

DRAFT ENVIRONMENTAL ASSESSMENT
FOR
PROPOSED MAUI ECONOMIC
OPPORTUNITY BEST “KE
KAHUA” FARM PROJECT

Prepared for:
Maui Economic Opportunity
99 Mahalani Street
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EXECUTIVE SUMMARY

Project Name: MEO BEST Ke Kahua Farm Project

Location: Maui Island
Wailuku
TMK: (2) 3-3-001:016 (portion)

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Project Summary: Maui Economic Opportunity, Inc. (“MEO” or “applicant”) proposes to develop and operate a farm and agricultural training center, as part of the Being Empowered and Safe Together (BEST) Reintegration Program. The MEO BEST Program will provide comprehensive transitional support services and training to prepare persons released from prison for their successful return to the community. The Program is modeled after the successful Delancey Street Project in San Francisco, California.

The project site is approximately 11.476 acres in area and is located on former agricultural land in Waiehu, Maui, as identified by Tax Map Key (2) 3-3-001:016. The project site is designated “Agricultural” and “Project District” in the Wailuku-Kahului Community

MEO BEST Ke Kahua Farm Project

Plan, classified in the State Agricultural District, and zoned County Agricultural District and County Interim.

Proposed improvements will include a farm dwelling, accessory farm dwelling, barn/greenhouse nursery building, water storage tank for irrigation purposes, onsite irrigation well, agricultural products stand, and an indigenous *hale* for gatherings and traditional cultural practices. A farm labor dwelling may be added in the future, when the farm is in full operation. Upon completion, the BEST Ke Kahua Project will contain 10 congregate residential units to house approximately 20 participants, plus a resident manager's unit.

The BEST Ke Kahua Farm will supply produce for the MEO BEST Vineyard Project at 2062 Vineyard Street that will prepare meals for MEO's Head Start Preschools on Maui and other clients.

Planning and design of this project has been funded by Maui County's Community Development Block Grant (CDBG) program. In the future, Federal, State or County funds may be used for design, construction and/or operation. Also, work may be performed within the State and County highway rights-of-way, including infrastructure and access improvements. Given the potential use of Federal, State and/or County funds and work on State or County lands, an Environmental Assessment is being prepared, in compliance with the National Environmental Policy Act (NEPA) and regulations of the Department of Housing and Urban Development (HUD) and Hawaii Revised Statutes, Chapter 343, Environmental Impact Statements.

TABLE OF CONTENTS

I. PROJECT OVERVIEW	1
A. Property Location	1
B. Existing Land Use.....	1
C. Land Ownership and Project Applicant	1
D. Proposed Action	2
E. Alternatives	4
F. Project Justification.....	5
G. Entitlements and Approvals.....	6
H. Early Consultation	7
II. AFFECTED ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES	9
A. Physical Environment	9
1. Land Use	9
2. Topography and Soils.....	10
3. Flood and Tsunami Zones	10
4. Flora and Fauna	11
5. Air and Noise Quality	12
6. Historical and Archaeological Resources.....	13
7. Visual Resources	13
8. Hazardous Substances	14
9. Agricultural Resources	14
B. Socio-Economic Environment.....	15
1. Population	15
2. Economy	16
C. Public Services.....	17
1. Recreational Facilities	17
2. Police and Fire Protection	17
3. Medical Facilities	18
4. Schools	18

MEO BEST Ke Kahua Farm Project

5. Solid Waste19

D. Infrastructure19

1. Roadways19

2. Water22

3. Wastewater23

4. Drainage24

5. Electrical and Telephone Systems25

E. Cumulative and Secondary Impacts25

III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS27

A. State Land Use District.....27

B. Hawaii State Plan27

C. State Functional Plans31

D. Maui County General Plan.....32

D. Wailuku-Kahului Community Plan34

E. County Zoning.....38

IV. SUMMARY OF UNAVOIDABLE IMPACTS ON THE ENVIRONMENT AND RESOURCES.....39

V. FINDINGS AND CONCLUSIONS.....40

VI. REFERENCES.....43

FIGURES

Figure 1	Regional Location Map
Figure 2	Tax Map Key (2) 3-5-002:011
Figure 3	Aerial Photographs
Figures 4a-b	Site Photographs
Figure 5	Conceptual Master Plan
Figure 6	Soils Map
Figure 7	Flood Map
Figure 8	ALISH Map
Figure 9	LSB Map
Figure 10	State Land Use Map
Figure 11	Community Plan Map
Figure 12	County Zoning Map

APPENDICES

Appendix A	Preliminary Agricultural Plan
Appendix B	Early Consultation
Appendix C	Preliminary Engineering Report
Appendix D	Archaeological Assessment Report
Appendix E	Cultural Impact Assessment Report
Appendix F	Traffic Impact Assessment Report
Appendix G	Botanical and Fauna Survey Reports

I. PROJECT OVERVIEW

A. Property Location

The subject property comprises 11.476 acres located in Waiehu, just north of Wailuku Town, at the intersection of Kahekili Highway and Waiehu Beach Road. See Figure 1, Regional Location Map. The parcel is identified as a portion (Lot 1-C) of Tax Map Key (2) 3-3-001:016. See Figure 2, Tax Map. The *makai* side of Kahekili Highway at the intersection of Waiehu Beach Road forms the northern boundary of the property. Waiehu Heights is located immediately to the east, while lands designated as the Piihana Project District lie to the south.

B. Existing Land Use

Historically, the subject property was farmed by Wailuku Agribusiness Co., Inc., and its forbearers for the cultivation of pineapple and sugarcane. More recently, the property was used for the cultivation of macadamia nuts. Agricultural production ceased on December 31, 1999. The property was acquired by Hawaii Land & Farming (HL&F) in 2004. HL&F formally conveyed the 11.476 acre lot to MEO in June of 2008. Agricultural operations ceased some time ago, but many macadamia nut trees still stand. The property is also occupied by overgrown cane grass and is fenced to deter the illegal dumping of appliances and automobiles. See Figure 3, Aerial Photographs, and Figures 4a-b, Site Photographs. There are no known violations on the property.

The subject property is designated “Agricultural” and “Project District” in the Wailuku-Kahului Community Plan, classified in the State Agricultural District, and zoned County Agricultural District and County Interim.

C. Land Ownership and Project Applicant

The subject property is owned in fee simple by the applicant, Maui Economic Opportunity, Inc. (MEO).

Maui Economic Opportunity, Inc., a non-profit corporation, was chartered in 1965 by federal mandate under the provisions of the Equal Opportunity Act of 1964 to manage an array of programs for the communities of Maui County. MEO oversees and administers programs in the following areas: Community Services (a human service case management and referral program for low-income individuals and families); Transportation (specialized service for elderly, disabled or disadvantaged persons, and youth); Employment and Training; Early Childhood Services (Head Start preschool, Infant/Toddler, and family services for low income families); Youth Services (teens and pre-teens); BEST Reintegration Program (serving persons returning from prison); Micro-Enterprise (business development through entrepreneurial training and small business loan program); and advocacy, including affordable housing and eradication of poverty. MEO has offices on Lanai, Molokai, and Maui and in Hana, Maui.

D. Proposed Action

The applicant proposes to develop a farm and agricultural training center, as part of MEO's Being Empowered and Safe Together (BEST) Reintegration Program. The MEO BEST Program provides comprehensive transitional support services and training to prepare persons released from prison for their successful return to the community. The Program is modeled after the successful Delancey Street Project in San Francisco, California that has operated for over 30 years. See Figure 5, Conceptual Master Plan.

Proposed improvements include a farm dwelling, accessory farm dwelling, barn/greenhouse nursery building, water storage tank for irrigation purposes, onsite irrigation well, agricultural products stand, and an indigenous *hale* for gatherings and traditional cultural practices. A farm labor dwelling may be added in the future, when the farm is in full operation. Upon completion, the BEST Ke Kahua Project will include 10 congregate residential units to house approximately 20 participants, plus

MEO BEST Ke Kahua Farm Project

accommodations for a resident manager. The proposed principal and accessory uses will comply with the provisions of MCC Article 1, Chapter 19.02 relating to Interim Provisions and MCC Article 2, Chapter 19.30A relating to the Agricultural District.

The BEST Ke Kahua Farm will cultivate a variety of vegetables (e.g. lettuce, tomato, green onion, etc.), taro, *ti* leaf, macadamia nut trees, and native drought tolerant plants for ground cover and use in *hula* and other traditional cultural practices. Importantly, the farm will supply produce for the MEO BEST Vineyard Project at 2062 Vineyard Street that will prepare meals for MEO's Head Start Preschools on Maui and other clients. The BEST Vineyard facility (formerly known as the Cabebe Store and Apartments) is currently under renovation and is slated to be operational in February 2010. The BEST Vineyard facility will contain a commercial kitchen, classroom and 10 congregate residential units to house up to 25 occupants. Program participants in the BEST Vineyard Project will have the opportunity to work and train at the BEST Ke Kahua Farm.

Land clearing and minor agricultural activities have begun, but construction of farm structures will commence following the appropriate approvals. For agricultural irrigation purposes, the applicant intends to drill an onsite well and will be filing required applications with the State Commission on Water Resources. The well will be designed to pump an average of 23,000 gallons per day at a rate of 60 gallons per minute. In addition, the applicant intends to request County service for potable water and has submitted plans with the Department of Water Supply for approval of a water lateral.

In January 2003, MEO contracted with the State Department of Public Safety (PSD) to implement the reentry program for sentenced inmates at Maui Community Correctional Center (MCCC). With grant funds from PSD, MEO established the BEST Reintegration Program to promote the successful reentry of former inmates into the community. The MEO BEST Program works in collaboration with MCCC, Probation, Parole and Maui Intake Services and the BEST Planning and Advisory Council to share in

the collective responsibility of preparing participants for their successful reintegration into the community.

Funding for the planning and design of this project was provided through a Community Development Block (CDBG) Grant. Also, MEO BEST received a grant from the Office of Hawaiian Affairs in 2008 for the BEST Ke Kahua Cultural Learning Center Project. The project is a native Hawaiian agricultural program that seeks to provide participants with hands on training in taro farming, cultivation of native plants, rock wall building and landscaping using traditional and modern techniques. The objective is to provide participants with marketable skills to enhance their employment skills and opportunities and self confidence.

The project is in the conceptual stages of design, and the site plan, architectural and landscape design, and other related plans may differ slightly from that described in the Final EA. A Preliminary Agricultural Plan has been prepared for the farm project. See Appendix A, Preliminary Farm Plan.

E. Alternatives

1. No Action

The “No Action” Alternative would preclude implementation of a successful program to assist persons released from prison. Given the percentage of repeat offenders that return to incarceration, and that Native Hawaiians are disproportionately represented in the prison population, this was deemed an unacceptable alternative.

2. Deferred Action

The “Deferred Action” Alternative would require the return of the federal monies if construction cannot begin within 18 months after

acceptable of the Final EA and was determined to be an unacceptable alternative.

3. Alternative Project

MEO contemplated other projects on the project site. Originally, the project was conceived of as a larger development with approximately 100 residents in a multi-story structure. This project would have required amendments to the Wailuku-Kahului Community Plan State Land Use District classification, and County zoning.

This project was ultimately rejected by MEO as being out of character with the setting of the surrounding area. The Proposed Project will maintain the character of the area and historic uses of the property, as well as support MEO's BEST Program.

F. Project Justification

MEO has been providing an array of services to over 20,000 people throughout the tri-isle County of Maui for over 40 years. MEO is one of only a handful of agencies—out of over 1,000 community action agencies nationwide—selected by the National Community Action Partnership to receive an Agency of Excellence Award, highlighting superior administrative operations and program excellence. This organization is well known for providing services and creating opportunities for the elderly, disabled, low-income residents, children, and to individuals incarcerated or previously incarcerated at Maui Community Correctional Center. The BEST Reintegration program serves individuals making the transition from prison to the community. Advocacy efforts work to create a better community for everyone.

MEO BEST Ke Kahua Farm Project

The applicant proposes to develop a farm and agricultural training center, as part of MEO's Being Empowered and Safe Together (BEST) Reintegration Program serving persons making the transition from prison to the community. Participants will receive comprehensive support services and training to promote successful reentry into the community. The farm will also include accommodations to house approximately 20 participants in a structured residential/work setting. The proposed BEST Ke Kahua Farm Project will support and compliment the MEO BEST Vineyard Street Project by providing produce for its food service operation that will prepare meals for MEO's Head Start Preschools and other clients.

There is a disproportionate representation of Native Hawaiians in the prison population, and the MEO BEST Ke Kahua Project will provide a nurturing learning environment that allows participants to learn marketable job skills, have access to support services, better understand their kuleana and live in a manner that is *pono* not only for themselves, but for their *ohana* and the Hawaiian community. The BEST Ke Kahua project seeks to strengthen family relationships, connect participants with the surrounding Native Hawaiian community, and reduce the recidivism rates of Native Hawaiians.

G. Entitlements and Approvals

Agricultural activities and accessory uses are permitted in the County Agricultural District, pursuant to MCC Chapter 19.30A. Implementation of the proposed improvements will require permits and approvals that may include the following: (1) Building, plumbing, electrical, grading and other construction permits from the Development Services Administration, Department of Public Works; (2) Water Use Permit and Well Drilling Permit from the State Commission on Water Resource Management for the onsite irrigation well; (3) Approval of water lateral plans and request for water meter from the County Department of Water Supply; and (4) National Pollution Discharge Elimination System (NPDES) permit from the State Department of Health.

H. Early Consultation

Early consultation for the project was sought with governmental agencies and other entities with some bearing on the proposed action. A list of those receiving early consultation requests, followed by the comments received and responses to substantive comments is included as Appendix B, Early Consultation. Additional consultation with public agencies is discussed below.

State Department of Transportation, August 17, 2007

Topics:

- a) Noted that the proposed access is located entirely within the county controlled portion of Kahekili Highway.
- b) Anticipates no significant impacts to their traffic operations.
- c) Planning drainage improvements to Waiehu Beach Road where it intersects Kahekili Highway, adjacent to the North Western boundary of the project site, which may benefit project drainage.

Maui County Department of Public Works, August 17, 2007

Topics:

- a) Approved the concept of the two-(2) access points onto Kahekili Highway.
- b) Coordination required with proposed development across the highway.
- c) Wastewater requirements.

MEO BEST Ke Kahua Farm Project

Maui County Department of Planning, August 31, 2007

Topics:

- a) Various land entitlement strategies required for project implementation.

Wai'ehu Kou 1 Community Association: Ryan 'Aikala, May 4, 2009

Wai'ehu Kou 2 Community Association: Lyn and Eddie Kahalewai, Steven and Noe Ho'opai , Jackie Ka'aihue, May 8, 2009

Wai'ehu Kou 3 Community Association: James Aki, Mel and Mary Akiona, Clement Mantalvo, May 6, 2009

Wai'ehu Kou 4 Community Association: Lyndel Tsutsui, May 6, 2009

Paukukalu Homestead Community Association, May 7, 2009

II. AFFECTED ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

A. Physical Environment

1. Land Use

Existing Conditions. The lands of the project site were formerly used for agricultural cultivation by Wailuku Agribusiness. In recent years, Wailuku Agribusiness has abandoned the cultivation of many of fields around Wailuku. The corridor running from Waiehu, through Wailuku Town and Waikapu, and down to Ma`alaea in the south, has transitioned from agricultural use to more rural residential uses.

This Waiehu parcel was previously used for the growing and harvesting of Macadamia nuts. The western boundary of the property borders the *makai* side of the Kahekili Highway at the intersection of Waiehu Beach Road and the eastern boundary abuts the Waiehu Heights residential community.

Surrounding land uses include the Waiehu Heights Subdivision to the east; the Piihana Project District, a proposed residential development, to the south; and the approved Hale Mua Residential project to the west. Other uses in the vicinity include agricultural subdivisions and the Waiehu Kou Hawaiian Homelands projects.

Potential Impacts and Mitigation Measures. The proposed farm and training center is anticipated to have a positive impact on existing land uses in the vicinity. The project site is largely overgrown and has been used as a dump site. The proposed BEST Ke Kahua Farm Project will return these lands to active agricultural use, improve the appearance of the property, and provide training opportunities and comprehensive support services for persons participating in MEO's BEST Reintegration Program.

2. Topography and Soils

Existing Conditions. A Preliminary Drainage Report was prepared for the project by Otomo Engineering, Inc. See Appendix C, Preliminary Engineering Report. This report analyzed the soils at the project site. The subject property lies within the Pulehu-Ewa-Jaucas soil association. The soils within the project site are classified as Iao clay (IaA and IaB), and Puuone sand (PZUE). See Figure 6, Soils Map. Iao clay is characterized as having slow runoff and not more than slight erosion hazard for 0 to 3 percent slopes; moderately slow permeability, medium runoff and slight to moderate erosion hazard for 3 to 7 percent slopes; and medium runoff and moderate erosion hazard for 7 to 15 percent slopes. Puuone sand permeability is moderately rapid, runoff is slow, and the hazard of wind erosion is moderate to severe for 7 – 30 percent slopes. (Soil Survey, 1972).

Potential Impacts and Mitigation Measures. Grubbing and minimal grading will be required for project implementation. If applicable, the project will comply with Chapter 20.08, Soil Erosion and Sediment Control, of the Maui County Code. An erosion control plan will be prepared to minimize soil erosion from wind and rain, and if applicable, a grading plan will be prepared and submitted for review and approval to the Development Services Administration, County Department of Public Works.

3. Flood and Tsunami Zones

Existing Conditions. The Preliminary Drainage Report analyzed the project site's flood zone hazard. According to that report, the project site is located in Flood Zone "C", an area of minimal flood hazard. See Figure 7, Flood Map. The project is not located within a tsunami zone.

Potential Impacts and Mitigation Measures. Absence of flood risk obviates the need for mitigation measures.

4. Flora and Fauna

Existing Conditions. In June 2009 Robert W. Hobdy conducted botanical and fauna surveys of the subject parcel. See Appendix G, Botanical and Fauna Survey Reports.

Botanical Survey

The vegetation on the property consists of a dense forest of macadamia nut trees with dense stands of Guinea grass in the openings along the margins. Other common species were Bermuda grass, spiny amaranth, koa haole and glycine.

A total of 84 plant species were recorded during two site visits to the property. Of these 2 were naturally occurring native Hawaiian plants, while an additional 4 native species had been recently planted as part of a landscape plan on the northern end of the property. Also planted were 5 species of Polynesian introductions. The remaining 73 plant species were a mix of non-native former crop plants, ornamentals and weeds species.

Fauna Survey

A day-time walk-through fauna survey was conducted in June 2009. Only one mammal species (Rats) was observed during two site visits to the property. While not seen during the survey, mice, Mongoose, feral cats and domestic dogs would be expected to occur within this type of habitat.

An evening survey was conducted on the property to look for any occurrence of the native Hawaiian hoary bat. No bats were detected during the survey.

Potential Impacts and Mitigation Measures. There are no known habitats of rare, endangered, or threatened species of flora or fauna located on the subject property. Project implementation is not expected to result in any adverse impacts to flora or fauna. See Appendix G, Botanical and Fauna Survey Reports.

5. Air and Noise Quality

Existing Conditions. Air quality in the Central Valley is considered relatively good. There are no point sources of air-borne emissions within proximity to the subject property. Non-point source emissions, such as automotive traffic from the adjacent highway and sugarcane burning from the nearby fields, are not significant enough to generate high concentrations of pollutants. The region's exposure to winds, which disperse pollutants, also helps maintain air quality.

Noise quality is affected primarily by traffic from the adjacent Kahekili Highway, with other area roadways also contributing ambient noise. Noise quality is relatively good.

Potential Impacts and Mitigation Measures. Construction-related activities will result in short-term impacts to air and noise quality. Best Management Practices (BMPs) will help to mitigate such impacts. Adequate dust control measures, in compliance with Section 11-60-1-33, "Fugitive Dust", of the Hawaii Administrative Rules will be implemented during all phases of construction. Construction-activities will be limited to normal daylight hours in order to limit noise impacts and adhere to the Department of Health's noise regulations for construction equipment.

Project implementation is not anticipated to result in substantive impacts to air or noise quality in the long-term.

6. Historical and Archaeological Resources

Existing Conditions. An archaeological inventory survey was performed for the subject property and a report prepared. See Appendix D, Archaeological Assessment Report. The assessment included a pedestrian survey and backhoe trenching for subsurface deposits. No surface or subsurface deposits were discovered. The report notes that the project site has been extensively disturbed through years of intensive agricultural activities.

A Cultural Impact Assessment Report was also prepared. See Appendix E, Cultural Impact Assessment Report. Based upon archival research, project site history, and a lack of response to requests to individuals, the Report concludes that there are no cultural activities associated with the site.

Potential Impacts and Mitigation Measures. No further archaeological investigation is recommended for the project site. Given the subject property's history, there is little likelihood of uncovering any archaeological deposits. However, the report recommends archaeological monitoring during construction-related activities. Thus, as a precautionary measure, an Archaeological Monitoring Plan was prepared for the project. See Appendix F, Archaeological Monitoring Plan.

There are no known cultural activities or historical associations connected with the site.

7. Visual Resources

Existing Conditions. The property is located on the eastern side of the West Maui Mountains. The project site lies below the level of Kahekili Highway to the west, and is at the bottom of a steep

embankment to the east. Only the West Maui Mountains are immediately visible to the west of the property.

Potential Impacts and Mitigation Measures. The project will have no impact on views from Kahekili Highway, or of the West Maui Mountains from Waiehu Heights Subdivision. The site plan has been designed to maintain an agricultural appearance and express the unique Hawaiian cultural and historic value of Waiehu. Aesthetically, the farm and training center will be in harmony with traditional architectural styles and provide a sense of place.

8. Hazardous Substances

Existing Conditions. The property site is not in the vicinity of any recognized environmental hazards or other hazardous substances.

Potential Impacts and Mitigation Measures. Because of the project's site agricultural history, soil testing will be performed prior to construction of farm dwellings.

9. Agricultural Resources

Existing Conditions. In 1977, the State Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawaii (ALISH). The classification system is based primarily, though not exclusively, upon the soil characteristics of the lands. The three (3) classes of ALISH lands are: "Prime", "Unique", and "Other", with all remaining lands termed "Unclassified". When utilized with modern farming methods, "Prime" agricultural lands have a soil quality, growing season, and moisture supply necessary to produce sustained crop yields economically. "Unique" agricultural lands possess a combination of soil quality, growing season, and moisture supply

to produce sustained high yields of a specific crop. “Other” agricultural lands include those that have not been rated as “Prime” or “Unique”.

The ALISH map for the project region indicates that the subject property is comprised of lands that have been defined as “Prime” agricultural lands. See Figure 8, ALISH Map. This is ideal for the farm and agriculturally based training center.

The University of Hawaii, Land Study Bureau (LSB), developed the Overall Productivity Rating, which classifies soils according to five (5) levels, ranging from “A”, representing the class of highest productivity soils, to “E”, representing the lowest productive capacity. The majority of the project site is comprised of lands designated as “B” by the LSB. See Figure 9, LSB Map.

Potential Impacts and Mitigation Measures. The project would reestablish active agricultural uses to the site and thus result in a positive impact upon agriculture in Hawaii.

B. Socio-Economic Environment

1. Population

Existing Conditions. Maui County experienced strong population growth during the past two and a half (2.5) decades. Between the 1980’s and 2005, resident population grew from 70,991 residents to 139,995. This represents a 97 percent increase (Maui County Data Book, 2006). Population growth is expected to continue with the 2030 resident population projected at approximately 199,550. Visitor counts have increased even more dramatically, with the average daily visitor count increasing from 15,363 in 1980 to 48,409 in 2005. This represents a 215 percent increase in visitors per day. Consequently, the County’s de facto population, which includes residents and visitors, grew from 85,803 in 1980 to 181,534 in 2000,

representing a 111.6 percent increase. Prison populations have been rising as well. From 1990 to 2003, inmate populations grew on the average of 12% per year, and the Maui County Correctional Center (MCCC) has been operating over-capacity for nearly a decade.

Potential Impacts and Mitigation Measures. The proposed project will not contribute to population growth. It will, rather, provide housing and training opportunities for existing residents. The farm and training center will help the participants reintegrate successfully into the Maui community and aims to reduce re-incarceration. The rehabilitative efforts of MEO's BEST Reintegration program will also increase public safety in the community.

2. Economy

Existing Conditions. Tourism and agriculture are the predominate components of Maui County's economy. Maui County hosted 2,207,826 visitors in the year 2004 and hotels experienced a 79 percent occupancy rate. In Central Maui, economic activity centers on retail sales and service establishments, including air- and water-transportation, as well as the various branches of state and county government.

Large-scale mono-crop agriculture, including sugar, pineapple, and cattle ranching, is the County's dominant agricultural land use and generates the majority of agricultural revenues. As of 2002, approximately 256,690 acres of the County were in farm use of some kind. This is a decrease from the 355,786 acres in farmland in 1992. Central Maui mirrors the county as a whole in this trend.

As of March 2009, unemployment in Maui County was 9.0 percent; this is the same as the nation-wide unemployment rate of 9.0 percent at the same period.

Potential Impacts and Mitigation Measures. The project is expected to generate short-term economic benefits in the form of construction-related employment. Long-term benefits will accrue from the increased employability of the program participants, and sales of agricultural products.

C. Public Services

1. Recreational Facilities

Existing Conditions. The Wailuku-Kahului area is serviced by several recreational facilities, such as Waiehu Park, the War Memorial Stadium Complex, featuring a 20,000-seat stadium, a gymnasium, and a swimming pool. The 110-acre Ke'opuolani Regional Park, the recently renovated and enlarged small boat launch ramp at Kahului Harbor, the Maui Botanical Garden, and several smaller parks and beaches are nearby. Also, the Wailuku Community Center is located near the project site.

Potential Impacts and Mitigation Measures. The project is not anticipated to increase demand on area recreational facilities. Residents at the BEST Ke Kahua Farm project are few and will spend most of their time at the project site. In addition, program enterprises involve numerous outdoor physical activities sufficient to accommodate the health needs of the residents.

2. Police and Fire Protection

Existing Conditions. The County of Maui's Police Department is headquartered in Wailuku. The project site is served by the Wailuku Patrol, District I. The Department of Fire Control provides fire prevention, suppression, and protection services and

is headquartered in Kahului. The project site is served by the Wailuku Station, No.1.

Potential Impacts and Mitigation Measures. In the context of the overall growth of the Wailuku-Kahului area, the proposed project is not anticipated to substantially increase demand for emergency services nor extend emergency service area limits.

3. Medical Facilities

Existing Conditions. Maui Memorial Medical Center, located in Wailuku, is the island's only acute care hospital. It is a 231 bed hospital. Various private medical offices and facilities are also located in the Wailuku-Kahului area.

Potential Impacts and Mitigation Measures. In the context of the overall growth of the Wailuku-Kahului area, the proposed project is not anticipated to substantially increase demand for medical services

4. Schools

Existing Conditions. Public education in the project area is provided by the State of Hawaii's Department of Education (DOE). The project area is located within the DOE's Baldwin Complex, which is part of the larger Baldwin-Kekaulike-Maui Complex Area. Schools in the Maui Complex include Waihee Elementary (2005 to 2006 enrollment of 784 students), Wailuku Elementary (2005 to 2006 enrollment of 875), Iao Intermediate (2005 to 2006 enrollment of 742 students), and Baldwin High School (2005 to 2006 enrollment of 1,349 students). Many of these schools are near or over ideal capacity.

Private schools in the project area include the existing Emmanuel Lutheran school, serving grades pre-K through 8 (estimated enrollment of 213 students); Christ the King, serving grades pre-K through 6 (estimated enrollment of 165 students); Victory Christian Academy, serving grades pre-K through 12 (estimated enrollment of 90 students); and St. Anthony's schools, serving grades K through 12 (estimated enrollment of 565 students).

Potential Impacts and Mitigation Measures. The proposed project is solely devoted to the training and support services for adults, and all educational pursuits will take place on-site and in collaboration with Maui Community College. Agricultural training will have a positive effect on the local economy by providing skilled agricultural workers. There are no impacts to public school facilities.

5. Solid Waste

Existing Conditions. Residential solid waste in the project area is collected by the County and delivered to the Central Maui landfill. This facility also accepts waste from private refuse collectors.

Potential Impacts and Mitigation Measures. The proposed facility will be served by a private collection service and is not anticipated to substantially impact landfill capacity.

D. Infrastructure

1. Roadways

Existing Conditions. The project site is located at the southern corner of the intersection of Kahekili Highway and Waiehu Beach Road. Kahekili Highway and Waiehu Beach Road are both two-way, two-lane undivided highways in the project vicinity, with

posted speed limits ranging from 30 to 55 miles per hour (mph). Both roads are the nearest major thoroughfares providing access to the project site. Kahekili Highway connects Upper Wailuku with the north side of the West Maui region, running from Wailuku Town in the south through Waiehu to the north, and then west, connecting to the Honoapiilani Highway near Honokohau Bay in the Lahaina region. There are currently no turn pockets or signals on Kahekili Highway near the project site. Waiehu Beach Road ends in a T-intersection with a stop sign at its junction with the Highway.

Makaala Drive is a two-way, two-lane urban roadway, approximately 1 mile south of the project site, connecting Kahekili Highway and Waiehu Beach Road with a posted speed limit of 20 mph. Makaala Drive serves residential developments East of Kahekili Highway.

A Traffic Impact Assessment Report was prepared for the project. See Appendix F, Traffic Impact Assessment Report. The TIAR analyses traffic operations in the vicinity of the subject property using Level of Service (LOS) ratings as determined by the Highway Capacity Manual—HCM 2000 methodology. This is a qualitative measurement ranging from “A” through “F” with LOS A representing ideal or free-flowing traffic operating conditions, LOS C representing average and acceptable traffic delays, and LOS F representing unacceptable or potentially congested traffic operating conditions. The LOS for the analyzed intersections was determined for both the morning (AM) and afternoon (PM) peak periods.

The TIAR analyzed the following intersections:

- a. Kahekili Highway at Waiehu Beach Road
- b. Kahekili Highway at Maka’ala Drive

MEO BEST Ke Kahua Farm Project

Table 1	Existing Levels-of-Service			
Intersection, Approach and Movement	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
<i>Kahekili Highway at Waiehu Beach Road</i>				
Southbound Left & Thru	8.9	A	8.6	A
Westbound Left & Right	52.5	F	18.3	C
<i>Kahekili Highway at Maka'ala Drive</i>				
Southbound Left	7.9	A	8.2	A
Westbound Left	22.3	C	14.0	B
Westbound Right	9.8	A	10.2	B

- c. Kahekili Highway at Hale Mua North Driveway & MEO BEST Project Driveway (a future intersection)
- d. Kahekili Highway at Hale Mua South Driveway & Waiehu Mauka Driveway (a future intersection)

The existing levels-of-service (LOS) for the study intersections are presented in Table 1 below

It should be noted that the traffic impact assessment report prepared for the Hale Mua project immediately across the highway from the Ke Kahua site advised that the Kahekili Highway/Waiehu Beach Road intersection, which currently functions at LOS F in the morning peak period, be signalized.

Potential Impacts. The proposed Ke Kahua project is estimated to generate very little traffic: 12 trips during the AM peak period and 13 in the PM peak period. The TIAR concludes that no traffic mitigation measures should be required of the project, although it does recommend coordination with the Maui Bus to see if adding a stop in the project vicinity would be advisable. It does note that background growth in the area may change the LOS of some of the study intersections. The background growth is dependant upon whether the proposed 400+ unit Hale Mau Affordable Subdivision is developed.

2. Water

Existing Conditions. A Preliminary Engineering Report was prepared for the proposed project, which analyzed existing and proposed water-service. See Appendix C, Preliminary Engineering Report. There are no existing waterlines along Kahekili Highway adjacent to the project site. There are existing 8-inch and 12-inch waterlines along Kahekili Highway to the north of the Waiehu Beach Road intersection. Both waterlines traverse onto Waiehu Beach Road from Kahekili Highway. Storage in this area is from an existing 1.0 million gallon reservoir located approximately 6,000 feet to the west of the project site at an elevation of 490 feet. The sources of water for this system are from wells located in Upper Waiehu and Waihee.

Potential Impacts and Mitigation Measures. The domestic water demand for the project is anticipated to be approximately 720 gallons per day as determined by the land area and 1,800 gallons per day as determined by the total number of units. Therefore, the 1,800 gallons per day will govern for the project. Plans for the installation of a water lateral has been prepared and submitted for review. A 3/4-inch water meter will provide domestic water for the project.

A well will be drilled onsite and a storage tank will be constructed to provide water for irrigation purposes. The well will be designed to pump an average of 23,000 gallons per day at a rate of 60 gallons per minute, which is adequate to provide for the agricultural irrigations needs of the proposed project.

In accordance with DWS standards, the fire flow demand for an agriculture land use is 500 gallons per minute for a 2-hour duration. The subject parcel was part of a Large Lot Subdivision. Some of the subdivision improvements such as water service and

fire protection were not required, until the development of the individual large lots. Fire protection for the project will be provided to meet the requirements of the Department of Water Supply and the Fire Department.

3. Wastewater

Existing Conditions. The Preliminary Engineering Report analyzed existing and proposed wastewater conditions. Refer to Appendix C. There are no existing gravity sewer lines in the immediate vicinity of the project site. The nearest wastewater facility is an existing 6-inch force main along Waiehu Beach Road, which is located approximately 900 feet away from the nearest proposed building in the project. Wastewater collected from the Wailuku and Waihee areas is transported to the Kahului-Wailuku Wastewater Reclamation Facility in Naska. According to the Wastewater Reclamation Division, County of Maui, as of December 31, 2008, the cumulative flow allocated for the facility is 6.85 million gallons per day (mgd) and the average daily flow is approximately 5.0 mgd. The design capacity of the facility is 7.9 mgd.

Potential Impacts and Mitigation Measures. The full build out of the proposed project is expected to generate a wastewater flow of 880 gallons per day. The nearest gravity sewer connection is located more than 1,500 feet from the proposed buildings in the project site. Connection to this gravity system will require a lift station for the project. Due to the distance to the wastewater system from the project site, the wastewater generated by the project will be collected by an onsite gravity sewer system and conveyed to individual wastewater systems. The individual wastewater systems will be designed, in accordance with State Department of Health regulations.

4. Drainage

Existing Conditions. The Preliminary Engineering Report analyzed existing and proposed drainage conditions. Refer to Appendix C. The western half of the project site is the developable area of the parcel. The existing ground slopes in a north to south direction from elevation 46 feet above mean sea level near the Waiehu Beach Road-Kahekili Highway intersection to elevation 120 feet above mean sea level at the southerly boundary, with an average slope of approximately 3.5%. The eastern half of the project site consists of a steep embankment up to the Waiehu Heights Subdivision. The highest point of the parcel is at the southeastern corner at an elevation of 155 feet above mean sea level.

There is an existing drainage swale located between the developable area of the parcel and the toe of the embankment. The swale runs in a south to north direction and crosses Waiehu Beach Road immediately east of the Kahekili Highway intersection via a 4-foot diameter culvert. Runoff ultimately flows into the ocean.

It is estimated that the present onsite runoff for a 50-year, 1-hour storm from the entire project site is 10.87 cfs.

Potential Impacts and Mitigation Measures. Onsite runoff from the project site will be collected by grated catch basins located at appropriate intervals along the driveways and parking areas. Runoff from the landscaped and farm areas will be collected by grassed swales. All runoff will be conveyed to an onsite detention basin which will be appropriately-sized to accommodate the increase in runoff from a 50-year, 1-hour storm. This is in accordance with Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui. Any overflow from the detention basin will sheet flow into the existing swale, as it is presently doing. There will be no increase in runoff into the existing swale due to the development of the project. It is estimated that the post

development runoff from the project site will be 13.39 cfs, with a net increase of 2.52 cfs.

In addition, it is noted that the State Department of Transportation is planning some drainage improvements to Waiehu Beach Road where it intersects Kahekili Highway, adjacent to the proposed retention basin.

5. Electrical and Telephone Systems

Existing Conditions. There are existing power, telephone, and cable television transmission facilities along Kahekili Highway.

Potential Impacts and Mitigation Measures. The proposed electrical, telephone, and cable TV distribution systems will be serviced from the existing overhead facilities along Kahekili Highway. Within the project site, all distribution systems will be installed underground. Lighting requirements will be determined by the electrical engineer.

E. Cumulative and Secondary Impacts

Cumulative impacts are defined as the impact on the environment, which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

The proposed project is not part of a larger action. There are no direct community growth impacts resulting from or occurring with the project.

Secondary impacts are those that have the potential to occur later in time or farther in distance, but which are reasonably foreseeable. They can be viewed as actions of others that are taken because of the presence of the project. Secondary impacts from highway projects, for example, can occur

MEO BEST Ke Kahua Farm Project

because they can induce development by removing transportation impediments to growth.

There are no foreseeable secondary impacts associated with the proposed project. It will not contribute to population growth, nor will it place additional burden upon infrastructure or the environment.

III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

A. State Land Use District

Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes four (4) major land use districts in which all lands in the state are placed. These districts are designated as “Urban”, “Rural”, “Agricultural”, and “Conservation”. The subject property is located entirely within the State Agricultural District. See Figure 10, State Land Use Map.

Analysis. The proposed MEO BEST Ke Kahua Farm is compatible with the Agricultural District and its permissible uses, including active farming, farm dwellings, agricultural storage, and a roadside produce stand. §205-4.5(a) (4) permits “[f]arm dwellings, employee housing, farm buildings, or activities or uses related to farming and animal husbandry.

B. Hawaii State Plan

Chapter 226, Hawaii Revised Statutes establishes a State Plan to help direct development within the State of Hawaii. As stated in Section 226-1:

The purpose of this chapter is to set forth the Hawaii state plan that shall serve as a guide for the future long-range development of the State; identify the goals, objectives, policies, and priorities for the State; provide a basis for determining priorities and allocating limited resources, such as public funds, services, human resources, land, energy, water, and other resources; improve coordination of federal, state, and county plans, policies, programs, projects, and regulatory activities; and to establish a system for plan formulation and program coordination to provide for an integration of all major state, and county activities.

Analysis. The proposed project is in accord with the following State Plan Objectives and Policies:

Sec. 226-6 Objective and policies for the economy--in general.

The goal of this project is to establish a farm and provide a training program required to allow for successful integration of participants into the Maui work force. Training workers locally will help reduce the number of workers imported from the mainland or other islands and support Maui's economy, lower unemployment rates, and improve regional income levels.

Creation of this farm and training center will provide short-term economic benefits in construction related operations, and long-term economic benefit to maintaining the BEST House Reintegration Program.

Sec. 226-7 Objectives and policies for the economy--agriculture.

The farm and training center is agriculturally based. The primary agricultural products will be vegetable crops and *taro* for the BEST Vineyard Project and *ti* and other native plants for use by the BEST program halau and sale to other hula groups and the community. Land will be maintained in agricultural use, and participants will gain farming skills and experience that will be useful in the job market.

Sec. 226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources.

The MEO BEST House will keep the subject property in agricultural uses and the farm will preserve the agricultural character of the site in this rapidly developing area.

Sec. 226-21 Objective and policies for socio-cultural advancement—education.

Participants will gain experience in agricultural work and other skills to enhance opportunities for future employment.

MEO BEST Ke Kahua Farm Project

Collaborations with Maui Community College will afford residents the opportunity to seek college degrees or course work. As most inmates gain their GED while incarcerated, higher education will be made available to the residents of the BEST Program.

Each resident will gain marketable skills before graduating from the program. Self-sufficiency is encouraged. Classes and group activities will include cognitive restructuring, life skills training, financial planning and management, and other activities designed to support reintegration.

Sec. 226-22 Objective and policies for socio-cultural advancement—social services.

MCCC has been operating over capacity for more than ten years. Crime rates in Maui are not dropping, yet resident population is growing rapidly. The need for social rehabilitation of previously incarcerated individuals is great. MEO BEST Program is a rehabilitative program based on San Francisco's Delancy Street Foundation, which has seen great success over its 30 year history.

Delivery of this program will provide Maui with a vastly beneficial social service.

Sec. 226-24 Objective and policies for socio-cultural advancement—individual rights and personal well being.

"Being Empowered and Safe Together", the name of the program, epitomizes this objective. The BEST Program promotes and positively guides the cherishing of individual rights and personal well being. Beyond teaching skills for future employment, the goal of this program is successful social rehabilitation for each participant through job training and comprehensive support services.

Social skills are an integral part of this process and related training will take place throughout the day. The common dining room allows residents and staff to share meals and is an ideal time for these activities.

MEO BEST Ke Kahua Farm Project

Breakfast will include building vocabulary and cognitive reasoning through ‘word of the day’ and ‘concept of the day’ exercises. Dinner will include regular discussions of current events and news articles. Each individual will be encouraged to engage in improving their social skills by learning to talk with each other during meals and learning to feel comfortable in social situations.

The project is based on the model of a healthy family. Each member is expected to care for and educate one incoming resident in all facets of life in the Reintegration Program. The task can be as simple as learning to read to the level of the teacher, or can be as complicated as learning a marketable skill such as maintenance, accounting, or sales. Delancey’s motto is “Each one, teach one”. Each person will be responsible for the next person that enters the community as a resident.

By socializing with each other and teaching and caring for each other, the residents will learn to consider the feelings of others and more accurately assess their own feelings and needs. Personal well being and respecting individual rights is the goal of each individual for himself and for his fellow participants.

Sec. 226-25 Objective and policies for socio-cultural advancement—culture.

Hawaiian culture is important to the structure of the educational program and physical design of the property.

Individuals selected for the program are required to learn about Hawaiian history and culture. Participants will learn about the history and customs of many cultures, with a focus on Hawaiian cultural values, language, dance and music, and agricultural practices.

The property design will be similar to a traditional Hawaiian village and will preserve the natural beauty of the land. Lightly-forested with macadamia nut trees, along with patches of taro and ti, this property will be a cultural inspiration to the residents and surrounding community. The production of native Hawaiian products, the cultural based

education, and hula performances make this center a living example of Hawaiian history.

Sec. 226-26 Objective and policies for socio-cultural advancement—public safety. The training center will help participants reintegrate successfully into society and aims to reduce MCCC's inmate by population by lowering recidivism rates. Educating and providing job training to previously incarcerated Maui residents will increase public safety in the community.

C. State Functional Plans

Chapter 226 further provides for the production of Functional Plans, which identify needs, problems, and issues and recommend policies and priority actions to address the areas of concern. The proposed reclassification request is in accord with the following State Functional Plans:

State Agriculture Functional Plan

The proposed BEST Ke Kahua Farm project would revive fallow agricultural land and re-establish active agricultural activity, therefore supporting agricultural production within the State of Hawaii and Maui County.

State Education Functional Plan

The agricultural training program provides needed job skills and experience for the members of our community that need a second chance. In so doing, it is in accord with the ultimate goals of the Education Functional Plan.

D. Maui County General Plan

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long-range development of the County. As stated in the Maui County Charter:

The general plan shall indicate desired population and physical development patterns for each island and region within the county; shall address the unique problems and needs of each island and region; shall explain the opportunities and the social, economic, and environmental consequences related to potential developments; and shall set forth the desired sequence, patterns, and characteristics of future developments. The general plan shall identify objectives to be achieved, and priorities, policies, and implementing actions to be pursued with respect to population density, land use maps, land use regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design, and other matters related to development.

Analysis. The proposed farm and training center is in accordance with applicable Objectives and Policies of the Maui County General Plan. Creation of a training center will help meet the social needs of this community and career training will provide improved educational opportunities to help program participants better understand themselves and their surroundings and help them realize their ambitions. The conceptual plan for agricultural use and the BEST Program emphasis exemplifies the unique Hawaiian cultural and historic value of Waiehu.

The proposed action is in accord with the following General Plan objectives and policies:

I. POPULATION, LAND USE, THE ENVIRONMENT AND CULTURAL RESOURCES

D. CULTURAL RESOURCES

Objective:

1. To preserve for present and future generations the opportunity to know and experience the arts, culture and history of Maui County.

Policy:

- a. Expand the opportunity for all age groups to experience and participate in the arts.

II. ECONOMIC ACTIVITY

A. GENERAL

Objective:

2. To provide a balance between visitor industry employment and non-visitor employment for a broader range of employment choices for the County's residents.

Policy:

- a. Encourage industries that will utilize the human resources available from within Maui County rather than having to import workers.

V. SOCIAL INFRASTRUCTURE

B. RECREATION AND OPEN SPACE

Objective:

2. To provide a wide range of recreational, cultural and traditional opportunities for all our people.

Policy:

- d. Foster an increased awareness of the ethnic and cultural heritage of our people.

D. EDUCATION

Objective:

1. To provide Maui residents with continually improving quality educational opportunities which can help them better understand

themselves and their surroundings and help them realize their ambitions.

Policy:

- a. Support educational and training programs that will equip our people with knowledge and skills that can be utilized in our basic industries...
- d. Encourage the development of a wide range of informal educational and cultural programs for people of all ages.

E. PUBLIC SAFETY

Objective:

- 1. To create an atmosphere which will convey a sense of security for all residents and visitors and aid in the protection of life and property.

Policy:

- a. Provide a wide range of social programs to help eliminate conditions that lead to crime and social disorder.

F. SPECIAL PROGRAMS

Objective:

- 1. To create a community in which the needs of all segments of the population will be recognized and met.

D. Wailuku-Kahului Community Plan

Within Maui County, there are nine (9) community plan regions. From a General Plan implementation standpoint, each region is governed by a community plan which sets forth desired land use patterns, as well as goals, objectives, policies, and implementing actions for a number of functional areas including infrastructure-related parameters. The subject property is located within the Wailuku - Kahului Plan region. The Community Plan was adopted in 1987, amended in 1992, and recently updated in 2002.

The Community Plan designation for the majority of the subject property is “Agricultural”. A small southern portion is designation ‘Project District’. See Figure 11, Community Plan Map. When the subject property was donated to MEO, Hawaii Land & Farming had intended only to donate lands designated “Agricultural” to MEO. Due to a mapping error, this small area of “Project District” was also conveyed.

Analysis. The proposed project is in accordance with guidance of the Wailuku-Kahului Community Plan, which establishes that the requirements and procedures of Chapter 205, HRS shall apply to lands designated “Agricultural.” It is noted that no development is proposed for the remnant piece designated “Project District”.

The proposed action is in accord with the following General Plan objectives and policies:

ECONOMIC ACTIVITY

Goal

A stable and viable economy that provides opportunities for growth and diversification to meet long-term community and regional needs and in a manner that promotes agricultural activity and preserves agricultural lands and open space resources.

Objectives and Policies

1. Support agricultural production so agriculture can continue to provide employment and contribute to the region’s economic well-being.

ENVIRONMENT

Goal

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

Objectives and Policies

1. Preserve agricultural lands as a major element of the open space setting that which borders the various communities within the planning region. The close relationship between open space and developed areas is an important characteristic of community form.

6. Encourage the use of siltation basins and other erosion control features in the design of drainage systems.

CULTURAL RESOURCES

Goal

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

1. Provide a sense of history and define a sense of place for the Wailuku-Kahului region; and
2. Preserve and protect native Hawaiian rights and practices customarily and traditionally exercised for subsistence, cultural and religious purposes in accordance with Article XII, Section 7, of the Hawaii State Constitution, and the Hawaii Supreme Court’s PASH opinion, 79 HAW. 425 (1995).

Objectives and Policies

3. Protect and preserve historic, cultural and archaeological sites and resources through on-going programs to identify and register important sites, and encourage their restoration. This shall include structures and elements that are a significant and functional part of Hawaii’s ethnic and cultural heritage.

SOCIAL INFRASTRUCTURE – SOCIAL SERVICES/HEALTH

Goal

Develop and maintain an efficient and responsive system of public services which promotes a safe, healthy and enjoyable lifestyle, accommodates the needs of young, elderly, disabled and disadvantaged persons, and offers opportunities for self-improvement and community well-being.

Objectives and Policies

4. Continue to assess the social needs in the community and facilitate a coordinated response in the delivery of social services and programs for young, elderly, disabled and disadvantaged persons.

LAND USE

Goal

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

Objectives and Policies

1. Ensure that adequate lands are available to support the region's present and future agricultural activities.

5. Encourage traditional Hawaiian agriculture, such as taro cultivation, within the agricultural district, in areas which have been historically associated with this cultural practice.

10. All zoning applications and/or proposed land uses and developments shall conform with the planned use designations, as specified in the adopted Community Plan Land Use Map, and be consistent with the Community Plan policies.

14. Maintain physical separation between traditional towns and villages in the region. Where possible, provide specific design or landscape elements, such as open space buffers or changes in streetscape, to clearly delineate the boundary between Kahului and Wailuku. Maintain open space around traditional rural areas, such as Waikapu and Waihe'e, to provide a sense of community and to prevent envelopment of these areas by urban expansion.

15. Provide a substantial greenway or greenbelt to serve as a buffer zone, line of demarcation, or definition between Wailuku and Waikapu, and between Waikapu and Ma`alaea, in order to prevent the continuation of urban sprawl. Changes in streetscapes could include landscaping and agricultural planting materials that reflect the character of each community, and are utilized to delineate a substantial boundary between Kahului and Wailuku.

INFRASTRUCTURE – DRAINAGE

Goal

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

Objectives and Policies

2. Respect natural drainage ways as part of good land development.

E. County Zoning

The property is zoned “Agricultural” and “Interim” by the County of Maui. The purpose of this zoning district is to promote agricultural development, preserve and protect agricultural resources, and support the agricultural character and components of the County’s economy and lifestyle. See Figure 12, County Zoning Map.

Analysis. The proposed project is in accordance with requirements of Chapter 19.30A, Agricultural District, Maui County Code, which permits agriculture, farm dwellings, storage, and produce stands.

IV. SUMMARY OF UNAVOIDABLE IMPACTS ON THE ENVIRONMENT AND RESOURCES

Construction-related activities will generate moderate, unavoidable, short-term impacts. Once the construction is completed, the project is not anticipated to have substantial adverse impacts upon the environment or residents of the area.

The project will require the irretrievable commitment of time, energy, and land.

V. FINDINGS AND CONCLUSIONS

The “Significance Criteria”, Section 12 of the Administrative Rules, Title 11, Chapter 200, “Environmental Impact Statement Rules”, were reviewed and analyzed to determine whether the proposed project will have significant impacts to the environment. The following analysis is provided.

1. **No Irrevocable Commitment to Loss or Destruction of Any Natural or Cultural Resources Would Occur as a Result of the Proposed Project**

The proposed project will revive the agricultural uses of the subject property and utilize this land as a natural resource.

2. **The Proposed Action Would Not Curtail the Range of Beneficial Uses of the Environment**

The subject property has been used for agricultural activities by several previous owners. There would be no consequent curtailment of uses of the environment.

3. **The Proposed Action Does Not Conflict with the State’s Long-Term Environmental Policies or Goals or Guidelines as Expressed in Chapter 344, Hawaii Revised Statutes**

The state’s Environmental Policy and Guidelines are set forth in Chapter 344, Hawaii Revised Statutes (HRS). The proposed action is in consonance with the policies and guidelines of Chapter 344, HRS.

4. **The Economic or Social Welfare of the Community or State Would Not Be Substantially Affected**

The proposed action would recognize the validity of the rights of long-time residents of the community. The construction of this farm and training center would have a slight impact on the local economy during the construction. In the long term, the project will have positive impacts to economic welfare by providing jobs for instructors and staff, and training to Maui’s labor force. Social welfare will be improved by reducing recidivism rates and raising public safety.

5. **The Proposed Action Does Not Affect Public Health**

No impacts to public health are anticipated to result from the proposed project.

6. **No Substantial Secondary Impacts, Such as Population Changes or Effects on Public Facilities are Anticipated**

No secondary impacts to population or effects upon public services, such as police, fire, medical, educational, or waste collection services are anticipated.

7. **No Substantial Degradation of Environmental Quality is Anticipated**

The proposed action will have no substantial impact to environmental quality.

8. **The Proposed Project Does Not Involve a Commitment to Larger Actions, Nor Would Cumulative Impacts Result in Considerable Effects on the Environment**

The proposed action involves the construction of farm and agricultural training center and will not involve a commitment to larger actions. This project will not have cumulative impacts resulting in considerable effects on the environment.

9. **No Rare, Threatened, or Endangered Species or Their Habitats Would Be Adversely Affected by the Proposed Action**

There are no rare, endangered, or threatened species within the project vicinity and none are anticipated to be impacted by the action.

10. **Air Quality, Water Quality, or Ambient Noise Levels Would Not Be Detrimentially Affected by the Proposed Project**

During the construction of the project building and other improvements, there may be short-term impacts to air and noise quality. Best Management Practices (BMP's) can reduce these short term impacts, which will not extend into the long term.

11. The Proposed Project Would Not Affect Environmentally Sensitive Areas, Such as Flood Plains, Tsunami Zones, Erosion-prone Areas, Geologically Hazardous Lands, Estuaries, Fresh waters, or Coastal Waters.

The subject property is located approximately 1,500 feet from the shoreline. The construction of the training center on the property will not impact the coastal waters. There are no wetlands in proximity and the property is an area of minimal flooding.

12. The Proposed Action Would Not Substantially Affect Scenic Vistas and Viewplanes Identified in County or State Plans or Studies

The proposed action would have no impact on vistas or viewplanes.

13. The Proposed Action Would Not Require Substantial Energy Consumption

The proposed project would not require a substantial commitment of energy. The project construction would involve the short term commitment of fuel for equipment, vehicles, and machinery during construction activities. However, this is not anticipated to result in any substantial consumption of energy.

Based on the foregoing findings, the conclusion reached is that the proposed action will not result in any significant impacts.

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Figures

Project Site

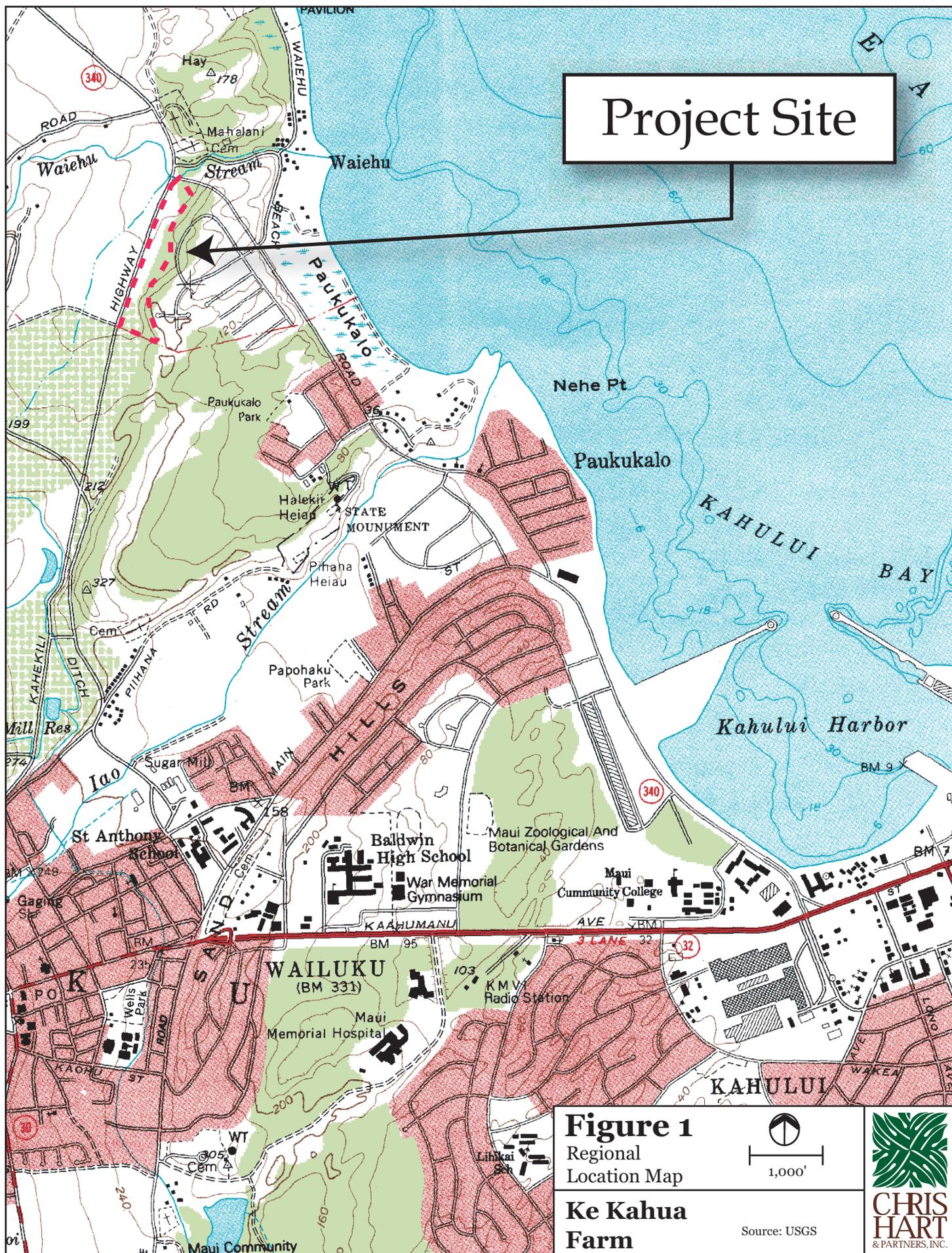
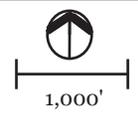


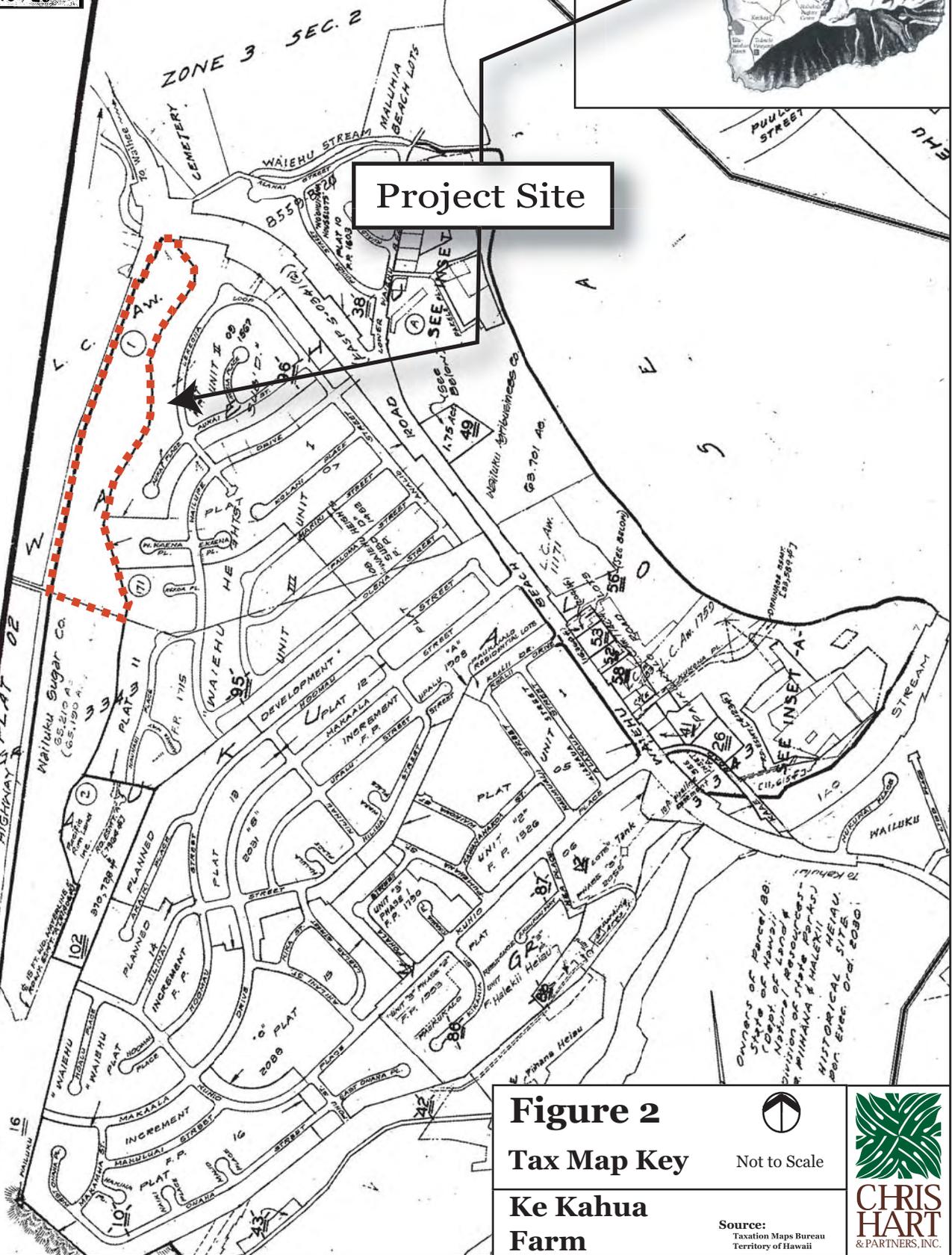
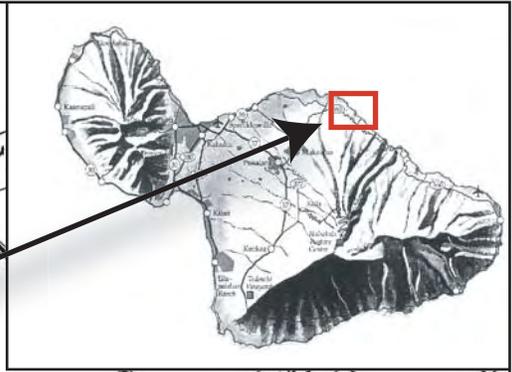
Figure 1
Regional
Location Map
**Ke Kahua
Farm**



Source: USGS



TAXATION MAPS BUREAU		
TERRITORY OF HAWAII		
TAX MAP		
SECOND DIVISION		
ZONE	SEC.	PLAT
3	3	01
CONTAINING PARCELS		
SCALE: AS NOTED		



Project Site

Figure 2

Tax Map Key



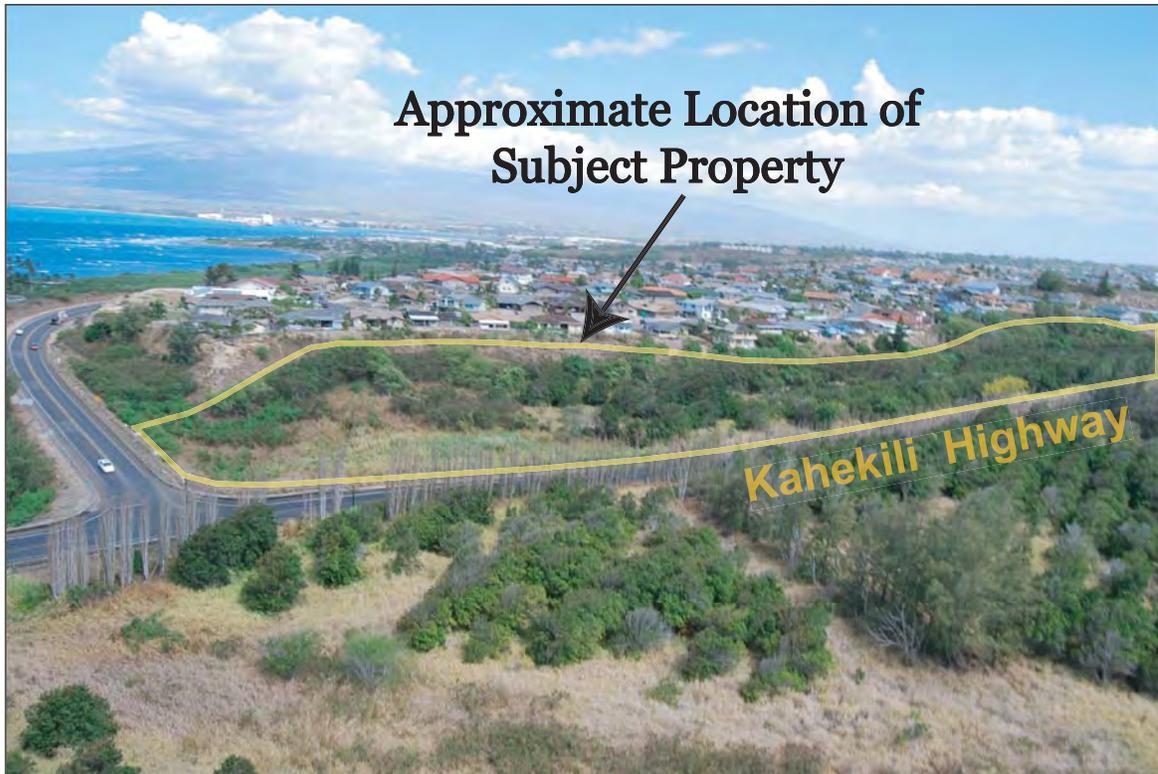
Not to Scale

Ke Kahua Farm

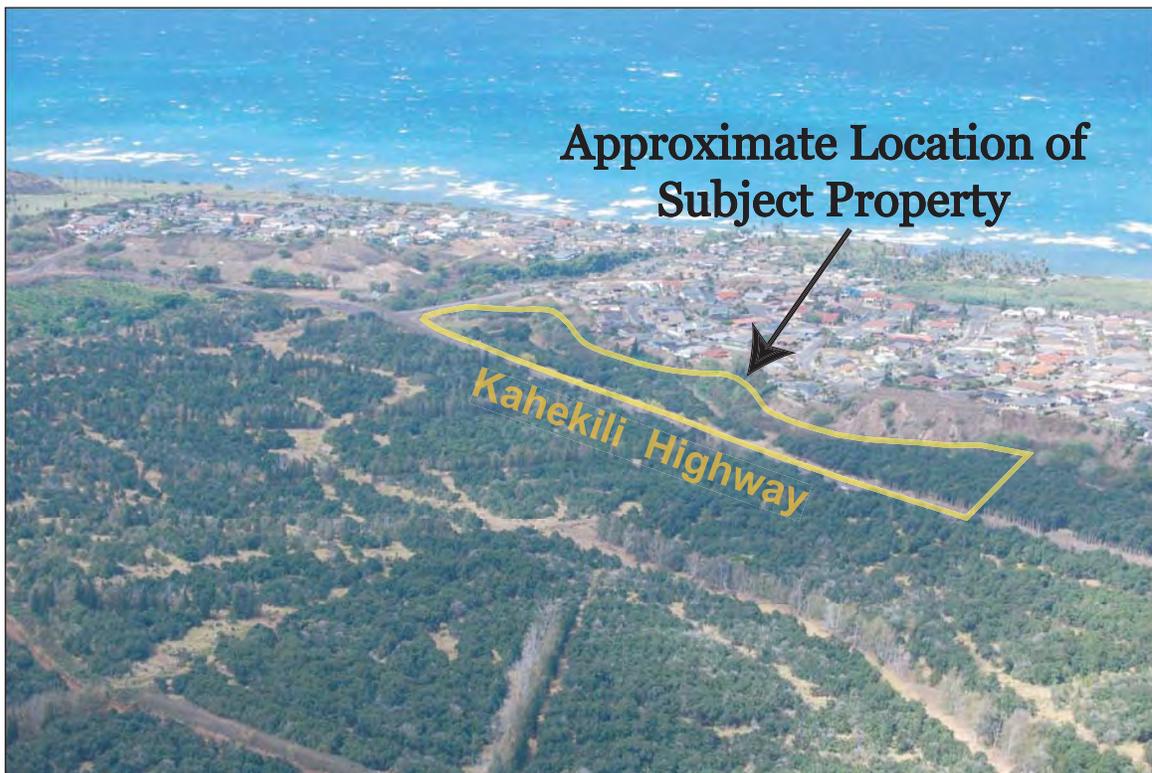
Source:
Taxation Maps Bureau
Territory of Hawaii



CHRIS HART
& PARTNERS, INC.



A Southeastern aerial view of subject property



B Eastern aerial view of subject property from southwest

Figure 3

Aerial Photos

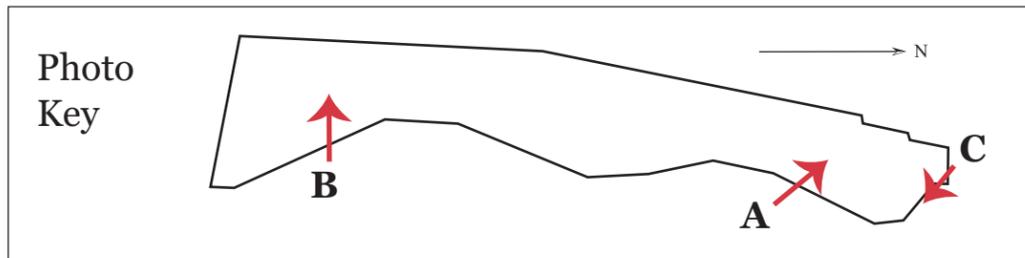


**Ke Kahua
Farm**





A Northwestern View Across Subject Property to Intersection of Kahekili Highway and Waiehu Beach Road



B Western View Across Southern End of Subject Property



C Southeastern View Looking Toward Waiehu Heights

Figure 4
Site Photos



**Ke Kahua
Farm**



ORIGINS OF LAND USE

	BUILDING COVERAGE	0.312 acres	
	CULTIVATED ACREAGE	6.199 acres	} 6.815 acres
	CULTIVATED PORTION OF DRAINAGE	0.616 acres	
	DRAINAGE AREA	2.829 acres	
	LANDSCAPED AREA	0.759 acres	
	ROADWAY ASPHALT	0.376 acres	
	ROADWAY GRAVEL/DIRT	0.368 acres	
	WATER TANK	0.018 acres	
		<u>11.476 acres</u>	

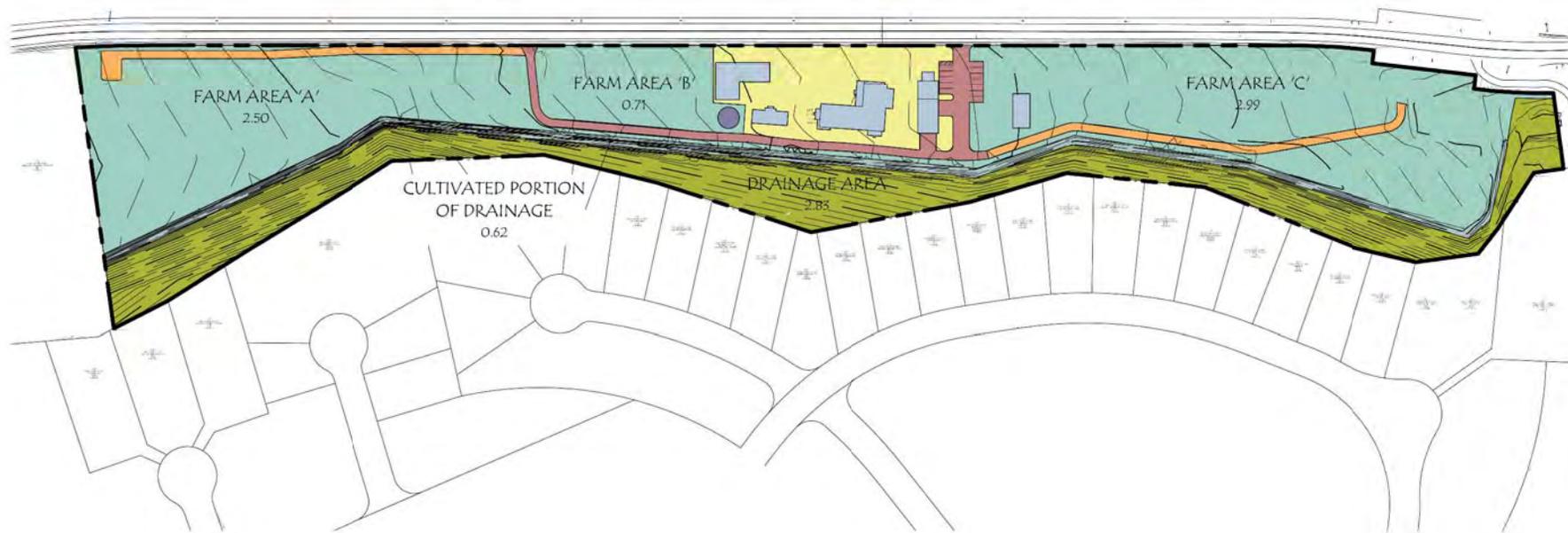


Figure 5

Conceptual Site Plan

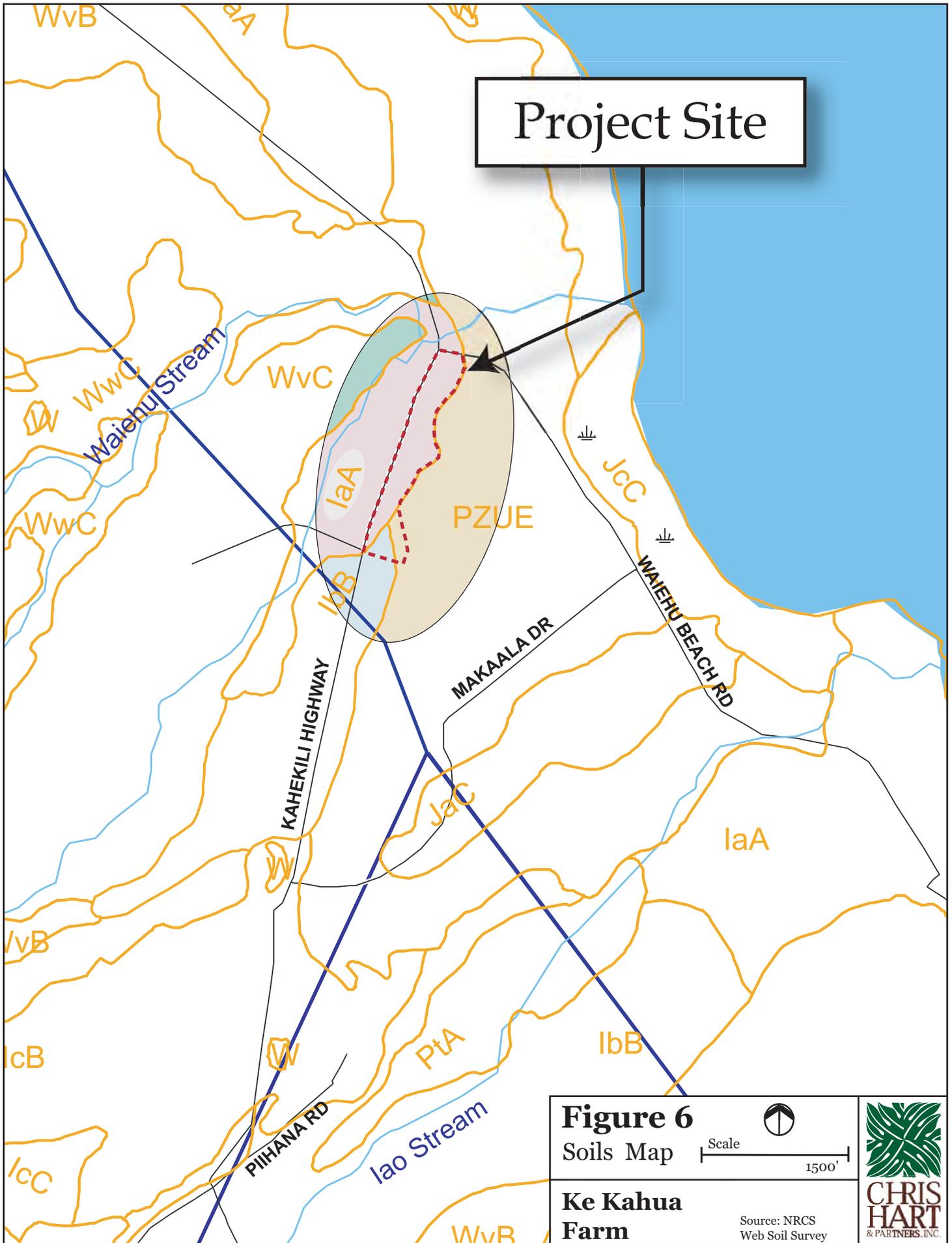


Ke Kahua Farm

Source: Maui Architecture Group



CHRIS HART & PARTNERS, INC.



Project Site

Figure 6

Soils Map



Scale
1500'



Ke Kahua Farm

Source: NRCS
Web Soil Survey

CHRIS HART
& PARTNERS, INC.

Legend

- Prime
- Unique
- Other
- Unclassified

Project Site

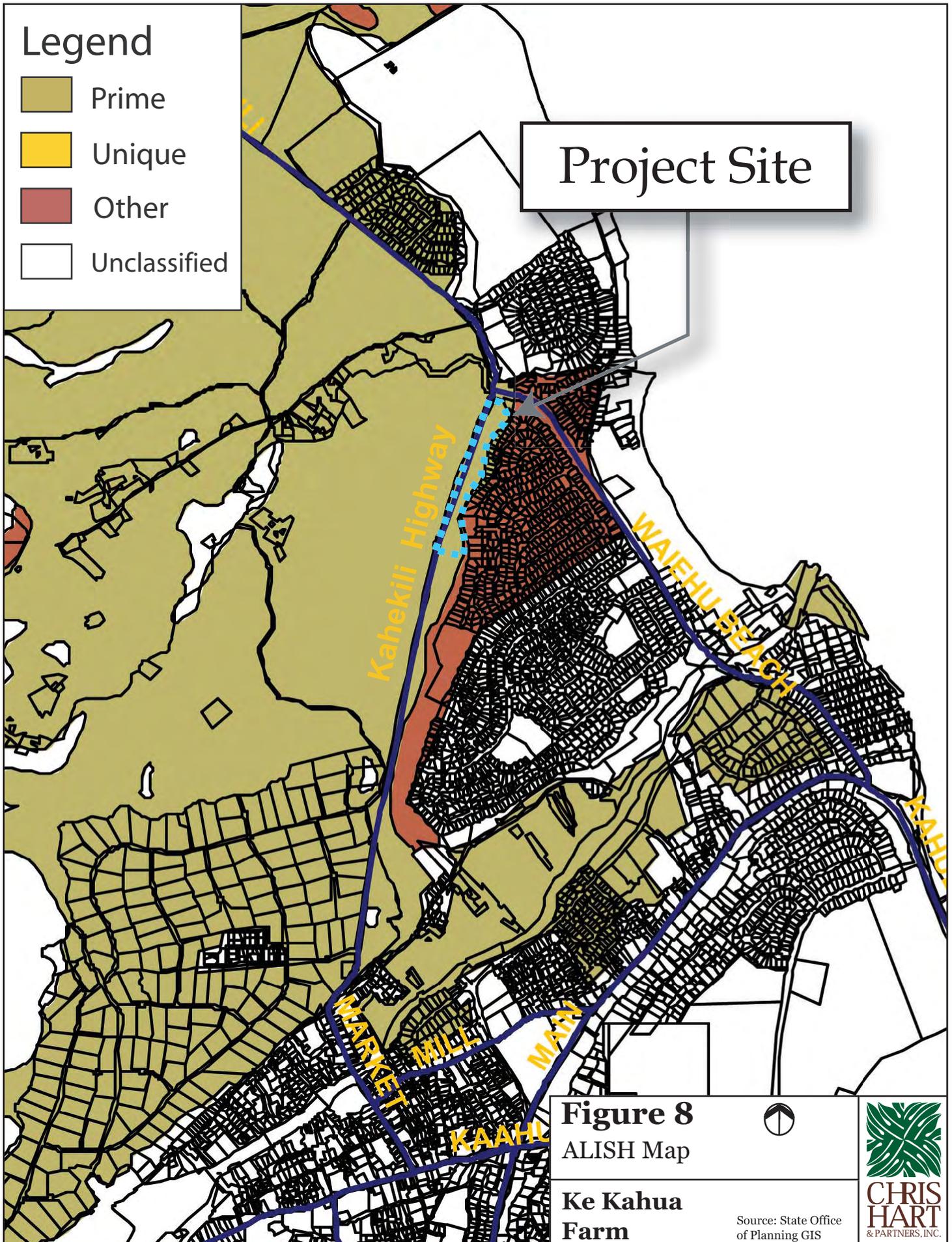


Figure 8

ALISH Map

Ke Kahua Farm

Source: State Office of Planning GIS



Legend

- A
- B
- C
- D
- E
- Unclassified

Project Site

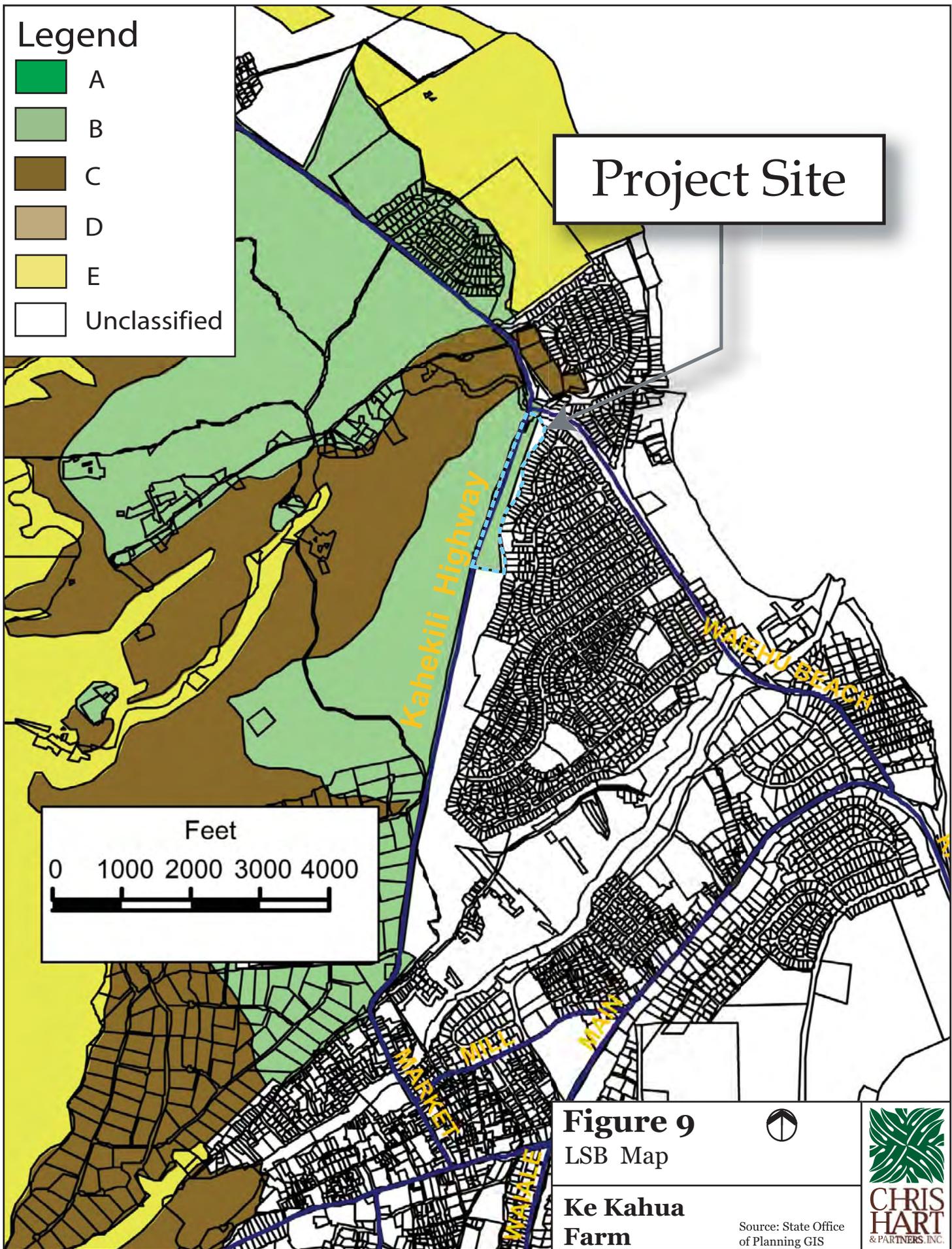


Figure 9

LSB Map

Ke Kahua Farm

Source: State Office of Planning GIS



Legend

- URBAN
- AGRICULTURAL
- RURAL
- CONSERVATION

Project Site

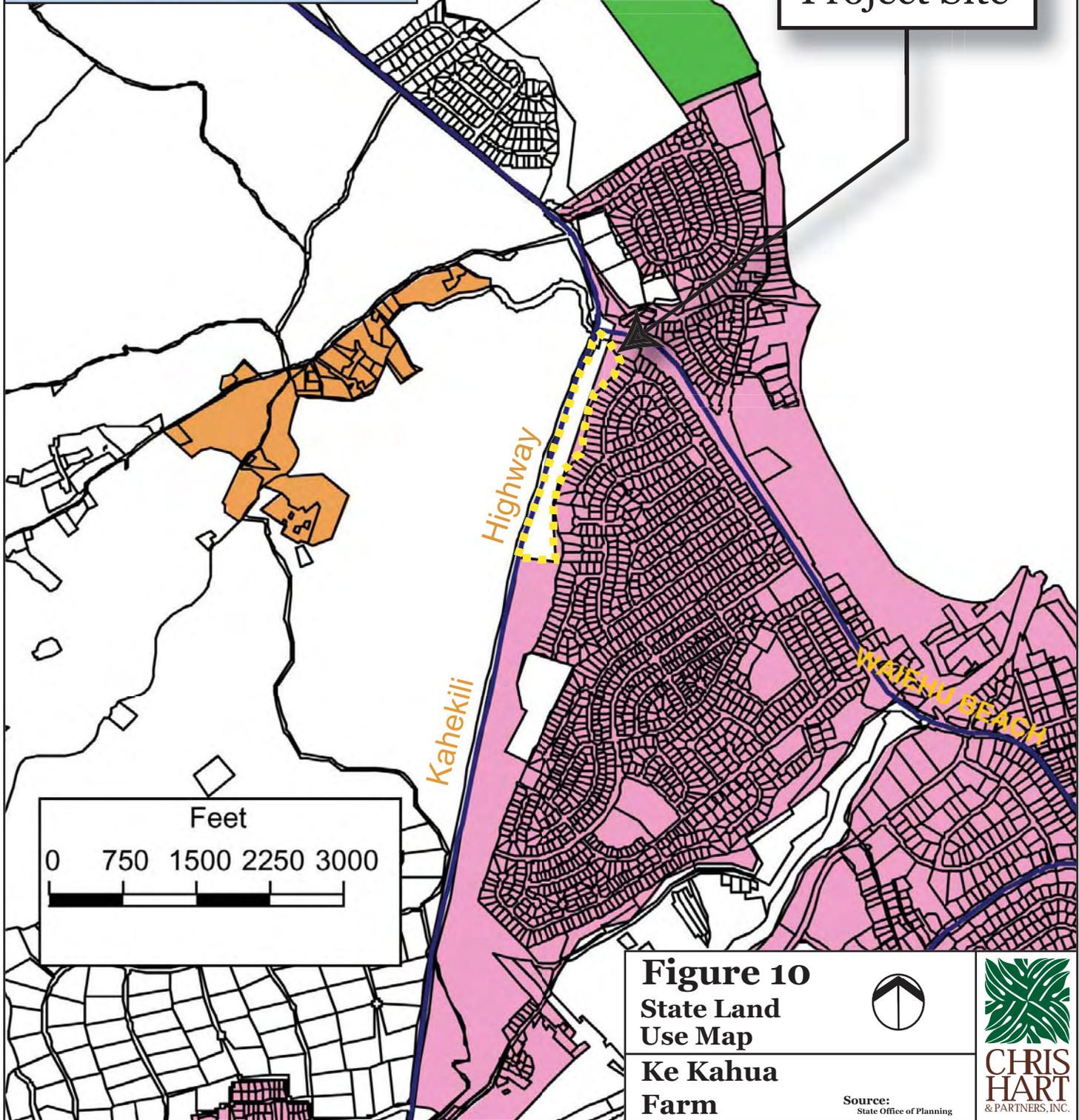


Figure 10
State Land Use Map
Ke Kahua Farm

Source:
State Office of Planning



LEGEND

AG	Agriculture
R	Rural
SF	Single Family Residential
MF	Multi-Family Residential
B	Business/Commercial
BR	Business/Multi-Family
BI	Business/Industrial
LI	Light Industrial
HI	Heavy Industrial
H	Hotel
P	Public/Quasi-Public
PK	Park
OS	Open Space
PD	Project District
A	Airport
C	Conservation
SB/R	Service Business / Residential



Project Site

Figure 11
Community
Plan Map

Ke Kahua
Farm



Not to Scale

Source:
Maui County
Planning Department



LAND ZONING LEGEND

- 1. RESIDENTIAL DISTRICTS
 - A. CLASS R-1 6,000 SQ. FT.
 - B. CLASS R-2 7,500 SQ. FT.
 - C. CLASS R-3 10,000 SQ. FT.
- 2. APARTMENT DISTRICTS
 - A. CLASS A-2 TWO FAMILY ZONE (DUPLEX ZONE)
 - B. CLASS A-3 APARTMENT HOUSE
- 3. HOTEL DISTRICT
- 4. BUSINESS DISTRICTS
 - A. B-1 DISTRICT (NEIGHBORHOOD BUSINESS ZONE)
 - B. B-2 DISTRICT (REGIONAL BUSINESS ZONE)
 - C. B-3 DISTRICT (GENERAL BUSINESS ZONE)
- 5. INDUSTRIAL DISTRICTS
 - A. M-1 LIGHT INDUSTRIAL ZONE
 - B. M-2 HEAVY INDUSTRIAL ZONE
 - C. SPECIAL USE INDUSTRIAL ZONE
- 6. AIRPORT DISTRICT
- 7. AGRICULTURAL DISTRICT**
- 8. FARMING DISTRICT
- 9. OFF-STREET PARKING & LOADING
- 10. CIVIC IMPROVEMENT DISTRICT

Off the Map

Project Site

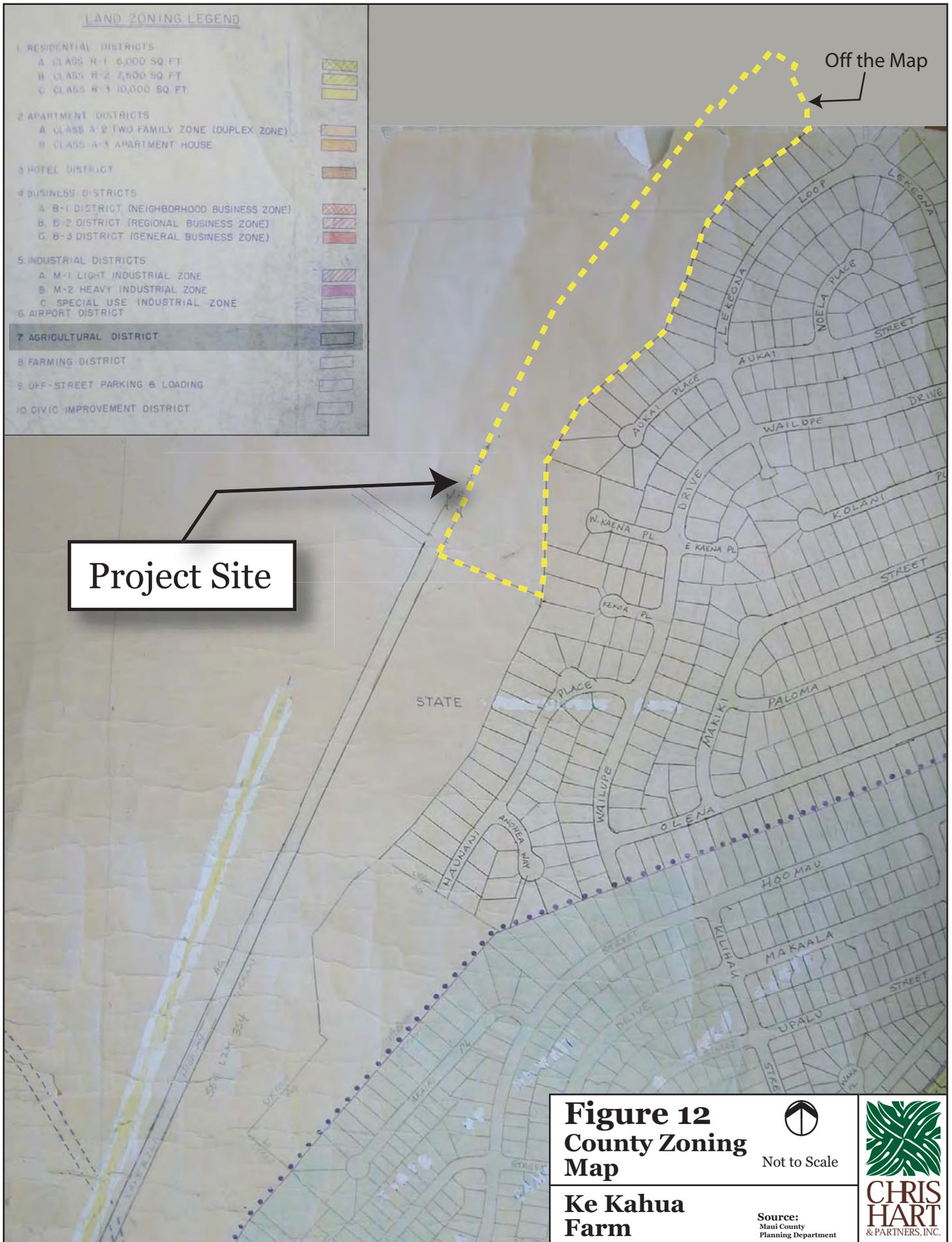


Figure 12
County Zoning
Map



Not to Scale

Ke Kahua
Farm

Source:
Maui County
Planning Department

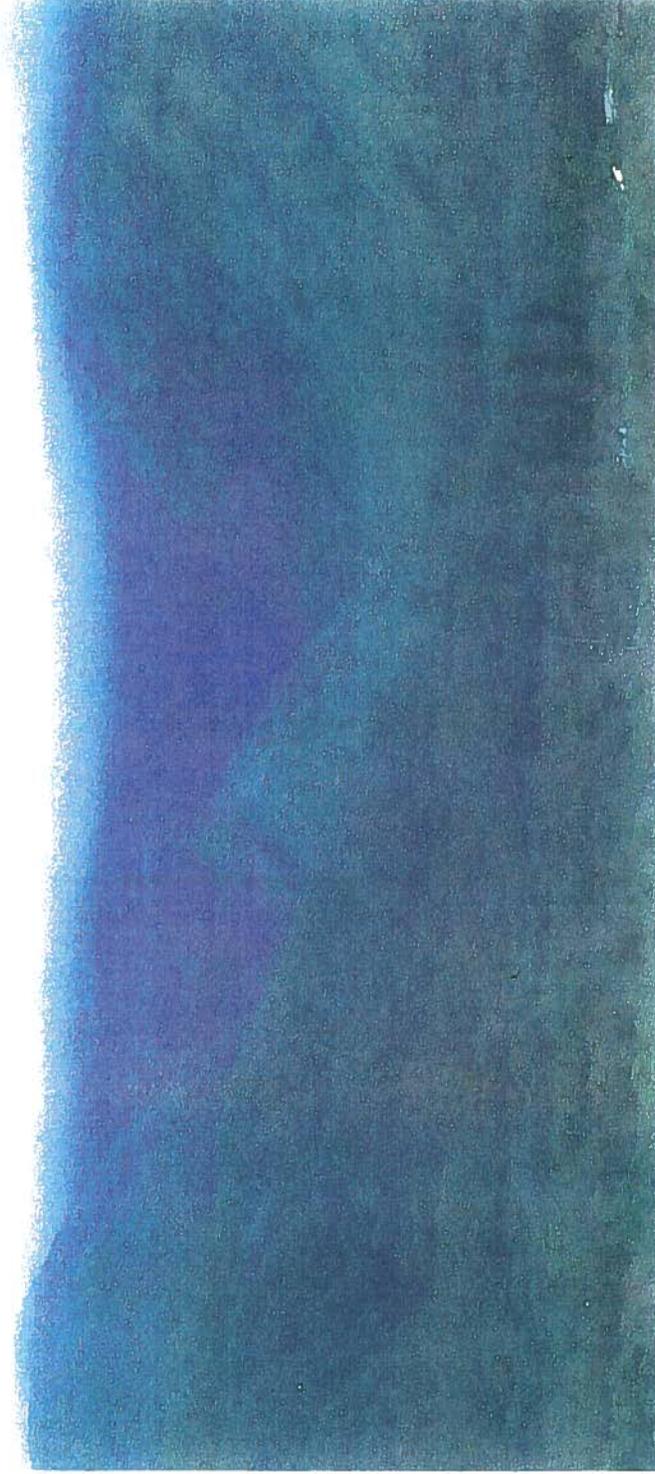


APPENDICES

Appendix A

KE KAHUA AGRICULTURAL PLAN

2007 - 2017



Prepared By:
Leo Kanaka
JANUARY 2007

KEKAHUA is located a few miles from the base of Mauna Kahalawai (West Maui Mountains) in the ahupua'a of Waiehu in the moku of Wailuku on the island of Maui. This area was well known for its extensive taro cultivation due to the abundance of flowing water and is commonly referred to as one of the "four waters of Maui" known as Nā Wai 'Ehā of Maui. Waiehu is blessed with the wind known as the makani hō'eha 'ilī (the wind that pains the skin) and the rain, ua lililehua (soft, gentle rain).

Waiehu was so productive that it was able to sustain large numbers of Hawaiian populations and was an important asset to the ali'i nui (high chief and ruler of Maui).



Waiehu, mai ka pali o Kapulehua a ka pali o 'A'ole.

TABLE OF CONTENTS

	<i>page</i>
Executive Summary.....	1-2
Moku o Maui.....	2a
Moku o Wailuku.....	2b
Ahupua'a 'o Waiehu.....	2c
Topography Map of Waiehu.....	2d
TMK Map of Waiehu.....	2e
Vision.....	3
Mission, Principles & Goal.....	3
Vision Composite.....	3a
Existing Conditions.....	4
Existing Conditions Photo.....	4a
Drainage & Easement Map.....	4b
Plant Selection.....	5
Implementation.....	6-7
Slope Plan.....	7a
Feasibility & Costs.....	8
Recommendations.....	9
Contacts.....	10
Appendix.....	11
soil report.....	11a
climate.....	11b
sun direction.....	11c
salinity.....	11d
rainfall.....	11e

EXECUTIVE SUMMARY

KE KAHUA AGRICULTURAL PLAN

This document is Leo Kanaka's Agricultural Plan for Maui Economic Opportunity's Paukukalo Large Lot Subdivision (TMK (2) 3-3-001:016) in Waiehu, Wailuku District, Island of Maui. This site will now be referred to in this document as KE KAHUA (The Foundation), a name that centralizes the plan's focus on providing a firm foundation for all who are involved in its development and its provisions. KE KAHUA is an 11.476 acre lot located on the corner of Kahekili Highway and Wai'ehu Beach Road behind an existing residential subdivision. In consideration of MEO's proposed residential training school, this plan's primary focus is on the agricultural development of the 3.5 acre area located nearest to the corner of Kahekili Hwy. and Waiehu Beach Rd., with the southern edge bordered by the Waiehu Heights Community. The report recommends several areas of implementation as well as irrigation needs, equipment, supplies and related human resource costs necessary for its long term sustainability.

Several benefits of agricultural development at KE KAHUA prompted the creation of this plan. First, KE KAHUA will be a sustainable agricultural site providing produce for the following MEO programs; Headstart, BEST Store, Meals for Residents, Farmers Markets and eventually catering and restaurant entrepreneurs linked with the residential training school. Second, KE KAHUA will also serve as a cultural land based community center, offering internships and workshops in Hawaiian cultural practices, values, language and traditional agricultural methodology for KE KAHUA's participants inclusive of families, support systems and community. In addition, the benefits to the Waiehu community at large will not be limited to its produce but the aesthetic factor will lend itself to the quality of life for the Waiehu resident. Further, this agricultural development will be an effective opportunity to fulfill the requirements of the Community Development Block Grant.

Development of the KE KAHUA Agricultural Plan involved three basic steps, research, writing and meetings. Beginning with a literary search for historical agricultural information regarding Waiehu, this plan recognizes the value of looking to our past to meet the needs of the future. Informal discussions with Waiehu residents and farmers also provided insight into the cultivation of this area and the expectations of KE KAHUA's neighbors. Meetings with MEO's BEST program staff helped to determine the human resources, desired crops and overall long range plan and use for the site. MEO staff also visited Ka Papa Lo'i 'O Kanewai in Manoa, O'ahu to better understand and recognize the potential and to formalize a vision for KE KAHUA. "Walkabouts" at both sites served to first, identify the physical and operational issues and second, confirmed the appropriate planning responses designed to address those issues and set a course for the future.

The **KE KAHUA** Agricultural Plan is comprised of the following elements:

1. Vision
2. Mission, Principles and Goal
3. Existing Conditions
4. Plant Selection
5. Implementation
6. Feasibility and Costs
7. Recommendations

This is a 10 year plan spread over three development phases, short, mid and long term.

Phase 1 (short): 0 to 1 year

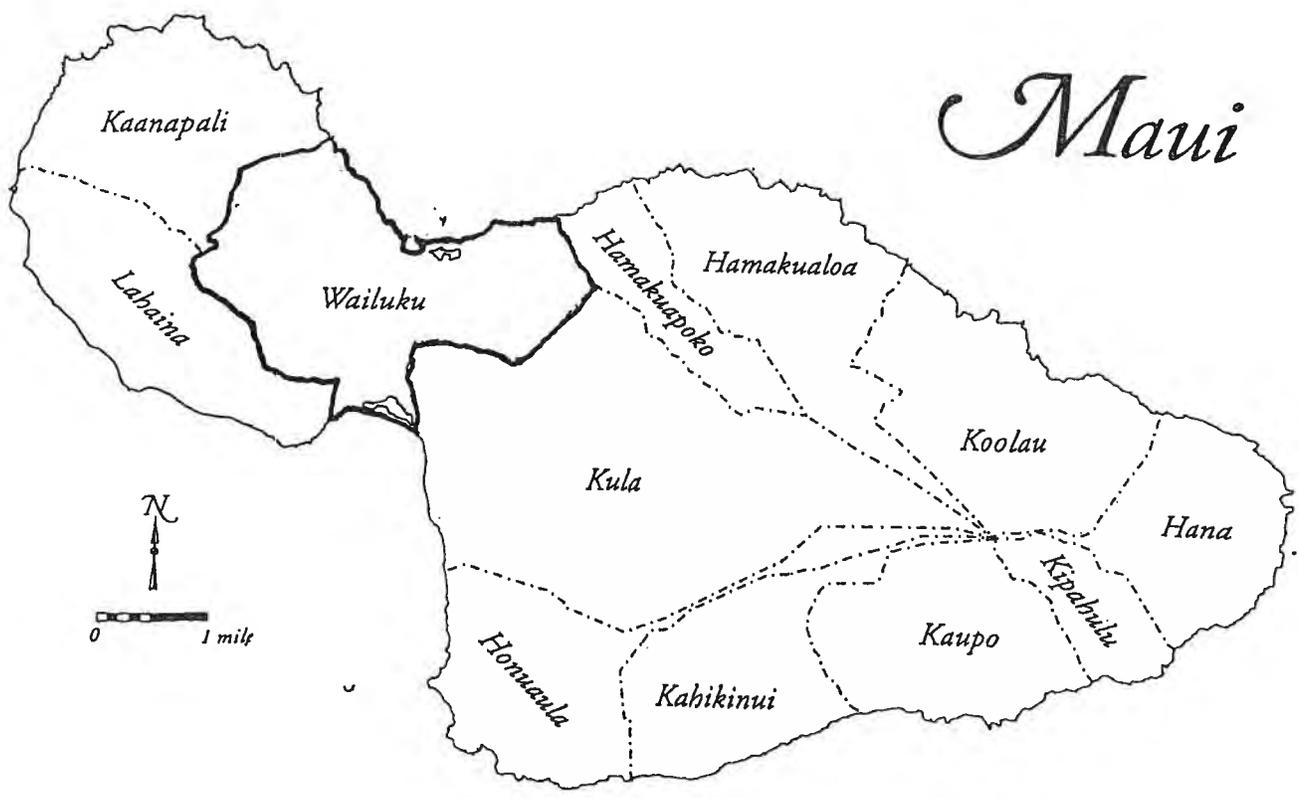
- Basic infrastructure
- Site stabilization
- Site clearing
- Greenhouse construction
- Toolshed construction

Phase 2 (mid): 1 to 3 years

- Irrigation
- Plant selection
- Soil Management
- Cultivation
- Mulch System

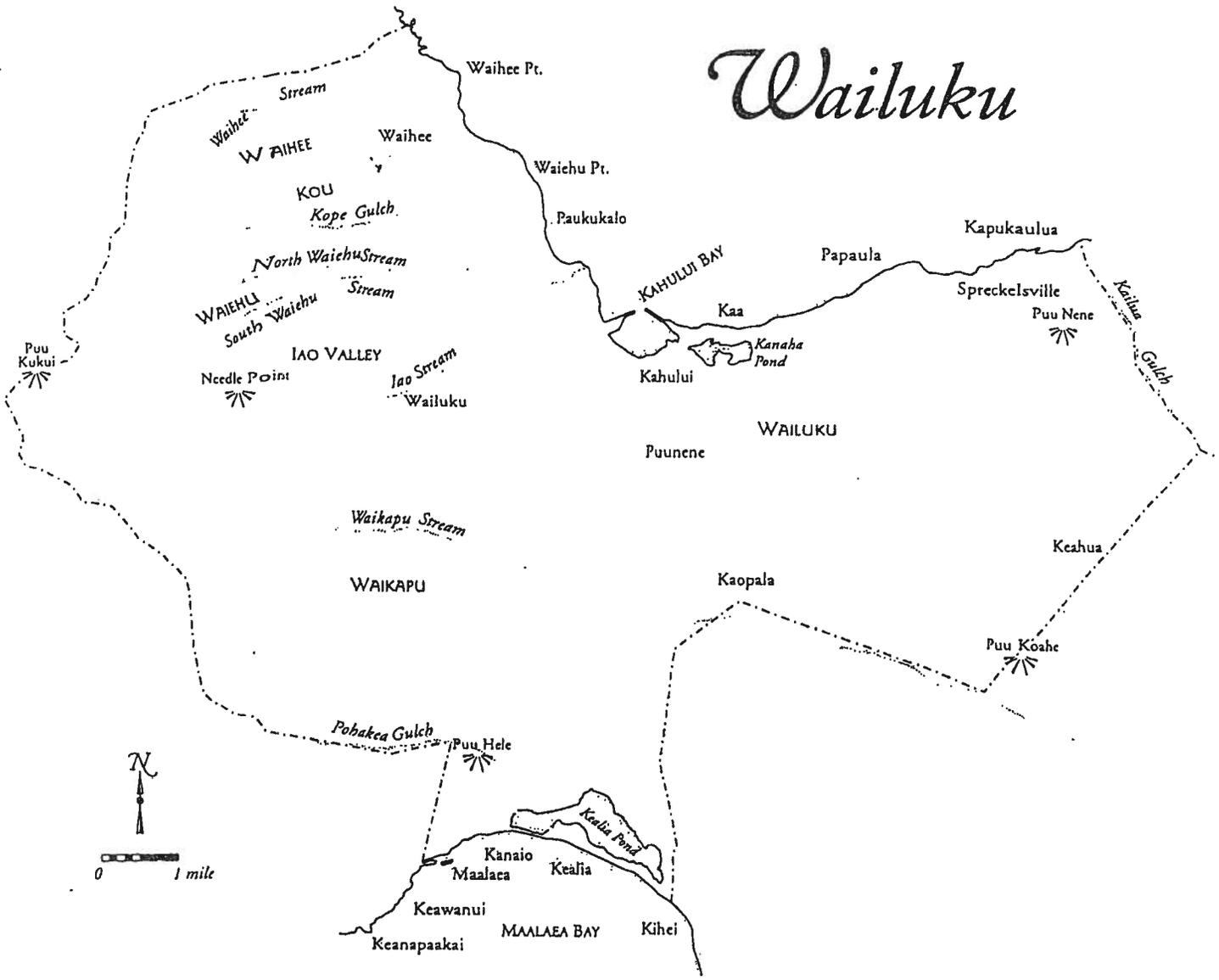
Phase 3 (long): 3+ years

- Hydroponic System
- Aquaculture
- Maintenance
- Education program and curriculum development



Sterling, Elspeth. "Sites of Maui." 1998: 2.

Wailuku

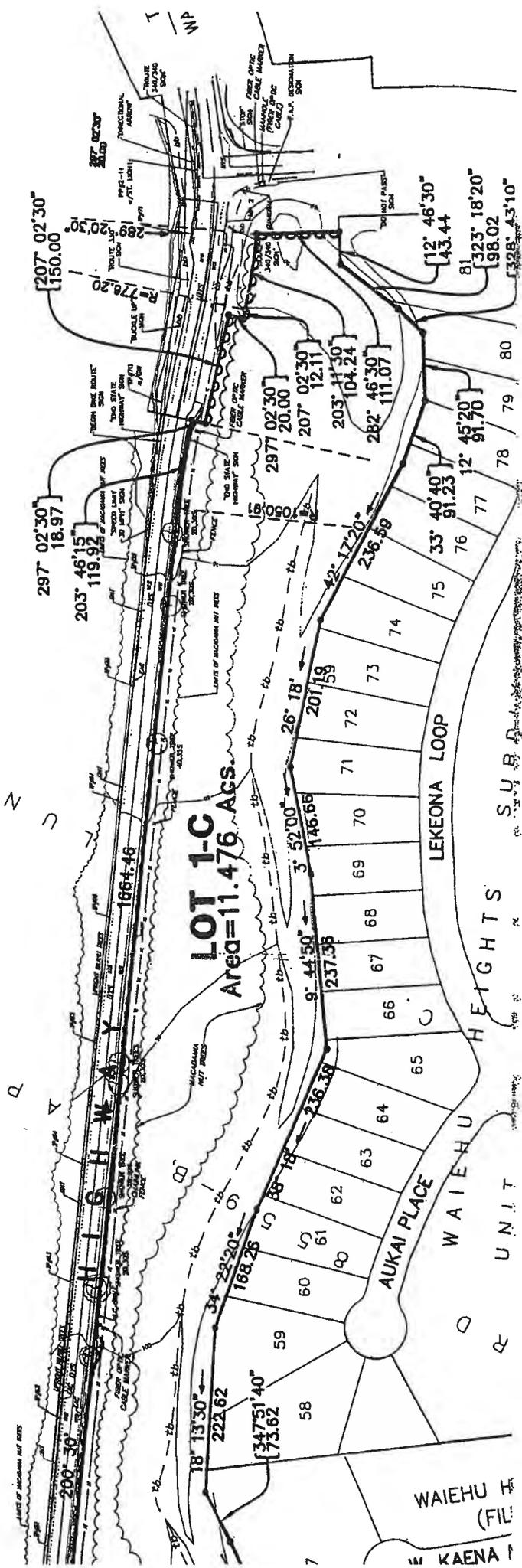


Sterling, Elspeth. "Sites of Maui." 1998: 62



TRUE NORTH
SCALE: 1" = 200'

W
A
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T



THE VISION

KE KAHUA is a place of growth; spiritual, emotional, mental and physical. Entering on a path lined with loulou pillars, it opens up to a place where families, friends and community come together to share food, physical labor, ideas and Ke Akua's blessings in the cool makani ho'eha 'ili. The light lililehua rains gently water taro plants surrounded by ti, 'a'li'i, kukui, naupaka, fragrant pua kenikeni and glistening hinahina. Here, at **KE KAHUA**, everyone is welcomed to change their lives through cultural awareness and enrichment activities. We observe kupuna who graciously share their knowledge with opio who are eager to learn. Olelo Hawaii is spoken. Strong kanaka build walls using traditional techniques, proud to be walking in the path of kupuna. Others are farming and gathering the fruits of their labor, preparing to take their yield to market. Halau hula gather lei materials, plants for kapa dyes and other resources for their costumes and adornments. Above all we hear laughter as sweet as a newborn's gentle cooing. It is the sound of rebirth. **KE KAHUA** is a source of enlightenment and nourishment for the physical as well as the emotional well being of each individual.

MISSION, PRINCIPLES AND GOAL

The **KE KAHUA** Agricultural Plan was not only guided by a shared vision of **KE KAHUA**, but the long recognized motto of Maui Economic Opportunity, Inc.:

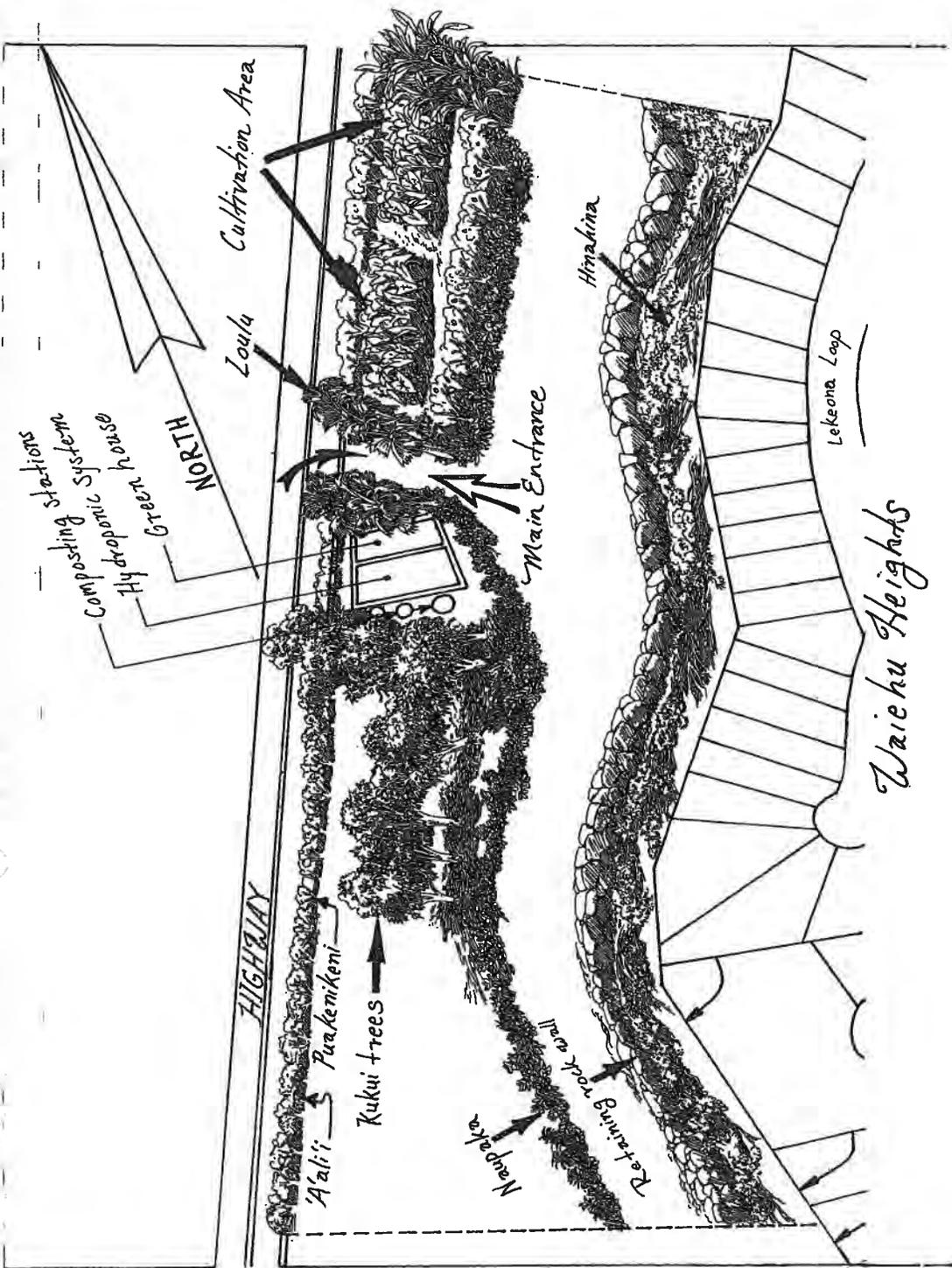
Helping People, Changing Lives

The following principles have provided direction for this plan:

- **KE KAHUA** is a pu'uhonua - a refuge for people and plants, each caring for the other.
- Values of aloha 'āina, mālama 'āina, kōkua, 'ohana and laulima are integral.
- Ma ka hana ka 'ike (through doing is knowledge) will be the guiding standard.

The goal of **KE KAHUA** is to have a manicured agricultural site that will complement the residential training school by providing:

- an aesthetic quality to the site,
- a conducive location for skill building through hands on learning in the areas of irrigation, taro farming, cultivation, rock wall building and landscaping using traditional and modern technology,
- a safe place for family, support agencies and community to share in the development and progress of **KE KAHUA** residents,
- an economic base for its sustenance.



EXISTING CONDITIONS

The project site located from the intersection of Waiehu Beach Road and Kahekili Highway and extending west toward Wailuku town (TMK(2) 3-3-01-016 (portional) is approximately 11.476 acres. It consists mainly of macadamia nut trees, cane grass and koa haole growing on a mixed substrate of soil and sand.

The Waiehu Heights community borders the south eastern edge of the property. Backyard patios of neighbors overlook the property toward the vista of Mauna Kahalawai (West Maui Mountains) from an elevation of 30 to 50 feet high.

Approximately 4.2 acres is presently a drainage easement that runs on the ma kai edge of the property from the Wailuku end to the Waihe'e end of the property. A constant water flow is virtually non-existent in the drainage ditch except during continuous heavy rains which cause further erosion to the sandy banks of the drainage and property.

The North Waiehu stream borders the ma kai end of the property on the ma kai side of Waiehu Beach road.

There are mature macadamia fruit bearing trees that could be potentially profitable and useful but are presently in poor condition due to the lack of irrigation, adequate nutrients and maintenance over the years. There is also a healthy kukui nut tree and several populations of native perennials and shrubs such as uhaloa.

Present use of the site includes but not limited to gathering of grass for cattle feed, private landscaping for leisure, a golfing range, a dirt bike track and illegal dumping of trash and vehicles by neighbors and the community at large.

Traditional use of the area included the cultivation of taro, sugarcane and the more recently, macadamia nuts by Wailuku Agribusiness.

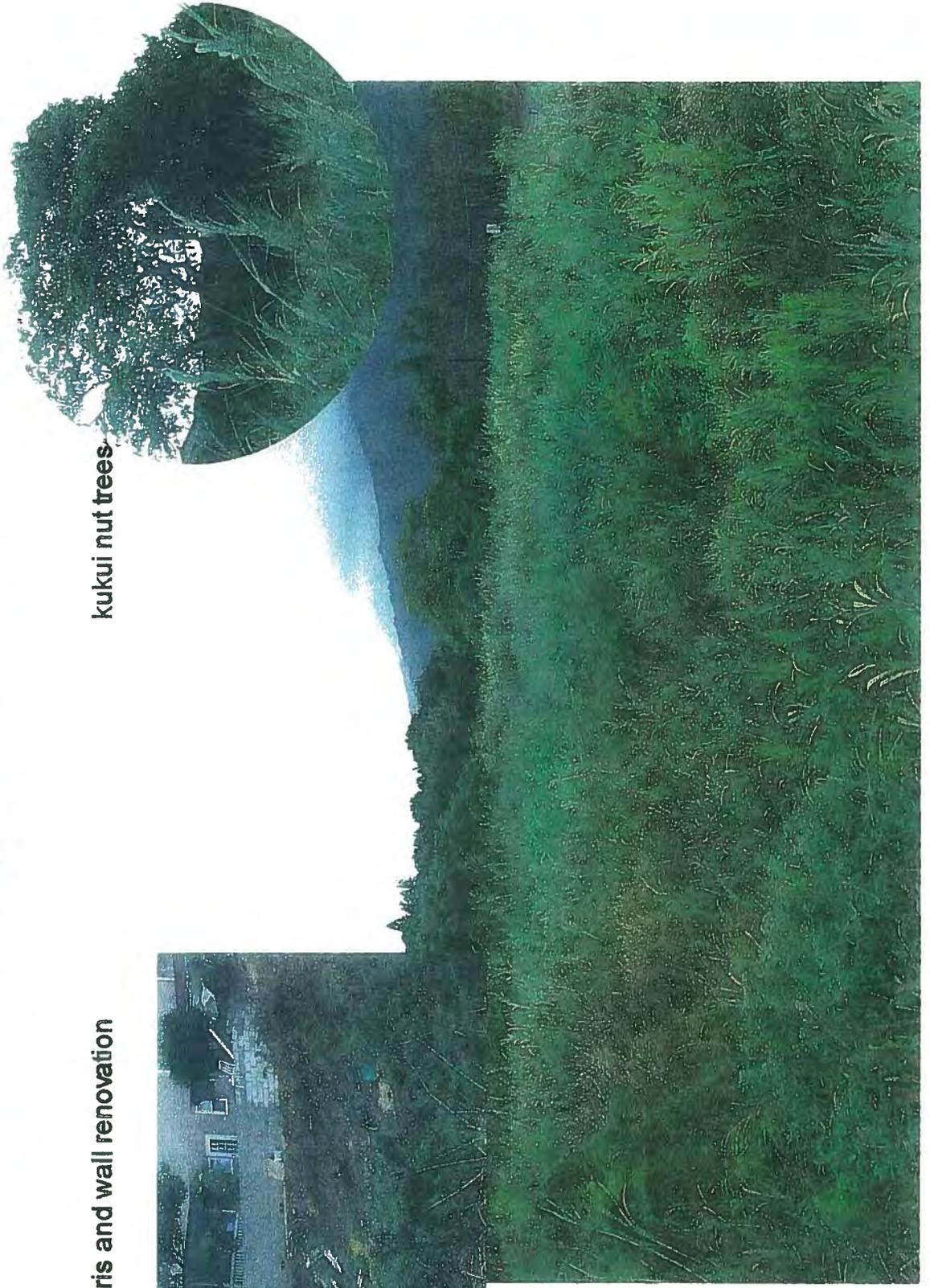
At this time the property does not have a potable or non-potable water source. There is no water line supporting the project site.

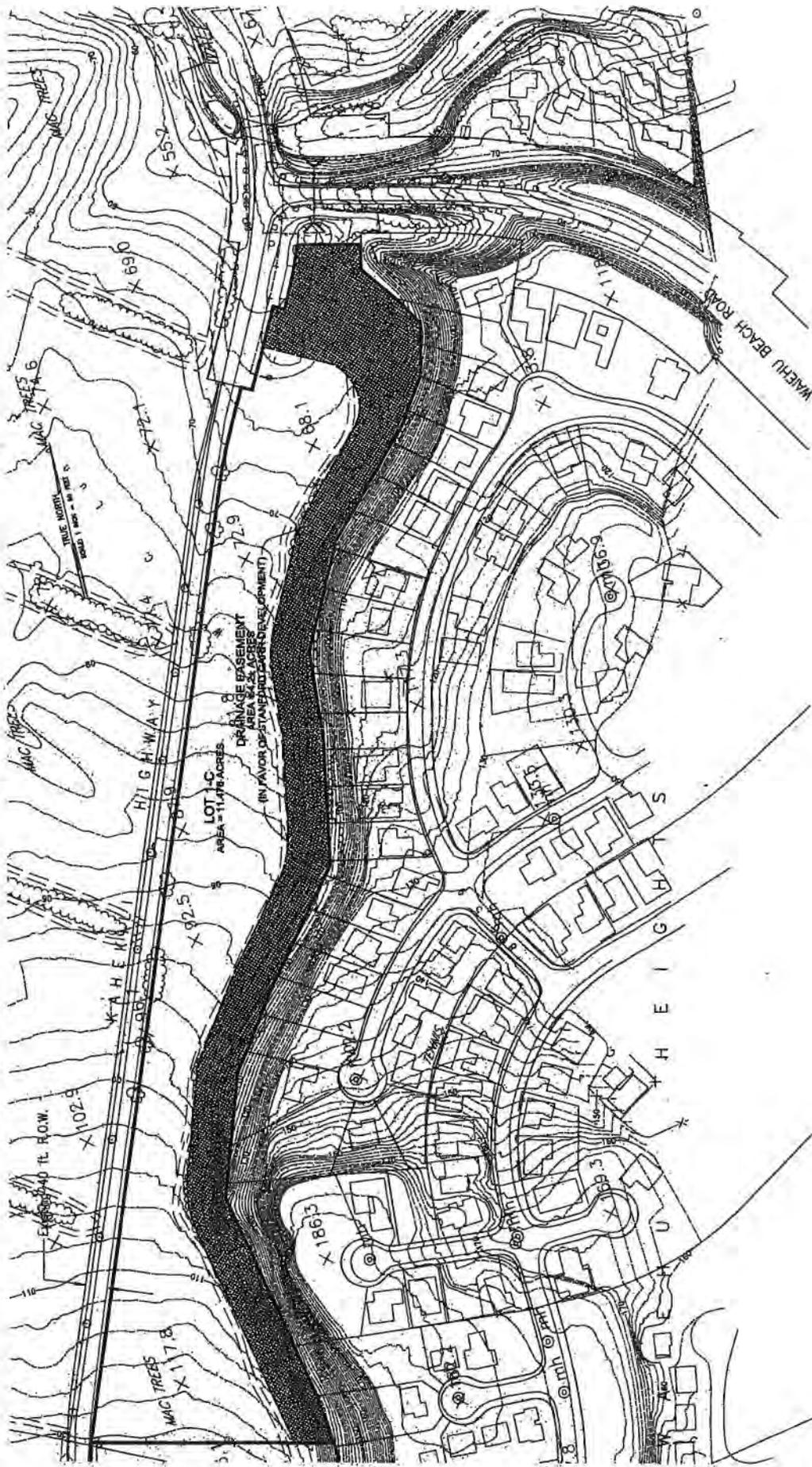
Existing Conditions

Slope debris and wall renovation



kukui nut trees





WARDEN S. LINDSAY - ENGINEER, INC.
 215 W. 1st St. - Honolulu, Hawaii - 96802
 (808) 531-1100
 FAX (808) 531-1108

February 24, 2008



PLANT SELECTION

Several factors were taken into serious consideration when selecting the plants for this particular site such as:

- geographic location
- sunlight
- soil type
- salinity level
- precipitation
- cloud cover
- program needs
- community requests

The following is a list of plants that have been selected for cultivation at KE KAHUA:

- kalo (taro; colocasia esculenta)
 - kī (ti; cordyline terminalis)
 - ‘uala (sweet potato; ipomea batatas)
 - naupaka (scaevola coriacea)
 - hinahina (heliotropium anomalum)
 - kukui (candlenut; aleurites moluccana)
 - loulu (palm; pritchardia beccariana)
 - ‘a‘li‘i (dodonaea sandwicensis)
 - pua kenikeni
 - ‘ulu (breadfruit, artocarpus altilis)
 - pakalana
 - ipu (gourd; lagenaria sicevaria)
 - niu (coconut; cocos nucifera)
 - vegetables including lettuce, cucumbers, tomatoes, Chinese peas, corn, eggplant, green beans, squash, watercress
 - fruits including banana, papaya, mango, lime
 - herbs including basil, cilantro, mint, thyme, rosemary
-
- the Hawaiian plants provide not only a Hawaiian ethnobotanical use but a highly sought after renewable resource, translating into sustainability
 - taro and lū‘au are long term viable commodities in Hawaiian communities, therefore it is a guarantee that there will always be a market for these products, in addition, clean seed stock or huli is desperately needed by many taro farmers here on Maui and across the state due to apple snail infestation and leaf blight
 - the average cost for one ti leaf is \$.15
 - mature loulu palms have been selling for nearly \$400 per palm
 - pua kenikeni trees average \$40 -\$60 and is the highest in demand amongst new homeowners in Hawai‘i, its blossoms are used in lei that are sold for \$8 - \$10
 - the average cost of a hinahina lei is \$20 - \$30 and is considered scarce, once the hinahina is established on the slope, it will be the largest available source outside of a conservation area

IMPLEMENTATION

The implementation of this plan has been divided into three phases, each requiring manual as well as contract labor. Refer to section on Feasibility and Costs for a comparison of both. Brief descriptions of required tasks within each phase is provided to better understand the amount of time and labor involved in the implementation of this plan.

Phase 1 (short): 0 to 1 year

- *Basic infrastructure* - clear identified access path of existing vegetation, lay blue chip down with compaction to allow vehicular access eventually paving path
- *Site stabilization* - install rock wall retainment for dual purpose of function and aesthetic value, plant native vegetation to prevent further erosion
- *Site clearing* - clear identified cultivation and work areas of undesired vegetation for each phase, includes removal and hauling of refuse, and leveling dirt brought in to the cleared areas as needed
 - labor - short term MCCC workline, other MEO program participants, BEST program participants and residents, community volunteers, site coordinator
 - equipment needs
 - tiller, weed wackers, lawn mower, pick, shovel, hoe, cane knife, hatchet D8, loader, back hoe, compactor, hauling trucks, tiller, tractor
- *Greenhouse construction* - pour 60x80 cement slab, cement pipes into footing, attach cables and shade cloth, install irrigation and benches
- *Toolshed construction* - pour 20x30 slab, frame, roof, paint and install shelving

Phase 2 (mid): 1 to 3 years

- *Irrigation* - install irrigation system; dig trench and bury PVC pipe from top of property on Wailuku side to the cultivation site ma kai of property, includes shut off valves, drip lines and sprinklers
 - peak usage in gallons per minute (gpm) = 80 gpm
 - gallons per day (gpd) = 115,200 gpd [non-potable water for agricultural purposes]
- *Plant selection* - obtain plants and seed stock, plant, maintain and observe for proper growth and acclimation to the site
- *Soil Management* - amend present soil conditions with fertilizers and other soil amendments
- *Cultivation* - utilize traditional Hawaiian and contemporary planting techniques, plant and harvest using the Hawaiian moon calendar to maintain a sustainable crop
- *Mulch System* - create a productive rotating mulch and compost system

Phase 3 (long): 3+ years

- *Hydroponic System* - develop a system to produce vegetables to sustain MEO programs and other needs or requests
- *Aquaculture* - create a closed recirculating system using fish by-products to enhance soil conditions
- *Maintenance* - provide adequate human resources and equipment to continually support general and specific management efforts; cultivation, weeding, harvesting, etc.
- *Education program and curriculum development* - incorporate Hawaiian scientific knowledge based on mālama 'āina and aloha 'āina through interdisciplinary skills. Hire and train site coordinator to implement phases 1-3, thereby providing clear articulation in the development of educational program for classes, staff and community.

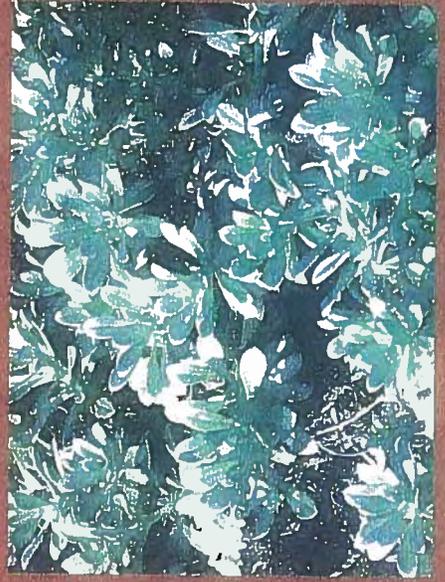
SLOPE PLAN



- *Clear debris*

- *Plant Hinahina*

- *Create buffer between concerned neighbors*
- *Minimize traffic*
- *Stabilize slope*
- *Visual enhancement*
- *Viable product*
- *Low maintenance*



FEASIBILITY AND COSTS

Per discussion with MEO staff, the MCCC workline and MEO programs' participants are available to provide man hours towards this project. Therefore, both contractual and manual costs are provided to assist MEO staff and the KE KAHUA site coordinator in choosing the best option of approach to fulfill the projected tasks for each phase. Reflected in the manual costs are primarily costs for equipment and supplies versus the contractual costs which also includes labor charges.

Manual time is calculated based on one site coordinator and the following information:

2 work crews of 8 people x twice per week x 7 hours per day = app. 200 hours per week

*Work Shop
Training*

	MANUAL COST/TIME	CONTRACT COST/TIME
PHASE 1 (0-1YR.)		
x Basic infrastructure	10,000/ 1 month	40,000/1 week
x Site stabilization	50,000/1 year	150,000/2 months
x Site clearing	5,000/9 months	40,000/2 weeks
+ Greenhouse construction	15,000/1 month	25,000/1 week
+ Toolshed construction	20,000/1.5 months	40,000/2 weeks
PHASE 2 (1-3 YRS.)		
+ Irrigation	5,000/2 months	18,000/2 weeks
+ Plant selection	5,000/growth over 7 years	40,000/2 years
Soil management	10,000	10,000
Cultivation	0	5,000
Mulch system	5,000	5,000
PHASE 3 (3+ YRS.)		
Hydroponic system	10,000	30,000
Aquaculture	20,000	45,000
Maintenance	0	NA
total costs:	155,000	445,000

RECOMMENDATIONS

Water Resources

There is no existing potable water system or water on the property. However, presently there is an 8 inch potable water line in the Waiehu Beach Rd. ma kai of the project site. The 8 inch main connects to the residential properties near the site. The one storage tank in the area may be too far from the project site to be feasible.

It is estimated that approximately ¼ mgd of irrigation water will be required for the initial start up of this agricultural project. Nonpotable water will be relied upon primarily for irrigation purposes.

At this time the property is not equipped with a source of potable nor non-potable water resource. There is no water line supporting the project site.

Implementation of this plan will benefit from a source of potable water for safety and for washing purposes. A non potable source of water is needed to support the proposed agricultural activities. Without a water line to the property, agricultural activities will be dependent on the fluctuating availability of existing water to the site.

Further study is required to provide a water line to the project site. There are currently political issues regarding water access to Nā Wai 'Ehā. This study does not address these concerns.

Leo Kanaka recommends that MEO complete the following:

- conduct further study into the provision of a water line to the site and sources of well distribution from Kupaa, Maluhia and Waiolai wells
- develop site in designated cultivation areas while trying to maintain and rejuvenate the macadamia nut trees
- create an open and friendly relationship with neighbors and Waiehu community at large

The following is a list of agencies, and individuals formally and informally contacted in the planning process.

Agencies

Maui Economic Opportunity, Inc.
Maui Community College
Kamehameha Schools
University of Hawaii
Waiehu Kou III Community Association
Puuhonua o Iao
Neighborhood Place
Residents of Waiehu Heights
Hui o Nā Wai 'Ehā
Earth Justice

Individuals

Kapua Sproat
Kaleikoa Kaeo
Jonathan Deenik
Bobby Pahia
Oliver Dukelow
Kalei Tsuha
Mel Akiona
Happy Aki
Ikaika Benavides
Alex Bode

REFERENCES

S. H. Sohmer and R. Gustafson, 1987, Plants and Flowers of Hawai'i, University of Hawai'i Press, Honolulu, Hawai'i

Elsbeth P. Sterling, 1998, Sites of Maui, Bishop Museum Press, Honolulu, Hawai'i

Kalei Tsuha, 2003, Cultural Impact Assessment on Paukūkalo, Wai'ehu, Island of Maui, prepared for North Shore at Wai'ehu LLC, Wailuku, Hawai'i

APPENDIX

- Soil Report
- Climate
- Sun direction
- Salinity
- Rainfall

Problem Description

Ti leaf also grown.

Fertilizer and Lime Recommendations

Total Nutrient Requirement (lbs/Acre):	Nitrogen: 350	Phosphorus: 9	Potassium: 0
Fertilizer / Lime Material	Total Amount (lbs/Acre)	Applications	Cost Estimate (\$/Acre)
Fertilizer: 21-0-0	1667	split into 8 appins.	267

Comments

---- BASED ON THE SUBMITTED SAMPLE SHEET, WE OFFER THE FOLLOWING PLANT INFORMATION ----
Withhold N after 5 months.

---- GENERAL INFORMATION ----

- o Please indicate the soil series when submitting your soil samples.
- o Knowing levels of sulfur and micronutrients in plants is also important. For proper diagnosis, tissue analysis is needed.
- o Split the fertilizer into several applications, at planting and thereafter once every month until the total amount has been applied.
- o The pH is extremely high. See comments on high pH on previous sample.
- o Sulfur can be incorporated at the rate of 3000 lbs./acre to help lower the pH.
- o We recommend that you adopt a nutrient monitoring approach by retaining this sample report for comparison with future samples.

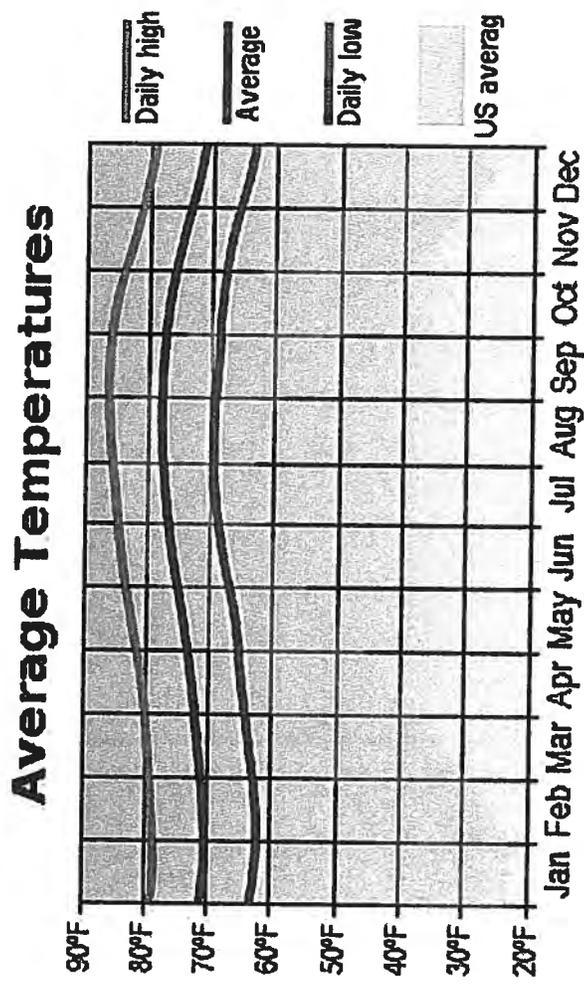
NOTE:

The interpretations are based on Fact Sheet No. 3 "Adequate Nutrient Levels in Soils and Plants in Hawaii."
To help improve future recommendations, please answer the following questions, photocopy this form and return it to above address.
1. Did you need to modify the recommendation? if so, how?
2. Did your plants improve? Please give unit area yield before and after the recommendation was applied.

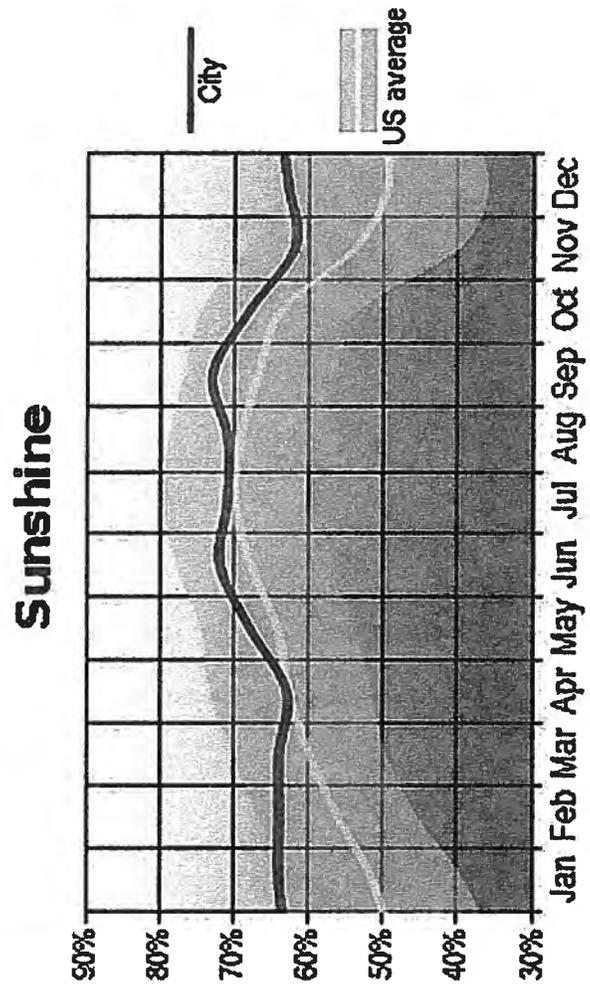
FEEDBACK

Factors in Crop Selection

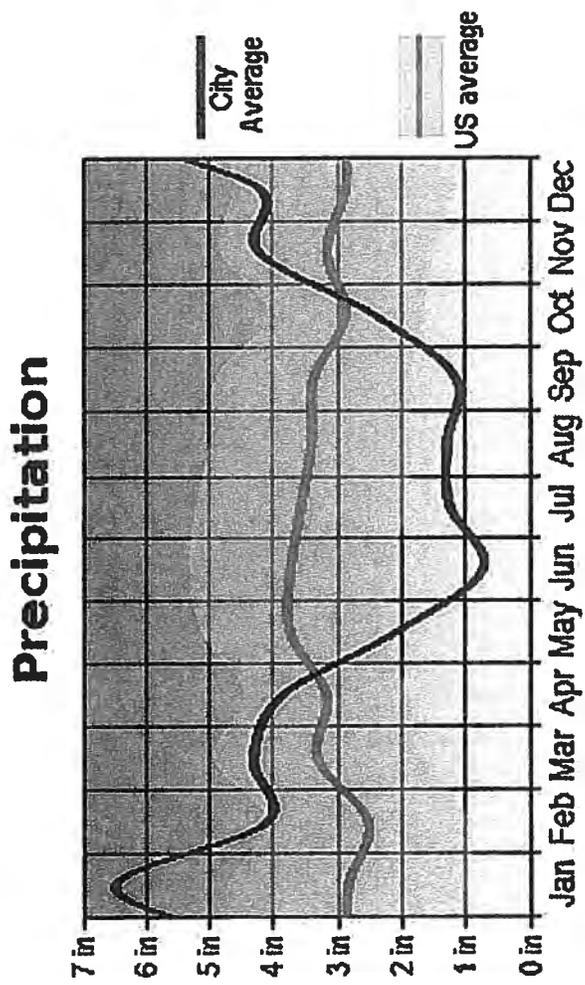
Average Climate in Wai'ehu



- **Sunshine**



- Precipitation



Appendix B

Ke Kahua Farm Early Consultation Letter Transmittal and Comment Letter Tracking	Letter Received [DATE]
FEDERAL	
Natural Resources Conservation Service	3.11.09
US Army Corps of Engineers	12.23.08
US Environmental Protection Agency	
US Fish & Wildlife Service	12.31.08
STATE	
Dept of Business Economic Development & Tourism (DBEDT)	
DBEDT, Office of State Planning	1.07.09
Department of Hawaiian Homelands (DHHL)	1.26.09
Department of Health (DOH)	
DOH, Clean Water Branch	
DOH, Environmental Planning Office	
DOH, Maui District Health Office	12.29.08
Dept of Education (DOE)	12.31.08
Dept of Land & Natural Resources (DLNR)	12.09.08
DLNR, OCCL	
DLNR SHPD	6.13.08
Dept of Transportation (DOT)	12.24.08
DOT, Statewide Planning Office	
DOT, Maui District Engineer	
Office of Hawaiian Affairs (OHA)	1.05.09
COUNTY	
Department of Environmental Management	1.26.09
Dept of Fire Control & Public Safety	
Dept of Housing & Human Concerns	12.10.08
Dept of Parks & Recreation	12.29.08
Dept of Planning	
Dept of Public Works	
Department of Transportation	
Dept of Water Supply	
Police Dept	12.19.08
LOCAL UTILITIES	
Alu Like	
MECO	12.11.08

United States Department of Agriculture

Natural Resources Conservation Service
77 Ho'okele Street, Suite 202
Kahului, HI 96732
808-871-5500

May 11, 2009

Mr. Matthew M. Slepín, Senior Associate
Chris Hart & Partners Inc.
115 North Market Street
Wailuku, Hawaii 96793

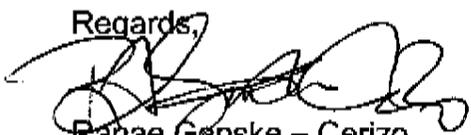
Subject: Early Consultation Request for the Proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu, Maui; TMK (2) 3-3-001:016)(portion)

Dear Mr. Slepín,

We highly recommend a Natural Resource Conservation Service conservation plan to be developed for the designated farm portion. The plan will identify the resource concerns which will help reduce erosion and other related resource concerns down slope.

Thank you for the opportunity to comment. Please contact me at 871-5500 EXT 107 if you have questions.

Regards,



Ranae Ganske - Cerizo
District Conservationist





Landscape Architecture
City & Regional Planning

June 12, 2009

Ranae Ganske-Cerizo, District Conservationist
U. S. Department of Agriculture
Natural Resources Conservation Service
210 Imi Kala Street, Suite 209
Wailuku, Hawaii 96793

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Ms. Ganske-Cerizo,

Thank you for your letter of May 11, 2009 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. In response to your comments, we note that Maui Economic Opportunity will implement erosion control and other resource management programs.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

Respectfully submitted,

Matthew M. Slepín
Senior Associate • Land Planner

CC. Project File 07-001



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF:

December 23, 2008

Regulatory Branch

File Number POH-2008-317

Mr. Mathew M. Slepín
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Hawaii 96793

Dear Mr. Slepín:

We have received your December 5, 2008, request for early consultation comments for the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm. The site is 11.476 acres located within a portion of TMK (2) 3-3-001:016, at Latitude 20.915° N. and Longitude -156.499° W. in Waichu, Maui Island, Hawaii. Based on the information you submitted, it appears the subject parcel consists entirely of uplands, and the proposed project will not involve the placement and/or discharge of dredged and/or fill material into waters of the U.S., including adjacent wetlands, subject to our jurisdiction; therefore, a **DA permit will not be required**. This determination does not relieve you of the responsibility to obtain any other permits, licenses, or approvals that may be required under County, State, or Federal law for your proposed work.

Section 404 of the Clean Water Act requires that a Department of the Army (DA) permit be obtained for the discharge of dredged and/or fill material into waters of the U.S., including jurisdictional wetlands (33 U.S.C. 1344). The Corps defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Section 10 of the Rivers and Harbors Act of 1899 requires that a DA permit be obtained for structures or work in or affecting navigable waters of the U.S. (33 U.S.C. 403). Section 10 waters are those waters subject to the ebb and flow of the tide extending shoreward to the mean high water mark.

This approved jurisdictional determination is valid for a period of five (5) years from the date of this letter, unless new information supporting a revision is provided to us before the expiration date.

Should you have any questions regarding this approved jurisdictional determination, please contact Ms. Joy Anamizu of my staff at (808) 438-7023 or at joy.n.anamizu@usace.army.mil. For additional information about our Regulatory Program, visit our web site at <http://www.poh.usace.army.mil/EC-R/EC-R.htm>. The file number assigned POH-2008-317 should be referred to in future correspondence with us.

Sincerely,

for 
George P. Young, P.E.
Chief, Regulatory Branch

07/100
cc: matt
RECEIVED

DEC 24 2008

**APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers**

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 23-Dec-2008

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Honolulu District, POH-2008-00317-JNA-JD1

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State : HI - Hawaii
 County/parish/borough: Maui
 City: Waiehu
 Lat: 20.9146
 Long: -156.49868
 Universal Transverse Mercator Folder UTM List
UTM list determined by folder location
 NAD83 / UTM zone 34S
Waters UTM List
UTM list determined by waters location
 NAD83 / UTM zone 34S

Name of nearest waterbody: Waiehu Stream
 Name of nearest Traditional Navigable Water (TNW): Pacific Ocean
 Name of watershed or Hydrologic Unit Code (HUC): Waiehu (2020000)

Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

Check if other sites (e.g., offsite mitigation sites, disposal sites, etc.) are associated with the action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION:

Office Determination Date: 23-Dec-2008

Field Determination Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION

There "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area.

Waters subject to the ebb and flow of the tide.

Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area.

1. Waters of the U.S.

a. Indicate presence of waters of U.S. In review area:¹

Water Name	Water Type(s) Present

Ke Kahua Ag Farm TMK233001016 (por. of) (Uplands) | Uplands

b. Identify (estimate) size of waters of the U.S. In the review area:

Area: (m²)

Linear: (m)

c. Limits (boundaries) of jurisdiction:

based on: []

OHWB Elevation: (if known)

2. Non-regulated waters/wetlands:³

Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

1. TNW

Not Applicable.

2. Wetland Adjacent to TNW

Not Applicable.

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size: []

Drainage area: []

Average annual rainfall: inches

Average annual snowfall: inches

(ii) Physical Characteristics

(a) Relationship with TNW:

• Tributary flows directly into TNW.

• Tributary flows through [] tributaries before entering TNW.

:Number of tributaries

Project waters are [] river miles from TNW.

Project waters are [] river miles from RPW.

Project Waters are [] aerial (straight) miles from TNW.

Project waters are [] aerial(straight) miles from RPW.

Project waters cross or serve as state boundaries.

Explain:

Identify flow route to TNW:⁵

Tributary Stream Order, if known:

Not Applicable.

(b) General Tributary Characteristics:

Tributary Is:

Not Applicable.

Tributary properties with respect to top of bank (estimate):
Not Applicable.

Primary tributary substrate composition:
Not Applicable.

Tributary (conditions, stability, presence, geometry, gradient):
Not Applicable.

(c) Flow:
Not Applicable.

Surface Flow Is:
Not Applicable.

Subsurface Flow:
Not Applicable.

Tributary has:
Not Applicable.

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction:

High Tide Line indicated by:
Not Applicable.

Mean High Water Mark indicated by:
Not Applicable.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Not Applicable.

(iv) Biological Characteristics. Channel supports:
Not Applicable.

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:
Properties:
Not Applicable.

(b) General Flow Relationship with Non-TNW:
Flow Is:
Not Applicable.

Surface flow Is:
Not Applicable.

Subsurface flow:
Not Applicable.

(c) Wetland Adjacency Determination with Non-TNW:
Not Applicable.

(d) Proximity (Relationship) to TNW:
Not Applicable.

(ii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Not Applicable.

(iii) Biological Characteristics. Wetland supports:

Not Applicable.

3. Characteristics of all wetlands adjacent to the tributary (if any):

All wetlands being considered in the cumulative analysis:
Not Applicable.

Summarize overall biological, chemical and physical functions being performed:

Not Applicable.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Significant Nexus: Not Applicable

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE:

1. TNWs and Adjacent Wetlands:

Not Applicable.

2. RPWs that flow directly or indirectly into TNWs:

Not Applicable.

Provide estimates for jurisdictional waters in the review area:

Not Applicable.

3. Non-RPWs that flow directly or indirectly into TNWs:⁸

Not Applicable.

Provide estimates for jurisdictional waters in the review area:

Not Applicable.

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

Not Applicable.

Provide acreage estimates for jurisdictional wetlands in the review area:

Not Applicable.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs:

Not Applicable.

Provide acreage estimates for jurisdictional wetlands in the review area:

Not Applicable.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs:

Not Applicable.

Provide estimates for jurisdictional wetlands in the review area:
Not Applicable.

7. Impoundments of jurisdictional waters:⁹
Not Applicable.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS:¹⁰
Not Applicable.

Identify water body and summarize rationale supporting determination:
Not Applicable.

Provide estimates for jurisdictional waters in the review area:
Not Applicable.

F. NON-JURISDICTIONAL WATERS. INCLUDING WETLANDS

If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements:

Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce:

Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR):

Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (Explain):

Other (Explain):

The review area, portion of TMK 233001016, consist entirely of uplands and is absent of waters of the U.S.

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment:
Not Applicable.

Provide acreage estimates for non-jurisdictional waters in the review area, that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction.
Not Applicable.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD
(listed items shall be included in case file and, where checked and requested, appropriately reference below):

Data Reviewed	Source Label	Source Description
--Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant	Figure 1. Location Map/Figure 2. Concept. Site Plan	Figures submitted with letter: a) Figure 1. Location Map; and b) Figure 2. Conceptual Site Plan.
--U.S. Geological Survey map(s).	POH-2008-317 USGS + TMK + NWI Layer	TIG eGIS maps
--National wetlands inventory map(s).	POH-2008-317 - TMK NWI wetlands	TIG eGIS maps
--Photographs	-	-
----Aerial	POH-2008-317 - Satellite Imagery 04-06	TIG eGIS maps

B. ADDITIONAL COMMENTS TO SUPPORT JD:

Not Applicable.

¹-Boxes checked below shall be supported by completing the appropriate sections in Section III below.

²-For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

³-Supporting documentation is presented in Section III.F.

⁴-Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

⁵-Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

⁶-A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

⁷-Ibid.

⁸-See Footnote #3.

⁹-To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

¹⁰-Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.



Landscape Architecture
City & Regional Planning

June 11, 2009

George Young, Chief
Department of the Army
Regulatory Branch
U.S. Army Engineer District, Honolulu
Ft. Shafter, Hawaii 96858

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Chief Young,

Thank you for your letter of December 23, 2008 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. We acknowledge your determination that no Department of the Army permits will be required for the project.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

Respectfully submitted,

Matthew M. Slepín

Senior Associate • Land Planner

CC. Project File 07-001



United States Department of the Interior

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



RECEIVED

JAN - 5 2009

In Reply Refer To:
2009-TA-0056

DEC 31 2008 CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

CC: Matt
07/001

Mr. Matthew M. Slepín
Senior Associate
Chris Hart & Partners Inc.
115 North Market Street
Wailuku, Maui, Hawaii 96793

Subject: Technical Assistance for Proposed Ke Kahua Agricultural Farm at Waiehu, Maui

Dear Mr. Slepín:

The U.S. Fish and Wildlife Service has reviewed your December 9, 2008, request for assistance regarding the proposed development of an 11-acre (5-hectare) Ke Kahua Agricultural Farm at Waiehu, Maui. The project entails the construction of two dwellings to accommodate up to twenty residents and the conversion of fallow agricultural land into native vegetation and row crops. Based on the information you provided and pertinent information in our files, the following listed species have been observed in the vicinity of the proposed project: (1) threatened Newell's shearwater (*Puffinus auricularis newelli*) and the endangered Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*) (collectively referred to as seabirds); (2) endangered Blackburn's sphinx moth (*Manduca blackburni*); (3) endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*); and (4) endangered *Scaevola coriacea* (Dwarf naupaka). As you develop your State and/or Federal environmental documentation for this project, we recommend you assess the potential for these listed species to be directly or indirectly impacted by your proposed activities. In addition, we offer the following recommendations to assist you in the development of your environmental assessment to determine if species are present or minimize project impacts to listed species. These recommendations do not alleviate your responsibilities pursuant to the Endangered Species Act of 1973, as amended, if a listed species does occur onsite.

- Seabirds may traverse the project area at night during the breeding season (February 1 through December 15). Any outdoor lighting, particularly when used during each year's peak fledging period (September 15 through December 15), could result in seabird disorientation, fallout, injury and/or mortality. Potential impacts to seabirds can be minimized by shielding outdoor lights associated with the project, avoiding night-time construction, and providing all project staff and residents with information regarding seabird fallout. All project lights should be shielded so the bulb can be seen only from below.

TAKE PRIDE[®]
IN AMERICA 

- Blackburn's sphinx moth may occur in the project area. The adult moth feeds on nectar from native plants including beach morning glory (*Ipomoea pes-caprae*), ilice (*Plumbago zeylanica*), maiapilo (*Capparis sandwichiana*), and the larvae feed upon nonnative tree tobacco (*Nicotiana glauca*) and the native aiea (*Nothocestrum latifolium*). All of these species may occur on the project site. We recommend you survey the site for the presence of Blackburn's sphinx moth host plants and if host plants are found, contact our office for further assistance.
- To minimize 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).
- We recommend the site be surveyed by a qualified botanist for *Scaevola coriacea*.
- We recommend the use of native plants for landscaping purposes in order to reduce the spread of non-native invasive species. If native plants do not meet your landscaping objectives, we recommend that you choose species that are thought to have a low risk of becoming invasive. The following websites are good resources to use when choosing landscaping plants: Pacific Island Ecosystems at Risk (<http://www.hear.org/Pier/>), Hawaii-Pacific Weed Risk Assessment (http://www.botany.hawaii.edu/faculty/daehler/wra/full_table.asp) and Global Compendium of Weeds (www.hear.org/gcw).

If you have questions or would like additional information, please contact Consultation and Technical Assistance Program Fish and Wildlife Biologist, Dawn Greenlee (phone: 808-792-9400; fax: 808-792-9581).

Sincerely,



for Patrick Leonard
Field Supervisor



Landscape Architecture
City & Regional Planning

June 12, 2009

Patrick Leonard, Field Supervisor
U.S. Fish and Wildlife Service
300 Ala Moana Blvd., Rm. 3-122
Box 50088
Honolulu, Hawaii 96813

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

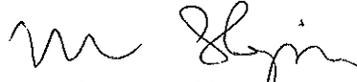
Dear Mr. Leonard,

Thank you for your letter of December 31, 2008 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. This letter supercedes our responses dated June 11, 2009.

We acknowledge your comments regarding measures to be taken regarding floral and faunal species. We note that the project site has been historically used for intensive agricultural operations, including sugar cane and macadamia nut cultivation. As part of preparing the Agricultural Plan for the project, which will be included in the Environmental Assessment, pedestrian surveys of the project site were conducted and no threatened and endangered species or habitats of the same were observed.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

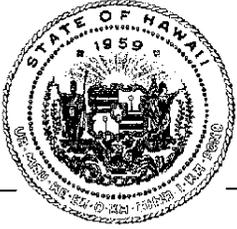
Respectfully submitted,

A handwritten signature in black ink, appearing to read "M. Slepik". The signature is fluid and cursive, with a large initial "M" and a stylized "Slepik".

Matthew M. Slepik

Senior Associate • Land Planner

CC. Project File 07-001



**DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM**

LINDA LINGLE
GOVERNOR
THEODORE E. LIU
DIRECTOR
MARK K. ANDERSON
DEPUTY DIRECTOR
ABBEY SETH MAYER
DIRECTOR
OFFICE OF PLANNING

OFFICE OF PLANNING

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

Telephone: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-12381

January 7, 2009

Mr. Matthew M. Slepín
Senior Associate
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Maui, Hawaii 96793-1717

Dear Mr. Slepín:

Subject: Early Consultation Request for
Proposed Maui Economic Opportunity Ke Kahua Agricultural Farm
TMK: (2)3-3-001:016, Waiehu, Maui, Hawaii (11.476 acres)

Thank you for the opportunity to review and comment on the proposed Maui Economic Opportunity Ke Kahua Agricultural Farm. The Office of Planning has no comments at this time. In so stating, the Office offers no judgment of either the adequacy of the document/application itself or the merits of the proposed project.

Since the project is still in its planning stage, we look forward to reviewing the Environmental Assessment. If you have any questions, please contact our Land Use Division at 587-2842.

Sincerely,

Abbey Seth Mayer
Director

LINDA LINGLE
GOVERNOR
STATE OF HAWAII



MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

KAULANA H. PARK
DEPUTY TO THE CHAIRMAN

ROBERT J. HALL
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

P.O. BOX 1879
HONOLULU, HAWAII 96805

January 26, 2009

Mr. Matthew M. Slepín
Senior Associate
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Hawaii 96793-1717

Dear Mr. Slepín:

Subject: Early Consultation Request for the Proposed Maui
Economic Opportunity "Ke Kahua" Agricultural Farm at
Waiehu, Maui, TMK (2) portion of 3-3-001:016, 11.476
Acres

Thank you for the opportunity to provide comments early in the
process on the subject proposal.

The project is located within two miles of several Hawaiian home
lands homestead communities. We request that you consult with
these community organizations. Their contacts are provided for
this purpose only.

If you have any questions, please contact our Planning Office at
620-9480.

Aloha and mahalo,

for

Micah A. Kane, Chairman
Hawaiian Homes Commission

Enclosure

cc: matt 01/29/09
RECEIVED

JAN 29 2009

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

HAWAIIAN HOMESTEAD ORGANIZATIONS
CENTRAL MAUI

WAIEHU KOU PHASE 1
Mr. Kahiwalani Enriques, President
664 Kononua Street
Wailuku, Hawaii 96793

WAIEHU KOU PHASE 2
Ms. Lisa Kane, President
5 Nakea Way
Wailuku, Hawaii 96793

WAIEHU KOU PHASE 3
Mr. James Aki, President
76 Kaulana Na Pua Lane
Wailuku, Hawaii 96793

PAUKUKALO HAWAIIAN HOMESTEAD
COMMUNITY ASSOCIATION, INC.
Ms. Olinda Aiwohi, President
781 Kawanana Street
Wailuku, Hawaii 96793

01/26/09



Landscape Architecture
City & Regional Planning

June 11, 2009

Micah Kane, Chair
State of Hawaii
Department of Hawaiian Homelands
PO Box 1879
Honolulu, Hawaii 96805

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Mr. Kane,

Thank you for your letter of January 26, 2009 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. In response to your comments, we note that MEO has been in contact with members of the Waiehu Kou Community Associations and intends to remain in contact with those communities.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

Respectfully submitted,

Matthew M. Slepina

Senior Associate • Land Planner

CC. Project File 07-001

LINDA LINGLE
GOVERNOR OF HAWAII



CHIYOME L. FUKINO, M. D.
DIRECTOR OF HEALTH

LORRIN W. PANG, M. D., M. P. H.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2102

December 29, 2008

Mr. Matthew M. Slepín
Senior Associate
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Hawai'i 96793

Dear Mr. Slepín:

Subject: **Early Consultation Request for the Proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu, TMK: (2) 3-3-001: 016**

Thank you for the opportunity to participate in the early consultation process for the proposed "Ke Kahua" Agricultural Farm. The following comments are offered:

1. National Pollutant Discharge Elimination System (NPDES) permit coverage may be required for this project. The Clean Water Branch should be contacted at 808 586-4309.
2. The noise created during the construction phase of the project may exceed the maximum allowable levels set forth in Hawaii Administrative Rules (HAR), Chapter 11-46, "Community Noise Control". A noise permit may be required and should be obtained before the commencement of work.
3. All lands formerly in the production of sugarcane should be characterized for arsenic contamination. If arsenic is detected above the US EPA Region preliminary remediation goal (PRG) for non-cancerous effects, then a removal and/or remedial plan must be submitted to the Hazard Evaluation and Emergency Response (HEER) Office of the State Department of Health for approval. The plan must comply with Chapter 128D, Environmental Response Law, Hawaii

cc: Matt 01/001
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DEC 30 2008

Mr. Matthew M. Slepín
December 29, 2008
Page 2

Revised Statutes (HRS), and Title 11, Chapter 451, HAR, State
Contingency Plan.

It is strongly recommended that the Standard Comments found at the Department's
website: <http://hawaii.gov/health/environmental/env-planning/landuse/landuse.html>
be reviewed, and any comments specifically applicable to this project should be
adhered to.

Should you have any questions, please call me at 808 984-8230.

Sincerely,

A handwritten signature in black ink, appearing to read 'H. Matsubayashi', with several loops and a long horizontal stroke extending to the right.

Herbert S. Matsubayashi
District Environmental Health Program Chief



Landscape Architecture
City & Regional Planning

June 11, 2009

Herbert Matsubayashi
District Environmental Health Program Chief
State of Hawaii
Department of Health
Maui District Health Office
54 High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Mr. Matsubayashi,

Thank you for your letter of December 29, 2008 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. In response to your comments, we note the following:

1. The applicant will coordinate with the Clean Water Branch in regards to National Pollutant Discharge Elimination System permit.
2. A Noise Permit will be obtained prior to construction activities should it be required.
3. The initial stages of the project entail agricultural activities. Environmental surveys will be carried out prior to any residential occupation of the site.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "M. Slepín". The signature is fluid and cursive, with a prominent initial "M" and a long, sweeping tail for the "n".

Matthew M. Slepín
Senior Associate • Land Planner

CC. Project File 07-001



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804

RECEIVED

Jan 5 2009

OFFICE OF SCHOOL FACILITIES AND SUPPORT SERVICES

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

CC: matt
07/001

December 31, 2008

Mr. Matthew M. Slepín, Senior Associate
Chris Hart & Partners, Inc.
115 N. Market Street
Wailuku, Hawaii 96793-1717

Dear Mr. Slepín:

Subject: Early Consultation Request for Agriculture Farm at Waiehu, Maui; TMK 3-3-001; por. 016

The Department of Education (DOE) has reviewed your request for comments on plans for a working farm in Waiehu, Maui, off of Kahekili Highway.

The DOE has only one concern, the proximity of the proposed farm to the future school site within the Hale Mua project, directly across Kahekili Highway from the proposed farm project. We would like to see that the Draft Environmental Assessment (DEA) for the project discuss the potential impact of the project on a school, including issues such as traffic flow, student safety, and farming practices. We assume that no school-age children will be permitted to live on the farm, but that should also be clarified in the DEA.

DOE has no further comment on the application but appreciates the opportunity to review the plans. If you have any questions, please call Heidi Meeker of the Facilities Development Branch at (808) 377-8301.

Sincerely yours,


Duane Y. Kashiwai
Public Works Administrator

DYK:jmb

c: Bruce Anderson, CAS, Baldwin/King Kekaulike/Maui Complex Areas



Landscape Architecture
City & Regional Planning

June 11, 2009

Duane Kashiwai, Public Works Administrator
State of Hawaii
Department of Education
PO Box 2360
Honolulu, Hawaii 96804

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Mr. Kashiwai,

Thank you for your letter of December 31, 2008 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. In response to your comments, we note that a traffic assessment has been prepared for the project and it will be included in the Draft EA. Due to the small size of the project, no impacts to area traffic operations are anticipated.

In addition, the Draft EA will clarify that the proposed "Ke Kahua" BEST House Program in Waiehu is an agriculturally based reintegration program which will provide career training to participants who have been previously incarcerated at Maui Community Correctional Center. No children will be program participants.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "M. Slepín". The signature is fluid and cursive, with a distinct flourish at the end.

Matthew M. Slepín

Senior Associate • Land Planner

CC. Project File 07-001

LINDA LINGLE
GOVERNOR OF HAWAII



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



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 9, 2008

Chris Hart & Partners, Inc.
115 N. Market Street
Wailuku, Hawaii 96793-1717

Attention: Mr. Matthew Slepín

Ladies and Gentlemen:

Subject: Early Consultation for the Proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu, Maui

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

A handwritten signature in cursive script that reads "Morris M. Atta".

Morris M. Atta
Administrator

RECEIVED

DEC 10 2008

CHRIS HART & PARTNERS, INC.
Landscape Architecture & Planning

CC: matt
07/001

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

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

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

June 13, 2008

Michael F. Dega, Ph.D.
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 975
Honolulu, Hawai'i 96813

LOG NO: 2008.2334
DOC NO: 0806PC23
Archaeology

Dear Dr. Dega:

SUBJECT: Chapter 6E-42 Historic Preservation Review of a Revised Archaeological Assessment for Approximately 11.75 Acres Located in Waiehu Waiehu Ahupua'a, Wailuku District, Island of Maui, Hawai'i TMK: (2) 3-3-001: por. 016

Thank you for the opportunity to review this revised report, which our staff received on June 12, 2008 (Shefcheck and Dega 2008): *An Archaeological Assessment of Approximately 11.75 Acres in Waiehu...* Scientific Consultant Services, Inc.

The report was first reviewed by SHPD staff on May 20 of 2008, resulting in two requested revisions (SHPD LOG NO: 2007.4178; DOC NO: 0805PC32). The most recent version of the report was reviewed in hardcopy format to confirm completion of previously requested revisions and suggestions.

The report now contains the required information as specified in HAR §13-276-5 regarding the contents of inventory survey level work conducted in general, and is acceptable.

Should you have any questions or comments regarding this review, please contact Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

A handwritten signature in black ink, appearing to read "Nancy McMahon".

Nancy McMahon, Archaeologist and Acting Archaeology Branch Chief
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

LINDA LINGLE
GOVERNOR



BRENNON T. MORIOKA
DIRECTOR

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

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

IN REPLY REFER TO:

DIR 1779
STP 8.3075

December 24, 2008

Mr. Matthew M. Slepín
Senior Associate
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Hawaii 96793-1717

RECEIVED

DEC 29 2008

CHRIS HART & PARTNERS, INC.
Landscape Architecture & Planning

CU *Matthew*

07/100

Dear Mr. Slepín:

Subject: Maui Economic Opportunity, Inc.
"Ke Kahua" Agricultural Farm at Waiehu
Early Consultation for Draft Environmental Assessment (Draft EA)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project. DOT's initial comments are as follows:

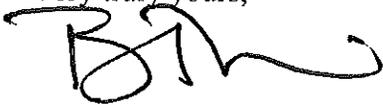
1. The project can impact the State highways by its contribution of traffic primarily at the Kahekili Highway/Waiehu Beach Road, intersection.
2. Any project access close to the Kahekili Highway/Waiehu Beach Road intersection or any access directly to Waiehu Beach Road including any infrastructure or utility connections abutting or into Waiehu Beach Road should be identified and described in the Draft EA.
3. A traffic assessment or traffic impact analysis report should be prepared and submitted as part of the Draft EA. The traffic report should cover any project contributions to local and regional traffic impacts. It should also include the cumulative traffic effects with all other projects in the area such as the proposed Hale Mua Subdivision located on Kahekili Highway across from the subject project. Required and recommended traffic mitigation measures should also be discussed in the report.
4. No additional storm water runoff will be allowed into the adjoining State highway right-of-way. Drainage from the subject project should be addressed in the Draft EA. Any construction work necessary along or in the State highway right-of-way will require the DOT Highways Division's prior review and approval.
5. The DOT requests that at least four copies of the Draft EA be provided to permit simultaneous review by the various appropriate Highways Division staff.

Mr. Matthew M. Slepín
December 24, 2008
Page 2

STP 8.3075

The DOT appreciates the courtesy of your early consultation. If there are any questions related to this early consultation, please contact Mr. David Shimokawa of the Plans Staff, Statewide Transportation Planning Office at 587-2356.

Very truly yours,

A handwritten signature in black ink, appearing to read 'BM', with a stylized flourish extending to the right.

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

c: Mr. Jeffrey S. Hunt, County of Maui, Department of Planning



Landscape Architecture
City & Regional Planning

June 11, 2009

Brennon Morioka, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Mr. Morioka,

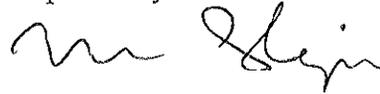
Thank you for your letter of December 24, 2008 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. In response to your comments, we note the following:

1. A traffic assessment has been prepared for the project and will be included in the Draft EA. This study finds that, due to the small size of the project, there are no substantive impacts to area traffic operations. This assessment includes cumulative traffic impacts, including the proposed Hale Mua Affordable Subdivision.
2. Onsite runoff from the project site will be collected by grated catch basins located at appropriate intervals along the driveways and parking areas. Runoff from the landscaped and farm areas will be collected by grassed swales. All runoff will be conveyed to an onsite detention basin which will be appropriately-sized to accommodate the increase in runoff from a 50-year, 1-hour storm.

3. The Department of Housing and Human Concerns, Maui Economic Opportunity, and Chris Hart & partners, Inc. all support paper conservation efforts and the reduction of needless paper waste. We would prefer to submit the Draft EA on compact discs, which reduce waste; however, we will accommodate the Department of Transportation.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

Respectfully submitted,



Matthew M. Slepín

Senior Associate • Land Planner

CC. Project File 07-001

PHONE (808) 594-1888

FAX (808) 594-1865



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

HRD08/4098

January 5, 2009

Chris Hart & Partners
115 N. Market Street
Wailuku, Maui, 96793-1706

RE: Early consultation request for the proposed Maui Economic Opportunity Ke Kahua agriculture farm at Waiehu, Maui, TMK: 3-3-001:016.

Aloha e Chris Hart,

The Office of Hawaiian Affairs (OHA) is in receipt of the above-mentioned letter dated December 5, 2008. OHA has reviewed the project and offers the following comments.

We are naturally supportive of a program that proposes to benefit our beneficiaries as well as draw upon Native Hawaiian concepts to do it. However, as with any project there are concerns and suggestions to help make the best probable outcomes result.

We look forward to seeing a more descriptive telling of the proposal. We are unsure how extensive the housing facilities will be, which would affect the nature of our comments. We also are interested in knowing how this proposal will use and affect the water in the area. We do note that this project does appear to match the zoning intent of the area in terms of the farming activities.

Thank you for the opportunity to comment. If you have further questions, please contact Grant Arnold by phone at (808) 594-0263 or e-mail him at granta@oha.org.

'O wau iho nō me ka 'oia'i'o,

A handwritten signature in black ink, appearing to read "Clyde W. Nāmu'o".

Clyde W. Nāmu'o
Administrator

C: OHA CRC Maui

cc: matt 07/01

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JAN - 9 2009

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning



Landscape Architecture
City & Regional Planning

June 11, 2009

Clyde Namu'o, Administrator
State of Hawaii
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Mr. Namu'o,

Thank you for your letter of January 5, 2009 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. In response to your comments, we note the following:

1. A copy of the Draft EA will be provided to you to provide more information on the project.
2. One or more farm labor dwellings may be constructed in the future as part of the project. Upon completion, this farm and agricultural training center is anticipated to house 20 residents.
3. A well will be drilled onsite and a storage tank will be constructed to provide water for irrigation purposes. The estimated irrigation demand for the project is 27,900 gallons per day based on the net area to be used for farming activities on the project site.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "M. Slepín".

Matthew M. Slepín

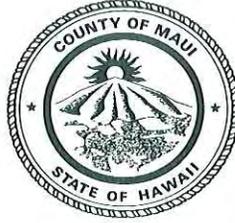
Senior Associate • Land Planner

CC. Project File 07-001

CHARMAINE TAVARES
Mayor

CHERYL K. OKUMA, Esq.
Director

GREGG KRESGE
Deputy Director



TRACY TAKAMINE, P.E.
Solid Waste Division

DAVID TAYLOR, P.E.
Wastewater Reclamation
Division

**COUNTY OF MAUI
DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT**
2200 MAIN STREET, SUITE 100
WAILUKU, MAUI, HAWAII 96793

January 26, 2009

Mr. Matthew Slepín
Senior Associate
Chris Hart & Partners Inc.
115 N. Market Street
Wailuku, Hawaii 96793

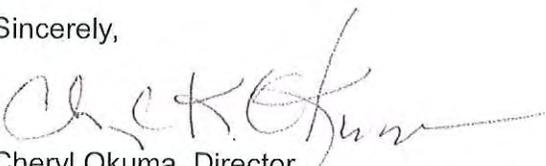
**SUBJECT: KE KAHUA AGRICULTURAL FARM
MAUI ECONOMIC OPPORTUNITY
EARLY CONSULTATION
TMK (2) 3-3-001:016, WAIEHU**

We reviewed the subject application and have the following comments:

1. Solid Waste Division comments:
 - a. None.
2. Wastewater Reclamation Division (WWRD) comments:
 - a. There is no County wastewater system in the immediate vicinity of this proposed project. If the developer intends to discharge the proposed project's wastewater to the County's system, submit detailed information on the proposed improvements to our division for review and approval

If you have any questions regarding this memorandum, please contact Gregg Kresge at 270-8230.

Sincerely,



Cheryl Okuma, Director

RECEIVED

JAN 28 2009

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

*Cc. matt
05/073*



Landscape Architecture
City & Regional Planning

June 11, 2009

Cheryl Okuma, Director
County of Maui
Department of Public Works and Environmental Management
200 South High Street, Suite 175
Wailuku, Hawaii 96793

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Ms. Okuma,

Thank you for your letter of January 26, 2009 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. In response to your comments, we note the Draft EA will contain more information regarding the proposed wastewater system. Wastewater generated by the project will be collected by an onsite gravity sewer system and conveyed to individual wastewater systems. The individual wastewater systems will be designed in accordance with State Department of Health regulations. Project consultants will coordinate with your Department.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

Respectfully submitted,

Matthew M. Slepín

Senior Associate • Land Planner

CC. Project File 07-001



DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

CHARMAINE TAVARES
Mayor

LORI TSUHAKO
Director

JO-ANN T. RIDAO
Deputy Director

2200 MAIN STREET • SUITE 546 • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165
MAILING ADDRESS: 200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • EMAIL director.hhc@mauicounty.gov

December 10, 2008

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DEC 12 2008

Mr. Matthew M. Slepín
Senior Associate
Chris Hart & Partners Inc.
115 N. Market Street
Wailuku, Hawaii 96793

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

cc: matt

07/001

Dear Mr. Slepín:

Subject: Early Consultation Request for the Proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-001:016 (11.476 acres)

We have reviewed the Early Consultation Request for the above subject project and would like to inform you that we do not have any comment to offer at this time.

Please call Mr. Wayde Oshiro of our Housing Division at 270-7355 if you have any questions.

Sincerely,

LORI TSUHAKO
Director of Housing and Human Concerns

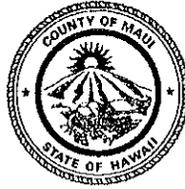
xc: Housing Division

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DEC 12 2008

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

CHARMAINE TAVARES
Mayor



TAMARA HORCAJO
Director

ZACHARY Z. HELM
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793

December 29, 2008

Chris Hart & Partners, Inc.
Attention: Mr. Matthew M. Slepín
115 N. Market Street
Wailuku, HI 96793

**SUBJECT: Early Consultation Request for the Proposed Maui Economic Opportunity
"Ke Kahua" Agricultural Farm
Waiehu, Maui
TMK: (2) 3-3-001:016 (por.)**

Dear Mr. Slepín:

Thank you for the opportunity to review and comment on the subject project. We would recommend that you meet with us to discuss the plans for the project, as the project scope may require Park Dedication Requirements.

Please feel free to contact me or Mr. Patrick Matsui, Chief of Parks Planning and Development at 270-7931, should you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Tamara Horcajo".

TAMARA HORCAJO
Director

xc: Patrick Matsui, Chief of Parks Planning and Development

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JAN - 5 2009

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

cc: matt
01/001



Landscape Architecture
City & Regional Planning

June 11, 2009

Tamara Horcajo, Director
County of Maui
Department of Parks and Recreation
700 Hali'a Nako Street, Unit 2
Wailuku, Hawaii 96793

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Ms. Horcajo,

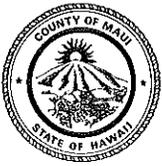
Thank you for your letter of December 29, 2008 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. The applicant will coordinate with your Department regarding the potential for Parks Dedication Requirements.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

Respectfully submitted,

Matthew M. Slepín
Senior Associate • Land Planner

CC. Project File 07-001



POLICE DEPARTMENT
COUNTY OF MAUI



CHARMAINE TAVARES
MAYOR

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

OUR REFERENCE
tj
YOUR REFERENCE

GARY A. YABUTA
DEPUTY CHIEF OF POLICE

December 19, 2008

RECEIVED

JAN - 5 2009

Mr. Matthew M. Slepín
Senior Associate
Chris Hart & Partners, Inc.
115 N. Market Street
Wailuku, HI 96793-1706

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

cc: matt
07/001

Dear Mr. Slepín:

SUBJECT: Early Consultation Request for the Proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu, Maui
TMK: 3-3-001:016 (por.)

Thank you for your letter of December 5, 2008, requesting comments on the above subject.

We have reviewed the information submitted for this project and offer the enclosed comments at this time.

Thank you for giving us the opportunity to comment on this project.

Very truly yours,

Assistant Chief Wayne T. Ribao
for: Thomas M. Phillips
Chief of Police

c: Jeffrey Hunt, Maui County Planning Department

COPY

CC: Matt
RECEIVED

JAN - 5 2009

TO : THOMAS PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI

VIA : CHANNELS

FROM : STEPHEN ORIKASA, ADMINISTRATIVE SERGEANT,
WAILUKU PATROL DIVISION

SUBJECT : RESPONSE TO A REQUEST FOR EARLY CONSULTATION COMMENTS
REGARDING THE PROPOSED MAUI ECONOMIC OPPORTUNITY "KE
KAHUA" AGRICULTURAL FARM

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

CONCUR:
AC W. Phillips
12/19/08

This communication is submitted as a response to a request for early consultation comments by Chris Hart & Partners, Inc., Senior Associate, Matthew M. Slepik, regarding the proposed Maui Economic Opportunity "Ke Kahua" agricultural Farm at Waiehu, Maui; TMK (2) Portion of: 3-3-001:016 (11.476 acres).

RESPONSE:

In review of the submitted documents, the focus from the police perspective would be upon the safety of pedestrian and vehicular movement.

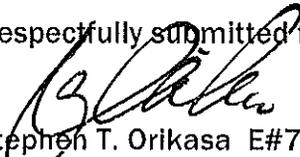
The primary and secondary ingress and egress points appear to be at an adequate distance as not to compromise safety or movement at the nearby intersections of Kahekili Highway and Waiehu Beach Road, and Kahekili Highway and Makaala Drive.

What I could not determine from Figure 2 of the Conceptual Site Plan, is if there will be any improvements for pedestrian walkways along Kahekili Highway fronting the proposed project. This may be something to look at since there is a plan to construct a roadside produce stand on the property.

During the construction phases of this project, extreme measures should be taken to minimize and mitigate any noise, dust and debris which could have adverse effects upon the health, safety and well being of those in nearby residential areas or passing through the area.

Should the ingress and egress of heavy equipment and vehicles providing service during the construction phases hinder normal vehicular and pedestrian movement, mitigation plans should be in place prior to its commencement.

Respectfully submitted for your review and approval.


Stephen T. Orikasa E#716
Administrative Sergeant/Wailuku Patrol Division
12/19/08 @ 0725 Hours

No further comments
J.M. [unclear]
12/19/08 @ 1120



Landscape Architecture
City & Regional Planning

June 11, 2009

Thomas Philips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Chief Philips,

Thank you for your letter of December 19, 2008 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. In response to your comments, we note the following:

1. There are no plans to create sidewalks along Kahekili Highway, which would be out of character for the area and would not be in the vicinity of any other sidewalks. The produce stand will be located within the project site and will have a location for parking.
2. Best Management Practices will be employed during construction activities to minimize impacts from noise, dust, and debris.
3. We do not anticipate substantial impacts to traffic operations from construction activities.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

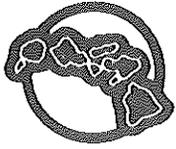
Respectfully submitted,

A handwritten signature in black ink, appearing to read "M. Slepín". The signature is fluid and cursive, with a small accent mark over the "i" in "Slepín".

Matthew M. Slepín

Senior Associate • Land Planner

CC. Project File 07-001



RECEIVED

DEC 15 2008

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

*CC: Matt
01/001*

December 11, 2008

Mr. Matthew M. Slepín, Senior Associate
Chris Hart & Partners, Inc.
115 N. Market Street
Wailuku, Hawaii 96793

Dear Mr. Slepín,

Subject: Early Consultation Request for the Proposed Maui Economic Opportunity "Ke
Kahua" Agricultural Farm at Waiehu, Maui
Waiehu, Maui, Hawaii
TMK: (2) 3-3-001:016(por.)

Thank you for allowing us to comment on the Early Consultation Request for the subject project.

In reviewing our records and the information received, Maui Electric Company (MECO) may require access and electrical easements for our facilities to serve the subject project site. Since State of Hawaii and County of Maui permits for work within their right-of-way may be required prior to MECO's installation, we highly encourage the customer's electrical consultant to submit the electrical demand requirements, project time schedule, and schedule a meeting with us as soon as practical so that service can be provided on a timely basis.

Should you have any questions or concerns, please call me at 871-2340.

Sincerely,

Ray Okazaki
Staff Engineer



Landscape Architecture
City & Regional Planning

June 11, 2009

Ray Okazaki, Staff Engineer
Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96733

SUBJECT: Proposed Maui Economic Opportunity "Ke Kahua"
Agricultural Farm at Waiehu, Maui; TMK (2) portion of: 3-3-
001:016 (11.476 acres)

Dear Mr. Okazaki,

Thank you for your letter of December 11, 2008 providing early consultation comments on the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu. In response to your comments, we note that the applicant's electrical consultant will coordinate with you regarding demand requirements, project time schedule, and any required easements.

Thank you again for providing us with your comments. Please feel free to call me at (808) 242-1955 should you have any questions.

Respectfully submitted,

Matthew M. Slepín
Senior Associate • Land Planner

CC. Project File 07-001

Appendix C

PRELIMINARY ENGINEERING REPORT
FOR
MAUI ECONOMIC OPPORTUNITY, INC.
KE KAHUA BEST HOUSE

Waiehu, Maui, Hawaii

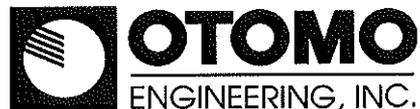
T.M.K.: (2) 3-3-001: 016

Prepared for:

Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Maui, Hawaii 96793



Prepared by:



CONSULTING CIVIL ENGINEERS
305 SOUTH HIGH STREET, SUITE 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032
FAX: (808) 242-5779

April 2009

TABLE OF CONTENTS

1.0 INTRODUCTION

2.0 EXISTING INFRASTRUCTURE

2.1 ROADWAYS

2.2 DRAINAGE

2.3 SEWER

2.4 WATER

2.5 ELECTRIC, TELEPHONE & CABLE TV

3.0 ANTICIPATED INFRASTRUCTURE IMPROVEMENTS

3.1 ROADWAYS

3.2 DRAINAGE

3.3 SEWER

3.4 WATER

3.5 ELECTRIC, TELEPHONE & CABLE TV

EXHIBITS

1 LOCATION MAP

2 VICINITY MAP

3 SOIL SURVEY MAP

4 FLOOD INSURANCE RATE MAP

APPENDICES

A HYDROLOGIC CALCULATIONS

B WATER DEMAND CALCULATIONS

C WASTEWATER CALCULATIONS

**PRELIMINARY ENGINEERING REPORT
FOR
MAUI ECONOMIC OPPORTUNITY, INC.
KE KAHUA BEST HOUSE
T.M.K.: (2) 3-3-001: 016**

1.0 INTRODUCTION

The purpose of this report is to provide information on the existing infrastructure which will be servicing the proposed project. It will also evaluate the adequacy of the existing infrastructure and anticipated improvements which may be required for the proposed project.

The subject parcel is identified as T.M.K.: (2) 3-3-001: 016. It is also known as Lot 1-C of the Paukukalo Large-Lot Subdivision, encompassing an area of 11.476 acres. It is bordered by Waiehu Beach Road to the north, the Waiehu Heights Subdivision to the east; vacant agricultural land to the south, and Kahekili Highway to the west. The project site is undeveloped and was previously used as a macadamia nut orchid.

The "Ke Kahua Farm" is part of MEO's BEST (Being Empowered and Safe Together) Reintegration Program. The BEST program will provide job training, counseling and other support services for persons released from prison. Residents will typically be in the program for two years before returning to the community-at-large. The residents will live on the farm in a structured setting and train and work on the farm. The proposed farm will grow a variety of crops such as vegetables, herbs, fruits, and other suitable crops. The produce grown on the farm will be sold at a roadside produce stand on the property to help support the program and provide hands-on business training.

Improvements include a farm dwelling, an accessory farm dwelling, a farm labor dwelling, an agricultural building, traditional hale for cultural activities, roadside stand, off-street parking, fencing, water storage tank, individual wastewater system, irrigation well, and related improvements.

2.0 EXISTING INFRASTRUCTURE

2.1 ROADWAYS

Kahekili Highway is located immediately west of the project site. It is a two-lane State Highway north of the Waiehu Beach Road-Kahekili Highway intersection, which runs in the north-south direction between Wailuku and Waihee. It is a two-lane County roadway to the south of said intersection. The

posted speed limit is 30 miles per hour (mph) in the vicinity of the project site. Kahekili Highway has paved shoulders on both sides of the travel lanes, but no curbs, gutters or sidewalks.

Waiehu Beach Road connects Kahekili Highway with Lower Main Street. It is a two-lane, two-way State roadway which runs in a northwest-southeast direction. The posted speed limit is 30 mph. The Waiehu Beach Road-Kahekili Highway intersection is an unsignalized T-intersection with a stop sign along Waiehu Beach Road. There are no separate turning lanes along any of the approaches.

2.2 DRAINAGE

The western half of the project site is the developable area of the parcel. The existing ground slopes in a north to south direction from elevation 46 feet above mean sea level near the Waiehu Beach Road-Kahekili Highway intersection to elevation 120 feet above mean sea level at the southerly boundary, with an average slope of approximately 3.5%. The eastern half of the project site consists of a steep embankment up to the Waiehu Heights Subdivision. The highest point of the parcel is at the southeastern corner at an elevation of 155 feet above mean sea level. There is an existing drainage swale located between the developable area of the parcel and the toe of the embankment. The swale runs in a south to north direction and crosses Waiehu Beach Road immediately east of the Kahekili Highway intersection via a 4-foot diameter culvert. Runoff ultimately flows into the ocean. The developable area of the project site is currently undeveloped and previously used as a macadamia nut orchid.

According to the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (August, 1972)," prepared by the United States Department of Agriculture Soil Conservation Service, the soils within the project site are classified as Iao silty clay, 0 to 3 percent slopes (IaA), Iao cobbly silty clay, 3 to 7 percent slopes (IbB), and Puuone sand, 7 to 30 percent slopes (PZUE). Iao silty clay is characterized as having slow runoff and no more than slight erosion hazard. Iao cobbly silty clay is characterized as having moderately slow permeability, medium runoff, and a slight to moderate erosion hazard. Puuone sand is characterized as having rapid permeability above the cemented layer, slow runoff and a moderate to severe hazard for wind erosion.

According to Panel Numbers 150003 0180 B, dated June 1, 1981 and 150003 0190 D, dated March 16, 1995, of the Flood Insurance Rate Map prepared by the United States Federal Emergency Management Agency, the subject parcel is located within Flood Zone C. Flood Zone C represents areas of minimal flooding.

It is estimated that the present onsite runoff for a 50-year, 1-hour storm from the entire project site is 10.87 cfs.

2.3 SEWER

There are no existing gravity sewerlines in the immediate vicinity of the project site. The nearest wastewater facility is an existing 6-inch force main along Waiehu Beach Road, which is located approximately 900 feet away from the nearest proposed building in the project.

Wastewater collected from the Wailuku and Waihee areas is transported to the Kahului-Wailuku Wastewater Reclamation Facility in Naska. According to the Wastewater Reclamation Division, County of Maui, as of December 31, 2008, the cumulative flow allocated for the facility is 6.85 million gallons per day (mgd) and the average daily flow is approximately 5.0 mgd. The design capacity of the facility is 7.9 mgd.

2.4 WATER

There are no existing waterlines along Kahekili Highway adjacent to the project site. There are existing 8-inch and 12-inch waterlines along Kahekili Highway to the north of the Waiehu Beach Road intersection. Both waterlines traverse onto Waiehu Beach Road from Kahekili Highway.

Storage in this area is from an existing 1.0 million gallon reservoir located approximately 6,000 feet to the west of the project site at an elevation of 490 feet.

The sources of water for this system are from wells located in Upper Waiehu and Waihee.

2.5 ELECTRIC, TELEPHONE & CABLE TV

There are existing overhead power, telephone and cable TV facilities along the mauka side of Kahekili Highway.

3.0 ANTICIPATED INFRASTRUCTURE IMPROVEMENTS

3.1 ROADWAYS

Primary access to and egress from the project site will be from a new driveway along Kahekili Highway, approximately 975 feet south of the Kahekili Highway-Waiehu Beach Road intersection. There are two secondary driveways, one on either side of the primary access that provide access and egress from the agricultural fields. The intended use of these driveways will be by agricultural vehicles only and during off-peak hours only.

The major interior roadways will consist of 24-foot wide paved roadways. All designated parking areas will be paved and meet the minimum dimensions set forth in the County's parking ordinance.

A Traffic Impact Assessment Report was prepared for the project on by Phillip Rowell and Associates, which concluded the following:

- "1. The proposed project will generate 7 inbound and 5 outbound trips during the morning peak hour. During the afternoon peak hour, the project will generate 8 inbound and 5 outbound trips.
2. The TIAR for Hale Mua recommended improvements to the intersections along Kahekili Highway. However, since Hale Mua may not be constructed within the study period for the MEO BEST project, all the study intersections were analyzed with and without Hale Mua traffic.
3. The traffic study for Hale Mua recommended that the intersection of Waiehu Beach Road at Kahekili Highway be signalized because the warrant for a traffic signal is satisfied by existing traffic conditions. With traffic signals, the intersection will operate at an acceptable level-of-service and no additional mitigation is required. The MEO BEST project adds two (2) trips to this intersection during the morning peak hour and four (4) trips during the afternoon peak hour.
4. At the intersection of Kahekili Highway at Makaala Drive, the left turns from westbound Makaala Drive to southbound Kahekili Highway will operate at Level-of-Service F during the morning peak with Hale Mua traffic and at Level-of-Service D without Hale Mua traffic. The proposed MEO BEST project adds ten (10) trips to this intersection during the morning peak hour and nine (9) trips during the afternoon peak hour. The conclusion is that the Level-of-Service F is the result of traffic generated

by Hale Mua. Otherwise, the intersection will operate at Level-of-Service D.

5. The intersection of Kahekili Highway at the project driveway will operate at a Level-of-Service B without any improvement, such as a left turn storage lane, without Hale Mua. The TIAR for Hale Mua recommended that a separate left turn lane be installed for traffic turning from northbound Kahekili Highway into the Hale Mua project. With this improvement and with Hale Mua traffic, the intersection will operate at Level-of-Service C during both peak periods.
6. The roadside stand should be located a sufficient distance from Kahekili Highway to discourage parking along Kahekili Highway and the associated pedestrian activity. Sufficient parking to accommodate foreseeable demand should be provided so that no vehicles will park along the highway.
7. The Maui Bus should be contacted regarding the feasibility of providing bus service to and from the project.”

3.2 DRAINAGE

Onsite runoff from the project site will be collected by grated catch basins located at appropriate intervals along the driveways and parking areas. Runoff from the landscaped and farm areas will be collected by grassed swales. All runoff will be conveyed to an onsite detention basin which will be appropriately sized to accommodate the increase in runoff from a 50-year, 1-hour storm. This is in accordance with Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui. Any overflow from the detention basin will sheet flow into the existing swale, as it is presently doing. There will be no increase in runoff into the existing swale due to the development of the project.

It is estimated that the post development runoff from the project site will be 13.39 cfs, with a net increase of 2.52 cfs.

3.3 SEWER

The full build out of the proposed project is expected to generate a wastewater flow of 880 gallons per day. The nearest gravity sewer connection

is located more than 1,500 feet from the proposed buildings in the project site. Connection to this gravity system will require a lift station for the project.

Due to the distance to the wastewater system from the project site, the wastewater generated by the project will be collected by an onsite gravity sewer system and conveyed to individual wastewater systems. The individual wastewater systems will be designed in accordance with State Department of Health regulations.

3.4 WATER

The domestic water demand for the project is anticipated to be approximately 720 gallons per day as determined by the land area and 1,800 gallons per day as determined by the total number of units. Therefore, the 1,800 gallons per day will govern for the project. Plans for the installation of a water lateral has been prepared and submitted for review. A 3/4-inch water meter will provide domestic water for the project.

A well will be drilled onsite and a storage tank will be constructed to provide water for irrigation purposes. The irrigation demand for the project is 27,900 gallons per day based on the net area to be used for farming activities on the project site.

In accordance with DWS standards, the fire flow demand for an agriculture land use is 500 gallons per minute for a 2-hour duration. The subject parcel was part of a large lot subdivision. Some of the subdivision improvements such as water service and fire protection were not required until the development of the individual large lots. Fire protection for the project will be provided to meet the requirements of the Department of Water Supply and the Fire Department.

3.5 ELECTRIC, TELEPHONE & CABLE TV

The proposed electrical, telephone, and cable TV distribution systems will be serviced from the existing overhead facilities along Kahekili Highway. Within the project site, all distribution systems will be installed underground. Lighting requirements will be determined by the electrical engineer.

APPENDIX A
HYDROLOGIC CALCULATIONS

Hydrologic Calculations

Purpose: Determine the increase in onsite surface runoff from the undeveloped portion of the project site based on a 50-year, 1-hour storm.

A. Determine the Runoff Coefficient (C):

DRAINAGE AREA CHARACTERISTICS:

ROOF AREAS:

Infiltration (Negligible)	=	0.20
Relief (Hilly)	=	0.06
Vegetal Cover (None)	=	0.07
Development Type (Roof)	=	<u>0.55</u>
C	=	0.88

PAVEMENT AREAS:

Infiltration (Negligible)	=	0.20
Relief (Flat)	=	0.00
Vegetal Cover (None)	=	0.07
Development Type (Pavement)	=	<u>0.55</u>
C	=	0.82

LANDSCAPE AREAS:

Infiltration (Medium)	=	0.07
Relief (Flat)	=	0.00
Vegetal Cover (Good)	=	0.03
Development Type (Landscape)	=	<u>0.15</u>
C	=	0.25

GRAVEL ROADWAY AREAS:

Infiltration (Medium)	=	0.07
Relief (Flat)	=	0.00
Vegetal Cover (None)	=	0.07
Development Type (Gravel)	=	<u>0.15</u>
C	=	0.29

EXISTING CONDITIONS:

Ag Area = 11.48 Acres

WEIGHTED C = 0.25

DEVELOPED CONDITIONS:

Paved Area = 0.57 Acres

Roof Area = 0.24 Acres

Gravel Roadway Area = 0.36 Acres

Landscaped Area = 10.31 Acres

WEIGHTED C = 0.29

- B. Determine the 50-year 1-hour rainfall:

$$i_{50} = 2.8 \text{ inches}$$

Adjust for time of concentration to compute Rainfall Intensity (I):

Existing Condition:

$$T_c = 32 \text{ minutes}$$

$$I = 3.79 \text{ inches/hour}$$

Developed Condition:

$$T_c = 28 \text{ minutes}$$

$$I = 4.02 \text{ inches/hour}$$

- C. Drainage Area (A) = 11.48 Acres

- D. Compute the 50-year storm runoff volume (Q):

$$Q = CIA$$

Existing Conditions:

$$\begin{aligned} Q &= (0.25)(3.79)(11.48) \\ &= 10.87 \text{ cfs} \end{aligned}$$

Developed Conditions:

$$\begin{aligned} Q &= (0.29)(4.02)(11.48) \\ &= 13.39 \text{ cfs} \end{aligned}$$

There will be an increase in runoff of $13.39 \text{ cfs} - 10.87 \text{ cfs} = 2.52 \text{ cfs}$ due to the proposed development .

Hydrograph Plot

English

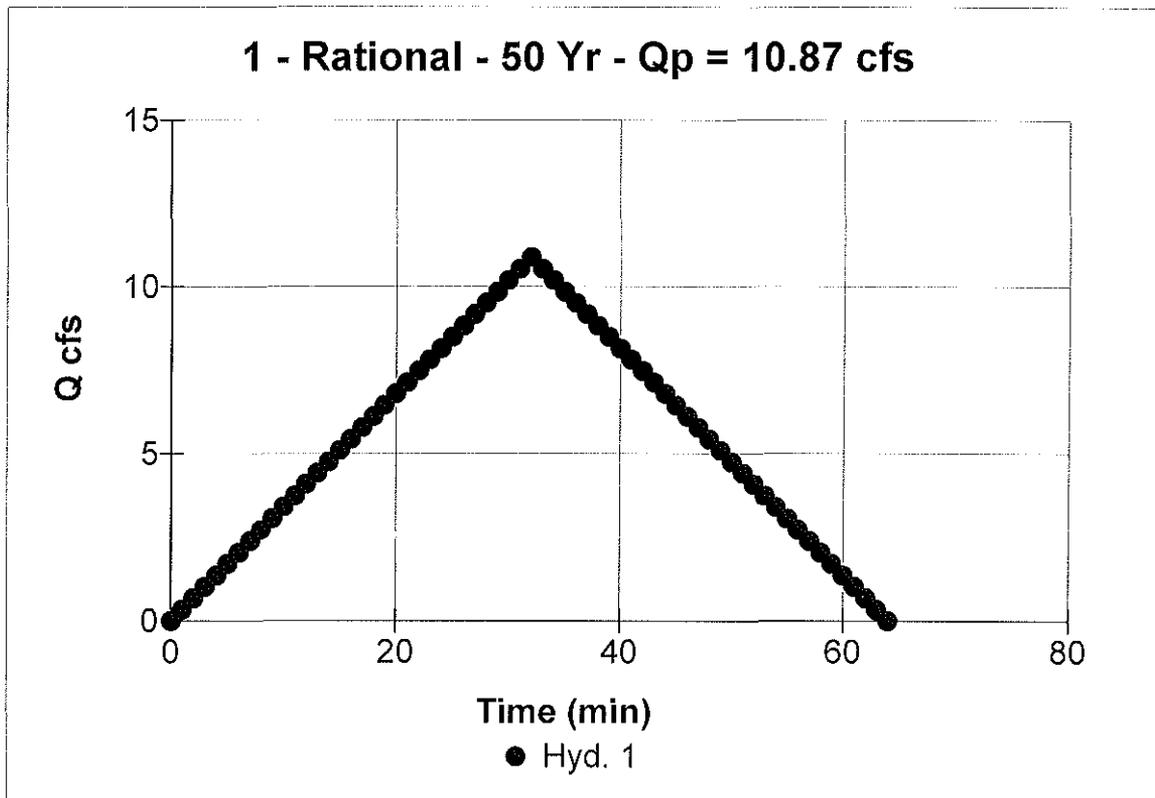
Hyd. No. 1

EXISTING CONDITION

Hydrograph type = Rational
Storm frequency = 50 yrs
Drainage area = 11.5 ac
Intensity = 3.79 in
I-D-F Curve = 2.8.IDF

Peak discharge = 10.87 cfs
Time interval = 1 min
Runoff coeff. = 0.25
Time of conc. (T_c) = 32 min
Reced. limb factor = 1

Total Volume = 20,875 cuft



Hydrograph Plot

English

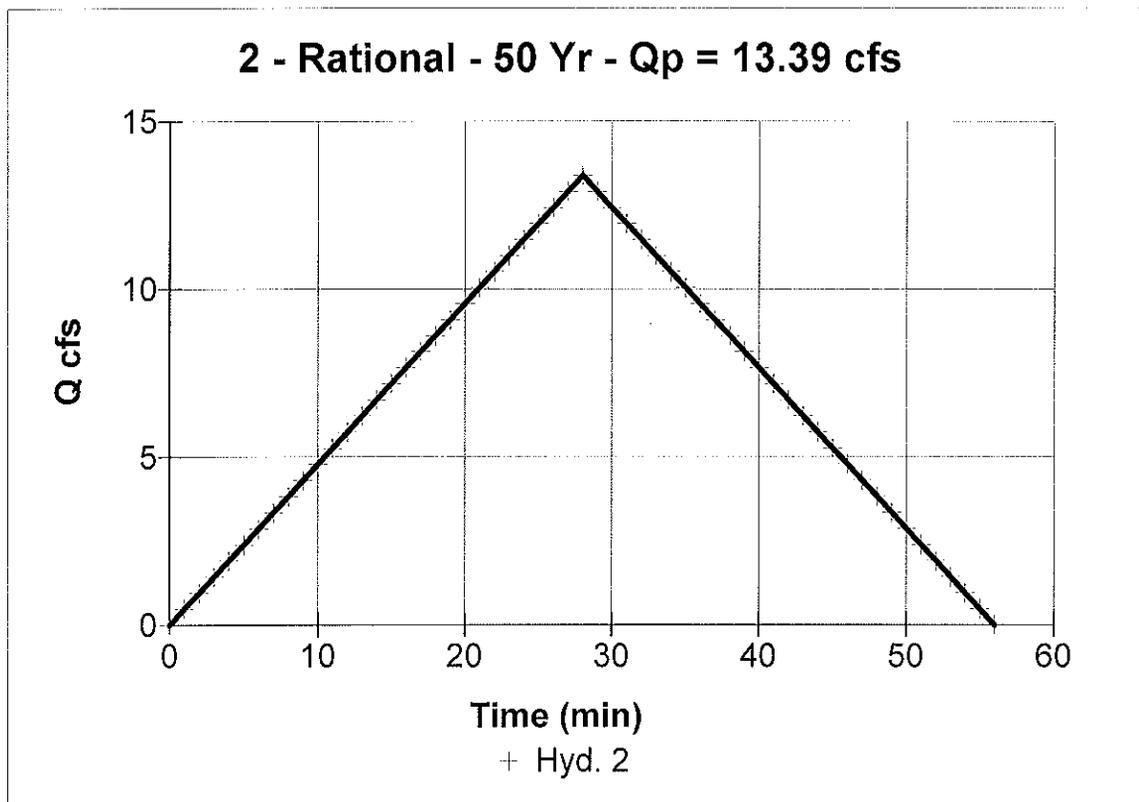
Hyd. No. 2

DEVELOPED CONDITIONS

Hydrograph type = Rational
Storm frequency = 50 yrs
Drainage area = 11.5 ac
Intensity = 4.02 in
I-D-F Curve = 2.8.IDF

Peak discharge = 13.39 cfs
Time interval = 1 min
Runoff coeff. = 0.29
Time of conc. (Tc) = 28 min
Reced. limb factor = 1

Total Volume = 22,491 cuft



APPENDIX B
WATER DEMAND CALCULATIONS

WATER DEMAND CALCULATIONS

The proposed project is comparable to two single family residences and an ohana unit.

Per 2002 Water System Standards:

Average Daily Demand (ADD) for domestic purposes = 600 gallons per unit or 3,000 gallons per acre

ADD = (3 Units) (600 gpd) = 1,800 gpd

ADD = (0.24 Acres) (3,000 gpd) = 720 gpd

The 1,800 gpd for the domestic demand governs.

Average Daily Demand (ADD) for irrigation purposes = 5,000 gallons per acre for an agriculture zoning designation.

The net farm area (less un-developable gulch and drainage area, buildings and roadways) = 5.58 acres.

ADD = (5,000 gal/acre) (5.58 acres) = 27,900 gpd (for irrigation)

APPENDIX C
WASTEWATER CALCULATIONS

WASTEWATER CALCULATIONS

The proposed project is comparable to two single family residences and an ohana unit.

Per the 2000 Wastewater Flow Standards:

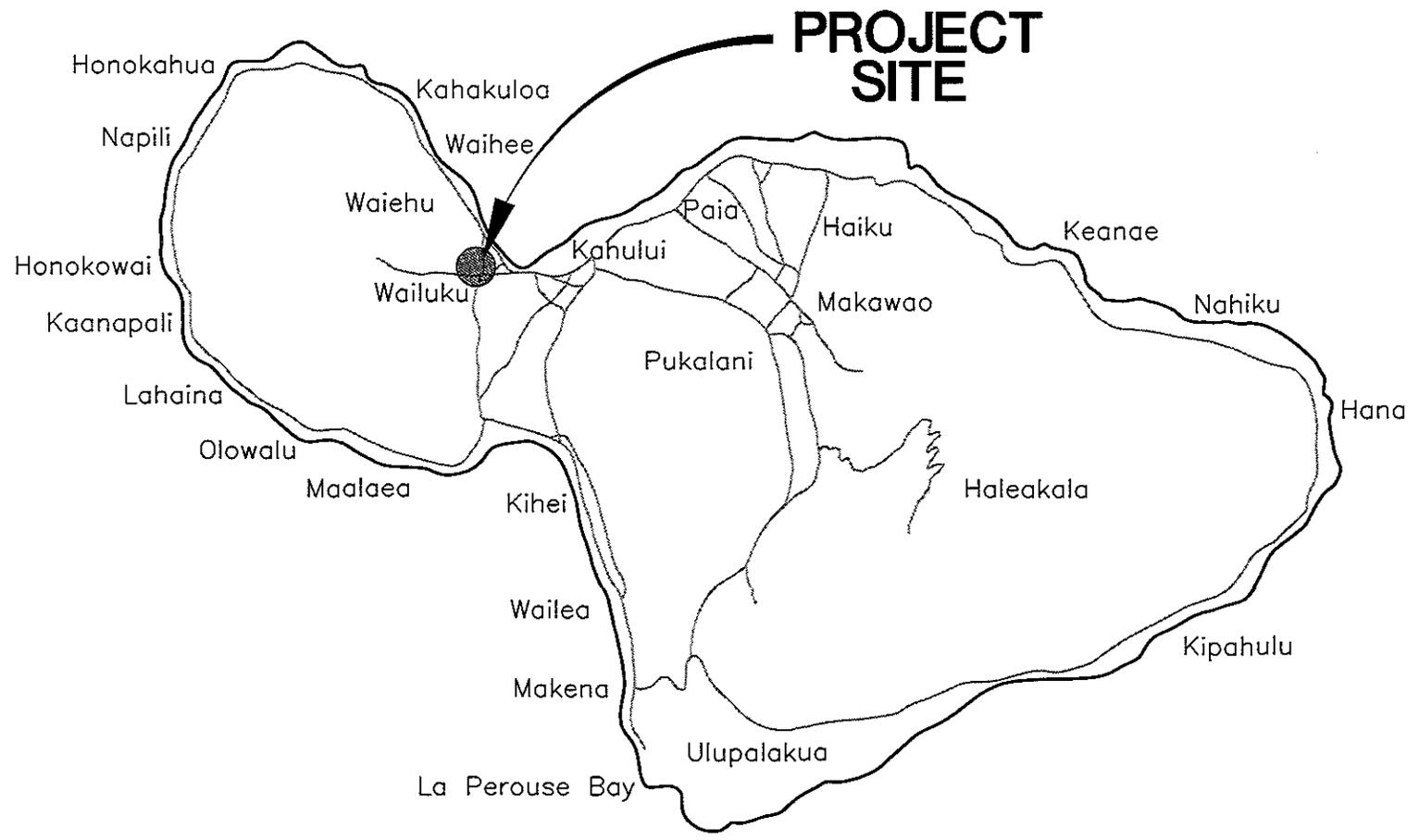
Wastewater Contribution for a Residence = 350 gpd

Wastewater Contribution for an Ohana = 180 gpd

Contribution = (2) x (350 gpd) + (1) x (180) = 880 gpd

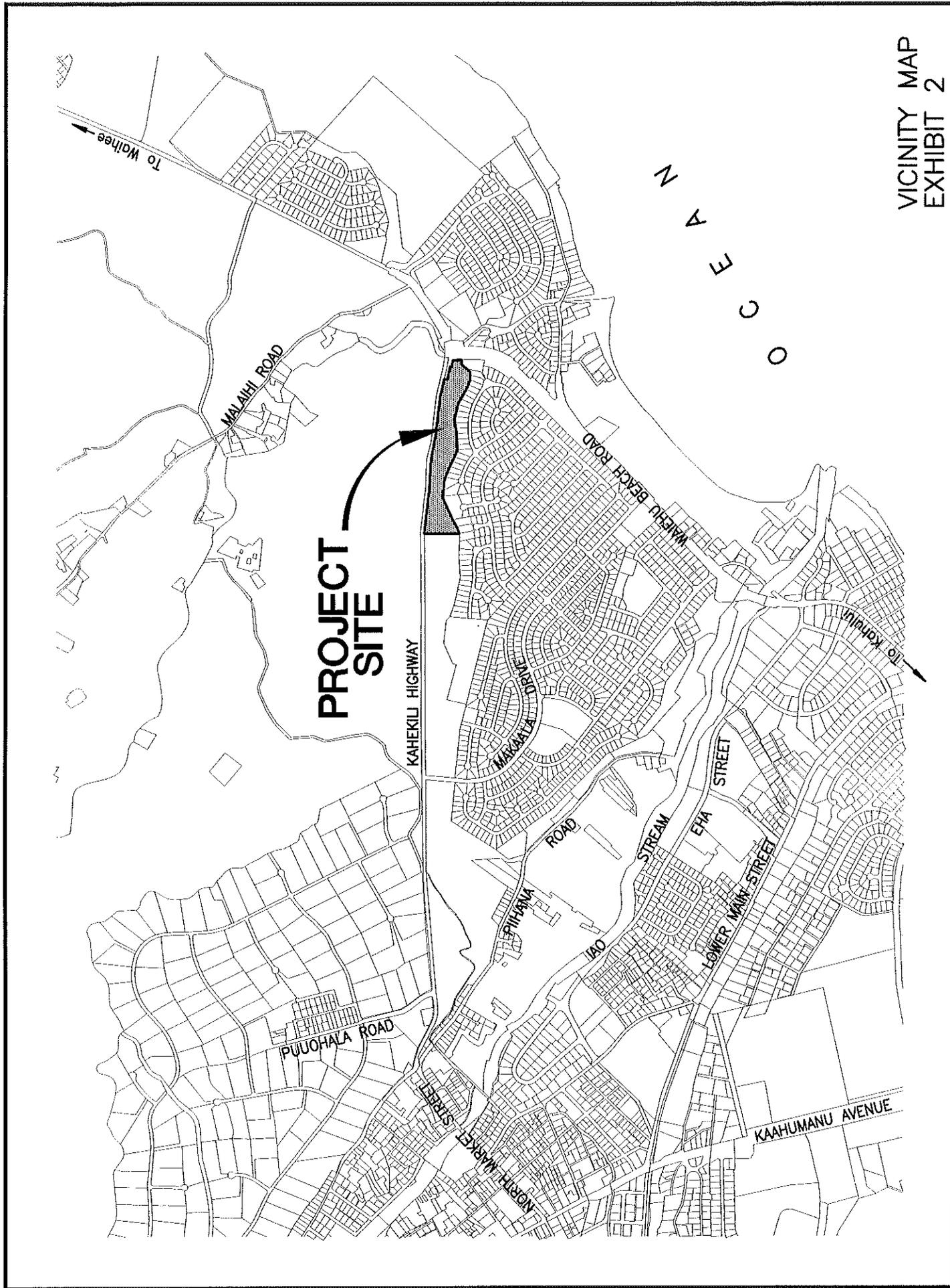
EXHIBITS

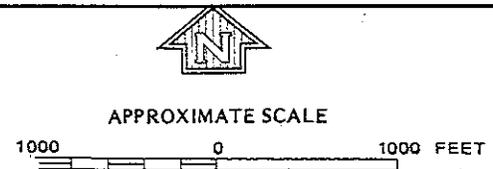
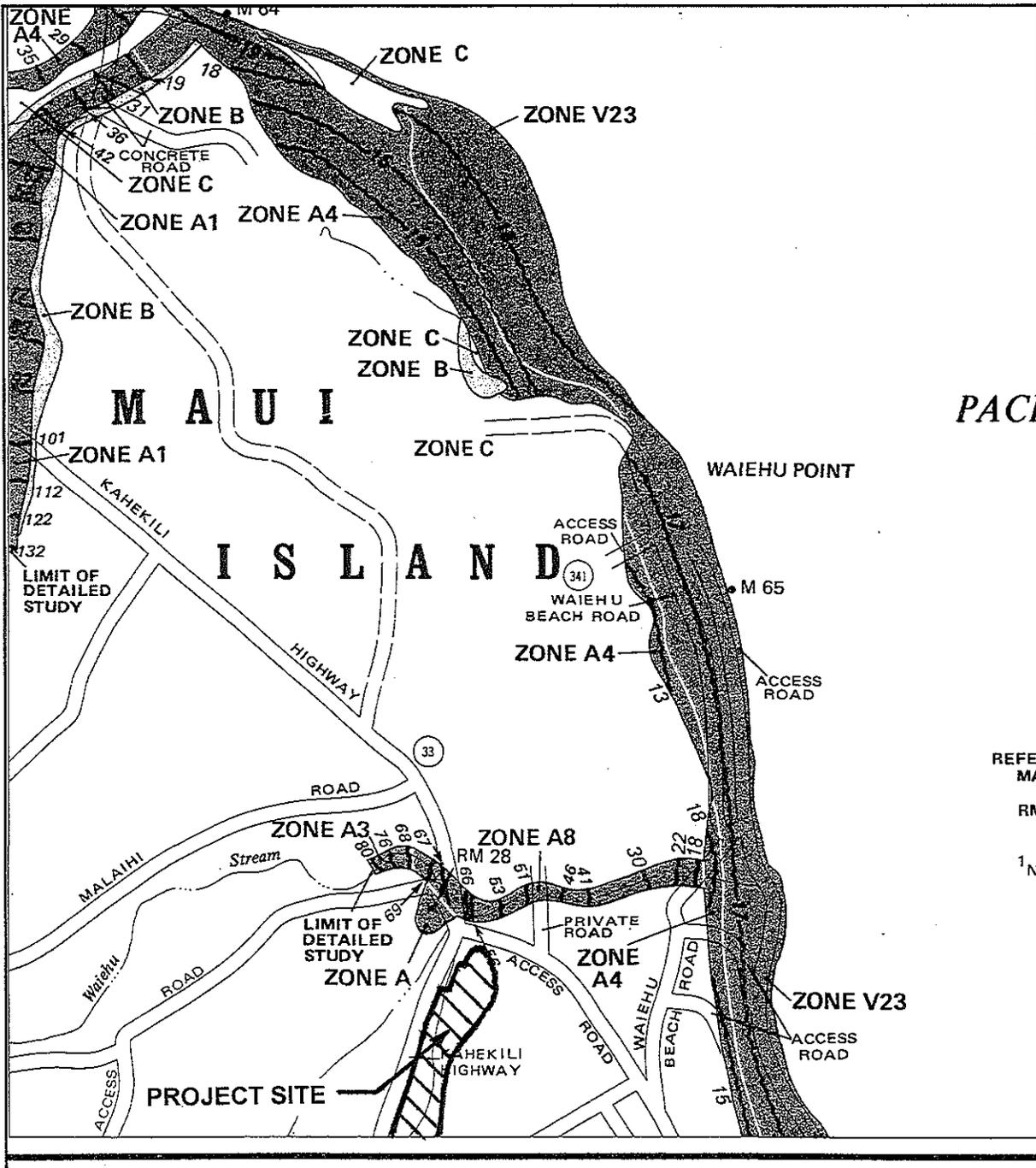
- 1 Location Map
- 2 Vicinity Map
- 3 Soil Survey Map
- 4 Flood Insurance Rate Map



 **ISLAND OF MAUI**
NOT TO SCALE

LOCATION MAP
EXHIBIT 1





NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MAUI COUNTY, HAWAII

PANEL 180 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150003 0180 B

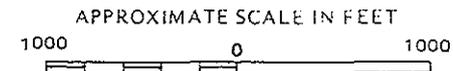
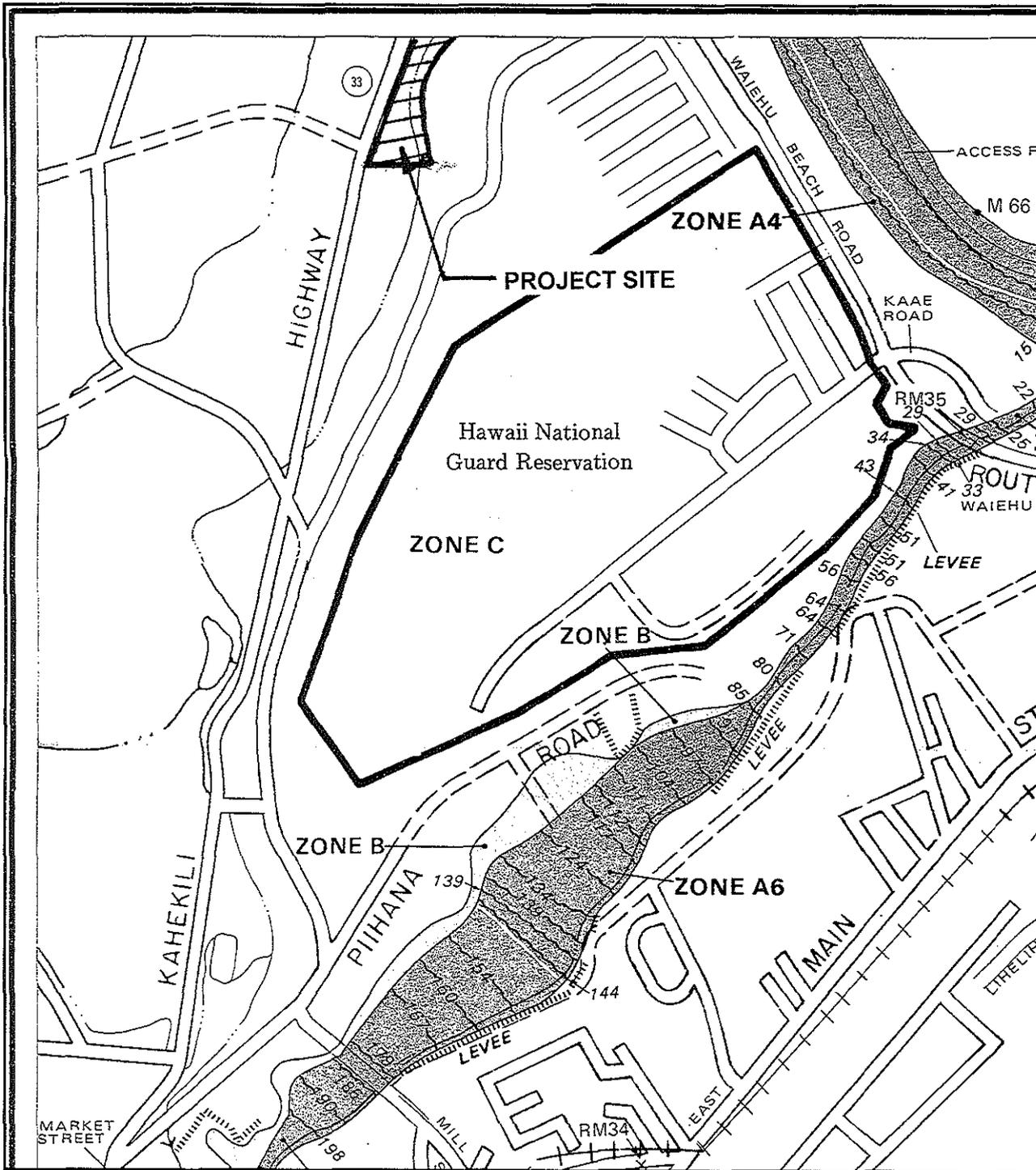
EFFECTIVE DATE:
JUNE 1, 1981

federal emergency management agency
federal insurance administration

REFE
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This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

FLOOD INSURANCE RATE MAP
EXHIBIT 4



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MAUI COUNTY, HAWAII

PANEL 190 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150003 0190 D

MAP REVISED:
MARCH 16, 1995



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

FLOOD INSURANCE RATE MAP
EXHIBIT 4

Appendix D

**AN ARCHAEOLOGICAL ASSESSMENT OF
APPROXIMATELY 11.75 ACRES
LOCATED IN WAIEHU AHUPUA`A,
WAILUKU DISTRICT, ISLAND OF MAUI, HAWAII
[TMK: (2) 3-3-001: por. 016]**

Prepared by:
Donna M. Shefcheck, B.A.
and
Michael F. Dega, Ph.D.
Revised June 2008

Prepared for,
Maui Economic Opportunity, Inc.
99 Mahalani Street
Wailuku, HI 96793

ABSTRACT

An Archaeological Inventory Survey, inclusive of pedestrian survey and representative testing, was conducted on approximately 11.5 acres of undeveloped land in Waiehu Heights, Waiehu Ahupua`a, Wailuku District, Island of Maui, Hawai`i [TMK: (2) 3-3-001: 016 (por.)]. This property is located at the border of the Waiehu Heights Subdivision and is known as Lot 1C of the Paukukalo Large-Lot Subdivision. The lot is currently vacant, but may have been used in the past for sand mining (Hawaiian Cement) and stockpiling of excess materials during the construction of the Waiehu Heights Subdivision itself. Modern disturbance to the project area ground surface includes extensive grubbing and grading, and the presence of macadamia nut trees indicates that it was at one time part of a larger macadamia nut farm. The proposed undertaking is to develop the subject property into an affordable housing residential subdivision.

No archaeological sites were identified during the Inventory survey. As such, the current report is being written as an Archaeological Assessment. While the current project yielded only negative results, sandy substrate was documented in the southern half of the project parcel. It remains possible that subsurface archaeological sites such as burials and/or habitation deposits do occur within the project area. Given the high number of burials and other culturally significant subsurface deposits in the surrounding area, a program of Archaeological Monitoring is recommended as a precautionary measure during all construction related ground altering activities. As such, Archaeological Monitoring was recommended for all construction related ground altering activities on the subject property.

TABLE OF CONTENTS

ABSTRACT.....	ii
TABLE OF CONTENTS.....	iii
LIST OF FIGURES	iv
INTRODUCTION	1
ENVIRONMENTAL SETTING	1
LOCATION	1
TRADITIONAL AND HISTORIC SETTING.....	5
THE TRADITIONAL PERIOD	6
KNOWN <i>HEIAU</i> IN THE VICINITY	7
HISTORIC SETTING OF THE PROJECT AREA AND ENVIRONS.....	8
LAND TENURE.....	8
HISTORIC ERA	9
PREVIOUS ARCHAEOLOGY.....	9
EXPECTED FINDINGS	15
METHODOLGY	15
FIELD METHODOLOGY	15
LABORATORY METHODOLOGY	17
RESULTS	17
RECOMMENDATIONS.....	18
REFERENCES	19
APPENDIX A.....	A

LIST OF FIGURES

Figure 1: USGS Wailuku Quadrangle Showing the Project Area.	2
Figure 2: Tax Map Key [TMK] Showing the Project Area.	3
Figure 3: Development Plan View Map Showing the Project Area.	4
Figure 4: Selected State Site Locations in Vicinity of Project Area. Adapted from Fredericksen and Fredericksen 2002: Map 5.....	11
Figure 5: Tax Map Key Showing Location of Stratigraphic Trenches.....	16
Figure 6: Representative Stratigraphic Profile for Northern Subsurface Deposits.....	17
Figure 7: Representative Stratigraphic Profile for Southern Subsurface Deposits.....	18

INTRODUCTION

Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey on approximately 11.5 acres of land in the Paukukalo Large Lot Subdivision (Lot 1-C), Waiehu Ahupua`a, Wailuku District, Island of Maui, Hawai`i [TMK: (2) 3-3-001: 016 (por.)] (Figures 1, 2 and 3). This property is located in between the existing Waiehu Heights Subdivision and Kahekili Highway. The general area was previously mined for sand by Hawaiian Cement and used as a stockpiling area for excess materials during the construction of the Waiehu Heights Subdivision (Dagher and Dega 2006). The parcel is currently vacant and undeveloped.

The current Inventory Survey yielded only negative results after both full pedestrian survey and representative testing. This document (an Archaeological Assessment Report follows an Archaeological Inventory Survey during which no historic sites or cultural materials are identified) includes historic background research and settlement pattern analysis prior to fieldwork and the results of systematic pedestrian survey and representative mechanical testing. Fieldwork was conducted October 29 through November 2, 2007 by SCS archaeologist David Perzinski, B.A. under the overall direction of Michael Dega, Ph.D. (Principal Investigator).

The Archaeological Assessment Survey was conducted in accordance with the State of Hawaii Department of Land and Natural Resources Historic Preservation Division (SHPD), as outlined in Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, and State Historic Preservation Rules in order to determine the presence/absence of archaeological sites and features in surface and subsurface contexts through complete systematic survey and representative subsurface testing. The ultimate goals were to determine the presence/absence of historical sites, to provide adequate recordation and documentation of all historic sites present, to determine the significance of these sites, and to provide recommendations to the SHPD concerning site significance and mitigation in lieu of future land use in the project area.

ENVIRONMENTAL SETTING

LOCATION

The current project area is an approximately 11.5 acre property located in Waiehu Ahupua`a, Wailuku District, Island of Maui [TMK (2) 3-3-01: 016 (por.)] (see Figures 1 and 2). The project area is roughly rectangular in shape, with its long axis oriented approximately North-South. Kahekili Highway bounds the area to the east, to the west are existing residential homes, to the south open, undeveloped land, and to the north lies Waiehu

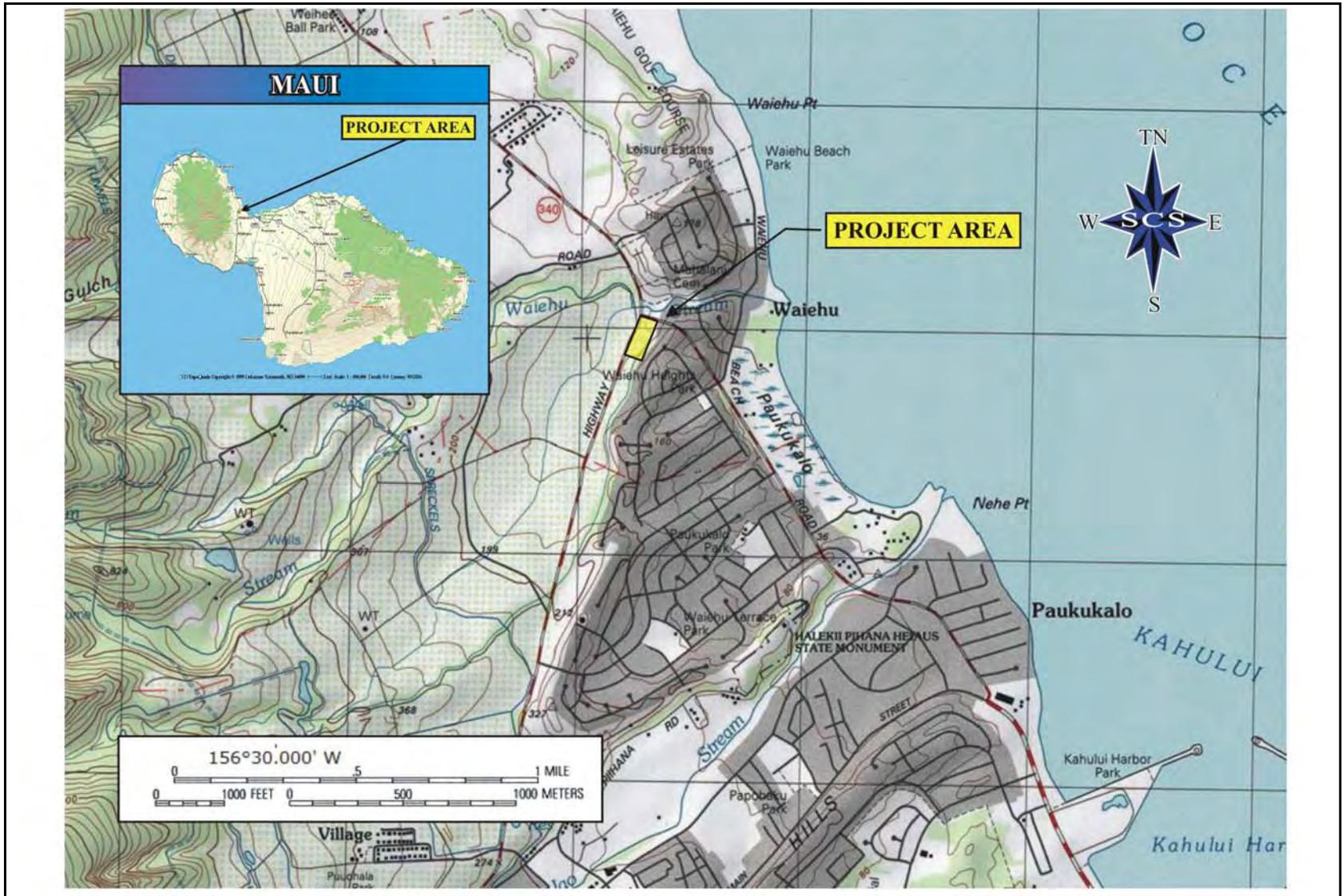


Figure 1: USGS Wailuku Quadrangle Showing the Project Area.

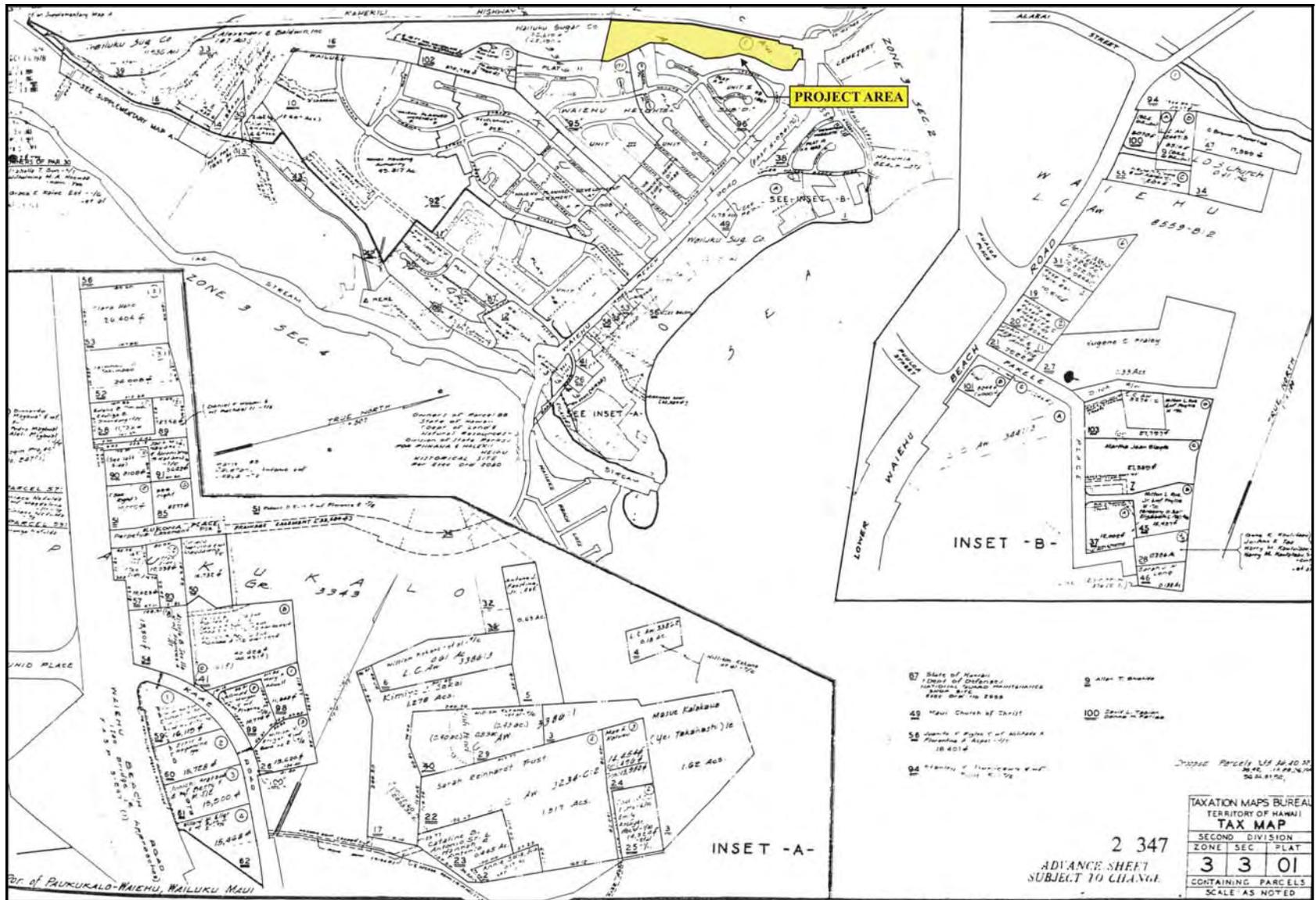


Figure 2: Tax Map Key [TMK] Showing the Project Area.

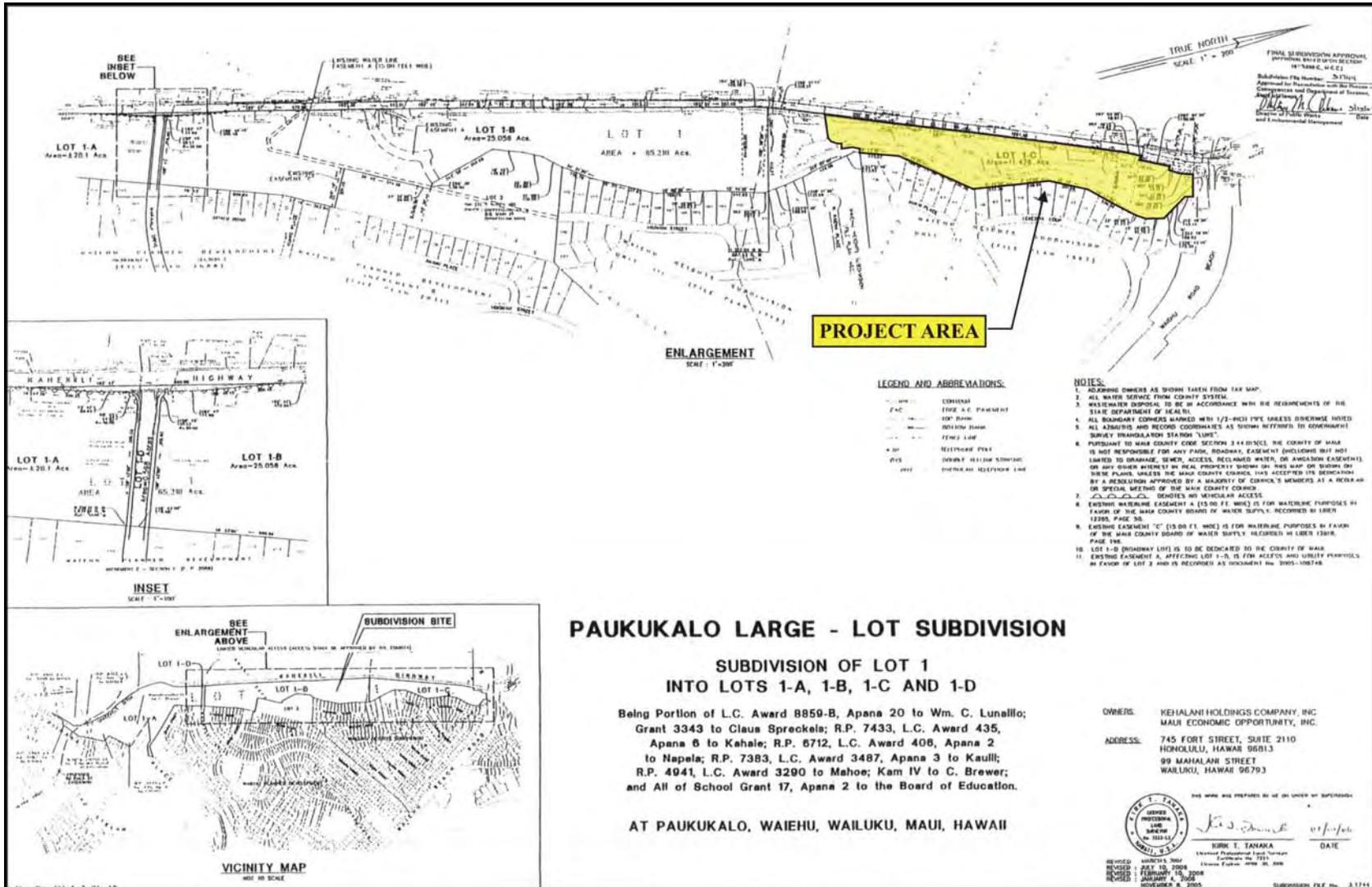


Figure 3: Development Plan View Map Showing the Project Area.

Beach Road. The lot is located approximately 140 feet amsl (above mean sea level) and approximately 2 kilometers from the shore of Paukukalo Beach. Several geographic landmarks dot the surrounding area. As there is a lot of rainfall in Waiehu, it goes without saying that there are many streams, ditches and drainages in the general vicinity of the project area. The most notable of these are Iao Stream, to the south of the project parcel, and Waiehu Stream and Spreckels Ditch to the west. A large coral reef fringes the coastline creating shallow fishing waters and protected inshore pools ideal for marine collecting. Traditional occupation of the area, believed to have been dense and continuous throughout Hawaiian history, is denoted geographically by Haleki`i and Pihana Heiau, which lie south of the project area on the banks of Iao Stream.

Historic grubbing and grading has nearly leveled the study parcel and an old access road runs through center, paralleling Kahekili Highway. The western portion of the site is within a pre-existing macadamia nut orchard and contains a grove of macadamia nut trees (*Macadamia integrifolia*), dense cane grass and sparse *koa haole* (*Leucaena leucocephala*). A large amount of modern trash (appliances, car parts, glass jars, etc.) is scattered throughout the project area.

According to Foote *et al.* (1972) the project area is located in the Puuone Sand (PZUE) deposit. In general, this soil series occurs in the lower uplands of the island of Maui with elevation ranging from 50 to 350 feet above mean sea level (amsl). These soils are comprised of somewhat over-drained soils, which have been formed from materials originating in coral and marine shell. The PZUE soil association is found in the south half of the project area. The north half consists of Iao clay (IcB), a soil type that is found on alluvial fans and valley bottoms.

TRADITIONAL AND HISTORIC SETTING

Archaeological settlement pattern data indicates that initial colonization and occupation of the Hawaiian Islands first occurred on the windward shoreline areas between the A.D. 4th and 11th centuries of the main islands, with populations eventually settling into drier leeward areas at later periods (Kirch 1985). Coastal settlement was still dominant, but populations began exploiting and living in the upland *kula* zones. Greater population expansion to inland areas did not occur until the c. A.D. 12th century but continued through the 16th century. Large scale or intensive agricultural endeavors were implemented in association with habitation. Coastal lands were used for settlement and taro was cultivated in near-coastal reaches and in the uplands.

THE TRADITIONAL PERIOD

According to W.D. Alexander (in Sterling 1998:91) the *ahupua`a* of Waiehu and Waihe`e were independent lands which did not belong to a particular district (*moku*). Thus, they were referred to as Na Poko. It was only during modern times that these lands were divided into a district. In reference to the origination and meaning of the name Waiehu, Sterling quotes Cheever (in Sterling 1998:63) who states that the name Waiehu translates as "...where the combatants smoked with dust and perspiration..." and refers to a battle or battles which occurred in the area. Pukui *et al.* (1974:221) offer another interpretation of Waiehu as meaning "water spray". This area is also known for having strong winds. The winds of Waiehu are said to be "Makani-hoo`eha-ili, the winds that hurt the skin" (Rebecca Nuuhiwa, Audio Collection in Sterling 1998:62). Although Pukui (*ibid*) interprets the meaning of Makani-hoo`eha-ili as "love disturbance" and the rains of Waiehu have been called "the fine mist" [Ka wai Kilioopu o Waihee] (Hyde in Sterling 1998:5).

Traditionally, the entire area from Wailuku Valley north to Waihe`e Valley was part of an old land division named Na Wai Eha ('The Four Streams'), referring to several great valleys draining the slopes of West Maui. This was said to be the most expansive area of continuous *kalo* (*taro*) pond-field agriculture in the Hawaiian Islands.

Waiehu is the second valley of the famous Na Wai Eha of western Maui, and it is watered by twin streams. The cane fields now extend throughout this region, continuously from Waihe`e on the lower slopes; but above Waiehu and Puakala from the upper roads following the irrigation ditches well toward the upper limits of the cane, a few old plantations still persisted in 1934. Some were used for raising wet taro, some for truck gardening. However, except for these few patches the old terraces of the upper slopes are entirely ploughed under (Handy and Handy 1972:496-7).

Before the historic era, it is highly likely that much of Waiehu Ahupua`a was extensively modified by terraces and irrigation ditches, from just mauka the near-coastal sand dunes to the high upper valleys. The present project area is situated *makai* of the probable lower limits of this extensive *lo`i* system. Later in time, much of these uplands were transformed into commercial sugar cane fields, which resulted in the destruction of innumerable terraces, irrigation ditches, and associated features.

We can infer from Walker's discussion in Sterling (1998:66) regarding the sandy ground in neighboring Waihe`e Ahupua`a being frequently used as a burial site that the same may be true for the sandy soils of Waiehu Ahupua`a:

The long sandy ridge near the shore at Waihee was another favorite burial ground. The erosion of the sand banks frequently exposes burials, but the bones are quickly disturbed and scattered so that their original position of burial cannot be determined. Modern graveyards occupy several sites along the crest of this ridge.

KNOWN HEIAU IN THE VICINITY

A large number of *heiau* were recorded by Thrum (in Sterling 1998) and Walker (1931) between Waihe`e and Wailuku which attest the importance of this area during traditional times. All of the documented *heiau* in Waiehu Ahupua`a, are located inland and *mauka* of the project area. The relatively large number and variety of named *heiau*, which included a *luakini heiau* (high chief-sacrificial shrine) in Paukūkalo built by Kahekili, indicates a substantial settled population in the region. Most of these *heiau* were completely or almost completely destroyed by the early 20th century.

Documented *heiau* in Waiehu Ahupua`a include:

- Halelau Heiau (Walker Site 37), located well inland (*mauka*) of the coast—apparently destroyed by a more recent cemetery.
- Malumaluakua Heiau (Walker Site 39), located at the head of the Waiehu Gulch, well inland (*mauka*) of the coast—possibly a sacrificial shrine, although there was no stone construction (e.g., walls and/or platforms) present, which Walker suggested may have been a local variant: “In this region a *heiau* seems to mean merely a scared spot not marked necessarily by either walls or platforms of stone” (Walker 1931:142).
- Kukuikomo Heiau (Walker Site 40), located on the ridge between North and South Waiehu Gulches, well inland (*mauka*) of the coast—another possible example of a shrine lacking observable rock architecture.
- Puukoa Heiau (Walker Site 41), located “[n]ear pond on ridge south of Waiehu Camp. Destroyed.” (Walker 1931:144)

In addition, Poaiwa Pu`uhonua (a place of refuge) was located in Waiehu Ahupua`a (Thrum in Sterling 1998:12). Walker also documented Pihani and Haleki`i Heiau within Wailuku Ahupua`a (southeast of the current project area), on the north side of `Īao Valley near the mouth of `Īao Stream (*ibid.* 31–144). In more recent decades, the archaeological significance of these important *heiau* has been determined through testing (Yent 1983), restoration, and preservation.

HISTORIC SETTING OF THE PROJECT AREA AND ENVIRONS

LAND TENURE

The land tenure system in prehistoric Hawai`i was rooted in a different epistemological framework than the subsequent colonially-imposed framework that is understood today as land ownership. The idea of holding land was not synonymous with owning it, but is described as closer to a trusteeship between the *ali`i nui* (ruling chiefs) of the island and the traditional Hawaiian *akua* (gods) Lono and Kane (Handy and Handy 1972:41). Each island was divided into *moku* (districts) that were solely geographical subdivisions. The number of these *moku* depended upon the size of each island. *Moku* were partitioned into smaller landholding units known as *ahupua`a* that were governed by *ali`i* or designated *konohiki*. The *ahupua`a* varied in size, but ideally encompassed land from the mountain to the sea, providing the chiefs and *maka`ainana* (people who cultivated the land) with the opportunity to recover both terrestrial and marine resources. All persons from chiefs to commoners were entitled to portions of these resources (Chinen 1961:5).

The prehistoric/traditional period in the Hawaiian Islands came to an end with the arrival of Captain Cook on Kaua`i in 1778. The years to follow would drastically change the political, agricultural, and social relationships and patterns of the Hawaiian Kingdom. Destabilization of Hawaiian society was further intensified by the profound reformation of traditional land systems. In 1848, the Māhele curtailed communal access to land. The Māhele system led to the introduction and implementation of privatization that required both chiefs and commoners to retain private land title (Kame`eleihiwa 1992). If properly informed of the procedures, Hawaiians were permitted to claim lands on which they had worked or lived.

While LCA (Land Court Awards) establish historic land utilization in Hawai`i (during the Māhele), documented testimony from many land recipients have also demonstrated continuous generational occupation of the land. Settlement patterns illustrated in the LCA records highlight the multi-functional land use practices related to habitation and agriculture and perhaps the clear connection of these strategies. By mid-century, the fledgling [Hawaiian] Kingdom undertook the single most significant inducement to cultural change, the Great Māhele or division of lands between the king, chiefs, and government, establishing land ownership on a Western-style, fee-simple basis. From this single act, an entire restructuring of the ancient social, economic, and political order followed [Kirch 1985:309].

Under the Māhele and the first Land Commission of the Trust Territory of Hawai`i, lands were allocated in three ways. A third of all lands became Crown Lands belonging to the *ali`i*, a

third was distributed to the chiefs, and a third was awarded to the general populace, which were represented by a large portion of foreigners as well as Hawaiians during this time. The first Land Commission was formed in 1845, during which time all individuals holding land were now required by new Western notions of law to submit their claims or forfeit their land.

The subject parcel is part of a large land claim awarded to William Lunalilo (LCA 8559B*M). This land claim included land parcels throughout Maui, Hawai`i Island, Oahu, Molokai and Kaua`i (Appendix A). Some of these lands were subsequently granted to the government.

HISTORIC ERA

According to Dorrance and Morgan (2000), the entire Na Wai Eha area from Wailuku Valley north to Waihe`e Valley, including Waiehu, was a major sugar cane cultivation zone from the lower slopes of the West Maui highlands to the near-coast area. The destruction of pre-Contact and early historic sites by commercial sugar cane operations was widespread and highly effective, as probably hundreds (if not thousands) of rock formations (e.g., habitations, agricultural features, *heiau*, burials, and other types of sites) were ploughed to create fields.

Commercial sugar cane cultivation in the neighboring Waihe`e Valley began in 1862 when Captain J. Hobron acquired land from T.H. Hobron to build the Waihe`e Sugar Mill (Donham 1989). By 1865, the Waihee Sugar Company was producing over 700 tons of sugar and 45,000 gallons of molasses per year. Production continued into the early 20th century. The Waihee Dairy and Farm, located along the coast, was established in 1919. The dairy closed in 1967. Sugar cane production was widespread throughout this region by the late 19th century to early 20th century. As a result of growth in the sugar cane industry, two irrigation ditches (Spreckels Ditch and the Waihe`e Ditch) were constructed in the late 19th century to early 20th century to channel water south from the Waihe`e Stream to nearby fields.

PREVIOUS ARCHAEOLOGY

As the project area is situated just *mauka* (west) of Paukukalo, south of Waihe`e Ahupua`a, and north of Wailuku Ahupua`a, these areas are broadly relevant to a review of previous archaeological research. The northern terminus of Wailuku Ahupua`a, which borders Waiehu Ahupua`a to the south, is relevant since a significant number of important sites have been identified. Cordy *et al.* (1978) have proposed a general settlement model for the area that includes temporary habitation and wetland agriculture in the upper valleys and elevations. Permanent habitation associated with *heiau* and burials are said to be found in the lower valleys

and at the coast. Cordy et al. (1978) suggest that the coast and lower valleys were first settled by A.D. 300 to 600, although thus far the earliest radiocarbon dates are significantly later than this. Bordner (1983) stated that the sand dunes of Waiehu and environs were a prime location for burials, and, in general, that extreme caution should be taken in developing these areas. As described above, Walker (1931) recorded many religious shrines within Waiehu Ahupua`a the vicinity of the project area, as well as villages and burial grounds in coastal settings just north of the project area.

The current study stands to gain more insight into the project area's historical and traditional land use via an examination of previous archaeology in the northeastern reaches of Wailuku District (Figure 4) (Table 1). Previous archaeological research in the eastern portion of Wailuku, Waiehu, and Waihe`e Ahupua`a is more relevant to the current study than research in areas to the south or west due to a shared topography, climate, land use, and settlement pattern.

Research at the State Historic Preservation Division (SHPD) indicated that the 1973 statewide inventory of known historic sites provided documentation on several burial sites in what is now the Waiehu Golf Course. The following descriptions are based on original site files available at the SHPD (in Kapolei). Site 50-50-04-1185 (designated the Waiehu Dune burials on original feature forms) was a burial site containing the remains of at least 33 human burials. The site is located at the top of the consolidated sand dune immediately west of the fairway of the fifth hole, at the Waiehu Municipal Golf Course, and the burials were exposed by natural, aeolian (wind) erosion. Some of the burials were associated traditional artifacts and midden. According to Donham (2003), this site has been preserved to prevent further erosion.

Site 50-50-04-1188 (designated the 'Golf Course Burials' on the original feature forms; designated Ma-D10-13 in B.P. Bishop Museum files) was a burial site consisting of "human skeletal remains eroding out of a sand bank along the northwest side of the service road in the Waiehu Municipal Golf Course. Human remains were found in three places along a 14-m stretch of the sand bank located about 65 m northwest of the maintenance building near the middle of the golf course" (SHPD 1973). The remains were reported as "fragmentary" (SHPD 1973).

The earliest archaeological endeavors in the Wailuku-Waiehu environs were undertaken by Thrum (1917), Stokes (1918), and Walker (1931). Although their archaeological finds do not directly pertain to the current project area, their data allows for a deeper understanding of the traditional use of the Wailuku-Waiehu area.

Table 1: Selected Archaeological Research in the Vicinity of the Project Area.

Year	Author	Project / Location within Waiehu, Paukukalo, or Wailuku Ahupua a	Nature of Work	Findings/Site #
2006	Fortini, W.R. and M.F. Dega	Residential Construction at 955 Puuloa Street, Waiehu TMK: 3-3-10:12	Monitoring	No new sites.
2006	Dagher, C. and M. Dega	Residential Development at TMK: 3-3-001:102 and 016	Assessment	No new sites.
2005	Monahan, C.	Waiehu Golf Course (Maintenance Building Project) TMK: 3-2-13: 06 With Addendum Added	Inventory Survey	Test units and backhoe trenches found nothing of archaeological significance on 1.5 acres. Addendum discusses two additional areas of subsurface testing in and near project area. Two new sites identified (50-50-04-5661, subsurface possible platform probably dating to late 18 th or early 19 th century, and 50-50-04-5662, subsurface asphalt road/cart path remnant dating to or around 1930).
2004	Wilson, J and M.F. Dega	240.087 Acres Located in Waiehu and Wailuku TMK: 3-3-02:001 por	Inventory Survey	1 previously identified site (50-50-07-1508, Spreckels Ditch) & 6 new sites (50-50-04-5522 through -5527) Sites include plantation-era sites, isolated lithic and marine shell finds, historic complex. C-14 data
2004	Fredericksen , D. and E.	Phase II of the Paukukalo 8-inch Waterline Replacement along Lilihua Place, Wailuku	Inventory Survey	Relocated previously identified site (50-50-04-5005, pre-Contact near coastal habitation site with associated human burials. Site utilized into early post-Contact period. Includes C-14 data
2003	Dr. Melissa Kirkendall, SHPD Maui Island Archaeologist, personal communication	Waiehu	Monitoring	In June 2003 Archaeological Services Hawaii, LLC conducted archaeological monitoring on the current project area during sand mining operations performed by Hawaiian Cement. During the monitoring activities human skeletal remains were identified
2003	Fredericksen, E.	Portion of Land in Waiehu. Waiehu Ahupua`a, Wailuku District TMK: 3-2-20: Por 47, Lot 9A	Monitoring	No new sites.
2003	Dega, M.F.	Kehalani Mauka Subdivision, in Wailuku near Waikapu TMK: 3-5-001:001	Inventory Survey	8 historic sites documented on 349 acres, two of which were previously recorded (50-50-04-5473, -5474, -5197, -5489, -5490, -5491, -5492, -5493), including a reservoir, ditches, historic-modern roadways, historic artifact scatter, plantation-era clearing mounds
2003	Donham, T.K.	Residential Construction at 1376 Kakae Place, Waiehu. TMK: 3-2-20:64	Archaeological Assessment	Negative results: no evidence of cultural material; monitoring not recommended

Year	Author	Project / Location within Waiehu, Paukukalo, or Wailuku Ahupua`a	Nature of Work	Findings/Site #
2002	Fredericksen, E. and D.	Puuohala Mauka Residential Subdivision, Wailuku Ahupua`a TMK: 3-3-2:001	Inventory Survey	4 sites, two previously unrecorded: a plantation-era boulder/retaining wall/platform (-5195), and coral/shell surface midden scatter (-5196); also the known historic Waihee Ditch (-5197) and Spreckels Ditch (-1508)
2000	Fredericksen, D. and E.	Waiehu Kou Residential Sewer Line Corridor TMK: 3-2-3	Inventory Survey	Habitation site with 3 burials (-4759)
1997	Fredericksen, E.	North Waihee Water Source Project, Phases I and II, along Kahekili Highway through both Waihee and I Waiehu Ahupua`a. (Area mauka of highway to water tank.)	Monitoring	No cultural deposits: Area under sugarcane cultivation for more than a century
1996	Dixon, B.	Inadvertent Discovery of Human Skeletal Remains at 741 Kuhio Place, Wailuku TMK: 3-3-06:47	Field Inspection	Site 50-50-04-1812, human skeletal remains representing single individual. Remains partially removed in 1985.
1996	Jones, B., J. Pantaleo, and A. Sinoto	North Waihee Wells Waterline Project	Inventory Survey	5 Sites: rock terrace (-3196); rock terrace along Waihee Stream (-3199); 3 surface scatters of artifacts, midden, and `ili `ili stones (-3197); 533 m long wall (-3198); Waihee Bridge foundation (-4097)
1993	Griffin, A.	Inadvertent Burial Discovery	Field Inspection	Site 50-50-04-3139, human skeletal remains representing 2 individuals
1992	Donham, T.	Waiehu Golf Course	Data Recovery	2 flexed burials were removed from eroding sand dune (-1189)
1992	Donham, T.	Waiehu Kou 1 Residential Development	Data Recovery	Burial (-2917) found in storm drain line excavation and re-interred 3.3 mbs
1992	Folk, W. and H. Hammatt	Waiehu Beach lots TMK: 3-2-13:05	Inventory Survey	Surface survey and 9 backhoe trenches produce no cultural material other than 2 buried charcoal lenses (-3115) ranging from A.D. 1300s–1600s
1991	Griffin, A.	Archaeological Assessment of a 3.1 Acre Parcel Proposed Phase 4 Residential Lots, Paukukalo TMK: 3-3-06:52 por	Field Inspection	Identified 2 new sites (2 caves and surface shell midden and artifact scatter. Determined area significant and important to understanding sociopolitical history of Maui. Recommended relocating development site.
1990a	Kennedy, J.	Portion of the Piihana District, Piihana TMK: 3-3-1:16 Por.	Subsurface Testing	No new sites.
1990b	Kennedy, J.	TMK: 3-4-30:11 Subdivision "C" Located at Paukukalo	Inventory Survey	No new sites.
1989	Donham, T.	Waihee Golf Club	Inventory Survey	270-acre project area found 88 sites with 195 components, including structures, surface midden, lithic scatters, agricultural and residential complexes, ceremonial features, 4 cemeteries, and 4 isolated human graves. Dates from A.D. 960–1330 to modern times.
1990c	Kennedy, J.	Survey and Subsurface Testing for Proposed Grading Project TMK: 3-3-01:16 por.	Archaeological Survey	No new sites.

Year	Author	Project / Location within Waiehu, Paukukalo, or Wailuku Ahupua`a	Nature of Work	Findings/Site #
1988	Clark, D. and J.F. Baliki	Waihee Midden Site	Inventory Survey	Coastal dune site: 4 fire hearths, 4 fire floors, an <i>imu</i> , a rock alignment, and artifact clusters. One date of A.D. 1010–1150 from 2.0 mbs
1987	Trembly, D.	Waiehu Planned Development	Monitoring	Remains of 6 individuals displaced by construction along Waiehu Beach Road
1983–1984	Yent, M.	Halekii-Pihana State Monument: Phase I, Waiehu	Survey, Test Coring	Halekii (-4592): <i>ili-ili</i> stones, shell, charcoal. No evidence of cultural deposit earlier than construction date. Pihana (-4592): <i>ili-ili</i> stones, shell, human and pig bone, human burial left in situ.
1983	Bordner, R.	Waiehu housing Development, Environmental TMK: 3-3-01:10, 92	Survey, Excavation	Historic military features only.
1978	Cordy, R.	Waihee Stream Hydroelectric power project	Survey	Numerous sites. Formulated model for predicting general location for 6 functional sites types: temporary and permanent habitation sites, dryland and wetland agriculture, burials, and <i>heiau</i>
1978	Kelly, M., Y. Sinoto, and R. Cordy	Waiehu Heights Subdivision	Survey, Data Recovery	Over 20 historic coffin burials exposed during bulldozer activity in dune area
1931	Walker, W.	<i>Archaeology of Maui</i>	Island-wide investigation	Among other records, documents 5 <i>heiau</i> in Waiehu and 13 <i>heiau</i> in Wailuku
1918	Stokes, J.F.G.	“. . . Heiau of Maui.”	Island-wide investigation	Among other records, documents <i>heiau</i> in Wailuku District
1917	Thrum, T.G.	“Maui’s Heiau . . .”	Island-wide investigation	Description of Wailuku’s Pihana Heiau, among other records

(Table1: Adapted from Fredericksen and Fredericksen 2000:12–13, 2002:12–13).

EXPECTED FINDINGS

Based on traditional Hawaiian settlement patterns, previous archaeological research, and historical activities in the project area, expected findings for this Inventory Survey were as follows:

1. There was a relatively high probability of finding pre-Contact (and possibly early Historic Period) Native Hawaiian burials due to the project area is being located in the Puuone Sand deposit which is known to be a traditional internment site for Native Hawaiian burials. There was also a relatively high probability of finding redeposited (i.e., previously disturbed) human skeletal remains, given that previous use of the project area involved ground disturbing activities including, sand mining by Hawaiian Cement and stockpiling of excess materials during the construction of the Waiehu Heights Subdivision.
2. There was a relatively high probability of finding subsurface evidence of traditional Native Hawaiian and/or early historic activities including: hearths, postholes, midden deposits, and other occupation debris (e.g., stone tool waste, discarded fishing gear).
3. There was essentially no expectation of finding any historically-significant sites or features on the present ground surface due to the fact that the ground surface has been extensively grubbed and graded.

METHODOLOGY

FIELD METHODOLOGY

Multiple tasks were completed during this project. First, systematic pedestrian survey of the entire project area was conducted by SCS archaeologist David Perzinski in order to identify and document any and all Historic and/or Traditional archaeological features, and assess the nature and extent of landscape modification. Survey also allowed for assessing areas amenable for testing. Following pedestrian survey, 17 stratigraphic trenches of various distances were mechanically excavated to basal strata throughout the project area (Figure 5). Written and photographic documentation of stratigraphy occurred during all trenching activities. None of the excavated sediments were screened as no artifacts or cultural deposits were encountered during excavation work. Representative stratigraphic profiles were completed following the termination of each trench.

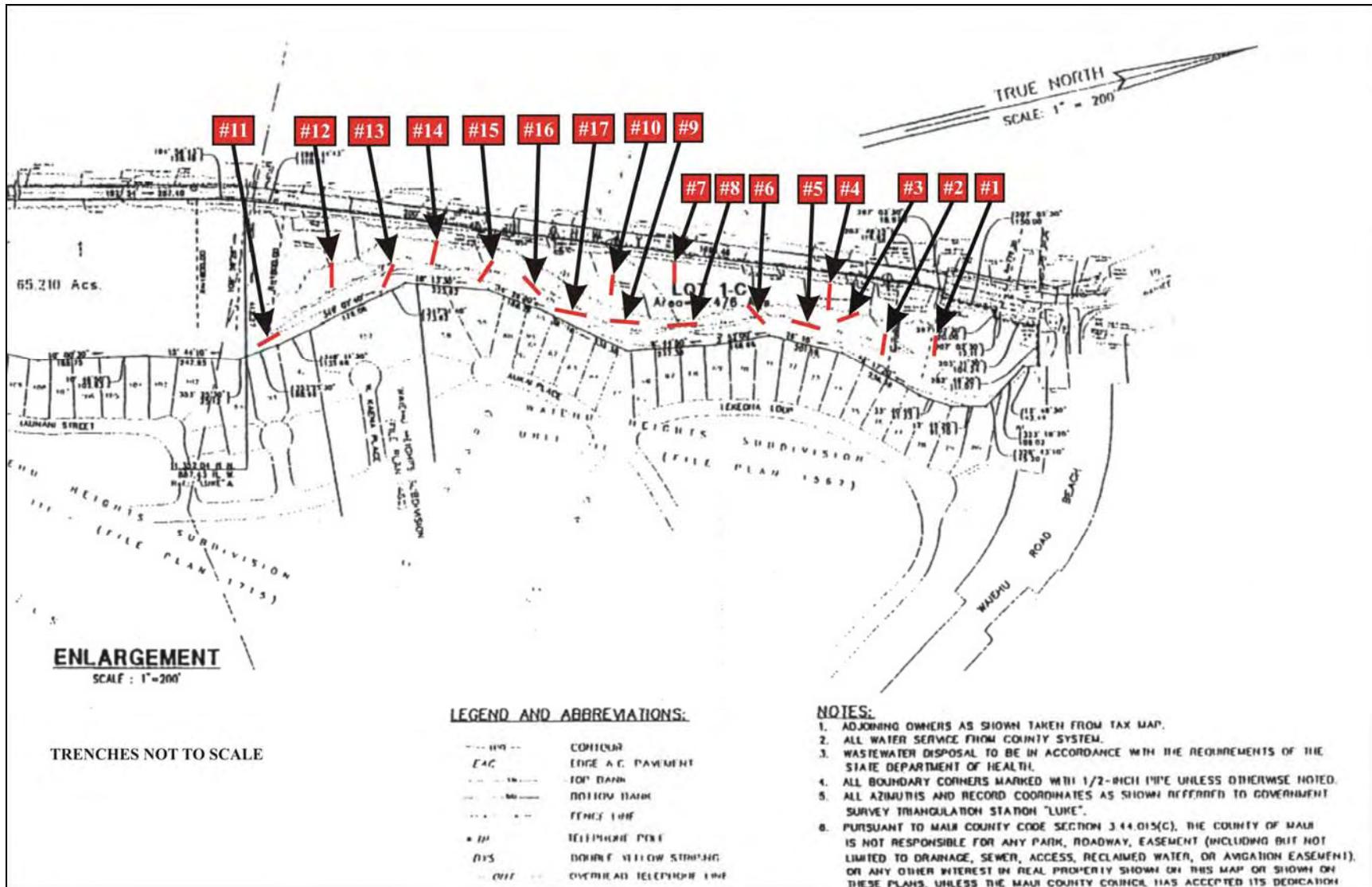


Figure 5: Tax Map Key Showing Location of Stratigraphic Trenches.

LABORATORY METHODOLOGY

Due to the negative results of this project, laboratory work was primarily limited to stratigraphic profile and map drafting as well as report production. All field notes from this project are being curated at the SCS laboratory in Honolulu.

RESULTS

No archaeological features or deposits were identified either on the ground surface or in subsurface contexts during the current project. The absence of sites on the surface may be attributed partly to previous grubbing of the landscape during sand mining (Dagher and Dega 2006) and the general lack of surface sites in this area. The excavation sample, while fairly intensive, also failed to yield cultural materials. It is possible that cultural deposits do occur in subsurface contexts as 100% of the parcel was not tested, as is the case with archaeological sampling.

Two stratigraphic profiles are representative of the project area as a whole (Figure 6). On the north side of the project area, subsurface deposits consisted of two layers. Layer I (0-40 cmbs) is a dry; very dark grayish brown (10 YR 3/2); silt loam. This deposit is weak, fine to medium granular structure with no plasticity, no cementation, and contains abundant roots and rootlets. The lower boundary is clear and smooth. Layer II (40-BOE) was a dry, brown (10 YR 4/3) slightly hard silt, with medium platy structure, no plasticity and no cementation.

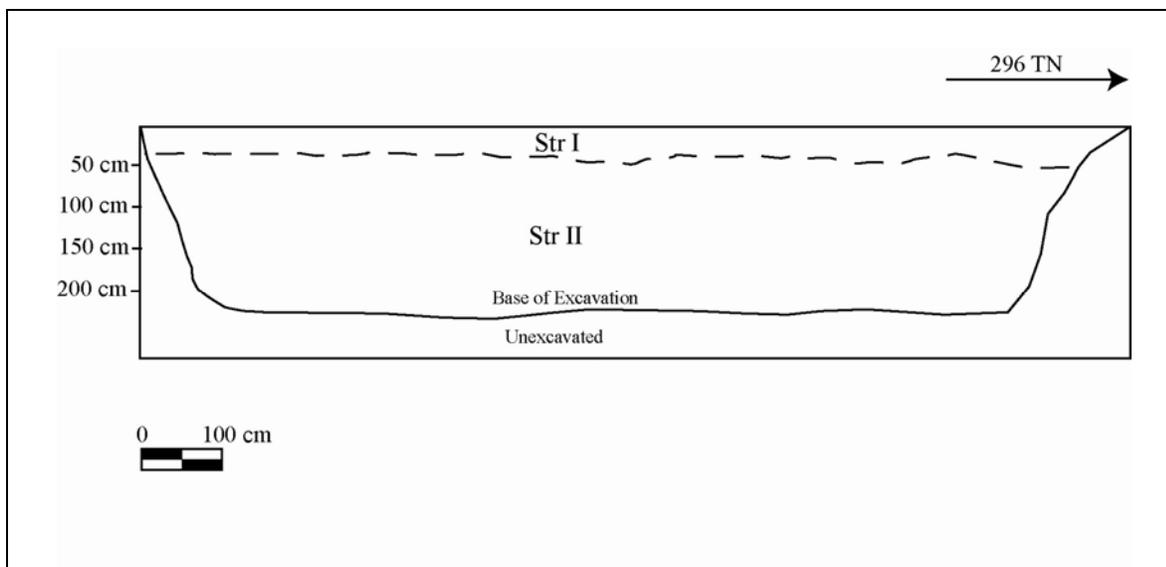


Figure 6: Representative Stratigraphic Profile for Northern Subsurface Deposits.

In the southern portion of the project area three strata were documented (Figure 7). Layer I (0-10 cmbs) consists of a dry, very dark grayish brown silt loam similar to that found in Layer I in the northern half of the project area. Also like its counterpart in the northern section, Layer II (10-120 cmbs) is a brown (10 YR 4/3), slightly hard silt, medium platy structure with no plasticity and no cementation. The lower boundary of this layer is abrupt and wavy. Layer III (120 cmbs to BOE) consists of pale brown (10 YR 6/3) loose silty sand with no structure, no plasticity, and contains few waterworn pebbles and cobbles.

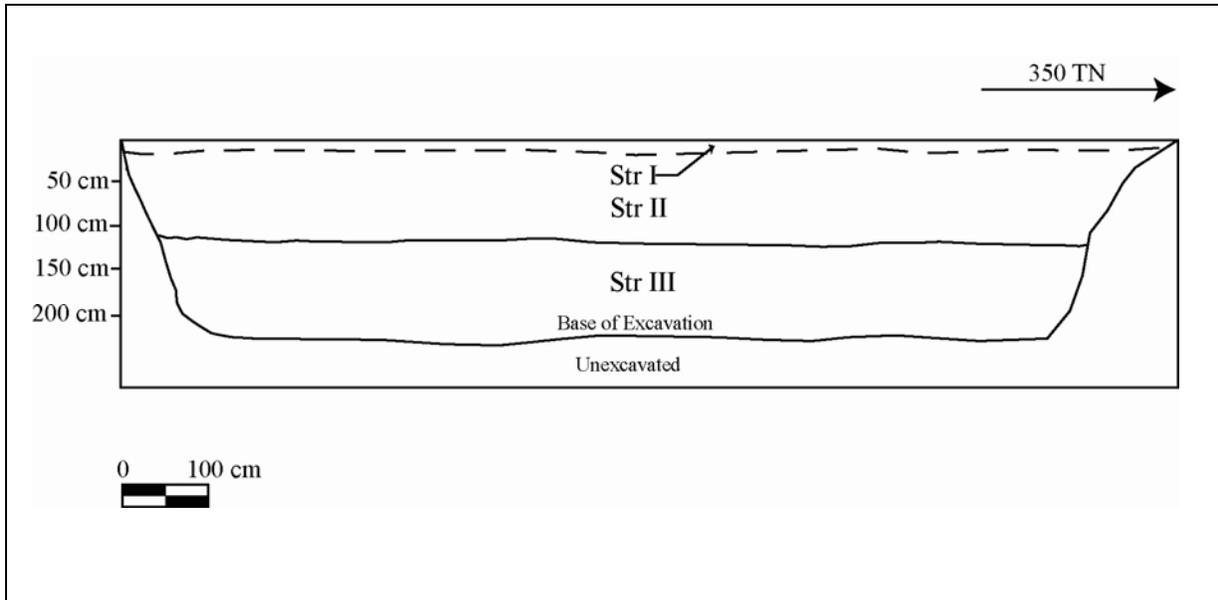


Figure 7: Representative Stratigraphic Profile for Southern Subsurface Deposits.

RECOMMENDATIONS

Although no significant sites or cultural materials were identified during this project, trenching showed that original sand (Puuone Sand) deposit are present in the southern half of the project area, particularly below 120 cmbs, a finding that is consistent with the Foote *et al.* (1972) soil survey map. The presence of sandy matrix and the high number of burials and other culturally significant subsurface deposits in the surrounding area suggest the likelihood for the discovery of archaeological sites, such as burials and/or habitation sites, in the subsurface deposits of the project area. Thus, a program of Archaeological Monitoring is recommended as a precautionary measure during all construction related ground altering activities.

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APPENDIX A



- Articles
 - Information
 - Samples
 - Gallery
 - About Us
 - Contact Us
- Mahele Database
 - Boundary Commission
 - Land Grants
 - Royal Patents
 - Review Cart & Checkout

DOCUMENT DELIVERY

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Mahele Database Documents
 Number: 08559B*M

Claim Number:	08559B*M		
Claimant:	Lunalilo, William C.		
Other claimant:	Kanaina, Charles for King		
Other name:			
Island:	Maui		
District:	Lahaina, Kaanapali, Wailuk		
Ahupuaa:	Polanui, Kalimaoha, Kuholilea, Aki, Paeohi, Waianae, Honolulu, Pepee, Waiehu 2, Kaapahu		
Ili:	Luaehu, Ahikuli		
Apana:	13	Awarded:	1
Loi:		FR:	
Plus:		NR:	
Mala Taro:		FT:	82v16
Kula:		NT:	
House lot:	1	RP:	5637, 5639, 5699-2, 7664,
Kihapai/Pakanu:		Number of Royal Patents:	13
Salt lands:		Koele/Poolima:	No
Wauke:		Loko:	No
Olona:		Lokoia:	No
Noni:		Fishing Rights:	No
Hala:		Sea/Shore/Dunes:	No
Sweet Potatoes:		Auwai/Ditch:	No
Irish Potatoes:		Other Edifice:	No
Bananas:		Spring/Well:	No
Breadfruit:		Pigpen:	No
Coconut:		Road/Path:	Yes
Coffee:		Burial/Graveyard:	No
Oranges:		Wall/Fence:	No
Bitter Melon/Gourd:		Stream/Muliwai/River:	No

Sugar Cane:	Pali:	No
Tobacco:	Disease:	No
Koa/Kou Trees:	Claimant Died:	No
Other Plants:	Other Trees:	
Other Mammals: No	Miscellaneous:	government road

**No. 8559B*M, (W.C. Lunalilo) C. Kanaina
F.T. 551-552v3**

W.H. Uana, sworn, says he knows the house lot of Lunalilo, in Kaluaaha, Molokai. It is bounded:

Mauka by the public road
On the Halawa side by a fish pond of the government called "Neaupala"
Makai by the sea beach
On Kaluaakoi side by a government fish pond called "Kaluaaha."

This lot formerly was ordered to be enclosed by Hoapili wahine and Kekaulohe when Eseta Kipa was Governess of Molokai. The people of Kekaulohe's lands erected a stone house on this lot in the year 1835. It is now in possession of Lunalilo as heir of Kekaulohe.

E. Kipa, sworn says, she knows the lot. I was Governess of Molokai under Hoapili wahine & Kekaulohe in former times, and by their orders enclosed this lot and built a stone house on it with the labor of the people of their own lands. When the government sold the land of "Kaluaaha" to the Missionaries, I heard Kalolou come and ask permission from Kanaina to live in the stone house, which permission she got.

(A. Paki sets up a claim for this lot as heir of Kalaolou.)

L. Haalelea, sworn says, he knows the house lot claimed by Lunalilo in Kailua, Hawaii. It is bounded:

On Kiholo side by the church lots
Makai by the public road
On Keauhou side by a road leading mauka
Mauka by some house lots.

It is enclosed by a wall. This lot I have heard belonged formerly to Keaho, the father of Mahuka. I have heard that when Keaho died he left this lot to Kekaulohe, and I have recently seen a letter from Mahuka to W.C. Lunalilo requesting him to allow Mahuka to retain charge of this lot under Lunalilo. In 1843 I was at Kailua & Kekaulohe was there. I then saw the later Governor Adams give her some money which he said was rent received for this same lot. Part of this lot is claimed by the heir of W.P. Leleiohoku. There is a fence remaining though and dividing the lot into two parts.

**F.T. 82-84v16 and N.T. 82-84v16
No. 8559B, William C. Lunalilo**

Polea, sworn says, he knows the lots claimed by William C. Lunalilo, at Lahaina, Maui.

The first called Luaehu, is bounded as follows:
Mauka by Kaiheekai and Hiram's land
Olowalu by King's land
Makai by Sea beach
Kaanapali by Polea and M.J. Nouliou [Nowlien].

The second in Pakala is bounded as follows:
Mauka by Public street
Olowalu by Kaiheekai's land
Makai by H.S. Swinton's and others' land

Kaanapali by Public road.

The third lot called Hawaikaekae is also bounded as follows:

Mauka by Kalaleikio's land
Olowalu by Public road
Makai by Alaloa Kahiko street
Kaanapali by Daniela li's land.

This lot is disputed by Maunahina the wife of George Shaw, whose claim in right of her father. She has already got an award for a part of this lot.

The fourth lot in Paunau is bounded as follows:

Mauka by Keaweihuhu's and Kahula's land
Olowalu by Keaweluaole's land
Makai by Old road
Kaanapali by Street leading to Lahainaluna.

The fifth lot called Loinui is bounded as follows:

Mauka by Keaweluaole; Kauhi and Kalolou's land
Olowalu by Mr. Baldwins
Makai by Old road
Kaanapali by Kamakinui's land.

The sixth lot in Aki is bounded as follows:

Mauka by Kaweka's land
Olowalu by Wahie's land
Makai by Main road
Kaanapali by M.I. Nowlein's land.

The seventh lot in Puunoa is bounded as follows:

Mauka by Main road
Olowalu by Iosua Kaeo
Makai by Iosua Kaeo
Kaanapali by King's land.

The eighth lot in Kelawea is bounded as follows:

Mauka by Lahainaluna
Olowalu by Road from the beach
Makai by Keleikini and Kahookano's lands
Kaanapali by A stream.

All these lots have descended to William C. Lunalilo from his mother, Kekauluohi, and are now in the hands of his lunas. The lot in "Pakala" is disputed by Paki and others.

N.T. 185-187v10

No. 8559B, William Charles Kanaina, [for Lunalilo], Honolulu, 24 April 1850

COPY

Greetings to you Highness, John Young, the Minister of Interior.

My desire is to have the government claim separated from my lands; therefore I hereby give some of my land for the government to have forever and the same shall apply to mine. Here are the names of my lands:

Kawela ahupuaa, Hamakua, Hawaii.
Waikaekoe ahupuaa, Hamakua, Hawaii.
Makapala ahupuaa, Kohala, Hawaii.
Kehena ahupuaa, Kohala, Hawaii.
Puhau ili of Iole, Kohala, Hawaii.

Puakoa ili of Waimea, Kohala, Hawaii.
Honuainonui ahupuaa, Kona, Hawaii.
Puapuanui ahupuaa, Kona, Hawaii.
Lehuulanui ahupuaa, Kona, Hawaii.
Kawainui ahupuaa, Kona, Hawaii.
Lanihaunui ahupuaa, Kona, Hawaii.
Pakiniili ahupuaa, Kau, Hawaii.
Hanuapo ahupuaa, Kau, Hawaii.
Kahanalea ahupuaa, Puna, Hawaii.
Keahialaka ahupuaa, Puna, Hawaii.
Keaau ahupuaa, Puna, Hawaii.
Makahanaloa ahupuaa, Hilo, Hawaii.
Pepekeo ahupuaa, Hilo, Hawaii.

Kaapuhu ahupuaa, Kipahulu, Maui.
2 Waiehu, Puali, West Maui.
Ahipuli [Ahikuli] ili for Waiehu, West Maui.
Pepee ili for Wailuku, West Maui.
Honolua ahupuaa, Kaanapali, Maui.
Kalimaohe ahupuaa, Lahaina, Maui.
Polanui ahupuaa, Lahaina, Maui.
Kuholilea ahupuaa, Lahaina, Maui.

Waialua ahupuaa, Kona, Molokai.
Kawela ahupuaa, Kona, Molokai.

Pau ili for Waikiki in Manoa, Kona, Oahu.
Kamoku ili for Waikiki in Manoa, Kona, Oahu.
Kaluaokau ili for Waikiki in Manoa, Kona, Oahu.
Kapahulu ili for Waikiki in Manoa, Kona, Oahu.
Kaalaea ahupuaa, Koolaupoko, Oahu.
Kapaka ahupuaa, Koolauloa, Oahu.
Laiewai ahupuaa, Koolauloa, Oahu.
Laiemaloo ahupuaa, koolauloa, Oahu.
Pahipahialua, Koolauloa, Oahu.

Kahili, Koolauloa [sic], Koolau, Kauai.
Kalihiwai, Koolauloa [sic], Koolau, Kauai.
Pilauwai, Koolauloa [sic], Koolau, Kauai.
Manuahi ili, Kona, Kauai.
Waipouli ahupuaa, Puna, Kauai.

These lands listed above shall be for me fee simple forever, it would not be right for the government to claim my land.

The following lands, I shall give to the government fee simple forever.
Kapulena ahupuaa, Hamakua, Hawaii.
Kukuihaele ahupuaa, Hamakua, Hawaii.
Auau ahupuaa, Kohala, Hawaii.
Keopuhuikahi ahupuaa, Kona, Hawaii.
Papaakoko ili of Honokohau, Kona, Hawaii.
Ninole ahupuaa, Kau Hawaii.
Laepaoo ahupuaa, Puna, Hawaii.
Koe 1 ahupuaa, Puna, Hawaii.
Koe 2 ahupuaa, Puna, Hawaii.
Laeapuki ahupuaa, Puna, Hawaii.
Kaiuiki ahupuaa, Hilo, Hawaii.
Kahuku ahupuaa, Hilo, Hawaii.

Waiakoa ahupuaa, Kula, Maui.
Kou ili of Waiehu Puali, Komohana Maui.
Kapoino ili of Waiehu Puali, Komohana, Maui.
Halelena ili of Waiehu Puali, Komohana, Maui.
Keokamu ili of Waiehu Puali, Komohana, Maui.
Wainee ahupuaa, Lahaina, Maui.

Mahana ahupuaa, Lanai.

Kamalomalo ahupuaa, Puna, Kauai.
Kumukumu ahupuaa, Koolau, Kauai.

I've given the lands listed above to the government forever, all of them are for the government.
Please consider my request with compassion for me.

With appreciation, I am,
William Charles Lunalilo, Charles Kanaina (child guardian)
Department of Interior, 6 April 1852.

This is a try copy of Lunalilo's division with the government,
A.G. Thruston, Secretary

N.T. 450v10

No. 8559B, William C. Lunalilo, Protested by Kaai

Mahuna, sworn, it is true my own place was written in the bill of sale to C. Kanaina, the place is just mauka of the land in Kailua of Kona, Hawaii, over which there is a dispute by Kaai. That is the lot I have transmitted to him, Kanaina, but I have not seen the property Kaai has at this present time; however, I had seen my parents living on this land at the time [of] Kaahumanu I. I had gone on a tour. Houses had been built, but I have not lived there since that time to the present, nor have I seen this lot over which there is a dispute with Kaai.

C. Kanaina, relates - the witnesses for this land on which Kaai and I are working are dead; although, I had thought they (two) would be my witnesses, but today they have denied by claim to this place. It is true this place had been for their father, Keoho, where he lived until he had died and they (two) are his own children, but I am demanding according to the old bequest of Keaho to M. Kekauluohi as well as by many other statements.

Naea, sworn, I have seen Kaai's place in Keopu of Kona, Hawaii, which is a house lot.

Mauka by Mahuka's lot
South Kona by a road
Makai by Government road
Kohala by vacant lot.

Land from Keoho (his father) upon his (Keoho) death in 1833. Keoho had obtained it long ago as idle land.

Kaai has always lived there peacefully to the present time.

Now C. Kanaina has offered a protest, I do not know the reason for it.

Kioloa, sworn, all of the statements above are true. I have known in the same way. I have not known the place was for C. Kanaina. It had been for Keoho, Kaai's father and now Kaai is the true claimant of this place.

[Award 8559B; (Maui) Land Patent 8395; Polanui Lahaina; 1 ap.; 440 Acs (apana 25); Land Patent 8129; Honolulu Kaanapali; 1 ap.; 3860 Acs (ahupua'a, apana 23); R.P. 7664; Pepe'e Wailuku (apana 22); 4 ap.; 255.70 Acres; Land Patent 8396; 1 ap.; 255.7 Acs; Kalimaohe Lahaina; 2 ap.; 4.93 Acs;

(apana 24); Land Patent 8397; Kuholilea Lahaina; 2 ap.; 184. 5 Acs; (apana 26); R.P. 5637; Paunau Lahaina; 1 ap.; 2 roods 24 perkas (apana 4); R.P. 5639; Aki Lahaina; 1 ap.; 16 perkas (apana 6); no R.P.; Paeohi Lahaina; 1 ap.; 1 Ac. 52 rods; R.P. 5699; Loiniu (Luaeahu Waianae) Lahaina; 2 ap.; 2.75 Acs 37 rods; Land Patent S-8597; Kaapahu Kipahulu; 1 ap.; (ahupuaa, apana 19); 1480 Acres; no R.P. Ahikuli Waiehu (apana 21); Land Patents 8537; Waiehu Wailuku; Por. apana 20; .205 Ac; Land Patent 8546; Waiehu Wailuku, Portion Apana 20, .41 Ac.; Land Patent S-8654; 2 Waiehu Wailuku, Por. apana 20; 27,797 square feet; (Hawaii) R.P. 478; Pakiniiki Kau; 1 ap.; 2357 Acs; Makanalao Hilo; 2 ap.; 7600 Acs; R.P. 7049; Honuapo Kau; 1 ap.; ahupuaa 2200 Acs; Honuaino nui; 1 ap.; 262 Acs; R.P. 7454; Kawainui iki Kona; 1 ap.; 380 Acs; R.P. 7455; Lehuula nui; 1 ap.; 290 Acs; Lehuula nui; 1 ap.; 2840 Acs; Puapuaanui Kona; 1 ap.; 370 Acs; R.P. 7680; Kahena 2 N. Kohala; 1 ap.; (ap.4); ahupuaa; Puako S. Kohala; 1 ap.; Iliaina (Ap.6); Kahaualea Puna; 1 ap.; 26,000; Keahialaka Puna; 1 ap.; 5562 Acs; Pepeekeo Hilo; Koaau Puna; 1 ap.; 64.275 Acs; Kawela Hamakua; R.P. 7434 Honuainonui N. Kona; R.P. 7456; Lanihau Nui Kona; Land Patent 8452; Waikoekoe Hamakua; no R.P.; Makapala Kohala; R.P. 7192 Makanalao Hilo; 2 ap.; 7600 Acs; (Molokai) R.P. 7655; Waiialua; R.P. 7656 Kawela; (Oahu); R.P.; 7635; Kamoku Waikiki; Land Patents 8193, 8311 & 8416; Pau Waikiki; Land Patent 8124 & 8165 (see Kapahulu award); Land Patent 8124; Kapahulu Kona; 1 ap.; 31.50 Acs; Land Patent 8165; Kapahulu Kona; 2 ap.; 2,184.44 Acs; R.P. 7652; Kalauakou Waikiki; R.P. 7531; Kaalaea Koolaupoko; R.P. 7494; Laie-wai Koolauloa; Laie-maloo Koolauloa; R.P. 5688; Pahipahialua Koolauloa; no R.P.; Kapaka Koolauloa; (Kauai) Land Patent 8173; Kalihiwai Halelea; no R.P. Manuahi Hanapepe; Land Patent 8323; Kahili Koolau; R.P. 7060; Pilaa Koolau; R.P. 7373; Waipouli Puna; See 8559 to C. Kanaina who is awarded a property at Ukumehame under 8559B; see also Award 277]



Appendix E

**A CULTURAL IMPACT ASSESSMENT
OF A PORTION OF 11.75 ACRE LAND PARCEL LOCATED IN
WAI`EHU AHUPUA`A, WAILUKU DISTRICT,
MAUI ISLAND, HAWAII
[TMK 3-3-001:16 por.]**

Prepared By:
Leann McGerty, B.A.
and
Robert L. Spear, Ph.D.
January 2008

Prepared For:
Maui Economic Opportunity, Inc.
99 Mahalani Street
Wailuku, HI 96793

TABLE OF CONTENTS

TABLE OF CONTENTS..... ii

LIST OF FIGURES ii

INTRODUCTION 1

METHODOLOGY 4

 ARCHIVAL RESEARCH..... 6

 INTERVIEW METHODOLOGY 6

 PROJECT AREA AND VICINITY 7

CULTURAL HISTORICAL CONTEXT..... 7

 PAST POLITICAL BOUNDARIES 8

 TRADITIONAL SETTLEMENT PATTERNS 8

WAHI PANI (LEGENDARY PLACES)..... 9

 THE GREAT MĀHELE..... 11

 HISTORIC LAND USE 12

SUMMARY 12

CIA INQUIRY RESPONSE..... 13

CULTURAL ASSESSMEMNT 13

REFERENCES CITED..... 14

LIST OF FIGURES

Figure 1: USGS Quadrangle Map Showing Project Area Location. 2

Figure 2: Map Showing Project Area. 3

INTRODUCTION

At the request of Maui Economic Opportunity, Inc., Scientific Consultant Services, Inc. (SCS) conducted a Cultural Impact Assessment, on 11.75 acres of land (TMK: 3-3-001:16 por.) located in Wai`ehu Ahupua`a, Wailuku District, Maui Island (Figures 1 and 2). Documents and exhibits submitted by Maui Economic Opportunity, Inc., described the proposed development of a residential training school that will be a replication of the Delancey Street Foundation in San Francisco and will initially (Phase 1) consist of two dorm-like buildings to house 10 men and 10 women. In addition, a structure for dining, a laundry room and administrative offices will be constructed. Phase 2 includes a proposed conference/gathering center for 200 capacity, including meeting rooms, a stage and commercial kitchen. Phase 3 proposes additional administrative offices and apartments for residents.

The Constitution of the State of Hawai`i clearly states the duty of the State and its agencies is to preserve, protect, and prevent interference with the traditional and customary rights of native Hawaiians. Article XII, Section 7 requires the State to “protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by *ahupua`a* tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778” (2000). In spite of the establishment of the foreign concept of private ownership and western-style government, Kamehameha III (Kauikeaouli) preserved the peoples traditional right to subsistence. As a result in 1850, the Hawaiian Government confirmed the traditional access rights to native Hawaiian *ahupua`a* tenants to gather specific natural resources for customary uses from undeveloped private property and waterways under the Hawaiian Revised Statutes (HRS) 7-1. In 1992, the State of Hawai`i Supreme Court, reaffirmed HRS 7-1 and expanded it to include, “native Hawaiian rights...may extend beyond the *ahupua`a* in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner” (Pele Defense Fund v. Paty, 73 Haw.578, 1992).

Act 50, enacted by the Legislature of the State of Hawaii (2000) with House Bill 2895, relating to Environmental Impact Statements, proposes that:

...there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaii’s culture, and traditional and customary rights... [H.B. NO. 2895].

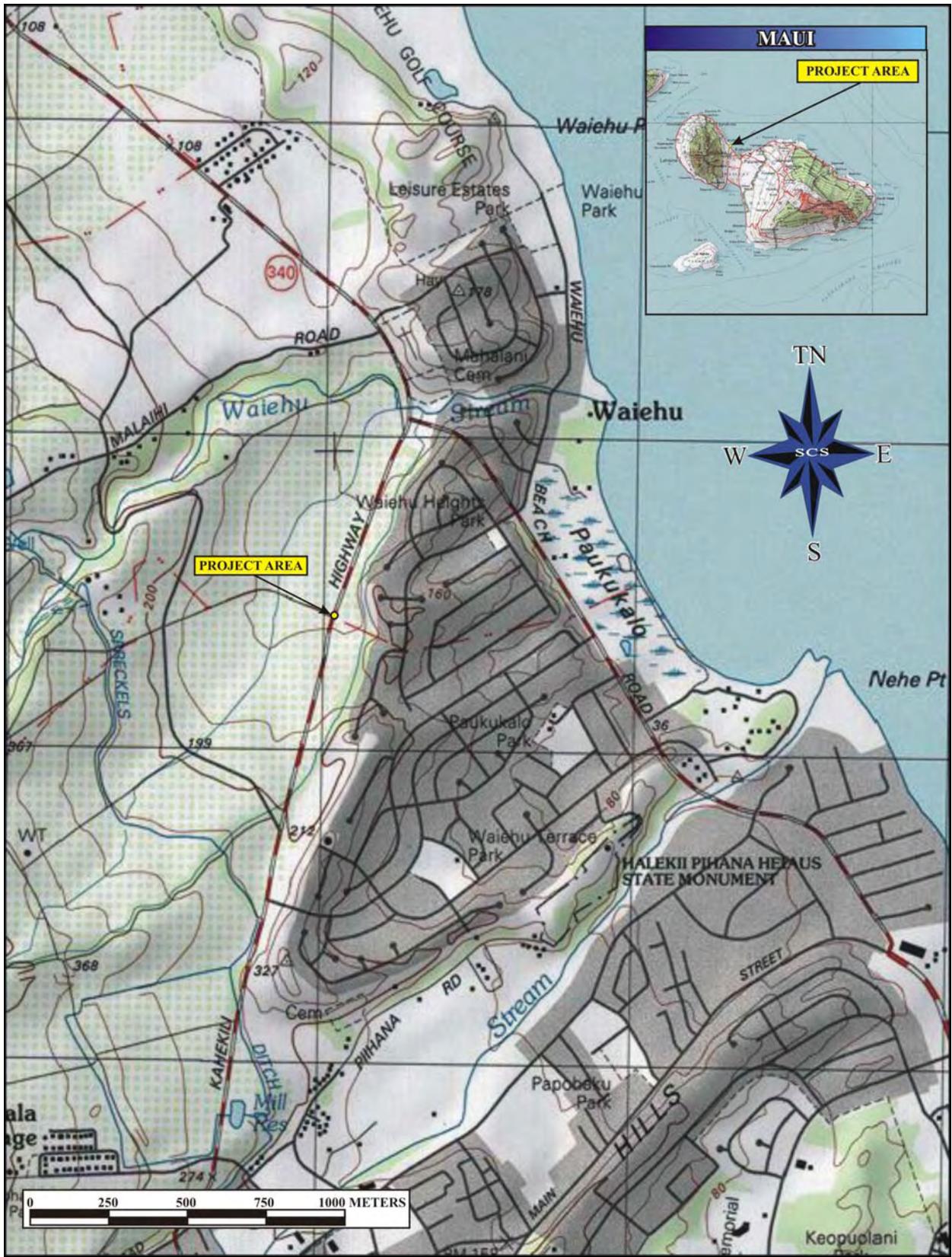


Figure 1: USGS Quadrangle Map Showing Project Area Location.

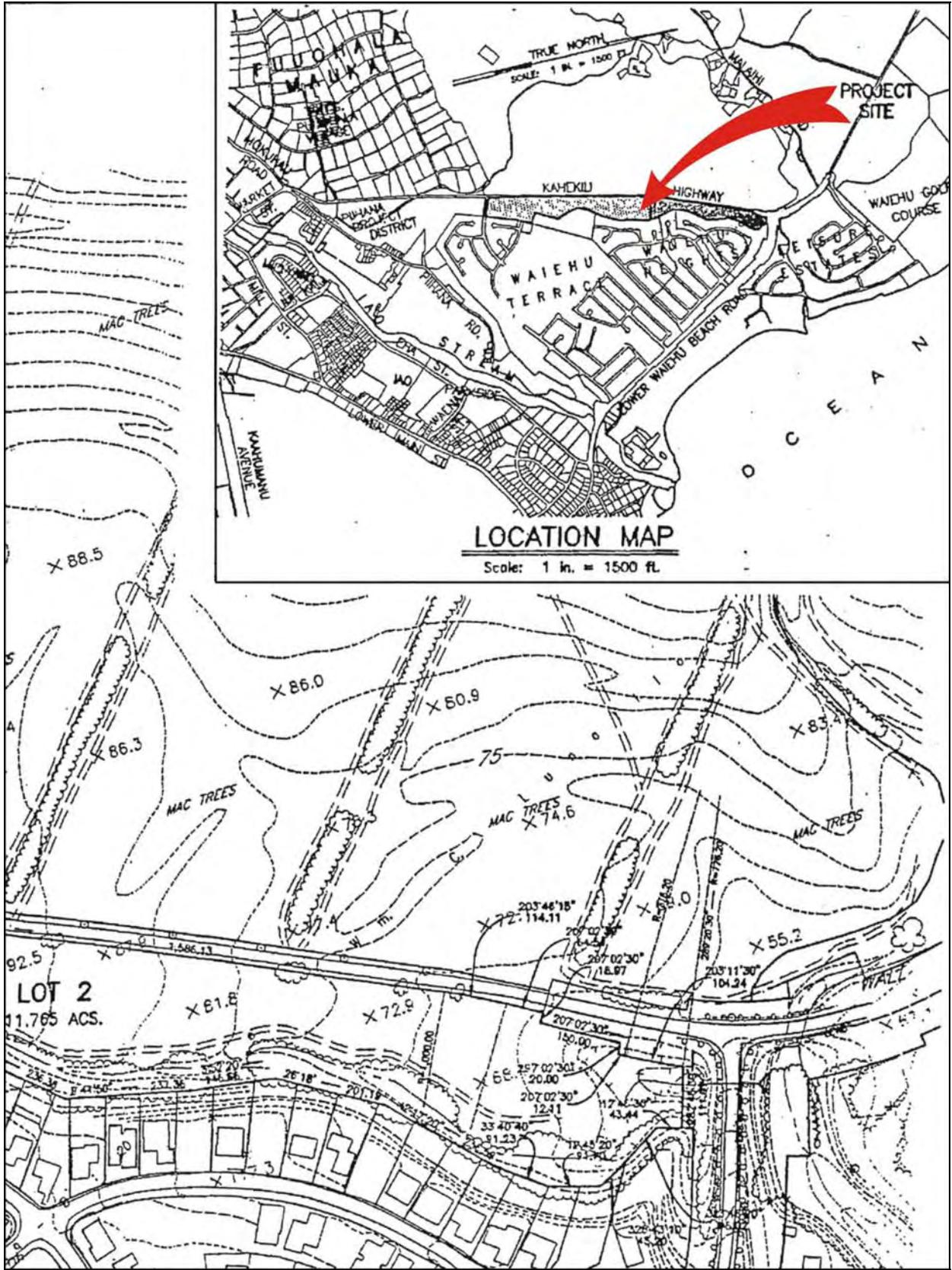


Figure 2: Map Showing Project Area.

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shore line developments on the “cultural practices of the community and State” as part of the HRS Chapter 343 environmental review process (2001). Its purpose has broadened, “to promote and protect cultural beliefs, practices and resources of native Hawaiians [and] other ethnic groups, and it also amends the definition of ‘significant effect’ to be re-defined as “the sum of effects on the quality of the environment including actions that are...contrary to the State’s environmental policies...or adversely affect the economic welfare, social welfare, or cultural practices of the community and State” (H.B. 2895, Act 50, 2000).

Thus, Act 50 requires an assessment of cultural practices to be included in the Environmental Assessments and the Environmental Impact Statements, and to be taken into consideration during the planning process. The concept of geographical expansion is recognized by using, as an example, “the broad geographical area, e.g. district or *ahupua`a*” (OEQC 1997). It was decided that the process should identify ‘anthropological’ cultural practices, rather than ‘social’ cultural practices. For example, *limu* (edible seaweed) gathering would be considered an anthropological cultural practice, while a modern-day marathon would be considered a social cultural practice.

According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control (OEQC 1997):

The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religions and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural, which support such cultural beliefs.

This Cultural Impact Assessment involves evaluating the probability of impacts on identified cultural resources, including values, rights, beliefs, objects, records, properties, and stories occurring within the project area and its vicinity cultural values and rights within the project area and its vicinity (H.B. 2895, Act 50, 2000).

METHODOLOGY

This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the “Cultural Impact Assessment Methodology”, the OEQC state:

...information may be obtained through scoping, community meetings, ethnographic interviews and oral histories... (1997).

The report contains archival and documentary research, as well as communication with organizations having knowledge of the project area, its cultural resources, and its practices and beliefs. This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). The assessment concerning cultural impacts should address, but not be limited to, the following matters:

- (1) a discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained;
- (2) a description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken;
- (3) ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained;
- (4) biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area;
- (5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as the particular perspective of the authors, if appropriate, any opposing views, and any other relevant constraints, limitations or biases;
- (6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;
- (7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;

- (8) an explanation of confidential information that has been withheld from public disclosure in the assessment;
- (9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;
- (10) an analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place, and;
- (11) the inclusion of bibliography of references, and attached records of interviews, which were allowed to be disclosed.

Based on the inclusion of the above information, assessments of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

ARCHIVAL RESEARCH

Archival research focused on a historical documentary study involving both published and unpublished sources. These included legendary accounts of native and early foreign writers; early historical journals and narratives; historic maps and land records such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records; historic accounts, and previous archaeological project reports.

INTERVIEW METHODOLOGY

Interviews are conducted in accordance with Federal and State laws and guidelines. Individuals and/or groups who have knowledge of traditional practices and beliefs associated with a project area or who know of historical properties within a project area are sought for consultation. Individuals who have particular knowledge of traditions passed down from preceding generations and a personal familiarity with the project area are invited to share their relevant information. Often people are recommended for their expertise, and indeed, organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs, historical societies, Island Trail clubs, and Planning Commissions are depended upon for their recommendations of suitable informants. These groups are invited to contribute their input, and suggest further avenues of inquiry, as well as specific individuals to interview.

If knowledgeable individuals are identified, personal interviews are sometimes taped and then transcribed. These draft transcripts are returned to each of the participants for their review

and comments. After corrections are made, each individual signs a release form, making the information available for this study. When telephone interviews occur, a summary of the information is often sent for correction and approval, or dictated by the informant and then incorporated into the document. Key topics discussed with the interviewees vary from project to project, but usually include: personal association to the *ahupua`a*, land use in the project's vicinity; knowledge of traditional trails, gathering areas, water sources, religious sites; place names and their meanings; stories that were handed down concerning special places or events in the vicinity of the project area; evidence of previous activities identified while in the project vicinity.

In this case, letters briefly outlining the development plans along with maps of the project area were sent to individuals and organizations whose jurisdiction includes knowledge of the area with an invitation for consultation. Consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs on O`ahu; Thelma Shimaoka, Coordinator of the Maui branch of the Office of Hawaiian Affairs; the Central Maui Hawaiian Civic Club; Hinano Rodrigues, Cultural Historian with State Historic Preservation Division; Native Hawaiian Preservation Council, and the Cultural Resources Commission of the Maui Planning Department. If cultural resources are identified based on the information received from these organizations and/or additional informants, an assessment of the potential effects on the identified cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

PROJECT AREA AND VICINITY

The project area is located in Wai`ehu Ahupua`a and occupies approximately 11 acres from the intersection of Wai`ehu Beach Road and Kahekili Highway, extending west toward Wailuku Town (see Figure 2). The site presently contains many macadamia nut trees, is overgrown with cane grass, and is fenced in.

CULTURAL HISTORICAL CONTEXT

The island of Maui ranks second in size of the eight main islands in the Hawaiian Archipelago. Pu`u Kukui, forming the west end of the island (1,215m above mean sea level), is composed of large, heavily eroded amphitheater valleys that contain well-developed permanent stream systems that watered fertile agricultural lands extending to the coast. The deep valleys of West Maui and their associated coastal regions have been witness to many battles in ancient times and were coveted productive landscapes.

PAST POLITICAL BOUNDARIES

Traditionally, the division of Maui's lands into districts (*moku*) and sub-districts was performed by a *kahuna* (priest, expert) named Kalaiha`ōhia, during the time of the *ali`i* Kaka`alaneo (Beckwith 1940:383; Fornander places Kaka`alaneo at the end of the 15th century or the beginning of the 16th century [Fornander 1919-20, Vol. 6:248]). Land was considered the property of the king or *ali`i`ai moku* (the *ali`i* who eats the island/district), which he held in trust for the gods. The title of *ali`i`ai moku* ensured rights and responsibilities pertaining to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka`ānana* (commoners) worked the individual plots of land.

In general, several terms, such as *moku*, *ahupua`a*, *`ili* or *`ili`āina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua`a*) which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua`a* were therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua`a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *`ili`āina* or *`ili* were smaller land divisions next to importance to the *ahupua`a* and were administered by the chief who controlled the *ahupua`a* in which it was located (*ibid*:33; Lucas 1995:40). The *mo`o`āina* were narrow strips of land within an *`ili*. The land holding of a tenant or *hoa`āina* residing in a *ahupua`a* was called a *kuleana* (Lucas 1995:61). The project area is located in the district of Wailuku, which translated literally means "waters of destruction" (Pukui *et al.* 1974:225).

TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various *ahupua`a*. During pre-Contact times, there were primarily two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugar cane, *Saccharum officinarum*) and *mai`a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *`uala* (sweet potato, *Ipomoea batatas*) were produced. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Between A.D. 600-1100, sometimes referred to as the Developmental Period, the major focus of permanent settlement continued to be the fertile and

well-watered windward valleys, such as those in the West Maui mountains in close proximity to Kahului (Kirch 1985).

WAHI PANA (LEGENDARY PLACES)

Scattered amongst the agricultural and habitation sites were other places of cultural significance to the *kama`āina* of the district. Līlīlehua was the name of the wind and rain that fell in the valley of Wai`ehu (Puku`i and Elbert 1981).

One of the recorded *mo`olelo*, spoke of the supernatural stones of Wai`ehu. Konole, who was a fisherman, would light his torch and on certain nights, would proceed to the ocean. He always brought a fish as an offering to the god Pehu when he returned. His wife mistreated the children while he was gone, and one night he returned to find the children dead. Konole had special powers and so he turned the children, his wife and himself into stones. Due to the evil found in the wife, the parent rocks were separated from the children rocks. The parent rocks lay in a bad place and those of the children where in a good place. A wind was named Maahaaha after one of the places and it means “the wind that distorts the features of the land’s growing things. . . “ and, therefore giving a strange appearance to natural images (Sterling 1998: 71-72).

There was a *heiau* named “Pu`ukuma” on the ridge between Waihe`e and Wai`ehu. This religious feature was dedicated to Kane and Lono and had been constructed by Kalanikupule, son of Kahekili, and the Ali`i Nui, or Chief of Maui. As it had been built “for the welfare of the people and the land”, it was called a *Heiau ho`o uluulu`ai*, a “Shrine to cause increased growth in food” (*ibid.*:496). One un-named *heiau* was obliterated by the placing of a historic cemetery in its place during the plantation days. A *pu`uhonua* (place of refuge) named Poaiwa was situated on a ridge in the middle of the valley. Stokes refers to it as a *pu`uhonua* and a *heiau* (*ibid.*: 72). During Walker’s archaeological survey in the 1930s, a man named Kawailana, 88 years old, took him to a grove of *kukui* trees at the head of south Wai`ehu valley. Kawailana identified the rocks in the grove as Malumalukua Heiau and said that all the *heiau* near Wai`ehu were all built by Kahekili and were dedicated to Kāne. Offerings of pigs and men were placed on the *lele*, or alter. Kaua`i seems unique in human sacrifice offered to the god Kāne (and sometimes Kanaloa), as this was reserved for Kū on most of the islands (Valeri 1985:185). Kukuikomo Heiau was located on a ridge between north and south Wai`ehu valleys and Puukoa Heiau was situated near a pond on the ridge before it was destroyed (Walker 1931).

Ka Lae O Kehoni was known traditionally as a site for wrestling matches between Kahekili and his son (Sterling 1998). It was also reputedly the birthplace of Namahana, Kahekili's full sister (*ibid.*)

Wailuku District was a center of political power often at war with its rival in Hana. By the end of the 18th century, Kahekili resided with his entourage in Wailuku and it was on its sand dunes that Kahekili and his warriors engaged those of Kalani`ōpu`ū, Chief from Hawai`i Island.

In his bid to conquer Kahekili and obtain Maui, Kalani`ōpu`ū brought his famous and fearless `Ālapa warriors who were slaughtered by Kahekili's men. "The dead lay in heaps strewn like *kukui* branches; corpses lay heaped in death; they were slain like fish enclosed in a net..." (Kamakau 1961:85-89).

Kahekili sailed with his brother, Kaeokulani, the *ali`i nui* on Kaua`i, from O`ahu down the Island chain. After a brief stop on Moloka`i, the fleet continued to Maui and stopped for a while at Waihe`e and Wai`ehu. Apparently, Kahekili had bestowed on Kaeo some form of sovereign authority over Maui. Kaeo proceeded to divide the Lands of Maui between various Kaua`i chiefs and warriors. This led to an altercation between the Maui chiefs and sons of Kahekili and the Kaua`i chiefs at Paukukalo near Wai`ehu which almost destroyed the expedition of the two kings. Koalaulani, one of the sons of Kahekili, showed much courage against the many Kaua`i warriors (Fornander 1969)

A later encounter (1776) between Kahekili and Kalani`ōpu`ū resulted in a temporary truce which was broken in 1790 by the battle of Kepaniwai in `Īao valley, when Kamehameha I consolidated his control over Maui Island. There were so many warriors and canoes invading from Hawai`i Island that it was called the Great Fleet.

WAI`EHU SETTLEMENT PATTERNS

Wai`ehu was part of Nā Wai `Eha (The Four Streams), four large valley's that cut deep into the West Maui mountains, capturing vast amounts of water draining from Pu`u Kukui and in the case of Wai`ehu and Waihe`e, eventually emptying into the ocean (Handy and Handy 1972).

Handy and Handy describe the "Four Streams" system below:

The old *`okana* (land division) named Na Wai Eha...comprised four great valleys which cut far back into the slopes of West Maui and drain the eastward watershed of Pu`u Kukui and the ridges

radiating northeastward, eastward, and southeastward from it. Two of the great valleys, Waihe`e and Waiehu, open toward the ocean and their streams empty into it. Wailuku is partly land bound, but its stream flows into Kahului Bay, which has been eroded by the ocean out of what was formerly the stream mouth. Waikapu is land bound. The waters of its great stream, now utilized for irrigating a great acreage of sugar cane, formerly was diverted into *lo`i* and its overflow was dissipated on the dry plains of the broad isthmus between West and East Maui [1972:496].

Traditionally, Wai`ehu was part of the largest continuous area of *lo`i* (taro pond fields) in the islands. Twin streams watered the taro terraces in Wai`ehu and in the upper portion of the valley, taro was still being cultivated in the 1930s.

Given the amount of intensive agricultural development within Nā Wai `Eha, it seems very likely that these coastal valleys would have been settled early. Wai`ehu along with similar valleys lent support to the increasingly stratified and expanding Hawaiian population, whose centralized ruling class congregated in the coastal region near religious complexes, such as Pihana and Hale Ki`i.

THE GREAT MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kamehameha III was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame`eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998:4; Daws 1962:111; Kuykendall 1938 Vol. I:145). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka`āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *`okipū* (on O`ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property (Chinen 1961:16). Wai`ehu Ahupua`a was awarded to William C. Lunalilo during the Mahele. There were 124 claims for *kuleana* in Wai`ehu Ahupua`a, but none were identified in the project area.

HISTORIC LAND USE

As the sugar industry developed in the mid to late 1800s in Hawai`i, Kahului became a cluster of warehouses, stores, wheel-wright and blacksmith shops close to the harbor. A small landing was constructed in 1879 to serve the sugar company (Clark 1980). The project area was planted with cane when it became part of the Wailuku Sugar Company, which was formed from Waihe`e and Wai`ehu Sugar Company's land and Wailuku Sugar lands in 1862 (Conté and Best 1973).

SUMMARY

The "level of effort undertaken" to identify potential effect by a project to cultural resources, places or beliefs (OEQC 1997) has not been officially defined and is left up to the investigator. A good faith effort can mean contacting agencies by letter, interviewing people who may be affected by the project or who know its history, research identifying sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project being proposed and its impact potential. Sending inquiring letters to organizations concerning development of a piece of property that has already been totally impacted by previous activity and is located in an already developed industrial area may be a "good faith effort". However, when many factors need to be considered, such as in coastal or mountain development, a good faith effort might mean an entirely different level of research activity.

In the case of the present parcel, letters of inquiry were sent to organizations whose expertise would include the project area. Consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs on O`ahu; Thelma Shimaoka, Coordinator of the Maui branch of the Office of Hawaiian Affairs; the Central Maui Hawaiian Civic Club; Hinano Rodrigues, Cultural Historian with State Historic Preservation Division; Native Hawaiian Preservation Council, and the Cultural Resources Commission of the Maui Planning Department.

Historical and cultural source materials were extensively used and can be found listed in the References Cited portion of the report. Such scholars as ʻIi, Kamakau, Beckwith, Chinen, Kame`eleihiwa, Fornander, Kuykendall, Kelly, Handy and Handy, Puku`i and Elbert, Thrum, Sterling, and Cordy have contributed, and continue to contribute to our knowledge and understanding of Hawai`i, past and present. The works of these and other authors were consulted and incorporated in the report where appropriate. Land use document research was supplied by the Waihona `Aina 2007 Data base.

CIA INQUIRY RESPONSE

As suggested in the “Guidelines for Accessing Cultural Impacts” (OEQC 1997), CIAs incorporating personal interviews should include ethnographic and oral history interview procedures, circumstances attending the interviews, as well as the results of this consultation. It is also permissible to include organizations with individuals familiar with cultural practices and features associated with the project area.

As stated above, consultation was sought from the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs on O`ahu; the Maui branch of the Office of Hawaiian Affairs; the Central Maui Hawaiian Civic Club; the Cultural Historian with the State Historic Preservation Division, Maui; and the Maui Planning Department. Except for OHA acknowledging the receipt of our letter, none of the organizations responded with information concerning the potential for cultural resources to occur in the project area (TMK:3-3-001: 16 por.), or with additional suggestions for further contacts.

Analysis of the potential effect of the project on cultural resources, practices or beliefs, its potential to isolate cultural resources, practices or beliefs from their setting, and the potential of the project to introduce elements which may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 1997). To our knowledge, the project area has not been used for traditional cultural purposes within recent times. Based on historical research and no response from the above listed contacts, it is reasonable to conclude that Hawaiian rights related to gathering, access or other customary activities within the project area will not be affected and there will be no direct adverse effect upon cultural practices or beliefs. The visual impact of the project from surrounding vantage points, e.g. the highway, mountains, and coast would appear to be minimal.

CULTURAL ASSESSMEMNT

Based on organizational response as well as archival research, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by development activities on a Parcel 16. Because there were no cultural activities identified within the project area, there are no adverse effects.

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Appendix F

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April 29, 2009

Mr. Matt Slepín
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Maui, HI 96793

Re: **Traffic Impact Assessment Report
MEO Ke Kahua Best House
Waiehu, Maui, Hawaii
TMK: (2) 3-3-001:16**

Dear Matt:

Phillip Rowell and Associates have completed the following Traffic Impact Assessment Report (TIAR) for the proposed MEO Ke Kahua Best House in Wailuku, Maui. The following report is presented in the following format:

- A. Project Location and Description
- B. Purpose and Objective of Study
- C. Methodology
- D. Description of Existing Streets and Intersection Controls
- E. Existing Peak Hour Traffic Volumes
- F. Level-of-Service Concept
- G. Existing Levels-of-Service
- H. Background Traffic Projections
- I. Project Trip Generation
- J. Background Plus Project Traffic Projections
- K. Traffic Impact Analysis with Hale Mua
- L. Traffic Impact Analysis without Hale Mua
- M. Mitigation
- N. Other Traffic Related Issues
- O. Summary and Conclusions

A. Project Location and Description

The proposed project is located adjacent to the Waiehu Heights Subdivision area of Wailuku. See [Attachment A](#).

The "Ke Kahua Farm" is part of MEO's BEST (Being Empowered and Safe Together) Reintegration Program. The BEST Program is modeled upon San Francisco's Delancey Street Program and provides job training, counseling and other support services for persons released from prison. Residents will typically be in the program for two years before returning to the community-at large. Residents will live on-premises in a structured setting and train and work on the farm. Produce grown on the Ke Kahua farm will be sold at a roadside produce stand on the property to help support the program and provide hands-on business training. Participants will cultivate native plants, fruits, and vegetables using traditional practices, as well as learn Hawaiian language and

*cultural activities. The Delancey Street Program has operated for over 30 years, and the recidivism rate of participants returning to prison is significantly lower than persons released directly into the community.*¹

Site improvements include the clearing of fallow agricultural lands and their development into active fields, site utility improvements, and the construction of two dwellings (to accommodate up to twenty residents-participants). The two dwelling units will be apartments comparable to dormitories.

Primary access to and egress from the project units will be via a new driveway along the east side of Kahekili Highway, approximately 2,500 feet--0.5 mile--south of the Kahekili Highway/Waiehu Beach Road intersection. This new access point appears to align with the north driveway to the proposed Hale Mua project. There are two other driveways on either side of the primary driveway that provide access to and egress from the agricultural fields. It is understood that these driveways will be used by agricultural vehicles only and will be used during off-peak hours only.

A preliminary site plan for the project is provided as [Attachment B](#).

B. Purpose and Objective of Study

1. Quantify and describe the traffic related characteristics of the proposed project.
2. Identify potential deficiencies adjacent to the project that will impact traffic operations in the vicinity of the proposed project.

C. Methodology

1. *Define the Study Area*

The first step in defining the study area was to estimate the number of peak hour trips that the proposed project will generate. Based on a review of studies for other projects in the area, it was determined that the following intersections should be studied:

- a. Kahekili Highway at Waiehu Beach Road
- b. Kahekili Highway at Maka'ala Drive
- c. Kahekili Highway at Hale Mua North Driveway & MEO BEST Project Driveway (a future intersection)
- d. Kahekili Highway at Hale Mua South Driveway & Waiehu Mauka Driveway (a future intersection)

¹ Early Consultation Letter to State of Hawaii Department of Transportation dated December 5, 2008 from Chris Hart & Partners, Inc.

2. *Analyze Existing Traffic Conditions*

Existing traffic volumes at the study intersections were estimated from manual traffic counts performed during February 2009. The intersection configuration and right-of-way controls were verified during a field reconnaissance of the study area during January 2009. Existing traffic operating conditions of the study intersection were determined using the methodology described in the 2000 *Highway Capacity Manual* (HCM)².

3. *Estimate Horizon Year Background Traffic Projections*

Background traffic conditions are defined as future traffic conditions without the proposed project. The design horizon year does not necessarily represent the project completion date of that phase. It is a date for which future background traffic projections were estimated. For this project, we have used a design, or horizon, year of 2015. Horizon year background traffic conditions were estimated using a background traffic growth factor.

4. *Estimate Project-Related Traffic Characteristics*

The number of peak-hour trips that the proposed project will generate was estimated using standard trip generation procedures outlined in the *Trip Generation Handbook*³ and data provided in *Trip Generation*⁴. These trips were distributed and assigned, based on the available approach and departure routes and trip distribution data from other recently completed traffic studies in the area.

5. *Analyze Project Related Traffic Impacts*

The project-related traffic was then superimposed on background traffic volumes. The traffic impacts of the project were assessed by analyzing the changes in peak hour traffic volumes and changes in the levels-of-service at the study intersections. The purpose of this analysis was to identify potential operational deficiencies in the vicinity of the proposed project.

D. Description of Existing Streets and Intersection Controls

The existing lane configurations and right-of-way controls are summarized in [Attachment C](#).

Waiehu Beach Road connects Kahekili Highway with Lower Main Street. Waiehu Beach Road is a two-lane, two-way roadway. Waiehu Beach Road runs northwest and southeast. However, for this project it was assumed that Waiehu Beach Road has an east-west orientation. The posted speed limit is 30 miles per hour. The intersection of Waiehu Beach Road with Kahekili Highway is an unsignalized T-intersection with the STOP sign along the Waiehu Beach Road. There are no separate turn lanes along any of the approaches.

² *Highway Capacity Manual*, Institute of Transportation Engineers, Washington, D.C., 2000

³ *Trip Generation Handbook*, Institute of Transportation Engineers, Washington, D.C., 1998

⁴ *Trip Generation*, Institute of Transportation Engineers, Washington, D.C., 2003

Kahekili Highway is a two-lane, two-way highway with a north-south orientation. There are no curbs, gutters or sidewalks, but there are paved shoulders. The posted speed limit is 30 miles per hour.

E. Existing Peak Hour Traffic Volumes

The existing morning and afternoon peak hour traffic volumes for the existing intersections are summarized in [Attachment D](#).

Traffic counts for the intersections of Kahekili Highway at Waiehu Beach Road and Kahekili Highway at Maka'ala Drive were performed during February 2009. The number of vehicles making each movement at the intersections was recorded at 15-minute intervals. The counts include mopeds, buses, trucks and other large vehicles. Bicycles are not included.

Northbound and southbound traffic at the intersections of Kahekili Highway at the Hale Mua North Driveway and Kahekili Highway at the Hale Mua South Driveway and Waiehu Mauka Driveway were calculated using the approach and departure volumes of the two intersections counted.

Pedestrian activity is negligible during both morning and afternoon counts.

F. Level-of-Service Concept

"Level-of-service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in [Table 1](#). In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. LOS D is typically considered acceptable for peak hour conditions in urban areas.

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics, such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

Table 1 Level-of-Service Definitions for Signalized Intersections⁽¹⁾

Level of Service	Interpretation	Volume-to-Capacity Ratio ⁽²⁾	Stopped Delay (Seconds)
A, B	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<20.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	20.1-35.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801-0.900	35.1-55.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901-1.000	55.1-80.0
F	Total breakdown with stop-and-go operation	>1.001	>80.0

Notes:
 (1) Source: *Highway Capacity Manual*, 2000.
 (2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. [Table 2](#) summarizes the definitions for level-of-service and the corresponding delay.

Table 2 Level-of-Service Definitions for Unsignalized Intersections⁽¹⁾

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	<10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	See note (2) below	>50.1

Notes:
 (1) Source: *Highway Capacity Manual*, 2000.
 (2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

G. Existing Levels-of-Service

The existing levels-of-service of the intersections are summarized in [Table 3](#). Since all the study intersections are unsignalized, only the delays and levels-of-service of the controlled movements at the study intersections are recorded. The HCM methodology does not calculate volume-to-capacity ratios for unsignalized intersections.

Table 3 Existing Levels-of-Service

Intersection, Approach and Movement	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
Kahekili Highway at Waiehu Beach Road				
Southbound Left & Thru	8.9	A	8.6	A
Westbound Left & Right	52.5	F	18.3	C
Kahekili Highway at Maka'ala Drive				
Southbound Left	7.9	A	8.2	A
Westbound Left	22.3	C	14.0	B
Westbound Right	9.8	A	10.2	B

NOTES:

1. V/C ratio is not calculated for unsignalized intersections.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.
4. See [Attachment S](#) for level-of-service worksheets.

The conclusions of the level-of-service analysis are:

1. At the intersection of Kahekili Highway at Waiehu Beach Road, the westbound approach operates at Level-of-Service F during the morning peak hour and Level-of-Service C during the afternoon peak hour. The TIAR for the Hale Mua project recommended that this intersection be signalized⁵.

H. Background Traffic Projections

Background traffic projections are defined as future background traffic conditions without the proposed project. Future traffic growth consists of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. This background growth rate will also compensate for any small development projects that are not identified as a related project. The second component is estimated traffic that will be generated by other development projects in the vicinity of the proposed project.

Background Growth

The *Maui Long Range Transportation Plan*⁶ concluded that traffic in Maui would increase an average of 1.6% per year from 1990 to 2020. This growth rate was rounded up to 2.0% and used to estimate the background growth between 2009 and 2015, which is the design year for this project. The growth factor was calculated to be 1.126 using the following formula:

$$F = (1 + i)^n$$

where F = Growth Factor
 i = Average annual growth rate, or 0.02
 n = Growth period in years

⁵ Julian Ng, Inc., *Revised Traffic Impact Report Hale Mua Subdivision*, November 12, 2007, pages 24-27.

⁶ Kaku Associates, *Maui Long Range Land Transportation Plan*, February 1997

The estimated background traffic growth between 2009 and 2015 is shown as [Attachment E](#).

Related Projects

The second component in estimating future background traffic volumes is traffic resulting from other proposed projects in the vicinity. Related projects are defined as those projects that are likely to be constructed within or adjacent to the study project and would significantly impact traffic in the study area. Related projects may be development projects or roadway improvements.

The following two projects were identified as related projects:

Hale Mua

Hale Mua is located along the west side of Kahekili Highway. The project's traffic assignments were obtained from the traffic studies for the project^{7, 8}. The project will have two driveways along the west side of Kahekili Highway. As described in the project's traffic report, both driveways will be unsignalized and will have separate turn lanes for traffic turning from northbound Kahekili Highway into the project, and will have separate left and right turn lanes along the approaches to Kahekili Highway. The south driveway aligns with the proposed connection to the multi-family component of Waiehu Mauka and the north driveway aligns with the primary driveway of the MEO Ke Kahua Best House.

The traffic report also concluded that traffic signals are warranted for the intersection of Waiehu Beach Road at Kahekili Highway for existing conditions. The report also assessed the viability of a roundabout, but recommended that the intersection should be signalized and improved to provide separate left turn lanes along the southbound and westbound approaches.

The timetable for the Hale Mua project is uncertain and the project may not be constructed within the study period of the MEO Ke Kahua Best House project. Based on discussions with Maui County Public Works relative to the Waiehu Mauka project, it was decided that background traffic projections would be developed with and without Hale Mua traffic.

Waiehu Mauka Rental Housing Project

The Waiehu Mauka Rental Housing Project is located adjacent to the Waiehu Heights Subdivision area of Wailuku. There are two components to the project, a single-family component and a multi-family component. There will be six (6) single-family units located on the north end of the project. Access to and egress from the single-family units will be via Waiehu Beach Road, Wailupe Drive and Haunani Place.

⁷ Julian Ng, Inc., *Traffic Impact Analysis Report Hale Mua Subdivision*, November, 2004

⁸ Julian Ng, Inc., *Revised Traffic Impact Analysis Report Hale Mua Subdivision*, November, 2007

The second will be 100 affordable multi-family housing units. The affordable units will consist of 42 rental (apartment) units and 58 condominium townhomes. Access to and egress from the multi-family units will be via a new roadway connection to Kahekili Highway approximately 4,500 feet--0.85 mile--south of the Kahekili Highway/Waiehu Beach Road intersection. This new access point aligns with the south driveway to the proposed Hale Mua project.

The trip assignments for the related projects including Hale Mua are presented as [Attachment F](#). Trip assignments without Hale Mua are presented as [Attachment G](#).

2015 background traffic projections were calculated by expanding existing traffic volumes by the appropriate growth rates and then superimposing traffic generated by related projects. The resulting 2015 background peak hour traffic projections with Hale Mau are shown as [Attachment H](#) and 2015 background peak hour traffic projections without Hale Mua are shown as [Attachment I](#).

I. Project Trip Generation

Future traffic volumes generated by a project are typically estimated using the methodology described in the *Trip Generation Handbook*⁹ and data provided in *Trip Generation*¹⁰. This method uses trip generation rates to estimate the number of trips that the project will generate during the peak hours of the project and along the adjacent street.

The proposed project will consist of three components: the area used for farming, two buildings (a farm dwelling and a farm labor dwelling) and the potential roadside stand. The farming area will be worked by residents of the project. Therefore, there will be no commuting of project workers of the project, and the only traffic associated with this component of the project will be deliveries of materials, which will be scheduled for off-peak periods.

Trip generation does not provide trip generation data for dwelling units as anticipated for this project. It is understood that the residential buildings will be dormitory-like and will house up to 20 persons. As we do not have individual units, it was decided to use trip generation rates for apartments using the number of residents as the independent variable. The results should be conservative as the residents of this project will live and work on the site, whereas residents of apartments typically commute to and from work during the peak commute periods.

The roadside stand is the retail component of the project. *Trip Generation* provides trip generation data for various categories of retail uses. However, there are no data for a "roadside produce stand." It was decided that the trip generation data for a Specialty Retail Center was the most comparable of the land uses for which data are provided. As defined by the Institute of Transportation Engineers, specialty retail includes various retail and commercial businesses providing a wide range of services and goods. Lastly, it was estimated that the maximum size of the roadside stand would be 900 square feet (30 feet and 30 feet).

⁹ Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., 1998, p. 7-12

¹⁰ Institute of Transportation Engineers, *Trip Generation, 7th Edition*, Washington, D.C., 2003

The trip generation rates and trip generation calculations are summarized in [Table 4](#). The proposed project will generate 7 inbound and 5 outbound trips during the morning peak hour. During the afternoon peak hour, the project will generate 8 inbound and 5 outbound trips, for purposes of developing traffic assignments for the project.

Table 4 Trip Generation Calculations for Proposed Project

Time Period	Direction	Apartments (Dormitories)			Specialty Retail (Roadside Stand)			Totals
		Rate or % ⁽¹⁾	Occupants	Trips	Rate or % ⁽¹⁾	TGSF	Trips	
AM Peak Hour	Total	0.30	20	6	6.84	0.9	6	12
	In	29%		2	84%		5	7
	Out	71%		4	16%		1	5
PM Peak Hour	Total	0.40		8	5.02		5	13
	In	61%		5	56%		3	8
	Out	39%		3	44%		2	5

NOTES:

(1) Institute of Transportation Engineers, *Trip Generation*, Seventh Edition, 2003.

The project generated traffic was distributed and assigned based on the assumption that 80 percent of the traffic would approach from and depart toward the south (toward Wailuku and Kahului) and that the remaining 20 percent would approach from and depart toward the north. This distribution is consistent with the distribution used for the proposed Hale Mua subdivision located along the west side of Kahekili Highway across from the study project.¹¹

The project trip assignments are shown in [Attachment J](#).

J. Background Plus Project Projections

Background plus project traffic projections were estimated by superimposing the peak hourly traffic generated by the proposed project on the background (without project) peak hour traffic projections. This assumes that the peak hourly trips generated by the project coincide with the peak hour of the adjacent street. This represents a worse-case condition, as it assumes that the peak hours of all the intersection approaches, the peak hours of the related projects and the peak hour of the study project all coincide, and that the related projects and the study project is 100% occupied. The resulting background plus project peak hour traffic projections are shown in [Attachments K and L](#). The traffic projection worksheets are shown as [Attachments M and N](#).

K. Traffic Impact Analysis with Hale Mua

The impact of the project was assessed by analyzing the changes in traffic volumes and levels-of-service at the study intersections.

¹¹ Julian Ng, Inc., *Revised TIAR Hale Mua Subdivision*, November 12, 2007, p. 19

Changes in Total Intersection Volumes

An analysis of the project's share of 2015 background plus project intersection approach volumes at the existing study intersections is summarized in [Table 5](#). The table summarizes the project's share of total 2015 peak hour approach volumes at each intersection. Also shown are the percentages of 2015 background plus project traffic that are the result of background growth and traffic generated by related projects.

Table 5 Project's Share of Total Intersection Approach Volumes with Hale Mua ⁽¹⁾

Intersection	Period	Existing	2015 Background	2015 Background Plus Project	Background Growth		Project Traffic	
					Trips	Percent of Total Traffic ⁽²⁾	Trips	Percent of Total Traffic ⁽³⁾
Kahekili Hwy at Waiehu Bch Rd	AM	1210	1465	1467	255	17.4%	2	0.1%
	PM	1030	1263	1267	233	18.4%	4	0.3%
Kahekili Hwy at Makaala Dr	AM	830	1311	1321	481	36.4%	10	0.8%
	PM	660	1164	1173	504	43.0%	9	0.8%
Kahekili Hwy at MEO Best Driveway	AM	610	990	1002	380	37.9%	12	1.2%
	PM	415	798	811	383	47.2%	13	1.6%
Kahekili Hwy at Waiehu Mauka Driveway	AM	610	1130	1140	520	45.6%	10	0.9%
	PM	415	950	959	535	55.8%	9	0.9%

Notes:

- (1) Volumes shown are total intersection approach volumes or projections.
- (2) Percentage of total 2015 background plus project traffic.

An analysis of the project's pro rata share of the increase of traffic volumes between 2009 and 2015 is summarized in [Table 6](#). This table summarizes the growth between 2009 and 2015 and indicates the percentage of growth resulting from background growth and related projects and the percentage growth resulting from project generated traffic.

Table 6 Project's Share of Total Intersection Approach Volumes Growth with Hale Mua ⁽¹⁾

Intersection	Period	Existing	2015 Background	Background Plus Project	Background Growth ⁽²⁾		Project Trips ⁽²⁾	
					Volume	% of 2005 to 2015 Growth	Volume ⁽⁴⁾	% of 2005 to 2015 Growth
Kahekili Hwy at Waiehu Bch Rd	AM	1210	1465	1467	255	99.2%	2	0.8%
	PM	1030	1263	1267	233	98.3%	4	1.7%
Kahekili Hwy at Makaala Dr	AM	830	1311	1321	481	98.0%	10	2.0%
	PM	660	1164	1173	504	98.2%	9	1.8%
Kahekili Hwy at MEO Best Driveway	AM	610	990	1002	380	96.9%	12	3.1%
	PM	415	798	811	383	96.7%	13	3.3%
Kahekili Hwy at Waiehu Mauka Driveway	AM	610	1130	1140	520	98.1%	10	1.9%
	PM	415	950	959	535	98.3%	9	1.7%

Notes:

- (1) Volumes shown are total intersection approach volumes or projections.
- (2) Background versus existing.
- (3) Background plus project versus background.
- (4) Project generated traffic.

Level-of-Service Analysis

1. The *Highway Capacity Software* (HCS) package was used to perform level-of-service analyses. This package uses the *Highway Capacity Manual* methodology.
2. As the *Highway Capacity Manual* defines level-of-service by delay, we have used the same definitions.
3. The anticipated roadway network, lane configurations and right-of-way controls are summarized graphically as [Attachment O](#).

The results of the level-of-service analysis are summarized in [Attachment Q](#). Shown are the average vehicle delays, levels-of-service and 95th percentile queues of all controlled lane groups. Existing delays and levels-of-service are also shown for comparison. The results of the level-of-service analysis are:

Kahekili Highway Beach Road at Waiehu Beach Road

1. At the intersection of Kahekili Highway at Waiehu Beach Road, the left and right turns from Waiehu Beach Road to Kahekili Highway will operate at Level-of-Service F during both peak periods, without and with project generated traffic. There is no increase in the average vehicle delay or 95th percentile queue as a result of project generated traffic. The delay will be 309.4 second per vehicle and the 95th percentile queue will be 24 vehicles, without and with project generated traffic. The project adds only two (2) vehicles during the morning peak hour.
2. During the afternoon peak hour, the left and right turns from Waiehu Beach Road will operate at Level-of-Service F. The average vehicle delay increases from 72.9 to 77.3 seconds per vehicle and the 95th percentile queue increases from 13 to 14 vehicles as a result of project generated traffic.
3. As previously noted, the traffic study for Hale Mua recommended that this intersection be signalized. With traffic signals, the intersection will operate at Level-of-Service B during both peak periods. See [Attachment V](#).

Kahekili Highway at Makaala Drive

4. At the intersection of Kahekili Highway at Makaala Drive, the westbound left turn will operate at Level-of-Service F during the morning peak hour, without and with the project. The average vehicle delays will increase from 118.1 seconds per vehicle to 123.6 seconds per vehicle. This is an increase of 4.7 percent. The 95th percentile queue will increase from 8.7 to 8.9 vehicles.
5. During the afternoon peak hour, all controlled movements will operate at Level-of-Service D, or better, without and with project generated traffic.

Kahekili Highway at Hale Mua North Driveway and MEO BEST Driveway

6. At Kahekili Highway at Hale Mua North Driveway and MEO BEST Driveway, all movements will operate a Level-of-Service D, or better, without and with project generated traffic.

Kahekili Highway at Hale Mua South Driveway and Waiehi Mauka Driveway

7. At the intersection of Kahekili Highway at Hale Mua South Driveway, the movements along Kahekili Highway will operate at Level-of-Service A. The westbound approach from Waiehi Mauka to Kahekili Highway will operate at Level-of-Service E during the morning peak hour and Level-of-Service D during the afternoon peak hour. The eastbound approach from Hale Mua to Kahekili Highway will operate at Level-of-Service D during the morning peak hour and Level-of-Service C during the afternoon peak hour.

L. Traffic Impact Analysis without Hale Mua

Changes in Total Intersection Volumes

An analysis of the project's share of 2015 background plus project intersection approach volumes at the existing study intersections is summarized in [Table 8](#). The table summarizes the project's share of total 2015 peak hour approach volumes at each intersection. Also shown are the percentages of 2015 background plus project traffic that is the result of background growth and traffic generated by related projects.

Table 8 Project's Share of Total Intersection Approach Volumes without Hale Mua ⁽¹⁾

Intersection	Period	Existing	2015 Background	2015 Background Plus Project	Background Growth		Project Traffic	
					Trips	Percent of Total Traffic ⁽²⁾	Trips	Percent of Total Traffic ⁽²⁾
Kahekili Hwy at Waiehu Bch Rd	AM	1210	1365	1367	155	11.3%	2	0.1%
	PM	1030	1163	1167	133	11.4%	4	0.3%
Kahekili Hwy at Makaala Dr	AM	830	941	951	111	11.7%	10	1.1%
	PM	660	754	763	94	12.3%	9	1.2%
Kahekili Hwy at MEO Best Driveway	AM	610	690	702	80	11.4%	12	1.7%
	PM	415	473	486	58	11.9%	13	2.7%
Kahekili Hwy at Waiehu Mauka Driveway	AM	610	730	740	120	16.2%	10	1.4%
	PM	415	520	529	105	19.8%	9	1.7%

Notes:

(1) Volumes shown are total intersection approach volumes or projections.

(2) Percentage of total 2015 background plus project traffic.

An analysis of the project's pro rata share of the increase of traffic volumes between 2009 and 2015 is summarized in [Table 9](#). This table summarizes the growth between 2009 and 2015 and indicates the percentage of growth resulting from background growth and related projects and the percentage growth resulting from project generated traffic.

Level-of-Service Analysis

The anticipated roadway network, lane configurations and right-of-way controls are summarized graphically as [Attachment P](#).

The results of the level-of-service analysis are summarized in [Attachment R](#). Shown are the average vehicle delays, levels-of-service and 95th percentile queues of all controlled lane groups. Existing delays and levels-of-service are also shown for comparison. The results of the level-of-service analysis are:

Kahekili Highway Beach Road at Waiehu Beach Road

1. At the intersection of Kahekili Highway at Waiehu Beach Road, the left and right turns from Waiehu Beach Road to Kahekili Highway will operate at Level-of-Service F during the morning peak hour and Level-of-Service D during the afternoon peak hour, without and with project generated traffic. The average vehicle delay increases from 167.7 to 171.1 seconds, or 2.0 percent, per vehicle, and the 95th percentile queue increases less than one vehicle as a result of project generated traffic.
2. During the afternoon peak hour, the left and right turns from Waiehu Beach Road will operate at Level-of-Service D. The average vehicle delay increases from 28.4 to 29.2 seconds per vehicle and the 95th percentile queue increases from 6.8 to 7.0 vehicles as a result of project generated traffic.
3. As previously noted, the traffic study for Hale Mua recommended that this intersection be signalized. With traffic signals, the intersection will operate at Level-of-Service B during both peak periods. See [Attachment V](#).

Kahekili Highway at Makaala Drive

4. At the intersection of Kahekili Highway at Makaala Drive, the westbound left turn will operate at Level-of-Service D during the morning peak hour, without and with the project.
5. During the afternoon peak hour, all controlled movements will operate at Level-of-Service C, or better, without and with project generated traffic.

Kahekili Highway at MEO BEST Driveway

6. At Kahekili Highway at Hale Mua North Driveway and MEO BEST Driveway, all movements along Kahekili Highway will operate a Level-of-Service A and traffic approaching from the MEO BEST driveway will operate at Level-of-Service B. There is no eastbound approach, as Male Mua is not included in this scenario.

Kahekili Highway at Waiehu Mauka Driveway

7. At the intersection of Kahekili Highway at Hale Mua South Driveway, the movements along Kahekili Highway will operate at Level-of-Service A. The westbound approach from Waiehu Mauka to Kahekili Highway will operate at Level-of-Service B during the morning and afternoon peak hours

M. Mitigation

We have used the Institute of Transportation Engineers standard that a Level-of-Service D is the minimum acceptable level-of-service and that the criteria is applicable to the overall intersection. If project generated traffic causes the level-of-service to drop below Level-of-Service D, resulting in Level-of-Service E or F, then mitigation should be provided to improve the level-of-service to Level-of-Service D or better. Minor movements, such as left turns and side street approaches may operate at Level-of-Service E for short periods. "Level-of-Service E is sometimes tolerated for minor movements such as left turns when there are no feasible mitigating measures or if it helps maintain the main through movements at acceptable levels-of-service."

Level-of-Service D is generally considered to be the minimum acceptable peak hour level-of-service for urban intersections¹². It is generally accepted that side street approaches and minor movements, such as left turn lanes may operate at Level-of-Service E or F for short periods, especially if the volume-to-capacity ratio indicates a higher Level-of-Service as this implies that the long delay and therefore the low level-of-service is a result of the traffic signal cycle length rather than a lane deficiency¹³.

Based on this criteria, no mitigation is required at the study intersections as a result of project generated traffic. The level-of-service analysis of future conditions of the study intersection concludes that the unacceptable levels-of-service at the intersection of Kahekili Highway at Waiehu Beach Road during the afternoon peak hour (LOS F) and Kahekili Highway at Makaala Drive during the morning peak hour are the result of traffic generated by the Hale Mua subdivision. The levels-of-service improve to Level-of-Service D in both cases when Hale Mua traffic is not included in the analysis. If the Hale Mua project proceeds, then any improvements required at these intersections are clearly the responsibility of the Hale Mua project.

The level-of-service at the intersection of Kahekili Highway at Waiehu Beach Road operates at Level-of-Service F during the morning peak hour and will therefore operate at Level-of-Service F under future conditions, whether Hale Mua or MEO BEST projects are constructed or not. The traffic study for Hale Mua recommended that this intersection be signalized because the **warrant for a traffic signal is satisfied by existing traffic conditions**. Since the warrant for a traffic signal is satisfied for existing conditions, the proposed project should not be responsible for installation of the signals. With traffic signals, the intersection will operate at an acceptable level-of-service and no additional mitigation is required.

N. Other Traffic Related Issues

Regional Traffic Impact

It is understood that residents of the proposed project will have travel destinations over a wide area of Maui and will use major regional roadways (Kahekili Highway and Waiehu Beach Road) to get to those destinations. Considering the heavy traffic volumes on these roadways and relatively small

¹² Institute of Traffic Engineers *Transportation Impact Analyses for Site Development, A Recommended Practice*, Washington, D.C., 2006, p 60.

¹³ Transportation Research Board, *Highway Capacity Manual*, Washington, D.C., 2000, p 16-35.

number of trips that the project will generate, the proposed project will have a minimal impact on the regional transportation system, especially at locations beyond the immediate vicinity of the project.

Public Transportation

The Maui Bus has a bus route along Waiehu Beach Road and the lower area of Waiehu Heights. See [Attachment T](#). The nearest bus stop is in the Waiehu Heights area along Lekeona Loop. There does not appear to be a connection between the project and existing bus route.

The Maui Bus also operates along Kahekili Highway between Wailuku and Makaala Drive, which is approximately 0.9 mile south of the project.

Maui Police Department Comments

A copy of the comment letter from the Maui Police Department (MPD) is provided as [Attachment U](#). The letter implies that MPD is concerned about the distance between the project driveways and the intersection of Kahekili Highway at Waiehu Beach Road and provision for pedestrian activity along Kahekili Highway. Responses are provided.

State of Hawaii Department of Transportation Comments

A copy of the comment letter from the State of Hawaii Department of Transportation is also provided as [Attachment U](#). Responses to the comments are provided.

O. Summary and Conclusions

The conclusions of the traffic impact assessment are:

1. The proposed project will generate 7 inbound and 5 outbound trips during the morning peak hour. During the afternoon peak hour, the project will generate 8 inbound and 5 outbound trips.
2. The TIAR for Hale Mua recommended improvements to the intersections along Kahekili Highway. However, since Hale Mua may not be constructed within the study period for the MEO BEST project, all the study intersections were analyzed with and without Hale Mua traffic.
3. The traffic study for Hale Mua recommended that the intersection of Waiehu Beach Road at Kahekili Highway be signalized because the warrant for a traffic signal is satisfied by existing traffic conditions. With traffic signals, the intersection will operate at an acceptable level-of-service and no additional mitigation is required. The MEO BEST project adds two (2) trips to this intersection during the morning peak hour and four (4) trips during the afternoon peak hour.
4. At the intersection of Kahekili Highway at Makaala Drive, the left turns from westbound Makaala Drive to southbound Kahekili Highway will operate at Level-of-Service F during the morning peak with Hale Mua traffic and at Level-of-Service D without Hale Mua traffic. The proposed MEO BEST project adds ten (10) trips to this intersection during the morning peak hour and nine (9) trips during the afternoon peak hour. The conclusion is that the Level-of-

Mr. Matt Slepín
April 29, 2009
Page 16

Service F is the result of traffic generated by Hale Mua. Otherwise, the intersection will operate at Level-of-Service D.

5. The intersection of Kahekili Highway at the project driveway will operate at Level-of-Service B without any improvement, such as a left turn storage lane, without Hale Mua. The TIAR for Hale Mua recommended that a separate left turn lane be installed for traffic turning from northbound Kahekili Highway into the Hale Mua project. With this improvement and with Hale Mua traffic, the intersection will operate at Level-of-Service C during both peak periods.
6. The roadside stand should be located sufficient distance from Kahekili Highway to discourage parking along Kahekili Highway and the associated pedestrian activity. Sufficient parking to accommodate foreseeable demand should be provided so that no vehicles will park along the highway.
7. The Maui Bus should be contacted regarding the feasibility of providing bus service to and from the project.

Respectfully submitted,
PHILLIP ROWELL AND ASSOCIATES



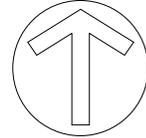
Phillip J. Rowell, P.E.
Principal

List of Attachments

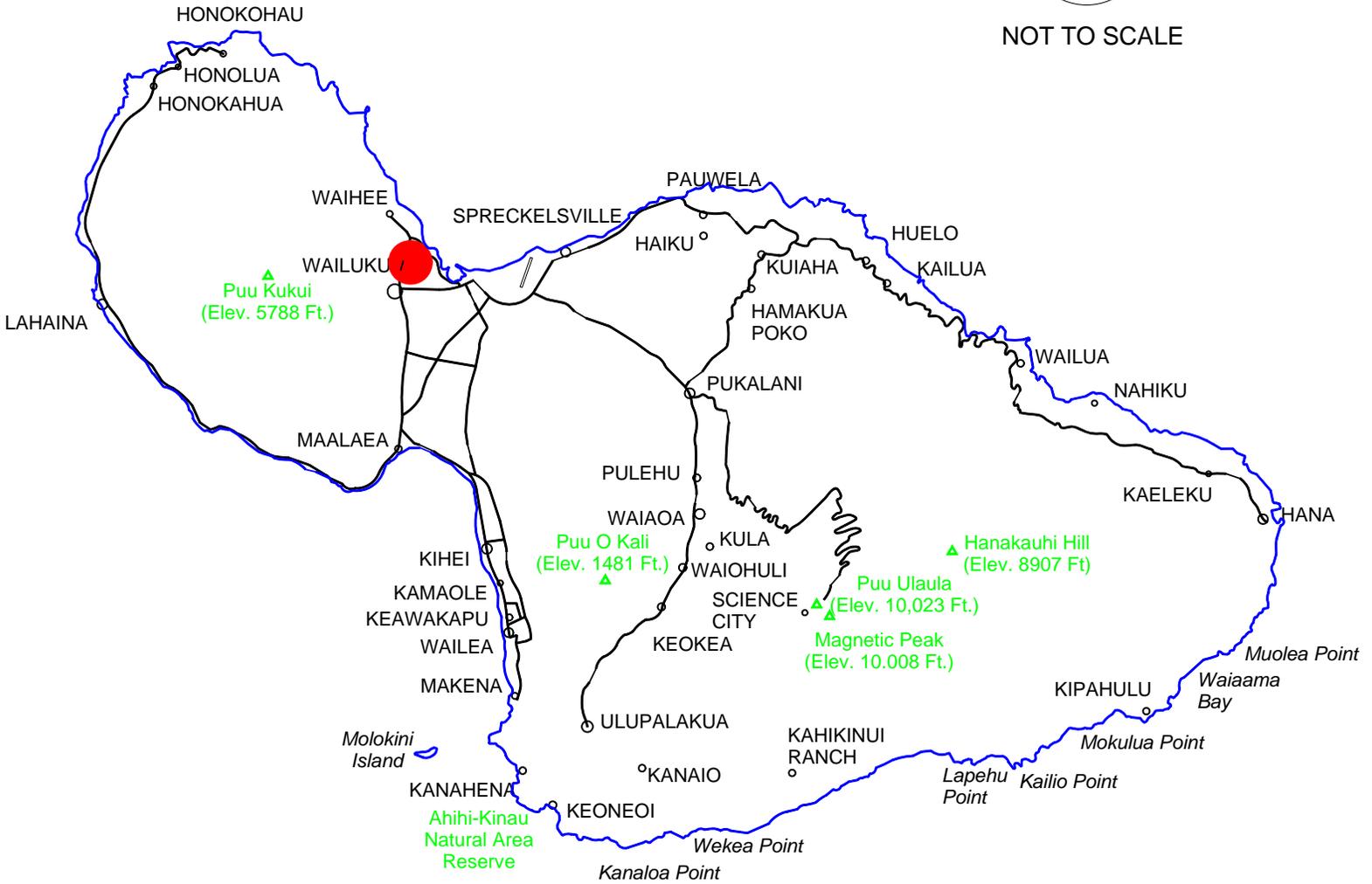
- A. Project Location Map
- B. Project Site Plan
- C. Existing Lane Configurations and Right-of-Way Controls
- D. Existing AM and PM Peak Hour Traffic Volumes
- E. Background Traffic Growth (2009 to 2015)
- F. Related Projects' Peak Hour Traffic Assignments with Hale Mua
- G. Related Project's Peak Hour Traffic Assignments without Hale Mua
- H. 2015 Background Peak Hour Traffic Projections with Hale Mua
- I. 2015 Background Peak Hour Traffic Projections without Hale Mua
- J. Project Trip Assignments
- K. Background Plus Project Peak Hour Traffic Projections with Hale Mua
- L. Background Plus Project Peak Hour Traffic Projections without Hale Mua
- M. Traffic Projection Worksheets with Hale Mua
- N. Traffic Projection Worksheets without Hale Mua
- O. 2015 Lane Configurations and Right-of-Way Controls with Hale Mua
- P. 2015 Lane Configurations and Right-of-Way Controls without Hale Mua
- Q. 2015 Levels-of-Service with Hale Mua
- R. 2015 Levels-of-Service without Hale Mua
- S. Level-of-Service Worksheets
- T. The Maui Bus Service in Waiehu Heights Area
- U. Comment Letters From Maui Police Department and State of Hawaii Department of Transportation
- V. Level-of-Service Analysis for Kahekili Highway at Waiehu Beach Road Signalized Conditions

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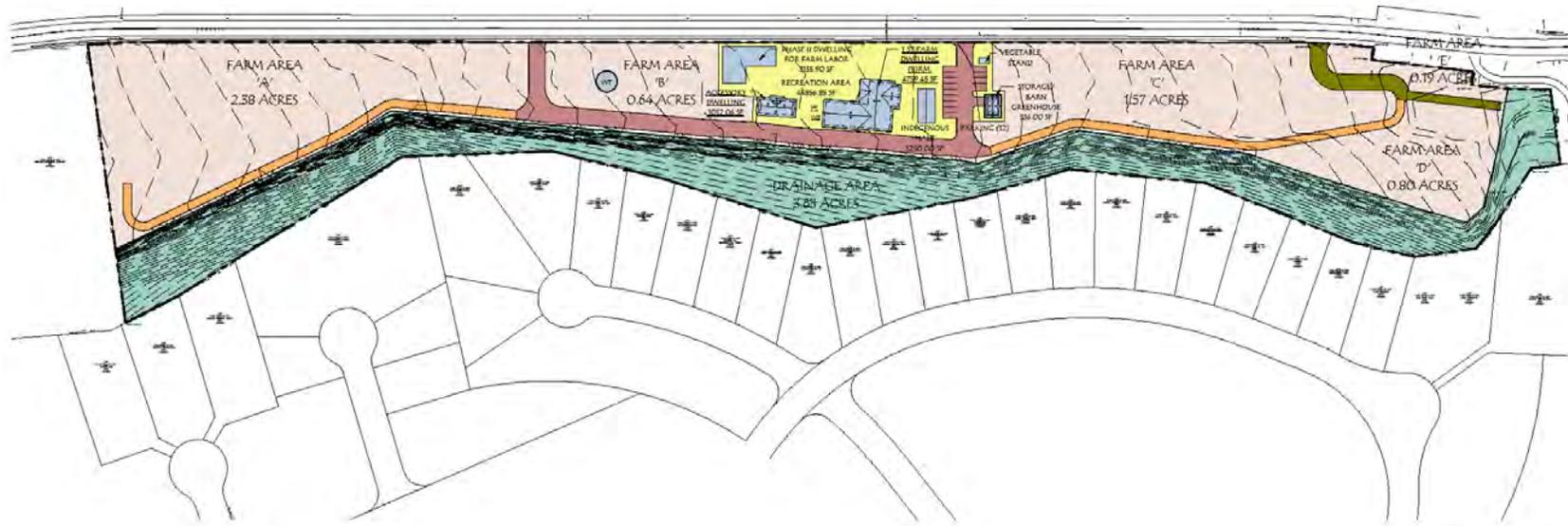
NOT TO SCALE



LEGEND
● PROJECT LOCATION

**Attachment A
PROJECT LOCATION MAP**

AREA CALCULATIONS	
NET CULTIVATED ACREAGE	5.58 ACRES
IMPREVIOUS SURFACE	
TOTAL BUILDING COVERAGE	0.24 ACRES
ROADWAY ASPHALT	0.57 ACRES
RECREATIONAL AREA	1.02 ACRES
DRAINAGE AREA	3.65 ACRES
ROADWAY GRAVEL	0.36 ACRES
AREA OF STATE EASEMENT (NEED INFO)	0.15 ACRES
TOTAL AREA OF PROPERTY	11.53 ACRES

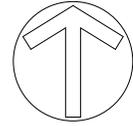


1 SITE PLAN
 C1 SCALE: 1"=80'-0"

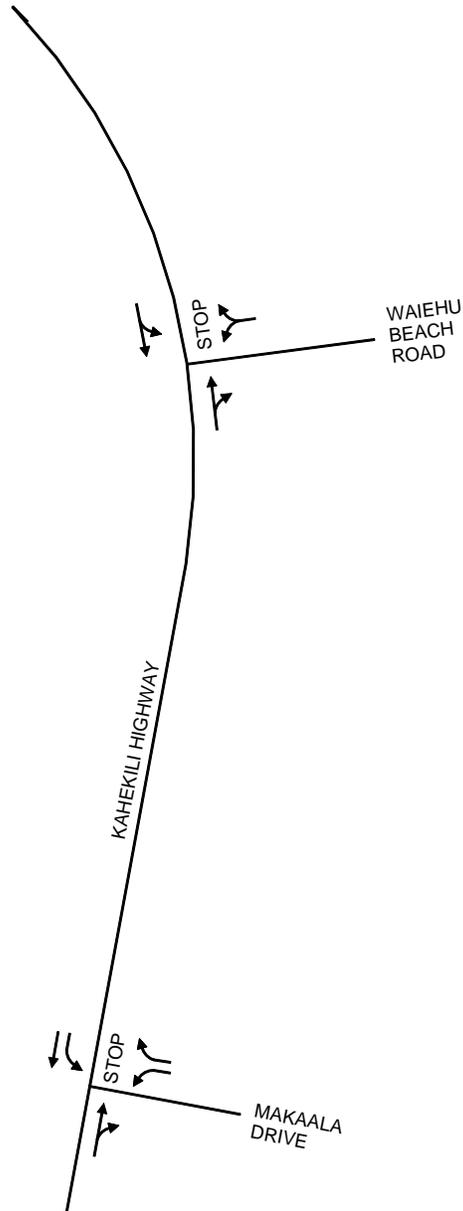


Source: Maui Architectural Group

Attachment B SITE PLAN

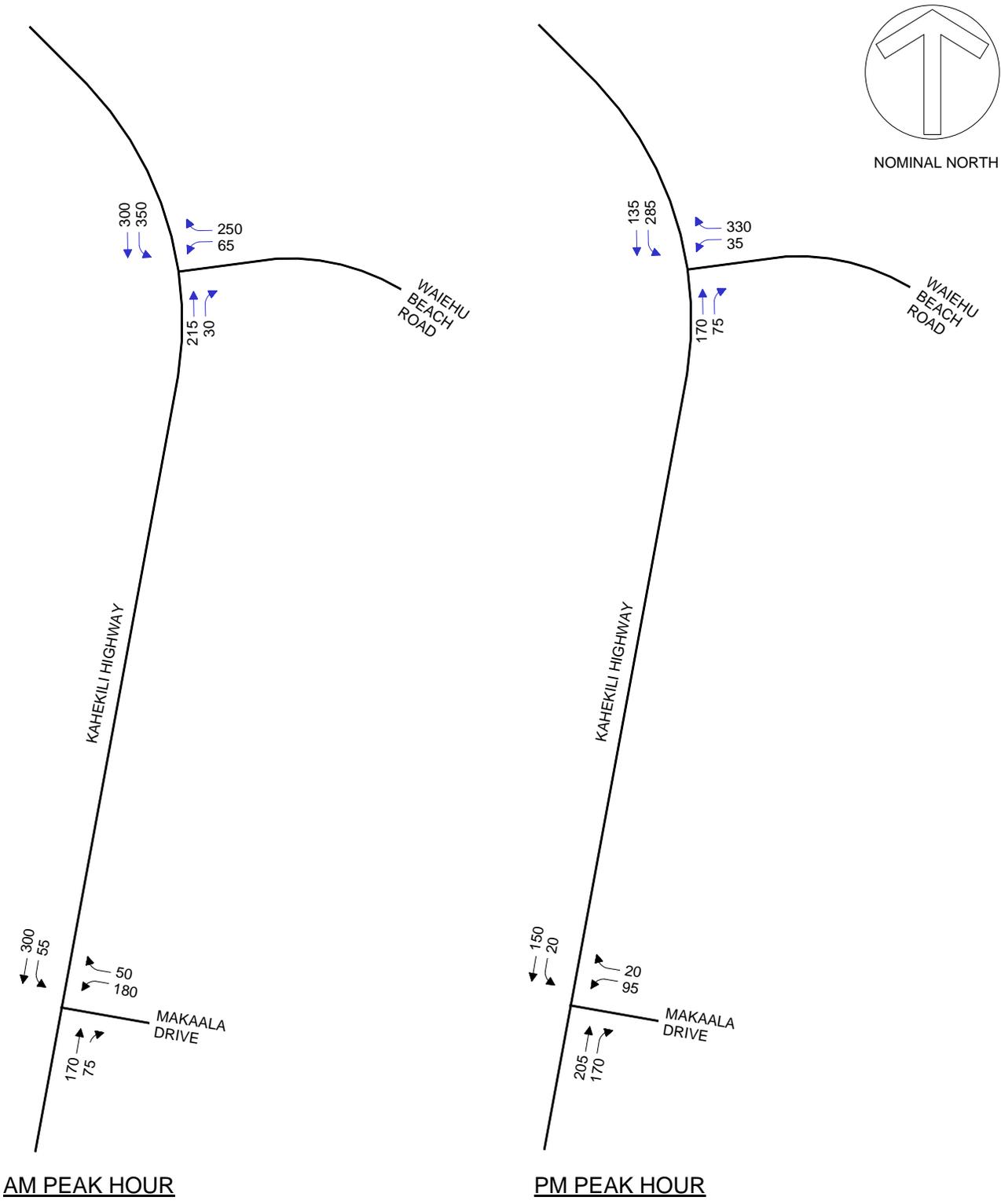


APPROXIMATE
NORTH



NOTE:
TIAR FOR HALE MUA RECOMMENDED
THAT TRAFFIC SIGNALS SHOULD BE
INSTALLED AT THE INTERSECTION OF
WAIIEHU BEACH ROAD AT KAHEKILI
HIGHWAY. THE INTERSECTION WAS
ANALYZED FOR UNSIGNALIZED AND
SIGNALIZED CONDITIONS.

Attachment C
EXISTING LANE CONFIGURATIONS AND RIGHT-OF-WAY CONTROLS



Attachment D
EXISTING AM AND PM PEAK HOUR TRAFFIC VOLUMES

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: MEO BEST Project
 INTERSECTION: 1. Kahekili Highway at Waiehu Beach Road
 DAY & DATE: Thursday, February 19, 2009
 START TIME: 6:30 am
 END TIME: 8:00 am

15-Minute Volumes Beginning at:

Interval	Start Time	North Approach			East Approach			South Approach			West Approach			Totals
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	
1	6:30 am		42	74	54		11	3	27					211
2	6:45 am		44	110	69		3	3	45					274
3	7:00 am		77	97	70		26	5	66					341
4	7:15 am		108	56	59		20	4	61					308
5	7:30 am		72	85	43		11	10	42					263
6	7:45 am		31	65	39		6	9	27					177
7	8:00 am		16	50	36		8	6	18					134
8	8:15 am		15	45	30		4	5	19					118
9	8:30 am													0
10	8:45 am													0
11	9:00 am													0
12	9:15 am													0
13	9:30 am													0
14	9:45 am													0
Maximum:			108	110	70		26	10	66					341

Hourly Volume of Each Movement

6:30 am	7:30 am	0	271	337	252	0	60	15	199	0	0	0	0	1134
6:45 am	7:45 am	0	301	348	241	0	60	22	214	0	0	0	0	1186
7:00 am	8:00 am	0	288	303	211	0	63	28	196	0	0	0	0	1089
7:15 am	8:15 am	0	227	256	177	0	45	29	148	0	0	0	0	882
7:30 am	8:30 am	0	134	245	148	0	29	30	106	0	0	0	0	692
7:45 am	8:45 am	0	62	160	105	0	18	20	64	0	0	0	0	429
8:00 am	9:00 am	0	31	95	66	0	12	11	37	0	0	0	0	252
8:15 am	9:15 am	0	15	45	30	0	4	5	19	0	0	0	0	118
8:30 am	9:30 am	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 am	9:45 am	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 am	10:00 am	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Volume		0	301	348	252	0	63	30	214	0	0	0	0	1186
Per Cent of Approach		0%	33%	58%	80%	0%	21%	12%	100%	0%	0%	0%	0%	
Peak Hour Factor:		0	0.7	0.79	0.9	0	0.61	0.75	0.81	0	0	0	0	0.87
Total Arrivals			649			315		244		0				
Total Departures			466			378		364		0				
Total			1115			693		608		0				

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: MEO BEST Project
 INTERSECTION: 1. Kahekili Highway at Waiehu Beach Road
 DAY & DATE: Thursday, February 19, 2009
 START TIME: 3:30 pm
 END TIME: 5:30 pm

15-Minute Volumes Beginning at:

Interval	Start Time	North Approach			East Approach			South Approach			West Approach			Totals
		Rt 1	Th 2	Lt 3	Rt 4	Th 5	Lt 6	Rt 7	Th 8	Lt 9	Rt 10	Th 11	Lt 12	
1	3:30 pm		30	57	58		6	14	34				199	
2	3:45 pm		37	52	78		7	10	36				220	
3	4:00 pm		35	61	62		15	9	30				212	
4	4:15 pm		31	62	73		4	13	29				212	
5	4:30 pm		26	63	95		7	21	54				266	
6	4:45 pm		28	78	78		10	19	39				252	
7	5:00 pm		29	58	84		9	15	37				232	
8	5:15 pm		24	79	74		5	20	41				243	
9	5:30 pm		25	72	69		5	15	29				215	
10	5:45 pm		26	53	75		9	17	30				210	
11	6:00 pm												0	
12	6:15 pm												0	
13	6:30 pm												0	
14	6:45 pm												0	
Maximum:			37	79	95		15	21	54				266	

Hourly Volume of Each Movement

3:30 pm	4:30 pm	0	133	232	271	0	32	46	129	0	0	0	0	843
3:45 pm	4:45 pm	0	129	238	308	0	33	53	149	0	0	0	0	910
4:00 pm	5:00 pm	0	120	264	308	0	36	62	152	0	0	0	0	942
4:15 pm	5:15 pm	0	114	261	330	0	30	68	159	0	0	0	0	962
4:30 pm	5:30 pm	0	107	278	331	0	31	75	171	0	0	0	0	993
4:45 pm	5:45 pm	0	106	287	305	0	29	69	146	0	0	0	0	942
5:00 pm	6:00 pm	0	104	262	302	0	28	67	137	0	0	0	0	900
5:15 pm	6:15 pm	0	75	204	218	0	19	52	100	0	0	0	0	668
5:30 pm	6:30 pm	0	51	125	144	0	14	32	59	0	0	0	0	425
5:45 pm	6:45 pm	0	26	53	75	0	9	17	30	0	0	0	0	210
6:00 pm	7:00 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Volume		0	133	287	331	0	36	75	171	0	0	0	0	993
Per Cent of Approach		0%	18%	46%	90%	0%	13%	30%	100%	0%	0%	0%	0%	
Peak Hour Factor:		0	0.9	0.91	0.87	0	0.6	0.89	0.79	0	0	0	0	0.93
Total Arrivals			420			367			246			0		
Total Departures			502			362			169			0		
Total			922			729			415			0		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: MEO BEST Project
 INTERSECTION: 2. Kahekili Highway at Makaala Road
 DAY & DATE: Wednesday, February 18, 2009
 START TIME: 6:30 am
 END TIME: 9:00 am

15-Minute Volumes Beginning at:

Interval	Start Time	North Approach			East Approach			South Approach			West Approach			Totals
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
1	6:30 am	41	0	2	43	13	20	119						
2	6:45 am	40	1	7	37	13	34	132						
3	7:00 am	60	8	15	45	7	37	172						
4	7:15 am	119	20	18	55	23	52	287						
5	7:30 am	65	18	8	26	27	46	190						
6	7:45 am	54	7	4	33	18	21	137						
7	8:00 am							0						
8	8:15 am							0						
9	8:30 am							0						
10	8:45 am							0						
11	9:00 am							0						
12	9:15 am							0						
13	9:30 am							0						
14	9:45 am							0						
Maximum:		119	20	18	55	27	52	287						

Hourly Volume of Each Movement

6:30 am	7:30 am	0	260	29	42	0	180	56	143	0	0	0	0	710
6:45 am	7:45 am	0	284	47	48	0	163	70	169	0	0	0	0	781
7:00 am	8:00 am	0	298	53	45	0	159	75	156	0	0	0	0	786
7:15 am	8:15 am	0	238	45	30	0	114	68	119	0	0	0	0	614
7:30 am	8:30 am	0	119	25	12	0	59	45	67	0	0	0	0	327
7:45 am	8:45 am	0	54	7	4	0	33	18	21	0	0	0	0	137
8:00 am	9:00 am	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 am	9:15 am	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 am	9:30 am	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 am	9:45 am	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 am	10:00 am	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Volume		0	298	53	48	0	180	75	169	0	0	0	0	786
Per Cent of Approach		0%	75%	52%	21%	0%	42%	31%	100%	0%	0%	0%	0%	
Peak Hour Factor:		0	0.63	0.66	0.67	0	0.82	0.69	0.81	0	0	0	0	0.68
Total Arrivals			351				228		244				0	
Total Departures			217				128		478				0	
Total			568				356		722				0	

TRAFFIC COUNT SUMMARY WORKSHEET

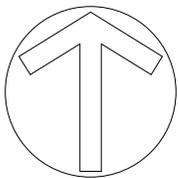
PROJECT: MEO BEST Project
 INTERSECTION: 2. Kahekili Highway at Makaala Road
 DAY & DATE: Tuesday, February 24, 2009
 START TIME: 3:30 pm
 END TIME: 6:00 pm

15-Minute Volumes Beginning at:

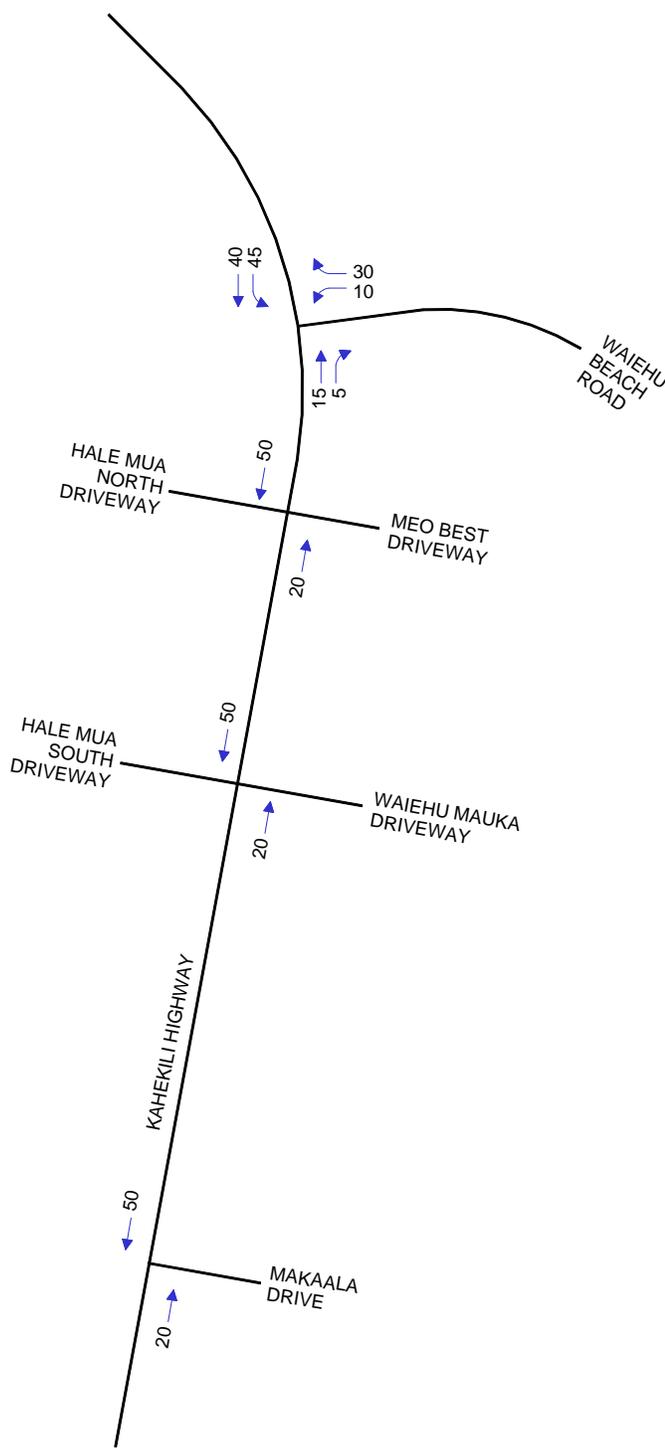
Interval	Start Time	North Approach			East Approach			South Approach			West Approach			Totals
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	
1	3:30 pm		33	4	6		16	36	55					150
2	3:45 pm		28	5	3		24	35	48					143
3	4:00 pm		41	3	8		19	38	56					165
4	4:15 pm		34	2	1		26	43	45					151
5	4:30 pm		42	5	5		16	43	47					158
6	4:45 pm		32	3	3		30	43	53					164
7	5:00 pm		35	8	2		23	40	39					147
8	5:15 pm		31	6	3		21	27	46					134
9	5:30 pm													0
10	5:45 pm													0
11	6:00 pm													0
12	6:15 pm													0
13	6:30 pm													0
14	6:45 pm													0
Maximum:			42	8	8		30	43	56					165

Hourly Volume of Each Movement

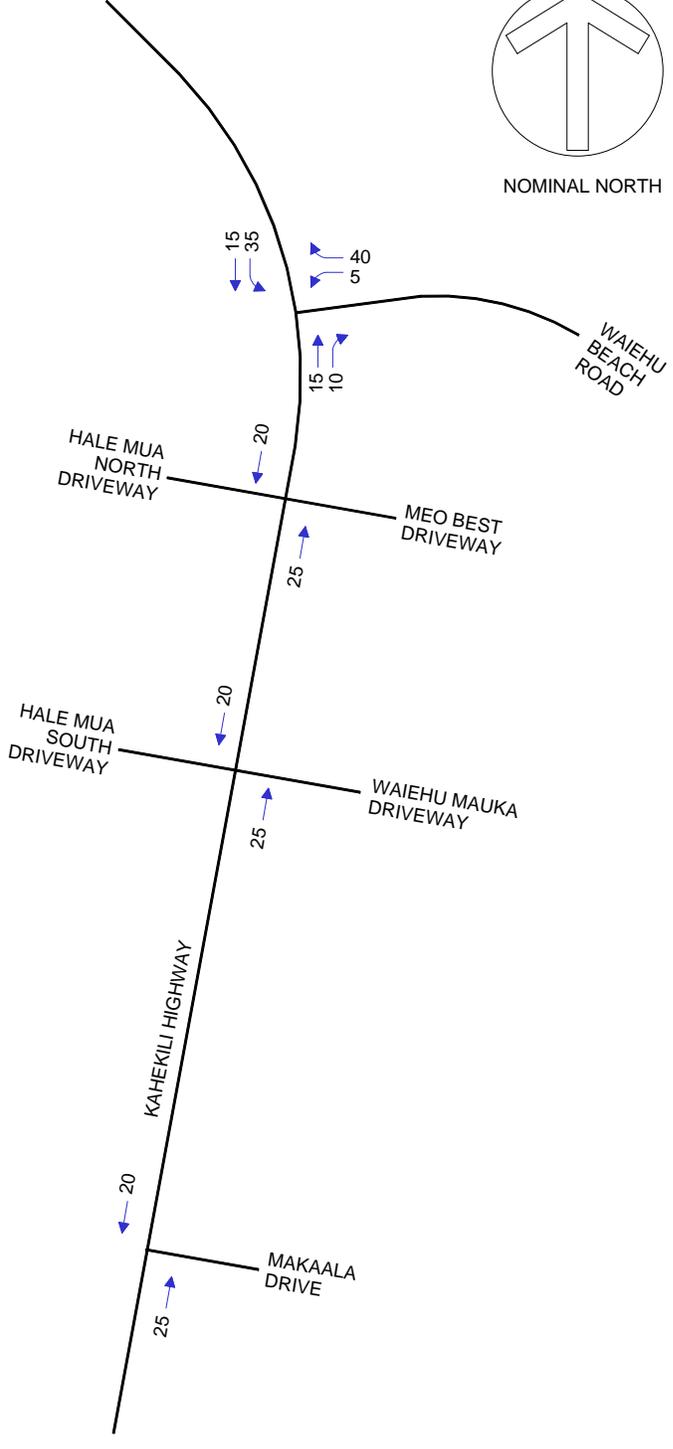
3:30 pm	4:30 pm	0	136	14	18	0	85	152	204	0	0	0	0	609
3:45 pm	4:45 pm	0	145	15	17	0	85	159	196	0	0	0	0	617
4:00 pm	5:00 pm	0	149	13	17	0	91	167	201	0	0	0	0	638
4:15 pm	5:15 pm	0	143	18	11	0	95	169	184	0	0	0	0	620
4:30 pm	5:30 pm	0	140	22	13	0	90	153	185	0	0	0	0	603
4:45 pm	5:45 pm	0	98	17	8	0	74	110	138	0	0	0	0	445
5:00 pm	6:00 pm	0	66	14	5	0	44	67	85	0	0	0	0	281
5:15 pm	6:15 pm	0	31	6	3	0	21	27	46	0	0	0	0	134
5:30 pm	6:30 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 pm	6:45 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 pm	7:00 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Volume		0	149	22	18	0	95	169	204	0	0	0	0	638
Per Cent of Approach		0%	79%	55%	16%	0%	20%	45%	100%	0%	0%	0%	0%	
Peak Hour Factor:		0	0.89	0.69	0.56	0	0.79	0.98	0.91	0	0	0	0	0.97
Total Arrivals			171				113		373				0	
Total Departures			222				191		244				0	
Total			393				304		617				0	



NOMINAL NORTH

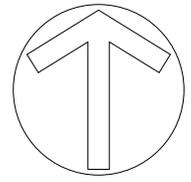


AM PEAK HOUR

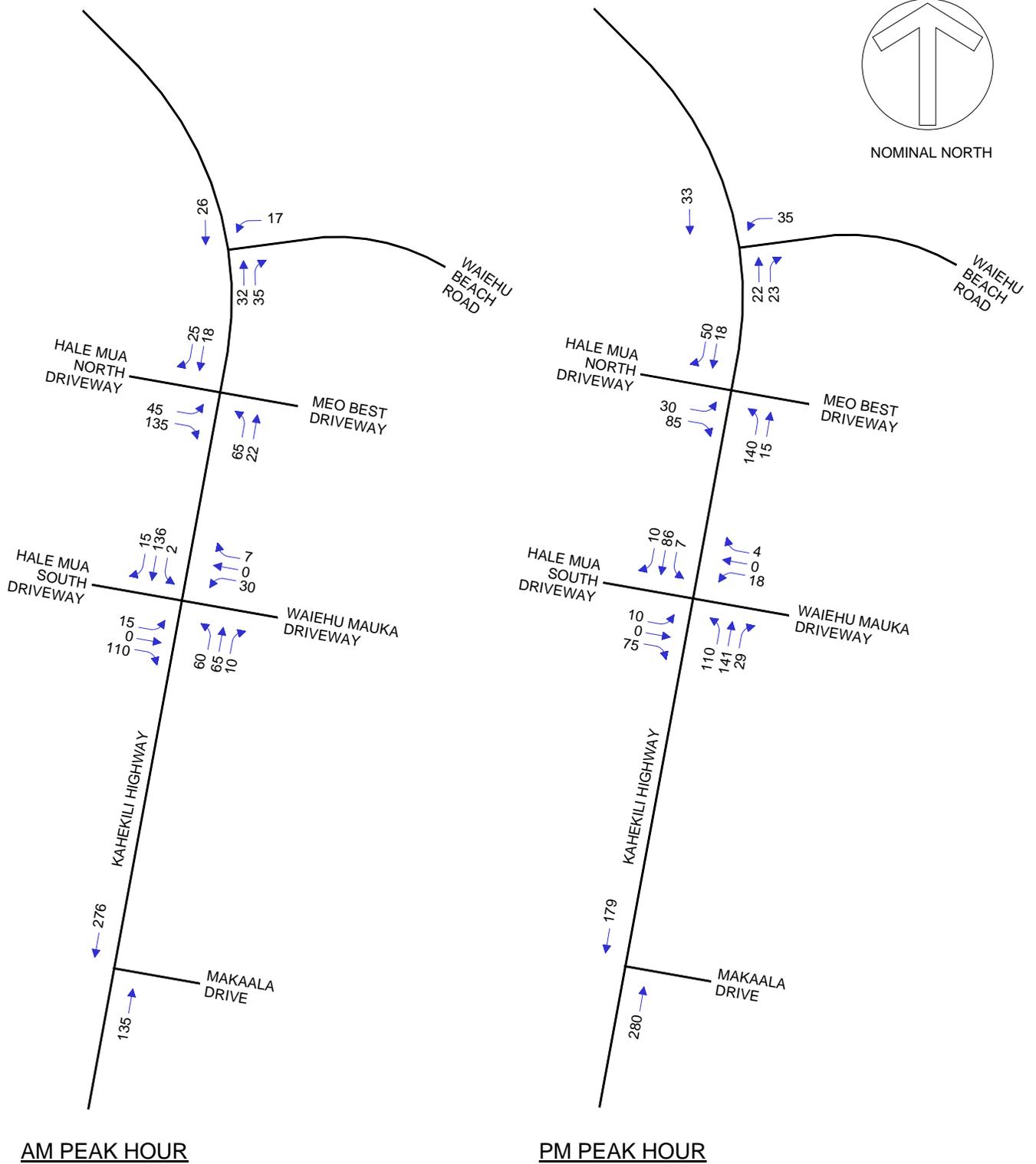


PM PEAK HOUR

**Attachment E
BACKGROUND GROWTH (2009 TO 2015)**



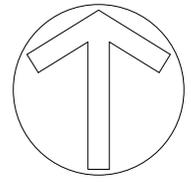
NOMINAL NORTH



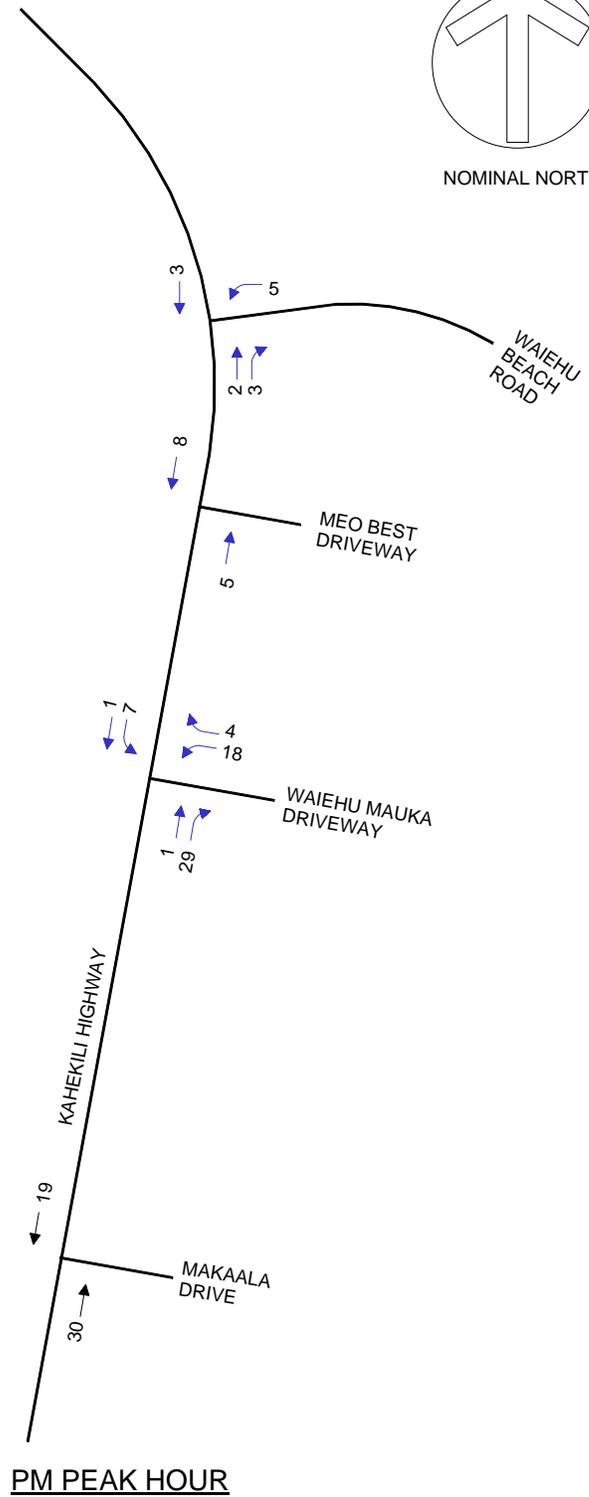
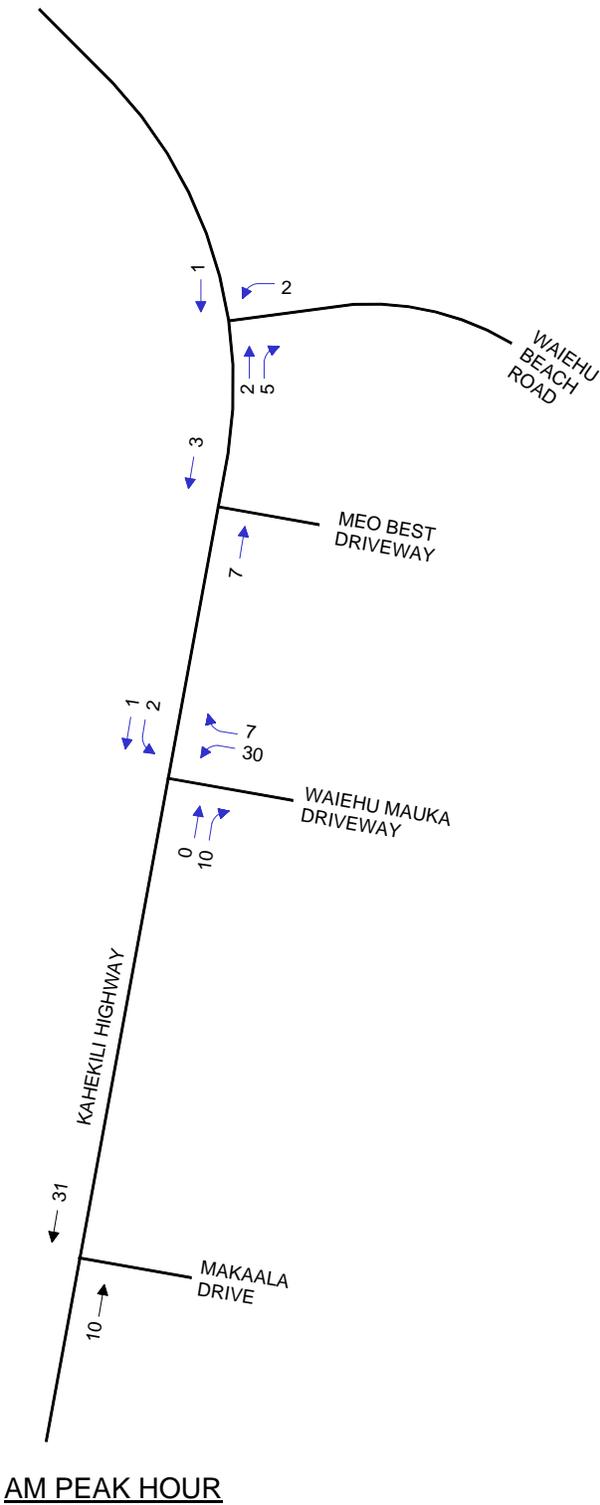
AM PEAK HOUR

PM PEAK HOUR

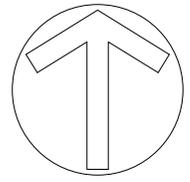
**Attachment F
RELATED PROJECTS' TRAFFIC ASSIGNMENTS
WITH HALE MUA**



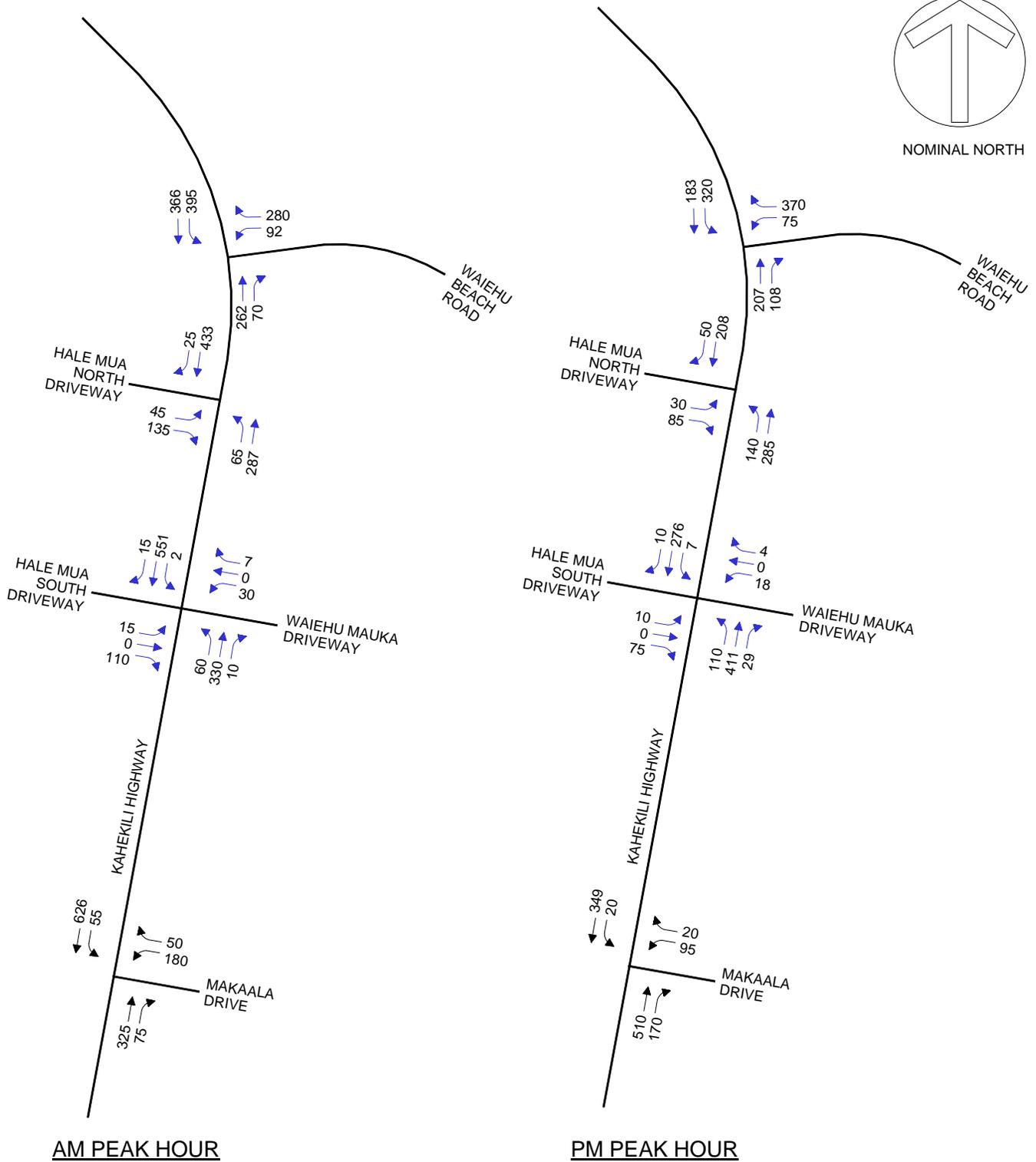
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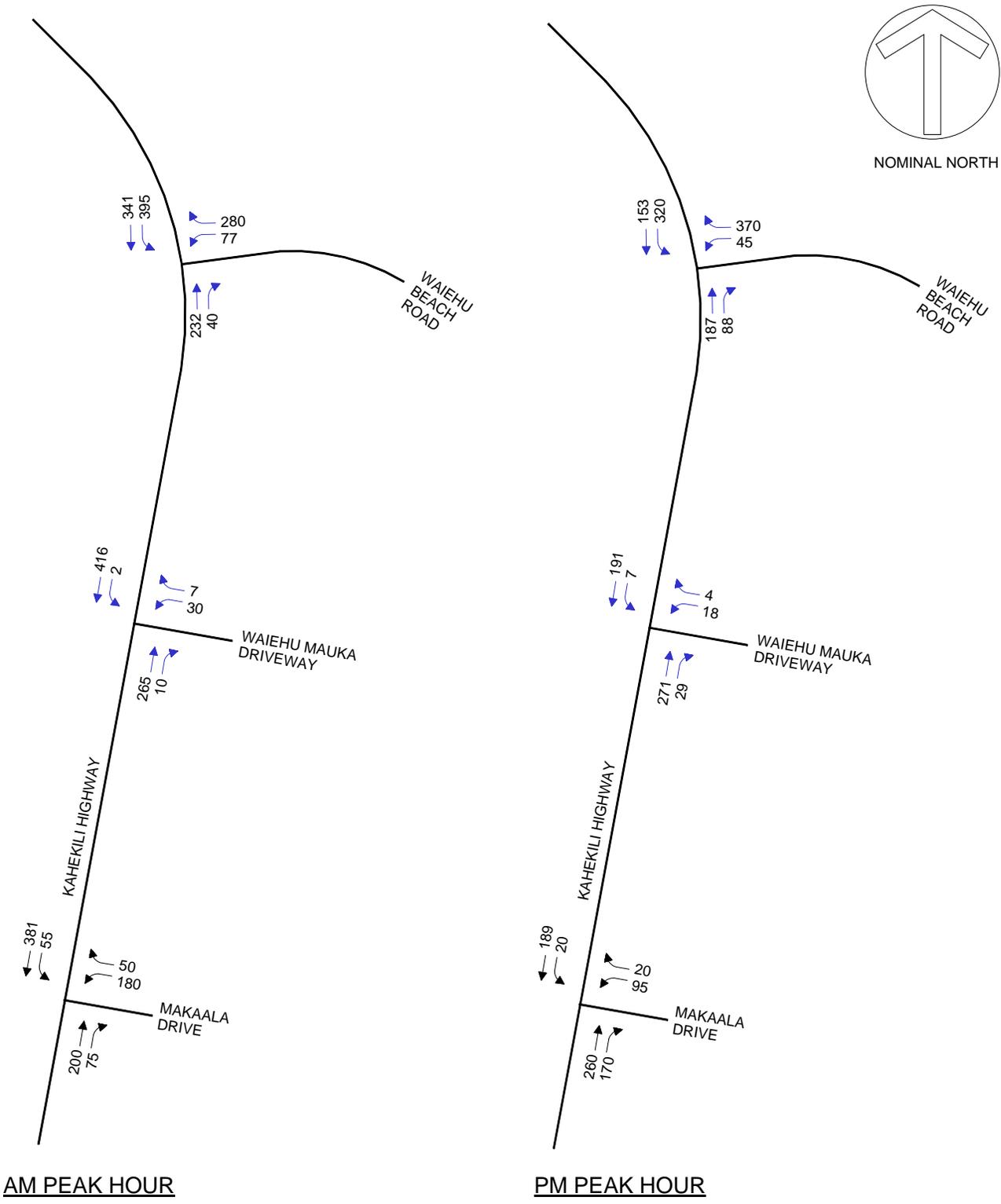
Attachment G
RELATED PROJECTS' TRAFFIC ASSIGNMENTS
WITHOUT HALE MUA



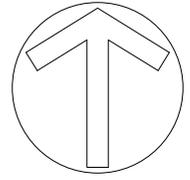
NOMINAL NORTH



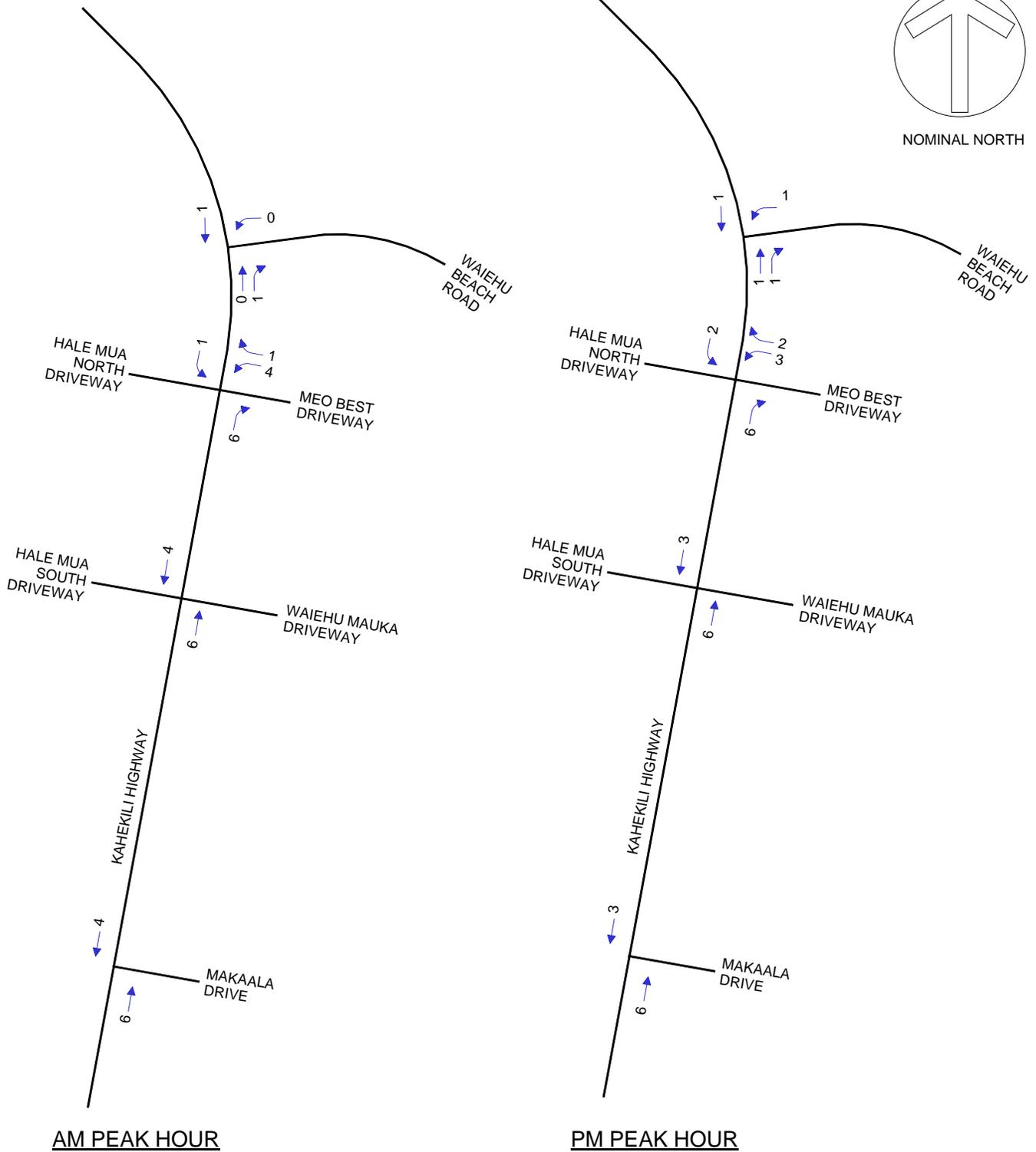
Attachment H
2015 BACKGROUND PEAK HOUR TRAFFIC PROJECTIONS
WITH HALE MUA



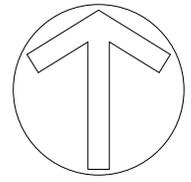
Attachment I
2015 BACKGROUND PEAK HOUR TRAFFIC PROJECTIONS
WITHOUT HALE MUA



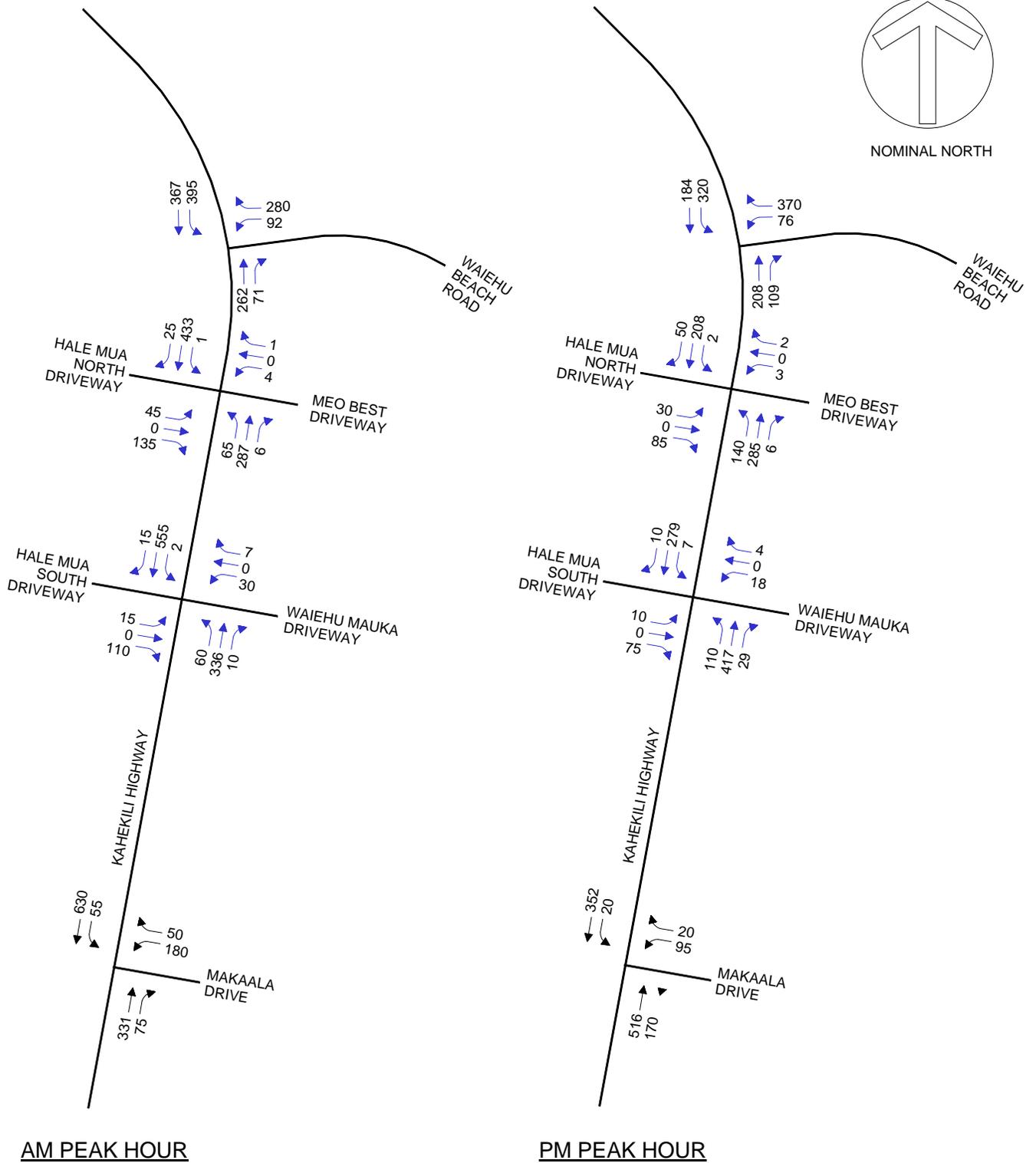
NOMINAL NORTH



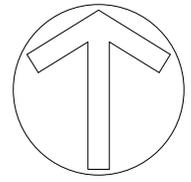
Attachment J
PROJECT PEAK HOUR TRIP ASSIGNMENTS



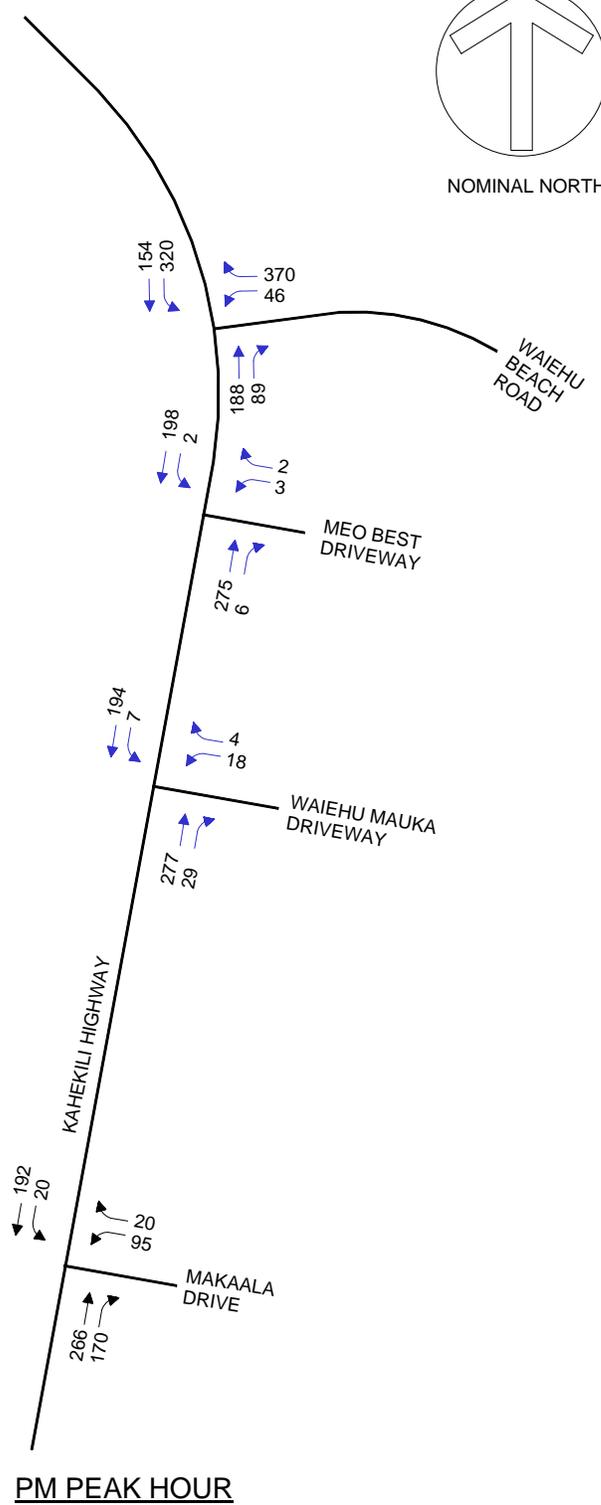
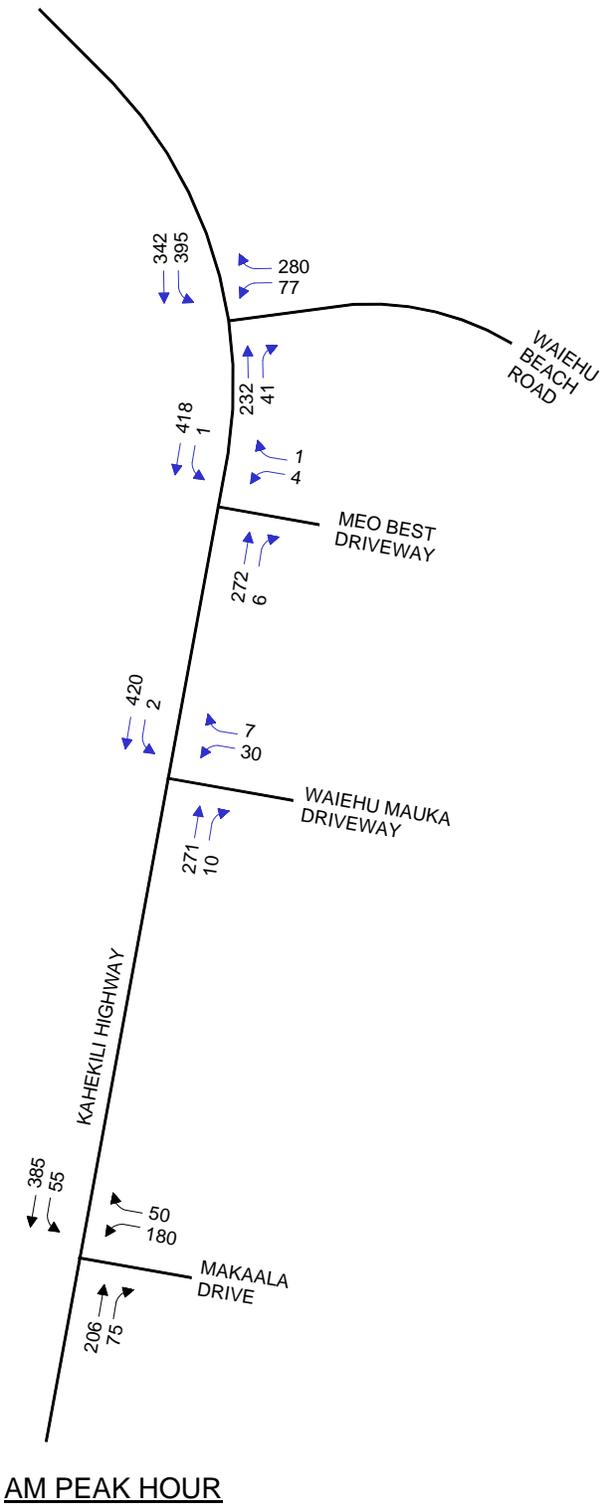
NOMINAL NORTH



Attachment K
2015 BACKGROUND PLUS PROJECT PEAK HOUR TRAFFIC PROJECTIONS
WITH HALE MUA



NOMINAL NORTH



Attachment L
2015 BACKGROUND PLUS PROJECT PEAK HOUR TRAFFIC PROJECTIONS
WITHOUT HALE MUA

Attachment M
TRAFFIC PROJECTION WORKSHEETS
WITH HALE MUA

Part 2.1
Traffic Projection Worksheet
 MEO BEST Project
 March 2009

INTERSECTION NO 1
 INTERSECTION OF Kahekili Highway at Waiehu Beach Road

No	Approach & Mvt	Case 1 Existing		Background Growth		Hale Mua Trips		Waiehu Mauka Trips		Related Project Traffic		Case 2 2015 Background		MEO Best Residents		MEO Best Roadside Stand	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	N- RT									0	0	0	0				
2	TH	300	135	40	15	25	30	1	3	26	33	366	183			1	1
3	LT	350	285	45	35			0	0	0	0	395	320				
4	E- RT	250	330	30	40			0	0	0	0	280	370				
5	TH									0	0	0	0				
6	LT	65	35	10	5	15	30	2	5	17	35	92	75	0	1		
7	S- RT	30	75	5	10	30	20	5	3	35	23	70	108	1	1		
8	TH	215	170	15	15	30	20	2	2	32	22	262	207			0	1
9	LT									0	0	0	0				
10	W- RT									0	0	0	0				
11	TH									0	0	0	0				
12	LT									0	0	0	0				
TOTAL		1210	1030	145	120					110	113	1465	1263				
Approach Totals																	
From North		650	420	0	85	50				26	33	761	503				
From East		315	365	0	40	45				17	35	372	445				
From South		245	245	0	20	25				67	45	332	315				
From West		0	0	0	0	0				0	0	0	0				
Total		1210	1030	0	145	120				110	113	1465	1263				
Departure Totals																	
To North		465	500	0	45	55				32	22	542	577				
To East		380	360	0	50	45				35	23	465	428				
To South		365	170	0	50	20				43	68	458	258				
To West		0	0	0	0	0				0	0	0	0				
Total		1210	1030	0	145	120				110	113	1465	1263				
Leg Totals																	
North		1115	920	0	130	105				58	55	1303	1080				
East		695	725	0	90	90				52	58	837	873				
South		610	415	0	70	45				110	113	790	573				
West		0	0	0	0	0				0	0	0	0				
Total		2420	2060	0	290	240				220	226	2930	2526				

Part 2.1
Traffic Projection Worksheet
 MEO BEST Project
 March 2009

INTERSECTION NO 2
 INTERSECTION OF Kahekili Highway at Makaala Drive

No	Approach & Mvt	Case 1 Existing		Background Growth		Hale Mua Trips		Waiehu Mauka Trips		Related Project Traffic		Case 2 2015 Background		MEO Best Residents		MEO Best Roadside Stand	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	N- RT									0	0	0	0				
2	TH	300	150	50	20	245	160	31	19	276	179	626	349	3	2	1	1
3	LT	55	20					0	0	0	0	55	20				
4	E- RT	50	20					0	0	0	0	50	20				
5	TH									0	0	0	0				
6	LT	180	95					0	0	0	0	180	95				
7	S- RT	75	170					0	0	0	0	75	170				
8	TH	170	205	20	25	125	250	10	30	135	280	325	510	2	4	4	2
9	LT									0	0	0	0				
10	W- RT									0	0	0	0				
11	TH									0	0	0	0				
12	LT									0	0	0	0				
TOTAL		830	660	70	45					411	459	1311	1164				
Approach Totals																	
From North		355	170	0	50	20				276	179	681	369				
From East		230	115	0	0	0				0	0	230	115				
From South		245	375	0	20	25				135	280	400	680				
From West		0	0	0	0	0				0	0	0	0				
Total		830	660	0	70	45				411	459	1311	1164				
Departure Totals																	
To North		220	225	0	20	25				135	280	375	530				
To East		130	190	0	0	0				0	0	130	190				
To South		480	245	0	50	20				276	179	806	444				
To West		0	0	0	0	0				0	0	0	0				
Total		830	660	0	70	45				411	459	1311	1164				
Leg Totals																	
North		575	395	0	70	45				411	459	1056	899				
East		360	305	0	0	0				0	0	360	305				
South		725	620	0	70	45				411	459	1206	1124				
West		0	0	0	0	0				0	0	0	0				
Total		1660	1320	0	140	90				822	918	2622	2328				

Part 2.1
Traffic Projection Worksheet
 MEO BEST Project
 March 2009

INTERSECTION NO 3
 INTERSECTION OF Kahekili Highway at Hale Mua North Driveway/MEO Best Driveway

No	Approach & Mvt	Case 1 Existing		Background Growth		Hale Mua Trips		Waiehu Mauka Trips		Related Project Traffic		Case 2 2015 Background		MEO Best Residents		MEO Best Roadside Stand		
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1	N- RT					25	50			25	50	25	50					
2	TH	365	170	50	20	15	10	3	8	18	18	433	208					
3	LT									0	0	0	0	0	1	1	1	1
4	E- RT									0	0	0	0	1	1	0	1	
5	TH									0	0	0	0					
6	LT									0	0	0	0	3	2	1	1	
7	S- RT									0	0	0	0	2	4	4	2	
8	TH	245	245	20	25	15	10	7	5	22	15	287	285					
9	LT					65	140			65	140	65	140					
10	W- RT					135	85			135	85	135	85					
11	TH									0	0	0	0					
12	LT					45	30			45	30	45	30					
TOTAL		610	415	70	45					310	338	990	798					
Approach Totals																		
From North		365	170	0	50	20				43	68	458	258					
From East		0	0	0	0	0				0	0	0	0					
From South		245	245	0	20	25				87	155	352	425					
From West		0	0	0	0	0				180	115	180	115					
Total		610	415	0	70	45				310	338	990	798					
Departure Totals																		
To North		245	245	0	20	25				67	45	332	315					
To East		0	0	0	0	0				0	0	0	0					
To South		365	170	0	50	20				153	103	568	293					
To West		0	0	0	0	0				90	190	90	190					
Total		610	415	0	70	45				310	338	990	798					
Leg Totals																		
North		610	415	0	70	45				110	113	790	573					
East		0	0	0	0	0				0	0	0	0					
South		610	415	0	70	45				240	258	920	718					
West		0	0	0	0	0				270	305	270	305					
Total		1220	830	0	140	90				620	676	1980	1596					

Part 2.1
Traffic Projection Worksheet
 MEO BEST Project
 March 2009

INTERSECTION NO 4
 INTERSECTION OF Kahekili Highway at Hale Mua South Driveway/Waiehu Mauka Driveway

No	Approach & Mvt	Case 1 Existing		Background Growth		Hale Mua Trips		Waiehu Mauka Trips		Related Project Traffic		Case 2 2015 Background		MEO Best Residents		MEO Best Roadside Stand	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	N- RT					15	10			15	10	15	10				
2	TH	365	170	50	20	135	85	1	1	136	86	551	276	3	2	1	1
3	LT							2	7	2	7	2	7				
4	E- RT							7	4	7	4	7	4				
5	TH									0	0	0	0				
6	LT							30	18	30	18	30	18				
7	S- RT							10	29	10	29	10	29				
8	TH	245	245	20	25	65	140	0	1	65	141	330	411	2	4	4	2
9	LT					60	110			60	110	60	110				
10	W- RT					110	75			110	75	110	75				
11	TH									0	0	0	0				
12	LT					15	10			15	10	15	10				
TOTAL		610	415	70	45					450	490	1130	950				
Approach Totals																	
From North		365	170	0	50	20				153	103	568	293				
From East		0	0	0	0	0				37	22	37	22				
From South		245	245	0	20	25				135	280	400	550				
From West		0	0	0	0	0				125	85	125	85				
Total		610	415	0	70	45				450	490	1130	950				
Departure Totals																	
To North		245	245	0	20	25				87	155	352	425				
To East		0	0	0	0	0				12	36	12	36				
To South		365	170	0	50	20				276	179	691	369				
To West		0	0	0	0	0				75	120	75	120				
Total		610	415	0	70	45				450	490	1130	950				
Leg Totals																	
North		610	415	0	70	45				240	258	920	718				
East		0	0	0	0	0				49	58	49	58				
South		610	415	0	70	45				411	459	1091	919				
West		0	0	0	0	0				200	205	200	205				
Total		1220	830	0	140	90				900	980	2260	1900				

Attachment N
TRAFFIC PROJECTION WORKSHEETS
WITHOUT HALE MUA

Part 2.1
Traffic Projection Worksheet
 MEO BEST Project
 March 2009

INTERSECTION NO 1
 INTERSECTION OF Kahekili Highway at Waiehu Beach Road

No	Approach & Mvt	Case 1 Existing		Background Growth		Hale Mua Trips		Waiehu Mauka Trips		Related Project Traffic		Case 4 2015 Background		MEO Best Residents		MEO Best Roadside Stand	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	N- RT									0	0	0	0				
2	TH	300	135	40	15			1	3	1	3	341	153			1	1
3	LT	350	285	45	35			0	0	0	0	395	320				
4	E- RT	250	330	30	40			0	0	0	0	280	370				
5	TH							0	0	0	0	0	0				
6	LT	65	35	10	5			2	5	2	5	77	45	0	1		
7	S- RT	30	75	5	10			5	3	5	3	40	88	1	1		
8	TH	215	170	15	15			2	2	2	2	232	187			0	1
9	LT							0	0	0	0	0	0				
10	W- RT							0	0	0	0	0	0				
11	TH							0	0	0	0	0	0				
12	LT							0	0	0	0	0	0				
TOTAL		1210	1030	145	120			10	13	10	13	1365	1163				
Approach Totals																	
From North		650	420	0	85	50				1	3	736	473				
From East		315	365	0	40	45				2	5	357	415				
From South		245	245	0	20	25				7	5	272	275				
From West		0	0	0	0	0				0	0	0	0				
Total		1210	1030	0	145	120				10	13	1365	1163				
Departure Totals																	
To North		465	500	0	45	55				2	2	512	557				
To East		380	360	0	50	45				5	3	435	408				
To South		365	170	0	50	20				3	8	418	198				
To West		0	0	0	0	0				0	0	0	0				
Total		1210	1030	0	145	120				10	13	1365	1163				
Leg Totals																	
North		1115	920	0	130	105				3	5	1248	1030				
East		695	725	0	90	90				7	8	792	823				
South		610	415	0	70	45				10	13	690	473				
West		0	0	0	0	0				0	0	0	0				
Total		2420	2060	0	290	240				20	26	2730	2326				

Part 2.1
Traffic Projection Worksheet
 MEO BEST Project
 March 2009

INTERSECTION NO 2
 INTERSECTION OF Kahekili Highway at Makaala Drive

No	Approach & Mvt	Case 1 Existing		Background Growth		Hale Mua Trips		Waiehu Mauka Trips		Related Project Traffic		Case 4 2015 Background		MEO Best Residents		MEO Best Roadside Stand	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	N- RT									0	0	0	0				
2	TH	300	150	50	20			31	19	31	19	381	189	3	2	1	1
3	LT	55	20					0	0	0	0	55	20				
4	E- RT	50	20					0	0	0	0	50	20				
5	TH									0	0	0	0				
6	LT	180	95					0	0	0	0	180	95				
7	S- RT	75	170					0	0	0	0	75	170				
8	TH	170	205	20	25			10	30	10	30	200	260	2	4	4	2
9	LT									0	0	0	0				
10	W- RT									0	0	0	0				
11	TH									0	0	0	0				
12	LT									0	0	0	0				
TOTAL		830	660	70	45					41	49	941	754				
Approach Totals																	
From North		355	170	0	50	20				31	19	436	209				
From East		230	115	0	0	0				0	0	230	115				
From South		245	375	0	20	25				10	30	275	430				
From West		0	0	0	0	0				0	0	0	0				
Total		830	660	0	70	45				41	49	941	754				
Departure Totals																	
To North		220	225	0	20	25				10	30	250	280				
To East		130	190	0	0	0				0	0	130	190				
To South		480	245	0	50	20				31	19	561	284				
To West		0	0	0	0	0				0	0	0	0				
Total		830	660	0	70	45				41	49	941	754				
Leg Totals																	
North		575	395	0	70	45				41	49	686	489				
East		360	305	0	0	0				0	0	360	305				
South		725	620	0	70	45				41	49	836	714				
West		0	0	0	0	0				0	0	0	0				
Total		1660	1320	0	140	90				82	98	1882	1508				

Part 2.1
Traffic Projection Worksheet
 MEO BEST Project
 March 2009

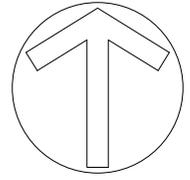
INTERSECTION NO 3
 INTERSECTION OF Kahekili Highway at Hale Mua North Driveway/MEO Best Driveway

No	Approach & Mvt	Case 1 Existing		Background Growth		Hale Mua Trips		Waiehu Mauka Trips		Related Project Traffic		Case 4 2015 Background		MEO Best Residents		MEO Best Roadside Stand	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	N- RT									0	0	0	0				
2	TH	365	170	50	20			3	8	418	198						
3	LT							0	0	0	0			0	1	1	1
4	E- RT							0	0	0	0			1	1	0	1
5	TH							0	0	0	0						
6	LT							0	0	0	0			3	2	1	1
7	S- RT							0	0	0	0			2	4	4	2
8	TH	245	245	20	25			7	5	272	275						
9	LT							0	0	0	0						
10	W- RT							0	0	0	0						
11	TH							0	0	0	0						
12	LT							0	0	0	0						
TOTAL		610	415	70	45			10	13	690	473						
Approach Totals																	
From North		365	170	0	50	20		3	8	418	198						
From East		0	0	0	0	0		0	0	0	0						
From South		245	245	0	20	25		7	5	272	275						
From West		0	0	0	0	0		0	0	0	0						
Total		610	415	0	70	45		10	13	690	473						
Departure Totals																	
To North		245	245	0	20	25		7	5	272	275						
To East		0	0	0	0	0		0	0	0	0						
To South		365	170	0	50	20		3	8	418	198						
To West		0	0	0	0	0		0	0	0	0						
Total		610	415	0	70	45		10	13	690	473						
Leg Totals																	
North		610	415	0	70	45		10	13	690	473						
East		0	0	0	0	0		0	0	0	0						
South		610	415	0	70	45		10	13	690	473						
West		0	0	0	0	0		0	0	0	0						
Total		1220	830	0	140	90		20	26	1380	946						

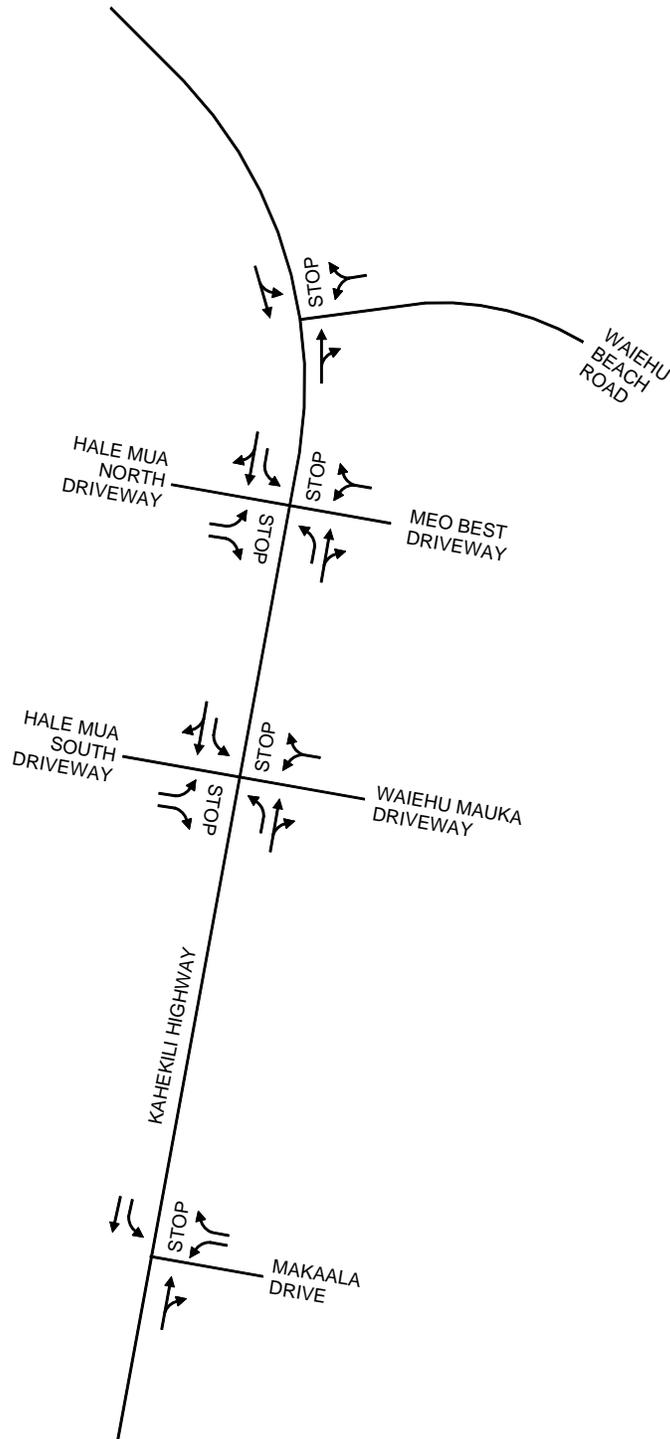
Part 2.1
Traffic Projection Worksheet
 MEO BEST Project
 March 2009

INTERSECTION NO 4
 INTERSECTION OF Kahekili Highway at Hale Mua South Driveway/Waiehu Mauka Driveway

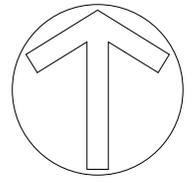
No	Approach & Mvt	Case 1 Existing		Background Growth		Hale Mua Trips		Waiehu Mauka Trips		Related Project Traffic		Case 4 2015 Background		MEO Best Residents		MEO Best Roadside Stand	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	N- RT									0	0	0	0				
2	TH	365	170	50	20			1	1	1	1	416	191	3	2	1	1
3	LT							2	7	2	7	2	7				
4	E- RT							7	4	7	4	7	4				
5	TH							0	0	0	0	0	0				
6	LT							30	18	30	18	30	18				
7	S- RT							10	29	10	29	10	29				
8	TH	245	245	20	25			0	1	0	1	265	271	2	4	4	2
9	LT							0	0	0	0	0	0				
10	W- RT							0	0	0	0	0	0				
11	TH							0	0	0	0	0	0				
12	LT							0	0	0	0	0	0				
TOTAL		610	415	70	45					50	60	730	520				
Approach Totals																	
From North		365	170	0	50	20				3	8	418	198				
From East		0	0	0	0	0				37	22	37	22				
From South		245	245	0	20	25				10	30	275	300				
From West		0	0	0	0	0				0	0	0	0				
Total		610	415	0	70	45				50	60	730	520				
Departure Totals																	
To North		245	245	0	20	25				7	5	272	275				
To East		0	0	0	0	0				12	36	12	36				
To South		365	170	0	50	20				31	19	446	209				
To West		0	0	0	0	0				0	0	0	0				
Total		610	415	0	70	45				50	60	730	520				
Leg Totals																	
North		610	415	0	70	45				10	13	690	473				
East		0	0	0	0	0				49	58	49	58				
South		610	415	0	70	45				41	49	721	509				
West		0	0	0	0	0				0	0	0	0				
Total		1220	830	0	140	90				100	120	1460	1040				



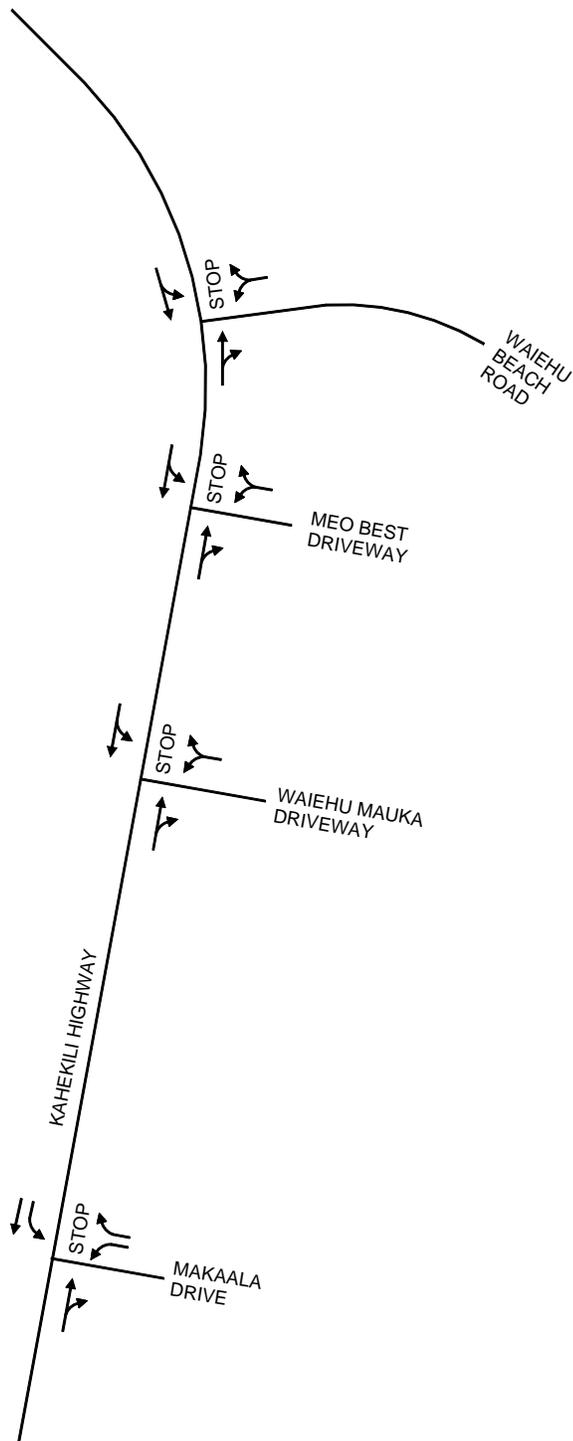
NOMINAL NORTH



Attachment O
2015 LANE CONFIGURATIONS AND RIGHT-OF-WAY CONTROLS
WITH HALE MUA



NOMINAL NORTH



Attachment P
2015 LANE CONFIGURATIONS AND RIGHT-OF-WAY CONTROLS
WITHOUT HALE MUA

Attachment Q

Level-of-Service Analysis for 2015 Conditions with Hale Mua

Approach and Movement	AM Peak Hour ⁽¹⁾									PM Peak Hour								
	Existing (2009)			2015 Without Project			2015 With Project			Existing (2009)			2015 Without Project			2015 With Project		
	Delay ⁽²⁾	LOS ⁽³⁾	95 th Q ⁽⁴⁾	Delay	LOS	95 th Q	Delay	LOS	95 th Q	Delay	LOS	95 th Q	Delay	LOS	95 th Q	Delay	LOS	95 th Q
Kahekili Highway at Waiehu Beach Road																		
Southbound Left & Thru	8.9	A	1.2	9.6	A	1.6	9.6	A	1.6	8.6	A	0.9	9.1	A	1.1	9.1	A	1.1
Westbound Left & Right	52.5	F	8.5	309.4	F	23.8	309.4	F	23.8	18.3	C	3.9	72.9	F	13.4	77.3	F	13.8
Kahekili Highway at Maka'ala Drive																		
Southbound Left	7.9	A	0.1	8.4	A	0.2	8.4	A	0.2	8.2	A	0.1	9.3	A	0.1	9.3	A	0.1
Westbound Left	22.3	C	2.6	118.1	F	8.7	123.6	F	8.9	14.0	B	0.8	31.4	D	2.0	31.9	D	2.1
Westbound Right	9.8	A	0.2	11.0	B	0.3	11.1	B	0.3	10.2	B	0.1	13.1	B	0.1	13.1	B	0.1
Kahekili Highway at Hale Mua North Driveway & MEO BEST Driveway																		
Northbound Left				8.7	A	0.2	8.7	A	0.2				8.2	A	0.4	8.2	A	0.4
Southbound Left				See Note (6)			7.9	A	0.0				See Note (6)			7.9	A	0.0
Westbound Left & Right	See Note (5)			See Note (6)			25.6	D	0.1	See Note (5)			See Note (6)			18.1	C	0.1
Eastbound Left & Thru				21.1	C	0.6	25.0	C	0.8				19.4	C	0.4	22.2	C	0.4
Eastbound Right				13.3	B	1.0	13.3	B	1.0				10.2	B	0.4	10.2	B	0.4
Kahekili Highway at Hale Mua South Driveway & Waiehu Mauka Driveway																		
Northbound Left				9.1	A	0.2	9.1	A	0.2				8.2	A	0.3	8.2	A	0.3
Southbound Left				8.0	A	0.0	8.1	A	0.0				8.3	A	0.0	8.4	A	0.0
Westbound Left & Right	See Note (5)			38.7	E	1.0	40.4	E	1.1	See Note (5)			26.4	D	0.4	27.3	D	0.4
Eastbound Left				27.9	D	0.3	28.4	D	0.3				24.6	C	0.2	24.9	C	0.2
Eastbound Right				14.6	B	0.9	14.7	B	1.0				10.6	B	0.4	10.6	B	0.4

NOTES:

1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the project.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.
4. 95th percentile queue length in vehicles.
5. These movements are not provided until the related projects are constructed.
6. These movements are not provided until the proposed project is constructed.
7. See [Attachment S](#) for level-of-service worksheets.

Attachment R

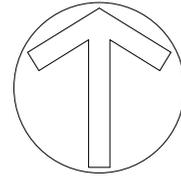
Level-of-Service Analysis for 2015 Conditions without Hale Mua

Approach and Movement	AM Peak Hour ⁽¹⁾									PM Peak Hour								
	Existing (2009)			2015 Without Project			2015 With Project			Existing (2009)			2015 Without Project			2015 With Project		
	Delay ⁽²⁾	LOS ⁽³⁾	95 th Q ⁽⁴⁾	Delay	LOS	95 th Q	Delay	LOS	95 th Q	Delay	LOS	95 th Q	Delay	LOS	95 th Q	Delay	LOS	95 th Q
Kahekili Highway at Waiehu Beach Road																		
Southbound Left & Thru	8.9	A	1.2	9.3	A	1.5	9.3	A	1.5	8.6	A	0.9	8.9	A	1.1	8.9	A	1.1
Westbound Left & Right	52.5	F	8.5	167.7	F	17.2	171.1	F	17.4	18.3	C	3.9	28.4	D	6.8	29.2	D	7.0
Kahekili Highway at Maka'ala Drive																		
Southbound Left	7.9	A	0.1	8.0	A	0.2	8.0	A	0.2	8.2	A	0.1	8.4	A	0.1	8.4	A	0.1
Westbound Left	22.3	C	2.6	29.2	D	3.4	30.0	D	3.5	14.0	B	0.8	15.8	C	0.9	16.0	C	1.0
Westbound Right	9.8	A	0.2	10.0	B	0.2	10.0	B	0.2	10.2	B	0.1	10.6	B	0.1	10.6	B	0.1
Kahekili Highway at MEO BEST Driveway																		
Southbound Left & Thru	See Note (5)			See Note (6)			7.9	A	0.0	See Note (5)			See Note (6)			7.9	A	0.0
Westbound Left & Right	See Note (5)			See Note (6)			13.8	B	0.0	See Note (5)			See Note (6)			11.3	B	0.0
Kahekili Highway at Waiehu Mauka Driveway																		
Southbound Left & Thru	See Note (5)			7.9	A	0.0	7.9	A	0.0	See Note (5)			8.0	A	0.0	8.0	A	0.0
Westbound Left & Right	See Note (5)			14.7	B	0.3	14.8	B	0.3	See Note (5)			12.1	B	0.1	12.2	B	0.1

NOTES:

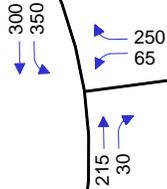
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the project.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.
4. 95th percentile queue length in vehicles.
5. These movements are not provided until the related projects are constructed.
6. These movements are not provided until the proposed project is constructed.
7. See [Attachment S](#) for level-of-service worksheets.

Attachment Q
LEVEL-OF-SERVICE WORKSHEETS



NOMINAL NORTH

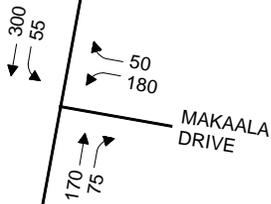
Case1am.Int1



WAIEHU
BEACH
ROAD

KAHEKILI HIGHWAY

Case1am.Int2

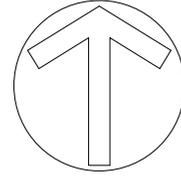


MAKAALA
DRIVE

Case1am
EXISTING

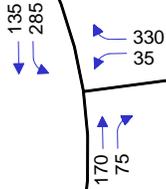
TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case 1am.Int1		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description <i>MEO BEST Project</i>							
East/West Street: <i>Waiehu Bch Rd</i>				North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street		Northbound			Southbound		
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		215	30	350	300		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	0	0	0	68	0	263	
Percent Heavy Vehicles	0	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street		Eastbound			Westbound		
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				65		250	
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	368	315	0	0	226	31	
Percent Heavy Vehicles	0	0	0	5	0	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		368		331			
C (m) (veh/h)		1290		381			
v/c		0.29		0.87			
95% queue length		1.19		8.45			
Control Delay (s/veh)		8.9		52.5			
LOS		A		F			
Approach Delay (s/veh)	--	--	52.5				
Approach LOS	--	--	F				

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case 1am.Int2		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Makaala Drive</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		170	75	55	300			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	195	0	54		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				180		50		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	59	326	0	0	184	81		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		59	195		54			
C (m) (veh/h)		1282	400		808			
v/c		0.05	0.49		0.07			
95% queue length		0.14	2.59		0.21			
Control Delay (s/veh)		7.9	22.3		9.8			
LOS		A	C		A			
Approach Delay (s/veh)	--	--	19.6					
Approach LOS	--	--	C					

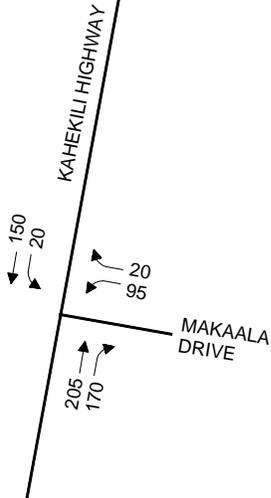


NOMINAL NORTH

Case1pm.Int1



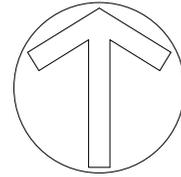
Case1pm.Int2



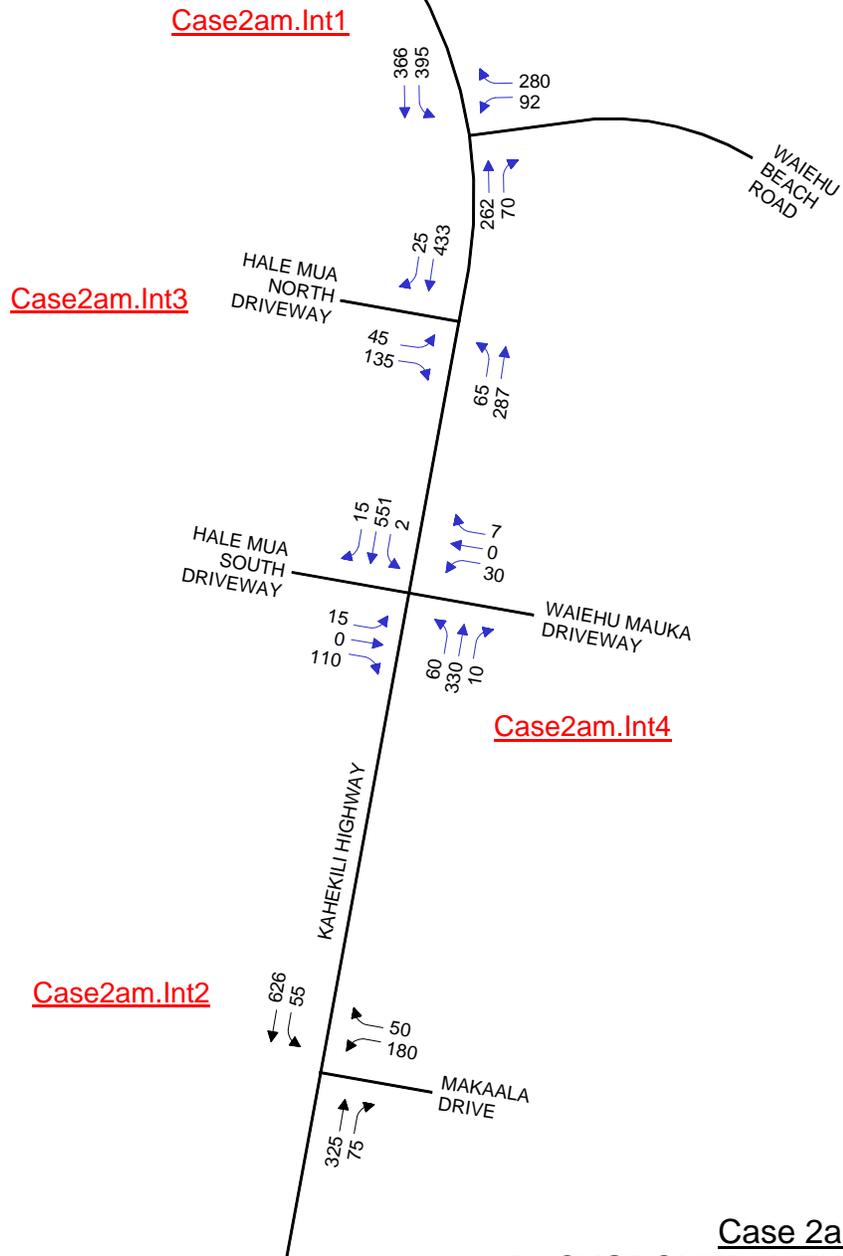
Case1pm
EXISTING

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case 1pm.Int1		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description <i>MEO BEST Project</i>							
East/West Street: <i>Waiehu Beach Rd</i>				North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		170	75	285	135		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	0	0	0	36	0	347	
Percent Heavy Vehicles	0	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				35		330	
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	300	142	0	0	178	78	
Percent Heavy Vehicles	0	0	0	5	0	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		300		383			
C (m) (veh/h)		1292		647			
v/c		0.23		0.59			
95% queue length		0.90		3.89			
Control Delay (s/veh)		8.6		18.3			
LOS		A		C			
Approach Delay (s/veh)	--	--	18.3				
Approach LOS	--	--	C				

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case 1pm.Int2		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Makaala Drive</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		205	170	20	150			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	103	0	21		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				95		20		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	21	163	0	0	222	184		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		21	103		21			
C (m) (veh/h)		1137	503		719			
v/c		0.02	0.20		0.03			
95% queue length		0.06	0.76		0.09			
Control Delay (s/veh)		8.2	14.0		10.2			
LOS		A	B		B			
Approach Delay (s/veh)	--	--	13.3					
Approach LOS	--	--	B					



NOMINAL NORTH



Case2am.Int1

Case2am.Int3

Case2am.Int4

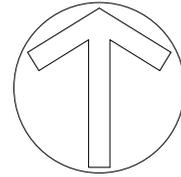
Case2am.Int2

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case2am.Int1		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description <i>MEO BEST Project</i>							
East/West Street: <i>Waiehu Beach Rd</i>				North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		262	70	395	366		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	0	0	0	96	0	294	
Percent Heavy Vehicles	0	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				92		280	
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	415	385	0	0	275	73	
Percent Heavy Vehicles	0	0	0	5	0	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		415		390			
C (m) (veh/h)		1194		249			
v/c		0.35		1.57			
95% queue length		1.57		23.78			
Control Delay (s/veh)		9.6		309.4			
LOS		A		F			
Approach Delay (s/veh)	--	--	309.4				
Approach LOS	--	--	F				

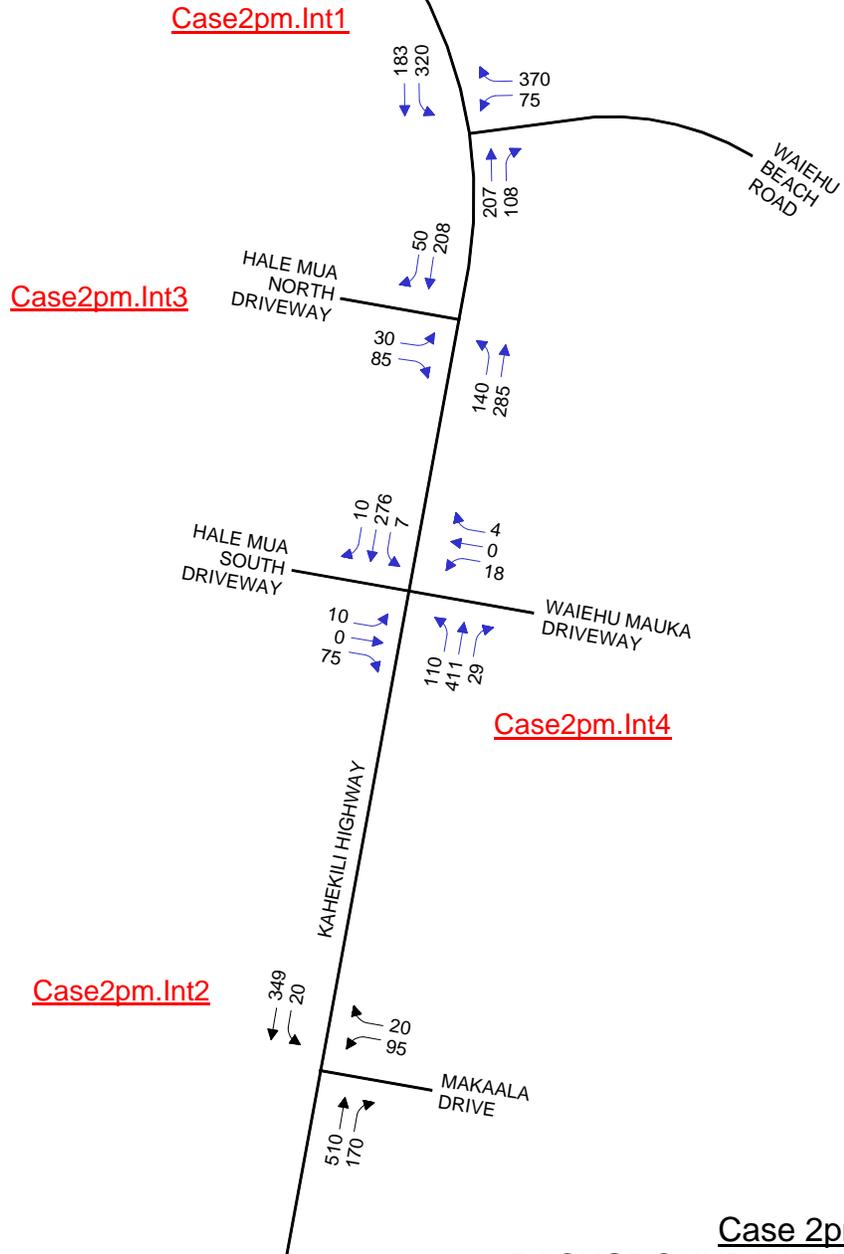
TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case2am.Int2		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Makaala Drive</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		325	75	55	626			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	195	0	54		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0					0
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				180		50		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	59	680	0	0	353	81		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		59	195		54			
C (m) (veh/h)		1110	193		649			
v/c		0.05	1.01		0.08			
95% queue length		0.17	8.68		0.27			
Control Delay (s/veh)		8.4	118.1		11.0			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	94.9					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	PJR			Intersection	Case2am.Int3			
Agency/Co.	PRA			Jurisdiction				
Date Performed	2/2/2009			Analysis Year				
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Hale Mua North/MEO BEST</i>				North/South Street: <i>Kahekili Highway</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	65	287			433	25		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	48	0	146	0	0	0		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	<i>Undivided</i>							
RT Channelized			0				0	
Lanes	1	1	0	0	1		0	
Configuration	L	T					TR	
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	45		135					
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	470	27	70	311	0		
Percent Heavy Vehicles	5	5	5	5	5	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0				0	
Lanes	1	0	1	0	0		0	
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	70					48		146
C (m) (veh/h)	1052					272		577
v/c	0.07					0.18		0.25
95% queue length	0.21					0.63		1.00
Control Delay (s/veh)	8.7					21.1		13.3
LOS	A					C		B
Approach Delay (s/veh)	--	--				15.2		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case2am.Int4		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Hale Mua South/Waiehu Mauka</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	60	330	10	2	551	15		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	16	0	119	32	0	7		
Percent Heavy Vehicles	5	--	--	0	--	--		
Median Type	<i>Undivided</i>							
RT Channelized			0					0
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	15		110	30		7		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	2	598	16	65	358	10		
Percent Heavy Vehicles	5	0	5	0	0	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R		LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LR			L		R
v (veh/h)	65	2	39			16		119
C (m) (veh/h)	951	1202	145			173		492
v/c	0.07	0.00	0.27			0.09		0.24
95% queue length	0.22	0.00	1.02			0.30		0.94
Control Delay (s/veh)	9.1	8.0	38.7			27.9		14.6
LOS	A	A	E			D		B
Approach Delay (s/veh)	--	--	38.7			16.2		
Approach LOS	--	--	E			C		



NOMINAL NORTH



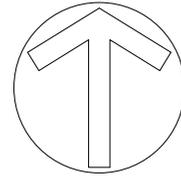
Case 2pm
BACKGROUND WITHOUT PROJECT
WITH HALE MUA

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case2pm.Int1		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description <i>MEO BEST Project</i>							
East/West Street: <i>Waiehu Beach Rd</i>				North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		207	108	320	183		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	0	0	0	78	0	389	
Percent Heavy Vehicles	0	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				75		370	
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	336	192	0	0	217	113	
Percent Heavy Vehicles	0	0	0	5	0	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		336		467			
C (m) (veh/h)		1213		465			
v/c		0.28		1.00			
95% queue length		1.14		13.36			
Control Delay (s/veh)		9.1		72.9			
LOS		A		F			
Approach Delay (s/veh)	--	--	72.9				
Approach LOS	--	--	F				

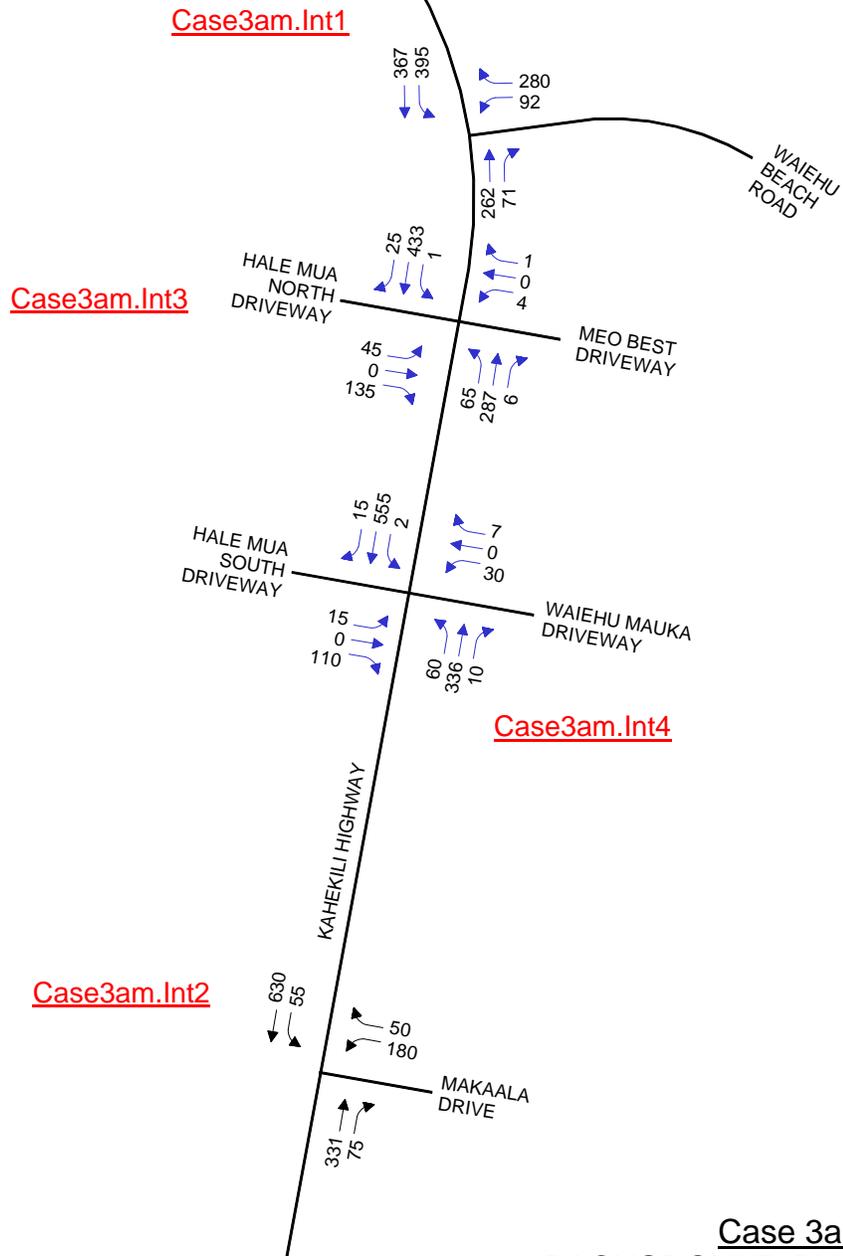
TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case2pm.Int2		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Makaala Drive</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		510	170	20	349			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	103	0	21		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				95		20		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	21	379	0	0	554	184		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		21	103		21			
C (m) (veh/h)		855	237		466			
v/c		0.02	0.43		0.05			
95% queue length		0.08	2.05		0.14			
Control Delay (s/veh)		9.3	31.4		13.1			
LOS		A	D		B			
Approach Delay (s/veh)	--	--	28.3					
Approach LOS	--	--	D					

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case2pm.Int3		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description MEO BEST Project								
East/West Street: Hale Mua North/MEO BEST					North/South Street: Kahekili Highway			
Intersection Orientation: North-South					Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	140	285			208	50		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	32	0	92	0	0	0		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0				0	
Lanes	1	1	0	0	1	0		
Configuration	L	T					TR	
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	30		85					
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	226	54	152	309	0		
Percent Heavy Vehicles	5	5	5	5	5	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0				0	
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	152					32		92
C (m) (veh/h)	1266					282		778
v/c	0.12					0.11		0.12
95% queue length	0.41					0.38		0.40
Control Delay (s/veh)	8.2					19.4		10.2
LOS	A					C		B
Approach Delay (s/veh)	--	--				12.6		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	PJR			Intersection	Case2pm.Int4			
Agency/Co.	PRA			Jurisdiction				
Date Performed	2/2/2009			Analysis Year				
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Hale Mua South/Waiehu Mauka</i>				North/South Street: <i>Kahekili Highway</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	110	411	29	7	276	10		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	10	0	81	19	0	4		
Percent Heavy Vehicles	5	--	--	0	--	--		
Median Type	<i>Undivided</i>							
RT Channelized			0			0		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	10		75	18		4		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	7	299	10	119	446	31		
Percent Heavy Vehicles	5	0	5	0	0	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R		LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LR		L		R
v (veh/h)	119	7		23		10		81
C (m) (veh/h)	1235	1096		191		194		729
v/c	0.10	0.01		0.12		0.05		0.11
95% queue length	0.32	0.02		0.40		0.16		0.37
Control Delay (s/veh)	8.2	8.3		26.4		24.6		10.6
LOS	A	A		D		C		B
Approach Delay (s/veh)	--	--	26.4			12.1		
Approach LOS	--	--	D			B		



NOMINAL NORTH



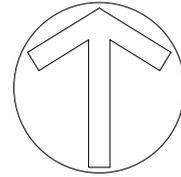
Case 3am
BACKGROUND PLUS PROJECT
WITH HALE MUA

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case3am.Int1		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description <i>MEO BEST Project</i>							
East/West Street: <i>Waiehu Bch Rd</i>				North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		262	71	395	367		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	0	0	0	96	0	294	
Percent Heavy Vehicles	0	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				92		280	
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	415	386	0	0	275	74	
Percent Heavy Vehicles	0	0	0	5	0	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		415		390			
C (m) (veh/h)		1193		249			
v/c		0.35		1.57			
95% queue length		1.57		23.78			
Control Delay (s/veh)		9.6		309.4			
LOS		A		F			
Approach Delay (s/veh)	--	--	309.4				
Approach LOS	--	--	F				

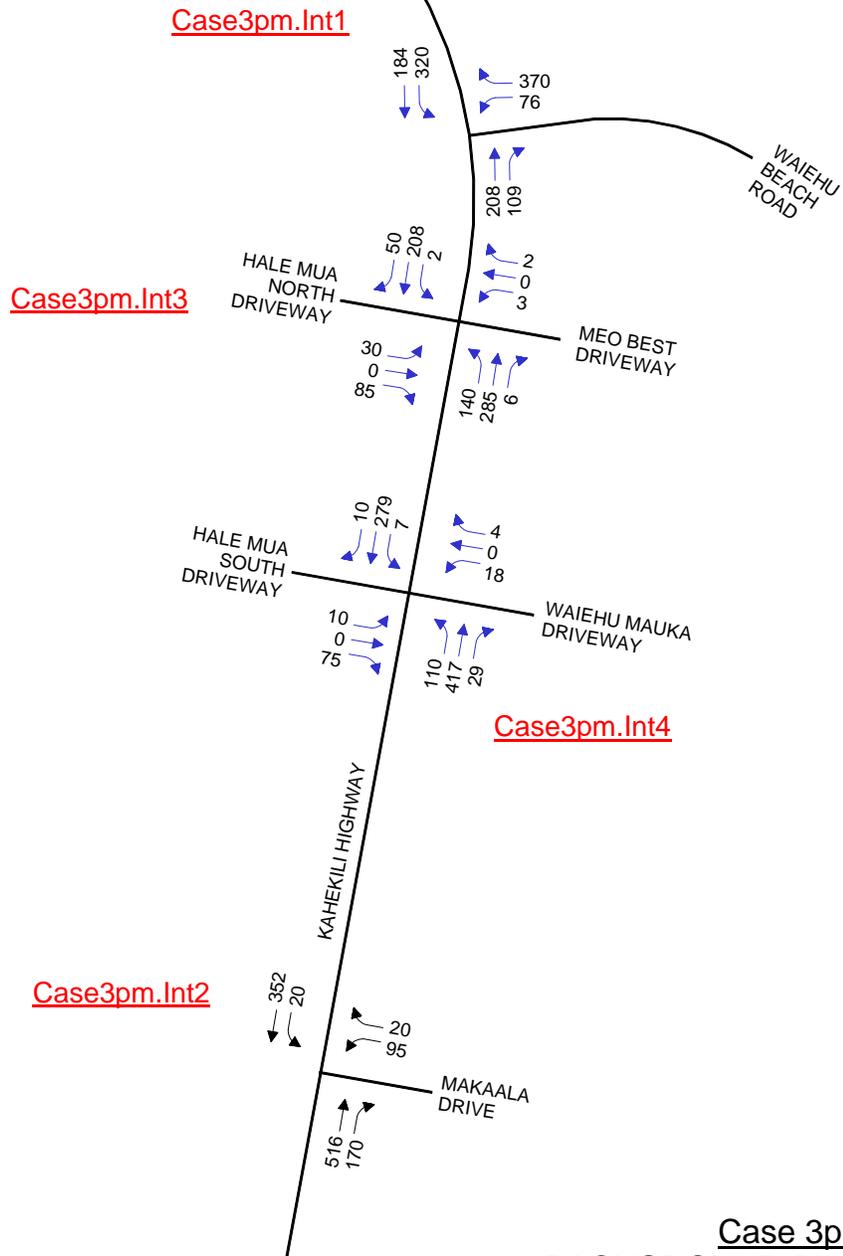
TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case3am.Int2		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Makaala Drive</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		331	75	55	630			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	195	0	54		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				180		50		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	59	684	0	0	359	81		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		59	195		54			
C (m) (veh/h)		1104	190		643			
v/c		0.05	1.03		0.08			
95% queue length		0.17	8.87		0.27			
Control Delay (s/veh)		8.4	123.6		11.1			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	99.2					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case3am.Int3		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Hale Mua North/MEO BEST</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	65	287	6	1	433	25		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	48	0	146	4	0	1		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	<i>Undivided</i>							
RT Channelized			0					0
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	45		135	4		1		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	1	470	27	70	311	6		
Percent Heavy Vehicles	5	5	5	5	5	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R		LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LR			L		R
v (veh/h)	70	1	5			48		146
C (m) (veh/h)	1052	1226	180			228		577
v/c	0.07	0.00	0.03			0.21		0.25
95% queue length	0.21	0.00	0.09			0.77		1.00
Control Delay (s/veh)	8.7	7.9	25.6			25.0		13.3
LOS	A	A	D			C		B
Approach Delay (s/veh)	--	--	25.6			16.2		
Approach LOS	--	--	D			C		

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case3am.Int4		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Hale Mua South/Waiehu Mauka</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	60	336	10	2	555	15		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	16	0	119	32	0	7		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	<i>Undivided</i>							
RT Channelized			0					0
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	15		110	30		7		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	2	603	16	65	365	10		
Percent Heavy Vehicles	5	5	5	5	5	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R		LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LR		L		R
v (veh/h)	65	2		39		16		119
C (m) (veh/h)	947	1167		140		170		488
v/c	0.07	0.00		0.28		0.09		0.24
95% queue length	0.22	0.01		1.07		0.31		0.95
Control Delay (s/veh)	9.1	8.1		40.4		28.4		14.7
LOS	A	A		E		D		B
Approach Delay (s/veh)	--	--	40.4			16.4		
Approach LOS	--	--	E			C		



NOMINAL NORTH



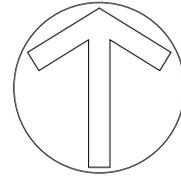
Case 3pm
BACKGROUND PLUS PROJECT
WITH HALE MUA

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case3pm.Int1		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description <i>MEO BEST Project</i>							
East/West Street:				North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street		Northbound			Southbound		
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		208	109	320	184		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	0	0	0	80	0	389	
Percent Heavy Vehicles	0	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street		Eastbound			Westbound		
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				76		370	
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	336	193	0	0	218	114	
Percent Heavy Vehicles	0	0	0	5	0	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		336		469			
C (m) (veh/h)		1211		460			
v/c		0.28		1.02			
95% queue length		1.14		13.84			
Control Delay (s/veh)		9.1		77.3			
LOS		A		F			
Approach Delay (s/veh)	--	--	77.3				
Approach LOS	--	--	F				

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case3pm.Int2		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Makaala Drive</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		516	170	20	352			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	103	0	21		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				95		20		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	21	382	0	0	560	184		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		21	103		21			
C (m) (veh/h)		850	234		463			
v/c		0.02	0.44		0.05			
95% queue length		0.08	2.09		0.14			
Control Delay (s/veh)		9.3	31.9		13.1			
LOS		A	D		B			
Approach Delay (s/veh)	--	--	28.8					
Approach LOS	--	--	D					

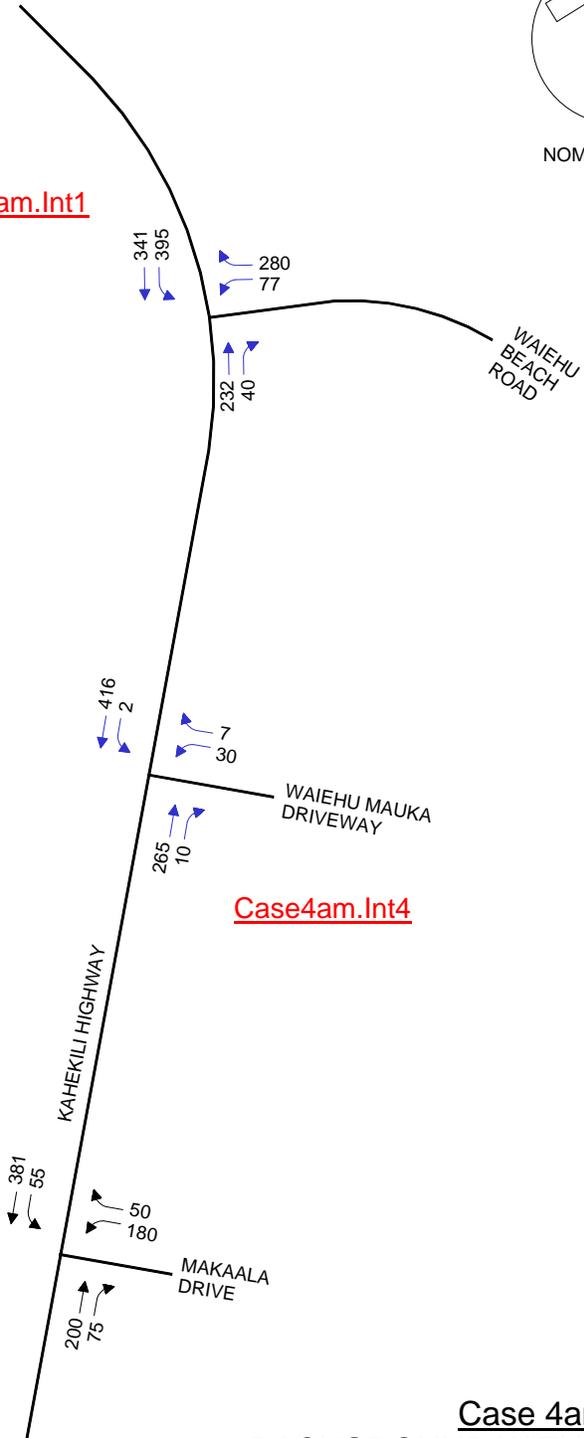
TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case3pm.Int3		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description MEO BEST Project								
East/West Street: Hale Mua North/MEO BEST					North/South Street: Kahekili Highway			
Intersection Orientation: North-South					Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	140	285	6	2	208	50		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	32	0	92	3	0	2		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0					0
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	30		85	3		2		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	2	226	54	152	309	6		
Percent Heavy Vehicles	5	5	5	5	5	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R		LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LR		L		R
v (veh/h)	152	2		5		32		92
C (m) (veh/h)	1266	1228		280		241		778
v/c	0.12	0.00		0.02		0.13		0.12
95% queue length	0.41	0.00		0.05		0.45		0.40
Control Delay (s/veh)	8.2	7.9		18.1		22.2		10.2
LOS	A	A		C		C		B
Approach Delay (s/veh)	--	--	18.1			13.3		
Approach LOS	--	--	C			B		

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case3pm.Int4		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Hale Mua South/Waiehu Mauka</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	110	417	29	7	279	10		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	10	0	81	19	0	4		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0				0	
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	10		75	18		4		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	7	303	10	119	453	31		
Percent Heavy Vehicles	5	5	5	5	5	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R		LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LR			L		R
v (veh/h)	119	7	23			10		81
C (m) (veh/h)	1230	1063	184			191		725
v/c	0.10	0.01	0.13			0.05		0.11
95% queue length	0.32	0.02	0.42			0.16		0.38
Control Delay (s/veh)	8.2	8.4	27.3			24.9		10.6
LOS	A	A	D			C		B
Approach Delay (s/veh)	--	--	27.3			12.2		
Approach LOS	--	--	D			B		



NOMINAL NORTH

Case4am.Int1



Case4am.Int4

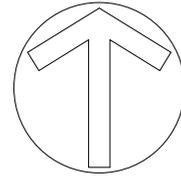
Case4am.Int2

Case 4am
BACKGROUND WITHOUT PROJECT
WITHOUT HALE MUA

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case4am.Int1		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description							
East/West Street: Waiehu Bch Rd				North/South Street: Kahekili Highway			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		232	40	395	341		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	0	0	0	81	0	294	
Percent Heavy Vehicles	0	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				77		280	
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	415	358	0	0	244	42	
Percent Heavy Vehicles	0	0	0	5	0	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		415		375			
C (m) (veh/h)		1259		303			
v/c		0.33		1.24			
95% queue length		1.46		17.18			
Control Delay (s/veh)		9.3		167.7			
LOS		A		F			
Approach Delay (s/veh)	--	--	167.7				
Approach LOS	--	--	F				

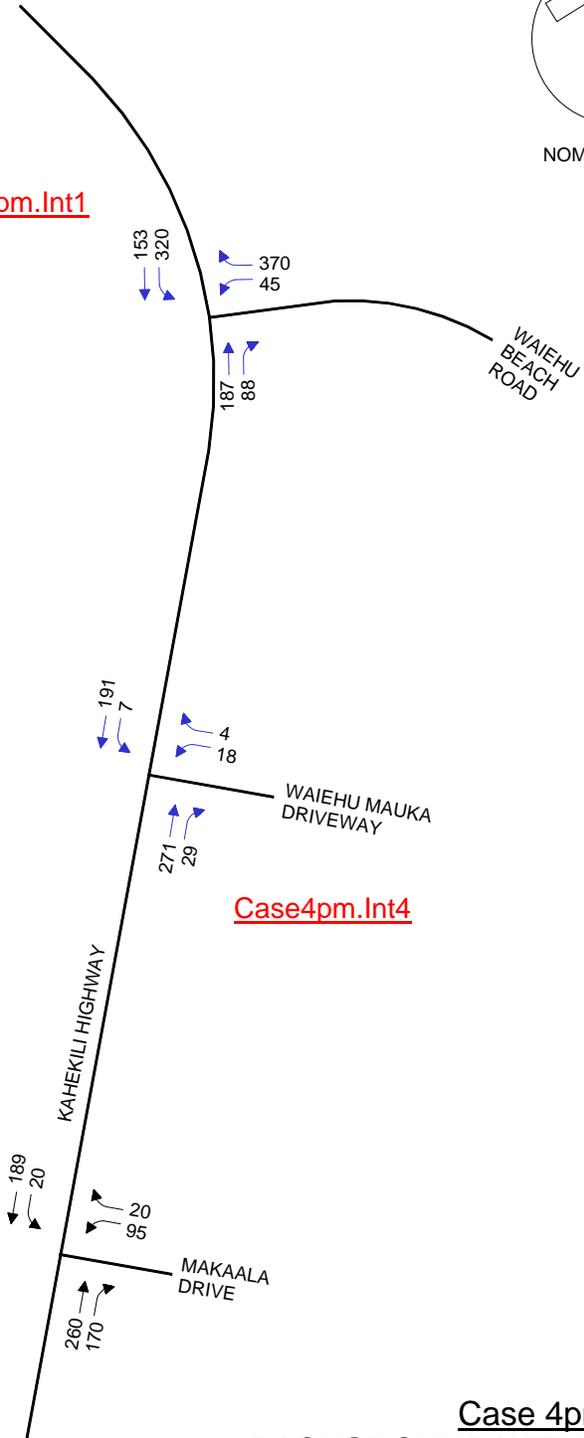
TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	PJR			Intersection	Case4am.Int2			
Agency/Co.	PRA			Jurisdiction				
Date Performed	2/2/2009			Analysis Year				
Analysis Time Period								
Project Description								
East/West Street: <i>Makaala Drive</i>				North/South Street: <i>Kahekili Highway</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		200	75	55	381			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	195	0	54		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				180		50		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	59	414	0	0	217	81		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		59	195		54			
C (m) (veh/h)		1246	338		773			
v/c		0.05	0.58		0.07			
95% queue length		0.15	3.43		0.22			
Control Delay (s/veh)		8.0	29.2		10.0			
LOS		A	D		B			
Approach Delay (s/veh)	--	--	25.0					
Approach LOS	--	--	D					

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case4am.Int4		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description							
East/West Street: Waiehu Mauka Driveway				North/South Street: Kahekili Highway			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		265	10	2	416		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	0	0	0	32	0	7	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				30		7	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	2	452	0	0	288	10	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		2		39			
C (m) (veh/h)		1246		410			
v/c		0.00		0.10			
95% queue length		0.00		0.31			
Control Delay (s/veh)		7.9		14.7			
LOS		A		B			
Approach Delay (s/veh)	--	--	14.7				
Approach LOS	--	--	B				



NOMINAL NORTH

Case4pm.Int1



Case4pm.Int4

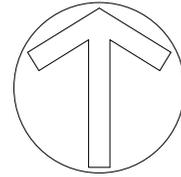
Case4pm.Int2

Case 4pm
BACKGROUND WITHOUT PROJECT
WITHOUT HALE MUA

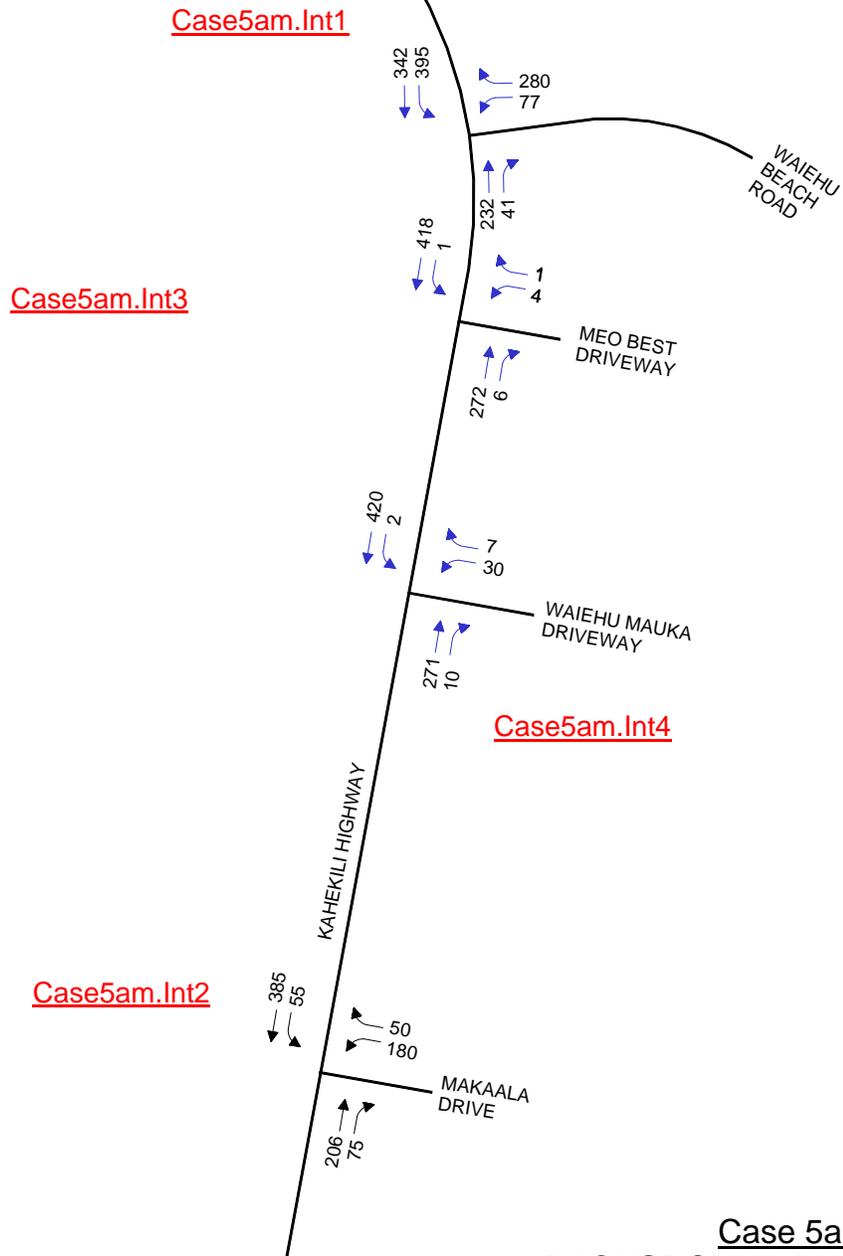
TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case4pm.Int1		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description <i>MEO BEST Project</i>							
East/West Street: <i>Waiehu Bch Rd</i>				North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		187	88	320	153		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	0	0	0	47	0	389	
Percent Heavy Vehicles	0	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				45		370	
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	336	161	0	0	196	92	
Percent Heavy Vehicles	0	0	0	5	0	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		336		436			
C (m) (veh/h)		1257		574			
v/c		0.27		0.76			
95% queue length		1.08		6.80			
Control Delay (s/veh)		8.9		28.4			
LOS		A		D			
Approach Delay (s/veh)	--	--	28.4				
Approach LOS	--	--	D				

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	PJR			Intersection	Case4pm.Int2			
Agency/Co.	PRA			Jurisdiction				
Date Performed	2/2/2009			Analysis Year				
Analysis Time Period								
Project Description								
East/West Street: <i>Makaala Drive</i>				North/South Street: <i>Kahekili Highway</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		260	170	20	189			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	103	0	21		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				95		20		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	21	205	0	0	282	184		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		21	103		21			
C (m) (veh/h)		1080	437		666			
v/c		0.02	0.24		0.03			
95% queue length		0.06	0.91		0.10			
Control Delay (s/veh)		8.4	15.8		10.6			
LOS		A	C		B			
Approach Delay (s/veh)	--	--	14.9					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case4pm.Int4		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description							
East/West Street: Waiehu Mauka Driveway				North/South Street: Kahekili Highway			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		271	29	7	191		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	0	0	0	19	0	4	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				18		4	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	7	207	0	0	294	31	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		7		23			
C (m) (veh/h)		1218		529			
v/c		0.01		0.04			
95% queue length		0.02		0.14			
Control Delay (s/veh)		8.0		12.1			
LOS		A		B			
Approach Delay (s/veh)	--	--	12.1				
Approach LOS	--	--	B				



NOMINAL NORTH



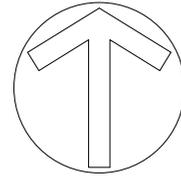
Case 5am
BACKGROUND PLUS PROJECT
WITHOUT HALE MUA

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	PJR			Intersection	Case5am.Int1			
Agency/Co.	PRA			Jurisdiction				
Date Performed	2/2/2009			Analysis Year				
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Waiehu Bch Rd</i>				North/South Street: <i>Kahekili Highway</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		232	41	395	342			
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95		
Hourly Flow Rate, HFR (veh/h)	0	0	0	81	0	294		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				77		280		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95		
Hourly Flow Rate, HFR (veh/h)	415	360	0	0	244	43		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		415		375				
C (m) (veh/h)		1258		301				
v/c		0.33		1.25				
95% queue length		1.46		17.35				
Control Delay (s/veh)		9.3		171.1				
LOS		A		F				
Approach Delay (s/veh)	--	--	171.1					
Approach LOS	--	--	F					

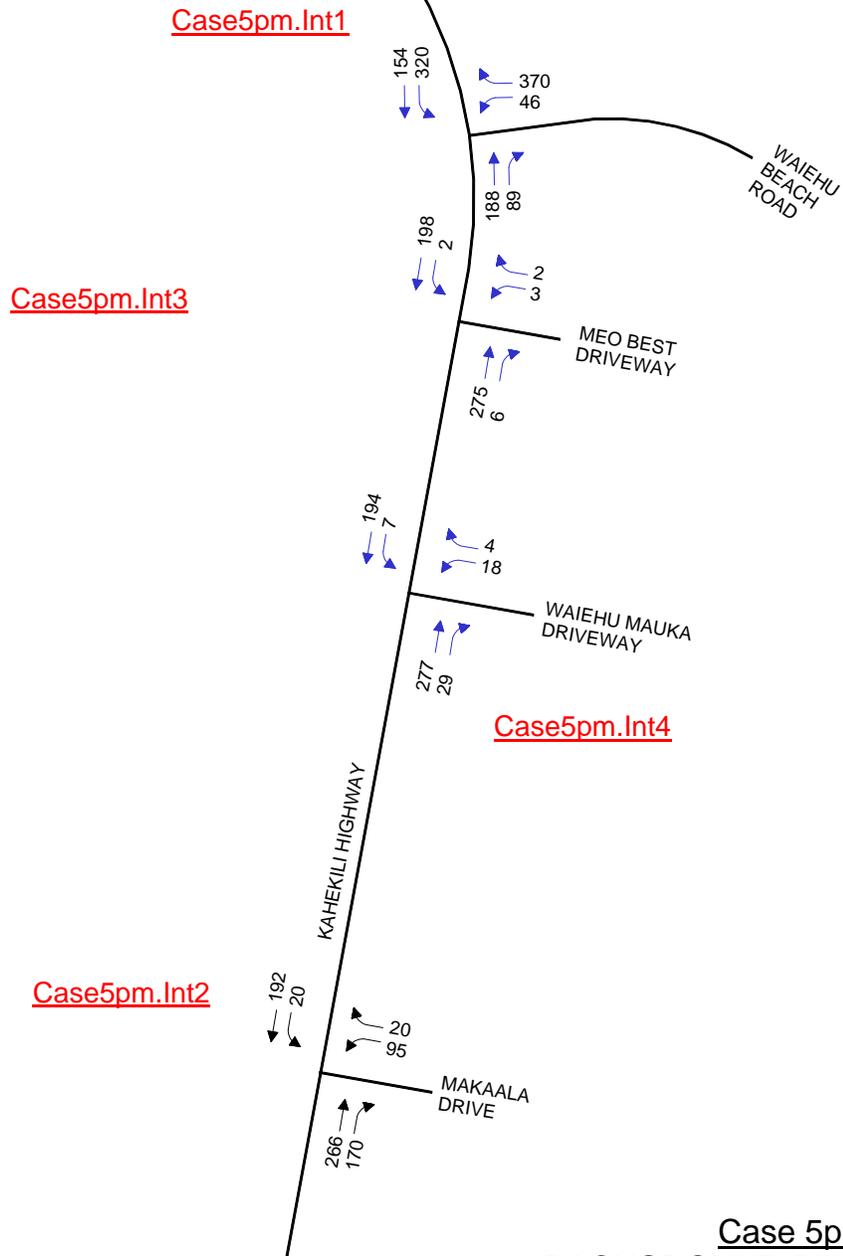
TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case5am.Int2		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Makaala Drive</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		206	75	55	385			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	195	0	54		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				180		50		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	59	418	0	0	223	81		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		59	195		54			
C (m) (veh/h)		1240	333		767			
v/c		0.05	0.59		0.07			
95% queue length		0.15	3.52		0.23			
Control Delay (s/veh)		8.0	30.0		10.0			
LOS		A	D		B			
Approach Delay (s/veh)	--	--	25.7					
Approach LOS	--	--	D					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	PJR			Intersection	Case5am.Int3			
Agency/Co.	PRA			Jurisdiction				
Date Performed	2/2/2009			Analysis Year				
Analysis Time Period								
Project Description MEO BEST Project								
East/West Street: MEO BEST Driveway				North/South Street: Kahekili Highway				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		272	6	1	418			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	4	0	1		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				4		1		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	1	454	0	0	295	6		
Percent Heavy Vehicles	5	5	5	5	5	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		1		5				
C (m) (veh/h)		1243		414				
v/c		0.00		0.01				
95% queue length		0.00		0.04				
Control Delay (s/veh)		7.9		13.8				
LOS		A		B				
Approach Delay (s/veh)	--	--	13.8					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	PJR			Intersection	Case5am.Int4			
Agency/Co.	PRA			Jurisdiction				
Date Performed	2/2/2009			Analysis Year				
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Waiehu Mauka Driveway</i>				North/South Street: <i>Kahekili Highway</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		271	10	2	420			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	32	0	7		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				30		7		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	2	456	0	0	294	10		
Percent Heavy Vehicles	5	5	5	5	5	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		2		39				
C (m) (veh/h)		1240		405				
v/c		0.00		0.10				
95% queue length		0.00		0.32				
Control Delay (s/veh)		7.9		14.8				
LOS		A		B				
Approach Delay (s/veh)	--	--	14.8					
Approach LOS	--	--	B					



NOMINAL NORTH



Case 5pm
BACKGROUND PLUS PROJECT
WITHOUT HALE MUA

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case5pm.Int1		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description <i>MEO BEST Project</i>							
East/West Street: <i>Waiehu Bch Rd</i>				North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		188	89	320	154		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	0	0	0	48	0	389	
Percent Heavy Vehicles	0	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				46		370	
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	336	162	0	0	197	93	
Percent Heavy Vehicles	0	0	0	5	0	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		336		437			
C (m) (veh/h)		1255		569			
v/c		0.27		0.77			
95% queue length		1.09		6.98			
Control Delay (s/veh)		8.9		29.2			
LOS		A		D			
Approach Delay (s/veh)	--	--	29.2				
Approach LOS	--	--	D				

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	PJR				Intersection	Case5pm.Int2		
Agency/Co.	PRA				Jurisdiction			
Date Performed	2/2/2009				Analysis Year			
Analysis Time Period								
Project Description <i>MEO BEST Project</i>								
East/West Street: <i>Makaala Drive</i>					North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>					Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments								
Major Street		Northbound			Southbound			
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		266	170	20	192			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	103	0	21		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street		Eastbound			Westbound			
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				95		20		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	21	208	0	0	289	184		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		21	103		21			
C (m) (veh/h)		1073	431		660			
v/c		0.02	0.24		0.03			
95% queue length		0.06	0.92		0.10			
Control Delay (s/veh)		8.4	16.0		10.6			
LOS		A	C		B			
Approach Delay (s/veh)	--	--	15.1					
Approach LOS	--	--	C					

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case5pm.Int3		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description MEO BEST Project							
East/West Street: MEO BEST				North/South Street: Kahekili Highway			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		275	6	2	198		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	0	0	0	3	0	2	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				3		2	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	2	215	0	0	298	6	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		2		5			
C (m) (veh/h)		1240		580			
v/c		0.00		0.01			
95% queue length		0.00		0.03			
Control Delay (s/veh)		7.9		11.3			
LOS		A		B			
Approach Delay (s/veh)	--	--	11.3				
Approach LOS	--	--	B				

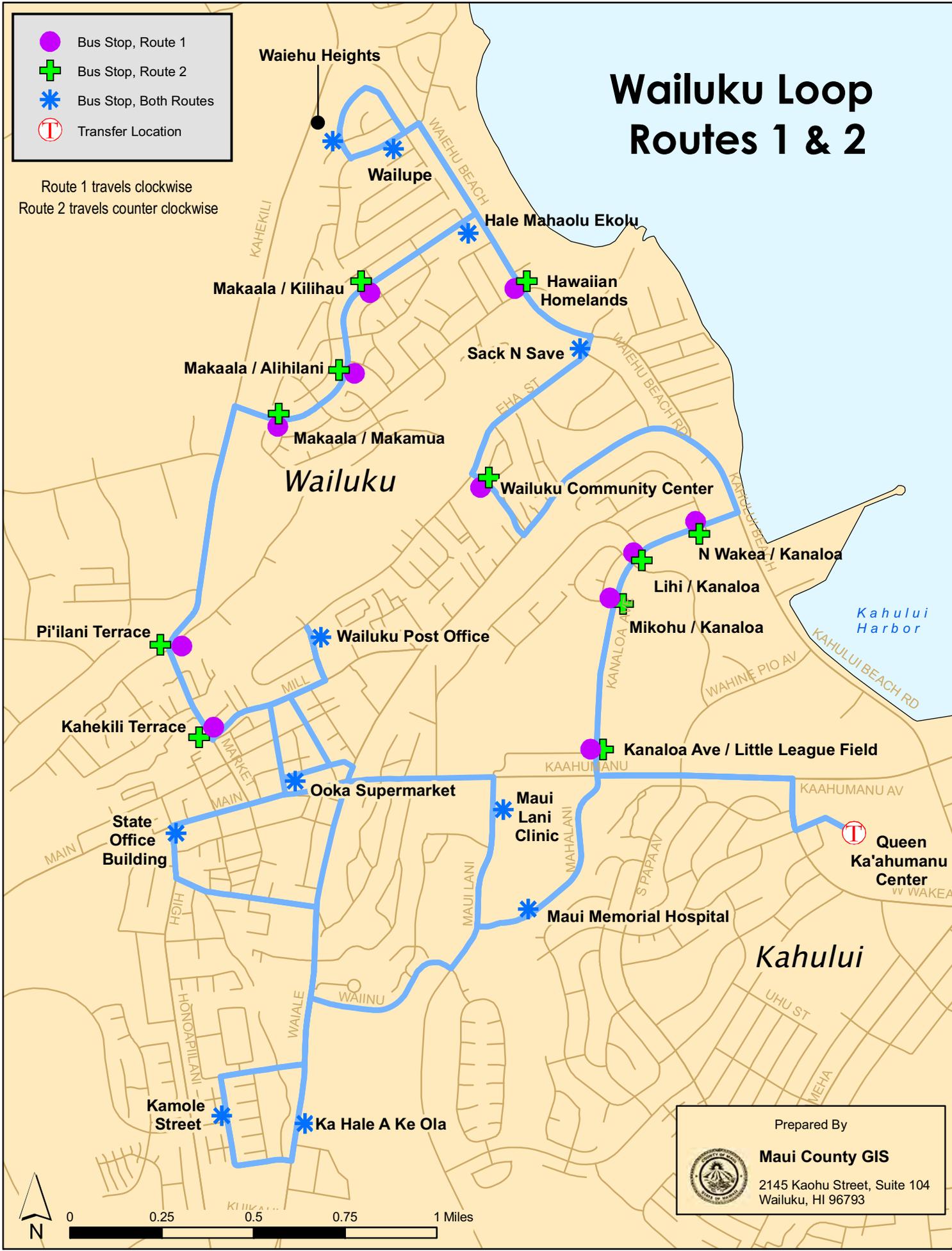
TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	PJR			Intersection	Case5pm.Int4		
Agency/Co.	PRA			Jurisdiction			
Date Performed	2/2/2009			Analysis Year			
Analysis Time Period							
Project Description <i>MEO BEST Project</i>							
East/West Street: <i>Hale Mua South/Waiehu Mauka</i>				North/South Street: <i>Kahekili Highway</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		277	29	7	194		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	0	0	0	19	0	4	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	<i>Undivided</i>						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				18		4	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	7	210	0	0	301	31	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		7		23			
C (m) (veh/h)		1211		523			
v/c		0.01		0.04			
95% queue length		0.02		0.14			
Control Delay (s/veh)		8.0		12.2			
LOS		A		B			
Approach Delay (s/veh)	--	--	12.2				
Approach LOS	--	--	B				

Attachment T
THE MAUI BUS SERVICE IN WAEHU HEIGHTS AREA

Wailuku Loop Routes 1 & 2

-  Bus Stop, Route 1
-  Bus Stop, Route 2
-  Bus Stop, Both Routes
-  Transfer Location

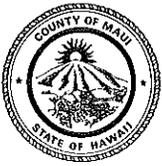
Route 1 travels clockwise
Route 2 travels counter clockwise



Prepared By

Maui County GIS
 2145 Kaohu Street, Suite 104
 Wailuku, HI 96793

Attachment U
COMMENT LETTERS FROM MAUI POLICE DEPARTMENT AND STATE
OF HAWAII DEPARTMENT OF TRANSPORTATION



POLICE DEPARTMENT
COUNTY OF MAUI



CHARMAINE TAVARES
MAYOR

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

OUR REFERENCE
tj
YOUR REFERENCE

GARY A. YABUTA
DEPUTY CHIEF OF POLICE

December 19, 2008

RECEIVED

JAN - 5 2009

Mr. Matthew M. Slepín
Senior Associate
Chris Hart & Partners, Inc.
115 N. Market Street
Wailuku, HI 96793-1706

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

cc: matt
07/001

Dear Mr. Slepín:

SUBJECT: Early Consultation Request for the Proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm at Waiehu, Maui
TMK: 3-3-001:016 (por.)

Thank you for your letter of December 5, 2008, requesting comments on the above subject.

We have reviewed the information submitted for this project and offer the enclosed comments at this time.

Thank you for giving us the opportunity to comment on this project.

Very truly yours,

Assistant Chief Wayne T. Ribao
for: Thomas M. Phillips
Chief of Police

c: Jeffrey Hunt, Maui County Planning Department

COPY

CC: Matt
RECEIVED

JAN - 5 2009

TO : THOMAS PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI

VIA : CHANNELS

FROM : STEPHEN ORIKASA, ADMINISTRATIVE SERGEANT,
WAILUKU PATROL DIVISION

SUBJECT : RESPONSE TO A REQUEST FOR EARLY CONSULTATION COMMENTS
REGARDING THE PROPOSED MAUI ECONOMIC OPPORTUNITY "KE
KAHUA" AGRICULTURAL FARM

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

CONCUR:
AC W. Slepina
12/19/08

This communication is submitted as a response to a request for early consultation comments by Chris Hart & Partners, Inc., Senior Associate, Matthew M. Slepina, regarding the proposed Maui Economic Opportunity "Ke Kahua" agricultural Farm at Waiehu, Maui; TMK (2) Portion of: 3-3-001:016 (11.476 acres).

RESPONSE:

In review of the submitted documents, the focus from the police perspective would be upon the safety of pedestrian and vehicular movement.

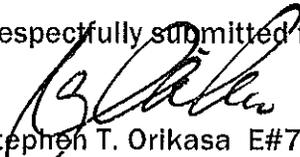
The primary and secondary ingress and egress points appear to be at an adequate distance as not to compromise safety or movement at the nearby intersections of Kahekili Highway and Waiehu Beach Road, and Kahekili Highway and Makaala Drive.

What I could not determine from Figure 2 of the Conceptual Site Plan, is if there will be any improvements for pedestrian walkways along Kahekili Highway fronting the proposed project. This may be something to look at since there is a plan to construct a roadside produce stand on the property.

During the construction phases of this project, extreme measures should be taken to minimize and mitigate any noise, dust and debris which could have adverse effects upon the health, safety and well being of those in nearby residential areas or passing through the area.

Should the ingress and egress of heavy equipment and vehicles providing service during the construction phases hinder normal vehicular and pedestrian movement, mitigation plans should be in place prior to its commencement.

Respectfully submitted for your review and approval.


Stephen T. Orikasa E#716
Administrative Sergeant/Wailuku Patrol Division
12/19/08 @ 0725 Hours

No further comments
from [unclear]
12/19/08 @ 1120

Responses to MPD's Comment Letter Dated December 19, 2008

TIAR for MEO Ke Kahua Best House

No.	Comment	Response
1.	The primary and secondary ingress and egress points appear to be at an adequate distance as to not compromise safety or movement at the nearby intersections of Kahekili Highway and Waiehu Beach Road, and Kahekili Highway and Makaala Drive.	The primary driveway is approximately one-half mile south of the Kahekili Highway/Waiehu Beach Road intersection. The two minor driveways are for service and farm related vehicles and should not be used during peak traffic periods. See page 2 of TIAR.
2.	[Will] there will be any improvements for pedestrian walkways along Kahekili Highway fronting the proposed project? This may be something to look at since there is a plan to construct a roadside produce stand on the property.	The TIAR recommended that the roadside stand be located far enough from the highway to discourage parking along the highway and associated pedestrian activity. The TIAR also recommended that sufficient parking be provided so that no one will need to park along the highway. See page 16.
3.	During the construction phases of this project, extreme measures should be taken to minimize and mitigate any noise, dust and debris which could have adverse effects upon the health, safety and well being of those in nearby residential areas or passing through the area.	No response required.

LINDA LINGLE
GOVERNOR



BRENNON T. MORIOKA
DIRECTOR

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

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

IN REPLY REFER TO:

DIR 1779
STP 8.3075

December 24, 2008

Mr. Matthew M. Slepín
Senior Associate
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Hawaii 96793-1717

RECEIVED

DEC 29 2008

CHRIS HART & PARTNERS, INC.
Landscape Architecture & Planning

CU *Mark*

07/100

Dear Mr. Slepín:

Subject: Maui Economic Opportunity, Inc.
"Ke Kahua" Agricultural Farm at Waiehu
Early Consultation for Draft Environmental Assessment (Draft EA)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project. DOT's initial comments are as follows:

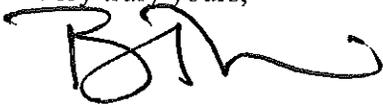
1. The project can impact the State highways by its contribution of traffic primarily at the Kahekili Highway/Waiehu Beach Road, intersection.
2. Any project access close to the Kahekili Highway/Waiehu Beach Road intersection or any access directly to Waiehu Beach Road including any infrastructure or utility connections abutting or into Waiehu Beach Road should be identified and described in the Draft EA.
3. A traffic assessment or traffic impact analysis report should be prepared and submitted as part of the Draft EA. The traffic report should cover any project contributions to local and regional traffic impacts. It should also include the cumulative traffic effects with all other projects in the area such as the proposed Hale Mua Subdivision located on Kahekili Highway across from the subject project. Required and recommended traffic mitigation measures should also be discussed in the report.
4. No additional storm water runoff will be allowed into the adjoining State highway right-of-way. Drainage from the subject project should be addressed in the Draft EA. Any construction work necessary along or in the State highway right-of-way will require the DOT Highways Division's prior review and approval.
5. The DOT requests that at least four copies of the Draft EA be provided to permit simultaneous review by the various appropriate Highways Division staff.

Mr. Matthew M. Slepín
December 24, 2008
Page 2

STP 8.3075

The DOT appreciates the courtesy of your early consultation. If there are any questions related to this early consultation, please contact Mr. David Shimokawa of the Plans Staff, Statewide Transportation Planning Office at 587-2356.

Very truly yours,

A handwritten signature in black ink, appearing to read 'BM', with a stylized flourish extending to the right.

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

c: Mr. Jeffrey S. Hunt, County of Maui, Department of Planning

Responses to SDOT's Comment Letter Dated December 24, 2008

TIAR for MEO Ke Kahua Best House

No.	Comment	Response
1.	The project can impact the State highways by its contribution of traffic primarily at the Kahekili Highway/Waiehu Beach Road, intersection.	No response required.
2.	Any project access close to the Kahekili Highway/Waiehu Beach Road intersection or any access directly to Waiehu Beach Road including any infrastructure or utility connections abutting or into Waiehu Beach Road should be identified and described in the Draft EA.	The primary driveway serving the project is approximately 0.5 mile south of the intersection of Kahekili Highway at Waiehu Beach Road. See page 2 of TIAR.
3.	A traffic assessment or traffic impact analysis report should be prepared and submitted as part of the Draft EA. The traffic report should cover any project contributions to local and regional traffic impacts. It should also include the cumulative traffic effects with all other projects in the area such as the proposed Hale Mua Subdivision located on Kahekili Highway across from the subject project. Required and recommended traffic mitigation measures should also be discussed in the report.	The TIAR provides an analysis of future conditions with and without Hale Mua traffic as Hale Mua may not be constructed before 2015, and to determine if the improvements recommend in the TIAR for Hale Mua are needed if Hale Mua is not constructed.
4.	No additional storm water runoff will be allowed into the adjoining State highway right-of-way. Drainage from the subject project should be addressed in the Draft EA. Any construction work necessary along or in the State highway right-of-way will require the DOT Highway's Division's prior review and approval.	Storm water issues are not included in the TIAR and will be addressed by others.
5.	The DOT requests that at least four copies of the Draft EA be provided to permit simultaneous review by the various appropriate Highways Division staff.	Acknowledged. The Draft EA is being prepared by others that will provide copies.

Attachment V
Level-of-Service Analysis - Kahekili Highway at Waiehu Beach Road
Signalized Conditions

Peak Hour, Approach and Movement	2015 Conditions With MEO BEST and With Hale Mua						2015 Conditions With MEO BEST and Without Hale Mua					
	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
	V/C ⁽²⁾	Delay ⁽³⁾	LOS ⁽⁴⁾	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Intersection Totals	0.82	18.0	B	0.83	18.2	B	0.77	17.4	B	0.80	18.0	B
Westbound Left	0.34	20.2	C	0.28	19.8	B	0.30	20.0	C	0.18	19.4	B
Westbound Right	0.19	19.4	B	0.25	19.7	B	0.19	19.5	B	0.25	19.9	B
Northbound Thru & Right	0.61	20.2	C	0.51	16.6	B	0.50	17.6	B	0.44	15.2	B
Southbound Left	0.82	27.7	C	0.77	26.1	C	0.82	27.2	C	0.76	25.1	C
Southbound Thru	0.31	4.0	A	0.16	3.3	A	0.29	3.8	A	0.13	3.0	A

NOTES:

1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. V/C denotes ratio of volume to capacity. V/C ratio is not calculated for unsignalized intersections.
3. Delay is in seconds per vehicle.
4. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

HCM Signalized Intersection Capacity Analysis
 1: Waiehu Beach Road & Kahekili Highway

4/11/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	1809		1770	1863
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	1809		1770	1863
Volume (vph)	92	280	262	71	395	367
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	100	304	285	77	429	399
RTOR Reduction (vph)	0	254	15	0	0	0
Lane Group Flow (vph)	100	50	347	0	429	399
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	8.7	8.7	16.6		15.5	36.1
Effective Green, g (s)	8.7	8.7	16.6		15.5	36.1
Actuated g/C Ratio	0.16	0.16	0.31		0.29	0.68
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	292	261	569		520	1274
v/s Ratio Prot	0.06		c0.20		c0.24	0.21
v/s Ratio Perm		0.19				
v/c Ratio	0.34	0.19	0.61		0.82	0.31
Uniform Delay, d1	19.5	19.0	15.4		17.4	3.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.4	4.8		10.3	0.6
Delay (s)	20.2	19.4	20.2		27.7	4.0
Level of Service	C	B	C		C	A
Approach Delay (s)	19.6		20.2			16.3
Approach LOS	B		C			B

Intersection Summary

HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 1: Waiehu Beach Road & Kahekili Highway

4/11/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↷		↶	↷
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	1776		1770	1863
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	1776		1770	1863
Volume (vph)	76	370	208	109	320	184
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	402	226	118	348	200
RTOR Reduction (vph)	0	334	29	0	0	0
Lane Group Flow (vph)	83	68	315	0	348	200
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	9.0	9.0	18.6		13.6	36.2
Effective Green, g (s)	9.0	9.0	18.6		13.6	36.2
Actuated g/C Ratio	0.17	0.17	0.35		0.26	0.68
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	299	268	621		452	1268
v/s Ratio Prot	0.05		c0.19		c0.20	0.11
v/s Ratio Perm		0.25				
v/c Ratio	0.28	0.25	0.51		0.77	0.16
Uniform Delay, d1	19.3	19.2	13.7		18.3	3.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.5	3.0		7.7	0.3
Delay (s)	19.8	19.7	16.6		26.1	3.3
Level of Service	B	B	B		C	A
Approach Delay (s)	19.7		16.6			17.8
Approach LOS	B		B			B

Intersection Summary

HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 1: Waiehu Beach Road & Kahekili Highway

4/11/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	1825		1770	1863
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	1825		1770	1863
Volume (vph)	77	280	232	41	395	342
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	304	252	45	429	372
RTOR Reduction (vph)	0	255	10	0	0	0
Lane Group Flow (vph)	84	49	287	0	429	372
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	8.4	8.4	16.6		15.5	36.1
Effective Green, g (s)	8.4	8.4	16.6		15.5	36.1
Actuated g/C Ratio	0.16	0.16	0.32		0.30	0.69
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	283	253	577		523	1281
v/s Ratio Prot	0.05		c0.16		c0.24	0.20
v/s Ratio Perm		0.19				
v/c Ratio	0.30	0.19	0.50		0.82	0.29
Uniform Delay, d1	19.4	19.1	14.6		17.2	3.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	0.4	3.0		10.0	0.6
Delay (s)	20.0	19.5	17.6		27.2	3.8
Level of Service	C	B	B		C	A
Approach Delay (s)	19.6		17.6			16.3
Approach LOS	B		B			B

Intersection Summary

HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	52.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 1: Waiehu Beach Road & Kahekili Highway

4/11/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↷		↶	↷
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	1782		1770	1863
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	1782		1770	1863
Volume (vph)	46	370	188	89	320	154
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	402	204	97	348	167
RTOR Reduction (vph)	0	338	26	0	0	0
Lane Group Flow (vph)	50	64	275	0	348	167
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	8.4	8.4	18.6		13.6	36.2
Effective Green, g (s)	8.4	8.4	18.6		13.6	36.2
Actuated g/C Ratio	0.16	0.16	0.35		0.26	0.69
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	283	253	630		458	1282
v/s Ratio Prot	0.03		c0.17		c0.20	0.09
v/s Ratio Perm		0.25				
v/c Ratio	0.18	0.25	0.44		0.76	0.13
Uniform Delay, d1	19.1	19.4	13.0		18.0	2.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.5	2.2		7.1	0.2
Delay (s)	19.4	19.9	15.2		25.1	3.0
Level of Service	B	B	B		C	A
Approach Delay (s)	19.8		15.2			17.9
Approach LOS	B		B			B
Intersection Summary						
HCM Average Control Delay			18.0		HCM Level of Service	B
HCM Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			52.6		Sum of lost time (s)	12.0
Intersection Capacity Utilization			46.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Appendix G

BOTANICAL AND FAUNA SURVEYS
for the
M.E.O. KE KAHUA AGRICULTURAL FARM
WAIEHU, MAUI, HAWAII

by

ROBERT W. HOB DY
ENVIRONMENTAL CONSULTANT
Kokomo, Maui
June 2009

Prepared for:
Chris Hart & Partners, Inc.

M.E.O. KE KAHUA AGRICULTURAL FARM BOTANICAL AND FAUNA SURVEY

INTRODUCTION

The M.E.O. Ke Kahua Agricultural Farm Project lies on 11.476 acres of old agricultural land TMK (2) 3-3-001:016 in Waiehu, West Maui along Kahekili Highway. The project area is a narrow strip of land stretching 0.5 miles between the east side of Kahekili Highway and the base of the sand dune on the west side of Waiehu Heights Subdivision (see Figure 1). This study was initiated in compliance with environmental requirements of the planning process.

SITE DESCRIPTION

The entire project area lies in the lee of a 100 foot tall lithified sand dune just south of Waiehu Stream at an elevation of 60 feet above sea level. The area is on old agricultural land that was under sugar cultivation for over 100 years. For the past 25 years the area has been a macadamia nut orchard, and today these mature trees cover the property. The soils are entirely of the Iao silty clay series, 0-3% slopes which are deep, well-drained alluvial soils (Foote et al, 1972). Rainfall averages 25 to 30 inches per year with the bulk falling during the winter months (Armstrong, 1983).

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the M.E.O. Ke Kahua Agricultural Farm Project which was conducted in June 2009.

The objectives of the survey were to:

1. Document what plant, bird and mammal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used following routes to ensure that all parts of the project area were covered. Areas most likely to harbor native or rare plants such as gullies were more intensively examined. Notes were made on plant species, distribution and abundance as well as terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation on the property consists of a dense forest of macadamia nut trees (*Macadamia integrifolia*) with dense stands of Guinea grass (*Panicum maximum*) in the openings and along the margins. Other common species were Bermuda grass (*Cynodon dactylon*), spiny amaranth (*Amaranthus spinosus*), koa haole (*Leucaena leucocephala*) and glycine (*Neonotonia wightii*).

A total of 84 plant species were recorded during two site visits to the property. Of these only 'uhaloa (*Waltheria indica*) and popolo (*Solanum americanum*) were naturally occurring native Hawaiian plants, while an additional 4 native species: naupaka kahakai (*scaevola taccada*), ma'o (*Gossypium tomentosum*), 'a'ali'i (*Dodonaea viscosa*) and manewanewa (*Vitex rotundifolia*) had been recently planted as part of a landscape plan on the northern end of the property. Also planted were 5 species of Polynesian introductions: kalo (*Colocasia esculenta*), niu (*Cocos nucifera*), 'uala (*Ipomoea batatas*), kukui (*Aleurites moluccana*) and milo (*Thespesia populnea*). The remaining 73 plant species were a mix of non-native former crop plants, ornamentals and weed species.

DISCUSSION AND RECOMMENDATIONS

The vegetation throughout the project area consists primarily of non-native species. Two common and widespread indigenous species, 'uhaloa and popolo, occur naturally on forest margins, and four additional native species have been planted in the landscape. None of these species are federally listed as Threatened or Endangered under the Endangered Species Act (USFWS, 1999), nor are any of them candidates for such status.

An Endangered plant, the creeping naupaka (*Scaevola coriacea*), is known to inhabit road cuts along Waiehu Beach Road on lithified sand dunes about 1,000 feet to the east of the northern tip of this property with a larger population occurring about 3,000 feet to the north on another sand dune. None of this preferred habitat occurs within the project area and no creeping naupaka were found during the survey within the project area. No special plant habitats were identified here either.

Because of the above existing conditions there is little of botanical concern on this property, and the proposed project is not expected to have a significant negative impact on the botanical resources in this part of Maui.

The only recommendation that is offered is that there are a number of native plant species that might be incorporated into the landscape design that would lend a distinctive accent to the project. Ideas for appropriate species for this habitat can be found in the Maui County Planting Plan or can be obtained from nursery growers who specialize in native plants.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within two groups: Monocots and Dicots. Taxonomy and nomenclature of the plants are in accordance with Wagner et al. (1999).

For each species, the following information is provided:

1. Scientific name with author citation
2. Common English or Hawaiian name.
3. Bio-geographical status. The following symbols are used:
 - endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.
 - indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
 - Polynesian = those plants brought to the islands by the Polynesians in the course of their migrations.
 - non-native = all those plants brought to the islands intentionally or accidentally after western contact.
4. Abundance of each species within the project area:
 - abundant = forming a major part of the vegetation within the project area.
 - common = widely scattered throughout the area or locally abundant within a portion of it.
 - uncommon = scattered sparsely throughout the area or occurring in a few small patches.
 - rare = only a few isolated individuals within the project area.

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
CONIFERS			
ARAUCARIACEAE (Araucaria Family)			
<i>Araucaria columnaris</i> (G.Forester) J.D.Hooker	Cook pine	non-native	rare
MONOCOTS			
ARACEAE (Aroid Family)			
<i>Colocasia esculenta</i> (L.) Schott	kalo	Polynesian intro	rare
ARECACEAE (Palm Family)			
<i>Cocos nucifera</i> L.	niu	Polynesian intro	rare
CYPERACEAE (Sedge Family)			
<i>Cyperus rotundus</i> L.	nut sedge	non-native	rare
POACEAE (Grass Family)			
<i>Cenchrus ciliaris</i> L.	buffelgrass	non-native	uncommon
<i>Chloris barbata</i> (L.) Sw.	swollen fingergrass	non-native	uncommon
<i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass	non-native	common
<i>Digitaria insularis</i> (L.) Mez ex Ekman	sourgrass	non-native	rare
<i>Panicum maximum</i> Jacq.	Guinea grass	non-native	abundant
<i>Pennisetum purpureum</i> Schumach.	Napier grass	non-native	uncommon
DICOTS			
ACANTHACEAE (Acanthus Family)			
<i>Asystasia gangetica</i> (L.) T. Anderson	Chinese violet	non-native	uncommon
AMARANTHACEAE (Amaranth Family)			
<i>Alternanthera pungens</i> Kunth	khaki weed	non-native	rare
<i>Amaranthus spinosus</i> L.	spiny amaranth	non-native	common
<i>Amaranthus viridis</i> L.	slender amaranth	non-native	rare
<i>Chenopodium carinatum</i> R. Br.	keeled goosefoot	non-native	rare
ANACARDIACEAE (Mango Family)			
<i>Mangifera indica</i> L.	mango	non-native	rare
<i>Schinus terebinthifolius</i> Raddi	Christmas berry	non-native	rare
ASTERACEAE (Sunflower Family)			
<i>Bidens pilosa</i> L.	Spanish needle	non-native	rare
<i>Calyptracarpus vialis</i> Less.	-----	non-native	rare
<i>Conyza bonariensis</i> (L.) Cronq.	hairy horseweed	non-native	uncommon
<i>Emilia fosbergii</i> Nicolson	red pualele	non-native	uncommon
<i>Emilia sonchifolia</i> (L.) D.C.	violet pualele	non-native	rare
<i>Gamochaeta purpurea</i> (L.) Cabrera	purple cudweed	non-native	rare
<i>Pluchea carolinensis</i> (Jacq.) G. Don	sourbush	non-native	uncommon
<i>Sonchus oleraceus</i> L.	pualele	non-native	uncommon
<i>Synedrella nodiflora</i> (L.) Gaertn.	nodeweeder	non-native	rare

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
<i>Tridax procumbens</i> L.	coat buttons	non-native	uncommon
<i>Verbesina encelioides</i> (Cav.) Benth. & Hook.	golden crown-beard	non-native	rare
BORAGINACEAE (Borage Family)			
<i>Heliotropium amplexicaule</i> Vahl.	summer heliotrope	non-native	rare
<i>Heliotropium procumbens</i> Mill.	four-spike heliotrope	non-native	uncommon
CARICACEAE (Papaya Family)			
<i>Carica papaya</i> L.	papaya	non-native	rare
CASUARINACEAE (She-oak Family)			
<i>Casuarina equisetifolia</i> L.	common ironwood	non-native	rare
CLEOMACEAE (Cleome Family)			
<i>Cleome gynandra</i> L.	wild spider flower	non-native	rare
CLUSIACEAE (Mangosteen Family)			
<i>Clusia rosea</i> Jacq.	autograph tree	non-native	rare
CONVOLVULACEAE (Morning Glory Family)			
<i>Ipomoea alba</i> L.	moon flower	non-native	uncommon
<i>Ipomoea batatas</i> (L.) Lam.	'uala, sweet potato	Polynesian intro	rare
<i>Ipomoea obscura</i> (L.) Ker-Gawl.	-----	non-native	rare
<i>Ipomoea triloba</i> L.	little bell	non-native	rare
CUCURBITACEAE (Gourd Family)			
<i>Momordica charantia</i> L.	balsam pear	non-native	uncommon
EUPHORBIACEAE (Spurge Family)			
<i>Aleurites moluccana</i> (L.) Willd.	kukui	Polynesian intro	uncommon
<i>Chamaesyce hirta</i> (L.) Millsp.	hairy spurge	non-native	uncommon
<i>Chamaesyce hypericifolia</i> (L.) Millsp.	graceful spurge	non-native	rare
<i>Chamaesyce prostrata</i> (Aiton) Small	prostrate spurge	non-native	rare
<i>Euphorbia heterophylla</i> L.	kaliko	non-native	rare
<i>Ricinus communis</i> L.	Castor bean	non-native	uncommon
FABACEAE (Pea Family)			
<i>Acacia confusa</i> Merr.	Formosa koa	non-native	rare
<i>Cassia fistula</i> L.	golden shower	non-native	rare
<i>Chamaecrista nictitans</i> (L.) Moench	partridge pea	non-native	rare
<i>Crotalaria incana</i> L.	fuzzy rattlepod	non-native	uncommon
<i>Crotalaria pallida</i> Aiton	smooth rattlepod	non-native	rare
<i>Desmanthus pernambucanus</i> (L.) Thellung	slender mimosa	non-native	rare
<i>Desmodium tortuosum</i> (Sw.) DC.	Florida beggarweed	non-native	uncommon
<i>Indigofera hendecaphylla</i> Jacq.	creeping indigo	non-native	rare
<i>Leucaena leucocephala</i> (Lam.) de Wit	koa haole	non-native	common
<i>Macroptilium atropurpureum</i> (DC.) Urb.	siratro	non-native	uncommon
<i>Neonotonia wightii</i> (Wight & Arnott) Lackey	glycine	non-native	common

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
<i>Pithecellobium dulce</i> (Roxb.) Benth.	'opiuma	non-native	rare
<i>Prosopis pallida</i> (Humb. & Bonpl. ex Willd.) Kunth	kiawe	non-native	rare
<i>Samanea saman</i> (Jacq.) Merr.	monkeypod	non-native	rare
GOODENIACEAE (Goodenia Family)			
<i>Scaevola taccada</i> (Gaertn.) Roxb.	naupaka kahakai	indigenous	rare
LAMIACEAE (Mint Family)			
<i>Leonotis nepetifolia</i> (L.) R.Br.	lion's ear	non-native	rare
LOGANIACEAE (Logania Family)			
<i>Fagraea berteriana</i> Benth.	puakenikeni	non-native	rare
MALVACEAE (Mallow Family)			
<i>Abutilon grandifolium</i> (Willd.) Sweet	hairy abutilon	non-native	rare
<i>Gossypium tomentosum</i> Nutt. ex Seem.	ma'o	endemic	rare
<i>Malvastrum coromandelianum</i> (L.) Garcke	false mallow	non-native	uncommon
<i>Sida rhombifolia</i> L.	Cuban jute	non-native	rare
<i>Thespesia populnea</i> (L.) Sol. ex Correa	milo	Polynesian intro	rare
<i>Waltheria indica</i> L.	'uhaloa	indigenous	rare
MORACEAE (Mulberry Family)			
<i>Ficus microcarpa</i> L. fil.	Chinese banyan	non-native	rare
MYRTACEAE (Myrtle Family)			
<i>Syzygium cumini</i> (L.) Skeels	Java plum	non-native	rare
NYCTAGINACEAE (Four-o'clock Family)			
<i>Boerhavia coccinea</i> Mill.	scarlet spiderling	non-native	uncommon
<i>Bougainvillea spectabilis</i> Willd.	bougainvillea	non-native	rare
PAPAVERACEAE (Poppy Family)			
<i>Argemone mexicana</i> L.	Mexican poppy	non-native	rare
PASSIFLORACEAE (Passion Flower Family)			
<i>Passiflora edulis</i> Sims	yellow passion fruit	non-native	uncommon
PORTULACACEAE (Purslane Family)			
<i>Portulaca oleracea</i> L.	pig weed	non-native	rare
<i>Portulaca pilosa</i> L.	-----	non-native	rare
PROTEACEAE (Protea Family)			
<i>Macadamia integrifolia</i> Maiden & Betche	Macadamia nut	non-native	abundant
RUBIACEAE (Coffee Family)			
<i>Gardenia taitensis</i> DC.	tiare	non-native	rare
SAPINDACEAE (Soapberry Family)			
<i>Dodonaea viscosa</i> Jacq.	'a'ali'i	indigenous	uncommon
SOLANACEAE (Nightshade Family)			
<i>Nicandra physalodes</i> (L.) Gaertn.	apple of Peru	non-native	rare
<i>Solanum americanum</i> Mill.	popolo	indigenous	rare
<i>Solanum lycopersicum</i> L.	cherry tomato	non-native	uncommon
<i>Solanum melongena</i> L.	eggplant	non-native	rare
VERBENACEAE (Verbena Family)			
<i>Vitex rotundifolia</i> L. fil.	mānewanewa	indigenous	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activities and location as well as observations of trails, tracks, scat and signs of feeding. In addition an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

Mammals

Only sign of one mammal species was observed during two site visits to the property. Taxonomy and nomenclature follow Tomich (1986).

Rats	(Rattus) species	non-native	uncommon
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While not seen during the survey, mice (*Mus domesticus*), Mongoose (*Herpestes auropunctatus*), feral cats (*Felis catus*) and domestic dogs (*Canis familiaris*) would be expected to occur within this type of habitat. Rats and mice feed on seeds, fruits and fallen macadamia nuts, while mongoose and cats are predators of these rodents and birds.

Bats

A special effort was made to look for any occurrence of the native Hawaiian hoary bat by making an evening survey on the property. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent. In addition a bat detection device (Batbox IIID) was employed set to the frequency of 27,000 to 28,000 hertz which is typical for this bat species. No bats were detected.

BIRDS

Birdlife was moderate in numbers but somewhat sparse in species diversity due to the densely forested, monotypic nature of the habitat. Only nine species of birds were seen during two site visits to the property. All of these were non-native birds that are common throughout Hawaii. Taxonomy and nomenclature follow American Ornithologists' Union (2005).

Zebra dove (*Geopelia striata*) – These small doves were common in small flocks throughout the macadamia orchard and in marginal clearings.

Spotted dove (*Streptopelia chinensis*) – These large doves were also common as individuals within the macadamia orchard.

Northern cardinal (*Cardinalis cardinalis*) – These red birds were seen and heard calling throughout the forest, especially during the early evening.

Common myna (*Acridotheres tristis*) – A few mynas were seen, mostly in pairs, in clearings along forest margins.

House finch (*Carpodacus mexicanus*) – A few of these finches were seen in trees and heard calling within the property.

Japanese white-eye (*Zosterops japonicus*) – A few pairs of these small green birds were seen foraging for insect larvae and making their high-pitched calls.

Chicken (*Gallus gallus*) – One flock of wild chickens was seen scratching for insects in the leaf litter beneath the macadamia nut trees.

Gray francolin (*Francolinus pondicerianus*) – One family of these tan francolins was seen scurrying through the forest understory.

Hwamei (*Garrulax canorus*) – One of these thrushes was heard making its melodious song in the forest during the early evening.

Other common non-native birds are known to inhabit this general area. Some that one might expect to see include house sparrow (*Passer domesticus*), nutmeg manikin (*Lonchura punctulata*), red-crested cardinal (*Paroaria coronata*) and cattle egret (*Bubulcus ibis*). This habitat, however, is unsuitable for Hawaii's native forest birds which are restricted to forested uplands beyond the elevational range of mosquitos and the avian diseases they carry.

No native seabirds, most particularly the Endangered Hawaiian petrel (*Pterodroma sandwichensis*) or the Threatened Newell's shearwater (*Puffinus auricularis newellii*), were found on the property nor were any burrows seen. No Endangered nene, the Hawaiian goose (*Branta samvicensis*), were seen on the property. The dense forest is not suitable habitat for these birds which prefer open areas with lush green grass.

INSECTS

While insects in general were not tallied, a good diversity of types were seen that no doubt helped fuel the diversity of birdlife seen. One native Sphingid moth, Blackburn's sphinx moth (*Manduca blackburni*) has been put on the federal Endangered species list and this designation requires special focus (USFWS 2000). Blackburn's sphinx moth is known to occur in parts of East Maui and Central Maui but its feeding requirements are very specialized. It requires host plants in the nightshade family that are toxic, such as native species of 'aiea (*Nothocestrum spp.*) and such non-native alternative hosts as tobacco (*Nicotiana tabacum*) and tree tobacco (*Nicotiana glauca*). None of these host species were found on the subject property and no Blackburn's sphinx moths or their larvae were seen.

CONCLUSION AND RECOMMENDATIONS

All of the fauna observed are common and widespread non-native species. None of these are of any particular environmental interest or concern. No federally listed Threatened or Endangered mammal, birds or insect species were recorded during the course of the survey and no special fauna habitats were identified. As a result the above findings, the proposed changes in land use are not expected to have a significant negative impact on the fauna resources in this part of Maui.

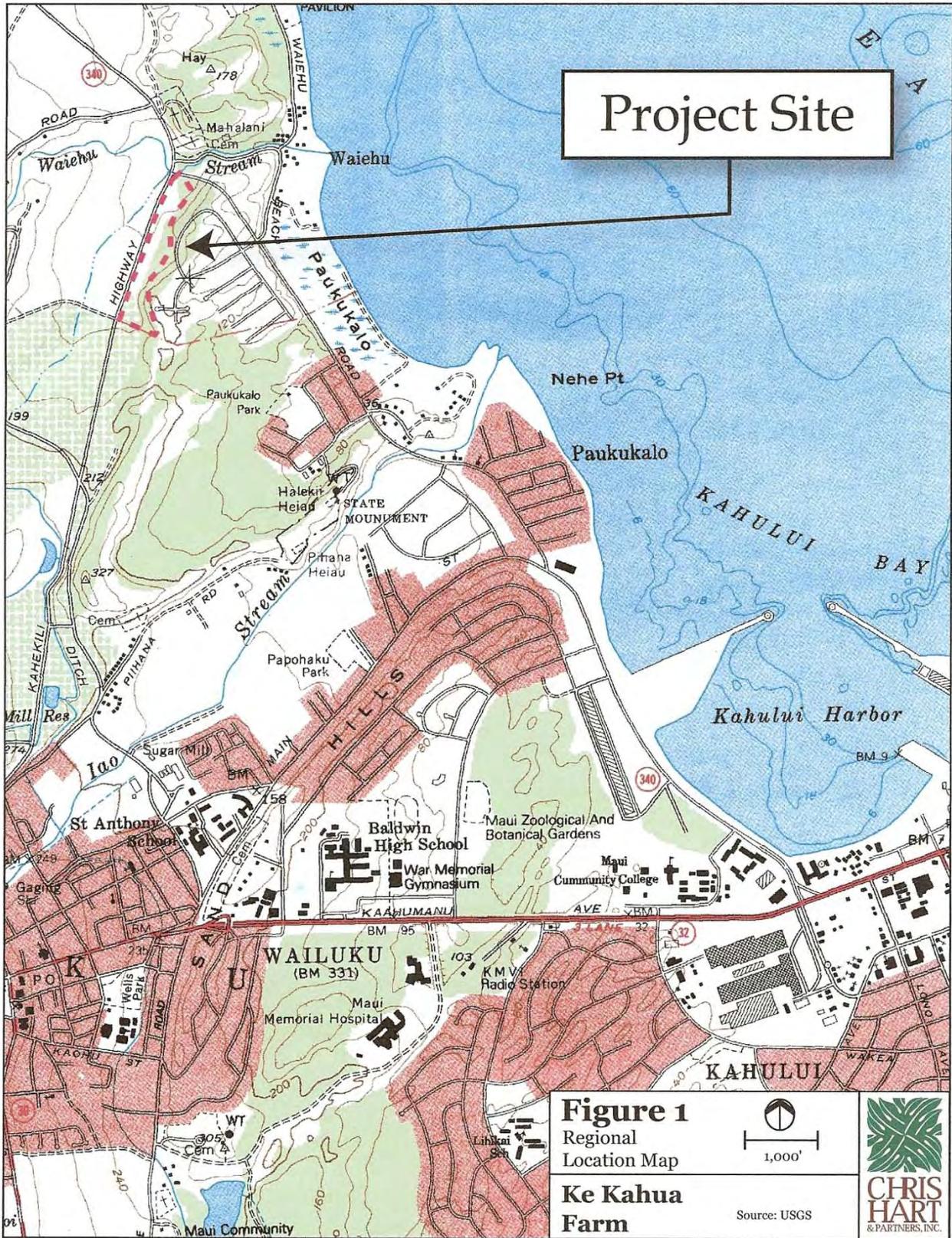
While no protected seabirds were found on the property, they are known to overfly the area at dawn and dusk to their burrows high in the mountains between the months of March and November. In late fall young birds fledge from their burrows to take their first tentative flights out to sea. These inexperienced birds are easily confused and distracted by bright lights and often crash to the ground where they are particularly vulnerable to being run over by vehicles or killed by predators.

It is recommended that any significant outdoor lighting such as street lights or flood lights that are incorporated into the project design be shielded to direct the light downward so that it is not visible from above.

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
MAMMALS			
Rat	<i>Rattus spp.</i>	non-native	uncommon
BIRDS			
Zebra dove	<i>Geopelia striata</i>	non-native	common
Spotted dove	<i>Streptopelia chinensis</i>	non-native	common
Northern cardinal	<i>Cardinalis cardinalis</i>	non-native	common
Common myna	<i>Acridotheres tristis</i>	non-native	uncommon
House finch	<i>Carpodacus mexicanus</i>	non-native	uncommon
Japanese white-eye	<i>Zosterops japonicus</i>	non-native	uncommon
Chicken	<i>Gallus gallus</i>	non-native	uncommon
Gray francolin	<i>Francolinus pondicerianus</i>	non-native	uncommon
Hwamei	<i>Garrulax canorus</i>	non-native	rare

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