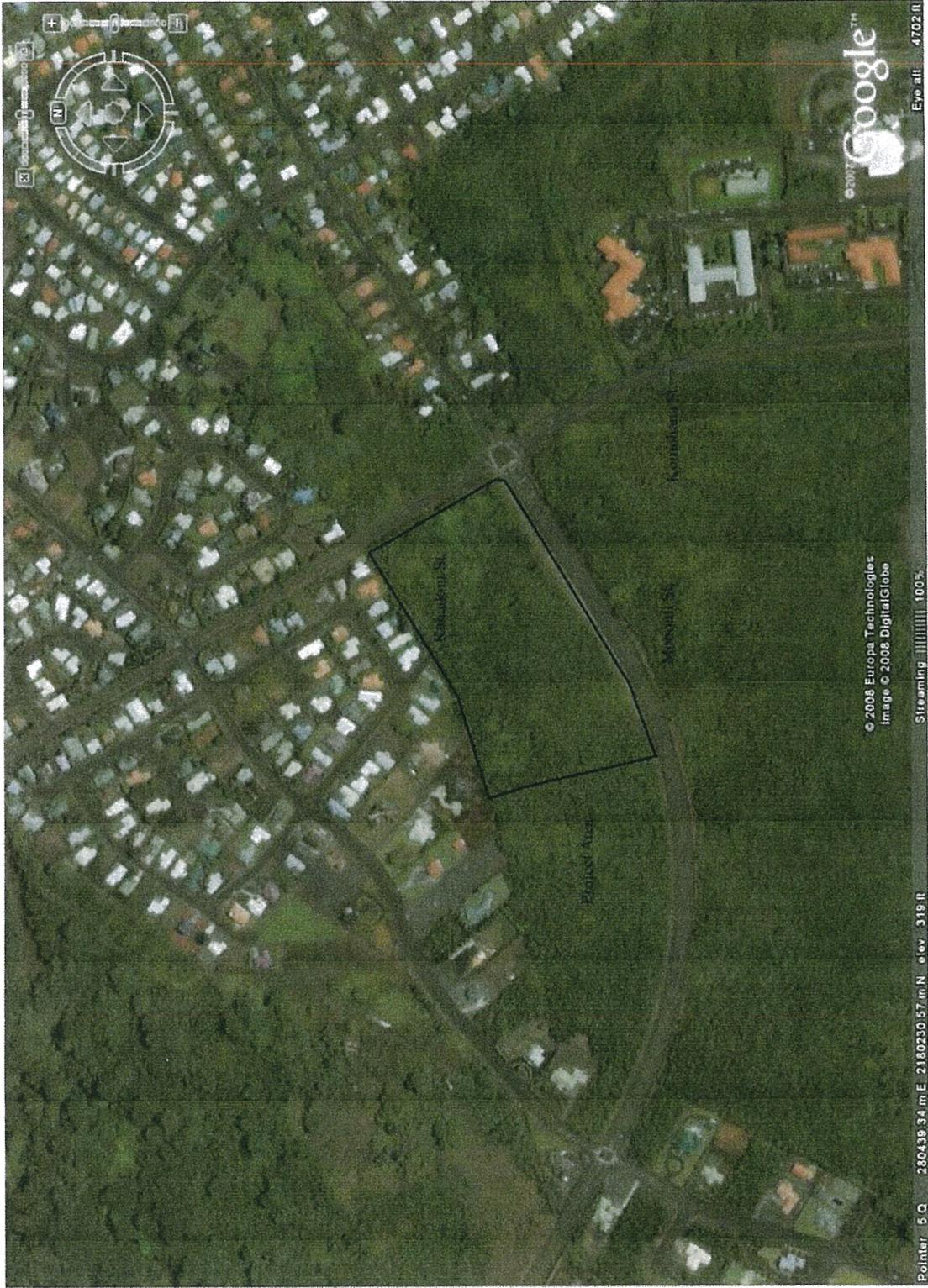


Figure 3. Project Area Overview (from Google Earth)

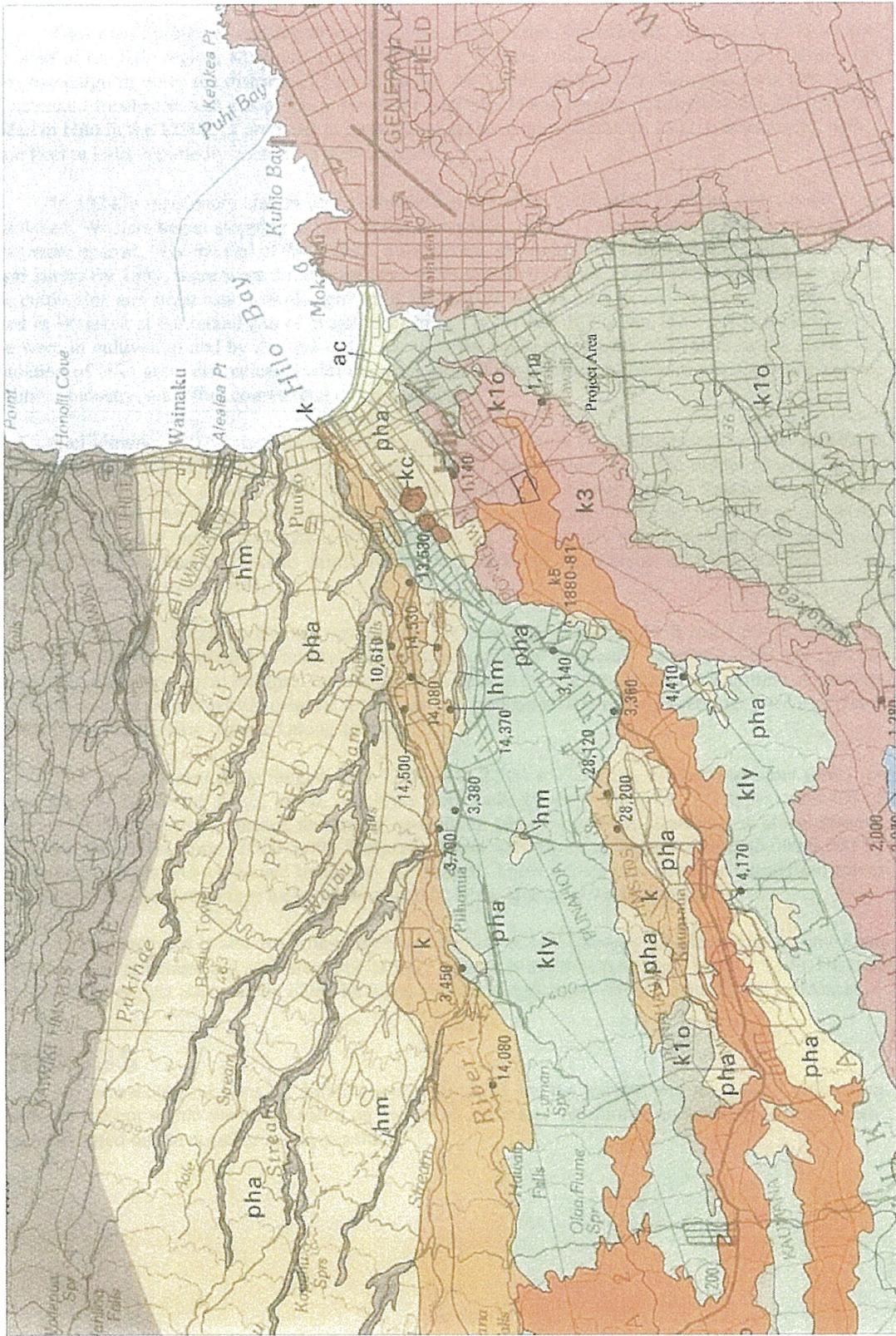


Figure 4. Portion of Wolfe and Morris (2001) Sheet 2 Lava Map showing Project Area

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 Pona-hawai 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, trails, 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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