

LINDA LINGLE
GOVERNOR



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

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IN REPLY REFER TO:

HWY-DD 2.3157

DEC 12 2006

TO: GENEVIEVE SALMONSON, DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM: BRENNON T. MORIOKA, Ph.D., P.E.
DEPUTY DIRECTOR-HIGHWAYS

A handwritten signature in black ink, appearing to read "Brennan T. Morioka".

SUBJECT: FINAL ENVIRONMENTAL ASSESSMENT (EA) AND FINDING OF NO
SIGNIFICANT IMPACT (FONSI) FOR INTERSTATE H-1 ADDITION AND
MODIFICATION OF HIGHWAY ACCESS, PALAILAI INTERCHANGE/
MAKAKILO INTERCHANGE (KAPOLEI INTERCHANGE COMPLEX),
EWA, OAHU, HAWAII, FEDERAL-AID INTERSTATE PROJECT
NO. IM-H1-1(257), TMK: 9-1-15, 9-1-16, 9-1-88, 9-1-106

The State of Hawaii Department of Transportation has reviewed the comments received during the 30-day public comment period, which began on June 8, 2006. The agency has determined that this project will not have significant environmental effects and has issued a FONSI. Please publish notice of this determination in the December 23, 2006 edition of *The Environmental Notice*.

We have enclosed a completed OEQC Publication Form and two print copies of the Final EA. Electronic (pdf) files of the Final EA and project summary will be transmitted separately, via email.

Should you have any questions, please call Christine Yamasaki of the Highways Division at 692-7572, or our consultant, Kenneth Ishizaki of Engineering Concepts, Inc. at 591-8820.

Enclosure

c: Engineering Concepts, Inc. (Kenneth Ishizaki)

OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

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RECEIVED

**Final Environmental Assessment
and Finding of No Significant Impact (FONSI)**

~

**INTERSTATE H-1
ADDITION AND MODIFICATION OF HIGHWAY ACCESS
PALAILAI INTERCHANGE / MAKAKILO INTERCHANGE
(KAPOLEI INTERCHANGE COMPLEX)
Ewa, Oahu, Hawaii**

Federal Aid Interstate Project No. IM-H1-1(257)

TMK: 9-1-015, 9-1-016, 9-1-106

Proposing Agency:

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII
869 Punchbowl Street
Honolulu, Hawaii 96813

Prepared by:

ENGINEERING CONCEPTS, INC.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

NOVEMBER 2006

**Final Environmental Assessment
and Finding of No Significant Impact (FONSI)**

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**INTERSTATE H-1
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*This environmental document has been prepared pursuant to
Chapter 343, Hawaii Revised Statutes*

Proposing Agency:

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII
869 Punchbowl Street
Honolulu, Hawaii 96813

Responsible Official:


for Rodney Haraga, Director

12-6-06

Date

Prepared by:

ENGINEERING CONCEPTS, INC.
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Honolulu, Hawaii 96814

NOVEMBER 2006

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DEVELOPMENT SUMMARY

PROPOSING AGENCY: Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Responsible Official: Mr. Rodney Haraga
Director

Contact: Ms. Christine Yamasaki, Project Manager
Phone: (808) 692-7572
Fax: (808) 692-7590

PROJECT NAME: Interstate H-1 Addition and Modification of Highway Access,
Palailai Interchange / Makakilo Interchange
(Kapolei Interchange Complex)

PROPOSED ACTION: Construction of a new freeway interchange at Kapolei and modifications
to two existing interchanges at Makakilo and Palailai

PROJECT LOCATION: Kapolei, Ewa, Oahu, Hawaii

TAX MAP KEY: 9-1-015, 9-1-016, 9-1-106

LAND OWNERS: State of Hawaii
City and County of Honolulu
Aina Nui Corp. (TMK: 9-1-015:004, 9-1-016:006* & 013)
Campbell Investor Hawaii LLC (TMK: 9-1-016:009)
Fort Street Investment Corp. (TMK: 9-1-106:009 & 010)
James Campbell Trust Estate (TMK: 9-1-016:006*, 9-1-106:015 & 054)
Makaiwa Hills LLC (TMK: 9-1-015:017)

PROJECT AREA: 65 acres

STATE LAND USE DESIGNATION: Urban and Agricultural

ZONING: Ag-1 (Restricted Agriculture)
Ag-2 (General Agriculture)
B-2 (Community Business)

EXISTING USE: State of Hawaii lands (freeway/highway rights-of-way)
City and County land (drainage channel)
TMK: 9-1-016:009 (water park)
TMK: 9-1-016:054 (bus transit facility)
All other lands are undeveloped

* Denotes former TMK designation prior to subdivision

CHAPTER 1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this Final Environmental Assessment (EA) is to disclose potential environmental impacts which may result from development of the proposed project, and to identify measures to mitigate these potential impacts. This document was prepared after public review of a Draft EA. Public comments and responses have been incorporated into this document.

1.2 BACKGROUND

The existing Interstate H-1 Freeway (I-H1) and the Makakilo and Palailai interchanges were constructed more than 30 years ago. Recent development of commercial and government facilities within the City of Kapolei has increased traffic use of these interchanges. In response, the State Department of Transportation (DOT) proposes modifications to the Makakilo and Palailai Interchanges to improve traffic access to the City of Kapolei and surrounding areas. These proposed actions include:

- Construction of additional ramps at the Makakilo Interchange to improve access to I-H1.
- Expansion of the Palailai Interchange by construction of a new freeway overpass and ramps to more directly access the City of Kapolei street network at Wakea Street. The new ramps will be referred to as the Kapolei Interchange.
- Construction of new ramps on the west side of the Palailai Interchange to connect to the planned extension of Hanua Street from Campbell Industrial Park.

A preliminary plan for these modifications was developed in the early 1990's for the Estate of James Campbell. The report, entitled: *I-H1 Addition and Modification of Highway Accesses, Palailai Interchange / Makakilo Interchange, Revised* (January 1994) identified proposed improvements that have been included in the Transportation Improvement Program by the State DOT and Oahu Metropolitan Planning Organization (OMPO). A recent update of the report, entitled: *Updated I-H1 Addition and Modification of Highway Accesses, Palailai Interchange / Makakilo Interchange* (May 3, 2006) was prepared for Aina Nui Corporation. The updated report addresses the current planning horizon to the year 2030 and identifies improvements that have been implemented since the mid-1990's.

1.3 OBJECTIVES

The general objective of the proposed project is to improve I-H1 access to the City of Kapolei and surrounding employment and residential areas. This objective will be achieved in phases, with the completion of the initial Phase 1 improvements by 2010, and construction of the full improvements to follow, based on year 2030 peak hour traffic forecasts.

1.4 PROJECT LOCATION

The project site is located in the City of Kapolei in west Oahu (see **Figure 1-1**), primarily within the existing I-H1 right-of-way. Portions of the proposed ramps in Phase 1 of the project will be constructed within lands owned by the Estate of James Campbell and its affiliates, and a parcel owned by the City and County of Honolulu. The process of dedicating and acquiring these lands to extend the existing freeway right-of-way has been initiated. The lands affected by future phases of the project will need to be acquired from the owners of such lands.

1.5 ALTERNATIVES CONSIDERED

Alternative interchange configurations were initially studied in preparation of the January 1994 *I-H1 Addition and Modification of Highway Accesses, Palailai Interchange / Makakilo Interchange* report. While this environmental assessment specifically addresses the recommended interchange modifications and additions, other alternatives considered and “no action” are presented in **Chapter 5**.

1.6 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES

Topography

Impacts on the area topography will be minimized due to the need for new freeway ramps to meet the existing roadway grades. However, new elevated bridge structures will be constructed at Wakea Street (to connect to the existing Farrington Highway overpass) and Hanua Street (Palailai Interchange improvements).

Soil Erosion

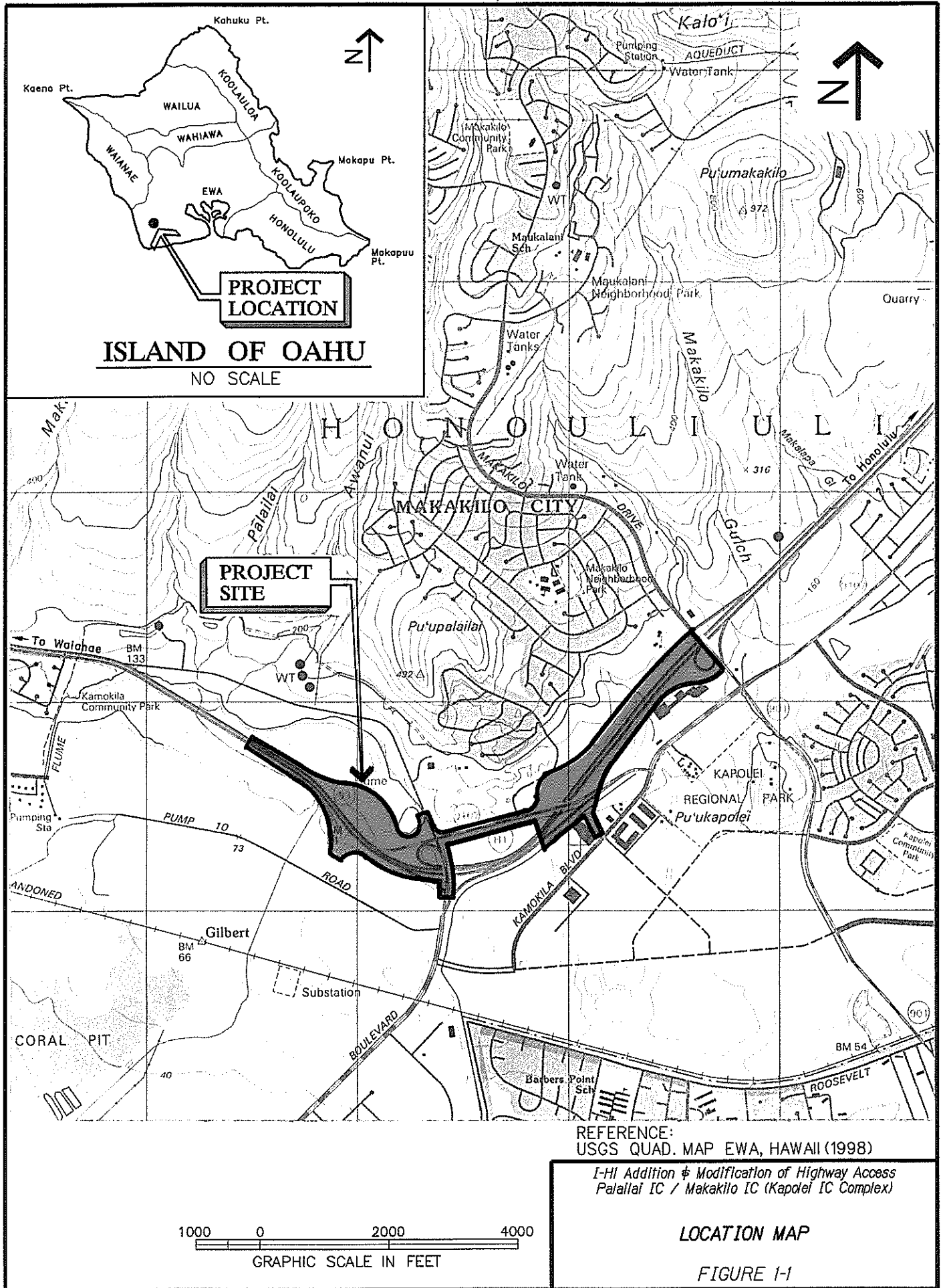
Short term impacts will occur during construction due to removal of existing vegetation and grading activities. Mitigative measures include implementation of best management practices as specified on the construction drawings, and compliance with NPDES permit requirements and local ordinances. No long term impacts are anticipated since the entire area of disturbance will be paved or landscaped upon completion of construction.

Flora and Fauna

There was no indication of any rare or endangered plant or animal species, or habitat, present at the project site during field surveys.

Flood and Tsunami Hazard

The project site is not located in a flood zone or tsunami inundation area. The proposed project will not cause flooding of surrounding areas.



Archaeological, Historic and Cultural Resources

The State Historic Preservation Division (SHPD) concurs with the archaeological assessment findings that “no historic properties will be affected” and commented that “historic preservation commitments for this project are complete”. Further, it is anticipated that the proposed project will have no effect on any on-going cultural practices in the area. Work will be halted and direction will be requested from the SHPD if inadvertent discoveries are made during construction.

Land Use and Zoning

Development of the proposed project is permitted under the present State Land Use and City and County Zoning designations.

Land Ownership and Neighboring Lands

Land will be acquired from the City and County of Honolulu for expansion of the highway right-of-way. Other private lands needed for Phase 1 of the proposed project will be dedicated to the State DOT by The Estate of James Campbell and its affiliates. The Kapolei Transit Center (utilized by TheBus) is a tenant of the Estate of James Campbell that will be displaced by construction of the proposed Kapolei Interchange. The private lands needed for future phases of the project will need to be acquired by the State DOT at the time those portions of the project are undertaken.

Roads and Traffic

Short term construction-related impacts will be mitigated by implementation of approved traffic control plans to safely route vehicular traffic around the construction area, scheduling construction activities to avoid peak traffic conditions, and implementation of a comprehensive public information program to provide advance notification for the public to anticipate and plan for delays. Additionally, the contractor will be required to maintain pedestrian routes when working in the vicinity of existing or relocated bus facilities. The project will have a net positive long term impact on traffic by providing alternate routes to improve freeway access.

Air Quality

Short term impacts to air quality include generation of fugitive dust and exhaust emissions during construction. The contractor will be required to implement an effective dust control plan and minimize vehicle exhaust emissions in compliance with the State Department of Health (DOH) regulations. Offsite emissions from concrete and asphalt batch plants will be minimized by use of highly efficient emission control devices required by DOH. No long term air quality impacts are anticipated. The mobile source impact analysis results indicated compliance with both federal and state carbon monoxide standards under worst case conditions of meteorology and peak hour traffic.

Noise

The contractor will be required to comply with DOH regulations to minimize short term noise impacts associated with construction, including obtaining a Community Noise Permit for Construction Activities and/or a Community Noise Variance (should construction activity extend beyond the normal construction hours). Other mitigative measures include specified use of

quieted generators and diesel equipment within 500 feet of noise sensitive properties; locating staging areas at least 500 feet from noise sensitive properties; avoiding truck routes through residential areas; and use of 8- to 12-foot high noise barriers where construction close to noise sensitive structures is unavoidable.

Predicted noise levels for the year 2030 are expected to exceed the DOT noise abatement criteria at two locations in the Hawaiian Waters Adventure Park and three locations within the Kapolei Shopping Center complex. Most of these exceedances were present in 2005, and are attributable to background growth of I-H1 traffic noise rather than due to the proposed project. Construction of sound attenuating walls were evaluated for both locations, but will not be constructed due to objections expressed by the affected facility owners and operator.

Hazardous Materials

No apparent environmentally adverse or detrimental effects were detected as a result of past or present use of the site.

Utilities

Impacts to nearby existing utilities will be minimized by coordination during planning, design and construction. The contractor will ultimately be responsible to locate and protect existing utilities; and repair any damage which may result to existing utilities due to the project construction.

Cumulative and Regional Impacts/Mitigation

Short term impacts resulting from concurrent construction of multiple transportation projects may include traffic disruptions and intensified dust and noise generation. Dust and noise mitigation were discussed previously. Mitigation of traffic disruptions can be achieved by construction schedule coordination between projects and implementation of a comprehensive public information program. In the long term, the cumulative and regional impact will be improved circulation and reduced traffic congestion.

1.7 PERMITS AND APPROVALS REQUIRED

Permits and approvals which may be required for construction of the proposed project are listed in **Table 1-1**. The applicability of these environmental permits will be coordinated with the respective agencies, and permit applications will be prepared as planning, design and construction of the project proceeds.

The project site is not located within the Special Management Area or Conservation District, and is therefore not subject to those respective permits. The State Commission on Water Resource Management has determined that the watercourses drained by the existing freeway culverts do not support instream uses and are not subject to a Stream Channel Alteration Permit. Refer to **Appendix A** for the determination letter. Further, the U.S. Army Corps of Engineers has determined that the project does not impact jurisdictional waters and therefore is not subject to a Department of the Army Permit. Refer to **Appendix I** for the determination letter.

**TABLE 1-1
PERMITS AND APPROVALS**

AGENCY	PERMIT / APPROVAL
Federal Highway Administration	<ul style="list-style-type: none"> • Documentation for Categorical Exclusion listed under 23 CFR §771.117(d)
State of Hawaii Office of Planning	<ul style="list-style-type: none"> • Coastal Zone Management Consistency Certification (issued 7/24/06, refer to Appendix A)
State of Hawaii Department of Health	<ul style="list-style-type: none"> • Construction Storm Water NPDES Permit • Hydrotesting NPDES Permit • Community Noise Permit for Construction Activities • Community Noise Variance
State of Hawaii Department of Land & Natural Resources Historic Preservation Division	<ul style="list-style-type: none"> • Section 106 Consultation
State of Hawaii Department of Transportation	<ul style="list-style-type: none"> • Construction Plan Approval • Use and Occupancy Permit
City and County of Honolulu Department of Planning and Permitting	<ul style="list-style-type: none"> • Grubbing, Grading and Stockpiling Permit • Sign Permit • Permit to Excavate Public Right-of-Way • Construction Plan Approval • Traffic Control Plan Approval
City and County of Honolulu Department of Transportation Services	<ul style="list-style-type: none"> • Street Usage Permit

CHAPTER 2 PROJECT DESCRIPTION

2.1 NEED FOR THE PROJECT

Most of the lands within and near the City of Kapolei are expected to be developed by the year 2030, with a substantial portion of proposed development expected to occur by the year 2010. The existing Interstate H-1 Freeway (I-H1) and interchanges in the Kapolei area are inadequate to meet the projected increased transportation facility needs of these future residents and businesses. The I-H1 corridor, Palailai Interchange and Makakilo Interchange were built over 30 years ago. Improvements are needed to address the normal growth, traffic operation, capacity and safety of the freeway system in the area. Addition and modification of freeway accesses from Palailai Interchange to Makakilo Interchange are proposed to improve I-H1 traffic operation and capacity, and to improve access to the City of Kapolei, Villages of Kapolei, Kapolei Business Park, Makakilo, Ko Olina, Barbers Point Harbor, Kalaeloa, and proposed future developments.

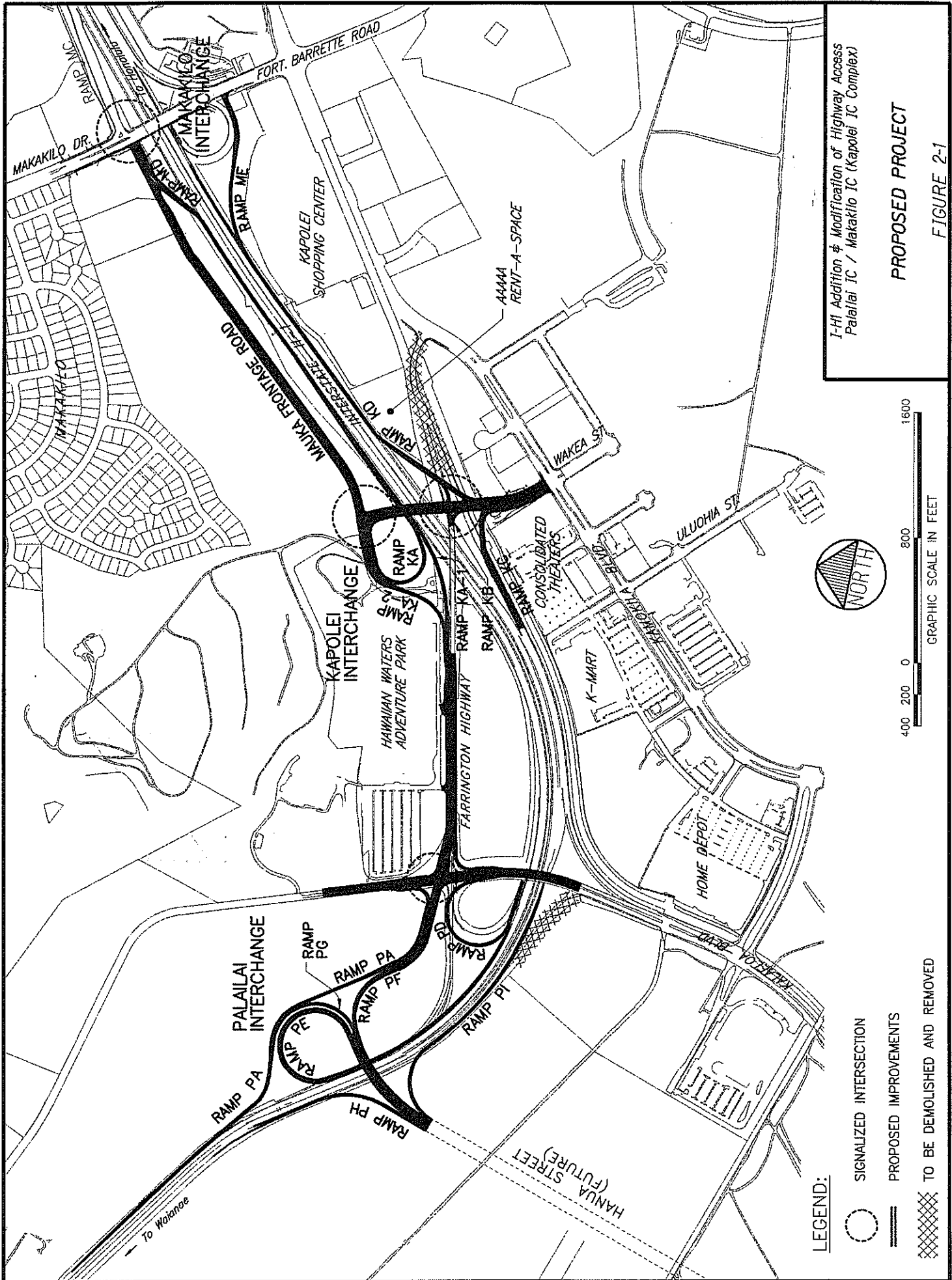
2.2 DESCRIPTION OF THE PROPOSED ACTION

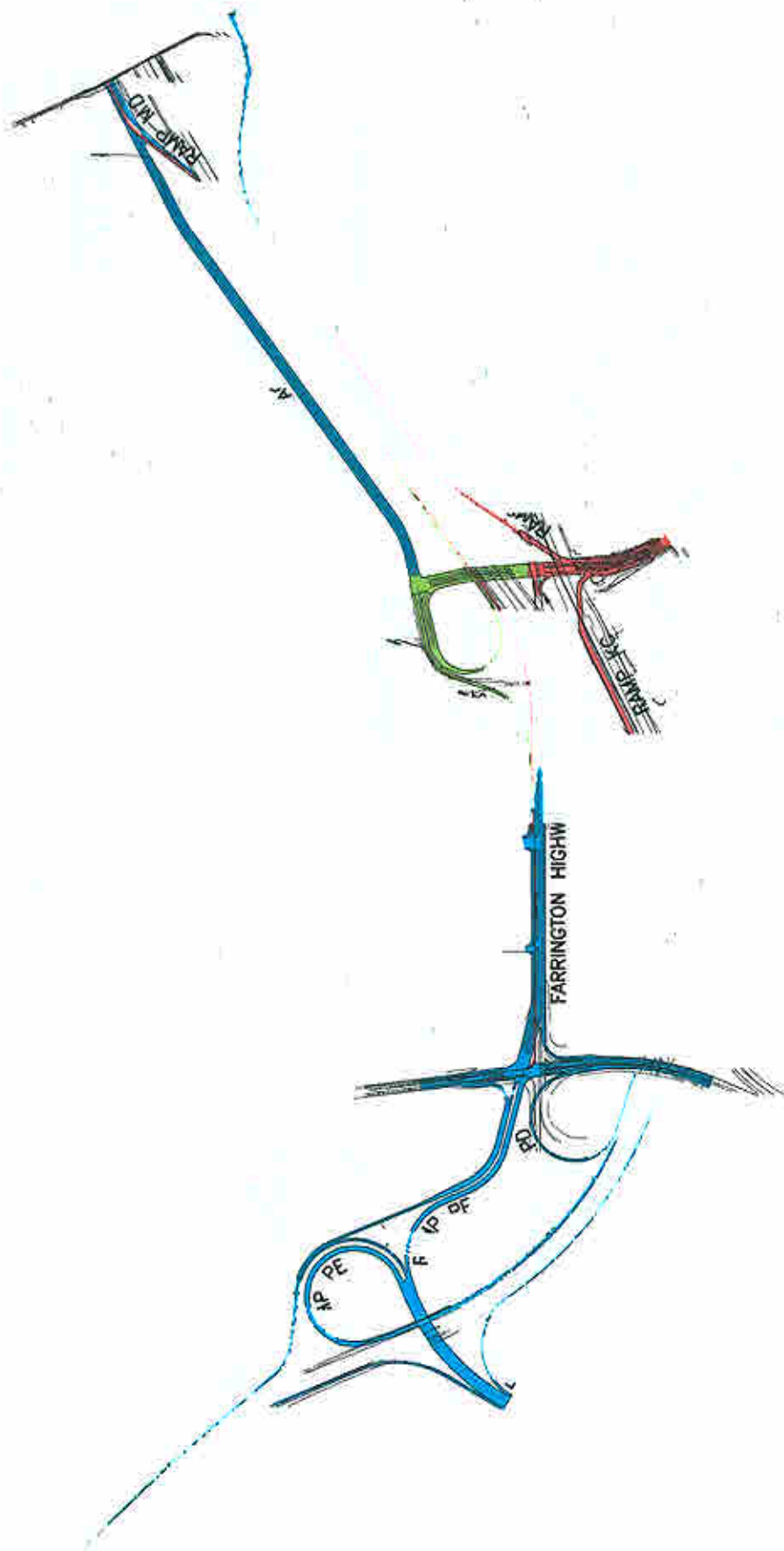
The proposed action (**Figure 2-1**) was initially identified as the “preferred alternative” in the 1994 planning study and 2006 update. Specifically, the proposed action will:

- Provide full direct access to and from both westbound and eastbound lanes along I-H1 at the existing Makakilo Interchange (Makakilo Drive / Fort Barrette Road intersection);
- Provide full (direct and semi-direct) access to and from both westbound and eastbound lanes along I-H1 at a new Kapolei Interchange (Wakea Street).
- Provide full (direct and semi-direct) access to and from both westbound and eastbound lanes along I-H1 at the existing Palailai Interchange (Kalaeloa Boulevard and future Hanua Street).

The proposed action will be developed in several phases over the next 25 years. While Phases 1 and 2 are well-defined, the limits of Phase 3 and beyond are not presently known and therefore grouped under the heading of “full” or “ultimate” development. The initial Phase 1 improvements are planned for completion by 2010, to provide a near-term increase in the traffic access to the freeway. Design of the Phase 2 and full development improvements will follow Phase 1 and will be based on year 2030 peak hour traffic forecasts.

Phase 1, Phase 2 and the full development project are described below. Refer to **Figure 2-2** and the sections that follow for the location of these development phases and identification of the specific components. Modifications to existing surface roadways are also proposed in conjunction with the interchange improvements.





2.2.1 Phase 1

Phase 1 includes improvements to the Makakilo Interchange and construction of the initial portion of the Kapolei Interchange, based on peak hour traffic forecasts for the year 2010. The proposed improvements include:

Makakilo Interchange

- Construction of westbound on-ramp MD (west leg of the existing Makakilo Drive intersection with westbound off-ramp MC) to access westbound lanes of I-H1 from Makakilo Drive.

Kapolei Interchange

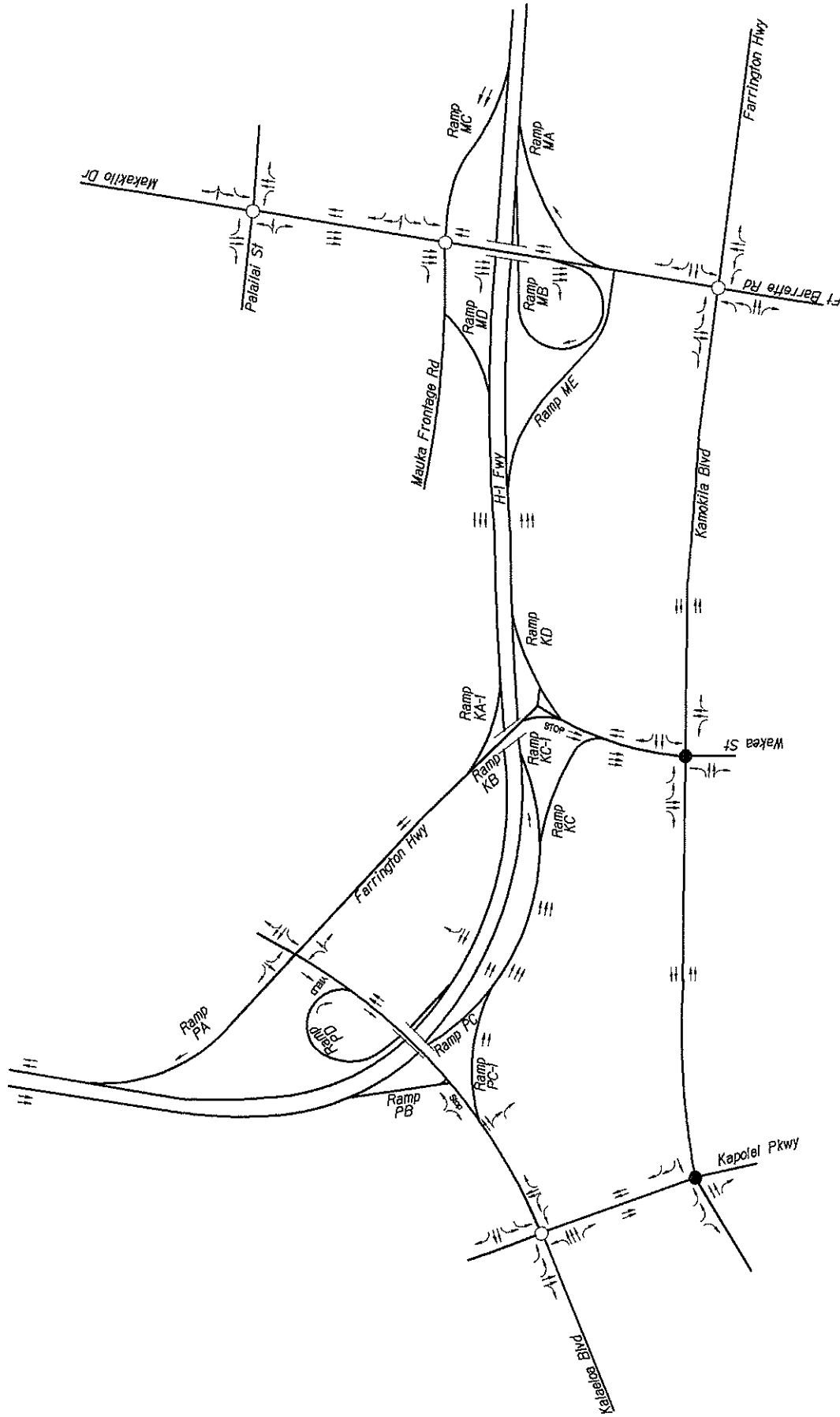
- Extension of Wakea Street to connect to Farrington Highway just east of the overpass (over I-H1) and removal of the section of Farrington Highway east of Wakea Street that connects to Kamokila Boulevard
- Addition of traffic signals at the intersection of Kamokila Boulevard and Wakea Street.
- Modification of existing off-ramp KC to provide a direct connection from the eastbound lanes of I-H1 to Kapolei City and Kamokila Boulevard via Wakea Street.
- Construction of eastbound on-ramp KD (west leg of Wakea Street intersection with Farrington Highway) to provide access to eastbound lanes of I-H1 from Kapolei City, Farrington Highway, and the proposed Mauka Frontage Road.
- Construction of westbound off-ramp KA-1 to connect to westbound Farrington Highway west of the existing overpass.
- Construction of a two-way collector-distributor (Ramp KB) to provide access from Farrington Highway and areas to the north to Kapolei City and the eastbound lanes of I-H1.

A diagram of the area traffic pattern upon completion of Phase 1 is presented in **Figure 2-3**.

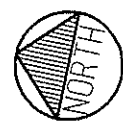
2.2.2 Phase 2

Phase 2 improvements are limited to expansion of the Kapolei Interchange, including:

- Construction of an overpass to extend Wakea Street across I-H1 for future connection to the proposed Mauka Frontage Road.
- Construction of westbound loop off-ramp KA to access Kapolei City via Wakea Street, Farrington Highway and the proposed Mauka Frontage Road.
- Construction of westbound on-ramp K-2 to connect the Wakea Street / Mauka Frontage Road intersection with Farrington Highway west of the interchange.



- LEGEND:**
- Traffic Lanes
 - Existing Traffic Signal
 - Proposed New Traffic Signal
 - Existing or Planned Stop or Yield Control



Ref: Wilbur Smith Associates (1/20/06)
 I-HI Addition & Modification of Highway Access
 Palatalai IC / Makakilo IC (Kapolei IC Complex)

PROPOSED ROADWAY LANES AND TRAFFIC CONTROLS (PHASE I)

FIGURE 2-3

2.2.3 Full Development (Year 2030)

It is likely that construction of the ultimate or full development improvements (beyond Phases 1 and 2) will be further phased. For descriptive purposes, all proposed improvements beyond Phases 1 and 2 are listed below without specific phase designation.

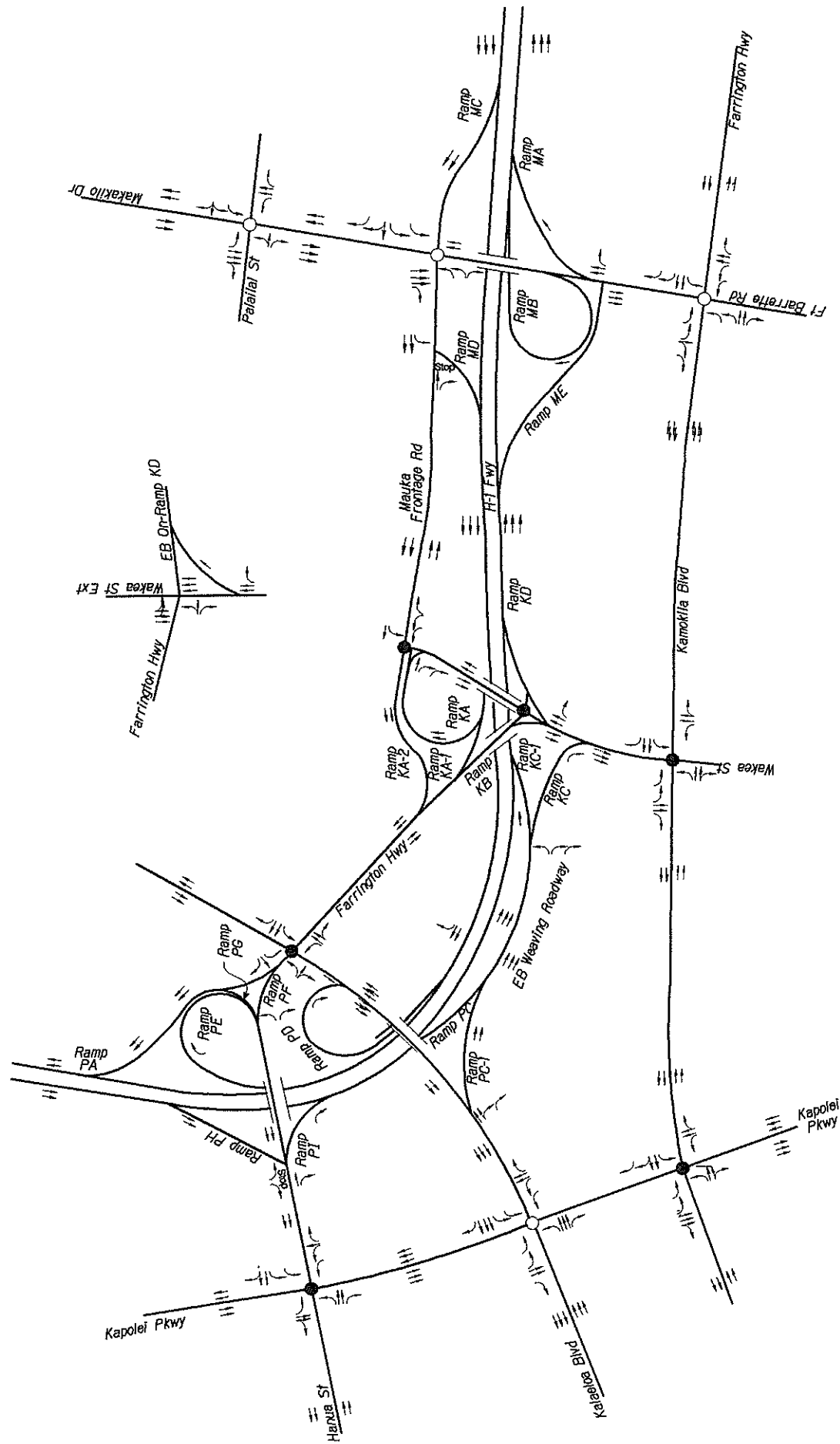
Makakilo Interchange

- Construction of a Mauka Frontage Road from Makakilo Drive (on-ramp MD intersection) to Kapolei Interchange (Ramp KA / Wakea Street).
- Construction of eastbound off-ramp ME from I-H1 to Makakilo Drive, when warranted.

Palailai Interchange

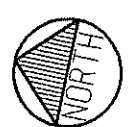
- Construction of westbound loop off-ramp PE and a new overpass to connect to the planned extension of Hanua Street. Ramp PE will allow traffic to flow directly from the westbound lanes of I-H1 onto southbound Hanua Street, serving Barbers Point Harbor and Kapolei Business-Industrial Park.
- Relocation of existing westbound on-ramp PA to provide space for modification of existing westbound off-ramp PD.
- Modification of existing westbound off-ramp PD to improve traffic movement from westbound lanes of I-H1 to areas south of the Palailai Interchange via Kalaeloa Boulevard.
- Removal of the loop off-ramp PD through connection to eastbound lanes of Farrington Highway at Kalaeloa Boulevard intersection to allow installation of traffic signals.
- Construction of eastbound on-ramp PI from northbound Hanua Street to I-H1.
- Construction of eastbound off-ramp PH to Hanua Street and removal of existing eastbound off-ramp PB to Kalaeloa Boulevard.
- Construction of Ramp PF to provide northbound traffic on Hanua Street access to areas north of I-H1.
- Construction of Ramp PG to provide northbound traffic on Hanua Street access to the westbound lanes of I-H1 via a merge with relocated westbound on-ramp PA.
- Modification/widening of Farrington Highway fronting the Hawaiian Waters Adventure Park.

A diagram of the ultimate traffic pattern for the area upon completion of all construction phases is presented in **Figure 2-4**.



LEGEND:

- Traffic Lanes
- Existing Traffic Signal
- Proposed New Traffic Signal
- STOP Existing or Planned Stop or Yield Control



Ref: Wilbur Smith Associates (1/20/06)

I-HI Addition & Modification of Highway Access
 Palala St / Makakilo IC (Kapolei IC Complex)

**PROPOSED ROADWAY LANES AND
 TRAFFIC CONTROLS (ULTIMATE)**

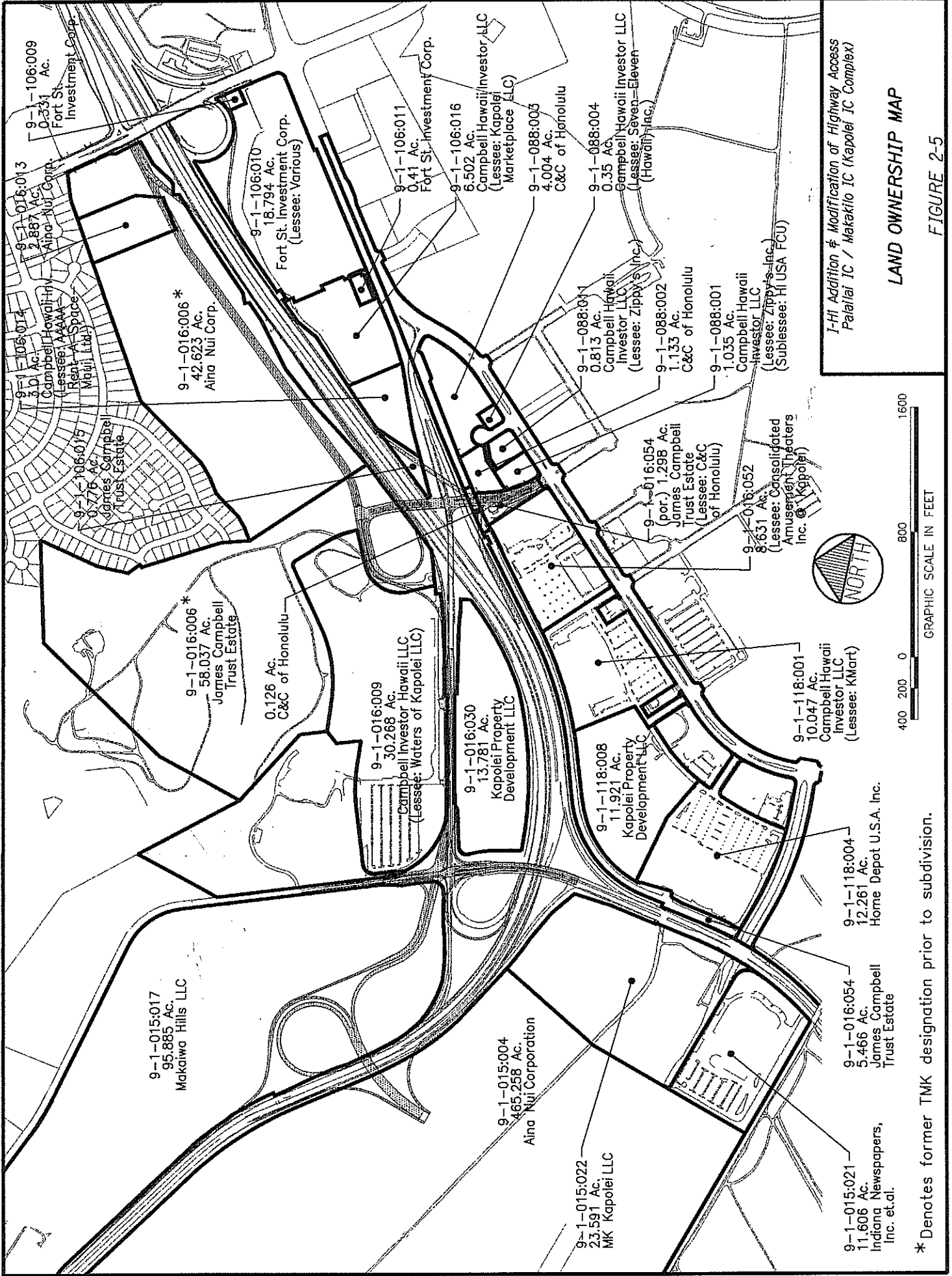
FIGURE 2-4

2.2.4 Land Donation and Acquisition

While some of the proposed improvements are situated within the existing I-H1 and Farrington Highway corridor, additional lands will need to be acquired by the State DOT for the improvements located beyond the existing freeway or highway rights-of-way. The Estate of James Campbell and its affiliates (Aina Nui Corp. and Campbell Hawaii Investor LLC) are the affected landowners for Phase 1 contributing these lands. In addition, a parcel owned by the City and County of Honolulu will need to be acquired by the State DOT. The lands required for future phases will need to be acquired by the State DOT at the time those portions of the project are undertaken. Refer to **Figure 2-5** for existing land ownership information and **Figure 2-6** for land acquisition requirements. The affected land owners, lessees and the approximate acreage requirements for development of the proposed project are listed in **Table 2-1**.

2.3 PROJECT SCHEDULE AND CONSTRUCTION COST

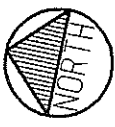
Construction of Phase 1 is anticipated to begin in mid-2007. The actual start date will be dependent on obtaining the required permits and approvals. It is anticipated that Phase 1 construction will be completed in 18 months, with planning and design of Phase 2 and the full development improvements to follow. The estimated Phase 1 construction cost is \$11 million. The project will be funded by the Federal Highway Administration (FHWA) and State DOT matching funds for contributions made by Kapolei Property Development LLC and other Estate of James Campbell affiliates.



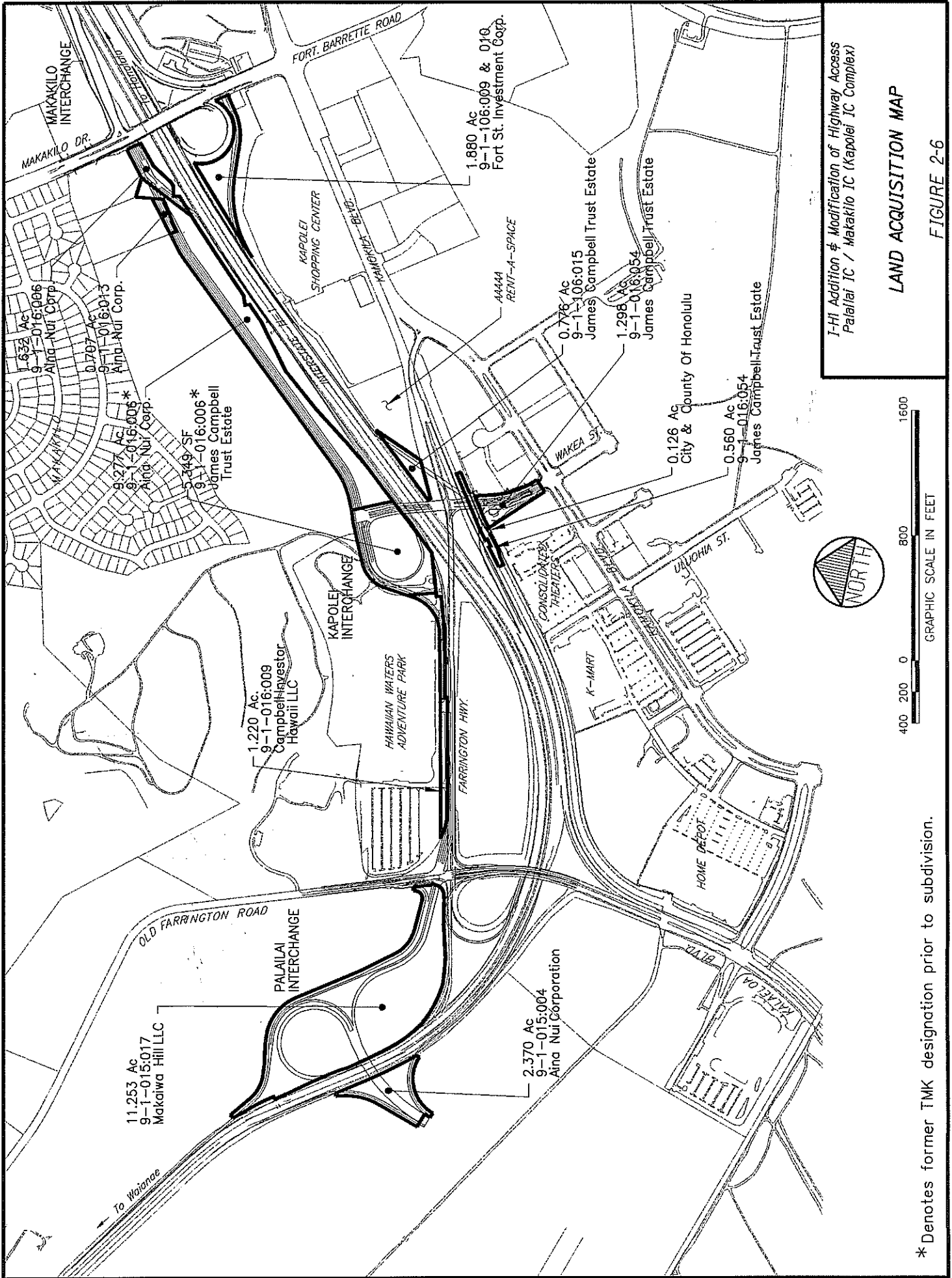
I-1HI Addition & Modification of Highway Access Palala IC / Makaloa IC (Kapolei IC Complex)

LAND OWNERSHIP MAP

FIGURE 2-5



* Denotes former TMK designation prior to subdivision.



LAND ACQUISITION MAP

FIGURE 2-6

I-Hi Addition & Modification of Highway Access
Palalai IC / Makakilo IC (Kapolei IC Complex)

* Denotes former TMK designation prior to subdivision.

**TABLE 2-1
LAND ACQUISITION REQUIREMENTS**

TMK Parcel	Land Owner	Affected Area ⁽¹⁾ (acres)	For	Phase
9-1-015:004	Aina Nui Corp.	2.370	Hanua Street Ramp PH Ramp PI	3
9-1-015:017	Makaiwa Hills LLC	11.253	Ramp PA Ramp PD Ramp PE Ramp PF Ramp PG	3
9-1-016:006 ⁽²⁾	Aina Nui Corp.	1.793	Ramp MD	1
	James Campbell Trust Estate	2.081	Ramp KA-1	1
		3.816	Wakea Street Ramp KA Ramp KA-2	2
	Aina Nui Corp.	9.237	Mauka Frontage Road	3
9-1-016:009	Campbell Hawaii Investor LLC (lessee: Waters of Kapolei LLC)	0.302	Ramp KA-1 Farrington Highway	1
		0.918	Ramp KA-2	2
9-1-016:013	Aina Nui Corp.	0.706	Mauka Frontage Road	3
9-1-016:054	James Campbell Trust Estate	0.560	Ramp KC Ramp KD	1
	James Campbell Trust Estate (lessee: City & County of Honolulu)	1.298	Wakea Street	1
9-1-106:009 9-1-106:010	Fort St. Investment Corp. (lessee: various)	1.880	Ramp ME	3
9-1-106:015	James Campbell Trust Estate	0.776	Ramp KD	1
--	City and County of Honolulu (drainage channel)	0.126	Wakea Street Ramp KC Ramp KD	1

Notes:⁽¹⁾ approximate values⁽²⁾ TMK 9-1-016:006 was subdivided into three parcels, but new TMK designations have yet to be assigned.

CHAPTER 3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

The intent of this chapter is to describe the existing physical and social environment affected by the proposed action. Potential impacts that may result from development of the proposed action, and mitigation measures to minimize negative impacts, are described in **Chapter 4**.

3.1 CLIMATE

Climatic norms, means and extremes for Honolulu are presented in **Table 3-1**. Northeast trade winds are prevalent, with low velocities (less than 10 mph) occurring frequently. From the fall to early spring, more light, variable wind conditions persist.

3.2 TOPOGRAPHY

The project site generally decreases in elevation from north to south and east to west. Existing elevations range from approximately 176 feet above mean sea level (MSL) at Makakilo Drive (at proposed on-ramp MD), to 72 feet at the intersection of Kamokila Boulevard and Wakea Street in Kapolei City. Development of the Interstate H-1 Freeway (I-H1) between Makakilo and Palailai interchanges has generally been at grade, with elevated cross traffic over the freeway corridor at Makakilo Drive/Fort Barrette Road, Farrington Highway, and Kalaeloa Boulevard/Old Farrington Highway.

3.3 SOILS

The soil classifications in the project vicinity are indicated on **Figure 3-1** and are described below. Soil classification locations and descriptions are referenced from the *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai*. The proposed Palailai Interchange improvements (including the proposed Kapolei Interchange) are generally situated in areas of HxA and EaB soil types, while the Makakilo Interchange improvements (including the Mauka Frontage Road) are expected to encounter all of the soil types listed below except HxA.

Ewa silty clay loam, 3 to 6 percent slopes (EaB), and Ewa stony silty clay, 0 to 2 percent slopes (EwA). The Ewa series consists of well-drained soils in basins and on alluvial fans, developed in alluvium derived from basic igneous rock. The EaB soil type occurs on alluvial fans and terraces, with a surface layer of dark reddish-brown silty clay loam (about 18 inches thick) and dark reddish-brown and dark red silty clay loam subangular blocky structure subsoil (about 42 inches thick). Permeability is moderate, runoff is slow and the erosion hazard is slight. The EmA soil type has a similar profile, except that the depth to coral limestone is 20 to 50 inches. Runoff is very slow and the erosion hazard is no more than slight.

Honouliuli clay, 0 to 2 percent slopes (HxA). The Honouliuli series consists of well-drained soils on coastal plains, developed in alluvium derived from basic igneous material. The HxA soil type occurs in the lowlands along coastal plains. The *Soil Survey* describes a representative profile of HxA as dark reddish-brown, very sticky and

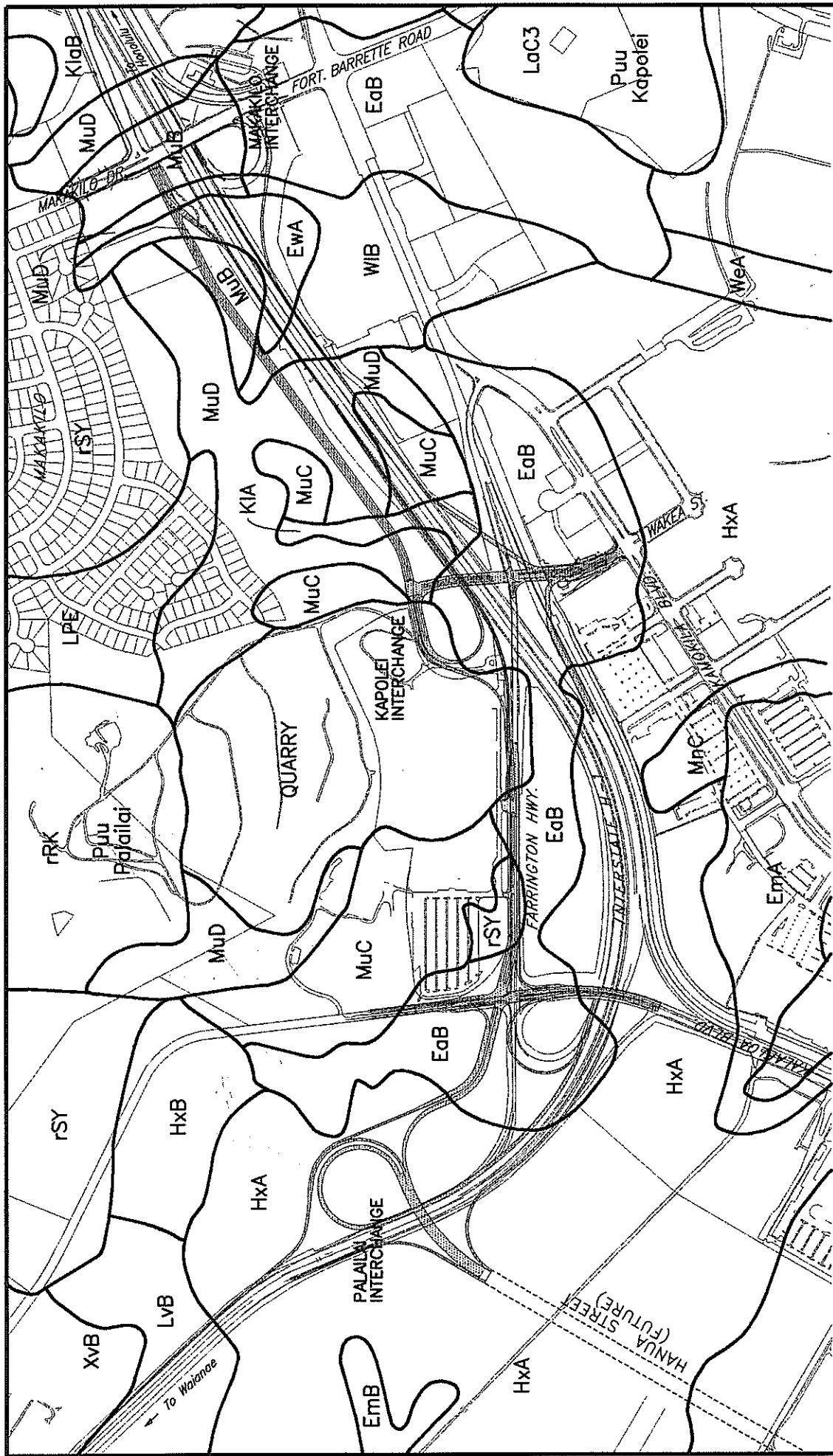
**TABLE 3-1
CLIMATIC NORMALS, MEANS AND EXTREMES**

Parameter	Descriptor	Value ⁽¹⁾
Temperature (degrees F)	Daily maximum	84.4
	Daily minimum	70.0
	Annual mean	77.2
Precipitation (inches)	Maximum monthly	20.91
	Minimum monthly	trace
	Annual mean	22.02
Humidity (%)	Normal	68
Wind Speed (mph)	Mean	11.4
Sunshine	Percent of possible	71
Sky Cover (mean no. of days)	Clear	90.0
	Partly cloudy	179.8
	Cloudy	92.0

Reference: J.W. Morrow (5/2/06) from National Climatic Data Center

Note:

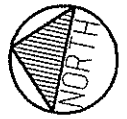
⁽¹⁾ Measurements taken at Honolulu International Airport



Reference: Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (<http://www.ctahr.hawaii.edu/soilsurvey/5is/oahu.htm>)

I-HI Addition & Modification of Highway Access
Palalei IC / Makaloa IC (Kapolei IC Complex)

- HxA HONOLULU CLAY, 0-2% SLOPES
- EoB EWA SILTY CLAY LOAM, 3-6% SLOPES
- MnC MAMALA STONY SILTY CLAY LOAM, 0-12% SLOPES
- MuD MOLOKAI SILTY CLAY LOAM, 15-25% SLOPES
- KIA KAWAIHAPAI CLAY LOAM, 0-2% SLOPES
- MuC MOLOKAI SILTY CLAY LOAM, 7-15% SLOPES
- WIB WAIALUA STONY SILTY CLAY, 3-8% SLOPES
- Ewa EWA STONY SILTY CLAY, 0-2% SLOPES
- MuB MOLOKAI SILTY CLAY LOAM, 3-7% SLOPES
- rSY STONY STEEP LAND



SOILS MAP
FIGURE 3-1

very plastic clay throughout. Permeability is moderately slow, runoff is slow, and the erosion hazard is no more than slight.

Kawaihapai clay loam, 0 to 2 percent slopes (KIA). The Kawaihapai series consists of well-drained soils in drainageways and on alluvial fans on coastal plains, formed in alluvium derived from basic igneous rock in humid uplands. The KIA soil type occupies smooth slopes. The surface layer is dark brown clay loam (about 22 inches thick) underlain with dark brown stratified sandy loam (32 inches thick). Permeability is moderate, runoff is slow, and the erosion hazard is no more than slight.

Mamala stony silty clay loam, 0 to 12 percent slopes (MnC). The Mamala series consists of shallow, well-drained soils along coastal plains formed in alluvium deposited over coral limestone and consolidated calcareous sand. The MnC soil type has a dark reddish-brown stony silty clay loam surface layer about 8 inches thick, underlain with a dark reddish-brown silty clay loam subsoil about 11 inches thick. Stones, mostly coral fragments, are common throughout the representative profile. Permeability is moderate, runoff is very slow to medium, and the erosion hazard is slight to moderate.

Molokai silty clay loam, 3 to 7 percent slopes (MuB), 7 to 15 percent slopes (MuC), and 15 to 25 percent slopes (MuD). The Molokai series consists of well-drained upland soils, developed in material weathered from basic igneous rock. Conditions may be nearly level to moderately steep, with elevations ranging from near sea level to 1,000 feet. Characteristic of the MuB soil type is slow to medium runoff potential and slight to moderate erosion hazard. The MuC soil type occurs on knolls and sharp slope breaks. Runoff is medium and the erosion hazard is moderate.

Waialua stony silty clay, 3 to 8 percent slopes (WIB). The Waialua series consists of moderately well-drained soils on alluvial fans, developed in alluvium weathered from basic igneous rock. For the WIB soil type, runoff is slow and the erosion hazard is slight.

3.4 BOTANICAL RESOURCES

A botanical survey of the project site was undertaken on November 30 and December 13, 2005 by AECOS, Inc. The purpose of the survey was to document flora on or near the project site and identify threatened, endangered, candidate or special status species. An excerpt of the report findings is presented below. Refer to **Appendix B** for the complete report and species list.

The survey was undertaken during the wet season following several months of light to moderate rains. Observed plants exhibited strong vegetative growth and most were in flower. It was noted that the majority of the project site contains open fields with scattered trees. The area proposed for the Mauka Frontage Road is a former nursery presently functioning as pasture for cows and horses. Other areas have previously been developed as part of the roadway network serving Kapolei, and the Wakea Street extension is presently a paved and landscaped bus terminal. Vegetation in the survey area can be divided into three broad categories: grassland with open tree and/or scrub growth, ruderal weeds characteristic of roadway rights-of-way and other disturbed sites, and landscaped grounds.

A total of 76 species of plants were identified, including one endemic species (loulou, *Pritchardia cf. remota*) and five indigenous species: naupaka (*Scaevola sericea*), hoary albutilon (*Abutilon incanum*), ilima (*Sida fallax*), alena (*Boerhavia acutifolia*), and uhaloa (*Waltheria indica*). The coconut palm (*Cocos nucifera*) was the only identified species of ancient Polynesian introduction. No plants that are of special concern or are protected by state or federal law were observed in the project area.

3.5 FAUNA

An ornithological and mammalian survey of the project site was conducted on November 30, 2005 by Rana Productions, Ltd. The primary goal of the survey was to determine if there were any federal or State of Hawaii listed endangered, threatened, proposed, or candidate avian, or mammalian species on, or in the immediate vicinity of the project site. An excerpt of the findings is presented below. Refer to **Appendix C** for the complete report.

Three mammalian species were detected during the site survey: domestic dog (*Canis f. familiaris*), horse (*Equus c. caballus*), and domestic cattle (*Bos taurus*). All three are introduced species that are considered deleterious to native avian species and Hawaiian ecosystems. Although no rodents were detected, it is likely that roof rats (*Rattus r. rattus*), Norway rats (*Rattus norvegicus*), European house mice (*Mus domesticus*) and possibly Polynesian rats (*Rattus exulans hawaiiensis*) use resources within the general project area. All of these introduced rodents are deleterious to remaining native ecosystems and the native floral and faunal species that are dependant on them for survival.

A total of 70 individual birds of 11 species, representing nine separate families were recorded during the site survey. Of the 11 avian species recorded during the course of the survey, 10 are alien to the Hawaiian islands. The lone native species detected, Pacific Golden-Plover (*Pluvialis fulva*), is an indigenous migratory shorebird species which nests in the high Arctic and spends the winter in Hawaii and the tropical Pacific. The other species detected are alien to the Hawaiian islands. In order of abundance, they are: Zebra Dove (*Geopelia striata*), Japanese White-eye (*Zosterops japonicus*), Red-vented Bulbul (*Pycnonotus cafer*), Java Sparrow (*Padda oryzivora*), Common Myna (*Acridotheres tristis*), Spotted Dove (*Streptopelia chinensis*), House Finch (*Carpodacus mexicanus*), Common Waxbill (*Estrilda astrild*), House Sparrow (*Passer domesticus*), and Cattle Egret (*Bubulcus ibis*).

3.6 FLOOD AND TSUNAMI HAZARD

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, the project site is located within Zone D, an area in which flood hazards are undetermined. According to the Oahu Civil Defense Agency Tsunami Evacuation Map 17 (Kahe Point to Ewa Beach), the project site is not located within a tsunami evacuation area.

AECOS, Inc. noted in their botanical survey report (**Appendix B**) that there were no perennial or significant intermittent streams in the project area, only dry swales modified in some cases to collect and direct surface flow into the drainage system for the existing road network.

3.7 ARCHAEOLOGICAL, HISTORIC AND CULTURAL RESOURCES

An archaeological assessment and cultural impact evaluation for the proposed project was prepared by Cultural Surveys Hawaii, Inc. (CSH). Their findings were based on a pedestrian inspection of the project area on October 19, 2005 and literature research. Descriptions in the following two sections are excerpted from the CSH report. Refer to **Appendix D** for the complete report.

3.7.1 Archaeological and Historic Resources

No additional historic properties were encountered during the field inspection. Further, it was observed that the majority of the project site has been modified significantly in the form of grading and commercial/highway development. Two archaeological inventory surveys of the western section of the project site were conducted by CSH in the last fifteen years. During these previous surveys, three historic sites were recorded, evaluated and given State Inventory of Historic Properties (SIHP) numbers:

#50-80-12-4341	ditch/flume, associated with sugar cane irrigation
#50-80-12-4342	reservoir, associated with sugar cane irrigation
#50-80-12-6679	drainage ditch, World War II era

All three of these nearby sites have been previously evaluated in earlier inventory surveys and determined to need no further work or preservation.

3.7.2 Cultural Resources

The project site is situated in an area inland from the coast, at the foot of upland ridges. According to Honouliuli settlement predictions, the project site probably provided temporary habitation for gatherers and travelers crossing the Ewa plains rather than permanent habitation. Specific aspects of traditional Hawaiian culture as they may relate to the project site are discussed below:

Gathering of plant resources. Upland forest resources for food, clothing, tools, weapons, canoe-building, home construction, dyes, adornments, hula, medicinal and religious purposes are typically found and gathered at higher elevations than the project site. Within the project area, there is no specific documentation of plant gathering during traditional Hawaiian times. The only plant observed in the project area that is known to have been gathered at all is uhaloa (*Waltheria indica*). The stems, leaves and root bark of this plant are pounded and strained, and the extract gargled for sore throat relief.

Historic properties. The findings of the field investigation confirm that the project area was probably only marginally utilized in traditional Hawaiian times. The only historic sites identified in the vicinity are related to post-Contact development of the land (e.g. sugar cane cultivation). No historic properties have been documented or are believed to exist in the project area.

Trails. In the past, trails served to connect the various settlements throughout the Ewa District. Based on descriptions by John Papa Ii, a portion of this trail network is believed

to have passed close to Farrington Highway. However, no clear remnant of this trail or associated site has been identified in the project vicinity.

Storied places. Puuokapolei (Kapolei Regional Park), located southeast of the project site, was a storied place (wahi pana) associated with a number of Hawaiian traditions. There are no storied places identified within the project area itself or in the immediate vicinity.

3.8 LAND USE AND ZONING

According to the State Land Use District boundary map for the area, the project site is primarily situated within the Urban District. A portion of I-H1 and Farrington Highway extending west from Kalaeloa Boulevard, including existing loop off-ramp PD, is located within the Agricultural District (see **Figure 3-2**).

The existing I-H1 corridor is zoned Ag-1 (Restricted Agriculture) in the vicinity of the project site. The proposed improvements will also be located in lands zoned Ag-2 (General Agriculture) and B-2 (Community Business). Refer to **Figure 3-3** for the City and County Zoning designations in the project vicinity.

3.9 LAND OWNERSHIP AND NEIGHBORING LANDS

The proposed improvements are located within both public and privately-held lands. The public lands include the existing I-H1 and Farrington Highway corridors under jurisdiction of the State DOT, and a drainage channel owned by the City and County of Honolulu. Privately-held lands are currently owned by the Estate of James Campbell and its affiliates (Aina Nui Corporation, Campbell Hawaii Investor LLC, and Fort Street Investment Corporation), and others.

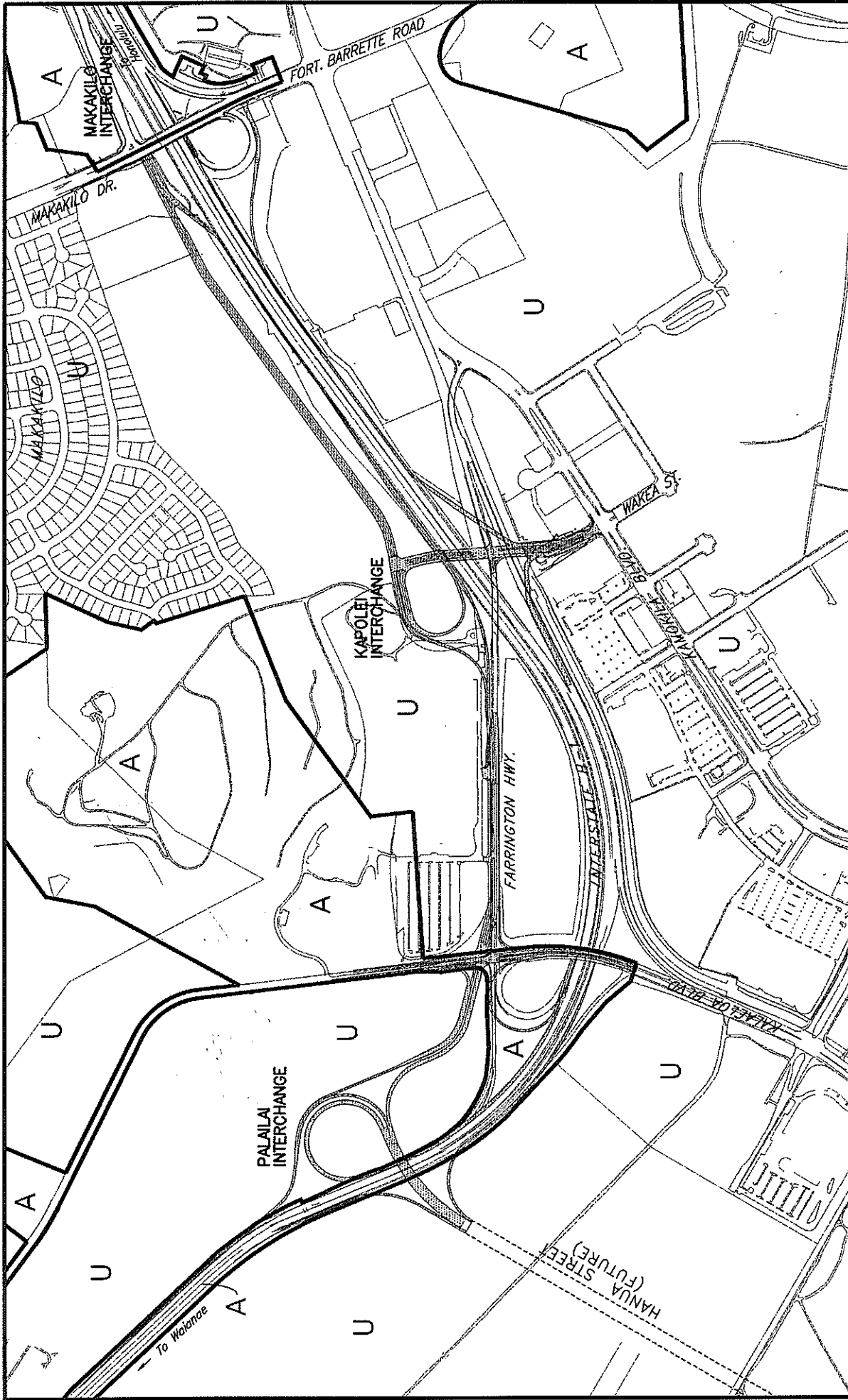
Additional lands to be acquired by the State DOT for development of the proposed project were identified in **Table 2-1** and **Figure 2-6**. These lands and neighboring parcels abutting the project site were identified on **Figure 2-5**.

3.10 ROADS AND TRAFFIC

The following description of the existing roads and traffic in the project vicinity has been excerpted from the Traffic and Operations Study prepared by Wilbur Smith Associates. Refer to **Appendix E** for the complete report.

3.10.1 Existing Roadway System

Existing roadway lanes and traffic controls are depicted on **Figure 3-4**. I-H1 and portions of Farrington Highway are under jurisdiction of the State DOT Highways Division. Kapolei Parkway, Kamokila Boulevard, Wakea Street, and portions of Farrington Highway are under jurisdiction of the City and County of Honolulu. Kalaeloa Boulevard is a private road owned by the Estate of James Campbell that is under State DOT jurisdiction. A brief description of the major roadways is provided below.

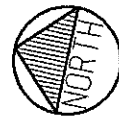


Ref: <http://gis.hicentral.com/>

I-11 Addition & Modification of Highway Access
 Palalal IC / Makakilo IC (Kapolei IC Complex)

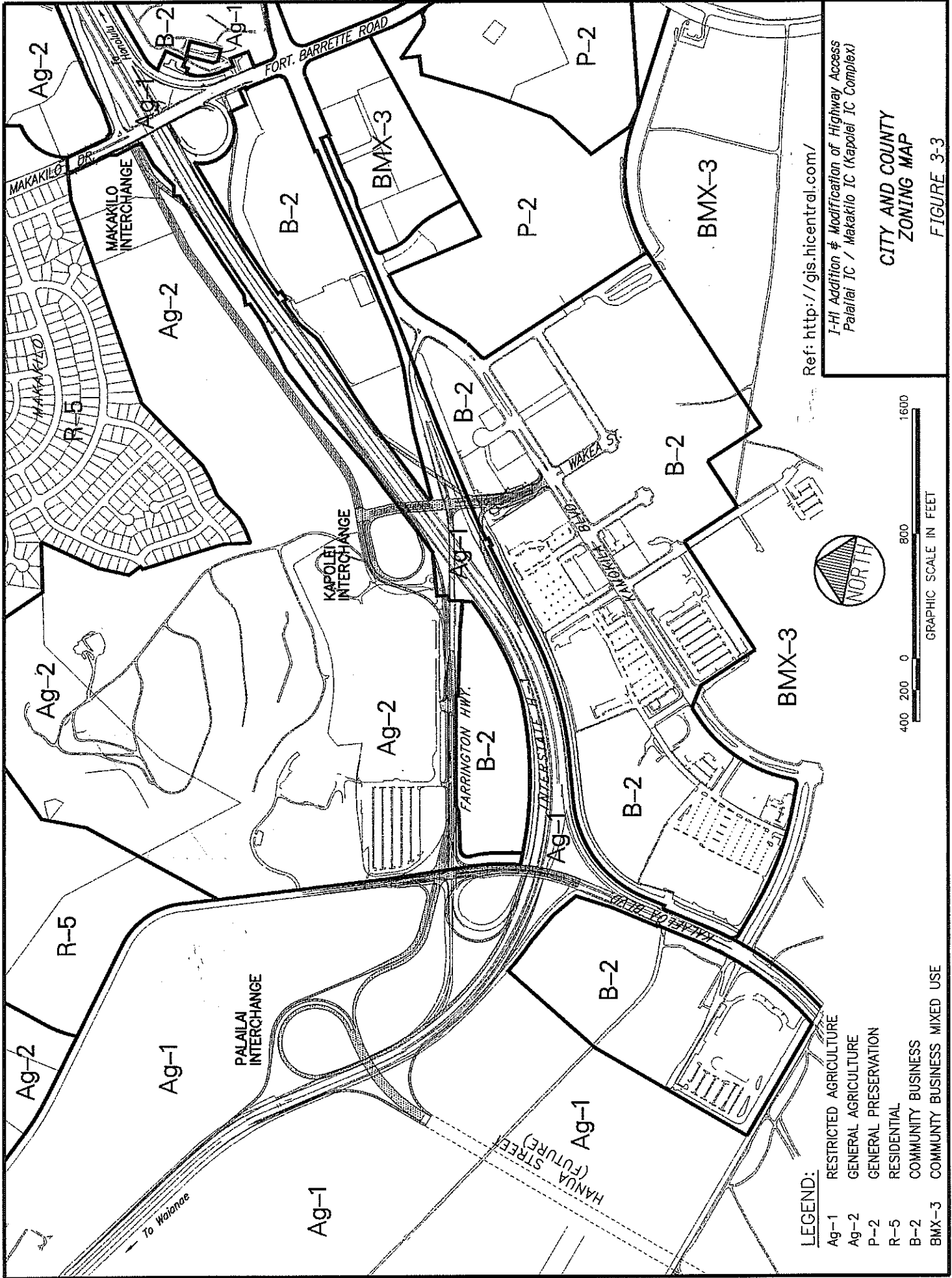
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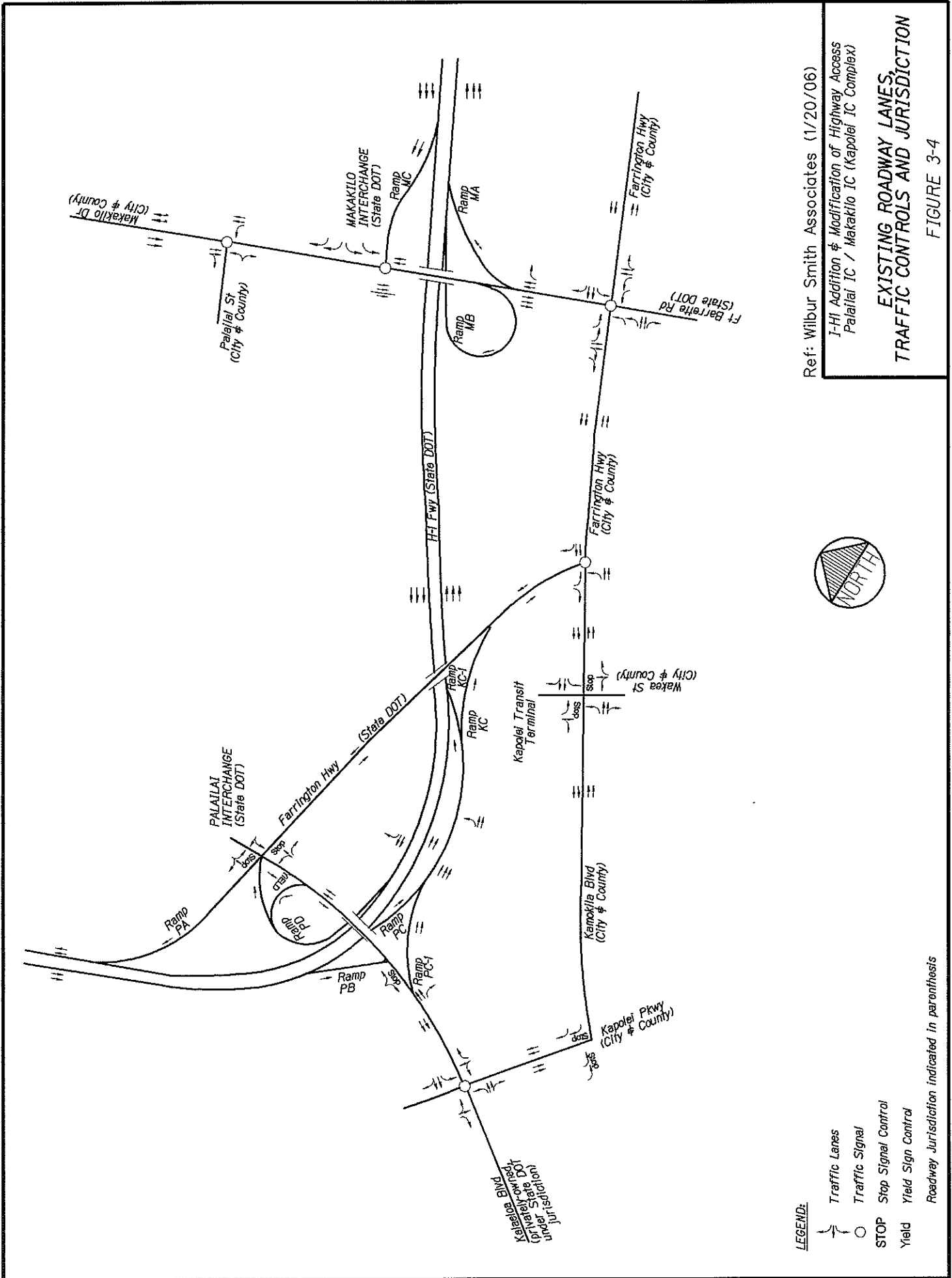
- A AGRICULTURAL DISTRICT
- U URBAN DISTRICT



**STATE LAND USE
 DISTRICT BOUNDARY MAP**

FIGURE 3-2





Ref: Wilbur Smith Associates (1/20/06)

I-1 Addition & Modification of Highway Access
 Palalal IC / Makakilo IC (Kapelei IC Complex)

**EXISTING ROADWAY LANES,
 TRAFFIC CONTROLS AND JURISDICTION**

FIGURE 3-4

LEGEND:

- Traffic Lanes
- Traffic Signal
- STOP Stop Signal Control
- Yield Yield Sign Control

Roadway Jurisdiction indicated in parenthesis

I-H1 is the major east-west roadway in the Ewa District, connecting the Ewa area to central Honolulu and other areas of Oahu. Access to I-H1 from the City of Kapolei is via the Makakilo Interchange (Makakilo Drive / Fort Barrette Road) and Palailai Interchange (Kalaeloa Boulevard). The freeway has six travel lanes east of the Palailai Interchange and four lanes to the west.

Farrington Highway parallels I-H1 and serves east-west travel through the Ewa District from Waipahu to the Palailai Interchange. Farrington Highway is also the major regional route westward from the terminus of I-H1 just east of Honokai Hale to the Waianae coast. The highway has four lanes with separate left-turn lanes from Kapolei Golf Course Road to Kamokila Boulevard in Kapolei City, two lanes between Kamokila Boulevard and Kalaeloa Boulevard, and continues as a four-lane divided highway west of the I-H1 terminus. Presently, in the project vicinity, State DOT jurisdiction of Farrington Highway extends westward from the intersection with Kamokila Boulevard and for 500 feet at the intersection with Fort Barrette Road. The portion of Farrington Highway between Kamokila Boulevard and Fort Barrette Road, and east of Fort Barrette Road, are under City and County of Honolulu jurisdiction.

Kalaeloa Boulevard is a four-lane divided roadway extending from the Palailai Interchange to Malakole Road, providing freeway access to Campbell Industrial Park, Barbers Point Harbor and Kapolei Business Park. Additionally, Kalaeloa Boulevard provides freeway access to the City of Kapolei via the Kapolei Parkway connection to Kamokila Boulevard.

Kapolei Parkway is planned to be a major traffic arterial connecting the City of Kapolei with Ko Olina to the west, and to the Villages of Kapolei and other communities to the east. Portions of the roadway completed within the Kapolei area include the one-block segment between Kalaeloa and Kamokila Boulevards, and a short section on the Honolulu side of Fort Barrette Road providing access to the Kapolei Middle and High schools. These segments have a median-divided roadway with two or more traffic lanes and a bicycle lane in each direction.

Kamokila Boulevard is a major roadway connecting Farrington Highway to Kapolei Parkway and Kalaeloa Boulevard and providing access to the center of the City of Kapolei. The roadway has two through lanes in each direction, a landscaped median for most of its length, and left-turn lanes at cross streets and driveways. The posted speed limit is 25 mph.

Wakea Street extends one block south of Kamokila Boulevard. North of Kamokila Boulevard, the street right-of-way is being used as a transit terminal for TheBus routes serving the Kapolei area.

3.10.2 Existing Traffic Volumes

Turning movement counts were conducted at key intersections during the weekday morning and afternoon peak commute traffic periods between May 19 and 25, 2005. The peak one-hour traffic volumes generally started at 7:00 or 7:30 AM in the morning and 4:15 to 4:30 PM in the afternoon. At most locations, the afternoon peak hour two-way traffic volumes were higher than the morning peak hour. Results of the traffic counts are summarized below.

Morning peak hour traffic. The eastbound freeway traffic increases from about 1700 vehicles west of the Palailai Interchange to over 3000 vehicles east of the Makakilo Interchange, with most of the increase occurring at the two Makakilo Interchange on-ramps. Westbound traffic decreases from about 2750 vehicles east of Makakilo Interchange to about 1400 vehicles west of the project area. About one-half of the westbound traffic exiting in the project area used the Makakilo off-ramp, with the other half using the Palailai off-ramp. Refer to **Figure 3-5** for the morning peak hour (7:00 to 8:00 AM) traffic volumes at the major intersections.

Afternoon peak hour traffic. The eastbound freeway traffic increases from about 1650 vehicles west of the project area to 3200 vehicles east of the area. Westbound freeway traffic decreases from 3700 vehicles east of the project area to about 2400 vehicles west of the area. Most of the exiting traffic use the Makakilo off-ramp (2000 vehicles), while the Palailai on-ramp adds nearly 1000 westbound vehicles. Refer to **Figure 3-6** for the afternoon peak hour (4:00 to 5:00 PM) traffic volumes.

3.10.3 Existing Traffic Conditions

Traffic conditions were analyzed for the weekday morning and afternoon peak one-hour traffic volumes for key intersections, freeway ramps and mainline freeway traffic. Level-of-service (LOS) ratings were assigned to describe the traffic conditions in terms of travel delays or travel speeds, with the service quality expressed on a letter basis from A (excellent) to F (unacceptable).

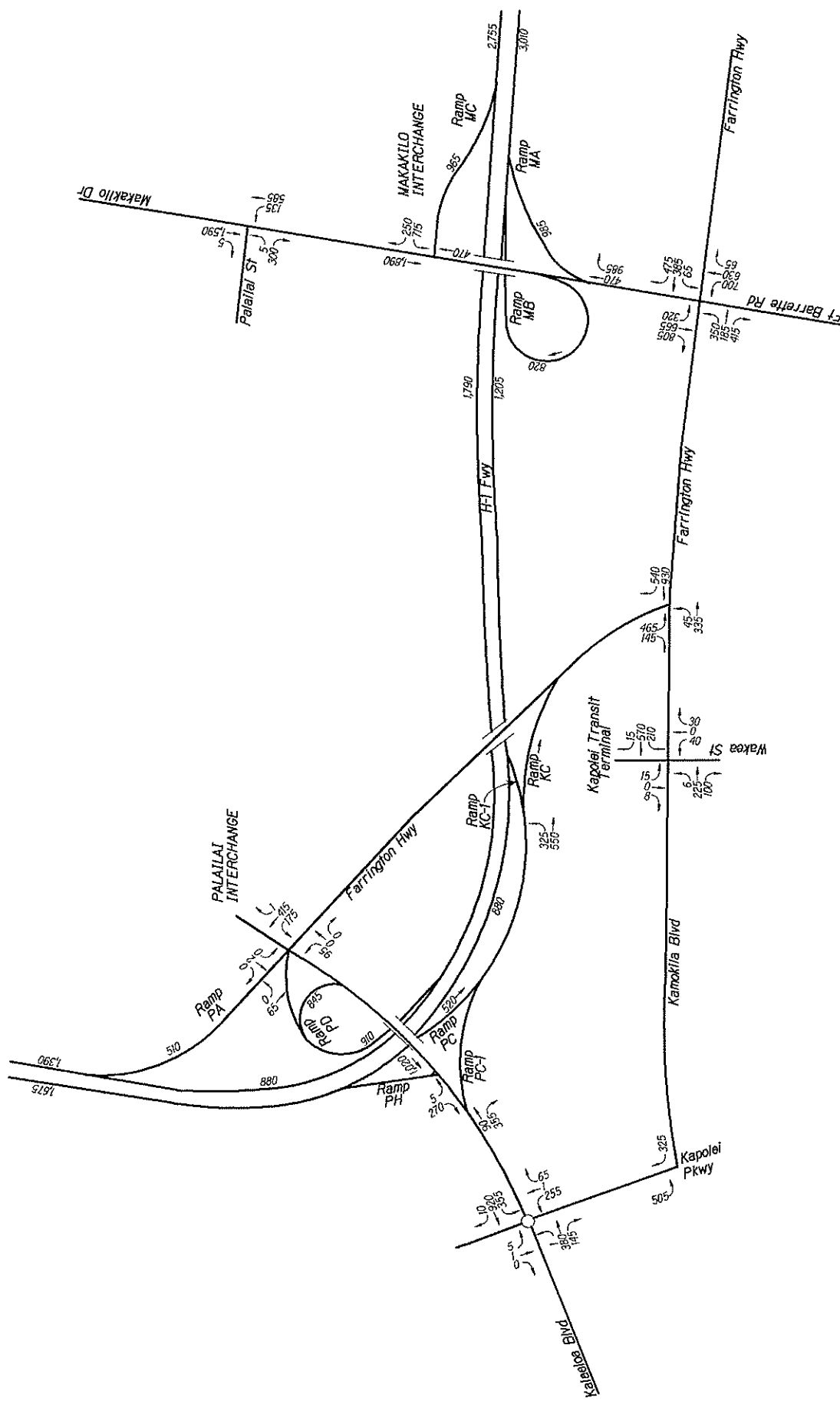
Existing Intersection Conditions. Overall traffic conditions at each of the key intersections is summarized in **Table 3-2**.

Existing Freeway Ramp Conditions (Makakilo & Palailai IC). Traffic conditions at most of the junctions of the on- and off-ramps at the Makakilo and Palailai Interchanges are summarized in **Table 3-3**. The merge or diverge of each of the ramps with the freeway through lanes presently operate at very acceptable densities and with little impact on traffic speeds.

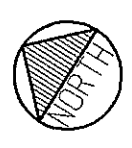
I-H1 Conditions. Existing traffic conditions along the mainline through lanes were assessed for the sections of I-H1 east of the Makakilo Interchange and west of the Palailai Interchange. The analysis indicated that peak hour traffic volumes are accommodated at very acceptable conditions (LOS B or C) in each direction (see **Table 3-4**).

3.10.4 Public Transportation

The City and County of Honolulu provides public transportation services to the area via TheBus (fixed route bus service) and TheHandiVan (door-to-door service for persons who have difficulty accessing the fixed route service). The Kapolei Transit Center is located on the alignment of the future Wakea Street extension north of Kamokila Boulevard. The transit center provides a transfer site for all of TheBus local and regional routes that serve the City of Kapolei and surrounding communities.



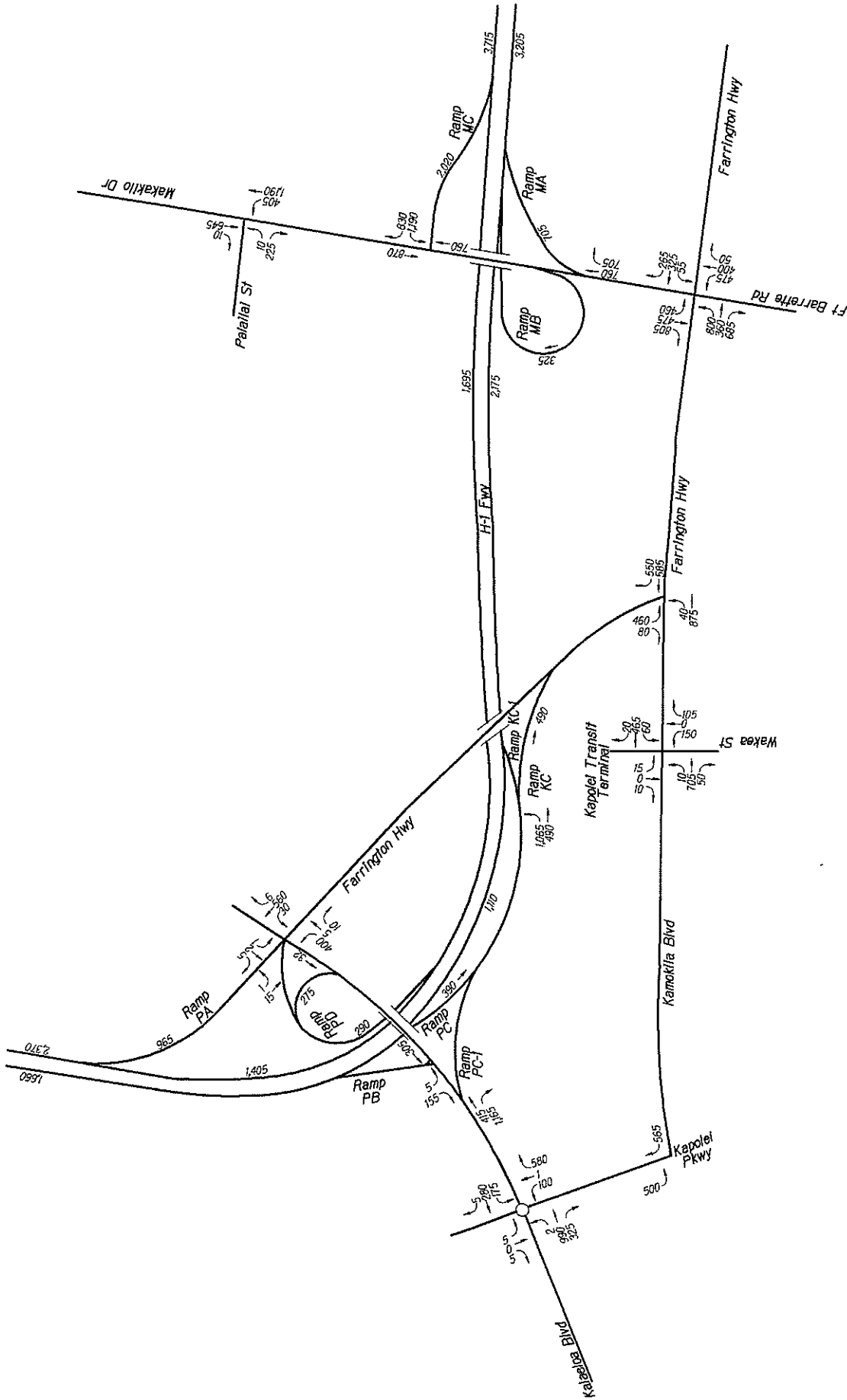
Ref: Wilbur Smith Associates (1/20/06)
 I-Hi Addition & Modification of Highway Access
 Palailai IC / Makakilo IC (Kapolei IC Complex)



LEGEND:
 ↑ Traffic Movements
 → 250 Traffic Volumes

2005 MORNING PEAK HOUR TRAFFIC

FIGURE 3-5



Ref: Wilbur Smith Associates (1/20/06)

I-HI Addition & Modification of Highway Access
 Palailai IC / Makakilo IC (Kapolei IC Complex)

2005 AFTERNOON PEAK HOUR TRAFFIC

FIGURE 3-6

**TABLE 3-2
2005 TRAFFIC CONDITIONS AT KEY INTERSECTIONS**

Intersection	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
	V/C	ADPV	LOS	V/C	ADPV	LOS
Makakilo Drive / Palailai Street	0.82	20.5	C	0.58	7.8	A
Makakilo Drive / Westbound I-H1 off-ramp	0.64	15.0	B	0.70	19.4	B
Farrington Hwy / Makakilo Dr / Fort Barrette Rd	0.84	49.0	D	0.94	74.6	E
Farrington Highway / Kamokila Boulevard	0.69	46.6	D	0.67	43.9	D
Kamokila Boulevard / Wakea Street (mauka-bound left turn)	0.04	9.5	A	0.70	49.1	E
Kalaeloa Boulevard / Kapolei Parkway	0.71	12.3	B	0.88	33.4	C
Kalaeloa Boulevard / Eastbound Off-ramp (eastbound left turn)	0.02	23.0	C	0.01	12.7	B
Kalaeloa Boulevard / Farrington Highway (mauka-bound left turn)	0.44	31.6	D	1.29	181.2	F

Reference: Wilbur Smith Associates (1/20/06)

Legend:

V/C ratio of the traffic volume to the theoretical capacity of the intersection

ADPV average delay per vehicle, in seconds

LOS level of service

**TABLE 3-3
2005 TRAFFIC CONDITIONS ALONG FREEWAY
AT RAMP MERGE AND DIVERGE AREAS**

Ramp Junction	Peak Hour	Average Speed (mph)		Traffic Density ⁽³⁾	LOS ⁽⁴⁾
		Near Ramp ⁽¹⁾	Other Lanes ⁽²⁾		
EASTBOUND FREEWAY					
Off-ramp PB to Kalaeloa Boulevard	AM	50.8	n/a	20.4	C
	PM	50.9	n/a	20.3	C
Off-ramp PC to eastbound Weaving Roadway	AM	50.4	n/a	17.8	B
	PM	50.6	n/a	18.8	B
On-ramp MB from southbound Makakilo Drive	AM	57.1	58.9	18.3	B
	PM	57.1	59.2	19.2	B
On-ramp MA from northbound Makakilo Drive	AM	57.2	58.8	22.1	C
	PM	57.2	58.9	22.2	C
WESTBOUND FREEWAY					
Off-ramp MC to Makakilo Drive	AM	53.5	57.0	9.5	A
	PM				
On-ramp PA from Kalaeloa Boulevard	AM	51.1	n/a	14.9	B
	PM	50.6	n/a	23.2	C

Reference: Wilbur Smith Associates (1/20/06)

Notes:

- (1) *Near Ramp* is the 1500-ft section of the two lanes closest to the ramp
(2) *Other Lanes* are lanes closest to median if there are 3 or more lanes on freeway
(3) vehicles per lane per hour for two lanes near ramp
(4) Level of Service for two lanes near ramp

**TABLE 3-4
2005 FREEWAY MAINLINE CONDITIONS EAST AND WEST OF PROJECT AREA**

Peak Hour	Direction	Traffic Volume	Lanes	Density ⁽¹⁾	Speed (mph)	Level of Service
EAST OF MAKAKILO INTERCHANGE AREA						
AM	Eastbound	3010	3	17.2	62.0	B
	Westbound	2755	3	15.7	62.0	B
PM	Eastbound	3205	3	18.3	62.0	C
	Westbound	3715	3	21.2	62.0	C
WEST OF PALAILAI INTERCHANGE AREA						
AM	Eastbound	1675	2	16.0	55.5	B
	Westbound	1390	2	13.3	55.5	B
PM	Eastbound	1660	2	15.9	55.5	B
	Westbound	2370	2	22.7	55.5	C

Reference: Wilbur Smith Associates (1/20/06)

Note:

⁽¹⁾ vehicles per hour per lane

3.10.5 Bicycles and Pedestrians

Bicycle lanes are provided along portions of Farrington Highway east of Kamokila Boulevard and along the one-block section of Kapolei Parkway between Kamokila and Kalaeloa Boulevards. Along the other major roadways, bicycles either use paved shoulder areas, wide outside lanes, or travel within the regular traffic lane.

Sidewalks are provided along both sides of Makakilo Drive, Kamokila Boulevard, Wakea Street, Kapolei Parkway, and the section of Farrington Highway east of Kamokila Boulevard. No sidewalks are provided along Kalaeloa Boulevard or the section of Farrington Highway west of the Kamokila Boulevard intersection.

3.11 AIR QUALITY

The following description of air quality in the vicinity of the project site has been excerpted from the *Air Quality Impact Report* by J. W. Morrow. Refer to **Appendix F** for the complete report.

The State Department of Health (DOH) maintains a network of air monitoring stations around the state to gather data on the following regulated pollutants: particulate matter ≤ 10 microns (PM_{10}), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and ozone (O_3). Lead (Pb) sampling was discontinued in October 1997 with EPA approval, largely due to the elimination of lead in gasoline and the resulting reduction of ambient lead levels in Hawaii to essentially zero. The DOH operates an air monitoring station in the Kapolei area southwest of the project site. A summary of the most recent published air quality data from the Kapolei station and Sand Island, the only ozone monitoring site, is presented in **Table 3-5**. These data are indicative of the generally good air quality in the project area.

In comparison, a summary of the State of Hawaii and national ambient air quality standards (NAAQS) is presented in **Table 3-6**. Some of Hawaii's standards are clearly more stringent than their federal counterparts (i.e. CO, NO_2 , O_3).

Onsite CO sampling was conducted in the project area in April 2006. A continuous CO instrument was set up and operated during the morning and afternoon peak traffic hours at the northeast side of the Farrington Highway / Kamokila Boulevard intersection. An anemometer and vane were also installed to record onsite surface winds during the sampling period, and simultaneous manual traffic counts were recorded. Measured CO levels were low during both the morning and afternoon peak hours, averaging 0.6 mg/m^3 and 0.5 mg/m^3 , respectively. Refer to **Figures 3-7** and **3-8** for the onsite air quality monitoring results.

3.12 NOISE

The following description of ambient noise in the vicinity of the project site has been excerpted from the Acoustic Study by Y. Ebisu & Associates. Refer to **Appendix G** for the complete report.

Existing traffic and background ambient noise levels were measured at 21 locations in the project area in November 2005, January 2006 and February 2006. Noise measurement locations are identified as "A" through "M" and "WP1" through "WP10" on **Figure 3-9**. Traffic noise calculations for the existing conditions were also performed using the Federal Highway

**TABLE 3-5
2004 AIR QUALITY DATA FROM DOH MONITORING SITES**

Pollutant	Concentration	Monitoring Site
Particulate matter ≤ 10 microns (PM ₁₀) 24-hr Annual	53 $\mu\text{g}/\text{m}^3$ 13 $\mu\text{g}/\text{m}^3$	Kapolei
Particulate matter ≤ 2.5 microns (PM _{2.5}) 24-hr Annual	7 $\mu\text{g}/\text{m}^3$ 3 $\mu\text{g}/\text{m}^3$	Kapolei
Sulfur dioxide (SO ₂) 3-hr 24-hr Annual	17 $\mu\text{g}/\text{m}^3$ 7 $\mu\text{g}/\text{m}^3$ 1 $\mu\text{g}/\text{m}^3$	Kapolei
Carbon monoxide (CO) 1-hr 8-hr	2.4 mg/m ³ 0.98 mg/m ³	Kapolei
Ozone (O ₃) 1-hr 8-hr Annual	118 $\mu\text{g}/\text{m}^3$ 110 $\mu\text{g}/\text{m}^3$ 34 $\mu\text{g}/\text{m}^3$	Sand Island
Nitrogen dioxide (NO ₂) Annual	9 $\mu\text{g}/\text{m}^3$	Kapolei

Reference: J.W. Morrow (5/2/06) from State of Hawaii Department of Health, *Annual Summary: Hawaii Air Quality Data - 2004*.

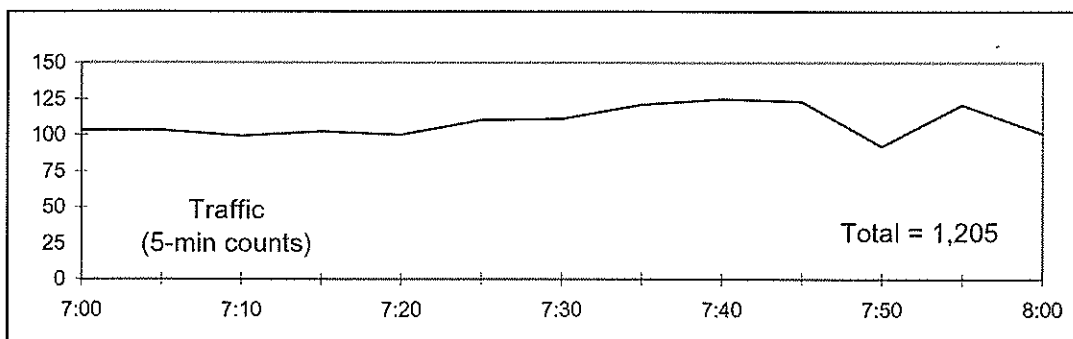
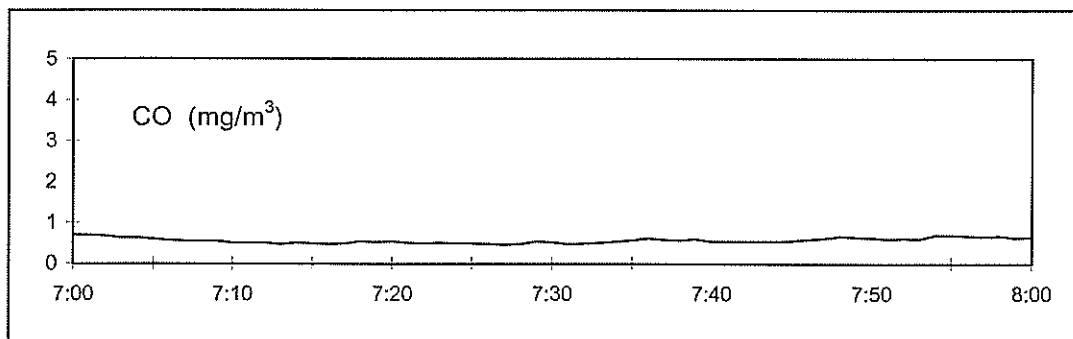
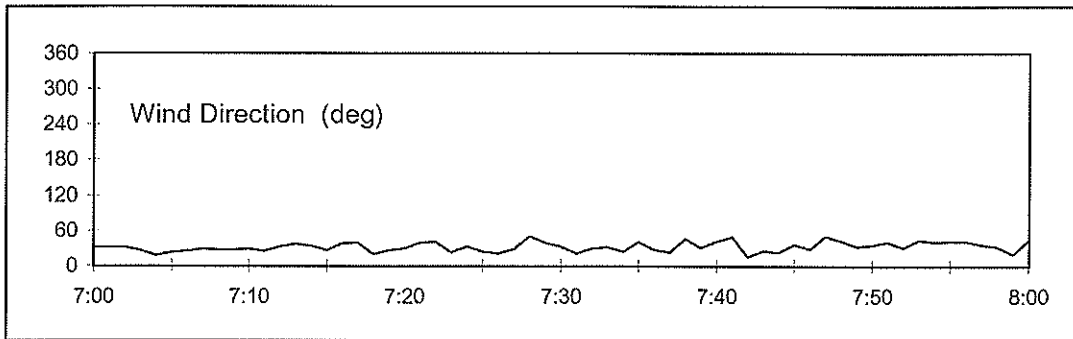
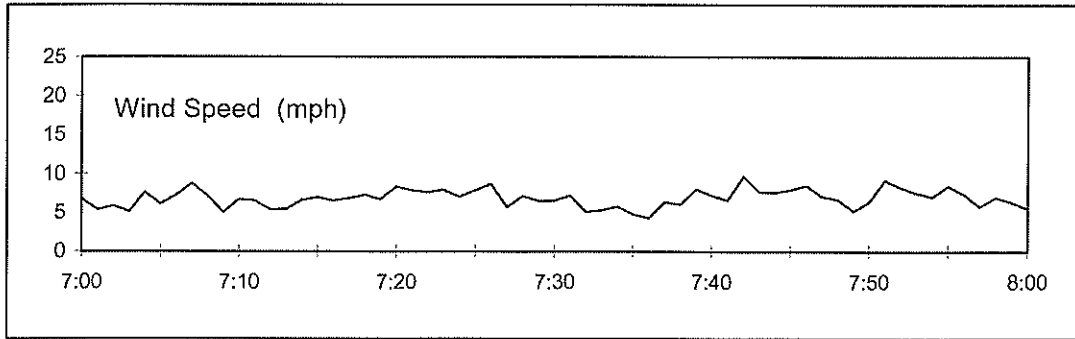
**TABLE 3-6
SUMMARY OF STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Period	NAAQS Primary ⁽¹⁾	NAAQS Secondary ⁽²⁾	State Standards
PM ₁₀	Annual 24-hr	50 µg/m ³ 150 µg/m ³	50 µg/m ³ 150 µg/m ³	50 µg/m ³ 150 µg/m ³
PM _{2.5}	Annual 24-hr	15 µg/m ³ 65 µg/m ³	15 µg/m ³ 65 µg/m ³	-- --
SO ₂	Annual 24-hr 3-hr	80 µg/m ³ 365 µg/m ³ --	-- -- 1300 µg/m ³	80 µg/m ³ 365 µg/m ³ 1300 µg/m ³
NO ₂	Annual	100 µg/m ³	100 µg/m ³	70 µg/m ³
CO	8-hr 1-hr	10 mg/m ³ 40 mg/m ³	-- --	5 mg/m ³ 10 mg/m ³
O ₃	8-hr 1-hr	156 µg/m ³ 235 µg/m ³	156 µg/m ³ 235 µg/m ³	-- 100 µg/m ³
H ₂ S	1-hr	--	--	35 µg/m ³
Pb	Calendar quarter	1.5 µg/m ³	1.5 µg/m ³	1.5 µg/m ³

Reference: J.W. Morrow (5/2/06)

Notes:

- ⁽¹⁾ National ambient air quality standards (NAAQS) *primary standards* are intended to protect public health with an adequate margin of safety.
- ⁽²⁾ National ambient air quality standards (NAAQS) *secondary standards* are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values.



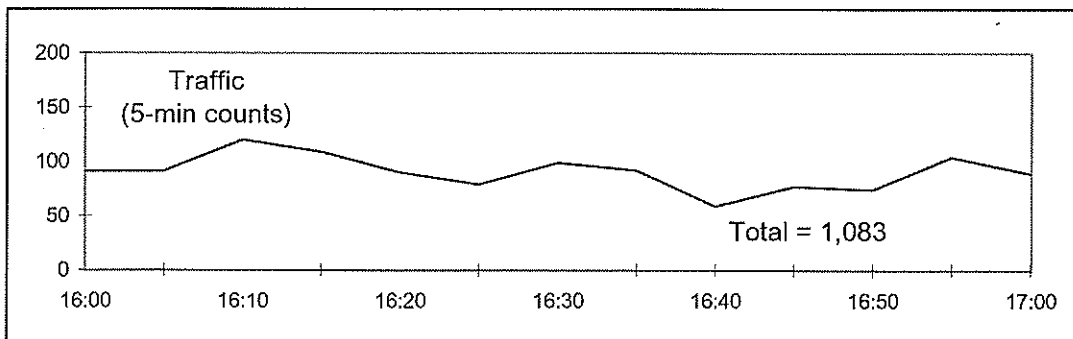
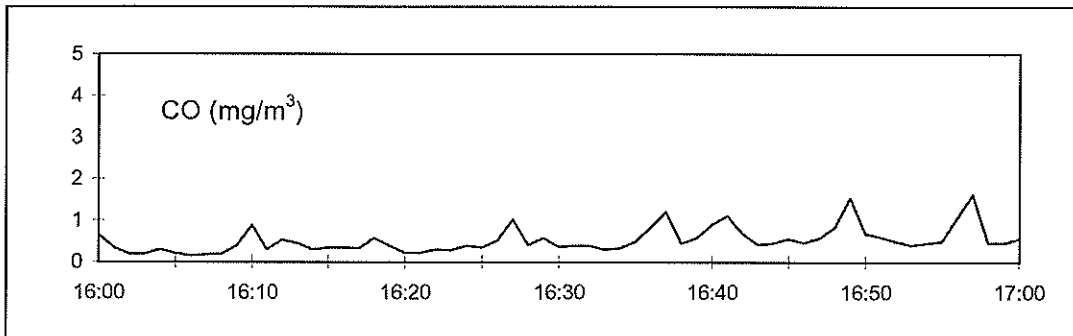
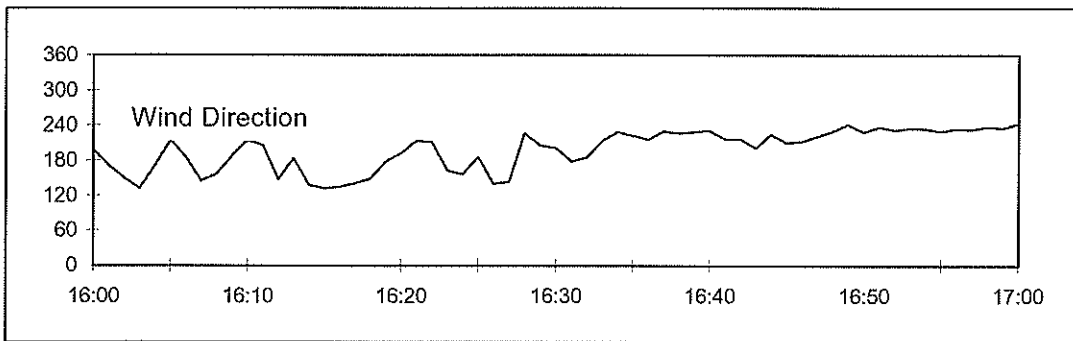
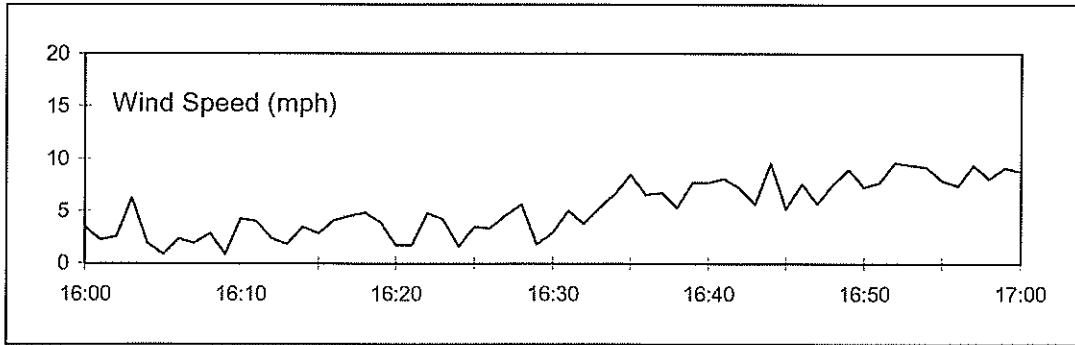
FARRINGTON HIGHWAY AT KAMOKILA BOULEVARD
 APRIL 28, 2006
 7:00 AM to 8:00 AM

Reference: J.W. Morrow (5/2/06)

*I-H1 Addition & Modification of Highway Access
 Palailai IC / Makakilo IC (Kapolei IC Complex)*

**MORNING PEAK HOUR CARBON
 MONOXIDE MONITORING RESULTS**

FIGURE 3-7



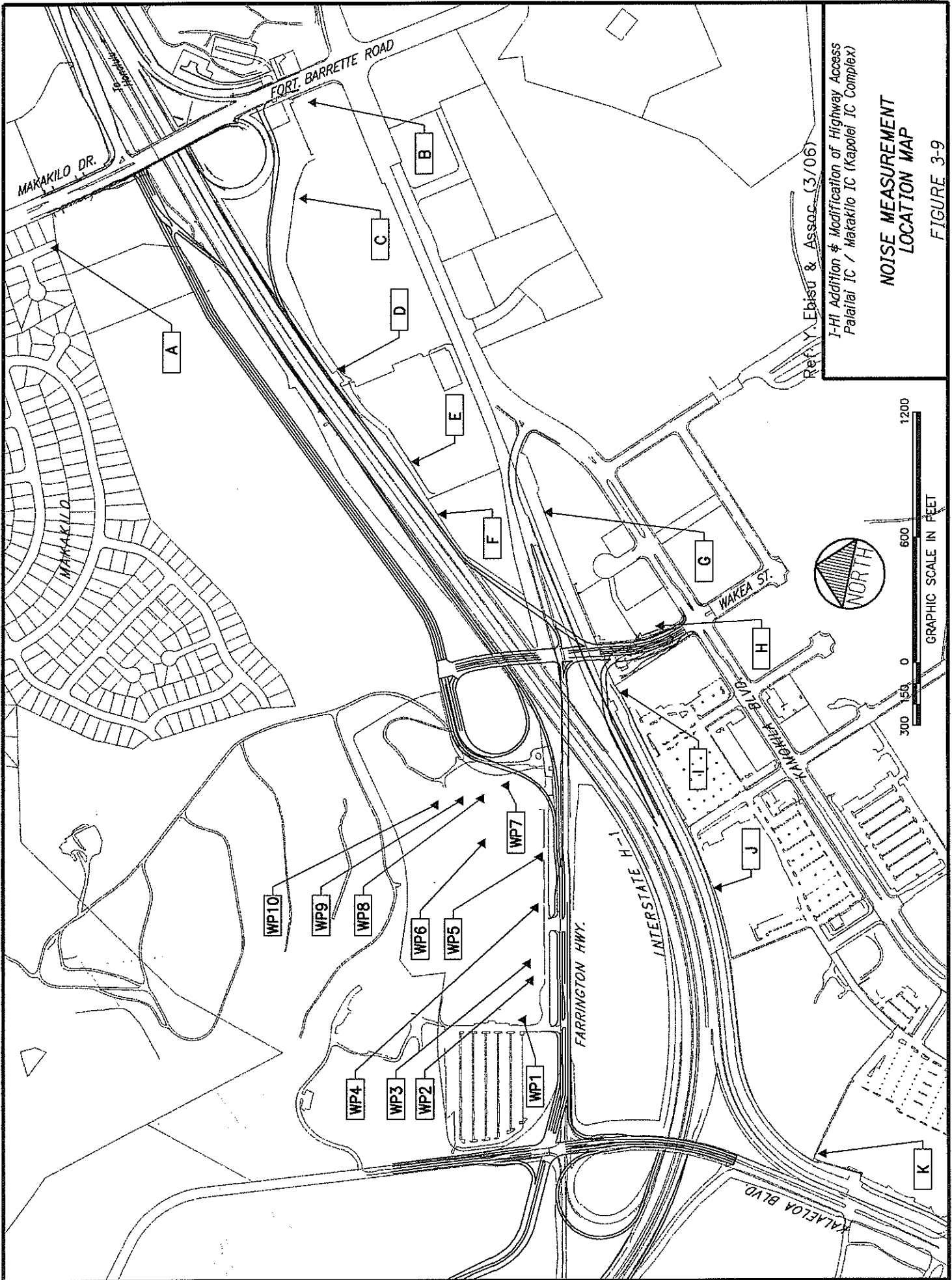
FARRINGTON HIGHWAY AT KAMOKILA BOULEVARD
 APRIL 26, 2006
 4:00 PM to 5:00 PM

Reference: J.W. Morrow (5/2/06)

*I-H1 Addition & Modification of Highway Access
 Palailai IC / Makakilo IC (Kapolei IC Complex)*

**AFTERNOON PEAK HOUR CARBON
 MONOXIDE MONITORING RESULTS**

FIGURE 3-8



Ref: Y. Ebisu & Assoc. (3/06)

I-HI Addition & Modification of Highway Access
 Palatal IC / Makakilo IC (Kapolei IC Complex)

**NOISE MEASUREMENT
 LOCATION MAP**

FIGURE 3-9

Administration (FHWA) Traffic Noise Model, Version 2.5 (TNM). Ambient noise measurements and predicted values based on the TNM are presented in **Tables 3-7** and **3-8**. The FHWA and State DOT noise abatement criteria is presented in **Table 3-9**. The following conclusions were based on these noise measurement results:

- Existing traffic noise levels do not exceed the State DOT noise abatement criteria level of 71 Leq for Activity Category C, except at location "F".
- Existing traffic noise levels do not exceed the State DOT noise abatement criteria level of 66 Leq for Activity Category B at the closest Makakilo residences.
- Existing traffic noise levels exceed the State DOT noise abatement criteria level of 66 Leq for Activity Category B at the Hawaiian Waters Adventure Park at locations "WP5" and "WP7".
- Existing traffic noise levels as predicted by the TNM were approximately 5 dB lower than measured values at locations "WP5" and "WP7".
- It was not possible to determine whether the State DOT noise abatement criteria level was exceeded at several locations. Local traffic and bus terminal activity (rather than high speed roadway traffic) were the dominant contributors to the measured noise levels at locations "C", "D" and "H". At the Hawaiian Waters Adventure Park, the measured noise levels at locations "WP4" and "WP6" were dominated by noise generated by water features and people.

3.13 HAZARDOUS MATERIALS

A Phase I Environmental Site Assessment (ESA) was prepared by EKNA Services, Inc. for the project site. Refer to **Appendix H** for the complete report. The purpose of the investigation was to determine the presence of petroleum products and other environmentally hazardous substances or wastes, and to identify potential sources of any suspected contaminants within the project site and its vicinity.

Based on review of available information over the past 64 years, it appears that the project site has been vacant, used for sugar cane cultivation, cattle grazing and most recently, portions have been developed for a freeway since the mid-1960's. Normally, sugar cane cultivation uses minimal amounts of pesticides. It is believed that previously cultivated areas have been vacant for at least 10 years, after which time any pesticides which may have been used would likely be dissipated. A survey/inspection was conducted in October 2005. A summary of the recognized environmental conditions at the project site is presented below:

- Soils alongside the I-H1 shoulders may contain some amount of residual petroleum constituents that have washed off the freeway during rainstorms.
- A transformer vault located at 91-995 Kalaeloa Boulevard on the south side of I-H1 at the Palailai Interchange (serial no. 4275, owned by the State DOT) is considered to contain polychlorinated biphenyls (PCB).

**TABLE 3-7
EXISTING AMBIENT NOISE MEASUREMENTS
MONITORING SITES "A" - "K"**

Monitoring Site	Location	Monitoring Date & Time	Measured Leq (dB) ⁽¹⁾	Adjusted Leq (dB) ⁽¹⁾ for P.M. Peak	Predicted Leq (dB) ⁽¹⁾
A	Makai end of Awana St in Makakilo residential area	11/16/05 (13:15 to 13:45) 2/2/06 (15:13 to 15:28)	59.7 59.5	61.0 59.5	62.1 62.1
B	Northeast corner of Chill's Restaurant	11/16/05 (14:07 to 14:37) 1/31/06 (12:16 to 12:32)	66.6 64.3	67.4 65.8	67.5 67.5
C	Northeast corner of Longs Drug Store	11/16/05 (14:53 to 15:23) 1/31/06 (12:56 to 13:11)	61.9 59.7	62.7 61.1	59.3 59.3
D	Northwest corner of Safeway Supermarket	11/17/05 (13:20 to 13:50) 1/31/06 (13:19 to 13:34)	69.8 69.5	71.1 70.8	70.4 70.4
E	Mauka side of the Marketplace at Kapolei	11/16/05 (15:36 to 16:06) 1/31/06 (13:39 to 13:54)	69.6 66.8	69.6 68.1	69.8 69.8
F	Northeast corner of storage building	11/16/05 (16:23 to 16:53) 1/31/06 (15:00 to 16:00) 2/2/06 (15:00 to 16:00)	72.5 72.8 74.5	72.5 72.8 74.5	72.6 72.6 72.6
G	Northeast corner of Kapolei Police Station	11/17/05 (15:35 to 16:05) 1/31/06 (15:52 to 16:07)	60.9 62.6	60.9 63.0	61.4 61.4
H	Northwest corner of Credit Union building	11/17/05 (14:20 to 14:50) 1/31/06 (14:05 to 14:20)	65.4 62.0	65.4 62.0	56.0 56.0
I	Northeast corner of Kapolei Theatres building	11/17/05 (14:53 to 15:23) 1/31/06 (14:26 to 14:42) 2/2/06 (16:39 to 16:54)	61.9 64.7 61.1	62.7 65.5 61.3	61.7 61.7 61.7
J	Mauka side of K-Mart building	11/15/05 (15:45 to 16:15) 1/31/06 (14:50 to 15:05)	70.2 67.1	70.2 67.5	67.5 67.5
K	Mauka corner fo Home Depot building	11/15/05 (16:31 to 17:01) 1/31/06 (15:22 to 15:37) 2/2/06 (16:18 to 16:33)	60.2 63.0 61.1	60.4 63.0 61.3	60.1 60.1 60.1

Reference: Y. Ebisu & Associates (3/06)

Note:

⁽¹⁾ equivalent sound level in decibels

**TABLE 3-8
EXISTING AMBIENT NOISE MEASUREMENTS
MONITORING SITES "WP1" - "WP10" AT HAWAIIAN WATERS ADVENTURE PARK**

Monitoring Site	Location	Monitoring Date & Time	Measured Leq (dB) ⁽¹⁾	Adjusted Leq (dB) ⁽¹⁾ for PM Peak	Predicted Leq (dB) ⁽¹⁾
WP1	Ticket booth, Hawaiian Waters Adventure Park	1/27/06 (12:34 to 12:36)	58.7	60.2	57.9
WP2	Gift shop	1/27/06 (12:38 to 12:43)	61.3	62.8	58.8
WP3	West of teen pool	1/27/06 (12:45 to 12:53)	63.6	63.6	59.3
WP4	South of water slide pool	1/27/06 (12:55 to 12:59)	69.1	69.1	60.9
WP5	Below tower at U-slide	1/27/06 (13:03 to 13:08)	68.8	70.1	67.2
WP6	Wave pool seating	1/27/06 (13:11 to 13:15)	68.7	68.7	56.4
WP7	Hawaii luau shed	1/27/06 (13:18 to 13:48) 2/2/06 (15:47 to 16:02)	65.6 66.2	66.9 66.2	66.3 66.3
WP8	Kauai luau shed	1/27/06 (13:50 to 13:56)	59.0	59.0	55.1
WP9	Oahu luau shed	1/27/06 (13:57 to 14:16)	61.4	61.4	58.0
WP10	Large water slide pool	1/27/06 (14:20 to 14:23)	65.9	65.9	57.3

Reference: Y. Ebisu & Associates (3/06)

Note:

⁽¹⁾ equivalent sound level in decibels

**TABLE 3-9
FHWA AND STATE DOT NOISE ABATEMENT CRITERIA**

Activity Category	FHWA Leq(h) ⁽¹⁾⁽²⁾	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the areas are to continue to serve their intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, activity sports areas, parks, residences, motels, hotels, churches, libraries, and hospitals.
C	72 (exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Reference: Y. Ebisu & Associates (3/06)

Note:

- ⁽¹⁾ Hourly average or equivalent A-weighted sound level in dBA
⁽²⁾ The Hawaii State Department of Transportation Highways Division utilizes Leq criteria which are 1 Leq unit less than the FHWA values shown.

- Small amounts of debris were consolidated in piles along I-H1. The debris does not appear to contain substances which would be considered hazardous to the project site.

No apparent environmentally adverse or detrimental effects were detected as a result of past or present use of the site. There is no distinct evidence which would indicate the presence of contamination by petroleum or other toxic/hazardous agents. There was no direct evidence that subsurface contaminants from nearby facilities have migrated to the soils and ground water beneath the site to cause any adverse environmental impacts.

3.14 UTILITIES

Existing utility infrastructure in the immediate project area are described below.

Drainage. Several drainage culverts are located within the I-H1 and Farrington Highway corridor for the purpose of conveying storm runoff from upland areas under the freeway to the municipal drainage system. The City and County of Honolulu maintains a concrete drainage channel on the makai side of Farrington Highway that conveys storm runoff to the ocean.

Water. Municipal water lines are located on the mauka side of Farrington Highway and mauka of the freeway toward Makakilo Drive. Water lines serving the Kapolei Transit Center are located in the Wakea Street extension mauka of Kamokila Boulevard.

Sewer. A private sewer serving the water park crosses Farrington Highway and I-H1 east of Kalaehoa Boulevard. A private sewer serving the Kapolei Transit Center conveys wastewater to the Kamokila Boulevard sewer. In the vicinity of future Ramp MD, an 18"-21" sewer from Makakilo crosses I-H1 west of the Makakilo Interchange.

Electrical and Telecommunications. Freeway lighting exists on two sides of the right-of-way. Hawaiian Electric Company, Hawaiian Telecom and Oceanic Time Warner Cable have existing aerial and underground facilities in the Phase 1 project area. An AT&T transcontinental fiber optic cable runs along Farrington Highway in the Phase 1 project area. An Army Corps Joint Trunking System (JTS) Signal Corps Cable runs along Farrington Highway in the Phase 1 project area.

Other Utilities. Gas, oil and other fuel pipelines are located in the State energy corridor, an easement situated makai of Farrington Highway and mauka of the municipal concrete drainage channel.

CHAPTER 4 POTENTIAL IMPACTS AND MITIGATION MEASURES

The intent of this chapter is to describe the potential impacts to the existing physical and social environment which may result from construction and operation of the proposed action. Mitigation measures to minimize negative impacts are also discussed in this chapter.

Potential impacts may be classified as "short term" or "long term". Short term impacts are generally associated with construction activities. Long term impacts are those which are lasting, resulting from the presence or operation of the project after it is constructed.

4.1 TOPOGRAPHY

Impacts on the area topography will be minimized due to the need for new freeway ramps to meet the existing roadway grades. However, elevated overpass structures will be constructed at Wakea Street (to connect to the existing Farrington Highway overpass) and Hanua Street (Palailai Interchange improvements) to convey cross traffic over the freeway grades. There is minimal development on properties mauka of the freeway; therefore, impacts on makai views due to development of proposed overpasses are not anticipated.

4.2 SOIL EROSION

It is anticipated that a short term increase in soil erosion will occur during construction. Removal of existing vegetation and grading will result in bare soil which is subject to erosion. Particularly vulnerable areas are the slopes located along the road shoulders.

Mitigative measures will be implemented during construction to minimize soil erosion and offsite sediment transport. The contractor will be required to implement control measures as shown on the construction drawings. These control measures may include:

- Installation of debris barriers at existing drainage inlets and catch basins downstream of the project site to minimize deposition of construction-related trash and sediment within the state highway and municipal storm drain systems.
- Installation of silt fences or erosion control berms to protect areas downstream of grading activities.
- Installation of cut-off ditches or berms to convey offsite runoff around grading activities.

The contractor will be responsible for compliance with the National Pollutant Discharge Elimination System (NPDES) requirements for DOT Oahu District Permit projects, including preparation of a best management practice (BMP) plan.

All grading work will be conducted in accordance with Chapter 14, Articles 13 through 16 as related to grading, soil erosion, and sediment control of the Revised Ordinances of Honolulu,

1990, as amended. Areas cleared of vegetation will be replanted as soon as possible to prevent soil loss.

Upon completion of construction, the erosion potential for the project site should improve over existing conditions. The project site will be paved and landscaped, ultimately decreasing the erodible surface area.

4.3 BOTANICAL RESOURCES

None of the plants observed in the project area are of special concern or are protected by state or federal law that would require care to be taken in planning or construction of the project. Presumably, after construction, the predominant alien vegetation will re-establish in areas not paved for roadways or otherwise landscaped.

4.4 FAUNA

It is not expected that the reduction of habitat due to construction of the proposed interchange improvements will have a negative impact on any avian or mammalian species currently listed as endangered, threatened, proposed, or any that are current candidates for listing under either state or federal endangered species statutes.

4.5 FLOOD AND TSUNAMI HAZARD

The project site is not located within a flood zone or tsunami inundation area. Conversely, construction of the proposed interchange improvements will include a roadway drainage system and will not result in increased flooding of surrounding areas.

4.6 ARCHAEOLOGICAL, HISTORIC AND CULTURAL RESOURCES

Based on the results of the background research and field assessment for the project area, no further archaeological or cultural work was recommended. The proposed project was deemed to have minimal or no effect on any historic properties or on any on-going cultural practices in the area. The State Historic Preservation Division (SHPD) concurred with the findings of the archaeological assessment in their letter dated January 30, 2006 (refer to correspondence in **Appendix A**). Further, in their letter of June 29, 2006, the SHPD stated that historic preservation commitments for this project are complete (refer to correspondence in **Appendix I**).

In the unlikely event that inadvertent discoveries of human remains or other cultural deposits are made during construction, work will be halted in the immediate area and the SHPD will be contacted for direction.

4.7 LAND USE AND ZONING

The proposed project is permitted under both the Urban and Agricultural State land use designations and under all City and County zoning designations.

4.8 LAND OWNERSHIP AND NEIGHBORING LANDS

Land will be acquired from the City and County of Honolulu for expansion of the highway right-of-way. Discussions are ongoing with the City and County of Honolulu regarding the portion of a municipal drainage channel to be enclosed as part of the project. The concrete-lined drainage channel will continue to service the area, and appropriate easements and maintenance agreements will be provided. The private lands needed for Phase 1 of the proposed project will be dedicated to the State DOT by the Estate of James Campbell and its affiliates. The Kapolei Transit Center (utilized by TheBus) is a tenant of the Estate of James Campbell that will be displaced by construction of the proposed Kapolei Interchange. Additionally, approximately 0.3 acre fronting Farrington Highway that is presently under lease by Campbell Hawaii Investor LLC to the Hawaiian Waters Adventure Park will be transferred to the State DOT for right-of-way expansion. The private lands needed for future phases of the project will need to be acquired by the State DOT at the time those portions of the project are undertaken.

4.9 ROADS AND TRAFFIC

The entities that will have jurisdiction over the roadways upon completion of the project are identified on **Figure 4-1**.

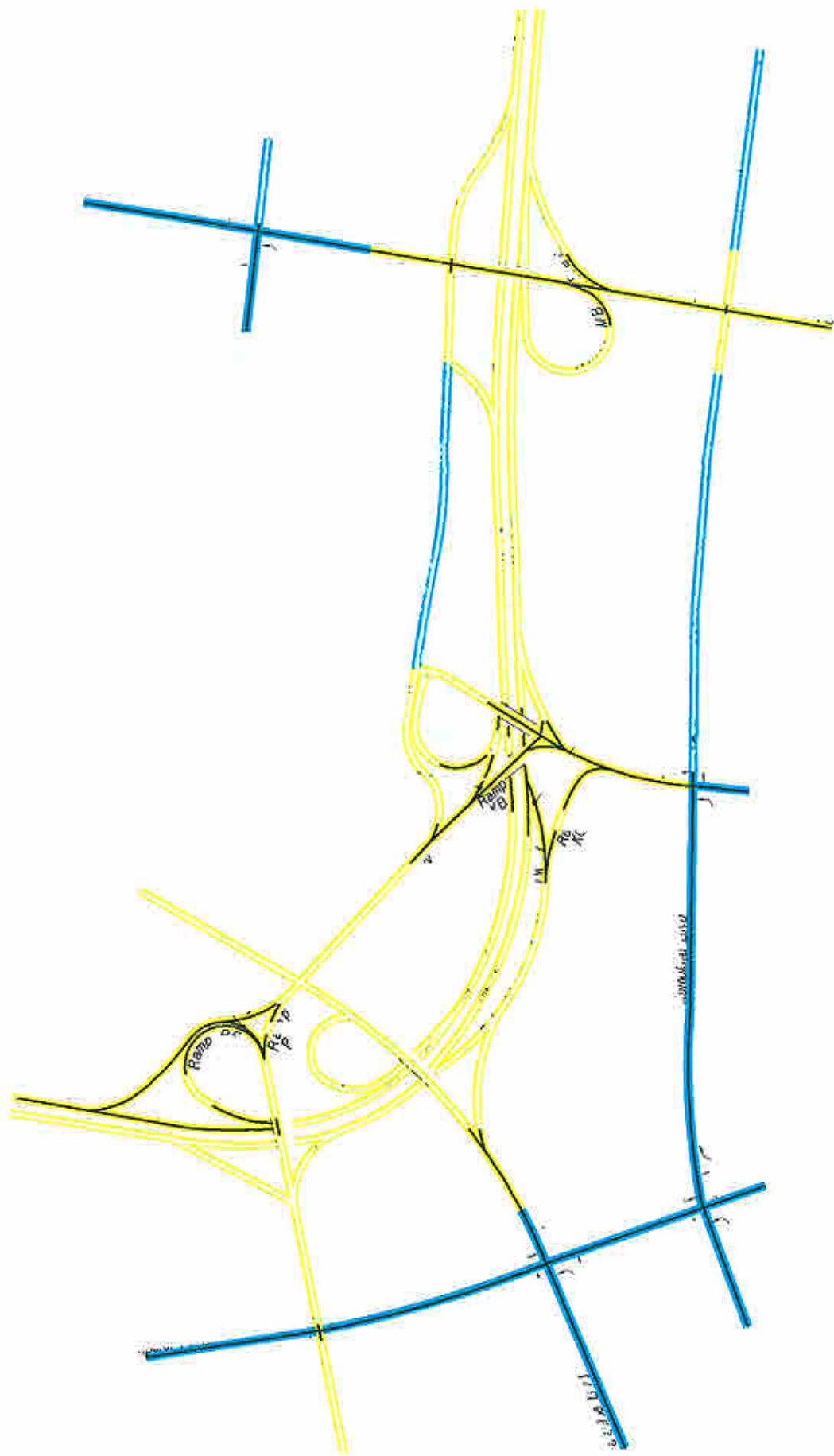
4.9.1 Construction Impacts and Mitigation Measures

The proposed project will have short-term construction-related impacts on traffic along I-H1 and other affected roadways. These short-term impacts will be limited to the period of construction only, and may include the following:

- Temporary lane closures;
- Temporary increase in construction-related traffic along neighboring roads due to commuting workers, trucks and other construction equipment; and
- Temporary increase in on-street parking congestion on neighboring roads due to construction activities.

Short-term construction-related impacts will be mitigated by implementation of the following measures:

- Traffic control plans will be prepared and submitted to the State Department of Transportation and the City Department of Planning and Permitting for approval. The traffic control plans will include measures to safely route traffic around the proposed construction area.
- Construction operations will be scheduled to avoid peak traffic conditions.



- Implementation of a comprehensive public information program to provide advance notification of lane closures and construction times via various media will allow the general public to anticipate and plan for delays, when inevitable.

Oahu Transit Services, Inc., expressed concerns for pedestrian safety due to relocation of bus operations from the present off-street Kapolei Transit Center site to an on-street location. The current plan is to temporarily relocate bus transit operations to Haumea Street, situated one block makai of Kamokila Boulevard. Construction activities will not directly impact the Haumea Street location. However, in order to minimize impacts to both bus operations and pedestrians, the contractor will be required to maintain pedestrian routes when working in the vicinity of existing or relocated bus facilities, including maintaining sidewalks and crosswalks along Kamokila Boulevard.

4.9.2 Short Term (2010) Impacts and Mitigation Measures

Construction of the Phase 1 modifications to the Makakilo Interchange and the initial elements of the Kapolei interchange are planned for completion in 2010. The Phase 1 roadways and ramps are expected to be in place for two or more years before completion of additional modifications. Traffic conditions were analyzed for the Phase 1 improvements with the forecast 2010 weekday peak hour traffic (see **Figures 4-2** and **4-3**). The analysis was used to identify potential problem locations and to plan modifications, if needed, to provide acceptable traffic conditions for the several years prior to full development of the project. Projected traffic conditions for the year 2010 with completion of the Phase 1 improvements are summarized in **Tables 4-1** through **4-3** for key intersections, freeway ramp merge and diverge areas, and mainline conditions east and west of the project, respectively.

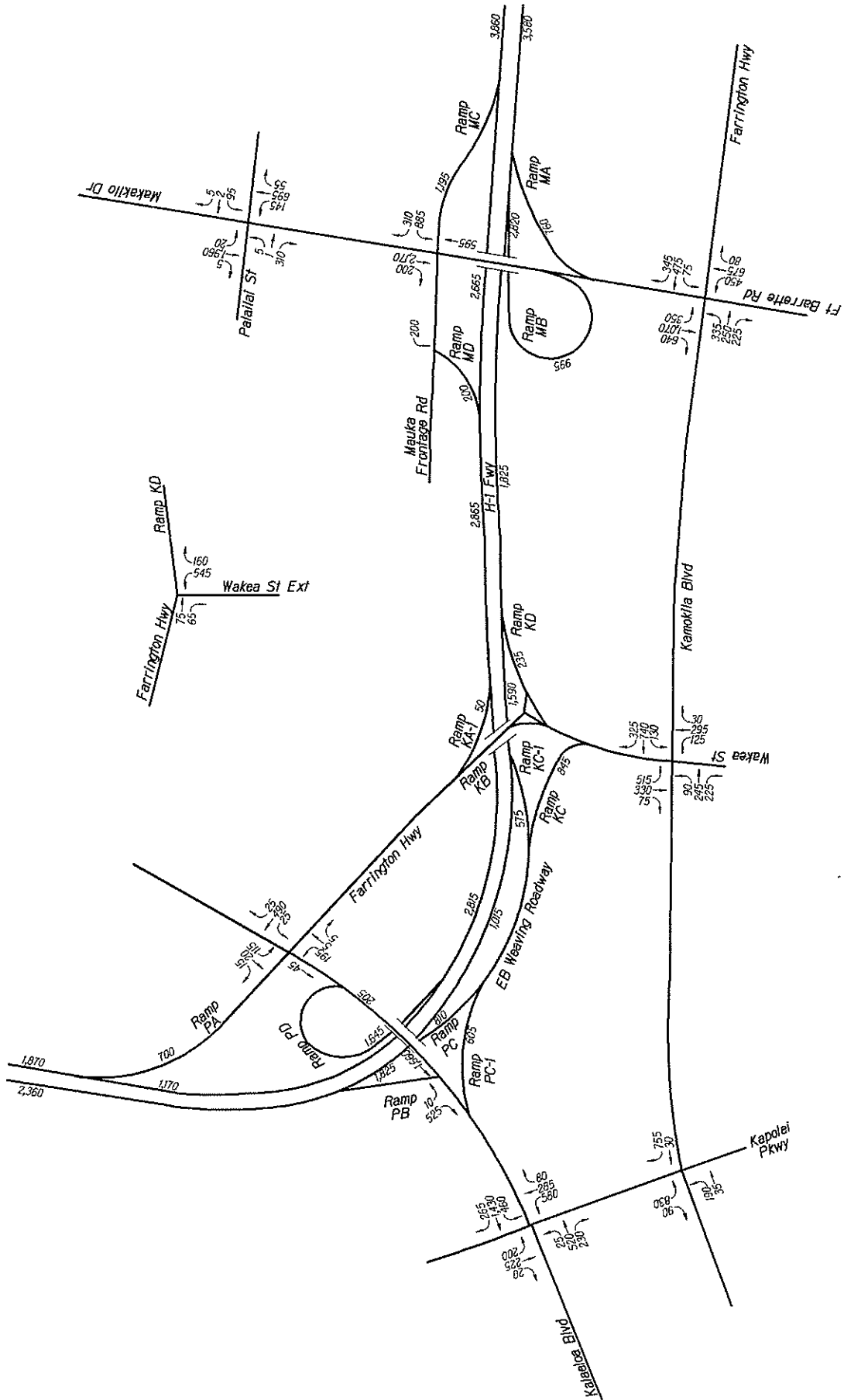
Potential improvements to provide additional capacity and improved traffic operations with the proposed Phase 1 project include:

- Expedite construction of the Kapolei Interchange overpass and loop off-ramp that provides access from the westbound freeway to the areas south of the freeway to reduce the volume of southbound traffic through the Makakilo Drive intersection with Farrington Highway in order to accommodate future traffic growth through this intersection.
- Modify the eastbound Kamokila Boulevard approach to Wakea Street to provide double left-turn lanes to access the Kapolei Interchange.
- Add a second (double) left-turn lane to the northbound approach of Kalaeloa Boulevard to Farrington Highway.

These improvements will be considered as the City of Kapolei develops and may be implemented with future road improvements in the area.

4.9.3 Long Term Impacts

Once construction is completed, the proposed project will have a net positive long term impact on traffic by providing improved I-H1 access and alternate routes. See **Figures 4-4** and **4-5** for 2030 weekday peak hour traffic projections under full development conditions.

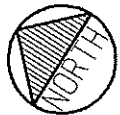


Ref: Wilbur Smith Associates (1/20/06)

I-11 Addition & Modification of Highway Access
 Palalalai IC / Makakilo IC (Kapolei IC Complex)

**2010 MORNING PEAK HOUR
 TRAFFIC WITH PROJECT (PHASE 1)**

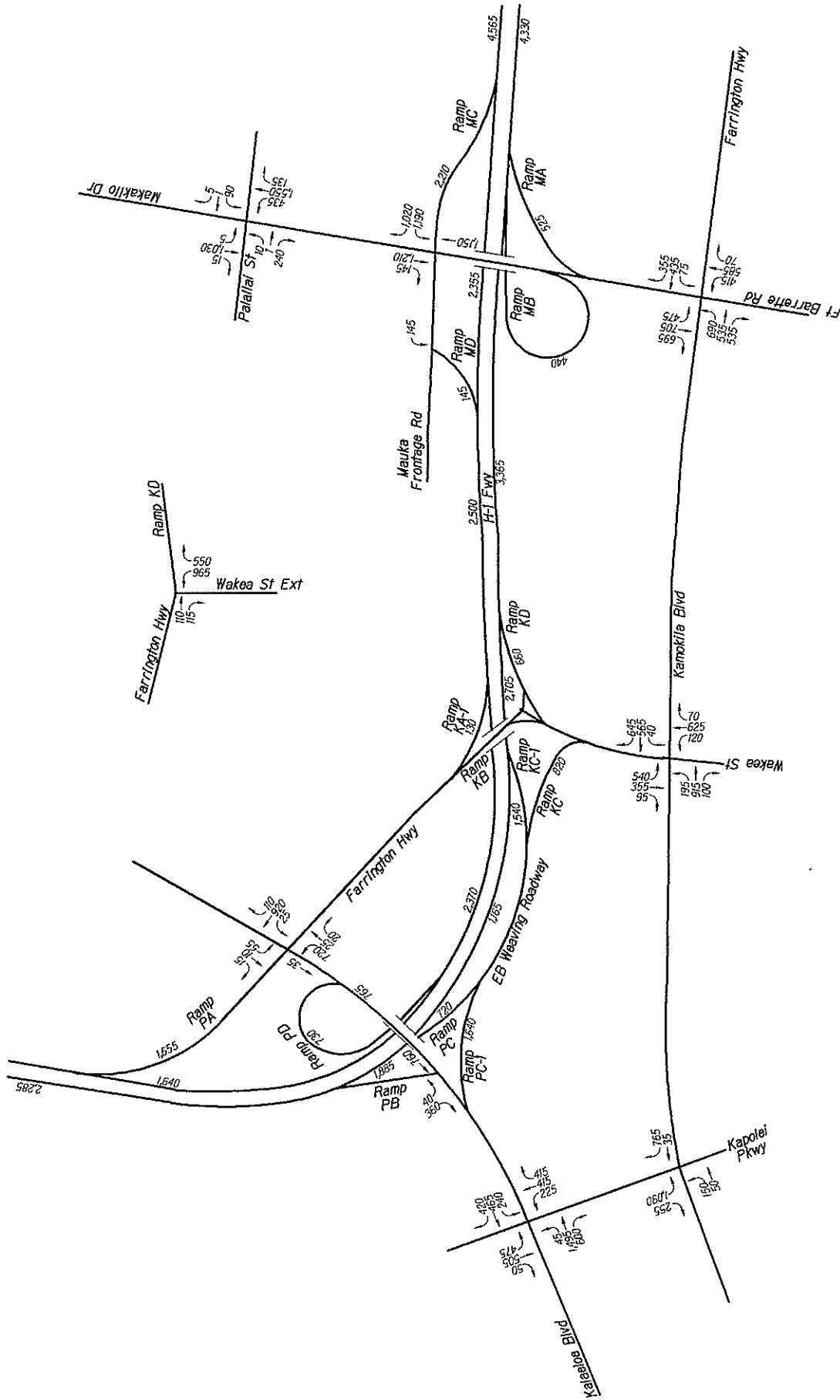
FIGURE 4-2





LEGEND:

↑ Traffic Movements

--330 Traffic Volumes



LEGEND:

-  Traffic Movements
-  Traffic Volumes

Ref: Wilbur Smith Associates (1/20/06)

I-HI Addition & Modification of Highway Access
Palailai IC / Makakilo IC (Kapolei IC Complex)

**2010 AFTERNOON PEAK HOUR
TRAFFIC WITH PROJECT (PHASE 1)**

FIGURE 4-3

**TABLE 4-1
2010 TRAFFIC CONDITIONS AT KEY INTERSECTIONS
(WITH PHASE 1 IMPROVEMENTS)**

Intersection	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
	V/C	ADPV	LOS	V/C	ADPV	LOS
Makakilo Drive / Palailai Street	0.93	43.2	D	0.74	14.9	B
Makakilo Drive / Westbound I-H1 off-ramp	0.89	28.7	C	0.85	21.6	C
Farrington Hwy / Makakilo Dr / Fort Barrette Rd	0.90	37.3	D	0.90	42.8	D
Wakea St Extension / Farrington Highway / Eastbound I-H1 on-ramp	0.18	10.1	B	0.40	14.8	B
Wakea Street / Kamokila Boulevard	0.70	24.1	C	0.95	44.3	D
Kalaeloa Boulevard / Farrington Highway	0.37	10.1	B	0.96	34.6	C
Kalaeloa Boulevard / Eastbound I-H1 off-ramp	0.08	44.2	E	0.21	27.0	D
Kalaeloa Boulevard / Kapolei Parkway	0.77	49.7	D	0.87	39.0	D

Reference: Wilbur Smith Associates (1/20/06)

Legend:

V/C ratio of the traffic volume to the theoretical capacity of the intersection
ADPV average delay per vehicle, in seconds
LOS level of service

TABLE 4-2
2010 TRAFFIC CONDITIONS ALONG FREEWAY
AT RAMP MERGE AND DIVERGE AREAS (WITH PHASE 1 IMPROVEMENTS)

Ramp Junction	Peak Hour	Average Speed (mph)		Traffic Density ₍₃₎	LOS ⁽⁴⁾
		Near Ramp ⁽¹⁾	Other Lanes ⁽²⁾		
EASTBOUND FREEWAY					
Off-ramp PB to Kalaeloa Boulevard	AM	50.4	n/a	27.0	C
	PM	50.6	n/a	26.3	C
Off-ramp PC to Wakea Street via eastbound Weaving Roadway	AM	50.1	n/a	21.9	C
	PM	50.2	n/a	22.5	C
On-ramp MB from southbound Makakilo Drive	AM	56.7	58.5	22.9	C
	PM	56.3	58.0	26.1	C
On-ramp MA from northbound Makakilo Drive	AM	56.9	58.5	24.3	C
	PM	56.3	57.7	27.4	C
WESTBOUND FREEWAY					
Off-ramp MC to Makakilo Drive	AM	55.4	59.8	5.7	A
	PM	53.0	56.8	14.2	B
On-ramp PA from Kalaeloa Boulevard & Farrington Highway	AM	50.8	n/a	19.5	B
	PM	49.2	n/a	31.2	D

Reference: Wilbur Smith Associates (1/20/06)

Notes:

- (1) *Near Ramp* is the 1500-ft section of the two lanes closest to the ramp
(2) *Other Lanes* are lanes closest to median if there are 3 or more lanes on freeway
(3) vehicles per lane per hour for two lanes near ramp
(4) Level of Service for two lanes near ramp

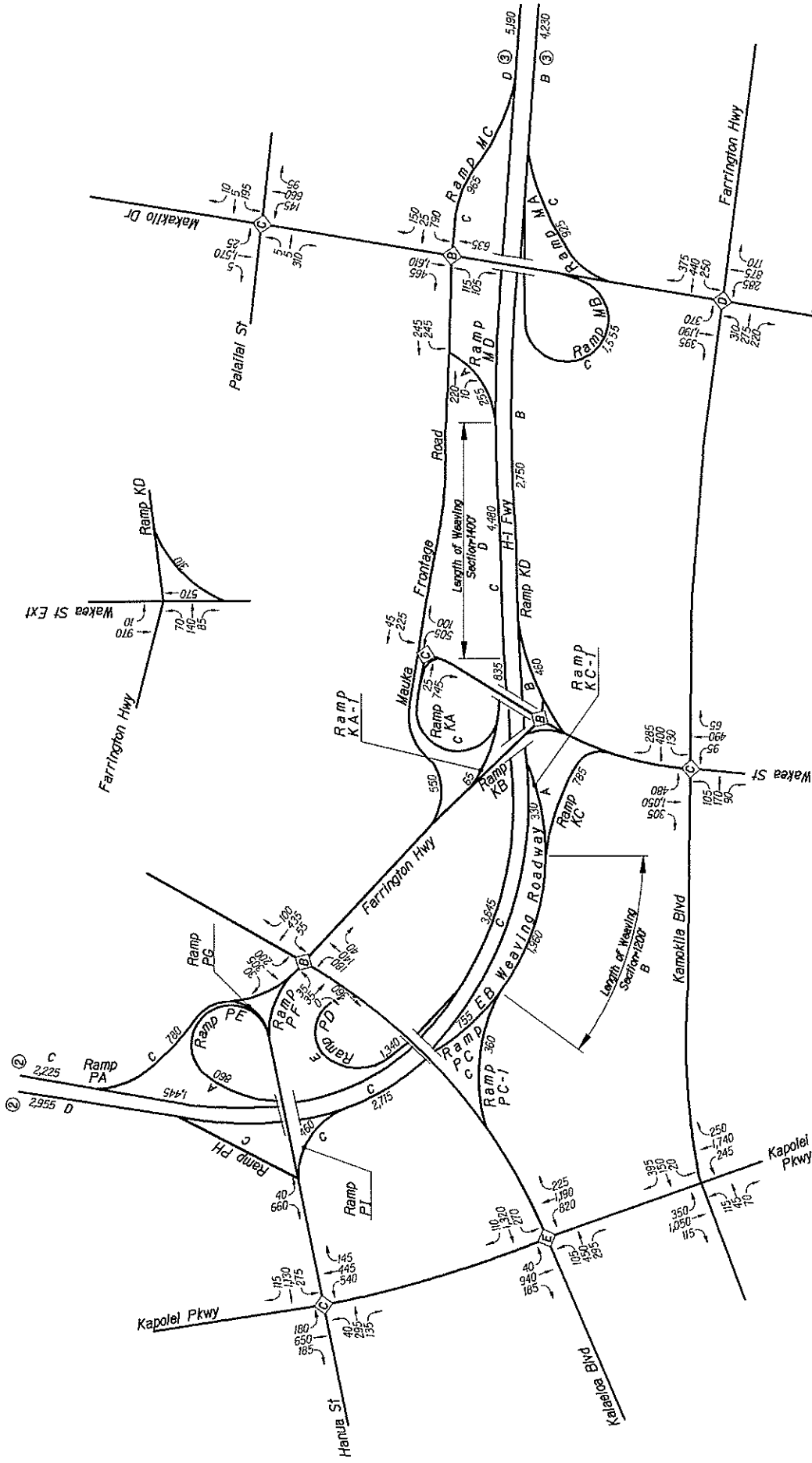
**TABLE 4-3
2010 FREEWAY MAINLINE CONDITIONS EAST AND WEST OF PROJECT AREA
(WITH PHASE 1 IMPROVEMENTS)**

Peak Hour	Direction	Traffic Volume	Lanes	Density ⁽¹⁾	Speed (mph)	Level of Service
EAST OF MAKAKILO INTERCHANGE AREA						
AM	Eastbound	3580	3	20.5	62.0	C
	Westbound	3860	3	22.1	62.0	C
PM	Eastbound	4330	3	24.7	62.0	C
	Westbound	4565	3	26.1	62.0	D
WEST OF PALAILAI INTERCHANGE AREA						
AM	Eastbound	2360	2	22.6	55.5	C
	Westbound	1870	2	17.9	55.5	C
PM	Eastbound	2285	2	21.9	55.5	C
	Westbound	3295	2	31.6	55.5	D

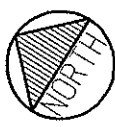
Reference: Wilbur Smith Associates (1/20/06)

Note:

⁽¹⁾ vehicles per hour per lane



- LEGEND:**
- 1,234 Traffic Volumes
 - B Roadway Level-of-Service
 - Overall Signalized Intersection Level-of-Service
 - Number of Lanes

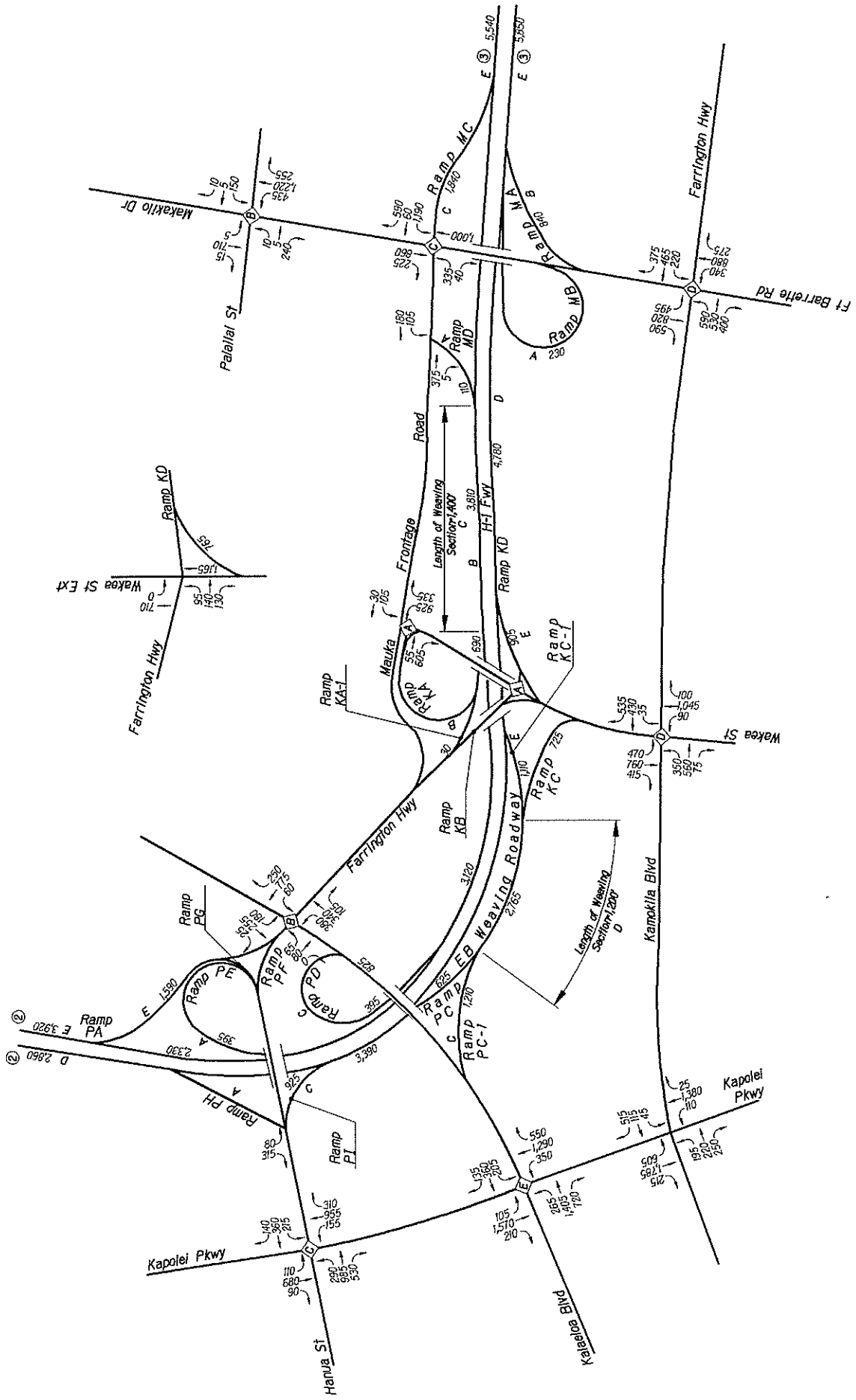


Ref: Wilbur Smith Associates (1/20/06)

I-HI Addition & Modification of Highway Access
 Palatalai IC / Makakilo IC (Kapolei IC Complex)

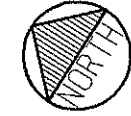
**2030 MORNING PEAK HOUR
 TRAFFIC WITH PROJECT (ULTIMATE)**

FIGURE 4-4



LEGEND:

- 1,234 Traffic Volumes
- B Roadway Level-of-Service
- ⊕ Overall Signalized Intersection Level-of-Service
- ③ Number of Lanes



Ref: Wilbur Smith Associates (1/20/06)

I-15 Addition & Modification of Highway Access
 Palatalai IC / Makakilo IC (Kapolei IC Complex)

**2030 AFTERNOON PEAK HOUR
 TRAFFIC WITH PROJECT (ULTIMATE)**

FIGURE 4-5

4.10 AIR QUALITY

4.10.1 Short Term Impacts and Mitigation Measures

Short term impacts can be separated into onsite and offsite impacts, which will be discussed separately in the following sections. In both cases, short-term impacts are construction-related, and will terminate once construction activities are completed.

Onsite Impacts. Construction vehicle activity can at times increase automotive pollutant concentrations along adjoining streets as well as on the project site itself. Construction vehicle traffic may cause a temporary reduction in average travel speeds with a concomitant increase in vehicle emissions due to the “stop and go” traffic conditions. Site preparation, earth moving, and roadway construction will also generate particulate matter emissions.

Adequate dust control measures will be employed during the construction period to mitigate generation of fugitive dust. Dust control may be accomplished by frequent watering of unpaved roadways and areas of exposed soil.

Offsite Impacts. In addition to the onsite impacts attributable to construction activity, there will also be offsite impacts due to the operation of concrete and asphalt batching plants needed to supply construction materials. Such plants routinely emit particulate matter and other gaseous pollutants. Although it is not possible to identify the specific facilities that will be providing these materials for construction, the following general statements can be made:

- Pursuant to state regulations, the operation of batch plants are subject to permits issued by the DOH Clean Air Branch. In order to obtain these permits, the batch plants must demonstrate their ability to continuously comply with both emission and ambient air quality standards.
- Under federal Title V operating permit requirements, now incorporated in Hawaii’s rules, air pollution sources must regularly attest to their compliance with all applicable requirements.
- A typical concrete batch plant in Hawaii is equipped with fabric filters for particulate matter control. Similarly, a typical asphalt plant is equipped with either a wet venturi scrubber or fabric filters. The efficiency of such controls is normally 95-99 percent.

Offsite impacts will be minimized by the need for concrete and asphalt batch plants to employ highly efficient emission control devices as required by DOH permit.

4.10.2 Long Term Impacts

Long-term impacts associated with or use of the interchange improvements are considered “mobile source” impacts. A mobile source impact analysis was prepared by J. W. Morrow (see **Appendix F**) using existing and projected peak-hour traffic volumes reported in the Traffic and Operations Study for the project. Modeling was performed for the years 2006, 2010, and 2030 to estimate carbon monoxide (CO) concentrations at 60 receptor sites in close proximity to existing and proposed roadways within the project area. The modeling results demonstrate

compliance with federal and state 1-hour and 8-hour CO standards under worst case conditions of meteorology and peak hour traffic; thus, no special mitigative measures are required.

4.11 NOISE

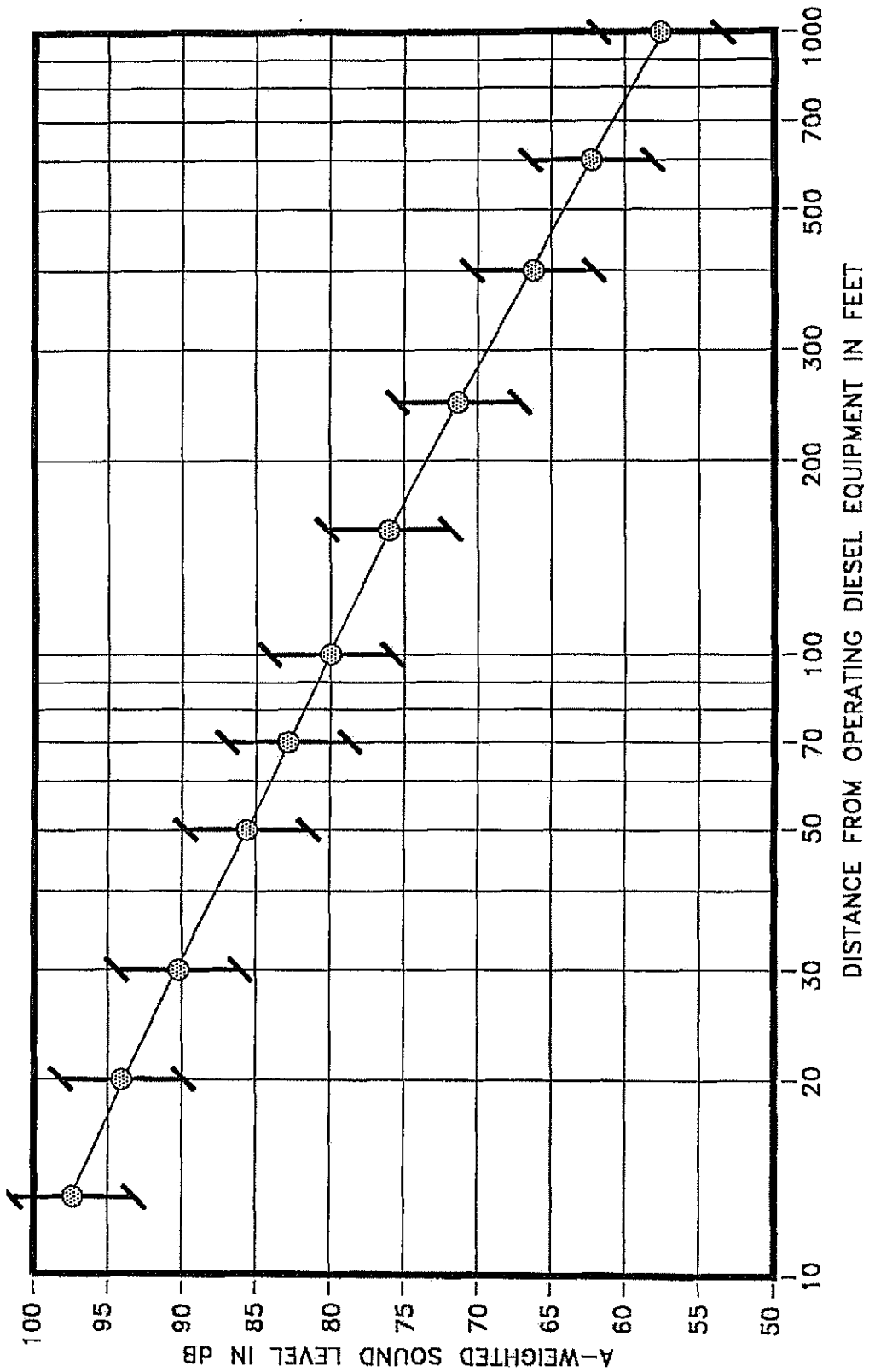
4.11.1 Short Term Impacts and Mitigation Measures

Short term noise impacts associated with construction activities may affect Makakilo residences if nighttime construction work is required to minimize traffic congestion along I-H1. These impacts can occur due to the relatively high noise levels associated with roadway construction equipment. Fortunately, noise exposure from construction activities at any one receptor location is not expected to be continuous during the total construction period.

Noise levels of diesel-powered construction equipment typically range from 80 to 90 dB at a distance of 50 feet. Typical noise levels from construction activity (excluding pile driving) are indicated on **Figure 4-6**. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

Construction noise levels at existing structures can intermittently exceed 90 dB when work is being performed at close distances from these structures. Along the Wakea Street extension and overpass, distances between the construction sites and the closest commercial receptors are expected to range between 25 and 50 feet, and construction noise levels may intermittently exceed 90 dB. The DOH currently regulates noise from construction activities under a permit system. Under current permit procedures, noisy construction activities are restricted to hours between 7:00 AM and 6:00 PM (Monday through Friday) and 9:00 AM to 6:00 PM on Saturday, with construction not permitted on Sundays or holidays. These restrictions minimize construction noise impacts on noise sensitive receptors such as residences, and have generally been successfully applied. However, where the closest receptors to the construction activities are business establishments, the use of the nighttime (or non-business hours) for construction has been beneficial in minimizing construction noise impacts on the business establishments. Along Wakea Street and near the Hawaiian Waters Adventure Park, nighttime construction may be considered to minimize noise impacts on the adjacent businesses due to the relatively large buffer distances available between the work area and the closest residences. Other mitigative measures include:

- Specified use of quieted portable engine generators and diesel equipment within 500 feet of noise sensitive properties.
- Location of heavy truck and equipment staging areas at least 500 feet from noise sensitive properties.
- Identify truck routes that avoid residential communities whenever possible.
- Use of 8- to 12-foot high construction noise barriers where construction work close to noise sensitive structures is unavoidable.



I-11 Addition & Modification of Highway Access
 Palailai IC / Makakilo IC (Kapolei IC Complex)

**ANTICIPATED RANGE OF CONSTRUCTION
 NOISE LEVELS VS. DISTANCE**

FIGURE 4-6

Reference: Y. Ebisu & Associates (3/06)

4.11.2 Long Term Impacts

Predicted future traffic noise levels at locations "A" through "K" and "WP1" through "WP10" are presented in **Table 4-4**. The noise level predictions were based on traffic volume forecasts for the year 2030. Future traffic noise levels are predicted to exceed the DOT 66Leq(h) noise abatement criteria for Activity Category B in 2030 at two locations within the Hawaiian Waters Adventure Park. In addition, 2030 traffic noise levels are expected to exceed the DOT 71Leq(h) noise abatement criteria for Activity Category C at three buildings within the Kapolei Shopping Center complex. It should be noted that most of these exceedances were present in 2005 and are attributable to the background growth of I-H1 traffic noise rather than due to the proposed project.

Possible noise mitigation measures were evaluated (see **Appendix G**). Several were deemed to achieve less significant results (e.g. restricting noisy vehicles) or not considered to be reasonable (e.g. alteration of horizontal or vertical alignment of the roadway; acquisition of real property to serve as a noise buffer zone). Construction of sound attenuating walls (a viable means of noise mitigation) was evaluated for ground level receptors at the affected areas of the Hawaiian Waters Adventure Park and Kapolei Shopping Center complex.

Hawaiian Waters Adventure Park. Construction of a sound attenuation wall as depicted on **Figure 4-7** would reduce traffic noise levels within the outdoor luau area ("WP7") and reduce noise interference during performances and shows at the outdoor stage. The sound attenuation wall would also reduce traffic noise levels for ground level receptors at location "WP5". However, mitigation of future traffic noise at the upper landing of the existing pedestrian tower at location "WP5" would not be feasible since wall heights in excess of 20 feet above the freeway right-of-way would be required to shield the upper landing of the tower structure from traffic noise. Both the Hawaiian Waters Adventure Park and its landowner, Campbell Hawaii Investor, LLC, submitted comments during the Draft EA review objecting to construction of a noise attenuation wall fronting the water park. Their objections to construction of a wall were: negative visual impact (both hindering public view of the water park and creation of a visual eyesore); and further encroachment of water park lands affecting internal operations and a special events area.

Kapolei Shopping Center complex. Construction of a sound attenuating wall along the freeway right-of-way as illustrated on **Figure 4-8** would block the view of the commercial properties from the freeway and ramps. Such action may be detrimental in eliminating exposure of these commercial structures to the traveling public. In addition, the benefits of the 5 dB reduction provided by the sound attenuating wall may not be realized within the commercial structures since they are currently enclosed and air conditioned. Fort Street Investment Corporation, owner of the Kapolei Shopping Center, submitted a comment letter during the Draft EA review to state their objection to construction of a noise attenuation wall along the northern limits of the shopping center. Their objections to construction of a wall were: severe effect on visibility, unattractive appearance, and impact on the neighborhood feel of the outdoor shopping center. They noted that all tenant spaces in the shopping center are fully air conditioned so noise should not be an issue.

Due to the objections expressed by the affected parties, construction of sound attenuating walls fronting the Hawaiian Waters Adventure Park and Kapolei Shopping Center will not be pursued. Refer to the correspondence in **Appendix I**.

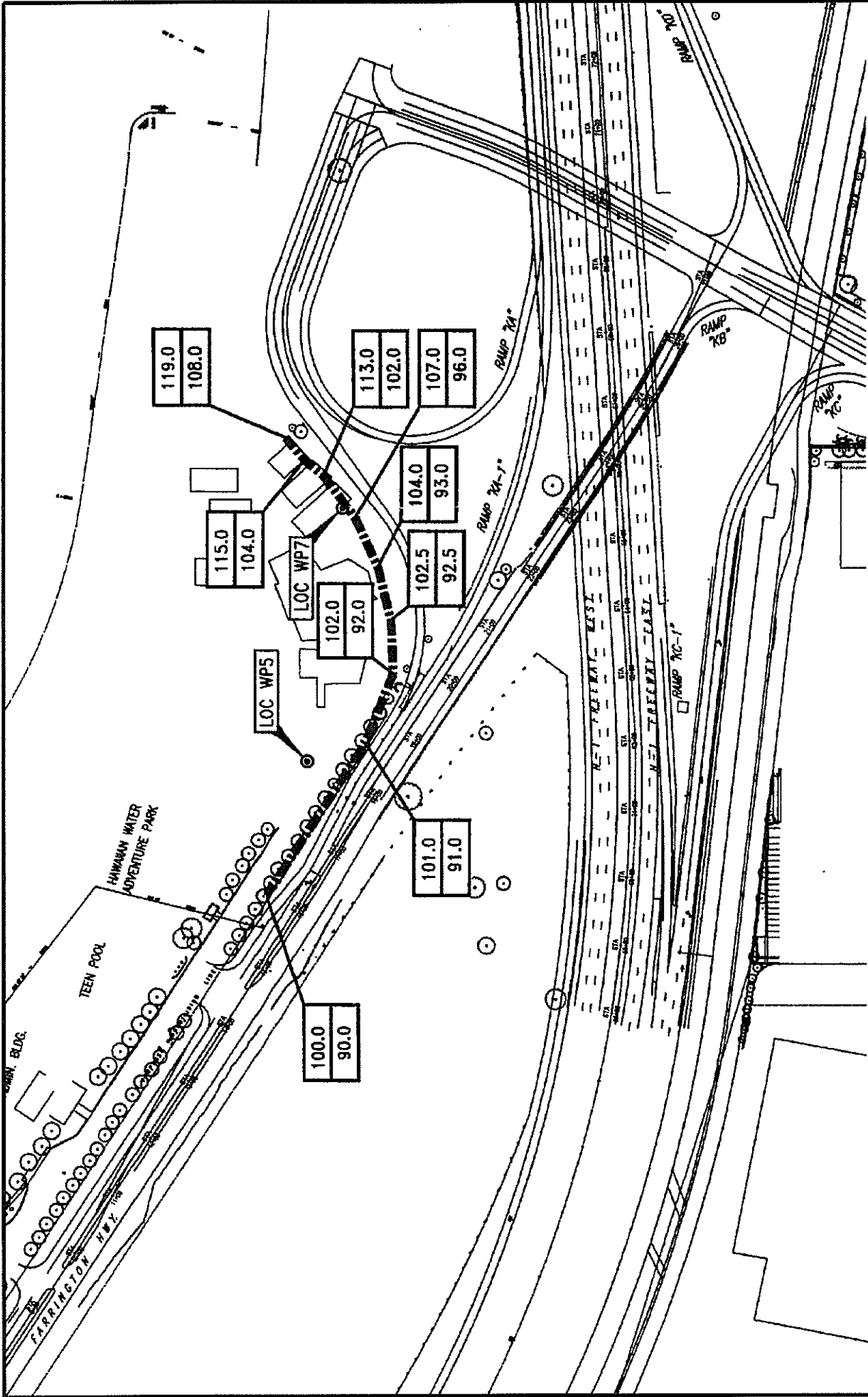
**TABLE 4-4
EXISTING (2005) AND FUTURE (2030) TRAFFIC NOISE LEVELS**

Receptor Site	Location ⁽¹⁾	Existing (2005) Leq ^(2,3)	Future (2030) Leq ^(2,3)	
			w/o Walls	Difference
A	Makai end of Awana St in Makakilo residential area	62.1	63.6	1.5
B	Northeast corner of Chili's Restaurant	67.5	68.4	0.9
C	Northeast corner of Longs Drug Store	62.7	65.6	2.9
D	Northwest corner of Safeway Supermarket	70.4	74.6 ⁽⁶⁾	4.2
E	Mauka side of the Marketplace at Kapolei	69.8	73.7 ⁽⁶⁾	3.9
F	Northeast corner of storage building	72.6 ⁽⁶⁾	76.3 ⁽⁶⁾	3.7
G	Northeast corner of Kapolei Police Station	61.4	59.4	(-) 2.0
H	Northwest corner of Credit Union building	65.4	67.9	2.5
I	Northeast corner of Kapolei Theatres building	61.7	62.4	0.7
J	Mauka side of K-Mart building	67.5	70.2	2.7
K	Mauka corner fo Home Depot building	60.1	62.3	2.2
WP1	Ticket booth ⁽⁴⁾	57.9	61.8	3.9
WP2	Gift shop ⁽⁴⁾	62.8	66.0	3.2
WP3	West of teen pool ⁽⁴⁾	63.6	66.3	2.7
WP4	South of water slide pool ⁽⁴⁾	69.1	70.6	1.5
WP5	Below tower at U-slide ⁽⁴⁾	70.1 ⁽⁵⁾	71.9 ⁽⁵⁾	1.8
WP6	Wave pool seating ⁽⁴⁾	68.7	69.3	0.6
WP7	Hawaii luau shed ⁽⁴⁾	67.1 ⁽⁵⁾	69.7 ⁽⁵⁾	2.6
WP8	Kauai luau shed ⁽⁴⁾	58.0	61.7	3.7
WP9	Oahu luau shed ⁽⁴⁾	61.4	64.9	3.5
WP10	Large water slide pool ⁽⁴⁾	65.9	67.6	1.7

Reference: Y. Ebisu & Associates (3/06)

Notes:

- ⁽¹⁾ All receivers were assumed to be 4.92 feet above ground level
- ⁽²⁾ Equivalent sound level in decibels
- ⁽³⁾ Based on afternoon peak hour traffic volumes
- ⁽⁴⁾ Location within Hawaiian Waters Adventure Park
- ⁽⁵⁾ Denotes exceedance of DOT "66 Leq" criteria for Activity Category B
- ⁽⁶⁾ Denotes exceedance of DOT "71 Leq" criteria for Activity Category C

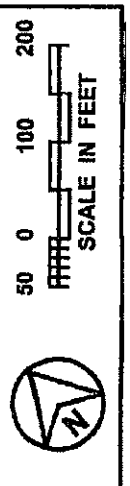


Ref: Y. Ebisu & Assoc. (3/06)

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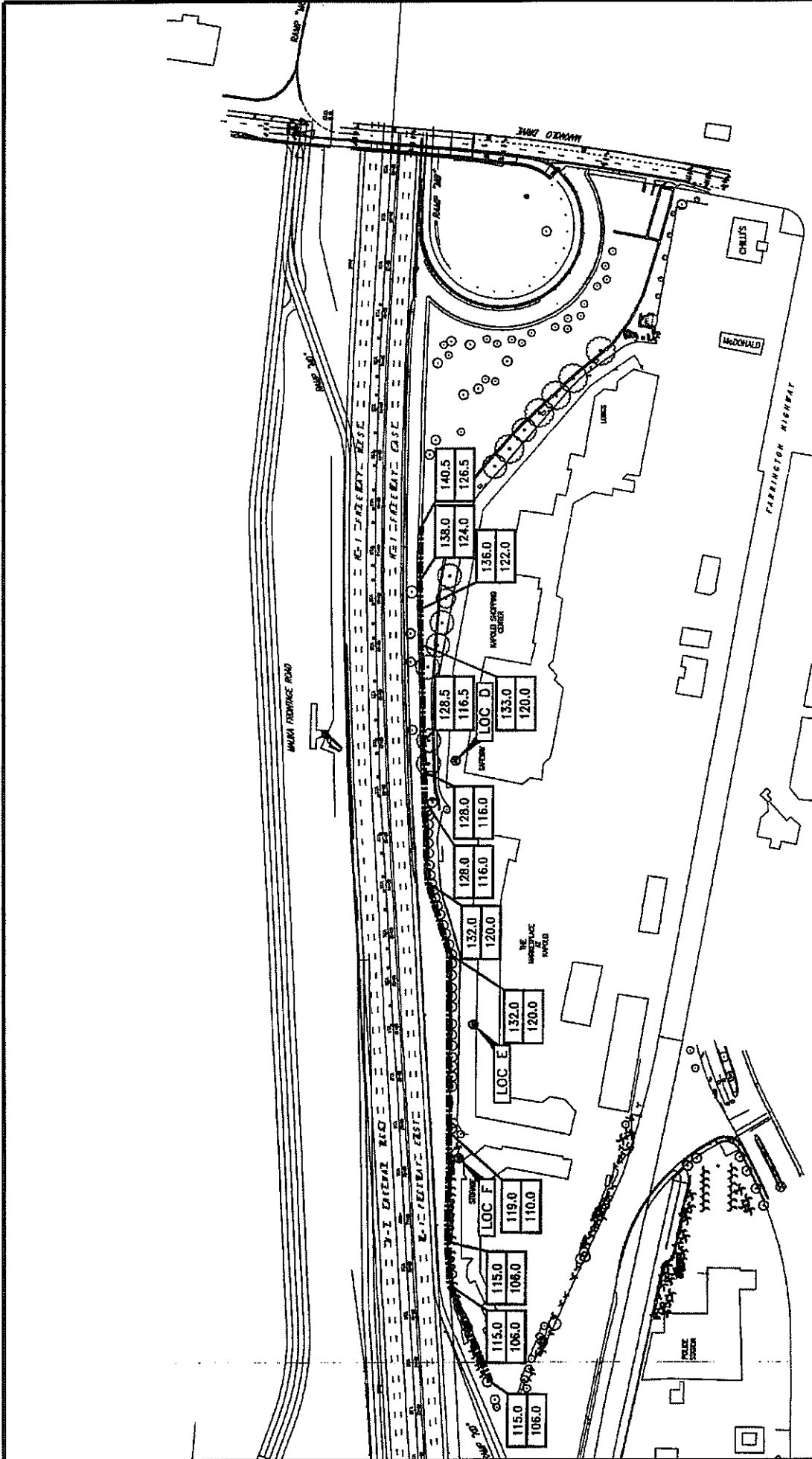
**PROPOSED NOISE BARRIER AT
 HAWAIIAN WATERS ADVENTURE PARK**

FIGURE 4-7



KEY:

100.0	WALL TOP ELEVATION (IN FEET)
90.0	WALL BOTTOM ELEVATION (IN FEET)
LOC WP5	NOISE MEASUREMENT LOCATION



The following general conclusions were made for the year 2030 with the proposed project:

- Substantial change in traffic noise levels (greater than 15 dB increase) will not occur at any receptor location within the study area. Maximum increases in traffic noise levels at any receptor location within the study area should not exceed 4.2 dB as a result of growth in traffic volumes and construction of additional ramps, the Mauka Frontage Road, and the Wakea Street extension and overpass.
- Future traffic noise levels at three commercial buildings on the makai side of I-H1 will exceed the DOT 71 Leq(h) noise abatement criteria for Activity Category C. However, risks of adverse noise impacts at these commercial establishments are considered to be low since they do not contain noise-sensitive occupants and are acoustically isolated from exterior noise through the use of closed ventilation openings and air conditioning. Further, Fort Street Investment Corporation, the shopping center owner, objects to construction of a sound attenuating wall due to the negative physical and visual impacts imposed by the structure.
- Future traffic noise levels at two locations near the makai property boundary of the Hawaiian Waters Adventure Park are expected to exceed DOH 66Leq(h) noise abatement criteria for Activity Category B. Of these two locations, only one ("WP7") in the luau assembly area is considered to be noise sensitive. Exceedance of the 66 Leq(h) criteria is a preexisting condition, but future traffic noise levels are expected to increase due to the background growth in I-H1 traffic volume and the addition of the Mauka Frontage Road ramp alongside the makai property boundary of the park. Construction of a sound attenuating wall to mitigate traffic noise will not be pursued due to objections expressed by the water park operator and landowner. The negative physical and visual impacts of a wall would outweigh the noise reduction benefit.
- Future traffic noise levels at the Kapolei Police Station (location "G") are expected to decline by approximately 2 dB following closure of the Farrington Highway connection to Kamokila Boulevard.

4.12 HAZARDOUS MATERIALS

No apparent environmentally adverse or detrimental effects were detected as a result of past or present use of the site. If contamination is observed during clearing of the site, a professional consultant will be contacted to evaluate the situation. In the event of leakage from the onsite transformer vault, all contaminated materials will be handled and disposed of by licensed hazardous materials abatement contractors in accordance with applicable laws and regulations.

4.13 UTILITIES

Project coordination has been initiated with the City and County of Honolulu, Hawaiian Electric Company, Hawaiian Telecom, The Gas Company, Oceanic Time Warner Cable, AT&T, and the military to minimize impacts on existing utilities. As planning and design proceeds, continued coordination will occur with appropriate agencies and organizations. Specific impacts to utilities include:

Street light relocation. Relocation of existing overhead lighting along I-H1 will be required to facilitate construction of new ramps.

Modification of drainage structures. Several culverts crossing I-H1 and Farrington Highway will be lengthened to accommodate the road widening associated with ramp construction. In addition, two existing concrete drainage channels will be enclosed to facilitate proposed construction. Enclosure of the City and County drainage channel will be coordinated with the appropriate City agencies, including appropriate easements and maintenance agreements.

The contractor will be required to verify the location of all existing utilities prior to excavation, and will be responsible for protecting existing utilities during construction. Any resulting damage to existing utilities will be repaired and paid for by the contractor.

4.14 CUMULATIVE AND REGIONAL IMPACTS / MITIGATION

A number of transportation projects have been planned for the Ewa District that would affect travel within the City of Kapolei. The proposed roadway improvements listed in the sections that follow have been considered in the traffic forecasts and analyses for this project.

2010 Regional roadway improvements. Several major regional projects are planned within the Phase 1 (year 2010) time frame that would divert traffic away from the City of Kapolei area or change traffic routing. These regional roadway improvement projects are:

- Completion of Phase 1 of the North-South Road from Kapolei Parkway to I-H1, with Honolulu-direction on- and off-ramps.
- Completion of the Kapolei Parkway connection east of the Villages of Kapolei

2010 Kapolei roadway improvements. Within the City of Kapolei, key roadway projects planned for completion by 2010 include:

- Completion of the Manawai Street / Kamaaha Avenue connection to divert traffic from the Farrington Highway / Makakilo Drive intersection.
- Extension of Haumea Street from Wakea Street to Uluohia Street.
- Extension of Kamokila Boulevard south to connect to Roosevelt Avenue in the Kalaeloa Redevelopment Area
- Widening of Fort Barrette Road to a four-lane divided roadway.
- Widening of the northern portion of Kalaeloa Boulevard to six lanes.

2030 Regional roadway improvements. Most of the regional roadway network is expected to be in place by the year 2030. The key elements that would affect traffic flow in the project area include:

- Extension of Makakilo Drive southeastward to connect to I-H1 at the future North-South Road Interchange.
- Extension of Kapolei Parkway westward to connect to Aliinui Drive in Ko Olina.
- Construction of the Makaiwa Hills Interchange west of Palailai Interchange to serve as a major entry into the proposed Makaiwa Hills development.
- Extension of Hanua Street to I-H1
- Connection of the proposed Kapolei West development to the proposed Makaiwa Hills development.

2030 Kapolei roadway improvements. Completion of the roadway network within the City of Kapolei is anticipated by 2030. Key elements include:

- Extension of Kapolei Parkway through the City of Kapolei
- Extension of Kamaaha Avenue from Manawai Street westward to connect with Kapolei Parkway and provide access to and circulation within the commercial area south of Kamokila Boulevard.
- Extension of Wakea Street southward to connect to Kapolei Parkway and the proposed Mehana at Kapolei development, with potential extension into the Kalaeloa Redevelopment Area.
- Completion of the downtown street grid within the commercial center.

4.14.1 Short Term Impacts and Mitigation Measures

Short-term cumulative and/or regional impacts may result from concurrent construction of multiple transportation projects. Of primary concern to motorists will be minimizing traffic congestion resulting from construction-related disruptions on one or more roadways in the vicinity. Coordination of construction schedules between concurrent projects will be critical to minimize and mitigate cumulative and/or regional traffic-related short-term impacts. Further, implementation of a comprehensive public information program to provide advance notification of lane closures and construction times via various media will allow the general public to anticipate and plan for delays, when inevitable.

Dust and noise generated from construction of multiple projects may affect a broader area or may intensify the nuisance if the projects are in close proximity. Mitigation of construction-related dust and noise impacts have been addressed in earlier sections.

4.14.2 Long Term Impacts

The proposed project, in conjunction with other transportation improvements proposed for the City of Kapolei and Ewa District, will have a positive long-term impact on the region by providing alternative travel routes and alleviating traffic congestion. The proposed project and other proposed regional or local transportation improvements are not expected to stimulate population growth. Rather, these projects provide a means to mitigate traffic impacts associated with development of the surrounding lands.

CHAPTER 5 ALTERNATIVES TO THE PROPOSED ACTION

This chapter discusses alternatives against which the proposed action was evaluated. The alternatives were rejected for their inability to meet the project objectives or attainment of the objectives at a higher cost (financially or environmentally).

To restate, the general objective of the proposed project is to improve Interstate H-1 Freeway (I-H1) traffic access to/from the City of Kapolei and surrounding employment and residential areas.

A total of four alternatives were considered, including the proposed action (preferred alternative) and "no action". Each rejected alternative is discussed in this chapter. In addition, potential alternate modes of transportation are discussed.

5.1 NO ACTION

Under the "no action" scenario, traffic access to/from I-H1 would continue with the present freeway ramp limitations. Traffic congestion at these existing interchanges and on local feeder roadways would be expected to increase with time, due to additional motorists associated with increased development and growth in the region. This alternative fails to meet the objective of improving I-H1 traffic access to/from the City of Kapolei. Specifically:

- The existing Makakilo Interchange is reaching capacity and does not provide westbound on-ramp access to I-H1.
- An existing overpass structure functions as a component of Palailai Interchange and services Farrington Highway. No existing interchange provides direct access to and from the westbound and eastbound lanes of I-H1.
- The present Palailai Interchange is approaching capacity and does not provide direct access to the eastbound lanes of I-H1 from areas north of the interstate.

5.2 ALTERNATIVE INTERCHANGE CONFIGURATIONS

Different configurations for the interchange complex from Palailai Interchange to Makakilo Interchange were originally studied and evaluated in the mid-1990's and reported in *Revised I-H1 Addition and Modification of Highway Accesses Palailai Interchange / Makakilo Interchange* (January 1994). These alternatives were also included in the 2006 updated report, which recognized implementation of ramps MA, MB and MC at the Makakilo Interchange. While the Makakilo Interchange is designed to provide all movements and operate independently, the Kapolei and Palailai interchanges are dependent on each other and operate as one interchange complex. Interchange configurations were studied and evaluated. The evaluation was based on capacity, operational characteristics, safety, environmental impacts, capital costs and user costs. A brief description of the alternative configurations is presented in the sections that follow. Both alternatives to the proposed action provide full access (direct and semi-direct) to both westbound and eastbound lanes of I-H1 at each interchange.

5.2.1 Alternative 1

A conceptual layout of Alternative 1 is presented in **Figure 5-1**.

Makakilo Interchange. This alternative provides full access to both westbound and eastbound traffic along I-H1. Both westbound on- and off-ramps are located across Makakilo Drive at the eastern terminus of the Mauka Frontage Road.

Kapolei Interchange. This alternative operates as a complex diamond interchange with the Palailai Interchange. This alternative provides three-lane collector-distributor roads paralleling I-H1 connected by a road with a grade separation structure.

Palailai Interchange. This alternative locates a second I-H1 overpass west of the existing facility to provide additional capacity for northbound and southbound traffic along the Kalaeloa Boulevard and Hanua Street corridors.

5.2.2 Alternative 2

A conceptual layout of Alternative 2 is presented in **Figure 5-2**.

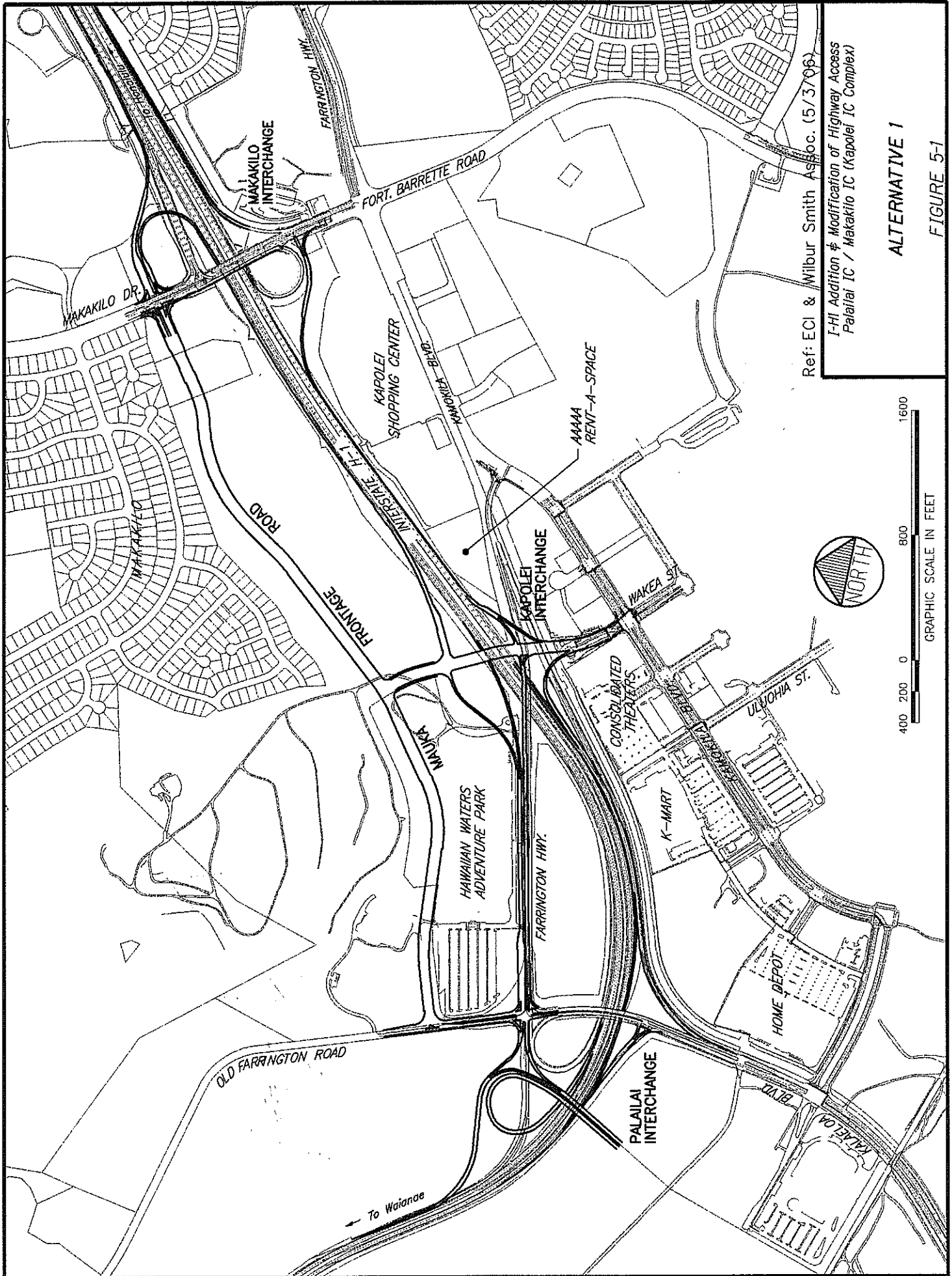
Makakilo Interchange. This alternative provided full access to both the westbound and eastbound traffic along I-H1 and is similar to Alternative 1 less any eastbound on-ramp improvements along I-H1.

Kapolei Interchange. The interchange is located west of the existing Farrington Highway overpass structure. A dedicated eastbound off-ramp along with a separate eastbound on-ramp from Kalaeloa Boulevard (Palailai Interchange) is proposed to eliminate an existing weaving section between the Palailai Interchange and Farrington Highway. In addition, two eastbound on-ramps are proposed for northbound traffic from Uluohia Street and eastbound traffic along Farrington Highway. A single westbound off-ramp is proposed with this alternative.

Palailai Interchange. This alternative locates a second I-H1 overpass west of the existing facility to provide additional capacity for northbound and southbound traffic along the Kalaeloa Boulevard and Hanua Street corridors. The interchange improvements resemble that in Alternative 1 with minor adjustments in the alignment of the loop ramp and Farrington Highway fronting the Hawaiian Waters Adventure Park.

5.3 ALTERNATIVE MODES OF TRANSPORTATION

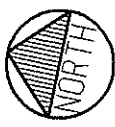
Alternative modes of transportation currently planned for the area include mass transit, public transit, and bicycle lanes. In addition, the existing unpaved median of I-H1 is being preserved to provide a corridor for additional High-Occupancy-Vehicle (HOV) lanes. These alternate modes of transportation may alleviate some existing and future traffic congestion in the area, but will not meet the general objective to improve I-H1 traffic access to/from the City of Kapolei and surrounding employment and residential areas.

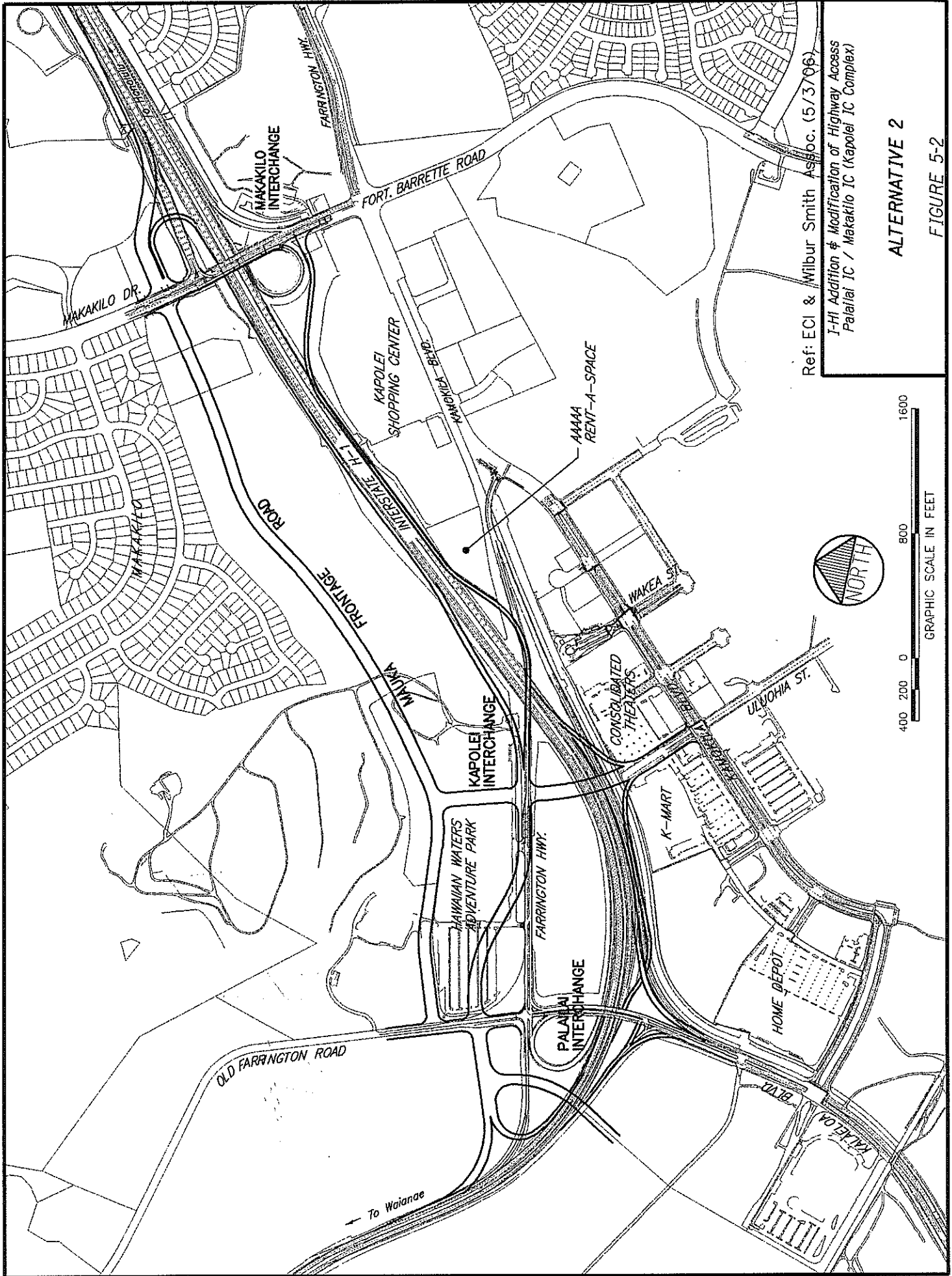


Ref: ECI & Wilbur Smith Assoc. (5/3/06)
 I-1 Addition & Modification of Highway Access
 Palalal IC / Makakilo IC (Kapolei IC Complex)

ALTERNATIVE 1

FIGURE 5-1

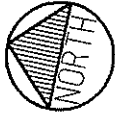




Ref: ECI & Wilbur Smith Assoc. (5/3/06)
 I-HI Addition & Modification of Highway Access
 Palani IC / Makakilo IC (Kapolei IC Complex)

ALTERNATIVE 2

FIGURE 5-2



→ To Waiānae

CHAPTER 6 FINDINGS AND DETERMINATION

6.1 DETERMINATION

The State Department of Transportation (DOT) has concluded that the proposed project does not have the potential to generate significant environmental impacts and the need to prepare an environmental impact statement is not evident. Therefore, this Final EA has been submitted with a Finding of No Significant Impact (FONSI) determination.

6.2 FINDINGS AND REASONS SUPPORTING DETERMINATION

The overall and cumulative impacts of the proposed action were evaluated with respect to Hawaii Administrative Rules (HAR) Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Section 11-200-12 "Significance Criteria". The following findings and conclusions can be made in support of the FONSI determination:

- (1) *The proposed action will not involve an irrevocable commitment to loss or destruction of any natural or cultural resource.*

The project site is located within or adjacent to the existing Interstate H-1 Freeway (I-H1) and Farrington Highway rights-of-way. The project site and surrounding area have been previously disturbed due to development of these roadways. No natural or cultural resources have been identified within the project site or in the immediate vicinity of the project site.

- (2) *The proposed action will not curtail the range of beneficial uses of the environment.*

Portions of the proposed project are located within lands presently owned by the Estate of James Campbell and its affiliates, the City and County of Honolulu, and others. The Estate of James Campbell and its affiliates have initiated the process to donate the needed lands for Phase 1 of the project under their ownership to the State DOT to expand the freeway right-of-way and facilitate the proposed interchange improvements. The State DOT is proceeding with negotiations to acquire the City and County owned parcel which contains a concrete drainage channel. The drainage channel will continue to serve the area, and appropriate easements and maintenance agreements will be provided.

- (3) *The proposed action will not conflict with the state's long term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.*

The State's environmental policy under §344-3, HRS, is to (1) conserve the natural resources and (2) enhance the quality of life. Impacts to the existing environment have been examined and disclosed, and no significant negative impacts to natural, cultural or historic resources are anticipated. The proposed project will enhance the quality of life in the Kapolei area by improving transportation facilities.

- (4) *The proposed action will not have a substantial negative effect on the economic or social welfare of the community or state.*

The proposed project will have a positive effect on the economic and social welfare of the residents and businesses in the Kapolei area by providing improved vehicular access to/from the area.

- (5) *The proposed action will not have a substantial negative effect on public health.*

While increased noise, dust, and vehicular air emissions are likely to result from construction and actual use of the proposed project, no long term negative impact on public health is foreseen.

- (6) *The proposed action will not involve substantial secondary impacts, such as population changes or effects on public facilities.*

The proposed project is not anticipated to incite population growth or changes. Rather, the need for the project is a result of growth in the Kapolei area. The project will have a positive impact on other currently congested roads by providing alternative freeway accesses.

- (7) *The proposed action does not involve substantial degradation of environmental quality.*

Construction activities may temporarily increase dust, noise and traffic vicinity. Mitigation measures will be implemented as discussed in Chapter 4. Upon completion of construction, these impacts will cease.

- (8) *The proposed action will not have a considerable cumulative effect upon the environment or involve a commitment for larger actions.*

The proposed project is a somewhat localized highway improvement project and does not involve a commitment for larger actions. The project itself provides traffic mitigation for projected future growth and development of the area.

- (9) *The proposed action will not substantially affect a rare, threatened, or endangered species or its habitat.*

There were no indications of rare, threatened or endangered species of flora or fauna present at the project site. Due to the proximity of the project site within and adjacent to roadway rights-of-way, suitable habitat conditions would not be expected.

- (10) *The proposed action will not affect air or water quality or ambient noise levels.*

Construction activities may have a short-term impact on air quality, water quality and ambient noise levels. No long-term impacts to air or water quality are anticipated. Ambient noise levels in 2030 are predicted to exceed State DOT criteria at two locations within the Hawaiian Waters Adventure Park and at three buildings within the Kapolei Shopping Center complex. Most of these predicted exceedences were present in 2005 and are attributable to the background growth of I-H1 traffic noise rather than the proposed project. Construction of sound attenuation walls was proposed in the Draft EA to mitigate noise levels at these locations. However, the water park operator and

landowner, and shopping center owner, submitted written objections to construction of the walls due to the negative physical and visual impacts which outweighed any noise level reduction.

- (11) *The proposed action will not affect, nor is it likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal water.*

The project site is not located in an environmentally sensitive area. Upon completion of construction, the entire project site will be paved or landscaped, minimizing soil erosion potential.

- (12) *The proposed action will not substantially affect scenic vistas or viewplanes identified in county or state plans or studies.*

The proposed project is located within and adjacent to the existing I-H1 and Farrington Highway corridor and connects to the existing roadway structures. Most of the proposed improvements will be built at grade, except for overpass ramps. The project site is not located in or along a scenic vista or view plane and negative visual impacts are not anticipated.

- (13) *The proposed action will not require substantial energy consumption.*

Although the proposed project will be illuminated, no significant impact on existing electrical service is foreseen and substantial energy consumption is not anticipated.

CHAPTER 7 CONSULTATION

7.1 PARTICIPANTS

This environmental assessment (EA) was prepared for the State Department of Transportation (DOT) by Engineering Concepts, Inc. The following consultants were also involved in preparation of this document:

<u>Consultant</u>	<u>Area of Expertise</u>
Wilbur Smith Associates	Traffic Engineering
J.W. Morrow	Air Quality
Y. Ebisu & Associates	Acoustical Engineering
EKNA Services, Inc.	Hazardous Materials Assessment
AECOS Consultants	Botany
Rana Productions, Ltd.	Avifauna/mammals

7.2 PARTIES CONSULTED DURING PREPARATION OF THE DRAFT EA

Preliminary consultation with agencies and other interested parties was conducted during project planning and preparation of the Draft EA. Selected correspondence is included in **Appendix A**. The following parties were consulted:

Federal Highway Administration
Hickam Air Force Base, Base Civil Engineers
Department of the Army, 30th Signal Battalion / Directorate of Information Management
Wheeler Army Air Field, Directorate of Public Works
Navy Region Hawaii, Facilities Department
Commission on Water Resource Management
State Historic Preservation Division
City and County of Honolulu, Board of Water Supply
City and County of Honolulu, Department of Design and Construction
City and County of Honolulu, Department of Environmental Services
City and County of Honolulu, Department of Facility Maintenance
City and County of Honolulu, Department of Transportation Services
City and County of Honolulu, Department of Planning and Permitting
AT&T
The Gas Company
Hawaiian Electric Company, Inc.
Hawaiian Telecom
Oceanic Time Warner Cable
Sandwich Isles Communications, Inc.
Tesoro Hawaii Corporation
Makakilo/Kapolei/Honokai Hale Neighborhood Board No. 34
Estate of James Campbell

7.3 PARTIES CONSULTED DURING PREPARATION OF THE FINAL EA

Sixty-six (66) copies of the Draft EA were distributed to agencies, organizations, public libraries and other interested parties. A complete list of these consulted parties is presented in **Table 7-1**.

Availability of the Draft EA was published in the June 8, 2006 edition of *The Environmental Notice* by the Office of Environmental Quality Control. A total of 22 comment letters were received as of October 9, 2006 (the 30-day public comment period officially ended on July 10, 2006). Agencies, organizations and individuals responding to the request for comments are indicated with a "C" in Table 7-1. Those parties responding with "no comments" are labeled with a "NC".

7.4 COMMENTS ON THE DRAFT EA

Comment letters received as a result of public review of the Draft EA and responses to those comments are included in **Appendix I**.

**TABLE 7-1
DRAFT EA DISTRIBUTION LIST**

No. of Copies	FEDERAL GOVERNMENT	Comment Letter
1	Senator Daniel K. Inouye	
1	Senator Daniel K. Akaka	
1	Congressman Ed Case	
1	U.S. Army Engineer District, Honolulu	C
1	U.S. Dept. of the Navy: Commander, Naval Base Pearl Harbor	
1	U.S. Fish and Wildlife Service, Pacific Islands Ecoregion	
1	U.S. Natural Resources Conservation Service	
1	U.S. Dept. of Transportation, Federal Highway Administration	
	STATE GOVERNMENT	
1	Senator Brian Kanno, 19 th District	C
1	Representative Mark S. Moses, 40 th District	
1	Dept. of Accounting & General Services	NC
1	Dept. of Agriculture	
1	Dept. of Business, Economic Development & Tourism	
1	Dept. of Defense	C
1	Dept. of Education	NC
1	Dept. of Hawaiian Homes Lands	
3	Dept. of Health, Environmental Planning Office	C
5	Dept. of Land and Natural Resources	
1	Commission on Water Resource Management	
1	State Historic Preservation Division	C
2	Office of Environmental Quality Control	C
1	Office of Hawaiian Affairs	C
1	Office of Planning	
1	Housing and Community Development Corporation of Hawaii	
	CITY AND COUNTY GOVERNMENT	
1	Councilmember Todd K. Apo, District I	
1	Councilmember Nestor R. Garcia, District IX	
1	Board of Water Supply	C
1	Dept. of Environmental Services	
1	Dept. of Facility Maintenance	C
1	Dept. of Parks and Recreation	NC
1	Dept. of Planning and Permitting	
1	Dept. of Transportation Services	C
1	Honolulu Fire Department	C
1	Honolulu Police Department	C
1	Oahu Civil Defense Agency	
	OTHER INTERESTED PARTIES	
1	AT&T	
1	The Gas Company	C
1	Hawaiian Electric Company, Inc.	C
1	Hawaiian Telecom	NC
1	Oceanic Time Warner Cable	
1	Sandwich Isles Communications, Inc.	
1	Makakilo/Kapolei/Honokai Hale Neighborhood Board No. 34	
3	Affiliates of The Estate of James Campbell	C (2)
1	Hawaiian Waters Adventure Park	C
1	AAAAA Rent-A-Space Maui, Ltd.	
1	Kapolei Marketplace LLC c/o Colliers Monroe & Friedlander LLC	
1	Oahu Transit Services, Inc.	C
	LIBRARIES	
2	State Main Library	
3	Kapolei Public Library	

REFERENCES

Engineering Concepts, Inc., Pacific Planning & Engineering, Inc., and William Chin, P.E., Inc., prepared for The Estate of James Campbell, *Revised I-H1 Addition and Modification of Highway Accesses Palailai Interchange / Makakilo Interchange*, January 1994.

Engineering Concepts, Inc. and Wilbur Smith Associates, prepared for Aina Nui Corporation, *Updated I-H1 Addition and Modification of Highway Accesses, Palailai Interchange / Makakilo Interchange*, May 3, 2006.

Federal Emergency Management Agency, Flood Insurance Rate Map

Hawaii State, Department of Health, Title 11, *Department of Health Administrative Rules*, "Chapter 200 - Environmental Impact Statement Rules", August 20, 1996.

Hawaii State, Department of Health, *Title 11, Department of Health Administrative Rules*, "Chapter 46 - Community Noise Control", September 23, 1996.

Hawaii State, Department of Health, *Title 11, Department of Health Administrative Rules*, "Chapter 60.1 - Air Pollution Control", November 14, 2003.

Helber, Hastert & Kimura, Planners, prepared for The Estate of James Campbell, *Kapolei Town Center Final Environmental Impact Statement*, August 1988.

Honolulu, City and County of, Department of Planning and Permitting, *Land Use Ordinance*, May 1999.

Honolulu, City and County of, Department of Planning and Permitting, (<http://gis.hicentral.com/>), March 14, 2006.

Honolulu, City and County of, Oahu Civil Defense Agency, Tsunami Evacuation Map 17 (Kahe Point to Ewa Beach).

U.S. Department of Agriculture Soil Conservation Service, *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, August 1972, (<http://www.ctahr.hawaii.edu/soilsurvey/5is/oahu.htm>).

University of Hawaii at Hilo, Department of Geology, *Atlas of Hawaii*, Third Edition, 1998.

William E. Wanket, Inc., prepared for The Estate of James Campbell, *Kapolei Business-Industrial Park Final Environmental Impact Statement*, April 1990.

William E. Wanket, Inc., prepared for The Estate of James Campbell, *Makaiwa Hills, Planning and Environmental Assessment*, September 1992.

APPENDIX A

MISCELLANEOUS CORRESPONDENCE

LINDA LINGLE
CHIEF OF POLICE



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMAKUILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

DEAN NAKANO
ACTIVE RECREATION, WATER
MANAGEMENT, AND
SPECIAL SERVICES
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMAKUILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

January 30, 2006

Dr. Hal Hamnatt
Cultural Survey Hawaii
P.O. Box 1114
Kailua, Hawaii 96734

Dear Dr. Hamnatt:

SUBJECT: Chapter 6E-8 Historic Preservation Review --
Archaeological Assessment and Cultural Evaluation for the Proposed I-HI Addition
and Modification of Highway Access, Palailai Interchange/Makakilo Interchanges
Honouliuli Aliupua'a, Ewa District, Island of O'ahu
TMK: (1) 9-1-015:004 (part), 017 (part), and 9-1-015:006 (part) 024 (part).

We are in receipt of the aforementioned archaeological assessment for our review. We received the plan on December 9, 2005.

During the assessment for the areas that were not previously surveyed, no historic properties were identified. There are three (3) historic properties near the project area, which were identified by early projects (50-80-12-4341 - ditch/funnel, 4342 - reservoir and 6679 - drainage ditch). These sites were determined to be significant under Criterion D and no further archaeological work was recommended.

No historic properties will be affected by the additions and modifications of highway accesses for I-HI near the existing Makakilo/Palailai interchanges and for the new Kapolei interchange.

This archaeological assessment report is acceptable.

If you have any questions please call Nancy McMahon, our Lead Kana'i Archaeologist, at 742-7033.

Aloha,

Melanie A. Chinen, Administrator
State Historic Preservation Division

NMC:jen

LINDA LINGLE
CHIEF OF POLICE



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

May 17, 2006

Mr. Kenneth Ishizaki, Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

Thank you for your May 8, 2006 letter requesting whether stream channel alteration permits (SCAP) are required for four watercourses crossing Interstate H-1 between Makakilo Interchange and Palailai Interchange at Kapolei, Oahu.

The Commission on Water Resource Management (Commission), Stream Protection and Management Branch, has the responsibility to protect stream channels from alteration whenever practicable to provide for fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses in the State of Hawaii under the authorization of the State Water Code (Code), Chapter 174C, and Hawaii Revised Statutes, Chapter 13-169 (Protection of Instream Uses of Water).

Pursuant to the Code, §174C-71(3)(A), the Commission "shall require persons to obtain a permit from the Commission prior to undertaking a stream channel alteration." The term "stream channel" is defined in the Code, §174C-3, as a "watercourse with a definite bed and banks which periodically or continuously contains flowing water."

Specifically for this project, the proposed construction improvements of lengthening four existing culverts under the H-1 Freeway will not require a SCAP from the Commission. Previous site inspections conducted in November 1998 along Farrington Highway, including nearby Awamui Gulch, indicated no flowing water, aquatic plants, or aquatic animals. The watercourses drained by the existing culverts do not support instream uses and are not considered to be "streams" that would require a SCAP.

Please be advised that the project may require other agency approvals regarding wetlands, water quality, grading, stockpiling, and floodways. This letter should not be used for other regulatory jurisdictions or used to imply compliance with other federal, state, or county rules.

If you have any questions, please contact Ed Sakoda at 587-0234.

Sincerely,

DEAN A. NAKANO
Acting Deputy Director

C:\WORK\RFID\2006 RFDS\NAKAKILO PALAILAI Interchange Ishizaki RFD.doc

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MAY 19 2006

ENR

PETER T. YOUNG
COMMISSIONER
HERBERT J. CHING
JAMES A. FRAZER
CHRISTOPHER L. FUKUKI, M.D.
LAWRENCE H. NIJKE, M.D., J.D.
STEPHANIE A. WHALEN
DEANA NAKANO
ADMINISTRATOR

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4529 • Fax: (808) 523-4730 • Internet: www.co.honolulu.hi.us

MUJI HANNEMANN
MAYOR



MELVIN N. KAKU
ACTING DIRECTOR

ALFREDA TANAKA, P.E.
DEPUTY DIRECTOR

Mr. David Miyamoto
April 25, 2006
Page 2

Should you have any questions, please call Michael Murphy of the Public Transit Division, at 523-4597.

April 25, 2006

Mr. David Miyamoto
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

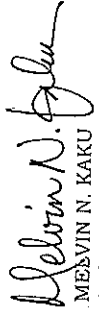
Dear Mr. Miyamoto:

Subject: I-H1 Addition and Modification of Highway Accesses
Palalal IC to Makakilo IC - Phase I
Federal Aid Project No. IM-HI-1(257)

We are responding to your request for comments for Federal Aid Project No. IM-HI-1(257), I-H1 Addition and Modification of Highway Accesses - Palalal IC to Makakilo IC (Kapolei IC Complex) - Phase I.

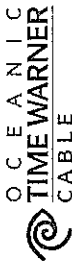
- There is one bus stop located within the project area (approximate location noted on the General Plan, page 4). It is on the property of Hawaiian Waters Adventure Park, thus it should not be affected.
- We have no immediate or future construction work planned within the project area.
- Within the project area, buses travel:
 - Kalaeloa Boulevard
 - Farrington Highway
 - Kamokila Boulevard
 - Makakilo Drive
 - On and Off Ramps for I-H1 at Makakilo Drive
 - Wakea Street (upon closure of Kapolei Transit Center)
- This project will affect bus routes and stops, therefore, notification of the scope of work, location, proposed closure of any street, traffic lane, or bus stop and duration of project must be made two weeks prior to construction by informing Oahu Transit Services, Inc. (Ed Sniffen at 848-4571 or Lowell Tom at 848-4578).

Sincerely,


MELVIN N. KAKU
Acting Director

cc: Christine Yamasaki-
SDOT
Oahu Transit Services, Inc.
DTS-Transportation Planning Division

200 Kamehameha Street
Makakilo, Hawaii 96750-5999
Tel 808-625-2109
Fax 808-625-5588



April 27, 2006

Engineering Concepts, Inc.
1150 S. King Street, Suite 700
Honolulu, Hawaii 96814

Attn: Mr. David Miyamoto

Subject: I-HI Addition and Modification of Highway Accesses - Palihaili IC to
Makakilo IC (Kapolei IC Complex) - Phase 1
Federal Aid Project No. IM-HI(257)

Dear Mr. Miyamoto,

Enclosed are the information you requested and a copy of your drawings showing the location of Oceanic Time Warner Cable's existing facilities in the project area.

At the entrance to the existing bus turn around area (Wakea Street Extension), off Kamokila Boulevard, is a 2'X4' CATV pullbox in the planter area. It is located on the mauka, Waianae side of the entrance and is being fed from a 2'X4' CATV pullbox on the makai side of Kamokila Boulevard. The pullbox in the planter has a conduit that services the Kapolei Theatres building. That pullbox and its associated conduits will have to be relocated when the road entrance is widened. Refer to Sheet R-1 for the location of the pullbox. At this time, Oceanic Time Warner Cable has no work planned in this area.

Oceanic Cable has fiber facilities attached to the pole line along Old Farrington Highway fronting Hawaiian Waters Adventure Park. On the underground portion of this run that crosses the freeway beneath the Old Farrington Highway overpass, Oceanic Cable's facilities co-exist in Hawaiian Telcom's conduit system. A portion of the underground system and the pole line fronting the Water Park will be in the project area. Refer to Sheets R-8 to R-10 for the location of facilities. The City and County has a lighting improvements project planned for Old Farrington Highway fronting the Water Park and Oceanic Cable intends to attach to the new poles being placed. The start date of this project is unknown.

Oceanic Cable also has fiber facilities running up Makakilo Drive, but the facilities are placed on the Ewa side of the road or in the medial strip and should not be in the project area.

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MAY 2006

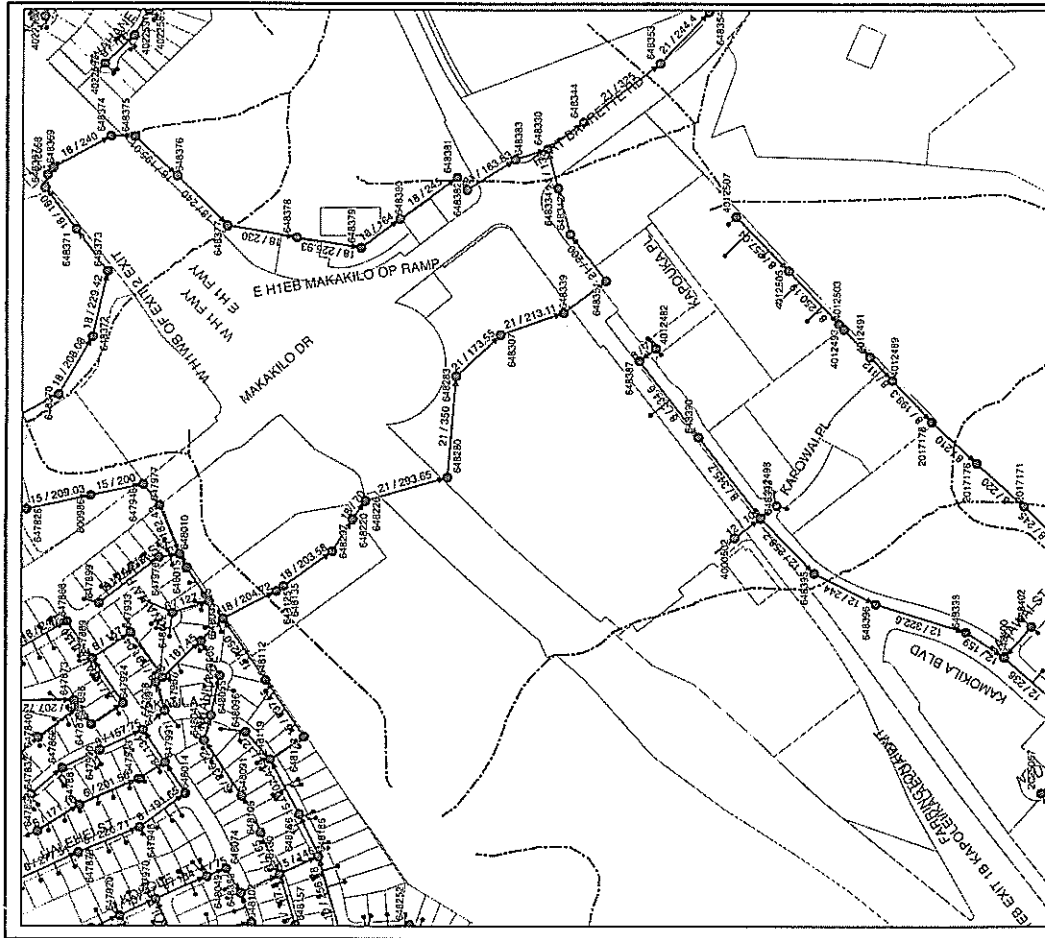
Engineering Concepts, Inc.

This is Oceanic Time Warner Cable's most current information regarding existing facilities and construction work planned for the future. If you have any questions or require more information, please call me at 625-8458.

Sincerely,

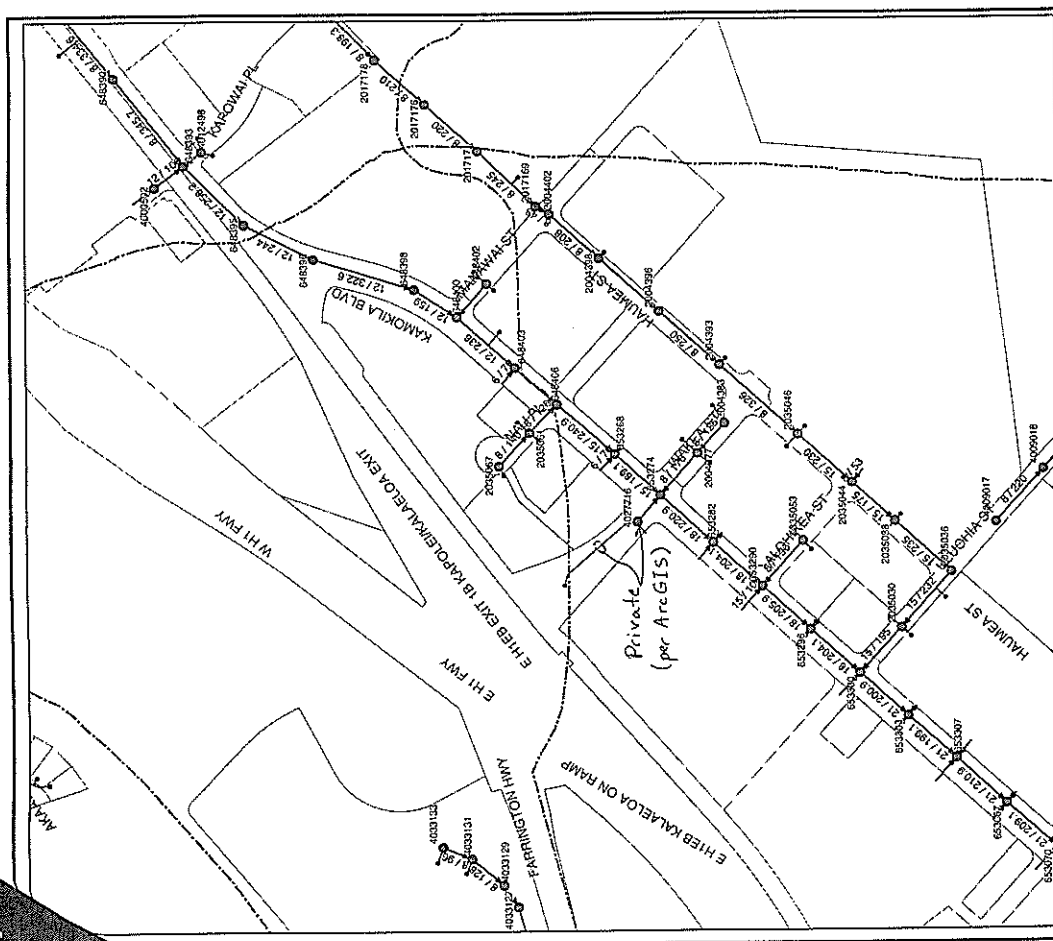
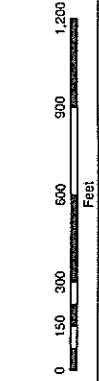
Darryl Osato
OSP Engineer

Enclosures (1)



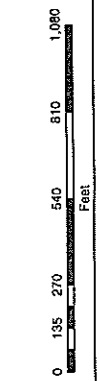
SubArea 3294
MANDŌ

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City & County of Honolulu
1001 Punchbun St
Honolulu, Hawaii 96813
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SubArea 3294
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MAY 10 2006

ENGINEERING CONCEPTS

Hawaiian Telecom 

May 8, 2006

Mr. David Miyamoto
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Miyamoto:

Subject: I-H1 Highway Accesses – Palalail IC to Makakilo IC – Phase 1

We have completed our review of the I-H1 Highway Accesses – Palalail IC to Makakilo IC – Phase 1 project located in the Kapolei IC Complex. We have determined that Hawaiian Telecom Inc. does have underground and aerial facilities within the project area. Their approximate location has been drawn in red for underground and green for aerial on the provided drawings.

The drawings only provide an approximate location of these cable facilities within the identified project site. It is recommended that toning be performed prior to excavation to determine the exact location of these cables.

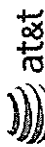
If you have any questions on this matter, please contact me at 840-1447.

Sincerely,



Paul K. Hanohano
Network Engineering & Planning

Attachment



2741 N. Main
Walnut Creek, CA 94597

May 15, 2006

Engineering Concepts, Inc
Attn: Mr. David Miyamoto
1150 S. King Street, Suite 700
Honolulu, Hawaii 96814

Re: IH1 ADDITION AND MODIFICATION OF HIGHWAY ACCESES -- PALAILAI IC TO
MAKAKILO IC (KAPOLEIIC COMPLEX) -- PHASE 1
FEDERAL AID PROJECT NO. IM-H1-1 (257)

Dear Mr. Miyamoto

This is in response to your inquiry dated April 14, 2006 regarding the above referenced project.

A review of your preliminary plans by AT&T Network Services reveals there is a conflict with the above-mentioned project and the AT&T Transcontinental Fiber Optic Cable at this location. AT&T must review your current and/or proposed engineering drawings to insure the safety and maintenance of AT&T facilities. AT&T is willing to provide you with its as built drawings and any details AT&T has available to help avoid any conflicts with its facilities.

Locating of AT&T's facilities must be arranged by contacting your local One-Call Utility Notification Center or AT&T's Cable Hazards Center at 1-800-252-1133 no less than 2 working days in advance of any activity within the defined easement area or 10' of cable. AT&T Plant Protection Services must be contacted, and be on site prior to any proposed activities on the AT&T easement or within 10' of cable. The AT&T Plant Protection Supervisor in charge of the cable locators for the AT&T cable facilities in the area of your proposed project above is Mr. Wayne Yamamoto / AT&T OSP Supervisor at, (808) 696-2777.

All inquiries requesting AT&T Proprietary Information in Northern California, Northern Nevada, and Hawaii (i.e. engineering as-builts) must be forwarded with detailed engineering drawings associated with your project to:

AT&T INQUIRY
Attn: Rosemary Hamill
2741 N. Main
Walnut Creek, CA 94597

CONFLICT

Enclosed is a copy of AT&T Honolulu to Makaha cable drawing WR 33329E-011,012 & 013 that depicts the approximate location of the AT&T cable in the general vicinity of your preliminary drawing. These as-builts are for informational use only in determining the approximate location of the AT&T facility. These drawings are "Proprietary Information" and should be utilized in strict confidence.

Should you have any questions related to engineering as builts, information, questions or concerns regarding your proposed project, please contact Mr. Paul Galleguer/Shasta Consulting Group at (415) 250-9447 or me at your earliest convenience.

Sincerely,

Ronald Pimentel for

Rosemary Hamill
AT&T Cable Maintenance Engineer
(925) 944-8416

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MAKAKILO / KAPOLEI / HONOKAI HALE NEIGHBORHOOD BOARD

**DRAFT REGULAR MEETING MINUTES
WEDNESDAY, JANUARY 25, 2006
KAPOLEI HIGH SCHOOL CAFETORIUM**

CALL TO ORDER: Chair Maeda Timson called the meeting to order at 7:00 p.m. with a quorum present.

MEMBERS PRESENT: Brent Buckley, Kioni Dudley, Michael Golojuch, Shad Kane, Marifa Makalwi, Jane Ross, Maeda Timson, George Yamamoto, Linda Young.

MEMBERS ABSENT: None.

GUESTS: Pat Lee, Frank Genadio, Jimmy Nakatani, Michael Golojuch Jr., Gary W. Oliva, Michele Golojuch, Ivan Atanason, L. D. Williams, Emily Viglielmo, Mike Leskovec, Lt. Farrel Sojot, Major Mike Tamashiro, Sgt. H. Javier (Honolulu Police Department), Henry Eng (Mayor's representative - Director, Department of Planning and Permitting), Councilmember Nestor Garcia, George Kuo (Board of Water Supply), Linda Smith (Governor's representative - Senior Policy Advisor), Senator Brian Kanno, Representative Mark Moses, Aulani Ahmad (Representative Kahikina's Office staff), Breene Harimoto (Board of Education Leeward member), Stanton Enomoto (Hawaii Community Development Authority), Theresia McMurdy (Campbell Estate), Dom Agorilla (Ko Olina), Doug Chafe, Alan Gano, Charles Zahn, Keoni Fox, Jackie Conant, Lolita Takeda, Robert H. Katalau III, Brennan Moricka (Hawaii Department of Transportation, Deputy Director for highways), Craig Atakaki (Engineering Concepts), Elwin Spray (Neighborhood Commission Office staff).

BOARD MEMBERS ROLL CALL: All nine Board members answered the roll call (Buckley, Dudley, Golojuch, Kane, Makalwi, Ross, Timson, Yamamoto, Young). Chair Timson reminded the community of the Board's rules on order and decorum, and of the time limits as noted on the distributed agenda. Dudley said that adoption of restrictions on members speaking time requires a vote, Chair Timson pointed out that such limitations were voted on, passed unanimously, and were in the distributed minutes of the Board's December 2005 meeting.

MONTHLY REPORTS, PART I:

Honolulu Fire Department (HFD) – Chair Timson noted that the HFD representatives were not present and suggested that they were likely responding to a call.

Honolulu Police Department (HPD) – Lt. F. Sojot introduced himself and Major M. Tamashiro and Sergeant H. Javier, distributed reports and highlighted the following information:

- 1) Crime statistics comparisons for the general Neighborhood Board area for November and December (format: Nov./Dec.) – 1/1 robbery, 15/15 burglaries, 43/51 thefts, 68/45 auto thefts, 79/61 thefts from vehicles (UEIMVs), 17/33 thefts from persons, 2/1 identity (ID) thefts, 66/105 motor vehicle collisions (MVCs), 1/4 driving under the influence (DUIs), 21/28 criminal property damages (CPDs), 4/3 drugs. There were 368/378 adult arrests.

150/103 juvenile arrests, and 518/481 total arrests.

- 2) **Crime tip: Reporting Drug Activity** – Drug activity in Hawaii is a problem of major concern to all citizens. Drugs affect not only individuals and their families, but entire communities. If you suspect drug dealing in your neighborhood, call any of the following organizations: Honolulu Police Department/Narcotics Division at 529-3101; Attorney Generals Office/Drug Nuisance Abatement Unit at 566-1328; Drug Enforcement Administration at 541-1930. When you call any one of the agencies, provide the location, type of activity, date and time, license numbers of vehicles, descriptions of people, and if known, names of suspects and types of drugs. The Attorney General's Office has an email address: stolice@hawaii.gov and a web site, http://www.hi.us/sg/stop_ice_index.htm in order to report drug activity. HPD has an online reporting form, at www.honolulu.org/nv/nvform.htm. If you suspect drug dealing in your area, please contact any or all of the above listed agencies for assistance.

Ross reported that concerns had been expressed to her of a group of youth frequenting the Kapolei Shopping Center and that some shoppers are being warned of the need to be careful at night in the parking lot. She reported the comments from several people, which included that the individuals were perhaps runaways, and asked for HPD to follow up. Chair Timson reported hearing similar concerns, identifying receiving four phone calls, which added the information that a fight at or in the regional park had occurred and that she had communicated these calls to the HPD officers prior to the start of the meeting. Chair Timson added that a neighborhood watch group had offered the nickname of the "Kapolei Wolf Pack" to identify the youths, who were reported to be attempting to hide in the theaters overnight, as well as scavenging dumpsters for food. Chair Timson also urged the community to call in other unusual incidents immediately to HPD. Dudley also requested a report back. Lt. Sojot reported that the fight had originally been identified as an isolated incident and that the HPD would follow up.

An audience member asked if there was any new information on a prior concern of a threatening letter (directed to resident D. Ackerman); Lt. Sojot will follow up.

Mayor's Representative – Henry Eng distributed Mayor Hanemann's newsletter for January 2006 and reported on the following issues from prior meetings:

- 1) A community group is being formed to identify community concerns with regards to a community benefits package for Leeward Coast residents who are neighbors to the Waimanalo Gulch Landfill.
- 2) Traffic volume studies are normally done every three years – although more frequently if there are large changes in the area – but that no new survey is expected immediately since a study was just accomplished in the spring of 2005.
- 3) Curbside green waste recycling is anticipated to start in the Makakilo/Kapolei area in March 2006.
- 4) Mayor Hanemann is discussing a possible tax credit and the creation of an owner/occupant class for the upcoming budget process.

Eng introduced Pat Lee, who will be attending future Board meetings to brief the community on the high-capacity transit corridor planning being done by the City. The transit corridor group office can be reached at 566-2299.

Questions, comments and concerns followed:

- 1) Kane made reference to last meeting's report on the Kapolei Regional Park; Chair Timson asked that the issue be deferred to the Park Committee item later on the agenda.
- 2) Yamamoto noted that the announced closure of the City's Waimanalo Gulch landfill operation will require planning and other expenditures prior to the 2008 date and asked for a report on the funds planned to be included in the FY2006 budget.
- 3) Dudley reported on the need for property tax relief, noting that there had been a large increase in the valuations for the Makakilo area. He asked for the item to be discussed at the next Board meeting.

Councilmember Todd Apo – Chair Timson announced that Wendy Sefto, who had been reporting to the Board over the past year, had resigned from Councilmember Apo's staff. There was no representative present.

Councilmember Nestor Garcia – Councilmember Garcia distributed his report and conveyed the following:

- 1) He expressed concern about the impact of anticipated property tax bills to residents and reported that there were eight current proposals, and probably a ninth being written, which will be considered by the Council; he reported that there would likely be some tax relief, although relief will be balanced against community needs.
- 2) The Council has set aside proposed legislation on street performers, so that the status quo remains.
- 3) He congratulated and thanked those involved in the Kapolei Christmas events.
- 4) He reported that the possible funding of a pedestrian-activated crosswalk in upper Makakilo will be discussed in the City's budget adoption process.

Chair Timson requested a future presentation on the various property tax relief proposals and suggested that the Council involve real estate professionals in the bill writing process. Garcia said that his office would assist with the presentation. Dudley noted that a proposed \$200 credit was not sufficient relief versus the much larger increase; Garcia reported that the long-term question of community needs will be discussed. An audience member reported that the pedestrian crosswalk was needed due to vehicles speeding uphill even more than the downhill traffic. An audience member reported several Farrington Highway concerns: increased use, less road maintenance, need for improvements and adjacent construction impacts of dust, mixed traffic and speeding of large trucks; Garcia said that both he and State Department of Transportation Deputy Director Brennon Morioka will work together to seek answers for the next meeting and will address safety concerns. Morioka explained that a City-mandated impact fee is paid by developers to assist the general community and the developer submits a work plan to the City dealing with the roadway use; he added that both the City and State are concerned – although the roadway is a state highway, this section is under City jurisdiction – and that both will work together. Young reported that the traffic concerns were just recently brought up at a community meeting and that there had been an improvement within the last few days – seemingly lower truck speed and temporary traffic stoppage to sweep up roadway. An audience member reported that excessive construction dust was damaging adjacent property in Kapolei Villages; Garcia thanked the community for the reports, added that there was a need for continual monitoring of projects and that the contractor should have a hotline phone number readily available, which he seek for the next meeting. Garcia reported he would work with Councilmember Apo to follow up on Makakilo issues.

Board of Water Supply (BWS) – George Kuo distributed BWS 2006 calendars and reported one main break in the past month, that the new BWS head is Clifford Lum (Chief Engineer), and that water conservation should be ongoing and that one way would be for everyone to limit their shower time.

PRESENTATIONS: Chair Timson introduced presentation items for information and possible Board action, asking that the total presentation time be limited to 15 minutes each.

Ali'i Wireless Specialists – Keoni Fox, of Ali'i Wireless Specialists, requested a conditional use permit and height waiver to develop a PCS telecommunications facility on Puu Palehua behind Umeha Street for the Cingular Wireless company. The single 35' wood pole with four-flush mounted antennas would be on approximately 900 square feet of property, surrounding a 12' by 24' equipment shelter and the pole. Maps distributed included trees to mask the structure. Fox reported that he met with Kane on archeological and cultural sites, including discussions of native trees, and reported no major concerns were identified. Fox reported that the closest resident property line was over 500 feet away. Fox reported 168 letters were sent to adjoining property owners. Dudley reported that the design seemed to be the best that had been submitted to the Board, with the commitment to paint the pole to blend in and asked about possible harm from antenna operation; Fox replied that it was a low power transmitter. Yamamoto asked about

community reaction; Fox reported no feedback. An audience member reported being an adjacent property owner and said he had not received a mail notice; he then asked about access to the site, if there could be multiple users for the antenna, and asked if a presentation would be made to the community association. Fox said the mailing had just gone out, that the site would be visited on a monthly basis through the Umeha Street easement and that the system was designed to be expanded to multiple users but that most users were seeking stand-alone sites. Alan Gano reported that his community association had a presentation on a new antenna design and suggested that Ali'i consider that design. Jerry Teles asked about specifications, with Fox reporting that the output will be for cell phones, up to 20 channels available, 100 watts per channel, and suggested the similarity to 20 100-watt light bulbs. Fox said the facility would be over 50 feet from the water tank and would operate on 1800 to 1900 megahertz and 800 to 900 megahertz. Chair Timson asked for any additional questions or comments before a motion was heard. Makaiwi thanked Fox for the presentation, characterizing it as very helpful. Dudley moved and Golojuch seconded that the Makaiwi/Kapolei/Honokai Hale Neighborhood Board No. 34 support a conditional use permit and height waiver to develop a PCS telecommunications facility on Puu Palehua behind Umeha Street. Yamamoto proposed deferring until after more community responses. Chair Timson asked about the timeline for the project, with Fox explaining that the earliest the project could start would be in three months and that if the Board does not support the project he would go back to Cingular for guidance. Chair Timson, Fox, Golojuch, Dudley and Yamamoto discussed if Fox could or would need to come back if the item were deferred, with Fox saying he would prefer to communicate to the Board, but would be available if needed. Dudley said that the answers for the project had been given, that it would have minimum impact and that it was the best-looking antenna project he's seen. Chair Timson stated that issue was before the Board to table until the next meeting and asked for a vote; there were eight ayes and one no. Aye: (Buckley, Golojuch, Kane, Makaiwi, Ross, Timson, Yamamoto, Young). No: (Dudley). A member of the audience said he wanted to comment on the motion. Chair Timson said that voting was withdrawn and that the audience might speak to the motion. The audience member said that the prior community association presentation referred to discussed the use of bundling antenna systems to be co-located and said that these new systems should be researched by Fox before new projects are approved. Chair Timson asked if there were any changes in voting and announced that the motion to table had passed, 8-1-0. Aye: (Buckley, Golojuch, Kane, Makaiwi, Ross, Timson, Yamamoto, Young). No: (Dudley).

State of Hawaii Department of Transportation (DOT) Kapolei Interchange Update – Brennon Morioka, Hawaii DOT deputy director for highways, and project engineer Craig Arakaki, of Engineering Concepts, discussed plans for the new H-1 Kapolei interchange, including creating a new west-bound on-ramp at the nearby H-1 Makakilo Interchange. The plan is a joint public-private project of DOT and Kapolei Property Development LLC, which will provide motorists another way in and out of the City of Kapolei. Drivers will be able to connect with the interchange from Kamokila Boulevard at Wakea Street and bypass traffic fronting busy Kapolei Shopping Center. The new interchange is intended to also relieve traffic congestion at the H-1 Makakilo or Palalailai interchanges, the current accesses to the freeway. Groundbreaking for the new interchange is scheduled for the end of the year. Plans also call for creating a new west-bound on-ramp at the nearby H-1 Makakilo Interchange, Kapolei Property Development (KPD), an affiliate of the Estate of James Campbell, is contributing the land and spending more than \$2 million for the planning and design of the on- and off-ramps and flyover for the Kapolei Interchange. The intent is to also use KPD's contributions as part of the State's match for federal funds for the project's construction phase. The public-private nature, with the private contribution, allows for the Kapolei Interchange project to be "on the fast track." The state DOT is working on other transportation projects for the Ewa-Kapolei area, including the second phase to widen Fort Weaver Road, scheduled to begin this summer; the ongoing construction of the "North-South Road" connecting Kapolei Parkway with the H-1 Freeway; and the widening of Fort Barrette Road, which is currently under design.

Young asked about timeframe; Morioka said they hope to start at the end of 2006 and that construction will take 18 months. Buckley asked about closure of Farrington Highway; Morioka said the on-ramp fronting Hawaiian Waters (as an on-ramp from Makakilo Drive) would close, as would the off-ramp at HPD – to be replaced by a new ramp at the bus transfer site by Zippy's, with

the explanation that the bus transfer site was always intended to be a temporary and short term usage. Dudley asked about reopening the bus transfer site; Morioka said the site would be closed and that the City would be establishing the permanent site. Kane asked about grade separation; Morioka said that all intersections would be on grade with widening shoulders (filled). Golojuch asked about the intersection at Makakilo Drive; Morioka said the two-way intersection – the off-ramp from town – would not be redone, but that an on-ramp from Makakilo Drive would be added. A member of the audience said that the westbound exit into Makakilo Drive is the problem and it is not being addressed. Gano said that the timing of all the projects being worked on at the same time will be more disruptive than necessary and asked that the multiple timing be reconsidered; Morioka said that some portions will overlap but said he did not believe there will be major construction occurring at the same time. The audience asked about the time to completion; Morioka said that the four different phases should be done in approximately three years, adding that this project is part of the Ewa Highway master planning and that this package is moving faster than the other areas. Morioka invited anyone with questions to call 587-2156.

Committee Reports: Recommendations to the City – Mike Golojuch reported on gathering Makakilo/Kapolei/Honokai Hale Neighborhood Board committee recommendations to be combined, prioritized and submitted to the City as Board priorities for Fiscal Year (FY) 2007 Capital Improvement Projects (CIP), a part of the City's budget process that is being sent to the City Council. He reported a gathering last week and explained that he will be making a table listing the individual priorities, including attempting to identify the missing portions (and their costs and what's lapsed) of projects such as the finishing of the regional park. Garcia said that he could offer assistance in the parks area since he is the Council Parks Committee chair and suggested that other communities had formed (through the Council) park advisory boards, which he said could be considered if this community felt it was of value. Golojuch suggested a possible Council Parks Committee meeting at Kapolei Hale, with Kane adding that the possible park advisory board would be valuable and Buckley agreeing, saying that he felt that the community hadn't been able to push through the completed park projects. Yamamoto said that the CIP list needed to pay attention to the options for closure and relocation of the landfill, with planning, design and development funds needed. Golojuch said the new transit center would require development planning. Golojuch said the CIP recommendations had to be finished for a June vote at the latest. Garcia said that the City's Transportation Director had been told of the importance of the Kapolei transit center; Golojuch said that the plan was always to have a transit center but not in the center of town. Chair Timson asked if Garcia could take the lead on some of these issues; Garcia said he could discuss with the Council Chair about a possible Kapolei hearing on an issues list. Golojuch said that a future meeting would have to have time set aside for discussion and that he will continue to condense the priorities down to an action report, especially with assistance from Kane and Yamamoto.

CHAIR'S REPORT:

Chair Timson reported on a number of issues from community members:

- The City Council is not in general support of transit and requests that Councilmembers Apo and Garcia push hard for more support.
- Large trucks pull into the Kapolei Shopping Center, taking all of the left turn light to make the turn, and then block multiple lanes and parking slots within the center; these are not necessarily delivery trucks but customers at the banks or lunch sites.
- Those exiting and entering into Makakilo Baptist Church are at risk because of excessive speeding, especially those coming up the hill who fail to slow to accommodate those making turns into the lot.
- Graffiti repairs are almost always done with non-matching (and clashing) paint.
- Chair Timson reminded members that video taping of board meetings (as was done in the past) is not being continued because the Neighborhood Commission can not provide enough funds to do the taping for the entire year.

COMMITTEE REPORTS

Education: Committee Chair Dudley had no report, but said he thought television coverage was important.

Environment/Public Safety: Committee Chair Yamamoto had no report.

Planning/Zoning: Committee Chair Buckley had no report, but said he was waiting for community input.

Parks: Committee Chair Kane reported that the Kapolei Regional Park continues to remain of concern, with two specific items, 1) that the space is not monitored after hours and is thus open to vandalism and homeless inhabitation, and 2) that the groundskeeper is only on the site for two days a week (and three days at other parks).

Transportation: Committee Chair Golojuch reported that the Oahu Metropolitan Planning Organization (OMPO) is having a series of meetings, with the last one planned for February 15, 2006 with decision making to follow on a major transportation master plan through 2030. He also reported there are island-wide transit corridor public meetings in progress. An audience member mentioned that the February 15 meeting would be repeated; one starting at 4:30 p.m. and one starting at 7:30 p.m. and noted Representative Moses' report includes two pages of projects.

DATE CHANGE FOR FEBRUARY MEETING – Chair Timson announced that all planning for the Kapolei first takes into consideration the transportation issues and that several major community transportation meetings are scheduled, including one for the February 22, 2006 regular Board meeting date: Rail Transit Route Selection Community Meeting at Kapolei Elementary School Cafeteria, 6:30 to 8:30 p.m. The meeting would be exploring the four routes under consideration, was sponsored by Senators Kaino and Espero, and would be involving the community in the decision-making. She suggested the Board consider the importance of the issue and discuss alternatives, including moving the meeting to February 15, 2006. Dudley suggested that the February 15, 2006 date also had an important transportation issue meeting and suggested another date be explored. With general consensus, Chair Timson requested a vote authorizing the Chair to move the date of the Board's Regular February 22, 2006 Meeting to another date. After discussion, Chair Timson restated the motion to authorize the Chair to cancel the February 22nd date and to reschedule the Board's Regular Meeting to an appropriate time, declaring it passed unanimously without objection, 9-0-0. Aye: (Buckley, Dudley, Golojuch, Kane, Makaiwi, Ross, Timson, Yamamoto, Young).

BOARD/COMMUNITY ANNOUNCEMENTS: Chair Timson explained that, according to the Sunshine Law, Board members are not allowed to discuss anything that's not on the agenda, although they may make brief announcements. Dudley expressed concern that the issue of time limitation on speaking as stated on the agenda and as referenced in the December 5, 2005 Minutes should not include a time limitation on members. Dudley expressed concern that the authority was being too broadly applied and asked that the issue be discussed at this time. Chair Timson asked that the parliamentary issue be deferred and placed on a future agenda in deference to the State Sunshine Law provisions. Chair Timson also reminded Dudley that this change was made by a Board motion and unanimous vote. Yamamoto expressed concern that the Board's agenda does not include community inputs as "Community Concerns." Chair Timson explained that the Sunshine Law limits Board discussion with being listed as an agenda item but added that the Board uses the Governor's and Mayor's Representatives agenda items as place markers for general community concerns. Chair Timson also reported on a scholarship program done by Hui o Kapolei: two \$500 college scholarships, with one for a Kapolei High School senior and one for a high school senior who is a resident of a 96707 address.

APPROVAL OF MINUTES OF REGULAR MEETING OF DECEMBER 5, 2005: Young moved, and Ross seconded, to approve the Regular Meeting Minutes of December 5, 2005. Chair Timson asked for corrections from Board members; there were none. Community members suggested the following corrections:

- Page 9, Senator Kano requested that his report read: "...there is no route planned that goes by both UH West Oahu and the Fort Weaver Road corridor."
- Page 9, Representative Mark Moses, item no. 1, requested that his report read: "his opinion

is that any alternative must serve ..."

- Page 9, Representative Mark Moses, item no. 2, requested that his report read: "The State school bus stops on Makakilo Drive between Panama and Paluhia Streets have been moved closer to the intersection crosswalks at his request."

Without objections, Chair Timson announced that the Minutes for December 5, 2005 were unanimously approved with the three corrections, 9-0-0. Aye: (Buckley, Dudley, Golojuch, Kane, Makaiwi, Ross, Timson, Yamamoto, Young).

TREASURER'S REPORT: Treasurer Buckley had no current report.

MONTHLY REPORTS, PART II:

Congressman Ed Case – Jimmy Nakatani distributed a written report and discussed the issue of the military chemical weapons dumped in the ocean off the Waianae Coast, explaining that a briefing had been given and that the complete report, including a requested survey, has not been received back. Nakatani also reported that the issue is not one involving Mahalo Water and the Big Island, referencing the exporting of ocean water, because the Big Island's water is taken a great depth.

Governor's Representative – Linda Smith, Senior Policy Advisory to the Governor, circulated the recent State of the State Report, several documents on the requirement that a by-product of molasses – ethanol – be combined into gasoline sold in Hawaii starting April 2, 2006 (including a memo from Mark Anderson, Deputy Director, Department of Business, Economic Development & Tourism) and a January 14-20 release from the Governor's Office. Smith discussed the State of the State address, the Legislative opening, and legislative initiatives from the administration – especially tax, pedestrian safety (including possible revocation of a driver's license for a citation for failure to yield to a pedestrian in a crosswalk).

Golojuch asked about Makalani School projects not being prioritized or funded; Smith reported that 165 projects were submitted but that not all projects had been prioritized by the Board of Education (BOE) – the prioritizing is now being done by the BOE. Dudley said that the Governor's energy plan is great; Smith emphasized the addition of ethanol is a positive direction for the State. Chair Timson asked about the Hawaii Raceway Park issue, with the operators citing closure due to cesspool issues requiring closure in March, 2006, stressing economic impact and possible increases in area speeding; Smith reported hearing of the possible closure but did not feel the racetrack was linked to speeding issues. Smith suggested the Hawaii Community Development Authority might have additional information (agenda item follows). An audience member asked about ethanol additive since it represented an extra step and no Hawaii plant exists to manufacture – resulting in an additional import; Smith explained there was no tax on ethanol so the cost of importing is offset by the lowering of total tax. Michelle Golojuch asked about excessive rubbish now occurring on the freeway, especially on off-ramps; Smith said those issues were primarily referred to a litter control office, which is no longer in operation. Gano reported revenue is up and that funds should be passed to the counties; Smith reported that Lingle supports counties receiving the un-adjudicated fines from citations and that the 1/2% General Excise Tax goes into the counties coffers. Smith also reported that there are other pressing State needs for funds.

Senator Brian Kanno – Senator Kanno distributed a written report and reported the Legislature's opening. He reported planned funding for the Hanua Street to Malakole Street extension.

Representative Mark Moses – Representative Moses distributed a written report and offered to bring bill listings to the next meeting. He reported several suggestions for tax relief were under active consideration and stressed that the community should be participating in the OMPO meeting on February 15, 2006. Moses also reported that the City should be conveyed the transit accommodations tax receipts, that caregivers and health professionals are under consideration for tax credits and that nursing licensing requirements are being reviewed. Yamamoto asked that the legislature address the gas cap law; Chair Timson suggested the issue could be added to a future

agenda.

Representative Michael Kahikina – Aulani Ahmad introduced herself as the new representative from Rep. Kahikina, distributed a written report, cited Kahikina's involvement with a homeless task force, and was available for questions.

Board of Education Member Breen Harimoto (BOE) – Leeward BOE member Breen Harimoto reported a planned 'talk story' session with Board of Education members at the Waipahu Intermediate School on February 22, 2006. He discussed that the BOE had identified \$557 million in repairs over the next three years but that the Governor had only released \$344 million; with procurement now starting on the released funds. He commented on the suggested higher prioritization of Maukalani Elementary School, explaining that the original listing included suggestions from school groups that were not included with the officially developed list from the individual school administrations. Chair Timson asked if the released funds were sufficient; Harimoto said that \$100 million was needed to maintain, to go forward and cover the missed needed repairs, then there is a need for additional funds. Moses pointed to the needs for Kapolei High School and suggested that the anticipated rebate fund could be adjusted to cover pressing needs; Smith said rebate monies could not be dedicated to schools. Harimoto said he would report back on funding issues.

Campbell Industrial Park Area – Chair Timson reported air quality data for the Campbell Industrial Park had been compiled by Ron Ho and were available at the table in the back of review. If anyone had any questions, the 24-hour environmental hotline number is 674-3388.

Hawaii Community Development Authority (HCDA) – Stanton Enomoto distributed a Kaaaloa Status Report and discussed that the Master Plan is in the process of wordsmithing, that the impact of the proposed location of a carrier group to Hawaii is a factor that needs to be reflected in the Master Plan (the decision is likely to be in a Congressional report scheduled for February 6, 2006), that a \$5 million dollar appropriation has been submitted for Kaaaloa infrastructure improvements (in SB 2541), and that he can confirm the anticipated closure of the Raceway Park. He added that the operators of the raceway park (and others) are proposing a land swap which may permit continued operation and that an extension of the current operation is under consideration until the new site is completed, but that he is hearing this from others. He reported that the HCDA Kaaaloa office is to open in mid-February. Chair Timson pointed out that raceway land swap is a State issue, not an HCDA issue.

ADJOURNMENT: With no objection, Chair Timson adjourned the meeting at 9:47 p.m., 9-0-0. Aye: (Buckley, Dudley, Golojuch, Kane, Makaiwi, Ross, Timson, Yamamoto, Young).

Submitted by Elwin Spray, Neighborhood Commission Office staff

Friday, February 17, 2006



ENGINEERING CONCEPTS, INC.
Consulting Engineers

May 8, 2006

Mr. George P. Young, P.E., Chief
Regulatory Branch, CEPOH-EC-R
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Subject: Determination of Jurisdiction for Various Drainageways Crossing Interstate H-1
between Makakilo Interchange and Palaliwai Interchange in Kapolei, Oahu, Hawaii

The State of Hawaii Department of Transportation is proposing to construct improvements to the Interstate H-1 freeway in Kapolei between the Makakilo Interchange and the Palaliwai Interchange. Proposed improvements include the construction of additional freeway on- and off-ramps that will result in widening the freeway and lengthening existing culverts under the freeway. The drainageways are all normally dry. We respectfully request a determination of whether construction of the proposed drainage improvements will require a Department of the Army permit.

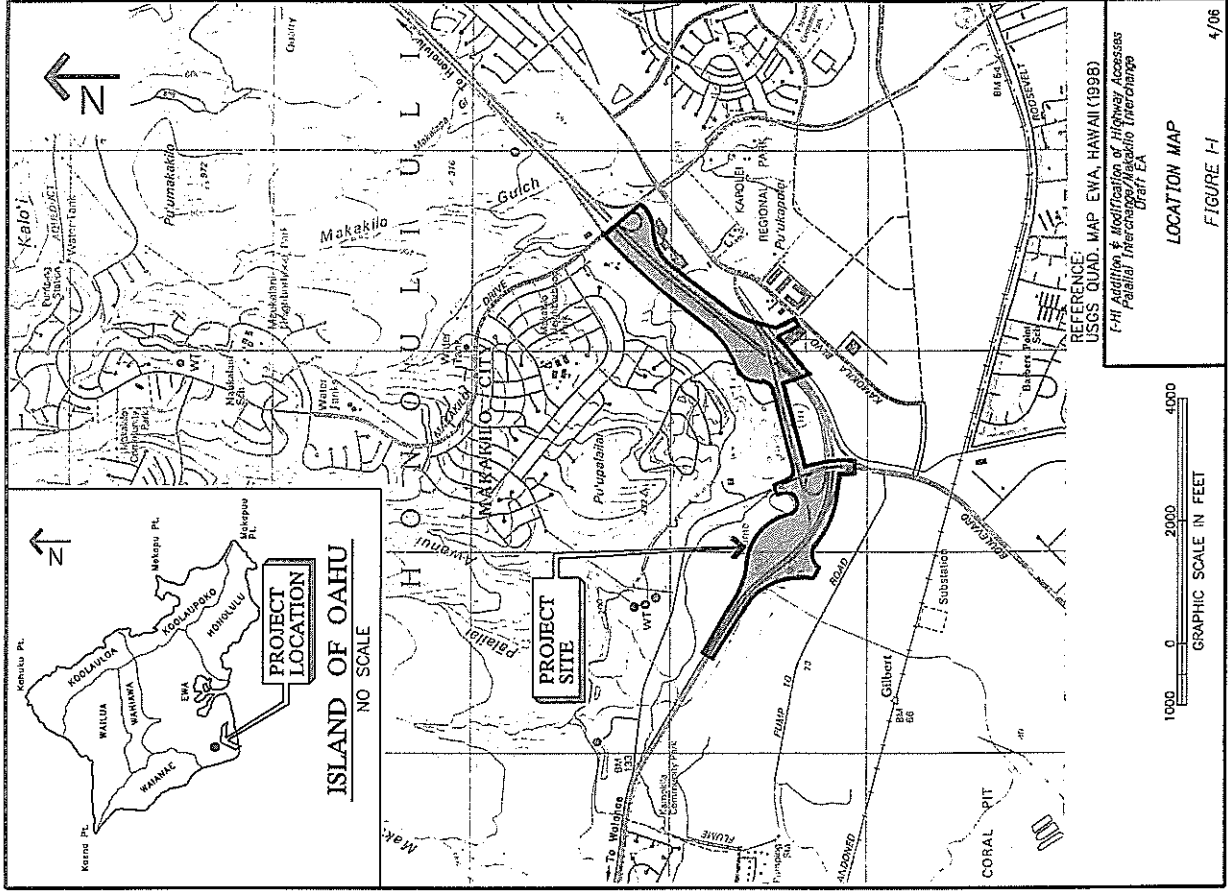
The following documents are enclosed for your review and use:

1. Project site location on 1998 USGS Ewa, Hawaii, quad map
 2. Photos showing locations on preliminary construction drawings
- Should you have any questions or require additional information for your determination, please call me or Dana Arakaki at 591-8820.

Very truly yours,

Craig Arakaki, P.E.
Vice President

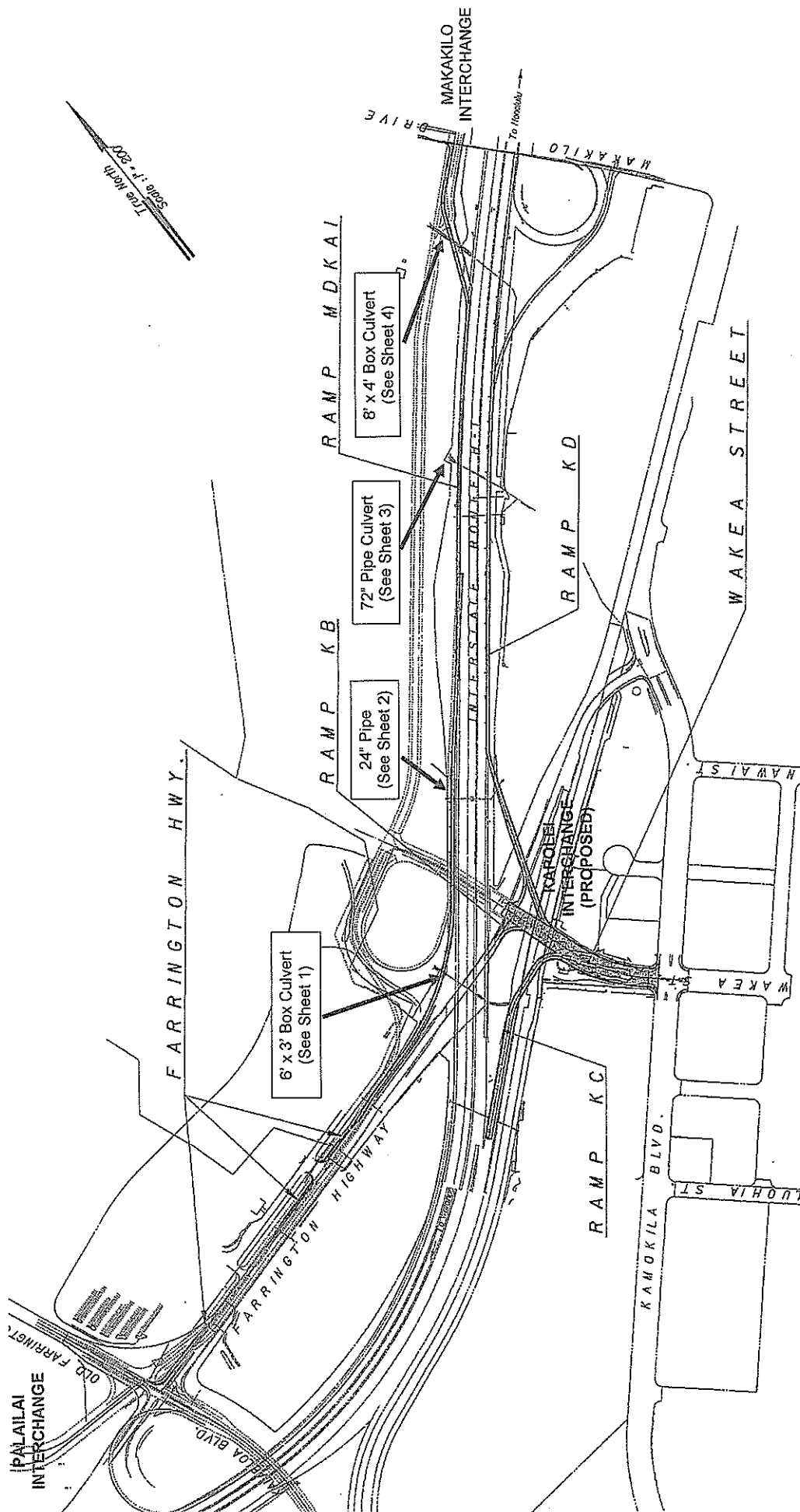
Enclosure



1000 0 2000 4000
GRAPHIC SCALE IN FEET

LOCATION MAP
FIGURE 1-I

4/06



PALILAI INTERCHANGE

FARRINGTON HWY.

6' x 3' Box Culvert
(See Sheet 1)

RAMP KB

24" Pipe Culvert
(See Sheet 2)

72" Pipe Culvert
(See Sheet 3)

RAMP MDKAL

8' x 4' Box Culvert
(See Sheet 4)

RAMP KC

KAROLEE INTERCHANGE
(PROPOSED)

RAMP KD

MAKAKILO INTERCHANGE

DRIVE

To Honolulu

The North
Scale 1" = 50'

KAMOKILA BLVD.

WAKEA STREET

LUOHIA ST.

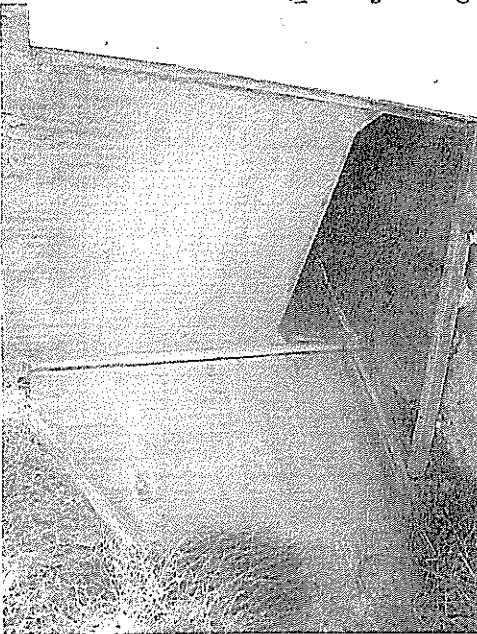
HAWAII ST.

FARRINGTON HIGHWAY

MAKAKILO

INTERSTATE ROUTE 5

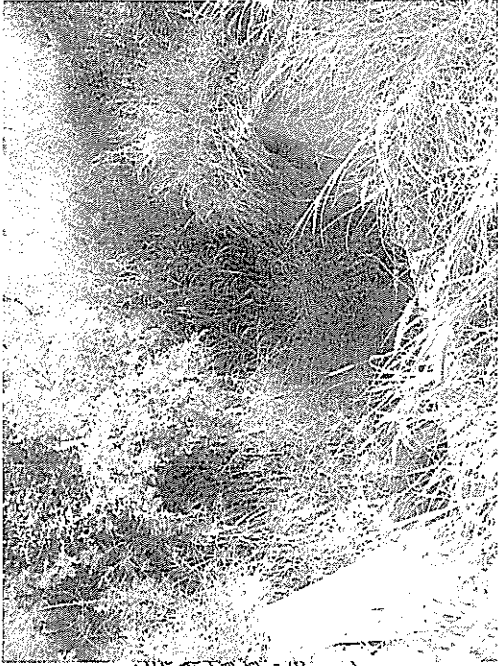
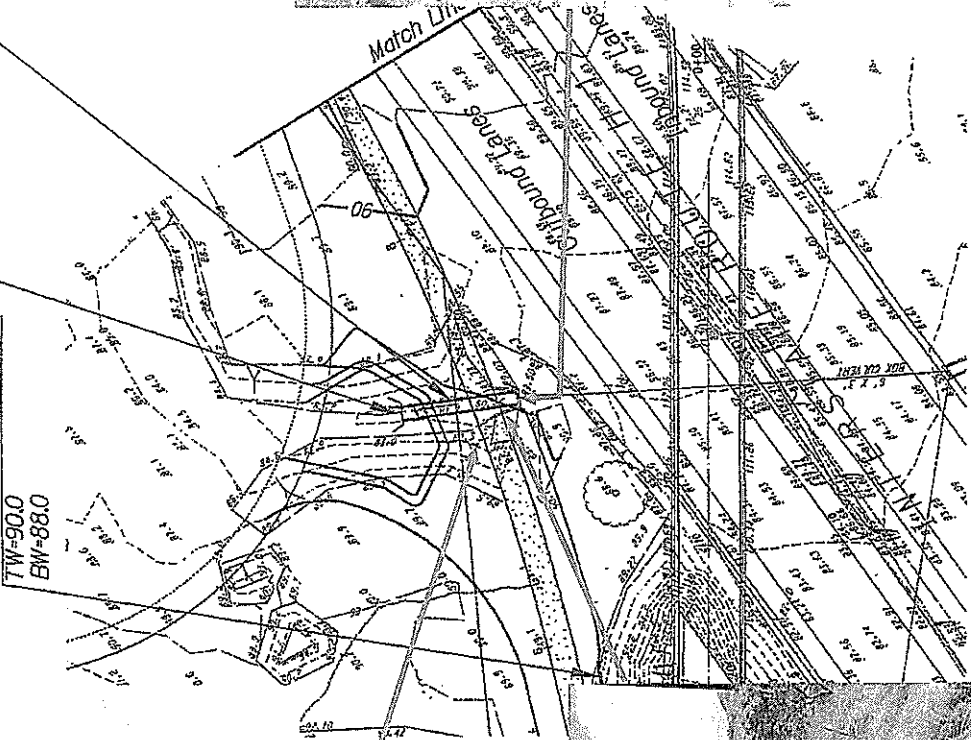
The North
Scale 1" = 40'



Concrete Headwall
Sta. 7+24.71
(30.94' Lt.)

6'x3' Box Culvert

Sta. 5+83.76 Ramp MDKAI
(20.00' Rt.)
TW=90.0
BW=88.0

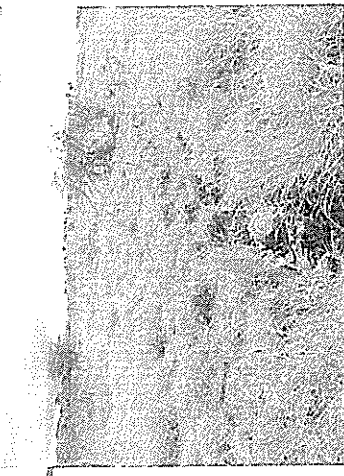
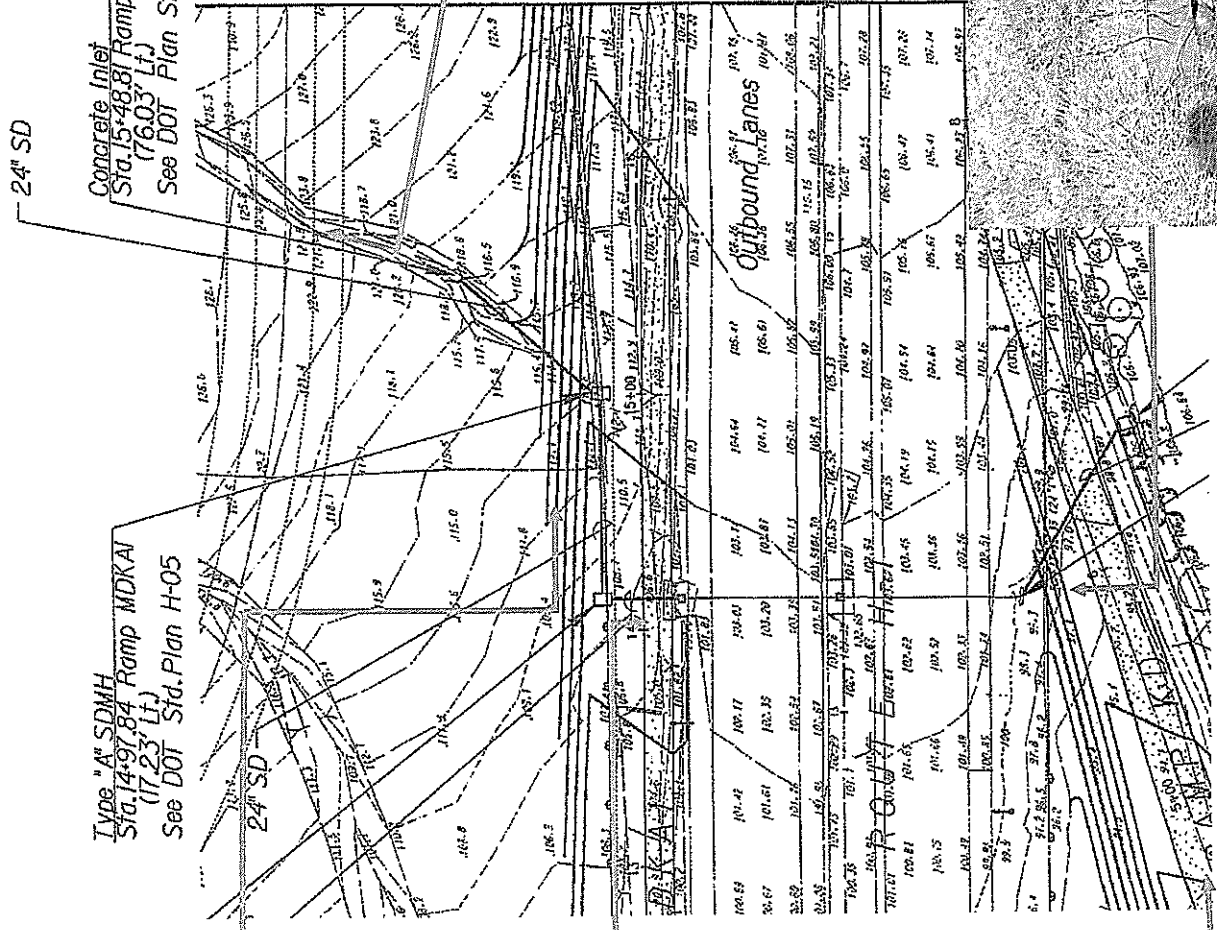


True North
Scale 1" = 40'

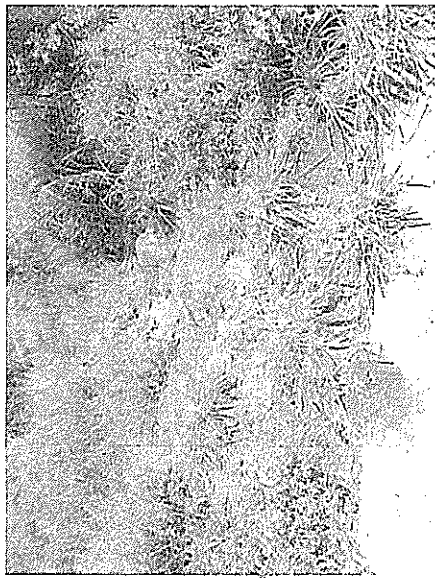
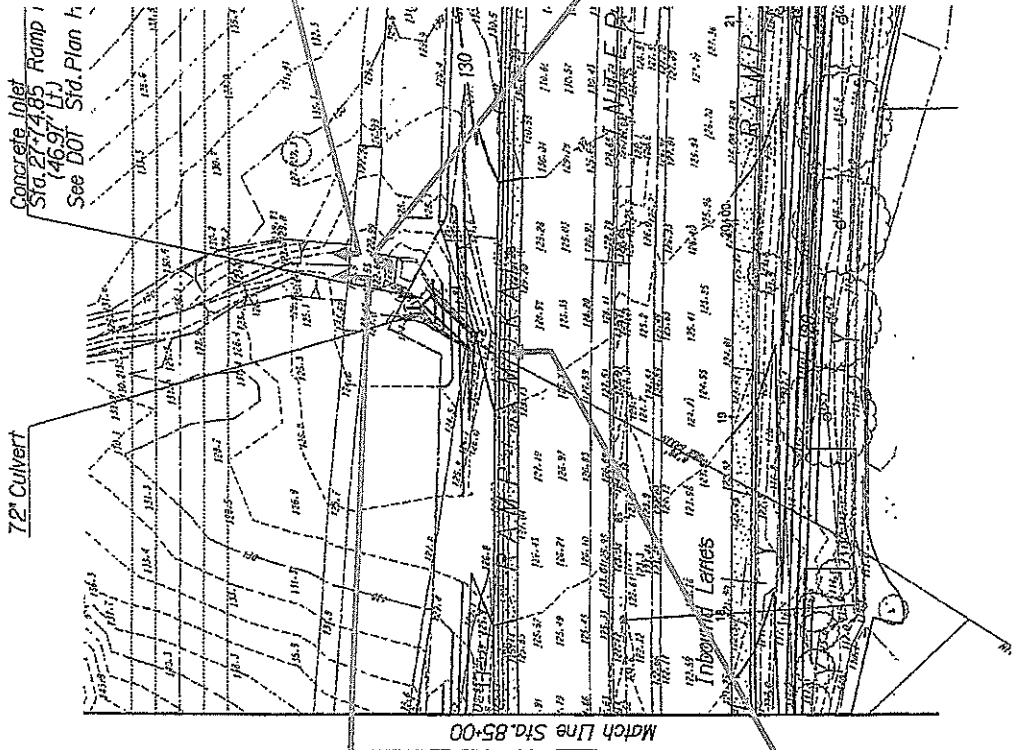
24" SD
Concrete Inlet
Sta. 15+48.81 Ramp MDKAI
(76.03' LI)
See DOT Plan Std. H-17

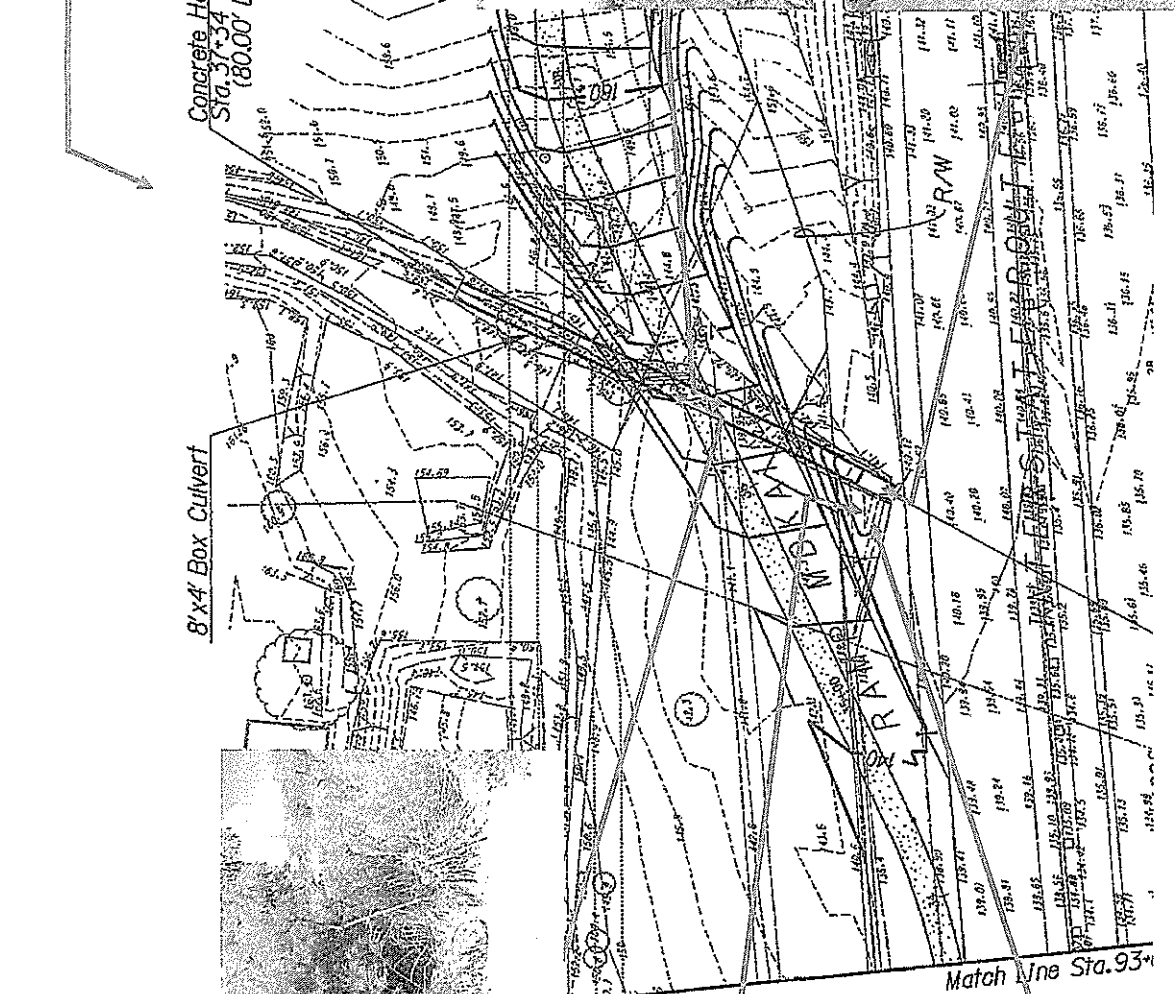
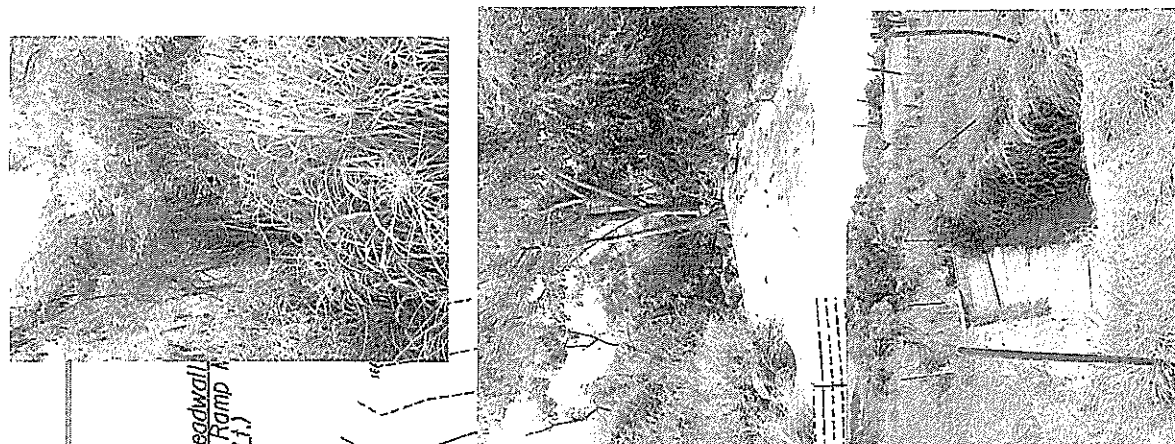
Type "A" SDMH
Sta. 14+97.84 Ramp MDKAI
(17.23' LI)
See DOT Std. Plan H-05

Match Line Sta. 76+00

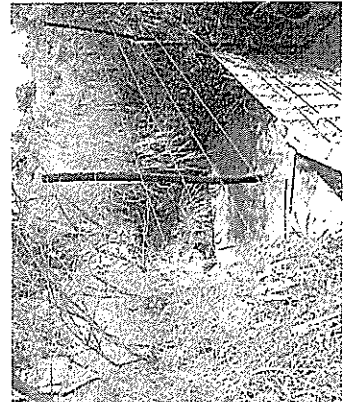


True North
Scale 1" = 40'





True North
Scale: 1" = 40'





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

June 19, 2006

REPLY TO
ATTENTION OF
Regulatory Branch

Mr. Craig Arakaki, P.E.
Vice-President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Arakaki:

This responds to a jurisdictional determination request for proposed repair and reconstruction improvements associated with 4 box culverts and pipe culverts at the proposed Kapolei Interchange and Makakilo Interchange, Kapolei, Oahu, as shown on your submitted map and associated photos. Based on the information provided and our records, I have determined that the function of the culverts is to divert surface stormwater from entirely upland sources to an upland stormwater retention system, that the stormwater drainageways have not replaced a previous tributary to Makakilo Gulch, and that such stormwaters and drainageways are not considered to be, or to contain, jurisdictional waters of the U.S.

Further, ground disturbing activities in the upland project area will not involve any specific activities or structures which constitute either excavation of sediments or discharge of dredged or fill material into lower elevation jurisdictional waters of the United States (i.e. Makakilo Gulch). Therefore, a DA permit will not be required for the proposed project. This determination does not obviate your client, the Hawaii Department of Transportation (State) from complying with other federal, state, or county permits, certifications or requirements which may be required.

In the future, if the State proposes activities in or near jurisdictional waters (namely, Makakilo Gulch) which require excavation, dredging, or the placement of dredged or fill material, consultation should take place with Mr. Farley Watanabe of our Regulatory Branch at 438-7701 to determine if a DA permit may then be required. Please reference the file number if you need additional clarification or information.

Sincerely,

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

Copy Furnished:

Mr. Peter T. Young, Chairperson, DLNR, State of Hawaii, P.O. Box 621, Honolulu, HI 96809
Mr. Denis R. Lau, Chief, Clean Water Branch, State Dept. of Health, POB 3378, Honolulu, HI 96801
Mr. John Nakagawa, Office of Planning, Coastal Zone Mgt. Program, POB 2359, Honolulu, HI 96804

RECEIVED

JUN 21 2006

ENGINEERING CONCEPTS

File Number POH-2006-225



DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING

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

Ref. No. P-11443

July 24, 2006

RECEIVED

JUL 27 2006

ENGINEERING CONCEPTS

LINDA LINGLE
DIRECTOR
THEODORE E. LIU
DIRECTOR
MARK K. ANDERSON
DEPUTY DIRECTOR
LAURA H. THIELEN
DIRECTOR
OFFICE OF PLANNING

Telephone: (808) 597-2846
Fax: (808) 597-2824

To: Rodney K. Haraga, Director
Department of Transportation

From: Laura H. Thielen, Director

Subject: Hawaii Coastal Zone Management (CZM) Program Federal Consistency Review for Federal Highway Administration Funding for Interstate H-1 Addition of the Kapolei Interchange and Modification of Highway Access at the Palatalai and Makakilo Interchanges, Kapolei, Oahu

The proposal to use federal funds from the Federal Highway Administration to construct a new Interstate H-1 freeway interchange at Kapolei and modify two existing interchanges at Makakilo and Palatalai has been reviewed for consistency with the Hawaii CZM Program. This CZM federal consistency review covers the federal funding, including the current application and future applications for Phase 1, Phase 2, and Phase 3 (full development). We concur with your agency's CZM consistency certification. If any portion of the project should require a federal permit, such as the Department of the Army Permit from the U.S. Army Corps of Engineers, then a separate CZM federal consistency review may be necessary at the time federal permits are applied for. Permit specific CZM concerns that were not raised during this review for federal funding may be raised during any permit review, if required.

CZM consistency concurrence is not an endorsement of the projects nor does it convey approval with any other regulations administered by any State or County agency. Thank you for your cooperation in complying with the Hawaii CZM Program. If you have any questions, please call John Nakagawa of our CZM Program at 587-2878.

c: Ms. Dana Arakaki, Engineering Concepts, Inc.
Department of Planning and Permitting, City and County of Honolulu

APPENDIX B

BOTANICAL SURVEY IN SUPPORT OF AN ENVIRONMENTAL
ASSESSMENT DOCUMENT FOR PROPOSED NEW INTERCHANGES
ON INTERSTATE H-1 AT KAPOLEI, OAHU, HAWAII

by AECOS Consultants
(December 15, 2005)

Botanical survey in support of an environmental assessment document for proposed new interchanges on Interstate H-1 at Kapolei, O'ahu, Hawai'i¹

December 15, 2005

DRAFT

AECOS No. 1105

Eric B. Guinther
AECOS, Inc.
45-939 Kamehameha Highway, Suite 104
Kane'ohie, Hawai'i 96744
Phone: (808) 247-3426 Fax: (808) 236-1782 Email: aecos@aecos.com

Introduction

This report presents results of a botanical field survey in support of an Environmental Assessment (EA) for construction of H-1 Interstate interchanges at Kapolei, Island of O'ahu, State of Hawai'i. Kapolei is located on leeward O'ahu as shown in Figure 1. The proposed interchanges would connect an extension of Wakea Street in Kapolei to the H-1 (Kapolei interchange) and a proposed northward extension of Hanua Street (not built and not part of this project; Palaloi interchange) in Campbell Industrial Park to the H-1. Further, a mauka frontage road would connect Makakilo Drive to the new Kapolei interchange and Farrington Highway on the mauka (north) side of the H-1. Important biological objectives of an EA are to document flora and fauna found on/or near a project site, search for threatened or endangered, candidate, or special status species, determine the presence of sensitive habitats or potential environmental concerns, and propose mitigation measures. This report by the botanical subcontractor presents findings for the project area and utilizes previous biological surveys (David & Guinther, 2005; Char, 1985, 1990) for nearby lands.

Survey Methods

The botanical survey of the project area was undertaken on November 30 and December 13, 2005. The survey proceeded by walking over the project area accompanied by the wildlife biologist (Reginald David) and identifying plants growing there. The plant survey covered the area along Farrington Highway from the powerline cross of Farrington Highway west of the Kalaeloa Blvd. interchange, east along both sides of Farrington to the over-crossing of H-1, and from Makakilo Drive west through the fields upslope of H-1 to the Farrington Highway over-

¹ Report prepared for Engineering Concepts, Inc. This report will become part of the public record.

crossing. The extension of Wakea Street in Kapolei to the proposed new overpass is presently occupied by a City and County bus terminus facility and was also surveyed up to the freeway security fence. Observations from both north of and south of the freeway fencing system confirmed that the vegetation along the active freeway right-of-way is essentially the same as in the surveyed areas.

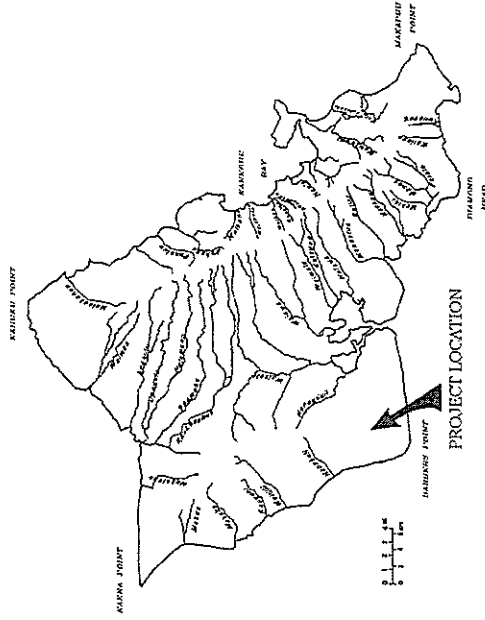


Figure 1. Project location on the Island of O'ahu.

Any botanical survey conducted at a specific point in time, is limited to the plants thriving at the time of the survey, and the possibility that some species present might be dormant. The date of this survey was regarded as good for locating and identifying annuals and perennials because it was undertaken in the wet season following several months of light to moderate rains. Plants found in the area had strong vegetative growth and most were in flower. Plant names used herein follow *Manual of the Flowering Plants of Hawai'i* (Wagner, et al., 1990) and as updated in the supplement (Wagner and Herbst, 1999). Names of ornamentals follow Staples and Herbst (2005), Federal and State of Hawai'i listed species status follows species identified in the following referenced documents (DLNR, 1998, Federal Register, 1999a, 1999b, 2001, 2002, 2004).

Site Description

The H-1 Interstate is a freeway extending from the Waiālae-Kahala neighborhood of East Honolulu to just beyond Kapolei in the 'Ewa District of O'ahu. It is the main transportation artery between Kapolei (Oahu's "Second City") and Honolulu. In the project area of Kapolei (the western end of the freeway) the roadway is located along the boundary between the 'Ewa Plain and the hills of the southern edge of the Waianae mountain. Although widely referred to as the Waianae Range, this single mountain is the eroded remnant of the Waianae Volcano. Project site elevation ranges from 80 to 160 ft (23-50 m) above sea level.

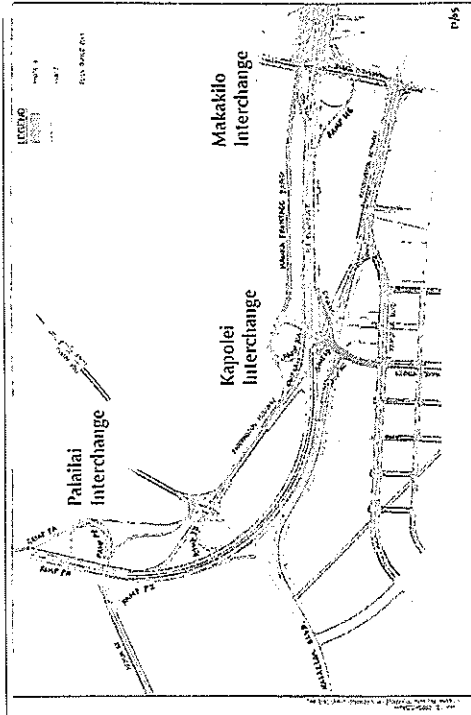


Figure 2. Location of two proposed interchanges for H-1 in Kapolei. Makakilo Interchange, Farrington Highway, and Kalaeloa Over-crossing are existing features of the road network; the Mauka Frontage Road is also proposed.

Although much of the area is developed as part of the roadway network serving Kapolei, and the Wakea Street extension is presently a paved and landscaped bus terminus, a majority of the site is open fields with scattered trees. Much of the land where the Mauka Frontage Road would be constructed is a former nursery, now used as pasture for cows and horses. This area has been influenced by fires, which have swept through the grasslands in recent years. The area proposed for the Palalali Interchange is a pasture with an open growth kiawe trees north of the

freeway. Some of the land south of the H-1 here was burned in a significant wildfire towards the end of the 2005 dry season. There are no perennial streams in this area. There are no significant intermittent streams either, just dry swales modified in some cases to collect and direct surface flow into the drainage system for the existing road network.

Survey Results

Vegetation in the survey area can be divided into three broad categories: 1) grassland with open tree and or scrub growth, 2) ruderal weeds characteristic of roadway rights-of-way and other disturbed sites, and 3) landscaped grounds. Within the project boundary maintenance along roadways tends to favor grasses and ruderal weeds: species adapted to the constant disturbance of mowing and or herbicide sprays. These are typically weedy plants that are herbaceous, low-growing, and reproduce quickly.

A list of the plants observed in the survey area is given as Table 1. Abundance is presented in relation to two very different areas: the grass-dominated fields and rural rights-of-way mostly north of H-1, and the landscaped and maintained plantings (with weeds) of the bus terminus extension of Wakea Street in Kapolei.

Table 1. Listing of plants (flora) at the proposed new Kapolei/H-1 interchange sites, west O'ahu, Hawai'i

Species listed by family	Common name	Status	Abundance Field	Abundance bus
FLOWERING PLANTS				
DICOTYLEDONES				
ACANTHACEAE				
<i>Asystasia</i> sp.		Om.	--	O3 (1)
AIZOACEAE				
<i>Trianthema portulacastrum</i> L.		Nat.	C	--
AMARANTHACEAE				
<i>Amaranthus spinosus</i> L.	spiny amaranth	Nat.	U	--
APOCYNACEAE				
<i>Nerium oleander</i> L.	oleander			
<i>Thevetia peruviana</i> (Persoon) K. Schum.	be-still tree	Om.	--	U2 (1)
ASTERACEAE (COMPOSITAE)				
<i>Calyptocarpus vialis</i> Less.		Om.	R	-- (1)
<i>Conyza</i> sp.		Nat.	U	--
<i>Emilia fosbergii</i> Nicolson	horseweed	Nat.	--	R
<i>Pinalele</i>		Nat.	U	--
<i>Lactuca serriola</i> L.	prickly lettuce	Nat.	--	R
<i>Pithecia carolinensis</i> (Jacq.) G. Don	sourbush	Nat.	U	--

Table 1 (continued).

Species listed by family	Common name	Status	Abundance Field	Notes
ASTERACEAE (continued)				
<i>Pluchea indica</i> (L.) Less.	Indian fleabane	Nat.	R U	
<i>Sphagneticola trilobata</i> (L.) Pruski	wedelia	Nat.	O3 O	
<i>Trixis procumbens</i> L.	coat buttons	Nat.	C2 --	
<i>Yorbesina encelioides</i> (Cav.) Benth. & Hook.	golden crown-beard	Nat.	O --	
BIGNONIACEAE				
<i>Spalioidea campanulata</i> V. Beauv.	African tulip tree	Nat.	U2 --	(1)
CHENOPODIACEAE				
<i>Atriplex suberecta</i> Vent.	---	Nat.	O --	
CONVOLVULACEAE				
<i>Ipomoea obscura</i> (L.) Ker-Gawl.	---	Nat.	C --	
<i>Merremia aegyptia</i> (L.) Urb.	hairy merremia	Nat.	R --	
CUCURBITACEAE				
<i>Coccoloba grandis</i> (L.) Voigt	scarlet-fruited gourd	Nat.	O --	
<i>Momordica charantia</i> L.	balsam pear	Nat.	U --	
CUSCUTACEAE				
<i>Cuscuta</i> sp.	dodder (no flwrs)	---	R --	
EUPHORBIACEAE				
<i>Chamaesyce hirta</i> (L.) Millsp.	garden spurge	Nat.	A --	
<i>Chamaesyce hyssopifolia</i> (L.) Small	---	Nat.	C --	
<i>Jatropha integerrima</i> N. Jacq.	jatropha	Orn.	-- R	(1)
<i>Ricinus communis</i> L.	castor bean	Nat.	O --	
FABACEAE				
<i>Acacia confusa</i> Merr.	Formosa koa	Nat.	U --	(1)
<i>Acacia farnesiana</i> (L.) Willd.	<i>kiu</i>	Nat.	O --	
<i>Bauhinia</i> sp.	orchid tree	Orn.	-- R	(1)
<i>Caesalpinia pulcherrima</i> (L.) Sw.	---	Orn.	R --	(1)
<i>Cassia</i> cf. <i>jananica</i> L.	shower tree	Orn.	U U	(1)
<i>Crotalaria incana</i> L.	fuzzy rattlepod	Nat.	R --	
<i>Crotalaria pallida</i> Aiton	smooth rattlepod	Nat.	U --	
<i>Desmanthus virgatus</i> (L.) Willd.	virgate mimosa	Nat.	O --	
<i>Leucaena leucocephala</i> (Lam.) deWit	<i>koa haole</i>	Nat.	O3 --	
<i>Erythrina cf. crista-galli</i> L.	coral tree	Orn.	U --	(1)
<i>Erythrina variegata</i> L.	---	Orn.	U2 --	(1)
<i>Indigofera spicata</i> Fossk.	creeping indigo	Nat.	-- R	
<i>Macropitium atropurpureum</i> (DC) Urb.	---	Nat.	C --	
<i>Mimosa pudica</i> L.	sensitive plant	Nat.	U --	
<i>Pithecellobium dulce</i> (Roxb.) Benth.	<i>opitima</i>	Nat.	U --	

Table 1 (continued).

Species listed by family	Common name	Status	Abundance Field	Notes
FABACEAE (continued)				
<i>Prosopis pallida</i> (Humb. & Bonpl. ex Willd.) Kuntz	<i>kiawe</i>	Nat.	O2 --	
<i>Sonanea saman</i> (N. Jacq.) Merr.	monkeypod	Nat.	R --	(1)
GOODENACEAE				
<i>Scaevola sericea</i> Vahl.	<i>naupaka</i>	Ind.	-- U	(1)
LAMIACEAE				
<i>Leonotis nepetifolia</i> (L.) R. Br.	lion's ear	Nat.	U --	†
MALVACEAE				
<i>Abutilon incanum</i> (Link) Sweet	hoary abutilon	Ind.	R --	
<i>Mahoevrum coromandelianum</i> (L.) Garck	false mallow	Nat.	O --	
<i>Hibiscus ovalifolius</i> (Forsk.) Vahl	Rock's hibiscus	Nat.	-- O2	(1)
<i>Sida citrifolia</i> L.	---	Nat.	A --	
<i>Sida fallax</i> Walp.	<i>'ilima</i>	Ind.	O3 --	
<i>Sida rhombifolia</i> L.	Cuba jute	Nat.	U --	
<i>Sida spinosa</i> L.	prickly sida	Nat.	R --	
MORACEAE				
<i>Ficus microcarpa</i> L. fil.	Chinese banyan	Nat.	R --	(1)
NYCTAGINACEAE				
<i>Boerhavia acutifolia</i> (Choisy) J.W. Moore	<i>alena</i>	Ind.	R --	
<i>Boerhavia coccinea</i> Mill.	false alena	Nat.	O --	
<i>Bougainvillea cultivars</i>	bougainvillea	Orn.	U U	(1)
PLUMBAGINACEAE				
<i>Plumbago auriculata</i> Lam.	blue plumbago	Orn.	-- R	(1)
PORTULACACEAE				
<i>Portulaca oleracea</i> L.	pigweed	Nat.	R R	
SOLANACEAE				
<i>Solanum lycopersicum</i> var. <i>cerasiforme</i> (Dunal) Spooner, G. Anderson, & Jansen	wild cherry tomato	Nat.	R --	
STERCULIACEAE				
<i>Waltheria indica</i> L.	<i>'uhaloa</i>	Ind.	O --	
ZYGOPHYLLACEAE				
<i>Tribulus terrestris</i> L.	puncture vine	Nat.	U --	
MONOCOTYLEDONES				
AGAVACEAE				
<i>Agave sisalana</i> Perrine	sisal	Nat.	U --	

Table 1 (continued).

Species listed by family	Common name	Status	Abundance ¹	Notes
			Field	Bus
ARACACEAE				
<i>Cocos nucifera</i> L.	coconut palm	Pol.	O	(1)
<i>Pritchardia cf. remota</i> (Kunze) Becc.	<i>lo'ahi</i>	End.	R	(1)
CYPERACEAE				
<i>Eleocharis geniculata</i> (L.) Roem. & Schult.	---	Nat.	U3	U
<i>Kyllinga brevifolia</i> Roth	<i>kiti'o'opu</i>	Nat.	U	--
POACEAE				
<i>Bathriochloa peritusa</i> (L.) A. Camus	pitted beardgrass	Nat.	O	--
<i>Brachiaria subquadriflora</i> (Vain.) Hitchc.	---	Nat.	O3	(1)
<i>Cenchrus ciliaris</i> L.	buffelgrass	Nat.	AA	--
<i>Cenchrus echinatus</i> L.	sand burr	Nat.	R	R
<i>Chloris barbata</i> (L.) Sw.	swollen fingergrass	Nat.	O	U
<i>Chloris divaricata</i> R. Br.	stargrass	Nat.	R	--
<i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass	Nat.	U	O
<i>Eleusine indica</i> (L.) Gaertn.	beach wiregrass	Nat.	O	--
<i>Eragrostis cf. tenella</i> (L.) R & S	lovegrass	Nat.	O	--
<i>Melinis repens</i> (Willd.) Zizka	Natal redtop	Nat.	U	--
<i>Panicum maximum</i> Jacq.	Guinea grass	Nat.	O3	--

Legend to Table 1

STATUS = distributional status for the Hawaiian Islands.
 end. = endemic, native to Hawaii and found naturally nowhere else.
 ind. = indigenous, native to Hawaii, but not unique to the Hawaiian Islands
 nat. = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.
 orn. = exotic, ornamental or cultivated, plant not naturalized (not well-established outside of cultivation).
 pol. = Polynesian introduction before 1778.
 ABUNDANCE = occurrence ratings for plants by area.
 R - Rare
 U - Uncommon - seen in only one or perhaps two locations
 O - Occasional - seen with some regularity in several locations
 C - Common - seen in large numbers during the survey
 A - Abundant - found in large numbers, may be locally dominant
 AA - Very abundant - abundant and dominant, defining vegetation type.
 Numbers following an occurrence rating indicate clusters within the survey area. The ratings above provide an estimate of the likelihood of encountering a species within the specified survey area, numbers modify this where abundance, where encountered, tends to be greater than the occurrence rating.
 1 - several plants present
 2 - many plants present
 3 - locally abundant
 AREAS - Survey areas for this report.
 Field - Grassland areas and road rights-of-way
 Bus - Wakea Street extension.
 NOTES
 (1) - In this setting, planted as an ornamental

A total of 76 species of plants were identified from the survey area. Included are 6 native species (7.9%) and one ancient Polynesian introduction (coconut palm, *Cocos nucifera*). If we do not consider any of the plants that are ornamentals or otherwise applied planted in the survey area for landscaping, the total number of species is reduced to 56 of which 4 (7.1%) are native species. The only plant listed that is even moderately uncommon is *Abutilon incanum*, an indigenous species (species native to Hawaii and other locations in the Pacific); this plant was found to be common however on the slopes above the project area (see David & Guinther, in prep.). No plants that are of special concern or are protected by state or federal law were observed in the project area.

DISCUSSION

None of the plants observed are listed or special in any respect that would require care to be taken in planning or constructing the proposed H-1 Freeway interchanges. Presumably, after construction the predominant alien vegetation will re-establish in areas not paved for roadways. Planting native dryland trees should be considered for final landscaping, especially at the more remote Palalal Interchange.

References

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APPENDIX C

A SURVEY OF AVIAN AND TERRESTRIAL MAMMALIAN SPECIES FOR
THE PROPOSED INTERSTATE H-1 ADDITION AND MODIFICATION OF
HIGHWAY ACCESSES, PALAILAI INTERCHANGE AND MAKAKILO
INTERCHANGE PROJECT, EWA DISTRICT, OAHU, HAWAII

by Rana Productions, Ltd.

(December 6, 2005)

**A Survey of Avian and Terrestrial Mammalian
Species for the Proposed Interstate H-1 Addition
and Modification of Highway Accesses, Pālai
Interchange and Makakilo Interchange Project,
‘Ewa District, O‘ahu, Hawai‘i.**

Prepared for:

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December 6, 2005

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Introduction

The State of Hawai'i, Department of Transportation, Highways Division is proposing to construct modification to three interchanges connecting the City of Kapolei to the H-1 freeway. The project includes expansion of the Pāhala Interchange to include a new Kapolei Interchange element and additional ramps to serve the planned extension of Hanua Street connecting it to the H-1 freeway. The Hanua Street connection is needed to provide increased capacity to developments at the western area of the City of Kapolei, and new commercial and industrial development anticipated in the Kalaheo Boulevard corridor, and the planned Kapolei West residential area. Construction of the proposed Kapolei Interchange will provide access to/from the central area of the City of Kapolei via an extension of Wakea Street connecting it to Farrington Highway and continuation across the freeway to link with the Mauka Frontage Road. The project also includes additional ramps at the Makakilo Interchange, and extensions and other modifications of the area streets to access the new freeway ramps (Figure 1).

This report summarizes the findings of an ornithological and mammalian survey conducted within the proposed project site. Fieldwork was conducted on December 1, and 2, 2005.

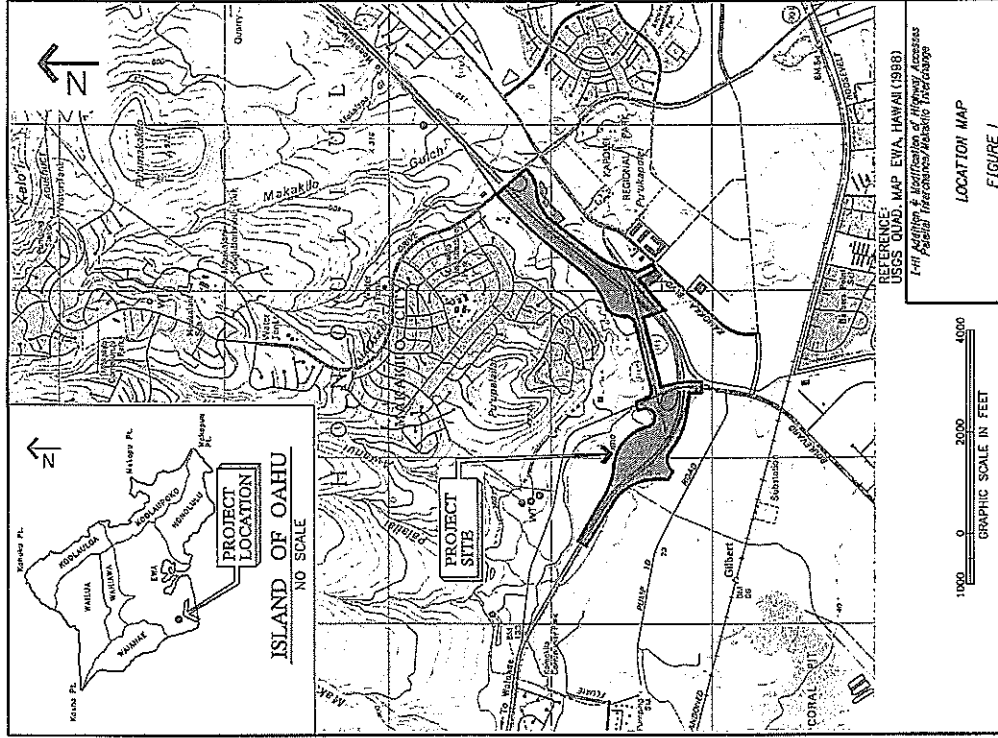
A primary goal of the surveys was to determine if there were any Federal or State of Hawai'i listed endangered, threatened, proposed, or candidate avian, or mammalian species on, or in the immediate vicinity of the proposed project site. Federal and State of Hawai'i listed species status follows species identified in the following referenced documents (DLNR, 1998, Federal Register, 1999a, 1999b, 2001, 2002, 2004). Fieldwork was conducted on November 30, 2005.

The avian phylogenetic order and nomenclature used in this report follows *The American Ornithologists' Union Check-list of North American Birds 7th Edition* (American Ornithologists' Union 1998), and the 42nd through the 46th supplements to *Check-list of North American Birds* (American Ornithologists' Union 2000; Banks et al. 2002, 2003, 2004, 2005). Mammal scientific names follow *Mammals in Hawaii* (Tomich 1986). Place names follow *Place Names of Hawaii* (Pukui et al. 1976).

Hawaiian and scientific names are italicized in the text. A glossary of technical terms and acronyms used in the document, which may be unfamiliar to the reader, are included at the end of the narrative text on page 9.

General Site Description

The project site is located on the northern edge of the City of Kapolei, in close proximity to the H-1 freeway, and will include modifications to a portion of Farrington Highway, Fort Barrett Road, Wakea Street, Kalaheo Boulevard, and Hanua Street (Figure 1). The bulk of the project site is within urbanized areas. Areas to the north of the H-1 freeway and Farrington Highway are made up of former agricultural lands now laying fallow.



Vegetation within portions of the project site within the developed areas of the City of Kapolei consists of well maintained and manicured ornamental trees, shrubs and lawns. Vegetation in the areas outside of the developed areas within the City of Kapolei is a mix of alien species typical of rural areas in the Ewa District, and abandoned agricultural fields.

Mammalian Survey Methods

All observations of mammalian species were of an incidental nature. With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or 'ōpe'ope'ope as it is known locally, all terrestrial mammals currently found on the Island of O'ahu are alien species, and most are ubiquitous. Two hours were spent within the project area on the evening of November 30, 2005 in an attempt to detect Hawaiian hoary bats. The survey of mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal signs. A running tally was kept of all vertebrate species observed and heard within the study area.

Mammalian Survey Results

Three mammalian species were detected while on the site: several domestic dog (*Canis f. familiaris*), were heard barking from the housing subdivision near the eastern terminus of the project. Scat and sign of dog, horse (*Equus c. caballus*), and domestic cattle (*Bos taurus*) was encountered throughout the eastern half of the project site. All three are introduced species that are considered deleterious to native avian species and Hawaiian ecosystems.

Avian Survey Methods

Avian species were recorded by walking a linear transect running the length of the proposed project site and keeping a running tally of all birds seen or heard while transiting the site. Field observations were made using Leitz 10 X 42 binoculars to sight birds and by listening for vocalizations. The field survey was conducted between 08:30 a.m. and 11:30 a.m., the peak of daily bird activity. An additional two hours was spent within the project area on the evening of November 30, 2005 in an attempt to detect crepuscular and/or nocturnally flying seabirds and owls.

Avian Survey Results

A total of 70 individual birds of 11 different species, representing nine separate families were recorded during the course of this survey. One species detected, Pacific Golden-Plover (*Pluvialis fulva*), is an indigenous migratory shorebird species, which nests in the high Arctic and spends the winter in Hawai'i and the tropical Pacific. The other ten species recorded are alien to the Hawaiian Islands. These data are summarized in Table 1.

Avian diversity and densities were relatively low, not surprising given the disturbed nature of the habitat present and the close proximity to the H1 freeway. Three species: Japanese White-eye (*Zosterops japonicus*), Zebra Dove (*Geopelia striata*), and Red-vented Bulbul (*Pycnonotus cafer*), accounted for slightly more than 52% of the total number of individual birds recorded. Japanese White-eyes and Zebra Doves were the most frequently recorded species, each accounting for slightly more than 18% of the total number of individual birds recorded during station counts.

Discussion **Mammalian Resources**

The findings of the mammalian survey are consistent with the findings of at least one faunal survey conducted on lands immediately adjacent to the project site (David and Guinther 2005b) and with several other surveys conducted in the general project vicinity within the past five years (David 2000, 2001, 2004, 2005a, 2005b, David and Guinther 2000, 2005a).

Although no rodents were detected during the course of this survey, it is likely that roof rats (*Rattus r. rattus*), Norway rats (*Rattus norvegicus*), European house mice (*Mus domesticus*) and possibly Polynesian rats (*Rattus exulans hawaiiensis*) use resources within the general project area. All of these introduced rodents are deleterious to remaining native ecosystems and the native floral and faunal species that are dependant on them for their survival.

Avian Resources

The findings of the avian survey are consistent with the findings of at least one faunal survey conducted on lands immediately adjacent to the project site (David and Guinther 2005b), and with several other surveys conducted in the general project vicinity within the past five years (David 2000, 2001, 2004, 2005a, 2005b, David and Guinther 2000, 2005a). It should be noted that though the results of this survey are consistent with those of the other surveys cited, they are not directly comparable, since the survey techniques used on this survey differed from those used in the cited surveys. The reason for the difference in protocols used, is a direct result of the extremely noisy environment present within this project site due to its close proximity to the H1-freeway and associated interchanges and access roads. The level of noise present precludes using point counts to census birds, since the majority of birds recorded using that technique are recorded aurally rather than visually, which in this situation was not a viable option. What is directly comparable, is the species lists, or to put it another way the avian makeup of the project area, which is similar to those recorded on the cited surveys.

Of the 11 avian species recorded during the course of this survey, 10 are alien to the Hawaiian islands. The lone native species detected, Pacific Golden-Plover is an indigenous migratory shorebird species, which nests in the high Arctic and spends the winter in Hawai'i and the tropical Pacific.

Table 1. Avian Species Detected, Kapolei Interchange

Common Name	Scientific Name	ST	A
Cattle Egret	CICONIIFORMES ARDEIDAE - Herons, Bitterns & Allies <i>Butorides ibis</i>	A	1
Pacific Golden-Plover	CHARADRIIFORMES CHARADRIIDAE - Lapwings & Plovers Charadriinae - Plovers <i>Pluvialis fulva</i>	IM	1
Spotted Dove	COLUMBIFORMES COLUMBIDAE - Pigeons & Doves <i>Streptopelia chinensis</i>	A	6
Zebra Dove	<i>Geopelia striata</i>	A	13
Red-vented Bulbul	PASSERIFORMES PYCNONOTIDAE - Bulbuls <i>Pycnonotus cafer</i>	A	11
Japanese White-eye	ZOSTEROPIDAE - White-Eyes <i>Zosterops japonicus</i>	A	13
Common Myna	STURNIDAE - Starlings <i>Acridotheres tristis</i>	A	7
House Finch	FRINGILLIDAE - Fringilline And Cardueline Finches & Allies Carduelinae - Cardueline Finches <i>Carpodacus mexicanus</i>	A	4
House Sparrow	PASSERIDAE - Old World Sparrows <i>Passer domesticus</i>	A	2
Common Waxbill	ESTRILIDAE - Estrilid Finches Estrilinae - Estrilid Finches <i>Estrilda astrild</i>	A	3
Java Sparrow	<i>Padda oryzivora</i>	A	10

KEY TO TABLE 1

- ST Status
A Alien - introduced to the Hawaiian Islands by humans
IM Indigenous Migrant - a native migratory species that winters in Hawai'i but breeds elsewhere
A Abundance - Number of birds detected

This species is ubiquitous in the Islands between late July and the end of April each year, and can be readily found in any cleared area, including shorelines, fields, lawns, athletic fields, parking lots and even roadway medians.

Conclusions

It is not expected that the modification of the habitat currently found within the project site or the construction of the proposed roadways and associated infrastructure improvements will have a negative impact on any avian or mammalian species currently listed as endangered, threatened, proposed, or any that are currently candidates for listing under either federal or State of Hawai'i endangered species statutes.

Glossary

Alien - Introduced to Hawai'i by humans
Crepuscular - Twilight hours
Endangered - Listed and protected under the ESA as an endangered species
Endemic - Native and unique to the Hawaiian Islands
Indigenous - Native to the Hawaiian Islands, but also found elsewhere naturally
Mauka - Upslope, towards the mountains
Nocturnal - Night-time, after dark
'ope'ope'ope - Hawaiian hoary bat
Ruderal - Disturbed, rocky, rubbishy areas, such as old agricultural fields and rock piles
Threatened - Listed and protected under the ESA as a threatened species
DLNR - Hawaii State Department of Land & Natural resources

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APPENDIX D

AN ARCHAEOLOGICAL ASSESSMENT AND
CULTURAL IMPACT EVALUATION FOR THE PROPOSED
I-H1 ADDITION AND MODIFICATION OF HIGHWAY ACCESSES,
PALAILAI INTERCHANGE / MAKAKILO INTERCHANGE,
HONOULIULI AHUPUAA, EWA DISTRICT, OAHU
by Cultural Surveys Hawaii, Inc.
(December 2005)

An Archaeological Assessment and Cultural Impact Evaluation for the Proposed I-HI Addition and Modification of Highway Accesses, Palalal Interchange/Makakilo Interchange/Makakilo Interchanges, Honouliuli Ahupua'a, Ewa District, O'ahu

TMK: (1) 9-1-015: 004 (por.), 017 (por.) and
9-1-016:006 (por.), 024 (por.)

Prepared for
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Management Summary

Report Reference	An Archaeological Assessment and Cultural Impact Evaluation for the Proposed I-HI Addition and Modification of Highway Accesses, Palalal Interchange/Makakilo Interchange Project
Project Number	Cultural Surveys Hawai'i Inc. (CSH) Project No. HONO 72
Location	Honouliuli Ahupua'a, Ewa District, Island of O'ahu TMK 1-9-1-015:004, 017 (portions); 1-9-1-016:006, 024 (portions), USGS 1:24,000 map Ewa Quad
Date Submitted	December 2005
Permit Number	Fieldwork was performed under CSH's annual archaeological research permit, No. 0508, issued by DLNR / SHPD
Agencies	State of Hawai'i Department of Land and Natural Resources / State Historic Preservation Division (DLNR / SHPD)
Land Jurisdiction	Private, owned by the Estate of James Campbell
Development Project Description	The State Department of Transportation (DOT) is planning to construct additions and modifications to Interstate HI accesses from Palalal Interchange to Makakilo Interchange
Historic Preservation Regulatory Context	The CSH study was conducted to fulfill HAR 13-276 and 13-284
Field Effort	Field work was accomplished on October 19, 2005 by Constance R. O'Hare, B.A.
Sites Identified	No new historic properties were found; three previously identified sites (30-80-12-4341, -4342, and -6679) are near the proposed access roads in the western section of the project area. All three have been evaluated as significant for information content (Criterion D) and were recommended for no further work and no preservation.
Area of Potential Effect (APE)	For this literature review and field check, the project's APE is defined as the entire road alignments of the parcel.
Recommendations	No further work is recommended for the project area. The three previously identified sites have been evaluated in earlier inventory surveys and determined to need no further work or preservation.

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Section 1 Introduction

1.1 Project Background

Cultural Surveys Hawai'i, Inc. has entered into a contractual agreement with Engineering Concepts, Inc. (1150 South King Street, Suite #700, Honolulu, Hawai'i 96184) to address the appropriate archaeological/historic/cultural issues of an Environmental Assessment (EA) for the proposed Interstate H1 addition and modification of highway accesses, Palaiah Interchange/Makakilo Interchange project area (TMK 1-9-1-006:016, 024) (Figures 1 and 2).

Our preliminary research indicates that most, but not quite all, of the project area has been formally evaluated and determined to be free of historic resources by the Department of Land and Natural Resources/State Historic Preservation Division (DLNR/SHPD). Regarding the cultural impact evaluation for the proposed project, there seems to be little likelihood that the undertaking will impact any ongoing cultural practices. Thus, no formal interviews were conducted for this report. This does not meet the standards set up by the State of Hawaii Office of Environmental Quality Control (OEQC) for cultural impact assessments, but the level of work should be sufficient to address the potential of cultural practices (or lack thereof) specific to the project area.

Background research into the previous archaeological work conducted near the proposed access roads identified three previously identified sites (Sites 50-80-12 4341, -4342, and -6679) near the proposed work area that may be impacted by future construction. These three sites have been recorded to modern standards, received recommendations for no future work and no preservation, and are described in archaeological reports (Hammat et al. 1990, O'Hare et al. 2004) submitted to the SHPD. No new sites were found during the field check during the current project, and thus this report is considered an archaeological assessment, not an inventory survey. This combined archaeological assessment and cultural impact evaluation details the research and field inspection methods, presents a summary of all field inspection findings, and assesses the potential for significant historic properties (archeological/historical potential) and potential impacts to cultural practices.

1.2 Scope of Work

This archaeological assessment and cultural impact evaluation includes a report detailing results of research and present conditions of the property. This study will not meet the requirements of an inventory-level survey per the rules and regulations of SHPD/DLNR. However, the level of work will be sufficient to address site types, locations, and allow for future work recommendations.

The scope of work for the combined assessment includes:

- a. Historical and previous archaeological background research to include study of archival sources, historic maps, Land Commission Awards, and previous archaeological reports to

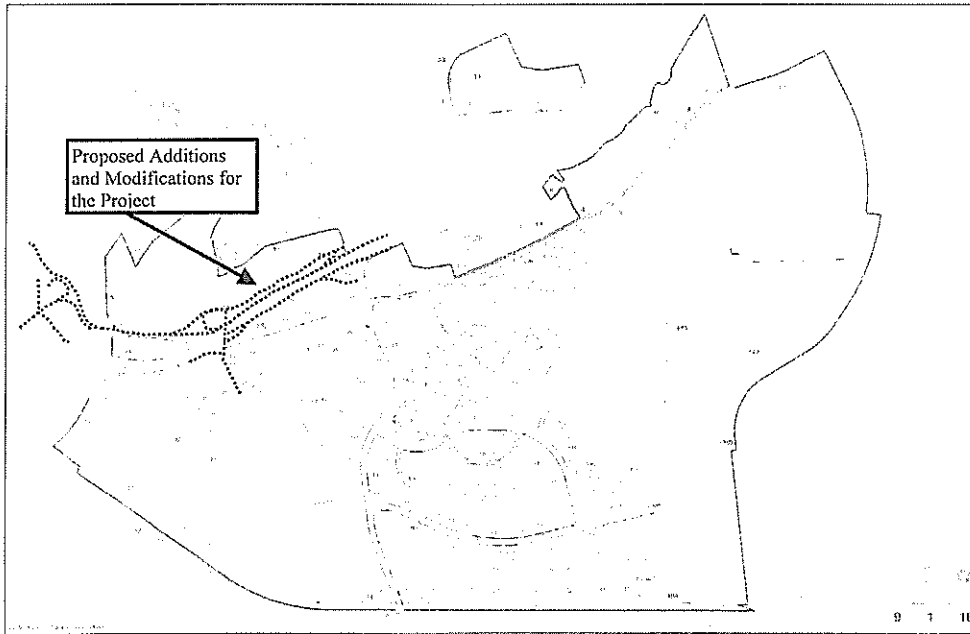


Figure 2. Tax Map Key 1-9-1-016 and portion of TMK 1-9-1-015, showing proposed additions and modifications (dashed red lines) to the Makakilo/Palilalai Interchanges area

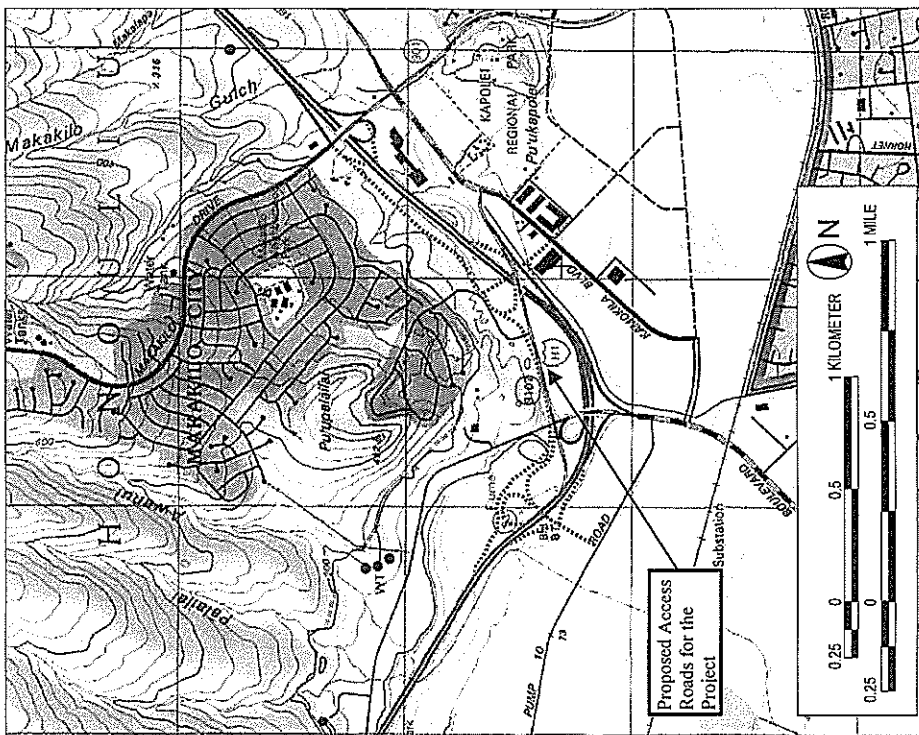


Figure 1. U.S. Geological Survey, Ewa Quad (1998), showing project area; dashed red line indicates additions and modifications to the access roads

- construct a history of land use and to determine if archaeological sites have been recorded on or near this property.
- b. Field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites.
 - c. The report assesses the likelihood that the proposed project will impact cultural practices. This assessment is based on the background research, the review of land use within the vicinity of the project area, and limited consultation. As indicated above, no formal interviews were conducted. If the need were to arise for this type of research, an additional proposal would be developed.
 - d. Preparation of a report to include the results of the historical research and the fieldwork, with an assessment of archaeological potential based on that research, with recommendations for further archaeological work, if appropriate. This report also provides mitigation recommendations if there are archaeologically sensitive areas that need to be taken into consideration.

1.3 Environmental Setting

1.3.1 Natural Environment

The project area is situated on the 'Ewa plain, south of the Wai'anae Mountain Range in the southwest corner of O'ahu. Lying in the lee of the Wai'anae mountain range, the project area is one of the driest areas of O'ahu, with most of the area averaging about 18 inches of rainfall annually (Juvik and Juvik 1998:56). Elevations within the project area ranged from approximately 80-160 ft (feet), or 25-48 m (meters) AMSL (above mean sea level). Temperatures range between 60° to 90° through the year; the highest temperatures are in August and September (Armistrong 1983).

The project area, from the upper to lower boundary, is covered with soils from the Molokai, Honouliuli, and Ewa Series (Foote et al. 1972). The Molokai Series (MolC, Molokai silty clay loam 7-15% slopes) consists of well-drained soils on uplands soils, formed in material weathered from basic igneous rock. These soils are used for sugarcane, pineapple, pasture, wildlife habitat, and homesites. The natural vegetation consists of *Kiawe* (*Prosopis pallida*), *'iima* (*Sida* sp.), *'uhaloa* (*Waltheria americana*), feather fingergrass (*Chloris virgata*), and buffelgrass (*Pennisetum ciliare*). The Honouliuli Series consists of well-drained soils on the coastal plains on the island of O'ahu in the 'Ewa area. These soils developed in alluvium derived from basic igneous material. They are located in nearly level and gently sloping lands at elevations range from 15 to 125 feet. The natural vegetation consists of *kiawe*, *koa haole* (*Leucaena leucoccephala*), fingergrass, bristly foxtail (*Setaria verticillata*), and bermudagrass (*Cynodon dactylon*). The Ewa series (EaB, Ewa silty clay loam) are well-drained soils in basins and on alluvial fans, which have developed on alluvium derived from igneous rock. These soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of fingergrass, *kiawe*, *koa haole*, *ku* (*Acacia farnesiana*), and *'uhaloa*.

In pre-contact Hawaii's the project area would have been mostly lowland dry shrub and grassland, dominated by species such as *wilhihi* (*Erythrina sandwicensis*), *lama* (*Diospyros ferrae*), sandalwood (*Santalum* sp.), *'a'ali'i* (*Dodonaea eriocarpa*), scrub *'ohi'a* (*Metrosideros collina*) and *pili* grass (*Heteropogon contortus*). Today the vegetation in the general area is dominated by introduced species such as *kiawe* and *koa haole*. Understory plants include *'iima ku hula* (*Sida cordifolia*), *cayenne vervain* (*Stachytarpheta urticaceifolia*), *ko'oko'olau* (*Bidens pilosa*), and morning glory (*Ipomoea indica*) (Moore and Kennedy 2002:3).

1.3.2 Built Environment

Twentieth century land use of the project area has been commercial sugarcane cultivation up to ca. 1955 and as undeveloped land adjacent to the H-1 freeway and the Farrington Highway since that time.

Section 2 Methods

2.1 Literature Search Methods

Background research included: a review of previous archaeological studies on file at the State Historic Preservation Division (SHPD) of the Department of Land and Natural Resources (DLNR); a review of geology and cultural history documents at Hamilton Library of the University of Hawaii; the Hawaii Public Library, and the Archives of the Bishop Museum; a study of historic photographs at the Archives of the Bishop Museum; and, a study of historic maps at the Survey Office of the DLNR.

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected type and location of sub-surface pre and post-contact historic properties in the project areas.

2.2 Field Methods

The pedestrian inspection of the project area was made on October 19, 2005 by CSH archaeologist Constance O'Hare, B.A., under the overall supervision of Hallett H. Hammatt, Ph.D. The pedestrian inspection of the project area was accomplished by walking along the proposed access road route north and *mauika* (inland) of the H-1 Freeway and along the existing freeway, streets, and interchange areas in the central and eastern portion of the project area that are planned for modifications. The majority of the land within the project area was observed to have undergone significant land modification, in the form of grading and commercial/highway development. The generally low vegetation cover and elevated vantage points within the project area allowed for a nearly complete visual inspection of lands within the project area. All significant historic properties encountered were to be recorded and documented with a brief written field description, photographs, and each site located using GPS survey technology; however, no historic properties were encountered during the field inspection. Photographs of the general area were taken.

The western section of the project area has been surveyed to modern inventory standards in the last fifteen year by CSH archaeologists during two inventory survey projects (Hammatt et al. 1990; O'Hare et al. 2004). During these two surveys, three sites that are adjacent to the proposed access roads were recorded, evaluated, and given State Inventory of Historic Properties (SIHP) numbers. In the reports, these three sites were not recommended for any further work or for preservation. This portion of the project area was not resurveyed for the current project, nor were any additional notes made on the three previously identified sites.

Section 3 Background Research

3.1 Traditional and Historical Background

3.1.1 Mythological and Traditional Accounts

The traditions of Honouliuli Ahupua'a have been compiled by several authors, in studies by Sterling and Summers (1978), Hammatt and Folk (1981), Kelly (1991), Charvet-Pond and Davis (1992), Maly (1992), and Tuggle and Tomonari-Tuggle (1997). Some of the traditional themes associated with this area include connections with Kahiki, the traditional homeland of Hawaiians in central Polynesia. There are several versions of the chief Kaha'i leaving from Kalaehoa for a trip to Kahiki; on his return to the Hawaiian Islands he brought back the first breadfruit (Kamakau 1991a:110) and planted it at Pu'uloa, near Pearl Harbor in 'Ewa (Beckwith 1940:97). Several stories associate places in Honouliuli to the gods Kāne and Kamaea, with the Hawaiian pig god Kamapua'a and the Hina family, and with the sisters of Pele, the Hawaiian volcano goddess, all of whom have strong connections with Kahiki (Kamakau 1991a:111; Pukui et al. 1974:200). The locations of traditional places names for Honouliuli are illustrated in Figure 3.

3.1.1.1 The Naming of Honouliuli

Honouliuli is the largest *ahupua'a* in the *moku* (district) of 'Ewa. One translation of the name for this district is given as "unequal" (*Saturday Press* Aug. 11, 1883). Others translate the word as "strayed" and associate it with the legends of the gods, Kāne and Kamaea.

When Kane and Kamaea were surveying the islands they came to Oahu and when they reached Red Hill saw below them the broad plains of what is now Ewa. To mark boundaries of the land they would throw a stone and where the stone fell would be the boundary line. When they saw the beautiful land lying below them, it was their thought to include as much of the flat level land as possible. They hurled the stone as far as the Waiānae range and it landed somewhere, in the Waimanalo section. When they went to find it, they could not locate the spot where it fell. So Ewa (strayed) became known by the name. The stone that strayed [Told to E.S. by Simeon Nawaa, March 22, 1954; cited in Sterling and Summers 1978:1].

Honouliuli means "dark water," "dark bay," or "blue harbor" and was named for the waters of Pearl Harbor (Jarrett 1930:22), which marks the eastern boundary of the *ahupua'a*. Another explanation for the name comes from the "Legend of Lepeamoa", the chicken-girl of Palama. In this legend, Honouliuli is the name of the husband of the chieftess Kapālama and grandfather of Lepeamoa (Thrum 1923:164-184). "Her grandfather gave his name, Honouliuli to a land district west of Honolulu . . ." (Thrum 1923:170). Westervelt (1963:209) gives an almost identical account.

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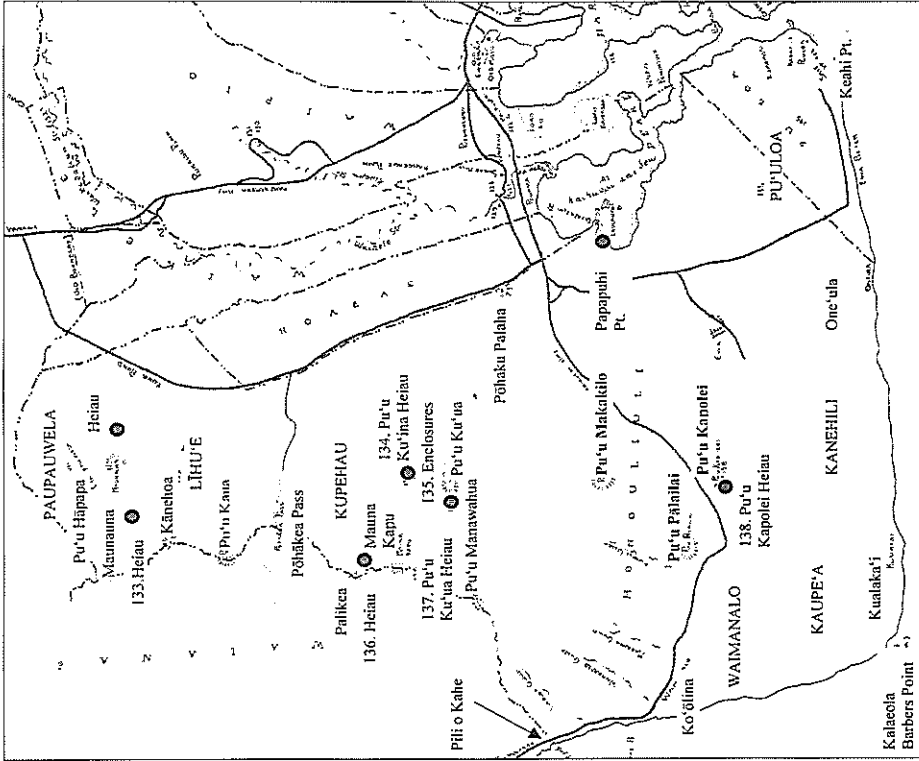


Figure 3. Place Names of Honouliuli (figure adapted from Sterling and Summers 1978); black circles mark heiau locations; numbers denote McAllister's (1933) listed sites

3.1.1.2 Pu'u o Kapolei and the Plains of Kaupé

The project area is south of a hill called Pu'u Palaliao; the name probably means the young *lati* (*Scomberoides* sp.) fish (Pukui et al. 1974:205). It is south of a second prominent hill, Pu'u Makaliko; this place name means "observing eyes hill" (Pukui et al. 1974:201) The project area is also west of Pu'uokapolei, another prominent hill at the *mauka* edge of the coastal 'Ewa Plains. Pu'uokapolei was the primary landmark for travelers on the trail that ran from Pearl Harbor west to Wai'anai (1939:27, 29; Nakuina 1992:54; E.M. Nakuina 1904, in Sterling and Summers 1978:34). The majority of Hawaiian legends and mythologies for the central 'Ewa plain concern this pu'u.

Pu'u o Kapolei, Astronomical Marker and Heiau

Pu'u means hill and Kapolei means "beloved Kapo," a reference to the sister of the Hawaiian volcano goddess, Pele. Samuel Kamakau (1976:14) says that ancient Hawaiians used Pu'uokapolei as an astronomical marker to designate the seasons. Samuel Kamakau (1870 *Mo'olelo Hawai'i*: Vol. I, Chap. 2, p. 23) relates:

... the people of O'ahu reckoned from the time when the sun set over Pu'uokapolei until it set in the hollow of Mahinaona and called this period Kau [summer], and when it moved south again from Pu'uokapolei and it grew cold and the time came when young sprouts started, the season was called from their germination (*aiho*) the season of Ho'oiho [winter, rainy, season].

A *heiau* was once on Pu'uokapolei, but had been destroyed by McAllister's (1933:108) survey of the island in the early 1930s. The hill was used as a point of solar reference or as an observation place for such observations (Fornander 1919, Vol. VI, Part 2:292). Pu'uokapolei may have been regarded as the gate of the setting sun, just as the eastern gate of Kumukahi in Puna is regarded as the rising sun; both places are associated with the Hawaiian goddess Kapo (Emerson 1978:41). This somewhat contradicts some Hawaiian cosmologies, in which Kū was the god of the rising sun, and Hina, the mother of Kamapua'a, was associated with the setting sun. Fornander (1919, Vol. VI, Part 2:292) states that Pu'uokapolei may have been a jumping off place (also connected with the setting sun) and associated with the wandering souls who roamed the plains of Kaupé'a and Kane-hili, *makai* of the hill.

Pu'u o Kapolei and the Plains of Kaupé'a and Kane-hiji

Hii'ika sang this bitter chant addressed to Lohiau and Wahine-oma'o, which uses the association of the Plains of Kaupé'a as a place for the wandering of lost souls:

*Ki'u aikana i ke awa iau o Pu'uiloa,
 Mai ke kaila o Pe'e-kaua, ke noho oe,
 E noho kaua e kui, e lei i ka pu'a o ke kauno'u,
 I ka pu'a o ke akili-kili, o ka wili-wili;
 O ka iho'ia o Kau-pe'e i Kane-hiji,
 Ua hili au; akahi no ka hili o ka ia pomaika'i;*

*E Lohian ipo, e Wāhine-oma'o,
Hoe 'a mai ka wa a i a'e aku au.*

We meet at Ewa's leaf-shaped lagoon, friends;

Let us sit, if you will on this lea

And bedeck us with wreaths of Kauno'a,

Of akuli-kuli and wili-wili,

My soul went astray in this solitude;

It lost the track for once, in spite of luek,

As I came down the road to Kau-pe'a.

No nightmare dream was that which tricked my soul.

This way, dear friends; turn the canoe this way;

Paddle hither and let me embark

[Emerson 1978:162-163].

Several other Honolulu places are mentioned in this chant, including Pe'e-kaua, which may be a variation of Kau-pe'e or Kaupe'a, and the plains of Kānehili, the last of which again refers to wandering, as the word *hiti* means "to go astray" (Emerson 1978:162). In the chant, Hi'iaka is moving downhill from Kaupe'a, probably the plains adjacent to Pu'u o Kapolei, toward the coast, the plain of Kānehili.

The plains of Kaupe'a and Pu'u Kapolei and the Realm of Homeless Souls

There are several places on the 'Ewa coastal plain that are associated with *ao kaeewa*, the realm of the homeless souls. Samuel Kamakau (1991b:47-49) explains the Hawaiian beliefs in the afterlife:

... There were three realms (*ao*) for the spirits of the dead... There were, first, the realm of the homeless souls, the *ao kaeewa*; second, the realm of the ancestral spirits, the *ao 'aumakua*; and third, the realm of Māhū, *ke ao o Māhū*...

The *ao kaeewa*, the realm of homeless souls, was also called the *ao 'auwaha*, the realm of wandering souls. When a man who had no rightful place in the 'aumakua realm (*kanaka kuleana 'ole*) died, his soul would wander about and stray amongst the underbrush on the plain of Kama'oma'o on Maui, or in the *wilwili* grove of Kaupe'a on Oahu. If his soul came to Leilono [in Halawa, 'Ewa near Red Hill], there he would find the breadfruit tree of Leiwalo, *ka 'ulu o Leiwalo*. If it was not found by an 'aumakua soul who knew it (*i ma'a mau itaitai*), or one who would help it, the soul would leap upon the decayed branch of the breadfruit tree and fall down into endless night, *the pō pau 'olo o Māhū*. Or, a soul that had no rightful place in the 'aumakua realm, or who had no relative or friend (*makamaka*) there who would watch out for it and welcome it, would slip over the flat lands like a wind, until it came to a leaping place of souls, a *leina a ka 'uhane*... [Kamakau 1991b:47].

On the plain of Kaupe'a beside Pu'u'uloa [Pearl Harbor], wandering souls could go to catch moths (*pūlelehuu*) and spiders (*nānana*). However, wandering souls could not go far in the places mentioned earlier before they would be found catching spiders by 'aumakua souls, and be helped to escape. . . . [Kamakau 1991b:49].

The breadfruit tree called Leilono was said to have been located on the 'Ewa-Kona border, above Āliamanu. In another section of his account of the dead, Kamakau calls the plain of wandering souls the "plain at Pu'uokapolei."

There are many who have died and have returned to say that they had no claim to an 'aumakua [realm] (*kālewa'ole*). These are the souls, it is said, who only wander upon the plain of Kama'oma'o on Maui or on the plain at Pu'uokapolei on Oahu. Spiders and moths are their food [Kamakau 1991b:29].

This association of Pu'u Kapolei and Kānehili with wandering souls is also illustrated in a lament on the death of Kahahana, the paramount chief of O'ahu, who was killed by his father, Kāhekili, after Kahahana became treacherous and killed the high priest Kaopulupulu.

Go carefully lest you fall dead in the sun,

E newa ai o lea make i ka la,

The god that dwells on Kapolei hill.

Akua noho la i Puuokapolei.

The sun is waiting on account of the

women of Kamao,

A hiding god, blossoming ohai of the banks,

Akua pae, pua ohai o ke kaha,

Contented among the stones-

I walea wale i ke a-

Among the breadfruit planted by Kahai.

I ka ulu kama a Kahai.

Thou wast spoken of by the oo-

Haina oe e ka oo-

By the bird of Kānehili.

E ka manu o Kānehili.

[Formander 1919, Vol. VI, Part 2:297]

Formander provides some notes on this lament. The god dwelling at Kapolei is the god Kahahana, stating that this is where his soul has gone. Kamao is one of the names of the door to the underworld. This lament draws an association with wandering souls and the place where the first breadfruit tree was planted by Kahai at Pu'u'uloa (Formander 1919, Vol. VI, Part 2:304).

Pukui (1983:180) offers this Hawaiian saying, which places the wandering souls in a *wilwili* grove at Kaupe'a.

The wilwili grove of Kaupe'a

Ka wilwili of Kaupe'a.

In 'Ewa, O'ahu. Said to be where homeless ghosts wander among the trees.

[Pukui 1983:#1666].

Beckwith (1940:154) has stressed that "the worst fate that could befall a soul was to be abandoned by its 'aumakua and left to stray, a wandering spirit (*kūewa*) in some barren and desolate place." These wandering spirits were often malicious, so the places that they wandered were avoided.

The Plain of Pukaua

The Hawaiian language newspaper *Ka Loea Kālai'āina*, (January 13, 1900) relates that near Pu'uokapolei, on the plain of Pukaua, on the *mauka* side of the road, there was a large rock. This legend suggests that the plain around Pu'u o Kapolei was called Pukaua. The legend is as follows:

If a traveler should go by the government road to Waiaanae, after leaving the village of gold, Honouliuli, he will first come to the plain of Puu-ainako and when that is passed, Ke-one-ae. Then there is a straight climb up to Puu-o-Kapolei and there look seaward from the government road to a small hill, That is Puu-Kapolei. . . . You go down some small inclines, then to a plain. This plain is Pukaua and on the mauka side of the road, you will see a large rock standing on the plain. . . . There were two supernatural old women or rather peculiar women with strange powers and Puukaua belonged to them. While they were down fishing at Kualaka'i [near Barber's Point] in the evening, they caught these things, *ā'ama* crabs, *pīpī* shellfish, and whatever they could get with their hands. As they were returning to the plain from the shore and thinking of getting home while it was yet dark, they failed for they met a one-eyed person [bad omen]. It became light as they came near to the plain, so that passing people were distinguishable. They were still below the road and became frightened lest they be seen by men. They began to run - running, leaping, falling, sprawling, rising up and running on, without a thought of the *ā'ama* crabs and seaweeds that dropped on the way, so long as they would reach the upper side of the road. They did not go far for by then it was broad daylight. One woman said to the other, "Let us hide lest people see us," and so they hid. Their bodies turned into stone and that is one of the famous things on this plain to this day, the stone body. This is the end of these strange women. When one visits the plain, it will do no harm to glance on the upper side of the road and see them standing on the plain [Ka Loea Kālai'āina, January 13, 1900, translation in Sterling and Summers 1978:39].

In another version of this story, the two women met Hi'aka as she journeyed toward the 'Eva coast. The women were *mo'ō* (supernatural beings) and were afraid that Hi'aka would kill them, so they changed into their lizard form. One of the lizards hid in a little space on a stone beside the coastal trail, and the other hid nearby (Ka Hōkū o Hawaii'i, February 15, 1927, translated in Maly 1997:19). From that time on the stone was known as *pe'e-kāua*, meaning "we two hidden." Hi'aka greeted the two women, but did not harm them, and passed on.

When she reached Pu'u o Kapolei, she also greeted two old women who lived at a 'ohai grove on the hill. These women were named Pu'uokapolei and Nāwainoakama'oma'o (Ka Hōkū o Hawaii'i, February 22, 1927, translated in Maly 1997:19). As she continued her travels, she looked to the ocean and saw the canoe carrying Lohi'au.

My man on the many harbored
sea of Pu'uoloa

Ku'u kāne i ke awa lau o Pu'u'oloa

As seen from the plain of Pe'e-kāua

Mai ke kula o Pe'e-kāua ke noho

Let us dwell upon the 'ōhai covered shore
Where the nani blossoms are twisted together

*E noho kāua i ke kahta o ka 'ōhai
I ka williwili i ka puu o ka lau nani*

Descending along Kānehili
I am winding along

*O ka ihona i Kānehili la
Ua hiki ho'i au-e*

[Ka Hōkū o Hawaii'i, February 22, 1927, translated in Maly 1997:20].

Pu'u Kapolei and Kamapua'a

Pu'uokapolei was the home of Kamapua'a's grandmother, Kamaunuiho, who was one of the three migrants from Kahiki that were ancestors to the people of O'ahu (Formander 1919, Vol. V, Part 2:318; Kahiolo 1978:81, 107). Kamapua'a, the Hawaiian pig god, once lived in Kahuui on the windward side, but escaped to 'Ewa when he was pursued by the chief Olopana.

Kamapua'a subsequently conquered most of the island of O'ahu, and, installing his grandmother [Kamaunuiho] as queen, took her to Pu'uokapolei, the lesser of the two hillocks [reference to Pu'u Palalāi] forming the southeastern spur of the Wai'anae Mountain Range, and made her establish her court there. This was to compel the people who were to pay tribute to bring all the necessities of life from a distance, to show his absolute power over all [Nakuina 1904:30-51].

Emma Nakuina goes on to note: "A very short time ago [prior to 1904] the foundations of Kamaunuiho's house could still be seen at Pu'uokapolei." Another account (Ka Loea Kālai'āina January 13, 1900, from Sterling and Summers 1978:34) speaks of Kekeleiku, the older brother of Kamapua'a, who also lived on Pu'uokapolei.

The Strife at Honouliuli: Kūali'i unites Hawaii'i nei [Mo'olelo o Kūali'i]

The celebrated chief, Kūali'i, is said to have led an army of twelve thousand (*'e-kōlu mano*) against the chiefs of Ko'olauloa with an army of twelve hundred (*'ēkolu lau*) upon the plains of Keahumoa (Formander 1917 Vol. IV, Part 2:364-401). Perhaps because the odds were so skewed the battle was called off and the *ali'i* of Ko'olau ceded (*ha'awi a'e*) the districts of Ko'olauloa, Ko'olauoko, Waialua and Wai'anae to Kūali'i. When the *ali'i* of Kāua'i heard of this victory at Honouliuli they gave Kāua'i to Kūali'i as well, and thus he became possessed of all the islands (*a lilo a'e la nā moke a pau ia Kūali'i mai Hawaii'i a Ni'ihau*). The strife at Honouliuli was the occasion of the recitation of a song for Kūali'i by a certain Kapa'āhulani (Ka Pule Ana a Kapa'āhulani). This *mela* compares the king to certain places and objects in the islands, in this instance to the first breadfruit planted by Kahai at Pu'uoloa, and a pig and a woman on Pu'u Kapolei, possibly a reference to Kamapua'a and his grandmother.

Not like these art thou, Ku.

Aole I ike Ku.

Not like the pig

Aole I ike i ka puua,

Discerning the progeny of the god;

I ka weke lau a ke akua,

[Or] The breadfruit planted by Kahai.

Ka ulu kama a Kahai;

Truly, have you not known

Oi ole ka oe i ike,

The woman with the dyed garment,

Ka wahine pau mao

On the top of Puuokapolei?

I ka luma o Puuokapolei-Ia?

[Formander 1917, Vol. IV, Part 2:392-393].

A later section of this *mele* also refers to Pu'u o Kapolei and makes mention of the famous blue *poi* of Honouliuli.

O Kawelo! Say, Kawelo!

Kawelokiki, the sharp-pointed hill,

Hill of Kapolei.

Blue is the *poi* which appeases

[the hunger] of Honouliuli.

[Formander 1917, Vol. IV, Part 2:400-401].

O Kawelo-e, e Kawelo-e,

O Kaweloki puu oioi,

Puu of Kapolei-e-

Uliuli ka poi e pihia nei-o Honouliuli;

3.1.2 Pre-Contact and Early Historic Period

By ca. A.D. 1320, 'Ewa, along with Kona, and Ko'olaupoko were the dominant polities, ruled by the sons of a chief named Māweke (Cordy 2002:21). 'Ewa at this time included the traditional districts of 'Ewa, Wai'anae, and Waiālua (Formander 1880:48). Around A.D. 1400, the entire island was ruled by King La'akona; chiefs within his line, the Māweke-Kumuhouma line, reigned until about A.D. 1520-1540, with their major royal center in Lihū'e, in 'Ewa. (Cordy 2002:24). Haka was the last chief of the Māweke-Kumuhouma line; he was slain by his men at the fortress of Waevae near Lihū'e (Kanaka 1991a:54-54; Formander 1880:88). Power shifted between the chiefs of different districts from the 1500s until the early 1700s when Kūali'i achieved control of all of O'ahu by defeating the Kona chiefs, then the 'Ewa chiefs, and then expanding his control on windward Kauai. Peliolani, the heir of Kūali'i, gained control of O'ahu ca. 1740, and later conquered parts of Molokai. He was ruler of O'ahu until his death in ca. 1778 when Kahahana, of the 'Ewa line of chiefs was selected as the ruler of O'ahu (Cordy 2002:24-41). After Kamehameha I conquered O'ahu, he gave the *ahupua'a* of Honouliuli to Kalanimōkū as part of the *panalā'au*, or conquered lands, with the right to pass the land on to his heirs rather than having it revert to Kamehameha (Kame'elehewa 1992:58, 112). Kalanimōkū subsequently gave the *ahupua'a* to his sister, Waihepe'o.

Various legends and early historical accounts indicate that the *ahupua'a* of Honouliuli was once heavily populated by pre-Contact Hawaiians. This substantial settlement is attributable for the most part to the plentiful marine and estuarine resources available at the coast and at Pearl Harbor, and for the lowlands suitable for wetland taro cultivation. In addition, forest resources along the slopes of the Wai'anae Range, as suggested by E.S. and E.G. Handy, probably acted as a viable subsistence alternative during times of famine and/or low rainfall.

The length or depth of the valleys and the gradual slope of the ridges made the inhabited lowlands much more distant from the 'wao, or upland jungle, than was the case on the windward coast. Yet the 'wao here was more extensive, giving greater opportunity to forage for wild foods during famine time [Handy and Handy 1972:469-470].

In addition, breadfruit, coconuts, *wauke*, bananas, and *olona* and other plants were grown in the interior. 'Ewa was known as one of the best areas to grow gourds and was famous for its

mamaki. It was also famous for a rare taro called the *kai o 'Ewa*, which was grown in mounds in marshy locations (Handy and Handy 1972:471). The cultivation of this prized and delicious taro led to the saying:

He has eaten the Kāi-koi taro of 'Ewa. *Ua 'ai i ke kāi-koi o 'Ewa.*

Kāi is O'ahu's best eating taro; one who has eaten it will always like it. Said of a youth of a maiden of 'Ewa, who, like the Kāi taro, is not easily forgotten [Pukui 1983:#2770].

The lochs of Pearl Harbor were ideal for the construction fishponds and fish-traps. Forest resources along the slopes of the Wai'anae Range probably acted as a viable subsistence alternative during times of famine and/or low rainfall (Handy 1940:211; Handy and Handy 1972:469-470). The upper valley slopes may have also been a resource for sporadic quarrying of basalt used in the manufacturing of stone tools. At least one probable quarrying site (SIHP site 50-80-12-4322) is present in Maka'ōwa Gulch at 152 m (500 ft) above mean sea level (Hammatt, Robins, et al. 1990).

John Papa 'Ī'i describes a network of Leeward O'ahu trails (Figure 4), which in historic times encircled and crossed the Wai'anae Range, allowing passage from Luāluālet to Honouliuli by three different trails (Ī'i 1959:96-98). The coastal trail skirted Pearl Harbor, passing by Pu'u o Kapolei; this would have been the nearest of three Honouliuli trails to the current project area. Following 'Ī'i's description, a portion of this trail network would have passed close to the existing Farrington Highway.

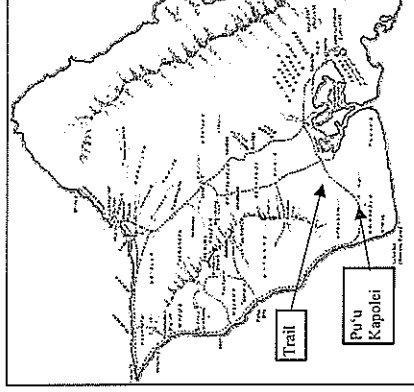


Figure 4. Early Nineteenth Century O'ahu Trails, showing trail north of Pu'u Kapolei

The trail is described by ʻŪi as:

The trail went down to the stream and up again, then went above the taro patches of Waiaia, up to a *makaʻi* field, to Wāimano, to Manana, and to Waiaia; then to the stream of Kukehi and up to two other *maika* fields, Pueohulumui and Haupu. At Pueohulumui was the place where a trail branched off to go Waialua and down to Honouliuli and on to Waianae. As mentioned before, there were three trails to Waianae, one by way of Puʻu o Kapolei, another by way of Pohakea, and the third by way of Kolekole [ʻŪi 1959:97].

There were many houses at Makaha, where a fine circle of sand provided a landing place for fleets of fishing canoes. The trail which passed by this sandy bar was the one from Puʻu o Kapolei, which had joined the beach trail from Puuloa and from Wāimanalo. It then went along the shore all around this island [ʻŪi 1959:97].

The first mission station in Ewa was established in 1834 at Kaituaʻāia near Pearl Harbor. Charles Wilkes, of the U.S. Exploring Expedition visited the missionary enclave at Honouliuli town in 1840.

At Ewa, Mr. Bishop has a large congregation. The village comprises about fifty houses, and the country around is dotted with them. . . . The natives have made some advance in the arts of civilized life; there is a sugar-mill which, in the season, makes two hundred pounds of sugar a day. . . . In 1840, the church contained nine hundred members, seven hundred and sixty of whom belonged to Ewa, the remainder to Waianae; but the Catholics have now established themselves at both these places, and it is understood are drawing off many from their attendance on Mr. Bishop's church [Wilkes 1970:80-81].

3.1.3 Mid- to late-1800s and the Māhele

At contact, the most populous *āhupuaʻa* on the island was Honouliuli, with the majority of the population centered on Pearl Harbor. In 1832, a missionary census of Honouliuli recorded the population as 1,026. Within four years the population was down to 870 (Schmitt 1973:19, 22). In 1835, there were eight to ten deaths for every birth (Kelly 1991: 157-158). Between 1848 and 1853, there was a series of epidemics of measles, influenza, and whooping cough that often wiped out whole villages. In 1853, the population of ʻEwa and Waʻānae combined was 2,451 people. In 1872, it was 1,671 (Schmitt 1968:71). The inland area of ʻEwa was probably abandoned by the mid-nineteenth century due to population decline and consolidation of the remaining people in town. A detailed discussion of the historic population counts in the ʻEwa District has been presented by Chiarvet-Pond and Davis (1992).

The Organic Acts of 1845 and 1846 initiated the process of the *māhele* - the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848 the crown and the *aliʻi* (chiefly class) received their land titles. The common people received their *kālema* (individual parcels) in 1850. During the *Māhele*, 72 individual land claims in the *āhupuaʻa* of

Honouliuli were registered and awarded by King Kamehameha III (Tuggle and Tomonari-Tuggle 1997:34). The 72 *kālema* awards were almost all made adjacent to Honouliuli Gulch, which contained fishponds and irrigated taro fields. No awards were located near the project area.

In 1855, the Land Commission awarded all of the unclaimed lands in Honouliuli, 43,250 acres, to Miriam Kēʻāhikuni Kekauʻōnohi (Royal Patent #6971 in 1877; Parcel #1069 in the Land Court office), a granddaughter of Kamehameha I, and the heir of Kalanimōkū, who had been given the land by Kamehameha after the conquest of Oʻahu (Indices of Awards 1929; Kameʻeleihiwa 1992). Kekauʻōnohi was also awarded the *āhupuaʻa* of Puʻuloa, but she sold this land in 1849 to a man named Isaac Montgomery, a British lawyer.

Kekauʻōnohi was one of Liholoho's (Kamehameha II's) wives, and after his death, she lived with her half-brother, Luanuʻu Kahalaʻiʻa, who was governor of Kaulaʻi (Hammatt and Shideler 1990:19-20:20). Subsequently, Kekauʻōnohi ran away with Queen Kaʻāhimanu's stepson, Keliʻiahonui, and then became the wife of Chief Levi Haʻaleleā. Upon her death on June 2, 1851, all her property was passed on to her husband and his heirs. In 1863, the owners of the *kālema* lands decided their lands back to Haʻaleleā to pay off debts owed to him (Friterson 1972:12). In 1864, Haʻaleleā died, and his second wife, Analeia Amos, transferred ownership of the land to her sister's husband, John Coney (Yoklavich et al 1995:16).

3.1.4 Mid-Nineteenth to Mid-Twentieth Century

3.1.4.1 Ranching on the ʻEwa Plain

John Coney rented the land to James Dowsett and John Meek in 1871, who used the land for cattle grazing. In 1877, the land, except for the ʻ*ili* of Puʻuloa, was sold to James Campbell. He drove off 32,237 head of stock belonging to Dowsett and Meek and to James Robinson and constructed a fence around the outer boundary of his property (Bordner and Silva 1983:C-12). He let the land rest for one year and then began to restock the ranch, so that he had a head of 5,500 head after a few years (Dillingham 1885, cited in Friterson 1972:14)

In 1880-81, the Honouliuli ranch was described as:

. . . Acreage, 43,250, all in pasture, but possessing fertile soils suitable for agriculture; affords grazing for such valuable stock. The length of this estate is no less than 18 miles. It extends to within less than a mile of the sea coast, to the westward of the Pearl River inlet. . . . There are valuable fisheries attached to this estate. . . . [Bowser 1880:489].

From Mr. Campbell's veranda, looking eastward, you have one of the most splendid sights imaginable. Below the house there are two lochs, or lagoons, covered with water fowl, and celebrated for their plentiful supply of fish, chiefly mullet. . . . Besides Mr. Campbell's residence, which is pleasantly situated and surrounded with ornamental and shade trees, there are at Honouliuli two churches and a school house, with a little village of native huts [Bowser 1880:495].

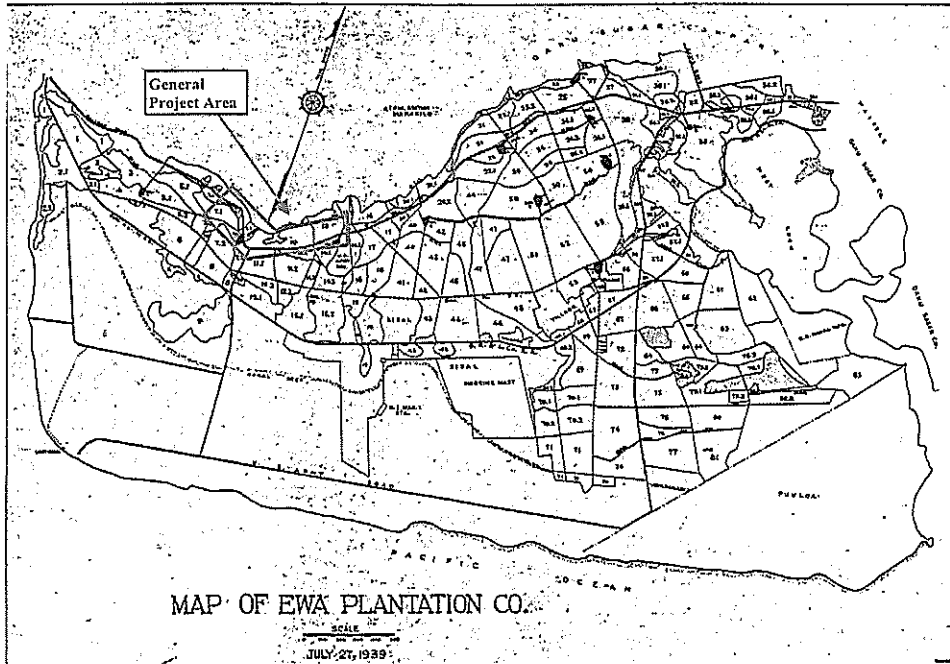


Figure 5. 1939 map of Ewa Plantation Co., with current project area outlined in red (figure from Condé and Best 1973)

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Campbell set up several enterprises in the *aihuia*, including a cattle ranch, a rice farm, a lime quarry, commercial *kiawe* cutting, and fisheries. Some sugar cane was grown in the area above the main pasturelands and the mountains. Most of Campbell's lands in Honouliuli were used exclusively for cattle ranching. At that time, one planter remarked "the country was so dry and full of bottomless cracks and fissures that water would all be lost and irrigation impracticable" (Ewa Plantation Co. 1923:6-7). In 1879, Campbell brought in a well-driller from California to search the Ewa plains for water, and the well, drilled to a depth of 240 feet near Campbell's home in Ewa, resulted in "... a sheet of pure water flowing like a dome of glass from all sides of the well casing." (The Legacy of James Campbell n.d., cited in Pagliaro 1987:3). Following this discovery, plantation developers and ranchers drilled numerous wells in search of the valuable resource.

3.1.4.2 History of the Ewa Sugar Plantation

In 1886, Campbell and B. F. Dillingham put together the "Great Land Colonization Scheme," which was an attempt to sell Honouliuli land to homesteaders (Thrum 1886:74). This homestead idea failed, but with the water problem solved by the drilling of artesian wells, Dillingham decided that the area could be used instead for large-scale cultivation (Pagliaro 1987:4).

In 1889, Campbell leased his property to Benjamin Dillingham, who subsequently formed the Oahu Railway & Land Co. (O.R. & L) in 1890. The railroad would reach from Honolulu to Pearl City in 1890, to Waianae in 1895, to Waihua Plantation in 1898, and to Kahuku in 1899 (Kuykendall 1967:100). This railroad line eventually ran across the center of the Ewa Plain at the lower boundary of the sugar fields.

To attract business to his new railroad system, Dillingham subleased all land below 200 ft elevation to William Castle, who in turn sublet the area to the newly-formed Ewa Plantation Company (Frierson 1972:15). Dillingham's Honouliuli lands above the 200 ft elevation that were suitable for sugar cane cultivation were sublet to the Oahu Sugar Company. Throughout this time, and continuing into modern times, cattle ranching continued in the area, and Honouliuli Ranch - established by Dillingham was - the "fattening" area for the other ranches (Frierson 1972:15). A 1939 map of the Ewa Plantation (Figure 5) shows that the project area was once planted in cane, in the fields numbered 7, 10, 11, 13, 14, 21, and 22.

Ewa Plantation Company was incorporated in 1890 for sugar cane cultivation. The first crop, 2,849 tons of sugar, was harvested in 1892 at the Ewa Plantation. Ewa was the first all-artesian plantation, and it gave an impressive demonstration of the artesian wells were to play in the later history of the Hawaiian sugar industry (Kuykendall 1967:69). As a means to generate soil deposition on the coral plain and increase arable land in the lowlands, the Ewa Plantation Company installed ditches running from the lower slopes of the mountain range to the lowlands.

When the rainy season began, they plowed ground perpendicular to the slope so that soil would be carried down the drainage ditches into the lower coral plain. After a few years, about 373 acres of coral wasteland were reclaimed in this manner (Immisch 1964). By the 1920s, Ewa Plantation was generating large profits and was the "richest sugar plantation in the world" (*Paradise of the Pacific* Dec. 1902:19-22, cited in Kelly 1991:171).

During the twentieth century, the Ewa Plantation would continue to grow and, by the 1930s, would encompass much of the eastern half of Honouliuli Ahupua'a. This growth impelled the creation of plantation villages to house the growing immigrant labor force working the fields. In the decade of the 1890s, the plantation built 72 houses, cottages or dwellings; in the first decade of this century, 336; in the second decade, 132; in the 1920s, 285; in the 1930s, 168; and in the 1940s, only 35. Censuses of the Ewa Plantation population record 4,967 persons in 1928, 4,477 in 1929, and 4,100 in 1932. After the outbreak of World War II, which siphoned off much of the plantation's manpower, along with the changeover to almost complete reliance on mechanical harvesting in 1938, there was little need for the large multi-racial (Japanese, Chinese, Okinawan, Korean, Portuguese, Spanish, Hawaiian, Filipino, European) labor force that had characterized most of the early history of the plantation.

Just north of Ewa Plantation was the equally sprawling Oahu Sugar Company which "covered some 20 square miles. . . ranging in elevation from 10 feet at the Waipio Peninsula. . . to 700 feet at the Waiahole Ditch" (Condé and Best 1973:313). The Oahu Sugar Company was incorporated in 1897. Prior to commercial sugar cultivation, the lands occupied by the Oahu Sugar Company were described as being "of near desert proportion until water was supplied from drilled artesian wells and the Waiahole Water project" (Condé and Best 1973:313). The Oahu Sugar Company took control of the Ewa Plantation lands in 1970 and continued operations until 1995, when they decided to shut down sugar cane production in the combined plantation area (Dorrance and Morgan 2000:45, 50).

During the subsequent decades of the twentieth century, sugar cane operations in 'Ewa phased out and, more recently, former cane lands have been rezoned for residential development. Structures in the area of the former plantation villages have fallen into disrepair or have been demolished. However, portions of the area - including Varona Village, Tenney Village, and Renton Village - have been designated the 'Ewa Villages Historic District (State site 50-80-12-9786), which has been nominated for National Historic Landmark status. Additionally, the still-extant O.R.&L. rail line through Honouliuli has been placed on the National Register of Historic Places (Site 50-80-12-9714).

3.1.5 Modern Land Use

Twentieth century land use of the project area has been commercial sugarcane cultivation up to ca. 1955 and as undeveloped land adjacent to the H-1 freeway and the Farrington Highway since that time. The area around Pu'u Kapolei, east of the project area, was developed as a military installation before World War II. An extensive study of Pu'u Kapolei's military history was conducted by Bennett (2004). The Kapolei Military Reservation was the second site on O'ahu to receive 16-inch seacoast guns. Construction of the battery for these guns commenced on July 5, 1931 and was completed on June 12, 1935. The military reservation was renamed Fort Barrette on November 23, 1934 in honor of Brig. Gen. John D. Barrette who had served as the commander of HSCAB from September 10, 1921 to August 12, 1924. The two guns were named Battery Hatch in honor of Brig. Gen. Henry J. Hatch. The guns were mounted on large open concrete emplacements. The gun tubes and carriages were transported to the *pu'u* by train. The two guns were proof-fired on April 24, 1936.

The 'Ewa Plain on O'ahu underwent many changes between 1943 and 1953. All of Pu'u Kapolei was labeled as a military reservation. Waianae Road was improved to a medium duty road and renamed Farrington Highway. A paved light duty road was built between Farrington Highway and Waimanalo Road that extends around the east side of Pu'u Kapolei.

3.2 Previous Archaeological Research

3.2.1 Overview of Archaeological Studies in Western Honouliuli

An overview of archaeological studies in Honouliuli Ahupua'a is presented in Table 1. The earliest attempt to record archaeological remains in Honouliuli Ahupua'a was made by Thrum (1906:46). He reported the existence of a *heiau* located on Pu'u Kapolei, east of the present study area. In a second monograph on *heiau*, Thrum (1917) called this *heiau* Palole'i [Kapolei]. Emory mapped and photographed these structures in 1933 (field notes), but they were dismantled and destroyed sometime before McAllister's survey of the islands in the 1930s. According to legend, Pu'u Kapolei was the location on which Kamapua'a, the pig-god, resided with his grandmother, Kamaunua'hiho (McAllister 1933:108).

In his surface survey of the 1930s, archaeologist J. Gilbert McAllister recorded the specific locations of important sites, and the general locations of less important sites (at least at Honouliuli). McAllister recorded six sites (see Figure 3 for site locations) in the upland section of Honouliuli, *mauka* of the 'Ewa coral plain and Pu'u o Kapolei. Site 133 is a possible *heiau*, a small enclosure at the foot of Pu'u Kanehoa. It was still standing during McAllister's day, and local residents informed him of its sacred nature. Site 134 is Pu'u Kuina Heiau, located in a gulch at the foot of Mauna Kapu. Only traces of a large terrace remained. Site 135 is a series of enclosures *maakai* of Pu'u Kuina Heiau. McAllister believed that the walls marked *kuleana* lots. Site 136 is a small platform near Mauna Kapu, a sacred site, possibly an altar. Site 137 is Pu'u Ku'ua Heiau, plotted on a ridge near Pu'u Ku'ua; it had been modified for use as a cattle pen; some areas had been cleared for pineapple cultivation or planted with ironwoods. Site 138 is Pu'u Kapolei Heiau, which had been on the *maakai* side of the hill before it was destroyed. The stones of the structure had been crushed in a nearby rock crusher. McAllister was also told that there was once a cave on the hill, in which Kamapua'a and his grandmother lived (McAllister 1933:107-108).

Between McAllister's 1930s study and the flurry of work that began in 1969, there are only a few sporadic pieces of research, which are not well documented. In 1933, Dr. Kenneth P. Emory recorded a well-preserved house site and a possible *heiau* (later destroyed by sugar cane cultivation) in the western part of the coral plains (Sinoto 1976:1). In 1959, William Kikuchi removed a number of burials from a burial cave site (Bishop Museum Site OA-B6-10) at the Standard Oil Refinery, which was subsequently destroyed (Barrera 1975:1). Kikuchi recovered 12-16 incomplete primary and/or secondary burials cached in a sinkhole or crevice exposed during construction activities near the big bend in Malakole Road (Kikuchi 1959; Davis 1990b: 146, 147). In 1960, Yoshi Sinoto and Elspeth Sterling visited a house site (3PBM. Site

Table 1. Archaeological and related studies in Honouliuli Ahupua'a

Reference	Nature of Study	General Location of Study
Thrum 1906	Heiau study	Hawaiian Islands
McAllister 1933	All Island survey	O'ahu Island
Kikuchi 1959	Site letter report	Barbers Point
Bowen and Soehren 1962	Burial Discovery	Barbers Point
Soehren 1964	Site letter report	Waimanalo Gulch
Lewis 1970	Reconnaissance survey	Barbers Point (harbor area)
McCoy 1972	Survey	Pu'ula Elementary School
Homonon 1973	Survey and excavations	Honouliuli
Frison 1972	Land use & vegetation change	Honouliuli
Barrera 1975	Reconnaissance survey	Barbers Point (harbor area)
Clark & Connolly 1975	Reconnaissance survey	Barbers Point (harbor area)
Oshima 1975	Reconnaissance survey	Barbers Point
Sinoto 1976	Cultural resources survey	Barbers Point (harbor area)
Bordner 1977a	Reconnaissance survey	Kalo'i Gulch
Bordner 1977b	Reconnaissance survey	Pu'u Kapolei
Bordner 1977c	Reconnaissance survey	Maka'ala Gulch
Clark 1977	Reconnaissance survey	Pu'u Kapolei/ft. Barrette
Connolly and Clark 1977	Reconnaissance survey	Pu'u Kapolei
Davis 1978	Scholarly paper	Barbers Point (harbor area)
Davis & Griffin 1978	Archaeological Survey	Barbers Point (harbor area)
Hawaii Marine Research Inc. 1978	Geoarchaeological reconnaissance	Barbers Point (harbor area)
Kirch 1978	L& small study	Barbers Point (harbor area)
Sinoto 1978a	Reconnaissance Survey and Burial Salvage	NAVMAG-West Loch
Sinoto 1978b	Archaeological & Palaeontological salvage	Barbers Point (harbor area)
Barrera 1979	Archaeological Survey	West Beach
Clark 1979	Reconnaissance survey	Barbers Point (harbor area)
Cleghorn 1979	Reconnaissance survey	Barbers Point
Davis 1979a	Emergency excavations	Barbers Point (harbor area)
Davis 1979b	Emergency excavations	Barbers Point (harbor area)
Davis 1979c	Emergency excavations	Barbers Point (harbor area)
Jourdane 1979	Reconnaissance Survey	*Eva Marina Community
Kennor & Dye 1979	Archaeological testing	West Beach
Sinoto 1979	Cultural resources survey	Barbers Point (harbor area)
Ahlo 1980	Reconnaissance survey	Solid Waste Processing Facility
Davis 1980	Research design	Barbers Point
Kirch & Christensen 1980	Land snail study	Barbers Point (harbor area)
Christensen & Kirch 1981	Land snail study	Barbers Point (harbor area)
Hammatt & Folk 1981	Archaeological & Palaeontological Investigation	Barbers Point (harbor area)
Davis 1982	Academic paper	Barbers Point
McCoy et al. 1982	Proposal for investigations	Barbers Point (harbor area)
Neller 1982	Scholarly study	Barbers Point
Ahlo & Hommon 1983	Reconnaissance survey	Barbers Point (harbor area)

Reference	Nature of Study	General Location of Study
Bordner & Silva 1983	Reconnaissance survey	Waimanalo Gulch
Davis 1983	Archaeological/Palaeontological Excavations	Barbers Point
Ahlo & Hommon 1984	Test excavations	Barbers Point (harbor area)
Barrera 1984	Archaeological Investigations	West Beach
Hammatt 1984a	Reconnaissance survey	Kahe Point
Hammatt 1984b	Reconnaissance survey	Eva Marina Community
Hau & Kelly 1984	Research design	Naval Air Station
Tuggle 1984	Survey report	Naval Air Station
Neller 1985	Review & evaluation	West Beach
Barrera 1986	Archaeological Investigations	West Beach
Davis & Hau 1986	Intensive survey & test excavations	West Beach
Davis et al. 1986 a & b	Research design	West Beach
Hau 1986a	Reconnaissance survey	Kapolei Town
Hau 1986b	Reconnaissance survey	Kapolei Town
Athens & Pterusevsky 1987	Burial documentation	Iroquois Point
Davis & Hau 1987	Intensive survey & test excavations	West Beach
Dicks et al. 1987	Reconnaissance survey	West Loch
Rosendahl 1987a	Reconnaissance survey	Kapolei Town
Rosendahl 1987b	Survey report	Kapolei Town
Rosendahl 1987c	Reconnaissance survey	West Loch
Rosendahl 1987d	Reconnaissance survey	Kapolei Golf Course
Welch 1987	Reconnaissance survey	Naval Air Station
Davis 1988a	Subsurface Survey	*Eva Gentry
Davis 1988b	Reconnaissance survey	Barbers Point HECCO
Kennedy 1988a	Reconnaissance survey	*Eva Gentry
Kennedy 1988b	Field Report	Waiuu-Campbell Industrial Park
Rosendahl 1988	Reconnaissance survey	Camp Malakole
Sinoto 1988a	Reconnaissance survey	*Eva Golf Course
Sinoto 1988b	Reconnaissance survey	Makaliko Golf Course
Bath 1989a	Petroglyph study	Waimanalo Gulch
Bath 1989b	Burial documentation	Kahe
Bath 1989c	Burial documentation	West Loch - H6'ae Point
Burgett & Rosendahl 1989	Subsurface testing	North of O.R.#1.
Hammatt & Shideler 1989a	Archaeological assessment	Barbers Point (harbor area)
Hammatt & Shideler 1989b	Reconnaissance survey	Kahe
Carlson & Rosendahl 1990	Inventory survey	Kaoni Loop Subdivision
Cleghorn & Davis 1990	Archaeological & palaeontological investigation	Barbers Point (harbor area)
Collins and Kennedy 1990	Burial documentation	Pu'ulon Golf Course
Davis 1990a	Archaeological & palaeontological study (Ph.D. dissertation)	Barbers Point (harbor area)
Davis 1990b	Archaeological & palaeontological investigation	Barbers Point (HECCO area)
Davis et al. 1990	Survey and Test Excavations	Eva Marina Community
Hammatt and Shideler 1990	Inventory survey	West Loch Bluffs

Reference	Nature of Study	General Location of Study
Hammatt, Shideler, et al. 1990	Inventory Survey	'Eva Villages
Kawachi 1990	Inadvertent Burial find	Campbell Industrial Park
Miller 1990	Inadvertent Burial find	Barber's Point, Nimitz Beach
Rosendahl 1990a	Letter report	Kapolei Golf Course
Rosendahl 1990b	Archaeological Survey and Test Excavations	'Eva Marina Community
Davis and Burtchard 1991	Inventory Survey	NAVMAG-West Loch
Dunn et al. 1991	Inventory Survey and Test Excavations	'Eva Marina Community
Folk 1991	Reconnaissance Survey	Kapolei Town
Goodman and Clegghorn 1991	Surface Survey	Laulani Fairways Housing
Hammatt 1991	Reconnaissance Survey	Honouliuli Livestock Park
Hammatt and Shideler 1991a	Archaeological assessment	Barbers Point (harbor area)
Hammatt and Shideler 1991b	Inventory Survey	St. Francis Medical Center West
Hammatt et al. 1991	Inventory survey	Makauiwa Hills
Hau et al. 1991	Survey report	Naval Air Station
Kennedy 1991	Subsurface testing	Pu'u o Kapolei/Ft. Barrette
Burgett & Rosendahl 1992	Inventory survey	Barbers Point (harbor area)
Charvet-Pond and Davis 1992	Data Recovery	West Beach
Clegghorn and Anderson 1992	Inventory Survey	Kahe Point
Erkelens 1992	Archaeological survey	Naval Air Station
Folk 1992	Subsurface Testing	Barbers Point
Hammatt 1992	Inventory Survey	Palikeya
Hammatt & Folk 1992	Subsurface testing	Barbers Point (harbor area)
Jayatilaka et al. 1992	Survey and Test Excavations	Hawai'i Prince Golf Course
Kennedy et al. 1992	Inventory Survey	Pu'u'o Kapolei Golf Course
Shideler et al. 1992	Assessment	Kahe Point
Tremblay et al. 1992	Burial documentation	West Beach
Davis 1993	Archaeological & paleontological investigation	Barbers Point (harbor area)
Glidden et al. 1993	Data recovery excavations	Paradise Cove
Goodman et al. 1993	Reconnaissance Survey	20-acre Commercial Project
Jones 1993	Fossil coral reefs study (Ph.D. dissertation)	Hawaiian Islands
Landrum and Schilz 1993	Reconnaissance & subsurface testing	Naval Air Station
Miller et al. 1993	Data recovery	Barbers Point (harbor area)
Nakamura et al. 1993	Inventory survey	Makakilo
Pantalco and Sinoto 1993	Inventory survey	Eva Gentry
Hammatt & Shideler 1994	Archaeological assessment	Barbers Point (harbor area)
Hammatt et al. 1994	Inventory survey	Barbers Point (harbor area)
Tuggle 1994	Inventory survey	Barbers Point
Davis et al. 1995	Archaeological & Paleontological investigations	Barbers Point (harbor area)
Dye 1995	Burial documentation	Barbers Point
Franklin 1995	Data Recovery	'Eva Marina Community
Hammatt & Shideler 1995	Data recovery plan	Barbers Point (harbor area)
Jourdane 1995	Burial documentation	Paradise Cove
Yoklavich et al. 1995	CRM Overview	Barbers Point

Reference	Nature of Study	General Location of Study
Corbin et al. 1996	Reconnaissance Survey	Laulani Island
Hammatt and Chigoleji 1996	Reconnaissance Survey	Corridor in Honouliuli
O'Hare et al. 1996	Intensive survey & testing	Naval Air Station
Schilz and Landrum 1996	Test Excavations	Barbers Point
Spear 1996	Archaeological Survey	Honouliuli Treatment Plant
Spear 1996	Reconnaissance Survey	Kapolei Town
Athens et al. 1997	Cultural resource inventory, paleo-environmental investigation, Assessment	Naval Air Station
Borthwick 1997	Inventory survey	'Eva Marina Community
Hammatt 1997	Inventory survey	Pu'u'o Kapolei
Jensen and Head 1997	Reconnaissance Survey	NAVMAG-West Loch
Tuggle 1997a	Cultural resource inventory	Naval Air Station
Tuggle 1997b	Synthesis	'Eva Marina Community
Tuggle and Tomonari 1997a,b	Cultural resource inventory survey	Naval Air Station
Wickler & Tuggle 1997	Cultural resource inventory, Inventory Survey	Naval Air Station
Wolforth and Wulzen 1997	Data Recovery	West Loch Estates
Wulzen & Rosendahl 1997	Subsurface testing & data recovery	Naval Air Station
Goodfellow et al. 1998	Data Recovery Program	West Loch
Hammatt and Shideler 1999	Inventory survey	Waimanalo Gulch
Magnuson 1999	Reconnaissance Survey	Farrington Hwy.
Elmore et al. 2001	Honouliuli	Pu'u Kapolei
McDermott et al. 2000	Data recovery	Barbers Point (harbor area)
O'Striff et al. 2001	Inventory Survey	Pu'u Kapolei/Ft. Barrette
Tulehin et al. 2001	Inventory survey	'Eva Marina Community
Cordy & Hammatt 2003	Archaeological assessment	Barbers Point, N of OR&L
McIntosh and Clegghorn 2003	Inventory survey	'Eva Gentry/Makai
Hoffman et al. 2004	Archaeological inventory Survey	Between OR&L and Barbers Point
O'Hare et al. 2004	Documentation of Plantation Infrastructure	North of O.R.&L.
Terry et al. 2004	Archaeological Inventory Survey of Two Sinkholes	North of O.R.&L.
O'Hare et al. 2005	Literature Search and Field Assessment	Eva Plantation Co. lands
O'Leary & Hammatt 2005	Literature Search and Field Assessment	Pu'u Kapolei/Ft. Barrette Road

OA-B6-8) within 'Ekahe Nui Gulch. "Around this elevation (1200 feet), along the sides of the stream, were seen remains of many terraces and some house sites" (Sterling and Summers 1978:37). In 1962, Lloyd Soehren recorded another secondary human burial in a sinkhole at the Barber's Point Naval Air Station (Davis 1990a:147). In 1966, Lloyd Soehren carried out salvage excavations at a possible fishing shrine (BPBM, Site # 50-OA-B6-13). The site was reported as destroyed by construction (Barrera 1975:1), but Davis relocated the shrine and performed additional excavations in 1982 (Davis 1990a:148). In 1969, artifacts were recovered by Roger Green from a beach midden site (B6-14), south of the barge harbor.

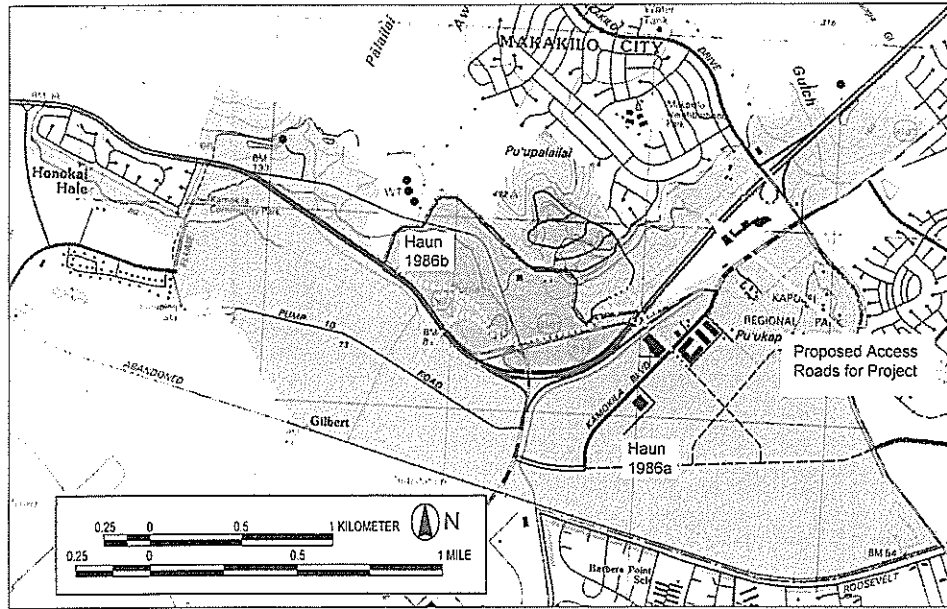


Figure 6. Previous archaeological near the project area; blue-shaded area=Ewa Town Center/Secondary Urban Center 1,400-acre study area (Haun 1986a); red-shaded area=Haun (1986b) Ewa Town Center/ Secondary Urban Center 200-acre study area; proposed additions and modifications of access roads for current project shown by yellow dashed line

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TMK 1-9-1-015:004, 017; 9-1-016:006, 024

3.2.2 Previous Archaeological Research In the Vicinity of the Present Project Area

The two most germane archaeological studies for the current project area two reports by Alan Haun of the archaeological firm Paul H. Rosendahl, Inc. (PHRI) (Figure 6). The first is a letter report entitled *Preliminary Archaeological Reconnaissance Survey for Environmental Assessment (EA) 'Ewa Town Center/ Secondary Urban Center, Land of Honouliuli, 'Ewa, Island of Oahu* (TMK: 9-1-15; Por. 4, 5, 17; 9-1-16:1, Por. 4, 6, 9, 16, 18, 24, 30; 9-2-19; Por. 1) (Haun 1986a). This study covered a petition area of approximately 1,400 acres, including an area that borders the H-1 freeway and will be affected by construction of the new Kapolei Interchange. The cloverleaf for the interchange is planned for construction in this area. The second is *Preliminary Archaeological Reconnaissance Survey for Environmental Assessment (EA) 'Ewa Town Center/ Secondary Urban Center, Land of Honouliuli, 'Ewa, Island of Oahu* (TMK: 9-1-15; Por. 5, 17; 9-1-16: Por. 9) (Haun 1986b). This study covered a petition area of approximately 200 acres (see Figure 6), also including areas that border the H-1 freeway and will be affected by the additions and modifications to the Interstate H-1 Makakilo/Palailai Interchange area.

The Haun studies note the extensive modification for sugarcane cultivation and concludes that only two sites had been previously reported in the vicinity: the OR&L alignment (Site 50-80-12-9714) on the southern border of the study area and the *heiau* and large rock shelter recorded by McAllister (1933) on Pu'u Kapolei (Site 50-80-12-138). Pu'u Kapolei was outside of the Haun study area and was not checked by him during his field survey. The Haun study identified two new sites: an irrigation ditch north of the H-1 and a WWII military structure on Pu'u Palailai, but both lie outside the present area of concern and both were regarded as of minimal significance. The Haun study (1987:4) concluded that "no further archaeological work is recommended."

Rosendahl (1987a) conducted an archaeological reconnaissance survey of approximately 850 acres for the Kapolei Village Project, south and on the opposite side of Farrington Highway to the current project area. Rosendahl's parcel was bounded by Farrington Highway on the northwest, Fort Barrette Road on the southwest, the OR&L on the southeast, and O'ahu Sugar Company lands adjacent to Kalo'i Gulch on the northeast. No archaeological sites are known to exist within the project area other than the railroad line (50-80-12-9714).

Rosendahl (1990) also conducted an archaeological survey of the Kapolei Golf Course Addition, a 58 acre parcel situated immediately adjacent to the northeast boundary of the Kapolei Village Master Plan Project. The area was found to be extensively altered for sugar cane cultivation and no sites were recorded.

In 1990, CSH (Hammatt et al. 1991) conducted an inventory survey of the 1,915-acre Makaiwa Hills. This project area was located between the towns of Makakilo and Waimanalo Gulch and extended from Farrington Highway on the south (*maaka*) boundary and to Palehua Road on the north (*maika* boundary). The *maaka* border of this project area is shown in Figure 7; the northwestern section of the current project area (roads north of Farrington Highway) is within this previously conducted inventory survey area. Of the 34 sites recorded during this survey, two

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are adjacent to proposed roads in the current project area. Site 50-80-12-4341, is a ditch/flume oriented roughly parallel and north of Farrington Highway in the northwestern section of the project area. It is labeled as "Flume" on the USGS map and illustrated as a blue line (see Figure 7). Site 50-80-12-4342 is a large circular-shaped structure that once functioned as a reservoir for sugar cane irrigation. Both sites were recorded during the survey and considered "No longer significant." They were not recommended for any additional work or for preservation.

Pu'u Kapolei/Fort Barrette has been the subject of four separate archaeological investigations. The first was by Clark (1977) who conducted an archaeological reconnaissance survey. Clark and colleagues surveyed the entire property and noted the extensive modification from the military development. They did not find any evidence of prehistoric use of the area. Clark concluded that no further archaeological work was necessary within the project area.

Kennedy (1991) conducted a surface survey as well as subsurface testing with a backhoe. The surface survey did not reveal any evidence of prehistoric use of the site. The surface survey did record the military structures associated with Battery Hatch discussed above. Twelve backhoe trenches varying in length from 10 m to 44 m were excavated. The total trench length was 312 m. No prehistoric cultural remains were discovered in any of the trenches. Modern trash was found in a few of the trenches. Like Clark (1977), Kennedy (1991) recommended that no further archaeological work was necessary.

Ostrov et al. (2001) completed a full-scale inventory survey of Pu'u Kapolei/Fort Barrette. The inventory survey included a complete surface survey, the excavation of 21 trenches with a backhoe, and the excavation of four controlled test units. Two sites were recorded during the investigations: 50-80-12-5918 and 50-80-12-5919. Site 50-80-12-5918 includes a stone mound and a petroglyph of questionable age. Because Fort Barrette had become more than fifty years old at the time of the study it was assigned state sight number 50-80-12-5919. Site 50-80-12-5919 includes 40 separate features, which are the various buildings throughout the property. Ostrov et al. concluded that site 50-80-12-5918 would need further investigation if any construction activities were going to take place that might impact the site. The authors also concluded that Fort Barrette (50-80-12-5919) was "an excellent candidate for placement on the National Register of Historic Places" (Ostrov et al. 2001:i).

CSH (O'Leary and Hammett 2005) conducted a literature search and a brief field inspection for the proposed project to widen Fort Barrette Road. During the field inspection two features were recorded, one large concrete pipe (Feature 1) and a rock wall (Feature 2). No site number was assigned to these features.

None of the four previous studies (Clark 1977, Kennedy 1991, Ostrov et al. 2001; O'Leary and Hammett 2004) found any evidence of the *heiau* or rock shelter (Site -138) originally mentioned by McAllister (1933).

Also pertinent to this project is a recent report (O'Hare et al. 2004) on the documentation of existing sugar plantation infrastructure still present in a 474-acre parcel of land (TMK (1) 9-1-015-004) overlapping and west of the current study area (see Figure 7). A portion of the current

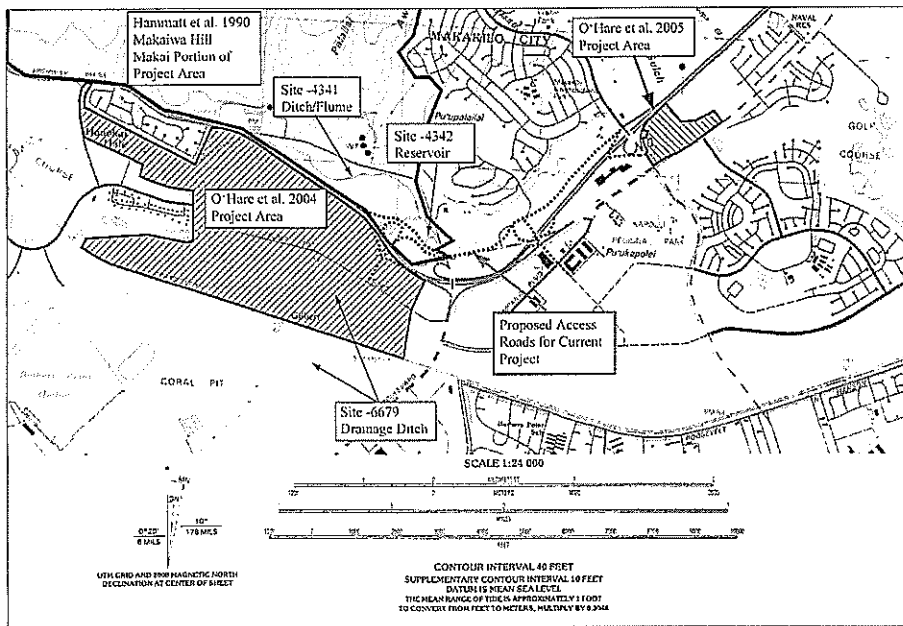


Figure 7. US Geological Survey Map (1998 series) showing current project area (blue dashed line) and project areas for O'Hare et al. 2004, 2005 (hatched areas) and makai section of the Makaiwa Hills Project (pink shaded area in upper left corner of figure)

project area (access roads *maka'i* of Farrington Highway in the southwestern section of the project area) is within this previously surveyed parcel. This report contains a detailed history of the Ewa Plantation Company, focusing on the changing irrigation technologies used for sugar cane cultivation, and the types of irrigation features, such as ditches, pipes, channels, and flumes that would be expected to be found still in the project area. A field survey was conducted by CSH in this parcel and all historic features relating to sugar cane cultivation, especially irrigation features, were documented and photographed. Two sites were recorded: Site 50-80-12-6679, an earthen ditch possibly constructed around World War II; and Site 50-80-12-6678, a complex of above ground irrigation features, such as concrete canals and basins, and metal pipes and flumes (Features A-E). Neither site was recommended for preservation or for additional archaeological work. The irrigation features (Site -6678) were all recorded in the northwestern section of this parcel, 0.5 miles west of the current project area. The irrigation ditch (Site -6679) is located close to the extreme western section of the current project area (see Figure 7; illustrated by a north-south oriented blue line).

This same site number for plantation infrastructure (50-80-12-6678) used for the O'Hare et al. 2004 parcel was also used for four features (Features F-I of site -6678) found during a recent field assessment (O'Hare et al. 2005) of a project area adjacent to the eastern boundary of the current project area (see Figure 7), within the northeastern corner of the Haun study area (see Figure 6).

In summary, the majority of the current project area has already been previously surveyed at least once during one or more archaeological inventory surveys (see Figures 6 and 7). The area for new access roads north of Interstate H-1 (the northeastern section of the project area) was previously surveyed by the Bishop Museum (Haun 1986a). The central portion of the current project area north of Farrington Highway (Haun 1986b) and south of the highway along Wakea Street (Haun 1986a) was previously surveyed by the Bishop Museum. The proposed access area north of Farrington Highway in the northwestern section of the current project area was previously surveyed by the Bishop Museum (Haun 1986a) and by Cultural Surveys Hawai'i in 1990 (Hammatt et al. 1990). The area south of Farrington Highway in the southwestern section of the current project area was surveyed by the Bishop Museum (1986a) and by CSH in 2004 (O'Hare et al. 2004). Only one small section of the current project area has not been previously surveyed, a proposed access road south of H-1 at the Makakilo Interchange.

3.2.3 State Historic Preservation Division Reviews of the Present Project Lands

As noted above and supported with Figures 6 and 7, the 1986a and 1986b archaeological studies by Alan Haun covered almost the entirety (except for a short access road south of Makakilo Interchange) of the area of present concern. The potential historic preservation concerns for these lands have been evaluated a number of times previously by the State Historic Preservation Division (SHPD). The first SHPD determination appears to have been in a letter from Ralston H. Nagata to Roger C. Evans dated January 28, 1987 entitled *Environmental Review - Secondary Urban Center in Ewa Oahu, Honouliuli, Ewa, Oahu TMK: 9-1-15, por. 4, 5, 17, 9-1-16, 1, por. 4, 6, 9, 16, 18, 24, 30; 9-2-19; por. 1*.

The majority of this area has long been under sugarcane cultivation. The remaining portions have recently had reconnaissance-level archaeological survey (Haun, for PHRI). No significant sites were recorded. We believe therefore that there will be "no effect" on significant historic sites. (Nagata to Evans, January 28, 1987).

This was basically the same wording used in subsequent SHPD evaluations of an LUC boundary petition for the secondary urban center (Ralston H. Nagata to Roger C. Evans dated August 26, 1987), for the Final EIS for the Kapolei Town Center (William W. Patty to Donald Clegg, July 6, 1988), and for an LUC motion for incremental districting of Kapolei City (Don Hibbard to Roger C. Evans, February 17, 1993).

An SHPD response to a "City and County of Honolulu Information Request Regarding an LUC boundary petition . . ." (Ralston H. Nagata to Roger C. Evans, August 26, 1987) specifically addressed lands including in the later Haun (1986b) study. The SHPD response to the information request noted:

The property involved in this petition has been archaeologically surveyed, and a copy of the report is included in the document. No significant historic sites were located during the survey. Therefore we believe that this project will have "no effect" on significant historic sites. . . ." (Nagata to Evans, August 26, 1987).

Thus it appears that all lands of concern in the present request for status clarification have been covered in previous archaeological studies (Haun 1986a, 1986b) and that the issue of development of all these lands have been previously evaluated by the SHPD as having "no effect" on significant historic sites.

Because some time had elapsed since formal SHPD consideration of these lands, Cultural Surveys Hawai'i recently requested a statement from the SHPD regarding any historic preservation concerns for several parcels in this area. The SHPD review letter of November 26 2003 (Log No 2003.2440, Doc No. 0311EJ38) concludes: "that: development of the lands covered in this status clarification will have 'no effect' on significant historic sites."

3.2.4 State Historic Preservation Division Letters Involving Haun 1986a, 1986b Study Areas

- a. Ralston H. Nagata to Roger C. Evans dated January 28, 1987 entitled: *Environmental Review - Secondary Urban Center in Ewa Oahu, Honouliuli, Ewa, Oahu TMK: 9-1-15, por. 4, 5, 17, 9-1-16, 1, por. 4, 6, 9, 16, 18, 24, 30; 9-2-19; por. 1*.
- b. Ralston H. Nagata to Roger C. Evans dated August 26, 1987 entitled: *LUC Boundary Petition 87-613, Campbell Estate, Ag. to Urban, Implementation of Honolulu General Plan Policy for Secondary Urban Center Honouliuli, Ewa, Oahu TMK: 9-1-15, por. 4, 9-1-16, 1, por. 4, 6, por. 9, 16, 18, 24, and 30; 9-2-03; por. 2; 9-2-19; por. 1*.
- c. William W. Patty to Donald Clegg, dated July 6, 1988 entitled: *Final EIS, Kapolei Town Center Honouliuli, Ewa, Oahu TMK: 9-1-16, various; 9-2-19; 1; 9-2-03; 2 and 12*

- d. Don Hibbard to Roger C. Evans, February 17, 1993 entitled: LUC Docket No. A87-613: Motion for Incremental Districting (Kapolei City) by the Estate of James Campbell (File No. 93-384) Honolulu, Ewa, Oahu TMK: 9-1-15; por. 4; 9-1-16 por. 1, por. 4, 5, 6, por. 9, 12, 13, por. 16, 18, por. 24, 30; ; 9-2-3; por. 2, 12; 9-2-19; por. 1).
- e. Ralston H. Nagata to Roger C. Evans, August 26, 1987 entitled: City and County of Honolulu Information Request Regarding an LUC boundary petition 87-613, Campbell Estate Honolulu, Ewa, Oahu TMK: 9-1-15; por. 4; 9-1-16: 1, por. 4, 6, por. 9, 16, 18, 24, and 30; ; 9-2-3; por. 2; 9-2-19; por. 1).
- f. Holly McEldowney to David Shideler, November 26, 2003 entitled Chapter 6E-42 Historic Preservation Review – Request for Written Status Clarification on Lands in Kapolei Area of Honolulu Ahupua'a Honolulu, Ewa, O'ahu.

3.3 Background Summary and Predictive Model

3.3.1 The Physical Layout

The *ahupua'a* of Honolulu is the largest traditional land unit on the island of O'ahu. Honolulu includes all the land from the western boundary of Pearl Harbor (West Loch) westward to the 'Ewa/Wai'anae District Boundary with the exception of the west side of the harbor entrance which is in the *ahupua'a* of Pu'uloa (the 'Ewa Beach/Iroquois Point area). This comprises approximately 12 miles of open coastline from One'ula westward to Pili O Kahe. The *ahupua'a* extends *mauka* (almost pie-shaped) from West Loch nearly to Schofield Barracks and the western boundary is the Wai'anae Mountain crest running *makai* to the east ridge of Nānākuli Valley.

Not only is there a long coastline fronting the normally calm waters of leeward O'ahu, but there are also four miles of waterfront along West Loch. The land immediately *mauka* of the Pacific coast consists of a flat karstic raised limestone reef forming a level nearly featureless "desert" plain marked in pre-Contact times (previous to alluviation caused by sugar cultivation) by thin or non-existent soil mantle. The microtopography is notable in containing countless sinkholes in some areas caused by chemical weathering (dissolution) of the limestone shelf.

Along the eastern flank of the Wai'anae Mountains, numerous gulches have contributed to the alluvial deposits over the coastal limestone shelf. The largest of the gulches is Honolulu Gulch, which drains into West Loch. The gulches are generally steep-sided in the uplands and generally of a high gradient until they emerge onto the flat 'Ewa plain. The alluvium they have carried has spread out in delta fashion over the *mauka* portions of the plain, which comprises a dramatic depositional environment at the stream gradient change. These gulches are generally dry, but during seasonal Kona storms carry immense quantities of runoff onto the plain and into the ocean. As typical drainages in arid slopes they are either raging uncontrollably, or are dry and, as such, do not form stable water sources for traditional agriculture in their upper reaches. The Honolulu gulches generally do not have valleys suitable for extensive irrigated agriculture; however, this lack is more than compensated by the rich watered lowlands near West Loch.

Honolulu Ahupua'a, as a traditional land unit had abundant and varied resources available for exploitation by early Hawaiians. The "karstic desert" and marginal characterization of the limestone plain, which is the most readably visible terrain, does not do justice to the *ahupua'a* as a whole. The richness of this land unit is marked by the following available resources:

- g. Twelve miles of coastline with continuous shallow fringing reef, which offered rich marine resources.
- h. Four miles of frontage on the waters of West Loch, which offered extensive fisheries (mullet, *awa*, shellfish), as well as frontage suitable for development of fishponds.

- i. The lower portion of Honouliuli Valley in the 'Ewa plain offered rich level alluvial soils with plentiful water for irrigation from the stream as well as abundant springs. This land would have stretched well up the valley.
 - j. A broad limestone plain which because of innumerable limestone sinkholes offered a nesting home for a large population of avifauna. This resource may have been one of the early attractions to human settlement.
 - k. An extensive upland forest zone extending as much as 12 miles inland from the edge to the coastal plain. As Handy and Handy (1972:469) have pointed out, the forest was much more distant from the lowlands here than it was on the windward side, but on the leeward side was more extensive. Much of the upper reaches of the *ahupua'a* would have had species-diverse forest with *kukui*, *'ohia*, sandalwood, *halehi*, *ti*, banana, etc.
- Within this natural setting archaeological and traditional sources show a general pattern of three main areas of settlement within the *ahupua'a*: (1) the coastal zone including Kalaeloa (Barber's Point), Ko'olina (West Beach), and One'ula ('Ewa Marina); (2) the Honouliuli Taro Lands; and, (3) the inland area of Pu'u Ku'ua.

3.3.2 The Coastal Zone

3.3.2.1 Kalaeloa (Barber's Point)

Archaeological research at Barber's Point has focused on the areas in and around the newly constructed Deep Draft Harbor (Barrera 1975; Davis and Griffin, 1978; Hammatt and Folk, 1981; McDermott et al. 2000). Series of small clustered shelters, enclosures and platforms show limited but recurrent use at the shoreline zone for marine oriented exploitation. This settlement covers much of the shoreline with more concentrated features around small marshes and wet sinks. Immediately behind the shoreline under a linear dune deposit is a buried cultural layer believed to contain some of the earliest habitation evidence in the area.

The attraction of the area to early Hawaiians was the plentiful and easily exploited bird population. Particular evidence for taking of petrel occurs at Site -2763 (Hammatt and Folk, 1972:13). Initial heavy exploitation of nesting seabirds and other species in conjunction with habitat destruction probably led to early extinction. There is some indication of limited agriculture in mulched sinkholes and limited soil areas. Considering rainfall, this activity would have been limited, but probably involved tree crops and roots (sweet potatoes). The archaeological content of the sites indicates a major focus on marine resources.

Davis and Griffin (1978) distinguish functional classes of sites, based on surface area size and argues that the Barber's Point settlement consists of functionally integrated multi-household residence groups. Density contours of midden (by weight) and artifacts (by numbers) plotted for residence sites by Hammatt and Folk (1981) generally indicate narrowly defined spatial foci of discard, possibly indicating continuous use, or at least with no refurbishing or additions to the structures through time (Hammatt and Folk 1981). The focus is small habitation sites, typically

lacking the full range of features found in large permanent residence complexes such as high platforms, complex enclosures and ceremonial sites.

3.3.2.2 Ko'olina (West Beach)

There are three available studies on the Ko'olina project area (Davis et al. 1986a; Davis et al. 1986b; and Davis and Haun 1987). Davis documents around 180 component features at 48 sites and site complexes consisting of habitation sites, gardening areas, and human burials. Chronologically the occupation covers the entire span of Hawaiian settlement in what Davis and Haun describe as "one of the longest local sequences in Hawaiian prehistory" (Davis and Haun 1987:37). The earliest part of the sequence relates to the discovery of an inland marsh, and early dates were also obtained for the beachfront site and an inland rock shelter.

3.3.3 Honouliuli Taro Lands

Centered around the west side of Pearl Harbor at Honouliuli Stream and its broad outlet into the West Loch are the rich irrigated lands of the 'ihi of Honouliuli which give the *ahupua'a* its name. The major archaeological reference to this area is Dicks, Haun and Rosendahl (1987), who documented remnants of a once-widespread wetland system (*lo'i* and fishponds) as well as dryland cultivation of the adjacent slopes. The current study area is within this environmental zone.

The area bordering West Loch was clearly a major focus of population within the Hawaiian Islands and this was a logical response to the abundance of fish and shellfish resources in close proximity to a wide expanse of well-irrigated bottomland suitable for wetland taro cultivation. The earliest detailed map (Malden 1825) shows all the roads of southwest O'ahu coalescing and descending the *paik* (cliff) as they funnel into the locality (i.e. Honouliuli Village). Dicks et al. (1987:78-79) conclude, on the basis of 19 carbon isotope dates and 3 volcanic glass dates that "Agricultural use of the area spans over 1,000 years." Undoubtedly, Honouliuli was a locus of habitation for thousands of Hawaiians. Pre-Contact population estimates are a matter of some debate but it is worth pointing out that in the earliest mission census (Schmitt 1973:19) 1831-1832, the land (*āina*) of Honouliuli contained 1026 men, women, and children. It is not clear whether this population relates to Honouliuli Village or the entire *ahupua'a*, but the village probably contained the vast majority of the district's population. The nature of the reported population structure for Honouliuli (less than 20% children under 12 years of age) and the fact that the population decreased more than 15% in the next 4 years (Schmitt 1973:22) suggests that the prehistoric population of Honouliuli Village may well have been significantly greater than it was in 1831-1832. A conservative estimate would be that tens of thousands of Hawaiians lived and died at Honouliuli Village.

3.3.4 Pu'u Ku'ua: Inland Settlement

Documentation of inland settlement in Honouliuli Ahupua'a is more problematic in that there are relatively few documented archaeological sources. However, it is probable that the area around Pu'uku'ua, on the east side of the Wai'anac Ridge seven miles inland of the coast, was a Hawaiian place of some importance.

In 1899, Hawaiian Newspaper *Ka Loea Kālai ʻāina* relates a story of Pu'uku'ua as "a place where chiefs lived in ancient times" and a "battle field," "thickly populated." The article summarizes:

There were two important things concerning this place. (1) This place was entirely deserted and left uninhabited and it seems that this happened before the coming of righteousness to Hawai'i Nei. Not an inhabitant is left. (2) The descendants of the people of this place were so mixed that they were all of one class. Here the gods became tired and returned to Kahiki [Sterling and Summers 1978:33].

McAllister recorded three sites in this area, two *heiau* (134, 137) (Pu'u Kuina and Pu'u Ku'ua, both destroyed) and a series of enclosures in Kukuilua which he calls "kuleana sites" (McAllister 1933). On the opposite side of the Wai'anae range, along the trail to Pōhākea Pass, Cordy (2002:36) states "Kākūhihewa was said to have built (or rebuilt) Nōi'ula, a *pō okanaka heiau* (1,300 sq. m.) in Hāloa in upper Luaiualei, along the trail to Pōhākea Pass leading into 'Ewa, ca. A.D. 1640-1660" (Cordy 2002:36). There is no direct archaeological evidence available to the authors' knowledge that intensive Hawaiian settlement occurred here, but it is considered as a place of high probability, based on the above indications. John Papa I'i (1959) described a journey that Lihilo took which led him and an entourage through inland Honouliuli and over Pōhākea Pass. Geographically, the area receives sufficient quantities of water and would have had abundant locally available forest resources.

3.3.5 Summary of Settlement Patterns in Honouliuli

Based on the above summary of areas of Honouliuli settlement, the following general considerations are made to place the project area in the context of the *ahupua'a* settlement pattern. There are three areas of Hawaiian settlement in the *ahupua'a*; two are well documented while the third is more problematic:

- a. The extensive limestone plain with recurrent use habitations for fishermen and gatherers and sometime gardeners;
- b. The rich cultivated lands of Honouliuli 'i'i for extensive wetland taro- the *ahupua'a* population center; and,
- c. The uplands around Pu'uku'ua probably for agriculture and forest resource utilization.

Honouliuli, as a unit, contains all the geographic elements of a typical Hawaiian valley *ahupua'a*, except they are arranged geomorphically in an atypical relationship. The *ahupua'a* is not organized around a single drainage network but shares the west portions of Waikēle drainage in its upper reaches. A highly advantageous characteristic for human subsistence is included in a vast coastline and fringing reef, as well as an extensive limestone plain that would support only limited agriculture but would be excellent for bird catching in early times, and a huge expanse of sloping forest land. The richest forestland for foraging for wood, birds, feathers, etc. would have been the east slope of the Wai'anae Range. The *mauka/makāi* route would have been up

Honouliuli Gulch or up the Makakilo ridge, paralleling the coast from Honouliuli Gulch to Kahe. The most convenient route to *mauka* lands, even from the western end of the coast (Ko'olina), would have been *mauka* only to the base of the hills and then either up the Makakilo Ridge or northeast to a trail to Pu'u Ku'ua. The *makāi* slope is the dry side of the ridge line. Here streams would respond to rainfall quickly but drain quickly leaving little available water for even short-term use.

The *makāi* slope was not a major thoroughfare. We can see some very limited evidence of part-time agriculture in and around gulches and two foci of sparse habitation. The first is limited to *makāi* portions of gulches and lava flats. This habitation is considered a *mauka* component or continuation of the Ko'olina coastal settlement rather than an independent focus. The second focus, separated from the first by a barren zone, is generally above the 800-foot elevation. Supported by seasonal dry land planting and forest foraging, this *mauka* habitation could have been the lower portion of a thinly scattered, but widespread zone of settlement stretching eastward and northeast along the east Wai'anae Range slopes, possibly increasing in intensity along the more watered lands forming the *mauka* western boundary of Honouliuli.

There is to date no archaeological evidence of high status residences in Honouliuli. Large residential structures are not present along the shoreline where they would be expected. The late prehistoric occurrence of chiefs' houses is not apparent, perhaps because the ocean shoreline, although rich in marine resources, is uninviting for sport and unsuitable for fishponds. The chiefly focus of 'Ewa District was Waipi'o. Whatever activities of this class occurred in Honouliuli would have been in or near the rich lands fronting West Loch (the 'i'i of Honouliuli) but to date there is no direct archaeological evidence of this. Concerning status associations with Honouliuli, it is interesting to note the connection of the Pu'uku'ua settlement with pariah (*kauwā*), the lowest class of Hawaiians (Sterling and Summers 1978:33).

The central place of the *ahupua'a* of Honouliuli in terms of population, as well as cultivated foods, was the 'i'i of Honouliuli. There is good reason to assume, given the lack of intensive agricultural resources in other locations during prehistoric times, that all other habitation zones were economically and socially co-dependent.

The project area lies back from the coast, at the foothills of the Ko'olau Mountain Range south and west of two prominent hills, Pu'u Palai'ai and Pu'u O Kapolei. It is not near any major gulches or other sources of water. The area could have provided temporary habitation for gatherers and fishermen traveling along the main trail across the 'Ewa Plains, a trail that was later covered by the Farrington Highway roadway, which forms the southern boundary of the project area. In general the project area lies in a region that would have been less than bountiful, and therefore sparsely utilized, even in pre-Contact times.

Section 4 TRADITIONAL CULTURE IN THE PROJECT AREA

The project area lies back from the coast, at the foot of the upland ridges, which was, according to Honouliuli settlement predictions, probably never permanently inhabited. It could have, however, provided temporary habitation for gatherers and travelers crossing the barren 'Ewa plains. Discussions of specific aspects of traditional Hawaiian culture as they may relate to the project area are presented below.

4.1 Gathering for Plant Resources

Upland resources were utilized by Hawaiians for a multitude of purposes. Forest resources were gathered, not only for the basic needs of food and clothing, but for tools, weapons, canoe-building, house construction, dyes, adornments, hula, medicinal and religious purposes. These resources were found and gathered at higher elevations than the present project area. Within the project area itself, there is no specific documentation of plant gathering during traditional Hawaiian times. The only plant observed in the project area that is known to have been gathered at all in this area is *'uhalea* (*Waltheria indica*). The stems, leaves, and root bark of this plant is pounded and strained; the extract is gargled to relieve a sore throat. This is still a common medicine used by Hawaiians today (Abbott 1992:101).

4.2 Historic Properties

As noted in the Previous Archaeology Research section, archaeological studies of land surrounding the present project area have identified only sites related to post-Contact development of the land for sugarcane cultivation by the Ewa Plantation Company, and later the Oahu Sugar Company. The findings of the field assessment appear to confirm that the project area in traditional Hawaiian times was probably only marginally utilized. No historic properties have been documented or are believed to exist in the project area.

4.3 Trails

Trails served to connect the various settlements throughout the District of 'Ewa. Based on nineteenth and twentieth century maps the primary transportation routes *maika/makai* correlated closely to the existing major roadways. John Papa 'Ūi describes a network of Leeward O'ahu trails (see Figure 4) that in later historic times encircled and crossed the Wai'anae Range, allowing passage from West Loch to the Honouliuli lowlands, past Pu'uokapolei and Waimānalo Gulch to the Wai'anae coast and onward, circumscribing the shoreline of O'ahu ('Ūi 1959:96-98). Following 'Ūi's description, a portion of this trail network would have passed close to the presently existing Farrington Highway, which is adjacent to a portion of the project area. To our knowledge, no clear remnant of this trail or associated site has been identified in the vicinity.

4.4 *Wahi pana* (Storied Places)

While clearly Pu'uokapolei (Kapolei Regional Park), east of the project area, was a storied place (*wahi pana*) associated with a number of Hawaiian traditions, there are no storied places identified within the project area itself or in the immediate vicinity.

Section 5 Results of Fieldwork and Recommendations

5.1 Historical Background Summary

As noted in the Previous Archaeological Research portion of this report, no historic properties were identified in the current project area during the two Bishop Museum surveys conducted in 1986 (Haun et al. 1986a, 1986b). Two sites, a ditch/flume and a reservoir (Sites 50-80-12-4341 and -4342), associated with sugarcane irrigation have been identified in a portion of the Makaiwa Hills project area (Hammatt et al. 1990) that overlaps the northwestern section of the current project area. Neither site was recommended for further archaeological work or for preservation. One site, a drainage ditch (Site 50-80-12-6679), possibly built around the World War II era, was identified during a previous survey (O'Hare et al. 2004) of a 474-acre parcel that overlaps the southwestern section of the current project area. This site was also not recommended for further work or for preservation. In adjacent properties (O'Hare et al. 2004, 2005) outside the current project area, only features utilized for sugar cane cultivation and irrigation were recorded.

In the Predictive Model section of this report, three areas of pre-Contact habitation were discussed: the coastal 'Ewa plain, Honouliuli 'Ili at Pearl Harbor, and inland settlement at Pu'uku'ua. The present project area is not within any of these three settlement loci. It is located along a pre-Contact/early post-Contact trail. The present-day Farrington Highway is aligned with this ancient trail. The section of the project area that intersects with Farrington Highway would be adjacent to the trail. It is likely that the project area was crossed by Hawaiians to travel to friends and family in Wai'anae/Pearl Harbor or to move *mauka-wakai*, from the mountains to the sea. A review of traditional Hawaiian literature, legends, and ethnology does not indicate that the project area was associated with any Hawaiian gods, noted chiefs or heroes, or with storied places. There is no indication that this area was used to collect resources or to conduct traditional cultural practices today or in the recent past. Based on this background material, it was thought unlikely that any traditional Hawaiian sites would be found in the project area. It was possible that some twentieth century sugar cane cultivation/irrigation features would be found.

5.2 Results of Field Work

A field assessment of the project was conducted on October 19, 2005. Those sections of the project area that have not previously been covered by Cultural Survey Hawai'i archaeological surveys were resurveyed on foot. This means that the one area not covered by any previous surveys (a short access road extending from the Makakilo Interchange south of Interstate H-1) and all of the eastern and central portion of the project area that was first surveyed over 25 years ago by the Bishop Museum (Haun 1986a, 1986b) were resurveyed for the current project. Those areas covered by recent CSH surveys (Hammatt et al. 1990; O'Hare et al. 2004), which overlap the western section of the current project area, were not resurveyed, since these surveys were conducted up to modern inventory survey guidelines and all sites within these areas had been previously recorded.

In the central and eastern portion of the project area, the area adjacent to existing roads has been graded and cleared. The only area not directly adjacent to an existing road, and thus with the possibility of some remaining structures is near the access road on the north side of the H-1 Highway. The area for the proposed access road parallel to the north, *manuka* side of the H-1 highway is now a four-wheel drive road with scattered gravel on the surface. Near the Farrington Highway overpass, the road becomes a dirt path; in several places, this surface has deep fissures and holes. No features were found in this area; several bulldozer push-piles of large boulders were noted to the north of the access road (Figure 8 and Figure 9), and it is likely that this area has also been extensively cleared and graded. The remaining areas of the survey are along existing interchange roads, roads in Kapolei town, in parking lots (behind the Kaiser Clinic at the north end of Wakea Street) or along the H-1 freeway itself (Figure 10 and Figure 11). The area pictured in Figure 11 is the only portion of the project area that has not been previously surveyed during earlier archaeological projects. No historic properties were found anywhere in the resurveyed (east and central area) portion of the project area, and therefore, no significance assessments or mitigation recommendations are needed.

5.3 Recommendations

Background historical research for this project indicates that this area of the 'Ewa Plain was not a focus for traditional Hawaiian habitation, agriculture, or ceremonial activities. No historic properties were found during the recent field assessment in the central and eastern portion of the project area, but three sites have been previously recorded in the western section. All three sites are associated with irrigation or drainage, and date to the plantation era and the World War II era. These three sites have been recorded to modern standards; no further work and no preservation were recommended for all three sites. Based on the results of the background research and the field assessment of the project area, it appears that no further archaeological or cultural work is appropriate for this project. The proposed construction of the additions and modifications of highway accesses for I-HI near the existing Makakilo/Palaliia interchanges and for the new Kapolei interchange will have minimal or no effect on any historic properties or on any on-going cultural practices in the project area.



Figure 8. Four-wheel drive (scattered gravel) access road north (*mauka*) of H-1 Highway, view to the northeast (H-1 freeway on right side of photo)

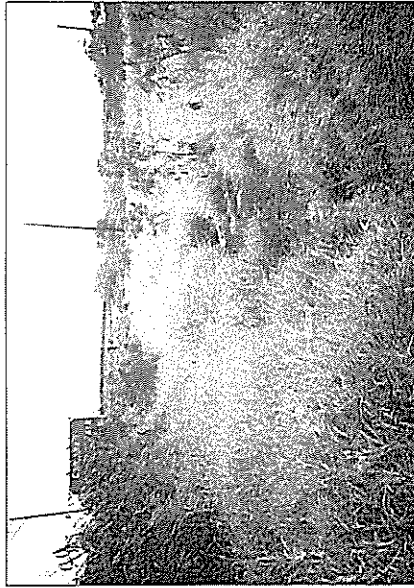


Figure 9. Access road *mauka* of H-1 Freeway, western portion with no gravel and deep fissures, view to the southwest

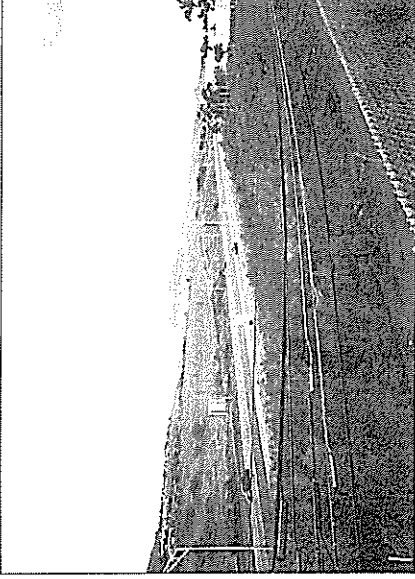


Figure 10. View of H-1 Highway and access road (*mauka* of H-1 Freeway), with Pu'u Makakilo in the background, photo taken from the Farrington Highway overpass, view to the northeast

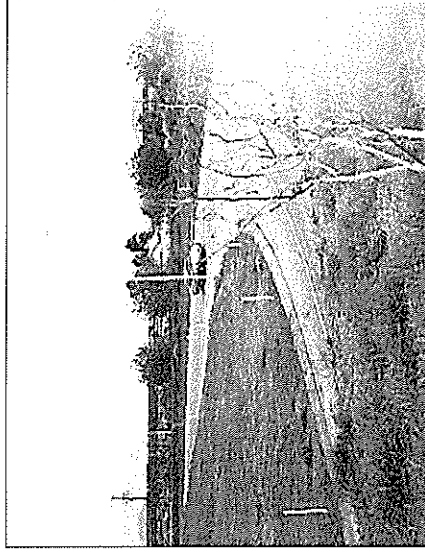


Figure 11. On-ramp to H-1 East at existing Makakilo Interchange, view to the southwest

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APPENDIX E

PALAILAI AND MAKAKILO INTERCHANGES
TRAFFIC AND OPERATIONS STUDY, CITY OF KAPOLEI
by Wilbur Smith Associates
(January 20, 2006)

DRAFT

**PALAILAI AND MAKAKILO INTERCHANGES
TRAFFIC AND OPERATIONS STUDY**

CITY OF KAPOLEI

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(WSA Project No. 527800)



CHAPTER

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EXECUTIVE SUMMARY

The existing H-1 Freeway and the Makakilo and Palailai Interchanges (Figure 1-1) were constructed more than 30 years ago. The development of commercial and government facilities within the City of Kapolei in recent years has increased traffic use of the Makakilo and Palailai Interchanges. The State of Hawaii Department of Transportation (State DOT) and Oahu Metropolitan Planning Organization (OMPO) have planned modifications to the Makakilo and Palailai Interchanges to improve the traffic access to the City of Kapolei and surrounding employment and residential areas. The planned actions include:

- Additional ramps at the Makakilo Interchange to provide improved access to the H-1 Freeway.
- Expansion of the Palailai Interchange by the construction of a new freeway overpass and ramps to more directly access the City of Kapolei street network at Wakea Street, with these new ramps referred to as the Kapolei Interchange.
- Construction of new ramps on the west side of the Palailai Interchange to connect to the planned extension of Hanua Street from the Campbell Industrial Park to provide a new connection between the freeway and the employment areas south of the freeway.

A preliminary plan for these modifications was developed in the early 1990's.¹ These improvements have been included in the Transportation Improvement Program by OMPO and the State DOT. This traffic study was conducted to reassess the preliminary plans for the modifications to the Makakilo and Palailai Interchanges in light of the better-defined types and intensities of development in the City of Kapolei area, as well as the traffic patterns and characteristics that have emerged in this rapidly developing area.

The present schedule anticipates the development of an initial Phase 1 set of lower-cost modifications by 2010 to provide a near-term increase in the traffic access to the freeway, with the construction of the full improvements planned to start during or immediately after the Phase 1 work. The analysis was conducted with the Phase 1 modifications based on peak hour traffic forecasts for 2010 and with the completed modifications using 2030 peak hour traffic forecasts.

INTERCHANGE PLAN USED IN ANALYSES

The planned modifications to improve freeway access to the City of Kapolei areas in the 1994 Palailai/Makakilo study included additional ramps at the Makakilo Interchange, expansion of the

¹ *H-1 Addition and Modification of Highway Accesses, Palailai Interchange/Makakilo Interchange, Revised,* prepared for The Estate of James Campbell by Engineering Concepts, Inc., January 1994.

Palailai Interchange to provide a "Kapolei Interchange" to provide more direct access to the City of Kapolei street network, and construction of new ramps on the west side of the Palailai Interchange to connect to the planned extension of Hanua Street to the freeway. The 1994 plan was modified for analysis in this study with the changes including the following:

- The planned off-ramp from the eastbound H-1 Freeway to Makakilo Drive (Ramp ME) was not included in the current plan and analyses due to potential disruption to traffic flow along Makakilo Drive given the short spacing from the intersection with Farrington Highway.
- The planned Mauka Frontage Road has been relocated southward to connect to the intersection of Makakilo Drive with the westbound Off-ramp, with the new westbound on-ramp (Ramp MD) now accessed via the Mauka Frontage Road.
- An on-ramp was added from northbound Hanua Street to the eastbound H-1 Freeway (Ramp PI) to attract more traffic use of Hanua Street and to reduce the traffic volumes using the eastbound weaving section between Kalaeloa Boulevard and Wakea Street Extension. Other traffic studies since 1994 had indicated that Kalaeloa Boulevard and its connection to the eastbound H-1 Freeway would be overloaded while Hanua Street Extension would be potentially underutilized without a Hanua Street connection to eastbound H-1 Freeway.
- The existing eastbound off-ramp from the H-1 Freeway to Kalaeloa Boulevard (Ramp PB) was eliminated to allow the new eastbound Ramp PI to be provided from Hanua Street Extension. A new off-ramp (PH) is planned from eastbound H-1 Freeway to Hanua Street Extension to accommodate this movement.

The revised plans, as split into two implementation phases analyzed in this study, now include the elements following described in the following sections.

Phase 1 Modifications – Phase 1 of the Project includes the changes at the Makakilo Interchange and the initial portion of the Kapolei Interchange.

Makakilo Interchange

- Construct new westbound On-ramp MD as west leg of existing Makakilo Drive intersection with the westbound Off-ramp MC.

Kapolei Interchange

- Extend Wakea Street to connect to Farrington Highway just east of the H-1 Freeway overpass and remove the section of Farrington Highway east of Wakea Street that connects to Kamokila Boulevard (Ramp KB).
- Connect existing Ramp KC to Wakea Street.
- Construct new eastbound On-ramp KD as west leg of new Wakea Street intersection with Farrington Highway.

- Retain Farrington Highway with one through lane in each direction between the Wakea Street extension and Kalaeloa Boulevard.
- Construct new westbound Off-ramp KA-1 to connect to westbound Farrington Highway west of the existing overpass.

Palailai Interchange

- Remove loop Off-ramp PD connection to Farrington Highway-Kalaeloa Boulevard intersection to allow traffic signal to be installed at intersection.

Project Completion – The majority of the modifications will be made following the Phase 1 work, with these focused on the Palailai and Kapolei Interchanges.

Kapolei Interchange

- Construct new overpass to extend Wakea Street across the H-1 Freeway to connect to the planned Mauka Frontage Road.
- Construct westbound loop Off-ramp KA-1 to access Wakea Street.
- Construct new westbound ramp to connect Wakea Street/Mauka Frontage Road intersection with Farrington Highway west of the interchange.
- Convert existing Farrington Highway overpass to one-way eastbound traffic flow.

Palailai Interchange

- Construct westbound loop Off-ramp PE and new overpass to connect to the planned extension of Hanua Street to the H-1 Freeway.
- Reconfigure and increase radius of Loop Off-ramp PD.
- Modify the alignment of On-ramp PA north and west of Ramps PD and PE.
- Connect northbound Hanua Street to the realigned westbound On-ramp PA.
- Realign and widen the section of Farrington Highway between the H-1 Freeway overpass and Kalaeloa Boulevard.
- Construct new eastbound On-ramp PI from Hanua Street to the H-1 Freeway.
- Construct new eastbound Off-ramp PH to Hanua Street.
- Remove existing eastbound Off-ramp PB.

POTENTIAL TRAFFIC OPERATIONAL PROBLEMS

The traffic conditions for the 2030 weekday peak traffic hours were analyzed for the freeway lanes and ramps using both the Highway Capacity Software (HCS) and CORSIM simulation model, while the conditions at the intersection of the ramps with the street system, as well as nearby intersections, were analyzed using Synchro or HCS analysis tools. The 2010 conditions were analyzed using HCS and Synchro. These assessments of the planned roadways indicated a number of potential operations problems for the Project area.

Project Phase 1 Plan



The analysis of the Phase 1 plan with the 2010 traffic growth indicated that traffic operational problems could occur at several locations within the ramps and intersections that are affected by the interchange modifications:

- If left turns are allowed from northbound Makakilo Drive onto the new westbound On-ramp MD, the additional conflict and signal time requirement would likely result in congestion along Makakilo Drive in the morning peak traffic hour.
- At the existing junction of southbound Kalaeloa Boulevard with the westbound loop Off-ramp PD, the southbound Kalaeloa approach traffic must yield to the ramp traffic to merge into the southbound single lane across the freeway overpass. Once the Makaiwa Hills development starts to add southbound traffic to Kalaeloa Boulevard, the increased southbound traffic would experience long delays and queuing that could block the Farrington Highway entrance to On-ramp PA.
- Continued traffic growth along the Kalaeloa Boulevard corridor is likely to result in increased traffic conflicts within the separate Eastbound Weaving Roadway in the afternoon peak commute period that could disrupt traffic operations in the eastbound freeway lanes at the exit to Off-ramp PC that provides access to the weaving roadway. The eastbound freeway traffic exiting via this off-ramp must weave through the northbound Kalaeloa Boulevard traffic using this weaving roadway to reach the lanes exiting to Wakea Street, while almost all of the Kalaeloa Boulevard traffic must weave through the off-ramp traffic to access the lane existing the weaving roadway onto the eastbound freeway via On-ramp KC-1.
- The large increase in afternoon peak hour traffic at the Wakea Street intersection with Kamokita Boulevard would likely result in congested traffic conditions during the afternoon peak hour.
- The high volume of vehicles turning left from the northbound approach of Kalaeloa Boulevard onto On-ramp PA would result in conditions approaching the capacity of the Kalaeloa Boulevard-Farrington Highway intersection.

Completed Project Plan

The analysis of 2030 weekday peak hour traffic conditions along the freeway, at ramp junctions, and at intersections used to access the ramps indicate that traffic operational problems could occur at several locations:

- The merge between the northbound Wakea Street traffic and the eastbound Farrington Highway traffic on On-ramp KD could result in traffic queuing back into and interfering with traffic flow through the Wakea Street-Farrington Highway intersection.



- Traffic volumes along the Eastbound Weaving Roadway could increase to levels that disrupt the exit of traffic from the eastbound freeway onto Off-ramp PC to access Wakea Street, as discussed for Phase 1.
- The high density of traffic in the outside lane of the eastbound freeway upstream of Off-ramp PC would interfere with the exiting of traffic onto that ramp. This high density is in part due to the proposed new On-ramp PI from Hanua Street.
- The traffic merging into the freeway from On-ramp PI could experience slowing due to the high density of traffic in the outside lane due in part to the nearby exit to Off-ramp PC.
- Traffic on Ramp PA may encounter slowing in merging from the two lanes at the ramp entry into the single lane prior to the junction with the freeway.
- The high volume of traffic entering the westbound freeway from Ramp PA in the afternoon peak hour would likely disrupt freeway traffic flow with the planned number of lanes and acceleration lane (450 feet in length).
- The small volume of traffic turning left from the eastbound Off-ramp PH onto northbound Hanua Street would experience very long waits for a gap in the Hanua Street traffic to complete their turn.
- The forecast traffic at the intersection of Kalaeloa Boulevard and the Kapolei Parkway would approach the intersection capacity in the afternoon peak hour.

PROPOSED MODIFICATIONS

Based on the traffic forecasts and analyses conducted during this traffic assessment of the Makakilo/Palālai Interchange Project, the following modifications to the plans are proposed for consideration:

Phase 1 Plans

1. Left turns should not be allowed from northbound Makakilo Drive onto the new westbound On-ramp MD until after the Mauka Frontage Road has been completed between Makakilo Drive and Wakea Street to divert some of the southbound through traffic. Once this connection has been completed, the intersection conditions should be reassessed to determine whether to allow the left turn.
2. A two-lane merge section should be provided along eastbound On-ramp KD for as long a distance as possible to facilitate the merge of the northbound Wakea Street and eastbound Farrington Highway traffic movements on this ramp.

3. A second (double) left-turn lane should be constructed on eastbound Kamokilia Boulevard at the Wakea Street intersection to accommodate the increased traffic flow through this intersection to access the Kapolei Interchange and the Mauka Frontage Road.
4. The Kalaeloa Boulevard freeway overpass should be re-stripped with two southbound lanes to allow non-stop traffic flow for both the southbound through traffic from the Farrington Highway intersection and the traffic exiting the westbound loop Off-ramp PD. At present, the second southbound lane begins with a free flow lane from eastbound Off-ramp PB, which is proposed for removal.
5. Add a second (double) left-turn lane to the northbound approach of Kalaeloa Boulevard to Farrington Highway.

The potential traffic operational problems at the merge of Off-ramp PC with the Eastbound Weaving Roadway would be addressed by the implementation of the Hanua Street extension and its On-ramp PI connection to the eastbound freeway, which would divert a portion of the traffic using this weaving roadway.

Completed Project Plan

1. A deceleration lane of 200 feet or more should be added to the present taper-only exit from the freeway onto Ramp PC to facilitate the exiting traffic. It would be desirable to either add a third lane to the eastbound freeway through this section to reduce the number of through vehicles in the outside lane, or to create a weaving lane from On-ramp PI to Off-ramp PC.
2. A second (double) left turn lane should be provided for the turn from southbound Hanua Street onto the eastbound Kapolei Parkway to provide additional capacity and convenience to attract the use of Off-ramp PH, Hanua Street, and the Kapolei Parkway for access from the eastbound freeway to the southern portion of the City of Kapolei along the Kapolei Parkway in lieu of using Off-ramp PC, the Eastbound Weaving Roadway, and Wakea Street.
3. Either a longer acceleration lane should be provided from On-ramp PA to the westbound freeway (minimum 800 feet) or the westbound freeway should be widened to three lanes either through this area, or with the westbound freeway widened with the third lane beginning at Off-ramp PD. If the third lane were to begin at Ramp PA, both lanes of Ramp PA should be continued to merge with the freeway.
4. If the left turn from eastbound Off-ramp PH becomes a safety or operational issue, the median opening could be closed and all traffic forced to turn right. Traffic destined to Makaia Hills and the section of Farrington Highway between Kalaeloa Boulevard and Wakea Street could access these areas by turning right and making a U-turn along Hanua Street, or by using Hanua Street, the Kapolei Parkway, and Kalaeloa Boulevard to loop around the Kapolei Commons development to reach those areas.

The potential traffic problems at the Kalaeloa Boulevard-Kapolei Parkway intersection largely result from a forecast high volume of northbound traffic turning right onto the Kapolei Parkway. The forecasts reflect two connections between the Kalaeloa Boulevard corridor and the Kalaeloa Redevelopment Area to the east of the corridor. However, these connections were not considered to compete in directness or travel speed with Kapolei Parkway. If a direct highway connection is constructed through the Kalaeloa Redevelopment Area to attract some traffic from the Kapolei Parkway, traffic may be reduced to acceptable levels at the intersection.

Chapter 1 INTRODUCTION

The existing H-1 Freeway and the Makakilo and Palailai Interchanges (Figure 1-1) were constructed more than 30 years ago. The development of commercial and government facilities within the City of Kapolei in recent years has increased traffic use of the Makakilo and Palailai Interchanges. The City of Kapolei growth, coupled with the increased development in the nearby residential communities and Campbell Industrial Park/Barbers Point Harbor area, have increased peak hour traffic to levels that are resulting in congested conditions in these interchange areas.

The State of Hawaii Department of Transportation (State DOT) and Oahu Metropolitan Planning Organization (OMPO) have planned modifications to the Makakilo and Palailai Interchanges to improve traffic access to the City of Kapolei and surrounding employment and residential areas. The planned actions include:

- Additional ramps at the Makakilo Interchange to provide improved access to the H-1 Freeway.
- Expansion of the Palailai Interchange by the construction of a new freeway overpass and ramps to more directly access the City of Kapolei street network at Wakea Street, with these new ramps referred to as the Kapolei Interchange.
- Construction of new ramps on the west side of the Palailai Interchange to connect to the planned extension of Hanua Street from the Campbell Industrial Park to provide a new connection between the freeway and the employment areas south of the freeway.

A preliminary plan for these modifications was developed in the early 1990's.¹ These improvements have been included in the Transportation Improvement Program by OMPO and the State DOT.

STUDY PURPOSE

This traffic study was conducted to reassess the preliminary plans for the modifications to the Makakilo and Palailai Interchanges in light of the better-defined types and intensities of development in the City of Kapolei area, as well as the traffic patterns and characteristics that have emerged in the area. The traffic study provides an assessment of key plan elements for consideration in the current preparation of the preliminary design plans for the interchange modifications. These include:

¹ *H-1 Addition and Modification of Highway Accesses, Palailai Interchange/Makakilo Interchange, Revised*, prepared for The Estate of James Campbell by Engineering Concepts, Inc., January, 1994.

- The number, location, and configuration of the new or modified interchange ramps.
- Configuration of ramp merge/diverge points with the freeway.
- Adequacy of the junctions/intersections of the ramps with the area streets.
- Adequacy of the surface roadways providing access to the interchange ramps.

The present schedule anticipates the development of an initial Phase 1 set of comparatively lower-cost modifications by 2010 to provide an immediate increase in traffic access to the freeway. The construction of the full improvements are planned to start during or immediately after the Phase 1 work, with the build-out (Phase 2) construction expected to last several years.

OVERVIEW OF METHODOLOGY

The general methodology used in the forecasting and analysis of the planned interchange modifications are outlined in the following sections and discussed in more detail in individual sections of the report.

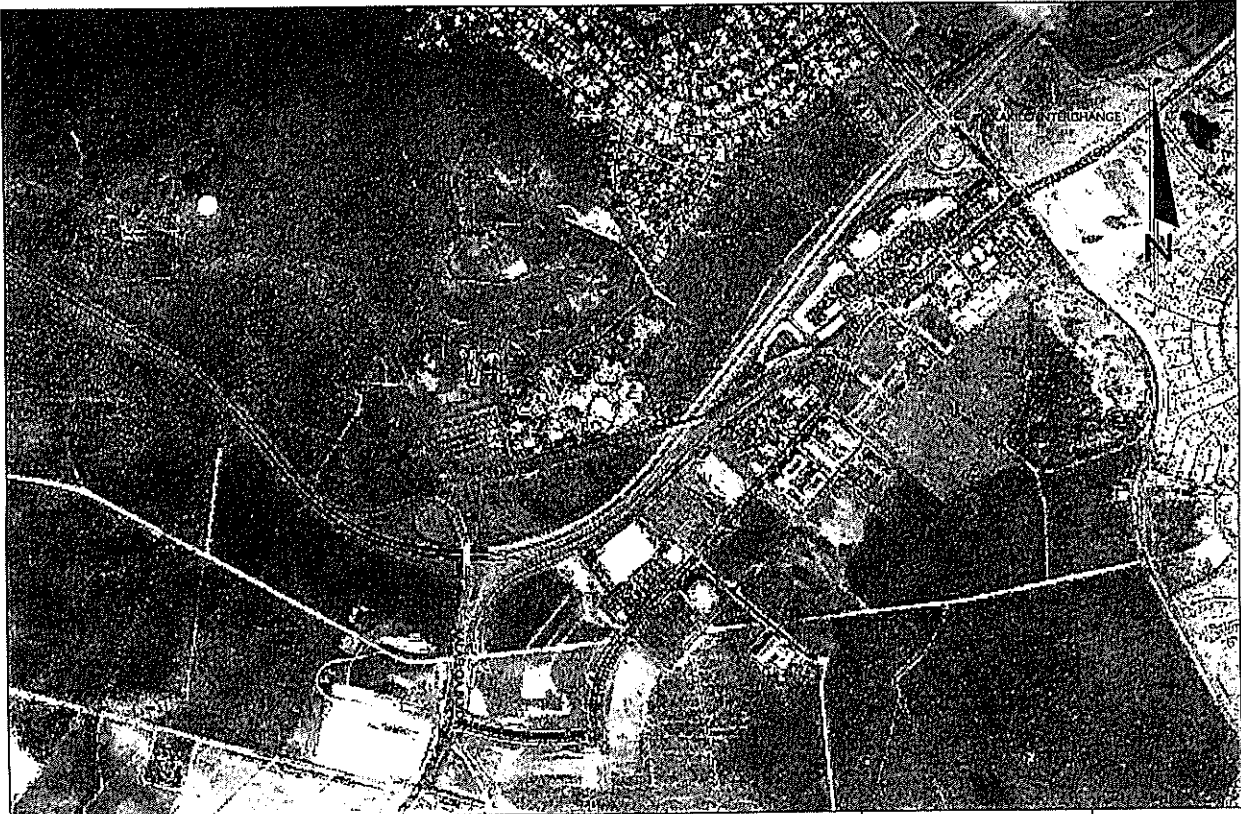
Analysis Years

A 20-year analysis horizon year is typically used to assess conditions with planned roadway improvements. For the purpose of this study, the traffic analysis was made as follows:

- **Year 2005 Existing** – Traffic conditions were analyzed for the present roadways and traffic usage to provide a basis for comparison to future levels.
- **Year 2010 With Phase I of the Project** – The traffic conditions were analyzed for 2010 with completion of only the interim Phase 1 modifications. The analysis for 2010 was made to identify any potential problem locations and mitigative actions with the partial Project modifications. The assessment also provides guidance as to how soon the additional modifications may be needed to accommodate traffic growth.
- **Year 2030 With Project Buildout** – Year 2030 was analyzed with completion of the planned interchange modifications. Year 2030 represents 20 years after completion of the Phase 1 increment as well as the planning horizon year being used for the ongoing OMPO update of the island-wide transportation plan. This year would closely approximate a 20-year period for the full Project completion based on present plans to immediately proceed with these plans.

Forecast Methodology and Assumptions

The traffic growth was forecast for years 2010 and 2030 through the use of a TRAFFEX trip generation and assignment model developed by Wilbur Smith Associates (WSA) for the City of Kapolei and the adjacent areas. No adjustments were made to the 2010 forecasts since there is a low level of uncertainty regarding new development, roadway modifications, and traffic characteristics during this relatively short time frame. However, the 2030 forecasts were



compared to the preliminary forecasts available from the ongoing OMPO island-wide study and the forecasts adjusted to better reflect the level of traffic increases projected for the travel corridor by the island-wide forecast model. The general procedure was as follows:

- Area property owners and/or developers were contacted to identify the general description and timing of additional development in those areas.
- For the 2030 time frame, the land uses provided by the property owners/developers were adjusted where appropriate to conform to the socioeconomic data being used for those areas by OMPO as input to the island-wide travel forecasts.
- Wilbur Smith Associates (WSA) staff estimated the peak hour vehicle trip generation for each of the potential developments.
- The origin/destination of trips for the new developments were based on a trip distribution for the Kapolei area developed from information provided by the OMPO regional travel forecasting model.
- The traffic to/from the new developments was assigned to the area roadway system using the TRAFFIX traffic model.
- An annual growth factor was used to increase through traffic along the H-1 Freeway.
- The resultant preliminary traffic forecasts for 2030 were compared to the OMPO preliminary forecasts at the east and west ends of the Interchange Project study area. The distributions of the origins/destinations of the study area trips were adjusted to better match the OMPO forecasts of travel through the study corridor. As noted earlier, no adjustment was made for the 2010 forecasts since there is less uncertainty in the shorter range forecasts.

Analysis Methodology

The traffic conditions along the freeway, at ramp junctions, and at intersections used to access the ramps were analyzed using the methodology set forth in the *2000 Highway Capacity Manual (HCM)*, as summarized in Appendix A. Standard analyses tools were used to analyze each element of the roadway network:

- Highway Capacity Software (HCS) developed by McTrans was used to analyze traffic conditions for the ramp junctions and weaving areas for 2005, 2010, and 2030.
- Traffic conditions at ramp intersections with the adjacent street network were generally analyzed using the Synchro/SimTraffic analysis tools. HCS was used in several locations to address atypical geometric layouts that could not be properly assessed with the Synchro street network created for the City of Kapolei area.

- The CORSIM traffic simulation model was used to analyze and simulate traffic flow along the freeway and ramps for the 2030 traffic peak hours. The CORSIM model allows a visual simulation of the traffic flow to identify problem locations that may not show up in the quantitative analyses.

REPORT ORGANIZATION

This report evaluating the traffic operations with the planned Palailai/Makakilo Interchange Project has been organized into the following chapters:

1. Introduction
2. Existing Conditions – Describes the existing roadway facilities, traffic volumes, and traffic conditions in the Project area.
3. Traffic Forecasts with Project – Describes the planned roadways and the traffic increases on area roadways and traffic conditions on the Project ramps and nearby key intersections in years 2010 and 2030 with the Project
4. 2030 Freeway and Ramp Operational Analyses – Describes the traffic conditions for the ramps at the Makakilo, Kapolei, and Palailai Interchanges in year 2030 with the completion of the Project. Potential problem locations and mitigative actions are identified.
5. 2030 Intersection Analysis with the Project – Describes the traffic conditions at key intersections in the interchange areas for year 2030 with the completion of the Project. Potential problem locations and mitigative actions are identified.
6. 2010 With Project Phase 1 – Describes the traffic conditions on freeway ramps and at key intersections in year 2010 with the development of the initial portion of the Project.

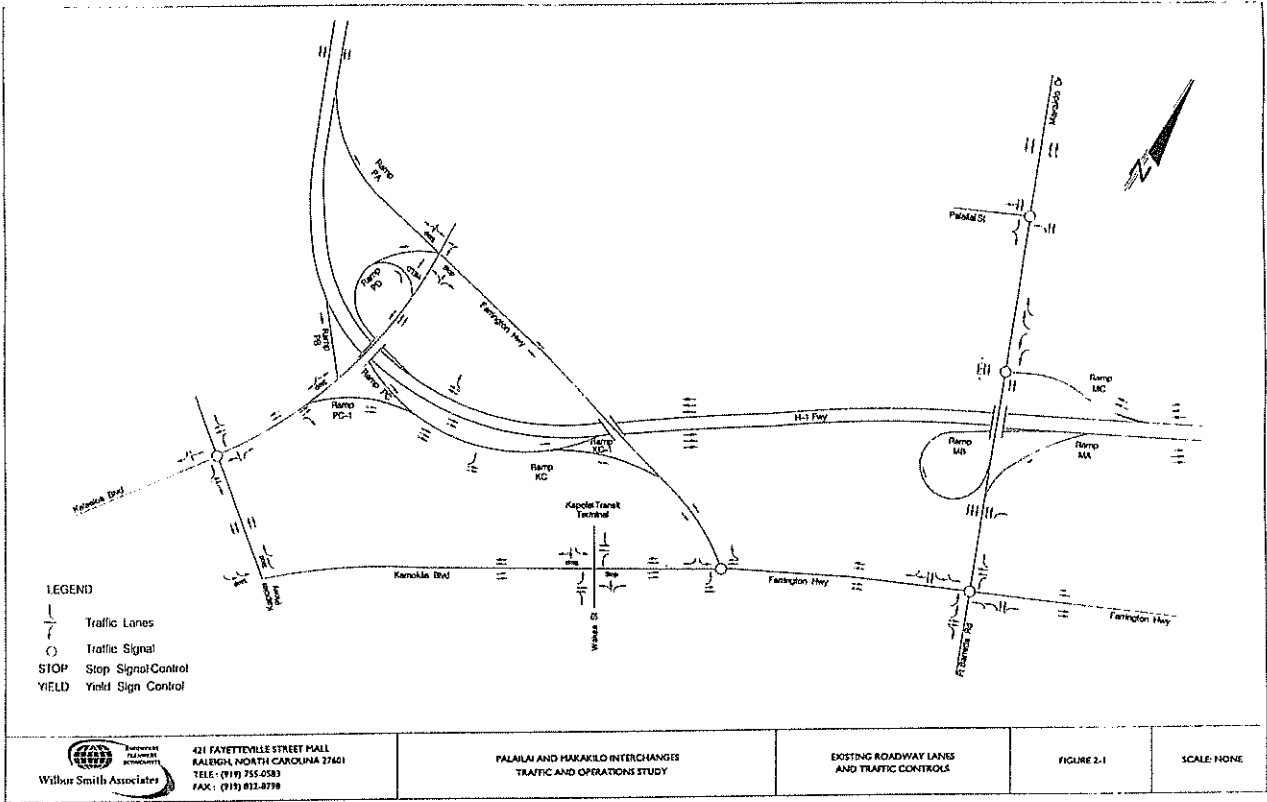
Chapter 2 EXISTING CONDITIONS

At the time of the traffic surveys in May 2005, the Honolulu Advertiser was the only development west of Kalaeloa Boulevard in the City of Kapolei area. East of Kalaeloa Boulevard, the Home Depot, Ace Hardware, and Outback Steakhouse facilities had each opened within the past year along Kamokila Boulevard just mauka of the Kapolei Parkway. Also recently opened in the Kamokila Boulevard corridor were the Island Pacific Academy (with first year enrollment of 200 students) and the Kapolei Library, as well as Assagio's restaurant and the Central Pacific Bank.

EXISTING ROADWAY SYSTEM

The major roadway system near the Project site is depicted in Figure 2-1. The major roadways within the area are discussed in the following paragraphs.

- H-1 Freeway** - This freeway is the major east-west roadway in the Ewa District and connects the Ewa area to central Honolulu and other areas of Oahu. City of Kapolei traffic access to the freeway is via the Makakilo (Makakilo Drive-Fort Barrette Road) and Palailai (Kalaeloa Boulevard) interchanges. H-1 Freeway has six travel lanes east of the Palailai Interchange and four lanes west of the interchange. In the westbound direction, the third through lane ends as the loop Off-ramp PD to Kalaeloa Boulevard; eastbound, the third through lane is added by the On-ramp KC-1 from the eastbound weaving roadway located near the Farrington Highway overpass.
- Farrington Highway** - This State highway parallels the H-1 Freeway and serves east-west travel through the Ewa District from the Waipahu area to the Palailai Interchange. Farrington Highway also serves as the major regional route westward from the terminus of the H-1 Freeway just east of the Honokai Hale residential area. It is a four-lane highway, with separate left-turn lanes, from the Kapolei Golf Course Road westward into the City of Kapolei to Kamokila Boulevard. The section between Kamokila Boulevard and Kalaeloa Boulevard is a two-lane roadway. Farrington Highway continues west of the terminus of the H-1 Freeway as a four-lane divided highway to serve the Ko Olina and Waianae coast areas.
- Kalaeloa Boulevard** - This major roadway provides access from the H-1 Freeway at the Palailai Interchange to the Kapolei Business Park, Campbell Industrial Park, and Barbers Point Harbor. The roadway also provides access to the City of Kapolei area via the Kapolei Parkway connection to Kamokila Boulevard. Kalaeloa Boulevard is a four-lane divided roadway from the H-1 Freeway to Malakole Road. Traffic signal controls are provided at its intersection with the Kapolei Parkway.



DRAFT Palailai and Makakilo Interchanges
Traffic and Operations Study

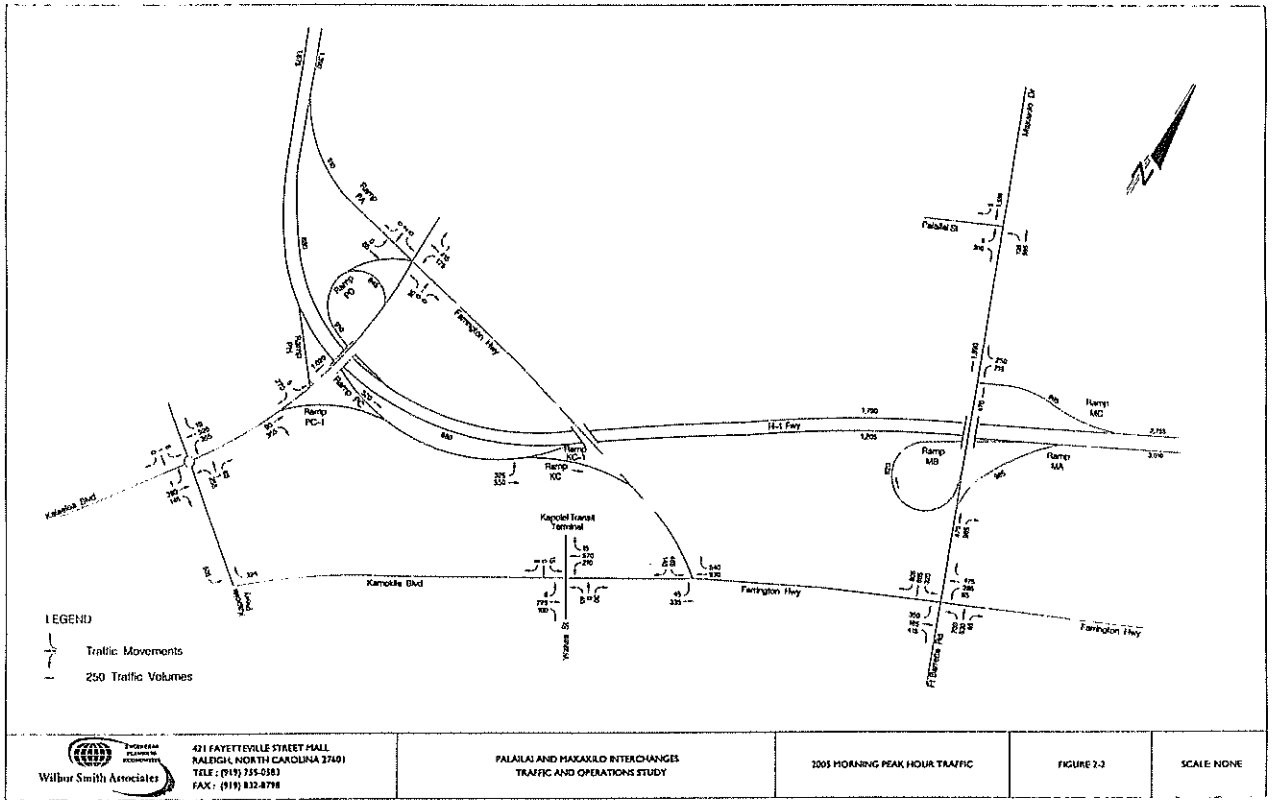
- **Kapolei Parkway** - This major roadway is planned to be a major traffic artery connecting the City of Kapolei to the Ko Olina area to the west and to the Villages of Kapolei and other communities to the east. Within the Kapolei area, the only completed portions of the roadway are the one-block segment between Kalaeloa and Kamokila Boulevards and a short section on the Honolulu side of Fort Barrette Road that provides access to the Kapolei Middle and High Schools, as well as the Villages of Kapolei. These segments have a median-divided roadway with two or more traffic lanes and a bicycle lane in each direction.
- **Kamokila Boulevard** - This major roadway connects Farrington Highway to the Kapolei Parkway and Kalaeloa Boulevard and provides access to the center of the City of Kapolei. Kamokila Boulevard provides two through lanes in each direction. The roadway has a landscaped median area for most of its length and has left-turn lanes at the intersections with cross streets and driveways. At present, the only traffic signal control is located at its intersection with Farrington Highway. West of the intersection with Farrington Highway, the cross street intersections are presently controlled by STOP signs on the side-street approaches. The speed limit is 25 mph.
- **Wailea Street** - The existing street extends only one-block south of Kamokila Boulevard. North of Kamokila Boulevard, the street right-of-way is being used temporarily as the transit terminal for TheBus routes serving the Kapolei area. This roadway is planned for extension southward to serve as a key north-south arterial within the commercial core area of the City of Kapolei.

EXISTING TRAFFIC VOLUMES

Wilbur Smith Associates (WSA) conducted special turning movement counts at the key intersections in the City of Kapolei and Ko Olina area during the weekday morning and afternoon peak commute traffic periods between May 19 and 25, 2005. Traffic counts were made for each 15-minute period between 6:00 and 8:30 AM, and between 3:30 and 6:30 PM. The 15-minute counts were used to identify the peak one-hour volumes at the study intersections in the morning and afternoon commute periods. The peak one-hour volumes generally started at 7:00 or 7:15 AM in the morning commute period, and 4:15 to 4:30 PM in the afternoon peak period.

Peak hour traffic volumes on the H-1 Freeway were based on traffic counts made by WSA on Farrington Highway at the Laaloa Street intersection on February 3, 2005. The WSA May 2005 traffic survey included counts at the H-1 Freeway on- and off-ramps at the Makakilo and Palailai Interchanges. The Farrington Highway and H-1 Freeway ramp traffic counts were used to derive the traffic volumes along the Freeway through the City of Kapolei.

The existing weekday morning peak one-hour traffic volumes are depicted in Figure 2-2 and the peak weekday afternoon volumes are depicted in Figure 2-3. At most locations, the afternoon peak hour two-way traffic volumes are higher than those in the morning peak hour.



The morning peak hour traffic volumes depicted in Figure 2-2 are for 7:00 to 8:00 AM, which is the peak one-hour period for most of the roadways and intersections within the City of Kapolei. Several roadways and intersections have an earlier peak one hour traffic period, typically from 6:30 to 7:30 AM. These include Kalaeloa Boulevard, the loop Off-ramp PD to Kalaeloa Boulevard, the H-1 Freeway through lanes, and the two eastbound on-ramps (MA and MB) at the Makakilo Interchange. The 7:00-8:00 AM period is being shown since that period would likely become the highest morning traffic hour for the Kapolei Interchange, since it will primarily serve the office and commercial uses within the City of Kapolei.

The afternoon peak hour traffic depicted in Figure 2-3 generally reflects traffic from 4:00 to 5:00 PM counts while the counts at several locations reflect peaks at 3:45 to 4:45 PM or 4:15 to 5:15 PM.

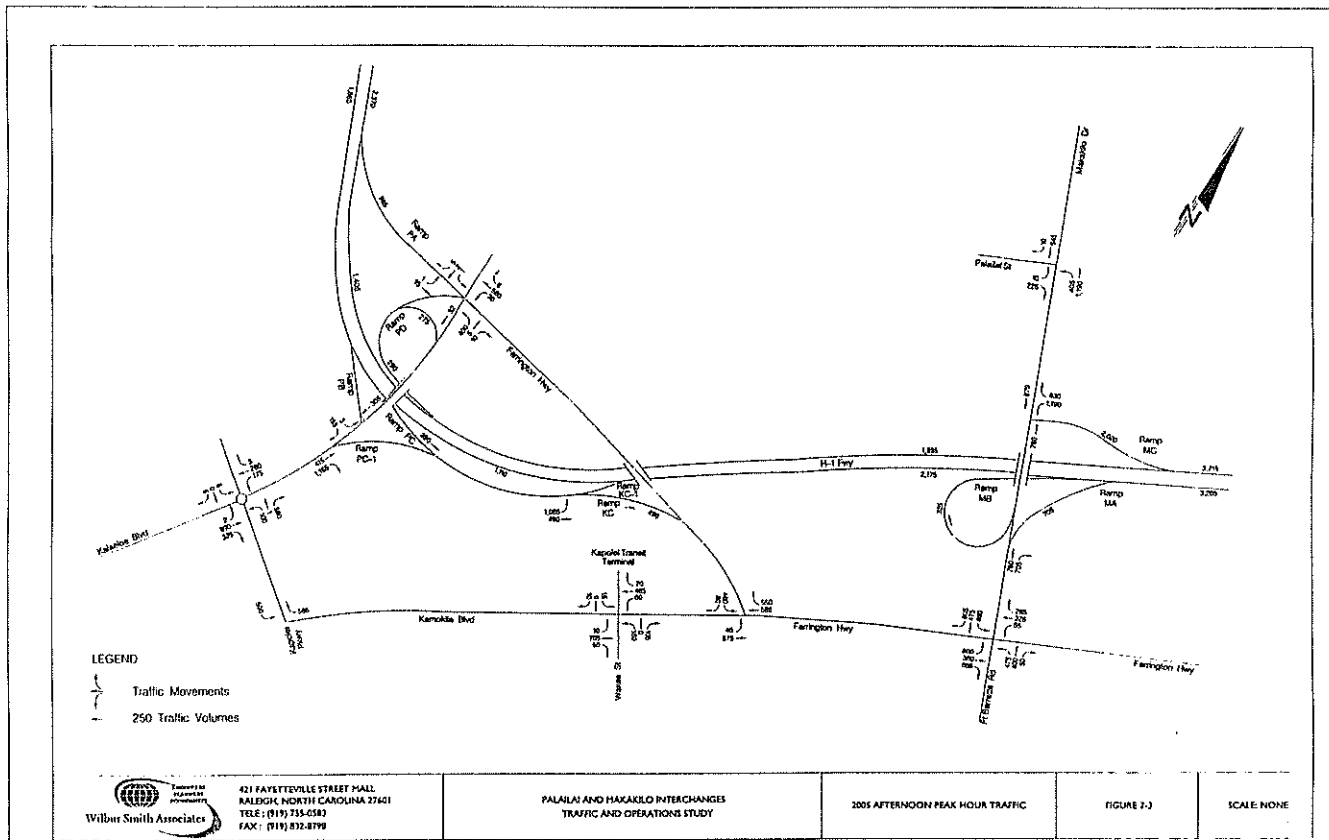
In the morning peak hour, the eastbound freeway traffic increases from about 1,700 vehicles west of the Palailai Interchange to over 3,000 vehicles east of the Makakilo Interchange, with most of the increase occurring at the two Makakilo Interchange on-ramps. Much of the Ramp MA traffic is from the Villages of Kapolei residential areas, while the Ramp MB is largely Makakilo residents commuting to Honolulu. The westbound traffic decreases from about 2,750 vehicles east of the Makakilo Interchange to about 1,400 vehicles west of the Project area. About one-half of the westbound traffic exiting in the Project area uses the Makakilo off-ramp, which provides access to the City of Kapolei business and government uses, and one-half at the Palailai off-ramp, which provides access to the Campbell Industrial Park and Harbor areas, as well as an access to the western portion of the City of Kapolei.

In the afternoon peak hour, the eastbound traffic along the freeway increases from about 1,650 vehicles west of the Project area to 3,200 vehicles east of the area. The on-ramps from Kalaeloa Boulevard (Ramp KC-1 via the eastbound weaving roadway) and from Makakilo Drive (combined MA and MB) each account for about one-half the increase. The westbound freeway traffic decreases from 3,700 vehicles east of the Project area to about 2,400 vehicles west of the area. Most of the exiting traffic use the Makakilo off-ramp (2,000 vehicles), while the Palailai on-ramp adds almost 1,000 westbound vehicles.

Traffic volumes along Makakilo Drive north of the freeway have a very unbalanced directional split with about two-thirds of the traffic southbound from the Makakilo residential areas in the morning peak hour and two-thirds northbound in the afternoon. South of the freeway the traffic volumes are more evenly balanced by vehicles southbound towards the employment areas and vehicles northbound from the Villages of Kapolei residential areas.

Kalaeloa Boulevard accommodates high volumes of traffic in the makai-bound direction in the morning peak period and in the mauka-bound direction in the afternoon peak period. This reflects the major employment areas located along the makai section of the roadway.

The traffic volumes at the Palailai Interchange are highest on the Westbound and Eastbound Off-ramps in the morning peak hour and higher for the Eastbound On-ramp in the afternoon peak



hour. The highest volumes on the weaving section between the Eastbound Off-ramp to Farrington Highway and the Eastbound On-ramp from Kalaeloa Boulevard occur in the afternoon peak hour as commuters depart the employment areas south of the freeway via Kalaeloa Boulevard.

At the Makakilo Interchange, the higher traffic volumes on the eastbound on-ramps occur in the morning peak hour, while the higher volumes on the westbound off-ramp are in the afternoon peak hour.

EXISTING TRAFFIC CONDITIONS

Traffic conditions were analyzed for the weekday morning and afternoon peak one-hour traffic volumes. The analyses were made for the key intersections near the Project site, and for the key H-1 Freeway ramps at the Makakilo and Palaitai Interchanges. The methodology and criteria used in analyzing the traffic conditions at the intersections and on the freeway are described in Appendix A.

Existing Intersection Conditions

The overall traffic conditions at each of the key intersections are summarized in Table 2-1 for the weekday morning and afternoon peak traffic hours.

The key intersection in the Makakilo Interchange area is the Makakilo Drive intersection with Farrington Highway and Fort Barrette Road. To travel to/from the Makakilo Interchange ramps most traffic from the Villages of Kapolei and City of Kapolei currently pass through this intersection. Makakilo traffic must also pass through this intersection to travel to the City of Kapolei and other commercial and employment areas south of the Freeway as well as the middle and high schools.

In the morning peak hour, traffic volumes at the Farrington Highway intersection with Makakilo Drive-Fort Barrette Road approximated 84% of the estimated intersection capacity with average delays calculated at Level of Service (LOS) D. During the 7:20-7:45 AM portion of the morning peak hour on the traffic survey day, a traffic queue formed on makai-bound Fort Barrette Road from the area makai of Kamaaha Avenue near the middle and high schools, with the queue stacking back to and through the Farrington Highway intersection. Therefore, the makai-bound traffic flow on Makakilo Drive during this short period was constrained by the traffic conditions on Fort Barrette Road. Southbound traffic flow was also adversely affected by the merge from two to one southbound through lanes just south of the intersection and by the short right- and left-turn storage lanes on the Makakilo Drive approach.

Traffic volumes at the Farrington Highway intersection with Makakilo Drive-Fort Barrette Road approximated 94% of the intersection capacity in the afternoon peak hour. The intersection operations resulted in long overall average delay times with LOS E conditions, with long delays for traffic turning left from eastbound Farrington Highway towards the freeway ramps and Makakilo.



**Table 2-1
2005 TRAFFIC CONDITIONS AT KEY INTERSECTIONS**

Intersections	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour			
	V/C	ADPV	LOS	V/C	ADPV	LOS
Makakilo Dr.-Palaitai St.	0.82	20.5	C	0.58	7.8	A
Makakilo Dr.-WB H-1 Off-Ramp	0.64	15.0	B	0.70	19.4	B
Farrington Hwy.-Makakilo Dr.-Fort Barrette Rd.	0.84	49.0	D	0.94	74.6	E
Farrington Hwy.-Kamokila Blvd.	0.69	46.6	D	0.67	43.9	D
Kamokila Blvd/Awakea St.	0.04	9.5	A	0.70	49.1	E
Mauka-bound Left Turn	0.71	12.3	B	0.88	33.4	C
Kalaeloa Blvd.-Kapolei Pkwy.	0.02	23.0	C	0.01	12.7	B
Kalaeloa Blvd.-EB Off-ramp	0.44	31.6	D	1.29	181.2	F
Eastbound Left Turn						
Kalaeloa Blvd.-Farrington Hwy						
Mauka-bound Left Turn						

V/C = Ratio of the traffic volume to the theoretical capacity of the intersection.
ADPV = Average delay per vehicle, in seconds.
LOS = Level of service.

Wilbur Smith Associates; December 9, 2005.

The Synchro analysis indicates that the Makakilo Drive intersection with the Westbound Off-ramp operates at very acceptable conditions in both peak our periods. Operations at the intersection are favorably affected by the placement of plastic pylons along the outside southbound lane to separate it from the other lanes and permit traffic to use that lane to travel through the intersection to access the eastbound loop On-ramp MB without stopping for the traffic signal. In both peak hours, traffic was observed to sometimes queue from the Farrington Highway intersection to or through the Westbound Off-ramp intersection and disrupt traffic operations for traffic exiting the Off-ramp.

The morning peak hour traffic volumes approximated 82% of the capacity of the Makakilo Drive intersection with Palaitai Street, with average delay calculated at LOS D. However, the



southbound traffic is sometimes affected by the queue along Makakilo Drive, with the queue on some days extending to or through this intersection. However, the makai-bound traffic lane adjacent to the curb is wide enough (20 feet) for two vehicles to pass. The southbound traffic headed to the eastbound Loop On-ramp MB to the H-1 Freeway often use the wide outside lane to pass by the waiting traffic queue to access the separated traffic lane that provides entry to On-ramp MB. In the afternoon peak hour, the traffic volumes amounted to 58% of the intersection capacity, with delays at LOS A

The Farrington Highway-Kamokila Boulevard intersection is currently used by traffic traveling between the City of Kapolei and the areas to the west of the City of Kapolei via ramps PC and PA and the freeway. The present connection of Farrington Highway to Kamokila Boulevard operates at very acceptable conditions.

The Kamokila Boulevard intersection with Wakea Street will be used in the future to access the planned Kapolei Interchange ramps as well as Ramps PA and PC. The Wakea Street approaches are STOP-controlled, with a raised median along Kamokila Boulevard that allows small vehicles to cross one direction of traffic and wait in the median area to merge with the other traffic. The higher traffic volumes turning left from northbound Wakea Street in the afternoon peak hour experience long delays (LOS E).

The overall traffic conditions at the signal-controlled Kalaeloa Boulevard intersection with Kapolei Parkway were at very acceptable levels in the weekday morning peak hour with the morning peak hour traffic approximating 71% of the intersection capacity and the average delay for all traffic passing through the intersection at LOS B. Long traffic queues and delays were observed for the makai-bound left-turn movement for 15-20 minutes just before 8:00 AM. The afternoon peak hour traffic amounted to 88% of capacity at the Kapolei Parkway-Kalaeloa Boulevard intersection with the overall average delay per vehicle at a very acceptable LOS C.

The traffic turning left from the STOP sign-controlled Kalaeloa Boulevard approach onto the Westbound On-Ramp at the Farrington Highway intersection experienced long delays in the weekday afternoon peak hour. The traffic analysis indicates an average delay of about 3 minutes per vehicle. Field observations noted the occasional formation of queues of up to 10-12 vehicles at times in the weekday afternoon peak hour. The average delays during the weekday morning peak hour were at acceptable levels (LOS D).

Ramp Conditions at Makakilo and Palailai Interchanges

Existing traffic conditions were assessed for the weaving section of the eastbound H-1 Freeway ramps on the east side of the Palailai Interchange. This weaving section, located mauka of the existing Kmart store, is separated from the H-1 Freeway mainline lanes by an open grass area. The 1,200-foot long weaving section has a single-lane entry from the Freeway at the west end with this single-lane continuing through the weaving section to exit onto the Freeway at the east end. The entry ramp from Kalaeloa Boulevard has two lanes with these lanes continuing through the weaving section to exit onto eastbound Farrington Highway north of the Police Station.

Table 2-2
2005 WEAVING SECTION TRAFFIC CONDITIONS

Peak Hour	Average Speed (mph)		Density (vplph)	Level of Service
	All Traffic	Non-Weave		
Eastbound Separate Weaving Roadway Kalaeloa Blvd.-Wakea St. (Existing)				
Morning	29.5	42.5	29.2	11.1
Afternoon	25.5	37.6	25.0	23.0
vplph = vehicles per lane per hour				

Wilbur Smith Associates: November 30, 2005

The existing traffic volumes on this eastbound weaving roadway are estimated to have operated at a very acceptable Level of Service (LOS) B during the weekday morning peak hour and LOS C in the afternoon peak hour, as shown in Table 2-2.

Traffic conditions at most of the junctions of the on- and off-ramps at the Makakilo and Palailai Interchanges are summarized in Table 2-3. The merge or diverge of each of the ramps with the freeway through lanes presently operate at very acceptable densities and with little impact on traffic speeds. The merge conditions are estimated at LOS C or better for each ramp junction.

Traffic conditions are not presented in Table 2-3 for the junction of On-ramp KC-1 since it joins the eastbound freeway as an added through lane and no merge maneuver is necessary. The on-ramp from the Eastbound Weaving Roadway has an estimated potential capacity of about 2,100 vehicles per hour. The afternoon peak hour volumes amount to about 51% of the capacity.

Similarly, the westbound freeway drops from three lanes to two lanes with the drop of the outside lane as the entry to the loop Off-ramp PD. This off-ramp for westbound traffic exiting from the H-1 Freeway to Kalaeloa Boulevard and Farrington Highway has an estimated capacity of about 1,800 vehicles per hour. The morning peak hour volume of just over 900 vehicles amounts to about half of the potential ramp capacity.

H-1 Freeway Conditions

Existing traffic conditions along the mainline through lanes were assessed for the sections of the H-1 Freeway east of the Makakilo Interchange and west of the Palailai Interchange. The assessment was made using the HCS software. For the purpose of this assessment, the free flow speed is assumed to be the posted 65 miles per hour (mph) speed limit in the east section and 60 mph in the west section (speed limit 55 mph).

Table 2-3
TRAFFIC CONDITIONS ALONG FREEWAY
AT RAMP MERGE AND DIVERGE AREAS

Ramp Junction	Peak Hour	Average Speed (mph)		Traffic Density (vplph)	Level of Service
		Near Ramp	Other Lanes		
Eastbound Freeway					
Off-ramp PB to Kalaeha Blvd.	AM	50.8	NA	20.4	C
	PM	50.9	NA	20.3	C
Off-ramp PC To EB Weaving Roadway	AM	50.4	NA	17.8	B
	PM	50.6	NA	18.8	B
On-ramp MB From SB Makakilo Dr.	AM	57.1	58.9	18.3	B
	PM	57.1	59.2	19.2	B
On-ramp MA from NB Makakilo Dr.	AM	57.2	58.8	22.1	C
	PM	57.2	58.9	22.2	C
Westbound Freeway					
Off-ramp MC to Makakilo Dr.	AM	53.5	57.0	9.5	A
	PM	51.1	NA	14.9	B
On-ramp PA from Kalaeha Blvd.	AM	50.6	NA	23.2	C
	PM				

Near Ramp is the 1,500-foot section of the 2 lanes closest to ramp.
Other lanes are lanes closest to median if 3 or more lanes on freeway.
Vplph = vehicles per lane per hour for 2 lanes near ramp.
Level of Service is for 2 lanes near ramp.

Wilbur Smith Associates; December 27, 2005

As summarized in Table 2-4, this section of the H-1 Freeway should accommodate the existing peak hour traffic volumes at very acceptable conditions. The analysis indicates that the traffic densities along this section equate to LOS B or C conditions in each peak hour and travel direction.

The HCS procedure indicates a travel speed of about 62 mph east of the Project section and 55.5 mph to the west of the Project. These speeds are provided for comparative purposes with future conditions as the HCS procedure provides estimated speeds that change little with increasing density until LOS F.



Table 2-4
2005 FREEWAY MAINLINE CONDITIONS
EAST AND WEST OF PROJECT AREA

Peak Hour	Direction	Traffic Volume	Lanes	Density (vplph)	Speed (mph)	Level of Service
East of Makakilo Interchange Area						
Morning	Eastbound	3,010	3	17.2	62.0	B
	Westbound	2,755	3	15.7	62.0	B
Afternoon	Eastbound	3,205	3	18.3	62.0	C
	Westbound	3,715	3	21.2	62.0	C
West of Palailai Interchange Area						
Morning	Eastbound	1,675	2	16.0	55.5	B
	Westbound	1,390	2	13.3	55.5	B
Afternoon	Eastbound	1,660	2	15.9	55.5	B
	Westbound	2,370	2	22.7	55.5	C

vplph = vehicles per hour per lane
mph = miles per hour

Wilbur Smith Associates; December 10, 2005.

PUBLIC TRANSPORTATION

The City and County of Honolulu provides public transportation services to the areas adjacent to the Kapolei West development area. These include a number of TheBus fixed route bus service that travel along the freeway and/or use the sections of the surface roadways through the interchange areas. TheHandiVan provides door-to-door service for persons who have difficulty in accessing the fixed route service.

Kapolei Transit Center – The City and County of Honolulu has constructed a temporary Transit Center on the alignment of the future extension of Wakea Street north of Kamokila Boulevard. The Transit Center provides a transfer site for all of TheBus local and regional routes that serve the City of Kapolei and the surrounding communities. The Transit Center will be located upon commencement of the construction of the Kapolei Interchange.

TheBus Routes – The existing bus routes that provide service through or near the Kapolei Interchange project area include the following:

Route C Country Express – Route C provides an express/limited stop service through the City of Kapolei area, with the route extending to the Honolulu Downtown area and Ala Moana Center to the east and along the Waianae Coast to Makaha to the west. Route



C uses the freeway east and west of the Project area and enters/exits the freeway at the Makakilo and Palailai Interchanges to provide service along Farrington Highway and Kamokila Boulevard between the two interchanges. The service operates seven days a week from about 4:30 AM to 11:00 PM.

Express Routes 93 and 93A – These two express routes from the Waianae area to Honolulu (93) and to Pearl Harbor (93A) travel along the H-1 Freeway but do not exit in the City of Kapolei area. About 11 bus trips travel through the area during both the morning and afternoon peak commute periods.

Express Route 102 Villages of Kapolei – This express route to/from Honolulu enters and exits the freeway at the Makakilo Interchange and uses Makakilo Drive south of the ramps to travel to/from the Villages of Kapolei residential area. The route provides three bus trips inbound to Honolulu in the morning commute period and three trips to the Villages of Kapolei in the afternoon commute period.

Route 40 Honolulu-Makaha – This trunk route provides regular bus service along the same general route as Route C. Within the City of Kapolei, it provides service along surface streets between the Makakilo and Palailai Interchanges, with the route using Makakilo Drive, Farrington Highway, Kamokila Boulevard, Kapolei Parkway, and Kalaeloa Boulevard. Service is provided seven days a week from about 5:00 AM to 9:30 PM.

Route 41 Kapolei-Ewa Beach – This trunk route provides regular service between the Kapolei Transit Center on Kamokila Boulevard and the Ewa Beach area with the route traveling along Kamokila Boulevard and Farrington Highway in the Project area. The route provides service at approximately half-hour frequency from about 5:00 AM until 10:00 PM.

Routes 411, 412, 413, 414, 415 – These local routes provide service from the Kapolei Transit Center to the surrounding communities and to the Campbell Industrial Park and Kalaeloa Redevelopment Area. Several of these routes use Makakilo Drive across the freeway and all of the routes provide service along Farrington Highway or Kamokila Boulevard. Each route operates on either a half-hour or hourly frequency during the commute periods with Routes 411 and 412 also providing midday service.

BICYCLES AND PEDESTRIANS

Bicycle lanes are provided along portions of Farrington Highway east of Kamokila Boulevard and along the one-block section of Kapolei Parkway between Kamokila and Kalaeloa Boulevards. Along the other major roadways, bicycles either use paved shoulder areas, wide outside lanes, or travel within the regular traffic lane.

Sidewalk facilities are provided along both sides of Makakilo Drive, Kamokila Boulevard, Wakea Street, the Kapolei Parkway, and the section of Farrington Highway east of Kamokila Boulevard. No sidewalks are provided along Kalaeloa Boulevard or the section of Farrington Highway west of the Kamokila Boulevard intersection.

Chapter 3 TRAFFIC FORECASTS WITH PROJECT

Future travel on the area roadways with the Project was forecast by estimating traffic to/from new developments in the City of Kapolei area and adding these new trips to the existing travel volumes. Traffic was also forecast to/from new development anticipated in the other areas near the City of Kapolei that would travel through the Project area.

At the time of this study, the on-going update of the regional long-range transportation plan (LRTP) by the Oahu Metropolitan Planning Organization (OMPO) had developed only preliminary 2030 traffic forecasts for the baseline "existing plus committed" scenario. These preliminary forecasts were incorporated into this study's forecasts as appropriate to identify origin-destination characteristics and to conform the level of year 2030 traffic increases in the study corridor to those in the OMPO regional study.

The overall methodology used to estimate future traffic for years 2010 and 2030 with the Project was as follows:

- Area property owners and/or developers were contacted to identify the general description and timing of additional development in those areas.
- For the 2030 time frame, the land uses provided by the property owners/developers were adjusted where appropriate to conform to the socioeconomic data being used for those areas by OMPO as input to the island-wide travel forecasts.
- Wilbur Smith Associates (WSA) staff estimated the peak hour vehicle trip generation for each of the potential developments.
- The origin/destination of trips for the new developments were based on a trip distribution for the Kapolei area developed from information provided by the OMPO regional model.
- The traffic to/from the new developments was assigned to the area roadway system using the TRAFFIX traffic model.
- An annual growth factor was used to increase through traffic along the H-1 Freeway.
- The resultant preliminary traffic forecasts for 2030 were compared to the OMPO preliminary forecasts at the east and west ends of the Interchange Project study area. The distributions of the origins/destinations of the study area trips were adjusted to better match the OMPO forecasts of travel through the study corridor. No adjustment

was made for the 2010 forecasts since there is less uncertainty in the shorter range forecasts.

The forecast traffic volumes were used in the analysis of the Project freeway interchange layouts and the key intersections and roadways that provide access to the interchanges as discussed in Chapters 4, 5, and 6.

PROJECT DESCRIPTION

The previous plans for the freeway interchange configurations and ramps, as described for the preferred alternative plan in *I-HI Addition and Modification of Highway Accesses, Palailai Interchange/Makakilo Interchange*¹ have been modified to reflect a number of factors. The principal modifications to the earlier roadway plans included the following:

- The planned off-ramp from the eastbound H-1 Freeway to Makakilo Drive (Ramp ME) was not included in the current plan and analyses due to potential disruption to traffic flow along Makakilo Drive given the short spacing from the intersection with Farrington Highway. The traffic study has assessed the capability of the other freeway access points and connecting roadways to accommodate the traffic that otherwise would have used Ramp ME.
- An on-ramp was added from northbound Hanua Street to the eastbound H-1 Freeway (Ramp PI) to attract more traffic use of Hanua Street and to reduce the traffic volumes using the eastbound weaving section between Kalaeloa Boulevard and Waka Street Extension. Other traffic studies since 1994 had indicated that Kalaeloa Boulevard and its connection to the eastbound H-1 Freeway would be overloaded while the Hanua Street Extension would be underutilized without a connection from Hanua Street to the eastbound H-1 Freeway.
- The existing off-ramp from the H-1 Freeway to Kalaeloa Boulevard (Ramp PB) was eliminated to allow the new eastbound Ramp PI to be provided from the Hanua Street Extension. A new off-ramp (PH) is planned from eastbound H-1 Freeway to Hanua Street Extension to accommodate this movement.

The following section describes the planned interchange configurations and ramps at completion (buildout) of the Project. Phased construction is planned for the Project, as described in this section, with the completion of the initial Phase 1 elements expected by the end of 2010.

Project at Full Development

The Project includes the expansion of the Palailai Interchange to include a new Kapolei Interchange element and additional ramps to serve the planned extension of Hanua Street to

¹ *I-HI Addition and Modification of Highway Accesses, Palailai Interchange/Makakilo Interchange, Revised*, prepared for The Estate of James Campbell by Engineering Concepts, Inc., January 1994.

access the H-1 Freeway. The Project also includes an additional ramp at the Makakilo Interchange as well as extensions and other modifications of the area streets to access the new freeway ramps. Figure 3-1 depicts the preliminary configuration of the interchanges, the roadway connections, and the initially proposed numbers of traffic lanes and types of traffic controls used as the basis of the traffic analysis.

Makakilo Interchange Area – The State DOT has requested the modification of the previous plans for the Makakilo Interchange area. The modified plan relocates the connection of the Mauka Frontage Road to Makakilo Drive southward to form the fourth leg of the existing intersection with the Westbound Off-ramp. This would avoid the additional signal-controlled intersection along Makakilo Drive and the signal coordination/progression issues that would likely occur with the short distance to the adjacent signal-controlled intersections. The descriptions of the existing and planned ramps used in the analyses are as follows:

Ramp MA Eastbound On-ramp from Northbound Makakilo Drive

This existing single-lane on-ramp would not be modified. It merges directly into the freeway about 700 feet downstream from Ramp MB and has a merge length of about 400 feet.

Ramp MB Eastbound Loop On-ramp from Southbound Makakilo Drive

This existing single-lane loop on-ramp would not be modified. It merges directly into the freeway about 700 feet upstream from Ramp MA and has a merge length of about 300 feet.

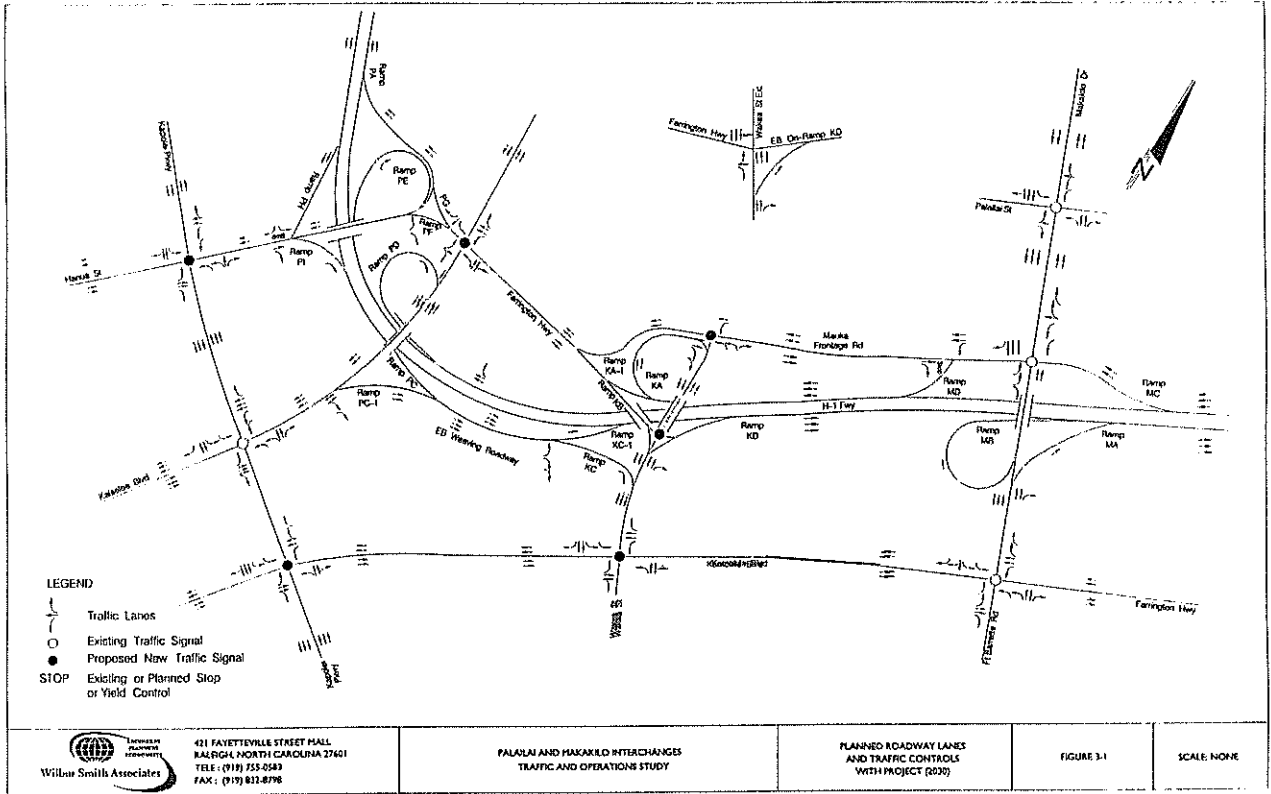
Ramp MC Westbound Off-ramp

This existing two-lane off-ramp would not be modified. The first lane diverges from the freeway with a deceleration lane of about 1,200 feet in length. The second lane onto the ramp diverges directly from the through lane without any deceleration lane. The ramp provides a two-lane section of about 400 feet from the exit point and an additional 400 feet with four storage lanes to the signal-controlled intersection.

Ramp MD Westbound On-ramp from Mauka Frontage Road (New)

This new single-lane on-ramp would access the freeway about 2,100 feet downstream from the exit to Ramp MC. The merge onto the freeway would be via a 1,600-foot long weaving lane shared with new Off-ramp KA. Traffic would be able to access this ramp from either travel direction along the Mauka Frontage Road.

Kapolei City Interchange – This interchange will provide access to/from the central area of the City of Kapolei via an extension of Waike Street to connect to Farrington Highway and extend across the freeway to link with the Mauka Frontage Road. The proposed ramps will increase the freeway entry/exit capacity and augment Ramps MA, MC, and PD which presently accommodate high volumes of traffic. The new freeway overpass provided by the extension of Waike Street will also provide a second route between the City of Kapolei and Makakilo and divert some traffic that would otherwise pass through the frequently congested Makakilo Drive-Farrington Highway intersection.



Ramp KA Westbound Off-ramp (New)

Freeway access to this new single-lane off-ramp will be provided by the 1,600-foot long weaving lane shared with Ramp MD. This off-ramp will split into two roadways with the Ramp KA loop connecting to the Wakea Street extension and Mauka Frontage Road, and the Ramp KA-1 connecting to westbound Farrington Highway. Ramp KA will be used by westbound freeway traffic to access the central City of Kapolei commercial area and the uses along the Mauka Frontage Road. Ramp KA-1 will be used to access the future Makaiwa Hills development, as well as the commercial development along the section of Farrington Highway north of the freeway.

Ramp KB Eastbound Connector to Wakea Street (Modified)

The existing two-lane Farrington Highway overpass will be converted to one-way eastbound traffic use to connect the section of Farrington Highway north of the freeway to Wakea Street and the new On-ramp KD to the eastbound freeway. This roadway section will also be used by eastbound traffic from Farrington Highway to access the Mauka Access Road on the east side of the Kapolei Interchange.

Ramp KC Eastbound Off-ramp Connector to Wakea Street (Modified)

This roadway currently connects the Eastbound Weaving Roadway to eastbound Farrington Highway. The section of Farrington Highway east of Wakea Street will be eliminated and this ramp will connect to southbound Wakea Street. The ramp will continue to exit the Eastbound Weaving Roadway with two lanes and narrows to one lane before its linkage to Wakea Street.

Ramp KC-1 Eastbound On-ramp from Weaving Roadway (Existing)

This existing single-lane on-ramp will continue to merge with the freeway as an additional (third) eastbound mainline freeway lane.

Ramp KD Eastbound On-ramp from Wakea Street (New)

This single-lane on-ramp will provide access to the eastbound freeway from Wakea Street and the section of Farrington Highway north of the freeway. This ramp will be used by the future Makaiwa Hills development to access eastbound H-1 Freeway. The analysis was based on the ramp having a 300-foot long acceleration lane at its merge with the freeway.

Palailai Interchange – The existing Palailai Interchange will be expanded to include the linkage of the future extension of Hanua Street to connect to the freeway. The Hanua Street connection is needed to provide increased capacity to the developments at the western area of the City of Kapolei, as well as new commercial and industrial development anticipated in the Kalaeloa Boulevard corridor and the planned Kapolei West residential area.

The previous plans have been modified to reflect the traffic needs of the area as development plans have been better defined and as the planned roadways have been subjected to more detailed study in the traffic impact studies prepared for these developments. The major modification in

the freeway access is the addition of an eastbound on-ramp (PI) from northbound Hanua Street and the relocation of the eastbound off-ramp to exit to Hanua Street (Ramp PH) instead of Kalaeloa Boulevard (existing Ramp PB).

Ramp PA Westbound On-ramp (Modified)

This existing single-lane ramp will be relocated westward and northward to provide space for the new Ramp PE and to improve the layout of Ramp PD. The analysis is based on the relocated on-ramp having a 450-foot long acceleration lane at its entrance to the freeway.

Ramp PB Eastbound Off-ramp to Kalaeloa Boulevard (Existing to be Relocated)

This existing off-ramp will be removed to allow the construction of an on-ramp (PI) from Hanua Street to the eastbound freeway. The freeway exit will be relocated to a new off-ramp on the west side of Hanua Street.

Ramp PC Eastbound Off-ramp (Existing)

The preliminary plans do not propose any changes to the existing single-lane off-ramp connection to the eastbound Weaving Roadway. The diverge area for this off-ramp has no deceleration lane. The off-ramp merges into the Eastbound Weaving Roadway as the northernmost lane of the three-lane weaving roadway, with this lane then diverging to connect to the freeway as the single-lane Ramp KC-1. All traffic exiting the freeway must weave into the adjacent two lanes to access Wakea Street.

Ramp PC-1 Kalaeloa Boulevard Link to Eastbound Weaving Roadway (Existing)

The only change planned for the existing two-lane ramp connection from northbound Kalaeloa Boulevard to the Eastbound Weaving Roadway is the widening of the Kalaeloa Boulevard entry to allow two lanes to exit onto the two-lane ramp as Kalaeloa Boulevard is widened to a six-lane roadway. The ramp merges into the Eastbound Weaving Roadway as the center and southernmost lanes of the three-lane weaving roadway, with these lanes then diverging at the east end of the weaving section to connect to Wakea Street. Almost all of the traffic using this ramp must weave into the northernmost lane to access the freeway, with less than 10% of the Ramp PC-1 vehicles continuing in the southernmost lane to access Wakea Street.

Ramp PD Westbound Off-ramp to Kalaeloa Boulevard (Modified)

This single lane loop off-ramp will be modified to increase the loop radius. At Kalaeloa Boulevard the ramp connection will be limited to right-turns-only onto southbound Kalaeloa Boulevard with the existing through/left-turn movements eliminated to allow a traffic signal to be installed at the Kalaeloa Boulevard-Farrington Highway intersection. Traffic that would otherwise use the ramp to turn left towards Makaiwa Hills or travel straight through the intersection would instead use new Ramp KA.

The third (outside) mainline freeway lane will end at this ramp with the outside freeway lane exiting as Ramp PD, as is the case with the existing ramp.

Ramp PE Westbound Off-ramp to Hanua Street (New)

This new single-lane loop off-ramp will provide access from the westbound freeway to southbound Hanua Street to provide increased capacity for access to the Deep Draft Harbor, the planned Kapolei West development, and new industrial areas planned west of Kalaeloa Boulevard.

Ramp PH Eastbound Off-ramp to Hanua Street (Relocated)

A single-lane off-ramp will be added from the eastbound freeway to Hanua Street to replace the access presently provided by Ramp PB. The ramp will allow both left and right turns onto Hanua Street. The left-turn movement is permitted in order to provide access to the future Makaiwa Hills development and to the commercial uses along the section of Farrington Highway north of the freeway.

Ramp PI Eastbound On-ramp from Hanua Street (New)

This new single-lane on-ramp from northbound Hanua Street will increase the access capacity to the eastbound freeway from the areas south of the freeway and allow more traffic to use Hanua Street in lieu of Kalaeloa Boulevard. For the analysis, Ramp PI was tested with an 800-foot long acceleration lane at the entry to the freeway. The ramp entry would be located about 1,200 feet west of the exit to Ramp PC.

Project Arterial Roadway Modifications – The Project interchange plans will also include modifications to the existing surface roadways. Key changes or new sections are summarized in the following paragraphs.

Mauka Frontage Road/Ramp MD

Present plans are to connect the Mauka Frontage Road to Makakilo Drive as the west leg of the intersection with the Westbound Off-ramp MC. The Mauka Frontage Road will provide access to the new Westbound On-ramp MD, with the entrance to the on-ramp located about 200 feet west of the intersection.

The left-turn movement from westbound Mauka Frontage Road onto the ramp is being planned as grade-separated from the eastbound traffic movement along the roadway. For this study, the analysis was based on an at-grade intersection to identify the likely operational conditions and storage requirements should an at-grade intersection be constructed. Given the proximity of the ramp to the Makakilo Drive intersection, the left-turn movement onto the ramp would be free-flow to avoid stacking needs, and the eastbound traffic would be STOP controlled. An alternative approach to an at-grade intersection would also be the construction of a roundabout at the junction.

At the intersection with Makakilo Drive, the Mauka Frontage Road would need double left-turn lanes to accommodate the anticipated high volume of traffic using this route to travel from the City of Kapolei to Makakilo. To avoid east-west split phase operation at the signal, a separate right-turn lane should be provided on the Mauka Frontage Road approach and the through movement from the Westbound Off-ramp should be included as a shared lane with the right-turn lanes rather than the left-turn lanes (Figure 3-1).

The initial forecasts and analyses were made with left turns prohibited from northbound Makakilo Drive onto the Mauka Frontage Road in order to test the adequacy of other intersections to accommodate this traffic. The intersection is located adjacent to the north end of the freeway overpass and it would be costly to widen the bridge structure. The left-turn traffic from the Villages of Kapolei area would likely use Wakea Street, the section of Farrington Highway north of the freeway, and Ramp PA to travel westbound towards Waianae if this left-turn is prohibited.

Wakea Street Extension

Wakea Street will be extended northward as a two-way street to intersect the Mauka Frontage Road and provide access to/from the Kapolei Interchange ramps. The junction of Off-ramp KC with Wakea Street was located as far from the Kamokila Boulevard intersection as feasible to maximize the distance for the Ramp KC traffic to weave across the southbound lanes to turn left at the intersection, as well as to provide as much stacking length as possible for the southbound traffic.

Farrington Highway

The section of Farrington Highway north of the freeway will end at Wakea Street, with the section east of Wakea Street removed and Wakea Street used as the connection to Farrington Highway. The existing Farrington Highway overpass will be operated as a one-way eastbound roadway connection to Wakea Street and On-ramp KD. The westbound connection from Wakea Street to Farrington Highway will be located north of the Loop Ramp KA-1, with the roadway provided as a continuation of the westbound lanes of the Mauka Frontage Road.

Hanua Street

Hanua Street will be extended from its present northern terminus at Malakole Street in the Campbell Industrial Park to the freeway as a four-lane median-divided roadway. The planned roadway connections will allow northbound traffic to continue north and east to Kalaeloa Boulevard. However, there is no plan to allow access from the Kalaeloa Boulevard-Farrington Highway intersection to the southbound direction.

The Ramp PH intersection with Hanua Street is analyzed with STOP controls on the left-turn from the ramp. A raised median is assumed at the junction to provide a median refuge area to allow vehicles to wait for a gap to cross the southbound traffic as one maneuver and then wait in the median for a gap to enter the northbound flow. No left-turn will be permitted from southbound Hanua Street onto Ramp PI.

Previous Roadway Elements Not Included in the Proposed Project – The traffic analysis is based on the deletion of eastbound Off-ramp ME to Makakilo Drive.

- **Makakilo Interchange Eastbound Off-Ramp (ME)** - The eastbound off-ramp planned for the Makakilo Interchange would also reduce traffic circulation through the City of

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Kapolei. However, the ramp would intersect Makakilo Drive at a very short distance from the Farrington Highway intersection, thus potentially worsening traffic operations at that intersection. Southbound traffic queues on Makakilo Drive usually extend beyond the planned ramp connection point to Makakilo Drive during much of the weekday commute periods. Traffic would not be able to turn left from the ramp without traffic signal controls, and traffic would have difficulty in crossing from the ramp to the through or left-turn lanes at the Farrington Highway intersection. Introduction of traffic signal controls at the ramp would create coordination and progression problems with the Farrington Highway signal. For the purpose of this study, the eastbound off-ramp is not included within the baseline roadway network. This traffic would have to exit the freeway at Ramp PC and use Ramp KC and Wakea Street to travel to Makakilo and Villages of Kapolei.

Project Phase 1 Improvements

The initial Project development (Phase 1) is planned to include the elements of the Kapolei Interchange that can be utilized without the construction of the Wakea Street overpass across the freeway. The Phase 1 elements will include:

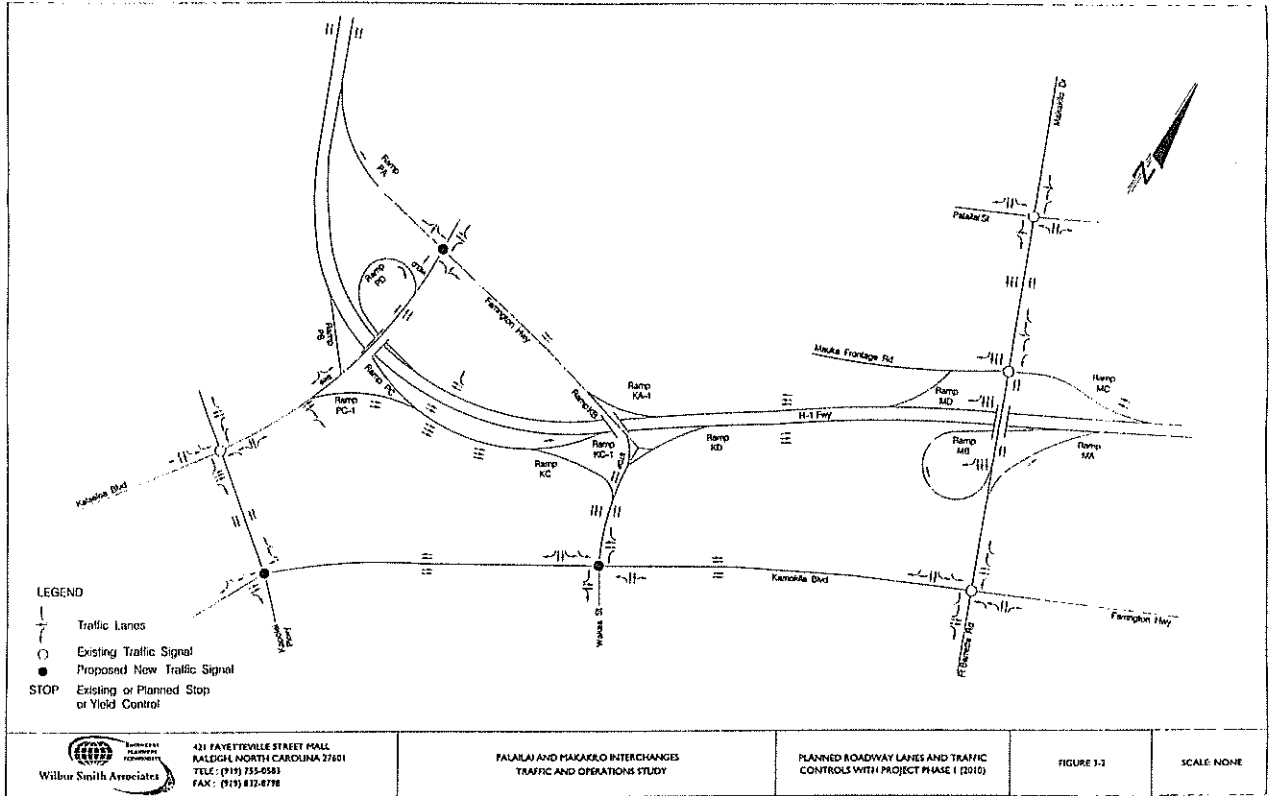
- Extension of Wakea Street to Farrington Highway.
- Removal of the eastern segment of Farrington Highway between the Wakea Street extension and Kaunokila Boulevard.
- Connection of Ramp KC to Wakea Street.
- Construction of Ramp KD to provide access to the eastbound freeway.
- Construction of Ramp KA to provide access to the section of Farrington Highway north of the freeway and the initial phases of the Makaiwa Hills development along the northward extension of Kalaeloa Boulevard.
- Removal of the connection of the loop Off-ramp PD to Farrington Highway.
- Construction of On-ramp MD and a short connecting segment of eastbound Mauka Frontage Road to provide access to the ramp.

Phase 1 of the Project is scheduled for completion by the end of 2010. The planned roadway network and lanes included in the forecast of 2010 traffic and analysis of traffic conditions are depicted in Figure 3-2.

OTHER PLANNED AREA ROADWAYS

A number of transportation projects have been planned for the Ewa District that would affect travel to and within the City of Kapolei. Most of these projects have been identified and/or confirmed through the Oahu Metropolitan Planning Organization (OMPO) transportation planning process², as well as the Ewa Highway Impact Fee Program studies and plans³.

² Transportation for Oahu Plan, TOP 2025, prepared for OMPO by Carter-Burgess, April 6, 2001.
³ Ewa Highway Impact Fee Program, prepared for State of Hawaii Department of Transportation by Kaku Associates, Inc. July, 2002.



The OMPO process assesses the long-range transportation needs to serve forecast travel over the next 20 or more years, but also selects a high-priority short list of projects and programs for funding within the next three years as covered by its adopted Transportation Improvement Program (TIP). The Ewa Highway Impact Fee Program (Ewa HIFP) addresses the travel needs through 2010 and establishes a developer-funded source to pay for 20% of the regional roadways needed in the Ewa District.

The roadway improvements reflected in this study's traffic forecasts and analyses are outlined in the following sections.

2010 Roadway Improvements

The area roadway improvements reflected in the 2010 forecasts with Phase 1 of the Kapolei Interchange are summarized in the following sections.

City of Kapolei Area Improvements – In 2010, some key portions of the roadway network will be in place, which should include:

- Completion of the Manawai Street-Kamaaha Avenue connection to divert traffic from the Farrington Highway-Makakilo Drive intersection.
- Extension of Haumea Street from Wakea Street to Uluohia Street.
- Extension of Kamokila Boulevard south to Roosevelt Avenue in the Kalaeloa Redevelopment Area.
- Widening of Fort Barrette Road to a four-lane divided roadway.
- Widening of the northern portion of Kalaeloa Boulevard to six lanes.

Regional Improvements – Several major regional projects are planned that would divert traffic away from the City of Kapolei area, or change the routing of the traffic. These include:

- Completion of Phase 1 of the North-South Road from the Kapolei Parkway to the H-1 Freeway, with Honolulu-direction on- and off-ramps.
- Completion of the Kapolei Parkway connection east of the Villages of Kapolei.

2030 Roadway Improvements

The key new roadway improvements between 2010 and 2030 are expected to include the completion of the roadway network within the City of Kapolei, as well as a number of regional roadway projects that would affect area traffic.

City of Kapolei – The roadway network in the City of Kapolei should be completed by 2030 with the key elements that would affect the Kapolei Interchange Project being as follows:

- Extension of Kapolei Parkway through the City of Kapolei.

- Extension of Kamaaha Avenue from Manawai Street westward to connect with the Kapolei Parkway and provide access to and circulation within the commercial area south of Kamokila Boulevard.
- Extension of Wakea Street southward to connect to the Kapolei Parkway and the Mehana at Kapolei development, with potential extension into the Kalaeloa Redevelopment area.
- Completion of the downtown street grid within the commercial center.

Regional Roadway Improvements near the City of Kapolei – Most of the network of regional roadways are expected to be in place by 2030. The key elements that would affect traffic flow in the Project area would include:

- Makakilo Drive Extension southeastward to connect to the H-1 Freeway at the future North-South Road Interchange, which would divert some of the traffic along Makakilo Drive.
- Kapolei Parkway extension westward to connect to the Alinui Drive in Ko Olina.
- Construction of the Makaiwa Hills Interchange west of the Palailai, which would serve as a major entry to the Makaiwa Hills development and constrain use of Kalaeloa Boulevard.
- Extension of Hanua Street to connect to the freeway.
- Connection of Kapolei West development to the Makaiwa Hills development which would reduce traffic use of Kalaeloa Boulevard and the Hanua Street extension.

FUTURE DEVELOPMENT ASSUMPTIONS

Most of the lands within and near the City of Kapolei are expected to be developed by 2030. A substantial portion of this development is expected to occur by 2010 when Phase 1 of the Project is planned for completion.

Development Within City of Kapolei

A number of new developments are planned for construction in the next few years and are assumed to be completed and occupied by the 2010 or 2030 forecast years. Where there are no specific plans as yet, the Campbell Estate staff identified the types of uses anticipated for the other vacant properties and the general timing of the development. In general, development in the central area of the City – between Fort Barrette Road and Kalaeloa Boulevard – is expected to progress from the blocks closest to Kamokila Boulevard towards the former OR&L track line. The anticipated developments are discussed by time period in the following paragraphs.

2005-2010 Development – The new developments or additions to existing development, expected between the May 2005 traffic counts and the end of 2010 include the following projects:

- **Kapolei Park Square** – An office development is expected for the 2-acre parcel at the south end of Kapowai Place across from the Kapolei Shopping Center.

- **Luana Koa Retirement Village** – A retirement village is planned for the 40-acre area along the west side of Fort Barrette Road between the future Kamaaha Avenue and Kapolei Parkway with access located along Manawai Street and Kamaaha Avenue.
- **Island Pacific Academy** – The private school on the southeast corner of Haunaea and Wakea Streets is expected to expand enrollment from 200 students in the Spring of 2005 to the planned capacity of 900 students in 2009.
- **Kamokila Blocks between Wakea and Uluohia Streets** – These two blocks on the makai side of Kamokila Boulevard are expected to be developed with a mix of restaurant, retail, and office uses in the next several years.
- **Kapolei Power Center** – The remaining portions of the site are expected to be developed by 2010 with a mix of retail, restaurant, and office uses.
- **Mehana at Kapolei** – Development of about 500 of the planned 1,150 residential units is anticipated by 2010.
- **Kapolei Rezoning Parcel 2** – This retail development, located along Farrington Highway east of Kalaeloa Boulevard is expected to be completed by 2010.
- **Kapolei Rezoning Parcel 3** – This commercial development, located on the northeast corner of the intersection of Farrington Highway and Makakilo Drive, is expected to be partially developed by 2010.
- **Kapolei Commons** – The 40-acre mixed-use commercial area located north of the Kapolei Parkway alignment between Kalaeloa Boulevard and Hanua Street is planned for development with retail, office, residential, and entertainment uses by 2010.

2030 Development – Full development is expected within the City of Kapolei area between Fort Barrette Road and Hanua Street including completion of the following projects:

- The remaining commercial and mixed use areas in the Kapolei Parkway and Kamaaha Avenue areas.
- Mehana at Kapolei residential community.
- Kapolei Mauka Residential Area, located north of the H-1 Freeway on the west side of Makakilo Drive, with a townhouse development.

Developments Near the City of Kapolei

Additional development, or occupancy of previously completed development, is expected in several areas that would directly add traffic on the roadways and through the key intersections that are the subject of this study. The amount of development was estimated for most of these areas from telephone discussions with representatives of either the developer or property owner.

2005-2010 Development – The new developments or additions to existing development, expected between the May 2005 traffic counts and the end of 2010 include the following projects:

- **Makakilo** – Infill and new development is expected to add about 900 housing units to the area.
- **Kapolei Knolls** – The remaining 200 single-family homes will be completed.
- **Villages of Kapolei** – Development is expected in the central and southern areas.
- **Kapolei Business Park** – An average of about 115,000 square feet of new warehouse and distribution floor area are expected to be developed each year.
- **Kalaeloa Industrial Areas** – Development of about 54 acres is anticipated by 2010.
- **Barbers Point Harbor** – Traffic forecasts for the harbor uses were based on continued 2.2% annual growth in vehicles accessing the facilities.
- **Kapolei West** – About 360 housing units are anticipated by 2010.
- **Makaiwa Hills** – Initial development is expected largely in areas that have zoning approval with about 400 housing units by 2010.
- **Ko Olina** – Continued development is expected for the several residential areas and hotels, as well as the time-share units and the aquarium.

2030 Development – Most of the major development near the City of Kapolei is expected to be developed by 2030. Full or near-full development is expected of the following:

- Makakilo.
- Villages of Kapolei.
- Mehana at Kapolei.
- Kapolei West.
- Kapolei Business Park.
- Ko Olina.

Full development is anticipated for the Makaiwa Hills development by 2030 with up to 4,100 housing units plus commercial uses. However, the OMPO forecasts include about half that level of development for the Makaiwa Hills area in the regional forecasts for 2030. Therefore, the traffic forecasts for this study are based on about 2,100 residential units to conform to the OMPO projections.

The recently released draft of the Master Plan for the Kalaeloa Redevelopment Area, as provided on the Hawaii Community Development Authority (HCDA) website, envisions the full development by 2030. However, the OMPO forecasts for 2030 are based on a small portion of the potential development, with the socioeconomic data used in the forecasts reflecting more of a residential orientation by 2030. For the Kapolei Interchange study, the forecasts were based on a level of residential and commercial uses reflective of the OMPO projections.

The light industrial/warehouse areas west of Kalaeloa Boulevard between the future Kapolei Parkway and Malakole Street could be fully developed by 2030. However the forecasts were based on about 80% of the potential development to reflect the level of activity in the OMPO forecasts.

GROWTH OF H-1 FREEWAY THROUGH TRAFFIC

A growth factor was applied to existing traffic volumes on the H-1 Freeway to reflect increased travel to/from the Waiānae Coast areas west of Ko Olina. The growth factor was determined from the traffic counts for the State DOT count station located on the H-1 Freeway west of Makakilo Drive (count station #H10-A). The historic counts indicated an average annual growth rate of 0.5% per year between January 1999 and January 2002.

The 0.5% annual growth rate was assumed to continue through the study period. With this rate, the 2005 freeway through traffic volumes are estimated to increase about 2.5% by 2010 and 13.3% by 2030. These volumes are further increased by the forecast trips to/from the new development within and near the City of Kapolei.

2010 PEAK HOUR TRAFFIC

The weekday peak hour traffic volumes were forecast for 2010 with the Project Phase 1 based on the new developments and roadways described in the preceding sections.

Trip Generation

The numbers of vehicle trips generated by the new development within and near the City of Kapolei were based on standard trip rates compiled by the Institute of Transportation Engineers (ITE).⁴ The vehicle trip generation rates and estimated vehicle trips for the various areas and types of developments are presented in Appendix B.

The numbers of vehicle trips entering or exiting a commercial development include both new vehicle trips and additional stops by vehicles that would be traveling through the area whether or not the Project is developed. These additional stops by traffic passing the site to use the retail and services uses are referred to as "pass-by trips," which do not represent additional trips on the adjacent roadway, but do result in additional turns into and out of the development driveways by vehicles that would be passing by that site. The ITE *Trip Generation Handbook*⁵ provides a methodology and pass-by rates for estimating the proportion of the Project vehicle trip ends that are pass-by trips. Pass-by trip factors are usually applied only to the afternoon peak hour since many retail and service businesses are not open or have low rates of trip generation during the morning peak hour. For the commercial uses, Appendix B lists the total number of vehicles entering and exiting the land use and also lists the number of "new" vehicle trips on the area roadways generated by the land use in the afternoon peak hour, excluding the pass-by trips.

The anticipated growth within the City of Kapolei by 2010 would increase the morning peak hour travel by about 2,850 vehicle trips, and the afternoon peak hour by about 4,300 new vehicle trips on area roadways. With the predominantly commercial uses, the majority of the trips in the

⁴ *Trip Generation, Sixth Edition*. Institute of Transportation Engineers, 1997.

⁵ *Trip Generation Handbook, An ITE Proposed Recommended Practice*. Institute of Transportation Engineers, October 1998.

morning peak hour are traveling to the City of Kapolei land uses, and in the afternoon the majority of trips are departing these uses.

Origin-Destination of 2010 Trips

The origins and destinations of the additional vehicle trips were based on present traffic circulation patterns in the area as augmented by previous OMPD forecast data for year 2020. The new trips generated by land uses in the Project area were distributed using the distributions presented in Appendix C.

2010 Peak Hour Traffic Volumes

The forecast 2010 weekday traffic volumes in the Project area are depicted in Figures 3-3 and 3-4 for the weekday morning and afternoon peak traffic hours, respectively.

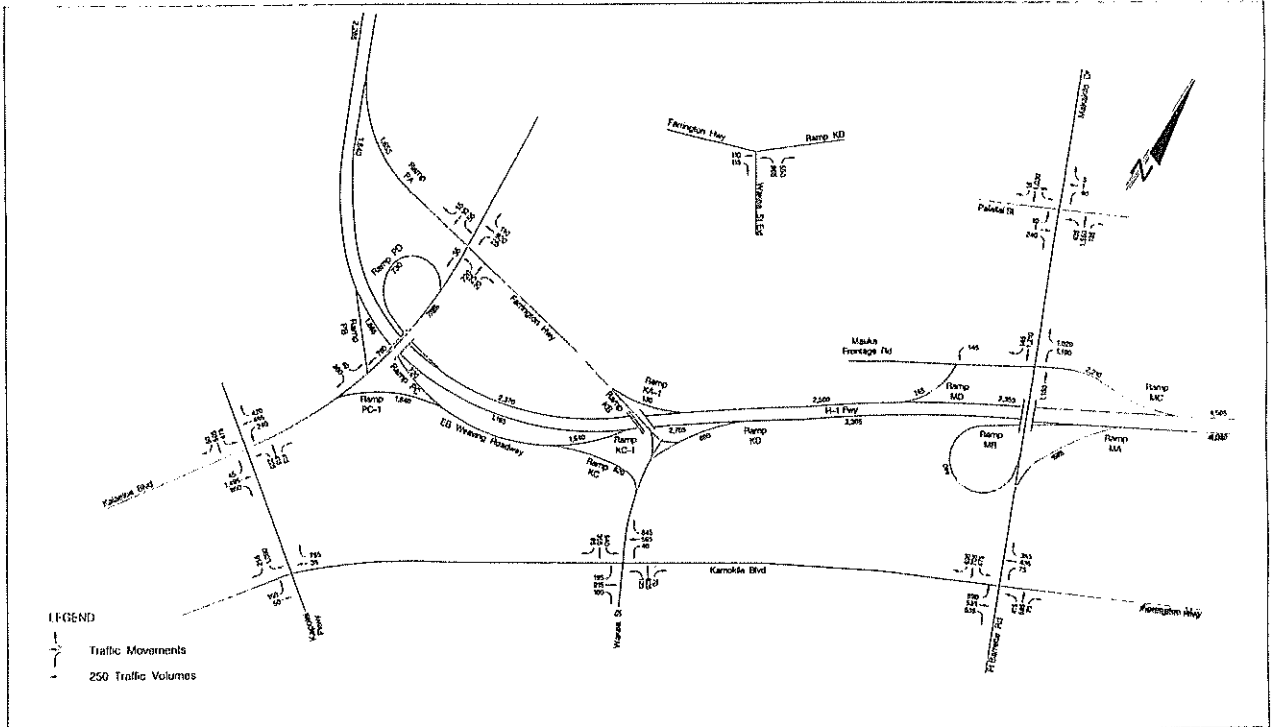
A morning peak hour volume of approximately 7,440 vehicles is forecast for the H-1 Freeway at the east end of the Project Area. This amounts to an increase of 1,680 vehicles, or a 29% increase, over 2005 traffic volumes. The afternoon peak hour volume east of the Makakilo Interchange is forecast at 8,895 vehicles for a 28.5% increase from 2005.

At the Makakilo Interchange, the new westbound On-ramp MD is estimated to attract use by 200 vehicles in the morning peak hour and 145 vehicles in the afternoon peak hour. The estimated volumes reflect only traffic from the Makakilo area since the forecasts are based on no left turns being permitted from Makakilo Drive onto the on-ramp access road.

At the Kapolei Interchange, traffic volumes on the new westbound Off-ramp KA are estimated at 50 and 130 vehicles in the morning and afternoon peak hours, respectively. This reflects usage by the commercial development along the adjacent section of Farrington Highway as well as the initial stage (400 housing units) of the Makaiwa Hills development.

The new eastbound On-ramp KD is projected to attract use by 235 vehicles in the morning peak hour. Much higher usage is forecast in the afternoon peak hour (660 vehicles) as workers and visitors depart from the City of Kapolei commercial and government uses.

The only ramp forecast for a reduction in use from the 2005 traffic volumes is the On-ramp MA from northbound Makakilo Drive to the eastbound freeway. The peak hour volumes are projected to decrease by about 23-25% in each peak hour as compared to the present usage due to diversion to the new On-ramp KD.




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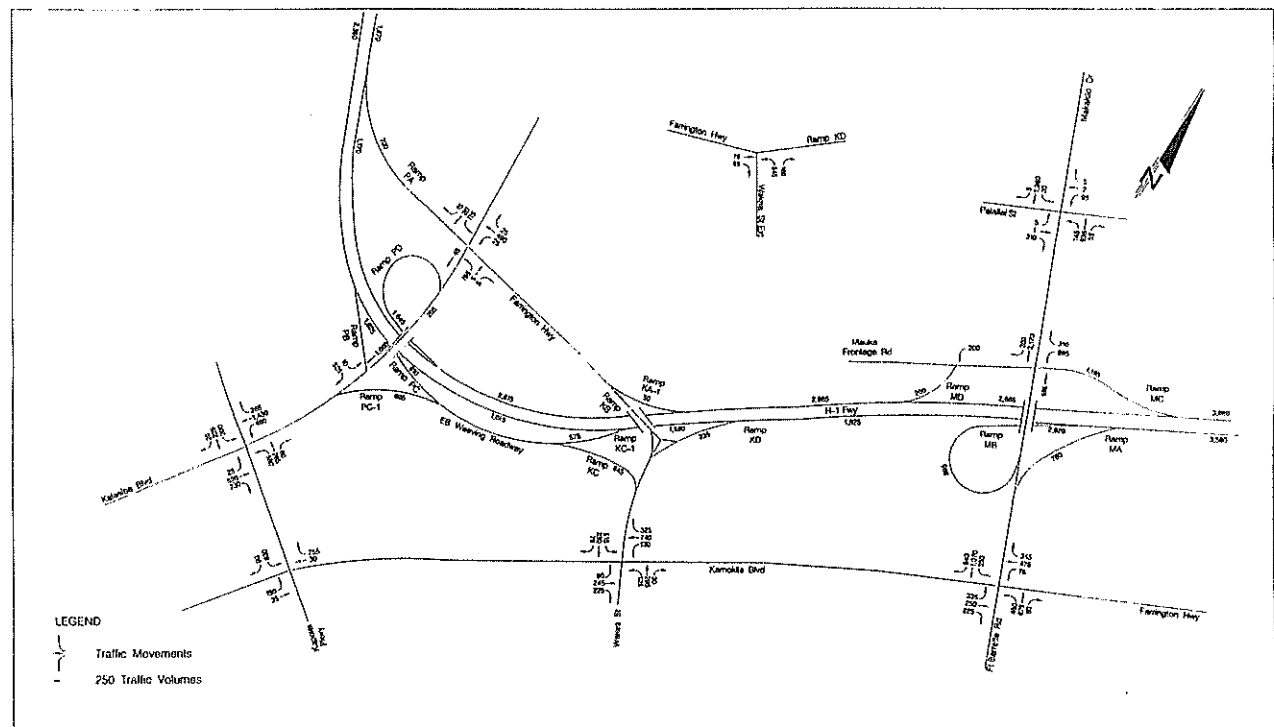
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PALALAI AND MAKAKILO INTERCHANGES
 TRAFFIC AND OPERATIONS STUDY

2018 AFTERNOON PEAK HOUR
 TRAFFIC WITH PROJECT PHASE I

FIGURE 3.4

SCALE: NONE




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PALALAI AND MAKAKILO INTERCHANGES
 TRAFFIC AND OPERATIONS STUDY

2018 MORNING PEAK HOUR
 TRAFFIC WITH PROJECT PHASE I

FIGURE 3.3

SCALE: NONE

- Traffic assignments to the preliminary "existing plus committed" roadway network for 2030 for the total weekday.

2030 PEAK HOUR TRAFFIC FORECASTS

The weekday peak hour traffic volumes were forecast for 2030 with the full buildout of the Palailai Interchange based on the new developments and other new roadways described in the preceding sections.

Trip Generation

As described for 2010, the numbers of vehicle trips generated by the new development within and near the City of Kapolei were based on standard trip rates compiled by the Institute of Transportation Engineers (ITE).⁶ The vehicle trip generation rates and estimated vehicle trips for the various areas and types of developments are presented for 2030 in Appendix D.

As noted, the estimated trips for 2030 reflect lower levels of development for many areas than reflected in the plans of individual property owners and developers. The lower levels of development were used for this study so that the forecasts for the Project Area would represent similar levels of travel in the H-1 Freeway travel corridor as those made in the OMPO regional planning studies for development of the Oahu long-range transportation plan. Lower levels of development, as compared to the developer plans, were used for the Kalaeloa Redevelopment Area, Makaiwa Hills development, and the Kalaeloa industrial area to conform the Kapolei Interchange traffic forecasts with those of the broader OMPO regional studies.

The new development within the City of Kapolei is estimated to generate about 5,450 vehicle trip origins or destinations in the morning peak hour between 2005 and 2030. In the afternoon peak hour, the new development is estimated to add about 7,000 vehicle trips after adjustment for pass-by traffic.

Conformance with OMPO Regional Forecasts

The schedule for the Palailai and Makakilo Interchanges Study was adjusted to allow the corridor traffic forecasts in the Interchange study to be calibrated to the island-wide forecasts being developed for the OMPO long-range transportation plan update. The OMPO information included the following:

- List of socioeconomic inputs to the OMPO model by traffic analysis zones (TAZ) for years 2000 and 2010.
- Journey-to-work origin-destination trip tables for 2030.
- 2030 tables indicating the total numbers of resident vehicle trips between each pair of zones for total vehicle trips and trips by purpose, with tables provided for the total weekday, morning peak, afternoon peak, and off-peak periods.

The OMPO origin-destination information was used to develop an initial distribution of the origins and destinations of those new trips estimated for the City of Kapolei study area in this study.

The OMPO preliminary assignment forecasts were used to calibrate/adjust the distribution of trips to better reflect the OMPO island-wide forecasts. This calibration was based on the estimated volumes of the 2030 peak hour traffic crossing two imaginary screenlines at either end of the area included within the TRAFFIX model network used in the Interchange Study: an East Screenline included the forecast traffic on all east-west major roads (H-1 Freeway, Farrington Highway, Kapolei Parkway, and Roosevelt Avenue) across an imaginary north-south line just east of the Villages of Kapolei, and a West Screenline that included only the Farrington Highway facility. The objective was to calibrate the TRAFFIX model to produce total peak hour traffic across each screenline within 5% of the OMPO forecasts from the island-wide model.

The general procedure used to develop and adjust the 2030 peak hour traffic forecasts included the following steps:

1. The travel forecasts in the OMPO trip tables were compressed to a smaller number of zones. The TAZ's within the Interchange study area (western Ewa District) were combined into one subarea zone within each of the major communities/development areas (Villages of Kapolei, Makakilo, City of Kapolei, etc.). The remainder of Oahu was combined to form several large zones (Waianae Coast, Fort Weaver Road, Waipahu, etc.).
2. The compressed OMPO trip origin-destination data for the morning and afternoon commute periods was used to develop an initial set of percentages trip distributions between each subarea within the Interchange study area and each of roadways entering the Interchange study area.
3. The TRAFFIX model was used to assign traffic to the area roadways using the trip distributions.
4. The OMPO forecast 2030 morning and afternoon traffic across the East and West screenlines was converted from commute period data to peak hour estimates using recent traffic count data for the H-1 Freeway east of Makakilo Interchange and the Farrington Highway at Kahe Point.
5. The TRAFFIX model forecasts of peak hour traffic across each screenline were compared to the OMPO screenline totals. The trip distributions used in the TRAFFIX model were then adjusted as appropriate to better reflect the OMPO forecasts.

⁶ *Trip Generation, Sixth Edition*. Institute of Transportation Engineers, 1997.

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The initial TRAFFIX model run produced forecasts between 5% and 10% high at the East Screenline and between 5% and 15% low at the West Screenline. The distribution was revised to the values presented in Appendix E. The comparison of the resultant final TRAFFIX model forecasts to the OMPO preliminary forecasts are summarized in Table 3-1.

2030 Peak Hour Traffic Volumes

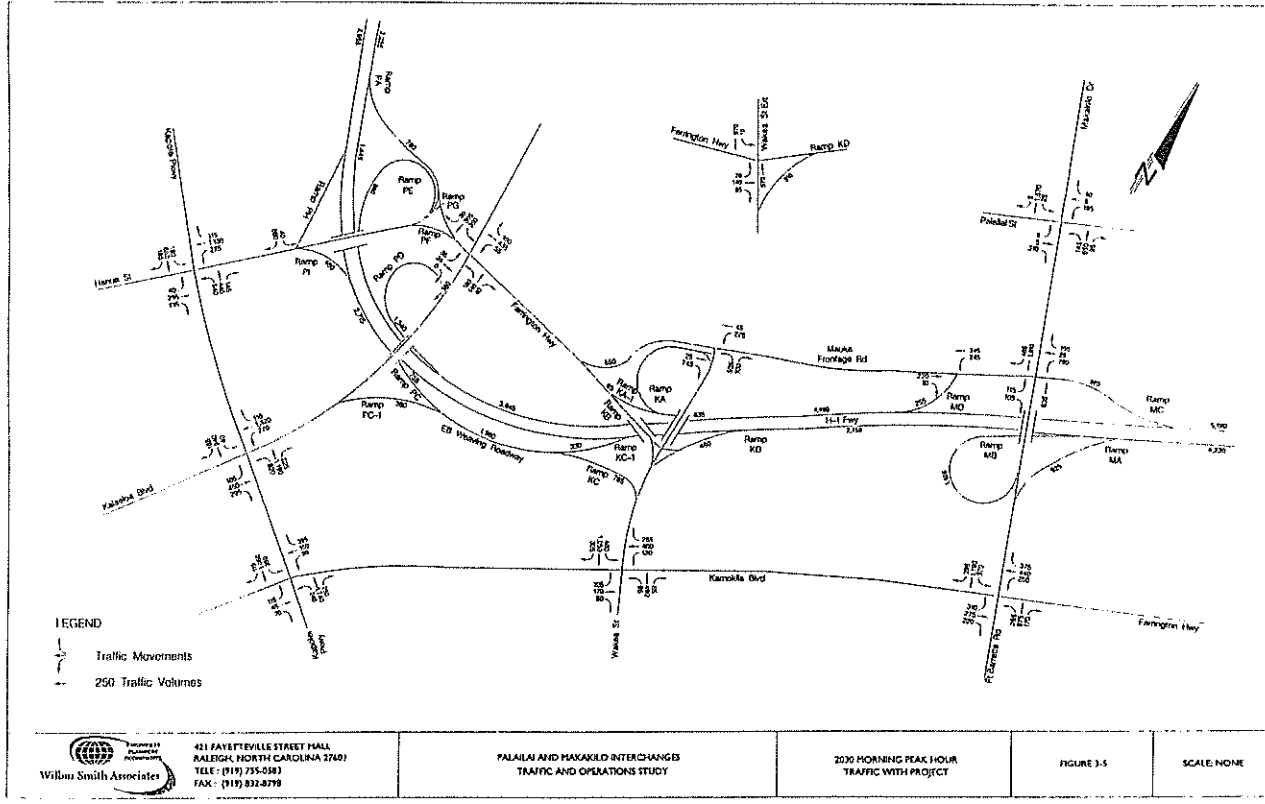
The forecast 2030 weekday traffic volumes with the Project are depicted in Figures 3-5 and 3-6 for the morning and afternoon peak traffic hours, respectively.

A morning peak hour volume of approximately 9,420 vehicles is forecast for the H-1 Freeway at the east end of the Project Area. This amounts to an increase of 63% increase over 2005 traffic volumes, or an average annual growth rate of about 2.1%. The afternoon peak hour volume east of the Makakilo Interchange is forecast at 11,390 vehicles for a 65% increase from 2005.

Table 3-1
COMPARISON OF 2030 TRAFFIX MODEL AND OMPO ISLAND-WIDE MODEL
FORECASTS FOR THE STUDY CORRIDOR

Screenline	Travel Direction	OMPO Island-Wide Forecasts	TRAFFIX Model Forecasts	Difference of TRAFFIX From OMPO	
				Volume	Percent
Morning Peak Hour					
East	Eastbound	7,138	7,081	-57	-0.8
	Westbound	7,945	8,282	+337	+4.2
	Combined	15,083	15,363	+280	+1.9
West	Eastbound	2,519	2,379	-140	-5.5
	Westbound	1,918	1,920	+2	0.0
	Combined	4,437	4,299	-138	-3.1
Afternoon Peak Hour					
East	Eastbound	8,480	8,829	+349	+4.1
	Westbound	8,196	8,296	+100	+1.2
	Combined	16,676	17,125	+449	+2.7
West	Eastbound	2,118	2,127	+9	+0.4
	Westbound	3,091	3,110	+19	+0.6
	Combined	5,209	5,237	+28	+0.5

Wilbur Smith Associates; November 30, 2005.



The 2030 peak hour traffic volumes on westbound On-ramp MD are similar to the estimated use in 2010, with 255 and 110 vehicles in the morning and afternoon peak hours, respectively. The small morning increase and afternoon decrease from the 2010 traffic volumes reflect diversion of some traffic to other new roadway connections, such as the connection of the southwest Makakilo community to Kalaeloa Boulevard as part of the Makaiwa Hills development and the connection of the Mauka Frontage Road to Kalaeloa Boulevard. These volumes reflect no left turn from northbound Makakilo Drive to access the ramp. If the left turn were to be allowed, the Ramp MD volumes would increase approximately 150 and 200 vehicles in the morning and afternoon peak hours, respectively.

The full development of the City of Kapolei results in higher usage levels on the Phase 1 On-ramp KD as compared to the 2010 forecasts. Traffic is projected as 460 and 905 vehicles in the morning and afternoon peak hours, respectively.

With the provision of the Wakea Street overpass, the traffic volumes forecast for westbound Off-ramp KA would be substantially higher than in 2010. In the morning peak hour, about 835 vehicles are estimated to exit the freeway via Ramp KA with most of these traveling to areas south of the freeway. About 690 vehicles are estimated to use the off-ramp in the afternoon peak hour.

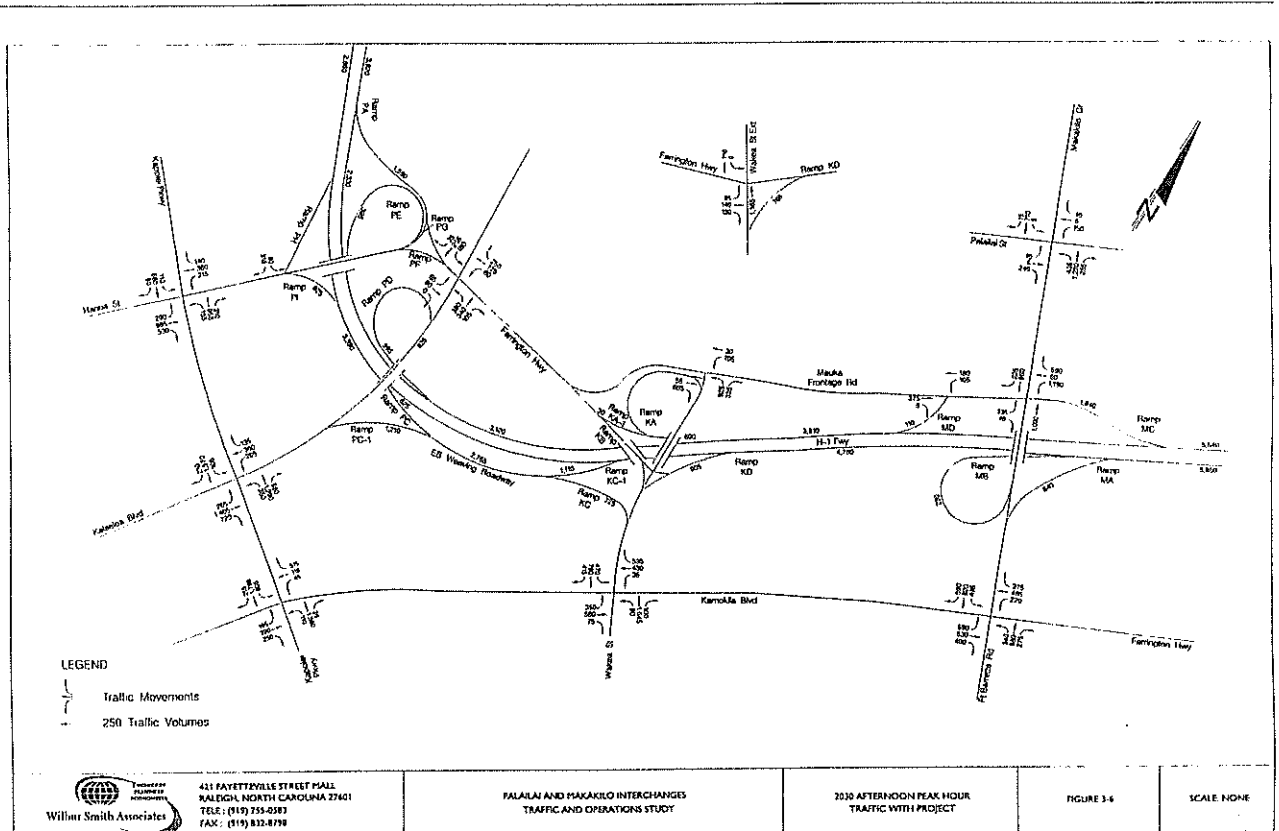
The construction of the Wakea Street overpass to connect to the Mauka Frontage Road would allow this route to be used for travel between Makakilo and the City of Kapolei area. About 300 to 400 vehicles are forecast to use the overpass in each peak hour to travel to/from Makakilo.

The added On-ramp PI from Hanua Street to the eastbound freeway is forecast for use by 460 and 925 vehicles in the morning and afternoon peak hours, respectively. Coupled with On-ramp KC-1 from Kalaeloa Boulevard, these two ramps accommodate a total of 2,035 vehicles entering the eastbound freeway in the afternoon peak hour.

The new westbound loop Off-ramp PE is estimated to attract use by 860 and 395 vehicles in the morning and afternoon peak hours, respectively.

Makakilo Interchange ramps MA, MB, and MC are forecast with peak hour volumes similar to or less than the 2005 volumes. The small increase or decrease would largely result from the diversion of traffic to the Makakilo Drive connection to the H-1 Freeway at the North-South Road Interchange.

The forecast traffic volumes on Ramp KC-1 are similar to 2005 volumes. New eastbound On-ramps KD (Wakea Street) and PI (Hanua Street) attract much of the traffic entering the eastbound freeway.



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PALAILAI AND MAKAKILO INTERCHANGES
 TRAFFIC AND OPERATIONS STUDY

2030 AFTERNOON PEAK HOUR
 TRAFFIC WITH PROJECT

FIGURE 3-4

SCALE: NONE



Chapter 4 FREEWAY AND RAMP OPERATIONAL ANALYSES

Traffic conditions were analyzed for the freeway mainline lanes and the planned ramps based on the preliminary plans described in *I-H1 Addition and Modification of Highway Accesses, Palailai Interchange/Makakilo Interchange*.¹ The roadway plans have been revised to reflect the following modifications:

- The planned off-ramp from the eastbound H-1 Freeway to Makakilo Drive (Ramp ME) was not included in the current plan and analyses due to potential disruption to traffic flow along Makakilo Drive given the short spacing from the intersection with Farrington Highway.
- An on-ramp was added from northbound Hanua Street to the eastbound H-1 Freeway (Ramp PJ) to attract more traffic use of Hanua Street and to reduce the traffic volumes using the eastbound weaving section between Kalaeloa Boulevard and Wakea Street Extension. Other traffic studies since 1994 had indicated that Kalaeloa Boulevard and its connection to the eastbound H-1 Freeway would be overloaded while Hanua Street Extension would be potentially underutilized without a Hanua Street connection to eastbound H-1 Freeway.
- The existing off-ramp from the H-1 Freeway to Kalaeloa Boulevard (Ramp PB) was eliminated to allow the new eastbound on-ramp (Ramp PJ) to be provided from Hanua Street Extension. A new off-ramp (Ramp PH) is planned from eastbound H-1 Freeway to Hanua Street Extension to accommodate this movement.

A CORSIM simulation model and analysis was the primary tool used to assess traffic conditions with the planned modifications to the freeway facilities and identify potential problem areas. Highway Capacity Software (HCS) was also used to assess the freeway mainline and ramp traffic conditions.

ANALYSIS METHODOLOGY AND ASSUMPTIONS

The general methodology and assumptions used in the analysis of traffic conditions with the Palailai and Makakilo Interchange Project are outlined in the following sections.

Analysis Methodology

Each element of the freeway system in the Palailai and Makakilo Interchange areas was individually analyzed using the appropriate Highway Capacity Software 2000 (HCS 2000)

¹ *I-H1 Addition and Modification of Highway Accesses, Palailai Interchange/Makakilo Interchange, Revised*, prepared for The Estate of James Campbell by Engineering Concepts, Inc., January 1994.

developed by McTrans Center at the University of Florida. The following elements were included in the assessment:

- Weaving section analyses were made for the existing eastbound weaving roadway between Kalaeloa Boulevard and the Wakea Street area, and for the planned westbound weaving section between the new Makakilo Interchange on-ramp and Kapolei Interchange off-ramp. In addition, a weaving analysis was made for a potential weaving section between the future eastbound Hanua Street On-ramp PI and existing Off-ramp PC to the eastbound weaving roadway in the event the Kalaeloa Boulevard overpass is reconstructed in the future to allow this weaving section.
- Each ramp merge and diverge junction with the freeway was analyzed using the HCS 2000 for ramp junctions. No analysis was made for those locations where a freeway mainline lane was added or terminated at the ramp.
- The forecast peak hour ramp volume was compared to the estimated capacity for the ramp roadway using the approximate capacities listed in Table 25-3 of the *Highway Capacity Manual 2000*.²
- Although the traffic conditions in the freeway mainline lanes within the Project area are reflected in the ramp junction and weaving analysis, a separate assessment was made of the mainline lanes to the east and west of the Project away from the influence area of the ramps. This analysis was made for comparative purposes and does not directly affect the Interchange Project.

The general criteria for the level of service (LOS) for each of the freeway elements are described in Appendix A.

To provide a more comprehensive assessment of the overall freeway interchange traffic operations through the Project area, a corridor traffic simulation model – the CORSIM model element of the Traffic System Integrated Software (TSIS) by McTrans Center – was prepared for the area from several thousand feet east of the Makakilo Interchange to several thousand feet west of the Palailai Interchange. The CORSIM model provides a visual representation of the traffic operations in the area including the slowing or queuing of traffic as a result of traffic density and/or maneuvers. The CORSIM model also provides traffic densities for use in evaluating traffic conditions and the location of potential problem locations. The CORSIM model was run for a series of 10 runs each for the 2030 morning and afternoon peak hour volumes, with the average of the 10 model runs presented herein for use in the assessment.

Roadway Plan for Analysis

The roadway ramps and configurations analyzed with year 2030 traffic generally conformed to those proposed by the 1994 I-H-1 Addition and Modification study report. The key changes from the interchange concept in that report are summarized in the following paragraphs.

² *Highway Capacity Manual 2000*, Transportation Research Board, 2000.

Westbound off-ramp to Makakilo Drive (Ramp ME) – This ramp was not included in the plan analyzed for 2030 due to concerns with the limited spacing (250 feet) from the signal-controlled intersection with Farrington Highway/Fort Barrette Road. At present, the queue of southbound traffic stopped at the Farrington Highway signal typically stacks well beyond the location of the ramp connection with Makakilo Drive. Traffic exiting this ramp would have extreme difficulty in exiting onto Makakilo Drive. Also, the installation of a traffic signal at the Ramp ME intersection with Makakilo Drive would pose coordination problems with the adjacent signal and would worsen the conditions at the Makakilo Drive-Farrington Highway intersection. Therefore, the initial traffic assessment was made without the ramp to assess whether the other ramps and intersections could accommodate the forecast area traffic demands without this ramp.

Eastbound On-Ramp from Hanua Street Extension (Ramp PI) – The preceding plan did not include an on-ramp from the future Hanua Street Extension to the eastbound H-1 Freeway. Several other recent traffic studies for the Kapolei West development area had indicated that the Kalaeloa Boulevard and its connection to the eastbound H-1 Freeway would likely be overloaded in the future as a result of traffic generated by the increased activity in the industrial and harbor areas south of the H-1 Freeway. The Hanua Street Extension would be potentially underutilized by future traffic without the connection of Hanua Street to the eastbound H-1 Freeway.

Therefore an on-ramp has been added to the plans for the Palailai Interchange connecting northbound Hanua Street to the eastbound H-1 Freeway (Ramp PI) to attract more traffic use of Hanua Street, and to reduce the traffic volumes using the eastbound weaving roadway between Kalaeloa Boulevard and the Waikea Street extension.

Eastbound Off-Ramp to Kalaeloa Boulevard and Hanua Street Extension – The distance between the planned Hanua Street extension and Kalaeloa Boulevard would not provide sufficient distance to accommodate both the new Hanua Street on-ramp (Ramp PI) and the existing off-ramp from the H-1 Freeway to Kalaeloa Boulevard (Ramp PB). Therefore, Ramp PB was eliminated to allow the new eastbound Ramp PI to be provided from Hanua Street. A new off-ramp (Ramp PH) is planned from eastbound H-1 Freeway to the Hanua Street extension to accommodate this movement.

FREEWAY RAMP ROADWAY CAPACITY ASSESSMENT

A planning-level assessment was initially made of the peak hour volumes forecast to use each on- or off-ramp versus the potential capacity of the ramp roadway. This assessment does not reflect any constraints at the ramp junctions with the freeway or street system, which are addressed in other sections of this chapter or in Chapter 5.

The ramp roadway capacity is primarily related to the level of free flow speed that can be accommodated on the ramp. The higher speeds can accommodate up to about 2,200 passenger cars per hour for a single-lane ramp. The criteria are outlined in Appendix A. The estimated free-flow speeds, potential capacity, and forecast volumes are summarized in Table 4-1. Note

that these are approximate values since the capacities have not been adjusted to reflect the mix of vehicle types.

Table 4-1
2030 FREEWAY RAMP CAPACITY USAGE

Ramp and Diagram Symbol ()	Free-flow Speed (mph)	Estimated Capacity (veh/hr)	Peak Hour	Peak Hour Volume	Capacity Used (%)
Eastbound Ramps					
Off-ramp to Hanua St. (PH)	45	2,100	AM	700	33
On-ramp from Hanua St. (PI)	45	2,100	AM	400	19
			PM	460	22
			PM	930	45
Off-ramp to EB Weaving Section and Waikea St. (PC)	45	2,100	AM	750	36
			PM	630	30
Ramp NB Kalaeloa Blvd. to Weaving Section (PC-1)	45	4,100	AM	360	9
			PM	1,210	29
On-ramp from EB Weaving Section to Fwy. (KC-1)	45	2,100	AM	330	16
			PM	1,110	53
Ramp from EB Weaving Section to Waikea St. (KC)	30	2,000	AM	790	40
			PM	730	37
On-ramp from Waikea St. & Farrington Hwy. (KD)	25	1,800	AM	450	25
			PM	910	51
Loop On-ramp from SB Makakilo Dr. (MB)	25	1,800	AM	560	31
			PM	230	13
On-ramp from NB Makakilo Dr. (MA)	45	2,100	AM	920	44
			PM	840	40
Westbound					
Off-ramp to Makakilo Dr. (MC)	45	4,100	AM	970	24
			PM	1,830	45
On-ramp from Mauka Frontage Rd. (MD)	25	1,800	AM	250	14
			PM	110	6
Loop Off-ramp to Waikea St. & Mauka Frontage Rd. (KA)	25	1,800	AM	830	47
			PM	660	37
Loop Off-ramp to Kalaeloa Blvd. (PD)	25	1,800	AM	1,340	75
			PM	400	22
Loop Off-ramp to Hanua St. (PE)	25	1,800	AM	850	47
			PM	400	22
On-ramp from Farrington Hwy. & Hanua St. (PA)	45	2,100	AM	780	37
			PM	1,590	76

Wilbur Smith Associates: November 14, 2005

The forecast 2030 peak hour volumes on most of the ramps amount to about 50% or less of the potential capacity of the ramp roadway. Those ramps with the highest capacity usage include:

Westbound On-ramp PA from Kalaeloa Boulevard/ Hanua Street/Farrington Highway	76%
Westbound Loop Off-ramp PD to Kalaeloa Boulevard	75%
Eastbound On-ramp KC-1 from Weaving Roadway	53%
Eastbound On-ramp KD from Wakea Street	51%

The ramps with volumes at these comparatively higher levels of capacity usage were closely examined in the other analyses regarding the potential operational conditions.

HCS ANALYSIS OF RAMP JUNCTIONS AND WEAVING SECTIONS

The general methodology and criteria used in analysis of traffic conditions at the ramp merges or diverge sections with the freeway mainline lanes, and with weaving sections, are summarized in Appendix A.

Weaving Sections

A weaving analysis was made for the existing Eastbound Weaving Roadway between Kalaeloa Boulevard and Wakea Street as well as a planned new weaving section and a potential future weaving section, with the results summarized in Table 4-2.

Eastbound Weaving Roadway between Kalaeloa Boulevard and Wakea Street – The HCS weaving analysis has limited applicability for collector-distributor roadways. The assessment was made to indicate the likely level of conditions along the 1,200-foot long, three-lane weaving section for the single-lane exit from the freeway (Ramp PC) and the two-lane ramp from Kalaeloa Boulevard (Ramp PC-1). The off-ramp traffic must cross through the Kalaeloa Boulevard traffic to reach the lanes exiting to Wakea Street while almost all of the Kalaeloa Boulevard traffic must weave through the off-ramp traffic to access the lane exiting the weaving roadway onto the eastbound freeway.

The resulting traffic density indicates that the weaving section should provide very acceptable LOS B conditions in the morning peak hour. The much higher weaving volumes in the afternoon period are projected to operate at LOS D conditions. However, the afternoon weaving volume amount to about 47% of capacity. The HCS 2000 warns that three-lane weaving sections with volume-to-capacity ratios of 0.45 or greater may encounter operational problems due to the limited usefulness of the third lane. Observation of the CORSIM simulation of afternoon traffic in this weaving section confirms this potential limitation as the Kalaeloa Boulevard ramp traffic slows and platoons while merging into the outside lane with the traffic exiting the freeway. The

estimated 2030 afternoon peak hour traffic using the weaving section is likely near the maximum volume levels that could be accommodated by the weaving section without substantial degradation of traffic operations in the weaving roadway. As operations worsen in the weaving section with increased traffic growth, traffic that otherwise would use Ramps PC or KC-1 may divert to other ramps:

- More of the vehicles wanting to access eastbound H-1 Freeway may instead use Hanua Street and the Hanua Street On-ramp PI or Wakea Street and On-ramp KD, which may worsen conditions at these ramps in the future.
- More of the vehicles exiting the eastbound freeway to access the City of Kapolei and Villages of Kapolei may instead use Ramp PH to Hanua Street instead of Ramp PC.

The weaving section could not be lengthened without major expense given the location and horizontal clearance beneath the existing Kalaeloa and Farrington overpasses. Potential roadway modifications to address any degraded operations in the eastbound weaving roadway could include the following:

- Reconstruct Ramp PC-1 to cross above the Off-ramp PC to avoid the weaving conflict.
- Construct the eastbound Off-ramp ME to Makakilo Drive to divert some of the traffic that would otherwise use the eastbound Off-ramp PC to the Weaving Roadway.

Table 4-2
2030 WEAVING SECTION TRAFFIC CONDITIONS

Peak Hour	Average Speed (mph)		Density (v/plph)	Level of Service	
	All Traffic	Weaving			
Eastbound Separate Weaving Roadway Kalaeloa Blvd.-Wakea St. (Existing)					
Morning	27.4	40.4	27.1	15.2	B
Afternoon	24.3	35.7	23.8	28.5	D
Westbound Weaving Lane Makakilo Dr./Mauka Frontage Rd. to Wakea St. (Planned)					
Morning	44.7	51.8	31.4	28.1	D
Afternoon	48.7	50.3	43.3	22.0	C
Eastbound Weaving Lane Hanua St.-Off-ramp to EB Weaving Roadway (Potential)					
Morning	37.2	48.3	28.8	27.7	C
Afternoon	34.3	45.3	26.7	37.4	E
V/plph = vehicles per lane per hour					
Wilbur Smith Associates; November 11, 2005					

- Widen the eastbound freeway to three lanes west of or at the junction of the Hanua Street On-ramp PI junction with the freeway to reduce the traffic densities in the freeway lanes at that junction and increase the number of vehicles that can merge into the freeway from that ramp.

Westbound Weaving Lane from Makakilo Drive On-ramp to Wakea Street Off-ramp – This section of the freeway is projected to operate at LOS D in the morning peak hour when there are higher volumes of traffic using both of the planned new ramps. Freeway traffic speeds would approximate 52 mph, or slightly below the speed limit in the morning peak hour. Afternoon peak hour conditions would be at acceptable levels.

Eastbound Weaving Lane from Hanua Street On-ramp to Off-ramp to Weaving Roadway This potential future weaving lane would operate at acceptable levels with the low level of traffic using the Hanua Street On-ramp in the morning peak hour. However, the much higher levels of traffic in the afternoon peak hour would result in LOS E conditions. Average speed in the adjacent freeway lanes near the weaving lane would decline to about 45 mph with the forecast afternoon peak hour volumes.

The traffic conditions could be improved to LOS D or better for this potential future weaving section if either one additional through (non-weaving) lane is added to the eastbound freeway through this section or the length of the weaving section is increased to 1,700 feet or more. The planned location of Hanua Street would preclude the extension of the weaving lane by this amount.

Ramp Junctions

Each on-ramp merge or off-ramp diverge area along the freeway was analyzed using HCS 2000, with the results summarized in Table 4-3. Eastbound On-ramp KC-1 from the Eastbound Weaving Roadway and westbound Off-ramp PD to Kalaeloa Boulevard are not included in the analysis since freeway through lanes are added or reduced via these ramps.

The HCS analysis estimates the average vehicle density and travel speeds along the 1,500-foot section of freeway through lanes affected by traffic entering or exiting the freeway, with the density also used to identify the level of service within this ramp influence area along the freeway mainline. The analysis is made for the two outside lanes that are most directly affected by the traffic entering/exiting the ramps and, for sections with three or more through freeway lanes, the conditions in the other lanes that are less affected by the ramp traffic.

In the morning peak hour, LOS D is estimated for the merge area of the on-ramp from northbound Makakilo Drive (MA). LOS C or better conditions are projected for each of the other ramp merge/diverge areas in the Project area.

Table 4-3
TRAFFIC CONDITIONS ALONG FREEWAY
AT RAMP MERGE AND DIVERGE AREAS

Ramp Junction	Peak Hour	Average Speed (mph)		Traffic Density (vplph)	Level of Service
		Near Ramp	Other Lanes		
Eastbound Freeway					
Off-ramp PH to Hanua St.	AM	50.2	NA	30.1	D
	PM	50.6	NA	29.2	D
On-ramp PI from Hanua St.	AM	50.7	NA	24.3	C
	PM	49.4	NA	29.9	D
Off-ramp PC To Wakea St.	AM	50.1	NA	23.4	C
Via EB Weaving Roadway	PM	50.3	NA	31.0	D
On-ramp KD	AM	50.1	51.7	18.0	B
	PM	49.6	49.8	29.9	D
From Wakea St.	AM	55.6	57.4	29.2	D
On-ramp MA from NB Makakilo Dr.	PM	51.8	53.9	37.2	E
Westbound Freeway					
Off-ramp MC to Makakilo Dr.	AM	55.9	59.7	10.3	B
	PM	53.9	57.9	16.4	B
Off-ramp PE to Hanua St.	AM	50.0	NA	26.5	C
	PM	50.6	NA	30.6	D
On-ramp PA from Kalaeloa Blvd. & Hanua St.	AM	50.8	NA	21.4	C
	PM	47.0	NA	36.3	E

Wilbur Smith Associates; November 15, 2005

In the afternoon peak hour, the conditions at the freeway entry area for the relocated westbound On-ramp PA from Kalaeloa/Hanua/Farrington is projected at LOS E. These conditions would result from the combined effects of a high volume of traffic entering from the ramp (1,590 vehicles) and moderate volume levels in the two freeway through lanes. Conditions would be improved to LOS C if the freeway is widened by one through lane in each direction in the future. Merge area conditions could be improved to LOS D if an acceleration lane of 800 feet or more is provided for the ramp entry to the freeway.

Also in the afternoon peak hour, LOS E traffic conditions are projected for the existing entry area for eastbound On-ramp MA from northbound Makakilo Drive, which is not affected by the



Project. Conditions could be improved to LOS D by provision of an acceleration lane with length of 800 feet or longer.

FREEWAY MAINLINE LANES EAST AND WEST OF PROJECT AREA

The conditions along the freeway through lanes to the east and west of the Project area are summarized in Table 4-4 as projected using the HCS software. The HCS results are presented to provide a comparison to the existing and 2010 level of service conditions as the methodology is less sensitive to estimating speed results than is the CORSIM model, which is discussed later in this chapter.

The analysis indicates that the freeway section east of the Project is projected to operate at LOS D or better conditions, except for the eastbound direction in the afternoon peak hour. The eastbound traffic densities are projected at LOS E with an estimated average speed reduction to about 58 mph based on the HCS methodology.

The freeway section west of the Project area is projected to operate at LOS D or better in each direction in both peak hours, with speeds approximating the speed limit.

**Table 4-4
2030 FREEWAY MAINLINE CONDITIONS
EAST AND WEST OF PROJECT AREA**

Peak Hour	Direction	Traffic Volume	Lanes	Density (vp/hpl)	Speed (mph)	Level of Service
East of Makakilo Interchange Area						
Morning	Eastbound	4,230	3	24.2	62.0	C
	Westbound	5,190	3	30.1	61.1	D
Afternoon	Eastbound	5,850	3	35.7	58.1	E
	Westbound	5,540	3	32.8	59.9	D
West of Palailai Interchange Area						
Morning	Eastbound	2,955	2	28.3	55.5	D
	Westbound	2,225	2	21.3	55.5	C
Afternoon	Eastbound	2,860	2	27.4	55.5	D
	Westbound	3,920	2	38.9	53.6	E
vp/hpl = vehicles per hour per lane						
mph = miles per hour						
Wilbur Smith Associates; December 10, 2005.						



CORSIM ANALYSIS OF FREEWAY MAINLINE AND RAMP MERGE/DIVERGE AREAS

The TSIS/CORSIM simulation model was used to analyze the traffic conditions along the freeway through the Project area, with the model assessing traffic conditions for each ramp, for the ramp merge-diverge areas, and for the sections of the freeway between the ramps. Ten model runs were made for the Project during both the morning and afternoon peak traffic hours. An average of the traffic densities and speeds were calculated from the results of the individual model simulation runs.

The simulation model was also reviewed to observe traffic flow through the Project area and assist in identifying/confirming potential operational problems with the planned interchange configurations and features.

Morning Peak Hour

The CORSIM model estimates of traffic densities and travel speeds, and the service levels reflective of these estimates are summarized for the morning peak hour in Tables 4-5 (eastbound travel direction) and 4-6 (westbound travel direction). The results are presented for each ramp, for the freeway at the ramp merge or diverge areas, and for the sections of the freeway through lanes between the ramps.

The CORSIM model indicates that the forecast 2030 morning peak hour traffic should operate at LOS C or better conditions on most sections of the freeway and ramps within the Project area.

LOS E conditions are indicated on the westbound Loop Off-ramp PD to Kalaeloa Boulevard. The high volume of traffic using this ramp would experience slowing speeds. Both the westbound off-ramps to Farrington Highway/Wakea Street (KA) and to Hanua Street are forecast with LOS C or better conditions. Therefore, a portion of the traffic forecast to use Ramp PD may choose to use these alternative ramp connections.

The section of the westbound freeway between the Makakilo Off-ramp MC and On-ramp MD is forecast with densities just high enough to be classified as LOS D conditions.

Although not listed in the tables, the simulation indicated a potential congestion problem at the merge of the Westbound Loop Off-ramp PD junction with southbound Kalaeloa Boulevard. At present, the single lane of southbound traffic on Kalaeloa Boulevard is controlled by a YIELD sign at the junction with the off-ramp so that the much higher volume of ramp traffic is allowed continuous flow onto the single southbound lane. With the higher volumes of both Kalaeloa southbound through traffic and off-ramp traffic in 2030, the queue of southbound traffic stopped to yield to the ramp traffic would extend back to and disrupt operations at the Kalaeloa Boulevard intersection with Farrington Highway through much of the peak traffic hour. Separate southbound lanes would be needed for the southbound Kalaeloa through traffic and for the off-ramp traffic to avoid the queuing problem.



Table 4-5
CORSIM ANALYSIS OF EASTBOUND FREEWAY CONDITIONS
2030 MORNING PEAK HOUR

Section of Freeway or Ramp Entry/Exit	Section Type	Peak Hour Traffic		Speed (mph)	Level of Service
		Volume	Density		
Mainline west of Project	Basic	2,980	28.5	52.3	D
Mainline & Decel Lane at Hanua Off-ramp (PH)	Diverge	2,980	23.5	51.7	C
EB Off-ramp to SB Hanua St. (PH)	Off-ramp	710	18.4	38.3	C
Mainline between Hanua St. Off-ramp (PH) & on-ramp (PI)	Basic	2,280	22.0	51.9	C
EB On-ramp from Hanua St. (PI)	On-ramp	460	10.8	42.0	A
Mainline from Hanua St. On-ramp (PI) & EB Weaving (PC)	Basic	2,740	20.4	49.9	C
Mainline at entry to Off-ramp (PC) to EB Weaving Section	Diverge	2,740	22.0	51.2	C
Mainline parallel to EB Weaving Section	Basic	1,980	18.3	52.7	C
On-ramp (KC-1 from EB Weaving Section	On-ramp	330	9.2	36.3	A
Mainline under Wakea Overpass beginning of 3-lane section	Basic	2,310	14.6	51.6	B
On-ramp from Wakea St. (KD)	On-ramp	440	17.5	30.7	B
Mainline & Acel lane at entry from Wakea St. On-ramp (KD)	Merge	2,760	13.8	50.7	B
Mainline from Wakea On-ramp to Makakilo Loop On-Ramp	Basic	2,760	16.9	53.2	B
Loop On-ramp (MB) from SB Makakilo Dr.	On-ramp	555	22.4	32.1	C
On-ramp (MA) from NB Makakilo Dr.	On-ramp	930	19.1	48.6	C
Mainline at entry from On-ramp MA	Merge	3,330	19.6	51.9	B
Mainline east of Project	Basic 3-Ln.	4,230	26.0	51.7	B

Wilbur Smith Associates; December 27, 2005



Table 4-6
CORSIM ANALYSIS OF WESTBOUND FREEWAY CONDITIONS
2030 MORNING PEAK HOUR

Section of Freeway or Ramp Entry/Exit	Section Type	Peak Hour Traffic		Speed (mph)	Level of Service
		Volume	Density		
Mainline east of Project	Basic 3-Ln.	5,190	33.5	52.0	D
Mainline at Decel Lane to Off-ramp to Makakilo Dr. (MC)	Diverge	5,190	25.3	51.9	C
Two-lane entry to Off-ramp to Makakilo Dr. (MC)	2-Lane Off-ramp	965	10.8	44.2	A
Mainline from Makakilo Off-ramp (MC) to On-ramp (MD)	Basic 3-Ln.	4,230	27.1	52.0	D
On-ramp (MD) from Mauka Frontage Rd.	On-ramp	260	6.8	36.6	A
Mainline from Makakilo On-ramp MD to Off-ramp KA to Wakea St./Farrington Hwy..	Weave with Basic 3-Ln.	4,480	21.5	52.1	C
Off-ramp KA to Wakea St. & Farrington Hwy.	Off-ramp	840	19.8	43.0	C
Mainline beneath Farrington Hwy. Bridge	Basic 3-Ln.	3,650	23.3	51.7	C
Mainline at entry to Loop Off-ramp to Kalaeloa (PD)	Diverge	3,650	23.8	50.6	C
Loop Off-ramp PD to SB Kalaeloa Blvd.	Off-ramp	1,340	36.7	36.6	E
Mainline at Decel Lane to Loop Off-ramp PE to SB Hanua St.	Diverge	2,280	19.4	51.2	B
Loop Off-ramp PE to SB Hanua St.	Off-ramp	850	9.7	43.7	A
Mainline from Hanua Off-ramp PE to On-ramp PA	Basic 2-Ln.	1,450	14.0	51.1	B
Single-lane section of On-ramp PA from Kalaeloa Blvd.	On-ramp	780	19.5	42.0	C
Mainline Accel. Lane from On-Ramp PA	Merge	2,230	17.9	46.9	B
Mainline west of Project	Basic 2-Ln.	2,230	21.4	52.6	C

Density is average vehicles per lane per mile during peak hour.

Wilbur Smith Associates; December 27, 2005



Afternoon Peak Hour

The CORSIM model estimates of traffic densities and travel speeds, and the service levels reflective of these estimates are summarized for the afternoon peak hour in Tables 4-7 (eastbound travel direction) and 4-8 (westbound travel direction). The results are presented for each ramp, for the freeway at the ramp merge or diverge areas, and for the sections of the freeway through lanes between the ramps.

The traffic condition on Ramp KD from Wakea Street onto the eastbound freeway is projected at LOS E with the forecast afternoon peak hour volumes. The apparent problem is the merge on the ramp between the westbound traffic entering from Farrington Highway and the traffic entering from northbound Wakea Street. A short two-lane section may be needed to facilitate this merge of the two traffic flows. Otherwise, the higher-volume northbound free flow traffic may have to be controlled by a yield sign, or that movement controlled by the traffic signal at the intersection of Farrington Highway and Wakea Street.

In the westbound direction, LOS E conditions are indicated west of Hanua Street for the both the single lane section of On-ramp PA and the merge of the ramp into the westbound freeway lanes. The merge into the freeway could be improved by the extension of the acceleration lane as discussed in the HCS analysis of the ramp junctions, or by merging the lane as an additional third westbound through lane. The potential merge problem within the on-ramp could be mitigated if the two-lane ramp section were continued to the merge with the freeway, which would function best if the section of the westbound freeway west of the junction is widened to continue one of the ramp lanes as a westbound mainline lane.

POTENTIAL MITIGATIVE ACTIONS

Proposed modifications and mitigative actions to address the potential traffic problems identified through the analysis are as follows:

- For eastbound On-ramp KD, provide as long a two-lane merge section as possible to accommodate the merge of the traffic from northbound Wakea Street and eastbound Farrington Highway.
- Allow horizontal clearance for future widening of the eastbound H-1 Freeway to three lanes beneath the Hanua Street overpass.
- Any future reconstruction of the 30-year old Kalaheoa Boulevard overpass should include clearance to provide an increased deceleration lane or weave section for the Off-ramp PC exit to the eastbound weaving roadway.

Table 4-7
CORSIM ANALYSIS OF EASTBOUND FREEWAY CONDITIONS
2030 AFTERNOON PEAK HOUR

Section of Freeway or Ramp Entry/Exit	Section Type	Peak Hour Traffic		Speed (mph)	Level of Service
		Volume	Density		
Mainline west of Project	Basic 2-Ln.	2,880	27.5	52.3	D
Mainline & Decel Lane at Hanua Off-ramp (PH)	Diverge	2,880	22.6	51.9	C
EB Off-ramp to SB Hanua St. (PH)	Off-ramp	400	10.1	40.1	A
Mainline between Hanua St. Off-ramp (PH) & on-ramp (PI)	Basic 2 Ln.	2,480	23.9	51.7	C
EB On-ramp from Hanua St. (PI)	On-ramp	930	22.2	41.5	C
Mainline from Hanua St. On-ramp (PD) & EB Weaving (PC)	Basic 2-Ln.	3,400	28.0	45.1	D
Mainline at entry to Off-ramp (PC) to EB Weaving Section	Diverge	3,400	28.0	49.9	C
Mainline parallel to EB Weaving Section	Basic 2-Ln.	2,780	25.9	51.7	C
On-ramp (KC-1) from EB Weaving Section	On-ramp	1,110	38.2	31.5	E
Mainline under Wakea Overpass beginning of 3-lane section	Basic 3-Ln.	3,880	25.8	48.1	C
On-ramp from Wakea St. (KD)	On-ramp	910	36.7	31.1	E
Mainline & Acel lane at entry from Wakea St. On-ramp (KD)	Merge with 3-Ln.	4,790	25.2	48.0	C
Mainline from Wakea On-ramp to Makakilo Loop On-Ramp	Basic 3-Ln.	4,790	29.8	52.0	D
Loop On-ramp (MB) from SB Makakilo Dr.	On-ramp	250	8.7	32.5	A
On-ramp (MA) from NB Makakilo Dr.	On-ramp	840	16.8	48.7	B
Mainline at entry from on-ramp	Merge with 3-Ln.	4,780	30.4	49.2	D
Mainline east of Project	Basic 3-Ln.	5,850	37.2	49.7	E

Density is average vehicles per lane per mile during peak hour.

Wilbur Smith Associates; December 27, 2005

Table 4-8
CORSIM ANALYSIS OF WESTBOUND FREEWAY CONDITIONS
2030 AFTERNOON PEAK HOUR

Section of Freeway or Ramp Entry/Exit	Section Type	Peak Hour Traffic		Speed (mph)	Level of Service
		Volume	Density		
Mainline east of Project	Basic 3-Ln.	5,540	39.8	46.7	E
Mainline at Decel Lane to Off-ramp to Makakilo Dr. (MC)	Diverge	5,540	27.2	51.4	C
Two-lane entry to Off-ramp to Makakilo Dr. (MC)	2-Lane Off-ramp	1,840	20.9	44.0	C
Mainline from Makakilo Off-ramp (MC) to On-ramp (MD)	Basic 3-Ln.	3,710	23.6	52.2	C
On-ramp (MD) from Mauka Frontage Rd.	On-ramp	110	3.3	36.8	A
Mainline from Makakilo On-ramp MD to Off-ramp KA to Wakea St./Farrington Hwy.	Weave with 3-Ln. Fwy.	3,820	18.2	52.6	B
Off-ramp KA to Wakea St. & Farrington Hwy.	Off-ramp	700	16.2	43.3	B
Mainline beneath Farrington Hwy. Bridge	Basic 3-Ln.	3,120	20.1	52.1	C
Mainline at entry to Loop Off-ramp to Kalaeloa (PD)	Diverge	3,120	20.2	51.8	C
Loop Off-ramp PD to SB Kalaeloa Blvd.	Off-ramp	400	10.0	39.3	A
Mainline at Decel Lane to Loop Off-ramp PE to SB Hanua St.	Diverge	2,720	26.7	51.3	D
Loop Off-ramp PE to SB Hanua St.	Off-ramp	390	4.4	44.3	A
Mainline from Hanua Off-ramp PE to On-ramp PA	Basic 2-Ln.	2,330	29.6	40.1	D
Single-lane section of On-ramp PA from Kalaeloa Blvd.	On-ramp	1,590	39.2	40.5	E
Mainline Accel. Lane from On-Ramp PA	Merge With 2-Ln.	3,930	44.3	33.6	E
Mainline west of Project	Basic 2-Ln.	3,930	39.9	49.1	E

Density is average vehicles per lane per mile during peak hour.

Wilbur Smith Associates; December 27, 2005

- The Kalaeloa Boulevard overpass should be re-stripped to provide two southbound lanes to allow removal of the YIELD sign on the southbound lane of Kalaeloa Boulevard at the junction with Off-ramp PD.
- The acceleration lane for On-ramp PA to the westbound freeway should be extended for a minimum of 800 feet plus taper.



Chapter 5 2030 INTERSECTION ANALYSIS WITH THE PROJECT

The key existing and planned intersections affected by traffic accessing the area via the Kapolei, Palailai, and Makakilo Interchanges were analyzed for the 2030 peak traffic hours. The analysis was used to identify potential problem locations and plan modifications to provide acceptable traffic conditions.

METHODOLOGY AND ASSUMPTIONS

The analysis of the planned roadways was based on the methodology and assumptions summarized in the following paragraphs.

Intersection Lanes and Traffic Controls – The 2030 analysis was based on the roadway lanes and type of intersection controls presented in Figure 3-1. The roadway lanes generally reflect those depicted for the Preferred Alternative in the 1994 study report for the interchange modifications,¹ as modified to reflect the changes in the interchange ramps and the new alignment of the Mauka Frontage Road. Several intersections have also been modified to reflect mitigative actions proposed in traffic studies for developments in the City of Kapolei area since the 1994 report.

Traffic Volumes – The analysis used the weekday commute peak hour traffic volumes as presented in Chapter 3. These traffic volumes reflect the individual developments planned in the City of Kapolei and adjacent areas. The overall level of traffic in the H-1 Freeway corridor has been limited to conform to the general level of traffic growth forecast in the corridor as part of the OMPD long-range planning study now underway, as discussed in Chapter 3.

Analysis Criteria – Locations were identified as potential problems where one or more of the following criteria were exceeded:

- The forecast volume in either 2030 weekday peak hour exceeded 90% of the planned intersection capacity.
- At signal-controlled intersections, the average delay per vehicle for the entire intersection in either peak hour was estimated at LOS E or F. Long delays for individual traffic movements at traffic-signal controlled intersections were not considered to merit mitigative actions as these types of problems should typically be addressed through refinement/modification of the timing plans for the intersection based on actual future traffic counts.

¹ *I-1H Addition and Modification of Highway Accesses, Palailai Interchange/Makakilo Interchange. Revised, prepared for The Estate of James Campbell by Engineering Concepts, Inc., January 1994.*

- For traffic movements controlled by STOP or YIELD signs, the average vehicle delay for the yielding traffic was estimated at LOS F.
- The estimated 95% queue length for a planned storage lane exceeds the proposed length of the storage lane.

Analysis Methodology – The intersection analysis was generally made using the Synchro intersection analysis tool and companion SimTraffic traffic simulation model. The Synchro model is based on the 2000 Highway Capacity Manual Procedures as summarized in Appendix A. The McTrans HCS model was used for several STOP or YIELD sign-controlled intersections where the intersection roadway geometrics did not permit analysis with the Synchro model.

PEAK HOUR CONDITIONS AT KEY INTERSECTIONS

Traffic conditions with the completion of the Project are summarized in Table 5-1 for the key intersections that provide access to the Makakilo, Kapolei, and Palailai Interchanges. The conditions are presented for the 2030 weekday morning and afternoon commute peak hours.

Makakilo Drive-Palailai Street – Although not directly affected by the planned interchange modifications, this intersection was analyzed due to its proximity to the planned new location for the Mauka Frontage Road connection to Makakilo Drive and the Westbound Off-ramp MC. The planned intersection lanes with the proposed new roadway connection to the Palehua East development would provide acceptable conditions with the forecast 2030 peak hour volumes, although the morning peak hour volumes would approximate 90% of the intersection capacity.

Makakilo Drive-Westbound Off-ramp-Mauka Frontage Road – The forecast traffic would amount to about 77-79% of the intersection capacity in each peak hour with the proposed lanes and the addition of the Mauka Frontage Road as the west leg of this intersection. These conditions reflect no left turn from northbound Makakilo Drive onto the Mauka Frontage Road due to the restricted width of the bridge across the H-1 Freeway.

There are currently four southbound lanes and two northbound lanes on the Makakilo Drive across the H-1 overpass south of this intersection. Left turns could potentially be permitted from a single left-turn lane striped from the existing southbound lane adjacent to the center line, which is used as a southbound left-turn lane for turns onto Farrington Highway. Left-turn volumes would approximate 150 to 200 vehicles in each peak hour in 2030. With the left-turn lane, traffic conditions would also be at acceptable levels as follows:

Peak Hour	Volume-to-Capacity Ratio	Ave. Delay Per Vehicle (sec.)	Level of Service
Morning	0.86	21.4	C
Afternoon	0.84	28.7	C

The 2030 traffic forecasts and this analysis reflect the completion of the Makakilo Drive Extension to the H-1 Freeway at the future North-South Road Interchange, and the Mauka Frontage Road connection to the Wakea Street Extension and Kalaehoa Boulevard. Each of these planned roadways diverts a substantial amount of traffic from the through volumes along this section of Makakilo Drive. Therefore the northbound left-turn lane should be implemented after both the Makakilo Drive Extension and Mauka Frontage Road are completed to avoid congested traffic conditions at this intersection.

**Table 5-1
2030 TRAFFIC CONDITIONS AT KEY INTERSECTIONS
WITH PLANNED ROADWAYS**

Intersections	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
	V/C	ADPV LOS	V/C	ADPV LOS
Makakilo Dr./Palailai St.	0.90	32.7 C	0.71	14.3 B
Makakilo Dr./WB H-1 Off-Ramp	0.77	16.1 B	0.79	21.1 C
Farrington Hwy./Makakilo Dr./Fort Barrette Rd.	0.91	36.8 D	0.99	45.3 D
Mauka Frontage Road/WB H-1 On-ramp MD	0.34	12.6 B	0.47	12.6 B
Wakea St. Ext./Mauka Frontage Road	0.51	10.1 C	0.51	8.0 A
Wakea St. Ext./Farrington Hwy./EB H-1 On-ramp	0.46	10.1 B	0.55	8.9 A
Wakea St./Kamokila Blvd	0.64	24.9 C	1.02	50.8 D
Kalaehoa Blvd./Farrington Hwy	0.48	14.8 B	0.69	18.8 B
Kalaehoa Blvd./Kapolei Pkwy.	0.91	63.0 E	0.99	61.6 E
Kapolei Pkwy./Hanua St. Ext.	0.79	30.9 C	0.84	32.9 C
Hanua St./EB H-1 Off-ramp PH	1.39	208.7 F	0.18	14.2 B

V/C = Ratio of the traffic volume to the theoretical capacity of the intersection.
ADPV = Average delay per vehicle, in seconds.
LOS = Level of service.

Wilbur Smith Associates; November 29, 2005.



The queue length of northbound vehicles waiting to turn left would need a stacking lane of at least 200 feet in length to minimize blockage of the northbound through lanes.

The left- and right-turn storage lanes on the Mauka Frontage Road at Makakilo Drive should provide a storage length of about 150 feet to avoid blockage of eastbound traffic accessing and efficiently using the turn lanes.

The analysis indicates that the queue of vehicles waiting to turn left from the Westbound Off-ramp would extend about 480 feet in each of the two left-turn lanes during the afternoon peak hour, versus a storage length of 400 feet for the dual turn lanes. However, there is 300 additional feet of single-lane storage on the ramp for the left-turn lane, which should be sufficient to accommodate the queue at the 95% probability level.

Makakilo Drive-Fort Barrette Road-Farrington Highway – The forecast 2030 volumes are projected at 99% of capacity in the afternoon peak hour with the planned lanes, which could potentially result in congestion and delays at this intersection. Average delays per vehicle are estimated at an acceptable LOS D in both peak hours, with this based on the optimization of signal timing for the traffic in each peak hour. In the afternoon peak hour, the critical conflicting traffic movements contributing to the high level of capacity use are the eastbound left turn and westbound through traffic along Farrington Highway, and the northbound through and southbound left-turn traffic along Makakilo Drive/Fort Barrette Road. Actions were evaluated to increase the capacity for this intersection.

The planned storage lengths for the turn lanes at the intersection would generally be acceptable to accommodate the 2030 peak hour traffic queues. The exceptions would include:

- Southbound right-turn traffic queue (about 400 feet at 95% level), which would likely be blocked from making a right-turn-on-red during a portion of both peak hours.
- Eastbound left-turn queue in afternoon peak hour when the combined queue in the double left-turn lanes would total 560 feet versus about 540 feet of storage at the 95% level. If there is inefficient use of the dual left-turn lanes, the queue could stack into and block the adjacent through lane.

The southbound left-turn queue would average about 225 feet in each of the dual turn lanes at the 95% level, versus a length of 270 feet in the added turn lane and a similar length in the left-turn lane that currently extends back about 1,050 feet to the intersection with the Westbound Off-ramp. Thus there should be adequate length to shorten the southbound turn lane by about 300 feet to provide a northbound left-turn lane at the Mauka Frontage Road to access the Westbound On-ramp.

Westbound On-ramp-Mauka Frontage Road – The analysis was based on STOP sign control of the westbound traffic along the Mauka Frontage Road with free traffic flow onto the



Westbound On-ramp. The westbound through traffic should experience only short delays (LOS B) with the forecast 2030 peak hour volumes in Chapter 3.

A sensitivity analysis was also made with the increased traffic if left turns were to be permitted from northbound Makakilo Drive onto the Mauka Frontage Road to access the on-ramp or development along the road. The eastbound traffic at the STOP sign should also operate at very acceptable delays with the increased westbound traffic (150 to 200 vehicles) as summarized below.

Peak Hour	Volume-to-Capacity Ratio	Ave. Delay Per Vehicle (sec.)	Level of Service
Morning	0.42	15.7	C
Afternoon	0.63	19.2	C

Wakaia Street Extension-Mauka Frontage Road – This intersection would operate at very acceptable conditions with the proposed lanes and traffic signal control.

A sensitivity analysis was also made to test conditions with only a single left-turn lane provided to accommodate the turn from northbound Wakaia Street towards Farrington Highway. The analysis indicates the intersection would also function satisfactorily with the single northbound left-turn lane as summarized below.

Peak Hour	Volume-to-Capacity Ratio	Ave. Delay Per Vehicle (sec.)	Level of Service
Morning	0.69	14.2	B
Afternoon	0.84	23.7	C

The intersection was also tested as a roundabout since the majority of the northbound and westbound traffic turn left at the intersection. Based on HCS analysis, the intersection would not function at acceptable levels as a single-lane roundabout because of the very high level of vehicles turning from northbound Wakaia Street onto westbound Farrington Highway.

Wakaia Street Extension-Farrington Highway – This intersection was initially tested with STOP control on the eastbound through movement from eastbound Farrington Highway onto the Eastbound On-ramp KD. However, the analysis indicated that the eastbound traffic would experience very long average delays with the forecast 2030 traffic volumes. The average delay to the eastbound through traffic was estimated at 11 minutes or more per vehicle in each peak hour.

The analysis with traffic signal control indicated very acceptable intersection conditions in both peak hours (Table 5-1).

Wakaia Street-Kamakila Boulevard – The planned intersection would accommodate the forecast morning peak hour traffic at very acceptable levels. However, the afternoon peak hour traffic is projected to slightly exceed the intersection capacity. The key conflicting traffic movements in the afternoon would be the northbound through traffic and southbound left-turn traffic along Wakaia Street, and the eastbound left turn and westbound through traffic along Kamakila Boulevard. The afternoon conditions would warrant improvement actions.

Additionally, the high volume of left turns on the eastbound Kamakila Boulevard approach in the afternoon peak hour would stack well beyond the existing storage lane and interfere with traffic flow in the adjacent through lane. The estimated queue at the 95% probability level is 369 feet versus an existing storage length of about 125 feet and a total block length of about 300 feet.

Kalaeloa Boulevard-Farrington Highway – Traffic conditions at the Kalaeloa Boulevard intersection with Farrington Highway would be at acceptable levels during both weekday peak hours with the addition of a second Waianae-bound through lane on Farrington Highway through the intersection onto the on-ramp.

Kalaeloa Boulevard-Kapolei Parkway – With both roadways planned for three through lanes in each direction plus right- and left-turn lanes, the forecast traffic in the afternoon peak hour would approximate the intersection capacity. The forecast morning peak hour traffic would amount to a marginally acceptable 91% of the intersection capacity.

The major contributor to these problem levels are the projected volume of traffic turning left from westbound Kapolei Parkway onto southbound Kalaeloa Boulevard in the morning peak hour, and the return traffic from northbound Kalaeloa Boulevard onto eastbound Kapolei Parkway in the afternoon. Construction of a convenient, direct east-west roadway connection through the Kalaeloa Redevelopment Area between the Fort Weaver Road corridor and Kalaeloa Boulevard would attract use by much of the traffic contributing to this problem movement. Such a roadway connection has been proposed by the City and County of Honolulu in the past and is reflected in the recently released Draft Kalaeloa Master Plan through the upgrading and extensions to Saratoga Road to create a boulevard paralleling the Kapolei Parkway through this area. Implementation of this facility may avoid the need to further improve this intersection.

A potential improvement action was considered for the intersection in the event the Saratoga Road facility is not developed or does not divert sufficient traffic from this intersection.

Hanuaa Street Extension-Kapolei Parkway – The planned lanes at the intersection would provide acceptable conditions with the forecast 2030 peak hour volumes.

The forecast volumes of left-turns are at levels that merit consideration of double left-turn lanes on both the northbound and southbound approaches of the future Hanuaa Street Extension.

Hanuaa Street Extension-Eastbound Off-ramp – The relatively low volume of traffic turning left from the off-ramp onto northbound Hanuaa Street would likely experience very long delays in

the morning peak hour due to the high volume of southbound traffic. Even with a wide median area that would allow the vehicles to cross one direction of traffic at a time, the average delay per vehicle is estimated at about 3.5 minutes.

This level of delay to the left-turn vehicles would not satisfy Warrant 3 of the MUTCD. Unless actual volume of traffic turning left from the off-ramp is substantially higher than the forecast volumes, this location would likely remain STOP controlled. A wide median with refuge area should be provided at this intersection to allow left-turn vehicles to wait in the median area for gaps in the northbound traffic.

POTENTIAL MODIFICATIONS FOR INTERSECTIONS

Further modifications are proposed to the planned lanes for several of the intersections to provide sufficient capacity and acceptable level of traffic operations with the planned freeway interchanges. The locations and potential actions are summarized in Table 5-2 and discussed in the following sections.

Makakilo Drive-Fort Barrette-Farrington Highway Intersection

The potential traffic problem in the afternoon peak hour could be offset by the re-striping of the right-turn lane on the northbound Fort Barrette Road approach for use as a shared through/right-turn lane. There are three existing northbound lanes on Makakilo Drive north of the intersection to receive the three lanes of through traffic.

With this modification the afternoon peak hour traffic would amount to 91% of intersection capacity with average delay at LOS D.

Wakea Street-Kamokila Boulevard Intersection

The afternoon traffic conditions could be improved by either providing double left-turn lanes on the eastbound approach of Kamokila Boulevard, or providing an additional lane on northbound Wakea Street.

Eastbound Double Left-turn Lanes

With the forecast traffic turning volumes, the double left-turn lanes would reduce the capacity use to 94% (Table 5-2), which would be higher than desired levels.

Without street widening, the double left-turn lanes could be constructed to provide a total storage length of about 350 feet to largely avoid queuing of waiting vehicles into the through lanes. This would limit the westbound left-turn lane at Road E to about 75 feet of storage, which could be acceptable. Also, a higher level of traffic than projected could access Wakea Street via Haumea Street, which would reduce the volume of left turns from Kamokila Boulevard.



Table 5-2
**2030 TRAFFIC CONDITIONS AT KEY INTERSECTIONS
WITH POTENTIAL MODIFICATIONS**

Intersections/Modifications	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour			
	V/C	ADPV	LOS	V/C	ADPV	LOS
Makakilo Dr.-Fort Barrette Rd.-Farrington Hwy.						
Convert NB right-turn lane to shared thru/right-turn lane	0.91	36.3	D	0.91	41.2	D
Wakea St.-Kamokila Blvd.						
Add EB double left-turn lane	0.64	24.8	C	0.94	45.4	D
Add NB right-turn lane	0.64	24.6	C	0.99	42.9	D
Add third NB through lane	0.64	24.5	C	0.90	37.7	D
Add EB double left-turn lane and NB right-turn lane		NA		0.90	37.5	D
Kalaeloa Blvd.-Kapolei Pkwy.						
Add 2 nd NB right-turn lane		NA		0.90	54.7	D

V/C = Ratio of the traffic volume to the theoretical capacity of the intersection.
ADPV = Average delay per vehicle, in seconds.
LOS = Level of service.

Wilbur Smith Associates; November 30, 2005.

Northbound Right-turn Lane

A northbound right-turn lane could be striped on Wakea Street at the intersection, which would not require widening of Wakea Street on the north side of the intersection. However, the analysis indicates this would result in forecast afternoon peak hour traffic at an undesirable 99% of intersection capacity.

Northbound Through Lane

An additional northbound through lane would likely require additional right-of-way on the north side of the intersection to provide three northbound lanes. This option would have the most significant effect on reducing the intersection volume-to-capacity ratio (90%).



Eastbound Double Left-Turn Lanes and Northbound Right-Turn Lane

With both additional lanes, the forecast traffic would approximate an acceptable 90% of the intersection capacity. This combined option would not require widening of Wakea Street Extension north of Kamokila Boulevard.

The proposed approach would be to initially provide the double left-turn lane on eastbound Kamokila Boulevard since the queue of waiting traffic would almost certainly exceed the existing storage lane. In the future, the right-turn lane on northbound Wakea Street could be provided should it be necessary.

Kapolei Parkway-Kalaeloa Boulevard Intersection

The traffic conditions with the forecast afternoon peak hour volumes could be improved by the construction of two (double) right-turn lanes on the northbound Kalaeloa Boulevard approach to accommodate the high volume of right-turns onto the eastbound Kapolei Parkway. The forecast traffic would approximate 90% of capacity with this improvement.

Since the provision of a convenient, direct roadway connection through the Kalaeloa Redevelopment Area (proposed Saratoga Road) may obviate the need for the improvement at this intersection, the right-of-way needed for the double right-turn lanes should be protected in the event the additional lane is needed in the future, but no construction is proposed if and until the actual traffic growth warrants the additional lane.

Chapter 6 2010 ANALYSIS WITH THE PROJECT PHASE 1

The construction of the Phase 1 modifications to the Makakilo and Palatalai Interchanges and the initial elements of the Kapolei Interchange are planned for completion in 2010. The Phase 1 roadways and ramps are expected to be in place for two or more years before the completion of the planned modifications to the Kapolei Interchange and Palatalai Interchange modifications.

Traffic conditions were analyzed for the planned Phase 1 roadways with the forecast 2010 weekday peak hour traffic. The analysis was used to identify potential problem locations and to plan modifications if necessary to provide acceptable traffic conditions for the several years prior to completion of the new interchange ramps and new roadway extensions and connections.

DESCRIPTION OF PHASE 1 MODIFICATIONS

The planned roadways with the completion of Phase 1 are depicted in Figure 3-2. The key changes to the existing roadways would include the following:

- Wakea Street will be extended northward as a four-lane roadway to connect to Farrington Highway. Southbound Wakea Street will be widened at the intersection with Kamokila Boulevard to provide two left-turn lanes and a separate right-turn lane on the southbound approach.
- The eastern section of Farrington Highway between the Wakea Street extension and Farrington Highway will be removed. The section of Farrington Highway west of Wakea Street will remain a two-lane, two-direction roadway in Phase 1.
- Existing Ramp KC from the Eastbound Weaving Roadway will be connected to southbound lanes of the Wakea Street extension.
- A new On-ramp KD will be constructed to access the eastbound H-1 Freeway from the intersection of the Wakea Street extension with Farrington Highway.
- A new Off-ramp KA will be constructed from the westbound H-1 Freeway to connect to westbound Farrington Highway.
- A new On-ramp (MD) will be constructed to provide direct access from Makakilo Drive to westbound H-1 Freeway. Access to the on-ramp will be provided as the new west leg of the existing intersection of the Westbound Off-ramp MC with Makakilo Drive. The initial assessment reflects no left-turn from northbound Makakilo Drive onto the on-ramp.

- A 1,600-foot long weaving lane will be provided along westbound H-1 Freeway between On-ramp MD and Off-ramp KA.
- The connection of loop Off-ramp PD to the intersection of Farrington Highway and Kalaheon Boulevard will be removed and a traffic signal installed.

The numbers of lanes and types of traffic controls with Phase 1 are depicted in Figure 3-2.

METHODOLOGY AND ASSUMPTIONS

The analysis of the planned Phase 1 roadways was generally based on the methodology discussed in Chapter 4 for ramps and in Chapter 5 for roadway intersections. The key difference was no CORSIM analysis was made for the interim Phase 1 roadways since this network should be in place only a few years before more extensive roadway modifications would begin towards the full buildout of the Palatalai Interchange modifications. The methodology and assumptions are summarized in the following paragraphs.

Intersection Lanes and Traffic Controls – The analysis was based on the roadway lanes and type of intersection controls as discussed in Chapter 3 and depicted in Figure 3-2. The lanes and traffic controls at several intersections have been modified from the existing to reflect mitigative actions proposed in traffic studies for several developments in the City of Kapolei area.

Traffic Volumes – The analysis used the weekday commute peak hour traffic volumes as presented in Chapter 3. These traffic volumes reflect the individual developments planned in the City of Kapolei and adjacent areas.

Analysis Criteria – Locations were identified as potential problems where one or more of the following criteria were exceeded:

- At ramp junctions and weaving sections, the traffic density and speeds were represented as LOS E or F.
- At intersections, the forecast volume in either 2010 weekday peak hour exceeded 90% of the planned intersection capacity.
- At signal-controlled intersections, the average delay per vehicle for the entire intersection in either peak hour was estimated at LOS E or F. Long delays for individual traffic movements at traffic-signal controlled intersections were not considered to merit mitigative actions as these types of problems should typically be addressed through refinement/modification of the timing plans for the intersection based on actual future traffic counts.
- For traffic movements controlled by STOP or YIELD signs, the average vehicle delay for the yielding traffic was estimated at LOS F.

- The estimated 95% queue length for a planned storage lane exceeds proposed length of the storage lane.

Analysis Methodology – The ramp analyses were made using the McTrans HCS software. The intersection analysis was generally made using the Synchro intersection analysis tool and companion SimTraffic traffic simulation model. The Synchro model is based on the 2000 Highway Capacity Manual Procedures as summarized in Appendix A. The McTrans HCS model was used for several STOP controlled intersections where the intersection roadway geometrics did not permit analysis with the Synchro model.

HCS ANALYSIS OF RAMP JUNCTIONS AND WEAVING SECTIONS

The general methodology and criteria used in analysis of traffic conditions at the ramp merge or diverge sections with the freeway mainline lanes, and with weaving sections, are summarized in Appendix A.

Weaving Sections

A weaving analysis was made for the existing Eastbound Weaving Roadway between Kalaheon Boulevard and Wakea Street and for a planned new westbound weaving lane between the Makakilo and Kapolei Interchange ramps, with the results summarized in Table 6-1.

Eastbound Weaving Roadway between Kalaheon Boulevard and Wakea Street – The HCS weaving analysis has limited applicability for collector-distributor roadways. The assessment was made to indicate the likely level of conditions along the 1,200-foot long, three-lane weaving section between the single-lane exit from the freeway (Ramp PC) and the two-lane ramp from Kalaheon Boulevard (PC-1). The off-ramp traffic must weave through the Kalaheon traffic to reach the lanes exiting to Wakea Street while the Kalaheon traffic must weave through the off-ramp traffic to access the lane exiting the weaving roadway onto the eastbound freeway.

The resulting traffic density indicates that the weaving section should provide acceptable LOS C conditions in the morning peak hour. The much higher weaving volumes in the afternoon period are projected to operate at LOS E conditions with the afternoon weaving volumes amounting to about 55% of capacity. The HCS 2000 warns that three-lane weaving sections with volume-to-capacity ratios of 0.45 or greater may encounter operational problems due to the limited usefulness of the third lane. The estimated 2010 volume of traffic using the weaving section in the afternoon peak hour likely represents or approaches the maximum volume levels that could be accommodated by the weaving section without substantial degradation of traffic operations in the weaving roadway. This could adversely affect traffic exiting the freeway onto Ramp PC and traffic operations in the freeway lanes at the entry to Ramp PC.

Table 6-1
2010 WEAVING SECTION TRAFFIC CONDITIONS

Peak Hour	Average Speed (mph)		Density (vplph)	Level of Service
	All Traffic	Non-Weave		
Eastbound Separate Weaving Roadway Kalaeloa Blvd.- Waka St. (Existing)				
Morning	25.5	37.9	25.3	20.8
Afternoon	22.5	32.6	22.2	39.6
Westbound Weaving Lane Makakilo Dr./Mauka Frontage Rd. to Waka St. (Planned)				
Morning	54.2	54.8	48.0	15.0
Afternoon	54.3	55.1	48.5	13.6

Vplph = vehicles per lane per hour

Wilbur Smith Associates; December 7, 2005

The projected conditions in this weaving roadway indicate that the Hanua Street connection to the Palailai Interchange and construction of On-ramp PI should be expedited to provide the additional entry location and capacity to relieve conditions in this weaving roadway.

Westbound Weaving Lane from Makakilo Drive On-ramp to Waka Street Off-ramp – This section of the freeway is projected to operate at very acceptable LOS B during both the morning and afternoon peak hours. Freeway traffic speeds would approximate the speed limit.

Ramp Junctions

Each on-ramp merge or off-ramp diverge area along the freeway was analyzed using HCS 2000, with the results summarized in Table 6-2. Eastbound On-ramp KC-1 from the Eastbound Weaving Roadway and westbound Off-ramp PD to Kalaeloa Boulevard are not included in the analysis since freeway through lanes are added or reduced via these ramps.

The analyses estimates the average vehicle density and travel speeds along the 1,500-foot section of freeway through lanes affected by traffic entering or exiting the freeway, with the density also used to identify the level of service within this ramp influence area along the freeway mainline. The analysis is made for the two outside lanes that are most directly affected by the traffic entering/exiting the ramps and, for sections with three or more through freeway lanes, the conditions in the other lanes that are less affected by the ramp traffic.



Table 6-2
2010 TRAFFIC CONDITIONS ALONG FREEWAY
AT RAMP MERGE AND DIVERGE AREAS

Ramp Junction	Peak Hour	Average Speed (mph)		Traffic Density (vplph)	Level of Service
		Near Ramp	Other Lanes		
Eastbound Freeway					
Off-ramp PB to Kalaeloa Blvd.	AM PM	50.4 50.6	NA NA	27.0 26.3	C C
Off-ramp PC To Waka St. Via EB Weaving Roadway	AM PM	50.1 50.2	NA NA	21.9 22.5	C C
On-ramp MB from SB Makakilo Dr.	AM PM	56.7 56.3	58.5 58.0	22.9 26.1	C C
On-ramp MA from NB Makakilo Dr.	AM PM	56.9 56.3	58.5 57.7	24.3 27.4	C C
Westbound Freeway					
Off-ramp MC to Makakilo Dr.	AM PM	55.4 53.0	59.8 56.8	5.7 14.2	A B
On-ramp PA from Kalaeloa Blvd. & Farrington Hwy.	AM PM	50.8 49.2	NA NA	19.5 31.2	B D

Near Ramp is the 1,500-foot section of the 2 lanes closest to ramp.
Other lanes are lanes closest to median if 3 or more lanes on freeway.
Vplph = vehicles per lane per hour for 2 lanes near ramp.
Level of Service is for 2 lanes near ramp.

Wilbur Smith Associates; December 7, 2005

In the morning peak hour, the junction areas of each of the eastbound ramps with the freeway are estimated to operate at acceptable LOS C conditions. LOS A conditions are estimated for the diverge area of the westbound off-ramp to Makakilo Drive (MC), while LOS B conditions are projected for On-ramp PA ramp merge with the westbound freeway.

In the afternoon peak hour, the conditions at the freeway entry or exit areas for each of the eastbound ramps are also projected at LOS C. Conditions at the ramp junctions with the westbound freeway are projected at LOS B at the Off-ramp MC to Makakilo Boulevard and LOS D at the entry of On-ramp PA.



FREEWAY MAINLINE LANES EAST AND WEST OF PROJECT AREA

The HCS analysis of the freeway through lanes east and west of the Project area indicate that LOS C conditions are expected except for the westbound traffic in the afternoon peak hour (Table 6-3). The increased westbound traffic is projected to result in LOS D conditions both east and west of the Project area.

**Table 6-3
2010 FREEWAY MAINLINE CONDITIONS
EAST AND WEST OF PROJECT AREA**

Peak Hour	Direction	Traffic Volume	Lanes	Density (vp/hpl)	Speed (mph)	Level of Service
East of Makakilo Interchange Area						
Morning	Eastbound	3,580	3	20.5	62.0	C
	Westbound	3,860	3	22.1	62.0	C
	Westbound	4,330	3	24.7	62.0	C
Afternoon	Westbound	4,565	3	26.1	62.0	D
West of Palailai Interchange Area						
Morning	Eastbound	2,360	2	22.6	55.5	C
	Westbound	1,870	2	17.9	55.5	C
Afternoon	Eastbound	2,285	2	21.9	55.5	C
	Westbound	3,295	2	31.6	55.5	D

vp/hpl = vehicles per hour per lane
mph = miles per hour

Wilbur Smith Associates; December 10, 2005.

PEAK HOUR CONDITIONS AT KEY INTERSECTIONS

Traffic conditions with Phase 1 of the Project in 2010 are summarized for the key intersections that provide access to the Makakilo, Kapolei, and Palailai Interchanges in Table 6-4 for the weekday morning and afternoon commute peak hours.

Makakilo Drive-Palailai Street – The planned Palailai East development would add a fourth leg to the east side of the existing T-intersection. With the proposed new roadway connection and the planned roadway lanes, the forecast 2010 morning peak hour traffic would approximate 93% of intersection capacity with average delay at LOS D. Very acceptable conditions are projected for the afternoon peak hour volumes.



**Table 6-4
2010 TRAFFIC CONDITIONS AT KEY INTERSECTIONS
WITH PLANNED ROADWAYS**

Intersections	Weekday Morning		Weekday Afternoon	
	V/C	ADPV LOS	V/C	ADPV LOS
Makakilo Dr./Palailai St.	0.93	43.2 D	0.74	14.9 B
Makakilo Dr./WB H-1 Off-Ramp	0.89	28.7 C	0.85	21.6 C
Farrington Hwy./Makakilo Dr./Fort Barrette Rd.	0.90	37.3 D	0.90	42.8 D
Wakae St. Ext./Farrington Hwy./EB H-1 On-ramp	0.18	10.1 B	0.40	14.8 B
Wakae St./Kamokila Blvd	0.70	24.1 C	0.95	44.3 D
Kalaeloa Blvd./Farrington Hwy	0.37	10.1 B	0.96	34.6 C
Kalaeloa Blvd./EB H-1 Off-ramp	0.08	44.2 E	0.21	27.0 D
Kalaeloa Blvd./Kapolei Pkwy.	0.77	49.7 D	0.87	39.0 D

V/C = Ratio of the traffic volume to the theoretical capacity of the intersection.
ADPV = Average delay per vehicle, in seconds.
LOS = Level of service.

Wilbur Smith Associates; December 22, 2005.

The morning conditions could be improved by the re-striping of a third southbound through lane along Makakilo Drive through this intersection to connect to the added lane to Loop On-ramp MB to the eastbound freeway. Much of the southbound traffic currently will use the wide outside lane as a third southbound lane when the southbound traffic queues along this section of Makakilo Drive. Peak hour traffic conditions with the additional southbound lane would be as follows:

Peak Hour	Volume-to-Capacity Ratio	Ave. Delay Per Vehicle (sec.)	Level of Service
Morning	0.71	17.4	B
Afternoon	0.72	12.7	B



The planned future extension of the north end of Makakilo Drive eastward to connect to the H-1 Freeway at the North-South Road Interchange will divert much of the existing traffic from this section of Makakilo Drive. Therefore re-striping rather than the widening of the roadway appears appropriate to provide additional capacity until the completion of the roadway extension.

Makakilo Drive-Westbound Off-ramp – The forecast traffic would amount to about 89% of the intersection capacity in the morning peak hour with the proposed lanes and the addition of the entrance to the westbound on-ramp as the west leg of this intersection. These conditions reflect no left turn from northbound Makakilo Drive onto the Mauka Frontage Road due to the restricted width of the bridge across the H-1 Freeway. In the afternoon peak hour, the traffic would approximate 85% of capacity. Average delay is estimated at LOS C in each peak hour.

If left turns were to be permitted from a single left-turn lane, the increased traffic movement and conflicts would result in congested conditions at this intersection in the morning peak hour. With the left-turn lane, traffic volumes would approximate 100% of capacity in the morning peak hour. Therefore the northbound left-turn lane should not be considered until after the completion of the Mauka Frontage Road and the Kapolei Interchange overpass have been completed to divert some of the southbound through traffic to turn right and use this future connection to access the City of Kapolei.

Makakilo Drive-Fort Barrette Road-Farrington Highway – The forecast 2010 volumes are projected to approximate 90% of intersection capacity in both peak hours. The average overall delay per vehicle is estimated at LOS D based on optimized signal timings. The traffic conditions are forecast to remain similar to or better than 2005 conditions due to the diversion to the planned alternative routes of much of the traffic that would otherwise pass through this intersection.

The morning peak hour would benefit primarily from the Kamaaha Avenue-Manawai Street connection which is estimated to divert approximately 900 vehicles from the critical conflicting movements at the Farrington Highway-Makakilo Drive intersection. In the afternoon peak hour, the planned On-ramp KD would divert about 500 vehicles from the eastbound left-turn movement from Farrington Highway towards the freeway, while the Kamaaha Avenue-Manawai Street connection is estimated to divert over 500 vehicles from the other critical conflicting traffic movements at the intersection.

Waka Street Extension-Farrington Highway – This T-intersection was initially tested with STOP control on the eastbound through movement from eastbound Farrington Highway onto the Eastbound On-ramp. The analysis indicated that the intersection would operate at an acceptable delay if the northbound traffic turning onto On-ramp KD is not considered as delaying the eastbound Farrington Highway traffic accessing the on-ramp. However, the analysis indicates that the eastbound traffic would experience very long delays during the afternoon peak hour if the northbound traffic turning onto Ramp KD is considered as delaying the Farrington traffic entering the on-ramp with average delay estimated at 2 minutes or more per vehicle in each peak hour.



An analysis with traffic signal control indicated very acceptable intersection conditions in both peak hours. Therefore, the intersection of Waka Street and Farrington Highway with the on-ramp should be laid out with either of the following:

1. Use of STOP control for the Farrington Highway approach at the intersection with Waka Street, with the merge junction of the Farrington and Waka on-ramp traffic located as a separate junction with the Farrington vehicles yielding and adequate storage for the Farrington vehicles at the junction; or
2. Install a traffic signal at the intersection.

When Waka Street is extended across the freeway to connect to the Mauka Frontage Road and the westbound loop Off-ramp K.A, a traffic signal will be needed at this intersection.

Waka Street-Kamakila Boulevard – The planned intersection would accommodate the forecast morning peak hour traffic at very acceptable levels. However, the afternoon peak hour traffic is projected to slightly exceed the intersection capacity. The key conflicting traffic movements in the afternoon would be the northbound through traffic and south left-turn traffic along Waka Street, and the eastbound left turn and westbound through traffic along Kamakila Boulevard. The afternoon conditions would warrant improvement actions.

As discussed in Chapter 5 for 2030 conditions, the intersection could be improved by either the construction of a second (double) left-turn lane on the eastbound Kamakila Boulevard approach, provision of a northbound right-turn lane or provision of a third northbound through lane. The proposed initial action is to provide the double left-turn lane on eastbound Kamakila Boulevard and make subsequent improvements if necessary. With these additional lanes, the 2010 afternoon peak hour conditions would be as follows.

Potential Modifications	Volume-to-Capacity Ratio	Ave. Delay Per Vehicle (sec.)	Level of Service
Add 2 nd EB Left-Turn Lane	0.91	41.0	D
Add EB Left- & NB Right-Turn Lanes	0.88	33.1	C
NB Through Lane	0.83	26.8	C

Kalaeloa Boulevard-Farrington Highway – Traffic conditions at the Kalaeloa Boulevard intersection with Farrington Highway would be at acceptable levels during morning peak hour with the addition of a second Waianae-bound through lane on Farrington Highway through the intersection onto the on-ramp. However, the afternoon traffic volumes are projected at 96% of



intersection capacity with the very high volume of traffic turning left from northbound Kalaeloa Boulevard the principal contributor to the high level of capacity usage.

The 2030 analysis with buildout of the Palailai Interchange (Chapter 5) indicates that the Hanua Street connection to the freeway should divert sufficient traffic from the northbound left turn movement to provide acceptable conditions in the afternoon peak hour. As an interim action until the Hanua Street extension is completed, traffic conditions could be improved by the provision of a second (double) left-turn lane on the northbound Kalaeloa Boulevard approach. The 2010 peak hour traffic would approximate 69% of capacity with delay at LOS B with this modification.

Kalaeloa Boulevard-Kapolei Parkway – With Kalaeloa Boulevard planned for three through lanes in each direction at this intersection, the forecast traffic in the 2010 peak hours would result in acceptable levels of capacity use and average delay per vehicle.

Kalaeloa Boulevard-Eastbound Off-ramp – The relatively low volume of traffic turning left from the off-ramp onto northbound Kalaeloa Boulevard would likely experience long delays in the morning peak hour (LOS E) due to the high volume of southbound traffic. The left-turn volume and this level of delay to the left-turn vehicles would not satisfy Warrant 3 of the MUTCD.

POTENTIAL MITIGATIVE ACTIONS

The proposed mitigative actions to provide sufficient capacity and acceptable level of traffic operations with the planned Phase I Project include the following:

- Stripe southbound Makakilo Drive for a third through lane from north of the Palailai Street intersection to the additional lane that provides access to the loop on-ramp to the eastbound freeway (Ramp MB).
- Expedite the construction of the Kapolei Interchange overpass and the loop off-ramp that provides access from the westbound freeway to the areas south of the freeway to reduce the volume of southbound traffic through the Makakilo Drive intersection with Farrington Highway in order to accommodate future traffic growth through this intersection.
- Modify the eastbound Kamokila Boulevard approach to Wakea Street to provide double left-turn lanes to access the Kapolei Interchange.
- Add a second (double) left-turn lane to the northbound approach of Kalaeloa Boulevard to Farrington Highway.

APPENDICES

Appendix A Methodology for Analyzing Traffic Conditions

The Transportation Research Board (TRB), a division of the National Science Foundation, has developed standardized methods for use in evaluating the effectiveness and quality of service for roadways and streets. Different methodologies are available for analyzing traffic signal-controlled intersections and other types of roadways.

The TRB evaluation methods use concepts referred to as volume-to-capacity ratio and level-of-service (LOS). The volume-to-capacity ratio (V/C) compares the existing or projected traffic volumes on a facility to the facility's theoretical capacity and, as such, indicates the relative adequacy of the facility to accommodate the traffic volumes. Capacity is estimated primarily from the facility's physical characteristics (e.g. number and widths of lanes), and to a lesser extent by the traffic characteristics (e.g. types of vehicles) and type of traffic controls. The level of service concept describes facility traffic conditions in terms of travel delays or travel speeds, with the service quality expressed on a letter basis from A to F, which signify excellent to unacceptable conditions, respectively.

Signal-Controlled Intersections--Traffic conditions at traffic signal-controlled intersections were evaluated using the Operations Analysis methodology described in the *2000 Highway Capacity Manual (HCM)*.¹ The methodology calculates a ratio of actual or estimated peak hour traffic volumes to the theoretical capacity of the intersection. This volume-to-capacity ratio (V/C) reflects the physical characteristics of the intersection and the traffic characteristics, and is somewhat independent of the efficiency of the traffic signal phasing/timing. This ratio indicates the proportion of available capacity being used by traffic volumes and where there is unused capacity available for future traffic increases.

With the 2000 HCM method, the level-of-service is based on the average delay per vehicle for the various movements within the intersection as a result of the traffic signal control. This total delay is the difference between the travel time experienced with the traffic signal and the reference travel time that would result under ideal conditions, in the absence of the traffic control and geometric delay. This delay, referred to as control delay, includes initial deceleration delay, stop delay, queue move-up delay, and final acceleration delay. Average delay time and level-of-service is estimated for the entire intersection, for each roadway approach, and for each traffic movement or lane group. A description of the criteria associated with LOS A through LOS F is provided in Table A-1.

In the assessment of traffic signal-controlled intersections, it is usually most appropriate to relate the adequacy of the geometric design features (such as numbers and use of lanes, lane widths, etc.) to the V/C. Delay and LOS are most relevant to assessing modifications to the traffic signal controls, since these are most directly related to the signal design features, such as cycle length, number and arrangement of phases, and allocation of green time.

¹ *2000 Highway Capacity Manual*, Transportation Research Board, October 2000.

Table A-1
LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS
WITH TRAFFIC SIGNAL CONTROL

Level of Service	Average Control Delay (seconds per vehicle)
A	10 or Less
B	10.1 – 20.0
C	20.1 – 35.0
D	35.1 – 55.0
E	55.1 – 80.0
F	More than 80.0

Source: Highway Capacity Manual 2000, Transportation Research Board, Chapter 16, 2000.

Unsignalized Intersections--At intersections with STOP sign controls, the level of service was calculated using the 2000 HCM procedures for intersections with STOP or YIELD signs. In this methodology, the six levels of service, A through F, are used to describe traffic conditions for those movements that must yield to other movements:

- Left-turn out of the side street or driveway;
- Through movement from the side street,
- Right-turn out of the side street or driveway; and
- Left-turn into the side street.

Through vehicles on the major streets are not required to yield to other movements at two-way STOP controlled intersections.

The general indicator of intersection delay is determined by calculating the one-hour capacity for each key movement, based on the conflicting traffic volumes, and then comparing the number of vehicles making that maneuver to the calculated capacity. The unused or "reserve" capacity for the movement is then used to identify a delay time and a level-of-service for that movement. Unlike analysis at signalized intersections, an overall intersection level-of-service is not calculated, but a level-of-service is calculated for each lane group subject to the STOP or YIELD condition.

The level-of-service criteria for unsignalized intersections with STOP or YIELD controls are defined in Table A-2.

Table A-2
LEVEL OF SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS

Level of Service	Average Stopped Delay (seconds per vehicle) 10 or Less
A	10.1 – 15.0
B	15.1 – 25.0
C	25.0 – 35.0
D	35.1 – 50.0
E	More than 50.0
F	

Source: Highway Capacity Manual 2000, Transportation Research Board, Chapter 17, 2000.

Freeway Sections – Speed and the freedom to maneuver are primary indicators of operating conditions on freeway sections. Both of these are related to the density of vehicles in the traffic stream, which the 2000 HCM uses to define conditions on freeway sections. Table A-3 presents the maximum vehicle density, minimum speed, and maximum volume-to-capacity ratio for Level of Service A through F for freeways designed for free flow speeds of 65 mph. The criteria for the 65 mph free flow speed are used in this study since this represents the posted speed limit, even though the design speed is likely higher. The maximum capacity is considered to be 2,400 vehicles per lane per hour under average conditions for six- and eight-lane freeways.

With these guidelines and assumptions, the H-1 Freeway is assumed to provide capacities of 2,350 vehicles per hour for normal use lanes.

Roadway or Freeway Ramp Weaving Sections – Weaving sections are formed where a merge area is followed by a diverge area with the two joined by an auxiliary lane with intense lane-change maneuvers taking place. The conditions within a weaving section is a factor of the length of the weaving section, the number of lanes, and the configuration of the entry leg, weaving section, and exit leg, as well as the volumes of the various traffic movements. The HCM 2000 relates the level of service to the vehicle density within the weaving section as presented in Table A-4.

Table A-3
LEVEL OF SERVICE CRITERIA FOR BASIC FREEWAY SEGMENTS

Level of Service	Maximum Density (PC/Mi/Ln)	Minimum Speed (mph)	Maximum Service Flow Rate (PC/Hr/Ln)	Maximum Volume/Capacity Ratio
A	11.0	65.0	710	0.30
B	18.0	65.0	1,170	0.50
C	26.0	64.6	1,680	0.71
D	35.0	59.7	2,090	0.89
E	45.0	52.2	2,350	1.00
F	*	*	*	*

Criteria based on free flow speed of 65 miles per hour (mph)
 PC/Mi/Ln = Passenger cars per mile per lane
 PC/Hr/Ln = Passenger cars per hour per lane
 * = An unstable operation, demand exceeds capacity.

Source: Highway Capacity Manual 2000, Transportation Research Board, Chapter 23, 2000.

Table A-4
LEVEL OF SERVICE CRITERIA FOR WEAVING SEGMENTS

Level of Service	Density (pc/mi/ln)	
	Freeway Weaving Segment	Multilane and Collector-Distributor Segments
A	10 or less	12 or less
B	10-20	12-24
C	20-28	24-32
D	28-35	32-36
E	35-43	36-40
F	Over 43	Over 40

PC/Mi/Ln = Passenger cars per mile per lane

Source: Highway Capacity Manual 2000, Transportation Research Board, Chapter 24, 2000.

VEHICLE TRIP GENERATION FOR 2010
NON-PROJECT LAND USES WITHIN CITY OF KAPOLEI

ZONE	Activity	Quantity	Units	ITE Use	Trip Generation Rates						Vehicle Trips To/From Area						Trips Less Passbys							
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			PM Peak Hour							
					Total	In	Out	Total	In	Out	Daily	Total	In	Out	Total	In	Out	Daily	%	Total	In	Out		
4	Kapowai Place	17	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	0	0	0	27	23	3	25	4	21	0	1	25	4	21
10	Kaiaeloa West Retail	0	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95	0	0	0	0	0	0	0	0	0	0	0.65	0	0	0
11	Advertiser Printing	0	Emp Trips		0.51	0.4	0.11	1	0.25	0.75	0	0	0	0	0	0	0	0	0	0	1	0	0	0
12	Kapolei Power Ctr Central Office-FHB	130	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95	134	82	52	488	234	254	0	0.65	317	152	165			
		10	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	16	14	2	15	3	12	0	1	15	3	12			
15	Library																							
	Public Library	0	TSF	590	1	0.72	0.28	7.09	3.4	3.69	0	0	0	0	0	0	0	1	0	0	0			
	Library Distribution	5	TSF	590	1	0.82	0.18	4.76	2.19	2.57	5	4	1	24	11	13	0	1	24	11	13			
16	Civic Center	50	Emp	710	0.48	0.42	0.06	0.46	0.08	0.38	24	21	3	23	4	19	0	1	23	4	19			
17	Ai / Chun Retail	25	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48	18	11	7	65	28	37	0	0.35	23	10	13			
18	Ulukouia																							
	Retail	6	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48	4	3	2	16	7	9	0	0.3	5	2	3			
	Quality Resuranti	0	TSF	831	0	0	0	7.49	5.02	2.47	0	0	0	0	0	0	0	0.56	0	0	0			
30	Luana Kea Ph I/ Ph II	217	Veh. Trips		0.68	0.31	0.37	1	0.55	0.45	148	66	81	217	119	98	0	1	217	119	98			
38	Kamaaha S5 Office	36	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	56	49	7	54	9	45	0	1	54	9	45			
40	Kamaaha N1 Office	39	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	61	53	7	58	10	48	0	1	58	10	48			
41	Kamaaha N2 Office	39	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	61	53	7	58	10	48	0	1	58	10	48			
42	Kamaaha N3 Office	39	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	61	53	7	58	10	48	0	1	58	10	48			
	Private School	700	Students	521	0.9	0.5	0.4	0.19	0.07	0.12	630	350	280	133	49	84	0	1	133	49	84			
43	YMCA	40	TSF	492	1.21	0.51	0.7	4.05	2.07	1.98	48	20	28	162	83	79	0	1	162	83	79			
44	Block 58 Road E Office	40	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	62	55	8	60	10	50	0	1	60	10	50			
45	Block 59 Road E Office	48	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	75	66	9	72	12	60	0	1	72	12	60			
48	Kapolei Power West																							
	Home Depot	0	TSF	862	1.48	0.8	0.68	2.87	1.35	1.52	0	0	0	0	0	0	0	0.52	0	0	0			
	Hardware	0	TSF	816	1.08	0.5	0.58	4.42	2.12	2.3	0	0	0	0	0	0	0	0.35	0	0	0			
	Retail	15	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48	11	6	4	39	17	22	0	0.35	14	6	8			
	Quality Restaurant	0	TSF	831	0	0	0	7.49	5.02	2.47	0	0	0	0	0	0	0	0.56	0	0	0			
Total											1440	931	509	1565	618	947	0	1316	503	813				

6/6/2005

DRAFT Palilalai and Makakilo Interchanges
Traffic and Operations Study

Ramp Merge and Diverge Areas – Traffic conditions in the freeway through lanes are affected by vehicles entering from or exiting onto ramps. The influence area of a ramp junction with the freeway generally encompasses the two freeway through lanes closest to the ramp with the influence area extending for a length of about 1,500 feet along the ramp entry/exit point and slightly upstream of the exit or downstream of the entry. The impact of the ramp junction on traffic flow is based on the traffic density within this influence area. Table A-5 lists the range of traffic densities associated with each level of service within the ramp merge or diverge influence area.

Level of Service	Density (pc/mi/ln) 10 or Less
A	10-20
B	20-28
C	28-35
D	35 or More
E	Demand Exceeds Capacity
F	PC/Mi/Ln = Passenger cars per mile per lane

Source: Highway Capacity Manual 2000, Transportation Research Board, Chapter 25, 2000.

Appendix Table B-3

VEHICLE TRIP GENERATION FOR 2010
NON-PROJECT AREAS WEST OF KAPOLEI

ZONE	Activity	Quantity	Units	ITE Use	Trip Generation Rates						Vehicle Trips To/From Area							Trips Less Passbys				
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				PM Peak Hour				
					Total	In	Out	Total	In	Out	Daily	Total	In	Out	Total	In	Out	Daily	%	Total	In	Out
25	Kapolei Business Park Lt. Ind.	575	TSF	130	0.84	0.69	0.15	0.86	0.18	0.69	6.96	483	397	86	495	104	391	4002	1	495	104	391
28	Barbers Pt. Harbor Lt. Ind.	85 Veh Trips		110	1	0.82	0.18	0	0	0		85	70	15	0	0	0	0	1	0	0	0
		75 Veh Trips		110	0	0	0	1	0.34	0.66		0	0	0	75	26	50	0	1	75	25.5	49.5
70	Kalaeloa Mauka Ind.	54 Acres		110	7.51	6.23	1.28	7.26	1.6	5.66	51.8	406	336	69	392	86	306	2797	1	392	86.4	306
	Total Kalaeloa Area											974	803	171	962	215	746	6799	0	962	215	746
61	Ko Olina Marriott	200 DU		330	0.31	0.22	0.09	0.42	0.18	0.24		62	44	18	84	35	48	0	1	84	36	48
	Time Share Units	590 Rooms		330	0.31	0.22	0.09	0.42	0.18	0.24		183	130	53	248	105	142	0	1	248	106	142
63	Ko Olina Single Family	60 DU		210	0.75	0.19	0.56	1.01	0.65	0.36		45	11	34	61	39	22	0	1	60.6	39	21.6
	Medium Density	390 DU		230	0.44	0.07	0.37	0.54	0.36	0.18		172	27	144	211	140	70	0	1	211	140	70.2
67	Hillside Villas Medium Density	174 DU		230	0.44	0.07	0.37	0.54	0.36	0.18		77	12	64	94	63	31	0	1	94	62.6	31.3
	Total											538	225	313	697	384	313	0.0		697	384	313
68	Makaiwa Makaiwa Hills East Single Family	0 DU		210	0.75	0.19	0.56	1.01	0.65	0.36		0	0	0	0	0	0	0	1	0	0	0
	Low Density	0 DU		231	0.67	0.17	0.5	0.83	0.47	0.36		0	0	0	0	0	0	0	1	0	0	0
	Medium Density	400 DU		230	0.44	0.07	0.37	0.54	0.36	0.18		176	28	148	216	144	72	0	1	216	144	72
	Total											176	28	148	216	144	72	0.0		216	144	72
	Grand Total											1688	1056	632	1875	744	1131	6799	0	1875	744	1131

8/18/2005

Appendix Table B-2

VEHICLE TRIP GENERATION FOR 2010
NON-PROJECT EAST AND SOUTH AREAS

ZONE	Activity	Quantity	Units	ITE Use	Trip Generation Rates						Vehicle Trips To/From Area							Trips Less Passbys				
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				PM Peak Hour				
					Total	In	Out	Total	In	Out	Daily	Total	In	Out	Total	In	Out	Daily	%	Total	In	Out
23	Villages of Kapolei Village Center	67 TSF		560	0.72	0.39	0.33	0.66	0.36	0.3		48	26	22	44	24	20	0	1	44	24	20
	Church	67 TSF		820	1.03	0.63	0.4	3.75	1.8	1.95		69	42	27	251	121	131	0	0.6	151	72	78
	Shopping Center	150 DU		230	0.44	0.07	0.37	0.54	0.36	0.18		66	11	55	81	54	27	0	1	81	54	27
27	Kapolei Village Single Family	314 DU		210	0.75	0.19	0.56	1.01	0.65	0.36		236	60	176	317	204	113	0	1	317	204	113
32	NW Commercial Shopping Center	0 TSF		814	0.71	0.43	0.28	2.59	1.11	1.48		0	0	0	0	0	0	0	0.68	0	0	0
	Total											419	139	280	694	403	291	0		593	355	239
56	Kalaeloa Redevelopment Area West Area Lt. Ind.	25 Acres		110	7.51	6.23	1.28	7.26	1.6	5.66		188	156	32	182	40	142	0	1	182	40	142
	Total											188	156	32	182	40	142	0		182	40	142
24	Makakilo Condominiums	329 DU		230	0.44	0.07	0.37	0.54	0.36	0.18		145	23	122	178	118	59	0	1	178	118	59
	Apartments	64 DU		220	0.51	0.1	0.41	0.62	0.4	0.22		33	6	26	40	26	14	0	1	40	26	14
	Single Family	517 DU		210	0.75	0.19	0.56	1.01	0.65	0.36		388	98	290	522	336	186	0	1	522	336	186
	Easter Seals Office	20 TSF		710	1.56	1.37	0.19	1.49	0.25	1.24		31	27	4	30	5	25	0	1	30	5	25
	Total											596	155	441	769	485	284	0		769	485	284
	Grand Total											1203	449	754	1644	928	717	0		1544	880	664

6/13/2005

Appendix Table B-5

VEHICLE TRIP GENERATION FOR 2010
KAPOLEI REZONING PARCELS 1, 2 & 3

ZONE	Activity	Quantity	Units	ITE Use	Trip Generation Rates						Vehicle Trips To/From Area						Trips Less Passbys					
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			PM Peak Hour					
					Total	In	Out	Total	In	Out	Daily	Total	In	Out	Total	In	Out	Daily	%	Total	In	Out
Parcel 2																						
21	North Kālae'oa Retail	120	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95		124	76	48	450	216	234	0	0.6	279	134	145
	Total											124	76	48	450	216	234	0		279	134	145
Parcel 3																						
31	Discount Store	150	TSF	815	0.84	0.57	0.27	5.06	2.53	2.53	56	126	86	41	759	380	380	8403	0.65	493	247	247
	Total											126	86	41	759	380	380	8403		493	247	247

6/10/2005

Appendix Table B-4

VEHICLE TRIP GENERATION FOR 2010
KAPOLEI SOUTH RESIDENTIAL AND KAPOLEI WEST AREAS

ZONE	Activity	Quantity	Units	ITE Use	Trip Generation Rates						Vehicle Trips To/From Area						Trips Less Passbys					
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			PM Peak Hour					
					Total	In	Out	Total	In	Out	Daily	Total	In	Out	Total	In	Out	Daily	%	Total	In	Out
Mehana Residential (Schuler)																						
53	Mehana East																					
	Low Density	270	DU	231	0.67	0.17	0.5	0.83	0.47	0.36		181	46	135	224	127	97	0	1.00	224	127	97
	Medium Density	230	DU	230	0.44	0.07	0.37	0.54	0.36	0.18		104	16	85	124	83	41	0	1.00	124	83	41
	Total Mehana											282	62	220	348	210	139	0		348	210	139
Kapolei West Area																						
10	Kap Commons Zoned Area																					
	Shopping Center	245	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95	42.92	252	154	98	919	441	478	10515	0.75	689	331	358
	Office	75	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	11.01	117	103	14	112	19	93	826	1.00	112	19	93
	Theater	2000	Seats	445	0	0	0	0.08	0.03	0.05	1.76	0	0	0	160	60	100	3520	1.00	160	60	100
	Subtotal Zoned Land											369	257	112	1191	520	671	14861		961	410	551
66	Kapolei Commons Unzoned																					
	Shopping Center	245	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95	42.92	252	154	98	919	441	478	10515	0.75	689	331	358
	Office	75	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	11.01	117	103	14	112	19	93	826	1.00	112	19	93
	Medium Density	300	DU	230	0.44	0.07	0.37	0.54	0.36	0.18	5.86	132	21	111	162	108	54	1758	0.75	122	81	41
	Subtotal Unzoned Land											501	278	223	1193	568	625	13099		922	431	492
67	Kapolei West Residential Areas																					
	Low Density	112	DU	231	0.67	0.17	0.5	0.83	0.47	0.36	6.82	75	19	56	93	53	40	764	1.00	93	53	40
	NonResident	142	DU	260	0.3	0.15	0.15	0.31	0.14	0.17	3.16	43	21	21	44	20	24	449	1.00	44	20	24
	Medium Density	112	DU	230	0.44	0.07	0.37	0.54	0.36	0.18	5.86	49	8	41	60	40	20	656	1.00	60	40	20
	Subtotal											167	48	119	197	113	85	1869		197	113	85
	Total Kapolei West Area											1038	583	454	2580	1200	1380	29829		2081	953	1128
	Grand Total											1320	645	674	2929	1410	1519			2429	1163	1266

6/15/2005

Appendix Table D-1

VEHICLE TRIP GENERATION FOR 2030
NON-PROJECT LAND USES WITHIN CITY OF KAPOLEI

ZONE	Activity	Quantity	Units	ITE	Trip Generation Rates						Vehicle Trips To/From Area						Trips Less Passbys				
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			PM Peak Hour				
					Total	In	Out	Total	In	Out	Daily	Total	In	Out	Total	In	Out	Daily	%	Total	In
4	Kapowai Place	17	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	27	23	3	25	4	21	0	1	25	4	21
10	Kalaehoa West Retail		TSF	820	1.03	0.63	0.4	3.75	1.8	1.95	0	0	0	0	0	0	0	0.65	0	0	0
11	Advertiser Printing		Emp Trips		0.5	0.4	0.11	1	0.25	0.75	0	0	0	0	0	0	0	1	0	0	0
12	Kapolei Power Ctr Central	130	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95	134	82	52	488	234	254	0	0.65	317	152	165
	FHB Branch Bank		TSF	911	4.07	2.28	1.79	33.14	16.57	16.6	0	0	0	0	0	0	0	0.53	0	0	0
	FHB Office	7	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	11	10	1	10	2	9	0	1	10	2	9
15	Library																				
	Public Library		TSF	590	1	0.72	0.28	7.09	3.4	3.69	0	0	0	0	0	0	0	1	0	0	0
	Library Distribution	5	TSF	590	1	0.82	0.18	4.76	2.19	2.57	5	4	1	24	11	13	0	1	24	11	13
16	Civic Center	50	Emp	710	0.46	0.42	0.06	0.46	0.08	0.38	24	21	3	23	4	19	0	1	23	4	19
17	Al / Chun Retail	25	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48	18	11	7	65	28	37	0	0.35	23	10	13
18	Ulukouia																				
	Retail	6	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48	4	3	2	16	7	9	0	0.3	5	2	3
	Quality Restaurant		TSF	831	0	0	0	7.49	5.02	2.47	0	0	0	0	0	0	0	0.56	0	0	0
	Lot 56 Restaurant	6	TSF	831	0	0	0	7.49	5.02	2.47	0	0	0	45	30	15	0	0.56	25	17	8
30	Luana Koa Ph I / Ph II	217	Veh. Trips		0.68	0.31	0.37	1	0.55	0.45	148	66	81	217	119	98	0	1	217	119	98
38	Generic A5 Office	36	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	56	49	7	54	9	45	0	1	54	9	45
41	Kamaaha N2 Office	39	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	61	53	7	58	10	48	0	1	58	10	48
42	Kamaaha N3 Office	39	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	61	53	7	58	10	48	0	1	58	10	48
	Private School	700	Students	521	0.92	0.55	0.37	0.2	0.08	0.12	644	385	259	140	56	84	0	1	140	56	84
43	YMCA	40	TSF	495	1.32	0.87	0.45	1.75	0.6	1.15	53	35	18	70	24	46	0	1	70	24	46
44	Block 59 Road E Office	40	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	62	55	8	60	10	50	0	1	60	10	50
45	Block 59 Road E Office	46	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	75	66	9	72	12	60	0	1	72	12	60
46	Pad A Bank Drive-Iluu	3	TSF	912	12.63	7.07	5.56	54.78	27.39	27.4	38	21	17	164	82	82	0.53	87	44	44	
48	Kapolei Power Ctr West																				
	Home Depot		TSF	862	1.48	0.8	0.68	2.87	1.35	1.52	0	0	0	0	0	0	0	0.52	0	0	0
	Ace Hardware		TSF	816	1.08	0.5	0.58	4.42	2.12	2.3	0	0	0	0	0	0	0	0.35	0	0	0
	Retail	15	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48	11	6	4	39	17	22	0	0.35	14	6	8
	Theme Steak House		TSF	831	0	0	0	7.49	5.02	2.47	0	0	0	0	0	0	0	0.56	0	0	0
69	Kapolei Mauka Residential Low Density	350	DU	231	0.67	0.17	0.5	0.62	0.42	0.2	235	60	175	217	147	70	0	1	217	147	70
Total											1665	1003	662	1843	615	1028	0	1498	648	850	

8/20/2005

Appendix Table C-1

DISTRIBUTION OF VEHICLE TRIPS
2010

Location	Gate	Kapolei Commercial		Adjacent Residential		Recreation Facilities		Industrial/Harbor	
		AM	PM	AM	PM	Employees	Visitors	AM	PM
H-1 Fwy West	1	11.5	14.0	8.5	12.0	11.5	7.9	20.0	21.0
H-1 Fwy East	2	29.5	23.5	39.8	39.8	29.5	79.4	51.0	55.0
Makakilo Dr	3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Farrington Hwy East	5	2.0	3.5	3.5	3.5	2.0	1.6	1.0	1.0
Kapolei Pkwy East	6	10.0	9.0	3.9	3.9	10.0	0.0	5.5	3.5
Kalaehoa Blvd South	7	4.0	4.0	2.8	6.8	4.0	0.0	2.0	4.0
Villages of Kapolei	10	14.0	12.0	5.0	5.0	14.0	3.7	7.5	4.5
Kapolei Power Ctr. Area	11	3.0	4.5	6.0	6.0	3.0	0.0	1.7	2.0
Kapolei Shop. Ctr. Area	12	3.0	4.5	4.0	4.0	3.0	0.5	1.7	2.0
Roosevelt East	14	3.5	3.0	3.0	3.0	3.5	0.9	2.0	2.0
Kalaehoa Redev.	15	1.0	3.5	2.0	2.0	1.0	0.0	0.5	1.0
Kapolei S. of Kamokila	16	12.0	12.5	16.0	8.0	12.0	2.0	4.7	1.5
Ko Olina	17	4.5	4.0	3.5	4.0	4.5	2.0	0.4	0.5
Totals		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

10/13/2005

Appendix Table D-3

VEHICLE TRIP GENERATION FOR 2030
OTHER AREAS WEST OF KAPOLEI

ZONE	Activity	Quantity	Units	ITE Use	Trip Generation Rates									Vehicle Trips To/From Area								Trips Less Passbys		
					AM Peak Hour			PM Peak Hour			Daily	AM Peak Hour			PM Peak Hour			Daily	%	PM Peak Hour				
					Total	In	Out	Total	In	Out		Total	In	Out	Total	In	Out			Total	In	Out		
25	Kapolei Business Park Ind. Park	2300	TSF	130	0.82	0.7	0.12	0.86	0.18	0.68	6.96	1886	1610	276	1978	414	1564	16008	1	1978	414	1564		
28	Barbers Pt. Harbor Lt. Ind.	395 Veh Trips 325 Veh Trips		110	1	0.81	0.19	0	0	0		395	320	75	0	0	0	0	1	0	0	0		
					0	0	0	1	0.32	0.68		0	0	0	325	104	221	0	1	325	104	221		
70	Kalaeloa Mauka Ind	75 Acres		110	7.51	6.23	1.28	7.26	1.6	5.66	51.8	563	467	96	545	120	425	3985	1	545	120	425		
29	Kalaeloa Makai Ind	50 Acres		110	7.51	6.23	1.28	7.26	1.6	5.66	51.8	376	312	64	363	80	283	2590	1	363	80	283		
78	Kalaeloa West Ind	200 Acres		110	7.51	6.23	1.28	7.26	1.6	5.66	51.8	1502	1246	256	1452	320	1132	10360	1	1452	320	1132		
83	Maritime Ind	75 Acres		120	1.98	1.64	0.34	2.16	0.48	1.68	6.75	149	123	26	162	36	126	506	1	162	36	126		
	Total Kalaeloa Area											4870	4078	793	4825	1074	3751	33349	0	4825	1074	3751		
61	Ko Olina Resort Beach Areas Hotel	2450 Rooms		330	0.31	0.22	0.09	0.42	0.18	0.24		760	539	221	1029	441	588	0	1	1029	441	588		
62	Olani SI Hotel	300 Rooms		330	0.31	0.22	0.09	0.42	0.18	0.24		93	66	27	126	54	72	0	1	126	54	72		
63	Coconut Plantation/Centex Single Family	60 DU		210	0.75	0.19	0.56	1.01	0.65	0.36		45	11	34	61	39	22	0	1	61	39	22		
	Medium Density	390 DU		230	0.44	0.07	0.37	0.54	0.36	0.18		172	27	144	211	140	70	0	1	211	140	70		
64	Medium Density	900 DU		230	0.44	0.07	0.37	0.54	0.36	0.18		396	63	333	486	324	162	0	1	486	324	162		
65	Marina Area Marriott Timosharas Aquarium	650 DU		330	0.31	0.22	0.09	0.42	0.18	0.24		202	143	59	273	117	156	0	1	273	117	156		
	25 Veh Trips				1	0.87	0.13	0	0	0		25	22	3	0	0	0	0	1	0	0	0		
	180 Veh Trips				0	0	0	1	0.44	0.56		0	0	0	180	79	101	0	1	180	79	101		
67	Low Density	160 DU		231	0.67	0.17	0.5	0.83	0.47	0.36		107	27	80	133	75	58	0	1	133	75	58		
	Total											1799	899	900	2498	1270	1228	0	0	2498	1270	1228		
	Grand Total											6669	4976	1693	7323	2344	4979	33349	0	7323	2344	4979		

10/24/2005

Appendix Table D-2

VEHICLE TRIP GENERATION FOR 2030
NON-PROJECT EAST AND SOUTH AREAS

ZONE	Activity	Quantity	Units	ITE Use	Trip Generation Rates									Vehicle Trips To/From Area								Trips Less Passbys		
					AM Peak Hour			PM Peak Hour			Daily	AM Peak Hour			PM Peak Hour			Daily	%	PM Peak Hour				
					Total	In	Out	Total	In	Out		Total	In	Out	Total	In	Out			Total	In	Out		
23	Village Center																							
	Church	67	TSF	500	0.72	0.59	0.33	0.66	0.36	0.3		48	26	22	41	24	20	0	1	44	24	20		
	Shopping Center	67	TSF	820	1.03	0.63	0.4	3.75	1.8	1.85		69	42	27	251	121	131	0	0.59	148	70	76		
	Medium Density Apts	290	DU	230	0.44	0.07	0.37	0.54	0.36	0.18		128	20	107	157	104	52	0	1	157	104	52		
27	Kapolei Village Single Family	314	DU	210	0.75	0.19	0.56	1.01	0.65	0.36		230	60	176	317	204	113	0	1	317	204	113		
32	NW Commercial Shopping Center	199.5	TSF	820	1.03	0.63	0.4	3.75	1.8	1.85		205	126	80	748	359	389	0	0.68	509	244	265		
	Medium Density Apts	200	DU	230	0.44	0.07	0.37	0.54	0.36	0.18		88	14	74	108	72	36	0	1	108	72	36		
33	Kapolei Knolls Single Family	50	DU	210	0.75	0.19	0.56	1.01	0.65	0.36		38	10	28	51	33	18	0	1	51	33	18		
	Total											811	287	514	1676	817	759	0	1331	751	580			
	Kalaeloa Redevelopment Area																							
56	Central Sinaloga Area Lt. Ind.	10 Acres		110	7.51	6.23	1.28	7.26	1.6	5.66		75	62	13	73	16	57	0	1	73	16	57		
	Office	20	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24		31	27	4	30	5	25	0	1	30	5	25		
	Specialty Retail	30	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48		21	13	8	78	33	44	0	0.59	43	18	24		
	Mid Rise Apt.	800	DU	223	0.3	0.09	0.21	0.39	0.23	0.16		240	72	168	312	184	126	0	1	312	184	126		
58	Regional Park	250 Acres		417	0.12	0.07	0.05	0.2	0.09	0.11		30	18	13	50	23	28	0	1	50	23	28		
	Mid Rise Apt.	400	DU	223	0.3	0.09	0.21	0.39	0.23	0.16		120	36	84	156	92	64	0	1	156	92	64		
57	Enterprise Voc Sch	25 Emp		540	2.65	2.28	0.57	3.12	1.78	1.34		71	57	14	78	45	34	0	1	78	45	34		
84	NW Lt Ind																							
	LT Ind	25 Acres		110	7.51	6.23	1.28	7.26	1.6	5.66		168	156	32	162	40	142	0	1	162	40	142		
	Total											777	441	336	858	437	520	0	923	422	500			
24	Makakilo Condominiums	329	DU	230	0.44	0.07	0.37	0.54	0.36	0.18		145	23	122	170	118	59	0	1	178	118	59		
	Apartments	64	DU	220	0.51	0.1	0.41	0.82	0.4	0.22		33	8	26	40	26	14	0	1	40	26	14		
	Single Family	740	DU	210	0.75	0.19	0.56	1.01	0.65	0.36		580	142	418	753	485	289	0	1	753	485	289		
	Exeter-Sanis Office	20	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24		31	27	4	30	5	25	0	1	30	5	25		
	Total											768	189	570	1001	634	367	0	1001	634	367			
	Mehana at Kapolei (Schuler)																							
62	Mehana West Low Density	344	DU	231	0.67	0.17	0.5	0.83	0.47	0.36		230	58	172	280	162	124	0	1	280	162	124		
	Medium Density	282	DU	230	0.44	0.07	0.37	0.54	0.36	0.18		124	20	104	152	102	51	0	1.00	152	102	51		
	Neighborhood Commercial	10	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48		7	4	3	26	11	15	0	0.30	8	3	4		
	Apartments	30	DU	220	0.3	0.09	0.21	0.39	0.23	0.16		9	3	6	12	7	5	0	1	12	7	5		
53	Mehana East Low Density	270	DU	231	0.67	0.17	0.5	0.83	0.47	0.36		181	46	135	224	127	97	0	1	224	127	97		
	Medium Density	230	DU	230	0.44	0.07	0.37	0.54	0.36	0.18		101	16	85	124	83	41	0	1	124	83	41		
54	Elementary School	650	Student	520	0.29	0.17	0.12	0.07	0.04	0.03		189	111	78	46	26	20	0	1	46	26	20		
	Total											841	258	583.4	870	517	353	0	851.3	509	342			
	Grand Total											3197	1185	2003	4504	2505	1999	0	4103	2316	1788			

10/20/2005

Appendix Table D-5

VEHICLE TRIP GENERATION FOR 2030
KAPOLEI REZONING PARCELS 1, 2 & 3

ZONE	Activity	Quantity	Units	ITE Use	Trip Generation Rates						Vehicle Trips To/From Area						Trips Less Passbys				
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			PM Peak Hour				
					Total	In	Out	Total	In	Out	Daily	Total	In	Out	Total	In	Out	Daily	%	Total	In
Parcel 1																					
8	Civic Center Office	205	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24											
20	South Kalaheo	113	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95											
34	Generic A1 Office	45	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24											
35	Generic A2 Office	39	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24											
36	Generic A3 Office	130	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24											
	Mid rise Apts	300	DU	223	0.3	0.09	0.21	0.39	0.23	0.16											
37	Generic A4 Office	36	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24											
39	Generic A6 Office	36	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24											
40	Kaunaha N1 Office	39	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24											
49	Generic D3 Office	100	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24											
50	Generic B1 Retail	65	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48											
51	Generic B2 Retail	65	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48											
55	Generic B3 Retail	70	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48											
60	Generic D1 Office	250	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24											
	Total																				
											1721	1390	331.4	2370	714	1656	0	2014	554	1460	
Parcel 2																					
21	North Kalaheo Retail	120	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95											
	Total										124	76	48	450	216	234	0	0.62	279	134	145
											124	76	48	450	216	234	0		279	134	145
Parcel 3																					
31	Farrington Commercial	218	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95											
	Total										225	137	87	818	392	425	0	0.68	556	267	289
											225	137	87	818	392	425	0		556	267	289
	Grand Total										2069	1603	466.6	3637	1323	2315	0	2849	955	1894	

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Appendix Table D-4

VEHICLE TRIP GENERATION FOR 2030
KAPOLEI COMMONS AND WEST KAPOLEI AREAS

ZONE	Activity	Quantity	Units	ITE Use	Trip Generation Rates						Vehicle Trips To/From Area						Trips Less Passbys					
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			PM Peak Hour					
					Total	In	Out	Total	In	Out	Daily	Total	In	Out	Total	In	Out	Daily	%	Total	In	Out
Kapolei Commons																						
10	Kap Commons Zoned Area																					
	Shopping Center	245	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95	42.9	252	154	98	910	441	478	10515	0.71	652	313	339
	Office	75	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	11	117	103	14	112	19	93	826	0.86	96	16	80
	Theater	2000	Seats	445	0	0	0	0.08	0.03	0.05	1.76	0	0	0	160	60	100	3520	1.00	160	60	100
	Subtotal Zoned Land											369	257	112	1191	520	671	14861		900	389	519
66	Kapolei Commons Unzoned																					
	Shopping Center	245	TSF	820	1.03	0.63	0.4	3.75	1.8	1.95	42.9	252	154	98	919	441	478	10515	0.71	652	313	339
	Office	75	TSF	710	1.56	1.37	0.19	1.49	0.25	1.24	11	117	103	14	112	19	93	826	0.86	96	16	80
	Medium Density	300	DU	230	0.44	0.07	0.37	0.54	0.36	0.18	5.86	132	21	111	162	108	54	1758	0.61	99	66	33
	Subtotal Unzoned Land											501	278	223	1193	568	625	13099		847	395	452
	Totals Kapolei Commons											871	535	336	2383	1088	1296	27960		1756	784	971
Kapolei West																						
71	L ¹ Trans Mixed Use																					
	Med Density Resident	150	DU	230	0.44	0.07	0.37	0.54	0.36	0.18		66	11	56	81	54	27	0	1.00	81	54	27
	Commercial	100	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48		71	43	28	259	111	149	0	0.50	155	67	89
72	A ¹ Residential																					
	Primary Resident SF Homes	162	DU	210	0.75	0.19	0.56	1.01	0.65	0.36		122	31	91	164	105	58	0	1.00	164	105	58
	Non-Resident Homes	29	DU	260	0.16	0.11	0.05	0.26	0.11	0.15	3.16	5	3	1	8	3	4	92	1.00	8	3	4
73	C ¹ Residential																					
	Primary Resident SF Homes	113	DU	210	0.75	0.19	0.56	1.01	0.65	0.36		85	21	63	114	73	41	0	1.00	114	73	41
	Non-Resident Homes	38	DU	260	0.16	0.11	0.05	0.26	0.11	0.15	3.16	6	4	2	10	4	6	120	1.00	10	4	6
74	B ¹ Residential																					
	Primary Resident Med Density	209	DU	230	0.44	0.07	0.37	0.54	0.36	0.18		92	15	77	112	75	37	0	1.00	132	75	37
	Non-Resident Homes	37	DU	260	0.16	0.11	0.05	0.26	0.11	0.15	3.16	6	4	2	10	4	6	117	1.00	10	4	6
	Middle School	600	Student	432	0.53	0.29	0.24	0.15	0.09	0.07		318	174	144	90	48	42	0	0.75	68	36	32
	18 Homes			430	3.01	1.41	1.6	3.56	1.53	2.03		54	25	28	64	28	37	0	1.00	64	28	37
75	SO ¹ Courts																					
76	L ¹ D ¹ Neighborhood Com.																					
	Primary Resident SF Homes	357	DU	210	0.75	0.19	0.56	1.01	0.65	0.36		268	66	200	361	232	129	0	1.00	361	232	129
	Non-Resident Homes	160	DU	260	0.16	0.11	0.05	0.26	0.11	0.15	3.16	26	18	8	42	18	24	506	1.00	42	18	24
	Neighborhood Commercial	22	TSF	814	0.71	0.43	0.28	2.59	1.11	1.48		7	4	3	26	11	15	0	0.30	8	3	4
77	E, F, G, H, K Residential																					
	Med Density Primary Resident Home	243	DU	230	0.44	0.07	0.37	0.54	0.36	0.18		107	17	90	131	87	44	0	1.00	131	87	44
	Mod Density Non-Resident Homes	592	DU	260	0.16	0.11	0.05	0.26	0.11	0.15	3.10	85	65	30	154	65	89	1871	1.00	154	65	89
	Low Dens Primary Resident Homes	237	DU	231	0.67	0.17	0.5	0.83	0.47	0.36		159	40	119	197	111	85	0	1.00	197	111	85
	Low Dens Non-Resident Homes	48	DU	260	0.16	0.11	0.05	0.20	0.11	0.15	3.16	8	5	2	12	5	7	152	1.00	12	5	7
	Total											1492	546	944	1834	1036	798	2857		1690	971	718
	Grand Total											2363	1003	1279	4217	2123	2094	30817		3446	1755	1669

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Appendix Table E-1

DISTRIBUTION OF VEHICLE TRIPS
2030

Subarea or Cordon Sta.	Gate	Percent of Trips For Land Use Types to/from Subareas and Cordon Entry/Exit Stations											
		Commercial		Residential East		Residential West		Recreation Uses		Industrial/Harbor		Resort	
		AM	PM	AM	PM	AM	PM	Emp	Guest	AM	PM	AM	PM
H-1 Fwy West	1	4.0	5.0	4.0	2.5	14.0	9.0	11.0	8.0	8.0	6.0	10.0	12.0
H-1 Fwy East	2	28.0	26.0	44.0	41.0	40.0	36.0	28.0	79.0	26.0	22.0	30.0	28.0
Makakilo Dr	3	3.5	3.0	8.0	8.0	1.0	1.5	4.0	2.0	3.0	2.5	2.0	1.5
Farrington Hwy East	5	7.0	6.0	5.0	4.0	2.0	2.0	5.0	1.0	3.0	3.0	1.0	0.0
Kapolei Pkwy East	6	15.0	12.0	6.0	6.0	2.0	3.0	15.0	2.0	12.0	10.0	6.0	4.0
Kalaeloa Blvd South	7	6.0	8.0	5.0	7.0	8.0	9.0	6.0	0.0	16.0	20.0	3.0	5.0
Kapolei West	9	3.0	3.0	1.0	1.5	6.0	7.0	3.0	1.0	5.0	7.0	12.0	10.0
Villages of Kapolei	10	6.0	5.0	4.0	8.0	1.0	1.0	8.0	2.0	4.0	4.0	3.0	1.5
Kapolei Power Ctr Area	11	3.0	4.0	3.0	3.0	1.0	2.0	2.0	0.0	2.0	3.0	1.0	2.0
Kapolei Shop Ctr Area	12	3.0	4.0	3.0	3.0	1.0	1.0	2.0	0.0	2.0	2.0	1.0	1.0
Roosevelt East	14	4.0	2.0	0.0	0.0	0.0	1.0	4.0	0.0	4.0	3.0	1.0	0.0
Kalaeloa Redev.	15	2.5	2.0	2.0	2.0	1.0	0.5	2.0	0.0	2.0	2.0	2.0	1.0
Kapolei Office Core	16	10.0	14.0	12.0	10.0	7.0	10.0	5.0	0.0	8.0	10.0	5.0	6.0
Ko Olina	17	2.0	3.0	2.0	2.0	8.0	9.0	2.0	3.0	2.0	2.5	17.0	22.0
Makaiwa Hills	20	3.0	3.0	1.0	2.0	8.0	8.0	3.0	2.0	3.0	3.0	6.0	6.0
Totals		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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Appendix Table D-6

VEHICLE TRIP GENERATION FOR 2030
MAKAIWA HILLS

ZONE	Activity	Quantity	Units	ITE Use	Trip Generation Rates								Vehicle Trips To/From Area								Trips Less Passbys				
					AM Peak Hour			PM Peak Hour			Daily	AM Peak Hour			PM Peak Hour			Daily	%	PM Peak Hour					
					Total	In	Out	Total	In	Out		Total	In	Out	Total	In	Out			Total	In	Out			
68	Makaiwa Central Makai																								
	Medium Density Townhouses	0 DU	100 DU	230	0.44	0.07	0.37	0.54	0.36	0.18	5.86	0	0	0	0	0	0	1	0	0	0				
79	Makaiwa Mauka																								
	Single Family	114 DU		210	0.75	0.19	0.56	1.01	0.65	0.36	9.57	86	22	64	115	74	41	1091	1	115	74	41			
	Low Density	149 DU		231	0.67	0.17	0.5	0.83	0.47	0.36	7.9	100	25	75	124	70	54	1177	1	124	70	54			
	Medium Density	168 DU		230	0.44	0.07	0.37	0.54	0.36	0.18	5.86	74	12	62	91	60	30	984	1	91	60	30			
	Total										259	59	201	330	205	125	3253		330	205	125				
80	Makaiwa Commercial																								
	Townhouses	200 DU		230	0.44	0.07	0.37	0.52	0.35	0.17	5.86	88	14	74	104	70	34	1172	1	104	70	34			
	Shopping Center	200 TSF		820	1.03	0.63	0.4	3.75	1.8	1.95	42.9	206	126	80	750	360	390	8584	0.69	510	245	265			
	Elementary School	650 Student		520	0.29	0.17	0.12	0.07	0.04	0.03	1.29	189	111	76	46	26	20	839	1	46	26	20			
	Total										483	251	232	900	456	444	10595		660	341	319				
81	Makaiwa East																								
	Low Density	38 DU		231	0.67	0.17	0.5	0.83	0.47	0.36		25	6	19	32	18	14	0	1	31.5	17.86	13.7			
	Medium Density	462 DU		230	0.44	0.07	0.37	0.54	0.36	0.18		203	32	171	249	166	83	0	1	249	166.3	83.2			
	Total										229	38.8	190	281	184	97	0		281	184.2	96.8				
82	Makaiwa Resort																								
	Resort Villas	855 DU		260	0.16	0.11	0.05	0.26	0.11	0.15	3.16	137	94	43	222	94	128	2702	1	222	94	128			
	Neighborhood Commercial	40 TSF		814	0.71	0.43	0.28	2.59	1.11	1.48	44.3	28	17	11	104	44	59	1773	0.55	57	24	33			
	Total										165	111	54	326	138	187	4475		279	118	161				
	Grand Total										1180	466	713	1888	1018	870	18908		1601	883	718				

10/19/2005

APPENDIX F

AIR QUALITY IMPACT REPORT
KAPOLEI INTERCHANGE, KAPOLEI, HAWAII
by J.W. Morrow
(May 2, 2006)

AIR QUALITY IMPACT REPORT (AQIR)

**KAPOLEI INTERCHANGE
KAPOLEI, HAWAII**

2 MAY 2006

**PREPARED FOR:
Engineering Concepts, Inc.**

**PREPARED BY:
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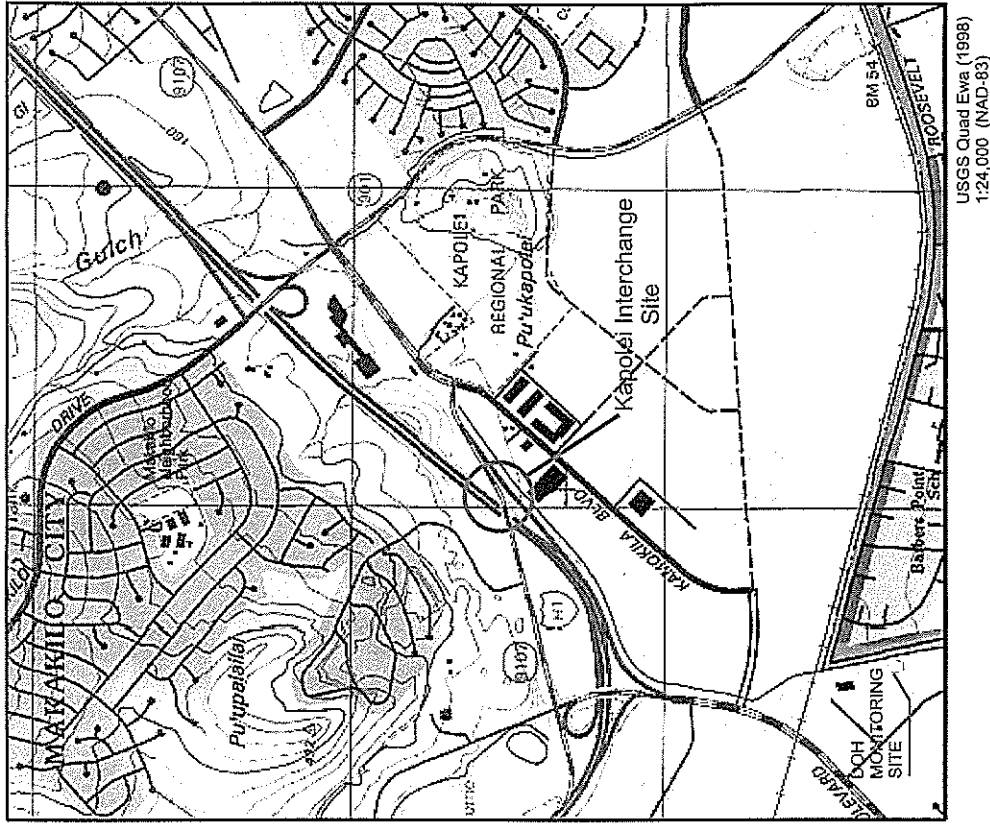
1. INTRODUCTION

The development and growth of the City of Kapolei on the island of Oahu has resulted in significant increases in traffic in the area necessitating plans for a new interchange to provide access to the existing H-1 Freeway, Farrington Highway and Kamokila Boulevard (see Figure 1).

The purpose of this report is to assess the short and long-term impacts of the proposed interchange on air quality. The project can be considered an "indirect source" of air pollution as defined in the federal Clean Air Act since its primary association with air quality is its inherent attraction for mobile sources, i.e., motor vehicles. Much of the focus of this analysis, therefore, is on the project's ability to generate additional traffic in the project area with its resultant impact on air quality. Air quality impact was evaluated for existing (2006), near-term (2010) and long-term (2030) conditions with the proposed new facility.

Finally, during construction of the road air pollutant emissions will be generated both onsite and offsite by vehicular movement, grading, concrete and asphalt batching, and general dust-generating construction activities. These impacts have also been addressed.

FIGURE 1
PROJECT LOCATION



2. AIR QUALITY STANDARDS

A summary of State of Hawaii and national ambient air quality standards (NAAQS) is presented in Table 1.² Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values.⁵ Note that in the case of the principal automotive pollutants [CO, NO₂ and O₃], the primary and secondary standards are identical.

Some of Hawaii's standards (CO, NO₂ and O₃) are clearly more stringent than their federal counterparts and like their federal counterparts in the case of short-term standards, they may be exceeded once per year.

3. EXISTING AIR QUALITY

3.1 General. The state Department of Health (DOH) maintains a network of air monitoring stations around the state to gather data on the following regulated pollutants:

- particulate matter ≤ 10 microns (PM₁₀)
- sulfur dioxide (SO₂)

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- nitrogen dioxide (NO₂)
- carbon monoxide (CO)
- ozone (O₃)

In the case of PM₁₀, measurements are made on a 24-hour basis to correspond with the averaging period specified in state and federal standards. Depending on the sampling equipment and site, samples are collected either continuously or once every six days in accordance with U. S. Environmental Protection Agency (EPA) guidelines. Carbon monoxide, sulfur dioxide, and ozone, however, are measured on a continuous basis due to their short-term (1- and 3-, and 8-hour) standards. Nitrogen dioxide is also measured with continuous instruments and averaged over a full year to correspond to its annual standards. Lead sampling was discontinued in October 1997 with EPA approval. This was largely due to the elimination of lead in gasoline and the resulting reduction of ambient lead levels in Hawaii to essentially zero.

3.2 Department of Health Monitoring. The DOH operates an air monitoring station in the Kapolei area southwest of the proposed interchange site (see Figure 1). A summary of the most recent published air quality data⁷ from that site and from the Sand Island site (the only ozone monitoring site) is presented in Table 2. These data indicate the existing good air quality in the project area.

3.3 Onsite Carbon Monoxide Sampling. In conjunction with this project, air sampling was conducted in the project area in April 2006. A continuous carbon monoxide (CO) instrument was set up and

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TABLE 1
SUMMARY OF STATE OF HAWAII AND FEDERAL
AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING PERIOD	NAAQS PRIMARY	NAAQS SECONDARY	STATE STANDARDS
PM ₁₀	Annual	50	50	50
	24-hr	150	150	150
PM _{2.5}	Annual	15	15	---
	24-hr	65	65	---
SO ₂	Annual	80	---	80
	24-hr	365	---	365
	3-hr	---	1,300	1,300
NO ₂	Annual	100	100	70
CO	8-hr	10	---	5
	1-hr	40	---	10
O ₃	1-hr	235	235	100
	8-hr	156	156	---
H ₂ S	1-hr	---	---	35
Pb	Calendar Quarter	1.5	1.5	1.5

KEY: PM₁₀ - particulate matter ≤ 10 microns
 PM_{2.5} - particulate matter ≤ 2.5 microns
 SO₂ - sulfur dioxide
 NO₂ - nitrogen dioxide
 CO - carbon monoxide
 O₃ - ozone
 H₂S - hydrogen sulfide
 Pb - lead

All concentrations in micrograms per cubic meter (µg/m³) except CO which is in milligrams per cubic meter.

TABLE 2
AIR QUALITY DATA
DEPARTMENT OF HEALTH MONITORING SITES
2004

Pollutant	Concentration (µg/m ³)	
Particulate matter (≤ 10 microns) (PM ₁₀)	24-hr	53
	Annual	13
Particulate matter (≤ 2.5 microns) (PM _{2.5})	24-hr	7
	Annual	3
Sulfur dioxide (SO ₂)	3-hr	17
	24-hr	7
	Annual	1
Carbon monoxide (CO)	1-hr	2.4
	8-hr	0.98
Ozone (O ₃)	1-hr	118
	8-hr	110
	Annual	34
Nitrogen Dioxide (NO ₂)	Annual	9

Notes: 1. PM₁₀, CO, SO₂ and NO₂ data from the Kapolei site.
 2. O₃ data are from the Sand Island site.
 3. CO data are milligrams per cubic meter (mg/m³)

Source: Hawaii Department of Health (Reference 7)

operated during the a.m. and p.m. peak traffic hours. An anemometer and vane were also installed to record onsite surface winds during the sampling period. A simultaneous manual count of traffic was performed. The variability of each of the parameters measured during the peak hours is clearly seen in Figures 2 and 3.

On Wednesday, 26 April 2006, the sampling equipment was set up on the northeast side of the Farrington Highway - Kamokila Boulevard intersection. Weather conditions during the afternoon peak hour were characterized by partly cloudy skies (50% sky cover) and light southwesterly winds averaging 5 mph. Carbon monoxide concentrations measured were low, averaging 0.5 mg/m^3 for the 1-hour period. Total 2-way traffic volume on the northwest leg of Farrington Highway was 1,083 vehicles between 4:00 and 5:00 p.m. Hawaiian Standard Time (HST).

On the morning of 28 April 2006, the equipment was again set up at the same location. Sky were clear and northeasterly tradewinds had returned averaging 6.8 mph. The total 2-way hourly traffic volume on the north leg of Farrington Highway was 1,205 vehicles, and the hourly mean CO level was 0.6 mg/m^3 .

FIGURE 2
A.M. PEAK HOUR CONDITIONS
FARRINGTON HIGHWAY AT KAMOKILA BOULEVARD
28 APRIL, 2006

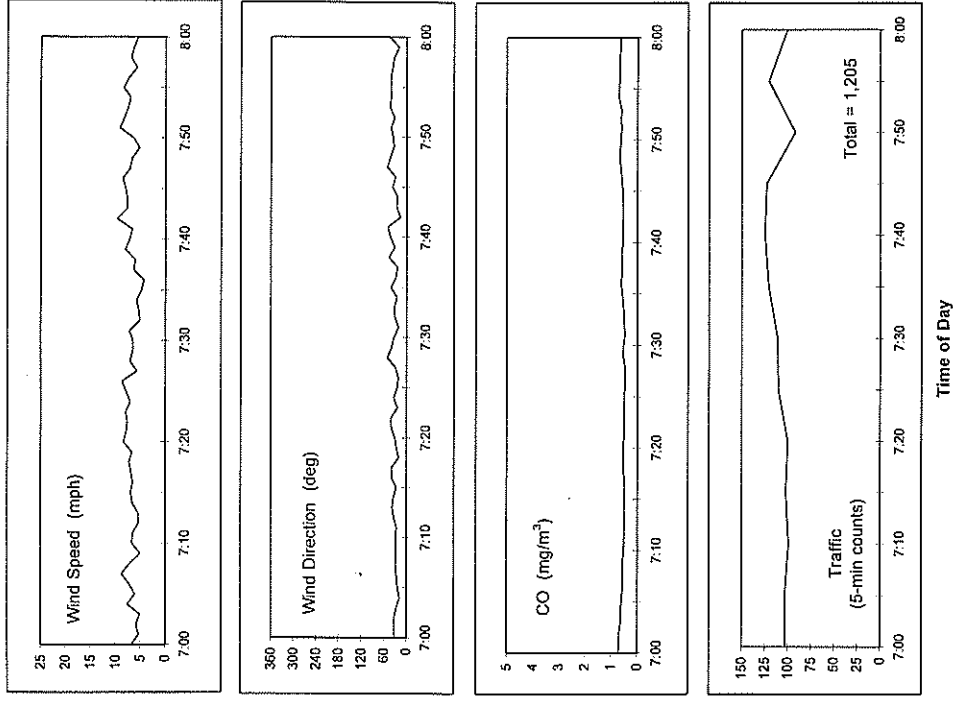
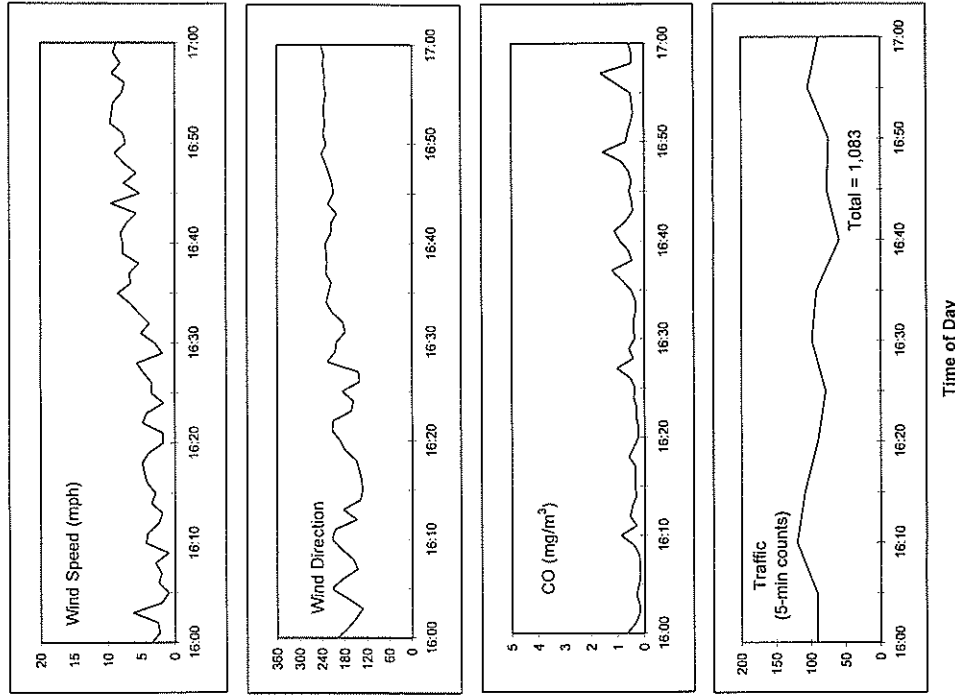


FIGURE 3

P.M. PEAK HOUR CONDITIONS
 FARRINGTON HIGHWAY AT KAMOKILA BOULEVARD
 26 APRIL 2006



4. CLIMATE AND METEOROLOGY

4.1 Climate. Climatic norms, means and extremes for Honolulu⁸ are presented in Table 3. Analysis of the monthly temperature and rainfall data for the National Weather Service station at Honolulu International Airport in accordance with Thornthwaite's scheme for climatic classification, yields a precipitation/evaporation (P/E) index of 26.6 which classifies the area as "semi-arid".⁹

4.2 Surface Winds. Meteorological data records were reviewed from the Honolulu International Airport and Hickam Air Force Base. The annual prevalence of northeast trade winds is clearly shown in Table 4. A closer examination of the data, however, indicates that low velocities (less than 10 mph) occur frequently and that the normal northeasterly trade winds tend to break down in the Fall giving way to more light, variable wind conditions through the Winter and on into early Spring. It is during these times that Honolulu generally experiences elevated pollutant levels. This seasonal difference in wind conditions can be easily contrasted by comparing August and January wind roses (Figures 4 and 5). Of particular interest from an air pollution standpoint were the stability wind roses prepared for Hickam Air Force Base¹⁰. These data indicated that stable conditions, i.e., Pasquill-Gifford stability categories E and F¹¹, occur about 28% of the time on an annual basis and 36% of the time during the peak winter month (January). It is under such conditions that the greatest potential for air pollutant buildup from groundlevel sources, e.g., motor vehicles, exists.

TABLE 3

CLIMATIC NORMS, MEANS AND EXTREMES
HONOLULU INTERNATIONAL AIRPORT (HIA)

Parameter	Descriptor	Honolulu International Airport
Temperature (deg F)	Daily maximum	84.4
	Daily minimum	70.0
	Annual mean	77.2
Precipitation (inches)	Maximum monthly	20.91
	Minimum monthly	trace
	Annual mean	22.02
Humidity (%)	Normal	68
Wind Speed (mph)	Mean	11.4
Sunshine	Percent of possible	71
Sky cover (mean # days)	Clear	90.0
	Partly cloudy	179.8
	Cloudy	92.0

Sources: National Climatic Data Center (NCDC) (Reference 8)

TABLE 4

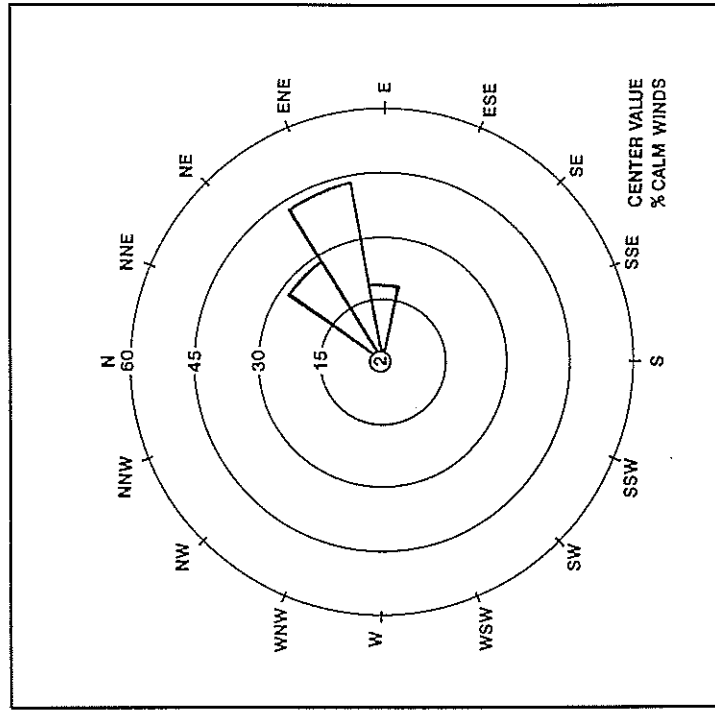
ANNUAL JOINT FREQUENCY DISTRIBUTION
OF WIND SPEED AND DIRECTION
HONOLULU INTERNATIONAL AIRPORT

Dir (deg)	Wind Speed (m/sec)					
	< 3.1	< 4.5	< 5.8	< 7.2	< 8.5	>= 8.5
10	0.0065	0.0038	0.0023	0.0016	0.0009	0.0001
20	0.0082	0.0041	0.0025	0.0023	0.0011	0.0001
30	0.0100	0.0061	0.0051	0.0038	0.0028	0.0007
40	0.0188	0.0157	0.0258	0.0222	0.0174	0.0040
50	0.0268	0.0290	0.0449	0.0385	0.0307	0.0054
60	0.0344	0.0289	0.0436	0.0273	0.0238	0.0041
70	0.0250	0.0181	0.0197	0.0122	0.0096	0.0009
80	0.0113	0.0081	0.0085	0.0039	0.0009	0.0003
90	0.0073	0.0049	0.0040	0.0009	0.0008	0.0000
100	0.0031	0.0016	0.0014	0.0006	0.0002	0.0000
110	0.0027	0.0019	0.0010	0.0007	0.0005	0.0001
120	0.0027	0.0013	0.0019	0.0009	0.0003	0.0003
130	0.0022	0.0032	0.0018	0.0015	0.0007	0.0002
140	0.0034	0.0033	0.0039	0.0018	0.0011	0.0006
150	0.0022	0.0030	0.0019	0.0003	0.0002	0.0005
160	0.0024	0.0033	0.0023	0.0010	0.0005	0.0000
170	0.0031	0.0045	0.0023	0.0007	0.0003	0.0000
180	0.0055	0.0042	0.0018	0.0008	0.0005	0.0000
190	0.0065	0.0038	0.0013	0.0002	0.0000	0.0000
200	0.0057	0.0032	0.0011	0.0001	0.0000	0.0000
210	0.0076	0.0038	0.0016	0.0001	0.0000	0.0000
220	0.0083	0.0077	0.0016	0.0001	0.0000	0.0000
230	0.0076	0.0049	0.0014	0.0001	0.0000	0.0000
240	0.0042	0.0016	0.0013	0.0000	0.0000	0.0000
250	0.0040	0.0010	0.0003	0.0000	0.0000	0.0000
260	0.0064	0.0023	0.0005	0.0000	0.0000	0.0000
270	0.0065	0.0010	0.0005	0.0002	0.0000	0.0000
280	0.0099	0.0005	0.0002	0.0000	0.0000	0.0000
290	0.0123	0.0003	0.0002	0.0001	0.0000	0.0000
300	0.0167	0.0018	0.0011	0.0000	0.0000	0.0000
310	0.0235	0.0022	0.0015	0.0001	0.0000	0.0000
320	0.0200	0.0022	0.0013	0.0006	0.0001	0.0000
330	0.0121	0.0023	0.0011	0.0005	0.0000	0.0000
340	0.0094	0.0010	0.0003	0.0001	0.0000	0.0000
350	0.0082	0.0025	0.0016	0.0002	0.0000	0.0000
360	0.0093	0.0027	0.0022	0.0006	0.0005	0.0000
All	0.3537	0.1898	0.1917	0.1240	0.0932	0.0174
						Calms: 0.0302

SOURCE: National Weather Service, 1992

FIGURE 4

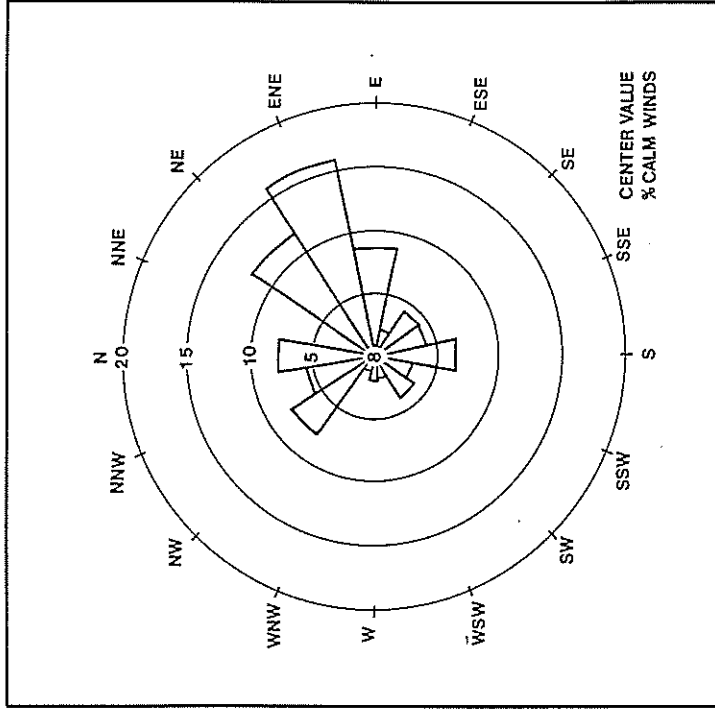
AUGUST WIND ROSE
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service
Historical Records, 1940-57

FIGURE 5

JANUARY WIND ROSE
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service
Historical Records, 1940-57

5. SHORT-TERM IMPACTS

5.1 Onsite Impacts. The principal source of short-term air quality impact will be construction-related activity. Construction vehicle activity can at times increase automotive pollutant concentrations along adjoining existing streets as well as on the project site itself. Construction vehicle traffic on the existing roadways may at times cause a temporary reduction in average travel speeds with a concomitant increase in vehicle emissions due to the "stop and go" traffic conditions. The site preparation and earth moving will create particulate matter (PM) emissions as will construction of new buildings and roadways themselves. Construction vehicle movement on unpaved on-site areas will also generate PM emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/evaporation (P/E) index of 50^{9,12}.

5.2 Offsite Impacts. In addition to the onsite impacts attributable to construction activity, there will also be offsite impacts due to the operation of concrete and asphalt batching plants needed for construction of buildings and parking areas. Such plants routinely emit particulate matter and other gaseous pollutants; however, it is too early to identify the specific facilities that will be providing these materials and thus the discussion of air quality impacts is necessarily generic. The batch plants which will be producing this concrete and asphalt must be permitted by the Department of Health Clean Air Branch pursuant to state regulations⁶. In order to obtain these permits they must demonstrate their ability to continuously comply with both emission⁶ and ambient air quality⁴ standards. Under the

federal Title V operating permit requirements¹³, now incorporated in Hawaii's rules⁹, air pollution sources must regularly attest to their compliance with all applicable requirements. A typical concrete batch plant in Hawaii is equipped with fabric filters, i.e., "baghouses" for particulate matter (PM) control. Similarly, a typical asphalt plant is equipped with either a wet venturi scrubber or fabric filters. The efficiency of such controls is normally 95 - 99%.

6. MOBILE SOURCE IMPACTS

6.1 Mobile Source Activity. An areawide traffic analysis report¹⁴ which included the proposed project served as the basis for this mobile source impact analysis. Existing and projected future peak-hour traffic volumes for the principal road serving the project site were obtained from that report.

6.2 Emission Factors. Automotive emission factors for carbon monoxide (CO) were generated for calendar years 2006, 2010 and 2030 using EPA's Mobile Source Emissions Model (MOBILE-6.2)¹⁵. To localize the emission factors as much as possible, an age distribution for registered vehicles in the City & County of Honolulu¹⁶ was used in lieu of national statistics. That same age distribution was the basis for the distribution of vehicle miles traveled as well.

6.3 Modeling Methodology. Mobile source air quality modeling has historically focused on estimating concentrations of non-reactive pollutants, primarily carbon monoxide (CO). This has been the case because CO is relatively stable in the atmosphere having a half-life on the order of about one (1) month,¹⁷ and it comprises the largest fraction of automotive emissions.¹⁵

Using the traffic data provided, modeling was performed for the for the years 2006, 2010 and 2030 with. The EPA guideline model CAL3QHC^{18, 19} as revised to allow for use of hourly meteorological data files²⁰ was employed to estimate near-intersection carbon monoxide concentrations. CO concentrations were estimated at 60 receptor sites arrayed in close proximity to existing and proposed roadways within the project area (see Figure 6). A background concentration of 0.41 mg/m³ from the Department of Health's 2004 monitoring data was also used as the background concentration in the modeling. Hourly meteorological data for a.m. and p.m. peak traffic hours used in the model were extracted from National Weather Service data collected at the Honolulu International Airport²¹ and preprocessed with EPA's PARAMMET program.²²

6.4 Results: 1-Hour CO Concentrations. The results of this modeling are summarized in Table 5 which lists the maximum estimated 1-hour CO concentrations in milligrams per cubic meter (mg/m³) for each of the evaluated scenarios along with the receptor locations at which they were predicted. The results suggest that, under *worst case* conditions of meteorology and traffic, both the federal and state 1-hour CO standards would be met at receptor locations close to and beyond the edge of roadways expected to be affected by project-related traffic. The changes in CO levels are relatively small in large part due to the offsetting effect of the federal motor vehicle emissions control program. Vehicle emissions standards for motor vehicles get progressively more stringent over time; thus, older, higher emitting vehicles lost by attrition, are replaced by newer, lower-emitting vehicles which comply with the more stringent standards.

FIGURE 6
CARBON MONOXIDE MODELING
RECEPTOR LOCATIONS

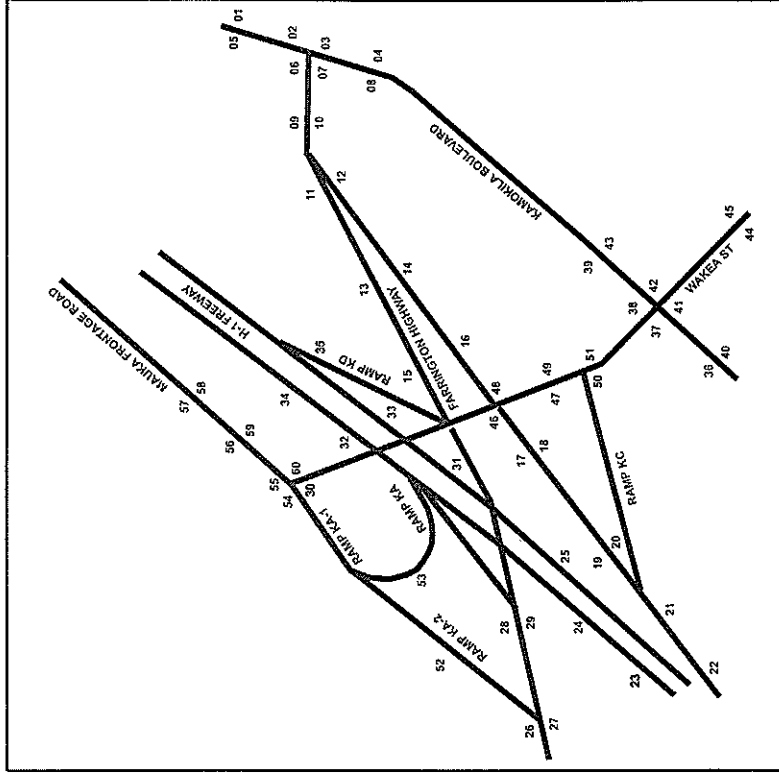


TABLE 5

MODELING RESULTS
ESTIMATES OF MAXIMUM 1-HOUR CO CONCENTRATIONS

Receptor	Concentration (mg/m ³)											
	2006				2010				2030			
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	1.44	1.44	0.64	0.52	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.52
2	1.66	1.44	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
3	1.66	1.21	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
4	1.44	0.87	0.75	0.64	0.64	0.75	0.64	0.64	0.64	0.64	0.64	0.64
5	1.78	1.21	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
6	1.44	0.98	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
7	2.01	0.87	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
8	1.55	0.87	0.75	0.64	0.64	0.75	0.64	0.64	0.64	0.64	0.64	0.64
9	1.32	1.44	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
10	1.66	1.09	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
11	2.01	1.09	0.75	0.75	0.75	0.75	0.87	0.87	0.87	0.87	0.87	0.64
12	1.32	0.98	0.75	0.64	0.64	0.98	0.64	0.64	0.64	0.64	0.64	0.64
13	2.12	1.09	0.98	0.87	0.98	1.21	0.87	0.87	0.87	0.87	0.87	0.87
14	1.55	0.87	0.98	0.75	0.98	0.75	0.98	0.75	0.98	0.75	0.98	0.75
15	2.46	1.32	1.55	1.21	1.78	1.21	1.78	1.32	1.78	1.32	1.78	1.32
16	1.55	0.98	1.21	0.87	1.44	0.87	1.44	0.87	1.44	0.87	1.44	0.87
17	1.55	0.98	1.44	0.98	1.78	1.09	1.78	1.09	1.78	1.09	1.78	1.09
18	1.66	0.98	1.32	0.98	1.55	1.55	1.55	0.98	1.55	0.98	1.55	0.98
19	1.66	1.21	1.89	0.98	2.12	1.44	2.12	1.44	2.12	1.44	2.12	1.44
20	1.66	1.21	1.21	0.75	1.55	1.55	1.55	1.09	1.55	1.09	1.55	1.09
21	2.23	1.09	1.89	0.98	2.23	2.23	2.23	1.09	2.23	1.09	2.23	1.09
22	2.46	0.98	2.23	0.98	2.46	2.46	2.46	1.32	2.46	1.32	2.46	1.32
23	2.80	1.66	3.15	1.78	3.49	3.49	3.49	1.89	3.49	1.89	3.49	1.89
24	2.92	1.66	3.03	1.55	3.37	3.37	3.37	1.89	3.37	1.89	3.37	1.89
25	2.69	1.78	2.69	1.32	3.26	3.26	3.26	1.89	3.26	1.89	3.26	1.89
26	1.89	1.09	1.44	0.64	1.66	1.66	1.66	1.21	1.66	1.21	1.66	1.21
27	2.69	0.87	1.55	0.75	1.89	1.89	1.89	0.98	1.89	0.98	1.89	0.98
28	2.23	1.21	1.66	0.98	1.78	1.78	1.78	1.32	1.78	1.32	1.78	1.32
29	2.92	1.09	2.12	0.98	2.58	2.58	2.58	1.32	2.58	1.32	2.58	1.32
30	3.03	1.66	3.15	1.89	3.15	3.15	3.15	1.32	3.15	1.32	3.15	1.32
31	2.12	2.23	2.35	2.23	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69
32	2.35	1.44	2.80	1.78	3.37	3.37	3.37	2.01	3.37	2.01	3.37	2.01
33	1.09	0.87	0.87	0.64	0.98	0.98	0.98	0.64	0.98	0.64	0.98	0.64
34	2.01	1.44	2.46	1.78	2.80	2.80	2.80	2.01	2.80	2.01	2.80	2.01
35	2.01	2.46	2.58	3.72	2.80	2.80	2.80	3.83	2.80	3.83	2.80	3.83
36	1.21	0.87	1.21	1.09	1.21	1.21	1.21	1.09	1.21	1.09	1.21	1.09
37	1.09	0.87	2.46	1.55	3.26	3.26	3.26	1.55	3.26	1.55	3.26	1.55

TABLE 5

MODELING RESULTS
ESTIMATES OF MAXIMUM 1-HOUR CO CONCENTRATIONS
(Cont)

Receptor	Concentration (mg/m ³)											
	2006				2010				2030			
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
38	1.09	0.87	1.66	1.21	1.66	1.21	1.66	1.21	1.78	1.44	1.78	1.21
39	1.09	0.87	1.78	1.66	1.78	1.66	1.78	1.66	1.78	1.66	1.78	1.66
40	1.66	0.98	1.66	1.21	1.66	1.21	1.66	1.21	1.66	1.21	1.66	1.21
41	1.55	1.09	2.80	1.66	2.80	1.66	2.80	1.66	2.80	1.66	2.80	1.66
42	1.66	1.21	2.35	1.66	2.35	1.66	2.35	1.66	2.35	1.66	2.35	1.66
43	1.44	0.98	1.78	1.55	1.78	1.55	1.78	1.55	1.78	1.55	1.78	1.55
44	1.32	0.52	2.23	1.32	2.23	1.32	2.23	1.32	2.23	1.32	2.23	1.32
45	1.09	0.64	1.66	1.21	1.66	1.21	1.66	1.21	1.78	1.44	1.78	1.21
46	1.55	0.98	1.55	0.98	1.55	0.98	1.55	0.98	2.01	1.09	2.01	1.09
47	1.66	1.44	1.66	1.44	1.66	1.44	1.66	1.44	2.35	1.78	2.35	1.78
48	1.32	0.75	1.32	0.75	1.32	0.75	1.32	0.75	1.89	0.98	1.89	0.98
49	1.66	1.21	1.66	1.21	1.66	1.21	1.66	1.21	2.23	1.55	2.23	1.55
50	1.55	1.21	1.55	1.21	1.55	1.21	1.55	1.21	2.01	1.09	2.01	1.09
51	1.89	1.55	1.89	1.55	1.89	1.55	1.89	1.55	2.58	1.78	2.58	1.78
52	1.89	1.09	1.89	1.09	1.89	1.09	1.89	1.09	1.89	1.09	1.89	1.09
53	2.12	1.21	2.12	1.21	2.12	1.21	2.12	1.21	2.12	1.21	2.12	1.21
54	1.66	0.98	1.66	0.98	1.66	0.98	1.66	0.98	1.66	0.98	1.66	0.98
55	1.66	0.98	1.66	0.98	1.66	0.98	1.66	0.98	1.66	0.98	1.66	0.98
56	1.21	0.75	1.21	0.75	1.21	0.75	1.21	0.75	1.21	0.75	1.21	0.75
57	1.09	0.87	1.09	0.87	1.09	0.87	1.09	0.87	1.09	0.87	1.09	0.87
58	1.09	0.87	1.09	0.87	1.09	0.87	1.09	0.87	1.09	0.87	1.09	0.87
59	1.09	0.87	1.09	0.87	1.09	0.87	1.09	0.87	1.09	0.87	1.09	0.87
60	1.32	1.21	1.32	1.21	1.32	1.21	1.32	1.21	1.32	1.21	1.32	1.21

6.5 Results: 8-Hour CO Concentrations. The 8-hour values presented in Table 6 are very conservative estimates because they are based on averages of the worst case 1-hour values during a.m. and p.m. peak hour traffic and meteorology. Nevertheless, the results are similar to the 1-hour findings in that compliance with state and federal standards is indicated.

7. CONCLUSIONS AND MITIGATION

7.1 Short-Term Impacts. Since, as noted in Section 4, the project area is considered to be "semi-arid" by Thornwaite's climate classification system with a P/E index lower than that associated with the EPA fugitive dust emission factor, there appears to be an increased potential for fugitive dust. Furthermore, the EPA emission factor assumes "moderate" silt content of the soils being disturbed during construction, but many of the local soils are silty clay loams with silt contents up to 55%²³. Thus, due to both climate and soil conditions, it will be important to employ adequate dust control measures during the construction period, particularly during the drier summer months. Dust control could be accomplished through frequent watering of unpaved roadways and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50%¹². The soonest possible paving of roadways and parking areas and landscaping of bare areas will also help.

Short-term air quality impacts due to offsite activities supporting the proposed development, i.e., concrete and asphalt production, appear to be *de minimus* due in large part to the high removal of control devices typically found on such production facilities. Furthermore, any emissions will be

TABLE 6
MODELING RESULTS
ESTIMATES OF MAXIMUM 8-HOUR CO CONCENTRATIONS

Receptor	Concentration (mg/m ³)		
	2006	2010	2030
1	0.95	0.44	0.44
2	1.24	0.44	0.44
3	1.14	0.44	0.44
4	1.11	0.48	0.49
5	0.78	0.44	0.44
6	0.80	0.44	0.46
7	0.93	0.44	0.47
8	0.82	0.49	0.49
9	0.91	0.46	0.46
10	1.47	0.47	0.48
11	0.74	0.51	0.52
12	1.09	0.51	0.52
13	0.88	0.76	0.79
14	1.01	0.73	0.75
15	1.28	1.20	1.36
16	1.29	0.97	1.05
17	1.29	1.16	1.28
18	1.31	1.01	1.22
19	1.36	1.20	1.39
20	1.32	1.08	1.29
21	1.40	1.14	1.24
22	1.28	1.08	1.16
23	1.31	1.37	1.44
24	1.39	1.39	1.43
25	1.66	1.45	1.73
26	0.71	0.82	0.76
27	1.14	0.65	0.82
28	0.81	0.81	0.87
29	1.24	0.87	1.09
30	1.20	1.41	0.76
31	1.68	1.71	1.94
32	1.06	1.25	1.63
33	0.80	0.59	0.59
34	0.97	1.17	1.24
35	1.50	2.00	2.09
36	0.97	1.01	0.97
37	0.95	1.89	2.28
38	0.95	1.17	1.17

strictly regulated by the Department of Health permit which each batch plant must have in order to operate.

7.2 Mobile Source Impacts. As reported in Section 6, compliance with federal and state carbon monoxide standards is demonstrated under *worst case* conditions of meteorology and peak hour traffic; thus, no special mitigative measures are required.

TABLE 6
MODELING RESULTS
ESTIMATES OF MAXIMUM 8-HOUR CO CONCENTRATIONS
(Cont)

Receptor	Concentration (ng/m ³)		
	2006	2010	2030
39	0.95	0.95	0.97
40	1.16	1.25	1.14
41	1.11	2.01	2.22
42	1.17	1.50	1.35
43	1.09	1.37	1.16
44	1.05	1.50	1.74
45	0.86	1.04	1.13
46		1.06	1.47
47		1.11	1.58
48		0.99	1.31
49		1.11	1.44
50		1.16	1.44
51		1.17	1.63
52			0.68
53			0.82
54			0.74
55			0.70
56			0.62
57			0.60
58			0.66
59			0.66
60			0.84

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APPENDIX G

ACOUSTIC STUDY FOR THE PALAILAI AND MAKAKILO
INTERCHANGES, CITY OF KAPOLEI, OAHU

by Y. Ebisu & Associates

(March 2006)

**ACOUSTIC STUDY FOR THE
PALAILAI AND MAKAKILO INTERCHANGES
CITY OF KAPOLEI, OAHU**

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MARCH 2006

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CHAPTER 1. SUMMARY

The existing and future traffic noise levels in the environs of the proposed Kapolei Interchange Project between Makakilo and Palalāi Interchanges on the island of Oahu were studied to evaluate potential noise impacts associated with the proposed Kapolei Interchange Project, hereinafter referred to as the Build Alternative. Noise measurements were obtained, traffic noise predictions developed, and noise abatement alternatives evaluated. Although the limits of project construction extend into areas west of Palalāi Interchange, these land areas were excluded from the noise study because they are totally vacant of development.

Existing traffic noise levels in the project area currently exceed the Hawaii State Department of Transportation, Highways Division (HDOT) noise abatement criteria at selected locations within Hawaiian Waters Adventure Park and the Kapolei Shopping Center complex. Future (CY 2030) traffic noise levels with the proposed freeway improvement project are also expected to exceed the 66 Leq HDOT noise abatement criteria for Activity Category B at selected locations within Hawaiian Waters Adventure Park. In addition, future traffic noise levels are expected to exceed HDOT's 71 Leq noise abatement criteria for Activity Category C at three buildings within the Kapolei Shopping Center complex. The 66 Leq noise abatement criteria is not expected to be exceeded at the closest residences in Makakilo.

Traffic noise mitigation measures in the form of noise barrier construction may be applied at some, but not all, of the affected properties. When noise abatement measures are considered, they will be evaluated according to the criteria of "reasonable and feasible" as set forth in HDOT's Noise Analysis and Abatement Policy (Reference 7). Noise abatement measures should be made to achieve "substantial" noise reductions, defined by HDOT policy as a reduction of at least 5 dB. Reference 7 does not provide guidance on the allowable costs of the noise mitigation measures for theme parks or commercial buildings. Therefore, other factors, such as aesthetic appearance and visual obstructions, and the desires of the property owners will need to be considered prior to implementation of the identified sound barriers. If noise barrier walls are implemented, landscaping should be used on the roadway side to mitigate visual impacts and discourage the potential for graffiti.

The following general conclusions can be made in respect to the number of impacted structures and lands which can be expected by CY 2030 under the Build Alternative. These conclusions are valid as long as the future vehicle mixes and average speeds do not differ from the assumed values.

- HDOT's "greater than 15 dB increase" criteria for substantial change in traffic noise levels will not be exceeded at any existing structure within the project limits of construction. Maximum increases in traffic noise levels in the project area should not exceed 4.2 dB as a result of growth in traffic volumes and construction of additional traffic lanes.

- With or without the proposed improvements, future traffic noise levels at two locations within Hawaiian Waters Adventure Park are expected to exceed HDOT's 66 Leq criteria for Activity Category B. At other locations within the theme park, the 66 Leq criteria is currently being exceeded by non-traffic noise sources, such as the noise of water features, the public address system, and visitors to the theme park.
- With or without the proposed improvements, future traffic noise levels at three locations within the Kapolei Shopping Center complex are expected to exceed HDOT's 71 Leq criteria for Activity Category C. Existing and future traffic noise associated with the H-1 Freeway lanes are the primary causes of the exceedances.
- Mitigation of future traffic noise by at least 5 dB at the two affected Hawaiian Waters Adventure Park locations is possible, but will require a sound attenuating wall of approximately 10 to 11 feet height.
- Mitigation of future traffic noise by at least 5 dB at the three affected Kapolei Shopping Center complex locations is possible, but will require a sound attenuating wall of approximately 9 to 14 feet height.

Potential short term construction noise impacts are possible during the project construction period. Minimizing these types of noise impacts is possible using standard curfew periods, properly muffled equipment, administrative controls, and construction barriers as required. If work during the nighttime hours is required to minimize traffic congestion during the normal daytime period, noise impacts are possible at existing Makakilo residences located on the mauka side of the freeway Right-of-Way. A variance from the existing state noise regulations will be required to perform nighttime work on this project.

CHAPTER II. GENERAL STUDY METHODOLOGY

Noise Measurements. Existing traffic and background ambient noise levels at twenty one locations in the project area were measured in November 2005, January 2006, and February 2006. The traffic noise measurements were used to validate the traffic noise model which was used to calculate the Base Year (CY 2005) and future (CY 2030) traffic noise levels under the Build Alternative. The background ambient noise measurements were used to define existing noise levels at noise sensitive and commercial use receptors which may be affected by the project. Also, the measurements were used in conjunction with forecast traffic noise levels to determine if future traffic noise levels are predicted to "substantially exceed" existing background ambient noise levels at these noise sensitive and commercial use receptors, and therefore exceed FHWA and HDOT noise standards and criteria.

The noise measurement locations ("A" through "N" and "WP1" through "WP10") are shown in Figure 1. The results of the traffic noise measurements are summarized in Tables 1 and 2. Noise measurement logs are included in Appendix C. In the tables, Leq represents the average (or equivalent), A-Weighted, Sound Level. A list and description of the acoustical terminology used are contained in Appendix B.

Traffic Noise Predictions. The Federal Highway Administration (FHWA) Traffic Noise Model, Version 2.5 (or TNM, see Reference 1) was used as the primary method of calculating Base Year and future traffic noise levels, with model parameters adjusted to reflect terrain, ground cover, and local shielding conditions. At the twenty one traffic noise measurement locations along the project corridor (Locations "A" through "N" and "WP1" through "WP10"), the measured noise levels were compared with model predictions to insure that measured and calculated noise levels for the existing conditions were consistent and in general agreement. The TNM and the project's traffic noise study (Reference 2) were used to generate the Equivalent Sound Level (Leq) predictions shown in the table. The average vehicle speed along H-1 Freeway entered into the TNM was adjusted to 59 miles per hour to achieve agreement between measured noise levels at Location "F" and those calculated by the TNM. With this input speed adjustment, the agreement between measured and predicted traffic noise levels was considered to be good and sufficiently accurate at most of the measurement locations to formulate the Base Year and future year traffic noise levels. At measurement Locations "WP5" and "WP7", the TNM predictions were determined to be approximately 5 dB lower than measured traffic noise levels, possibly due to the elevated receptor locations at Hawaiian Waters Adventure Park.

Base Year traffic noise levels were then calculated along the project corridor using Base Year (2005) traffic volume data for the pm peak hour from Reference 2. Traffic mix by vehicle types and average vehicle speeds for the various sections of the existing and future roadway were derived from observations during the noise monitoring periods and from References 3 and 4. Determinations of the periods of highest hourly traffic volumes along the project corridor were made after reviewing the am and pm peak hour traffic volumes from References 2 through 5.

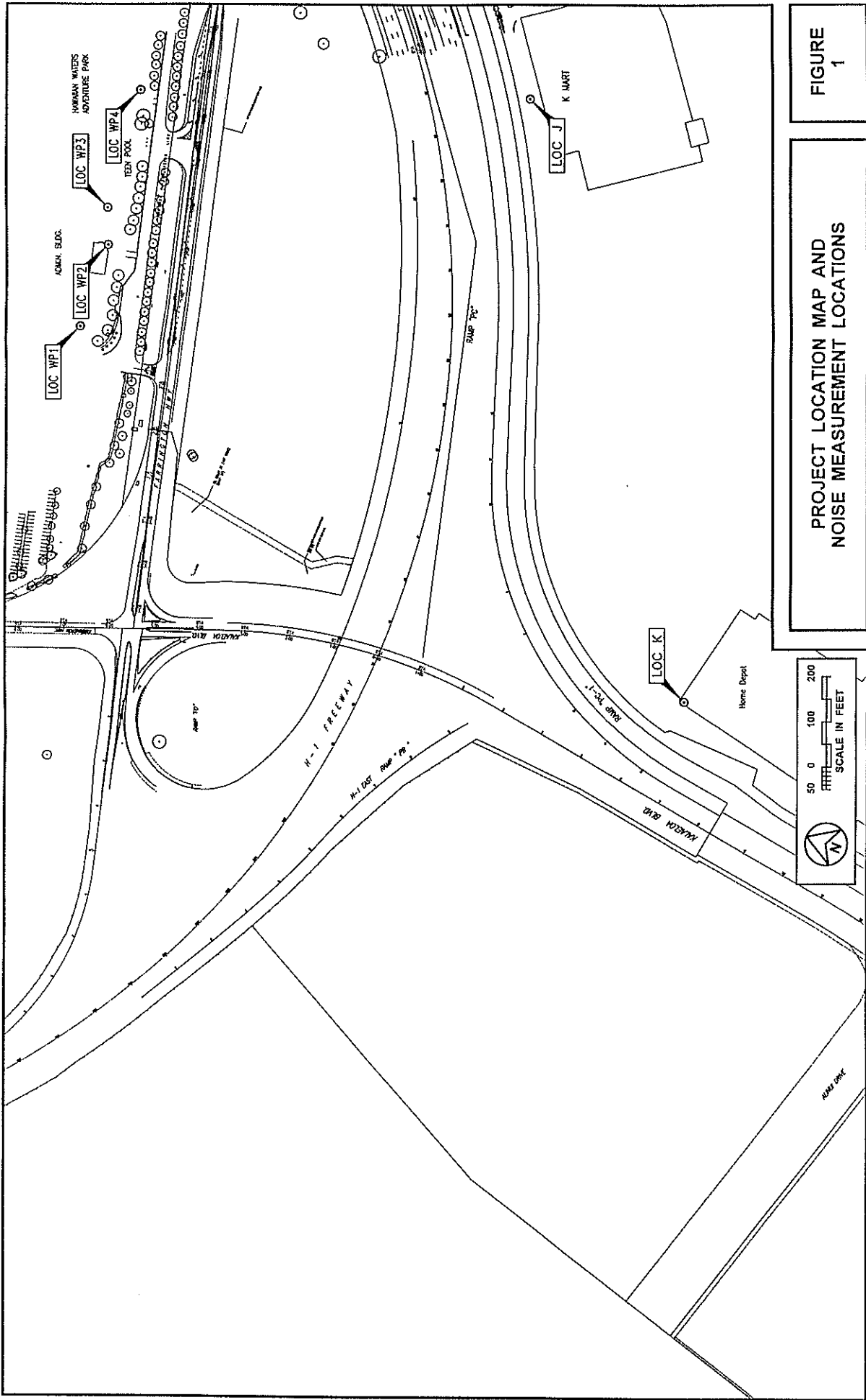


FIGURE 1

PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

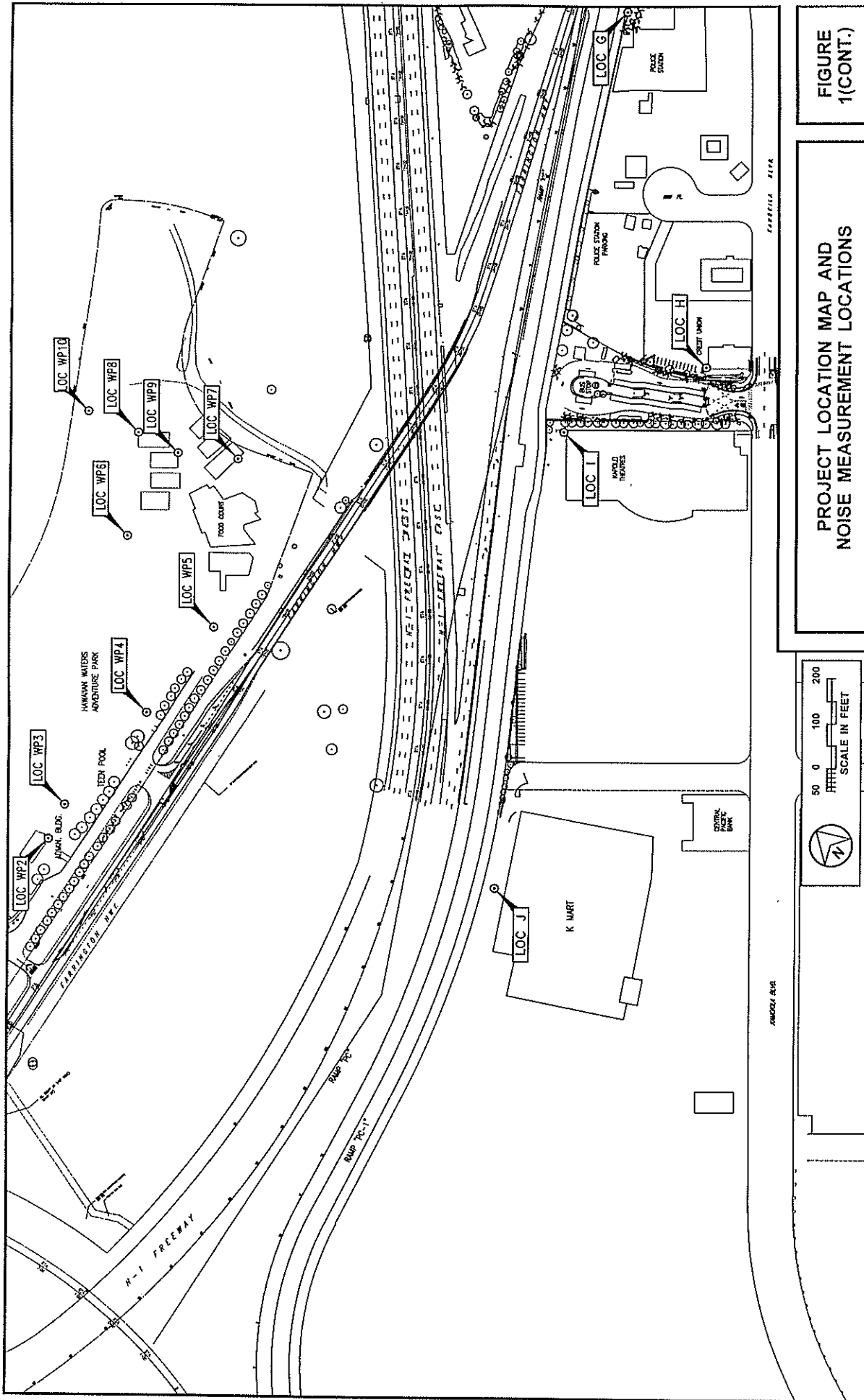


FIGURE 1 (CONT.)

PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

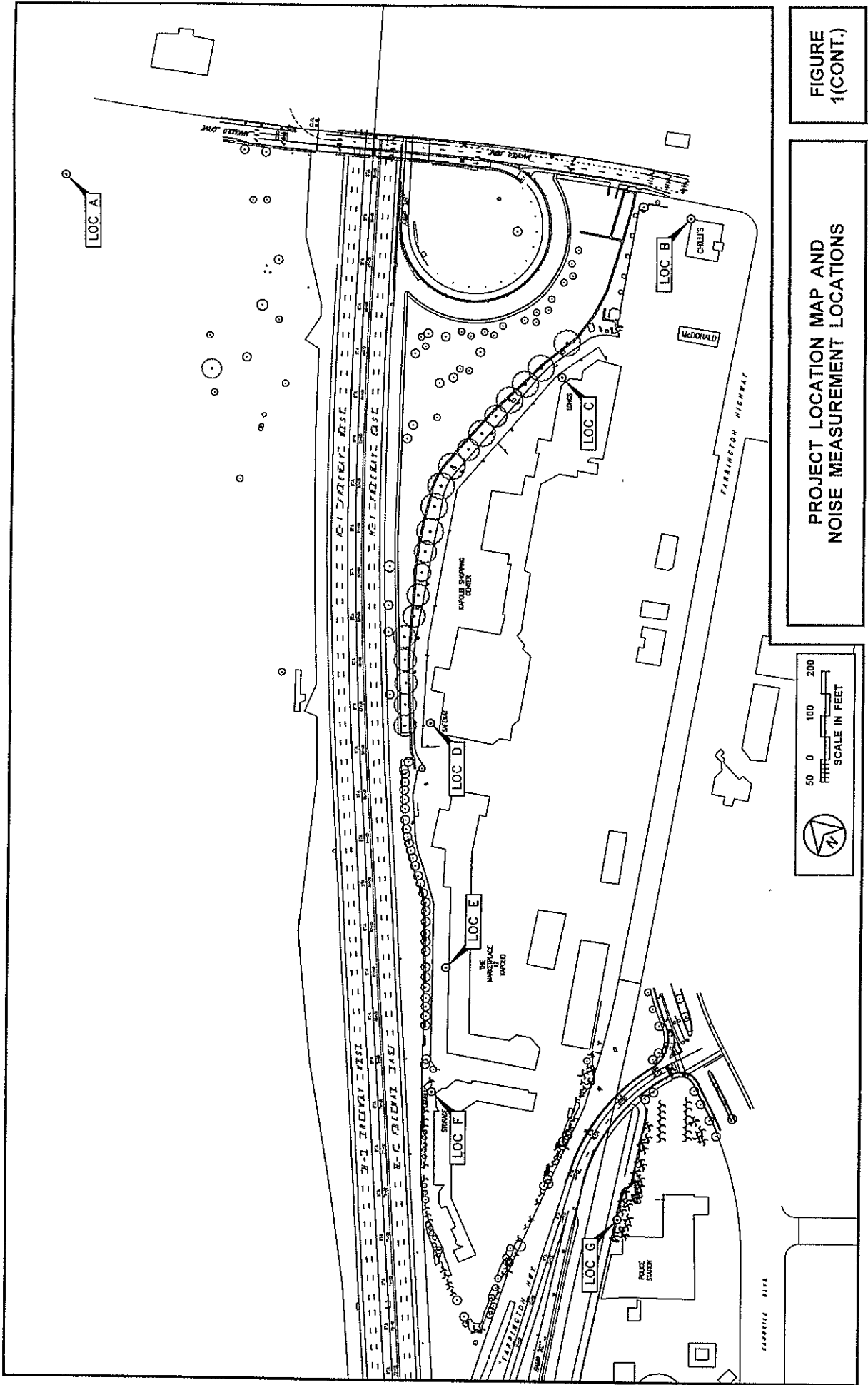


FIGURE 1(CONT.)

PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

50 0 100 200
 FEET
 SCALE IN FEET

**TABLE 1
TRAFFIC NOISE MEASUREMENT RESULTS (11/16/05 & 1/27/06)**

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<u>LOCATION</u>	<u>Time of Day (HRS)</u>	<u>Measured Leq (dB)</u>	<u>Adjusted Leq for PM Peak</u>	<u>Predicted Leq (dB)</u>	<u>Remarks</u>
A At makai end of Awana St. in Makakilo residential area (11/16/05)	1315 TO 1345	59.7	61.0	62.1	Background noise at 57.5 dB without barking dogs and aircraft noise.
B At northeast corner of Chilli's Restaurant (11/16/05)	1407 TO 1437	66.6	67.4	67.5	
C At northeast corner of Longs Drug Store (11/16/05)	1453 TO 1523	61.9	62.7	59.3	
D At northwest corner of Safeway Supermarket (11/17/05)	1320 TO 1350	69.8	71.1	70.4	Background noise at 68.8 dB without traffic noise from service road.
E Mauka side of the Market-place At Kapolei (11/16/05)	1536 TO 1606	69.6	69.6	69.8	
F Northeast corner of storage building. (11/16/05)	1623 TO 1653	72.5	72.5	72.6	

**TABLE 1 (CONTINUED)
TRAFFIC NOISE MEASUREMENT RESULTS (11/16/05 & 1/27/06)**

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<u>LOCATION</u>	<u>Time of Day (HRS)</u>	<u>Measured Leq (dB)</u>	<u>Adjusted Leq for PM Peak</u>	<u>Predicted Leq (dB)</u>	<u>Remarks</u>
G At northeast corner of Kapolei Police Station (11/17/05)	1535 TO 1605	60.9	60.9	61.4	
H At northwest corner of Credit Union Building (11/17/05)	1420 TO 1450	65.4	65.4	56.0	Background noise controlled by noise from Bus Station.
I At northeast corner of Kapolei Theatres Building (11/17/05)	1453 TO 1523	61.9	62.7	61.7	
J At mauka side of K-Mart Building (11/15/05)	1545 TO 1615	70.2	70.2	67.5	
K At mauka corner of Home Depot Building (11/15/05)	1631 TO 1701	60.2	60.4	60.1	
WP1 At Ticket Booth, Hawaiian Waters Adventure Park (1/27/06)	1234 TO 1236	58.7	60.2	57.9	Mostly people and water feature noise.

TABLE 1 (CONTINUED)
TRAFFIC NOISE MEASUREMENT RESULTS (11/16/05 & 1/27/06)

<u>LOCATION</u>	<u>Time of Day (HRS)</u>	<u>Measured Leq (dB)</u>	<u>Adjusted Leq for PM Peak</u>	<u>Predicted Leq (dB)</u>	<u>Remarks</u>
WP2 At Gift Shop, Hawaiian Waters Adventure Park (1/27/06)	1238 TO 1243	61.3	62.8	58.8	H-1 Freeway and Farrington Highway noise.
WP3 West of Teen Pool, Hawaiian Waters Adventure Park (1/27/06)	1245 TO 1253	63.6	63.6	59.3	Mostly water noise; some Farrington Highway noise.
WP4 South of Water Slide Pool, Hawaiian Waters Adventure Park (1/27/06)	1255 TO 1259	69.1	69.1	60.9	Mostly water fall noise from two slides.
WP5 Below Tower at U-Slide, Hawaiian Waters Adventure Park (1/27/06)	1303 TO 1308	68.8	70.1	67.2	Traffic noise and people talking. 5 dB added to TNM prediction.
WP6 At Wave Pool Seating, Hawaiian Waters Adventure Park (1/27/06)	1311 TO 1315	68.7	68.7	56.4	PA System music; water noise, and people screaming.
WP7 At Hawaii Luau Shed, Hawaiian Waters Adventure Park (1/27/06)	1318 TO 1348	65.6	66.9	66.3	Mostly H-1 Freeway noise; some mechanical equipment. 5.5 dB added to TNM prediction.

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TABLE 1 (CONTINUED)
TRAFFIC NOISE MEASUREMENT RESULTS (11/16/05 & 1/27/06)

<u>LOCATION</u>	<u>Time of Day (HRS)</u>	<u>Measured Leq (dB)</u>	<u>Adjusted Leq for PM Peak</u>	<u>Predicted Leq (dB)</u>	<u>Remarks</u>
WP8 At Kauai Luau Shed, Hawaiian Waters Adventure Park (1/27/06)	1350 TO 1356	59.0	59.0	55.1	Mostly music from PA System.
WP9 At Oahu Luau Shed, Hawaiian Waters Adventure Park (1/27/06)	1357 TO 1416	61.4	61.4	58.0	Mostly music from PA System; some freeway noise.
WP10 Large Water Slide Pool, Hawaiian Waters Adventure Park (1/27/06)	1420 TO 1423	65.9	65.9	57.3	Mostly water fall noise from large slides.

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TABLE 2
TRAFFIC NOISE MEASUREMENT RESULTS (1/31/06 & 2/2/06)

	<u>LOCATION</u>	<u>Time of Day (HRS)</u>	<u>Measured Leq (dB)</u>	<u>Adjusted Leq for PM Peak</u>	<u>Predicted Leq (dB)</u>	<u>Remarks</u>
A	At makai end of Awana St. in Makakilo residential area (2/2/06)	1513 TO 1528	59.5	59.5	62.1	
B	At northeast corner of Chilli's Restaurant (1/31/06)	1216 TO 1232	64.3	65.8	67.5	
C	At northeast corner of Longs Drug Store (1/31/06)	1256 TO 1311	59.7	61.1	59.3	
D	At northwest corner of Safeway Supermarket (1/31/06)	1319 TO 1334	69.5	70.8	70.4	5 dB added to TNM prediction.
E	Mauka side of the Market-place At Kapolei (1/31/06)	1339 TO 1354	66.8	66.1	69.8	
F	Northeast corner of storage building. (1/31/06)	1500 TO 1600	72.8	72.8	72.6	

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TABLE 2 (CONTINUED)
TRAFFIC NOISE MEASUREMENT RESULTS (1/31/06 & 2/2/06)

	<u>LOCATION</u>	<u>Time of Day (HRS)</u>	<u>Measured Leq (dB)</u>	<u>Adjusted Leq for PM Peak</u>	<u>Predicted Leq (dB)</u>	<u>Remarks</u>
F	Northeast corner of storage building. (2/2/06)	1500 TO 1600	74.5	74.5	72.6	Freeway surface wet from light rain.
G	At northeast corner of Kapolei Police Station (1/31/06)	1552 TO 1607	62.6	63.0	61.4	
H	At northwest corner of Credit Union Building (1/31/06)	1405 TO 1420	62.0	62.0	56.0	
I	At northeast corner of Kapolei Theatres Building (1/31/06)	1426 TO 1442	64.7	65.5	61.7	See 2/2/06 data for better agreement with TNM prediction.
I	At northeast corner of Kapolei Theatres Building (2/2/06)	1639 TO 1654	61.1	61.3	61.7	
J	At mauka side of K-Mart Building (1/31/06)	1450 TO 1505	67.1	67.5	67.5	

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Figure 2 depicts the results of hourly noise measurements at Location "F" obtained on January 31, 2006. Figure 3 depicts the predicted hourly noise level variations along H-1 Freeway over a 24-hour period from traffic counts contained in Reference 5. From the results shown in Figures 2 and 3, it was concluded that the hourly traffic noise levels along the freeway do not vary more than 2 Leq between the am and pm peak hours, and that the hour with the highest noise level was the pm peak hour. From Reference 5, total two-way traffic volumes along H-1 Freeway, in vehicles per hour, (or vph) were generally highest during the pm peak hour (3,386 vph), with the am peak hour volume (3,130 vph) being only slightly lower. From Reference 2, total two-way traffic volume assignments were also highest during the pm peak hour (3,870 vph), with the am peak hour volume (2,995 vph) also being lower. For noise modeling purposes, the traffic noise levels were considered to be highest during the pm peak hour, with average hourly noise levels between the am and pm peak hours being approximately 1.5 dB less than the pm peak hour value.

The Equivalent (or Average) Hourly Sound Level [Leq(h)] noise descriptor was used to calculate the Base Year and CY 2030 traffic noise levels as required by Reference 6. Aerial photomaps, topographic maps, and project plans (where available) of the area were used to determine terrain, ground cover, and local shielding effects from building structures, which were entered into the noise prediction model.

Future year (2030) traffic noise levels were then developed for the Build (roadway improvement) Alternative using the future traffic assignments of Reference 2, the topographic and existing development features described previously, and the new roadway ramps and roadways under the Build Alternative. Forecast traffic mixes and speeds for Year 2030 were assumed to be similar to Base Year values. The pm peak hour traffic volumes used to model CY 2030 traffic noise levels were obtained from Reference 2.

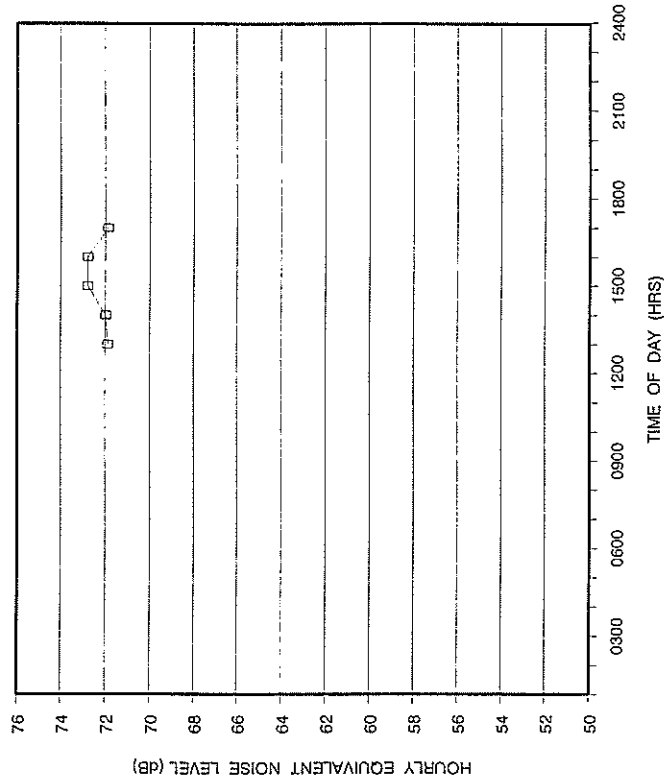
Impact Assessments and Mitigation. Following the calculation of the future traffic noise levels, evaluations of the future traffic noise levels and impacts at noise sensitive and commercial use receptor locations along H-1 Freeway were made. Comparisons of predicted future traffic noise levels with FHWA and HDOT noise abatement criteria (see Table 3) were made to determine specific locations within the project limits of construction where the noise abatement criteria are expected to be exceeded. In addition, HDOT's criteria of "greater than 15 dB increase above existing background noise levels" was also used as a noise abatement threshold for this project (from Reference 7). Along the project corridor, the predicted future traffic noise levels were compared with the 66 and 71 Leq(h) traffic noise criteria for Activity Categories B and C, respectively (see Table 3). HDOT's 66 Leq(h) and the "greater than 15 dB increase" criteria were both applied to all noise sensitive buildings along the project corridor, since, by Reference 7, HDOT has replaced the FHWA 67 Leq(h) criteria with their 66 Leq(h) criteria. At the commercial establishments along the project corridor, HDOT's 71 Leq(h) noise abatement criteria was applied to identify commercial establishments where noise abatement measures may also be applied. Where noise mitigation

TABLE 2 (CONTINUED)
TRAFFIC NOISE MEASUREMENT RESULTS (1/31/06 & 2/2/06)

LOCATION	Time of Day	Measured Leq (dB)	Adjusted Leq for PM Peak	Predicted Leq (dB)	Remarks
	(HRS)				
K At mauka corner of Home Depot Building (1/31/06)	1522 TO	63.0	63.0	60.1	See 2/2/06 data for better agreement with TNM prediction.
	1537				
K At mauka corner of Home Depot Building (2/2/06)	1618 TO	61.1	61.3	60.1	
	1633				
WP7 At Hawaii Luau Shed, Hawaiian Waters Adventure Park (2/2/06)	1547 TO	66.2	66.2	66.3	5.5 dB added to TNM prediction.
	1602				

FIGURE 2

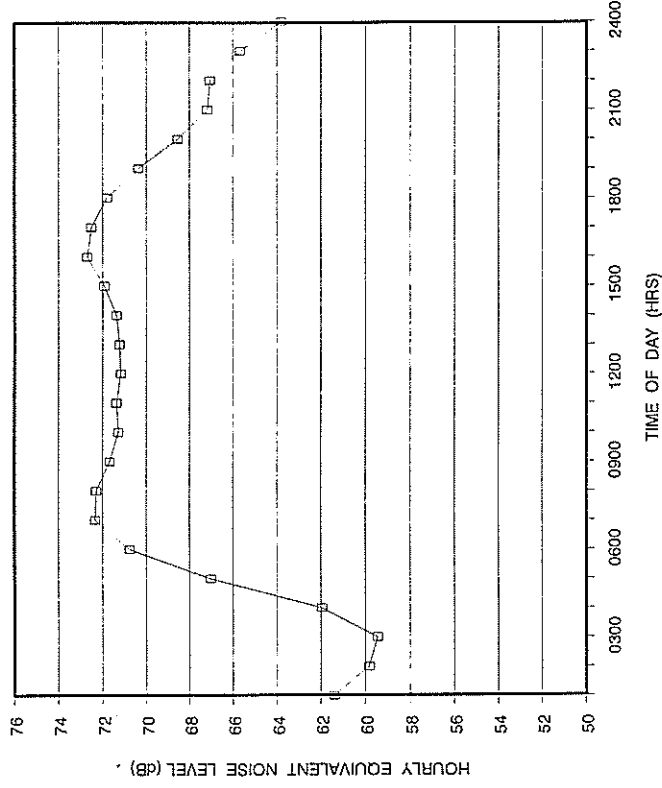
HOURLY VARIATIONS OF TRAFFIC NOISE AT 120 FEET
 SETBACK DISTANCE FROM THE CENTERLINE OF
 H-1 FREEWAY MEASURED AT LOCATION "F"
 (JANUARY 31, 2006)



□ Measured Traffic Noise At Location "F"

FIGURE 3

HOURLY VARIATIONS OF TRAFFIC NOISE AT 120 FT
 SETBACK DISTANCE FROM THE CENTERLINE OF
 H-1 FREEWAY AT LOCATION "F"
 (JANUARY 22 - 23, 2002)



□ 120 FT from Roadway Centerline (74.3 DNL)

TABLE 3

FHWA & HDOT NOISE ABATEMENT CRITERIA
[Hourly A –Weighted Sound Level – – Decibels (dBA)]

measures were indicated for this project, the effectiveness of sound attenuating barriers and other possible noise mitigation measures were evaluated. The ability to meet HDOT's criteria of 5 dBA noise reduction was also examined for various noise barrier heights.

<u>ACTIVITY CATEGORY</u>	<u>LEQ (h)*</u>	<u>DESCRIPTION OF ACTIVITY CATEGORY</u>
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the areas are to continue to serve their intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, activity sports areas, parks, residences, motels, hotels, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	-----	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

 * The Hawaii State Department of Transportation, Highways Division, utilizes Leq criteria levels which are 1 Leq unit less than the FHWA values shown.

CHAPTER III. EXISTING ACOUSTICAL ENVIRONMENT

For the purposes of this study, 2005 was used as the Base Year for calculating changes in traffic noise levels associated with the Build Alternative in CY 2030. The Base Year noise environment along the project corridor was described by calculating the Hourly Equivalent Sound Levels [Leq(h)] along the existing freeway and ramps, Farrington Highway, and Makakilo Drive during the pm peak traffic hour for the 2005 time period. The hourly sound levels, expressed in decibels, represent the average levels of traffic noise along these roadway sections within the study area during the pm peak hour of the study's Base Year. The study area was defined as those lands mauka and makai of H-1 Freeway between Makakilo and Palailai Interchanges. Land areas east of Makakilo Interchange were considered to be beyond the limits of project construction. Land areas west of Palailai Interchange were within the limits of project construction, but were excluded from the noise study area because they are totally vacant or under development. The developed areas mauka of H-1 Freeway include residences near the Palailai Street intersection along Makakilo Drive, and the Hawaiian Waters Adventure Park located mauka of Farrington Highway at the Palailai Interchange. The developed areas makai of H-1 Freeway include the commercial Kapolei developments mauka of Farrington Highway and Kamokila Boulevard, a police station, and movie theaters.

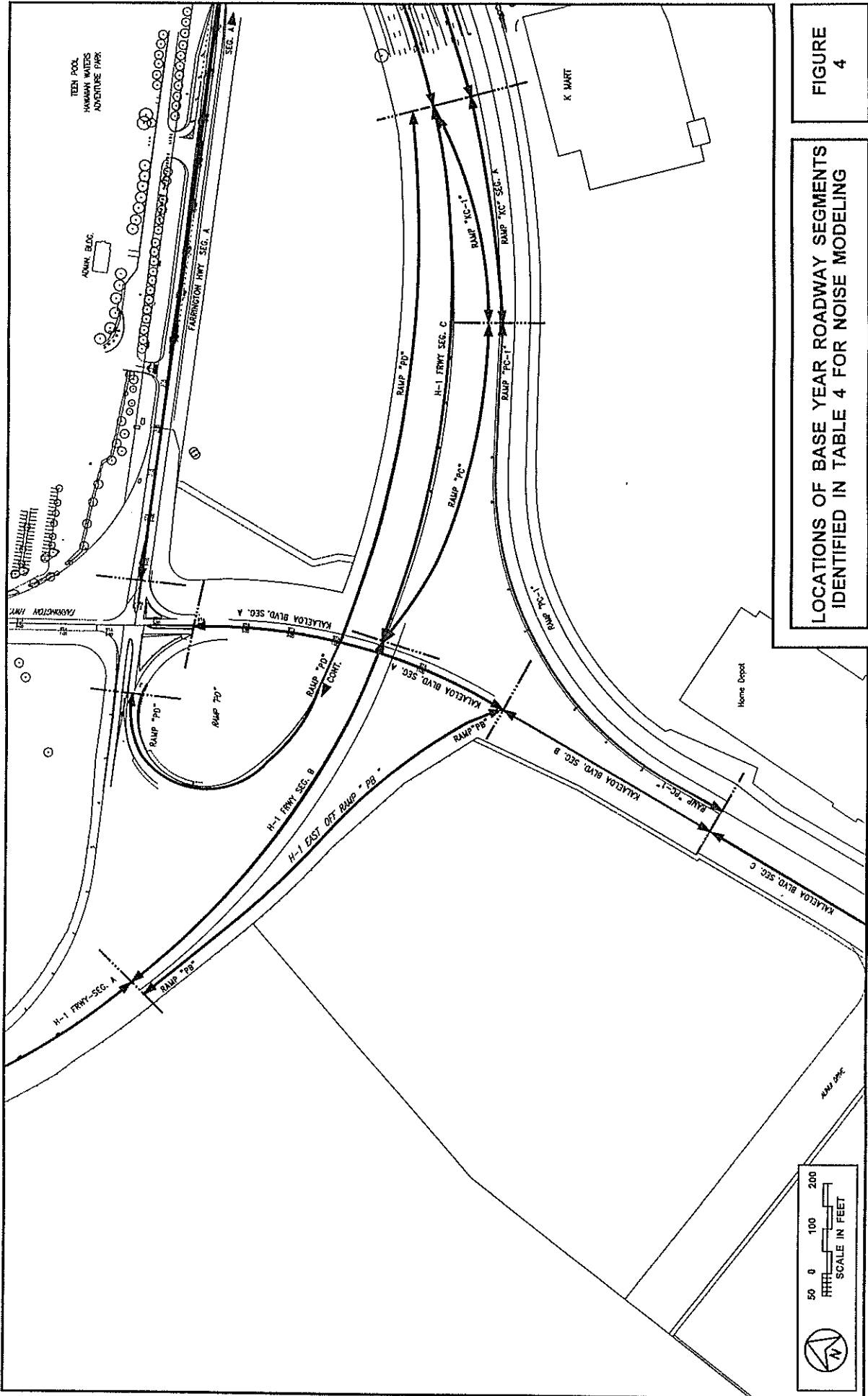
The traffic volume, speed, and mix assumptions used to calculate the Base Year noise levels during the pm peak hour along H-1 Freeway, its ramps, and adjacent roadways are shown in Table 4. The locations of the roadway segments listed in Table 4 are shown in Figure 4. Comparisons of the predicted traffic noise levels with the noise measurement results at Locations "A" through "N" and "WP1" through "WP10" are shown in Tables 1 and 2. In Tables 1 and 2, the noise levels in the "Predicted Leq (dB)" column were determined from the TNM model run for the pm peak hour of the Base Year. The measured traffic noise levels obtained during the off peak periods were adjusted upward to reflect expected noise levels at those locations during the pm peak hour. The possible reasons for large differences between the measured (as adjusted) and predicted traffic noise levels were indicated in Tables 1 and 2. The results of Table 1 and Table 2 were used to determine where the TNM model predictions were good, fair, or poor.

Based on the results shown in Table 1 and Table 2, the following conclusions were possible regarding Base Year traffic noise levels in the project study area:

1. Existing (or Base Year) traffic noise levels do not exceed the HDOT noise abatement criteria level of 71 Leq for Activity Category C except at Location "F";
2. Existing (or Base Year) traffic noise levels do not exceed the HDOT noise abatement criteria level of 66 Leq for Activity Category B at the closest Makakilo residences;

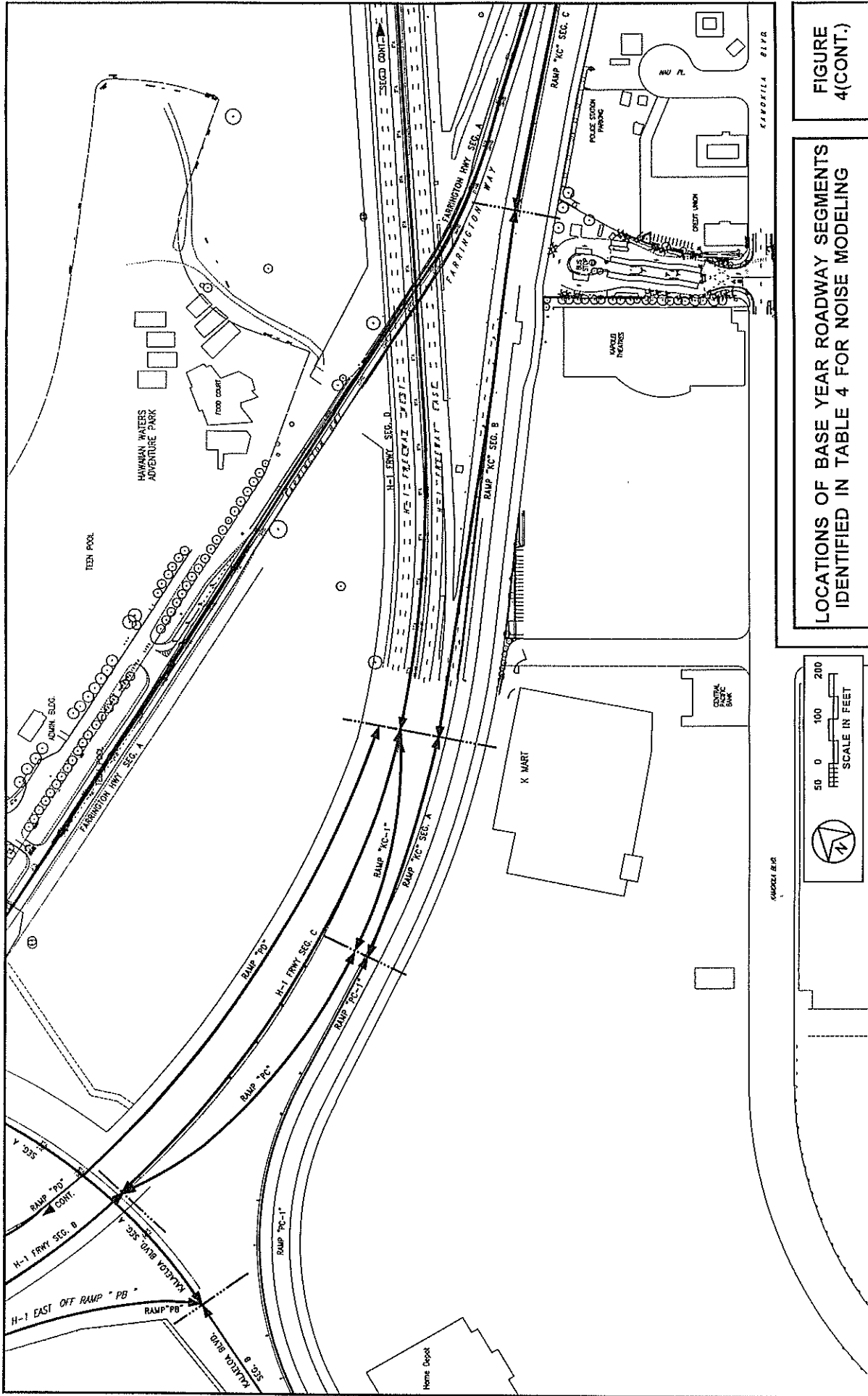
TABLE 4
CY 2005 TRAFFIC VOLUME AND SPEED MODELING ASSUMPTIONS

ROADWAY_SECTION	SPEED (MPH)	AUTOS/HR	MEDIUM TRUCKS/HR	HEAVY TRUCKS/HR	TOTAL VPH
<u>Makakilo Drive</u>					
Segment A	40	3,109	48	48	3,205
Segment B	40	2,741	42	42	2,825
Segment C	40	2,386	37	37	2,460
<u>Ramp MA</u>	45	683	11	11	705
<u>Ramp MB</u>	45	315	5	5	325
<u>Ramp MC</u>	45	1,960	30	30	2,020
<u>Farrington Highway</u>					
Segment A	45	604	9	9	622
Segment B	45	1,102	17	17	1,136
<u>Ramp KC</u>	55	476	7	7	480
Segment A	55	476	7	7	490
Segment B	45	476	7	7	490
<u>Ramp PC</u>	45	378	6	6	390
<u>Kahaloa Boulevard</u>					
Segment A	45	849	13	13	875
Segment B	45	700	11	11	722
Segment C	45	1,973	31	31	2,035
<u>Ramp PC-1</u>	45	1,131	17	17	1,165
<u>Ramp PB</u>	45	156	2	2	160
<u>Ramp PD</u>	45	282	4	4	290
<u>H-1 Freeway</u>					
Segment A	59	2,911	77	77	3,055
Segment B	59	2,759	73	73	2,905
Segment C	59	2,389	63	63	2,515
Segment D	59	3,676	97	97	3,870
Segment E	59	6,574	173	173	6,920
<u>Ramp KC-1</u>	55	1,011	27	27	1,065



LOCATIONS OF BASE YEAR ROADWAY SEGMENTS IDENTIFIED IN TABLE 4 FOR NOISE MODELING

FIGURE 4



LOCATIONS OF BASE YEAR ROADWAY SEGMENTS IDENTIFIED IN TABLE 4 FOR NOISE MODELING

FIGURE 4(CONT.)

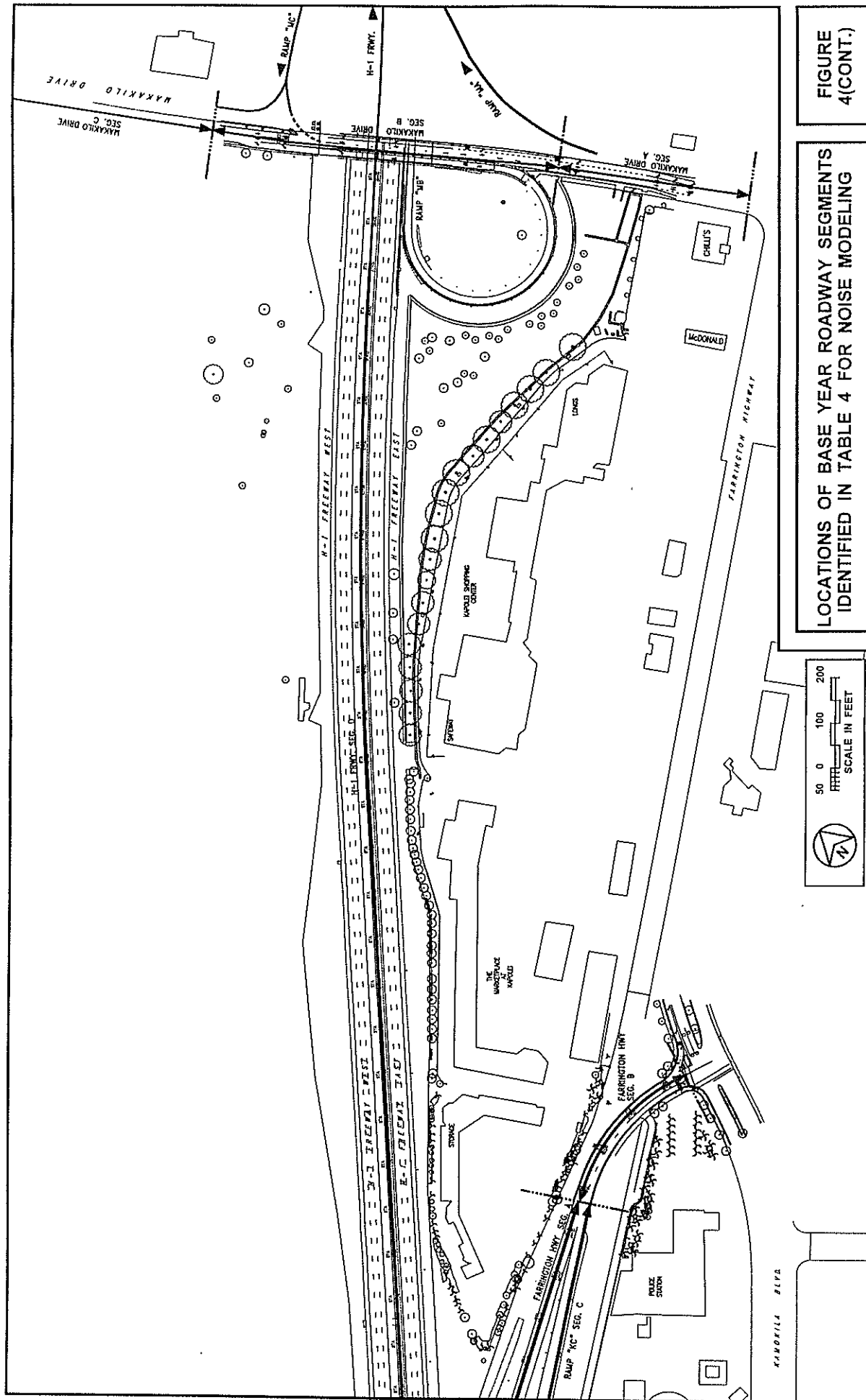
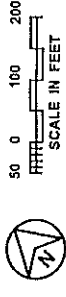


FIGURE 4(CONT.)

LOCATIONS OF BASE YEAR ROADWAY SEGMENTS IDENTIFIED IN TABLE 4 FOR NOISE MODELING



3. Existing (or Base Year) traffic noise levels exceed the HDOT noise abatement criteria level of 66 Leq for Activity Category B at the Hawaiian Waters Adventure Park. Measured traffic noise levels exceeded the 66 Leq criteria at Locations "WP5" and "WP7".

4. Existing (or Base Year) traffic noise levels as predicted by the TNM were approximately 5 dB lower than measured values at Locations "WP5" and "WP7". TNM model outputs at these two receptor locations were therefore increased by 5.0 to 5.5 dB to compensate for these differences between measured and modeling results as indicated in Tables 1 and 2; and

5. At some locations, such as Location "C", "D", and Location "H", local traffic and bus terminal activity instead of high speed roadway traffic were the dominant contributors to the measured traffic noise levels. At the Hawaiian Waters Adventure Park, the measured noise levels at Locations "WP4" and "WP6" were dominated by water feature and people noise sources. It was not possible to determine an exceedance of the HDOT noise abatement criteria at these measurement locations for these reasons.

CHAPTER IV. DESCRIPTION OF FUTURE TRAFFIC NOISE LEVELS

The future traffic noise levels in the immediate vicinity of the project between Makakilo Interchange and Paliwai Interchange were evaluated for the Build Alternative through CY 2030. The locations of the various roadway improvements included in modeling CY 2030 traffic noise levels are shown in Figure 5. The same methodology that was used to calculate the Base Year noise levels was also used to calculate the Year 2030 noise levels. It should be noted that forecast traffic volumes used to evaluate 2030 noise levels were obtained from Reference 2. The 2030 average vehicle speeds and traffic mix were assumed to be identical to the Base Year values. The traffic volume, speed, and mix assumptions used to calculate the Year 2030 noise levels during the pm peak hour along H-1 Freeway, its ramps, and adjacent roadways are shown in Table 5. The locations of the existing and future roadway segments listed in Table 5 are shown in Figure 6.

The primary differences in freeway configuration between the No Build and Build Alternatives are shown in Figure 5. The project improvements include:

- An extension of Wakea Street over H-1 Freeway.
- The addition of a two-way, Mauka Frontage Road connecting Makakilo Drive and the north extension of Wakea Street.
- The addition of a new westbound On-Ramp MD at Makakilo Drive.
- The addition of a new westbound Off-Ramp KA to the north extension of Wakea Street and the new Mauka Frontage Road.
- The addition of a new westbound Off-Ramp PE to the mauka section of Farrington Highway and Hanua Street.
- The addition of a westbound connector road from the Mauka Frontage Road to the mauka section of Farrington Highway.
- The relocation of eastbound Off-Ramp KC from Farrington Highway to the extension of Wakea Street.
- The connection of the mauka section of Farrington Highway eastbound lanes to the extension of Wakea Street.
- The addition of a new eastbound On-Ramp KD from the extension of Wakea Street.
- Removal of the existing eastbound Off-Ramp PB onto Kalaieoa Boulevard and the addition of various ramp connections to Hanua Street.

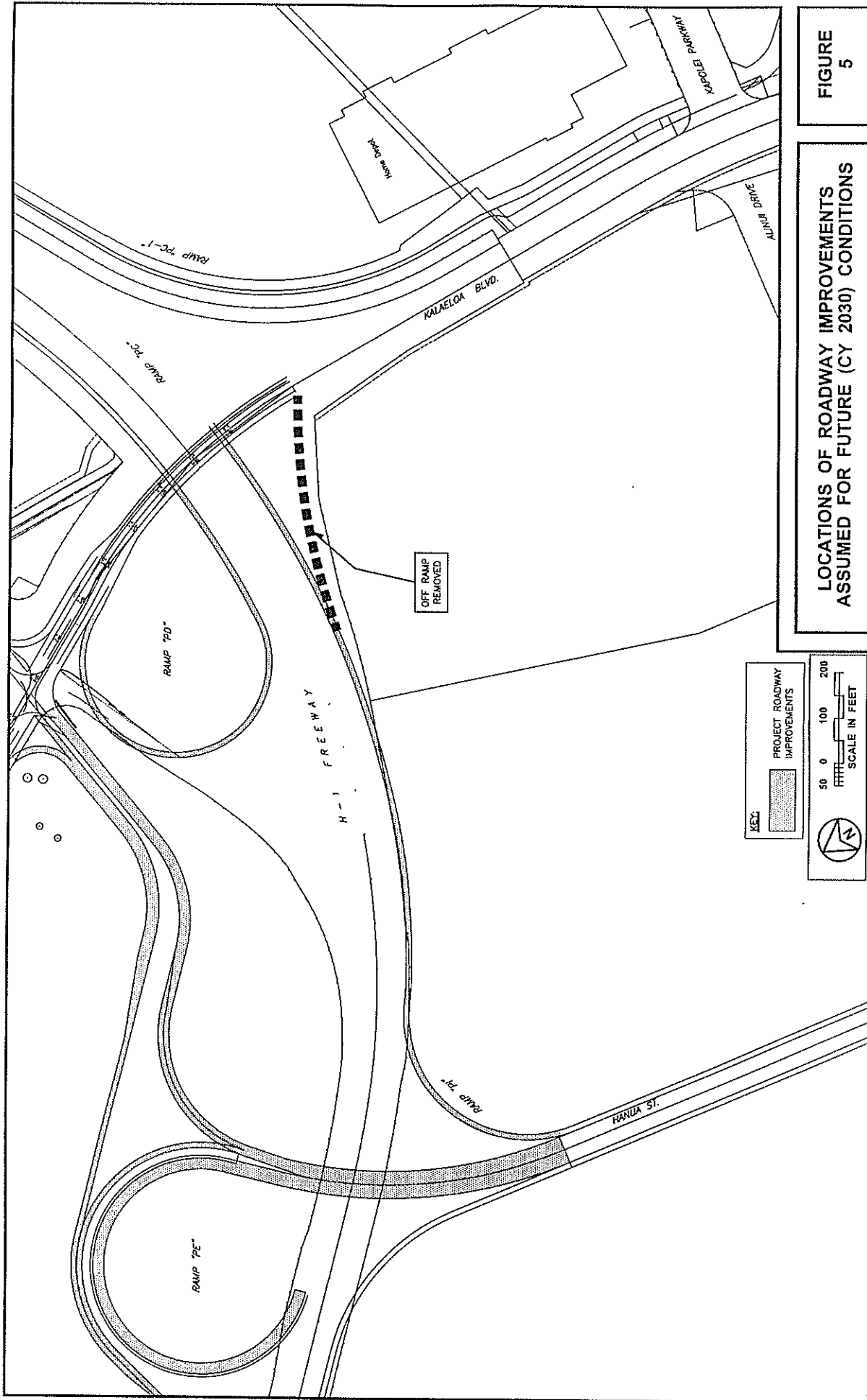


FIGURE 5

LOCATIONS OF ROADWAY IMPROVEMENTS ASSUMED FOR FUTURE (CY 2030) CONDITIONS

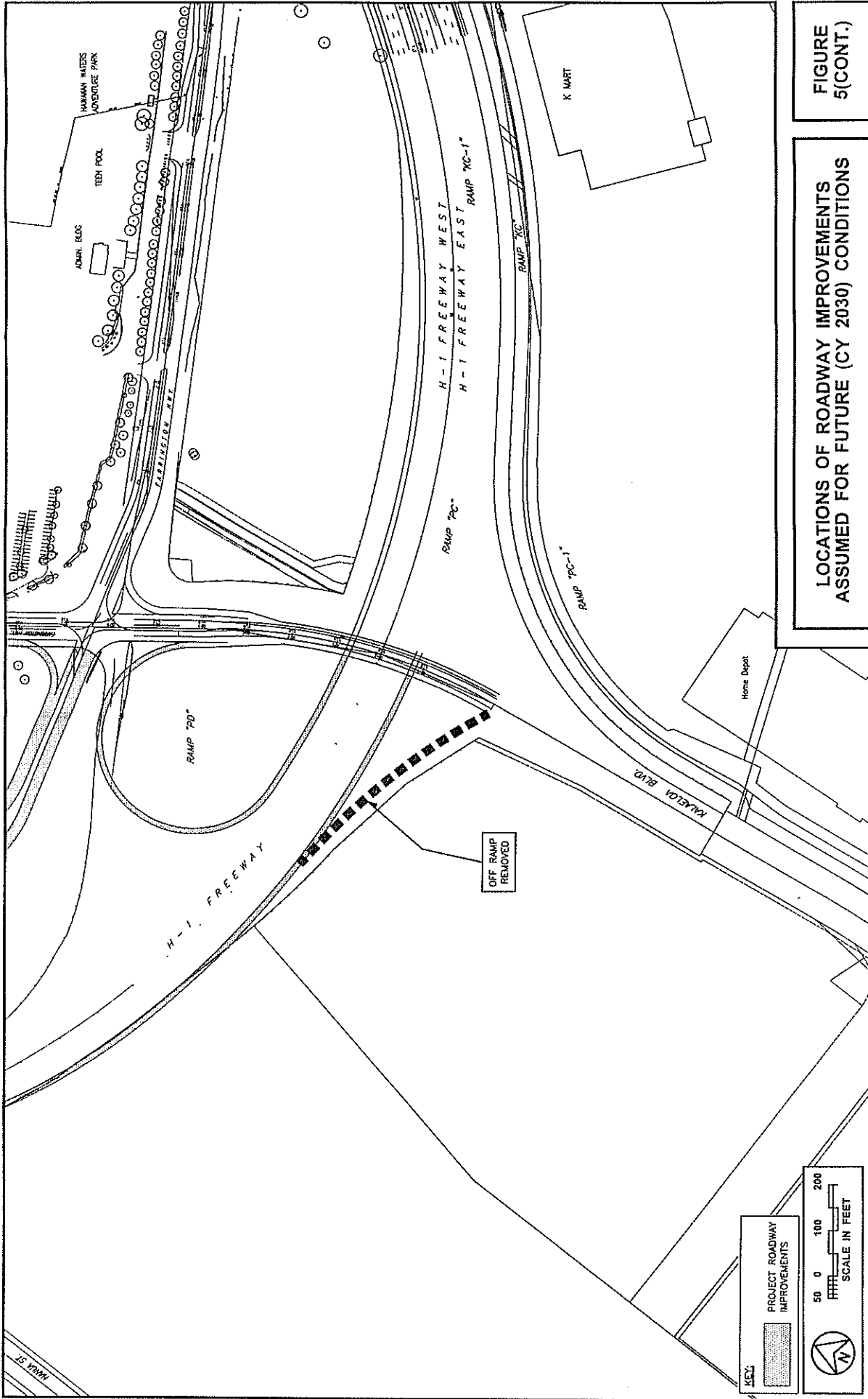


FIGURE 5 (CONT.)

LOCATIONS OF ROADWAY IMPROVEMENTS ASSUMED FOR FUTURE (CY 2030) CONDITIONS

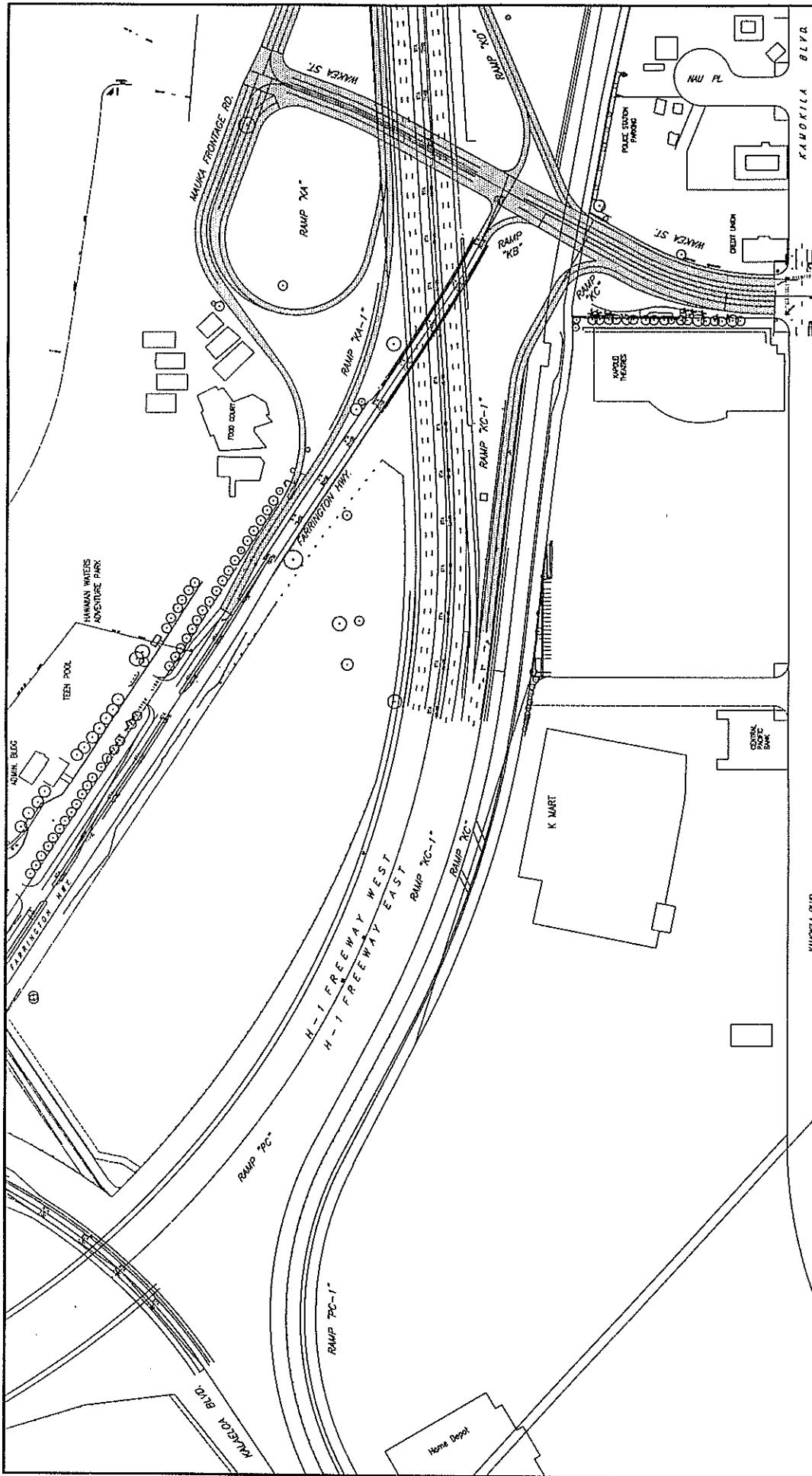
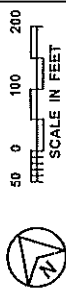


FIGURE 5 (CONT.)

LOCATIONS OF ROADWAY IMPROVEMENTS ASSUMED FOR FUTURE (CY 2030) CONDITIONS



PROJECT ROADWAY IMPROVEMENTS

Legend:

- RAmp 7A-1
- RAmp 7A
- RAmp 7B
- RAmp 7C
- RAmp 7C-1

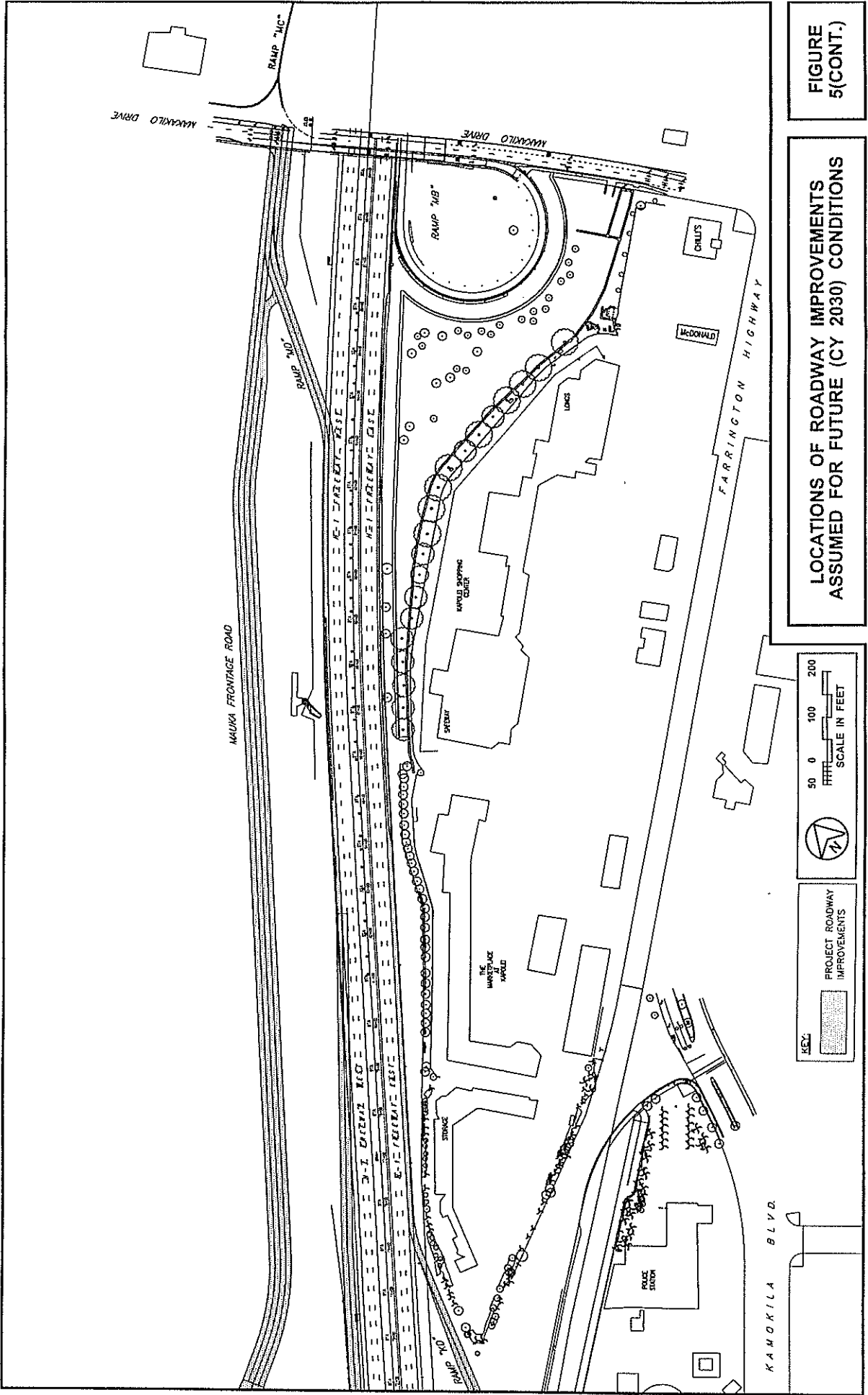
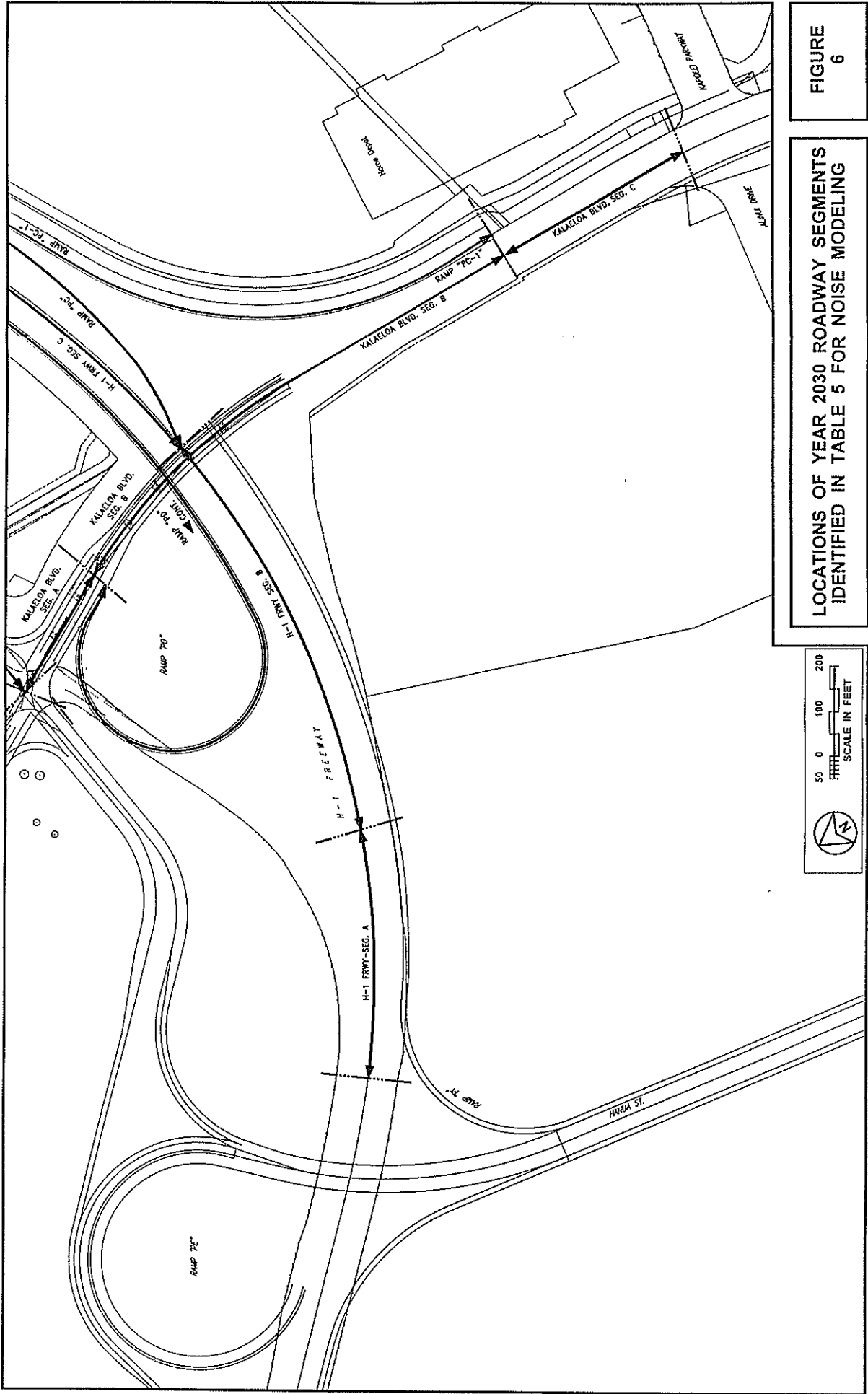


TABLE 5
CY 2030 TRAFFIC VOLUME AND SPEED MODELING ASSUMPTIONS

ROADWAY_SECTION	SPEED (MPH)	AUTOS/HR	MEDIUM TRUCKS/HR	HEAVY TRUCKS/HR	TOTAL VPH
<u>Makilo Drive</u>					
Segment A	40	3,638	56	56	3,750
Segment B	40	2,988	46	46	3,090
Segment C	40	3,638	56	56	3,750
<u>Ramp MA</u>	45	814	13	13	840
<u>Ramp MB</u>	45	224	3	3	230
<u>Ramp MC</u>	45	1,784	28	28	1,840
<u>Mauka Frontage Road</u>					
Segment A	45	927	14	14	955
Segment B	35	552	9	9	570
Segment C	35	640	10	10	660
<u>Ramp MD</u>	45	106	2	2	110
<u>Wakea Street</u>					
Segment A	35	3,467	54	54	3,575
Segment B	35	1,945	30	30	2,005
Segment C	35	1,910	30	30	1,970
<u>Ramp KA</u>	45	640	10	10	660
<u>Ramp KA-1</u>	45	30	0	0	30
<u>Farrington Highway</u>					
Segment A1	45	1,408	21	21	1,450
Segment A2	45	355	5	5	365
<u>Ramp KC</u>	55	703	11	11	725
Segment B	55	703	11	11	725
<u>Ramp PC</u>	45	607	9	9	625
<u>Kalaheon Boulevard</u>					
Segment A	45	1,106	17	17	1,140
Segment B	45	1,479	23	23	1,525
Segment C	45	2,678	41	41	2,760
<u>Ramp PC-1</u>	45	1,174	18	18	1,210
<u>Ramp PD</u>	45	383	6	6	395
<u>H-1 Freeway</u>					
Segment A	59	5,808	153	153	6,115
Segment B	59	5,809	153	153	6,115
Segment C	59	5,591	147	147	5,885
Segment D	59	6,845	175	175	6,995
Segment E	59	8,160	215	215	8,590
Segment F	59	8,056	212	212	8,480
<u>Ramp KC-1</u>	55	1,076	17	17	1,110



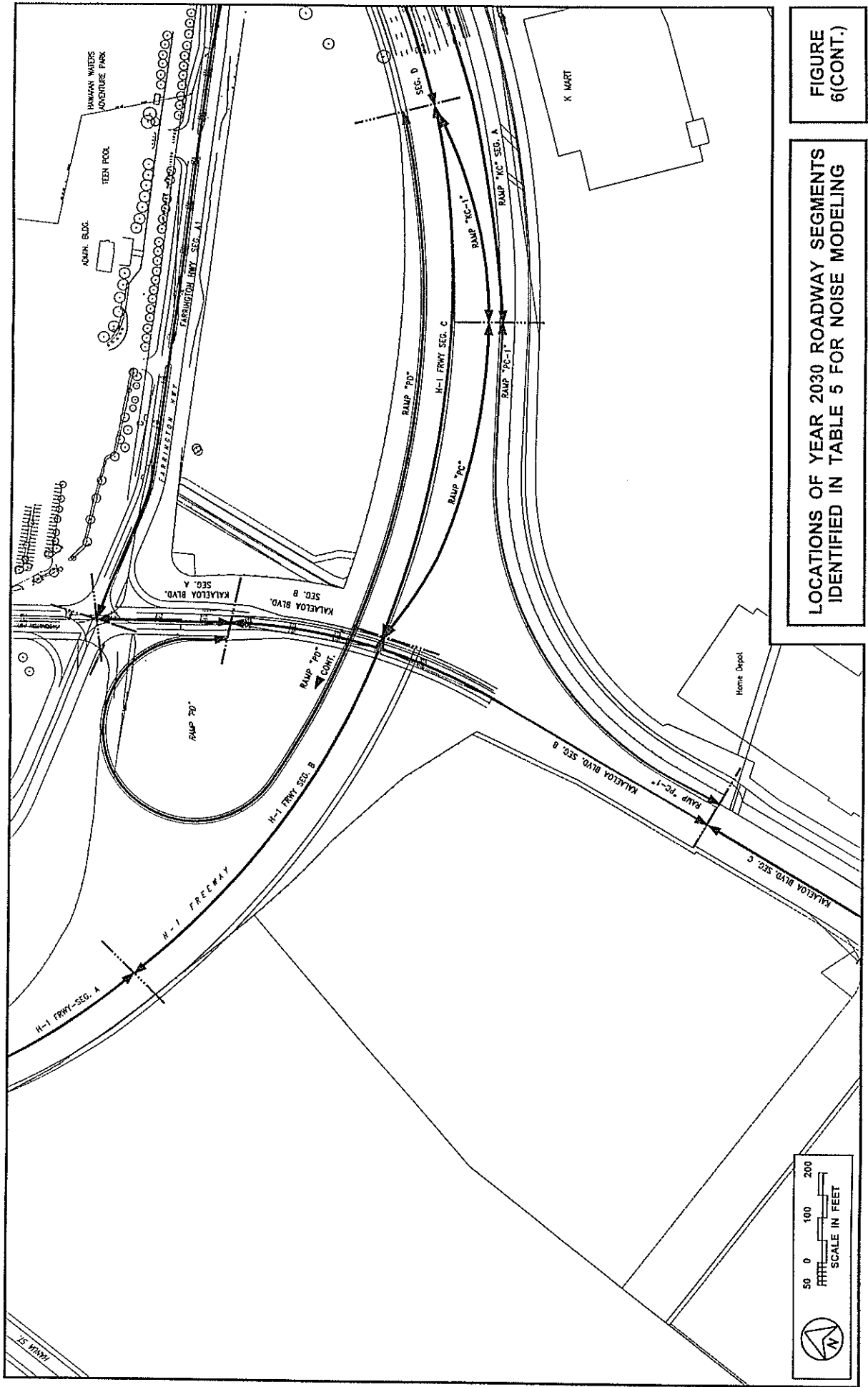


FIGURE 6(CONT.)

LOCATIONS OF YEAR 2030 ROADWAY SEGMENTS IDENTIFIED IN TABLE 5 FOR NOISE MODELING

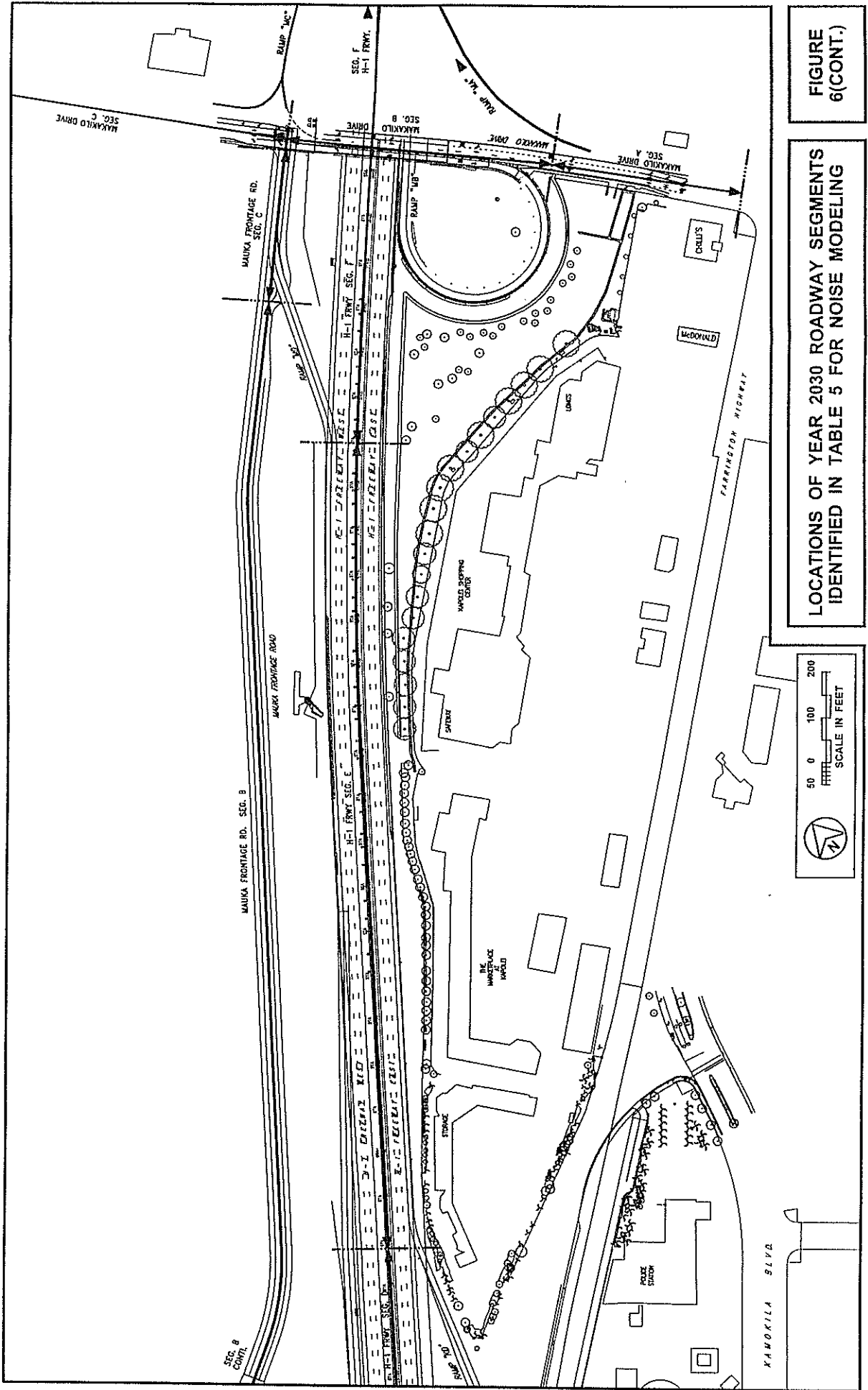


FIGURE 6(CONT.)

LOCATIONS OF YEAR 2030 ROADWAY SEGMENTS IDENTIFIED IN TABLE 5 FOR NOISE MODELING

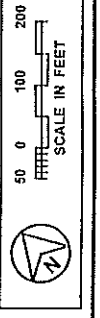


Table 6 presents the future traffic noise level predictions at measurement Locations "A" through "N" and "WP1" through "WP10" for CY 2030 using the traffic volume forecasts contained in Reference 2, which are reproduced in Table 5. Where large differences were present between the measured and modeled noise levels during the Base Year (see Tables 1 and 2), the differences between measured and modeled noise levels during the Base Year were used to adjust the predicted noise levels for future conditions. For example, the TNM model predictions for 2005 at measurement Locations "WP5" and "WP7" were increased by 5.0 and 5.5 dB, respectively, to adjust for differences between measured and TNM predicted traffic noise levels. So for future conditions at Locations "WP5" and "WP7", the TNM modeled traffic noise levels were also increased by 5.0 and 5.5 dB prior to their entry into Table 6. In addition, where background ambient (or non-traffic) noise levels (from people, bus transit station, PA System, or water fall noise) were included in the Base Year noise levels, these background ambient noise levels were added to traffic noise components obtained from the TNM model predictions. These adjustments for background ambient noise were performed at Locations "WP2", "WP3", "WP4", "WP5", "WP6", "WP9", "WP10", and "H" (existing only).

By CY 2030, the Makakilo residential lands currently within the study area and within Activity Category B should not be exposed to traffic noise levels at or greater than the HDOT noise abatement criteria of 66 Leq(h). Therefore, traffic noise mitigation measures at existing noise sensitive residential developments within the study area should not be required.

By CY 2030, two locations within the Hawaiian Waters Adventure Park and in Activity Category B will be exposed to noise levels at or greater than the HDOT noise abatement criteria of 66 Leq(h) solely due to traffic noise. These exceedances are preexisting at Locations "WP5" and "WP7".

By CY 2030, three locations ("D", "E", and "F") along the mauka boundary of Kapolei Shopping Center and in Activity Category C will be exposed to noise levels at or greater than the HDOT noise abatement criteria of 71 Leq(h) solely due to traffic noise. These exceedances are due to preexisting conditions at Location "F", and due to the background growth of traffic volumes on H-1 Freeway, rather than due to the implementation of the Kapolei Interchange project.

The following general conclusions can be made in respect to the number of impacted structures and lands which can be expected by CY 2030 under the Build Alternative. These conclusions are valid as long as the future vehicle mixes and average speeds do not differ from the assumed values.

- The HDOT's "greater than 15 dB increase" criteria for substantial change in traffic noise levels will not be exceeded at any receptor location within the study area. Maximum increases in traffic noise levels at any receptor location in the

TABLE 6
EXISTING AND FUTURE TRAFFIC NOISE LEVELS
(4.92 FT RECEPTOR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING	FUTURE (CY 2030) Leq	
		(CY 2005) Leq	W/O WALLS / (CHANGE)	-----
Receiver A	PM	62.1	63.6	/ 1.5
Receiver B	PM	67.5	68.4	/ 0.9
Receiver C	PM	62.7	65.6	/ 2.9
Receiver D	PM	70.4	74.6	/ 4.2 **
Receiver E	PM	69.8	73.7	/ 3.9 **
Receiver F	PM	72.6 **	76.3	/ 3.7 **
Receiver G	PM	61.4	59.4	/ -2.0
Receiver H	PM	65.4	67.9	/ 2.5
Receiver I	PM	61.7	62.4	/ 0.7
Receiver J	PM	67.5	70.2	/ 2.7
Receiver K	PM	60.1	62.3	/ 2.2
Receiver WP1	PM	57.9	61.8	/ 3.9
Receiver WP2	PM	62.8	66.0	/ 3.2
Receiver WP3	PM	63.6	66.3	/ 2.7
Receiver WP4	PM	69.1	70.6	/ 1.5
Receiver WP5	PM	70.1 *	71.9	/ 1.8 *
Receiver WP6	PM	68.7	69.3	/ 0.6
Receiver WP7	PM	67.1 *	69.7	/ 2.6 *
Receiver WP8	PM	58.0	61.7	/ 3.7
Receiver WP9	PM	61.4	64.9	/ 3.5
Receiver WP10	PM	65.9	67.6	/ 1.7

Notes:

- All receivers were assumed to be at 4.92 feet above ground level.
- * Denotes exceedance of HDOT "66 Leq" criteria for Activity Category B.
- ** Denotes exceedance of HDOT "71 Leq" criteria for Activity Category C.

study area should not exceed 4.2 dB as a result of growth in traffic volumes and construction of additional ramps, the Mauka Frontage Road, and the Wakea Street extension and overpass.

- Under the Build Alternative, future traffic noise levels at three commercial buildings on the makai side of H-1 Freeway will exceed the HDOT 71 Leq(h) noise abatement criteria for Activity Category C. Because these commercial establishments do not contain noise sensitive occupants and are acoustically isolated from exterior noise through the use of closed ventilation openings and air conditioning, risks of adverse noise impacts at these commercial establishments are considered to be very low.
- The future traffic noise levels at two locations near the makai property boundary of the Hawaiian Waters Adventure Park are expected to exceed the HDOT 66 Leq(h) noise abatement criteria for Activity Category B. Of these two locations, only one (Location "WP7") in the luau assembly area is considered to be noise sensitive. The exceedance of the 66 Leq(h) criteria at Location "WP7" is a preexisting condition, but future traffic noise levels are expected to increase due to the background growth in H-1 Freeway traffic volume and the addition of the Mauka Frontage Road ramp alongside the makai property boundary of the theme park. Mitigation of traffic noise in the luau assembly area is recommended.
- The future traffic noise levels at the Kapolei Police Station (Location "G") are expected to decline by approximately 2 dB following closure of the Farrington Highway connection to Kamokila Boulevard.

CHAPTER V. POSSIBLE NOISE MITIGATION MEASURES

Possible noise mitigation measures considered included the following:

- A. Restricting the Growth in the Number of Noisy Buses, Heavy Trucks, Motorcycles, and Automobiles with Defective Mufflers. The percentage contribution to the total traffic noise by heavy trucks, buses, and noisy vehicles is currently less than 50 percent, and elimination of these noise sources would reduce total traffic noise levels by less than 3 Leq(h) units. Restricting the growth rate of these vehicles (to growth rates below passenger automobile growth rates) could produce noise reductions in the order of 1 or 2 dB, which are not considered significant for the level of regulatory efforts required. In addition, this mitigation would not result in the minimum reduction of 5 dB required of sound attenuation measures by current HDOT policy (see Reference 7).
- B. Alteration of the Horizontal Or Vertical Alignment of the Roadway. Major alterations of the horizontal or vertical alignment of the existing freeway was not considered appropriate due to the scope of this roadway improvement project, the space required for On- and Off-Ramps, and due to the Right-of-Way constraints on both sides of the freeway. The application of noise abatement measures should be considered on both the north (mauka) and south (makai) sides of the freeway. The Category B lands at Hawaiian Waters Adventure Park are located north (mauka) of H-1 Freeway, and vacant lands to the south are not available to accommodate lateral displacement of the freeway alignment. A buffer distance of approximately 750 feet from the baseline of H-1 Freeway to the Hawaiian Waters Adventure Park lands is required. The Category C lands at Kapolei Shopping Center are located south (makai) of H-1 Freeway, and while vacant lands exist north of the freeway, major reconstruction of the freeway lanes (by approximately 100 feet toward the north) would be required. Vertical realignment of the existing freeway upward or downward would not result in significant traffic noise reductions. For these reasons, realignment of H-1 Freeway away from the affected receptors was not considered to be a reasonable noise mitigation measure.

- C. Acquisition of Property Rights for Construction of Noise Barriers, and/or Construction of Noise Barriers Along the Right-of-Way. For single story, noise sensitive buildings, construction of a sound attenuating wall along the Right-of-Way is normally the preferred noise mitigation measure. The 6 to 7 dB of noise attenuation normally achievable with a 6 feet high wall may be sufficient for single story structures. Because some of the theme park lands and commercial structures are one-story structures, construction of a sound attenuating barrier could possibly provide sufficient noise reduction benefits at the affected low-rise structures and theme park lands. Some of the affected structures where the HDOT noise abatement criteria are exceeded are in excess of 10 feet in height, and will not benefit from 6 foot high walls. In these situations, excessive barrier heights (8 to 33 feet) will be required to provide sound

attenuation to upper floor spaces, and height variances from local codes will be required to construct these high walls. It should also be noted that sound barriers will block the views to and from the freeway and beyond which some of the business owners may enjoy and/or prefer. For these reasons, concurrence from the affected property owners and commercial establishments should be obtained prior to construction of sound barriers as a noise mitigation measure.

D. Acquisition of Real Property Interests To Serve As A Noise Buffer Zone. Where tall (or multistory) structures are expected to be impacted by future traffic noise, the use of sound attenuating barriers (see para. C above) will not be practical due to the excessive heights required to shield the upper levels from traffic noise. Acquisition of the real property interests to serve as noise buffer zones were considered. However, noise buffer zones extending approximately 750 feet from the freeway's baseline and at substantial cost would be required to meet the HDOT 66 Leq criteria for the elevated receptors at Hawaiian Waters Adventure Park. In general, the acquisition of property for the creation of noise buffer zones for noise mitigation has seldom been applied in Hawaii.

E. Noise Insulation of Public Use or Nonprofit Institutional Structures. No public use or nonprofit institutional structures located within the limits of project construction are expected to be exposed to traffic noise levels which exceed the HDOT 66 Leq(h) noise abatement criteria. So sound insulation treatment of these facilities should not be required in conjunction with this project.

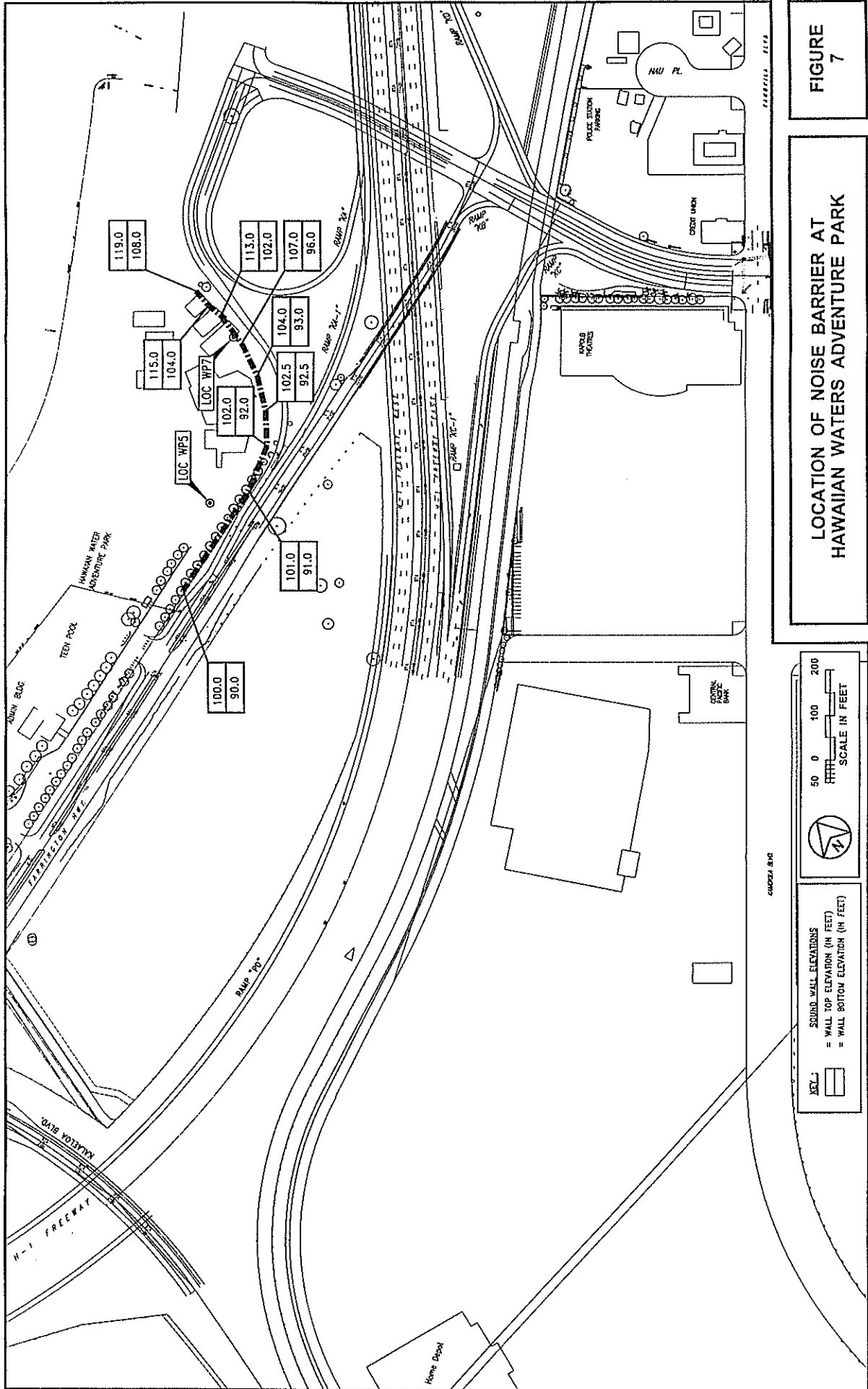
CHAPTER VI. FUTURE TRAFFIC NOISE IMPACTS AND RECOMMENDED NOISE MITIGATION MEASURES

Future traffic noise levels are predicted to exceed the HDOT 66 Leq(h) noise abatement criteria for Activity Category B in CY 2030 at two locations within Hawaiian Waters Adventure Park. In addition, CY 2030 traffic noise levels are expected to exceed the HDOT 71 Leq(h) noise abatement criteria for Activity Category C at three buildings within the Kapolei Shopping Center complex. It should be noted that most of these exceedances were present during the Base Year (CY 2005), and are attributable to the background growth of H-1 Freeway traffic noise rather than to the proposed Kapolei Interchange Project.

Figures 7 and 8 depict the locations of the sound attenuation walls which were evaluated for receptors located at ground level at the affected areas of Hawaiian Waters Adventure Park and Kapolei Shopping Center, respectively. The required top of wall elevations shown in Figures 7 and 8 are relatively high, and will be required to provide a minimum of 5 dB of sound attenuation at the affected areas. The requirement of 5 dB minimum sound attenuation for a noise mitigation measure is contained in the HDOT noise abatement policy document (Reference 7). Mitigation of future traffic noise at the upper landing of existing pedestrian tower at Location "WPS" may not be feasible, since wall heights in excess of 20 feet above the Right-of-Way elevation will be required to shield the upper landing of the tower structure from traffic noise.

At the present time, HDOT noise abatement policy (see Reference 7) addresses allowable noise mitigation costs for residential receptors, and allows approximately \$35,000 per benefited residence. For theme parks or commercial buildings, the HDOT noise abatement policy is silent on allowable costs for noise mitigation measures such as a sound attenuating wall. For this reason, determination of the reasonableness and feasibility of the sound attenuating walls shown in Figures 7 and 8 would need to be determined from considerations other than those contained within Reference 7.

For commercial properties, the construction of a sound attenuating wall, which would block the view of the commercial properties from the freeway and ramps, may be detrimental in eliminating exposure of the commercial structures to the traveling public. The benefits of the 5 dB of sound attenuation provided by the sound attenuating wall may also not be realized within the commercial structures, since they are currently enclosed and air conditioned. Existing and future traffic noise levels within the three commercial structures (a storage facility, and two retail complexes) should be acceptable without a sound attenuating wall, and the addition of a sound attenuating wall is probably more detrimental than beneficial. For these reasons, the construction of the sound attenuating wall shown in Figure 8 is not recommended for implementation.



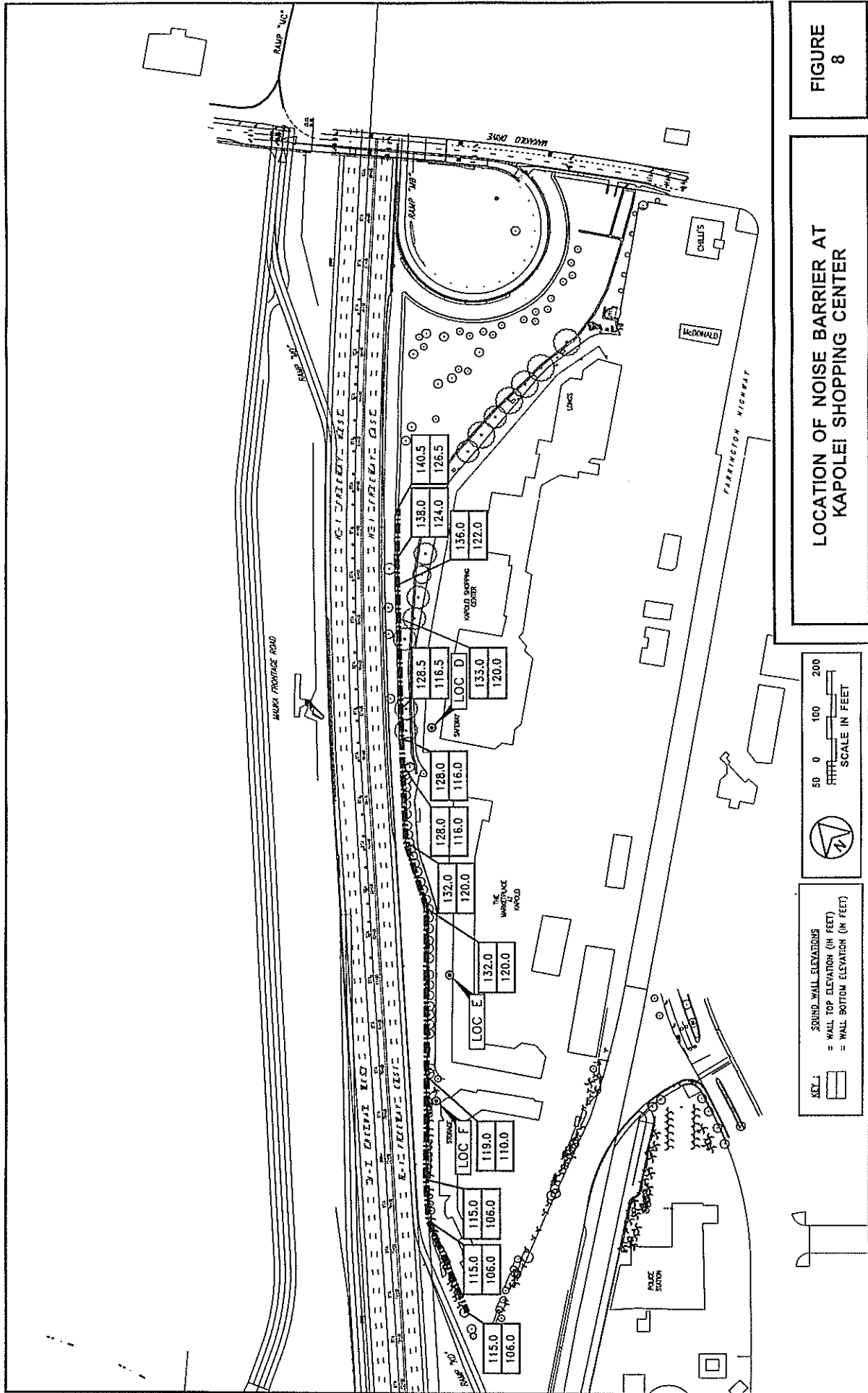


FIGURE 8

LOCATION OF NOISE BARRIER AT KAPOLEI SHOPPING CENTER

The sound attenuation wall shown in Figure 7 should reduce traffic noise levels within the outdoor luau area and at Location "W/P7", and reduce the noise interference during performances and shows at the outdoor stage. Blocking the visibility of the outdoor luau area from the freeway and ramps should not be detrimental to the theme park. For these reasons, the inclusion of the sound attenuating wall shown in Figure 7 is recommended. If total costs of the wall is beyond the allowable costs for the wall, consideration should be given towards eliminating the wall sections near Location "W/P5", which is less noise sensitive than the outdoor luau area.

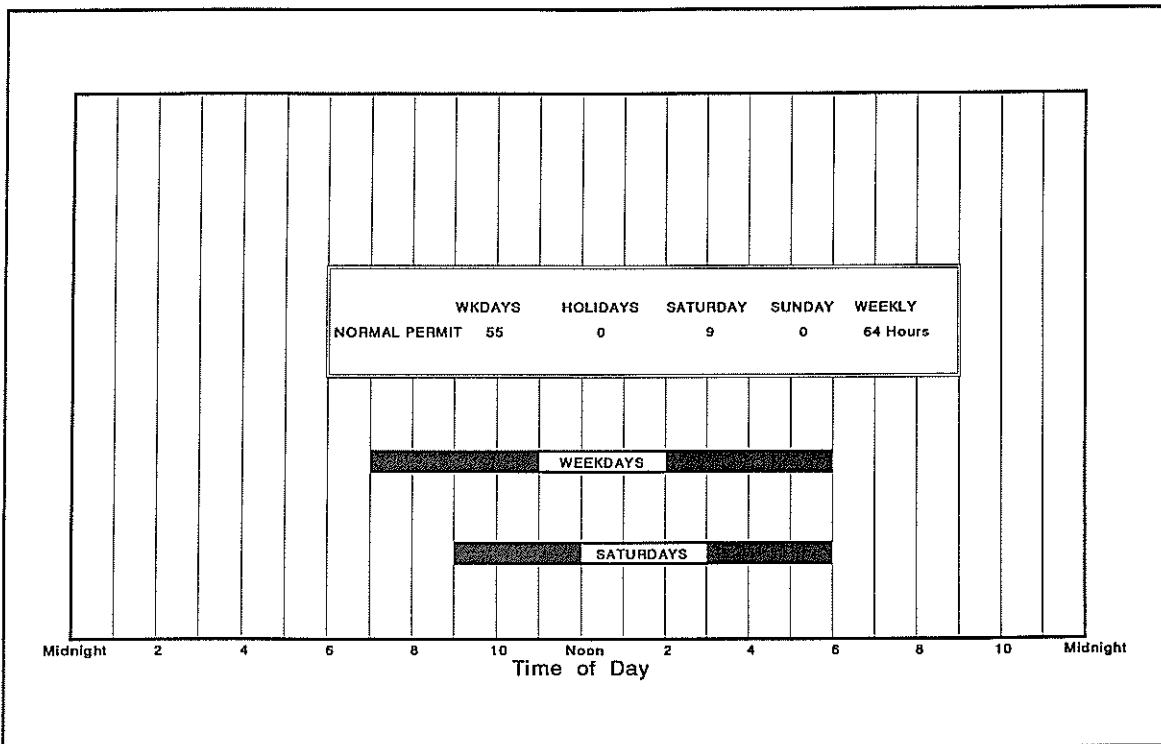
CHAPTER VII. CONSTRUCTION NOISE IMPACTS

Short-term noise impacts associated with construction activities along the existing freeway may occur, and may affect Makakilo residences if nighttime construction work is required to minimize traffic congestion along the freeway. These impacts can occur due to the relatively high noise levels associated with roadway construction equipment. The total duration of the construction period for the proposed project is not known, but noise exposure from construction activities at any one receptor location is not expected to be continuous during the total construction period.

Noise levels of diesel powered construction equipment typically range from 80 to 90 dB at 50 feet distance. Typical levels of noise from construction activity (excluding pile driving activity) are shown in Figure 9. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

Construction noise levels at existing structures can intermittently exceed 90 dB when work is being performed at close distances in front of these structures. Along the Wakea Street extension and overpass, distances between the construction sites and closest commercial receptors are expected to range between 25 to 50 feet, and construction noise levels may intermittently exceed 90 dB. The State Department of Health currently regulates noise from construction activities under a permit system (Reference 8). Under current permit procedures (see Figure 10), noisy construction activities are restricted to hours between 7:00 am and 6:00 pm, from Monday through Friday, and exclude certain holidays. Noisy construction activities are normally permitted on Sundays or holidays. These restrictions minimize construction noise impacts on noise sensitive receptors such as residences, and have generally been successfully applied. However, where the closest receptors to the construction activities are business establishments, the use of the nighttime (or non-business hours) for construction has been beneficial in minimizing construction noise impacts on the business establishments. Because relatively large buffer distances are available between the Wakea Street work area and the closest residences, the use of nighttime construction should be considered for minimizing noise impacts on adjacent businesses. Similar conclusions apply to construction work near the Hawaiian Waters Adventure Park.

In addition, the use of quieted portable engine generators and diesel equipment should be specified for use within 500 feet of noise sensitive properties. Heavy truck and equipment staging areas should also be located at areas which are at least 500 feet from noise sensitive properties whenever possible. Truck routes which avoid residential communities should be identified wherever possible. The use of 8 to 12 foot high construction noise barriers may also be used where construction work close to noise sensitive structures is unavoidable.



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 10

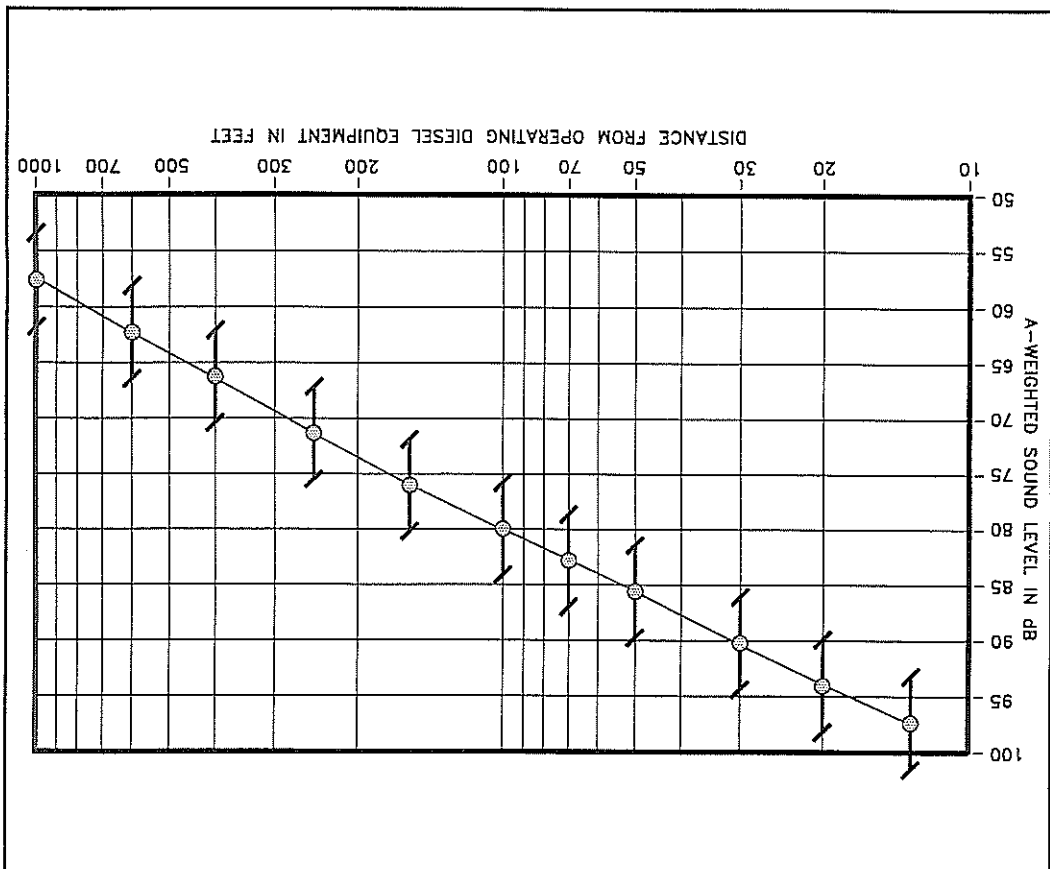


FIGURE 9

ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table 1. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table 1.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, the nomenclature of Table 1 was developed (Table 11). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages: the first stage indicates the type of quantity (power, i.e., based upon the logarithm of a ratio), the second stage indicates the weighting network (A, B, C, D, E, . . .), and the third stage indicates the weighting network (A, B, C, D, E, . . .). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table 11 permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the L_{dn} with the L_{dnA}.

Although not included in the tables, it is also recommended that "L_{pn}" and "L_{epm}" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, L_{eq} is designated the "equivalent sound level". For L_{dn}, L_{dn}, and L_{dn}, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root-mean-square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PRdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (L_{pn} was found to be 75 dB, L_{pn} = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighted Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX A. REFERENCES

- (1) "FHWA Highway Traffic Noise Model User's Guide," FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 2.5 Upgrade (April 14, 2004).
- (2) "Draft Palailai and Makakilo Interchanges Traffic and Operations Study, City of Kapolei," Wilbur Smith Associates; January 20, 2006.
- (3) 24-Hour Traffic Counts and Vehicle-Type Classification, Station H1-1, H-1 Freeway 300 Feet West of Kalaeloa Boulevard Grade Separation; January 22-23, 2002, and January 23-24, 2002; Hawaii State Department of Transportation.
- (4) 24-Hour Traffic Counts and Vehicle-Type Classification, Station 11-M, Fort Barrette Road and Makakilo Drive At Farrington Highway; January 28-29, 2002; Hawaii State Department of Transportation.
- (5) 24-Hour Traffic Counts, Station H1-2, H-1 Freeway 0.2 Miles West of Makakilo Drive; January 22-23, 2002; Hawaii State Department of Transportation.
- (6) Federal Highway Administration; "Procedures for Abatement of Highway Traffic Noise and Construction Noise;" 23 CFR Chapter I, Subchapter H, Part 772; April 1, 1995.
- (7) "Noise Analysis and Abatement Policy," Hawaii State Department of Transportation, Highways Division, Materials Testing and Research Branch; June 1997.
- (8) "Title 11, Administrative Rules, Chapter 46, Community Noise Control," Hawaii State Department of Health; September 23, 1996.

TABLE II
RECOMMENDED DESCRIPTOR LIST

TERM	A-WEIGHTING	ALTERNATIVE ⁽¹⁾	OTHER ⁽²⁾	UNWEIGHTED
	A-WEIGHTING	A-WEIGHTING	WEIGHTING	
1. Sound (Pressure) ⁽³⁾ Level	L _A	L _{pA}	L _B , L _{pB}	L _p
2. Sound Power Level	L _{WA}		L _{WB}	L _W
3. Max. Sound Level	L _{max}	L _{Amx}	L _{Bmax}	L _{pmax}
4. Peak Sound (Pressure) Level	L _{Apk}		L _{Bpk}	L _{pk}
5. Level Exceeded x% of the Time	L _x	L _{Ax}	L _{Bx}	L _{px}
6. Equivalent Sound Level	L _{eq}	L _{Aeq}	L _{Beq}	L _{peq}
7. Equivalent Sound Level Over Time ⁽⁴⁾ (T)	L _{eq(T)}	L _{Aeq(T)}	L _{Beq(T)}	L _{peq(T)}
8. Day Sound Level	L _d	L _{Ad}	L _{Bd}	L _{pd}
9. Night Sound Level	L _n	L _{An}	L _{Bn}	L _{pn}
10. Day-Night Sound Level	L _{dn}	L _{Adn}	L _{Bdn}	L _{pdn}
11. Yearly Day-Night Sound Level	L _{dn(Y)}	L _{Adn(Y)}	L _{Bdn(Y)}	L _{pdn(Y)}
12. Sound Exposure Level	L _S	L _{SA}	L _{SB}	L _{Sp}
13. Energy Average Value Over (Non-Time Domain) Set of Observations	L _{eq(e)}	L _{Aeq(e)}	L _{Beq(e)}	L _{peq(e)}
14. Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	L _{x(e)}	L _{Ax(e)}	L _{Bx(e)}	L _{px(e)}
15. Average L _x Value	L _x	L _{Ax}	L _{Bx}	L _{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(t). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine).

TABLE I
A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

TERM	SYMBOL
1. A-Weighted Sound Level	L _A
2. A-Weighted Sound Power Level	L _{WA}
3. Maximum A-Weighted Sound Level	L _{max}
4. Peak A-Weighted Sound Level	L _{Apk}
5. Level Exceeded x% of the Time	L _x
6. Equivalent Sound Level	L _{eq}
7. Equivalent Sound Level over Time (T) ⁽¹⁾	L _{eq(T)}
8. Day Sound Level	L _d
9. Night Sound Level	L _n
10. Day-Night Sound Level	L _{dn}
11. Yearly Day-Night Sound Level	L _{dn(Y)}
12. Sound Exposure Level	L _{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is Leq(t)). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

LOCATION: H-1 Freeway at Kapolei Interchange
 DATE: January 27, 2006

Start Time	End Time	Leq	Lmax	Lmin	Location	Remarks
1234	1236	58.7	74.2	55.1	WP1	Water & people noise
1238	1243	61.3	74.6	57.4	WP2	
1245	1253	63.6	82.9	60.9	WP3	Water noise.
1255	1259	69.1	83.4	66.6	WP4	Water fall noise.
103	108	68.8	84.9	62.6	WP5	
111	115	68.7	80.1	62.9	WP6	PA system, water.
118	148	65.6	76.8	61.0	WP7	Mostly H-1 Freeway.
150	156	59.0	76.2	53.8	WP8	PA System
157	216	61.4	86.8	56.9	WP9	PA System
220	223	65.9	79.3	62.9	WP10	Water fall noise.

Notes:

- a. Leq = Equivalent (or Average) A-Weighted Sound Level (in dBA)
- b. Lmax = Maximum A-Weighted Sound Level (in dBA)
- c. Lmin = Minimum A-Weighted Sound Level (in dBA)

LOCATION: H-1 Freeway at Kapolei Interchange
 DATE: November 15, 16, & 17, 2005

Start Time	End Time	Leq	Lmax	Lmin	Location	Remarks
1315	1345	59.7	85.6	51.9	A	Dogs barking.
1407	1437	66.6	83.9	57.7	B	
1453	1523	61.9	79.0	55.9	C	
1320	1350	69.8	91.6	59.4	D	Service road noise.
1536	1606	69.6	85.7	61.1	E	
1623	1653	72.5	91.0	58.7	F	
1535	1605	60.9	76.7	57.5	G	
1420	1450	65.4	87.9	57.5	H	Bus Terminal noise.
1453	1523	61.9	82.0	54.9	I	
1545	1615	70.2	81.8	61.9	J	
1631	1701	60.2	70.6	51.3	K	

Notes:

- a. Leq = Equivalent (or Average) A-Weighted Sound Level (in dBA)
- b. Lmax = Maximum A-Weighted Sound Level (in dBA)
- c. Lmin = Minimum A-Weighted Sound Level (in dBA)

LOCATION: H-1 Freeway at Kapolei Interchange
 DATE: January 31, 2006 & February 2, 2006

Start Time	End Time	Leq	Lmax	Lmin	Location	Leq @ "F"	Leq Diff.
January 31, 2006:							
1216	1232	64.3	76.8	54.0	B	71.1	6.8
1256	1311	59.7	77.7	48.8	C	71.9	12.2
1319	1334	69.5	87.9	54.1	D	72.2	2.7
1339	1354	66.8	77.4	54.3	E	71.6	4.8
1552	1607	62.6	72.8	58.8	G	73.6	11.0
1405	1420	62.0	81.0	51.5	H	72.7	10.7
1427	1442	64.7	78.3	55.4	I	73.3	8.6
1450	1505	67.1	76.7	55.3	J	72.0	4.9
1522	1537	63.0	88.7	46.8	K	72.2	9.2
February 2, 2006:							
1513	1528	59.5	82.8	49.6	A	73.9	14.4
1547	1602	66.2	75.9	60.4	WP7	75.0	8.8
1618	1633	61.1	69.3	53.6	K	74.2	13.1
1639	1654	61.1	70.0	54.7	I	73.4	12.3

Notes:

- a. Leq = Equivalent (or Average) A-Weighted Sound Level (in dBA)
- b. Lmax = Maximum A-Weighted Sound Level (in dBA)
- c. Lmin = Minimum A-Weighted Sound Level (in dBA)
- d. Leq Diff = Leq @ "A" minus Leq at other measurement location.
- * Roadway wet from light rain.

LOCATION: H-1 Freeway at Kapolei Interchange
 DATE: January 31, 2006 and February 2, 2006

Start Time	End Time	Leq	Lmax	Lmin	Location
January 31, 2006:					
1200	1300	72.0	94.3	51.5	F
1300	1400	72.0	94.3	51.5	F
1400	1500	72.8	89.3	55.4	F
1500	1600	72.8	85.2	54.7	F
1600	1700	71.9	85.7	49.5	F
February 2, 2006:					
1500	1600	74.5	86.7	60.5	F
1600	1700	74.1	87.0	58.8	F

Notes:

- a. Leq = Equivalent (or Average) A-Weighted Sound Level (in dBA)
- b. Lmax = Maximum A-Weighted Sound Level (in dBA)
- c. Lmin = Minimum A-Weighted Sound Level (in dBA)
- * Roadway wet from light rain.

APPENDIX H

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT
PROPOSED KAPOLEI INTERCHANGE - INTERSTATE ROUTE H-1
KAPOLEI, OAHU, HAWAII 96707
by EKNA Services, Inc.
(November 2005)

**Phase I Environmental Site Assessment
Proposed Kapolei Interchange - Interstate Route H-1
Kapolei, Oahu, Hawaii 96707**

Prepared For:
**Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814**

Prepared By:
**EKNA Services, Inc.
615 Piikoi Street Suite 300
Honolulu, Hawaii 96814-3139**

Project No. 2522-00F#
November 2005

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
PROPOSED KAPOLEI INTERCHANGE - INTERSTATE ROUTE H-1
KAPOLEI, OAHU, HAWAII 96707

Executive Summary

A Phase I Environmental Site Assessment has been conducted on the proposed Interstate Route H-1 Kapelei Interchange site at Kapelei ("the Site") in October 2005 by EKNA Services, Inc. at the request of Engineering Concepts, Inc., 1150 South King Street, Suite 700, Honolulu, Hawaii 96814. The assessed Site is an approximately 132 acre land area along Interstate Route H-1 in the Kapelei area on the island of Oahu, Hawaii. This report has been prepared for the use of Engineering Concepts, Inc., or their assigns.

The purpose of the Phase I Environmental Site Assessment was to determine the presence of petroleum products and other environmentally hazardous substances/wastes, and to identify potential sources of any suspected contaminants at the assessed portion of the subject site.

This Phase I Environmental Site Assessment, conducted in October 2005, indicates that:

- No previous Phase 1 environmental site assessment were found to exist for the subject property.
- Based on available information over the past 64 years, it appears that the assessed Site has been vacant, used for sugar cane cultivation, cattle grazing and most recently, portions of the Site have been used for a freeway since the mid-1960s. Normally, sugar cane cultivation uses minimal amounts of pesticides. It is believed that the vacant portions of the property have been vacant for at least 10 years, after which time any pesticides which may have been used would likely be dissipated. The remainder of the assessed property has been in use as the H-1 Freeway for about 30 years.
- The storm drainage channels running through the assessed property provide storm drainage of the mostly vacant area north of the H-1 Freeway.
- The site history and prior land usage suggest that no significant amounts of petroleum products and/or hazardous substances/wastes were stored, used, or generated at the assessed property.
- It is likely that soils alongside the H-1 Freeway shoulders may contain some amount of residual petroleum components washing off the freeway during rain storms.
- There is a transformer vault on the south side of the H-1 Freeway at the Peilalala Interchange, that is considered to be polychlorinated biphenyls (PCB) containing. The transformer serial number is 4275, located at 91-995 Kalaeloa Boulevard, and is owned by the State of Hawaii, Department of Transportation.
- Small amounts of debris have been consolidated in piles along the H-1 Freeway. The debris does not appear to contain substances which would be considered hazardous.
- There are two (2) facilities within a ¼ mile radius of the assessed property that are listed as being a generator or transporter of hazardous wastes. Both of the facilities are listed as Small Quantity Generators (SQG).
- In addition to the Federal CERCLIS database, the State of Hawaii DOH maintains a list of priority sites for cleanup that is roughly equivalent to CERCLIS. Sites may or may not duplicate Federal listings.

Research indicates that there are 14 State Hazardous Waste Sites (SHWS) within one mile of the assessed property.

- State leaking underground storage tank databases indicate there is one (1) facility within a one-half (½) mile radius from the Site that has reported a release or leak from underground storage tanks to the Hawaii Department of Health (DOH)
- There are currently four (4) facilities listed as having an underground or aboveground storage tank (UST/AST) adjoining the assessed property.
- Federal databases indicated no facilities within a one (1) mile radius from the Site, that have been or are currently under investigation by the U.S. Environmental Protection Agency (EPA) for possible inclusion onto the National Priorities List ("Superfund" site or NPL). No facilities within the one-half (½) mile radius are currently or formerly were under review by EPA (CERCLIS).
- Federal and state environmental databases indicated no facilities within a one-half (½) mile that are listed as having been or are currently being investigated by the U.S. Environmental Protection Agency (EPA) (CERCLIS).

In view of the above, and based on a review of available information, the following may be concluded:

- No apparent environmentally adverse or detrimental effects were detected as a result of past or present use of the site.
- There is no distinct evidence which would indicate the presence of contamination by petroleum or other toxic/hazardous agents.
- There was no direct evidence that subsurface contaminants from nearby facilities have migrated to the soils and ground water beneath the assessed property to cause any adverse environmental impacts.

To address the environmental concerns identified by this Phase I Environmental Site Assessment, it is recommended that:

- The consolidated debris piles along the H-1 Freeway should be removed.
- At the time of this assessment, portions of the Site were overgrown with dense vegetation and access to the entire Site was not possible. Due to this dense vegetation, the potential exists that some indicators of contamination could not be seen during the property assessment. If possible, contamination is observed during clearing of the Site, a professional environmental consultant should be contacted to evaluate the situation.

In the event any leakage occurs from the transformer vault on the Site, all contaminated materials should be handled, removed and disposed of, by licensed and hazardous materials abatement contractors, in accordance with plans and specifications based on all applicable laws and regulations

PHASE I ENVIRONMENTAL SITE ASSESSMENT
PROPOSED KAPOLEI INTERCHANGE - INTERSTATE ROUTE H-1
KAPOLEI, OAHU, HAWAII 96707

1.0 Introduction

A Phase I Environmental Site Assessment has been conducted on the proposed Interstate Route H-1 Kapolei Interchange site at Kapolei ("the Site") in October 2005 by EKNA Services, Inc. at the request of Engineering Concepts, Inc., 1150 South King Street, Suite 700, Honolulu, Hawaii 96814. The assessed Site is an approximately 132 acre land area along Interstate Route H-1 (H-1 Freeway) in the Kapolei area on the island of Oahu, Hawaii. This report has been prepared for the use of Engineering Concepts, Inc., or their assigns.

1.1 Purpose

The purpose of this Phase I ESA was to determine the presence of petroleum products and other environmentally hazardous substances/wastes, and to identify potential sources of any suspected contaminants at the assessed Site.

1.2 Involved Parties

The involved parties for this assessment are:

Client Point of Contact: Ms. Dana Arakaki, PE
Engineering Concepts, Inc.

EKNA Project Manager: Mr. Dayton E. Fraim, PG, PE
Senior Engineering Geologist

EKNA Site Assessor: Mr. Charles G. Brown
Environmental Physicist

1.3 Scope of Work

This work has been conducted in general accordance with American Society for Testing and Materials (ASTM) Standard Practice E 1527-00, "Standard Practices for Environmental Site Assessments", accepted industry standards, accepted local practices and a professional standard of care. This Phase I ESA was performed with the objective of developing environmental information about the Site as part of "an appropriate inquiry" under the innocent purchaser/landowner defense.

The scope of work involved two (2) tasks: a review of the history of the property and surrounding areas, and a field survey/inspection of the property and site improvements, surrounding properties and other facilities in the immediate vicinity of the property.

In conducting this assessment, the following efforts were undertaken:

- review of available archive maps and historical land use maps of the site and area for information regarding land use involving the manufacture, generation, use, storage, and/or disposal of environmentally hazardous substances;
- review of available documents regarding past and present site development;
- review of State of Hawaii and U.S. Environmental Protection Agency (EPA) databases of hazardous waste generators, violations, underground storage tank facilities, landfills, and sites currently under investigation;
- review of available U.S. Geological Survey and Hawaii State Department of Health (DOH) documents and maps for pertinent geologic and hydrogeologic conditions;
- interviews with individuals familiar with the site history, and who have knowledge of activities on adjacent properties that may be pertinent to this assessment;
- a survey of the subject site for possible sources of hazardous material contamination, such as petroleum products, electrical equipment containing polychlorinated biphenyls (PCB), and underground storage tanks; and,
- a brief reconnaissance of the surrounding area for possible off-site sources of contamination from neighboring facilities which could impact the site.

No invasive sampling was undertaken in the conduct of this ESA. Suspected hazardous materials which may be described herein have been identified on the basis of visual observation, public records and reports from previous environmental studies, if available.

Sanborn® Maps (Fire insurance maps) were not available for this site and were not used in the conduct of this ESA.

This Phase I ESA is limited to the property at the Proposed Kapolei Interchange - Interstate Route H-1 Site, as delineated in maps provided by Engineering Concepts.

2.0 General Site Characteristics

2.1 Site Location

The assessed property consists of the H-1 Freeway and portions of vacant land adjacent to the freeway. The proposed project includes constructing a new freeway interchange serving the City of Kapolei connecting H-1 Freeway to Wakea Street. The project will also include a frontage road and ramps connecting to the existing Makakilo Interchange as well as improvements and ramps along Farrington Highway to the existing Paliailai Interchange in the Kapolei area on the island of Oahu, Hawaii (Figure 1). The site is legally identified as the Kapolei portion of FAP No. 1-H-1 (11) and portions of TMKs (1) 9 - 1 - 015: 004, (1) 9 - 1 - 015: 017, (1) 9 - 1 - 015: 022, (1) 9 - 1 - 016: 006, (1) 9 - 1 - 016: 028 and (1) 9 - 1 - 016: 030 (Figure 2a and 2b). The vacant areas of the assessed property are zoned as Restricted Agricultural (AG-1) by the City and County of Honolulu, Department of Planning and Permitting.

2.2 Adjacent Properties and Vicinity

The Site is bordered by vacant land, a water park, the town of Makakilo and the Kapolei shopping area (Figures 1 and 3).

A walk-through and drive-through reconnaissance of the area for approximately one-quarter (¼) mile radius from the Site was conducted. The properties in the surrounding area are a mix of vacant land, single family residences, multi-family residences, public schools, a child and adult day care center, City and State governmental offices, a police station, a large shopping center, doctor's offices, gasoline service stations, a health care facility, a public park and a public library.

2.3 Site Description and Current Uses/Operations

The Site is comprised of approximately 132 acres of land area encompassing the H-1 Freeway in the Kapolei area and portions of vacant land adjacent to the freeway. The vacant land areas of the Site are covered with vegetation including various types of trees, shrubs, grasses and a large assortment of weeds. Some vegetation adjacent to the H-1 Freeway within the assessed area, has been burnt off due to a recent brush fire.

3.0 Environmental Setting

3.1 Regional Physiographic Conditions

The topography of the site and its vicinity has a moderate to steep slope down towards the ocean to the south. The ground surface elevation ranges from about 80 to 160 feet above mean sea level (MSL).

Precipitation falling on the property either infiltrates the soil, flows into storm drainage channels running through the property or flows into the adjacent streets where it is intercepted by the municipal storm sewer system which eventually discharges to the Pacific Ocean to the south. The nearest surface water course are the storm drainage channels running through the property. These channels provide storm drainage from the vacant hillside areas just north of the property and discharge either to the Pacific Ocean or into basins on the golf course south of Farrington Highway.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, the Site is located in an area where flood hazards are undetermined, but possible (Zone D)(Figure 6).

3.2 Soil Conditions

The surface soils in the area of the properties have been classified by the U.S. Department of Agriculture as Ewa Silty Clay Loam (EaB), Ewa Stony Silty Clay (EwA), Honouliuli Clay (HxA), Kawaihapai Silty Clay Loam (KiaB), Kawaihapai Clay Loam (KiaA) 0-2% slopes, Molokai Silty Clay Loam 3-7% slopes (MuB), Molokai Silty Clay Loam 7-15% slopes (MuC) and Molokai Silty Clay Loam 15-25% slopes (MuD), Waiakua Stony Silty Clay (WiB) 3-8% slopes (Figure 4).

Ewa Silty Clay Loam (EaB) soils consist of well drained soils found in basins and on alluvium fans. These soils developed in old alluvium derived from basic igneous rock. Permeability is moderate. Runoff is slow and the erosion hazard is slight.

Ewa Stony Silty Clay (EwA) soils consist of well drained soils found in basins and on alluvium fans. These soils developed in old alluvium derived from basic igneous rock. Permeability is moderate. Runoff is very slow and the erosion hazard is no more than slight.

Honouliuli Clay (HxA) soils consist of well drained soils found on coastal plains. These soils developed in old alluvium derived from basic igneous rock. Runoff is slow and the erosion hazard is slight.

Kawaihapai Silty Clay Loam (KiaB) soils consist of well drained soils found in drainage-ways and on alluvium fans on coastal plains. These soils developed in alluvium derived from basic igneous rock in humid uplands. Runoff is slow and the erosion hazard is slight.

Kawaihapai Clay Loam (KiaA) 0-2% slopes soils consist of well drained soils found in drainage-ways and on alluvium fans. These soils formed in alluvium derived from basic igneous rock in humid uplands. Permeability is moderate. Runoff is slow and the erosion hazard is no more than slight.

Molokai Silty Clay Loam 3-7% slopes (MuB), Molokai Silty Clay Loam 7-15% slopes (MuC) and Molokai Silty Clay Loam 15-25% slopes (MuD) soils consist of well drained soils found on the island uplands. These soils formed in material weathered from basic igneous rock. Runoff is slow to medium and the erosion hazard is slight to severe.

Waiialua Stony Silty Clay (WIB) 3-8% slopes soils consist of moderately well drained soils found on alluvium fans. These soils developed in alluvium weathered from basic igneous rock. Permeability is moderate. Runoff is slow and the erosion hazard is slight.

3.3 Regional Geology

The island of Oahu is composed largely of the weathered remnants of two extinct shield volcanoes - Waianae and Koolau. Koolau is the younger of the two and forms the eastern two-thirds (2/3) of the island. After the cessation of the main shield building phase of Koolau, erosion deposited alluvial materials on the lower flanks of the volcano.

The assessed property is located at the base of an erosional remnant ridge on the southern flank of Waianae. The surface soils are residual soils derived from the in-situ weathering of basic volcanic rock.

3.4 Ground Water Conditions

The site is situated in an area of ground water discharge. Ground water occurring in this portion of the aquifer is currently exploited for drinking water purposes. According to the University of Hawaii Water Resources Research Center Technical Report #179 (Mink & Lau, 1990), the deep basal ground water underlying the site is considered to be a source of drinking water. According to aquifer classification records, the property is situated over a single aquifer of the Ewa Basal Aquifer system, as shown in Table 1 (see Appendix D for explanation of codes). The aquifer is a basal aquifer where a layer or lens of fresh water is situated on top of sea water following the Ghyben-Herzberg principal. Ground water flow in the aquifer is generally towards the south.

The assessed property is situated up gradient (mauka) of the Underground Injection Control Line (UIC) in this area of Oahu. The utility of the ground water immediately beneath the Site has been evaluated in accordance with revised guidelines presented in the DOH's Technical Guidance Manual for Underground Storage Tank Closure and Release Response, Second Edition, March 2000, and the ground water underlying the Site was determined to be a potable source.

Based on the DOH Underground Injection Control Maps for Ewa (O-6)(Figure 5), there is one known public water supply well within a one (1) mile radius of the assessed property. This public water supply well is immediately adjacent to the assessed property at the east end (Figure 5). The records also indicate that there are several other water wells within one (1) mile of the assessed property (Figure 5). These wells have generally been used for irrigation water. The records also indicate that there are three (3) injection wells within one (1) mile of the assessed property (Figure 5). These wells have generally been used for storm runoff.

Table 1: Aquifer Classification System

Aquifer Code	30204111
Island Code	3 - Oahu
Aquifer Sector	02 - Pearl Harbor
Aquifer System	04 - Ewa
Aquifer Type, hydrogeology	1 - Basal
Aquifer Condition	1 - Unconfined
Aquifer Type, geology	1 - Flank
Status Code	11111
Development Stage	1 - Currently Used
Utility	1 - Drinking
Salinity (in mg/L Cl ⁻)	1 - Fresh (<250)
Uniqueness	1 - Irreplaceable
Vulnerability to Contamination	1 - High

4.0 Results of Investigation

4.1 Site Inspection Observations

On October 21, 2005, EKNA Services, Inc. (EKNA) performed on-site survey inspections of the subject property and the surrounding area. The results are discussed below.

- The assessed property consists of portions of several irregularly shaped parcels (Figure 2a and 2b). Based on available information over the past 64 years, it appears that the assessed Site has been vacant, used for sugar cane cultivation, cattle grazing and most recently, portions of the Site have been used for a freeway since the mid-1960s. The site at present is vacant land adjacent to and including the H-1 Freeway (Photos 1 through 4)(Figure 3). Some storm drainage channels exist on the assessed property.
- No previous Phase 1 environmental site assessment were found to exist for the subject property.
- The site survey indicated no evidence of the current or past presence of underground fuel storage tanks (USTs) or aboveground fuel storage tanks (ASTs) on the site (e.g., vent pipes, fill caps, abandoned dispensers, etc.).
- There was no direct evidence that subsurface contaminants from any nearby facilities have migrated to the soils and ground water beneath the assessed properties to cause adverse environmental conditions.

- There were no direct signs which would indicate the presence of contamination by petroleum or other toxic/hazardous agents. It is likely that soils alongside the H-1 Freeway shoulders may contain some amount of residual petroleum constituents washing off the freeway during rain storms.
- Some vegetation adjacent to the H-1 Freeway within the assessed area has been burnt off due to a recent brush fire.
- To the extent visual observation of Site soils was possible, there were no visual signs of stained or discolored soils on the property.
- Potable water for the property and in its vicinity is supplied by the City and County of Honolulu Board of Water Supply through a Public Water Supply system.
- Sanitary wastes generated at the assessed property and in its vicinity are disposed of through the municipal sewer system.
- No suspect asbestos containing materials (ACM) were identified at the Site.
- No suspect lead containing paints (LCP) were observed on the Site.
- Electrical equipment, such as transformers, which could be a potential source of polychlorinated biphenyls (PCB), were observed on the site. There is a transformer vault on the south side of the H-1 Freeway at the Paliaialai Interchange (Photo 5). Information provided by the Hawaiian Electric Company (HECO) provided in Appendix F, indicates that the transformer serial number is 4275, located at 91-995 Kalaeloa Boulevard, and that the transformer is owned by "the customer", the State of Hawaii, Department of Transportation. HECO does not have information on the PCB content of the transformer, therefore, it is considered to be PCB containing.
- At present, there are no pits, trenches, or landfills for disposal of solid waste on the property. Solid waste generated at the assessed property and at facilities in its vicinity is removed by a commercial or municipal refuse service. Debris left on the H-1 Freeway is removed by the State of Hawaii, Department of Transportation. Small amounts of debris have been consolidated in piles along the H-1 Freeway, awaiting removal (Photo 6).
- No strong, pungent or obnoxious odors were noted at the Site. No pools or sumps containing liquids were noted at the Site.

4.2 Observations of Adjacent Properties and Vicinity

The vacant areas of the assessed property is zoned as Restricted Agricultural (AG-1) by the City and County of Honolulu, Department of Planning and Permitting. The Site is bordered by vacant land, a water park, the town of Makakio and the Kapolei shopping area. The properties

in the surrounding area are a mix of vacant land, single family residences, multi-family residences, public schools, a child and adult day care center, City and State governmental offices, a police station, a large shopping center, doctor's offices, gasoline service stations, a health care facility, a public park and a public library.

- None of these nearby facilities appear to have an adverse impact on the assessed property.

4.3 Results of Regulatory Agency List Review and File Research

Research was undertaken to identify off-site facilities which may present a potential for adverse environmental effects on the assessed Site. Part of this research included a radius report from Environmental Data Resources, Inc. (Appendix C). Table 2 provides a summary of the various Federal and State environmental database listings and the search radius for each that is required by ASTM standards. Table 2 also summarizes the number of facilities listed that were found for each database in the vicinity of the subject Site.

- There are no facilities within a one (1) mile radius of the Site listed as having been or as currently being investigated by the U.S. Environmental Protection Agency (EPA) for possible inclusion onto the National Priorities List ("Superfund" or NPL site).

Federal and State databases did not list any CORRACTS facilities within one (1) mile of the investigated Site.

Federal and State databases did not list any CERCLIS/NFRAP (Comprehensive Environmental Response, Compensation and Liability Act/No Further Remedial Action Planned) facilities within ¼ mile of the investigated Site.

Federal and State databases did not list any solid waste facility/land fills (SWF/LF), active incinerators or transfer stations within ¼ mile of the assessed Site.

There are two (2) facilities within a ¼ mile radius of the assessed property that are listed as being a generator or transporter of hazardous wastes. Both of the facilities are listed as Small Quantity Generators (SQG). The names and locations of these facilities are listed below:

- Shell Service Station
577 Farrington Highway
Small Quantity Generator
- DAGS CSD Kakuhihewa Building
601 Kamokila Boulevard
Small Quantity Generator

Table 2: Summary of Facilities on Federal and State Environmental Databases		
FEDERAL/STATE ENVIRONMENTAL DATABASE	SEARCH RADIUS	FACILITIES
US EPA National Priorities List ¹ (NPL)	1 mile	0
US EPA CERCLIS ²	1/2 mile	0
US EPA CERCLIS-NFRAP ³	1/4 mile	0
US EPA CERCLIS-CORRACTS TSD ⁴	1 mile	0
US EPA RCRA NON-CORRACTS TSD	1/2 mile	0
US EPA Resource Conservation & Recovery Act Generators ⁵ (RCRA)	1/4 mile	2
Emergency Response Notification System ⁶ (ERNS)	Site	0
State Hazardous Waste Sites (SHWS) ⁷ (State-equivalent CERCLIS)	1/2 mile	14
State Solid Waste Facility Land Fill (SWFLF) ⁸	1/2 mile	0
Hawaii Department of Health Leaking UST (LUST) List ⁹	1/2 mile	1
Hawaii Department of Health UST List ¹⁰	adjoining property	4
Hawaii Department of Health Spills (SPILL) List ¹¹	adjoining property	0

1 The US EPA National Priorities List (NPL) is the EPA's database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Federal Superfund Program.

2 The US EPA CERCLIS Database is a compilation of sites which have been investigated or are currently under investigation for a release or threatened release of hazardous substances in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund). NFRAP indicates No Further Remedial Action Planned.

3 The US EPA RCRA CORRACTS TSD Database is the EPA's database of corrective actions under the Resource Conservation and Recovery Act and associated hazardous materials Treatment, Storage and Disposal sites.

4/5 The US EPA RCRA Database is a program which identifies and tracks hazardous substances/waste from the point of generation to the point of disposal.

6 The Emergency Response Notification System (ERNS) is a nation-wide database with listings of reported releases/spills of oil and hazardous substances.

7 Hawaii Department of Health's Hazardous Waste Site Priority List. May or may not be parallel to Federal Databases.

8 Hawaii Department of Health's landfill and/or solid waste disposal sites.

9 Hawaii Department of Health, Solid and Hazardous Waste Branch, Underground Storage Tank Section's (DOH-SHWB) Leaking Underground Storage Tank (LUST) Listing.

10 Hawaii Department of Health, Solid and Hazardous Waste Branch, Underground Storage Tank Section's (DOH-SHWB) Registered Underground Storage Tank (UST) Listing.

11 Hawaii Department of Health, Hazard Evaluation and Emergency Response Office (HEER) Spills (SPILL) Listing.

In addition to the Federal CERCLIS database, the State of Hawaii DOH maintains a list of priority sites for cleanup that is roughly equivalent to CERCLIS. Sites may or may not duplicate Federal listings. Research indicates that there are 14 State Hazardous Waste Sites (SHWS) within one mile of the assessed property. The names and locations of these facilities are contained in Appendix C. The closest two (2) facilities/spill locations are listed below:

- Hawaii Cement - Makakilo
- Aloha 7-Eleven Kapolei
91-920 Farrington Highway
1000 Kamokila Boulevard

There is one (1) facility within a 1/2 mile radius of the property listed as having a release of petroleum products from an underground storage tank system (LUST). The name, location and the status of the leakage/cleanup of this facility is listed below.

- Palaiatalai Landfill
91-402 Farrington Highway
Cleanup Completed

There are currently four (4) facilities listed as having an underground or aboveground storage tank (UST/AST) adjoining the assessed property. The name and location of these facilities are listed below:

- GTE Kapolei Earth Station
91-340 Farrington Highway
- Kapolei Shell
577 Farrington Highway
- Chevron #209722
565 Farrington Highway
- Aloha 7-Eleven Kapolei
1000 Kamokila Boulevard

4.4 Aerial Photographs

The following historical aerial photographs by R.M. Towill Corporation were reviewed:

Photograph Number	Date	Figure
83-24	1949	
913-6	1952	
2779-10	1963	
9640	1976	
8186-13	1982	Figure 7
2070	1982	
9012-70	1995	

Photographs from 1949 through 1963 show the assessed property in use for agriculture and as Farrington Highway. Photographs from 1976 through 1995 show the assessed property either vacant or in use as Farrington Highway and the H-1 Freeway with associated cross roads.

4.5 Historical Topographic Maps

The following Historical Topographic Maps produced by Environmental Data Resources, Inc. (EDR) were reviewed:

Quadrangle	Minutes Series	Scale	Date	Figure
Ewa	7.5	1:24,000	1962	Figure 8a
Ewa	7.5	1:24,000	1968	Figure 8b

Quadrangle	Minutes Series	Scale	Date	Figure
Ewa	7.5	1:24,000	1983	Figure 8c
Ewa	7.5	1:24,000	1998	Figure 8d

The 1962 Historical Topographic Map shows Farrington Highway with associated cross roads as the only improvement on the Site. The 1968 to 1998 Historical Topographic Maps show Farrington Highway, the H-1 Freeway, Makakilo Drive and other minor cross roads as the improvements on the Site. The 1998 Historical Topographic Map shows significant development compared to previous maps in the immediate vicinity of the Site.

4.6 Sanborn® Maps

Sanborn® Maps are not available for this property.

4.7 Results of Site History/Land Use Review

The assessed property is identified as H-1 Freeway with adjoining vacant areas. A review of the property use was conducted as reasonably ascertainable back to the property's obvious first developed use. For an undetermined period of time prior to the mid-1960s, the assessed property appears to have been used for agriculture purposes, based on surrounding property use, historical aerial photographs, property leases to agricultural companies documented between 1941 to 1995 as a minimum and general historical knowledge of the area. Based on available information, agricultural use of the property under the H-1 Freeway ended in the mid-1960s when the freeway was constructed. For the remainder (currently vacant) portions of the assessed property, agricultural use ended in the 1990s and the property has remained vacant since. Small portions of the assessed property have been used for cattle grazing. The current property owners of record are the State of Hawaii, Department of Transportation; Kapolei Property Development LLC; MK Kapolei, LLC; Aina Nui Corp.; and the James Campbell Trust Estate. Table 3 through 8 provides the past history for the assessed property.

Table 3: Property Ownership History: H-1 Freeway	
Date	Owner
Prior to 1941	James Campbell Trust Estate (with a lease Ewa Plantation Co.) as part of TMKs: (1) 9 - 1 - 015: 004, (1) 9 - 1 - 016: 001 and (1) 9 - 1 - 016: 004.
Mid 1960s to present	State of Hawaii, Department of Transportation

Table 4: Property Ownership History: TMK (1) 9 - 1 - 015: 004

Date	Owner
Prior to 1941	James Campbell Trust Estate (with a lease Ewa Plantation Co.)
May 1968	James Campbell Trust Estate (with a lease to Ewa Sugar Co., Inc. from a merger with Ewa Plantation Co.)
April 1970	James Campbell Trust Estate (with a lease to Oahu Sugar Co., Ltd.)
June 1995	James Campbell Trust Estate.
June 2003 to present	Aina Nui Corp.

Table 5: Property Ownership History: TMK (1) 9 - 1 - 015: 017

Date	Owner
Prior to 1941	James Campbell Trust Estate (with a lease Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 015: 004.
May 1968	James Campbell Trust Estate (with a lease to Ewa Sugar Co., Inc. from a merger with Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 015: 004.
April 1970	James Campbell Trust Estate (with a lease to Oahu Sugar Co., Ltd.) as part of TMK (1) 9 - 1 - 015: 004.
November 1999	James Campbell Trust Estate (with a lease to Oahu Sugar Co., Ltd.).
June 1995	James Campbell Trust Estate.
December 2004 to present	Kapolei Property Development LLC.

Table 6: Property Ownership History: TMK (1) 9 - 1 - 015: 022

Date	Owner
Prior to 1941	James Campbell Trust Estate (with a lease Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 015: 004.
May 1968	James Campbell Trust Estate (with a lease to Ewa Sugar Co., Inc. from a merger with Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 015: 004.
April 1970	James Campbell Trust Estate (with a lease to Oahu Sugar Co., Ltd.) as part of TMK (1) 9 - 1 - 015: 004.
June 1995	James Campbell Trust Estate as part of TMK (1) 9 - 1 - 015: 004.
January 2002	Kapolei Property Development LLC as part of TMK (1) 9 - 1 - 015: 019.
December 2004 to present	MK Kapolei LLC.

Table 7: Property Ownership History: TMK (1) 9 - 1 - 016: 006

Date	Owner
Prior to 1941	James Campbell Trust Estate (with a lease Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 016: 004.
May 1945	James Campbell Trust Estate (with a lease to Ewa Sugar Co., Inc. from a merger with Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 016: 004.
May 1949	James Campbell Trust Estate (with a lease to Louis P. Price).
December 1950	James Campbell Trust Estate (with a lease to Louis P. Price and a sub-lease to Pacific Concrete & Rock Co., Ltd.)
February 1996	James Campbell Trust Estate (with a lease to Pac Concrete & Rock Co., Ltd.)
September 1999 to present.	James Campbell Trust Estate.

Table 8: Property Ownership History: TMK (1) 9 - 1 - 016: 028

Date	Owner
Prior to 1941	James Campbell Trust Estate (with a lease Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 016: 001.
1963	James Campbell Trust Estate (with a lease Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 016: 016.
May 1968	James Campbell Trust Estate (with a lease to Ewa Sugar Co., Inc. from a merger with Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 016: 016.
1969	James Campbell Trust Estate (with a lease to Oahu Sugar Co., Ltd.)
November 1992	James Campbell Trust Estate.
January 2002 to present.	Kapolei Property Development LLC.

Table 9: Property Ownership History: TMK (1) 9 - 1 - 016: 030

Date	Owner
Prior to 1941	James Campbell Trust Estate (with a lease Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 016: 001.
May 1968	James Campbell Trust Estate (with a lease to Ewa Sugar Co., Inc. from a merger with Ewa Plantation Co.) as part of TMK (1) 9 - 1 - 016: 001.
April 1970	James Campbell Trust Estate (with a lease to Oahu Sugar Co., Ltd.) as part of TMK (1) 9 - 1 - 016: 001.
1973	James Campbell Trust Estate (with a lease to Oahu Sugar Co., Ltd.)
November 1992	James Campbell Trust Estate.
January 2002 to present.	Kapolei Property Development LLC.

The vacant property areas are zoned as Restricted Agricultural (AG-1) by the City and County of Honolulu, Department of Planning and Permitting. Based on available information over the past 64 years, it appears that the assessed Site has been vacant, used for sugar cane cultivation, cattle grazing and most recently, portions of the Site have been used for a freeway since the mid-1960s. Normally, sugar cane cultivation uses minimal amounts of pesticides. It is believed that the property has been vacant for at least 10 years, after which time any pesticides which may have been used would likely be dissipated.

4.8 Interviews

Personnel familiar with the past history of the assessed property were not available for interviews.

4.9 Previous Environmental Investigations

No previous environmental site assessments are known to exist for the subject property.

4.10 Summary of Recognized Environmental Conditions

The following is a summary of the recognized environmental conditions which this assessment has found to be associated with the assessed property:

- It is likely that soils alongside the H-1 Freeway shoulders may contain some amount of residual petroleum constituents washing off the freeway during rain storms.
- There is a transformer vault on the south side of the H-1 Freeway at the Palatial Interchange, that is considered to be polychlorinated biphenyls (PCB) containing. The transformer serial number is 4275, located at 91-995 Kaiaeloa Boulevard, and is owned by the State of Hawaii, Department of Transportation.

The following is a summary of the possible recognized environmental conditions which were reviewed during this assessment and do not pose a potential for adverse impact on the Site:

- Small amounts of debris have been consolidated in piles along the H-1 Freeway. The debris does not appear to contain substances which would be considered hazardous to the Site.
- There are two (2) facilities within a ¼ mile radius that are listed as generators or transporters of hazardous wastes. Both of these facilities are listed as Small Quantity Generators (SQG).
- There are 14 State Hazardous Waste Sites within one mile of the Site. However, review of these listings indicate that most are "de minimis" spills and similar conditions which should not have a potential to impact the assessed Site.

• There is one (1) LUST facilities within a ½ mile of the Site. Review of this listing indicates that it is unlikely to have a potential impact on the assessed Site.

• There are four (4) facilities listed as having an underground or aboveground storage tank (UST/AST) adjoining the assessed property. Review of these listings indicates that none have a potential to impact the assessed Site.

5.0 Conclusions and Recommendations

The Phase I Environmental Site Assessment indicates that:

• Based on available information over the past 64 years, it appears that the assessed Site has been vacant, used for sugar cane cultivation, cattle grazing and most recently, portions of the Site have been used for a freeway since the mid-1960s. Normally, sugar cane cultivation uses minimal amounts of pesticides. It is believed that the vacant portions of the property have been vacant for at least 10 years, after which time any pesticides which may have been used would likely be dissipated. The remainder of the assessed property has been in use as the H-1 Freeway for about 30 years.

• The storm drainage channels running through the assessed property provide storm drainage of the mostly vacant area north of the H-1 Freeway.

• The site history and prior land usage suggest that no significant amounts of petroleum products and/or hazardous substances/wastes were stored, used, or generated at the assessed property.

• It is likely that soils alongside the H-1 Freeway shoulders may contain some amount of residual petroleum components washing off the freeway during rain storms.

• There is a transformer vault on the south side of the H-1 Freeway at the Pailialai Interchange, that is considered to be polychlorinated biphenyls (PCB) containing. The transformer serial number is 4275, located at 91-995 Kalaaloa Boulevard, and is owned by the State of Hawaii, Department of Transportation.

• Small amounts of debris have been consolidated in piles along the H-1 Freeway. The debris does not appear to contain substances which would be considered hazardous to the Site.

• There are two (2) facilities within a ¼ mile radius of the assessed property that are listed as being a generator or transporter of hazardous wastes. Both of the facilities are listed as Small Quantity Generators (SQG).

• In addition to the Federal CERCLIS database, the State of Hawaii DOH maintains a list of priority sites for cleanup that is roughly equivalent to CERCLIS. Sites may or may not duplicate

Federal listings. Research indicates that there are 14 State Hazardous Waste Sites (SHWS) within one mile of the assessed property.

• State leaking underground storage tank databases indicate there is one (1) facility within a one-half (½) mile radius from the Site that has reported a release or leak from underground storage tanks to the Hawaii Department of Health (DOH).

• There are currently four (4) facilities listed as having an underground or aboveground storage tank (UST/AST) adjoining the assessed property.

• Federal databases indicated no facilities within a one (1) mile radius from the Site, that have been or are currently under investigation by the U.S. Environmental Protection Agency (EPA) for possible inclusion onto the National Priorities List ("Superfund" site or NPL). No facilities within the one-half (½) mile radius are currently or formerly were under review by EPA (CERCLIS).

• Federal and state environmental databases indicated no facilities within a one-half (½) mile that are listed as having been or are currently being investigated by the U.S. Environmental Protection Agency (EPA) (CERCLIS).

In view of the above, and based on a review of available information, the following may be concluded:

• No apparent environmentally adverse or detrimental effects were detected as a result of past or present use of the site.

• There is no distinct evidence which would indicate the presence of contamination by petroleum or other toxic/hazardous agents.

• There was no direct evidence that subsurface contaminants from nearby facilities have migrated to the soils and ground water beneath the assessed property to cause any adverse environmental impacts.

To address the environmental concerns identified by this Phase I Environmental Site Assessment, it is recommended that:

• The consolidated debris piles along the H-1 Freeway should be removed.

• At the time of this assessment, portions of the Site were overgrown with dense vegetation and access to the entire Site was not possible. Due to this dense vegetation, the potential exists that some indicators of contamination could not be seen during the property assessment. If possible contamination is observed during clearing of the Site, a professional environmental consultant should be contacted to evaluate the situation.

- In the event any leakage occurs from the transformer vault on the Site, all contaminated materials should be handled, removed and disposed of, by licensed and hazardous materials abatement contractors, in accordance with plans and specifications based on all applicable laws and regulations

6.0 Limitations and Conditions

Although this Phase I Environmental Site Assessment provides information on the relative presence or absence of suspected environmental contaminants at the investigated site, it should not be construed as a final statement regarding environmental conditions at the assessed facility or the subject property. This Phase I ESA was performed with the objective of developing environmental information about the Site as part of "an appropriate inquiry" under the innocent purchaser/landowner defense. A Business Environmental Risk assessment was not performed as part of this investigation.

The information set forth is based solely on the agreed upon scope of services. This information is based on personal observation, researching of public documentation, and data provided by others. The presence of subsurface contamination, asbestos containing materials, lead-based paints, radioactive materials, and biological hazards were not specifically investigated.

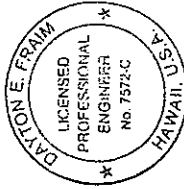
Given the often obscure and elusive nature of hazardous substances it is never possible to absolutely dismiss the possibility of site contamination, even with exhaustive sampling and testing. EKNA Services, Inc. expressly disclaim any and all liability representations, expressed, or implied, contained in, or for omissions from this report, or any other written or oral communication which might be interpreted as establishing the total extent of all liability present at the subject property.

Our services have been performed with the usual thoroughness and competence of the consulting profession, in accordance with the standards for professional services at this time. No other warranty or representation, either expressed or implied, is included or intended.

EKNA Services, Inc.

Charles G. Brown

Charles G. Brown
Environmental Physicist



Dayton E. Fram
Dayton E. Fram, PG, PE
Senior Engineering Geologist

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Published References

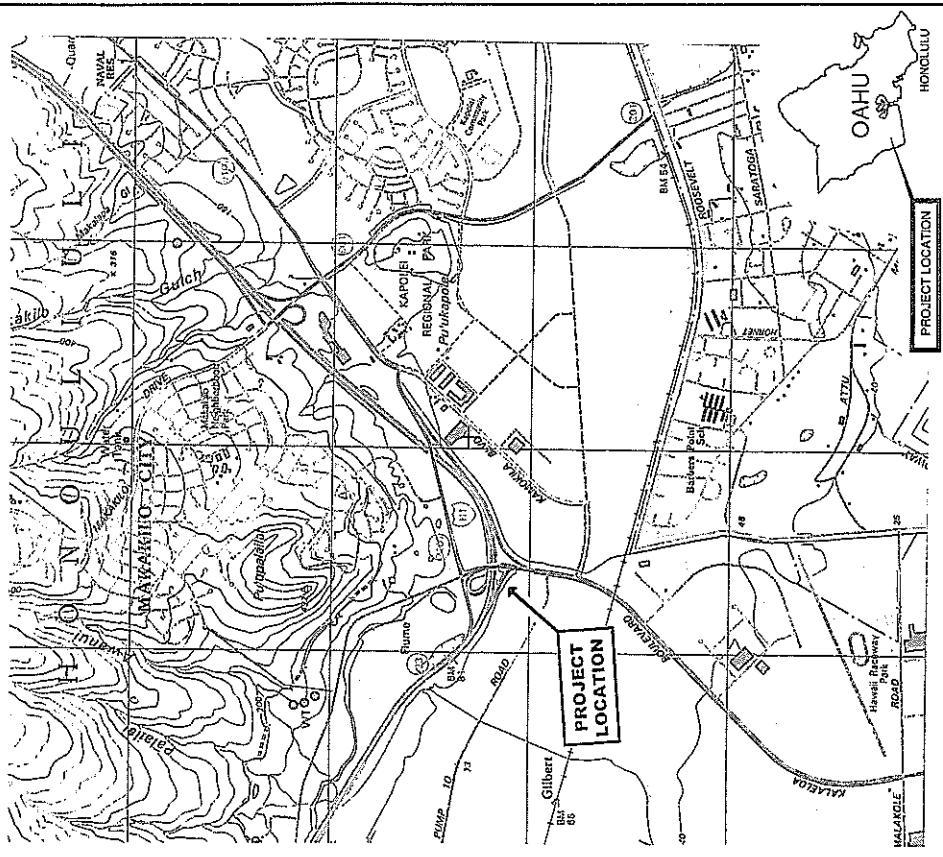
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- U.S. Geological Survey, "Ewa Quadrangle", 7.5 Minute Series, Topographic Maps for 1962, 1968, 1983 and 1998.
- U.S. Department of Agriculture, "Soil Survey of Island of Hawaii, State of Hawaii", 1972.
- Department of Health, State of Hawaii, "Underground Injection Control Map, Ewa (O-6) Quadrangle", 1983.
- City and County of Honolulu, Department of Land Utilization for Zoning.
- Federal Emergency Management Agency, "Flood Insurance Rate Maps, 15003C0305F and 15003C0310F", September 30, 2004.
- Sanborn® Maps - No Coverage


Appendix A - Figures

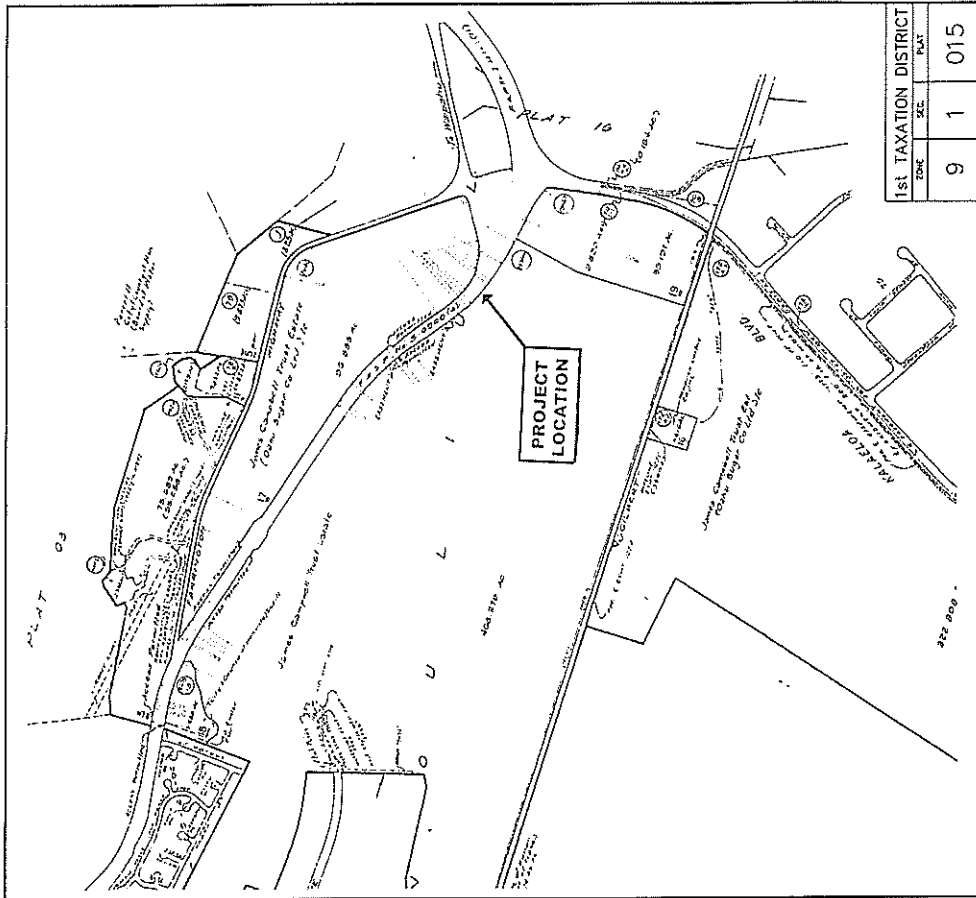
- Figure 1 - Location Map
- Figure 2a and 2b - Tax Map Keys
- Figure 3 - Site Plan
- Figure 4 - Soil Classification Map
- Figure 5 - Underground Injection Control/Water Well Map
- Figure 6 - Flood Insurance Rate Map
- Figure 7 - Aerial Photograph
- Figure 8a to 8d - Historical Topographic Maps




 NORTH
 2,000 1,000 0 2,000 4,000
 APPROXIMATE SCALE IN FEET

REFERENCE: USGS "Ewa Quadrangle", 1998, 7.5 Minute Series, Topographic Map
 PREPARED BY: C. BROWN
 PROJECT NUMBER: 2522-00F#
 DATE: October 2005


 ENWA Services, Inc.

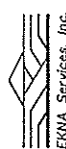


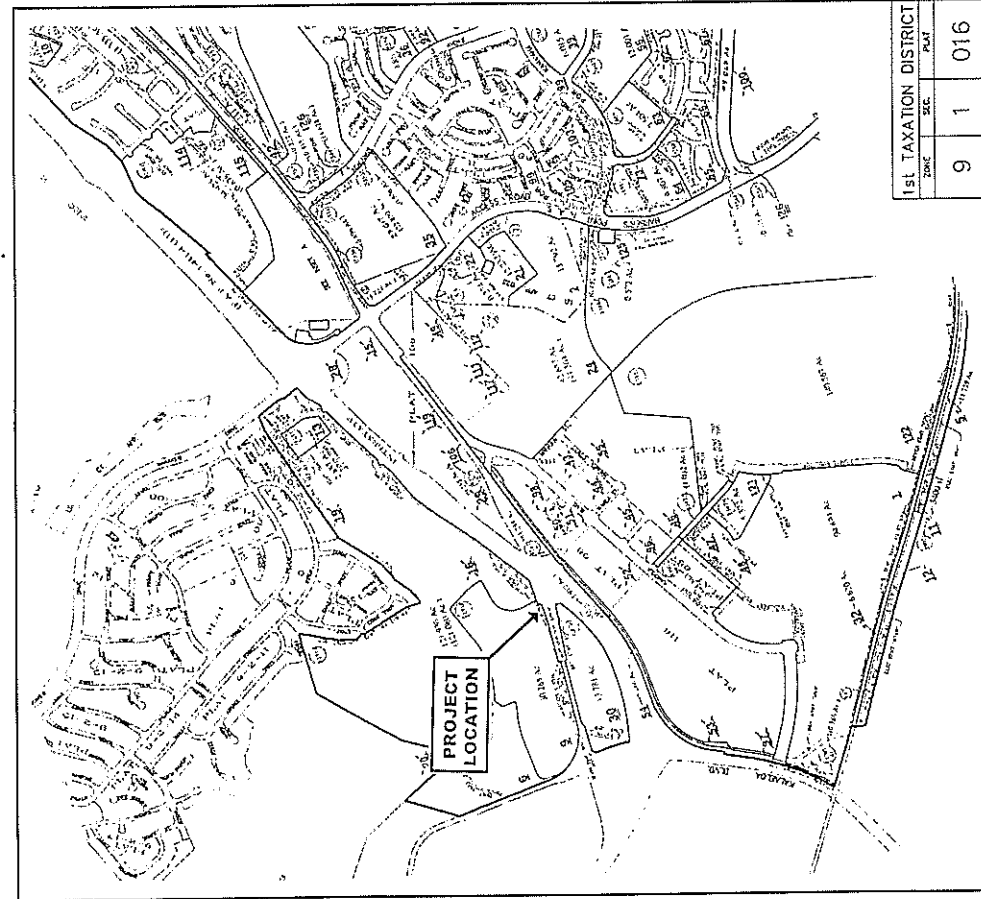
 NORTH
 2,000 1,000 0 2,000 4,000
 APPROXIMATE SCALE IN FEET


1st TAXATION DISTRICT		
EDIC	SEC.	PLAT
9	1	015

REFERENCE: C&C of Honolulu, Real Property Tax Division, Tax Maps For
 © 2000, Experian Information Solutions, Inc.

PREPARED BY: C. BROWN
 PROJECT NUMBER: 2522-00F#
 DATE: October 2005


 ENWA Services, Inc.

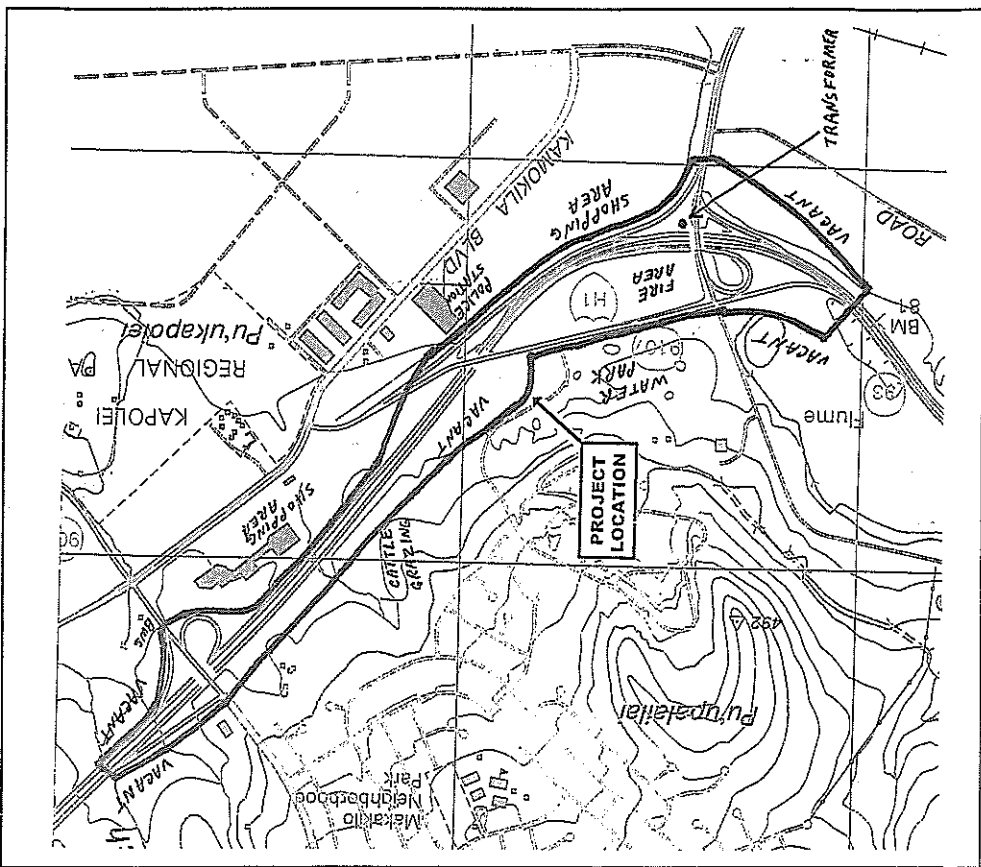



 NORTH
 2,000 1,000 0 2,000 4,000
 APPROXIMATE SCALE IN FEET

REFERENCE: C&C of Honolulu, Real Property Tax Division, Tax Maps For
 © 2000, Experian Information Solutions, Inc.

PREPARED BY: C. BROWN
 PROJECT NUMBER: 2522-00F#

FIGURE 2b - TMK LOCATION MAP
 DATE: October 2005

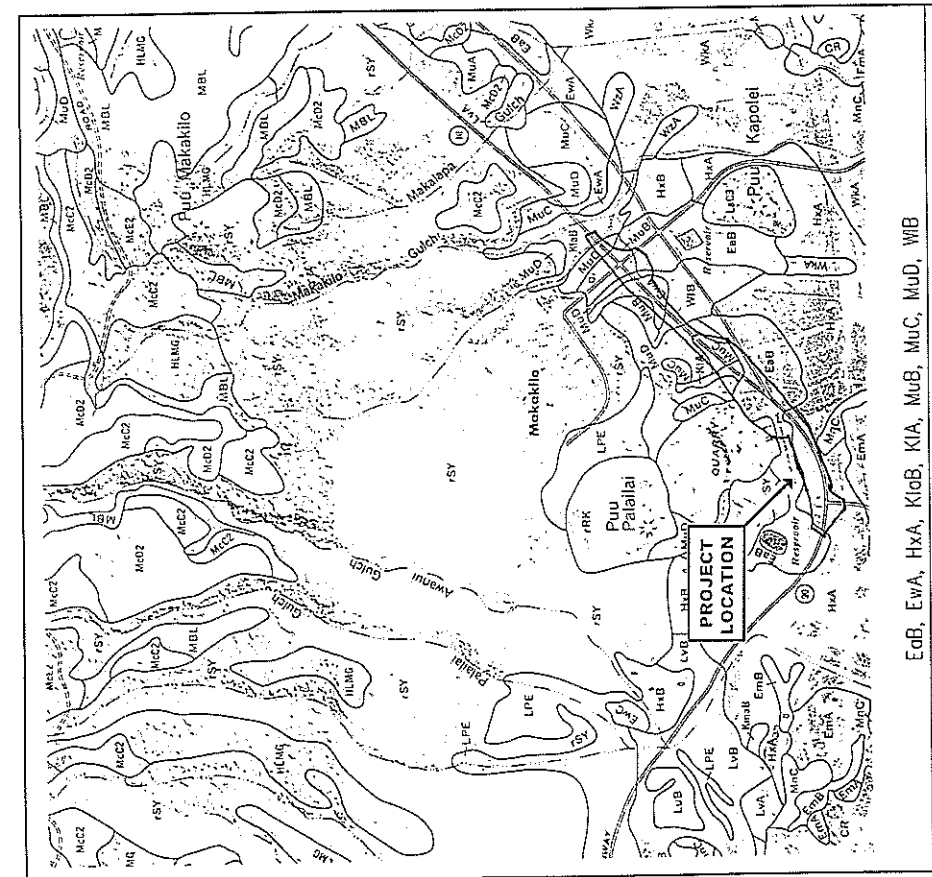


 NORTH
 1,000 500 0 1,000 2,000
 APPROXIMATE SCALE IN FEET

PREPARED BY: C. BROWN
 PROJECT NUMBER: 2522-00F#

FIGURE 3 - SITE PLAN
 DATE: October 2005





EoB, EwA, HxA, KioB, KIA, MuB, MuC, MuD, WIB

2,000 1,000 0 2,000 4,000

GRAPHIC SCALE IN FEET

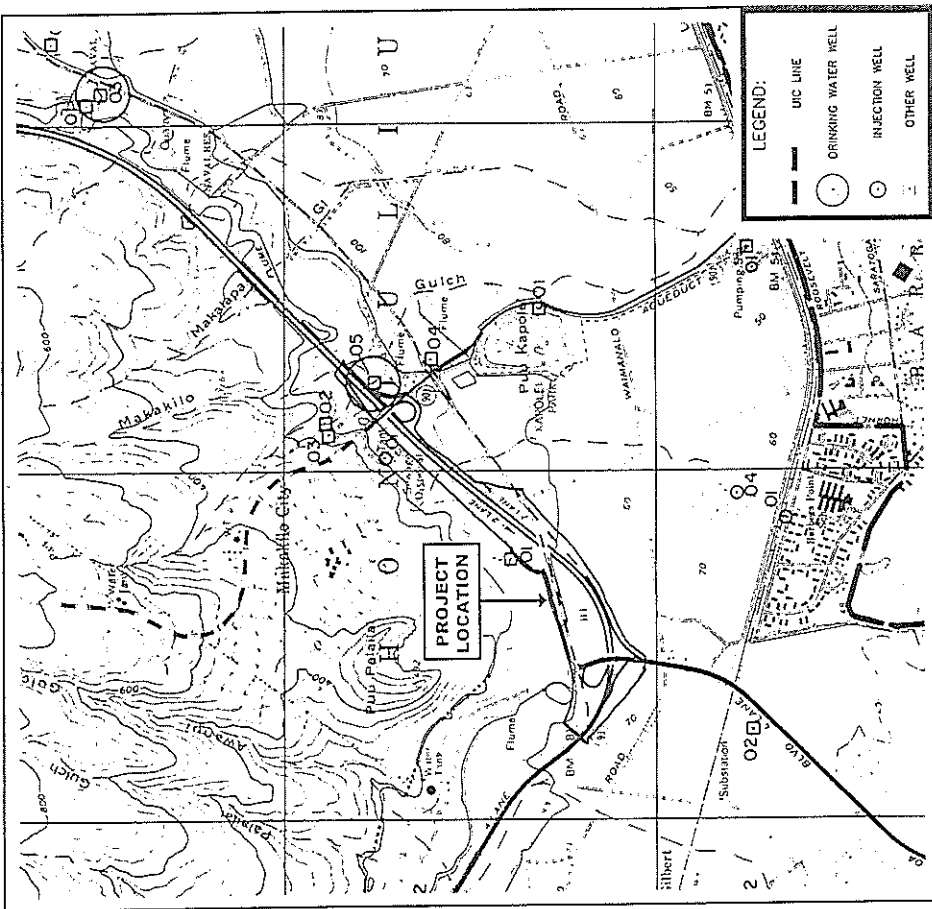
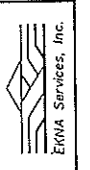
FIGURE 4 -- SOIL CLASSIFICATION MAP

REFERENCE: U.S.D.A., 1972. "SOIL SURVEY OF ISLANDS OF KAUAI, OAHU, MAUI, MOLOKAI and LANAI, STATE OF HAWAII"

PREPARED BY: C. BROWN

PROJECT NUMBER: 2522-00F#

DATE: October 2005



2,000 1,000 0 2,000 4,000

GRAPHIC SCALE IN FEET

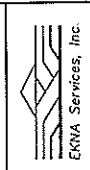
FIGURE 5 -- UNDERGROUND INJECTION CONTROL MAP

Reference: State of Hawaii, Department of Health, 1983 "Underground Injection Control Map, Ewa (0-6) Quadrangle"

PREPARED BY: C. BROWN

PROJECT NUMBER: 2522-00F#

DATE: October 2005



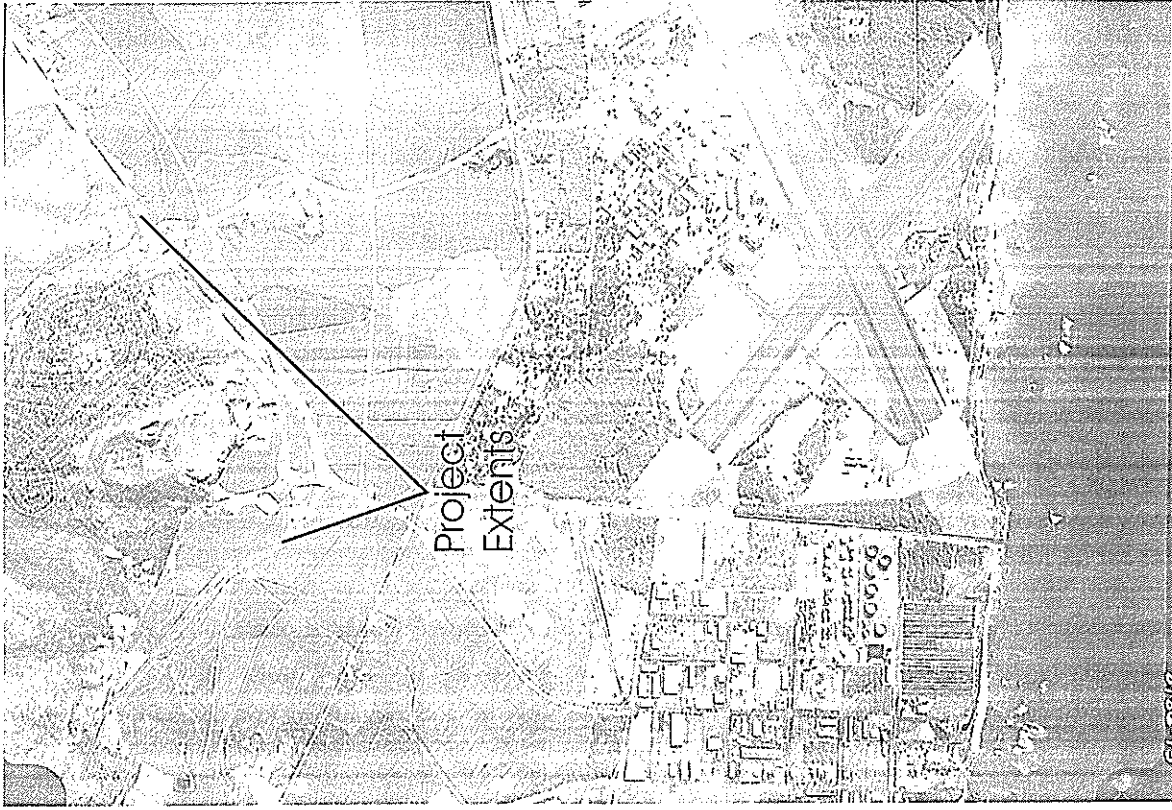
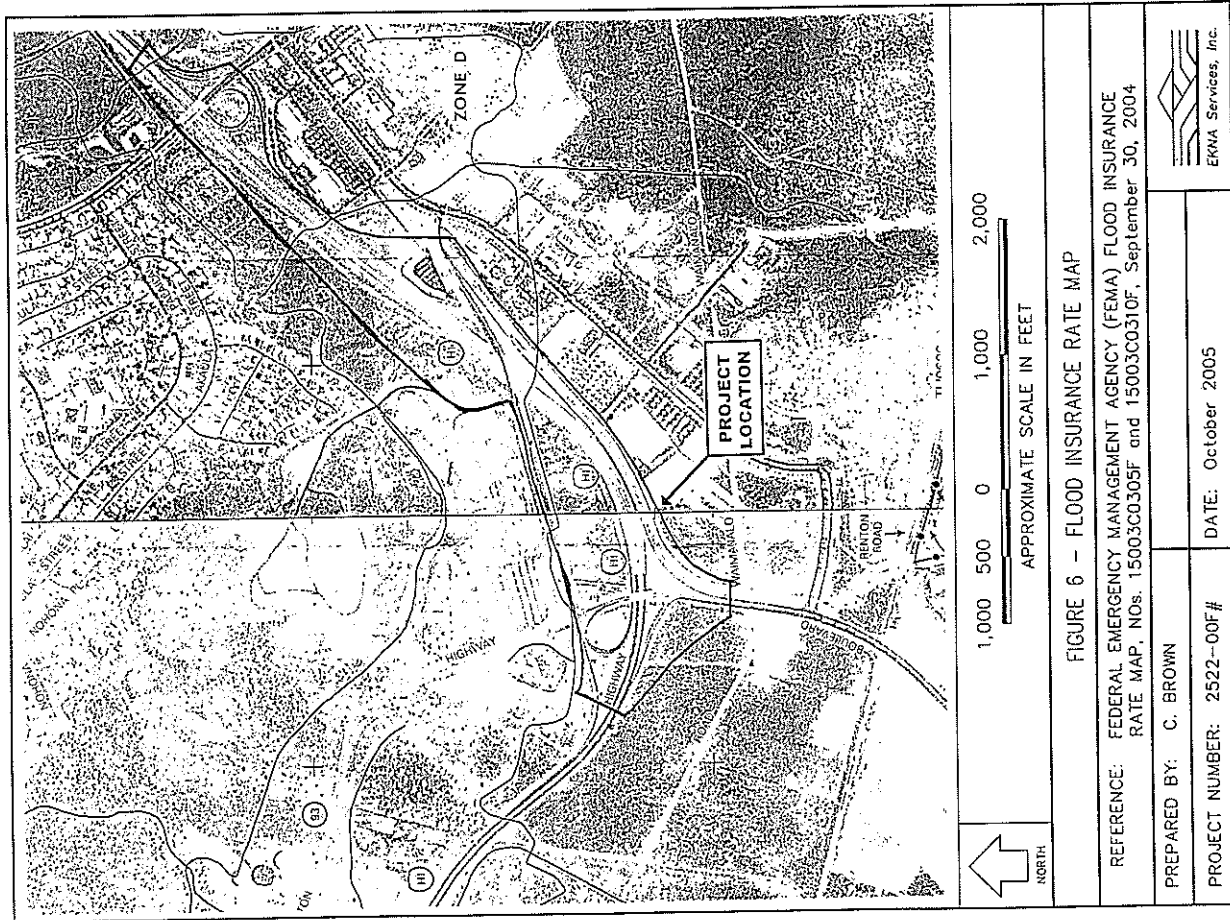


Figure 7 - 1982 Aerial Photograph

Photograph # 8186-13 by R.M. Towill Corporation



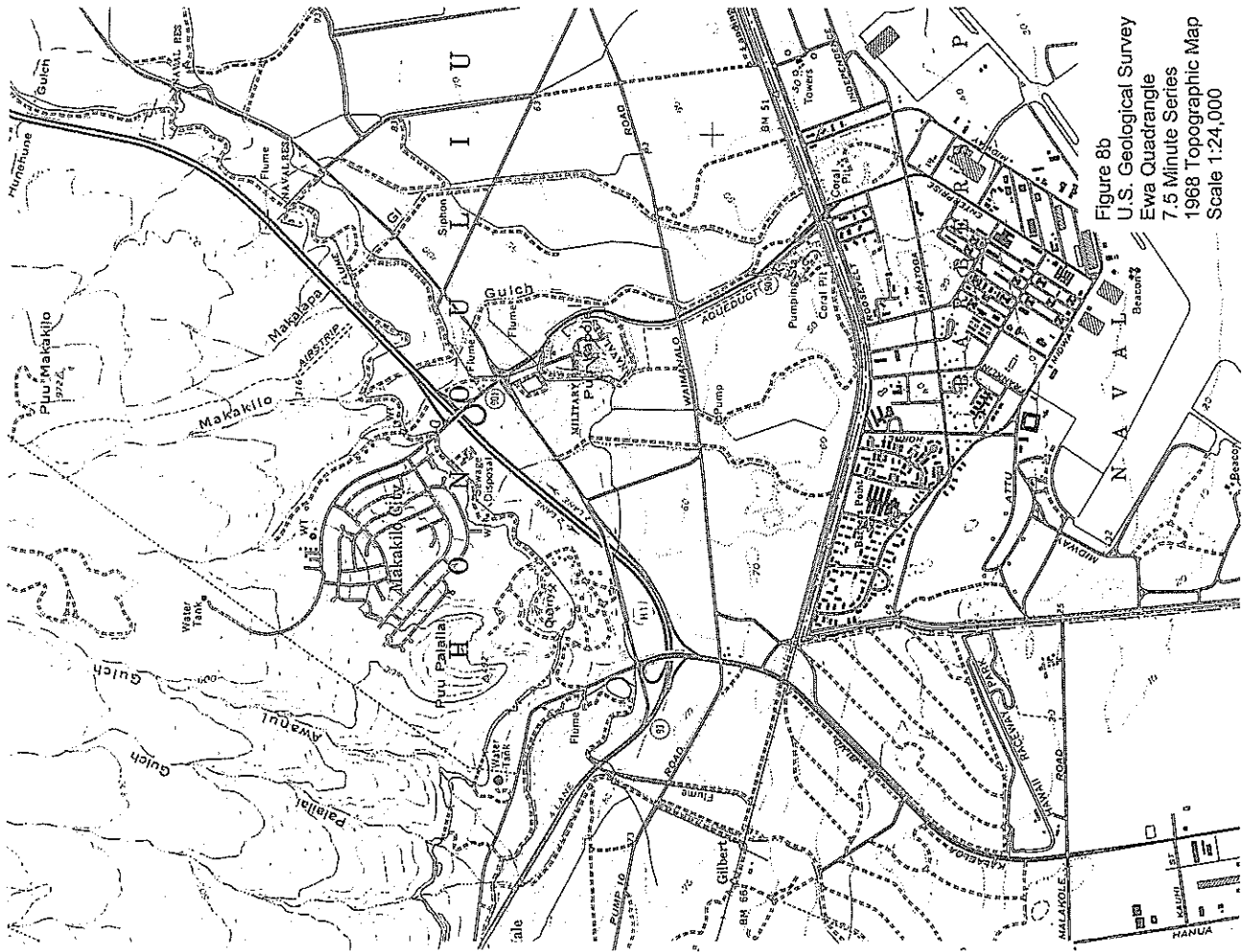


Figure 8b
 U.S. Geological Survey
 Ewa Quadrangle
 7.5 Minute Series
 1968 Topographic Map
 Scale 1:24,000



Figure 8a
 U.S. Geological Survey
 Ewa Quadrangle
 7.5 Minute Series
 1962 Topographic Map
 Scale 1:24,000

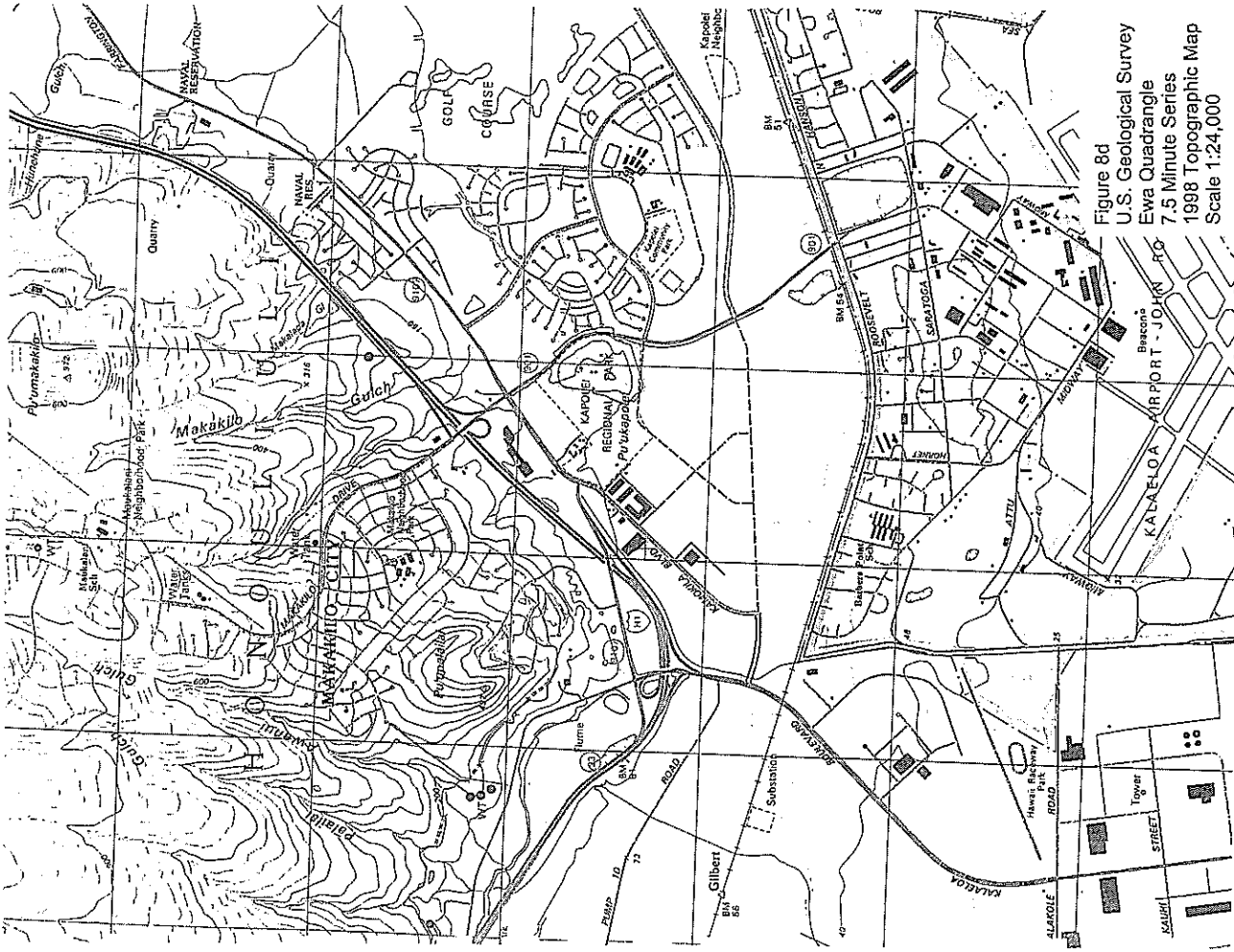


Figure 8d
 U.S. Geological Survey
 Ewa Quadrangle
 7.5 Minute Series
 1998 Topographic Map
 Scale 1:24,000

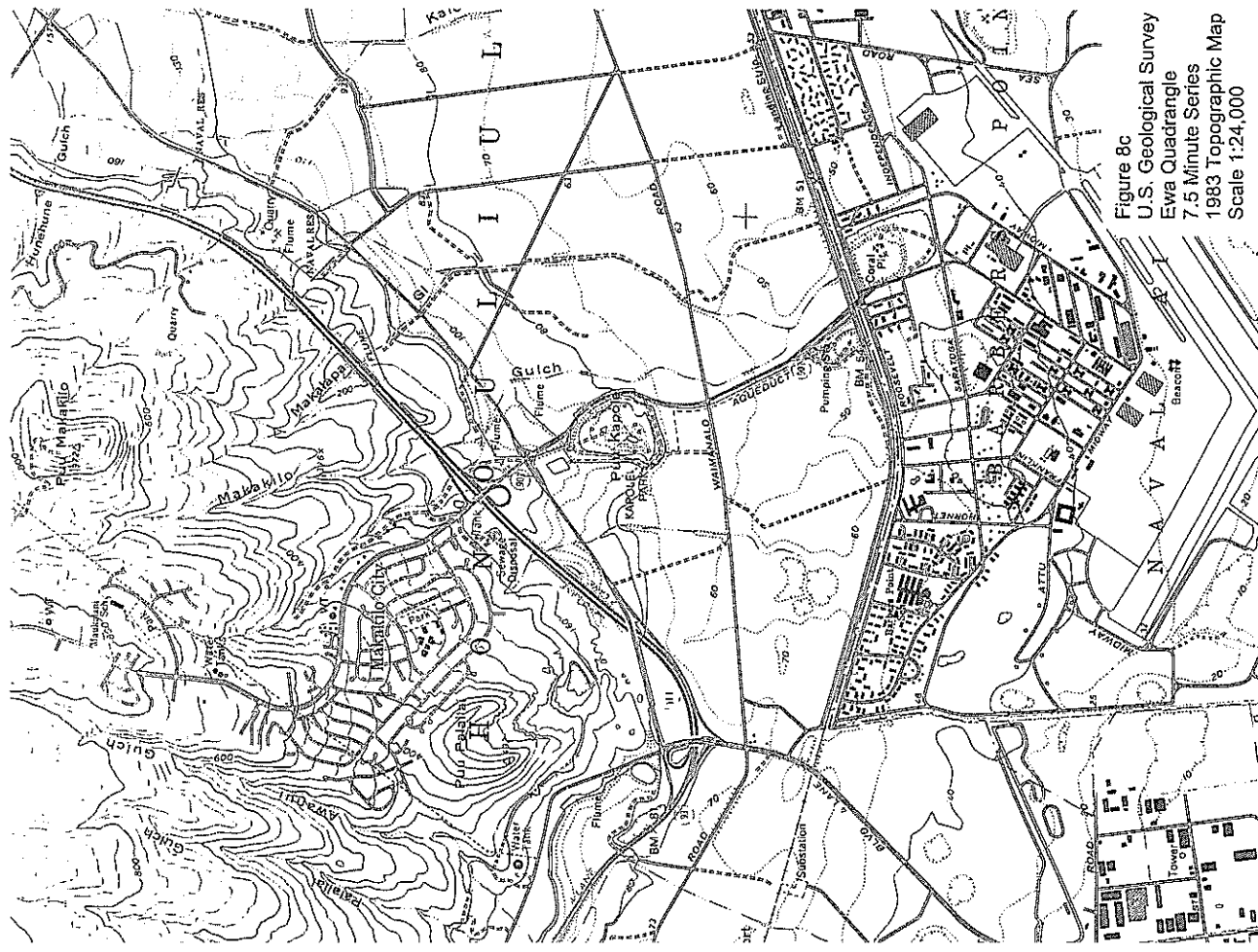


Figure 8c
 U.S. Geological Survey
 Ewa Quadrangle
 7.5 Minute Series
 1983 Topographic Map
 Scale 1:24,000

Photo 1: End View H-1 Freeway looking East with Proposed Frontage Road on left side
Photo taken by: C. Brown October 21, 2005

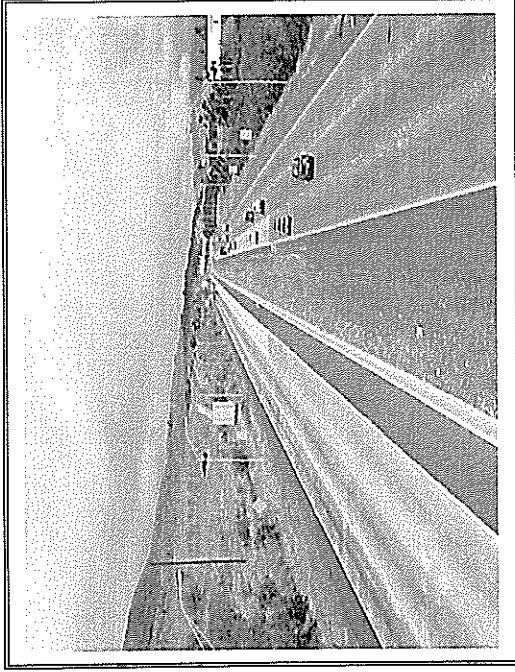
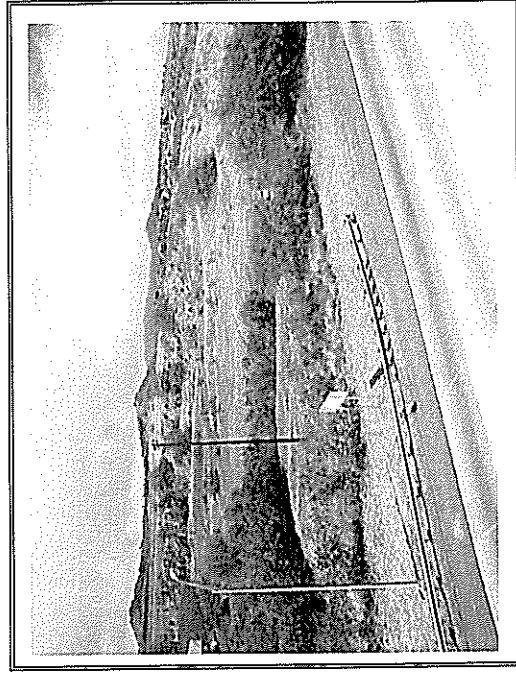


Photo 2: Side View of East Portion of Proposed Interchange Area
Photo taken by: C. Brown October 21, 2005



Appendix B - Site Photographs

Photo 3: View of West Portion of Proposed Interchange Area (includes abandoned fill materials)
Photo taken by: C. Brown October 21, 2005

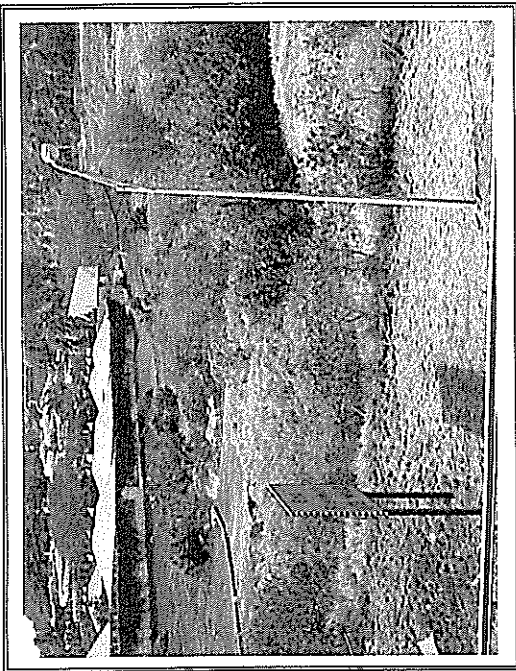


Photo 4: View of Vacant Area Burnt by Brush Fire
Photo taken by: C. Brown October 21, 2005



Photo 5: View of Transformer Vault
Photo taken by: C. Brown October 21, 2005

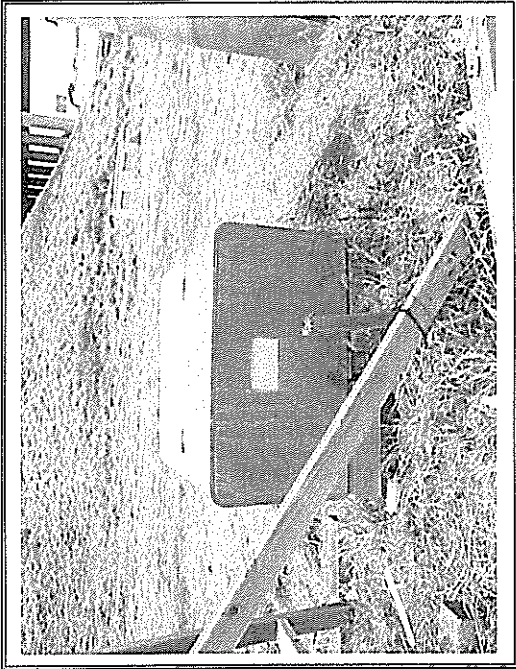
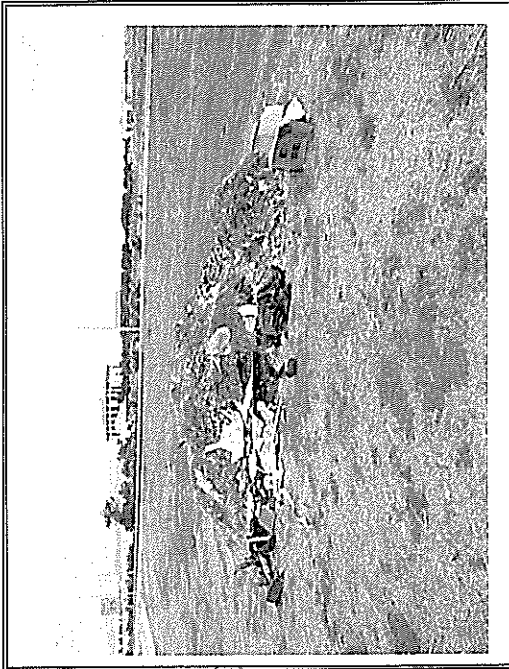
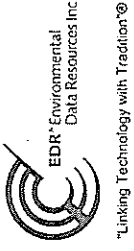


Photo 6: View of One Debris Pile on the Site
Photo taken by: C. Brown October 21, 2005





Sanborn® Map Report

Ship To: Charles Brown Order Date: 9/20/2005 Completion Date: 9/23/2005

EKNA Services, Inc
615 Piikoi Street
Honolulu, HI 96814

Inquiry #: 1515490.1s

P.O. #: na

Site Name: Kapolei Interchange

Address: Kapolei Interchange

City/State: Kapolei, HI 96707

Cross Streets:

Customer Project: na
6017532MER 808-591-8553

This document reports that the largest and most complete collection of Sanborn fire insurance maps has been reviewed based on client supplied information, and fire insurance maps depicting the target property at the specified address were not identified.

NO COVERAGE

Appendix C - Environmental Data Resources, Inc. Report

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY STATEMENTS OR OPINIONS IN THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSSES OR DAMAGES, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES, ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REASONABLE AMOUNT OF THE FEES PAID FOR THIS REPORT. AND THE INFORMATION PROVIDED IN THIS REPORT IS NOT TO BE INTERPRETED AS PROVIDING ANY FACTS REGARDING THE ENVIRONMENTAL RISK FOR ANY PROPERTY. ONLY A PHASE I ENVIRONMENTAL SITE ASSESSMENT PERFORMED BY AN ENVIRONMENTAL PROFESSIONAL CAN PROVIDE INFORMATION REGARDING THE ENVIRONMENTAL RISK FOR ANY PROPERTY. ADDITIONALLY, THE INFORMATION PROVIDED IN THIS REPORT IS NOT TO BE CONSTRUED AS LEGAL ADVICE.

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EDR DataMap™ Area Study

Kapolei Interchange
Kapolei, HI 96707
September 27, 2005

Inquiry number 01515490.3r



EDR® Environmental
Data Resources Inc

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR).

TARGET PROPERTY INFORMATION

ADDRESS

KAPOLEI, HI 96707
KAPOLEI, HI 96707

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable") government records within the requested search area for the following databases:

FEDERAL ASTM STANDARD

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP..... CERCLIS No Further Remedial Action Planned
CORRACTS..... Corrective Action Report
RCRA-TSDF..... Resource Conservation and Recovery Act Information
RCRA-LQG..... Resource Conservation and Recovery Act Information
ERNS..... Emergency Response Notification System

STATE ASTM STANDARD

SW/IFL..... Permitted Landfills in the State of Hawaii
VCP..... Voluntary Response Program Sites

FEDERAL ASTM SUPPLEMENTAL

CONSENT..... Superfund (CERCLA) Consent Decrees
ROD..... Records Of Decision
Delisted NPL..... National Priority List Deletions
HMIRS..... Hazardous Materials Information Reporting System
MLTS..... Material Licensing Tracking System
MINES..... Mines Master Index File
NPL Liens..... Federal Superfund Liens
PADS..... PCB Activity Database System
US ENG CONTROLS..... Engineering Controls Sites List
ODI..... Open Dump Inventory
UMTRA..... Uranium Mill Tailings Sites
FUDS..... Formerly Used Defense Sites
INDIAN RESERV..... Indian Reservations

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

EXECUTIVE SUMMARY

- RAATS..... RCRA Administrative Action Tracking System
- TRIS..... Toxic Chemical Release Inventory System
- TSCA..... Toxic Substances Control Act
- SSTS..... Section 7 Tracking Systems
- FTTS INSP..... FIFRA TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

EDR PROPRIETARY HISTORICAL DATABASES

- Coat Gas..... Former Manufactured Gas (Coal Gas) Sites

BROWNFIELDS DATABASES

- US BROWNFIELDS..... A listing of Brownfields Sites
- US INST CONTROL..... Sites with Institutional Controls
- BROWNFIELDS..... Brownfields Sites
- INST CONTROL..... Sites with Institutional Controls
- YCP..... Voluntary Response Program Sites

SURROUNDING SITES- SEARCH RESULTS

Surrounding sites were identified.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in *bold italics* are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL ASTM STANDARD

RCRAInfo: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting activities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSD's treat, store, or dispose of the waste.

A review of the RCRA-SQG list, as provided by EDR, and dated 05/20/2005 has revealed that there are 2 RCRA-SQG sites within the searched area.

Site	Address	Map ID	Page
SHELL SERVICE STATION	577 FARRINGTON HWY	6	6
DAGS CSD KARUHIREWA BLDG	607 KAMOKILA BLVD	13	12

EXECUTIVE SUMMARY

STATE ASTM STANDARD

SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Health.

A review of the SHWS list, as provided by EDR, and dated 02/15/2005 has revealed that there are 14 SHWS sites within the searched area

Site	Address	Map ID	Page
MAKAKILO CENTRAL OFFICE	92-815 NOHO HALE ST	1	3
MAKAKILO PARK POOL	92-665 ANIPEAHI ST	2	3
MAKAKILO PROPANE CYLINDER	MAKAKILO DR / PALAILA	3	3
92-507 UALEHEI STREET	92-507 UALEHEI ST	4	4
HAWAIIAN CEMENT- MAKAKILO	91-920 FARRINGTON HWY	6	7
VANTERPOOL RESIDENCE ON THE RI	91-1036 PALALA ST	7	7
BURNT ODOR	91-1063 HOLOMUA ST	8	8
CAMPBELL INDUSTRIAL PARK	1001 KAMOKILA BLVD	10	10
ALOHA 7-ELEVEN KAPOLEI	1000 KAMOKILA BLVD	10	11
KAPOLEI MEDICAL PARK	FORT BARRETTE RD / FA	11	11
PAE KO GARDENS	91-1038 KIAU AVE	12	11
BARBERS POINT CENTRAL OFFICE	COPAHEE ST & ROOSEVELT	14	13
ALLEGHANCE HEALTHCARE (AKA CAR	1009 OPULE ST	15	13
KAPOLEI FIRE STATION	2020 LAUWILWILI AVE	16	13

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Health's Active Leaking Underground Storage Tank Log Listing

A review of the LUST list, as provided by EDR, and dated 08/01/2005 has revealed that there is 1 LUST site within the searched area

Site	Address	Map ID	Page
PALAILAI LANDFILL	91-402 FARRINGTON HWY	5	5

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Health's Listing of Underground Storage Tanks.

A review of the UST list, as provided by EDR, and dated 08/01/2005 has revealed that there are 4 UST sites within the searched area

Site	Address	Map ID	Page
CHEVRON #209722	565 FARRINGTON HWY	6	5
KAPOLEI SHELL	577 FARRINGTON HWY	6	6
GTE KAPOLEI EARTH STATION	91-340 FARRINGTON HWY /	9	10
7-11 KAPOLEI	1000 KAMOKILA BLVD	10	10

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.

FEDERAL ASTM SUPPLEMENTAL

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA) (Federal Insecticide Fungicide Rodenticide Act) and TSCA Enforcement System; FTTS (FIFRA/TSCA Tracking System); CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURIS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-1 (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/ANTIS.

A review of the FINDS list, as provided by EDR, and dated 07/11/2005 has revealed that there are 7 FINDS sites within the searched area.

Site	Address	Map ID	Page
MAKAKILO CENTRAL OFFICE	92-815 NOHO HALE ST	1	3
MAKAKILO PARK POOL	92-665 ANIPEAHI ST	2	3
SHELL SERVICE STATION	577 FARRINGTON HWY	6	6
HAWAIIAN CEMENT-MAKAKILO	91-920 FARRINGTON HWY	6	7
DASS CSD KAKUIHEWA BLDG	601 KAMOKILA BLDV	13	12
BARBERS POINT CENTRAL OFFICE	COPAHEE ST & ROOSEVELT	14	13
KAPOLEI FIRE STATION	2020 LAUWILWILI AVE	16	13

Federal Lands: Consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

A review of the DOD list, as provided by EDR, and dated 10/01/2003 has revealed that there is 1 DOD site within the searched area.

Site	Address	Map ID	Page
BARBERS POINT NAVAL AIR STATION		0	3

STATE OR LOCAL ASTM SUPPLEMENTAL

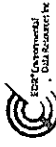
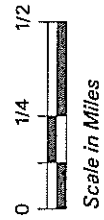
SPILLS: Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

A review of the SPILLS list, as provided by EDR, and dated 09/01/2000 has revealed that there are 4 SPILLS sites within the searched area.

Site	Address	Map ID	Page
92-307 UALEHEI STREET	92-307 UALEHEI ST	4	4
VANTERPOOL RESIDENCE ON THE RI	91-1036 PALALA ST	7	7
BURNT ODOR	91-1063 HOLOMUA ST	8	8
PAE KO GARDENS	91-1038 KIAU AVE	12	11

Kapolei Interchange

- Listed Sites
- Earthquake Epicenters (Richter 5 or greater)
- Search Boundary
- Roads
- Major Roads
- Waterways
- Railroads
- Contour Lines
- Pipelines
- Powerlines
- Fault Lines
- Water
- Superfund Sites
- Federal DOD Sites
- Indian Reservations BIA
- 100-Yr Flood Zones
- Wetlands



MAP FINDINGS SUMMARY

Total
Plotted

Database

FEDERAL ASTM STANDARD

NPL
Proposed NPL
CERCLIS
CERC-NFRAP
CORRACTS
RCRA TSD
RCRA Lg. Quan. Gen.
RCRA Sm. Quan. Gen.
ERNS

0
0
0
0
0
0
2
0

STATE ASTM STANDARD

SHWS
State Landfill
LUST
UST
VCP

14
0
1
4
0

FEDERAL ASTM SUPPLEMENTAL

CONSENT
ROD
Designated NPL
FINDS
HMIRS
MLTS
MINES
NPL Liens
PADS
US ENG CONTROLS
CUI
UMTRA
FUDS
INDIAN RESERV
DOD
RAATS
TRIS
TSCA
SSTS
FTIS

0
0
7
0
0
0
0
0
0
0
0
0
0
1
0
0
0
0
0

STATE OR LOCAL ASTM SUPPLEMENTAL

SPILLS

4

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas

0

MAP FINDINGS SUMMARY

Total
Plotted

Database

BROWNFIELDS DATABASES

US BROWNFIELDS
US INST CONTROL
BROWNFIELDS
INST CONTROL
VCP

0
0
0
0
0

NOTES:

Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Database(s) EDR ID Number EPA ID Number

Coast Gas Site Search: No site was found in a search of Real Property Scan's ENVIROHAZ database.

DOD Region
BARBERS POINT NAVAL AIR STATION (CLOSED)
BARBERS POINT NAVAL AIR S (County), HI
FEDERAL LANDS:
 Feature 1: Navy DOD
 Feature 2: Not reported
 Feature 3: Not reported
 Agency: DOD
 URL: Not reported
 Name 1: Barbers Point Naval Air Station (Closed)
 Name 2: Not reported
 Name 3: Not reported
 State: HI

1
MAKAKILO CENTRAL OFFICE
92-515 NHOHO HALE ST
KAPOLEI, HI 96707
FINDS:
 Other Pertinent Environmental Activity Identified at Site:
 HAWAII ENGINE CONTROL SYSTEM
 HAWAII-UNDERGROUND STORAGE TANK
SHWS:
 Island: Oahu
 Supplement: Not reported

2
MAKAKILO PARK POOL
92-565 ANIPEAHI ST
EWA BEACH, HI 96706
FINDS:
 Other Pertinent Environmental Activity Identified at Site:
 HAWAII ENGINE CONTROL SYSTEM
SHWS:
 Island: Oahu
 Supplement: Not reported

3
MAKAKILO PROPANE CYLINDER
MAKAKILO DR / PALALAI ST
KAPOLEI, HI 96707
SHWS:
 Island: Oahu
 Supplement: Makakilo

MAP FINDINGS

Map ID Direction Distance Database(s) EDR ID Number EPA ID Number

4
92-507 UALEHEI STREET
92-507 UALEHEI ST
MAKAKILO, HI 96707

SHWS
 Island: Oahu
 Supplement: Not reported

HI SPILLS:
 Reported Date: Not reported
 Case Number: 19941128
 Island: Oahu
 Incident Description: Wastewater spill on the street roads.
 Cause: Unknown
 Quantity: 150
 Media Affected: Asphalt
 Reportable Quantity: Not reported
 Category: Yes
 Reported By: Ahead Diggs
 Reporter's Affiliation: C & C Wastewater
 EHS Number: Not reported
 Responder: C & C Wastewater
 Responder Affiliation: removed biohazard, cleaned, disinfected, and decolorized
 Initial Response: 11/28/94
 Release Date: Not reported
 Time of Release: Not reported
 Duration: Terry
 Reported By: Terry
 Date Input: 12/01/94
 Staff 1: Not reported
 Staff 2: Not reported
 Emergency Response: Not reported
 Initial Site Screening Team Rank: Not reported
 No Further Action: Not reported
 Priority: Active

Comments:
 File Section: Single
 Type: Not reported
 Department 1: Not reported
 Department 2: Not reported
 Department 3: Not reported
 Cost Recovery: Not reported
 Official Notification: Not reported
 Written Report: Not reported
 Confirmation Number: Not reported
 Pounds: Not reported
 Responsible Party: Not reported
 Manifest Document Number: Not reported
 Units: Gallons
 Standard Cause: Not reported
 Numerical Quantity: Not reported
 Zip Id: Not reported
 Initial Notification: Not reported
 Written Notification: Not reported
 Inherent And Substantial: Not reported
 Label: Not reported
 Verification of source: Not reported
 Potential Quantity Amount: Not reported

MAP FINDINGS

Map ID Direction Distance EDR ID Number EPA ID Number Database(s)

Map ID Direction Distance EDR ID Number EPA ID Number Database(s)

92-507 UALEHEI STREET (Continued)
Potential Quantity Unit: Not reported
Verification of source: Not reported
Source ID: Not reported
Responsible Party Name: Not reported
Responsible Party Address: Not reported
RP Contact: Not reported
RP Phone Number: Not reported
Verification of RP: Not reported
Responsible Party ID: Not reported
Contractor Amount: Not reported
Personnel Amount: Not reported
Equipment Amount: Not reported
Travel Amount: Not reported
Miscellaneous Amount: Not reported
Federal Project Number: Not reported
Pollution Removal Funding Auth: Not reported
Authorization Date: Not reported
Authorization Ceiling: Not reported
Identifier: Not reported
Total Environment Revolving Response Fund: Not reported

92-507 UALEHEI STREET (Continued)
Potential Quantity Unit: Not reported
Verification of source: Not reported
Source ID: Not reported
Responsible Party Name: Not reported
Responsible Party Address: Not reported
RP Contact: Not reported
RP Phone Number: Not reported
Verification of RP: Not reported
Responsible Party ID: Not reported
Contractor Amount: Not reported
Personnel Amount: Not reported
Equipment Amount: Not reported
Travel Amount: Not reported
Miscellaneous Amount: Not reported
Federal Project Number: Not reported
Pollution Removal Funding Auth: Not reported
Authorization Date: Not reported
Authorization Ceiling: Not reported
Identifier: Not reported
Total Environment Revolving Response Fund: Not reported

Palailai Landfill
91-402 Farrington Hwy
Kapolei, HI 96707
LUST S103455038 NIA

Palailai Landfill
91-402 Farrington Hwy
Kapolei, HI 96707
LUST S103455038 NIA

Chevron #209722
565 Farrington Hwy
Kapolei, HI 96707
UST U003762154 NIA

Chevron #209722
565 Farrington Hwy
Kapolei, HI 96707
UST U003762154 NIA

MAP FINDINGS

Map ID Direction Distance EDR ID Number EPA ID Number Database(s)

6 SHELL SERVICE STATION
577 Farrington Hwy
Kapolei, HI 96707
RCRAInfo:
Owner: EQUILON ENTERPRISES L L C
EPA ID: HIR000112649
Contact: SONORA BIENVENU
(713) 241-5036
(713) 241-5036
Classification: Small Quantity Generator
TSDF Activities: Not reported
Facility Status: No violations found

6 SHELL SERVICE STATION
577 Farrington Hwy
Kapolei, HI 96707
RCRA-SQG
FINDS
RCRA-SQG
FINDS
HIR000112649

Other Pertinent Environmental Activity Identified at Site:
HAWAII-UNDERGROUND STORAGE TANK
RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM

Other Pertinent Environmental Activity Identified at Site:
HAWAII-UNDERGROUND STORAGE TANK
RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM

Kapolei Shell
577 Farrington Hwy
Kapolei, HI 96707
UST
Facility ID: 9-203632
Tank Status: Currently in Use
Tank Capacity: 12000
Date Closed: Not reported
Owner: EQUILON ENTERPRISES, LLC DBA SHELL OIL PRODUCTS US
2555 13TH AVE, SW
Kapolei, HI 96707

Kapolei Shell
577 Farrington Hwy
Kapolei, HI 96707
UST
Facility ID: 9-203632
Tank Status: Currently in Use
Tank Capacity: 12000
Date Closed: Not reported
Owner: EQUILON ENTERPRISES, LLC DBA SHELL OIL PRODUCTS US
2555 13TH AVE, SW
Kapolei, HI 96707

Chevron Products Company
91-480 Malakole St.
Kapolei, HI 96707
UST
Facility ID: 9-203662
Tank Status: Currently in Use
Tank Capacity: 15000
Date Closed: Not reported
Owner: CHEVRON PRODUCTS COMPANY
91-480 MALAKOLE ST.
Kapolei, HI 96707

Chevron Products Company
91-480 Malakole St.
Kapolei, HI 96707
UST
Facility ID: 9-203662
Tank Status: Currently in Use
Tank Capacity: 15000
Date Closed: Not reported
Owner: CHEVRON PRODUCTS COMPANY
91-480 MALAKOLE ST.
Kapolei, HI 96707

6 HAWAIIAN CEMENT- MAKAKILO
91-820 FARRINGTON HWY
KAPOLEI, HI 96707

SHWS 1006821111
FINDS 110013791557

Other Proficient Environmental Activity Identified at Site
HAWAII ENGINE CONTROL SYSTEM

SHWS: Oahu
Island: Not reported
Supplement: Not reported

7 VANTERPOOL RESIDENCE ON THE RIGHT S
91-1030 PALALA ST
KAPOLEI, HI 96707

SHWS \$105263779
SPILLS N/A

Other Proficient Environmental Activity Identified at Site
HAWAII ENGINE CONTROL SYSTEM

SHWS: Oahu
Island: Not reported
Supplement: Not reported

8 BURNT OGOR
91-1063 HOLOIRUA ST
KAPOLEI, HI 96797

SHWS \$105263370
SPILLS N/A

VANTERPOOL RESIDENCE ON THE RIGHT S (Continued)

Responsible Party: Not reported
Manifest Document Number: Not reported
Units: Not reported
Standard Cause: Not reported
Numerical Quantity: Not reported
Zip Id: Not reported
Initial Notification: Not reported
Written Notification: Not reported
Imminent And Substantial: Not reported
Last On: Not reported
Verification of source: Not reported
Potential Quantity Amount: Not reported
Potential Quantity Unit: Not reported
Verification of source: Not reported
Source Id: Not reported
Responsible Party Name: Not reported
RP Address: Not reported

RP Contact: Not reported
RP Phone Number: Not reported
Verification Of RP: Not reported
Responsible Party ID: Not reported
Contractor Amount: Not reported
Personnel Amount: Not reported
Equipment Amount: Not reported
Travel Amount: Not reported
Miscellaneous Amount: Not reported
Federal Project Number: Not reported
Pollution Removal Funding Auth: Not reported
Authorization Date: Not reported
Authorization Ceiling: Not reported
Identifier: Not reported
Total Environment Revolving Response Fund: 0

HI SPILLS:
Island: Oahu
Supplement: Not reported

Reported Date: 02/25/97
Case Number: 19970226-1000
Island: Oahu
Incident Description: Milky white liquid on ground giving off strange chemical odor. Complainant states its from the neighbor.

Cause: UNKN
Substances: Not reported
Quantity: Not reported
Media Affected: Soil, Air
Reportable Quantity: Not reported
Category: Not reported
Spill?: Yes

Reported By: Capt. Davis
Reporters Affiliation: HFD
ERMS Number: Not reported
Responder: Capt. Davis

Initial Response: HFD

Release Date: 02/25/97
Time of Release: 10:00 AM
Duration: Not reported
Input By: Tricia Nagatani
Date Input: 02/10/97
Staff 1: Terry Corpus
Staff 2: Not reported
Emergency Response: Yes
Initial Site Screening Team Rank: No
No Further Action: NFA
Priority: NFA

File Section: Single
Type: Not reported
Department 1: Not reported
Department 2: Not reported
Department 3: Not reported
Cost Recovery: Not reported
Official Notification: No
Written Report: Not reported
Confirmation Number: Not reported
Pounds: Not reported

HI SPILLS:
Island: Oahu
Supplement: Not reported

Reported Date: Not reported
Case Number: 19951210-1031
Island: Oahu
Incident Description: A small something like burnt fire crackers.
Cause: UNKN
Substances: Not reported
Quantity: Not reported
Media Affected: Air
Reportable Quantity: Not reported
Category: Not reported
Spill?: Odor
Reported By: Frank Junilla
Reporters Affiliation: Not reported
ERMS Number: Not reported
Responder: referred to SOSOC - Terry Corpus
Responder Affiliation: DOH - HEER

MAP FINDINGS

Map ID
Direction
Distance
Distance (ft) Site

EPA ID Number
EPA ID Number

Database(s)
Database(s)

BURN'T ODOR (Continued)

Initial Response: none
 Release Date: 12/10/95
 Time of Release: 10:31 AM
 Duration: UNKN
 Input By: Teica Nagaiem
 Date Input: 08/27/96
 Staff 1: Terry Comus
 Staff 2: Not reported
 Emergency Response: No
 Initial Site Screening Team Rank: No
 Priority: NFA
 Comments: NFA
 File Section: No
 Type: Single
 Department 1: Not reported
 Department 2: Not reported
 Department 3: Not reported
 Cost Recovery: Not reported
 Official Notification: No
 Written Report: Not reported
 Confirmation Number: Not reported
 Pounds: Not reported
 Responsible Party: Not reported
 Manifest Document Number: Not reported
 Units: Not reported
 Standard Cause: Not reported
 Zip Id: Not reported
 Initial Notification: Not reported
 Imminent And Substantial: Not reported
 Lead on: Not reported
 Verification of source: Not reported
 Potential Quantity Amount: Not reported
 Potential Quantity Unit: Not reported
 Verification of source: Not reported
 Source Id: Not reported
 Responsible Party Name: Not reported
 RP Address: Not reported
 RP Contact: Not reported
 RP Phone Number: Not reported
 Verification Of RP: Not reported
 Responsible Party ID: Not reported
 Contractor Amount: Not reported
 Personnel Amount: Not reported
 Equipment Amount: Not reported
 Travel Amount: Not reported
 Miscellaneous Amount: Not reported
 Federal Project Number: Not reported
 Pollution Removal Funding Auth: Not reported
 Authorization Date: Not reported
 Authorization Ceiling: Not reported
 Identifier: Not reported
 Total Environment Revolving Response Fund: 0

MAP FINDINGS

Map ID
Direction
Distance
Distance (ft) Site

EPA ID Number
EPA ID Number

Database(s)
Database(s)

9
 GTE KAPOLEI EARTH STATION
 91-340 FARRINGTON HWY / CENTRAL-91-595 FARRINGTON
 KAPOLEI, HI 96707

UST:
 Facility ID: 9-102406
 Tank Status: Currently In Use
 Tank Capacity: 4000
 Date Closed: Not reported
 Owner: Hawaiian Telecom
 P.O. Box 2200
 Kapolei, HI 96707

Tank ID: M-1
 Installed: 1991-02-01 00:00:00
 Substance: Diesel

Facility ID: 9-102406
 Tank Status: Permanently Out of Use
 Tank Capacity: 1000
 Date Closed: 1997-06-16 00:00:00
 Owner: Hawaiian Telecom
 P.O. Box 2200
 Kapolei, HI 96707

Tank ID: R-M-1
 Installed: Not reported
 Substance: Diesel

10
 CAMPBELL INDUSTRIAL PARK
 1001 KAMOKILA BLVD
 KAPOLEI, HI 96707

SHWS:
 Island: Oahu
 Supplement: Campbell Industrial Park

SHWS S106816660
 N/A

10
 ALOHA 7-ELEVEN KAPOLEI
 1000 KAMOKILA BLVD
 KAPOLEI, HI 96707

SHWS:
 Island: Oahu
 Supplement: Not reported

SHWS S106816157
 N/A

10
 7-11 KAPOLEI
 1000 KAMOKILA BLVD
 KAPOLEI, HI 96707

UST:
 Facility ID: 9-203179
 Tank Status: Currently In Use
 Tank Capacity: 10000
 Date Closed: Not reported
 Owner: ALOHA RETROLEUM LTD
 1122 BISHOP STREET, SUITE 1700
 Kapolei, HI 96707

Tank ID: 87
 Installed: 1995-02-02 00:00:00
 Substance: Gasoline

Facility ID: 9-203179
 Tank Status: Currently In Use
 Tank Capacity: 10000
 Date Closed: Not reported

Tank ID: 92
 Installed: 1995-02-02 00:00:00
 Substance: Gasoline

UST U003402908
 N/A

MAP FINDINGS

Map ID: Direction: Distance (ft): Sub: EDR ID Number: EPA ID Number: Database(s):

Map ID: Direction: Distance (ft): Sub: EDR ID Number: EPA ID Number: Database(s):

7-11 KAPOLEI (Continued) U003402908 SHWS \$106818228 N/A

Owner: ALOHA PETROLEUM, LTD.
1132 BISHOP STREET, SUITE 1700
KAPOLEI, HI 96707

11 KAPOLEI MEDICAL PARK
FORT BARRETTE RD / FARRINGTON HWY
KAPOLEI, HI 96707

SHWS:
Island: Oahu
Supplement: Not reported

12 PAE KO GARDENS
91-1038 MAU AVE
KAPOLEI, HI 96707

SHWS \$105263351 SHILLS N/A
Island: Oahu
Supplement: Not reported

HI SPILLS
Reported Date: Not reported
Case Number: 18951206-1
Island: Oahu
Incident Description: Female called fire dept. stating that she smells a sulfur-like odor. She complained that the odors were strong enough to leave her residence and spend the night at her mother's in Ewa Beach.

Cause: Not reported
Substances: Not reported
Quantity: Not reported
Media Affected: Air
Reportable Quantity: Not reported
Category: Not reported
Spill?: Other
Repaired By: Joe Reed
Repairers Affiliation: Oahu Civil Defense
ERNS Number: Not reported
Responder: SOSOC - Terry Corpus
Responder Affiliation: DOR-HEER
Initial Response: SOSOC went on scene. Area is a townhouse complex. Light winds were detected coming from the Campbell Industrial Park. No sulfur odor or other unusual odor to report at that time.

Release Date: 12/06/95
Time of Release: 2:00 pm
Duration: UNKN
Input By: TN
Date Input: 12/27/95
Staff 1: Terry Corpus
Staff 2: Not reported

Emergency Response: Yes
Initial Site Screening Team Rank: No
No Further Action: NFA
Priority: NFA
Comments: Single
File Section:

PAE KO GARDENS (Continued)

Type: Not reported
Department 1: Not reported
Department 2: Not reported
Department 3: Not reported
Cost Recovery: Not reported
Official Notification: Not reported
Written Report: Not reported
Confirmation Number: Not reported
Founds: Not reported
Responsible Party: Not reported
Manifest Document Number: Not reported
Units: Not reported
Standard Cause: Not reported
Numerical Quantity: Not reported
Zip Id: Not reported
Initial Notification: Not reported
Written Notification: Not reported
Imminent And Substantial: Not reported
Lat/Long: Not reported
Verification of source: Not reported
Potential Quantity Amount: Not reported
Potential Quantity Unit: Not reported
Verification of source: Not reported
Source Id: Not reported
Responsible Party Name: Not reported
RP Address: Not reported

RP Contact: Not reported
RP Phone Number: Not reported
Verification Of RP: Not reported
Responsible Party ID: Not reported
Contractor Amount: Not reported
Personnel Amount: Not reported
Equipment Amount: Not reported
Travel Amount: Not reported
Miscellaneous Amount: Not reported
Federal Project Number: Not reported
Pollution Removal Funding Auth: Not reported
Authorization Date: Not reported
Authorization Ceiling: Not reported
Identifier: Not reported
Total Environment Revolving Response Fund: 0

13 DAGS CSD KAKUHIHEWA BLDG
601 KAMOKILA BLVD
KAPOLEI, HI 96707

RCRA-SQG 1004688993
FINDS HFR00052845

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zo	Database(s)
COUNTY	S106818148	KAMOKILA PARK WHITE POWDER ON GROUND	LAALO A ST	96707	SHWS
COUNTY	S106820360	SEWAGE SPILL 92-577 MAKAKILO DRIVE	92-577 MAKAKILO DR	96707	SHWS
EWA BEACH	S105262779	MAKAKILO ELEMENTARY SCHOOL, 62-675	62-675 ANIPEAHI PL	96707	SHWS, SPILLS
HONOLULU COUNTY	S103763651	KANEHOE BAY OIL DIESEL SIGHTED ALON	KANEHOE BAY		SWFLF, SPILLS
KALAELOA	S106806721	PACNAVFACENGCOM BARBERS POINT (BRAC)	FORMER NAS BARBERS POINT BRAC	96707	RCRA-SQG, FINDS
KAPOLEI	S106815851	95-582 PALALAI STREET, OIL DUMPING	95-582 PALALAI ST	96707	SHWS
KAPOLEI	S106818888	MAKAKILO ODOR	92-521 AUA AUA PL		SHWS
KAPOLEI	S106815177	1325 AUKAHI STREET SEWAGE SPILL	1325 AUKAHI ST	96707	SHWS
KAPOLEI	S106815802	92-562 AWAWA STREET	92-562 AWAWA ST	96707	SHWS
KAPOLEI	S100102412	DIP LEG 2 THE GAS COMPANY	CRNR OF KALAELOA BLVD AND	96707	RCRA-SQG, FINDS
KAPOLEI	S106816781	CORNER OF FARRINGTON HIGHWAY AND KALAELOA BOULEVAR	FARRINGTON HWY / KALAELOA BLVD	96707	SHWS
KAPOLEI	S106818230	KAPOLEI STATE BUILDING	FARRINGTON HWY	96707	SHWS
KAPOLEI	S106818227	KAPOLEI EARTH STATION	91-340 FARRINGTON HWY	96707	SHWS
KAPOLEI	S105264763	KAPOLEI STATE BUILDING	FARRINGTON HWY, 3RD / 4TH FL	96707	SPILLS
KAPOLEI	S106820927	KAHE POINT CABLE STATION	92-480 FARRINGTON HWY	96707	SHWS, FINDS
KAPOLEI	S106816528	BHP GAS EXPRESS (STATION # 55)	91-590 FARRINGTON HWY	96707	SHWS
KAPOLEI	S106817432	HECO GENERATING STATION, KAHE	92-200 FARRINGTON HWY	96707	SHWS
KAPOLEI	S106819464	OLD FARRINGTON HIGHWAY, COOKING OIL DRUMS	FARRINGTON HWY	96707	SHWS
KAPOLEI	S106821057	WAIMANALO GULCH SANITARY LANDFILL	92-460 FARRINGTON HWY	96707	SHWS
KAPOLEI	S106819753	PUU KAPOLEI CENTRAL OFFICE	FORT BARRETTE RD & KAMAHA AVE	96707	SHWS, FINDS
KAPOLEI	S106819412	OFF OF FORT BARRETTE ROAD	FORT BARRETTE RD	96707	SHWS
KAPOLEI	S106817224	H-1 NEAR ENTRANCE TO CAMPBELL INDUSTRIAL PARK	H-1		SHWS
KAPOLEI	S106820896	HANUA STREET FUGITIVE OIL	HANUA ST	96707	SHWS, FINDS
KAPOLEI	S104534170	CAMPBELL INDUSTRIAL PARK PUNCTURED	HANUA ST	96707	SHWS, SPILLS
KAPOLEI	S106815785	91-275 HANUA STREET	91-275 HANUA ST	96707	SHWS
KAPOLEI	S106815889	AAT CHEMICAL INC	91-080 HANUA ST	96707	SHWS
KAPOLEI	S106815993	AIR LIQUIDE AMERICA CORPORATION, HANUA STREET	91-163 HANUA ST	96707	SHWS
KAPOLEI	S106816193	ALOHA PETROLEUM, BARBERS PT SALES TERMINAL (FORMER)	91-119 HANUA ST	96707	SHWS
KAPOLEI	S106816226	AMERON HAWAII INDUSTRIAL PRECAST PRODUCTS (FKA PIP)	91-059 HANUA ST	96707	SHWS
KAPOLEI	S106817096	FLEMING COMPANIES INC (FORMERLY C&S)	91-315 HANUA ST	96707	SHWS
KAPOLEI	S106817196	GRACE PACIFIC CORPORATION-BARBERS POINT KALAELOA Q	91-341 HANUA ST	96707	SHWS
KAPOLEI	S106817312	HANUA STREET, SOUTHERN TERMINUS	HANUA ST	96707	SHWS
KAPOLEI	S106817365	HAWAII MEDICAL VITRIFICATION, INC	91-161 HANUA ST	96707	SHWS
KAPOLEI	S106817443	HECO PROPERTY FUGITIVE DUMPING	HANUA ST	96707	SHWS
KAPOLEI	S106817869	HORIZON WASTE SERVICES OF HAWAII INC (BROWNING-FER)	91-310 HANUA ST	96707	SHWS
KAPOLEI	S106820563	TANAKA TRUCKING	HANUA ST	96707	SHWS

MAP FINDINGS

EDR ID Number
EPA ID Number
Database(s)

Map ID
Direction
Distance (ft) Site

14	DAGS CSD KAKUIHEWA BLDG (Continued)	RCRA/Info Owner: STATE OF HAWAII DAGS CEN SVC (808) 631-6734 HFM000026945 Contact: JAMES HISANO (808) 631-6734 Classification: Conditionally Exempt Small Quantity Generator TSDF Activities: Not reported Violation Status: No violations found	1004689983	SHWS FINDS	1006830452 11001576482
15	BARBERS POINT CENTRAL OFFICE COPAHEE ST & ROOSEVELT AVE KAPOLEI, HI 96707	FINDS: Other Pertinent Environmental Activity Identified at Site: RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM		SHWS	1006816142 N/A
15	ALLEGANCE HEALTHCARE (AKA CARDINAL HEALTH, FKA BA 688 OPULE ST KAPOLEI, HI 96707	FINDS: Other Pertinent Environmental Activity Identified at Site: HAWAII ENGINE CONTROL SYSTEM HAWAII-UNDERGROUND STORAGE TANK		SHWS Island: Oahu Supplement: Not reported	1006819247 110013770231
15	KAPOLEI FIRE STATION 2020 LAUWILIILI AVE KAPOLEI, HI 96707	FINDS: Other Pertinent Environmental Activity Identified at Site: HAWAII ENGINE CONTROL SYSTEM		SHWS Island: Oahu Supplement: Not reported	1006819247 110013770231

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
KAPOLEI	S106819376	DAHU CABINET, SULFUR ODOR	91-424 KOMOHANA ST	96707	SHWS
KAPOLEI	S106819379	DAHU CABINET, SULFUR/BURNT MATCH/ROTTEN EGG ODORS	91-424 KOMOHANA ST	96707	SHWS
KAPOLEI	S106819719	PHILIP SERVICES HAWAII LTD (ALLWASTE)- OIL RECYCLI	91-410 KOMOHANA ST	96707	SHWS
KAPOLEI	S106819720	PHILIP SERVICES HAWAII LTD (ALLWASTE)-WASTEWATER T	91-416 KOMOHANA ST	96707	SHWS
KAPOLEI	S106820110	PRECISION WOOD OF HAWAII INC	91-476 KOMOHANA ST	96707	SHWS
KAPOLEI	S106820212	REFRIGERANT RECYCLING, INC	91-220 KOMOHANA ST	96707	SHWS
KAPOLEI	S106820586	TESORO HAWAII CORPORATION REFINERY-KAPOLEI	91-325 KOMOHANA ST	96707	SHWS
KAPOLEI	S106820593	TESORO HAWAII REFINERY DRILL 748995	91-325 KOMOHANA ST	96707	SHWS
KAPOLEI	S106817483	HECO TRANSFORMER 46851 (VAULT 5603A)	92-1299 KUAMU ST	96707	SHWS
KAPOLEI	S106819184	MORRISON KNUDSEN CORP/AMERICAN PIPING AND BOILER C	91-252 KUHELA ST	96707	SHWS
KAPOLEI	S106817754	HONAKAI HALE, FORMALDEHYDE DISPOSAL	52-363 LAALOA ST	96707	SHWS
KAPOLEI	S105264625	KAPOLEI POST OFFICE, POSSIBLE ANTHR	MAIL DISTRIBUTION/SORTING ROOM	96707	SPILLS
KAPOLEI	S106815803	92-577 MAKAKILO DRIVE	92-577 MAKAKILO DR	96707	SHWS
KAPOLEI	S106816261	ARCO AM/PM #82109 (TEXACO 61-109-0850)	92-577 MAKAKILO DR	96707	SHWS
KAPOLEI	S106817488	HECO TRANSFORMER 48593	92-651 MAKAKILO DR	96707	SHWS
KAPOLEI	S106817093	FLARE STACK RELEASE	91-480 MAKALOA ST	96707	SHWS
KAPOLEI	1066818575	TEXACO MALAKOLE STREET PIPELINE EXCAVATION	MALAKOLE ST	96707	SHWS, FINDS
KAPOLEI	1066820449	BARBERS POINT HARBOR SURGE TANK	MALAKOLE ST	96707	SHWS, FINDS
KAPOLEI	S106815920	ABANDONED DRUMS MALAKOLE STREET	MALAKOLE ST	96707	SHWS
KAPOLEI	S106816707	CHEVRON REFINERY	91-480 MALAKOLE ST	96707	SHWS
KAPOLEI	S106818976	MARISCO, LTD	91-607 MALAKOLE ST	96707	SHWS
KAPOLEI	S106818927	DRUMS AT MONTEREY AND MIDWAY	MIDWAY ST / MONTEREY ST	96707	SHWS
KAPOLEI	S106817505	HECO TRANSFORMER 91-1089 NAMAHOE STREET	91-1089 NAMAHOE ST	96707	SHWS
KAPOLEI	S106819361	NUKUAWA STREET, CIP, ABANDONED DRUMS	NUKUAWA ST	96707	SHWS
KAPOLEI	S106817154	GARAGE VEHICLE SERVICE AREA OIL RELEASE	91-908 OAHIANI ST	96707	SHWS
KAPOLEI	S106816943	E K FERNANDEZ SHOWS INC	91-246 OIHANA ST	96707	SHWS
KAPOLEI	1066820838	ISLE GAS LPG LOADRACK	OLAI ST	96707	SHWS, FINDS
KAPOLEI	S106816399	BARBERS NAS CENTRAL OFFICE	91-120 OLAI ST	96707	SHWS
KAPOLEI	S106817184	GERMAINE'S LU'AU EMPLOYEES REPORT ODOR 1/25/86	91-019 OLAI ST	96707	SHWS
KAPOLEI	S106817185	GERMAINE'S LU'AU EMPLOYEES REPORT SULFUR ODOR 1/31/	91-019 OLAI ST	96707	SHWS
KAPOLEI	S106817919	IHLANI RESORT, SEWAGE ODOR COMPLAINT	OLANI ST	96707	SHWS
KAPOLEI	S106620144	PUMP 15 STATION, FORMER OAHU SUGAR COMPAN	OLD FARRINGTON HWY	96707	SHWS
KAPOLEI	S106817766	HONOKAI HALE RESIDENCE	92-374 PAALA PL	96707	SHWS
KAPOLEI	S106815804	92-608 PALALAI STREET, SEWAGE SPILL	92-608 PALALAI ST	96707	SHWS
KAPOLEI	S106815805	92-610 PALALAI STREET, SEWAGE OVERFLOW	92-610 PALALAI ST	96707	SHWS
KAPOLEI	S106815808	92-715 PALALAI, MAKAKILO	92-715 PALALAI	96707	SHWS
KAPOLEI	1000906750	BARBERS POINT HARBOR	PIERS FIRST 5 6 BARBERS POINT	96707	RCRA-SQG, FINDS
KAPOLEI	S106708610	EAST KAPOLEI	RENTON RD	96707	SHWS, BROWN/FIELDS
KAPOLEI	S106817055	FD ROOSEVELT AVENUE, BARBERS POINT	FD ROOSEVELT AVE / RABAUU ST	96707	SHWS
KAPOLEI	S106818896	MAKAKILO ELEMENTARY SCHOOL, MALATHION ODC	92-551 WALEHEI ST	96707	SHWS
KAPOLEI	1008173814	BWS VILLAGES OF KAPOLEI	WESTERLY SIDE OF KAHEKILI HWY	96707	FINDS

TC01515490.3r Page 3 of 4

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
KAPOLEI	S106820627	TILECO, INC	91-209 HANUA ST	96707	SHWS
KAPOLEI	S106821179	ZEP MANUFACTURING COMPANY	91-110 HANUA ST	96707	SHWS
KAPOLEI	S106816799	92-1240 HAUONE STREET	92-1240 HAUONE ST	96707	SHWS
KAPOLEI	S106816798	92-1221 HOOKEHA STREET, SEWAGE SPILL	92-1221 HOOKEHA ST	96707	SHWS
KAPOLEI	S106816784	91-1018 KAIJAU AVENUE SULFUR SMELL	91-1018 KAIJAU AVE	96707	SHWS
KAPOLEI	S106816750	COCA-COLA USA (KALAELOA BOULEVARD)	91-233 KALAELOA BLVD	96707	SHWS
KAPOLEI	S106817197	GRACE PACIFIC CORPORATION-GRACE PACIFIC BLOCK FACI	91-205 KALAELOA BLVD	96707	SHWS
KAPOLEI	S106817692	HICKLIN VALLEY DETROIT DIESEL	91-265 KALAELOA BLVD	96707	SHWS
KAPOLEI	S106818077	KALAELOA BOULEVARD, WELL CLOSURE	KALAELOA BLVD	96707	SHWS
KAPOLEI	S106818864	MACSTEEL SERVICE CENTERS USA (FORMERLY FERRO UNION	91-104 KALAELOA BLVD	96707	SHWS
KAPOLEI	S106819475	OLIVIA COLLECTION AND PILLOWS OF PARADISE WAREHOUSE	KALAELOA BLVD AT MAKALOA ST	96707	SHWS
KAPOLEI	U003154952	VALLEY DETROIT DIESEL	91-265 KALAELOA BLVD	96707	LUST
KAPOLEI	1008310640	KAPOLEI ELEMENTARY SCHOOL	91-1119 KAMAHAHA LOOP	96707	FINDS
KAPOLEI	1006842457	KAPOLEI CENTRAL OFFICE	KAMAHA RD & FT BARRETT RD	96707	FINDS
KAPOLEI	S106815953	AES HAWAII INC	91-086 KAOMI LP	96707	SHWS
KAPOLEI	S106816476	BEI (BREWER ENVIRONMENTAL INDUSTRIES) KAOMI LOOP	91-291 KAOMI LOOP	96707	SHWS
KAPOLEI	S106816477	BEI HAWAII - BARBERS POINT	91-150 KAOMI LOOP	96707	SHWS
KAPOLEI	S106817167	GASPRO - CAMPBELL INDUSTRIAL PARK	91-102 KAOMI LOOP	96707	SHWS
KAPOLEI	S106817373	HAWAII PROJECT MANAGEMENT (HPM) / HAWAIIAN WESTERN	KAOMI LOOP	96707	SHWS
KAPOLEI	S106817398	HAWAIIAN CEMENT- KAOMI LOOP	91-055 KAOMI LOOP	96707	SHWS
KAPOLEI	1008318024	KAPOLEI MIDDLE SCHOOL	91-3335 KAPOLEI PARKWAY	96707	FINDS
KAPOLEI	1008281835	KAPOLEI HIGH SCHOOL	91-5005 KAPOLEI PARKWAY	96707	FINDS
KAPOLEI	S106816504	BHP EXERCISE	KAUAI ST	96707	SHWS
KAPOLEI	S106817418	HAWAIIAN REMEDIATION & RECYCLING	91-383 KAUI ST	96707	SHWS
KAPOLEI	S106817336	INDUSTRIAL TECHNOLOGY KAUI STREET	91-313 KAUI ST	96707	SHWS
KAPOLEI	S106818011	KRAFT FOODS - HAWAII DISTRIBUTION CENTER	91-290 KAUI ST	96707	SHWS
KAPOLEI	S106815810	92-890 KOHUPONO STREET, STRONG SULFUR SMELL	92-890 KOHUPONO ST	96707	SHWS
KAPOLEI	S106815811	92-890 KOHUPONO STREET, SULFUR SMELL UNKNOWN SOURC	92-890 KOHUPONO ST	96707	SHWS
KAPOLEI	S106818224	KAPOLEI	91-325 KOMOHANA ST	96707	SHWS
KAPOLEI	1006820022	CHEVRON PIPELINE BREAK AT HAWAIIAN REFRACATORIES	220 KOMOHANA ST	96707	SHWS, FINDS
KAPOLEI	S106816101	ALCAL HAWAII (AKA ALCAL ARCADE CONTRACTING INC)	91-446 KOMOHANA ST	96707	SHWS
KAPOLEI	S106816231	AMFACWOOD TREATMENT FACILITY	91-445 KOMOHANA ST	96707	SHWS
KAPOLEI	S106816394	BALL METAL BEVERAGE CONTAINER CORP (FORMERLY REYNO	91-320 KOMOHANA ST	96707	SHWS
KAPOLEI	S106816576	BONDED MATERIALS COMPANY	91-400 KOMOHANA ST	96707	SHWS
KAPOLEI	S106816697	CHEMWOOD TREATMENT CO, INC	91-476 KOMOHANA ST	96707	SHWS
KAPOLEI	S106817141	FRONT LOADER ACCIDENTAL FALL INTO DEEP DRAFT HARBOR	KOMOHANA ST	96707	SHWS

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GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required

Elapsed ASTM days: Provides confirmation that this EDR report meets or exceeds the 90-day updating requirement of the ASTM standard

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List

Source: EPA
 Telephone: N/A
 National Priorities List (Superfund) The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices

Date of Government Version: 07/01/05
 Date Made Active at EDR: 06/22/05
 Database Release Frequency: Quarterly
 Date of Data Arrival at EDR: 06/03/05
 Elapsed ASTM days: 19
 Date of Last EDR Contact: 06/03/05

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)

Telephone: 202-564-7333

EPA Region 1

Telephone: 017-918-1143

EPA Region 3

Telephone: 215-814-6418

EPA Region 4

Telephone: 404-562-8033

EPA Region 6

Telephone: 214-555-6659

EPA Region 8

Telephone: 303-312-6774

Proposed NPL: Proposed National Priority List Sites

Source: EPA

Telephone: N/A

Date of Government Version: 04/27/05

Date Made Active at EDR: 05/16/05

Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 05/04/05

Elapsed ASTM days: 12

Date of Last EDR Contact: 06/05/05

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

Source: EPA

Telephone: 703-413-0223

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 06/27/05

Date Made Active at EDR: 08/17/05

Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 07/22/05

Elapsed ASTM days: 26

Date of Last EDR Contact: 07/22/05

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Source: EPA

Telephone: 703-413-0223

As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
MAKAKILO	S106815185	1350 KIKAHA STREET	1350 KIKAHA ST	96707	SHWS
MAKAKILO	1007092157	BWS MAKAKILO BOOSTER STATION NO 1	92 405 MAKAKILO DR	96707	RCRA-SQG
MAKAKILO	U003222113	AERONAUTICAL RADIO, INC	MAKAKILO ON PALEHUA RIDGE	96707	UST
MAKAKILO	S106818897	MAKAKILO FIRE STATION	92-685 MAKAKILO DR	96707	SHWS
MAKAKILO	S106819567	PALEHUA STREET MERCURY RELEASE	PALEHUA RD	96707	SHWS
WAIMANALO GULCH, OAHU	S106401346	WAIMANALO GULCH LANDFILL, EWA	94-460 FARRINGTON HWY	96707	SWFLF

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 05/17/05
 Date Made Active at EDR: 08/17/05
 Database Release Frequency: Quarterly

CORRECTIVE ACTION REPORT

Source: EPA
 Telephone: 800-424-9346
 CORRECTS identifies hazardous waste handlers with RCRA corrective action activity.
 Date of Government Version: 08/28/05
 Date Made Active at EDR: 08/28/05
 Database Release Frequency: Quarterly

RCRA: Resource Conservation and Recovery Act Information

Source: EPA
 Telephone: 800-424-9346
 RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1981. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat, or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally, publicly available quantity generators (CQGS) generate less than 100 kg of hazardous waste, less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGS) generate less than 1,000 kg of hazardous waste, less than 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDF's treat, store, or dispose of the waste
 Date of Government Version: 05/20/05
 Date Made Active at EDR: 06/09/05
 Database Release Frequency: Quarterly

ERNS: Emergency Response Notification System

Source: National Response Center, United States Coast Guard
 Telephone: 202-200-2342
 Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances
 Date of Government Version: 12/31/04
 Date Made Active at EDR: 03/24/05
 Database Release Frequency: Annually

FEDERAL ASTM SUPPLEMENTAL RECORDS

BRS: Biennial Reporting System

Source: EPA/NTIS
 Telephone: 800-424-9346
 The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.
 Date of Government Version: 12/31/03
 Database Release Frequency: Biennially

CONSENT: Superfund (CERCLA) Consent Decreases

Source: Department of Justice, Consent Decree Library
 Telephone: Varies
 Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.
 Date of Last EDR Contact: 06/17/05
 Date of Next Scheduled EDR Contact: 09/12/05

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 12/14/04
 Database Release Frequency: Varies

ROD: Records Of Decision

Source: EPA
 Telephone: 703-416-0223
 Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup
 Date of Government Version: 06/09/05
 Date of Last EDR Contact: 07/06/05
 Database Release Frequency: Annually

DELISTED NPL: National Priority List Deletions

Source: EPA
 Telephone: N/A
 The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delist sites from the NPL. In accordance with 40 CFR 300.425 (e), sites may be deleted from the NPL where no further response is appropriate
 Date of Government Version: 07/01/05
 Date of Last EDR Contact: 06/03/05
 Database Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Source: EPA
 Telephone: (415) 947-3000
 Facility Index System. FINDS contains both facility information and "pointers" to other sources that contain more data. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System)
 Date of Government Version: 07/11/05
 Date of Last EDR Contact: 07/05/05
 Database Release Frequency: Quarterly

HMIRS: Hazardous Materials Information Reporting System

Source: U.S. Department of Transportation
 Telephone: 202-366-4555
 Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.
 Date of Government Version: 08/27/05
 Date of Last EDR Contact: 07/22/05
 Database Release Frequency: Annually

MLTS: Material Licensing Tracking System

Source: Nuclear Regulatory Commission
 Telephone: 301-415-7169
 MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.
 Date of Government Version: 07/14/05
 Database Release Frequency: Quarterly

MINES: Mines Master Index File

Source: Department of Labor, Mine Safety and Health Administration
 Telephone: 303-231-5959
 Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information
 Date of Last EDR Contact: 07/05/05
 Date of Next Scheduled EDR Contact: 10/03/05

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 05/13/05
 Database Release Frequency: Semi-Annually

NPL LIENS: Federal Superfund Liens

Source: EPA
 Telephone: 202-564-4297
 Federal Superfund Liens Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability
 USEPA compiles a listing of filed notices of Superfund Liens

Date of Government Version: 10/15/91
 Database Release Frequency: No Update Planned

PADS: PCB Actively Database System

Source: EPA
 Telephone: 202-564-3887
 PCB Actively Database, PADS identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities

Date of Government Version: 03/20/05
 Database Release Frequency: Annually

DOD: Department of Defense Sites

Source: USGS
 Telephone: 703-692-8601
 This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands
 Date of Government Version: 10/01/03
 Database Release Frequency: Semi-Annually

UMTRA: Uranium Mill Tailings Sites

Source: Department of Energy
 Telephone: 505-845-0011
 Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases, tailings were used as construction materials before the potential health hazards of the tailings were recognized. In 1978, 24 inactive uranium mill tailings sites in Oregon, Idaho, Wyoming, Utah, Colorado, New Mexico, Texas, North Dakota, South Dakota, Pennsylvania, and on Navajo and Hopi tribal lands, were targeted for cleanup by the Department of Energy

Date of Government Version: 12/29/04
 Database Release Frequency: Varies

ODI: Open Dump Inventory

Source: Environmental Protection Agency
 Telephone: 800-424-9346
 An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria

Date of Government Version: 06/30/95
 Database Release Frequency: No Update Planned

FUDS: Formerly Used Defense Sites

Source: U.S. Army Corps of Engineers
 Telephone: 202-528-4285
 The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 12/31/04
 Database Release Frequency: Varies

INDIAN RESERV: Indian Reservations

Source: USGS
 Telephone: 202-208-3710
 This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres

Date of Government Version: 10/01/03
 Database Release Frequency: Semi-Annually

US ENG CONTROLS: Engineering Controls Sites List

Source: Environmental Protection Agency
 Telephone: 703-603-8867
 A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or affect human health

Date of Government Version: 01/10/05
 Database Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

Source: EPA
 Telephone: 202-564-4104
 RCRA Administrative Action Tracking System RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administrative actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/95
 Database Release Frequency: No Update Planned

TRIS: Toxic Chemical Release Inventory System

Source: EPA
 Telephone: 202-566-0250
 Toxic Release Inventory System TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/03
 Database Release Frequency: Annually

TSCA: Toxic Substances Control Act

Source: EPA
 Telephone: 202-260-5591
 Toxic Substances Control Act TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substances inventory list. It includes data on the production volume of these substances by plant site

Date of Government Version: 12/31/02
 Database Release Frequency: Every 4 Years

FTS INSF: FIFRA/TSCA Tracking System - FIFRA, (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

Source: EPA
 Telephone: 202-586-1667

Date of Government Version: 07/15/05
 Database Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SSTS: Section 7 Tracking Systems
 Source: EPA
 Telephone: 202-564-4203
 Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (82 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.
 Date of Government Version: 12/31/03
 Database Release Frequency: Annually
 Date of Last EDR Contact: 07/18/05
 Date of Next Scheduled EDR Contact: 10/17/05

FTTS: FIFRA/TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
 Source: EPA/Office of Prevention, Pesticides and Toxic Substances
 Telephone: 202-566-1667
 FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.
 Date of Government Version: 07/15/05
 Database Release Frequency: Quarterly
 Date of Last EDR Contact: 06/20/05
 Date of Next Scheduled EDR Contact: 09/19/05

STATE OF HAWAII ASTM STANDARD RECORDS

SHWS: Sites List
 Source: Department of Health
 Telephone: 808-586-4249
 Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites)
 Date of Government Version: 02/15/05
 Date Made Active at EDR: 04/13/05
 Database Release Frequency: Semi-Annually
 Date of Data Arrival at EDR: 03/22/05
 Elapsed ASTM days: 22
 Date of Last EDR Contact: 07/08/05

SWFLF: Permitted Landfills in the State of Hawaii
 Source: Department of Health
 Telephone: 808-586-4245
 Solid Waste Facilities/Landfill Sites. SWFLF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.
 Date of Government Version: 05/19/04
 Date Made Active at EDR: 08/22/04
 Database Release Frequency: Varies
 Date of Data Arrival at EDR: 05/20/04
 Elapsed ASTM days: 33
 Date of Last EDR Contact: 08/16/05

LUST: Leaking Underground Storage Tank Database
 Source: Department of Health
 Telephone: 808-586-4228
 Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.
 Date of Government Version: 08/01/05
 Date Made Active at EDR: 09/20/05
 Database Release Frequency: Semi-Annually
 Date of Data Arrival at EDR: 06/15/05
 Elapsed ASTM days: 32
 Date of Last EDR Contact: 06/29/05

UST: Underground Storage Tank Database
 Source: Department of Health
 Telephone: 808-586-4228
 Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 08/01/05
 Date Made Active at EDR: 06/20/05
 Database Release Frequency: Semi-Annually
 Date of Data Arrival at EDR: 08/19/05
 Elapsed ASTM days: 12
 Date of Last EDR Contact: 06/29/05

VCP: Voluntary Response Program Sites
 Source: Department of Health
 Telephone: 808-586-4249
 Date of Government Version: 01/05/05
 Date Made Active at EDR: 02/08/05
 Database Release Frequency: Varies
 Date of Data Arrival at EDR: 01/06/05
 Elapsed ASTM days: 33
 Date of Last EDR Contact: 07/25/05

STATE OF HAWAII ASTM SUPPLEMENTAL RECORDS

SPILLS: Release Notifications
 Source: Department of Health
 Telephone: 808-586-4249
 Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988
 Date of Government Version: 09/01/00
 Database Release Frequency: Varies
 Date of Last EDR Contact: 07/08/05
 Date of Next Scheduled EDR Contact: 09/19/05

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. ©Copyright 1993 Real Property Scan, Inc. For a mechanical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

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BROWNFIELDS DATABASES

US BROWNFIELDS: A Listing of Brownfields Sites
 Source: Environmental Protection Agency
 Telephone: 202-566-2777

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities- especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 01/10/05
 Date of Last EDR Contact: 06/13/05
 Date of Next Scheduled EDR Contact: 09/12/05
 Database Release Frequency: Semi-Annually

BROWNFIELDS: Brownfields Sites
 Source: Department of Health
 Telephone: 808-586-4249

Date of Government Version: 01/05/05
 Date of Last EDR Contact: 07/25/05
 Date of Next Scheduled EDR Contact: 09/19/05
 Database Release Frequency: Varies

VCP: Voluntary Response Program Sites
 Source: Department of Health
 Telephone: 808-586-4249

Date of Government Version: 01/05/05
 Date of Last EDR Contact: 07/25/05
 Date of Next Scheduled EDR Contact: 09/19/05
 Database Release Frequency: Varies

INST CONTROL: Sites with Institutional Controls
 Source: Department of Health
 Telephone: 808-586-4249

Voluntary Remediation Program and Brownfields sites with institutional controls in place
 Date of Government Version: 01/05/05
 Date of Last EDR Contact: 07/25/05
 Date of Next Scheduled EDR Contact: 09/19/05
 Database Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls
 Source: Environmental Protection Agency
 Telephone: 703-602-8857

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.
 Date of Government Version: 01/10/05
 Date of Last EDR Contact: 07/05/05
 Date of Next Scheduled EDR Contact: 10/03/05
 Database Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
 Source: American Hospital Association, Inc.
 Telephone: 312-280-5991
 The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Medical Centers, Provider of Services Listing
 Source: Centers for Medicare & Medicaid Services
 Telephone: 410-786-3000
 A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services

Nursing Homes
 Source: National Institutes of Health
 Telephone: 301-594-6248
 Information on Medicare and Medicaid certified nursing homes in the United States

Public Schools
 Source: National Center for Education Statistics
 Telephone: 202-502-7300
 The National Center for Education Statistics' primary database on private school locations in the United States and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states

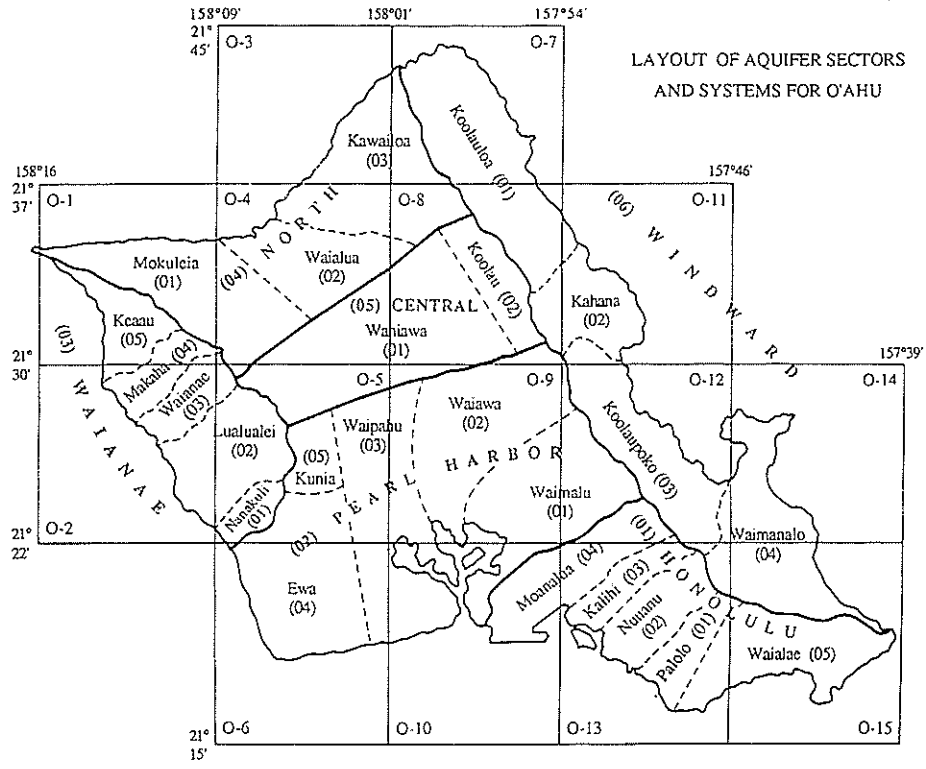
Private Schools
 Source: National Center for Education Statistics
 Telephone: 202-502-7300
 The National Center for Education Statistics' primary database on private school locations in the United States

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service

STREET AND ADDRESS INFORMATION

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Appendix D - Aquifer Classification

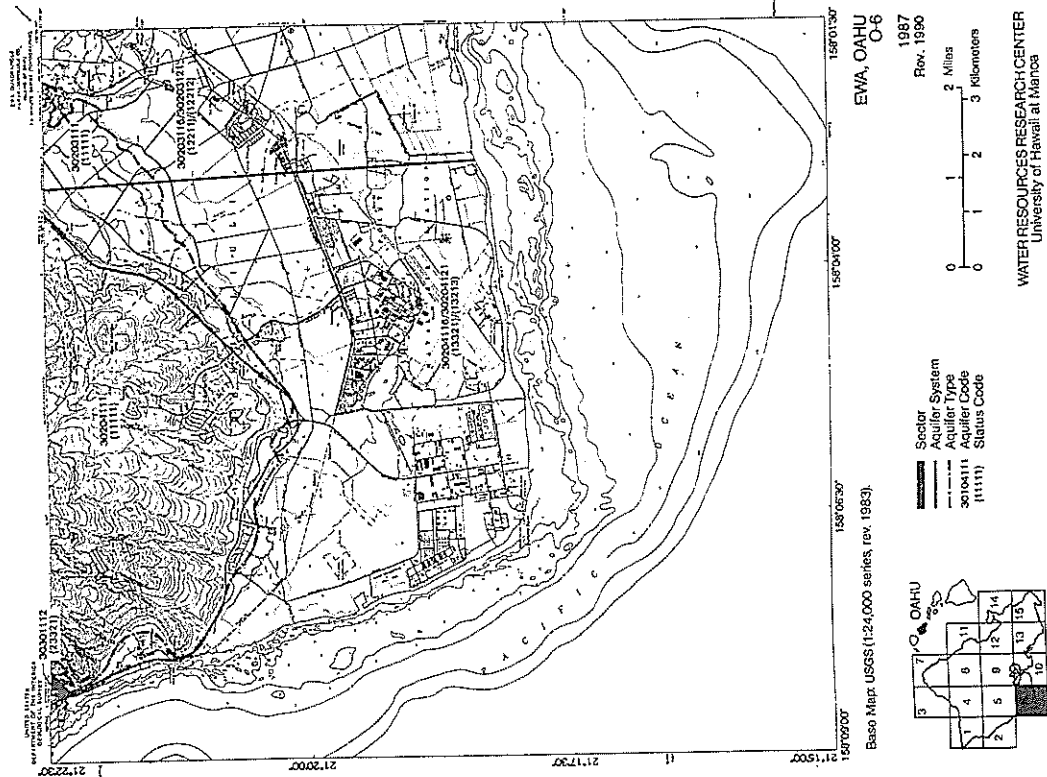


Figure 1.6. Aquifer classification map, Ewa, Oahu, Hawaii

AQUIFER CLASSIFICATION EXPLANATION

AQUIFER AND STATUS CODES*		AQUIFER TYPE:		Hydrology†	
AQUIFER CODE	AQUIFER TYPE	1	Basal	Fresh water in contact with seawater	
+	AQUIFER SECTOR	2	High Level	Fresh water not in contact with seawater	
3	AQUIFER SYSTEM	1	Unconfined	Where water table is upper surface of saturated aquifer	
01	AQUIFER TYPE	2	Confined	Aquifer bounded by impermeable or poorly permeable formations, and top of saturated aquifer is below groundwater surface	
04	AQUIFER CODE	3	Confined or Unconfined	Where actual condition is uncertain	
1	AQUIFER TYPE	AQUIFER TYPE:		Geology‡	
1	AQUIFER SYSTEM	1	Flank	Horizontally extensive lavas	
1	AQUIFER SYSTEM	2	Dike	Aquifers in dike compartments	
1	AQUIFER SYSTEM	3	Flank/Dike	Indistinguishable	
1	AQUIFER SYSTEM	4	Perched	Aquifer on an impermeable layer	
1	AQUIFER SYSTEM	5	Dike/Perched	Indistinguishable	
1	AQUIFER SYSTEM	6	Sedimentary	Nonvolcanic lithology	
1	AQUIFER SYSTEM	† Last two digits from hydrologic descriptors (pgs. 1, 2). ‡ Last digit from geologic descriptor.			
STATUS CODE (GROUNDWATER)					
Development Stage					
1	Currently used				
2	Potential use				
3	No potential use				
Utility					
1	Drinking				
2	Ecologically important				
3	Neither				
Salinity (mg/l Cl ⁻)					
1	Fresh (<250)				
2	Low (250-1000)				
3	Moderate (1000-5000)				
4	High (5000-15,000)				
5	Seawater (>15,000)				
Uniqueness					
1	Irreplaceable				
2	Replaceable				
Vulnerability to Contamination					
1	High				
2	Moderate				
3	Low				
4	None				

*Where sedimentary caprock aquifers rest on primary basalt aquifers, two Aquifer and Status Codes are used by a slash; the numerator code is upper aquifer and denominator is lower aquifer.

TSC 2.7.1
Due Diligence Inquiries
October 7, 2005



Mr. Charles Brown
EKNA Services
615 Piikoi Street, Suite 300
Honolulu, HI 96814

Re: Transformer Information; Kalaeloa Blvd

Mr. Brown:

In response to your October 4, 2005 request for information regarding Hawaiian Electric (HECO) transformers located at/near the above subject address, we provide the following information:

Vault #	Address	Transformer Number	Date Purchased	Date Installed	PCB Status
4275	91-985 Kalaeloa Blvd	NA	NA	NA	NA

NA denotes information not available

Our records indicate that the transformer is owned by the customer, and we do not have any PCB information on customer-owned equipment.

If you have further questions, please contact me at 543-4524.

Sincerely,

David Kaneko
Environmental Scientist

Appendix E - Hawaiian Electric Company Correspondence



WINNER OF THE EDISON AWARD
FOR DISTINGUISHED INDUSTRY LEADERSHIP

CHARLES G. BROWN

Environmental Physicist

Mr. Brown has a broad range of experience in operations, administration, nuclear engineering, open ocean operations, safety, training, environmental assessment, hazardous materials management and hazardous material remediation. He has worked throughout the Pacific Rim, including Hawaii, California, Washington, Alaska, Panama, Guam, the Republic of the Philippines, Thailand, Hong Kong, Kwajalein Island and Japan.

EDUCATION

- B.S., Physics, United States Naval Academy, Annapolis, Maryland, 1976
- Naval Nuclear Propulsion Engineer, United States Naval Nuclear Training, 1978

EXPERIENCE

- Edward K. Noda and Associates, Inc.
1995 to Present
 - Mr. Brown's experience includes Radioactive Material Management, Safety and Control, OSHA Regulations and Management; Hazardous Material Sampling and Analysis; Phase I/Phase II Environmental Assessments; preparation of sampling plans; and preparation of safety plans.
 - United States Naval Officer
1972 to 1994
- Management positions at the executive level including Operations, Administration, Nuclear Engineering, Safety and Training.
- Last assignment was as the Radiation Safety, Hazardous Material and Safety Manager for the Naval Submarine Training Center, Pearl Harbor, Hawaii from 1991 to 1994.

Appendix F - Assessor Qualifications

RELATED TRAINING

- Radioactive Material Safety
- Hazard Control Safety Program Management
- Hazardous Materials & Waste Control
- General Industry Standards
- Respirator Protection Program Manager
- Supervisors Safety Training
- Hazardous Waste Operations (HAZWOPER) 40 hour and 8 hour refreshers
- Safe Transportation of Hazardous Materials
- Confined Space Entry
- Lead Abatement Contractor/Supervisor and Inspector
- AHERA Asbestos Certifications
- NIOSH 582 Equivalent Microscopy
- Occupational Safety and Health Instructor
- Total Quality Management/Leadership Training and Application
- Certified SCUBA Diver

Previous project experience includes:

- US Army Corps of Engineers, Various Locations, Hawaii - Indefinite Delivery/Indefinite Quantity contract involving site characterizations, UST removals, site closures, risk assessments and remedial actions at over 30 sites in Hawaii.

DAYTON E. FRAM, P.G., P.E., PROJECT MANAGER/SENIOR ENGINEERING GEOLOGIST

As a professional engineer and geologist, Mr. Fram has a broad range of experience in construction, geotechnical engineering, ground water hydrology, and environmental work. He has worked in both the public and private sectors as a regulator and as a consultant. Mr. Fram has developed and implemented environmental regulatory programs, and managed major geotechnical engineering, environmental, geological and hydrological projects. In addition, he has trained/supervised personnel involved in environmental investigations/remediation operations, and is competent in working with clients to ensure that the projects needs and expectations were met.

Mr. Fram has over 25 years of experience in the fields of geotechnical engineering, geoenvironmental engineering, earthwork construction, environmental permitting and contaminant remediation. He has worked on projects throughout Hawaii and the Pacific area, including Guam, the Republic of the Philippines, Midway, American Samoa, Ponape, Diego Garcia and the Republic of Korea. His career also includes experience as an environmental regulator through previous employment at the Hawaii Department of Health.

In addition, Mr. Fram has continued his education by attending short courses in geotechnical engineering, ground improvement, erosion control, environmental assessments and contaminant remediation. He has also received training in Total Quality Management and management/ supervision of Hazardous Waste projects.

EDUCATION

B.S., Geology and Geophysics, University of Hawaii, 1973

REGISTRATION

Civil Engineer, State of Hawaii, 1992, License No. C-7572
Geologist, Wyoming 1998, License No. PG-2990

EXPERIENCE

• Edward K. Noda and Associates, Inc.
1993 to Present

Mr. Fram is project manager for the environmental and hazardous materials group. He is responsible for the planning and implementing environmental site assessments, audits, investigation and remedial efforts. His primary responsibility is coordinating all activities of the group for site assessments, site characterizations, remedial actions and other projects. He is also actively involved in business development.

• Geolabs-Hawaii
1987 to 1993

In this position, Mr. Fram served as senior engineering geologist and project manager for a major Hawaii-based geotechnical engineering firm. He was in charge of field exploration efforts for geotechnical and environmental projects as well as overall supervision and management of the operations of the company's drilling department.

• State of Hawaii
Department of Health
1983 to 1987

Mr. Fram served as a geologist with the Underground Injection Control Program at the Environmental Permits Branch. As the lead person on the program, Mr. Fram was responsible for the final development of the Department's administrative rules regulating injection wells and implementation of the permitting system. During his tenure with the Department, he also provided technical assistance to the Safe Drinking Water Program, the Solid Waste Program and the Hazardous Waste Branch. He was also responsible for review of Environmental Impact Statements, development plans and other permit activities with respect to potential impacts on ground water and drinking water supplies.

2. Hawaii Department of Transportation, Airports Division, Various Facilities, Hawaii - Several delivery orders involving site closures, UIC well closures, UST removals and hazardous material abatement.
3. Reef Runway Soil Management Facility, Honolulu International Airport, Hawaii - Placement and management/remediation of petroleum hydrocarbon containing soil generated at airport construction projects.
4. Closure of Seven (7) Underground Injection Control Wells and Two (2) Sumps, Lihue, Kauai, Hawaii - Contractor monitoring, field inspection, field sampling and report preparation.
5. Closure of Four (4) Underground Storage Tanks, Halawa Medium Security Facility, Aiea, Hawaii - Contractor monitoring, field inspection, field sampling and report preparation.
6. Phase 1 ESA, Asbestos Survey, and Lead Paint Survey, Jolly Roger, Waiatae, Hawaii - Field inspection, history investigation, research and report preparation.
7. Phase 1 ESA, Kaneohe Atrium, Kaneohe, Hawaii - Field inspection, history investigation, research and report preparation.
8. Phase 1 ESA, Air Liquide, Hilo, Hawaii - Field inspection, history investigation, research and report preparation.
9. Closure of Underground Storage Tanks, University of Hawaii Hilo, South Hilo, Hawaii - Contractor monitoring, field inspection, field sampling and report preparation.
10. Lead and Chloride Investigation, NCTAMS EASTPAC Naval Facility, Hawaii - Field inspection, history investigation, research, field sampling and report preparation.
11. Closure of Underground Storage Tank, Waipahu Wastewater Pump Station, Waipahu, Hawaii - Contractor monitoring, field inspection, field sampling and report preparation.
12. Phase 1 and 2 ESAs, Hawaii State Project, Kalihi, Hawaii - Field inspection, history investigation, research, field sampling and report preparation.
13. Phase 1 ESA, Kona Ace Hardware, Kailua-Kona, North Kona, Hawaii - Field inspection, history investigation, research and report preparation.
14. Phase 1 ESA, Condominium Development, Princeville, Kauai, Hawaii - Field inspection, history investigation, research and report preparation.
15. Phase 1 ESA, Koolauloa Farm, Hawaii - Field inspection, history investigation, research and report preparation.
16. Phase 1 ESA, Kapalua Bay Hotel, Kapalua, Maui, Hawaii - Field inspection, history investigation, research and report preparation.
17. Phase 1 ESA, Queen Street Extension, Honolulu, Hawaii - Field inspection, history investigation, research and report preparation.
18. Remedial Site Grading, Residential Construction, Hawaii Kai, Hawaii - Contractor monitoring, field inspection, field sampling and report preparation.
19. Soil Remediation, KSJ Radio Tower, Honolulu, Hawaii - Contractor monitoring, field inspection, field sampling and report preparation.
20. Asbestos and Lead Paint Surveys, Misawa Air Base, Misawa, Japan - Field inspection, field sampling and report preparation.

4. Honolulu Mass Transit System, Honolulu, Hawaii - Project Engineering Geologist. Responsible for research of available records for preparation of initial report related to route selection. Coordinated field exploration by five crews, compiled data and developed recommendations for foundation systems for proposed fixed rail transit system.
5. Proposed Quarry Site, Circumferential Road Project, Pohonpei, F.S.M. - Responsible for field exploration of proposed quarry site by borings and geophysical methods. Prepared report recommending extraction and use of aggregate materials.
6. Fuel Storage Facilities, U.S. Naval Support Facility, Diego Garcia, B.I.O.T. Project Engineering Geologist for exploration of proposed fuel storage facilities using borings, dynamic penetration testing and electric cone penetrometer testing to evaluate liquefaction potential of lagoonal coral reef formations.
7. Rainwater Catchment, Naval Air Facility, Midway Island - Project Engineering Geologist. Responsible for field testing of failing rainwater catchment which was the sole source of freshwater. Recommendations included design of new catchment system using flexible membrane liner to replace existing soil-cement pavement.
8. West Loch Estates and Ewa Villages, Honolulu, Ewa, Oahu, Hawaii - Project Engineering Geologist/Geotechnical Engineer for major projects with housing, infrastructure, golf course and recreational development. Responsible for exploration, design recommendations, plan/specification review and post-construction award services. Design included use of geotextiles and subdrains to stabilize soft soil conditions for golf course construction and to improve performance of flexible pavements over expansive soil subgrades.
9. Reef Runway Soil Management Facility, Honolulu International Airport, Hawaii - Project Manager for placement and management/remediation of petroleum hydrocarbon containing soil generated at airport construction projects. Project responsibilities included development of work plans, Operations Manual and application for Hawaii Department of Health permit to operate a remediation facility.
10. Ala Wai Canal, Honolulu, Hawaii - Project Manager for geotechnical/geohydrological exploration to develop ground water based saline water source to flush canal and maintain constant flow through canal to reduce stagnation. Responsible for exploration efforts and location of alternate site for proposed well field. Developed conceptual design for ground water extraction and transmission system including aesthetic water feature to provide passive aeration of water prior to discharge to canal.
11. Ford Island Bridge, Pearl Harbor, Hawaii - Project Geologist/Environmental Engineer responsible for Phase I Environmental Site Assessment, Phase II Environmental Site Assessment and site characterization for preparation of NPDES/NOI application.
12. Costco Wholesale, Seoul, Republic of Korea and Honolulu, Hawaii - Project Manager and Site Assessor for Phase I Environmental Site Assessments for three (3) proposed warehouse store sites in Seoul, Republic of Korea. Environmental Consultant for proposed acquisition and development of new warehouse store site in Honolulu, Hawaii including review/oversight of property owner's environmental consultant and review/oversight of Voluntary Response Program application.
13. US Army Corps of Engineers, Various Locations, Hawaii - Project Manager on Indefinite Delivery/Indefinite Quantity contract involving site characterizations, UST removals, site closures, risk assessments and remedial actions at over 30 sites in Hawaii.
14. Hawaii Department of Transportation, Airports Division, Various Facilities, Hawaii - Project Manager for several delivery orders involving site closures and a hydrogeological site assessment for development of a small neighbor island air facility.

Geotechs-Hawaii
1980 to 1983

As an engineering geologist, Mr. Fraim was responsible for project coordination and management for geotechnical engineering and ground water projects. His assignments also included preparation of proposals and engineering reports. In this position, Mr. Fraim was responsible for the field exploration and development of design recommendations for several major development and capital improvement projects. In addition, he was assigned to oversee the day to day operations of the drilling department.

Fewell Geotechnical Engineering
1977 to 1980

In this position, Mr. Fraim served as staff geologist. His primary areas of responsibility were field exploration for geotechnical engineering investigations, quality control of earthwork during construction and assisting project engineers in calculations and development of design recommendations. He also was in charge of the soils testing laboratory and drafting technicians.

Trans Pacific Laboratories
1973 to 1977

As a senior engineering technician, Mr. Fraim worked in the quality control testing of soils, concrete, asphalt and metals for construction work throughout the state of Hawaii. Duties included the physical testing of soils, concrete and asphalt as well as non-destructive testing of metals using magnetic, ultrasonic and radiographic methods.

RELATED TRAINING

- Leaking Underground Storage Tank Workshop, 1984, by U.S. Environmental Protection Agency
- Fundamentals of Ground Water Contamination, 1985, by U.S. Environmental Protection Agency and Geraghty and Miller
- 40 Hour Hazardous Waste Operations Safety Training, 1989, by Unitek Environmental Consultants
- 8 Hour Hazardous Waste Operations Supervisors Training, 1990, by Environmental Technologies International
- 8 Hour Annual Health and Safety Refresher Courses, 1990 through 2001 by Engineering Science, Inc., Brewer Environmental Consultants, Professional Training Services and EKNA
- Total Quality Management Seminars, 1991 and 1992, by Keye Seminars
- Certified SCUBA diver

Previous project experience includes:

1. Hangar & Rinse Facility, Cubi Point, Republic of Philippines (1990 CECH Excellence Award) - Participated on this project as Project Engineering Geologist. Responsible for field exploration by drilling and sampling of borings, geophysical exploration and permeability testing. Also responsible for engineering analyses, preparation of report sections on regional geology, ground water hydrology and preparation of earthwork specifications.
2. Hawaii Ocean Science & Technology Park, Keahole Point, Hawaii - Project Engineering Geologist and Hydrogeologist. Responsible for development of geotechnical engineering recommendations, diving inspections of underwater excavations, design and installation of ground water monitoring well network, consultation on construction claim for unforeseen conditions and design of a high capacity tail water disposal trench.
3. Honolulu Waterfront Master Plan, Honolulu, Hawaii - Project Engineering Geologist. Responsible for research of available data relevant to engineering geology and geotechnical engineering, development of recommendations for incorporation into master plan and report preparation.

APPENDIX I

DRAFT EA COMMENTS AND RESPONSES



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

REPLY TO
ATTENTION OF

June 23, 2006

RECEIVED

JUN 27 2006

ENGINEERING CONCEPTS

Regulatory Branch

File No. POH-2006-251

Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

This letter is in response to the May 2006 Draft Environmental Assessment (DEA) for the *Interstate H-1 Addition and Modification of Highway Access, Palaitai Interchange/Makakilo Interchange (Kapolei Interchange Complex)* located in Ewa, Oahu, Hawaii (TMK: 9-1-015, 9-1-016, 9-1-106). The DEA was prepared pursuant to the Environmental Impact Statement law (Hawaii Revised Statutes, Chapter 343) to disclose the potential environmental impacts which may result from the project and to identify mitigation measures to offset these potential impacts. It is our understanding the DEA will be used to determine whether an environmental impact statement (EIS) is warranted.

According to the document, the proposed action would be developed in several phases over the next 25 years and would include construction of a new freeway interchange at Kapolei and modifications to two existing interchanges at Makakilo and Palaitai.

Based on our review, the DEA does not appear to specifically address existing water resources occurring within the project area or the potential for the project to impact aquatic resources. Nonetheless, we did note the discussion on page 3-5 pertaining to flood and tsunami hazards indicates "...AECOS, Inc. noted [that] there were no perennial or significant intermittent streams in the project area, only swales modified in some cases to collect and direct surface flow into the drainage system for the existing road network." In addition, page 3-28, Utilities, reveals that "...Several drainage culverts are located within the Interstate H-1 and Farrington Highway corridor for the purpose of conveying storm runoff from upland areas under the freeway to a municipal drainage system. The City and County of Honolulu maintain a concrete drainage channel on the makai side of Farrington Highway that conveys storm runoff to the ocean." The analysis of potential impacts to utilities on page 4-19 goes on to document that "...several culverts crossing Interstate H-1 and Farrington Highway will be lengthened...[and] In addition, two existing concrete drainage channels will be enclosed to facilitate construction." Collectively, these references to streams, swales, and drainage channels suggest aquatic resources that could be subject to our regulatory jurisdiction may occur within the project area. However, without further clarifying information, my staff is unable to determine whether the proposed interchange complex and ancillary features would result in activities that would require Department of the Army (DA) authorization pursuant to Section 404 of the Clean Water Act

(33 U.S.C. 1344).

As you may know, the placement or discharge of dredged and/or fill material into waters of the U.S., including wetlands, requires DA authorization prior to work occurring in jurisdictional areas. U.S. Geological Survey (USGS) quadrangle maps and U.S. Fish and Wildlife Service national wetlands inventory maps indicate blue line streams and/or wetlands either occur, or historically occurred, within the project vicinity. Accordingly, we recommend that a future site visit be coordinated by your office with the Corps of Engineers Regulatory Branch to determine the presence, or lack thereof, of jurisdictional waters of the U.S., including wetlands, within the project area.

We appreciate the opportunity to review the DEA pursuant to our regulatory purview. Should you have questions, please contact Ms. Susan A. Meyer of my Regulatory staff at 438-2137 or by facsimile at 438-4060, or by email at Susan.A.Meyer@usace.army.mil. Please reference the file number in any future correspondence with our office regarding this project.

Sincerely,

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

Copies Furnished:

Ed Chen, Clean Water Branch, Dept. of Health, P.O. Box 3378, Honolulu, HI 96801
John Nakagawa, Office of Planning, CZM Program, P.O. Box 2359, Honolulu, HI 96804



ENGINEERING CONCEPTS, INC.
Consulting Engineers



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96886-5440

RECEIVED

JUL 26 2006

ENGINEERING CONCEPTS

July 14, 2006

REPLY TO
ATTENTION OF

July 13, 2006

Regulatory Branch

File No. POH-2006-251

Mr. George P. Young, P.E., Chief
Regulatory Branch, CEPOH-EC-R
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Attention: Ms. Susan A. Meyer


Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palalalai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated June 23, 2006 (File No. POH-2006-251) regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document.

The additional information you requested to determine whether jurisdictional waters of the U.S. are present within the project site will be included in Appendix A of the Final EA.

A copy of your correspondence and this response will also be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,


Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

Dear Mr. Ishizaki:

This letter is in response to your correspondence dated July 13, 2006 and acknowledges that the additional information we requested on June 23, 2006 relating to the Draft Environmental Assessment (dEA) for the *Interstate H-1 Addition and Modification of Highway Access, Palalalai Interchange/Makakilo Interchange (Kapolei Interchange Complex)* has been furnished to our office and will be appended to your Final EA. The Kapolei Interchange Complex project proposes, in part, to repair and reconstruct improvements associated with four box culverts and pipe culverts at the proposed interchange locations located in Ewa, Oahu, Hawaii (FMK: 9-1-15, 9-1-16, 9-1-106).

As a matter of background and context, in a letter dated May 25, 2006 your office had requested we review the project's Draft EA. As part of our review, we noted site-specific information pertaining to the presence/absence of aquatic resources was either missing or incomplete and that the geographic location of the proposed construction activities with respect to potential on-site jurisdictional aquatic resources was also absent or unclear. Concurrently, but under separate cover, your office transmitted a letter dated May 8, 2006 that requested our jurisdictional determination for the project.

Based on the supplemental project information we received (i.e., maps and on-site photographs) and in acknowledgement of our previous jurisdictional determination issued June 19, 2006 (File No. POH-2006-225), I am reaffirming that the function of the subject culverts is to divert surface stormwater from entirely upland sources to an upland stormwater retention system; that the stormwater drainageways have not replaced a previous tributary to Makakilo Gulch; and that such stormwaters and drainageways are not considered to be, or to contain, jurisdictional waters of the U.S.

Further, based on your design drawings, it appears that ground disturbing activities in the upland project area will not involve any activities or structures which would constitute either excavation of sediments or a discharge of dredged or fill material into jurisdictional waters of the U.S. Therefore, a Department of Army (DA) permit will not be required for the proposed project. This determination does not obviate your client, the Hawaii Department of

Transportation (State), from compliance with all other applicable Federal, state and local laws and regulations; other approvals and permits may still be required.

We appreciate the opportunity to review the proposed project pursuant to our regulatory purview. Should you have questions, please contact Ms. Susan A. Meyer of my Regulatory staff at 438-2137 or by facsimile at 438-4060, or by email at Susan.A.Meyer@usace.army.mil. Please reference the file number in any future correspondence with our office regarding this project.

Sincerely,



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

Copies Furnished:

Ed Chen, Clean Water Branch, Dept. of Health, P.O. Box 3378, Honolulu, HI 96801
John Nakagawa, Office of Planning, CZM Program, P.O. Box 2359, Honolulu, HI 96804
Mr. Peter T. Young, Chairperson, DLNR, State of Hawaii, P.O. Box 621, Honolulu, HI 96809

ROBERT BUNDA
PRESIDENT

DONNA MEGGADO KANI
VICE PRESIDENT

COLLEEN HANABUSA
MAJORITY LEADER

CLAYTON LEE
MAJORITY FLOOR LEADER

SHANE TEFESI
MAJORITY COUNCIL LEADER

FRED HEWINGS
MINORITY LEADER

BOB HOGUE
MINORITY FLOOR LEADER

GORDON TRIMBLE
MINORITY POLICY LEADER

FIRST DISTRICT
LORNAHEE JOHNS

SECOND DISTRICT
RUCHELL S. KOMARU

THIRD DISTRICT
PAUL WAIKEN

FOURTH DISTRICT
SHANE TEFESI

FIFTH DISTRICT
ROSALYN BAKER

SIXTH DISTRICT
J. PALANI TINKLEN

SEVENTH DISTRICT
DARYL H. KOOPER

EIGHTH DISTRICT
SAM SUK

NINTH DISTRICT
LETI IMA, JR.

TENTH DISTRICT
ORRANTY TENGICH

ELEVENTH DISTRICT
CAROL FAWCETT

TWELFTH DISTRICT
GORDON TRIMBLE

THIRTEENTH DISTRICT
SHANE OHA OLANI

FOURTEENTH DISTRICT
DONNA MEGGADO KANI

FIFTEENTH DISTRICT
HONOLUHU SAKAI

SIXTEENTH DISTRICT
DARYL LEE

SEVENTEENTH DISTRICT
HOWARD

EIGHTEENTH DISTRICT
CHUCKIE T. OSHIMA

NINETEENTH DISTRICT
SHANE IMA

TWENTIETH DISTRICT
PAUL LEE

TWENTY-FIRST DISTRICT
COLLEEN HANABUSA

TWENTY-SECOND DISTRICT
ROBERT BUNDA

TWENTY-THIRD DISTRICT
CLAYTON LEE

TWENTY-FOURTH DISTRICT
BOB HOGUE

TWENTY-FIFTH DISTRICT
FRED HEWINGS

CHIEF CLERK
PAUL T. KUMAGAKI

RECEIVED

JUL 3 2006

The Senate

The Twenty-Third Legislature

of the

State of Hawaii

STATE CAPITOL

HONOLULU, HAWAII 96813

June 28, 2006



ENGINEERING CONCEPTS, INC.
Consulting Engineers

July 14, 2006

Senator Brian Kanno
State Senate, District 19
Hawaii State Capitol
415 South Beretania Street, Room 202
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palalal Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated June 28, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we offer the following information in response to your comment regarding inclusion of Makakilo Interchange eastbound off-ramp ME from I-H1 to Makakilo Drive in Phase 1 of the project:

While it is recognized that the proposed Makakilo eastbound off-ramp ME may ultimately improve traffic circulation through the City of Kapolei fronting the Kapolei Shopping Center, it is also anticipated that there will be near term negative impacts should the ramp be implemented at this time. Traffic operations are likely to worsen in the vicinity due the high volume of traffic on Makakilo Drive, and the short distance between the planned off-ramp ME connection to Makakilo Drive and the Makakilo Drive / Farrington Highway intersection. During weekday commute periods, southbound queues on Makakilo Drive extend beyond the planned off-ramp ME connection to Makakilo Drive. As a result, off-ramp traffic would have difficulty both turning left up Makakilo Drive and merging right from the off-ramp to the Makakilo Drive southbound through and left-turn lanes. There is also a potential for traffic queues to backup onto the freeway. Installation of traffic signals on Makakilo Drive at off-ramp ME would aid these turning movements; however, coordination and progression problems with the existing Farrington Highway traffic signals would result due to the close proximity of the two signalized intersections.

Off-ramp ME has been excluded from Phase 1 in light of the associated signalization and coordination problems described above. As stated in the Draft EA, the off-ramp was included in previous planning documents and is anticipated to be constructed at some time in the future "when warranted". Construction is likely to occur after implementation of other regional traffic improvements that are necessary to relieve traffic on Makakilo Drive at the Makakilo Interchange. These improvements include completion of the North-

1150 South King Street, Suite 700 • Honolulu, Hawaii 96814
Tel (808) 591-8320 • Fax (808) 591-9010 • E-Mail: ect@cchawaii.com



Mr. Kenneth Ishizaki, Executive Vice-President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Subject: Interstate H-1 Addition and Modification of Highway Access,
Palalal Interchange /Makakilo Interchange (Kapolei Interchange
Complex) Ewa, Oahu, Hawaii, TMK: 9-1-15, 9-1-88, 9-1-106

Dear Mr. Ishizaki:

I am providing comments on the above project. The Draft Environmental Assessment indicates that Phase 1 improvements will include construction of a westbound on-ramp (MID) to access westbound lanes of the H-1 Freeway from Makakilo Drive. I am concerned that the eastbound off-ramp (ME) from H-1 Freeway to Makakilo Drive has not been included in Phase 1. Further, it is indicated the ME ramp will be completed "when warranted" and the ME ramp is not included in traffic projections for the year 2030.

The ME ramp will help lessen the traffic fronting the Kapolei Shopping Center. Currently, there are two off-ramps available at the Palalal Interchange for traffic heading from Waianae to Makakilo, the Villages of Kapolei, Kalaeloa/Barbers Pt., Ewa and Ewa Beach. Currently, the bulk of these vehicles contribute to the traffic in front of Kapolei Shopping Center. It is critical that the ME ramp be included in the Phase 1 improvements.

Mahalo for the opportunity to submit comments on this project.

Māiana pono,

Brian Kanno

Brian Kanno
State Senator

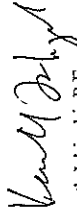
ENGINEERING CONCEPTS, INC.

Senator Brian Kanno
July 14, 2006
Page 2

South Road and interchange, extension of Makakilo Drive from Makakilo to the North-South interchange, and completion of Phase 2 of the Kapolei Interchange.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,



Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEOC
Ms. Christine Yamasaki - DOT Highways Division

LINDA LINGLE
GOVERNOR



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JUN 2 2006

RUSSELL SATO
COMPTROLLER
KATHERINE H. THOMASON
DEPUTY COMPTROLLER



ENGINEERING CONCEPTS, INC.
Consulting Engineers

STATE OF HAWAII

DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810

(PH)124-6

July 14, 2006

JUN 20 2006

Mr. Kenneth Ishizaki, Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

Subject: Interstate H-1 Addition and Modification of Highway Accesses
Palailai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii
TMK: 9-1-15, 16, 88 & 106

Thank you for the opportunity to provide comments on the subject project's Draft Environmental Assessment. This project does not directly impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions, please have your staff call Mr. Bruce Bennett of the Planning Branch at 586-0491.

Sincerely,

ERNEST Y. W. LAU
Public Works Administrator

BB:mo
c: Mr. Brennon T. Morioka, DOT
Ms. Genevieve Salmonson, DOH-OEQC

Mr. Ernest Y. W. Lau
Public Works Administrator
Department of Accounting and General Services
State of Hawaii
P.O. Box 119
Honolulu, Hawaii 96810

Attention: Mr. Bruce Bennett
Planning Branch

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palailai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated June 20, 2006 (reference: [P]1124.6) regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document and acknowledge that you have no comments at this time.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

LINDA LINGLE
GOVERNOR

MAJOR GENERAL ROBERT G. F. LEE
DIRECTOR OF CIVIL DEFENSE

EDWARD T. TEIXEIRA
VICE DIRECTOR OF CIVIL DEFENSE



STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

July 5, 2006

Mr. Kenneth Ishizaki
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:


Thank you for this opportunity to comment on the Draft Environmental Assessment (DEA) that was prepared for the Interstate H-1 addition and modification of highway accesses at Palalal and Makakilo Interchanges, City and County of Honolulu.

Proximity to commercial and residential development in addition to potential commercial sites merits careful consideration of water collection and runoff issues before finalizing construction plans. The highway at Palalal Interchange in particular has past water collection problems that have caused serious hydroplaning.

Any further development plans, including commercial as well as residential, should be forwarded to State Civil Defense for recommended flooding or flood plain mitigation.

Should you have any questions, please contact me at 733-4300, ext. 501.

Sincerely,


EDWARD T. TEIXEIRA
Vice Director of Civil Defense

c: Mr. Bremnon T. Morioka, State Department of Transportation
Ms. Genevieve Salmonson, Office of Environmental Quality Control

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JUL 7 2006

ENGINEERING CONCEPTS



PHONE (808) 733-4300
FAX (808) 733-4287



ENGINEERING CONCEPTS, INC.
Consulting Engineers

November 10, 2006

Mr. Edward T. Teixeira
Vice Director of Civil Defense
Office of the Director of Civil Defense
Department of Defense
State of Hawaii
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palalal Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated July 5, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we offer the following response to your comments:

1. *Proximity to commercial and residential development in addition to potential commercial sites merits careful consideration of water collection and runoff issues before finalizing construction plans. The highway at Palalal Interchange in particular has past water collection problems that have caused serious hydroplaning.*

State highway drainage system improvements will be included in the project design. Proposed improvements along Farrington Highway and Palalal Interchange should address existing runoff issues along I-H1 at the Palalal Interchange.

2. *Any further development plans, including commercial as well as residential, should be forwarded to State Civil Defense for recommended flooding or flood plain mitigation.*

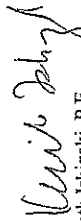
The State Department of Transportation will not be participating in development of any commercial or residential projects. Developers of such projects will be responsible for individual coordination with your office.

ENGINEERING CONCEPTS, INC.

Mr. Edward T. Teixeira
November 10, 2006
Page 2

A copy of your correspondence and this response will be included in the Final E.A. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,



Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2260
HONOLULU, HAWAII 96814

PATRICIA HAMAMOTO
SUPERINTENDENT

JUN 30 2006



ENGINEERING CONCEPTS, INC.
Consulting Engineers

OFFICE OF THE SUPERINTENDENT

June 30, 2006

Mr. Kenneth Ishizaki, Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

Subject: Draft Environmental Assessment (DEA) for Kapolei Interchange Complex,
Ewa, Oahu, Hawaii. TMK: 9-1-15, 9-1-16, 9-1-38, 9-1-106

The Department of Education has no comment on the Draft Environmental Assessment (DEA) for the Kapolei Interchange Complex. Thank you for the opportunity to review and comment on the DEA.

Should you have any questions, please call Heidi Meeker of the Facilities Development Branch at 733-4862.

Very truly yours,

Patricia Hamamoto
Superintendent

PfH:jmb

c: Randolph Moore, Acting Assistant Superintendent, OBS
Duane Kashiwai, Public Works Manager, FDB
Mamo Carreira, CAS, Campbell/Kapolei/Waianae Complex Areas
Genevieve Salmonson, OEQC
Brennon T. Morioka, DOT

July 14, 2006

Ms. Patricia Hamamoto, Superintendent
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, Hawaii 96804

Attention: Ms. Heidi Meeker
Facilities Development Branch

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palahai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated June 30, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document and acknowledge that you have no comments at this time.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division



STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

July 7, 2006

Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

SUBJECT: Draft Environmental Assessment
Interstate H-1 Addition and Modification of Highway Accesses, Palaiiai
Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii
TMK: (1) 9-1-015
(1) 9-1-016
(1) 9-1-088
(1) 9-1-106

Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have the following Clean Water Branch and Noise, Radiation & Indoor Air Quality Branch comments.

Clean Water Branch (Standard Comments)

The Department of Health (DOH), Clean Water Branch (CWB) has reviewed the limited information contained in the subject document and offers the following comments:

1. The Army Corps of Engineers should be contacted at (808) 438-9258 for this project. Pursuant to Federal Water Pollution Control Act (commonly known as the "Clean Water Act" (CWA) Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40, Code of Federal Regulations (CFR), Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

2. In accordance with HAR, Sections 11-55-04 and 11-55-34.05, the Director of Health may require the submittal of an individual permit application or a Notice of Intent (NOI) for

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JUL 18 2006

CHUNG-LE L. HUNG, M.D.
DIRECTOR OF HEALTH
ENGINEERING CONCEPTS

In reply, please refer to:
EPO-06-099

Mr. Ishizaki
July 7, 2006
Page 2

general permit coverage authorized under the National Pollutant Discharge Elimination System (NPDES).

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

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

- i. Storm water associated with industrial activities, as defined in Title 40, CFR, Sections 122.26(b)(14)(f) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi). [HAR, Chapter 11-55, Appendix B]
- ii. Construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the commencement of the construction activities. [HAR, Chapter 11-55, Appendix C]
- iii. Discharges of treated effluent from leaking underground storage tank remedial activities. [HAR, Chapter 11-55, Appendix D]
- iv. Discharges of once through cooling water less than one (1) million gallons per day. [HAR, Chapter 11-55, Appendix E]
- v. Discharges of hydrotesting water. [HAR, Chapter 11-55, Appendix F]
- vi. Discharges of construction dewatering effluent. [HAR, Chapter 11-55, Appendix G]
- vii. Discharges of treated effluent from petroleum bulk stations and terminals. [HAR, Chapter 11-55, Appendix H]

Mr. Ishizaki
July 7, 2006
Page 3

- viii. Discharges of treated effluent from well drilling activities. [HAR, Chapter 11-55, Appendix I]
- ix. Discharges of treated effluent from recycled water distribution systems. [HAR, Chapter 11-55, Appendix J]
- x. Discharges of storm water from a small municipal separate storm sewer system. [HAR, Chapter 11-55, Appendix K]
- xi. Discharges of circulation water from decorative ponds or tanks. [HAR, Chapter 11-55, Appendix L]

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

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

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

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

Noise, Radiation & Indoor Air Quality Branch (NRIAQ)

Project activities shall comply with the Administrative Rules of the Department of Health: Chapter 11- 46 Community Noise Control.

If you have any questions, please contact Noise Section of NRIAQ at (808) 586-4700.

Mr. Ishizaki
July 7, 2006
Page 4

We strongly recommend that you review all of the Standard Comments on our website: www.shtc.hi.us/health/environmental/envy-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

If there are any questions about these comments please contact Jiacci Liu with the Environmental Planning Office at 586-4346.

Sincerely,



KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO
CWB
NRIAQ



ENGINEERING CONCEPTS, INC.
Consulting Engineers

November 10, 2006

Mr. Kelvin H. Sunada, Manager
Environmental Planning Office
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801-3378

Attention: Mr. Jiakai Liu

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palalal Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated July 7, 2006 (reference: EPO-06-099) regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we offer the following response to your comments:

Clean Water Branch (Standard Comments)

1. *The Army Corps of Engineers should be contacted at (808) 438-9258 for this project...*
The Army Corps of Engineers has been consulted and has issued a determination that a Department of the Army permit will not be required. A copy of the official correspondence will be included in the Final EA.
2. *In accordance with HAR, Sections 11-55-04 and 11-55-34.05, the Director of Health may require the submittal of an individual permit application or a Notice of Intent (NOI) for general permit coverage authorized under the National Pollutant Discharge Elimination System (NPDES)...*
The State Department of Transportation will submit a NOI for discharge of stormwater associated with Phase I construction. Future construction phases will be addressed in subsequent NOI submittals. The contractor will be tasked with preparation of other NOIs for discharge of hydrotesting effluent and/or construction dewatering effluent, if needed.
3. *In accordance with HAR, Section 11-55-38, the applicant for an NPDES permit is required to...demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD...*

1150 South King Street, Suite 700 • Honolulu, Hawaii 96814
Tel (808) 591-8820 • Fax (808) 591-9010 • E-Mail: cct@echawaii.com

ENGINEERING CONCEPTS, INC.

Mr. Kelvin H. Sunada
November 10, 2006
Page 2

The SHPD has reviewed the project and has issued a letter dated June 29, 2006 stating that "historic preservation commitments for this project are complete". A copy of this letter will be included in the Final EA. Further, a copy of the letter will be furnished in the NOI as evidence of coordination.

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

Compliance with applicable water quality standards during construction will be reiterated to the Contractor via the NPDES permit conditions. Upon completion of construction, discharges related to operation of the interchange system will be subject to the NPDES permit conditions issued to the State Department of Transportation and City and County of Honolulu under their respective municipal separate storm sewer system (MS4) permits.

Noise, Radiation & Indoor Air Quality Branch (NR/IAQ)

Project activities shall comply with the Administrative Rules of the Department of Health; Chapter 11-46 Community Noise Control.

The Contractor will be required to comply with HAR, Chapter 11-46, and will obtain a Community Noise Permit and/or Community Noise Variance, if needed.

Additionally, we reviewed the Standard Comments on your website (updated 9/15/05) for applicability to this project. The Draft EA has disclosed the absence of perennial and significant intermittent streams in the project area. Storm drainage systems constructed or altered as part of the project will be subject to conditions of the respective NPDES permits issued to the City and County of Honolulu and the State Department of Transportation for their MS4s.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

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



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JUL 3 2006
ENGINEERING CONCEPTS, INC.
PETER T. YOUNG
CHAIRMAN
BOARD OF LAND AND NATURAL RESOURCES
COMMISSIONER OF WATER RESOURCES MANAGEMENT
ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND
DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER
AGRI-CULTURE RESOURCES
DIVISION OF ANTIQUARIAN REGULATION
COMMISSIONER OF WATER RESOURCES MANAGEMENT
DIVISION OF WATER RESOURCES MANAGEMENT
COMMISSIONER OF WATER RESOURCES MANAGEMENT
COMMISSIONER OF WATER RESOURCES MANAGEMENT
TERRACE AND WINDMILLS
HAWAIIAN PRESERVATION
LAND
STATISTICS

June 29, 2006

Mr. Kenneth Ishizaki
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

SUBJECT: Chapter 61E-8 Historic Preservation Review [State DOT]-
DEA Interstate H-1 Addition and Modification of Highway Accesses, Palalali
Interchange, Makaiolo Interchange (Kapolei Interchange Complex)
Honolulu, Hawaii
TMK: (1) 9-1-015, 016, 088 & 106

LOGNO: 2006.2166
DOC NO: 0606CM41
Archaeology

Thank you for the opportunity to review the aforementioned project. We received your document, including a brief cover sheet and DEA, on June 6, 2006. The proposed undertaking consists of modifications to the aforementioned H-1 interchanges, in order to serve the expansion of Kapolei.

In a letter (LOG NO: 2005.2809, DOC NO: 0601NM22) dated January 30, 2006, our office accepted an *Archaeological Assessment and Cultural Evaluation for the Proposed H-1 Addition and Modification of Highway Accesses, Palalali Interchange/Makaiolo Interchanges*, by Cultural Surveys of Hawaii, Inc. No new (*i.e.*, previously-undocumented) sites were identified during this recent work; however three (3) previously-identified sites occur within the area of potential effect (APE). These sites (SIHP No. 50-80-12-4341, a flume-ditch, 4342, a reservoir, and -6679, a drainage ditch) were assessed as historically-significant under Criterion D, and no further archaeological work was recommended.

We concur with these findings. Your historic preservation commitments for this project are complete.

Please call Dr. Chris Monahan at 808-692-8015 if you have any questions about this letter.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

CM

cc: Ms. Genevieve Salmonson, OEQC
Mr. Brennon T. Morioka, State DOT



ENGINEERING CONCEPTS, INC.
Consulting Engineers

July 14, 2006

Ms. Melanie Chinen, Administrator
State Historic Preservation Division
601 Kamokila Boulevard, Room 555
Kapolei, Hawaii 96707

Attention: Dr. Chris Monahan

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palalali Interchange / Makaiolo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated June 29, 2006 (LOG NO: 2006.2166, DOC NO: 0606CM41) regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document and acknowledge your comment that historic preservation commitments for this project are complete.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

1150 South King Street, Suite 700 • Honolulu, Hawaii 96814
Tel (808) 591-8820 • Fax (808) 591-9010 • E-Mail: eci@ceihawaii.com



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 591-4185
FACSIMILE (808) 591-4186
E-mail: eeac@ehawaii.state.hi.us

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GENEVEIVE SALMONSON
DIRECTOR

ENGINEERING CONCEPTS



ENGINEERING CONCEPTS, INC.
Consulting Engineers

July 14, 2006

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Attention: Mr. Jeyan Thirugnanam

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palailai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated July 7, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we offer the following response to your comment:

1. This project should comply with section 103D-407 and 408 of Hawaii Revised Statutes concerning the use of indigenous plants and recycled glass.

Use of recycled glass products will be specified in the project construction documents in accordance with Section 103D-407, HRS. Use of indigenous and Polynesian introduced plants for landscaping (per Section 103D-408, HRS) will be considered in the design. Currently, the project landscaping is limited to grassed slopes for erosion control.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Christine Yamasaki - DOT Highways Division

July 7, 2006

Mr. Rodney K. Haraga, Director
State Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Haraga:

Subject: Draft EA for the H1 Kapolei Interchange Complex, Oahu

Thank you for the opportunity to review the subject document. We have the following comment.

1. This project should comply with sections 103D-407 and 408 of Hawaii Revised Statutes concerning the use of indigenous plants and recycled glass.

Should you have any questions, please call Jeyan Thirugnanam at 586-4185.

Sincerely,

Genevieve Salmonson
Director

c: EC

PHONE (808) 594-1888



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPIOLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

FAX (808) 594-1865

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OCT 17 2006

ENGINEERING CONCEPTS

HRD06/2479

October 9, 2006

Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 South King Street
Suite 700
Honolulu, HI 96814

RE: Draft Environmental Assessment, Interstate H-1 Addition and Modification of Highway Access, Palalai Interchange / Makakilo Interchange, 'Ewa, O'ahu, TMK: 9-1-015, 016 & 106.

Dear Mr. Ishizaki,

The Office of Hawaiian Affairs (OHA) is in receipt of your request for comments on the above-referenced, proposed project. We apologize for the delayed response and have no project-specific comments at this time, but look forward to receiving a copy of the Final Environmental Assessment, upon completion.

OHA does request your assurances, however, that if this project goes forward, should iwi or Native Hawaiian cultural or traditional deposits be found during ground disturbance, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

Thank you for the opportunity to comment. If you have further questions, please contact Kai Mantell, Lead Advocate - Culture, at (808) 594-1945 or kaim@oha.org.

Sincerely,

Clyde W. Nāmūtō
Administrator

Mr. Kenneth Ishizaki
Executive Vice President
October 9, 2006

C: Mr. Brennan T. Morioka
Deputy Director
Department of Transportation
Aliiimoku Building
869 Punchbowl Street
Honolulu, HI 96813

Ms. Genevieve Salimonson
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, HI 96813



ENGINEERING CONCEPTS, INC.
Consulting Engineers

November 10, 2006

Mr. Clyde W. Namuo, Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palailai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated October 9, 2006 (reference: HRD06/2479) regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document and acknowledge that you have no project-specific comments at this time. On behalf of the State Department of Transportation, please be assured that contract documents will include the following statement pertaining to protection of archaeological, historical and burial sites:

Whenever the Contractor uncovers sites of potentially historic or archeological significance, such as walls, platforms, pavements and mounds, or remains such as artifacts, burials, concentration of charcoal or shells, work shall cease in the immediate vicinity of the site and the site shall be protected from damage. The Contractor shall suspend any work that may affect the site and inform the Engineer immediately.

Further, as previously stated in Section 4.6 of the Draft EA:

In the unlikely event that inadvertent discoveries of human remains or other cultural deposits are made during construction, work will be halted in the immediate area and the SHPD will be contacted for direction.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

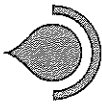
Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



June 20, 2006

RECEIVED

JUN 22 2006

ENGINEERING CONCEPTS

AMFI HANNEMANN, Mayor
RANDALL Y. S. CHUNG, Chairman
HERBERT S. K. KADRU, SR.
SAUJEL T. HATA
ALLY J. PARK

RODNEY K. HARAGA, Ex-Officio
LAVERNE T. HIGA, Ex-Officio

CLIFFORD P. LUM
Manager and Chief Engineer

DONNA FAY K. KIYOSAKI
Deputy Manager and Chief Engineer

Mr. Kenneth Ishizaki
Engineering Concepts, Incorporated
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

Subject: Draft Environmental Assessment, Interstate H-1 Addition and Modification of Highway Accesses, Palalal Interchange/Makakilo Interchange (Kapolei Interchange Complex), Ewa, Oahu, Hawaii, TMK: 9-1-15, 9-1-16, 9-1-88, 9-1-106

Thank you for the opportunity to comment on the proposed project.

The construction drawings should be submitted for our review and approval.

The construction schedule should be coordinated to minimize impact to the water system. Please coordinate construction with the Board of Water Supply's Capital Projects Division, Support Section (748-5740) for possible conflicts.

If you have any questions, please contact Robert Chum at 748-5440.

Very truly yours,

for KEITH S. SHIDA
Principal Executive
Customer Care Division

cc: Engineering
Ms. Genevieve Salmonson, Director, Office of Environmental Quality Control
Mr. Brennan T. Morioka, Deputy Director, Department of Transportation



ENGINEERING CONCEPTS, INC.
Consulting Engineers

July 14, 2006

Mr. Keith S. Shida, Principal Executive
Customer Care Division
Honolulu Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Attention: Mr. Robert Chum

Subject: Draft Environmental Assessment (EA) for Interstate H-1 Addition and Modification of Highway Access Palalal Interchange / Makakilo Interchange (Kapolei Interchange Complex) Ewa, Oahu, Hawaii

Thank you for your letter dated June 20, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we offer the following in response to your comments:

1. Construction drawings will be submitted for BWS review and approval, and
2. Construction schedule will be coordinated with the BWS Capital Projects Division, Support Section to minimize potential conflicts.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

DEPARTMENT OF FACILITY MAINTENANCE
CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 692-5054 • Fax: (808) 692-5857
Website: www.honolulu.gov



MURF HANSELMANN
MAYOR

July 7, 2006

Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

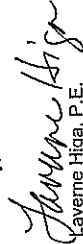
Subject: Draft Environmental Assessment (DEA)
Interchange H-1 Addition and Modification of Highway Access
Palalalai Interchange/Makakilo Interchange (Kapolei Interchange
Complex) Ewa, Oahu, Hawaii, TMK: 9-1-15, 9-1-16, 9-1-88, 9-1-106
(HWY-DD 2.1208)

Thank you for the opportunity to provide comments on the DEA, dated May 2006, for the
subject H-1 Highway addition and modification project.

Our only comment is in regards to the existing City and County open drainage channel that
will be enclosed as part of the project. It is our understanding the State will be acquiring
ownership from the City of that portion of the channel being altered. Accordingly, we request that
the DEA document indicate that the City will be granted a flowage easement through and across
this property and maintenance jurisdiction of the enclosed portion of the channel will be the
responsibility of the State.

Should you have any questions, please call Charles Pignataro of the Division of Road
Maintenance, at 484-7697.

Sincerely,


Laverne Higa, P.E.
Director and Chief Engineer

LH:sm

cc: Office of Environmental Quality and Control
Attention: Ms. Genevieve Salmonson, Director

Department of Transportation
Attention: Mr. Brennon T. Morioka, Deputy Director



ENGINEERING CONCEPTS, INC.
Consulting Engineers

November 10, 2006

Ms. Laverne Higa, P.E.
Director and Chief Engineer
Department of Facility Maintenance
City and County of Honolulu
1000 Uluohia Street, Suite 215
Kapolei, Hawaii 96707

Attention: Mr. Charles Pignataro
Division of Road Maintenance

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palalalai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated July 7, 2006 (reference: DRM 06-659) regarding the Draft EA for
the subject project. We appreciate your effort in reviewing the document. On behalf of the State
Department of Transportation, we offer the following response to your comment on ownership,
alteration, and maintenance jurisdiction of the existing City and County open drainage channel.

Land acquisition is still under negotiation, and disposition of the drainage channel has yet to be
determined. Therefore, the Final EA will include the following statements for clarification:

Chapter 4 - Potential Impacts and Mitigation Measures
Section 4.8 Land Ownership and Neighboring Lands:

*Land will be acquired from the City and County of Honolulu for expansion of the
highway right-of-way. Discussions are ongoing with the City and County of Honolulu
regarding the portion of a municipal drainage channel to be enclosed as part of the
project. The concrete-lined drainage channel will continue to service the area, and
appropriate easements and maintenance agreements will be provided...*

Section 4.13 Utilities:
*...Enclosure of City and County drainage channel will be coordinated with the
appropriate City agencies, including appropriate easements and maintenance
agreements.*

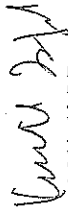
ENGINEERING CONCEPTS, INC.

Ms. Lavene Higa
November 10, 2006
Page 2

Chapter 6 - Findings and Determination
Section 6.2 Findings and Reasons Supporting Determination:
(2)...The State DOT is proceeding with negotiations to acquire the City and County owned parcel which contains a concrete drainage channel. The drainage channel will continue to serve the area, and appropriate easements and maintenance agreements will be provided.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,



Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
KAPOLEI HALE • 1000 ULUOHIA STREET, SUITE 309 • KAPOLEI, HAWAII 96707
TELEPHONE: (808) 692-5561 • FAX: (808) 692-5131 • INTERNET: www.honolulu.gov



MUFI HANNEKAWA
MAYOR

July 5, 2006

Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

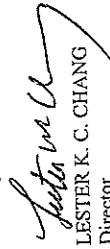
Subject: Interstate H-1 Addition and Modification of Highway Accesses, Palalal
Interchange/Makakilo Interchange (Kapolei Interchange Complex) Ewa, Oahu,
Hawaii, TMK: 9-1-15, 9-1-16, 9-1-88, 9-1-106.

Thank you for the opportunity to review and comment on the subject additions and
modifications of highway accesses.

The Department of Parks and Recreation has no comment and as the proposed additions
and modifications will not impact any of our programs or facilities, you are invited to remove us
as a consulted party for the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid at 692-5454.

Sincerely,


LESTER K. C. CHANG
Director

LKCC:mk
(158921)

cc: Ms. Genevieve Salmonson, Director, Office of Environmental Quality Control
Mr. Bremnon T. Morioka, Deputy Director, Department of Transportation

RECEIVED

JUL 6 2006

ENGINEERING CONCEPTS

LESTER K. C. CHANG
DIRECTOR
DANA TAKAHARADIAS
DEPUTY DIRECTOR



ENGINEERING CONCEPTS, INC.
Consulting Engineers

July 14, 2006

Mr. Lester K. C. Chang, Director
Department of Parks and Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Kapolei, Hawaii 96707

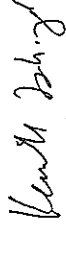
Attention: Mr. John Reid

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palalal Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated July 5, 2006 regarding the Draft EA for the subject project. We
appreciate your effort in reviewing the document and acknowledge that you have no comments at
this time.

A copy of your correspondence and this response will be included in the Final EA. Should you
have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,


Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

RECEIVED
JUL 17 2006
ENGINEERING DEPT

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4629 • Fax: (808) 523-4730 • Internet: www.honolulu.gov



MUFI HANNEMANN
MAYOR

MELVIN N. KAKU
DIRECTOR

TP6/06-157849R
July 13, 2006

Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

Subject: Interstate H-1 Addition and Modification of Highway Accesses,
Palalalai Interchange/Makakilo Interchange
(Kapolei Interchange Complex)

Thank you for the May 25, 2006 letter from the State Department of Transportation, requesting our review of and comments on the draft environmental assessment for the subject project. We have the following comments regarding the document:

1. Pages 2-4 (Section 2.2.1) and 4-4 (Section 4.9.2) should discuss proposed traffic signalization plans for the intersection of Kamokila Boulevard and Wakea Street.
2. Section 3.10 ROADS AND TRAFFIC should identify the entities which currently have jurisdiction of the existing roadways and discuss the future jurisdiction of the roadways after the proposed improvements.
3. Section 4.9.1 Construction Impacts and Mitigation Measures discusses the project's construction-related impacts on traffic. Construction of the proposed project may require the relocation of the Kapolei Transit Center to a temporary site on a strip of Kamokila Boulevard, to utilize both directions. This location would require bus

Mr. Kenneth Ishizaki
Page 2
July 13, 2006

users to cross the four-lane boulevard. Construction traffic mitigation efforts should consider efficient bus operations and pedestrian safety.

4. On Page 4-4, the striping of southbound Makakilo Drive for a third through lane is listed as a potential improvement to provide additional capacity and improved traffic operations. This traffic measure was implemented earlier this year.
5. Tables 4-1, 4-2 and 4-3 (Pages 4-7 - 4-9) should indicate that the traffic conditions projected are for the year 2010 with the completion of the Phase 1 improvements.
6. The description of Alternative 2 in Section 5.2.2 Alternative 2 (Page 5-2) does not match the layout in Figure 5-2 (Page 5-4).
7. Appendix E is the Draft Palalalai and Makakilo Interchanges Traffic and Operations Study. The proposed improvements will result in new roadways, such as Wakea Street extension and Mauka Frontage Road. The report should identify which roadways and intersections will be proposed to be under City jurisdiction.

Should you have any questions regarding these comments, please contact Ms. Faith Miyamoto of the Transportation Planning Division at 527-6976.

Sincerely,

MELVIN N. KAKU
Director

cc: Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
Mr. Brennon T. Morioka, Deputy Director
State Department of Transportation



Mr. Melvin N. Kaku
November 10, 2006
Page 2

November 10, 2006

Mr. Melvin N. Kaku, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Attention: Ms. Faith Miyamoto
Transportation Planning Division

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palaiala Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated July 13, 2006 (reference: TP6/06-157849R) regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we offer the following response to your comments:

1. Pages 2-4 (Section 2.2.1) and 4-4 (Section 4.9.2) should discuss proposed traffic signalization plans for the intersection of Kamokila Boulevard and Wakea Street.
2. Section 3.10 ROADS AND TRAFFIC should identify the entities which currently have jurisdiction of the existing roadways and discuss the future jurisdiction of the roadways after the proposed improvements.

The Final EA will include the following statement in Section 3.10.1 (Existing Roadway System):

...I-H1 and portions of Farrington Highway are under jurisdiction of the State DOT Highways Division. Kapolei Parkway, Kamokila Boulevard, Wakea Street and portions of Farrington Highway are under jurisdiction of the City and County of Honolulu. Kalaeloa Boulevard is a private road owned by the Estate of James Campbell that is under State DOT jurisdiction...

The following statement will be added to the description for Farrington Highway:

...Presently, in the project vicinity, State DOT jurisdiction of Farrington Highway extends westward from the intersection with Kamokila Boulevard and for 500 feet at the intersection with Fort Barrette Road. The portion of Farrington Highway between Kamokila Boulevard and Fort Barrette Road, and east of Fort Barrette Road, are under City and County of Honolulu jurisdiction.

Further, the Final EA will include a revision to Figure 3-4 (Existing Roadway Lanes and Traffic Controls) to identify existing roadway jurisdiction, and add reference to a new figure in Section 4.9 to identify the future roadway jurisdiction upon completion of the project.

3. Sections 4.9.1 Construction Impacts and Mitigation Measures discusses the project's construction-related impacts on traffic. Construction of the proposed project may require the relocation of the Kapolei Transit Center to a temporary site on a strip of Kamokila Boulevard, to utilize both directions. This location would require bus users to cross the four-lane boulevard. Construction traffic mitigation efforts should consider efficient bus operations and pedestrian safety.

It is our understanding that the current plan is to temporarily relocate bus operations to Haumea Street rather than Kamokila Boulevard. Although Haumea Street will not be directly impacted by construction activities, Section 4.9.1 of the Final EA (pertaining to traffic-related construction impacts and mitigation measures) will be revised to include the following statement:

Oahu Transit Services, Inc. expressed concerns for pedestrian safety due to relocation of bus operations from the present off-street Kapolei Transit Center site to an on-street location. The current plan is to temporarily relocate bus transit operations to Haumea Street, situated one block makai of Kamokila Boulevard. Construction activities will not directly impact the Haumea Street location. However, in order to minimize impacts to both bus operations and pedestrians, the contractor will be required to maintain pedestrian routes when working in the vicinity of existing or relocated bus facilities, including maintaining sidewalks and crosswalks along Kamokila Boulevard.

ENGINEERING CONCEPTS, INC.

Mr. Melvin N. Kaku
November 10, 2006
Page 3

4. On Page 4-4, the striping of southbound Makaiolo Drive for a third through lane is listed as a potential improvement to provide additional capacity and improved traffic operations. This traffic measure was implemented earlier this year.

The bullet item will be stricken from the list of potential future improvements.

5. Tables 4-1, 4-2, and 4-3 (Pages 4-7 - 4-9) should indicate that the traffic conditions projected are for the year 2010 with the completion of the Phase 1 improvements.

The table titles will be revised as noted below:

Table 4-1 2010 Traffic Conditions at Key Intersections (with Phase 1 Improvements)

Table 4-2 2010 Traffic Conditions Along Freeway at Ramp Merge and Diverge Areas (with Phase 1 Improvements)

Table 4-3 2010 Freeway Mainline Conditions East and West of Project Area (with Phase 1 Improvements)

6. The description of Alternative 2 in Section 5.2.2 Alternative 2 (Page 5-2) does not match the layout in Figure 5-2 (Page 5-4).

The description of Alternative 2 in Section 5.2.2 will be revised to state:

...In addition, two eastbound on-ramps are proposed for northbound traffic from Uluohia Street and eastbound traffic along Farrington Highway...

7. Appendix E is the Draft Palailai and Makaiolo Interchanges Traffic and Operations Study. The proposed improvements will result in new roadways, such as Waikea Street extension and Mauka Frontage Road. The report should identify which roadways and intersections will be proposed under City jurisdiction.

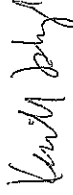
The Draft Palailai and Makaiolo Interchanges Traffic and Operations Study will not be updated for the Final EA. However, as indicated in item 2, above, the Final EA will identify future roadway jurisdiction in a new figure referenced under Section 4.9.

ENGINEERING CONCEPTS, INC.

Mr. Melvin N. Kaku
November 10, 2006
Page 4

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,



Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

HONOLULU FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
636 SOUTH STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 723-7139 • FAX: (808) 723-7111 • INTERNET: www.honolulufire.org



MUPI HAHREMARU
MAYOR

RECORDED
JUL 10 2006
ENGINEERING CONCEPTS, INC.

KENNETH G. SILVA
FIRE CHIEF
ALVIN K. TOSHIKA
DEPUTY FIRE CHIEF



ENGINEERING CONCEPTS, INC.
Consulting Engineers

July 14, 2006

Kenneth G. Silva, Fire Chief
Honolulu Fire Department
636 South Street
Honolulu, Hawaii 96813

Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

July 5, 2006

Dear Mr. Ishizaki:

Subject: Interstate H-1 Addition and Modification of Highway Accesses,
Palalal Interchange/Makakilo Interchange (Kapolei Interchange Complex)
Tax Map Keys: 9-1-015, 9-1-016, 9-1-088, and 9-1-106
Project File Number: HWY-DD 2-1208

In response to a letter dated May 25, 2006, from Deputy Director Brennon T. Morioka of the State of Hawaii's Department of Transportation regarding the above-mentioned project, the Honolulu Fire Department (HFD) reviewed the material provided and requires that you comply with the following for the duration of the project:

1. Maintain fire apparatus access throughout the construction site.
2. Maintain access to fire hydrants. Please notify the HFD's Fire Communication Center at 523-4411 regarding any interruption of the existing fire hydrant system.

Should you have any questions, please call Battalion Chief Lloyd Rogers of our Fire Prevention Bureau at 723-7151.

Sincerely,

KENNETH G. SILVA
Fire Chief

KGS/SK:bh

cc: Genevieve Salmonson, Office of Environmental Quality Control
Brennon T. Morioka, Department of Transportation

Attention: Lloyd Rogers, Battalion Chief
Fire Prevention Bureau

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palalal Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated July 5, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we offer the following response to your comments:

1. Fire apparatus access will be maintained throughout the construction site.
2. Fire hydrant access will also be maintained. In the unlikely event of interruption of the existing fire hydrant system, the Fire Communication Center will be notified.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

RECEIVED

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111
<http://www.honolulu.gov>

JUN 13 2006
ENGINEERING CONCEPTS



BOISSE P. CORREA
CHIEF
GLENN R. KAJIYAMA
PAUL D. POZDOL
DEPUTY CHIEFS

MUFI HADNEMANN
MAYOR

OUR REFERENCE BS-DK

June 9, 2006

Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Ishizaki:

This is in response to the state Department of Transportation's letter of May 25, 2006, regarding the Interstate H-1 Addition and Modification of Highway Access, Palailai/Makakilo Interchanges (Kapolei Interchange Complex), project.

This project should have no unanticipated impact on the facilities or operations of the Honolulu Police Department.

If there are any questions, please call Major Michael Tamashiro of District 8 at 692-4253 or Mr. Brandon Stone of the Executive Bureau at 529-3644.

Sincerely,

BOISSE P. CORREA
Chief of Police

By *Ms. Genevieve Salmonson*
KARL GODSEY
Assistant Chief of Police
Support Services Bureau

cc: Ms. Genevieve Salmonson, OEQC
Mr. Brennon T. Morioka, DOT

Serving and Protecting with Aloha



ENGINEERING CONCEPTS, INC.
Consulting Engineers

July 14, 2006

Boisse P. Correa, Chief of Police
Honolulu Police Department
801 South Beretania Street
Honolulu, Hawaii 96813

Attention: Karl Godsey, Assistant Chief of Police
Support Services Bureau

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palailai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated June 9, 2006 (reference: BS-DK) regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document and acknowledge that the project should have no unanticipated impact on the facilities or operations of the Honolulu Police Department.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

David Miyamoto
Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

1150 South King Street, Suite 700 • Honolulu, Hawaii 96814
Tel (808) 591-8820 • Fax (808) 591-9010 • E-Mail: eci@ecihawaii.com

RECEIVED

JUN 26 2006

ENGINEERING CONCEPTS

P.O. Box 3000
Honolulu, Hawaii 96802-3000



ENGINEERING CONCEPTS, INC.
Consulting Engineers

June 22, 2006

Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Attention: Mr. Kenneth Ishizaki
Executive Vice President

Gentlemen:

Subject: Draft Environmental Assessment for
Palalal Interchange / Makakilo Interchange (Kapolei IC Complex)

Please be advised that The Gas Company, LLC maintains underground utility gas mains in the project vicinity, which serves commercial and residential customers in the area. We would appreciate your consideration during the project planning and design process to minimize any potential conflicts with the existing gas facilities in the project area. Please be advised that the project area falls within the Energy Corridor, and plans should be sent to the Department of Transportation Harbors Division during planning.

Thank you for the opportunity to comment on the Draft Environmental Assessment. Should there be any questions, or if additional information is desired, please call Stason Nishimura at 594-5689.

Sincerely,

Charles E. Calvet, P.E.
Manager, Engineering

CEC:KRS
06-148

cc: Ms. Genevieve Salmonson, Office of Environmental Quality Control
Mr. Breannon T. Morioka, Department of Transportation

July 14, 2006

Mr. Charles E. Calvet, P.E., Manager
Engineering
The Gas Company
P.O. Box 3000
Honolulu, Hawaii 96802-3000

Attention: Mr. Stason Nishimura

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palalal Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated June 22, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we offer the following in response to your comments:

1. Design of the project will continue to be coordinated with The Gas Company to minimize potential conflicts with existing gas facilities in the project area. Construction drawings will be submitted for your review.
2. Design of the project is also being coordinated with the State Department of Transportation Harbors Division to minimize potential conflicts within the Energy Corridor.

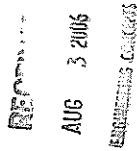
A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEOC
Ms. Christine Yamasaki - DOT Highways Division

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001



August 1, 2006



Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 S. King Street - Suite 700
Honolulu, HI 96814

Re: Interstate H-1 Addition & Modification
of Highway Access
Palailai / Makakilo Interchanges
Ewa, Oahu

Thank you for the opportunity to comment on the above-referenced project. Hawaiian Electric Company, Inc. (HECO) has no objections at this time.

Should HECO have existing facilities/leases on the subject property, we will need continued access for maintenance purposes. In addition, we reserve the opportunity to further comment on the protection of existing power lines and electric power facilities that may be affected by the project.

As the project develops and construction plans are finalized, please continue to keep us informed so that we may be better able to evaluate any effects on our system facilities.

Routing of the DEA was inadvertently interrupted and slowed our review process. We hope this late response did not cause undue inconvenience. Thank you again for the chance to comment on this project.

Sincerely,

Kirk S. Tomita
Senior Environmental Scientist

cc: Ms. Genevieve K.Y. Salmonson (OEQC)
Mr. Brennan T. Morioka (DOT)



ENGINEERING CONCEPTS, INC.
Consulting Engineers

November 10, 2006

Mr. Kirk S. Tomita, Senior Environmental Scientist
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palailai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your letter dated August 1, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document and acknowledge that you have no objections at this time. We will continue to keep you informed during design and construction of the project.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division



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Consulting Engineers

Hawaiian Telecom

June 20, 2006

Reply to
HIABY3

Mr. Kenneth Ishizaki
Engineering Concepts, Inc.
1150 South King St. Suite 700
Honolulu, HI 96814

Dear Mr. Ishizaki:

Subject: Interstate H-1 Addition and Modification of Highway Accesses, Palatalai
IC/Makakilo IC (Kapolei IC Complex)

Thank you for the opportunity to review and comment on the environmental assessment document for the Kapolei Interchange Complex Project. We have no comments to add to your document at this time.

If you have any questions or require assistance in the future, please call me at 840-1447.

Sincerely,

Paul Hanohano
OSP Engineering

cc: Genevieve Salmonson - EQC
Brennon Morioka - DOT
Darrell Leroux

July 14, 2006

Mr. Paul Hanohano
OSP Engineering
Hawaiian Telecom
1177 Bishop Street
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palatalai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

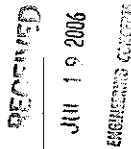
Thank you for your letter dated June 20, 2006 (reference: HIABY3) regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document and acknowledge that you have no comments at this time.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division



ENGINEERING CONCEPTS, INC.
Consulting Engineers

Campbell Hawaii Investor, LLC
(an affiliate of the Estate of James Campbell)

July 17, 2006

Mr. Kenneth Ishizaki, PE
Executive Vice President
Engineering Concepts, Inc.
1150 S. King Street, Suite 700
Honolulu, Hawaii 96814

Dear Ken:

RE: Interstate H-1 Addition and Modification of Highway Access
Palatalai Interchange/Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

This letter is written in response to *Section 4.11 Noise* of the Draft Environmental Assessment (EA) dated May 2006 for this project. As the owner of the land under Hawaiian Waters Adventure Park, we would like to provide input on the potential construction of a noise wall that would run along the southern limits of the water park. We concur with the draft EA's recommendation regarding these walls and are not in favor of the addition of such wall as it would negatively impact the visibility and appearance of the entertainment and amusement destination. The water park operators have worked very hard to make the park as attractive, internally and externally, as possible. The construction of this wall would take away from all that hard work. Also, it would most likely negatively impact the internal operations of the support facilities of the park.

By copy of this letter to the general manager of the adventure park, I invite the park to also comment to you regarding how the wall would impact the operations and overall appearance of the park.

We appreciate your continued efforts in allowing us to provide feedback on this project. If you have any questions or concerns, please contact me at 674-3237.

Very truly yours,

Susan
Susan H. Graham, CPM, CCIM
Vice President, Developed Properties

cc: Hawaiian Waters Adventure Park

shg:16031300K11939

1001 Kamokila Boulevard, Suite 257 - Kapolei, Hawaii 96707
Phone (808) 674-3324 - Fax (808) 674-3111

November 10, 2006

Ms. Susan H. Graham, CPM, CCIM
Vice President, Developed Properties
Campbell Hawaii Investor, LLC
1001 Kamokila Boulevard, Suite 257
Kapolei, Hawaii 96707

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palatalai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Thank you for your correspondence dated July 17, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we note your objection to construction of a noise attenuation wall fronting the Hawaiian Waters Adventure Park, and recognize that the benefit of a wall is outweighed by its visual and physical impact.

Section 4.11 of the Final EA (pertaining to noise impacts and mitigation measures) will be revised to include the following statement:

Both the Hawaiian Waters Adventure Park and its landowner, Campbell Hawaii Investor, LLC, submitted comments during the Draft EA review objecting to construction of a noise attenuation wall fronting the water park. The objections to construction of a wall were: negative visual impact (both hindering public view of the water park and creation of a visual eyesore); and further encroachment of water park lands affecting internal operations and a special events area.

The Final EA will further state that construction of a noise attenuation wall fronting the water park will not be pursued due to the objections expressed by the affected parties.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Christine
Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmanson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

1150 South King Street, Suite 700 - Honolulu, Hawaii 96814
Tel (808) 591-8820 - Fax (808) 591-9010 - E-Mail: cci@cechawaii.com



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CORPORATION
An affiliate of the
State of James Campbell

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July 17, 2006

November 10, 2006

Kenneth Ishizaki, PE
Executive Vice President
Engineering Concepts, Inc.
1150 S. King Street, Suite 700
Honolulu, Hawaii 96814

Ms. Susan H. Graham, CPM, CCIM
Vice President, Developed Properties
Fort Street Investment Corporation
1001 Kamokila Boulevard, Suite 256
Kapolei, Hawaii 96707

Re: Interstate H-1 Addition and Modification of Highway Access
Palaiwai Interchange/Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palaiwai Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

Dear Ken:

This letter is written in response to *Section 4.11 Noise* of the Draft Environmental Assessment (EA) dated May 2006 for this project. As the owner of Kapolei Shopping Center, we would like to provide input on the potential construction of noise walls that would run along the northern limits of the Kapolei Shopping Center. We concur with the draft Environmental Assessment's (EA), recommendation regarding these walls and are not in favor of the addition of these walls as they would severely affect the visibility, appearance, and feel of the outdoor shopping center. All tenant spaces in the shopping center are fully air conditioned, thus noise will not be a problem in the stores. Secondly, this wall would be unattractive and not in keeping with the general neighborhood feel that exists now in the shopping center area.

We appreciate your continued efforts in allowing us to provide feedback on this project. If you have any questions or concerns please contact me at 674-3237.

Very truly yours,

Susan H. Graham, CPM, CCIM
Vice President, Developed Properties

Thank you for your correspondence dated July 17, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we note your objection to construction of a noise attenuation wall fronting the Kapolei Shopping Center.

Section 4.11 of the Final EA (pertaining to noise impacts and mitigation measures) will be revised to include the following statement:

Fort Street Investment Corporation, owner of the Kapolei Shopping Center, submitted a comment letter during the Draft EA review to state their objection to construction of a noise attenuation wall along the northern limits of the shopping center. Their objections to construction of a wall were: severe effect on visibility, unattractive appearance, and impact on the neighborhood feel of the outdoor shopping center. They noted that all tenant spaces in the shopping center are fully air conditioned so noise should not be an issue.

The Final EA will further state that construction of a noise attenuation wall fronting the shopping center will not be pursued due to objections expressed by the owner.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,

Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OFQC
Ms. Christine Yamasaki - DOT Highways Division

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Consulting Engineers



July 17, 2006

Mr. Kenneth Ishizaki
Executive Vice President
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, HI 96814

Dear Mr. Ishizaki:

RE: Interstate H-1 addition and modification of highway access, Palalalai and Makakilo Interchanges (Kapolei Interchange Complex) Ewa, Oahu, Hawaii

This letter is written in response to *section 4-11* Noise of the Draft Environmental Assessment (EA) dated May 2006 for this project.


As the operators of Hawaiian Waters Adventure Park and occupant of the land owned by Campbell Hawaii Investor, LLC we wish to provide input to said project regarding a potential sound barrier wall. In essence, we support Campbell Hawaii Investor's position on this project and would not like a sound barrier wall to be constructed.

Hawaiian Waters has been in operation for over 7 years now and we rely heavily on our community to view and are reminded of the friendly and fun atmosphere we portray here at the park. Besides a serious visual hindrance and eyesore, the construction of a wall would cut into and encroach further into a very important area of the park for groups and special events.

I have dialogued this position with our landlord and thank you in advance for allowing our input to be heard and considered.

If you have any questions or concerns or need clarification regarding this letter, please feel free to contact me at 674-9283 ext. 101

Sincerely,


Jerry Pupillo
President

Cc: Campbell Hawaii Investor, LLC

November 10, 2006

Mr. Jerry Pupillo, President
Hawaiian Waters Adventure Park
400 Farrington Highway
Kapolei, Hawaii 96707

Subject: Draft Environmental Assessment (EA) for Interstate H-1 Addition and Modification of Highway Access Palalalai Interchange / Makakilo Interchange (Kapolei Interchange Complex) Ewa, Oahu, Hawaii

Thank you for your correspondence dated July 17, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we note your objection to construction of a noise attenuation wall fronting the Hawaiian Waters Adventure Park, and recognize that the benefit of a wall is outweighed by its visual and physical impact.


Section 4.11 of the Final EA (pertaining to noise impacts and mitigation measures) will be revised to include the following statement:

Both the Hawaiian Waters Adventure Park and its landowner, Campbell Hawaii Investor, LLC, submitted comments during the Draft EA review objecting to construction of a noise attenuation wall fronting the water park. Their objections to construction of a wall were: negative visual impact (both hindering public view of the water park and creation of a visual eyesore); and further encroachment of water park lands affecting internal operations and a special events area.

The Final EA will further state that construction of a noise attenuation wall fronting the water park will not be pursued due to the objections expressed by the affected parties.

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,


Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division

1150 South King Street, Suite 700 • Honolulu, Hawaii 96814
Tel (808) 591-8820 • Fax (808) 591-9010 • E-Mail: ec@echawaii.com



Oahu Transit Services, Inc.

811 Middle St. Honolulu, HI 96819
Telephone (808) 948-5555 Facsimile (808) 948-4419
www.otsbus.org

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July 10, 2006

ENGINEERING CONCEPTS, INC.
Consulting Engineers



November 10, 2006

Mr. J. Roger Morton
President & General Manager
Oahu Transit Services, Inc.
811 Middle Street
Honolulu, Hawaii 96819

Attention: Mr. Kenneth O. Stanley, Vice President
Operational Planning and Marketing

Subject: Draft Environmental Assessment (EA) for
Interstate H-1 Addition and Modification of Highway Access
Palakoi Interchange / Makakilo Interchange (Kapolei Interchange Complex)
Ewa, Oahu, Hawaii

M E M O R A N D U M

TO: KENNETH ISHIZAKI, EXECUTIVE VICE PRESIDENT,
ENGINEERING CONCEPTS

VIA: J. ROGER MORTON, PRESIDENT & GENERAL MANAGER

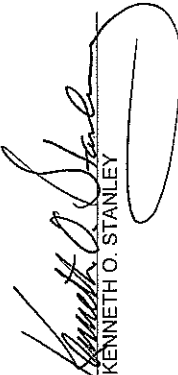
FROM: KENNETH O. STANLEY, VICE PRESIDENT,
OPERATIONAL PLANNING AND MARKETING

SUBJECT: HWY-DD 2.1208

We have reviewed the Draft Environmental Assessment (DEA) for the Interstate H-1 Addition and Modification of Highway Accesses/Makakilo Interchange (Kapolei Interchange Complex). Our comments are related to the traffic during the construction period covered under Section 4.9 of the DEA.

Our passengers are also pedestrians; proper traffic controls must be in place during the construction period to ensure their safety. The current off-street Kapolei Transit Center, an important transit hub, which links ten (10) local and regional buses every half-hour, must be relocated due to the construction of the Kapolei interchange. As such, we may be required to temporarily site the Kapolei Transit Center on a strip of Kamokila Boulevard utilizing both directions, which would require our passengers to cross the four-lane boulevard. We ask that any construction traffic mitigation efforts consider efficient bus operations and, more importantly, pedestrian safety.

Should you have any questions or concerns regarding this matter, feel free to contact me at 848-4468.


KENNETH O. STANLEY

KOS:mgd

cc: J. Burke, PTD

Thank you for your correspondence dated July 10, 2006 regarding the Draft EA for the subject project. We appreciate your effort in reviewing the document. On behalf of the State Department of Transportation, we offer the following response to your comments on traffic during the construction period relating to efficient bus operations and pedestrian safety.

It is our understanding that the current plan is to temporarily relocate bus operations to Haumea Street rather than Kamokila Boulevard. Although Haumea Street will not be directly impacted by construction activities, Section 4.9.1 of the Final EA (pertaining to traffic-related construction impacts and mitigation measures) will be revised to include the following statement:

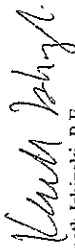
Oahu Transit Services, Inc. expressed concerns for pedestrian safety due to relocation of bus operations from the present off-street Kapolei Transit Center site to an on-street location. The current plan is to temporarily relocate bus transit operations to Haumea Street, situated one block north of Kamokila Boulevard. Construction activities will not directly impact the Haumea Street location. However, in order to minimize impacts to both bus operations and pedestrians, the contractor will be required to maintain pedestrian routes when working in the vicinity of existing or relocated bus facilities, including maintaining sidewalks and crosswalks along Kamokila Boulevard.

ENGINEERING CONCEPTS, INC.

Mr. J. Roger Morton
November 10, 2006
Page 2

A copy of your correspondence and this response will be included in the Final EA. Should you have any questions, please call me or David Miyamoto at 591-8820.

Very truly yours,



Kenneth Ishizaki, P.E.
Executive Vice President

cc: Ms. Genevieve Salmonson - OEQC
Ms. Christine Yamasaki - DOT Highways Division