West Maui

Transportation

Access Plan

July 1, 2009

WEST MAUI TRANSPORTATION ACCESS PLAN
TABLE OF CONTENTS

INTRODUCTION

The West Maui Transportation Access Plan is mandated by Act 214. This plan is deemed necessary by the Twenty Fourth Legislature because of the vulnerability of Honoapiilani Highway, West Maui's principle arterial, to road closures. These closures severely complicate and restrict travel to and from West Maui.

Like many of Hawaii's communities, West Maui is dependent on limited roadways for commuting, enterprise and recreation. West Kauai (Kalaheo through Kekaha), North Kauai (Kapaa through Hanalei), West Oahu (Kalaeloa through Makaha), Molokai, East Hawaii (Pahoa through Kalapana) are linked to their islands' central business districts via singular roadways and are thus even more susceptible to principle arterial closures. A clear delineation between West Maui and these other communities, however, is the volume of visitor accommodations within the area. The number of visitors traveling on West Maui's principal arterial, Honoapiilani Highway (Route 30), often causes congestion and extended travel times between West and Central Maui. Closures of Honoapiilani Highway, which occur more frequently than other arterials, are traumatic. Families are separated for hours, sometimes days. Visitors miss their flights and are stranded. Business suffers as clients are unable to access the desired services. Commuters and residents have been left stranded.

Traffic accidents, high ocean surges crossing portions of the roadway, fires and smoke hazards along the route, etc., have resulted in disruptions to the traffic flow and/or complete road closures. The road closures have made it difficult to travel between Central and West Maui, requiring many additional driving hours.

Honoapiilani Highway

West Maui is served by a belt roadway which follows the general alignment of the shoreline for most of its route. Honoapiilani Highway (Route 30) is a State Highway, which begins at Main Street in Wailuku and continues for 41.65 miles, ending at Kahekili Highway. The route transitions to the county portion of Kahekili Highway, a narrow, winding, single-lane road, which mainly services the local traffic in Kahakuloa. The county road eventually connects to the State portion of Kahekili Highway (Route 340) which continues for 4.29 miles until it ties into Waiehu Beach Road and Market Street.

The segment of Honoapiilani Highway along the mountainous terrain known as the Pali, between Olowalu and Central Maui, is the solitary route through this area. This portion of the route consists of a 12-foot wide lane in each direction, with no passing lanes and limited opportunities for turn-arounds.

Cane Haul Roads

The segment of Honoapiilani Highway between Olowalu and Kaanapali is laced with cane haul roads which access the lands mauka of the highway. While these roads were intended to service the sugar plantation operations, these cane haul roads also serve as emergency alternate routes in the event of road closures occurring within this segment of Honoapiilani Highway.

County Roadways

The area surrounding Honoapiilani Highway through Lahaina and between Kaanapali and Kapalua includes various parallel County roads such as Front Street and Lower Honoapiilani, which serve as alternate routes through the area. The traffic volumes through this segment are higher than other portions of Honoapiilani Highway due to the local circulation within the area.

The segment from Kapalua through Honokaohau and onto Kahakuloa services local traffic, with significantly lower traffic volumes.

Kahekili Highway

A single-lane country road connects the end of Honoapiilani Highway and Kahekili Highway. This is a winding one-lane road that is not up to current standards. In times of emergency, this road has been used to direct traffic out of West Maui through Kahekili Highway during daylight hours, and reversed at night. Contra-flow operations are necessary because the road can only accommodate one-directional traffic. The West Maui Transportation Access Plan Working Group recommends that visitors be restricted from driving this route.

Other Modal Options

While West Maui contains both airport and harbor facilities, neither would be capable of providing the equivalent capacity during Honoapiilani Highway closures.

Kapalua Airport in West Maui operates only during daylight hours. Its ability to transfer passengers to Kahului Airport or airports on the other islands is limited. In 1999, the airport accommodated roughly 16 daily flights or 8 roundtrips provided by Aloha Air using DeHavilland Dash-8's, for a maximum daily total of 592 passengers. Helicopters are permitted use of the facility during emergencies only, e.g., to fight fires.

Lanai Airport on the island of Lanai and Molokai Airport on the island of Molokai would also serve as alternative transportation links to Maui's Central Business District. Use of Lanai or Molokai Airports requires ocean transport links between West Maui and Lanai or West Maui and Molokai via small boat operators.

Lahaina Small Boat Harbor with one pier, 21 berths, and 79 moorings, is the main boating facility in West Maui. There are additional small anchorages, mooring areas, and boat ramps at Kaanapali, Lahaina Roadstead, and Mala. Boating provides an alternative transportation link between Central and West Maui. For example, when fires caused road closures on Honoapiilani Highway, approximately 100 passengers were shuttled by boats between Lahaina and Maalaea Small Boat Harbors.

Maalaea Small Boat Harbor is located within Maalaea Bay, on the east side of Honoapiilani Highway's Pali tunnel, and thus offers an alternate route during Honoapiilani closures. Maalaea Small Boat Harbor is approximately 16 miles southeast of Lahaina and seven miles south of Kahului Airport. Maalaea Small Boat Harbor facilities include a dry-dock, loading dock, boat ramp, dry storage, restaurant, boat club, waste oil facility, Coast Guard office, Harbor Agent's office comfort station and 93 berths/moorings.

Manele Small Boat Harbor on the island of Lanai offers another alternate route during Honoapiilani Highway closures. Boats could ferry people from Lahaina Small Boat Harbor to Manele Small Boat Harbor. Travelers could then secure ground transportation services for a ride to Lanai Airport, then air transportation services to Kahului Airport. Manele Small Boat Harbor is located on the south coast of Lanai, eight miles from the coast of Maui. Manele Small Boat Harbor has one ramp, one pier, 24 berths, a loading dock, a vessel wash-down area, restrooms, shower and harbor office.

Kaunakakai Harbor is both a recreational and commercial harbor. The *Molokai Princess* provides ferry service between Kaunakakai Harbor and Lahaina Small Boat Harbor. Kaunakakai Harbor thus offers another alternative route during Honoapiilani Highway closures. Travelers could take the *Molokai Princess* from Lahaina Small Boat Harbor to Kaunakakai Harbor, secure ground transportation from Kaunakakai Harbor to Molokai Airport, and air transportation from Molokai Airport to Kahului Airport. Kaunakakai Harbor includes a twelve-foot ramp, 29 berths/moorings, two docks, a commercial pier, a vessel wash-down area, restrooms and harbor office.

The **MAUI BUS** public transit system has both hourly service between Lahaina town and Kahului, 365 days a year from 6:30 a.m. to 8:30 p.m., as well as Commuter service.

P**rivate shuttle buses** run between the resorts on West Maui, the shopping malls and Kahului Airport.

Finally, the **Kaanapali and Pacific Railroad** is a private operation running between Lahaina and Kaanapali. This facility mainly serves as a tourist attraction, although it also provides a link between the resort area in Kaanapali and the historic town of Lahaina.

WORKING GROUP RECOMMENDATIONS

The West Maui Transportation Access Plan Working Group (hereafter Working Group) recommends the following:

1. The Working Group agreed that West Maui's traffic problems could be significantly attenuated by the implementation of an Intelligent Transportation System (ITS). The process of instituting an ITS begins with an analysis or study of the feasibility of an ITS in West Maui, which would likely be expanded to an island-wide study. The Working Group further recommends that Lahaina Small Boat Harbor, Maalaea Small Boat Harbor and Kapalua Airport be included in the study as potential ITS links. The County of Hawaii ITS Strategic Plan may be referenced in Appendix B.

2. The Maui Civil Defense Agency should be involved in the coordination of services during possible extended closures of Honoapiilani Highway. Maui Civil Defense Agency's role in coordinating government and information management services could be based on the concepts, recommendations and standards of the National Incident Management System, which is also included as a reference (Appendix C).

3. To ensure clear, consistent, proper and viable information management, all agencies involved in Honoapiilani Highway closures and the provision of alternate aeronautical, marine and surface transportation routes (e.g., Fire, Parks, Police, Public Works, Transportation, Water, Maui Visitors Bureau, DOT Airports, Harbors, Highways Divisions, DLNR Division of Boating & Ocean Recreation, etc.) will coordinate their informational/situation reports, updates and notifications through the County of Maui Community Relations and Communications Director.

4. The alternate surface transportation route via Kahakuloa will be activated and controlled at the discretion of the County of Maui and its Police Chief. This alternate ingress/egress route is not recommended for visitor use.

5. Any aeronautical, marine or surface transportation services operating to circumvent Honoapiilani Highway closures should not charge more than the normal one-way fare between points of origin and destination.

Intelligent Transportation Systems (ITS) are a broad range of diverse technologies which, when applied to a surface transportation system, can help improve safety, reduce congestion, enhance mobility, minimize environmental impacts, save energy, and promote economic productivity.

Key services include the management of arterial roadways and providing traveler information to the public.

ITS is the application of advanced detection, computing, and communication technology to the transportation system to achieve increases in efficiency, safety, and environmental quality.

ITS that is commonly deployed elsewhere…..include advanced traffic management systems (ATMS) and advanced traveler information systems (ATIS).

- o ATMS…..incorporates traffic detection and communications technologies with traffic signal operations software to improve traffic operations…. Centralized transportation monitoring and control of the roadway network may be accomplished by connecting all traffic control signals to a traffic control center (TCC)…..Alarms of signal malfunctions and outages will be received at the TCC, enabling staff to respond in a timely manner…..Deployment of CCTVs…..will allow visual monitoring of the traffic, in further support of remote traffic signal operations. The video images will be shared with emergency operations (e.g., Civil Defense) and emergency responders.

- o ATIS refers to the dissemination of real-time information on route conditions. Video images from the CCTVs will be posted on a traveler information website so that travelers will have the ability to view traffic conditions prior to beginning their journey and adjust their plans based on the images and additional information about travel related to events, construction and emergencies. A voice-responsive phone system will also be provided that will include the same information as the website.

  Dynamic message signs (DMS) are used to provide information to motorists en-route regarding delays, work zones, travel time estimates, alternative routes, emergencies that affect travel, Maile-Amber alerts and the like.

WEST MAUI TRANSPORTATION ACCESS PLAN

Until the desired West Maui ITS is operational, the following Communications Plans will enable dissemination of Honoapiilani Highway closure information to the:
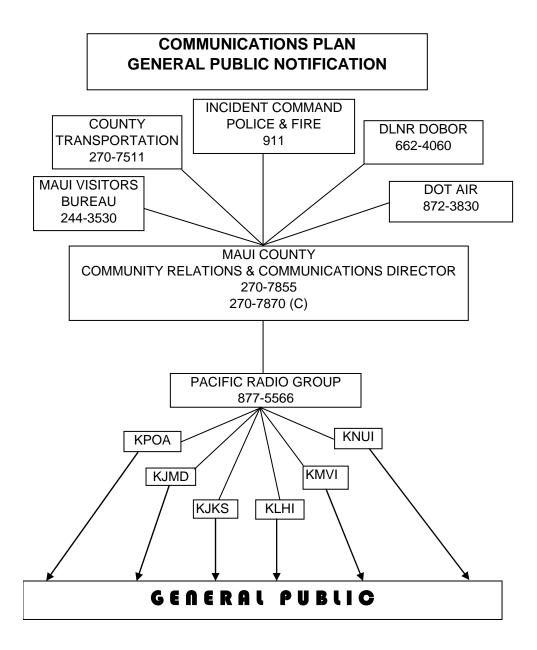
1. General Public;

2. Visitors; and

3. Government Services.

COMMUNICATIONS PLAN FOR GENERAL PUBLIC NOTIFICATION

The Working Group focused on the problems encountered by the lack of information provided to the general public. The Working Group believes that public notification would ease the number of motorists on Honoapiilani Highway when the closure is expected to remain in effect for extended periods of time. Information disseminated to the general public may include details on the nature of the closure, estimated duration of the closure, alternate routes available, alternate modes of transportation services available, the locations, schedule and prices of these services, instructions for accessing these services, procedures for parking/return of rental cars, emergency medical services, shelter locations, child and pet care service providers. The Communications Plan for General Public Notification is presented as a checklist and as a flow-chart diagram in keeping with the Working Group's desires for a short, simple plan.

GENERAL PUBLIC NOTIFICATION
CHECKLIST

☐ The **Maui County Police Department Incident Commander** will provide information on Honoapiilani Highway closures, alternate surface transportation routes (e.g., cane haul roads and the Kahukuloa route) available, situation reports and updates to the Maui County Community Relations & Communications Director.

☐ The **Maui County Fire Department Incident Commander** will provide information on any fires that threaten Honoapiilani Highway traffic operations to the Maui County Community Relations & Communications Director.

☐ The **Maui Visitors Bureau** will provide information on shelter locations, shuttle services, procedures for parking/turnover of rental cars, notifications made (e.g., visitor accommodations, security associations, car rental agencies, the Chamber of Commerce, Paradise T.V., the airline and cruise ship industries) and other considerations for Maui's visitor industry to the Maui County Community Relations & Communications Director.

☐ The **State Department of Land & Natural Resources Division of Boating & Ocean Recreation** (DLNR DOBOR) Lahaina Harbor Master will provide information and contact numbers for any available marine transport services between Lahaina, Maalaea, Manele Small Boat Harbors and Kaunakakai Pier to the Maui County Community Relations & Communications Director.

☐ The **Maui County Transportation Department** will provide information on any buses available for shuttle service between Kahului Airport and Maalaea Small Boat Harbor, between West Maui hotels and Lahaina Harbor, and between West Maui hotels and Kapalua Airport to the Maui County Community Relations & Communications Director

☐ The **State Department of Transportation Airports Division** (DOT AIR) will provide information and contact numbers for any available aeronautical services between Kapalua and Kahului Airports, between Lanai and Kahului Airports, and between Molokai and Kahului Airports to the Maui County Community Relations & Communications Director.

☐ The **Maui County Community Relations & Communications Director** will disseminate the appropriate general public notifications via the Pacific Radio Group, which includes KPOA, KJMD, KJKS, KLHI, KMVI and KNUI radio stations.

☐ The **Pacific Radio Group** will broadcast timely public service announcements of the information provided by the Maui County Community Relations & Communications Director to the general public.

**COMMUNICATIONS PLAN
GENERAL PUBLIC NOTIFICATION**

COUNTY
TRANSPORTATION
270-7511

INCIDENT COMMAND
POLICE & FIRE
911

DLNR DOBOR
662-4060

MAUI VISITORS
BUREAU
244-3530

DOT AIR
872-3830

MAUI COUNTY
COMMUNITY RELATIONS & COMMUNICATIONS DIRECTOR
270-7855
270-7870 (C)

PACIFIC RADIO GROUP
877-5566

KPOA

KNUI

KJMD

KMVI

KJKS

KLHI

GENERAL PUBLIC

COMMUNICATIONS PLAN FOR VISITOR NOTIFICATION

West Maui's visitor accommodations and attractions provide significant economic benefits. Maui is thus mindful of the concerns of its visitor industry. The West Maui Transportation Access Plan is an effort to minimize any visitor inconveniences, which include the inability to get to Kahului Airport as well as the inability to access their accommodations in West Maui.

The Maui Visitors Bureau plays an integral role in the dissemination of information for West Maui's visitor population. The Maui Visitors Bureau has compiled a phenomenal list of affiliates that deal with vital components of the visitor industry. The Maui Visitors Bureau communicates with these organizations via an extensive e-mail "tree", which includes hundreds of individuals/agencies. The Maui Visitors Bureau initiates the emergency notification of the first tier of this "tree" (see flowchart: Communications Plan Visitor Notification).

The primary organizations contacted by the Maui Visitors Bureau and that, in turn, forward the Honoapiilani Highway closure information to their affiliates and clients are: 1) the Maui Hotel & Lodging Association; 2) the Kaanapali Beach Resort Association; 3) the Maui Visitors Bureau Board; 4) the Security Association; 5) the Kahului Airport District Office; 6) the Maui Chamber of Commerce; 7) the car rental agencies; 8) visitor channel Paradise TV – Channel 7; and 9) Norwegian Cruise Lines (and the DLNR Lahaina Harbor Agent for the foreign cruise lines). These agencies' and enterprises' secondary tier of emergency notification contacts include a comprehensive array of visitor industry services (e.g., delivery and transportation services; activities and attractions; dining and other retail enterprises; vehicle and accommodation rentals).
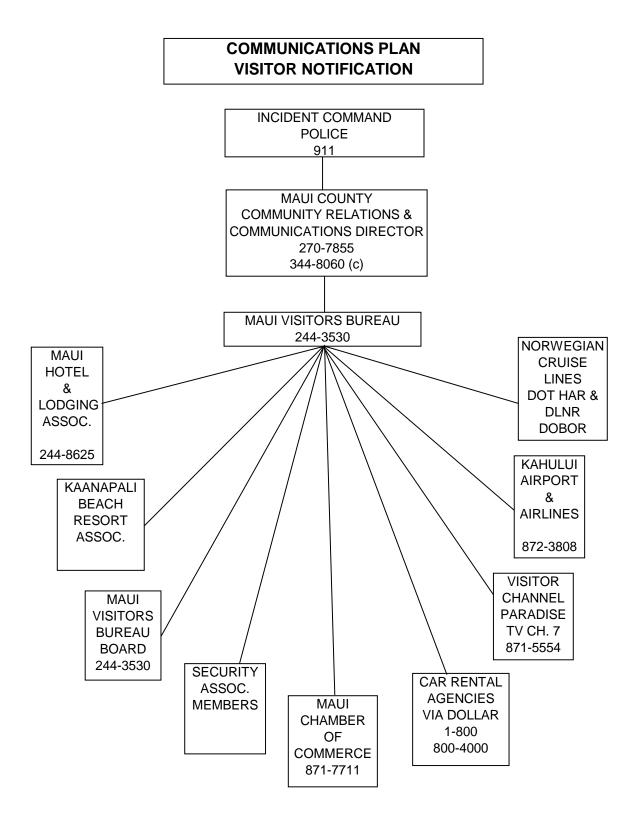
The Communications Plan for Visitor Notification was developed with the assistance of the Maui Visitors Bureau. The plan is presented as a checklist and in diagram form in keeping with the Working Group's desires for a short, simple plan.

<div align="center">

VISITOR NOTIFICATION
CHECKLIST

</div>

□ The **Maui County Police Department Incident Commander** will provide information on Honoapiilani Highway closures, alternate surface transportation routes (e.g., cane haul roads and the Kahukuloa route) available, situation reports and updates to the Maui County Community Relations & Communications Director.

□ The **Maui County Community Relations & Communications Director** will provide all appropriate incident status reports and information on the alternate routes available to the Maui Visitors Bureau.

The **Maui Visitors Bureau** will provide information on Honoapiilani Highway closures, alternate routes available, shelter locations, shuttle services, procedures for parking/return of rental cars, and other considerations to:

□ The Maui Hotel & Lodging Association

□ The Kaanapali Beach Resort Association

□ Security Association Members

□ The Maui Chamber of Commerce

□ The Car Rental Agencies via Dollar Rent-A-Car

□ Visitor Channel Paradise T.V., Channel 7

□ The Airlines via the State DOT Airports Division District Manager

□ Norwegian Cruise Lines, DOT Harbors Division and the Foreign Cruise Lines via DLNR DOBOR

COMMUNICATIONS PLAN
VISITOR NOTIFICATION

INCIDENT COMMAND
POLICE
911

MAUI COUNTY
COMMUNITY RELATIONS &
COMMUNICATIONS DIRECTOR
270-7855
344-8060 (c)

MAUI VISITORS BUREAU
244-3530

MAUI
HOTEL
&
LODGING
ASSOC.

244-8625

NORWEGIAN
CRUISE
LINES
DOT HAR &
DLNR
DOBOR

KAANAPALI
BEACH
RESORT
ASSOC.

KAHULUI
AIRPORT
&
AIRLINES

872-3808

MAUI
VISITORS
BUREAU
BOARD
244-3530

VISITOR
CHANNEL
PARADISE
TV CH. 7
871-5554

SECURITY
ASSOC.
MEMBERS

MAUI
CHAMBER
OF
COMMERCE
871-7711

CAR RENTAL
AGENCIES
VIA DOLLAR
1-800
800-4000

COMMUNICATIONS PLAN FOR GOVERNMENT SERVICES

The State Department of Defense Civil Defense Division, a.k.a. State Civil Defense, under the authority of Hawaii Revised Statutes Chapter 128, "Civil Defense and Emergency Act", will direct the services of the agencies identified in the "State Plan for Emergency Preparedness, Volume III, Disaster Preparedness and Assistance," during emergency situations proclaimed by the Governor of the State of Hawaii or declared by the President of the United States. Although HRS 128 specifies civil defense actions as being pertinent to response to attacks, civil defense agencies have expanded their responsibilities during natural and technological disasters in general.
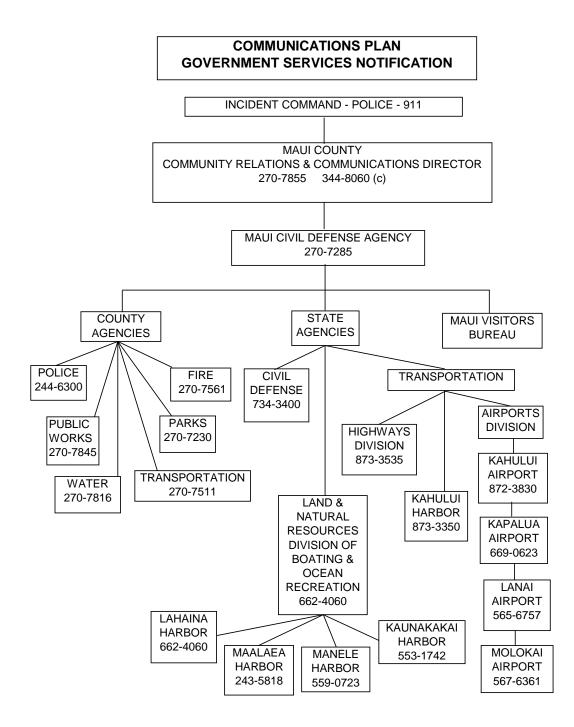
The State Civil Defense Agency website, *http://www.scd.hawaii.gov*, includes a link to the National Incident Management System (NIMS). NIMS is an all-hazards approach to unify Federal, State and local government response procedures for terrorist incidents, man-made or natural hazards and disasters. The adoption of NIMS will result in a greater margin of safety for Hawaii's residents and visitors. The NIMS components applicable to the West Maui Transportation Access Plan have been extracted and compiled as Appendix C.

Maui County's Maui Civil Defense Agency is directed by the Mayor, who is an appointed Deputy Director of Civil Defense. On occasion, county civil defense agencies have activated their Emergency Operating Centers and assumed command and control of first responder (police, fire, emergency medical, etc.) agency actions in response to fires, lava flows, storms, tsunami and hazardous materials incidents without benefit of Gubernatorial or Presidential decree.

The West Maui Transportation Access Plan's Communications Plan for Government Services is intended for use by County officials at their discretion and as applicable to the severity of the emergency situation.   It does not supersede or replace any Civil Defense contingency plans, which are likely to be more comprehensive and in consonance with established procedures and emergency management protocol.

<div align="center">

GOVERNMENT SERVICES NOTIFICATION
CHECKLIST

</div>

☐ **Maui County Police Department** will notify the Maui County Community Relations & Communications Director of Honoapiilani Highway multi-day closures and alternate surface transportation routes being utilized.

☐ **Maui County Community Relations & Communications Director** will notify the Maui Civil Defense Agency of Honoapiilani Highway multi-day closures.

☐ **Maui Civil Defense Agency**, as applicable to the severity of the situation, will notify the following agencies of the coordination necessary for activation of any alternate aeronautical, marine or surface transportation routes:

  ☐ Maui County Fire Department

  ☐ Maui County Parks Department

  ☐ Maui County Police Department

  ☐ Maui County Public Works Department

  ☐ Maui County Transportation Department

  ☐ Maui County Water Department

  ☐ Maui Visitors Bureau (although not a government service, the Bureau is a tremendous asset during Honoapiilani Highway closures)

  ☐ State Civil Defense Agency

  ☐ State Department of Land & Natural Resources Division of Boating & Ocean Recreation

  ☐ State Department of Transportation Airports Division

  ☐ State Department of Transportation Highways Division

COMMUNICATIONS PLAN
GOVERNMENT SERVICES NOTIFICATION

INCIDENT COMMAND - POLICE - 911

MAUI COUNTY
COMMUNITY RELATIONS & COMMUNICATIONS DIRECTOR
270-7855   344-8060 (c)

MAUI CIVIL DEFENSE AGENCY
270-7285

COUNTY AGENCIES

STATE AGENCIES

MAUI VISITORS BUREAU

POLICE
244-6300

FIRE
270-7561

PUBLIC WORKS
270-7845

PARKS
270-7230

WATER
270-7816

TRANSPORTATION
270-7511

CIVIL DEFENSE
734-3400

TRANSPORTATION

HIGHWAYS DIVISION
873-3535

AIRPORTS DIVISION

KAHULUI HARBOR
873-3350

KAHULUI AIRPORT
872-3830

KAPALUA AIRPORT
669-0623

LAND & NATURAL RESOURCES DIVISION OF BOATING & OCEAN RECREATION
662-4060

LANAI AIRPORT
565-6757

LAHAINA HARBOR
662-4060

MAALAEA HARBOR
243-5818

MANELE HARBOR
559-0723

KAUNAKAKAI HARBOR
553-1742

MOLOKAI AIRPORT
567-6361

ALTERNATE SURFACE TRANSPORTATION ROUTES

The alternate surface transportation routes available during Honoapiilani Highway closures include the use of:
- Cane haul roads
- County roadways
- Kahakuloa route.

Cane Haul Roads.

Special Order 99-12 establishes guidelines for closing portions of major highways on Maui due to a critical incident. A critical incident is defined as any natural or manmade emergency which includes or may cause major property damage, serious bodily injury or death.

Honoapiilani Highway is specifically addressed in Special Order 99-12. Private roads may be used in accordance with G.O. 401.11, "Emergency Use of Private Property." This applies to cane haul roads whenever they permit bypassing any portion of the main highway that is closed during emergency operations.

A ten-mile segment of Honoapiilani Highway, between Olowalu and Puamana, is interfaced by cane haul roads. In times of emergency, these roads have been used as alternate routes. (See Appendix D.)
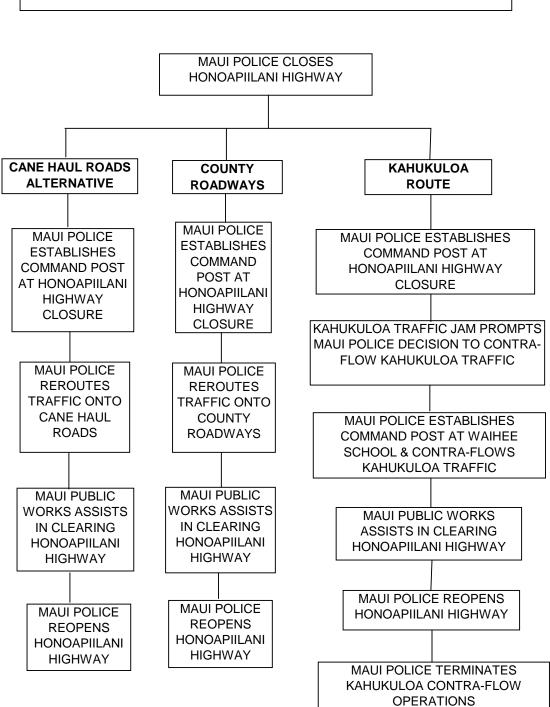
County Roadways

Various County roads such as Front Street and lower Honoapiilani run parallel to Honoapiilani Highway and serve as alternate routes through the area. These County roadways also serve as alternate routes when Honoapiilani Highway closures occur between Lahaina and Kapalua.

Kahukuloa Route

The northern route that links West Maui to Maui's Central Business District takes motorists from Lahaina to Waihee via Kahakuloa. The County roadway on this route is sub-standard and narrow, requiring the Maui Police Department to contra-flow traffic when vehicular traffic increases in response to Honoapiilani Highway closures. The West Maui Transportation Access Plan Working Group recommends that visitors be restricted from driving this route.

The Alternate Surface Transportation Routes are also depicted in flow chart diagram format.

ALTERNATE SURFACE TRANSPORTATION ROUTES

```
                    MAUI POLICE CLOSES
                    HONOAPIILANI HIGHWAY
```

CANE HAUL ROADS ALTERNATIVE

```
MAUI POLICE
ESTABLISHES
COMMAND POST
AT HONOAPIILANI
HIGHWAY
CLOSURE
```

```
MAUI POLICE
REROUTES
TRAFFIC ONTO
CANE HAUL
ROADS
```

```
MAUI PUBLIC
WORKS ASSISTS
IN CLEARING
HONOAPIILANI
HIGHWAY
```

```
MAUI POLICE
REOPENS
HONOAPIILANI
HIGHWAY
```

COUNTY ROADWAYS

```
MAUI POLICE
ESTABLISHES
COMMAND
POST AT
HONOAPIILANI
HIGHWAY
CLOSURE
```

```
MAUI POLICE
REROUTES
TRAFFIC ONTO
COUNTY
ROADWAYS
```

```
MAUI PUBLIC
WORKS ASSISTS
IN CLEARING
HONOAPIILANI
HIGHWAY
```

```
MAUI POLICE
REOPENS
HONOAPIILANI
HIGHWAY
```

KAHUKULOA ROUTE

```
MAUI POLICE ESTABLISHES
COMMAND POST AT
HONOAPIILANI HIGHWAY
CLOSURE
```

```
KAHUKULOA TRAFFIC JAM PROMPTS
MAUI POLICE DECISION TO CONTRA-
FLOW KAHUKULOA TRAFFIC
```

```
MAUI POLICE ESTABLISHES
COMMAND POST AT WAIHEE
SCHOOL & CONTRA-FLOWS
KAHUKULOA TRAFFIC
```

```
MAUI PUBLIC WORKS
ASSISTS IN CLEARING
HONOAPIILANI HIGHWAY
```

```
MAUI POLICE REOPENS
HONOAPIILANI HIGHWAY
```

```
MAUI POLICE TERMINATES
KAHUKULOA CONTRA-FLOW
OPERATIONS
```

ALTERNATE MODE ROUTES

During severe, lengthy closures of Honoapiilani Highway, the County of Maui may decide to broadcast the availability of alternative modes of travel for residents' and visitors' desiring West Maui access or departure.
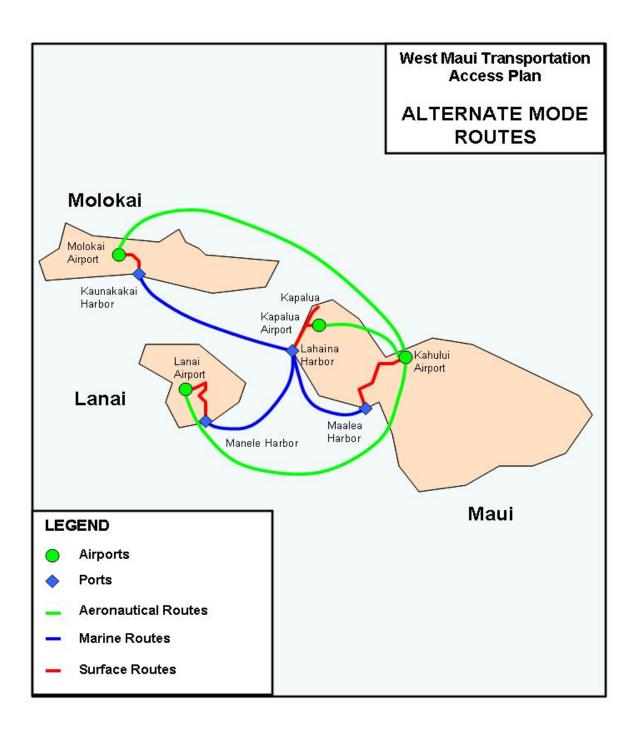
Boat operators could ferry passengers between Lahaina and Maalaea Small Boat Harbors. Taxis, County and private buses would shuttle these boat passengers between the boat harbors, the hotels and Maui's Central Business District.
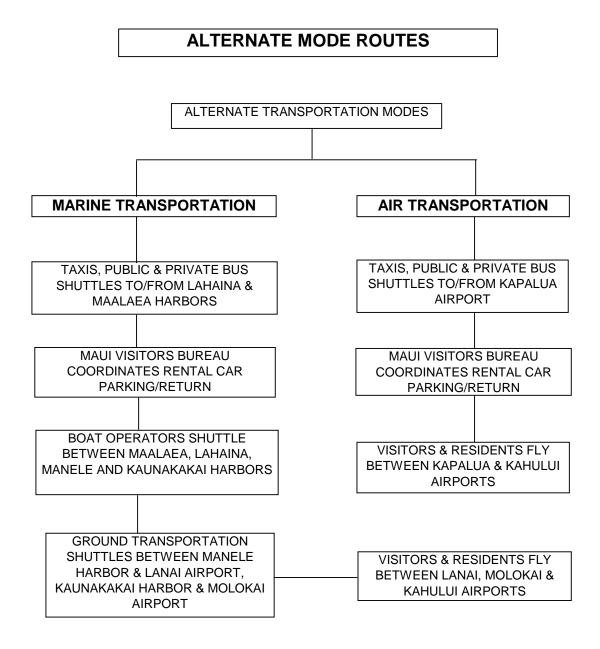
General aircraft operators could fly their passengers between Kahului and Kapalua Airports. County and private buses would shuttle these aircraft passengers between the airports and their hotels.

Lanai and Molokai Airports could also avail themselves as alternative modes. Passengers would have to be ferried by boat from Maui to Manele Small Boat Harbor or Kaunakakai Harbor, shuttled to Lanai or Molokai Airports, then flown to Kahului or Kapalua Airports.

Activation of this plan will require extensive coordination between the Maui County Communications Relations and Communications Director, the Maui County Civil Defense Agency, the Maui County Transportation Department, the Maui County Department of Public Works, the Maui Visitors Bureau, the State Department of Land & Natural Resources Division of Boating & Ocean Recreation and the State Department of Transportation Airports Division.

The Alternate Mode Routes are also presented in chart and diagram format.

West Maui Transportation
Access Plan

ALTERNATE MODE
ROUTES

Molokai

Molokai
Airport

Kaunakakai
Harbor

Kapalua

Kapalua
Airport

Lahaina
Harbor

Kahului
Airport

Lanai
Airport

Lanai

Manele Harbor

Maalea
Harbor

Maui

LEGEND

● Airports
◆ Ports
— Aeronautical Routes
— Marine Routes
— Surface Routes

ALTERNATE MODE ROUTES

ALTERNATE TRANSPORTATION MODES

MARINE TRANSPORTATION

TAXIS, PUBLIC & PRIVATE BUS SHUTTLES TO/FROM LAHAINA & MAALAEA HARBORS

MAUI VISITORS BUREAU COORDINATES RENTAL CAR PARKING/RETURN

BOAT OPERATORS SHUTTLE BETWEEN MAALAEA, LAHAINA, MANELE AND KAUNAKAKAI HARBORS

GROUND TRANSPORTATION SHUTTLES BETWEEN MANELE HARBOR & LANAI AIRPORT, KAUNAKAKAI HARBOR & MOLOKAI AIRPORT

AIR TRANSPORTATION

TAXIS, PUBLIC & PRIVATE BUS SHUTTLES TO/FROM KAPALUA AIRPORT

MAUI VISITORS BUREAU COORDINATES RENTAL CAR PARKING/RETURN

VISITORS & RESIDENTS FLY BETWEEN KAPALUA & KAHULUI AIRPORTS

VISITORS & RESIDENTS FLY BETWEEN LANAI, MOLOKAI & KAHULUI AIRPORTS

WEST MAUI TRANSPORTATION ACCESS PLAN

APPENDICES

APPENDICES

TABLE OF CONTENTS

APPENDIX A

ACT 214

ACT 214

EXECUTIVE CHAMBERS

HONOLULU

LINDA LINGLE
GOVERNOR

July 7, 2008

The Honorable Colleen Hanabusa, President
 and Members of the Senate
Twenty-Fourth State Legislature
State Capitol, Room 409
Honolulu, Hawaii 96813

Dear Madam President and Members of the Senate:

This is to inform you that on July 7, 2008, the following bill was signed into law:

HB2531 HD1 SD2 CD1   A BILL FOR AN ACT RELATING TO THE WEST
                           MAUI TRANSPORTATION ACCESS PLAN.
                           (ACT 214)

Sincerely,

LINDA LINGLE

Approved by the Governor

On _____July 7, 2008_____

HOUSE OF REPRESENTATIVES   ACT 214   H.B. NO. 2531
TWENTY-FOURTH LEGISLATURE, 2008   H.D. 1
STATE OF HAWAII   S.D. 2
                                                                      C.D. 1

A BILL FOR AN ACT

RELATING TO THE WEST MAUI TRANSPORTATION ACCESS PLAN.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

 SECTION 1. The legislature funds that West Maui is one of the largest generators of state and county revenues and is one of the largest visitor destinations outside of Waikiki. Yet access in and out of the region is served by only one major highway that may be closed for days at a moment's notice, which occurred in the past two years due to wildfires. In West Maui, unlike in other areas where a full-blown natural disaster is the cause for a total shutdown of transportation access, events and accidents that do not rise to the level of an emergency have closed the highway for days. Because of the non-emergency status of these incidents, the State has no coordinated plan to transport people into and out of West Maui during road closures. Because there is no hospital in West Maui, such road closures put people's lives at risk. They also divide families, as many Maui residents work in West Maui but reside in other parts of Maui county. The booming industry in West Maui is also jeopardized.

 During July of 2007 when a fire closed the highway for several days, a task force was created by the department of land and natural resources to address transportation access to West Maui. However, because no official support was mandated for this group's work, the task force has dispersed. The legislature finds that a West Maui transportation access plan is critical.

 The purpose of this Act is to require the department of transportation to develop a West Maui transportation access plan, which can serve as a model for developing plans in other areas having similar problems, such as West Kauai, Wainee, and the Kealakekua area.

SECTION 2. (a) There is created the informal, temporary West Maui transportation access plan working group within the department of transportation to develop a West Maui transportation access plan to address road closures in West Maui. The working group may elect from among its members a chairperson. The working group shall consist of the following member:
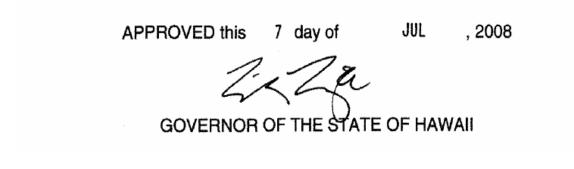
(1)   The director of transportation;

(2)   The state senator representing district 5 in West Maui;

(3)   The state representative representing district 10 in West Maui;

(4)   The member of the Maui county council representing West Maui;

(5)   The chief of the highway division of the department of transportation;

(6)   A staff member of the department of land and natural resources representing the Lahaina small boat harbor;

(7)   The mayor of Maui county;

(8)   The director of the department of transportation of Maui county;

(9)   The police chief of Maui county;

(10)   The fire chief of Maui county;

(11)   The administrator of the civil defense agency of Maui county;

(12)   A representative of Lahaina Bypass Now;

(13)   A representative of the Kaanapali Beach Resort Association;

(14)   A representative of the Maui Visitors Bureau;

(15)   A Maui-based representative of Island Air;

(16)   A Maui-based representative of the Car and Truck Renting and Leasing Association;

(17)   A representative of the Maui Hotel and Lodging Association;

(18)   A Maui-based representative of the Hawaii Transportation Association;

(19)   A representative of the Pacific Radio Group;

(20)   A representative of Expeditions Lanai Ferry;

(21)   A representative of Molokai Princess Ferry; and

(22)   A Maui-based representative of Cruise Lines International Association.

(b)   The temporary working group shall develop a West Maui transportation access plan to address road closures in West Maui and may contract with a consultant to develop the plan without regard to chapter 103D, Hawaii Revised Statutes.

(c)   The temporary working group shall submit a written report including findings, recommendations, the finalized West Maui transportation access plan, and any necessary proposed legislation to the legislature no later than twenty days prior to the convening of the regular session of 2009.

(d)   The temporary working group shall terminate on June 30, 2009.

SECTION 3.   There is appropriated out of the general revenues of the State of Hawaii the sum of $0 or so much thereof as may be necessary for fiscal year 2008-2009 for the West Maui transportation access plan temporary working group to develop a West Maui transportataion access plan, including the hiring of a technical consultant.

The sum appropriated shall be expended by the department of transportation for the purposes of this Act.

SECTION 4. This Act shall take effect upon its approval, except that section 3 shall take effect on July 1, 2008.

APPROVED this   7 day of   JUL   , 2008

GOVERNOR OF THE STATE OF HAWAII

APPENDIX B

COUNTY OF HAWAII

INTELLIGENT TRANSPORTATION SYSTEMS

STRATEGIC PROGRAM PLAN

*The following excerpts address the West Maui Transportation Access Plan
Working Group's desires for an Intelligent Transportation System to
alleviate the traffic problems caused by Honoapiilani Highway closures.*

**County of Hawaii
ITS Strategic Program Plan**

Five Year Strategic Plan
2017-002: Deliverable 2

Submitted to:
County of Hawaii
Department of Public Works
101 Pauahi Street, Suite 7
Hilo, Hawaii 97620-4224

Submitted by:
ICx Transportation Group
Seven Waterfront Plaza, Suite 400
500 Ala Moana Boulevard
Honolulu, Hawaii 96813

December 2008

Table of Contents

List of Acronyms

AC Alternating current
ASP Application service provider
ATIS Advanced traveler information systems
ATMS   Advanced traffic management systems
CCTV Closed circuit television
CIP Capital improvement program
COH County of Hawaii
DMS Dynamic message sign
DPW Department of Public Works
FHWA Federal Highway Administration
HDOT Hawaii Department of Transportation
HLTAP Hawaii Local Technical Assistance Program
IP   Internet protocol
ITS Intelligent transportation systems
IVR Interactive voice response
LED Light emitting diode
MPEG Moving Picture Experts Group
OC Oceanic Cable
POTS Plain old telephone system
State State of Hawaii
TCC Traffic Control Center
VIDS Video detection

1. Introduction

Intelligent Transportation Systems (ITS) are a broad range of diverse technologies which, when applied to a surface transportation system, can help improve safety, reduce congestion, enhance mobility, minimize environmental impacts, save energy, and promote economic productivity. The County of Hawaii (COH) Department of Public Works (DPW) Traffic Division [heretofore, "Traffic"] initiated the development of the ITS Strategic Program Plan to assess its readiness and capabilities for implementing ITS functions and technologies on the island of Hawaii, commonly called the "Big Island", and to identify a strategic path for ITS implementation. The overarching goal of this Plan is to ensure that the investments made in the ITS program maximize the benefits to the travelling public.

1.1 Purpose

The purpose of the ITS Strategic Program Plan is to provide a framework for the implementation of ITS to improve the efficiency of the existing surface transportation system on the island of Hawaii. The Plan outlines how the COH will use ITS in a coordinated fashion to enhance their abilities to deliver transportation services. Key services include the management of arterial roadways and providing traveler information to the public. A short- and long-term list of capital improvement program (CIP) projects is developed that support the goals of the Department and leverages the investments made for arterial traffic management to provide traveler information through web- and phone-based solutions. The phasing of the proposed CIP projects is structured to ensure that investments made in the ITS program will maximize the benefit to the COH.

1.2 Organization

This report begins with an overview and description of what is meant by intelligent transportation systems. It then presents a proposed vision for the ITS program and outlines a strategy for implementation in Chapter 3, followed by two over-arching goals that support the vision. Chapter 4 provides an assessment of the baseline conditions of functions that support ITS, with Chapter 5 providing details about the existing funding in place. The information about existing conditions, equipment, and staffing, as well as the recommendations provided herein are based on work conducted over a two-month period, from March through May 2008.

The final chapters of the Strategic Plan focus on the implementing ITS technologies and functions in the Traffic Division over the next five years and beyond. The solutions proposed will enable travelers to make informed travel choices and avoid congestion, enable Traffic staff to respond in a timely manner to congestion-producing situations, and to support and enhance emergency response. Chapter 6 describes the program approach and Chapter 7 describes a set of suggested capital improvements, and provides information on ongoing operations and maintenance costs for any new systems or infrastructure suggested. Chapter 8 concludes the Plan by describing the expansion of staffing required to support the future ITS within the Traffic Division.

2. What is ITS?

ITS is the application of advanced detection, computing, and communication technology to the transportation system to achieve increases in efficiency, safety, and environmental quality.

ITS that is commonly deployed elsewhere, and can effectively be deployed on the Big Island, include advanced traffic management systems (ATMS) and advanced traveler information systems (ATIS).

- o ATMS, with respect to arterial traffic management, incorporates traffic detection and communications technologies with traffic signal operations software to improve traffic operations. Key to improved operations is communications with signals to provide coordinated (synchronized) operations. More than half of the traffic signals in the major metropolitan areas of the US have some form of communications connection to provide for coordinated operations.

- o ATIS refers to the dissemination of real-time information on route conditions. It involves the collection of data about congestion, construction, special events, incidents and travel advisories. One key element of ATIS nationally is the 511 telephone number. The Federal Communications Commission has designated 511 as the nationwide traveler information number, similarly to how 911 is used for emergencies. More than half of the US population has access to 511 traveler information telephone numbers. Many areas are using an integrated 511 phone and web system where real-time information is provided both on a website and by phone.

  Dynamic message signs (DMS) are used to provide information to motorists en-route regarding delays, work zones, travel time estimates, alternative routes, emergencies that affect travel, Maile-Amber alerts and the like.

Both ATMS and ATIS rely on various forms of wireline and wireless telecommunications technologies that are used to transmit real-time information (e.g., traffic data from sensors and images from closed-circuit television (CCTV)) from the field to a traffic control center (TCC). Without a connection to a staffed, central location, staff are unaware of conditions in the field. Most TCCs devoted to arterial operations are integrated with the other traffic functions of an agency. A TCC provides the ability to monitor and operate computerized traffic signal systems, dynamic DMS, CCTV images, and to respond to emergencies, all from a central location.

3. ITS Program Vision and Goals

The core mission of the Traffic Signal and Streetlight Section (Traffic Section) of the DPW Traffic Division is the safe and efficient operation of traffic signals during all conditions, including disasters and normal operations. The ITS Program Vision is based on that core function.

> **The ITS Program vision is to implement and sustain technologies that:**
> - o **Enhance traveler safety and convenience,**
> - o **Improve traffic flow, and**
> - o **Support response to emergencies, including Civil Defense operations**

The ITS vision can be translated into systems that will be deployed to achieve the vision:
> o ATMS Components:

> > Centralized transportation monitoring and control of the roadway network may be accomplished by connecting all traffic control signals to a traffic control center (TCC).

> > Deployment of CCTVs, starting first in priority areas…..will allow visual monitoring of the traffic, in further support of remote traffic signal operations. The video images will be shared with emergency operations (e.g., Civil Defense) and emergency responders.

> o ATIS Components:

> > Video images from the CCTVs will be posted on a traveler information website so that travelers will have the ability to view traffic conditions prior to beginning their journey and adjust their plans based on the images and additional information about travel related to events, construction and emergencies.
> > A voice-responsive phone system will also be provided that will include the same information as the website. Portable and fixed DMS will provide travelers with real-time information about current traffic conditions.

3.1 Related Plans

The Big Island ITS Program vision is built upon the mission and goals of the County of Hawaii, which are formalized in the Hawaii County General Plan (2005), as well as a number of planning documents and annual reports by the DPW.

The Hawaii County General Plan puts forth two goals for transportation in the COH:

> Provide a transportation system whereby people and goods can move efficiently, safely, comfortably and economically.

> Make available a variety of modes of transportation that best meets the needs of the County.

Both of these transportation goals are supported through the County Department of Public Works, whose mission it is to maintain and continually make improvements to the County's roadway transportation system to permit the safe and efficient movement of people and goods around the island, and to strive to make Hawaii County a better place to live.

While the core function of the Traffic Division is to install, maintain, and repair traffic control facilities and devices and the street lighting system, the Department has a number of goals. The following DPW goals can be best supported by the ITS program:

#2 To provide a safe roadway for the public's use.

#3 To be prepared to assist Civil Defense in emergencies.

#6 To develop and implement operational and technical programs for traffic control devices.

#7 To provide timely operations and maintenance of traffic control devices through improved scheduling of projects and personnel.

#10 To operate and maintain traffic signals, streetlights, signs, and markings islandwide.

#11 To enable better traffic engineering and decisions through collection of roadway sensor data.

3.2 ITS Program Goals

To support the vision, the following ITS Program Goals were developed. Each goal is followed by a short description of ITS applications that support the goal.

o Enhance the safety and efficiency of traffic signal operations.

> While the County is providing safe and efficient traffic signal operations, the addition of a central traffic signal control platform connected to all traffic signals across the island will enhance the provision of these services and enable improved response to outages and malfunctions.

o Improve the capability to inform the public in real-time of traffic/travel conditions.

> Implementing an automated web and phone-based system that includes traveler, emergency, and construction advisories, camera images of traffic condition ns, and other information will greatly increase public access to information.

o Improve the capability to support local emergency response.

> With communications connections to all traffic signals, staff will be able to quickly implement special traffic signal timing plans to support closures and diversions. CCTV images can be shared with emergency managers and responders to support assessment and response.

o Manage the investment in ITS.

4.2 Closed-Circuit Television Cameras

Closed-circuit television cameras are used for many functions, including helping manage traffic signal operations. CCTV allows staff to view several intersections at once – which cannot be done from ground level. Plus, CCTVs allow staff to observe operations without having to drive to the intersections.

4.2.1 CCTV - Future Considerations and Assessment

The implementation of CCTV cameras on arterials in the US has been constrained by the availability of appropriate telecommunications. The FHWA tracks deployment of ITS devices, including CCTV on arterials. Reviewing the data from those that responded in 2006 indicate that most regions with similar numbers of traffic signals had deployed approximately 10 to 15 cameras. And, as of 2004, 35 of 50 states have deployed cameras in non-urban or rural areas (USDOT, 2005).

For Hawaii, the usefulness of CCTV to improve response time to traffic signal operations and maintenance issues supports their deployment. The images can also be provided to the public via the Internet, for their use in assessing congestion on their selected routes, and making informed travel choices (e.g. departure time, route selection). The cameras can also be used by Civil Defense to observe road conditions, evacuation routes, or other aspects of emergency management that affect the transportation system.

The key to deploying cameras is the provision of a communications link with sufficient bandwidth. While the same communications network implemented for the traffic signals can be used to support cameras, it should be noted that the bandwidth requirements for CCTV are significantly greater than the requirements for signal operation. Care in locating CCTV at existing signalized intersections should be taken such that only those intersections that require higher bandwidth to support CCTV should carry the telecommunications investment associated with it.

4.3 Dynamic Message Signs

Portable DMS have been procured as part of work zone management systems for County construction projects. The signs support County maintenance and construction operations by informing traffic of work ahead or lane closures. DPW has between ten and 15 DMS stored at various yards. These signs are also deployed for Civil Defense operations, such as recent road closures due to earthquakes or volcanic activity. The current signs are designed for local operations only. There is no capability to address these signs from a remote location to change the message, power on/off, or other functions. DPW staff has conducted initial tests to address the capability.

4.3.1 DMS – Future Considerations and Assessment

Portable DMS have proven their usefulness for work zone and emergency management on the Big Island. The County is considering using permanent DMS to provide drivers with information on emergencies, events, crashes, and congestion. Typically, these types of DMS are implemented at major decision points. A decision point is a location where drivers can decide on an alternative route.

4.4 Smart Signs
Smart signs, which gather counts and speeds, then displays the speeds to drivers, are currently being installed at 30 locations island wide. These signs serve a dual purpose. First, they are intended to moderate drivers' speeds by making them aware of their current speed. Second, they are a data collection tool, providing speed and traffic count information. About half of the signs are powered via AC connection, and the other half are solar-powered. They are able to collect traffic count and speed information, which must be downloaded monthly from each location in order to capture the 30-day maximum stored data.

4.4.1 Smart Signs – Future Considerations and Assessment
The deployment of additional smart signs in the future will be based on community requests and the results of speed and crash studies. The capability to download the data without having to visit each sign will reduce staff travel. This can be accomplished with the deployment of communications to reach traffic signals and CCTV on the island.

4.5 Website
The COH website (http://www.hawaii-county.com/) offers general information about the county, including direct links to press releases, contact information about each of the county departments, and links to various planning documents and maps. It is managed by the Department of Data Systems. There is no real-time information on the web site.

4.5.1 Website - Future Considerations and Assessment
The October 2006 earthquake and the current eruption episode of Kilauea that began in July 2007 reinvigorated County staff and leadership with a desire to improve the public's access to information on emergencies by using key advanced technologies (e.g. the internet, automated phone information system, and DMS) that have now become mainstream in the US.

If a traveler information web site (coordinated with a traveler information phone system) is implemented, the web hosting and management capability, including the bandwidth available to the public, will have to be greatly expanded. Off-site hosting should be considered.

4.6 Public Information Phone System
The DPW maintains a phone system that allows users to get local information about current construction projects and lane closures. The information is contained in pre-recorded messages and users push numbers to select the information they would like. Four lines are maintained for the system, with each line directed to a different message. The current system capacity is 90 calls per hour. The system averages about 5 calls per week. Usage increases exponentially when there are emergencies or unplanned events on the Island. DPW Public Information is in the start-up stages of implementing an automated telephone advisory system to support emergencies.

4.6.1 Phone System – Future Considerations and Assessment

In other areas, phone systems, such as the one in place at the DPW, are being phased out with new telephony technologies that enable greater capabilities. With greater capabilities and relevant content, usage of these systems increases. If a traveler information phone system that has real-time information about construction, planned events and incidents, as well as tourist information (e.g., access to Kilauea Volcano is closed due to vog) is implemented, the number of calls expected will exceed the capacity of the current system.

6. Program Approach

The baseline assessment provided an overview of the existing ITS capabilities and needs. Using that as a base, this section provides the framework for the strategic approach to implementing ITS on the Big Island.

The County has an opportunity to produce significant improvements in traffic operations, and to provide greatly enhanced public access to traveler information for normal and emergency operations.

To ensure the best return on investment, the implementation strategy deploys the technologies required to improve traffic signal operations, such as upgrading traffic detection at intersections and deploying CCTV cameras. This investment, managed by the Traffic Division, becomes the basis of ATIS, and can be disseminated to the public through the implementation of web-based, and potentially phone-based, traveler information systems.

The key step is to provide communications to every traffic signal so they can be managed from a central location (a traffic control center), or from two, interconnected locations. With the traffic signal communications in place, CCTV can be deployed with the images being brought back to central over the same communications media. With data and video images being brought back to a central location, the provision of a traveler information phone and web site system can be accomplished.

The strategy also includes making investments in traffic detection at signals, to improve operations and safety.

The benefits of this approach are:
  o Improved traffic signal operations;
  o Improved responsiveness to traffic signal outages and operational issues;
  o Reduced driving hours (and gas consumption) for maintenance staff;
  o Improved public access to road condition information for normal and emergency operations, enabling new travel choices for drivers; and
  o Enhanced traffic engineering decisions.

7. Program Plan
This chapter describes a set of suggested capital improvements, and provides information onongoing operations and maintenance costs for any new systems or infrastructure suggested.

There are two program areas, each of which ties back to the Traffic Division's ITS program goals:
- o Arterial Traffic Management and Operations
- o Advanced Traveler Information

Budget-level and program-level projects are proposed within each program area. A brief description is included, as are rough, order-of-magnitude cost estimates and project phasing.

Note that the phasing approach is based on the implementation strategy described in Chapter 6 and is divided into three time periods: short-term (0-2 years); mid-term (3-5 years); and long term (5+ years)

7.1 Arterial Traffic Management and Operations
The first step for the Traffic Division is to implement a telecommunications network, with the focus at key intersections, thus enabling the traffic signals to be connected to a central traffic control center in real-time. With the telecommunications network in place, a complimentary second step is to expand CCTV coverage at the connected signalized intersections to allow Traffic staff to view real-time traffic images.

7.1.1 Telecommunications
Several telecommunications media and sources were assessed for their suitability to meet the operational needs outlined in this plan. The various media data-carrying capabilities vary. All media are capable of carrying data, which is suitable for communicating with traffic signals and DMS. Higher bandwidths are needed to carry streaming, high-quality video images.

To meet the target operational needs, traffic signals and CCTV must be connected on a media that is open at all times. While it is desirable to provide a full-time connection to DMS, as the channel could then send information on the device health and communication connectivity, it is not strictly required for DMS operations.

The following describes key features of the various technologies and approaches investigated.

7.1.1.1 Wired (wireline) Options

COH Fiber Network (supplied by Oceanic Cable)
COH currently uses a fiber backbone privately owned by Oceanic Cable (OC). COH leases a single pair (2 fibers) and has multiple drops to several COH buildings around the island. There are several COH agencies using the fiber, and all network traffic is

maintained by the COH Data Services Department. The Data Services Department and OC are in the process of extending fiber to more COH facilities, however the full build-out is a long-term project.

COH pays $80 per month for each location that has service. Ordering a new drop is simple because the agreement between COH & OC is already in place. Installation costs depend upon the location. Installation related costs can be high depending on how far the site is located from the existing fiber network. Cost estimates for several drops were obtained from OC, and they ranged from $1,500 (at the intersection of Queen Kaahumanu Highway and Hinalani Street in Kona) to $35,000 (at the intersection of Kaneolehua and Leilani Streets, in Hilo), with the majority in the $20,000 range. The existing network is somewhat remote from about half of the traffic signals on the island. The fiber network could be extended without major construction by using wireless links from the field site (traffic signal, CCTV or DMS) to the COH/OC network hub. However, not every field site is reachable due to distance and topography.

The OC service has proven to be very reliable as it provides all maintenance to the fiber in the field. The network is secure as all traffic is monitored by the COH Data Systems Department and must be authenticated before access is permissible.

High Bandwidth Connections
Traffic has installed four CCTV cameras connected to the Traffic Division facility at Railroad Avenue using high bandwidth connections. The high bandwidth connections have exhibited no issues in addressing or controlling the cameras, and the images are appropriate for signal or emergency operations, as well as for public viewing. The cost for a high bandwidth depends upon the proximity to the existing lines. High bandwidth connections will provide more than adequate bandwidth for traffic signals and DMS.

The service is as reliable as the overall high bandwidth connection service, which is maintained by the private carrier. The connection would not be strictly secure, as it is managed by the private carrier.

Build Out of a New Fiber Network
A private (owned by the Traffic Division) fiber optic network provides one of the most reliable forms of communication available. It allows for high data speeds and provides a secure environment. However, one of the biggest challenges in deploying a fiber network is the cost of construction for the cabling to reach field locations. Depending on the amount of miles installed, the costs can range into the millions. At an estimated $15.00 to $20.00 per foot, a 500-mile (estimated length for island-wide coverage) overhead deployment of 36 strands of single mode fiber optic cable will cost between $40 and $53 million. 36 strands is used in the estimate as the cost differential between this and smaller bundles is minor. The major cost is associated with the installation and is a considerable up-front expenditure. Additionally, construction of a new fiber network can take a significant amount of time to complete. However, creating a new fiber network will provide the DPW with a secure, robust, communications network that requires minimal maintenance, has low recurring costs and will last many years.

It may be cost feasible to implement aerial fiber optic cable in Hilo, as the signal shop (and future TMC) are nearby.

POTS (Plain old telephone lines)
Telephone connections may also be used for some applications. Telephone connections do not have adequate bandwidth to carry streaming video, nor are they open, or full-time, connections. However, they can be used to reliably communicate with devices that require only intermittent data connections. As noted above, open connections are desirable for ALL devices, but some can be managed on a dial-up basis. DMS are candidates for dial-up connections. Some remote traffic signals are also candidates. Phone lines are not appropriate for CCTV connections.

The cost to install a phone drop varies depending upon the location. Monthly charges are currently $10 per location.

Utilize Sandwich Isles Fiber-Optic Network
Sandwich Isles Communications, Inc. is a Hawaii-based company that provides fiber-optic cable through Hawaiian Home Lands on six Hawaiian islands, including the Big Island. It offers broadband services to the COH, through which the Traffic Division may access. The tariff offered by Sandwich Isles to COH departments was previously reported to be reduced; however, this needs to be verified.

7.1.1.2 Wireless Options

AT&T Wireless
AT&T provides a dedicated data network wireless product that can be used to transmit streaming video from CCTV locations. The "EDGE Network" operates using AT&T's 3G network and provides data transfer rates between 800KB and 1.4MB. Installation costs are approximately $3,000 per location. The service fee for each unit is $47.99 per month for unlimited use. AT&T does not guarantee full coverage of the island and the Traffic Division confirmed several "dead spots" exist. AT&T stated they are committed to improving their coverage on the island. COH is investigating AT&T's coverage.

A test of the ability to view streaming CCTV video over the EDGE Network was conducted by DPW staff. While the streaming video was viewable, it was not of the quality required for normal traffic operations, and substandard for the quality needed for general public viewing. However, it may be suitable to transmit still images (snapshots) from CCTVs over the EDGE Network, updating the images at a reasonably frequent rate (once or twice per minute).

The AT&T wireless network is the same as that used by the general public. During emergencies, the network will experience high usage, which may negatively impact the data rate available for Traffic Division use.

Satellite
SATWEST provides satellite data communication services to the island. They state they have full coverage to all of the Hawaiian Islands. The data transfer speed for each satellite location is approximately 500K which is not enough to support live video streams. They offer several types of price plans; however it is a high cost to both procure and operate the equipment. This may be a solution for a specific site or as a means of backup communications, but overall it is not recommended for wide-scale deployment.

County Of Hawaii Police Department Wireless Radio Network
The COH Police Department made a proposal to the Hawaii County Council in mid-2008 to procure and deploy an island wide wireless microwave network. The gigabit wireless data network would provide coverage to approximately 95% of the island. If the network is approved, funded, and deployed it could provide an opportunity to use a COH-owned communications network for DPW's CCTV and signals. This is not a near-term solution but something that may become available in the next few years.

Millimeter Wave (E-Band)
Millimeter wave wireless is a point-to-point line of sight wireless technology that operates in the 70/80GHz spectrum (E-Band). This spectrum currently allows for full-duplex 1.25Gbps throughput and it is anticipated that data rates could increase up to 10Gbps in the near future. The E-Band range allows for a very high reliability rate and the technology is less impacted by poor weather than other spectrums.

Using millimeter wave requires two types of FCC licensing; the registration process verifies that the link being registered will not interfere with previously registered links. The exclusive right to use the spectrum is granted on a per link basis, rather than a nationwide or even regional basis. This also provides a high level of security on each link; however, additional hardware is still needed at the head end location.

For DPW, this technology should be considered only for portions of the backbone network where wired options do not exist, or as a "home-run" connection. It is not appropriate for use to connect field device to a backbone network. The cost of procuring, installing and maintaining several field locations, for individual signals or CCTV is prohibitive.

Loea is a Hawaii-based company that currently provides millimeter wave wireless services to the military and the State of Hawaii. Each unit can be powered through electricity or by solar panels, with battery storage. While heavy rain can be a challenge for the units, existing Loea deployment on Oahu was not impacted by the December 2007 wind and rain storm. During this event, the power poles along the Waianae Coast were down and the Loea units remained online. The distance between deployed units is a function of the bandwidth required, availability, and line-of-sight. Each unit costs approximately $25K per link. There is minimal ongoing maintenance costs associated with this technology.

7.1.1.3 Security
As this plan proposes the implementation of a new DPW Traffic Division-owned communications network infrastructure (separate from the COH/OC network), the new infrastructure should be implemented based on an appropriate security policy.
The following provides an overview of security policy and implementation. The information below is intended to provide recommended security "best practices".

Creating a Security Policy
A security policy is a formal statement of the rules that people who are given access to an organization's technology and information assets must abide. The policy relays the security goals to all of the users, the administrators, and the managers. For the most part, the goals are determined by the following key tradeoffs: services offered versus security provided, ease of use versus security, and cost of security versus risk of loss. In order for a security policy to be appropriate and effective, it needs to have the acceptance and support of all levels of employees within the organization.

A security policy must:

- o Clearly define the areas of responsibility for the users and administrators
- o Be able to be operated and maintained through system administration procedures
- o Be communicated to all once it is in place
- o Be flexible to the changing environment of a network

The first step in developing a security policy is a threat assessment. The threat assessment identifies potential threats to the network, the potential outcomes if the threat is realized, and the impact of that outcome.

As the DPW's ITS communications network will be physically separate from the CPH/OC network, the threats to be assessed relate to operations of the ITS infrastructure (traffic signals, CCTV, and DMS). Back-up communications are proposed to include connection to the COH/OC network. This network operates under its own security policy, which policy is sufficient to protect the ITS assets.

Across the US, ITS network security policy has focused on threats to safety. The most critical impact to safety would be based on intrusion to the traffic signal systems. All traffic signals are protected from displaying all green indications in opposing directions, as hardware (a conflict monitor) is installed in every controller cabinet. Traffic signals could be timed to short cycle, with the signal going from red to green to yellow very rapidly, which could cause a safety impact in addition to creating congestion. This is a concern that should be addressed.

Nuisances, such as taking control of a CCTV camera, or posting undesirable messages on a DMS, have typically been second-tier concerns.

Identify and Document the Network
Developing and maintaining a list of all hardware devices and installed software is
important to the security of the network. Understanding software applications that are
installed is also important. This provides administrators the ability to identify what
devices are running on the network and what version of firmware or software they are
using. This is crucial in determining where updates are needed and what protocols are
being used across the network. Administrators can routinely scan networks for protocol
violations that may indicate an intrusion on the network.

Passwords
Passwords are a primary method used to control access to resources. Because
authenticated access is seldom logged, a compromised password is a way to explore a
system without causing suspicion. An attacker with a compromised password may be
able to access any resource available to that user. Poor passwords or blank passwords are
still a common occurrence on many networks. Many users still use standard words,
hybrids, names, and default passwords. Additionally passwords less than 8 characters
and passwords that are the same as the username are also frequently used. These types of
passwords can be cracked within minutes or even seconds using any number of publicly
available password crackers.

Passwords should be changed regularly (every 30 to 90 days).

Passwords should be difficult to guess and include uppercase, lowercase, special (e.g.,
punctuation and extended character set), and numeric characters. They should not include
dictionary words or names.

Users should never share their passwords or keep written passwords in an easily-
accessible place (e.g. under a keyboard, on the computer monitor).

Host Security
Recommendations for improved host security include:
   o   Shut down unneeded TCP/UDP servers on the router or the firewall. Servers that
       are not
   o   running cannot break. Also, more memory and processor slots are available with
       fewer
   o   servers running.
   o   For TCP/UDP servers on the router or the firewall that are necessary, make sure
       that
   o   access to them is limited only to the administrators.
   o   Shut down unneeded services (e.g., source routing, remote configuration) on the
       router
   o   or the firewall.
   o   Disable any unused interface on the router or the firewall. Protect each and every
       active
   o   interface on the router or the firewall from information gathering and attacks.

o Protect each and every management port on the router or the firewall from attacks.
o Disable any unused management port.
o Configure durable passwords on the router or the firewall.

TCP/IP Filters
The policy should also consider which TCP/IP services will be allowed to and through the perimeter routers and firewalls (inbound and outbound). The guidelines should be that services not explicitly permitted are prohibited. In other words, the administrator should create filters focusing on what services and hosts are permitted and denying everything else.

Logging and Debugging
Logging on a router or a firewall offers several benefits. It informs the administrator if the router or the firewall is working properly or has been compromised. It can also show what types of attacks are being attempted against the router, the firewall or the protected network.

Intrusion Detection System (IDS)
Generally, there are two types of IDS: host based and network based. Host based IDS monitor security within a network component, such as a server or a workstation. Network based ID systems monitor the traffic between network components and networks. Some IDS are strictly network based, whereas others are a combination of network and host based.

To maximize the utilization of IDS, the organization must first determine in order of priority what needs to be protected. For many organizations, the various servers (e.g.., application, database, file and domain controllers) contain mission-critical resources. Some departments may be more critical than others or must enforce different trust relationships. All of this must be defined in a priority list prior to deploying any IDS.

Remote Security
This includes physical security at a location such as:
o Cabinet locks with removable handles;
o Differently keyed cabinets so 1 lost key does not compromise all cabinets; and
o Alarm contact sensors to detect when cabinets are opened.

Additionally, all security methods listed above for host security should be deployed at remote location for applicable equipment.

Network Security Testing
Administrators should regularly test the security of all of the following devices on the network: clients, servers, switches, routers, firewalls and intrusion detection systems. Testing should also be run after any major configuration changes on the network.

Staffing Considerations
The security policies must also protect from the potential that staff maliciously and intentionally disrupt operations. The security policy should consider security screening of staff, and should minimize the number of staff with access to the network. There is a current court case against staff employed by the City of Los Angeles that are accused on short-cycling key traffic signals as a form of protest. Although an agency has few options to prevent cleared and credentialed staff from accessing the network, this case is mentioned simply to point out the potential internal threat.

Physical Network Considerations for DPW
As the DPW implements the physical network, each element should be assessed for security based on the developed policy. Specifically, key aspects will include:
- o Documenting the security inherent to the AT&T Edge network, which includes encryption of the wireless network, and prevention of accessing the traffic signal controllers external to the network.
- o Documenting the firewalls implemented in network switches and routers.
- o Documenting additional network firewalls.
- o Documenting how passwords, phone numbers to dial-up locations, IP addresses and the like are protected.

Recommendation
It is recommended that the Traffic Division implement a combination of approaches to meet the Program Plan goal of communicating with every traffic signal on the island, and bringing video images to the traffic management center. Beginning with a short-term approach to provide connectivity, the long-term recommendation is to migrate to use a fiber optic network reaching the majority of signals, CCTV and DMS. The rate of migration and ownership depends entirely on funding availability.

It is suggested that the AT&T EDGE Network be implemented in the short-term as the primary means to communicate with traffic signals. Where no AT&T EDGE Network coverage exists, alternatives include:
- o the COH/OC network;
- o high bandwidth connections; and
- o implementing fiber optic cable either to a point where it could be connected to the COH/OC network, or connected directly to the Shop. Two options are provided in the cost estimates: Option 1 addresses Traffic Division-owned fiber, and Option 2 proposes leasing fiber owned by others for use by the Traffic Division.

For CCTV, high bandwidth connections are recommended for the short-term. It is also recommended that the Traffic Division evaluate the cost effectiveness to use Sandwich Isles Communications, Inc. fiber-optic cable network at a reduced tariff.

The network must also connect with DMS as they are deployed. POTS (phone drops) are suitable for most DMS applications. As the Traffic Division-owned fiber optic network is deployed the DMS may be connected to it. In locations where DMS are deployed outside of the future Traffic Division-owned fiber optic network, phone drops can remain in the long-term. For DMS with high usage, high bandwidth connections should be considered. If no phone or service is available, the EDGE Network would be a secondary approach, if coverage is available.

Finally, in recognition of the dynamic nature of the telecommunications industry and the rapid expansion of wireline and wireless technology and devices, it is recommended that the Traffic Division reassess these approaches and the recommendations provided herein every one or two years, to ensure that it is investing in technology that is best for the Division over time.

Short-term Recommendations (0-2 years)
o Place AT&T wireless units utilizing the EDGE Network at every traffic signal within the EDGE coverage area, thus enabling DPW to monitor traffic signals continuously. Estimated number of locations is 50.

o Implement 10 high bandwidth connections at 10 new CCTV camera locations noted in this Program Plan.

o Implement an additional 10 high bandwidth connections OR connections to the COH/OC network to signals outside of the EDGE network.

o Evaluate cost-effectiveness of utilizing the Sandwich Isles Communications, Inc. fiberoptic network.

Mid-term Recommendations (3-5 years)
   o Create a ring of fiber network around the greater Hilo area (assume that the ring is about 10 miles in length, starts and ends at the East Hawaii Traffic Division Facility, and aerially spans these corridors: Kanoelehua, Kamehameha, Wainuenue, and Komohana). OR, use existing fiber, owned by other entities.

   o Migrate the signals and CCTV from the EDGE Network to the fiber network.

   o Reassess telecommunications recommendations every one to two years.

Long-term Recommendations (5+ years)
- o Consider extending Traffic Division-owned fiber to all signals to create an islandwide
- o Traffic Division-owned communications network or use existing fiber network owned by others. (Note that two options are presented with rough, order-of-magnitude cost estimates, as identified in Table 7.1. Option 1 is for a 500-mile deployment of Traffic Division-owned fiber. Option 2 is for tariffs associated for use of existing fiber owned by others; $100K per year was assumed in the short- and mid-terms, with $200K per year assumed in the long term.)
- o Reassess telecommunications recommendations every one to two years.

7.1.2 Back-up Communications

Communications media are subject to interruptions in service for a variety of reasons, a key one affecting all media is power outages. Wireline (fiber optics, copper) media are subject to breakage or loss of connections, sometimes due to wind forces. During emergencies, it is desirable to have a form of back-up communications for signal, camera and DMS operations to support the emergency response.

Back-up communications are not suggested for every intersection, camera or DMS. The plan should address intersections of major arterials, emergency routes and other important locations where the communications are critical in emergencies. The long-term goal is to have back-up communications in place at about 50 key locations across the island.

The short-term recommendation for the primary communications network is to rely principally on the cable and wireless AT&T EDGE Network, with other wired means for locations where coverage is not available. Further, it is recommended that the network be migrated to a fiber optic network over time, with funding being the key constraint to the timing of the migration. With fiber as the primary network, it is recommended that back-up communications follow a reverse migration strategy. That is, in the near-term, that the back-up communications should be principally based on the COH/OC network. As locations are migrated from AT&T as the primary communications, then the EDGE Network could be maintained as the back-up communications.

As an aside, it may be possible to negotiate a lower rate with AT&T for wireless service when used for back-up communications, as the devices will not be active unless primary communications are not available.

Last, DPW may also wish to use either radio or the AT&T EDGE Network as a back-up for DMS communications.

<u>Short-term Recommendations (0-2 years)</u>
- o Use Oceanic Cable at key locations in Hilo and Kona.

- o Use COH/OC fiber at key locations in Keeau and Pahoa.

<u>Mid-term Recommendations (3-5 years)</u>
- o As migration to a fiber optic network continues, retain EDGE Network communications at key locations.

<u>Long-term Recommendations (5+ years)</u>
- o Complete migration of primary network to regions to create an island-wide redundant communications network.

- o Retain EDGE Network links at key locations. If there is no EDGE coverage, options include COH/OC network, and phone or high bandwidth connections.

7.1.3 Traffic Signal Systems

Over the past several years, between two and five new signals have been added on the Big sland as development has occurred or as traffic volumes warrant. As new signals are constructed, these must be planned and designed such that they can be readily added to the traffic signal system communications network such that signal operations can be monitored remotely.

<u>Short-term Recommendations (0-2 years)</u>
- o Continue to work with private landowners, providing additional traffic signals (at their cost) when new residential, commercial, and industrial sites are developed to provide appropriate communications and camera assets.

- o Implement new traffic signals as MUTCD warrants are satisfied.

<u>Mid and Long-term Recommendations (3-5+ years)</u>
- o Continue to connect traffic signals to the TCC.
- o Continue to work with private landowners.
- o Implement new traffic signals as MUTCD warrants are satisfied.

7.1.4 Traffic Signal Detection

While detection at signalized intersections is used primarily for signal control, detectors can also be used to determine traffic volume and speed. This information can be processed to provide measures of congestion, which can be provided to the public in real time via a traffic information web site.

The current arrangement of traffic detectors should be upgraded at many locations to enable improved operations and to enhance safety. To allow for this additional functionality, the existing loop detectors will need to be enhanced, and perhaps replaced. The current technology used by the Traffic Division is the induction loop, which is placed in a sawcut in the traffic lanes. New wireless technologies for traffic detection are now available, and may be implemented at a lower cost than the traditional induction loop. Options include video detection and wireless magnetometers. New offerings in these technologies may also support provision of travel time information to the public. The Highway Division is reporting pavement failure at loops and is considering increasing pavement overlays from two-inches thick to four-inches thick. This additional cost may be mitigated with new wireless sensor technologies.

Short-term Recommendations (0-2 years)
- o Test and review new, lower cost, field technologies for traffic detection.
- o Update detection at ten intersections to provide additional functionality and improved response to traffic conditions.

Mid-term Recommendations (3-5 years)
- o Update detection at 20 intersections.

Long-term Recommendations (5+ years)
- o Update remainder of required intersections.

7.1.5 Traffic Signal Optimization
DPW has an existing project underway that is addressing traffic signal optimization across the Big Island. Optimizing traffic signal timing is one of the best means to get the most out of the existing infrastructure. New traffic detection and traffic signal communications will be required to improve the ability to time traffic signals to meet traffic demands. However, optimization can be conducted with the existing infrastructure in the interim.

Short, Mid, and Long-term Recommendations
- o Assess signal timing every two years.

- o Implement updated traffic signal timing plans as needed.

- o Provide staff training for coordinated signal timing plans

7.1.6 Traffic Control Center
The TCC is the central place whereby signals, CCTV, DMS and other ITS field devices can be addressed remotely. Space within the TCC must allow for desk and office uses, video displays mounted on the wall ("videowall"), an equipment room for computer and communications equipment, and limited bench space for equipment testing. The effectiveness of the TCC is dependent on the telecommunications network as well as the central computer system, videowall, and software. For example, the ability to share video images and DMS control with partner agencies is dependent upon the software implemented and the communications network that supports it. (Recommendation for a video management and distribution system is found in Section 7.2.2.)

Not only is it logical to bring the traffic control and monitoring equipment to a single, physical point, coalescing this equipment at a TCC provides many benefits to the traveling public, including:
- o A TCC enables and/or enhances staff capabilities to time traffic signals remotely. For example, using the CCTV camera images, staff can view how an entire corridor operates from the TCC. Staff attempting to understand the impacts of traffic signal timing changes can view only a limited number of intersections from the ground in the field. There is no other way to monitor an entire corridor than by using CCTV images. This complete view provides staff with a full understanding of how the whole corridor operates, and enables them to modify signal timing as needed to ensure optimized operations. The TCC integrates the traffic signal timing/optimization software capabilities with the information that can be gathered from CCTV images.

- o Traveler information from CCTV, detection, and traffic signal system monitoring is brought to a single location, where it can be readily disseminated to the public via a traffic information website.

- o Multiple CCTV images can be viewed simultaneously on the monitors at a TCC. This capability enhances the response to emergency situations. During an emergency, staff can quickly review images from several locations to assess the impacts. In addition, staff can respond to more than one location simultaneously.

- o A TCC provides a focal point for traffic operations and management. These functions may often be hidden within an organization. Implementing a TCC brings these functions into focus, elevating their place within the organization's mission.

Short-term Recommendations (0-2 years)
- o Convert existing space at the East Hawaii Traffic Facility to a traffic control center so that staff can view CCTV images, manage normal and incident/event operations, and optimize traffic signals remotely.

- o Begin discussions with partner agencies regarding the potential to share video images and DMS control.

Mid-term Recommendations (3-5 years)
- o Begin planning and design for future TCC space. Construct if possible.

- o Implement shared control, if desired.

Long-term Recommendations (5+ years)
- o Construct new TCC if not possible in mid-term.

7.1.7 CCTV Expansion
Surveillance, through expansion of the CCTV camera system, will provide the Traffic Division with real-time images at signalized intersections. These images will support the assessment of traffic conditions, traffic flow patterns and enable staff to determine the impacts of an incident or event on the arterials without a site visit. In addition, the images may be provided directly to emergency responders, such as police and civil defense, for their assessment and use in incident management and to the public through a traveler information website.

Short-term Recommendations (0-2 years)
- o Add up to 30 CCTV cameras on existing mast arms at signalized locations that have (or re planned to have in the same time frame) communications connectivity to the East Hawaii Traffic Management Facility.

Mid-term Recommendations (3-5 years)
- o Add up to an additional 20 CCTV cameras on existing mast arms or luminaire davit arms at signalized locations that have communications connectivity to the Traffic Division.

Long-term Recommendations (5+ years)
- o Expand CCTV camera coverage throughout the Big Island based on signal operations, emergency management, and traveler information needs.

7.2 Traveler Information
Through the upgrading of the telecommunications system, traffic signal system, and CCTV system, described in Section 7.1, the Traffic Division will be in position to leverage these investments and provide real-time information to travelers. The deployment of this arterial traffic management system will allow advanced traveler information to be provided on the Internet and by telephone. Both web and phone systems will be able to have information including, but not limited to, current traffic conditions, emergency messages, CCTV video feeds, planned construction and special events, and weather information.

7.2.1 Website

A traveler information website allows travelers to make decisions about their trip prior to beginning their trip. In the long-term, the website can include consolidation of traffic, construction, other modal information, tourist and weather (e.g., alerts and advisories for vog, earthquake, tsunami, hurricane, etc.) information through the implementation of a single web portal. The Web Portal will integrate and link relevant transportation services and emergency operations as well as be scalable to accommodate new features as they become available.

It is suggested that in the short-term (within two years), a website be developed that provides access to traffic camera snapshots and/or streaming video images for end users use in assessing traffic conditions.

In the mid-term, the Web Portal can be expanded to include the ability to post travel advisories, and to provide links to transportation, emergency operations, and tourism. It may be provisioned with a content management utility that can enable authorized personnel to enter and update content (e.g., construction activities, incidents, graphics, etc.).

Key considerations for the deployment of the web site include maintenance and operations requirements, bandwidth capabilities, back-up power availability and server capacities. While it is recommended that the Web Portal be installed at a secure facility to provide highly available operations either on Island, at a private entity out of State, it could be housed anywhere, including within COH facilities. Hosting the Web Portal at an offsite co-location facility can cost anywhere from $500 a month (for a server with limited support services) to about $6,000 a month (for fully managed services). Other ongoing costs include management of the content of the web pages themselves, and Traffic staff time. To summarize, annual O&M of the Web Portal can range from $10,000 to $100,000 or more, depending on the hosting environment and the information to be provided and updated on the website.

Finally, it is recommended that the Traffic Division pursue cost-offsetting (revenue generating) measures. Opportunities include:
- o Sponsorships and ad revenue from web (and phone); the amount of offsetting revenue that could be collected from advertising/sponsorships depends upon usage and the sophistication of the application. Kiosks at major collectors (e.g. tourism locations, the airport) could boost the ad and sponsorship options; and
- o Providing shuttle and taxi service information, with fees paid by the private transportation providers.

If the Web Portal is designed to support emergency operations and evacuations during catastrophic events, there may be opportunities to apply for FEMA funds to support implementation and operations.

Short-term Recommendations (0-2 years)
- o Design and build a Web Portal featuring snapshot images and streaming video from CCTV.

- o Potentially add the ability for posting travel advisories.

- o Begin discussions within the COH and relevant State agencies to expand functions of the website.

- o Begin process to secure advertising revenues from non-COH entities that may be used for the operations and maintenance of the Web Portal.

- o Consider coordinating with HDOT regarding the statewide ATIS web portal.

Mid-term Recommendations (3-5 years)
- o Provide additional functionality, as determined, based on partnering with other County and State agencies.

- o Implement revenue-generating applications to support ongoing operations and maintenance of the Web Portal.

Long-term Recommendations (5+ years)
- o Operate and maintain.

- o Expand the Web Portal functionality, as needed.

7.2.2 Video Management and Distribution System

The streaming video and snapshot images from CCTV must be accessed through a video management system that will be deployed in the near-term to capture the planned 30 cameras and expanded in the mid-term to support the planned 20 additional cameras. It is anticipated that the video management system will be managed and operated at the Traffic Division TCC. As part of the mid-term expansion, the video management system can include a distribution component, allowing for the distribution of the video feeds to other users/agencies not located at the Traffic yard. Interested partners may include emergency responders like police, fire, EMS and civil defense, for their use in emergency operations.

Short-term Recommendations (0-2 years)
- o Design and build a video management system to support existing (4) and planned (30) CCTV video feeds.

Mid-term Recommendations (3-5 years)
- o Expand the system to support additional 20 CCTV deployed in the mid-term.

- o Provide video distribution capabilities for other stakeholders to access video images and control.

  o Operate and maintain.

  o Expand the video management system, as needed.

7.2.3 Traveler Phone Information System
Upon completion of the website, an interactive voice response (IVR) phone system can be created. It is envisioned that the system will be the functional complement to the web applications by providing traffic information via phone. As experienced with the existing DPW phone service, usage of phone-based traveler information will increase dramatically during major events.

It is recommended that a hosted solution be evaluated that has the features and functions desired by the COH that has the capability to accommodate dramatic increases in usage and that could support personalized services and possible revenue-based services. "Reverse 511/911" could also be considered whereby emergency information is pushed to registered users, via landline and wireless, with the option for text and voice.

The system may use a toll-free number where callers can obtain traveler information and advisories. The information staff input to the Web Portal will drive the IVR application so that callers will have access to the same information as web users, and DPW staff need not input the information to two separate systems.

Key aspects of a phone system affecting the implementation cost include:
  o Capacity for taking calls;

  o Complexity of the caller selection trees;

  o Amount and types of information available; and

  o Amount of voice recognition programmed in the system. (Note: Some systems recognize a limited setoff voice prompts such as numbers, yes, no, and the like. More sophisticated systems are custom programmed to recognize place names and multiple languages.)

A significant cost for phone systems is the ongoing carriage charges, which are typically based on a fixed price per call. The investigation of agreements with the telephone carriers on Big Island was not included in the development of this Strategic Plan, so an estimated cost is not provided at this time. However, based on systems in California, it could be expected that annual charges of some $100,000 to $200,000 could be expected. It may not be reasonable to place this cost on a single department (DPW) and discussions within the County are recommended to determine if a County-wide IVR phone system with advanced features should be implemented to serve several functions and departments, and how that would affect allocation of call charges.

It is also noted here that the State of Hawaii's Department of Transportation is in the planning stages of implementing a statewide 511 service. Each of the four Hawaii counties is expected to be offered the opportunity to co-manage traveler information about its county, thereby ensuring that each has the ability to retain its own "look and feel" while leveraging the HDOT's web portal and IVR infrastructure. This approach has been used throughout the US with success; examples of coordinated programs include the franchising of SANDAG 511 (www.511sd.org) and CARS/511 (511.alaska.gov). Deployment of the HDOT web portal is expected in the next 12-to 18-months, with the associated IVR/phone system planned in the mid-term.

Short-term Recommendations (0-2 years)
  o Develop a cross-departmental approach to implementing an automated phone system that provides construction advisories, emergency and other traveler-related information.

  o Consider working with HDOT as a partner in their IVR system.

Mid-term Recommendations (3-5 years)
  o Develop an automated phone system that provides construction advisories, emergency and other traveler-related information.

  o Allow for emergency information through floodgate messages (when required) to users.

  o Potentially provide interactive voice response for three languages (e.g., English, Japanese and Spanish) with local pronunciations.

Long-term Recommendations (5+ years)
  o Operate and maintain.

  o Expand the system, as needed.

7.2.4 DMS Expansion
Traveler information through the strategic placement of DMS can provide drivers with real-time information about travel conditions. This may include information about construction and road closures, existing traffic, or weather-related issues, such as low visibility due to vog. DMS are available that can be addressed wirelessly and easily from a central command center, such as a TCC enabling staff to change the messages and update the signs almost effortlessly. Figure 7.1 identifies potential locations where DMS may be deployed, either with temporary signs or with permanent ones.

The key to strategically locating DMS is to set the sign prior to a decision point, meaning that, with the information provided on the sign, the driver has information to either remain on the current path, or to choose a different route. Because of the size of overhead, permanent DMS, it is imperative that public support be established prior to design and construction. This may be done through using temporary signs at key locations with good information.

<u>Short-term Recommendations (0-2 years)</u>
- o Purchase up to ten portable DMS (NTCIP-compliant) and place upstream of key decision points.

- o Monitor public response and use.

<u>Mid-term Recommendations (3-5 years)</u>
- o Review DMS usage and identify locations where portable DMS should be replaced with permanent DMS.

- o Begin planning, design, and public outreach for permanent DMS.

<u>Long-term Recommendations (5+ years)</u>
- o Construct permanent DMS.

- o Continue to use portable DMS at other locations and monitor public response and use.

7.3 Operations and Maintenance

7.3.1 Training
Training is needed for Traffic Division staff as part of the ITS program. As new technology is procured and installed, training is imperative to keep staff up to date in equipment operation and maintenance.

<u>Short-, Mid-, and Long-term Recommendations</u>
- o Develop and implement a training program to include travel to partner and vendor locations to support training needs.

- o Coordinate with HLTAP for funding.

7.3.2 Equipment Replacement
Field devices and office equipment do not last forever. An equipment replacement program will ensure that all equipment is operating efficiently and effectively.

<u>Short-, Mid-, and Long-term Recommendations</u>
- o Establish and implement an equipment replacement program for communications, ITS field, TCC and other devices.

7.4 Summary

A summary of the short-, mid-, and long-term recommendations are shown in Table 7.1, followed by cost estimates in Table 7.2.

Table 7.1: Summary of Recommendations

	Short-Term (0-2 Years)	Mid-Term (3-5 Years)	Long-Term (5+ Years)
Telecommunications			
1. Telecommunications	Place AT&T wireless units at every traffic signal within the EDGE Network (est. 50) Implement 10 high bandwidth connections at 10 new CCTV camera locations Implement 10 high bandwidth connections OR connections to the COH/OC network signals outside of the EDGE Network Evaluate the cost-effectiveness of utilizing the Sandwich Isles Communications, Inc. fiber-optic network Reassess telecommunications Recommendations periodically.	Migrate the signals and CCTV from the EDGE Network to the fiber Network Option 1: Create a ring of fiber network around the greater Hilo area Option 2: Use existing fiber (owned by others) Reassess telecommunications recommendations periodically.	Option 1: Extend Traffic Division-owned fiber to all signals to create an islandwide. Traffic Division-owned Communications network [assume a 500-mile deployment]. Option 2: Use existing fiber (owned by others) Reassess telecommunications recommendations periodically.
2. Back-up Communications	Use COH/OC fiber at key locations in Hilo and Kona Use COH/OC fiber at key locations in Keeau and Pahoa	As migration to fiber continues, retain EDGE Network communications at key locations	Complete migration to fiber network to create an islandwide redundant Communications network Retain EDGE Network links at key locations.

Arterial Traffic Management and Operations			
3. Traffic Signal Systems	Begin to connect traffic signals to the TCC. Continue to work with private landowners to provide appropriate communications and camera assets Implement new traffic signals as MUTCD warrants are satisfied	Continue to connect traffic signals to the TCC Continue to work with private landowners Implement new traffic signals as MUTCD warrants are satisfied	
4. Traffic Signal Detection	Test and review new, lower cost, field technologies for traffic detection Update detection at 10 intersections to provide additional functionally and improved response to traffic conditions	Update detection at 20 intersections	Update remainder of required intersections (estimate 20 locations)
5. Traffic Signal Optimization	Assess signal timing every two years Implement updated traffic signal timing plans as needed	Assess signal timing every two years Implement updated traffic signal timing plans as needed	
6. Traffic Control Center	Convert existing space at the East Hawaii Traffic Facility to a TCC	Begin discussions with partner agencies regarding the potential to share video images and DMS control Begin planning and design for future TCC space Implement shared control, if desired	Construct new TCC
7. CCTV Expansion	Add 30 CCTV cameras	Add 20 CCTV cameras	Expand CCTV camera coverage (estimate 20 locations)

Traveler Information			
8. Website	Design and build a Web Portal featuring snapshot images and streaming video from CCTV Potentially add the ability for posting travel advisories Begin discussions within the COH and relevant State agencies to expand functions of the website Begin process to secure advertising revenues from non-COH entities that will be used for O&M of the Web Portal Consider coordinating with HDOT regarding the statewide ATIS web portal	Provide additional functionality, as determined, based on partnering with other County and State agencies Implement revenue generating applications to support ongoing O&M of the Web Portal	Operate and maintain Expand the Web Portal functionality, as needed
9. Video Management and Distribution System	Design and build a video management system to support existing and planned CCTV video feeds	Expand to support additional 20 CCTV deployed in the mid-term Provide video distribution capabilities	Operate and maintain Expand the video management system, as needed
10. Phone System	Develop a cross-departmental approach to implementing an automated phone system that provides construction advisories, emergency and other traveler-related information Consider partnering with HDOT in their IVR system	Develop an automated phone system that provides traveler related information Allow for emergency information through floodgate messages Potentially provide IVR for three languages	Operate and maintain Expand the system, as needed
11. DMS Expansion	Purchase 10 portable DMS and place at key decision points Monitor public response and use	Review DMS usage and identify permanent DMS locations Begin planning, design, and public outreach for permanent DMS	Construct permanent DMS Continue to use portable DMS at other locations and monitor public response and use

Operations and Maintenance		
12. Training	Develop and implement training program; begins in Year 1	
13. Equipment Replacement	Establish and implement equipment replacement program; begins in Year 1	
14. Communications fees and maintenance	Annual maintenance fees for communications network; begins in Year 1	
15. Web Portal fees and maintenance	Annual costs to host, operate and maintain and update Web Portal; begins in Year 2	
16. Video management and distribution	Annual costs for video management and distribution license and software; begins in Year 2	
17. Phone maintenance and toll charges	No charges in Years 1-5.	Annual costs for IVR hosting and maintenance (e.g., ASP model 3rd party service provider)

Table 7.2: Rough, Order-of-Magnitude Cost Estimates (Year 2008 Dollars)

	Short-Term (0-2 Years)	Mid-Term (3-5 Years)	Long-Term (5+ Years)*
Telecommunications			
1. Telecommunications OPTION 1: Traffic Division Owned Fiber (Islandwide network) OPTION 2: Use existing fiber (owned by others)	OPTION 1: $200,000 OPTION 2: $200,000	OPTION 1: $5,000,000 OPTION 2: $300,000	OPTION 1: $50,000,000 OPTION 2: $1,000,000
2. Back-up Communications	$100,000	$100,000	$100,000
Subtotal	**OPTION 1: $300,000** **OPTION 2: $300,000**	**OPTION 1: $5,100,000** **OPTION 2: $400,000**	**OPTION 1: $50,100,000** **OPTION 2: $1,100,000**
Arterial Traffic Management and Operations			
3. Traffic Signal Systems ($500,000 per location)	Funded by others		
4. Traffic Signal Detection ($15,000 per location)	$150,000	$300,000	$300,000
5. Traffic Signal Optimization ($50,000 every two years, starting in Year 3)	$0	$100,000	$150,000
6. Traffic Control Center (cost for equipment and systems; does not construction costs)	$200,000	$300,000	$0
7. CCTV Expansion ($5,000 per location)	$150,000	$100,000	$100,000
Subtotal	**$500,000**	**$800,000**	**$550,000**
Traveler Information			
8. Website	$125,000	$50,000	$150,000
9. Video Management and Distribution System	$35,000	$10,000	$20,000
10. Phone System	$0	$175,000	$0
Subtotal	**$410,000**	**$235,000**	**$1,220,000**
Operations and Maintenance			
12. Training ($15,000 annually)	$30,000	$45,000	$75,000
13. Equipment Replacement ($100,000 per year, starting in Year 3)	$0	$300,000	$500,000
14. Communications maintenance and fees	$12,000	$30,000	$30,000
15. Web Portal maintenance and hosting fees (Max of $100,000 per year, starting in Year 3)	$0	$300,000	$500,000
16. Video management and distribution license and software (annual cost is $2,500 with 34 CCTVs; $5,500 with 54 CCTVs; starts in Year 2)	$2,500	$16,500	$27,500
17. Phone maintenance and toll charges (up to $200,000 per year, starting in Year 6)	$0	$0	$1,000,000
Subtotal	**$44,500**	**$691,500**	**$2,132,500**
TOTAL (w/OPTION 1: Traffic Division-Owned Fiber)	**$1,454,500**	**$7,126,500**	**$54,002,500**
TOTAL (w/OPTION 2: Fiber owned by Others)	**$1,328,750**	**$2,126,500**	**$4,002,500**

*For recurring costs, the cost estimate for the long-term are provided for 5 years.

8. Staffing

With the addition of technologies and systems that are new to the Division, additional staff will be needed, and current staff will need to enhance and continually update their current skill sets. Staff training was addressed previously; this chapter addresses the numbers of staff that will be needed to maintain and operate the new systems proposed in this plan.

As noted in the baseline assessment, current staff levels are adequate to support the short-term implementation plan. However, as additional devices and systems are deployed, more staff will be required. The most significant new devices and systems proposed in this plan are CCTV cameras, communications networks, the traveler information web site, and DMS. Each of these presents maintenance and operations needs.

8.1 CCTV Cameras

Field maintenance of cameras involves preventative visits one to two times per year to check connections and clean lenses. Camera change-out for repair or replacement will become part of the maintenance functions. In addition, the field electronics that support image transmission will become added to maintenance functions.

Operation of cameras is on an as-needed basis, as they are used to monitor signal operations, check on reports of problems, and to check and monitor emergency operations. These functions will be added to the existing operations staff's work.

8.2 Communications Networks

This plan proposes that at least some portion of the communications network be DPW-owned fiber optic cable. These networks require field and office devices to support transmission. Maintenance involves checking connections and cleaning the devices twice a year. Change-out for repair or replacement will become part of the maintenance work load as well. The field equipment has a life of five years. Depending on the skills of the maintenance staff, terminating fiber optic cable as the system is expanded may also be part of the maintenance work load. Maintenance also involves maintaining an inventory of the network, and using trouble-shooting software as needed to diagnose problems. Operations staff will need to understand how to bring down and restart the network, if problems occur.

8.3 Traveler Information Web Site

Staff will be responsible for ensuring that camera and data feeds to the web site are operating continuously. As the functions of the web site are expanded, staff may be responsible for inputting messages to the system to warn drivers of specific incidents, events, emergencies or other traveler advisories. If the system is operated and maintained by a vendor, there will be no additional operations or maintenance needs. If done in-house, staff will need to monitor the ATIS servers, occasionally update the server systems and software, and ensure security of the ATIS system.

8.4 Dynamic Message Signs
Portable and permanent DMS require annual maintenance including cleaning and checking connections, and running diagnostics to determine if the display modules are healthy. Some parts replacements can be anticipated annually (particularily after a few years in service) to ensure optimal function. Staff will need to remove and replace signs that have major malfunctions or have reached the end of their useful life. Normally, service life for portable DMS is five years, and ten years for permanent DMS.

Operation of DMS will involve staff posting messages, and programming messages for posting at specific dates and times, and ensuring that messages that are posted meet established standards and policies, including FHWA standards.

8.5 Staffing Summary
Some guidance for estimating the maintenance staff needs of ITS devices has been provided by the FHWA. They recommend that one staff person per 50 devices is required for maintenance. This guidance does not cover telecommunications networks or ATIS systems. Nor does it address operations. It is anticipated that two maintenance staff will need to be added in the mid-term with skills in electronics and communications networks operations and maintenance. In addition, one office staff person familiar with electronics, communications networks, and traffic operations will also be required.

Appendix B: Traveler Information

Purpose
The County of Hawaii (COH) desires a method to provide residents and tourists a centralized location that provides real-time traveler information for the Big Island. Information may include: current traffic conditions, emergency messages, CCTV video feeds, planned construction and special events. Users can access information either through a website or a toll free dial in phone number.

Current Status
The Department of Public Works (DPW) maintains system that allows users to dial a number and obtain local information. The information is contained in a pre-recorded message and provides details on topics from volcanoes to recycling. There are 4 lines maintained for people to dial in and each line contains a different message. The current system capacity is approximately 90 calls per hour however the DPW states they average approximately 5 calls per week. The DPW uses local staff to record all messages for the system.

The COH also operates a web site (http://www.hawaii-county.com/contents.htm) that serves as a portal to links for several types of data. Users can access information on topics including employment opportunities, county services, bus schedules and project updates. No real time travel information is available on the site. There is a project in development to update the look and feel of the website with a new title of "Here and Now".

Stakeholders & Information Sources
- o Civil Defense Agency
- o Police Departments
- o Fire Departments
- o Department of Public Works
- o Hawaii DOT
- o FHWA
- o Tourism Industry (Public & Private)
- o Media
- o Other

Most of the agencies above play some role in managing the traveler network throughout the island while the others directly provide information to the local and visiting population. During their day-to-day operations, a few of the agencies share resources of various types (coordination, response, funding). However, to support a successful ATIS/511 system there needs to be a commitment from team members to share resources and data. The development of strong agency partnerships is crucial to meeting the goal of creating an information delivery system that will provide users multiple access points of easy to understand traveler information

APPENDIX C

NATIONAL
INCIDENT
MANAGEMENT
SYSTEM

APPENDIX C

NATIONAL INCIDENT MANAGEMENT SYSTEM

March 1, 2004

A comprehensive national approach to incident management, applicable at all jurisdictional levels and across functional disciplines, would further improve the effectiveness of emergency response providers[1] and incident management organizations across a full spectrum of potential incidents and hazard scenarios. Such an approach would also improve coordination and cooperation between public and private entities in a variety of domestic incident management activities. For purposes of this document, incidents can include acts of terrorism, wildland and urban fires, floods, hazardous materials spills, nuclear accidents, aircraft accidents, earthquakes, hurricanes, tornadoes, typhoons, war-related disasters, etc.

To provide for interoperability and compatibility among Federal, State, and local capabilities, the NIMS will include a core set of concepts, principles, terminology, and technologies covering the incident command system; multiagency coordination systems; unified command; training; identification and management of resources (including systems for classifying types of resources); qualifications and certification; and the collection, tracking, and reporting of incident information and incident resources.

While most incidents are generally handled on a daily basis by a single jurisdiction at the local level, there are important instances in which successful domestic incident management operations depend on the involvement of multiple jurisdictions, functional agencies, and emergency responder disciplines. These instances require effective and efficient coordination across this broad spectrum of organizations and activities. The NIMS uses a systems approach to integrate the best of existing processes and methods into a unified national framework for incident management. This framework forms the basis for interoperability and compatibility that will, in turn, enable a diverse set of public and private organizations to conduct well-integrated and effective incident management operations.

B. CONCEPTS AND PRINCIPLES.

1. Flexibility.

The NIMS provides a consistent, flexible, and adjustable national framework within which government and private entities at all levels can work together to manage domestic incidents, regardless of their cause, size, location, or complexity. This flexibility applies across all phases of incident management: prevention, preparedness, response, recovery, and mitigation.

2. Standardization.

The NIMS provides a set of standardized organizational structures—such as the Incident Command System (ICS), multiagency coordination systems, and public information systems.

C. OVERVIEW.

1. NIMS Components.

a. Command and Management.

NIMS standard incident command structures are based on three key organizational systems:

(1) The ICS.

The ICS defines the operating characteristics, interactive management components, and structure of incident management and emergency response organizations engaged throughout the life cycle of an incident;

(2) Multiagency Coordination Systems.

These define the operating characteristics, interactive management components, and organizational structure of supporting incident management entities engaged at the Federal, State, local, tribal, and regional levels through mutual-aid agreements and other assistance arrangements; and

(3) Public Information Systems.

These refer to processes, procedures, and systems for communicating timely and accurate information to the public during crisis or emergency situations.

d. Communications and Information Management.

The NIMS identifies the requirement for a standardized framework for communications, information management (collection, analysis, and dissemination), and information-sharing at all levels of incident management. These elements are briefly described as follows:

(1) Incident Management Communications.

Incident management organizations must ensure that effective, interoperable communications processes, procedures, and systems exist to support a wide variety of incident management activities across agencies and jurisdictions.

(2) Information Management.

Information management processes, procedures, and systems help ensure that information, including communications and data, flows efficiently through a commonly accepted architecture supporting numerous agencies and jurisdictions responsible for managing or directing domestic incidents, those impacted by the incident, and those contributing resources to the incident management effort. Effective information management enhances incident management and response and helps insure that crisis decisionmaking is better informed.

COMMAND AND MANAGEMENT

This chapter describes the systems used to facilitate domestic incident command and management operations, including the ICS, multiagency coordination systems, and the Joint Information System (JIS). Additional details on incident command and management are contained in Appendix A.

A. INCIDENT COMMAND SYSTEM.

The ICS is a management system designed to enable effective and efficient domestic incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, designed to enable effective and efficient domestic incident management. A basic premise of ICS is that it is widely applicable. It is used to organize both near-term and long-term field-level operations for a broad spectrum of emergencies, from small to complex incidents, both natural and manmade. ICS is used by all levels of government—Federal, State, local, and tribal—as well as by many private-sector and nongovernmental organizations. ICS is also applicable across disciplines. It is normally structured to facilitate activities in five major functional areas: command, operations, planning, logistics, and finance and administration.

1. Concepts and Principles.

a. Most Incidents Are Managed Locally.

The initial response to most domestic incidents is typically handled by local "911" dispatch centers, emergency responders within a single jurisdiction, and direct supporters of emergency responders. Most responses need go no further. In other instances, incidents that begin with a single response discipline within a single jurisdiction may rapidly expand to multidiscipline, multijurisdictional incidents requiring significant additional resources and operational support. Whether for incidents in which additional resources are required or are provided from different organizations within a single jurisdiction or outside the jurisdiction, or for complex incidents with national-level implications (such as an emerging infectious disease or a bioterror attack), the ICS provides a flexible core mechanism for coordinated and collaborative incident management.

b. The NIMS Requires That Field Command and Management Functions Be Performed in Accordance with a Standard Set of ICS Organizations, Doctrine, and Procedures.

However, Incident Commanders generally retain the flexibility to modify procedures or organizational structure to align as necessary with the operating characteristics of their specific jurisdictions or to accomplish the mission in the context of a particular hazard scenario.

c. ICS Is Modular and Scalable.

ICS is designed to have the following operating characteristics; it should be
- suitable for operations within a single jurisdiction or single agency, a single jurisdiction with multiagency involvement, or multiple jurisdictions with
- multiagency involvement;
- applicable and acceptable to users throughout the country;
- readily adaptable to new technology;
- adaptable to any emergency or incident to which domestic incident
- management agencies would be expected to respond; and
- have a scalable organizational structure that is based on the size and complexity of the incident.

h. Integrated Communications.

Incident communications are facilitated through the development and use of a common communications plan and interoperable communications processes and architectures. This integrated approach links the operational and support units of the various agencies involved and is necessary to maintain communications connectivity and discipline and enable common situational awareness and interaction.

B. MULTIAGENCY COORDINATION SYSTEMS.

1. Definition.

A multiagency coordination system is a combination of facilities, equipment, personnel, procedures, and communications integrated into a common system with responsibility for coordinating and supporting domestic incident management activities. The primary functions of multiagency coordination systems are to support incident management policies and priorities, facilitate logistics support and resource tracking, inform resource allocation decisions using incident management priorities, coordinate incident related information, and coordinate interagency and intergovernmental issues regarding incident management policies, priorities, and strategies. Direct tactical and operational responsibility for conducting incident management activities rests with the Incident Command.

2. System Elements.

Multiagency coordination systems may contain EOCs and (in certain multijurisdictional or complex incident management situations) multiagency coordinating entities:

a. Emergency Operations Center.

For purposes of this document, EOCs represent the physical location at which the coordination of information and resources to support incident management activities normally takes place. The Incident Command Post (ICP) located at or in the immediate vicinity of an incident site, although primarily focused on the tactical on-scene response, may perform an EOC-like function in smaller-scale incidents or during the initial phase of the response to larger, more complex events. Standing EOCs, or those activated to support larger, more complex events, are typically established in a more central or permanently established facility; at a higher level of organization within a jurisdiction. EOCs are organized by major functional discipline (fire, law enforcement, medical services, and so on); by jurisdiction (city, county, region, and so on); or, more likely, by some combination thereof.

EOCs may be permanent organizations and facilities or may be established to meet temporary, short-term needs. The physical size, staffing, and equipping of an EOC will depend on the size of the jurisdiction, resources available, and anticipated incident management workload. EOCs may be organized and staffed in a variety of ways. Regardless of the specific organizational structure used, EOCs should include the following core functions: coordination; communications; resource dispatch and tracking; and information collection, analysis, and dissemination. EOCs may also support multiagency coordination and joint information activities as discussed below.

On activation of a local EOC, communications and coordination must be established between the IC or UC and the EOC, when they are not collocated. ICS field organizations must also establish communications with the activated local EOC, either directly or through their parent organizations. Additionally, EOCs at all levels of government and across functional agencies must be capable of communicating appropriately with other EOCs during incidents, including those maintained by private organizations.

b. Multiagency Coordination Entities.

When incidents cross disciplinary or jurisdictional boundaries or involve complex incident management scenarios, a multiagency coordination entity, such as an emergency management agency, may be used to facilitate incident management and policy coordination. The situation at hand and the needs of the jurisdictions involved will dictate how these multiagency coordination entities conduct their business, as well as how they are structured. Multiagency coordination entities typically consist of principals (or their designees) from organizations and agencies with direct incident management responsibility or with significant incident management support or resource responsibilities.

In some instances, EOCs may serve a dual function as a multiagency coordination entity.

C. PUBLIC INFORMATION SYSTEMS.

Systems and protocols for communicating timely and accurate information to the public are critical during crisis or emergency situations. This section describes the principles, system components, and procedures needed to support effective emergency public information operations.

1. Public Information Principles.

a. The PIO Supports the Incident Command.

Under the ICS, the Public Information Officer (PIO) is a key staff member supporting the incident command structure. The PIO represents and advises the Incident Command on all public information matters relating to the management of the incident. The PIO handles media and public inquiries, emergency public information and warnings, rumor monitoring and response, media monitoring, and other functions required to coordinate, clear with appropriate authorities, and disseminate accurate and timely information related to the incident, particularly regarding information on public health and safety and protection. The PIO is also responsible for coordinating public information…..with links to the Joint Information Center (JIC).

b. Public Information Functions Must Be Coordinated and Integrated Across Jurisdictions and Across Functional Agencies; Among Federal, State, Local, and Tribal Partners; and with Private-Sector And Nongovernmental Organizations.

During emergencies, the public may receive information from a variety of sources. The JIC provides a location for organizations participating in the management of an incident to work together to ensure that timely, accurate, easy-to-understand, and consistent information is disseminated to the public. The JIC comprises representatives from each organization involved in the management of an incident.

Public awareness functions must also be coordinated with the information- and operational-security matters that are the responsibility of the information and intelligence function of the ICS, particularly when public awareness activities may affect information or operations security.

c. Organizations Participating in Incident Management Retain Their Independence.

ICs and multiagency coordination entities are responsible for establishing and overseeing JICs including processes for coordinating and clearing public communications. In the case of UC, the departments, agencies, organizations, or jurisdictions that contribute to joint public information management do not lose their individual identities or responsibility for their own programs or policies. Rather, each entity contributes to the overall unified message.

2. System Description and Components.

a. Joint Information System.

The JIS provides an organized, integrated, and coordinated mechanism to ensure the delivery of understandable, timely, accurate, and consistent information to the public in a crisis. It includes the plans, protocols, and structures used to provide information to the public during incident operations, and encompasses all public information operations related to an incident, including all Federal, State, local, tribal and private organization PIOs, staff, and JICs established to support an incident. Key elements include the following:

- interagency coordination and integration;
- developing and delivering coordinated messages;
- support for decision-makers; and
- flexibility, modularity, and adaptability.

b. Joint Information Center.

A JIC is a physical location where public affairs professionals from rganizations involved in incident management activities can collocate to perform critical emergency information, crisis communications, and public affairs functions. It is important for the JIC to have the most current and accurate information regarding incident management activities at all times. The JIC provides the organizational structure for coordinating and disseminating official information. JICs may be established at each level of incident management, as required. Note the following:

- The JIC must include representatives of each jurisdiction, agency, private sector, and nongovernmental organization involved in incident management activities.
- A single JIC location is preferable, but the system should be flexible and adaptable enough to accommodate multiple JIC locations when the circumstances of an incident require. Multiple JICs may be needed for a complex incident spanning a wide geographic area or multiple jurisdictions.
- Each JIC must have procedures and protocols to communicate and coordinate effectively with other JICs, as well as with other appropriate components of the ICS organization.

COMMUNICATIONS AND INFORMATION MANAGEMENT

Effective communications, information management, and information and intelligence sharing are critical aspects of domestic incident management. Establishing and maintaining a common operating picture and ensuring accessibility and interoperability are principal goals of communications and information management. A common operating picture and systems interoperability provide the framework necessary to
- formulate and disseminate indications and warnings;
- formulate, execute, and communicate operational decisions at an incident site, as well as between incident management entities across jurisdictions and functional agencies;
- prepare for potential requirements and requests supporting incident management activities; and
- develop and maintain overall awareness and understanding of an incident within and across jurisdictions.

Prior to an incident, entities responsible for taking appropriate preincident actions use communications and information management processes and systems to inform and guide various critical activities. These actions include mobilization or predeployment of resources, as well as strategic planning by preparedness organizations, multiagency coordination entities, agency executives, jurisdictional authorities, and EOC personnel. During an incident, incident management personnel use communications and information processes and systems to inform the formulation, coordination, and execution of operational decisions and requests for assistance.

A. CONCEPTS AND PRINCIPLES.

1. A Common Operating Picture Accessible Across Jurisdictions and Functional Agencies.

A common operating picture allows incident managers at all levels to make effective, consistent, and timely decisions. Integrated systems for communication, information management, and intelligence and information sharing allow data to be continuously updated during an incident, providing a common framework that covers the incident's life cycle across jurisdictions and disciplines. A common operating picture helps ensure consistency at all levels of incident management across jurisdictions, as well as between various governmental jurisdictions and private-sector and nongovernmental entities that are engaged.

2. Common Communications and Data Standards.

Common communications and data standards and related testing and compliance mechanisms are fundamental to an effective NIMS. Communications interoperability in the context of incident management is also critical. Effective communications outside the incident structure—between other levels of government and between government and private entities—for resources and other support is also enhanced by adherence to such standards. Although much progress has been made in these areas, much more work remains to be done. Additional progress toward common communications and data standards and systems interoperability will be accomplished over time through a sustained collaborative effort facilitated by the NIMS Integration Center.

B. MANAGING COMMUNICATIONS AND INFORMATION.

NIMS communications and information systems enable the essential functions needed to provide a common operating picture and interoperability for incident management at all levels in two ways:

1. Incident Management Communications.

Preparedness organizations must ensure that effective communications processes and systems exist to support a complete spectrum of incident management activities. The following principles apply:

a. Individual Jurisdictions.

These will be required to comply with national interoperable communications standards, once such standards are developed. Standards appropriate for NIMS users will be designated by the NIMS Integration Center in partnership with recognized standards development organizations (SDOs).

b. Incident Communications.

These will follow the standards called for under the ICS. The IC manages communications at an incident, using a common communications plan and an incident-based communications center established solely for use by the command, tactical, and support resources assigned to the incident. All entities involved in managing the incident will utilize common terminology, prescribed by the NIMS, for communications.

2. Information Management.

The NIMS Integration Center is charged with facilitating the definition and maintenance of the information framework required to guide the development of NIMS-related information systems. This framework consists of documented policies and interoperability standards.

NIMS APPENDIX A

THE INCIDENT COMMAND SYSTEM

The Incident Command System (ICS) is the combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, designed to aid in domestic incident management activities. It is used for a broad spectrum of emergencies, from small to complex incidents, both natural and manmade, including acts of catastrophic terrorism. ICS is used by all levels of government—Federal, State, local, and tribal, as well as by many private-sector and nongovernmental organizations. ICS is usually organized around five major functional areas: command, operations, planning, logistics, and finance and administration. A sixth functional area, Intelligence, may be established if deemed necessary by the Incident Commander, depending on the requirements of the situation at hand.

Some of the more important "transitional steps" that are necessary to apply ICS in a field incident environment include the following:
- • recognizing and anticipating the requirement that organizational elements will be
- activated and taking the necessary steps to delegate authority as appropriate;
- • establishing incident facilities as needed, strategically located, to support field
- operations;
- • establishing the use of common terminology for organizational functional elements,
- position titles, facilities, and resources; and
- • rapidly evolving from providing oral direction to the development of a written
- Incident Action Plan.

APPENDIX D

TRANSPORTATION
FACILITIES

Honoapiilani Highway

Honoapiilani Highway is a belt roadway that follows the general alignment of the shoreline for most of its route. Honoapiilani Highway (Route 30) is a State Highway, beginning at Main Street in Wailuku, continuing for 41.65 miles and ending at the narrow, winding, single-lane county portion of Kahekili Highway, which services Kahakuloa local traffic. The county road eventually connects to the State portion of Kahekili Highway (Route 340), which continues for 4.29 miles until it connects to Waiehu Beach Road and Market Street.
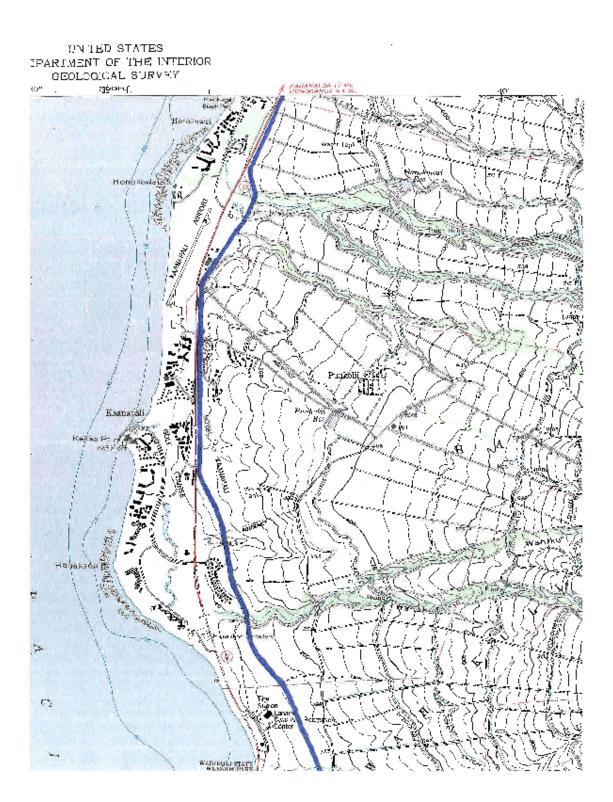
Honoapiilani Highway is the only route between Central Maui and Olowalu along the mountainous terrain known as the Pali,. Honoapiilani Highway in this area is a 12-foot wide lane in each direction, with no passing lanes and with limited opportunities for turn-arounds.
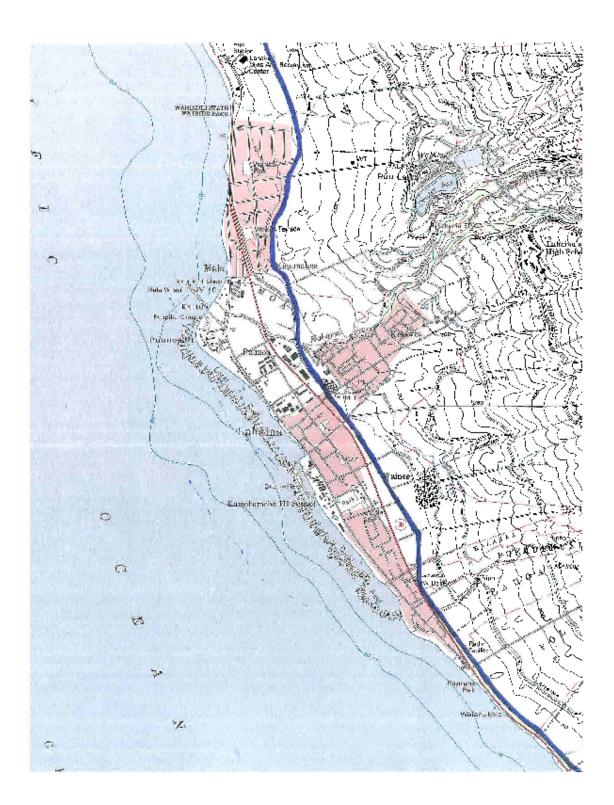
Between Olowalu and Kaanapali, Honoapiilani Highway adjoins many cane haul roads that access and service the sugar plantation lands mauka of the highway. These roads could be used as emergency bypass routes to circumvent the highway closures within this segment of Honoapiilani Highway.
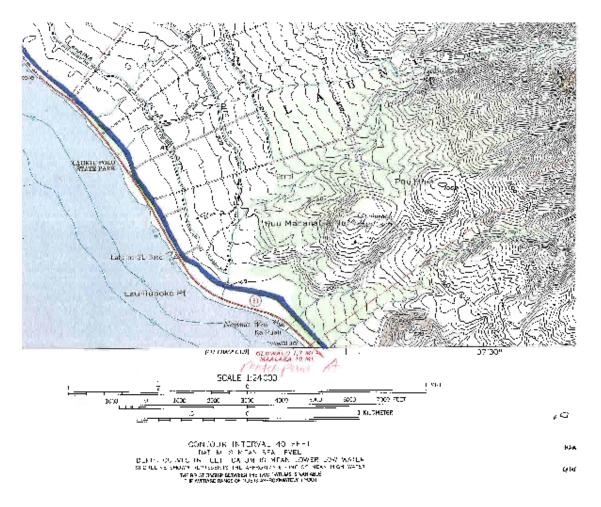
Honoapiilani Highway in the Lahaina area and in the area between Kaanapali and Kapalua connects to various parallel county roads such as Front Street and Lower Honoapiilani. These county roads would serve as alternate or bypass routes in these areas. Traffic volumes in these areas are higher than in other segments of Honoapiilani Highway, due to the local traffic circulation routes.

Honoapiilani Highway between Kapalua and Kahakuloa is used mainly by local traffic, with significantly lower traffic volumes.
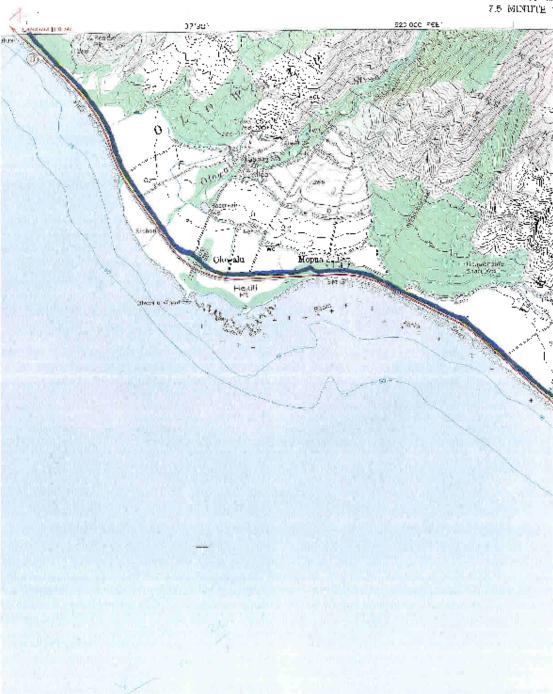
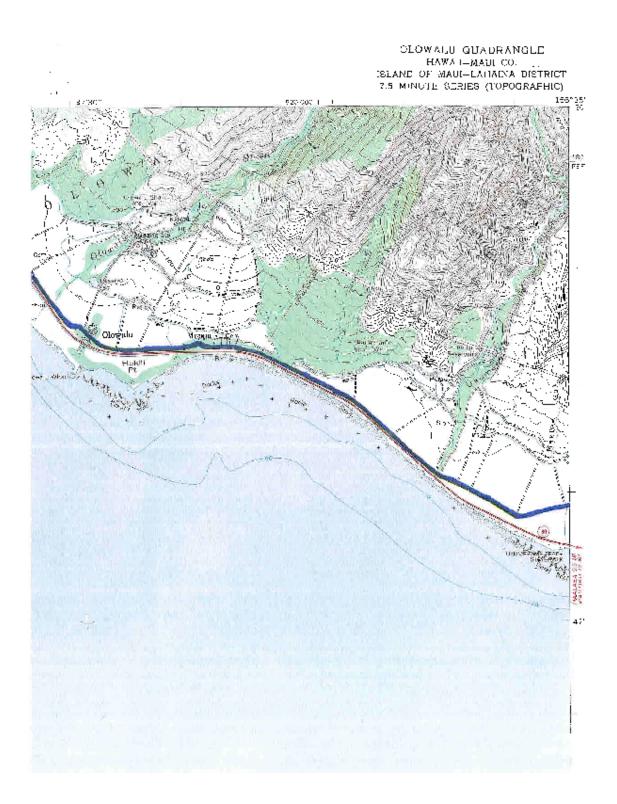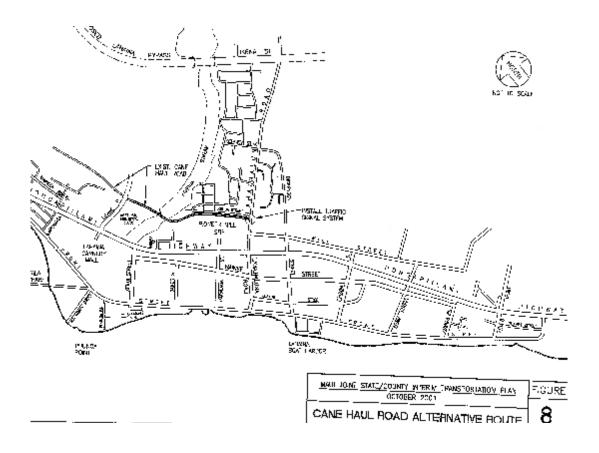## Bypasses – Cane Haul and County Roads

SCALE 1:24000

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Maui Joint State/County Interim Transportation Plan
October 2001

CANE HAUL ROAD ALTERNATIVE ROUTE

FIGURE 8

Kahekili Highway Connection

A winding, single-lane country road connects Honoapiilani Highway and Kahekili Highway. This road, which is not up to current standards, has been used for traffic out of West Maui during emergencies. Because the road is a one-lane roadway, this roadway is restricted to use as an egress route during these emergency operations.

MARINE TRANSPORTATION

Kahului Commercial Harbor

Maui is served by one deep-draft commercial harbor located in Kahului. Kahului Commercial Harbor is the island's major commercial, industrial and transportation center. It is also the busiest neighbor island port and the only commercial harbor that provides seaborne cargo transit to and from Maui. Kahului Harbor is located on the north shore of the isthmus connecting East and West Maui and is centrally positioned in Kahului Bay. The bay is bordered to the south and east by Maui's principal towns of Kahului and Wailuku.

Kahului Commercial Harbor is one of nine, State-managed, commercial harbors in Hawaii. It is located along the northern slope or the windward side of Maui and is the island's only commercial harbor. The State Department of Transportation Harbors Division's jurisdiction over commercial harbor facilities is primarily directed at the movement of cargo, passenger, and fishing vessels entering, leaving or traveling within Hawaii, and the facilities and supporting services for loading, off-loading and handling of these vessels, their cargo and passengers.

Kahului Commercial Harbor is a manmade port, dredged from naturally formed Kahului Bay. The harbor basin is 2,050 feet wide by 2,400 feet long with a project depth of 35 feet. The entrance channel is 660 feet wide and 40 feet deep. There are three piers in Kahului Commercial Harbor.
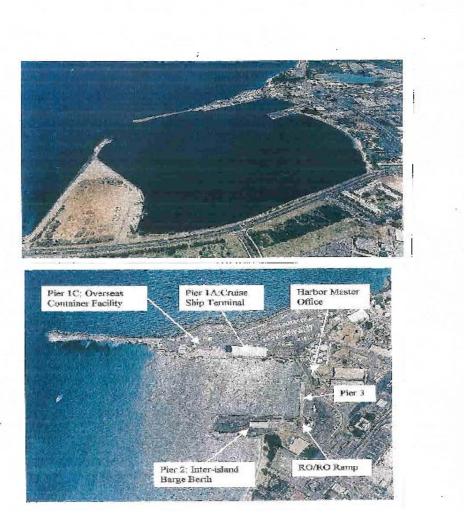
Kahului Commercial Harbor's Pier 1 is utilized by:

1. Matson's overseas container operations.
2. Norwegian Cruise Lines' domestic cruise ship operations and various foreign cruise ship operations.
3. Maui Electric Company's coal ship.
4. Maui Land & Pineapple Company's tin plate ship.
5. Kahului Trucking & Storage's sugar/molasses ship.

Pier 2 is utilized by:

1. Young Brothers' inter-island barge cargo operations.
2. Horizon Lines' overseas container shipments.
3. The Gas Company's liquid bulk cargo shipments.
4. The Hawaii Superferry' passenger and vehicle operations.

Pier 3 services:
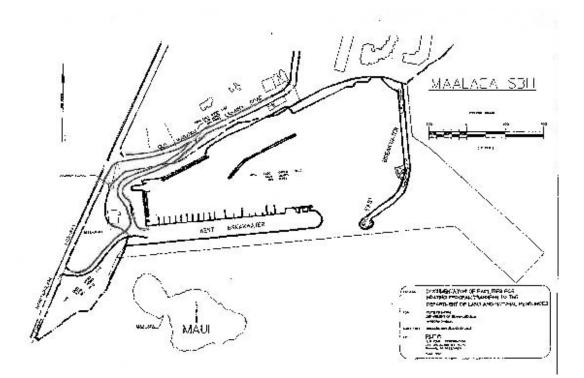
1. The liquid bulk cargo operations of Tesoro, Chevron and the Maui Electric Company.
2. The dry bulk cargo operations of Hawaiian Cement and Ameron Hawaii.

Ma'alaea Small Boat Harbor

Ma'alaea Small Boat Harbor is located on the west coast of Maui, approximately 7 miles south of Kahului, 16 miles southeast of Lahaina and 9.5 miles north of Molokini Island. The harbor is protected by breakwaters and marked by a lighted range and buoys within the harbor. Depths in the harbor are about 7 feet at best, but because of the construction adjacent to the harbor, some silting/shoating problems are occurring. A pair of buoys mark the channel into the harbor, with range marks behind the entrance. The berths and moorings are permanently assigned. There are no anchorage areas. The harbor includes: 89 berths/moorings; 1 ramp; loading dock; drydock; fuel delivered by truck; vessel washdown; restrooms and shower; restaurant and boat club; U.S. Coast Guard Station; and the harbor office.

Ma'alaea Small Boat Harbor is under the State of Hawaii Department of Land & Natural Resources Division of Boating & Ocean Resources. This harbor services recreational and commercial boaters. Ma'alaea Small Boat Harbor covers approximately 29.51 acres. Ma'alaea Small Boat Harbor is being improved to accommodate the ferry service between Maui and Lanai, *Expeditions*.

Lahaina Small Boat Harbor

The Lahaina Small Boat Harbor is located on the northwestern coast of Maui in Lahaina town, 23 miles northeast of Cape Hanamanioa and 22 road miles from Wailuku. The Lahaina Small Boat Harbor covers approximately 11.556 acres. The harbor's access channel opens to the southwest. The Lahaina Small Boat Harbor includes 16 berths; 83 moorings; loading docks; fuel facility, restrooms; and the harbor office.

The Lahaina Small Boat Harbor is under the jurisdiction of the State of Hawaii Department of Land & Natural Resources (DLNR) Division of Boating & Ocean Resources.

DLNR is building a new pier to provide a dedicated facility for the existing inter-island ferries that serve the residents of Maui, Moloka'i and Lana'i. This new pier will serve the Lahaina-Kaunakakai commuter ferry service and the Lahaina-Manele ferry service to Lana'i. The new pier will be approximately 60 feet to the north of the existing pier, approximately 115 feet long and 35 feet wide, and constructed as pier-on-piles. A low-rise, open-sided structure on the deck of the new pier will provide shade and shelter for pier users. The Lahaina Small Boat Harbor Ferry Pier Project includes:

- dredging to widen the entrance channel to Lahaina Small Boat Harbor;
- development of a berthing area to the north of the new pier;
- construction of two sewage pump-out stations;
- construction of a concrete pedestrian walkway measuring 16 feet by 60 feet to connect the existing pier with the new pier structure; replacement of the existing - administration office and ferry ticket booth;
- construction of passenger loading and drop off area;
- relocation and expansion of on-site parking stalls;
- construction of sidewalk expansion along the northwestern portion of Hotel Street;
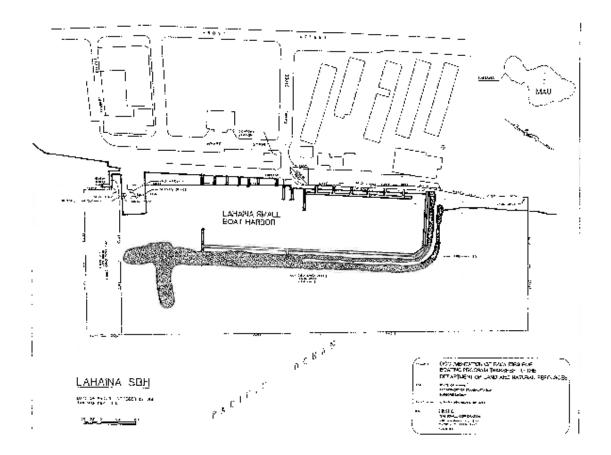- resurfacing of a portion of Wharf Street.

This project is supported by the U.S. Department of Transportation, Federal Transit Administration and the State of Hawai'i, Department of Transportation.

Commercial Vessel Information					
Permittee Name	**Vessel Name**	**Vessel Size**	**Vessel Cap.**	**Berth No.**	**People Loading/ Unloading No. of Times[1]**
Alihilani Yacht Chtrs, Inc.	Paragon	47	24		1
Big Blue Boat Corp.	Napali Explorer	51	44	11	1
C. Chase Sailing Co., Inc.	Man-O-War	28	29	63	2
C.R. Rose Consultants, Ltd.	Kaiakua	31	6	14	
Finest Kind, Inc.	Finest Kind	37	6	7	
Hinatea, Inc.	Hinatea	41	6	27	
Hone Heke Corp.	Lanai Ferry Expedition IV	65	130		6
Hood Marine, Ltd.	Express	45	49	13	2
Hudson, David	Exact	31	6		
Iconoclast, Ltd.	Great White	28	25		1
Islander Industries, Inc.	Atlantis IX	50	48	18	
Kahili Charters, Inc.	Expeditions (Lanai Ferry)	38	36		
Kamehameha Sails, inc.	Kamehameha	36	6	67	
Kanoa Charters, Inc.	Kanoa	30	6	51	
Kaulana of Maui, Inc.	Kaulana	65	149		2
Kolea Chrtrs of Lahaina, Inc.	Reef Dancer (Semi-sub)	56.5	35	6	
Lahaina Charter Boats, Inc.	Judy Ann II	43	13	8	
Lahaina Divers, Inc.	Dauntless	46	49	22/23	
Lahaina Divers, Inc.	Dominion	46	49	24	
Lahaina Maritime, Inc.	Start Me Up La-Dat	42	6		
Lahaina Water Taxi Service	Holokai	55	70	19	
Lin Wa Cruises, Inc.	Lahaina Princess	65	149	3	1
Linnline Marine, Inc.	Wahine Ra	45	6	15	
Luakini Marine, Inc.	Wiki Wahine	30	24	17	
Luckey Strike Chtrs., Inc.	Luckey Strike II	50	27	50	
Mareva, Inc.	Start Me Up Again	42	6	12	
Maui Navigation	Trilogy III	50	49	97	1
Michelle Marine, Ltd.	Atlantis IX (TS-9)	65	48	5	
Moore, Carol	America II	65	24		1
P.S. I Love You, Inc.	Reel Hooker	35	6		
Pardner, Inc.	Expeditions 2 Lanai Ferry	50	64	21	
Ranger Boat Charters, Inc.	Start Me Up Too	42	6	88	
Rose Marine, Inc.	No Problem	35	6	9	

Commercial Vessel Information					
Permittee Name	**Vessel Name**	**Vessel Size**	**Vessel Cap.**	**Berth No.**	**People Loading/ Unloading No. of Times[1]**
Rose Marine, Inc.	Scotchmist II	50	25	2	
Seabern Yachts, Inc.	Hookela	36	6	35	
Seabird Charters, Inc.	Spirit of Lahaina	65	149	3	
Seabird Cruises	Ihe Kai	51	49		2
Seafoam, Inc.	Iwalele	42	6	72	1
Seven Seas Cruises, Inc.	Maui Princess Molokai Ferry	118	149		
Slip 10, Inc.	Ocean Explorer	55	49	10	
Sumner H. Bates, Inc.	Napali Explorer	51	49		
Trilogy Corp.	Trilogy	65	92		1
Trilogy Corp.	Trilogy II	55	49	98	2
Unicorn Tours	Manutea	52	49		
Absolute Charters, Inc.	Absolute	31	6		3
Alihilani Yacht Chtrs. Inc.	Start Me Up Again	42	6		
Crystal Seahorse, Ltd.	Shangri La	65	49		
Diver Dan's Specialty	Diver Dan	31	6		
Diver Dan's Specialty	Desperado	31	6		
Fun Charters, Inc.		14	6		
Green Water, Inc.	Zip Purr	16	49		
K.B.T.S. Inc.	UFO 4	28	6		
K.M.B.S., Inc.	Casey Ann	28	12		
Kaanapali Kai Charters, Inc.	Teralani	51	47		
Kaanapali Queen, Inc.	Trilogy IV	51	49		
Kaanapali Sails, Inc.	Teralani II	65	49		
Kapalua Kai Sailing, Inc.	Kapalua Kai	53	49		
Kellam, Terry	Tail Walker	31	6		
Lahaina Parasail, Inc.	Nordic I (Red Nordic)	25	6		
Maui Boat Co.	Kiele V	51	49		
Maui Navigation	Trilogy III	51	49		
Sailing Shipps, Ltd	Gemini	51	49		
Sramek, Milos	Parasail Kaanapali	30	6		
UFO Chuting of Hawaii, Inc.	UFO I	28	6		
West Maui Parasail	Nordic (Blue Nordic)	25	6		
Sea Links of Hawaii	Molokai Princess	118	149		3
Four Island Adventure	Ocean Quest	65			3
Various	Cruise ship tenders				

Notes:
1. People (passenger) loading = 30 minutes
2. Sewer Pumpout use = 45 minutes (large vessels) and 30 minutes (small vessels); projected usage based on the assumption that vessel owners/captains will utilize the sewer pumpout if it is readily available.
3. Fuel pump use = 30 minutes
4. Fish Hoist use = 30 minutes: used only to unload large fish that are unable to unloaded at the assigned berths
5. Cruise Ship Tenders continuous use from 6:00 AM to 10:00 PM
6. Other Uses include vessel maintenance involving fork lifts, boom trucks, crane, etc.
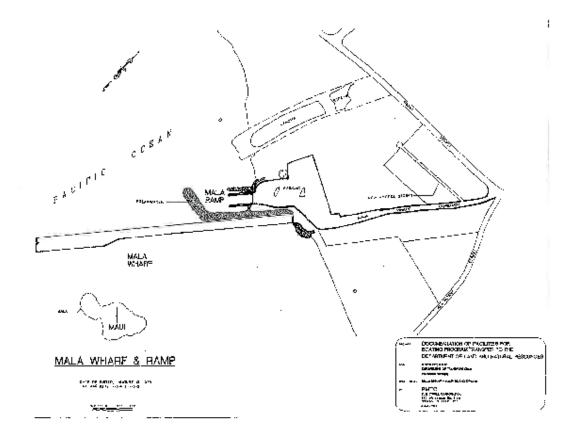

LAHAINA SBH

Mala Boat Ramp and Wharf

The Mala Boat Ramp and Wharf are located approximately 1 mile north of Lahaina on the west coast of Maui. The facility includes: 2 ramps; 2 loading docks; a vessel washdown area; restrooms and showers.
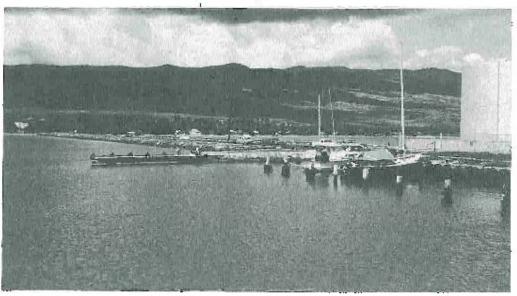
The boat ramp is double-laned and located adjacent to the abandoned wharf. The wharf was originally constructed to berth large passenger steamships. However, due to swells and current, these ships were unable to berth, and the wharf was left to be used by small recreational craft, fishing boats and small inter-island ferries. This facility is currently not used due to disrepair.

Mala Boat Ramp and Wharf occupy approximately 0.35 acres, and offers paved car and trailer parking. The Mala Boat Ramp and Wharf are under the jurisdiction of the State of Hawaii Department of Land & Natural Resources Division of Boating & Ocean Recreation.
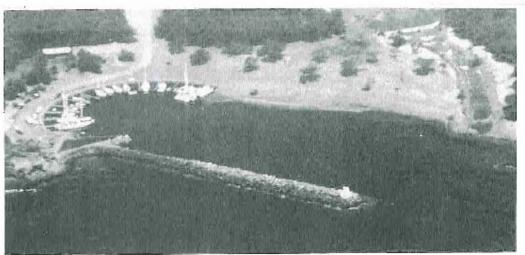

MALA WHARF & RAMP

Kaunakakai Harbor

Kaunakakai Harbor, 16 miles from the western extremity of Molokai, is a commercial barge harbor. A 16-foot deep entrance channel is marked by lighted and unlighted buoys and a lighted range. Small boat mooring facilities are located on the northeast side of the harbor protected by a small breakwater. There are 32 berths of which approximately 15 are available to visiting yachts. Water depth is 8 feet with a mud and coral bottom. A 12-foot wide launch ramp was constructed in 1963. Available parking will accommodate approximately 15 cars with trailers.

Kaunakakai Harbor, Molokai

Manele Small Boat Harbor

Manele, a joint Federal and State project, is one of Hawaii's most popular anchorages and is the only State recreational boat harbor on the Island of Lanai. Located on the south coast of Lanai, it is only 8 miles across the Auau Channel form Maui and the same distance southward across the Kalohi Channel form Molokai. The harbor entrance is marked by the large Puupehe Rock which is on the seaward end of the south shore. A white pyramidal marker sits on the end of the breakwater. Boaters are advised to stay high on the breakwater side when entering and to power in. Manele Harbor provides 24 berths for permanent moorers. Improvements are underway to dredge the right side of the channel. This will provide for additional mooring. The depth at berth is 6 feet with mud bottom. Anchorage is secure and protected in virtually any kind of weather. A single lane 18-foot wide launch ramp, constructed in 1962, and a fueling pier are located at the head of the harbor.

Manele Harbor, Lanai

Kapalua West Maui Airport

Final Statewide Airport System Plan: Vol. I. June 17, 1998. Airports Division.
Department of Transportation. State of Hawaii.
Acquired by the State in 1992.
Daily flights and type of aircraft will continue to be constrained by Administrative Rules
for the airport agreed upon between Hawaiian Airlines (the former operator), Maui
county and Maui Land and Pineapple Company (the landowner). These limitations
preclude major airport development at Kapalua.
Terminal Area: 15,000 sq. ft.
Runway Length/Width: 3000 x 100
Runway classification: general utility, large aircraft runways; short haul, less than 500
miles
Airport classification: non-hub; primary commercial
Airfield rescue and fire fighting: yes
Fuel storage capacity: none
FY 1997-2003: plan for fuel station enlargement
Air traffic control tower: none
Number of rent-a-car agencies: 0
Terminal curb length: 250 ft.
Public parking spaces: 75
Employee parking spaces: 0
Number of operations 1992: 18,794
Interisland Passengers 1997: 177,929
1997 Helicopter Operations: No
1997 Civil Air Patrol Unit: No

The Kapalua Airport is a commercial service airport that is served by commercial
propeller air carriers and commuter/air taxi aircraft only. This facility started as a private
facility until its acquisition by the State. The facility consists of a single runway, terminal
facilities, and support facilities. There are no air cargo facilities at this airport. Access to
this airport is provided from a two-lane road off of Honoapiilani Highway. Improvements
to this airport are limited to certain upgrades only. The runway, apron and other facilities
cannot be expanded without changes to the existing agreement with the County of Maui.
Operations are limited to daytime hours only.

FAA INFORMATION EFFECTIVE 05 JUNE 2008
Location
FAA Identifier: JHM
Lat/Long: 20-57-46.5710N / 156-40-22.9140W
               20-57.776183N / 156-40.381900W
               20.9629364 / -156.6730317
               (estimated)
Elevation: 256 ft. / 78.0 m (surveyed)
Variation: 11E (1990)
From city: 5 miles NW of LAHAINA, HI

Time zone: UTC -10 (year round; does not observe DST)
Zip code: 96761
Airport Operations
Airport use: Private use. Permission required prior to landing
Activation date: 04/1987
Sectional chart: HAWAIIAN ISLANDS
Control tower: no
ARTCC: HONOLULU CONTROL FACILITY CENTER
FSS: HONOLULU FLIGHT SERVICE STATION
Attendance: 0615-1815
Wind indicator: yes
Segmented circle: yes
Fire and rescue: ARFF index A
Airline operations: ARFF HRS: 0615-1815
Airport Communications
CTAF/UNICOM: 122.7
WX AWOS-3:   118.525 (808-665-6101)
WX ASOS at OGG (14 nm E):   PHONE 808-877-6282
WX ASOS at LNY (19 nm SW): 118.375 (808-565-6586)
UNICOM OPN 0600-1800 DAILY. TSNT ACFT MAL CALL FOR TFC ADVYS.
Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
OGGr272/14.5	MAUI VORTAC	115.10	11E
LNYr043/20.4	LANAI VORTAC	117.70	11E
MKKr100/29.6	MOLOKAI VORTAC	116.10	11E

NDB name	Hdg/Dist	Freq	Var	ID
VALLEY ISLAND	280/13.8	327	11E	VYI . . . - - . - - . .
LANAI	045/20.4	353	11E	LLD . - . . . - . . - . .

Airport Services
Runway Information
Runway 2/20
Dimensions: 3000 x 100 ft. / 914 x 30 m
Surface: asphalt, in fair condition
Weight bearing capacity: Double wheel: 44.0

	RUNWAY 2	RUNWAY 20
Latitude:	20-57.557400N	20-57.994950N
Longitude:	156-40.505733W	156-40.258067W
Elevation:	240.7 ft.	255.8 ft.

Traffic pattern:	left	right
Runway heading:	017 magnetic, 028 true	197 magnetic, 208 true
Markings:	nonprecision, in fair condition	nonprecision, in fair condition
Touchdown point:	yes, no lights	yes, no lights
Obstructions:	none	90 ft. tree, 3500 ft. from runway, 700 ft. left of centerline, 39:1 slope to clear

Airport Ownership and Management from official FAA records

Ownership: Publicly-owned

Owner: HAWAII STATE AIRPORTS DIV
          HONOLULU INTL ARPT
          HONOLULU, HI 96819
          Phone 808-838-8701

Manager: DALE TSUBAKI
          KAHULUI, HI 96732
          LAHAINA, HI 96761
          Phone 808-372-3830
          ARPT OPNS/MAINT MGR/ADM MR. ROBERT M. FLOREK - PHONE
          KAPALUA 808-669-0623.

Airport Operational Statistics

Aircraft operations: avg 27/day *

51%   commercial
49%   air taxi

* for 12-month period ending 31 December 2004

Additional Remarks

- ARPT RESTRICTED TO PART 121 & 135 FAR OPERATORS WITH PPR CTC
  KAHULUI ARPT OPNS 808-872-3880 (24 HRS).
- NO HELICOPTER OPNS PERMITTED.

- NO JET POWERED ACFT ALLOWED.

- NO PRACTICE & TRAINING FLTS PERMITTED.

- SPECIAL NOISE LEVEL STANDARDS FOR ACFT OPER AT ARPT.

- RESTRICTION ON NUMBER OF DAILY FLTS DEPENDING ON ACFT
  CAPACITY & SIZE.
- RAPIDLY RISING TERRAIN UP TO 300 FT MSL ALONG THE FULL LENGTH
  OF RWY 02/20 APPROX 160 FT EAST OF CENTERLINE.

Instrument Procedures

There are no published instrument procedures at PHJH.

Kapalua Airport Planning Study
BACKGROUND

Kapalua Airport (airport identifier, JHM) is located on property in Kahana and Mahinahina, Lahaina, Maui on the western side of the Island of Maui. The Airport encompasses 57.3 acres of land and is owned and operated by the State of Hawaii, Department of Transportation, Airports Division.
The site is about .03 mile uphill above Honoapiilani Highway. The Airport consists of a single runway, terminal facilities and support facilities. Access to the Airport is provided from a two-lane road off of Honoapiilani Highway.
The Airport is classified as a commercial service airport. The National Plan of Integrated Airport Systems (NPIAS) classifies Kapalua Airport as a Commercial Service, Primary, Short Haul, which typically serves short-haul air carrier routes of less than 500 miles.
Kapalua Airport is served by commercial propeller air carriers and commuter/air taxi aircraft between West Maui and Honolulu. Presently, Aloha Island Air (DH-6 and DH-8 airplanes) provides scheduled service to Kapalua. Pacific Wings and Maui Air operating C402 and PA31 aircraft provide "on demand" air transportation service. Other air carriers who provide air tours from Kapalua are Maui Air, Air Ambulance and Paragon Air. Federal Express provides five days a week, twice-a-day cargo service into Kapalua.

AIR OPERATIONS AND RESTRICTIONS

Air operations at Kapalua Airport are governed by the Maui County Ordinance 1535 and the State of Hawaii Administrative Rules 19-39. Operations are limited to daylight hours only. No jet powered aircraft and helicopters are allowed. The number of flights permitted each day are limited to 70 flights. Aircraft noise levels for takeoff, sideline and approach are limited. Parking aircraft at the airport is limited to no more than 45 minutes. No practice or training flights are allowed. Parking or storage of rental cars on the Airport is not permitted.

EXISTING AIRPORT FACILITIES
Runways

Kapalua Airport has a single runway configuration: Runway 2-20. The runway is non-precision and visual. In normal trade wind conditions, aircraft land and takeoff on Runway 2. The paved portion of Runway 2-20 is approximately 3,000 feet long and 100 feet wide. Runway 2-20 is oriented in a northeast-southwest direction. The airport runway elevation is surveyed at approximately 256 feet above MSL. Runway 2-20 has a pavement design strength, in terms of maximum gross weight of 44,000 pounds. Runway 2-20 is a non-precision runway with no visual approach aids.

Taxiways

Two taxiways serve as an entrance and exit to and from Runway 2-20 to the aircraft parking apron. The aircraft enter the parking apron via the north taxiway. This taxiway is approximately 363 feet by 50 feet or 18,170 square feet. The aircraft exit to the runway using the south taxiway which is approximately 263 feet by 50 feet or 13,150 square feet. The taxiways are aligned perpendicular to the runway. Aircraft landing on Runway 2 must back-taxi along the runway to exit onto the taxiway.

Aircraft Parking Apron

The terminal apron provides the connection between the terminal buildings and the airfield. It includes parking areas for airplanes and aircraft circulation, and taxiing areas for access to these parking areas. The aircraft park in areas designated as gates. The total paved apron area is 120,162 square feet. Three aircraft parking positions of 20,300 square feet each are included in the apron area. Parking of aircraft on the apron may not exceed 45 minutes in duration.

Runway Protection Zones, Approach Areas And Obstructions

Publicly owned airports such as Kapalua Airport are required to conform to certain Federal Aviation Administration (FAA) design standards. These airports must meet certain geometric design criteria regarding runway protection zones (RPZ), runway approach and departure areas and obstructions may be hazardous to air navigation.

The FAA classifies airports based upon an airport reference code (ARC). The ARC consists of two components that are directly related to a specific design aircraft. The first component, depicted by a letter, is the airport approach category and relates to aircraft approach speed. The second component, depicted by a Roman numeral, is the airplane design group and relates to airplane wingspan. Generally, aircraft approach speed applies to runways and runway related facilities. Airplane wingspan primarily relates to separation criteria involving taxiways and taxilanes. The ARC for Kapalua Airport is A III.

Runway protection zones (RPZ) dimensions are based on Federal Aviation Regulation (FAR) Part 77 approach surface dimensions out to where the surface is 50-feet above the runway threshold or 50-feet above the underlying terrain. At Kapalua Airport the approach surface and the RPZ start 200 feet beyond the runway threshold. The RPZ dimensions are an inner width of 250 feet, a length of 1,000 feet and an outer width of 450 feet. The RPZs are centered on the extended runway centerline.

The Federal Aviation Administration (FAA) in their annual Airport Letter of Certification inspection of Kapalua Airport states that the runway safety areas are not within the dimensional standards of the Advisory Circular 150/5300-13. The corrective action stated is "the airport would need to relocate the perimeter fencing and grade the runway safety areas (grade the north end, fill the south end and grade the mauka side of the runway) to achieve proper safety area and dimensions. Evaluation of wind cone locations should be conducted to ensure their proximity outside of the runway safety areas while maintaining their visibility to aircraft on approach." The perimeter fence should be 250 feet from the runway centerline, but is only 150 feet from runway centerline.

Navigational Facilities and Lighting

The VORTAC at Molokai Airport (identification call sign letters MKK) is used for the approach to Kapalua Airport. A VORTAC is a facility consisting of two components, VOR and TACAN, which provides three individual services: VOR azimuth, TACAN azimuth and TACAN distance at one site. VORTAC is considered to be a unified navigational aid.

The Airport has no runway lights, precision approach indicator (PAPI), or runway end identifier lights (REIL).

Meteorological Conditions

There are 3 wind socks and two wind sensors at the Airport. They are utilized by the Contract Tower air traffic controllers to relay wind conditions to the incoming aircraft.

The wind is generally from a northeasterly direction at 10-20 knots. In winter conditions, the wind is 35-40 knots and 15-20 knots in the summer.

The Automated Weather Observing System (AWOS) is located in close proximity to the Contract Tower. The AWOS sensors measure, collect and disseminate weather data to help meteorologists, pilots and flight dispatchers prepare and monitor weather forecasts, plan flight routes and provide necessary information for correct takeoffs and landings. AWOS provide a minute-to-minute update that is usually provided to pilots by a VHF radio. The sensors measure weather parameters, such as wind speed and direction, temperature and dew point, visibility, cloud heights and types, precipitation and barometric pressure.

Passenger Terminal Complex

The Kapalua Airport Passenger Terminal Complex consists of the two-story terminal building, a crash/fire and communication building, an automobile parking area, tenant concession areas and an aircraft parking apron. Passengers enplane and deplane at the ground level. A restaurant was planned for the second level of the terminal, but was never constructed.

The passenger terminal provides space for commuter airline operations, passenger services, baggage claim, passenger waiting lobby, public telephones, restrooms, and terminal support facilities. The terminal has four gates, two holding rooms, a food concession and eating area, one food kiosk, and 64 seats in the lobby area for waiting passengers. The United States Department of Agriculture performs inspection of baggage with interline connections to the mainland United States.

Island Air operates as a commuter airline operating under Code of Federal Regulations, Title 14, Part 121 (Commercial Operator). They average 39 scheduled flights per week to/from Honolulu International Airport per day. Island Air utilizes the DeHavilland (DHC) Dash 8 aircraft in its operations at the airport. Pacific Wings did provide scheduled daily trips between Kapalua and Lanai City and offered "city hopper service" between Kapalua and Kahului.

The Main Terminal Building 300 has a total area of 10,840 square feet on the ground level. The second level of the terminal building has a total of 4,626 square. The second level is largely vacant except for a small area utilized for offices. A restaurant with views to the ocean was envisioned for the second level, but was never constructed.

Air Cargo

The Airport does not have any air cargo facilities. However, Federal Express transports cargo to Kapalua Airport. They average two trips a day on weekdays only, Monday through Friday. Federal Express operates a Cessna 208 Caravan turbo prop aircraft at Kapalua.
General Aviation

General aviation activity is minimal, since aircraft are prohibited to park at the airport apron area for longer than 45 minutes
Air Taxis

Air Taxi is defined as " a nonscheduled carrier using small aircraft for very short haul travel on a charter basis." Air taxi is not regulated. The following air taxis operate at Kapalua Airport: Air Links, Avante Air, Air-Eco Air Tours, Commercial Flyers, Kumulani Air, Maui Air, Molokai Shuttle, and Paragon Air. An Air Ambulance is available for emergency medical transportation. The total air taxi operations average less than 20 flight per week.
Helicopters

Helicopter operations are prohibited at Kapalua Airport under Maui Ordinance 1535 and the State of Hawaii Administrative Rules §19-39.

In the past, Hawaii Helicopters has proposed a short haul commuter helicopter transportation service between Kapalua and Lanai and later between Kapalua and Kahului. They planned to fly the twin-engine Sikorsky S-76 with a capacity of twelve passengers. However, they would have to amend the Maui Ordinance and the Hawaii Administrative Rules.
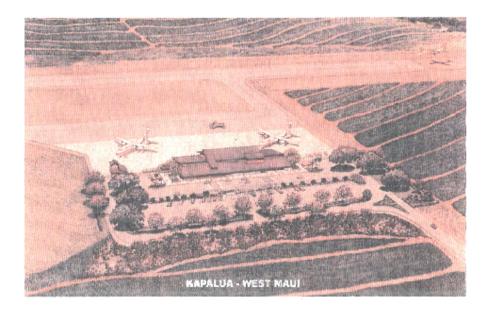Airport Access, Parking and Ground Transportation

Access to the Airport is provided from a two-lane road, Akahele Street, about 1,600 feet long connecting to Honapiilani Highway below. As you enter the Airport, a public parking lot is on the left for passenger automobiles. It is located just below the terminal building. It can accommodate 77 motor vehicles. The parking rate is $7.00 per day.
There are no rental car counters at the Airport. However, passengers may use a designated phone to call for rental car pickup. The rental car facility is located about two miles from the Airport. There are two parking stalls reserved for taxi service. There are also two parking stalls reserved for Airport District Manager and one stall for the Maui County Fire Department.
Universal Communication

Kapalua is an uncontrolled airport and does not have a federal Air Traffic Control Tower (ATCT). However, there is a Common Traffic Advisory Frequency (CTAF) that is the published Universal Communication (UNICOM) frequency. The UNICOM is operated from 6:00 am to 6:00 pm or ½ hour before sunset. Pilots must contact Kapalua UNICOM before entering the traffic pattern and maintain contact while operating in the area.

The Communications staff is located on the second level of the Crash/Fire and Communication Building adjacent to the passenger terminal.
Aircraft Rescue and Firefighting (ARFF)

The ARFF is located in the Crash/Fire and Communication Building north, adjacent of the passenger terminal. The building has two trucks, one of which is used for rescue. Two firefighters are on a 12-hour work shift from 6:30 am to 6:30 pm.
Fuel Storage and Loading Facilities

There are two 500-gallon above ground storage tanks located on Kapalua Airport. One tank contains diesel fuel and the other stores gasoline.

KAPALUA - WEST MAUI

Kahului Airport

Kahului Airport is part of the Statewide Airport System operated by the State Department of Transportation, Airports Division. The system includes all of the major airports in the islands. Administratively, Kahului Airport is part of the Maui District. In addition to Kahului Airport, the District includes Hana, Kapalua-West Maui, Hana, Kalaupapa, Lanai, and Molokai Airports.

The Maui District Manager is responsible for the overall administration of all the airports on the islands of Maui, Lanai, and Molokai. The District Manager oversees the day-to-day operations of Kahului Airport and exercises control over the other airports through four assistants. These airport operations and maintenance workers are based at, and are responsible for the day-to-day management of the District's airports.

Three assistant airport superintendents report to the Maui District Manager for operations at Kahului Airport. The head of the general construction and maintenance section oversees maintenance, janitorial, and groundskeeping operations at Kahului Airport. The Fire Commander oversees the aircraft rescue and firefighting operations, and the Chief of Operations is responsible for maintaining the security of the Airport.

With one exception, all land within the Airport Boundary is owned by the State of Hawaii and controlled by the Department of Transportation Airports Division through executive orders. The exception is the U.S. Post Office site located on Keolani Plance. A number of related business concessions hold leases within the Airport.

Kahului Airport occupies approximately 1,447 acres of land on the northeastern side of the Town of Kahului, Maui. The main passenger terminal, commuter airline terminal, airline offices, air cargo facilities, airline ground maintenance facilities, aircraft rescue and firefighting (ARFF) facilities, DOT airport maintenance baseyard, ground transportation subdivision, and airport industrial area are located on the west side of Runway 2-20. Facilities for general aviation (e.g., aircraft maintenance facilities, hangars, based and itinerant aircraft parking apron, fixed base operator), facilities for helicopter and air taxis (including scenic air tour operations), and the FAA Air Traffic Control Tower are located on the eastern side of Runway 2-20. The ARFF training area is located on the north side of Runway 5-23.

Kahului Airport's service area includes the entire island of Maui. The Airport's location places it within an hour's drive of over 90 percent of the island's population. It is the only airport on the island capable of accommodating turbo-jet aircraft; consequently, it handles the vast majority of the passengers and air cargo moving from and to the island. Maui's two other airports handle general aviation and air taxi aircraft, as well as a limited number of scheduled Dash-7 flights operated by Hawaiian Airlines to and from the Kapalua-West Maui Airport and DHC-6 flights operated by Island Air to and from the Kapalua-West Maui and Hana Airports. Both the Hana Airport and the Kapalua-West Maui Airport are owned and operated by the Airports Division.

Kahului Airport has two runways: Runway 2-20 and Runway 5-23.

Runway 2-20 is 7,000 feet long, 150 feet wide, and has 35-foot-wide stabilized asphaltic concrete shoulders. The runway safety area shown in the FAA approved Airport Certification Manual (dated October 30, 1992) is 400 feet wide and extends 1,000 feet beyond both ends of Runway 2-20. The ends of Ruways 2 and 20 are 54 feet and 12 feet above mean sea level, respectively. The average runway slope from southwest to northeast is 0.60 percent. The runway is painted with all-weather precision markings.

According to the February 1991 edition of the FAA Airport Master Record, the generalized gross load pavement strength for unlimited numbers of operations is 130,000 pounds for single-wheel aircraft and 170,000 pounds for dual-wheel aircraft. The FAA's published pavement strength data sheets for the runway (WE Form 5335-1 dated July 9, 1992) indicate the following gross load capabilities for specific aircraft currently using the runway:

Aircraft	Pavement Strength Capacity	Main Landing Gear Configuration
B-747-100	550,000 pounds	Double Dual Tandem
DC-10-10	360,000 pounds	Dual Tandem
DC-10-30	460,000 pounds	Dual Tandem (with additional center landing gear)
L-1011-100	360,000 pounds	Dual Tandem

The maximum allowable gross takeoff weights of these aircraft exceed these strengths by a considerable amount.

DOT is currently limiting DC-10-10 and DC-10-30 aircraft to gross takeoff weights of 405,000 pounds and 430,000 pounds, respectively. Widebody aircraft have also been required to abandon their previous practice of turning off at the intersection of Runway 5-23. Instead they must now proceed to the northern end of Runway 2 before taxiing back to the terminal. Spot repairs have also been made to the runway and taxiways.

Runway 5-23

Runway 5-23 is 4,990 feet long and 150 feet wide. Because portions of it cross an abandoned intersecting runway (old Runway 17-35), the width of its asphaltic concrete shoulders is variable; however, in all instances they are at least 35 feet wide. The runway safety area shown in the Airport Certification Manual is 370 feet wide and extends 1,000 feet beyond both ends of Runway 5-23. The threshold elevations for Runways 5 and 23 are 20 feet and 16 feet above mean sea level, respectively. The average gradient from west-to-east is 0.08 percent. Runway 5-23 is painted with non-precision markings and there are no instrument approach aids.

The gross load limits listed on the FAA Airport Master Record (February 1991) for the runway are 130,000 pounds, 170,000 pounds, and 270,000 pounds for single-wheel, dual-wheel, and dual-tandem wheel aircraft, respectively. This is more than adequate for all of the aircraft that are capable of operating on the existing runway length. No signs of pavement distress have been observed on this runway except for where it crosses Runway 2-20.

TAXIWAYS

The locations of the designated taxiways at Kahului Airport are illustrated on Figure 2-1. Taxiway "B", Taxiway "E", Taxiway "F", and Taxiway "G" have variable widths ranging from 50 to 400 feet wide. Taxiway "A", Taxiway "C", and Taxiway "I" are each 75 feet wide while Taxiway "D" is approximately 200 feet wide. Taxiway "H" and the unnamed taxiway that runs parallel to Runway 2-20 on the east side are each 50 feet in width.

Table 2-1

DESIGNATED TAXIWAYS

KAHULUI AIRPORT

Taxiway   Description

A.   Parallel taxiway to Runway 2-20 on west side with 75-foot wide asphaltic
          concrete pavement and 25-foot wide asphaltic concrete shoulders.

B.   Diagonal connecting taxiway from a point 2,000 feet from the southern end
          of Runway 2-20 to the main passenger terminal apron and Runway 5-23.
          Pavement width ranges from approximately 50 feet to over 75 feet.

C.   Exit taxiway at the end of Runway 2 that connects to the helicopter
          operating area. Pavement width is 75 feet.

D.   Exit taxiway that connects the passenger terminal apron with Runway 2-20
          approximately 1,000 feet from the southern end of the runway. Pavement
          width is approximately 200 feet.

E.   The portion northwest of Runway 2-20 is a diagonal exit taxiway
          connecting the passenger terminal apron with Runway 2-20 approximately
          2,000 feet from its southern end. This portion's pavement is approximately
          125 feet wide.

          The portion southeast of Runway 2-20 is a diagonal exit taxiway
          connecting the southern end of the air taxi apron with Runway 2-20. This
          portion's pavement is 75 feet wide with 20-foot wide asphaltic concrete
          shoulders.

F.   Exit taxiway connecting Runway 2-20 with Taxiway "B" and Taxiway "H"
          at the western end of Runway 5-23. A portion of the taxiway connects the
          general aviation apron with Runway 2-20. Pavement width is 75 feet
          between Runway 2-20 and Taxiway "A", and between the general aviation
          apron and Runway 2-20; 50 feet between Taxiway "A" and Taxiway "B";
          and variable between Taxiway "B" and Runway 5-23.

G.   Exit taxiway connecting northern part of Runway 2-20 with Taxiway "A".
          Pavement width varies from 125 to 400 feet.

H.   Exit taxiway at the end of Runway 5-23 that connects the commuter
          terminal apron with the approach end of Runway 5. Pavement width is
          approximately 50 feet.

I.   Exit taxiway that connects the northern end of the general aviation apron
          with Runway 2-20. Pavement width is 75 feet.

Unnamed   Connecting taxiway, parallel to Runway 2-20 on east side, that connects the runway to the East Ramp parking apron. Pavement width is 50 feet.

The pavement strengths of Taxiways "A" through "H" indicated on the FAA's Form 5335-1 for Single-wheel, dual-wheel, and dual-tandem-wheel aircraft are 130,000, 170,000, and 270,000 pounds, respectively. The corresponding figures are Taxiways "I" and portions of "F" are 30,000 pounds, 40,000 pounds, and 65,000 pounds, respectively.

The DOTA considers the taxiway pavement strengths to be generally adequate for the runways they serve, and most are in reasonably good condition. An exception is the portion of Taxiway "A" near the northern end of Runway 2-20, where some distress has been noticed on portions used by wide-body aircraft.

AIRCRAFT PARKING APRONS

Kahului Airport has several aircraft parking aprons. The main apron is the passenger terminal apron and is located between the terminal building and Taxiway "A". The commuter/air taxi terminal aircraft parking apron is located northeast of the terminal building on the island side of Runway 5-23. The "East Ramp" apron east of Runway 2-20 serves general aviation aircraft, helicopters, and air taxi operations. The characteristics of these aprons are described below.

PASSENGER TERMINAL APRON

The apron fronting the new passenger terminal measures approximately 2,900 feet by 500 feet. The concrete hardstand portion of it is approximately 2,800 feet long and 150 feet wide. The hardstand was reconstructed as part of the passenger terminal expansion project and is designed to accommodate all of the types of wide-body aircraft now using the Airport. The FAA has calculated pavement strengths, based on their Advisory Circulars, for the terminal apron (*telephone conversation with FAA representative, July 1992*). Their calculations indicated the following gross load capacities for aircraft using the apron:

Aircraft	Pavement Strength Capacity	Main Landing Gear Configuration
B-747-100	780,000 pounds	Double Dual Tandem
B-747SP	700,000 pounds	Double Dual Tandem
DC-1O-1O	450,000 pounds	Dual Tandem
DC-1Q-30	520,000 pounds	Dual Tandem (with additional center landing gear)
L-101 1-100	450,000 pounds	Dual Tandem
L-101 1-200	470,000 pounds	Dual Tandem

COMMUTER TERMINAL APRON

The commuter terminal apron measures approximately 600 feet by 400 feet. Airport records indicate that it is designed to accommodate single-wheel aircraft with gross weights up to 75,000 pounds and duel-wheel type landing gear aircraft with gross weights up to 145,000 pounds. This is more than adequate to accommodate the type of aircraft that use the commuter/air taxi terminal.

EAST RAMP APRON

The "East Ramp" Apron consists of two distinct areas. The first consists of the southern end of an abandoned runway (formerly Runway 17-35). This area measures approximately 1,200 feet long by 400 feet wide and is now used for helicopter operations. The second area parallels Runway 2-20. It is approximately 3.400 feet long by 200 feet wide and is used for general aviation and air taxi aircraft parking. According to the latest information available from the Airports Division, the pavement strength for single-, dual-, and dual-tandem-landing gear aircraft for most of the apron are 30,000, 40,000, and 65,000 pounds, respectively.

RUNWAY PROTECTION ZONES, APPROACH AREAS, AND OBSTRUCTIONS

Runway Protection Zones (RPZ)

Runway protection zones (formerly called clear zones) are based on Federal Aviation Regulations (FAR) Part **77** approach surface dimensions out to the point at which the approach surface is 50 feet above the runway threshold <u>or</u> 50 feet above the underlying terrain, whichever is less. The width of the runway end of the RPZ is determined by the most precise approach standard applicable to the runway. For example, if an instrument (IFR) approach is maintained at one end and a visual (VFR) approach at the other, the IFR inner width minimum is applicable at both ends.

Runway 2 (which is equipped with an Instrument Landing System, or ILS) has a precision instrument approach requiring an inner width of 1,000 feet for both ends of Runway 2-20. Based on the most precise approach procedure, only a non-precision instrument runway protection zone with a 34:1 approach slope is required for Runway 20. However the Airports Division maintains a more restrictive instrument runway protection zone for the runway. The approach surface slopes for Runways 2 and 20 are 50:1 for the first 10,000 feet from the runway threshold. The slope of the remaining 40,000 feet of these approach surfaces is 40:1. This meets the FAA's standard for precision instrument approaches to runways.

Runway 5-23 has only visual approaches to both ends requiring an inner width of 500 feet and an outer width of 1,010 feet. Based on the most precise approach procedure, only a visual runway protection zone with a 20:1 approach slope is required for Runway 5-23. However the Airports Division maintains more restrictive non-precision runway protection zones—with a 34:1 approach slope for Runways 5 and 23. This meets the FAA criteria for non-precision approaches for large aircraft with visibility minimums of more than three-quarters of a mile. Because the runway is occasionally used by jet air carrier (interisland) aircraft when Runway 2-20 is not available (e.g., when it is closed for maintenance or when crosswinds preclude its use), the more restrictive approach slope provides an added margin of safety.

Existing runway protection zone information for each runway approach end is as follow:

Runway	Type of Runway Protection Zone	Length in feet	Inner Width in feet	Outer Width in feet
2	Precision	2,500	1,000	1,750
20	Precision	2,500	1,000	1,750
5	Non-precision	1,700	500	1,010
23	Non-precision	1,700	500	1,010

Except for portions over the Pacific Ocean to the north and a small portion for Runway 23 to the northeast, all of the runway protection zones lie entirely within Airport property (see Figure 2-1).

OBSTRUCTIONS

Both the FAA Airport Master Record and the Airport Obstruction Chart published by the National Oceanic and Atmospheric Administration (NOAA) were reviewed to identify obstructions as defined by Federal Aviation Regulations (FAR) Part *77:* "Objects Affecting Navigable Airspace." FAR Part *77* establishes "imaginary surfaces" related to airports and their runways. These imaginary surfaces are used to identify obstructions. See Table 2-2 for a comparision of the standard FAR Part *77* approach slopes at Kahului Airport with existing obstacles/obstructions in the vicinity of the Airport.

The Runway 2 imaginary approach surface is penetrated by two groups of objects. The first penetration is by Kealoloa Ridge of the West Maui Mountains, which penetrates a portion of the 7:1 transitional surface between 8 and 10 miles south of the runway threshold. The second penetration is by the tallest (252 feet above mean sea level) of the five stacks at the Puunene Sugar Mill. This stack is located approximately 9,800 feet south of the Runway 2 threshold and extends almost 6 feet into the approach surface *(A. T. Tanaka Engineers, Inc., February 1991).*

Some trees penetrate the approach surface to Runway 20, but they are 475 feet off the Runway centerline.

NAVIGATIONAL FACILITIES AND LIGHTING

Kahului Airport has an FAA Air Traffic Control Tower which operates between 6:00 AM and 10:00 PM. The Airport also has an Airport Surveillance Radar (ASR) for control of aircraft within the Airport Radar Service Area. The ASR is located on the Airport, but is controlled remotely from the Honolulu Air Route Traffic Control Center (ARTCC) which provides radar approach/departure control services. The FAA radio transmitter/receiver building for air traffic control is located east of Runway 2-20 near the existing ASR facility. The Airport is equipped with a lighted wind indicator, a segmented circle and wind cones, and a rotating beacon. Non-directional beacons are located at McGregor Point (identification call sign letters "MPH") and at the middle marker (identification call sign letters "VYI").

Table 2-2
COMPARISON OF FAR PART 77 STANDARDS FOR APPROACH SLOPES
WITH EXISTING OBSTACLE-CONTROLLED APPROACH SLOPES
KAHULUI AIRPORT

				Controlling Obstacle/Obstruction Location From End of Runway Primary Surface Related		
Runway		Approach Slope				Extended Runway Centerline Threshold
No.	Elev.	Standard	Actual	Type	Elev.	Location
2	53 feet	50:1	48:1	Stack	252	9,837 ft along and 300 ft N.West of runway centerline
20	12 feet	50:1	15:1	Trees		200 ft along and 475 ft N.West of runway centerline
						NOTE: Actual slope 50:1 is Along runway centerline
5	20 feet	34:1	50:1	None		
23	16 feet	34:1	50:1	None		

Source: FAA Airport Master Record and NOAA Airport Obstruction Chart

The Airport is equipped with a VHF Omni-Directional Range/Tactical Air Navigation (VORTAC) radio navigational aid system (Maui VORTAC) to assist aircraft in determining azimuth and distance. The VORTAC is located 500 feet from Runway 5-23 and 638 feet from Runway 2-20. The FAA has recommended that it be relocated to an area at the approach end of Runways 20 and 23 to eliminate signal problems that are believed to be related to new construction in the terminal area.

Runway 2-20 has precision runway markings and high intensity runway lights (HIRL). Both ends of the runway are equipped with Visual Approach Slope Indicators (VASI-4). Runway 2 has an Instrument Landing System (including Middle and Outer Markers), and a medium intensity approach lighting system with runway alignment indicator lights (MALSR).

Runway 5-23 is painted with non-precision runway markings and equipped with medium intensity runway lights (MIRL). Runway 5 has a VASI-4 visual approach slope indicator.

All entry/exit taxiways and parallel taxiways to both runways are equipped with medium intensity taxiway lights (MITL).

The airfield lighting vault is located in the new passenger terminal building.

METEOROLOGICAL CONDITIONS

The average annual temperature at Kahului Airport is 74⁰ F. During the summer, the average monthly high is 82⁰ F and the average low is in the low 70s. Winter temperatures are about ten degrees cooler. The highest temperature on records is 91⁰ F and the lowest is 55⁰ F. The average maximum daily temperature for the hottest month is 84⁰ F.

Rainfall at Kahului is quite low, averaging less than 20 inches per year. The majority of this occurs during the winter as large-scale frontal systems move past the island. Despite the relatively low annual average, storms can generate intense rainfall over short periods of time, and the runoff from these events must be accommodated in the published by the U.S. Department of Commerce (1962), estimates that the average 24 hour rainfall having a recurrence interval of 50 years is approximately 7 inches.

Winds at Kahului Airport are influenced by a variety of factors. These include: the strong prevailing tradewinds; the physical presence of large mountain masses to the east (Haleakala) and west (West Maui Mountains) of the Airport; and the nighttime drainage winds that carry cool air from the mountain slopes to the coastal areas of Kahului. These winds have a significant effect on the operations of the Airport.

Based on data collected at the Airport between January 1970 and December 1979, the wind coverage for 13 knots crosswinds is 96.1 percent for Runway 2-20 and 98.4 percent for Runway 5-23. The combined coverage for both runways is 99.8 percent for 13 knot crosswinds.

Wind speeds are greater than 10 knots for more than two-thirds of the time during the day; however at night, the percentage of the time during which they exceed 10 knots is less than half that. Moderate to brisk tradewinds (easterly winds greater than 6 knots) occur approximately 77 percent of the time during the day and 50 percent of the time

during the night. Winds less than 6 knots occur approximately 17 percent of the time during the day end 48 percent of the time during the night. In general, winds from the south tend to occur more frequently during the night than during the day, and southerly winds most often have speeds of less than 6 knots.

The annual frequencies of wind speed/direction for the daytime and nighttime periods at Kahului Airport are as follows (Note: because of rounding, the figures do not add to 100 percent):

Daytime Wind Direction/Speed	Calm	1-6 knots	7-10 knots	>10 knots 65.2%
Tradewind	2.0%	8.9%	12.2%	
Kona		6.3%	1.8%	3.8%

Nighttime Wind Direction/Speed	Calm	1-6 knots	7-10 knots	>10 knots 30.7%
Tradewind	5.4%	17.1%	18.8%	
Kona		25.4%	1.6%	0.9%

Air carrier aircraft generally use Runway 2 during tradewind conditions and Runway 20 during Kona conditions. The same kind of use occurs on Runway 5.23, with Runway 5 being used during tradewind conditions and Runway 23 being used when there are Kona winds.

PASSENGER TERMINAL COMPLEX

The first increment of Phase 1 of the new passenger terminal complex was completed in October 1990. It contains new passenger ticketing/check-in counters, baggage handling facilities, six passenger hold rooms (i.e., waiting areas), and eight passenger loading bridges. In addition, the terminal complex contains automobile and tour bus parking areas, concessions, a realigned roadway system, and an aircraft parking apron. Passengers enplane and deplane at the second level through passenger loading bridges. Construction of the second increment of the new passenger facilities is scheduled for completion by mid-1993. It involves the conversion of the old passenger terminal into a baggage claim area (now completed) and the construction of additional passenger hold rooms along the airfield side of the complex.

The passenger terminal apron can accommodate up to 20. interisland-size (DC-9/B-737) aircraft in a single row with power-in/push back operation. Currently, eight positions, are marked for overseas DC-B, DC-b, and L-1011 aircraft which reduces the below-grade hydrants, but the fuel storage and supply lines for them has not yet been installed. Hence, aircraft continue to be fueled from trucks.

COMMUTER TERMINAL

Located north of the air carrier passenger terminal, the commuter terminal building includes space for
ticketing/check-in, baggage claim, waiting, airline offices, and restrooms. Opened in 1987, the facilities are in good condition. The commuter aircraft parking apron can accommodate up to 12 de Havilland DHC-6 type aircraft. It is connected to the southern end of Runway 5-23 by Taxiways "F" and "H" and also to Taxiway "B" via Taxiway "F" approximately 1,500 feet from the approach end of Runway 5. Aircraft are refueled from trucks.

AIR CARGO FACILITIES

Most air cargo is processed at the cargo facility located north of the passenger terminal just to the west of the Aircraft Rescue and Firefighting (ARFF) Station and adjacent to the passenger terminal. This building was completed in 1983 and accommodates air cargo from most interisland and overseas air carriers, as well as some air taxis. In the past, a small volume of air cargo was handled from facilities at the northern end of the East Ramp. UPS operations are presently being conducted from a portion of the ground equipment maintenance building north of the existing ARFF building.

GENERAL AVIATION FACILITIES

General aviation facilities are located east of Runway 2.20. These facilities include three T-hangar buildings (with a total of 30 spaces) that are owned by the State and leased to individual aircraft owners. The 34 tiedowns presently situated on the East Ramp occupy an 800-foot by 200-foot area immediately adjacent to the T-hangars and are used by based and itinerant aircraft. Because of the absence of other suitable on-airport space, the State's guidelines for use of the T-hangars have been broadly interpreted. Consequently, some of the T-hangar spaces are used for activities for which they were not intended, including aircraft maintenance.

Century Aviation operates a number of facilities on the East Ramp. It is currently the primary fuel vendor at the Airport. In addition to the fueling services, this company also provides a full range of services for corporate (executive) aircraft that visit Kahului. It has a reception office and employee areas, a maintenance shop and storage shed, and fuel storage tanks.

American Pacific Air, Inc. occupies one of the T-hangar spaces. This company operates a fleet of 12 aircraft used for aircraft rental s and flight training. This company is presently severely constrained by the lack of suitable space. A similar situation exists for Air Molokai which owns three aircraft and also operates out of a T-hangar.

AIR TAXIS

The scenic air taxi aircraft that visit Kahului park on the East Ramp apron. Aircraft are fueled on the apron by Century Aviation. Parking space is provided adjacent to the apron for tour buses and vans that carry passengers around Maui. A small terminal building, with only basic amenities for passengers, is also located on the site but it is not currently in use.

HELICOPTERS

Helicopter operations at Kahului Airport are concentrated at the southeastern corner of the Airport. This area includes two landing and takeoff helipads, as well as an apron area for helicopter parking and passenger loading and unloading. However, some helicopters land and takeoff from the passenger loading and unloading positions. Small plots along the edge of the apron are leased to the helicopter operators who have erected buildings containing reception areas, offices, and aircraft storage space. Helicopters are fueled on the apron by Century Aviation or, in some cases, from operator-owned fuel trucks or from the two underground fueling tanks maintained by Papillon Hawaiian Helicopters and Hawaii Helicopters.

AIRPORT ACCESS, PARKING, AND GROUND TRANSPORTATION

Airport Access

Keolani Place is a 4-lane roadway that provides vehicular access to the main passenger terminal, the parking areas, the rental car ready/return area west of the terminal, as well as to the air cargo facilities, the commuter/air taxi terminal, and other facilities west of the passenger terminal. It provides a direct connection with Hana Highway for vehicles traveling between the Airport and Wailuku and Kahului.

The facilities adjacent to the East Ramp are reached from Hana Highway via Kala Road and Haleakala Highway. At present, Haleakala Highway continues around the southern end of Runway 2-20, terminating at the intersection of Keolani Place and Dairy Road. Therefore, these facilities can also be readily accessed from the west side of the Airport. However, the State has announced plans to close the portion of Haleakala Highway west of Runway 2-20 if the runway is extended. If that is done, this segment of the roadway will serve only the East Ramp development.

While not intended as a major access route, Koeheke Street (which intersects Keolani Place opposite the main passenger terminal parking area and provides access to the rental car baseyards and airport industrial area) extends to Alahao Street, Alahao Street is a narrow, two-lane roadway which runs along the west side of the Airport and serves the recreational areas and other facilities located along the shoreline adjacent to the Airport. At one time Alahao Street crossed what is now Airport property into West Spreckelsville; however, it now ends at a fence along the Airport boundary.

VEHICULAR PARKING

The principal vehicular parking area at the Airport is located on the northwestern side of the passenger terminal. It contains 1,172 parking stalls for use by the public and 742 parking stalls for use by employees of Federal and State agencies, tenants, concessionaires, and airlines. A limited number of parking stalls are also located adjacent to the cargo facility, the rental car counters and commuter terminal north of the passenger terminal and the general aviation and helicopter facilities which are adjacent to the East Ramp. Parking at the main parking area is under the operation of a concessionaire. The other areas are patrolled by Airport security personnel.

GROUND TRANSPORTATION

At present, approximately 23 acres of land along the western side of Keolani Place is made available for lease by rental car operators. The parcels, which range in size from one-quarter of an acre to four acres, are used to store and service the vehicles. Convenient public access to the lease sites is provided from Keolani Place and Koeheke Street. Other ground transportation activities are interspersed with rental car activities in this area. The State provides improved streets, level lots, and utilities. The operators are responsible for constructing and maintaining their own facilities. The rental car counters are situated in a relatively new, State-owned building constructed for that purpose opposite the northern end of the main passenger terminal parking area. As previously noted, a limited number of parking stalls are situated immediately north of the rental car counters for ready and return vehicles.

AIRPORT SUPPORT FACILITIES

FAA AIR TRAFFIC CONTROL TOWER

The FAA Air Traffic Control Tower complex, which includes offices for the FAA and the National Weather Service, was completed in 1988. It is located east of the General Aviaition T hangars. Underground communication lines link the FAA Air Traffic Control Tower with the Airport Surveillance Radar (ASR), new Radio Transmitter/Receiver Building, and new Airfield Lighting Vault.

Because of the Air Traffic Control Tower's location relative to terrain and buildings that have been constructed adjacent to the East Ramp, certain portions of the apron used by helicopters cannot be seen by controllers. This complicates the task of controlling the ground movement of these aircraft. The northernmost portion of the new passenger terminal obstructs the controllers views of Taxiway "H", portions of Taxiway "F" and the commuter terminal apron.

AIRCRAFT RESCUE AND FIREFIGHTING (ARFF)

The Aircraft Rescue and Firefighting (ARFF) facility abuts the apron on the west side of Runway 2-20. It has direct access to the aircraft operating area which helps ARFF crews

to respond quickly to fires in the passenger terminal complex area. Completed in 1978, the structure is in relatively good condition. Six firefighting and rescue trucks are assigned to the station. These include two 3,000-gallon and two 1,500-gallon capacity firefighting trucks, one rescue truck, and one 4-wheel drive utility vehicle. Airfield access, however, from the station has been compromised by the new holdrooms, and the Airports Division has a new ARFF facility under construction on the East Ramp.

The training area for the ARFF crew is located on the west side of Runway 5-23. It is a remote area and well-screened by vegetation from public view. This training area is readily accessible from the aircraft operating area, as well as from the Airport via Alahao Street. The prevailing winds blow smoke generated by practice operations away from the passenger terminal.

AIRLINE GROUND EQUIPMENT MAINTENANCE

The airlines at Kahului Airport use a portion of the ramp located to the east of the intersection of Taxiway "B" and Taxiway "F" and leading to the commuter aircraft parking apron, to maintain ground support equipment. Because of the area's proximity to the VORTAC navigational facility, maintenance shelters have been constructed of wood to minimize electromagnetic interference.
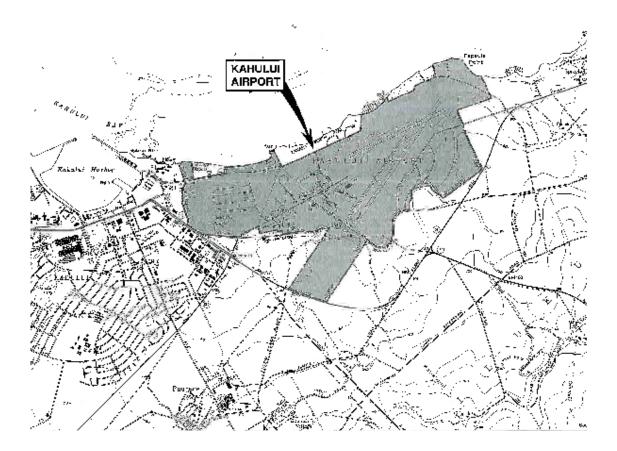
FUEL STORAGE AND LOADING FACILITIES

Fuel storage and loading at Kahului Airport is decentralized. Century Aviation has four storage tanks, with only three in use at the present time. The two largest tanks are used for jet fuel with 23,000-gallon and 28,000-gallon capacities, respectively. The third tank, with a 10,000-gallon capacity, is used for Avgas. The fourth tank, with a capacity of approximately 8,000 gallons, is unused at the present time. Fuel is brought to these tanks by the company's tanker trucks. Trucks resupplying the tanks travel between the large oil company fuel storage tanks located at Kahului Harbor and the Airport via Hana Highway, Haleakala Highway, Kala Road, and Eena Street. Currently, the tanker trucks used for aircraft refueling are based on the East Ramp. Because there is no suitable airport service road, they must cross Runway 2-20 to reach the air carrier aircraft parking apron adjacent to the passenger terminal. This requires clearance from the FAA Air Traffic Control Tower. Reportedly the FAA has requested that the practice be terminated at the earliest possible date. The only available alternate route would take the tanker trucks out of the Airport along Hana Highway but because the equipment now in service exceeds the load ratings of the roads that would have to be used, this is neither feasible nor permitted.

At the present time, the only other large fuel tank on the Airport is a 50,000-gallon capacity tank that Hawaiian Airlines constructed to store fuel for its aircraft. The tank is located at the intersection of Aalele Street and Old Haleakala Highway. It is not currently in use. When it was in use, it was resupplied by trucks that followed an Aalele Street/Keolani Place/Hana Highway route between the harbor storage facilities and the

Airport. Hawaiian Airlines refueling trucks traveled via Aalele Street and Keolani Place past the passenger terminal to Gate 1, entering the airport operating area at that point.

In addition to these on-site fuel tanks, two of the helicopter operators based on the East Ramp have their own small fuel storage tanks. These are refilled by trucks that follow essentially the same route used by the Century Aviation tanker trucks to and from the Airport.

Lanai Airport

Lanai Airport is located on the island of Lanai, three miles southwest of Lanai City. The Airport is situated on the rim of an ancient volcano, surrounded by agricultural lands. Lanai Airport is the only aviation transportation facility located on the island. The existing Airport boundaries encompass approximately 505 acres of land. The Airport is located at approximately 20 degrees 47' 20" N latitude and 156 degrees 57' 15" W longitude. The topographical elevation of the property is 1,308 feet above mean sea level. Lanai Airport is classified as a "Commercial Service Primary Airport – Short Haul" in the National Plan of Integrated Airport Systems, which typically serves short haul air carrier routes of less than 1,500 miles. Facilities at Lanai Airport accommodate primarily inter-island passenger and cargo operations as well as charter flights.

RUNWAYS

Lanai Airport has a single runway configuration. This is the simplest of runway configurations. Runway 3-21, which is 5,000 feet long and 150 feet wide, is aligned in a northeast-southwest direction. The effective gradient is 0.06 percent sloping downward toward the southwest.

The structural pavement section of Runway 3-21 consists of a 5 1/2 –inch thick layer of asphaltic concrete pavement on a 6-inch layer of aggregate base and a 7-inch layer of sub-base on a sub-grade with a CBR of 11. The equivalent pavement thickness is 18 inches. In early 1998, the runway pavement was resurfaced by removing and replacing 2 inches of asphaltic concrete. The runway pavement was also re-grooved at that time with ¼-inch deep by ¼-inch wide grooves running perpendicular to the runway.

Runway 3-21 has an estimated pavement strength, in terms of maximum gross weight (pounds), as defined by aircraft landing gear configuration as follows: Single Wheel (S) – 75,000, Dual Wheel (D) – 110,000, Dual Tandem (DT) – 170,000.

TAXIWAY

There is a single taxiway that serves as both an entrance and exit to and from Runway 3-21. The taxiway is 75 feet wide by 287.5 feet long. It is aligned perpendicular to the runway and is located approximately 1,050 feet from the end of Runway 3-21. Taxiing to the runway thresholds for takeoff is along the runway. Aircraft landing on Runway 21 must back-taxi along the runway to exit onto the taxiway. Taxiway markings on the pavement are used to aid pilots in guiding the aircraft during the day and at dusk. Lights are used to guide pilots maneuvering at the Airport at night.

Essential features of a taxiway marking system include: the centerline of the taxiway, holding line at intersections where there is an operational need, and at the edge of the taxiway that may occur on a large paved area such as an aircraft parking apron. The existing markings consist of yellow centerline taxiway markings and holding line. There is no directional taxiway signage at the Airport.

The taxiway pavement section consists of a 4 ½-inch thick layer of asphaltic concrete overlay on a 6-inch layer of untreated base over a 7-inch layer of granular sub-base.

AIRCRAFT PARKING APRON

The terminal apron provides the connection between the terminal buildings and the airfield. It includes parking areas for airplanes and aircraft circulation, and taxiing areas for access to these parking areas. The aircraft park in areas designated as gates or aircraft hard stands. The parking positions are sized-based on the geometric properties of the aircraft, including wingspan, fuselage length, and turning radii, and for the requirements for aircraft access by ground support vehicles and equipment at the gates. A total paved apron area of approximately 317,000 is available.

Directly adjacent to the passenger terminal building are two angled nose-in striped gate parking positions for power in/power out operations by inter-island aircraft that allow for the enplaning and deplaning of passengers. Both jet and turbo-prop aircraft currently being utilized by air carriers (DC-9, B-737, Dash 8, and Dash 6) servicing the Airport are accommodated by these gates.

There are three angled nose-in long term aircraft parking positions located along the northeastern edge of the apron. General aviation and business jets are accommodated by these parking positions. A fourth aircraft may be parked in the turfed area adjacent to the apron.

Short-term parking for aircraft involved in air cargo operations is provided in designated area approximately 90-feet by 140-feet directly opposite and adjacent to the cargo building. Transient aircraft with wing spans less than 50 feet are parked in the turfed area along the perimeter of the apron. There are seven aircraft tie-down positions located in a turfed area along the southwestern edge of the parking apron. These tie-downs are adequate for single engine and light twin engine airplanes in airplane design group I, which is a grouping of airplanes based on a wingspan up to, but not including, 49 feet. One tie-down position is located next to the designated air cargo operations area. Additional parking for transient aircraft is accommodated in the turfed area along the east perimeter of the apron.

The apron currently has no designated area for the parking of helicopters. It has been reported that occasionally up to twelve helicopters have been parked on the southwest portion of the apron.

The pavement section of the parking apron consists of a 4-inch thick layer of asphaltic concrete pavement on a 6-inch layer of asphalt-treated base over a 7-inch layer of aggregate base placed on a prepared sub-grade.

For ease of towing and aircraft taxiing, apron slopes or grades are kept to the minimum consistent with good drainage requirements. The effective gradient of the apron is approximately 0.7 percent.

Lighting of the apron is provided by four light standards located along the building restriction line. The spacing of the light standards is approximately 200 feet center-to-center.

RUNWAY PROTECTION ZONES, APPROACH AREAS, AND OBSTRUCTIONS

Publicly-owned airports, such as Lanai Airport, are required to conform to certain Federal Aviation Administration (FAA) design standards. These airports must meet certain geometric design criteria regarding runway protection zones (RPZ), runway approach and departure areas, and obstructions that may be hazardous to air navigation.

For geometric design, the FAA classifies airports based on an airport reference code (ARC). The current ARC for Lanai Airport is C-111. Runway 3 currently has a non-precision approach requiring an inner width of 500 feet. The lengths of the RPZ are 1,700 feet for Runway 3 and 1,000 feet for Runway 21. The outer widths are 1,010 feet for Runway 3 and 700 feet for Runway 21.

The approach area to Runway 3 has no controlling obstacle/obstruction to set an actual approach slope. The Lanai Very High Frequency Omnidirectional Range/Tactical Air Navigational Facility (VORTAC) at 7,290 feet from the runway to the southwest is the highest obstacle in the approach area and its elevation is 1,276 feet MSL, or 29 feet below the runway threshold elevation.

Although the controlling obstacle in the approach area to Runway 21 sets an actual approach slope of 34:1, there is a bush at the corner of the inner end and northwest edge of the approach area that is nine feet above the Runway 21 threshold. Just beyond the outer end of the 5,000-foot approach surface at 5,960 feet from the threshold, there is an old abandoned pineapple field with an elevation of 1,492 feet MSL. This is part of a larger area of old pineapple field that penetrates both the 150-foot horizontal and 20:1 conical surface to the north-northeast of the Airport.

It should be noted that along the outer edges of the primary surface are bushes ranging form two to eight feet above the centerline elevation of the runway and are identified as obstructions. The primary surface extends the length of the runway plus 200 feet beyond each end of the runway, and it is 500 feet wide, and centered on the runway centerline.

NAVIGATIONAL FACILITIES AND LIGHTING

Runway 3-21 is painted with non-precision runway markings and equipped with medium intensity runway lights (MIRL). Runway 3 has a non-precision instrument approach with straight in minimums. Runway 3 has a visual approach slope indicator (VASI-4L) and an instrument landing system (ILS). There is an airport rotating beacon located west of the passenger terminal and aircraft parking apron. The Airport has a lighted wind indicator, wind cones and a segmented circle at the end of Runway 21. There is also a lighted anemometer to the southwest of the aviation apron.

The Airport does not have an Air Traffic Control tower and is therefore an uncontrolled airport. However, there is a Common Traffic Advisory Frequency (CTAF) for pilots to advise each other of their intentions and positions while operating near the Airport. Additionally, a Remote Communications Outlet (RCO) is located near the Airport for communications with Honolulu Flight Service Stateion (FSS). The Honolulu Combined Center/Radar Approach Control (CERAP), located on the island of Oahu, provides air traffic control for en route IFR aircraft and for approach and departure IFR aircraft.

The Lanai VORTAC facility is 1.2 nautical miles (NM) southwest fromt eh Runway 3 threshold and provides the primary navigational information for Lanai Airport. Distance Measuring Equipment (DME), which provides the pilot with information on how many nautical miles the aircraft is from the airport, is typically co-located with the localizer in an ILS. The DME at the Lanai Airport is currently located at the VORTAC and would not be co-located with the localizer.

Navigational and landing aids at the Lanai Airport include the following;

- VORTAC (identification call sign letter LNY)
- Remote communications outlet (RCO)
- Airport rotating light beacon
- Visual approach slope indicator (VASI-4) to Runway 3
- Instrument Landing System (ILS) (Glide Slope Antenna on Fwy 3 and Localizer on Rwy 21)
- Medium Intensity Runway Lights (MIRLS) on Runway 3-21
- Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR)

METEOROLOGICAL CONDITIONS

At Lanai City, at an elevation of 1,620 feet MSL, the average temperature of the warmest month is 73 degrees (Fahrenheit) and of the coolest month is 66 degrees. The extreme range of temperature is a low of 46 degrees and a high of 88 degrees. The average maximum daily temperature during the hottest month is 84 degrees.

Annual rainfall is generally low due to the island's location on the leeward side of Maui. Lanai's annual average rainfall is estimated to vary between 10 inches near the coast to 35 inches at Lanaihale, which reaches an elevation of 3,370 feet.

Lanai lies in the belt of the northeasterly trade winds, which are very consistent. The whole island is not exposed to the full effect of the trade winds as the island is partly sheltered by Maui. However, the funneling effect of the East Molokai and West Maui mountains increases wind velocity in the channel. Southerly or "kona" winds interrupt the trade winds at times, especially during the winter months.

Based on the data collected at Lanai Airport for the period January through December 1965, Runway 3-21 provides 98.3 percent wind coverage for 15 knot crosswinds and 93.8 percent wind coverage for 10.5 knot (12 mph) crosswinds.

PASSENGER TERMINAL COMPLEX

The Lanai Airport passenger terminal complex includes the terminal building, administration building, Aircraft Rescue Fire Fighting (ARFF), cargo/maintenance building, public and employee automobile parking areas, tenant concession area, and an aircraft parking apron. Passengers enplane and deplane at ground level.

The one-story passenger terminal building consists of four interconnected one-story buildings with an interior gross floor area encompassing 13,516 square feet. The terminal building provides space for airline ticketing and check-in operations, USDA agricultural inspection, baggage claim, security check point, passenger waiting lobby, public telephones, restrooms, resort registration and terminal support facilities. Commuter and cargo airlines also use space in the cargo building.

AIR CARGO

Air cargo is defined as "any mail, freight or goods moving by air." A new cargo building with an interior gross floor area of 4,000 square feet was completed in February 1993. The cargo building has three cargo spaces. There is also a maintenance shop, a maintenance office and a generator room. The maintenance spaces are for custodial staff and for general repairs to the terminal grounds and not for any aircraft maintenance.

GENERAL AVIATION

General aviation is the term used to designate all flying done other than by the commercial airlines, commuter, air taxi, or the military. General aviation aircraft have a transportation function similar to that of the private automobile. For statistical purposes, general aviation in the United States is usually divided into business flying (i.e., transportation not for hire), commercial flying, instructional flying, and personal flying.

There are no fixed base operators (FBO) or hangar facilities at the Airport. Presently there are limited general aviation facilities at Lanai Airport.

AIR TAXIS

Air taxi is defined as "a non-scheduled carrier using small aircraft for very short haul travel on a charter basis." Air taxi is not "regulated." There is no FAA certificated fixed wing air taxi operators located at the Lanai Airport.

HELICOPTERS

There are no helicopters based at Lanai Airport, nor facilities to support them. Charter helicopter tours use the Airport on a non-regularly scheduled basis.

AIRPORT ACCESS, PARKING AND GROUND TRANSPORTATION

Access to the Airport is via a two-lane paved road from Kaumalapau Highway half-a-mile in length. The pavement section of the access road was widened in 1994 from 18 feet to 24 feet with 6-foot shoulders. At the present time, traffic is relatively light on both the highway and the airport access road so traffic signals are not currently required at the intersection. However turning lanes from Kaumalapau Highway onto the airport access road are provided.

Immediately upon entering the terminal complex, vehicular parking facilities are provided. Vehicular parking at the Airport consists of 90 public parking spaces, 55 designated employee parking spaces, 11 cargo parking spaces, and 5 commercial bus/van parking spaces, for a total of 161 spaces. While there is no charge for parking, 24 of the public parking stalls have one-hour parking restrictions.

In addition, 18 of the stalls are designated as 24-hour parking. Overnight parking is confined to the remaining 48 public parking stalls.

There are no rental car or taxi counters at the Airport. However, rental cars and taxis area available at Lanai City through Lanai City Service & U-Drive and Dollar Rent-A-Car. The Koele Lodge and Manele Bay Hotels provide shuttle service to the hotels from the Airport.

Kaumalapau Highway (Hawaii State Route 440) is the major road connecting the Lanai Airport to Lanai City.

The circular turnaround located adjacent to the new terminal curbside entrance provides a convenient space for unloading and loading of passengers and their baggage directly in front of the entrance to the terminal building. The pavement section of the parking areas consists of a 2-inch thick layer of asphaltic concrete pavement on an 8-inch thick layer of aggregate base over a compacted sub-grade.

LANAI AIRPORT

Photo by Air Survey Hawaii, Inc. July 6, 1995

Molokai Airport

Molokai Airport is located on the Island of Molokai's central plateau with the towns of Kaunakakai 6 miles to the southeast, Kualapuu 3-1/2 miles to the east and Mauna Loa 8 miles
to the southwest. The location of the Airport is shown on Figure 2-1. The Airport boundary encompasses 207 acres of land at approximately 454 feet above mean sea level (MSL). Molokai Airport is classified as a "Commercial Service – Primary Airport" in the *National Plan of Integrated Airport Systems* (NPIAS) serving short-haul air carrier routes of less than 500 miles. Facilities at Molokai Airport accommodate primarily interisland passenger and cargo operations and some general aviation and military activity.

Facilities at the Airport accommodate mostly air carrier, commuter/air taxi and general aviation operations. Existing facilities include those for airfield (runways, taxiways, aprons, helipad), passenger and cargo service, general aviation, airport support (aircraft rescue and firefighting facility and an air traffic control tower), as well as supporting infrastructure and utilities.

2.2   EXISTING AIRPORT FACILITIES

This section describes the existing airport facilities including the airfield, passenger and cargo terminal, navigational aids, access and parking and support and utility systems.

2.2.1   RUNWAYS

There are two runways: Runway 5-23 is 4,494 feet long and 100 feet wide, aligned in an approximate northeast – southwest direction. The effective gradient is 0.38 percent sloping downward to the southwest. There is a 593-foot displaced landing threshold on Runway 23. The runway was resurfaced and grooved in 1998.

Runway 5-23 has an asphalt pavement with an aggregate friction seal coat, with estimated pavement strengths, in terms of maximum gross weight (pounds), as defined by aircraft landing gear configuration, and as presented in the latest FAA Form WE 5335-1, *Pavement Strength Survey*
(July 17, 1995), as follows:

        Single Wheel (S)   30,000
        Dual Wheel (D)   48,000

Runway 17-35 is 3,118 feet long and 100 feet wide, aligned in an approximate north-south direction. The effective gradient is 0.59 percent sloping downward to the south. There is a 426-foot displaced landing threshold on Runway 17. The runway was paved and restriped in 1995.

Runway 17-35 has an asphalt pavement with an aggregate friction seal coat with an estimated pavement strength, in terms of maximum gross weight (pounds) as defined by aircraft landing gear configuration as follows:

Single Wheel (S)   12,500

2.2.2   TAXIWAYS

Taxiway A is 40 feet wide and 250 feet from the centerline of Runway 5-23. The parallel taxiway connects the runway to the aircraft parking aprons. There are two exit taxiways (B and C) along Runway 5-23 in addition to the entry/exit taxiways at both ends of the runway.

There is no taxiway parallel to Runway 17-35. Taxiing to the runway thresholds for takeoff and to exit after landing is along the runway. Taxiway E connects Runway 17-35 to Taxiway A and the aircraft parking aprons.

2.2.3   RUNWAY PROTECTION ZONES, APPROACH AREAS, AND OBSTRUCTIONS

The runway protection zone (formerly clear zone) for Runway 23 lies mostly outside of the Airport property line but entirely within the avigation easement. A portion of the minimum required runway protection zone for Runway 5 is also outside the Airport property line.

The runway protection zone for Runway 17 lies entirely outside of the Airport property line. A portion of the minimum required runway protection zone for Runway 35 is also outside the Airport property line.

When the existing runway protection zone (formerly clear zone) dimensions were established at the Airport they were based on Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace,* approach surface dimensions out to where the surface is 50 feet above the runway threshold or the underlying ground surface. The inner width was determined by the most precise type of approach for either end of the runway. Because neither runway end has an instrument approach with straight-in minimums, Runway 5-23 required an inner width of
500 feet. The lengths of the existing runway protection zones are 1,000 feet for Runway 23 and 350 feet for Runway 5, i.e., to the point where the surface is 50 feet above the terrain. The outer widths are 700 feet for Runway 23 and 570 feet for Runway 5.

Runway 17-35 has visual approaches and required an inner runway protection zone width of 500 feet. The lengths of the runway protection zones are 1,000 feet for Runway 17 and 500 feet for Runway 35 (i.e., to the point where the surface is 50 feet above the terrain). The outer widths are 700 feet for Runway 17 and 600 feet for Runway 35.

Both the FAA Airport Master Record (Form 5010-1) and the Airport Obstruction Chart, published by the National Oceanic and Atmospheric Administration (NOAA), were reviewed to identify obstructions as defined by FAR Part 77.

The following tabular data shows the FAR Part 77 approach slopes, compared with existing obstacle/obstruction controlled approach slopes.

					Controlling Obstacle/Obstruction Location from Runway Threshold Related to Extended Run Centerline	
No.	Runway Elevation	Part 77 Slope	Actual Slope	Actual Type	Elevation	Location
5	437	20:1	50:1	none	----	not applicable
23	454	20:1	13:1	brush	546	1,390 feet along runway centerline
17	448	20:1	0:1	fence	460	80 feet along runway centerline
35	430	20:1	50:1	none	----	not applicable

Although the controlling obstacle in the approach area to Runway 23 sets an actual approach slope of 13:1, the operational approach slope to the displaced threshold is 31:1. The mountain at 2.8 nautical miles from the Runway 5 threshold to the southwest is the highest obstacle in the approach area and its elevation is 1,431 feet MSL.

The approach area to Runway 35 has no controlling obstacle/obstruction to set an actual, approach slope. Although the controlling obstacle in the approach area to Runway 17 sets an actual approach slope of 0:1, the operational approach slope to the displaced threshold is 34:1.

The existing Building Restriction Line (BRL) along the north side of Runway 5-23 is at 500 feet from the runway centerline. It extends outside the Airport property line at the southwest end of the runway. The BRL is also at 500 feet from the runway centerline south of Runway 5-23 and extends across Maunaloa Highway (State Highway 460). The BRL for Runway 17-35 is established at 300 feet to the east and west, north of Runway 5-23, and 500 feet to the east, south of Runway 5-23. No BRL has been established southwest of the intersection of Runways 5-23 and 17-35.

2.2.4   NAVIGATIONAL FACILITIES AND LIGHTING

The Molokai VORTAC is 3.8 NM from the Runway 5 threshold and provides primary navigational information for the Molokai Airport.

Runway 5-23 is painted with nonprecision runway markings and equipped with medium intensity runway lights (MIRL). There is a VOR nonprecision instrument approach, with circling minimums to the Airport, Runway 5 has runway end identifier lights (REIL). A

precision approach path indicator (PAPI) was installed on Runway 5 in 1995. Use of the PAPI is not authorized 1.8 NM beyond the landing threshold due to rapidly rising terrain. Runway 17-35 is painted with basic runway markings but is not equipped with runway lights. There are taxiway entrance/exit lights but only reflectors on the taxiways.

There is an airport rotating light beacon located on the passenger terminal building. The Airport has a lighted wind indicator and segmented circle, and wind cones near the end of Runway 23 and west of the intersection of the two runways. There is also a lighted anemometer on the Airport. There are three obstruction lights located approximately 1,500 feet northeast of the physical end of Runway 23.

An Automated Surface Observing System (ASOS) has recently been installed and permits FAR Part 121, *Operating Requirements: Domestic, Flag, and Supplemental Operations,* and FAR Part 135, *Operating Requirements: Commuter and On-Demand Operations* flight operations (i.e, air carrier, commuter/air taxi and commercial operations) when the air traffic control tower is closed.

2.2.5   METEOROLOGICAL CONDITIONS

The summary of local climatological conditions is based on information provided by available sources. At the Molokai Airport the normal maximum temperature of the hottest month is 85 degrees Fahrenheit. The average temperature of the warmest month is 78 degrees Fahrenheit and the coolest month is 70 degrees Fahrenheit. The extreme range of temperatures is a low of 48 degrees Fahrenheit and a high of 90 degrees Fahrenheit.

Based on data collected at Molokai Airport for the period July 1977 through May 1979, Runway 5-23 provides 96.3 percent wind coverage for 10.5 knot (12 mph) crosswinds and Runway 17-35 provides 73.4 percent wind coverage for 10.5 knot crosswinds. Together, both runways provide 99.2 percent wind coverage for 10.5 knot crosswinds. Prevailing trade winds are from the northeast. Users of the Airport report that when winds are strong, there is moderate to heavy turbulence. A summary of estimated wind and runway use patterns at the Airport is presented in Table 2-1.

The Molokai Airport lies within a cloud belt which, during current normal operating hours, usually has sufficient ceiling height to permit nonprecision instrument approaches for landings. However, lower ceilings are experienced during the late evening hours through the early morning hours.

Based on discussions with persons knowledgeable of weather conditions at Molokai, IFR (Instrument Flight Rules) ceiling and visibility conditions below 1,000 feet and/or three miles at Molokai Airport occur about 10 percent of the time.

Table 2-1

SUMMARY OF WIND AND RUNWAY USE PATTERNS
Molokai Airport

A.   ANNUALIZED PERCENTAGES FOR WINDS ALIGNED TO RUNWAY 5-23:

Direction	<5 kts	5 to 10 kts	10 to 16 Kts	>16 Kts
Trade	----	31.3%	33.7%	16.6%
Kona	----	4.85%	1.5%	0.1%
Calms	8.0%	----	----	----
Crosswinds	----	2.9%	0.4%	0.7%

B.   ANNUALIZED RUNWAY USE FREQUENCY FOR RUNWAY 5-23:

	Takeoffs		Landings	
Winds	Rwy 5	Rwy 23	Rwy 5	Rwy 23
Calms	7.0%	1.0%	7.0%	1.0%
Trade	81.6%	0.0%	81.6%	0.0%
Kona	0.0%	6.4%	0.0%	6.4%
Crosswinds	1.4%	1.5%	1.4%	1.5%
Totals	90.0%	8.9%	90.0%	8.9%

C.   ANNUALIZED RUNWAY USE FREQUENCY FOR RUNWAY 17-35:

	Takeoffs		Landings	
Winds	Rwy 35	Rwy 17	Rwy 35	Rwy 17
Crosswinds	0.2%	0.9%	0.2%	0.9%
Totals	0.2%	0.9%	0.2%	0.9%

2.2.6 PASSENGER TERMINAL COMPLEX

The Molokai Airport passenger terminal includes the aircraft parking apron, terminal building, and ancillary service facilities (see Figure 2-3). The one-level terminal building provides space for airline and passenger service facilities, cargo, terminal support facilities, and airport administrative offices.

2.2.6.1 AIR CARRIER AND COMMUTER AIRCRAFT PARKING APRON

The existing air carrier and commuter aircraft parking apron is located on the south side of the terminal building. A 110,000 square foot aircraft parking apron serves the air carrier, commuter, and cargo aircraft. There are two aircraft parking positions marked on the apron (one at each end) to accommodate air carrier (B-737, DC-9, ATR-42 and DHC-8) aircraft. In addition, there are five (5) commuter/air taxi (DHC-6, Cessna 402) aircraft parking positions marked in the center of the apron. Small commuter passenger and cargo aircraft can use any of the five positions. Alternatively, this space could be used for a third air carrier aircraft parking position. Power-in/power-out aircraft parking procedures are used.

2.2.6.2 PASSENGER TERMINAL BUILDING

The air carrier and commuter airlines currently operating in the passenger terminal are Hawaiian Airlines, Island Air, Molokai-Lanai Air Shuttle, Pacific Wings, and Paragon Air.

Airline operations and passenger service facilities include airline ticketing/check-in, baggage handling, baggage claim area, passenger waiting area and cargo handling. Passenger services include an airport lounge and snack bar, rental car counters, lei shop, Visitor Information Program booth, telephones and restrooms. These facilities occupy an area of approximately 16,800 square feet.

Passenger security screening is currently only required for Hawaiian Airlines DC-9 flights and is conducted inside the building using a handheld screening process.

There is no U.S. Department of Agriculture inspection facility at the Airport. Occasionally inspectors are brought in from other islands for charter flights at the airlines request.

2.2.7 CARGO FACILITIES

Hawaiian Airlines and Island Air use their leased space in the passenger terminal building for their cargo operations. Hawaiian keeps their equipment used for cargo outside the building. Trans Air uses ticket counter space for their cargo operations. Federal Express, Polynesian Airways and United Parcel Service (UPS) handle air cargo through the old baggage claim area at the east end of the terminal for both inbound and outbound cargo and have storage space in this area. Hawaiian Airlines and Island Air also have storage space at the old baggage claim area. Genavco handles cargo on the grass area by the two hangars at the north end of the Airport.

2.2.8 GENERAL AVIATION FACILITIES

The general aviation area, located north of the control tower, includes two T-hangars and nine (9) tiedowns. There are also eight aircraft tiedown positions southwest of the air carrier/commuter aircraft parking apron.

2.2.9 AIRPORT ACCESS AND PARKING

2.2.9.1   ACCESS ROAD

The primary airport access is via a two-lane paved road from Keonelele Avenue north of the Airport, as shown on Figure 2-3. The roadway pavement width is 24 feet and is in good condition. There are no shoulders along the access road. Traffic is relatively light on both Keonelele Avenue and the Airport access road.

Other access roads from Keonelele Avenue are northwest of the terminal area. These roadways access the car rental facilities, aircraft hangars and the State DOT baseyard facility. These roadways are paved or unpaved, 15 feet or less in width, and in generally poor condition.

2.2.9.2   PARKING

The airport parking areas are shown on Figure 2-3. Paved vehicular parking consists of 1 handicapped, 12 metered, and 68 non-metered public stalls fronting the Passenger Terminal Building; 3 airport employee, 3 handicapped and 8 passenger and baggage pickup stalls adjacent to the Aircraft Rescue and Firefighting Facility (ARFF); 28 stalls north of the ARFF reserved for car rentals; and 19 visitor stalls at the base of the air traffic control tower. An 89-stall paved employee lot is located adjacent to the ATCT access road. The pavements are in good condition.

Overnight parking is limited to a grassed, unmarked area adjacent to the air traffic control tower access road. Except for the 12 metered stalls, there are no parking fees.

2.2.9.3   GROUND TRANSPORTATION FACILITIES

Budget Rent-A-Car and Dollar Rent-A-Car have counters in the Passenger Terminal Building. There are ground transportation lease lots for Budget and Dollar north of the terminal area. Kukui Tours and Limousines and Molokai Off-Road Tours and Taxi provide taxi and tour service.

MOLOKAI AIRPORT

Photograph from the
"Molokai Airport Master Plan Phase I Improvements
Final Environmental Assessment"

Prepared by
Engineering Concepts, Inc.
Aries Consultants, Ltd.,
Y. Ebisu & Associates, Inc.

APPENDIX E

STRATEGIES TO LINK CENTRAL AND WEST MAUI

TASK FORCE REPORT

STRATEGIES TO LINK CENTRAL AND WEST MAUI

Prepared in collaboration with:
CENTRAL AND WEST MAUI CONNECTOR TASK FORCE,
A CITIZENS ADVISORY GROUP

In cooperation with:
COUNTY OF MAUI DEPARTMENT OF PUBLIC WORKS & WASTE MANAGEMENT
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAYS ADMINISTRATION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

Prepared by:
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION
STATEWIDE TRANSPORTATION PLANNING OFFICE

FEBRUARY 2000

Excerpts From the:

Task Force Report Strategies to Link Central and West Maui

2000.   State of Hawaii Department of Transportation Statewide Transportation Planning Office.

In an effort to seek some sort of solution or mitigation of the problem, State Senator Jan Yagi-Buen has convened a task force of public and private sector representatives to investigate the situation, and to recommend any possible remedies. Staff from the Federal Highway Administration, Maui Country Department of Public Works and Waste Water Management, and the State Department of Transportation were tasked with providing technical support and guidance.

The primary mission of the Task Force was to look at permanent solutions (i.e., alternate routes) to this recurring problem, but in the course of its meetings, the groups also identified other problems, which could be addressed with more immediate, temporary measures. This included the lack of public notification of road closures; poor conditions of alternate emergency routes, i.e., cane haul roads, and northern route via Kahakuloa; and possible inefficient use of the emergency routes, e.g., inadequate accesses.

Existing Infrastructure

While West Maui does include both airport and harbor facilities, neither would be capable of providing the equivalent capacity should a road closure occur.

Kapalua Airport in West Maui operates only during daylight hours. Its capability of transferring passengers to Kahului Airport or airports on the other islands is limited. In 1999, the airport accommodated roughly 16 daily flights or 8 roundtrips provided by Aloha Air using DeHavilland Dash-8's, for a maximum daily total of 592 passengers. Helicopters are permitted use of the facility only during emergencies such as to fight fires.

Lahaina Small Boat Harbor with one pier, 21 berths, and 79 moorings, is the main boating facility in West Maui. There are additional small anchorages, mooring areas, and boat ramps at Kaanapali, Lahaina Roadstead, and Mala. Boating provides an alternative transportation link between Central and West Maui. For example, when fires caused road closures on Honoapiilani Highway recently, approximately 100 passengers were shuttled by boats between Lahaina and Maalaea Small Boat Harbors.

There are also some private shuttle buses, which run between the resorts on West Maui and the shopping malls and Kahului Airport.

Finally, the Kaanapali and Pacific Railroad is a private operation running between Lahaina and Kaanapali. This facility mainly serves as a tourist attraction, although it also provides a link between the resort area in Kaanapali and the historic town of Lahaina.

Emergency Plans

Maui County Police Department – Highway Closures (Special Order 99-12)

Special Order 99-12 establishes guidelines for closing portions of major highways on Maui due to a critical incident. A critical incident is defined as any natural or manmade emergency, which has or may cause major property damage, serious bodily injury or death. The chief of Police or ranking field supervisor on duty will determine whether a road closure is required.

Honoapiilani Highway is specifically addressed in the special order. If any portion of Honoapiilani Highway, between Kuihelani Highway and Honolua, is close, then Kahekili Highway traffic flow is only allowed one-way from Lahaina to Kahului. Private roads may be used in accordance with a separate general order, which deals with the emergency use of private property. This would apply to cane haul roads if and where they permit bypassing any portion of the main highway that has been closed due to an emergency.

Additional Problems Encountered

The impact of road closures are magnified by communication barriers or the lack of systematic public notification, delays in clearing the accident scenes, and the poor condition of the alternate emergency routes. An effort is underway to amend the emergency plans, with special procedures to address the Pali Road Closures. While a separate committee has been convened to improve the emergency procedures, the related comments which surfaced at the West Maui Connector Task Force meetings are presented.

a) There are currently no road signs along the roads leading to the Pali area to notify motorists whenever there is a road closure. Unless they happen to find out through a radio broadcast or by word of mouth, drivers have no means of foretelling a closure until they have traveled into the congested area.

b) Traffic accidents require the police to gather evidence through procedures acceptable in court. This requires sophisticated data taking and records completion, which in the past have taken up to about 5 or 6 hours to complete. This procedure has since been expedited to about 3.5 hours, but still results in a delay in clearing the accident scene.

c) The emergency routes, formerly old cane haul roads, are in poor condition. They have potholes and other surface discrepancies, and lack signage, lighting, and striping or other lane division.

Identification of Alternatives

The Task Force identified various improvements to mitigate the road closure problem, depending n the location of the incident. If the problem occurred in the Pali area, the permanent solution would be the construction of an alternate route. If the closure was along other portions of the route, short-term improvements to the contingency plans were recommended.

Long Term

1) Add two lanes to the Honoapiilani Highway Corridor from Maalaea Road to Puamana

The need for an additional two lanes of capacity along this segment of Honoapiilani Highway was identified in the Maui Long Range land Transportation Plan to mitigate existing traffic problems, and to accommodate the projected 20-year travel demand. With the frequency of the road closures, it would be desirable to add the lanes along a separate alignment from the existing road, to provide an alternate route. Also, areas of the existing highway near the coastline have experienced erosion and impacts during high ocean surges

2) Transit

Various transit options have been evaluated over the years, the most recent reassessment during the development of the Long Range Plan in 1997. The lack of funding available for an extensive transit system and the need for a large operating and maintenance subsidy on a continuing basis have discouraged the county from pursuing expanded public transit operations. A proposed ferry service between Central and West Maui has also been discussed. A business plan outlining the financial viability of such a service would be required, before the necessary harbor and landside improvements for parking and passenger facilities can be considered.

Short Term

1) Emergency use of cane haul roads
A 10-mile segment of Honoapiilani Highway, in the vicinity between Olowalu and Puamana, is interfaced by cane haul roads. In times of emergency, these roads have been used as alternate routes. There have been occasions when the supervising officer on duty had determined that the condition of the cane haul road was such that it should not be used even as a temporary route. To prevent this from happening, the Task Force discussed general spot maintenance of the roads. Also, to improve the traffic flow when the roads are used, it was suggested that coning be considered.

2) Northern route via Kahakuloa

A narrow, single lane, county dirt road links the end of Honoapiilani Highway with Kahekili Highway. This road primarily services the local residents in the area. When road closures occur in the Pali section, this northern route becomes the emergency alternate to get out of West Maui. Traffic is allowed in one direction, out of Lahaina, with personnel stationed at key locations to direct the motorists. The condition of this segment of the road was described as being below standards. Sport improvements to the road would be highly desirable.

3) Improving communications

The lack of advance warning of road closures was cited as further exasperating the situation. If motorists could be alerted to road closures before traversing the router to West Maui, they could be deterred before getting caught in the congestion. Besides establishing communication networking with the broadcast media, which would be addressed in the effort to amend the emergency plans, it was suggested that variable message signs along the routes leading to West Maui would mitigate the problem. These would be permanently installed, programmable signs controlled from the highways district office. Approximately six roadside signs would be required.

4) Service patrols

Service patrols could be implemented, which would assist in incident management and expedite restoring the roadway to normal operations.

ASSESSMENT OF ALTERNATIVES

Cane Haul Roads

The emergency use of the cane haul roads is provided through G.O. 401.11, "Emergency Use of Private Property."

These roads, however, are not intended for the general public and are thus not well maintained. Spot improvements to fix potholes or other minor maintenance work have been suggested. Coning of the cane haul roads would improve the traffic flow during emergency use.

As these are private, sub-standard roads, the roads are not eligible for federal funds. Improvements to the cane haul roads, including signage, pot-hole filling and access improvements require funds. These improvements must satisfy Federal (AASHTO) standards to qualify for FHWA funds. In the absence of FHWA funds, funding from other sources is required. Jurisdictional responsibility for the improvements (i.e.,

designation of the expending agency) must also be determined; and roles during times of emergency would need to be defined (e.g., which agency would be responsible for coning).

Estimated cost for minimal spot improvements: $250,000 (one time).

Northern Route via Kahakuloa

The county portion of the northern route is substandard. Spot improvements along the route are desired. Improvements to the northern belt road via Kahakuloa require funds. These improvements must satisfy Federal (AASHTO) standards to qualify for FHWA funds.

Federal funds could be used if it were determined that the road would be built to standards. This has not been pursued as a viable project in the past because of the environmental and social impacts. It is anticipated that an improved roadway would open the region to more traffic, a scenario discouraged by the local community. Efforts to improve the road to standards should b pursued during the development of the long-range highway plan.

Estimated cost for minimal spot improvements: $250,00/year.

Estimated cost for improvement to standards: $100+ million (includes improving to 2 lanes)

Improving Communications

Federal funding to provide for variable message sings along state routes could be secured as part of ongoing highway projects. The installation of the signs, however, would be tied into the construction schedule of the projects, which may span a period of years. If local funding were available, the signage could be undertaken as a project by itself and completed within a year.

Estimated cost for variable message signs and control center: $500,000

Service Patrols

Service patrols would aid in incident management, accident or debris clearance, containment of minor oil or gasoline spills, on-the-spot assistance for disabled vehicles, etc. The program could be eligible for federal funds.

Estimated costs: $220,000/year (assumes extended hours of service, but not 24-hour coverage; patrol including vehicle and equipment; dispatcher).

RECOMMENDATIONS

While various alternatives are identified by the Task Force, improvements for the different portions of the West Maui routes would solve different problems and could be pursued concurrently. It was therefore, unnecessary to select a "preferred" alternative. As such, the Task Force's recommendations are as follows:

a. **A feasibility/planning study for Honoapiilani Highway, Maalaea Road to Puamana, should be initiated.** This would address the need for a permanent alternate route through the corridor, the imminent shoreline erosion situation, and as the first step in the project development process, expedite potential right-of-way acquisitions.

b. **Minimal, spot improvements should be provided for the cane haul roads to improve their use as emergency alternate routes. Also, coning during emergency operations should be implemented.** The affected state and county agencies (e.g. HDOT, County Public Works, County Police) and the affected landowners should meet to determine the specific improvements which should be undertaken, as well as the associated roles and responsibilities. This would include addressing resurfacing requirements, access and signage improvements, lighting, operational roles during the emergency, etc.

c. **Minimal, spot improvements along the northern route should be continued.** Repairs to this sub-standard county route have been ongoing. It would be desirous to continue and possibly upgrade these improvements to improve its use as an emergency alternate route.

d. **Programmable signs should be installed on the major roads leading to Honoapiilani Highway to notify motorists of road closures.** This should be expedited, subject to the availability of funds.

e. **Service patrols should be investigated and if warranted, implemented.** This program is as yet unproven in the State of Hawaii, but has the potential of minimizing the impact of traffic incidents and reducing the duration of road closures, especially those involving minor accidents.
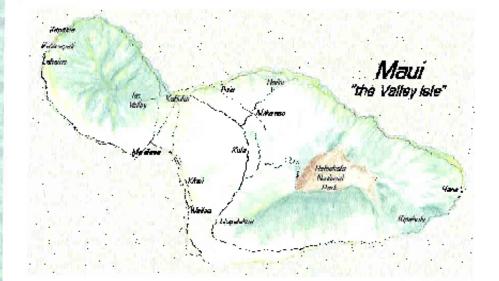
APPENDIX F

JOINT STATE/COUNTY

MAUI INTERIM TRANSPORTATION PLAN

FINAL

JOINT STATE/COUNTY
MAUI INTERIM TRANSPORTATION PLAN

Maui
"the Valley Isle"

JOINT STATE/COUNTY MAUI INTERIM TRANSPORTATION PLAN
JANUARY 2002

Excerpts from the Executive Summary

INTRODUCTION

The Island of Maui has experienced significant growth in population over the past several years. Census 2000 information reveals that the total population on the Island of Maui has increased 28.8 percent over the period 1990-2000, with most of the growth occurring in Central and South Maui.

This growth in population has resulted in a commensurate increase in traffic demands on the island's transportation system. In those areas where the transportation system has insufficient reserve capacity to accommodate the increase in demand, traffic congestion has occurred. Although there are several major roadway improvement projects currently underway that will provide relief to many of these congested areas, there is a growing sense of public frustration with existing traffic conditions.

PURPOSE

This Maui Interim Transportation Plan (Maui ITP) is a joint effort between the County of Maui and the State of Hawaii, Department of Transportation (HDOT) to develop interim solutions to relieve traffic congestion on the Island of Maui until long-term solutions can be implemented. This effort also attempts to consolidate multiple efforts to develop alternative solutions to mitigate traffic congestions, including the efforts of the West Maui Traffic Action Committee and the Mayor's Transportation Action Committee.

STUDY PROCESS

The general objective of this effort was to assess what congestion mitigation measures would be in place in the near future; and for areas where relief was not imminent, to investigate possible interim strategies.

The study began with a review of existing transportation plans and reports to identify measures previously recommended, and an investigation on the status of recommended improvements underway. Interim strategies were explored and alternatives identified and evaluated. An ad hoc Citizens Advisory Committee (CAC) was convened to provide assistance in verifying focal problem areas, and recommending and screening viable solutions/projects.

FOCAL AREAS

The review of the deficiencies identified in the transportation plans and documents, status of ongoing State and County roadway improvement projects, and discussion and comments from the CAC resulted in a screening of locations where interim improvements would provide the greatest benefit by providing temporary relief of traffic congestion until planned long term solutions are implemented. For the purposes of this report, the Island of Maui was divided into four regions—Central Maui, East Maui/Upcountry, South Maui, and West Maui. Based on the screening, the following problem areas within each of the regions were identified as having opportunities for the implementation of interim measures to relieve congestion.

West Maui

- Congestion along Honoapiilani Highway, between Lahainaluna Road and Puamana
- Congestion at the Honoapiilani Highway/Lahainaluna Road intersection.

INTERIM ALTERNATIVES, ALTERNATIVE INTERIM STRATEGIES

Alternative strategies to provide interim relief of traffic congestion in the various regions on the Island of Maui were developed and evaluated. These alternative strategies included accelerating major roadway improvement project construction through phased implementation, Transportation System Management (TSM) measures, Transportation Demand Management (TDM) techniques, roadway improvements, and alternative routes.

Alternative Routes

Alternative routes divert traffic away from congested areas by dispersing traffic to alternate corridors. The construction of portions of long-term roadway improvements was considered in the development of alternative routes. Phased construction of critical segments of long-term roadway improvements along with the construction of associated connector roads can provide an alternative route to and from destinations and around existing congestion.

EVALUATION OF ALTERNATIVE STRATEGIES

Alternative strategies were evaluated at those locations where there are opportunities to provide interim relief to traffic congestion.

West Maui

The Honoapiilani Highway/Lahainaluna Road intersection experiences heavy congestion during the morning and afternoon peak periods due to traffic demand generated by the elementary, middle, and high schools located along Lahainaluna Road. Alternative routes could divert traffic away from this congested intersection.

A. Dickenson Street

The County of Maui has initiated a planning study for the extension of Dickenson Street towards the proposed Lahaina Bypass Road. They are currently negotiating a contract with an engineering consultant for this work.

B. Cane Haul Road Alternative Route

The West Maui Highway Action Committee independently developed a recommendation for an alternative route to divert traffic from the Honoapiilani Highway/Lahainaluna Road intersection. This alternative route involves the use of the cane haul road system previously used for sugar cane production, through the Pioneer Mill site. This alternative route also utilizes an existing bridge over Kahoma Stream and connects to Keawe Street int eh Lahaina Business Park.   Keawe Street int eh Lahaina Business Park connects to Honoapiilani Highway across the Lahaina Cannery Shopping Mall. The proposed alignment for the cane haul road alternate route is shown in Figure 8.
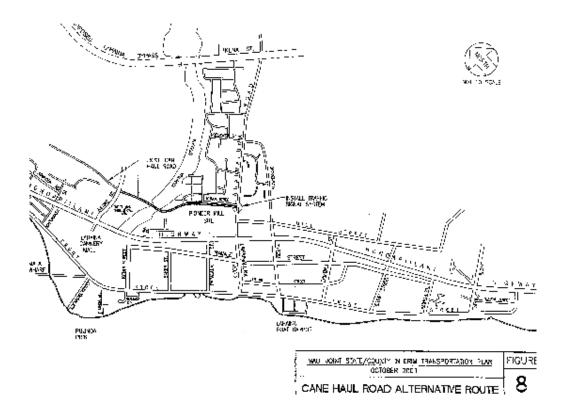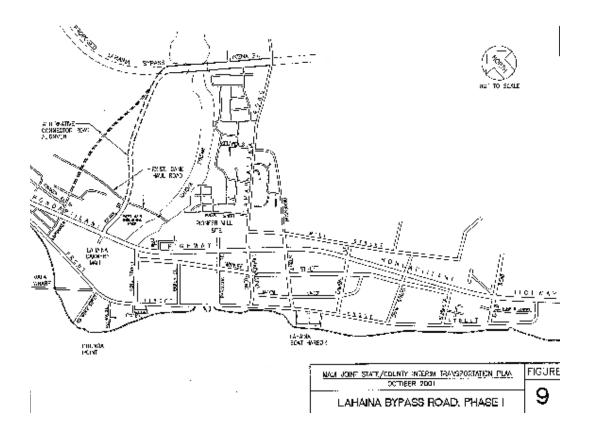
C. Phased Construction of the Lahaina Bypass Road

Another strategy evaluated was the phased construction of the Lahaina Bypass Road with connections to Honoapiilani Highway. An initial phase of the Lahaina Bypass Road between the proposed connector in the vicinity of the Lahaina Business Park (possibly extending from Kapunakea Street or Keawe Street) and Lahainaluna Road could be implemented to provide an alternate northerly route to areas along Lahainaluna Road. This alternate route could significantly reduce the volume of traffic on Lahainaluna Road and improve operations at the Honoapiilani Highway/Lahainaluna Road intersections. Major constraints with this alternative are the crossing of Kahoma Stream and possible ceded land issues. The proposed Lahaina Bypass Road alignment requires an approximate 400-foot crossing of Kahoma Stream.

RECOMMENDATIONS

West Maui

1. Investigate the use of the Cane Haul Road as an interim roadway. Pursue an interim roadway alignment between Lahainaluna Road and the Lahaina Business Park by using Keawe Street, the existing cane haul road through the Pioneer Mill site, and connecting to Lahainaluna Road at Kahua Street,
2. HDOT should construct the first phase of the Lahaina Bypass, between Kapunakea Street and Lahainaluna Road; the County of Maui should construct the connector road from Honoapiilani Highway to Lahaina Bypass.
3. HDOT should initiate the project to widen Honoapiilani Highway to a four lane facility between Dickenson Street and approximately 1,000 feet south of Front Street. Construction of these improvements should be done in two phases to utilize the funds already available. The first phase will include widening

WAU JOINT STATE/COUNTY INTERIM TRANSPORTATION PLAN
OCTOBER 2001

CANE HAUL ROAD ALTERNATIVE ROUTE

FIGURE 8

NORTH
NOT TO SCALE

MAUI JOINT STATE/COUNTY INTERIM TRANSPORTATION PLAN
OCTOBER 2001

LAHAINA BYPASS ROAD, PHASE I

FIGURE
9

APPENDIX G

AMERICAN MEDICAL RESPONSE

APPENDIX G

AMERICAN MEDICAL RESPONSE

230 Hana Highway, Space 10B   Telephone number 871-2153

Hana   Telephone number 248-8201

Curt Morimoto

American Medical Response is the emergency medical service ground-ambulance company that is awarded the State contract for the Maui Emergency MedEvac Helicopter. The Maui Emergency MedEvac Helicopter is a state-run program funded by State and County funds. The MedEvac Helicopter operations are restricted during bad weather and at night unless the moon is more than half-full and above the horizon. Abient light levels may suffice for MedEvac Helicopter response to West Maui incidents, however, as the missions will likely involve transfers from West Maui to Central Maui medical facilities, and not require flights over open oceans. American Medical Response operations also utilize the County Fire Department's helicopter and the Hawaii National Guard's HUMVEE for rough terrain rescues. American Medical Response operations are activated via 911.

QUICK FACTS

- Emergency Certified, CEN, CCRN and CFRN Flight Nurses
- Newest and Largest Fleet of Aircraft on the Islands (five aircraft)
- Unprecedented ETAs
- 365/24/7 Local/Live Dispatch
- Highly Trained/Competent and Qualified Medical Staff
- Best-of-Class Pilots (3000 hrs+)
- Community Based
- Bed to Bed Service (actual flight crews)
- In-House Maintenance Facilities
- Completely New Management Team
- Preferred Provider: HMSA (all plans), Kaiser, UHA, Aloha Care, HMN, Medicare, Medicaid, MDX Hawaii/Queens Health Mgmt +

Hawaii Air Ambulance

"Serving our Ohana, our Friends and our Community!"

LOCAL 24-HOUR DISPATCH
800-201-2911

Hawaii Air Ambulance
155 Kapalulu Place, #201
Honolulu, HI 96819
1-808-833-2270

R/2

THE MEDICAL TRANSPORTATION EXPERTS

-Trauma	-Neurological
-Cardiac	-High-Risk Obstetrical
-Medical	-IABP
-Pediatrics	-Psychiatric

EQUIPPED

CrossVent 3
Capable of CMV, SIMV, PS, PEEP and CPAP modes. Ventilator can monitor exhaled tidal volume, peak inspiratory pressures, mean airway pressures and alarm for critical conditions. I:E ration and inspiratory flow rate can be adjusted to patient condition. With pressure limiting volume control, barotrauma is minimized. HEPA filtered for infection control.

MRL Cardiac Monitor
Capable of biphasic defibrillation, transcutaneous pacing, continuous waveform capnography, arterial line, CVP and Swan-Ganz monitoring, transesophageal temperature monitoring, 12-lead EKG, pulse oximetry and NIBP.

Nicolet Versalab 3 Obstetrical Monitor
Allows for continuous tocodynamometer and FHT readouts. Mom carries a push button to document contractions.

Airway Management
Items include orotracheal intubation, nasotracheal trigger tubes, LMA, Bougie introducer, combitube airway, surgical and needle cricothyrotomy. Flight crews are trained in difficult airway techniques such as bimanual intubation, digital intubation, BURP maneuver and capnography assisted intubation. ETT tube cuff pressures are measured to minimize tracheal necrosis.

IVAC Pump
Provides a three channel system allowing for three separate drip medications. Flight crews are trained to manually calculate and infuse drip medications as backup.

Advanced IV Access
Flight crews are trained to perform *drill gun intraosseous access* on adult and pediatrics in emergency situations, eliminating the need for unreliable sternal IO or unsafe central line placement

COMMITTED

Hawaii Air Ambulance, a FAA certified carrier, is a dedicated provider of air medical services, committed to the highest level of safety attainable in the air medical transport environment. Our focus is a strong devotion to progressive medical practice and clinical excellence. Highly trained, qualified and experienced medical and aviation professionals use state-of-the art equipment to provide safe, proper and comfortable care to patients requiring basic, advance and critical care life support services. The multi-disciplinary patient care team includes physicians, registered nurses, paramedics, pilots and flight communications specialists who provide seamless and excellent patient care.

CONTRACTED

Preferred provider agreements with most insurance companies including **HMSA (all plans)**, Kaiser, Aloha Care, **HMN (including HMA Summerlin, IMX, PPO)**, **MDX Hawaii/Queens Health Management**, UHA, Medicare, Medicaid.

EXPERIENCED

Our medical crew members average 10 years of critical care or emergency medicine experience. RN/Paramedic or RN/RN crews are highly trained in all aspects of emergency care including:

—**Advance Airway Insertion**
—**Mechanical Ventilation Modes and Techniques**
—**Continuous Waveform Capnography**
—**Critical Care Drugs**
—**Arterial Line, CVP, Swan-Ganz Monitoring**
—**Hemodynamic Monitoring**
  Drill Gun Intraosseous Access (Adult and Ped.)
—**Biphasic Defibrillation and Cardiac Pacing**
—**Tocodynamometer and FHT Monitoring**
—**12 lead EKG**

DEPENDABLE

Beechcraft King Air C90B (five aircraft)
Range: 1475 statute miles
Max Cruising Speed: 276 miles/hour
Equipment:

     Global Positioning System
     Pressurized Cabin
     Turbine (Jet) Engines
     Air Conditioning
     Built-in Oxygen and Suction
     Full-De-Icing Equipment
     Satellite Radio

Crews:

     Pilots (3000 hrs+)
     Registered Nurses
     MICT's

PROMPT

Unlike many air ambulance providers, Hawaii Air Ambulance personnel are permanent residents for the different bases in the communities they serve. This creates a mutual relationship of respect and trust between Hawaii Air Ambulance and hospital staff. This also insures the fastest ETAs (estimated time of arrival) by providing the greatest opportunity for the aircraft and crew to be where the patient transport originates. **Basing on the different islands preserves the critical "Golden Hour" of treatment rather than waiting for an aircraft to be dispatched from Oahu, as was the old practice.**

Hawaii Air Ambulance Bases of Operation

"Basing on the different islands helps preserve the critical GOLDEN HOUR!"

Fleet

    -King Air C90B

    ◯ - Bases
    ◉ - Dispatch/Administrative Offices

PARTICIPANTS
OF THE
WEST MAUI TRANSPORTATION
ACCESS PLAN
WORKING GROUP

WEST MAUI TRANSPORTATION ACCESS PLAN WORKING GROUP

The Working Group participants' concerns, cooperation, courteous discussions and dedicated efforts are truly appreciated by the State Department of Transportation. The following sacrificed time and energy in serving on the West Maui Transportation Access Working Group:

The Honorable Rosalyn Baker
Senator
5th Senatorial District
Hawaii State Capitol, Room 210
415 South Beretania Street
Honolulu, Hawaii 96813

The Honorable Angus McKelvey
Representative
10th Representative District
Hawaii State Capitol, Room 315
Honolulu, Hawaii 96813

The Honorable Jo Anne Johnson
County Councilperson
Maui County Council
Kalana O Maui Building, 8th Floor
200 South High Street
Wailuku, Hawaii 96793

Mr. Brennon Morioka, P.E., PhD.
Director of Transportation
State Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Mr. Jiro Sumada
Deputy Director, Highways Division
State Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Mr. Glenn Yasui
Administrator, Highways Division
State Department of Transportation
869 Punchbowl Stree
Honolulu, Hawaii 96813

Mr. Ferdinand Cajigal
District Engineer
Highways Division
Department of Transportation
650 Palapala Drive
Kahului, Hawaii 96732

Ms. Charlene Shibuya
Assistant District Engineer
Highways Division
Department of Transportation
650 Palapala Drive
Kahului, Hawaii 96732

Mr. Marvin Moniz, Maui District
Manager
Airports Division
1 Kahului Airport Road, Unit 5
Kahului, Hawaii 96732-2327

Mr. Ronald Gibo
Construction & Maintenance Supervisor
Airports Division
1 Kahului Airport Road, Unit 5
Kahului, Hawaii 96732-2327

Mr. Hal Silva, Harbor Agent
Lahaina Boat Harbor
675 Wharf Street
Lahaina, Hawaii 96793

Mr. Stan Zitnick, Executive Assistant
Office the Mayor
County of Maui
200 South High Street, 9th Floor
Wailuku, Hawaii 96793-2155

Ms. C. Mahina Martin
Community Relations and
Communications Director
Office of the Mayor
200 South High Street
Wailuku, Hawaii 96793

Mr. Lawrence Kauhaahaa
Police Department
County of Maui
55 Mahalani Street
Wailuku, Hawaii 96793-2155

Mr. Ricky Uedoi
Police Department
County of Maui
55 Mahalani Street
Wailuku, Hawaii 96793-2155

Mr. Charles Hirata
Police Department
County of Maui
55 Mahalani Street
Wailuku, Hawaii 96793-2155

Mr. Don Medeiros, Director
Department of Transportation
County of Maui
2145 Kaohu Street, Suite 102

Mr. Gen Iinuma, Administrator
Maui Civil Defense Agency
County of Maui
200 South High Street
Wailuku, Hawaii 96793-2155

Ms. Darlene Lai
Maui Civil Defense Agency
County of Maui
200 South High Street
Wailuku, Hawaii 96793-2155

Ms. Terryl Vencl
Maui Visitor's Bureau
1727 Wili Pa Loop
Wailuku, Hawaii 96793

Ms. Janet Kuwahara
Maui Visitor's Bureau
1727 Wili Pa Loop
Wailuku, Hawaii 96793

Mr. Bill Caldwell
Expeditions Lanai Ferry
658 Front Street, Suite 127
Lahaina, Hawaii 96761

Mr. Michael Miyamoto
Department of Public Works
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

Ms. Leilani Puomano
Lahaina Bypass Now
1000 Kapalua Drive
Lahaina, Hawaii 96761

Ms. Stacie Thorlakson
Lahaina Bypass Now
1000 Kapalua Drive
Lahaina, Hawaii 96761

Mr. Bob Pure
Lahaina Bypass Now
1000 Kapalua Drive
Lahaina, Hawaii 96761

Ms Carol Reimann
Maui Hotel and Lodging Association
1727 Wili Pa Loop, Suite B
Wailuku, Hawaii 96797

Ms. Joy Yokouchi
Kahului Trucking & Storage
140 Hobron Avenue
Kahului, Hawaii 96732