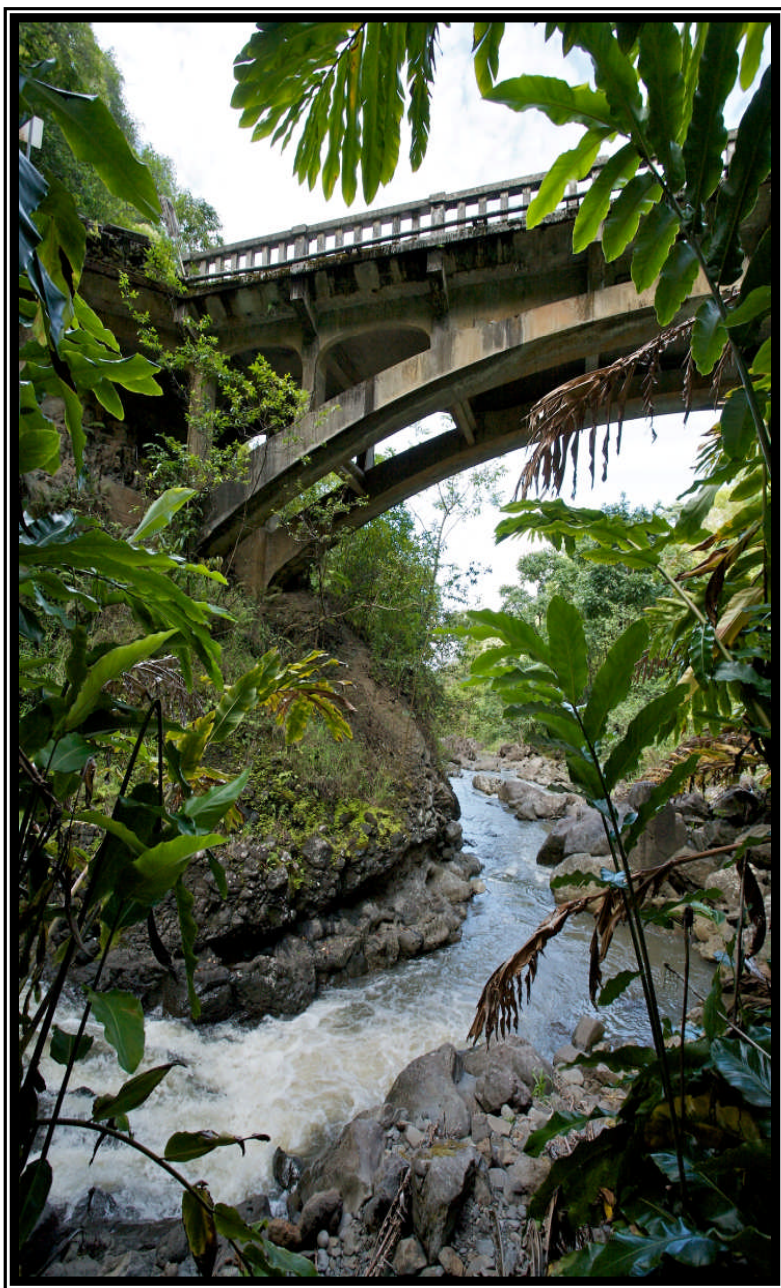


## ***Chapter 6: Infrastructure and Public Facilities***

*A society grows great when old men plant trees whose shade they know they shall never sit in.*  
~Greek Proverb



*A historic bridge on Hāna Highway, East Maui.*

**T**he island of Maui carries the marks of those who came before us. The foresight of our forbearers – the time, the energy and the resources they expended to make their vision of the future a reality – is evident all around us. Their vision can be seen in every rock wall, fishpond, and irrigation ditch; and in every park, highway, plane that lands, or ship that docks. Every time we draw a drink of water, switch on a light, or bring our children to school, we reap the benefits of our grandparents’ sacrifices. They built a foundation that we have come to take for granted. That foundation, Maui’s infrastructure, now shows the wear of the years between our grandparents’ investment and our own generation.

The island's infrastructure systems are vital to our community, economic prosperity, and quality of life. They are also expensive to construct, maintain and replace. However, for Maui to be prosperous in the future we must now make the same sacrifice our grandparents made. We must aim to share their foresight and be willing to make the investments needed to provide a stable future for our children and grandchildren.

This chapter will examine the following infrastructure and public facility systems: Solid Waste, Wastewater, Water, Transportation, Transit, Parks, Public Facilities, Schools and Libraries, Health Care, Energy, and Harbors and Airports.

### **Background Information**

The information presented in this chapter of the MIP draws from numerous plans, technical studies, and issue papers.

1. Infrastructure and Public Facilities Technical Issue Paper, Chris Hart & Partners, Inc., September 2007;
2. Long-range Capital Improvement Program-Infrastructure Planning and Delivery Challenges, Chris Hart & Partners, Inc., September 2007;
3. Long-range Capital Improvement Programming-Infrastructure and Public Facility System Funding Sources and "Order of Magnitude" CIP Costs, Technical Memorandum, Chris Hart & Partners, Inc., September 2007;
4. Infrastructure Assessment Update, County of Maui Planning Department, Long Range Division, September 2007;
5. Proposed Roadway Development Program, Fehr & Peers Kaku Associates, January 2007;
6. Integrated Solid Waste Management Plan, Maui County Department of Environmental Management, Solid Waste Division, February 2009;
7. Water Use and Development Plan, Maui County Department of Water Supply, Water Resources and Planning Division, Draft, May 2007;
8. County of Maui Short Range Transit Plan, Final Report, January 2005;
9. Public Facilities Assessment Update, County of Maui Planning Department, Long Range Division, prepared by R. M. Towill Corporation, March 2007;
10. Preliminary Report to the Twenty-Fourth Legislature, Department of Health & Department of Human Services, State of Hawai'i, 2007 and 2008;
11. Hawai'i Health Performance Plan, State Health Planning and Development Agency, Hawai'i, 1999-2004;
12. 2005-2025 Maui Bed Needs Study, Final Report, collaborative efforts by the State Health Planning and Development Agency/Memorial Medical Center/Malulani Health Systems, Inc./Kaiser Permanente/the Maui Mayor's office, prepared by Hawai'i Health Information Corporation, August 2004; and
13. Bike Plan Hawai'i, A State of Hawai'i Master Plan, Highways Division, Department of Transportation, State of Hawai'i, September 2003.



*A Central Maui Landfill employee directs traffic, Pu`unēnē.*

## SOLID WASTE

*According to the U.S. Environmental Protection Agency (EPA), the United States has witnessed a steady rise in total tons of waste generated and pounds generated per person. Management of this waste will increasingly rely on a sophisticated array of strategies. However, landfill disposal remains the most common method of dealing with waste both on the mainland and in Maui County. Maui's waste management strategies include landfill disposal, source reduction, recycling, and composting. Source reduction and waste diversion will continue to contribute to solid waste management on the island. The use of alternative technologies for converting waste to energy can contribute to extending the life of the landfill.*

## INFRASTRUCTURE AND PUBLIC FACILITIES

The County of Maui Department of Environmental Management's Solid Waste Division is responsible for the planning, operation, and maintenance of the County's landfills. The Central Maui Landfill is located off Pūlehu Road. It is owned and operated by the County and accepts all types of municipal waste, except for regulated hazardous wastes and commercial construction/demolition debris. In 2009 the Department of Environmental Management's Solid Waste Division updated its county-wide Integrated Solid Waste Management Plan (ISWMP). The ISWMP provides a comprehensive blueprint for the planning and expansion of the County's solid waste management system. The updated ISWMP addresses several issues including the finite capacity of the County's landfills, the growing waste stream, the rising cost of energy, and the desire to provide more and better services to Maui's residents. The island's landfill facilities on Maui include:

1. The Hāna Landfill serves the Hāna community plan area and has a total area of approximately 35 acres and accepts residential, commercial and green waste.
2. The Olowalu Convenience Center located adjacent to the former Olowalu landfill, accommodates self-haul residential waste from residents of Lahaina for transfer to the Central Maui landfill. The site also includes a limited recycling drop station.
3. The Maui Demolition and Construction Landfill is a privately owned and operated facility that accommodates the island's construction waste.



Maui County Landfill, Pu'unēnē.

### CHALLENGES AND OPPORTUNITIES

#### **Limited Landfill Capacity**

Most of the island's waste goes to the Central Maui Landfill. The Central Maui Landfill accepts about 500 tons per day of waste on average, although with the recent economy this tonnage is less. If nothing is done to divert waste from this landfill through increased recycling and WasteTEC (waste to energy), the landfill capacity will be reached by 2026. Efforts to increase diversion as recommended by the ISWMP could increase landfill capacity until 2042.

Based on the ISWMP, Hāna Landfill is expected to accommodate the needs of its community through the planning period as its projected capacity will be reached by 2096.

#### **Source Reduction and Recycling**

The National Recycling Coalition (NRC) and the Environmental Defense Fund (EDF) view source reduction as a viable means to reduce municipal solid waste. Recently, the NRC broadened its mission statement to include source reduction. It states: "ton for ton, source reduction is more valuable to society than recycling." The EDF has stated that eliminating excessive layers of packaging is one of the most obvious and important



*Recycling containers at Pa`uwela Recycling Center, Ha`ikū*

forms of source reduction, and that source reduction has the potential to alleviate natural resource depletion.

In recent years, the County has diverted around 30 percent of its waste to recycling, composting, and other uses; this doesn't meet the State's goal of 50 percent diversion by 2000. The ISWMP sets forth an implementation plan that aims to attain an 83 percent waste diversion by the year 2040. To achieve this, the County is moving towards full automation of its trash collection (where feasible) and curbside recycling. Implementation of curbside recycling will require the acquisition and development of property to support a materials recovery facility (MRF).

The ISWMP explores options for waste-to-energy for Maui that would divert waste from landfills and convert the waste stream to a beneficial project such as electricity. The County's waste stream projected to the year 2030 could sustain such a facility and a 54 percent recycling rate. Currently the recycling rate is about 30 percent. The recycling program, gas to energy program, waste-to-energy and waste diversion programs will need to be coordinated and integrated in the overall management of our solid waste stream to extend the capacity of our landfills.

## **GOAL, OBJECTIVES, POLICIES, AND ACTIONS**

### **Goal:**

- 6.1** Maui will have implemented the ISWMP thereby diverting waste from its landfills, extending their capacities.

## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

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### **Objective:**

- 6.1.1** Meet our future solid waste needs with a more comprehensive planning and management strategy.

### **Policies:**

- 6.1.1.a** Update and publicize the ISWMP every ten years.
- 6.1.1.b** Strengthen inter-agency coordination including Planning and Environmental Management departments.
- 6.1.1.c** Divert waste from the landfills and educate the public about the recommendations of the ISWMP.
- 6.1.1.d** Minimize future active, unlined landfill cells to the extent feasible.

### **Implementing Actions:**

- 6.1.1-Action 1** Implement the ISWMP through programs/improvements/upgrades of the solid waste management system and the Capital Improvement Project (CIP) budget in a timely manner.
- 6.1.1-Action 2** Regularly update waste generation, reuse, recycling, and disposal data for monitoring and implementation purposes.
- 6.1.1-Action 3** Educate the public about the importance and cost savings of solid waste reduction.

### **Objective:**

- 6.1.2** Divert at least 60 percent of solid waste from the island's landfills.

### **Policies:**

- 6.1.2.a** Require residents and commercial enterprises that generate waste to pay a fair proportion of disposal costs.
- 6.1.2.b** Encourage environmentally safe waste-to-energy solutions.
- 6.1.2.c** Facilitate the reduction of solid waste generated by packaging, food service products, construction waste, etc.
- 6.1.2.d** Educate residents and visitors about the impacts of and methods to reduce, reuse, and recycle.
- 6.1.2.e** Discourage the disposal of landfill leachate by diversion to wastewater treatment plants, where practicable.

### **Implementing Actions:**

**6.1.2-Action 1** Implement a comprehensive, curbside recycling program.

**6.1.2-Action 2** Develop regulations, programs, funding opportunities, and/or incentives to:

- (1) Increase recycling of used appliances/furniture/electrical/components/clothing/other household items and recyclable materials;
- (2) Increase the number of composting centers;
- (3) Reduce solid wastes generated by packaging, food service products, home construction waste, etc.;
- (4) Construct materials recovery facilities (MRFs) including a facility in Central Maui, in accordance with the ISWMP, and investigate a cost-recovery fee to meet funding needs; and
- (5) Discourage slow degradable materials, e.g., Styrofoam.

**6.1.2-Action 3** Develop public outreach/education/incentive programs to increase awareness to reduce, reuse, and recycle.

**6.1.2-Action 4** Prepare a study to assess the feasibility of a future waste to energy program.

**6.1.2-Action 5** Identify and develop a recycling/redemption facility at an appropriate location in West Maui.



*Central Maui Wastewater Reclamation Facility, Kanahā.*

## WASTEWATER

*The Maui County Code defines wastewater as “water-carried wastes from dwellings, commercial establishments, institutions and industrial plants, and may include groundwater, surface water and storm water not intentionally admitted.” Management of wastewater is important because it helps guard the water supply from becoming contaminated, protects the public health and environment, and aids in water conservation by allowing reclaimed water to be used for nonpotable water purposes. Proper disposal of the millions of gallons of wastewater produced on Maui protects the drinking water supply, coastal water quality, and other important environmental resources.*



The Maui County Department of Environmental Management, Wastewater Reclamation Division (WWRD), is responsible for the development, operation, and maintenance of the municipal wastewater system. The Division operates three principal wastewater management and reclamation systems: Wailuku-Kahului, Kīhei, and Lahaina. Table 6-1 lists the areas which are supplied by each wastewater system.

**Table 6 - 1: Maui’s Wastewater Systems**

<b>System</b>	<b>Towns Served</b>
Wailuku-Kahului	Wailuku, Kahului, Kū`au, Pā`ia, Spreckelsville, Waikapū, Waiehu
Kīhei	Kīhei, Wailea
Lahaina	West Maui, from Kapalua to Puamana
Hāli`imaile	Hāli`imaile Town

The service areas of the three wastewater management systems correspond generally to Maui’s Community Plan areas. The Makawao-Pukalani-Kula Community Plan area is served by individual cesspools and septic tanks, with the exception of a portion of Pukalani, which is served by a privately-owned wastewater reclamation facility. Hāli`imaile is unique as it is the only Upcountry subdivision that is served by a County collection system (and private treatment pond). Mākena has a private treatment plant. The Hāna Community Plan area is served by individual cesspools and septic tanks.

### **Existing Plans and Programs**

Maui’s wastewater systems were assessed in the *County of Maui Infrastructure Assessment Update* (Wilson Okamoto, 2003). Wastewater system monitoring is an ongoing task for the WWRD. Much of the assessment and planning for different parts of the system, such as pumps and plants, is updated as frequently as every quarter. The Wastewater Division is utilizing a hydraulic model to analyze areas of the system that will require upgrades due to current use or further development. Major expansions and capital improvements are guided by the Division’s facility plans; projects are then incorporated into its annual capital budgeting process.

### **Regional Analysis**

The regional analysis provides an overview of each wastewater system’s existing 2005 demand, projected 2030 demand, projected surpluses, shortages, and major capital improvement project investments. Wastewater demand is expressed as millions of gallons per day (mgd).

### **Wailuku-Kahului Wastewater System**

The Wailuku-Kahului wastewater system is the largest and oldest of Maui’s wastewater collection systems. The treatment facility currently has a design capacity of 7.9 mgd. Based on population growth to 2030, the capacity of the treatment facility will not be reached by the end of the planning horizon.

In August 2005, the County completed a study to address shoreline erosion and tsunami hazards at the Central Maui Wastewater Reclamation Facility. The study evaluated 11 treatment and disposal alternatives that ranged from maintaining the facility at its current location with fortification to withstand

shoreline erosion and tsunami hazards, to relocating the facility to an alternative inland location. Cost estimates associated with these alternatives ranged from \$30 million to \$400 million, respectively. Based on the conclusion of this study, the Maui County Council adopted a resolution to maintain the existing facility at its present location with appropriate fortification to withstand shoreline erosion and tsunami hazards.

### **Kīhei Wastewater System**

The Kīhei wastewater system was built in 1975 and has a design capacity of 8.0 mgd. In 2005, wastewater flows to the facility averaged 5.0 mgd. Based on projected population growth between 2005 and 2030, the capacity of the treatment facility will be sufficient to meet projected demand over the period.

Approximately 1 mgd of final effluent is currently treated as reclaimed water for irrigation. According to WWRD, there are no near-term concerns with the capacity of the Kīhei Wastewater Reclamation Facility. Larger projected developments like Mākena and Wailea 670 have indicated they will use their own private treatment plants, not placing additional demands on the County system. However, should they connect to the County system then they will have a long-term impact on plant capacity.

### **Lahaina Wastewater System**

The original Lahaina Wastewater Reclamation Facility was constructed in 1975 and has undergone several modifications and additions since that time. It currently has a capacity of up to 9.0 mgd. In 2005, wastewater flows to the Lahaina facility averaged 5 mgd. If regulatory constraints and requirements remain unchanged, adequate treatment capacity should be available to serve the projected population growth through the 2030 planning horizon. In addition to wastewater treatment, the facility supplies about 1.0 to 1.4 mgd of reclaimed water for nearby customers.

### **Makawao-Pukalani-Kula Community Plan Area**

The majority of the Makawao-Pukalani-Kula Community Plan area is served by individual cesspools and septic tanks. Hāli`imaile is the only subdivision that is served by a County collection system. It is expected that new developments in the Upcountry area, aside from those in Hāli`imaile, will all be served by septic systems as required by the State Department of Health. Any new development in Hāli`imaile is required by the Department of Environmental Management to obtain a letter from Maui Land and Pineapple Company accepting the added flow to their treatment facility before the County will issue approval for the connection. Otherwise, the project will be required to build its own package wastewater treatment plant.

## **CHALLENGES AND OPPORTUNITIES**

### ***Need for Additional Funding to Maintain Aging Facilities***

County operated wastewater treatment facilities and collection systems are aging, and will require increased maintenance during this planning horizon.

County, State, and Federal requirements prescribe the operation of treatment facilities and the quality of treated wastewater. To date, the County meets the requirements of all jurisdictions. Maintaining this level of quality will require thoughtful planning by the Department of Environmental Management, Wastewater Division.

**Wastewater Reuse**

To meet the projected demand, sufficient funding is needed for the upgrade and maintenance of the island’s wastewater facilities.

Each year, the County treats approximately 17 mgd of wastewater. This is an amount that is nearly equivalent to the sustainable yield of the `Iao Aquifer. Once wastewater is properly treated, it is possible for the nonpotable water to be stored and transported for landscaping, fighting fires, and agricultural irrigation. An excess of approximately 11.4 mgd of reclaimed water is produced at treatment facilities. But, without sufficient storage and distribution capability to make use of all of it, the excess is sent down injection wells. Reuse of wastewater is an electricity dependent process. The increased reuse of wastewater will increase electrical usage and costs.

**Injection Wells**

The County manages fifteen injection wells on Maui: eight in Kahului, four in Lahaina, and three in Kīhei. In addition to the publicly maintained wells, there are numerous privately-owned and operated injection wells in the County. Many privately-owned condominiums and businesses in areas that were built outside of existing County sewer service have their own injection well(s).

There has been a growing public concern that wastewater may be leaching from injection wells into the ocean. Some alternatives are to upgrade the wastewater reclamation reuse systems, improve the current level of water treatment, or to phase out injection wells entirely. All of these alternatives will require a significant financial investment to implement.

**Private Wastewater Treatment Plants**

Private wastewater treatment plants present an alternative to centralized plants when new developments are built beyond the service area boundaries. However, it is important to understand that the County land use policies and directed growth strategies are critical to direct future growth and development to the most appropriate locations and communities. The permitting and use of private plants are appropriate only when they implement the County land use policies and directed growth strategies. These privately-owned and operated facilities can treat wastewater to a level of quality that meets Federal, State, and County requirements. The primary issues associated with these plants are the high up-front cost and ongoing operation costs that these facilities place on individual communities. Also, a related issue that must be addressed is the need to secure financial assurance to ensure an uninterrupted operation (in case of bankruptcy or any default on financial obligation by the private operation).

**GOAL, OBJECTIVES, POLICIES, AND ACTIONS**

**Goal:**

**6.2** Maui will have wastewater systems that comply with or exceed State and Federal regulations; meet levels-of-service needs; provide adequate capacity to accommodate projected demand; ensure efficient, effective, and environmentally sensitive operation; and maximize wastewater reuse where feasible.

**Objective:**

**6.2.1** A wastewater planning program capable of efficiently providing timely and adequate capacity to service projected demand where economically feasible and practicable.

### **Policies:**

- 6.2.1.a** Encourage the use of renewable energy in support of wastewater treatment facilities.
- 6.2.1.b** Focus the expansion of wastewater systems to accommodate planned growth consistent with the MIP Directed Growth Strategy.
- 6.2.1.c** Establish new wastewater treatment plant(s) outside the tsunami zone.

### **Objective:**

- 6.2.2** Adequate levels of wastewater service with minimal environmental impacts.

### **Policies:**

- 6.2.2.a** Meet or exceed all State and Federal standards regulating wastewater disposal or reuse.
- 6.2.2.b** Encourage tertiary treatment for all municipal wastewater that is disposed through deep injection wells. Phase out all municipal and private injection wells in coordination with water reuse programs, where feasible, by 2020.
- 6.2.2.c** Improve and upgrade the County's existing wastewater collection, treatment, and reuse facilities consistent with current and future plans and the County's CIP.
- 6.2.2.d** Maintain an ongoing sewer inspection program for public and private multi-user systems to identify potential problems and forecast each system's residual life.
- 6.2.2.e** Require all new developments to fund system improvements in proportion to the development impact and in accordance with the County's wastewater functional plan.
- 6.2.2.f** Require appropriate funding mechanisms, such as a sinking fund, to adequately maintain or replace aging water-system components.
- 6.2.2.g** Strongly encourage the phase out of cesspools.

### **Implementing Actions:**

- 6.2.2-Action 1** Implement the following to ensure effective, safe multi-user wastewater treatment systems:
  - (1) Amend County regulations and plans to ensure adequate operating procedures, treatment standards, and monitoring programs;
  - (2) Establish treatment and capacity requirements suitable for the required level of service/use; and
  - (3) Require private treatment facilities or public-private funded facilities to provide financial assurance, including bonds, for the following:
    - a. Repair, removal, or replacement of any system components reaching the end of intended service life; and

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- b. Enforcement of other needed corrective action(s) or guaranteeing uninterrupted operation in case of bankruptcy, abandonment, or any other default on financial obligation.

**6.2.2-Action 2** Work with the State toward the phase out of cesspools.

**6.2.2-Action 3** Conduct and implement technical studies to identify appropriate level of service and potential funding mechanisms to augment the funding available for ongoing upgrade/maintenance of the wastewater system.

### **Objective:**

**6.2.3** Increase the reuse of wastewater.

### **Policies:**

**6.2.3.a** Strengthen coordination between the Department of Water Supply (DWS) and the WWRD to promote reuse/recycling of wastewater.

**6.2.3.b** Expand the reuse of wastewater from the Central Maui, Kihei, Lahaina, and other wastewater systems.

### **Implementing Actions:**

**6.2.3-Action 1** Identify potential new users of treated effluent and implement the necessary improvements to supply this water through the County CIP.

**6.2.3-Action 2** Amend County regulations to allow for the use of grey water for approved purposes.

**6.2.3-Action 3** Create education, marketing, and incentive programs that promote the reuse/recycling of wastewater.

*When you are thirsty, it is too late to think about digging a well.  
~Japanese Proverb*



*East Maui Irrigation Ditch.*

## **WATER**

*As the most isolated archipelago on earth, the provision of clean and reliable sources of fresh water - vital for survival - must come from our own endeavors. Natural reservoirs of water are available to meet future demand if we, as a community, are willing to invest in the stewardship and storage of this critical resource. Balanced stewardship - respectful of the varied needs of the land, people, and future - will require much in terms of capital and human resources. To meet our water needs we will need to be creative, adapt to changing situations, develop innovative solutions to conflicting needs, and commit to our island society as a whole.*

## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

Looking forward, water will continue to be of paramount importance to Maui’s urban, agricultural, rural, industrial, commercial, and native Hawaiian users, as well as sensitive biological and ecological systems. Land use decisions must be closely tied to water availability.

Maui has two primary forested mauka watersheds: East and West Maui. The West Maui watershed is composed of the mountain ridges, valleys, streams, and aquifers stretching from the top of Pu`u Kukui down to the sea. The East Maui watershed begins at the summit of Haleakalā; it is the island’s largest water producer. Sources of water on Maui consist of streams (surface water) and aquifers (groundwater). Maui’s perennial streams are predominantly on the windward slopes of the island’s watersheds. Streams are also influenced by periods of prolonged drought, resulting in minimal flow or a dry stream bed. As a result of high precipitation and geology, Maui possesses vast underground reservoirs of freshwater. Rainwater seeps through the highly permeable basalt of the volcanoes and is stored in aquifers, floating on the underlying saltwater. The majority of the water supplied to the island comes from groundwater. Groundwater is generally more reliable and less expensive to treat than surface water.

### **Water Systems**

The DWS is responsible for the development, operation, maintenance and protection of the municipal water system and supply. On the island of Maui, DWS manages nine public water systems as defined by the State Department of Health under the State Drinking Water Act, in four districts: Central Maui, West Maui, Upcountry, and Hāna.

The mission of DWS is to “provide clean water efficiently.” One method is by enforcing system standards. System standards are set statewide and are based on national utility standards; however, there is currently no approved County policy regarding water system standards. The standards vary by source (ground and surface); they take into account various factors such as redundancy, aquifer sustainable yield, peak demand, drought, and equipment malfunctions.

**Table 6 - 2: Water Districts on Maui**

<b>District</b>	<b>County Water Systems</b>	<b>Areas Supplied</b>
<b>Central Maui</b>	<b>Drinking Water:</b> (Central Public Water System (PWS))(aka Wailuku)  <b>Irrigation:</b> Wastewater Reclamation Division	Wailuku, Waikapū , Waihe`e, Waiehu, Kahului, Pu`unēnē across the isthmus, Spreckelsville, Pā`ia, Kū`au to the north, Mā`alaea, Kihei, Wailea, and Mākena to the South
<b>West Maui</b>	<b>Drinking Water:</b> Lahaina PWS, Honokōhau PWS  <b>Irrigation:</b> Wastewater Reclamation Division	Lahaina, Honokowai, `Alaeloa-Kahana, Nāpili, Honokōhau, and spans Kā`anapali region
<b>Upcountry</b>	<b>Drinking Water:</b> Makawao PWS, Lower Kula PWS, and Upper Kula PWS  <b>County Irrigation:</b> Kula Agricultural Park  <b>State / County System – Irrigation:</b> Upcountry Dual System	Ha`ikū, Hāli`imaile, Makawao, Pukalani, Kula, `Ulupalakua, and Kanaio
<b>East Maui</b>	<b>Drinking Water:</b> Ke`anae , Nāhiku, Hāna  <b>County / Private Shared – NonPotable</b> Kaupō / Kaupō Ranch	Ke`anae, Nāhiku, Hāna, Hāmoa, Koali, and Kaupō

### **Regulatory Controls**

In addition to the DWS, the Board of Water Supply (BWS) and the Maui County Council are responsible for decisions regarding fresh water on the island. The BWS is obligated to review DWS's request for an annual appropriation for operations and capital improvements, and to recommend the establishment or adjustment of water rates and charges. The Maui County Council has the duty to review matters related to DWS and the State Commission on Water Resource Management (CWRM), as well as matters related to compliance with safe drinking water rules and regulations.

Maui's water sources, ground and surface, must meet Federal Safe Drinking Water Act (SDWA) quality standards. Regulation of the SDWA is administered by the EPA through the State Department of Health (DOH). The CWRM also has regulatory control over Maui's water resources. CWRM, through administration of the State Water Code, Chapter 174, Hawai'i Revised Statutes, is obligated to set policies, protect resources, define uses, establish priorities while assuring rights and uses, and establish regulatory procedures. Within designated Water Management Areas, CWRM possesses regulatory control over water withdrawals through a water use-permit process. The permit process is designed to provide better protection of freshwater resources. Only one groundwater management area has been designated by CWRM on the island: the 'Āo Aquifer system. In addition, the surface water area of Na Wai 'Ehā has been designated.

### **Existing Plans and Programs**

The Water Use and Development Plan (WUDP) is the primary long-range plan of DWS. The WUDP serves as a long range guide for water resource management for the County. The WUDP is intended to identify system needs consistent with the General Plan, identify water issues, challenges and opportunities, and, with Maui County Council approval, to set forth County policy with regard to such issues, including allocation of water to land uses. Such policies are intended to be considered by the State in making its decisions regarding new pumping permits, stream withdrawals, and other matters. The WUDP must be updated on a regular basis to ensure consistency with the General Plan, and to address significant changes to water status, policies, or issues that may need to be addressed. An update of the WUDP for Maui is in progress. The BWS holds a public hearing and submits findings and recommendations to the DWS. The DWS then transmits the WUDP to the Maui County Council for review and approval. The WUDP must also be adopted by the CWRM.

### **Regional Analysis**

Each of Maui's four water systems possesses unique challenges, constraints, and opportunities. The following regional analysis provides an overview of each system's status, sources, and projected 2030 demand<sup>5</sup>. Since the WUDP is currently undergoing a comprehensive update, the regional analysis is based on the best available information. This analysis uses the following documents as the primary source of information: *County of Maui Infrastructure Assessment Update* (May 2003), prepared by Wilson Okamoto & Associates, Inc.; DWS Availability Worksheets; and Maui County Water Use and Development Plan (May 2007 Draft), prepared by Ha'ikū Design and Analysis.

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<sup>5</sup> Water demand is expressed as million gallons per day (mgd) and existing demand refers to 2005. When referring to an aquifer's sustainable yield, the given calculation represents the estimated maximum amount of groundwater that can be withdrawn without damaging the aquifer's ability to replenish itself.



### **Central Maui Water System**

Approximately 75 percent of the water supplied by the Central Maui system is withdrawn from the `Īao Aquifer in the vicinity of `Īao and Waiehu Streams. The remaining 25 percent is supplied primarily by the Waihe`e Aquifer with a small portion coming from surface-water sources. In practical terms, the available supply of water for the Central Maui system is estimated at 26 mgd. The average daily demand on the Central Maui system for 2005 was 21.39 mgd. Current projections indicate that demand will outpace current supply prior to 2020. Total projected 2030 demand on the Central Maui system is estimated at 34.11 mgd, which exceeds the current 26 mgd supply of the system by 8.11 mgd. Development of additional sources is crucial for the Central Maui system.

### **West Maui Water System**

The West Maui system receives water from ground and surface sources. Total available water supply for the West Maui water system is 8 mgd. Current demand on the system is 5.17 mgd. Projected demand for 2030 is estimated to be 6.56 mgd.

### **Upcountry Water System**

The Upcountry system is supplied primarily by surface-water sources; however, groundwater sources are available to service the Upcountry system during periods of drought. The Upcountry system is one of the more complex DWS systems for several reasons. The system is composed of four interconnected sub-systems, as well as a range of source- and service-area elevations. The system is almost completely reliant on surface water, making it vulnerable to drought conditions. The system is supplemented by pumping groundwater during drought periods; however, this activity is extremely expensive due to the high energy costs of pumping water to the service-area elevation. Voluntary and mandatory water-use restrictions are imposed on residential and agricultural users of the system during dry periods. These restrictions often negatively impact the productivity of Upcountry farmers.

### **Hāna Water System**

The Hāna system currently receives all of its water from ground sources consisting of two wells. Total available supply for the Hāna system is approximately 0.487 mgd. Two private water systems, Hāna Water Resources and Hāna Water Company, exist in the area. In 2005, the system average daily demand was 0.195 mgd. Projected demand for 2030 is estimated at 0.215 mgd.

The Ke`anae system is served by the Ke`anae Well, and back-up well (Ke`anae Well 2). Current demand is approximately 100,000 gallons per day. Nāhiku is served by the Nāhiku Tunnel which has about 20,000 gallons per day of available capacity. Current demand from the Nāhiku Tunnel is approximately 15,000 gallons per day.

Table 6-3 identifies long-range water source development opportunities for each DWS water system. These are included in the DWS long-range capital project database and evaluated in the WUDP. All of the strategies represent a series of projects that come on as indicated by demand growth, sufficient to supply enough water for forecasted growth in the region. In West Maui and East Maui, resource options have not been combined into “strategies” by the County’s Water Advisory Committees. However, new-source options under consideration include those listed.

**Table 6 – 3 Long-Range Water Source Development Opportunities:**

<b>Resource Strategy or Resource Option</b>	<b>Notes</b>
<b>CENTRAL MAUI</b>	
<b>All Strategies Assumed to Include:</b> Conservation Resource Protection Maui Lani Wells Kupa`a Well Shaft 33 Replacement Waikapū Wells	
<b>Strategy Options:</b>	
Northward Basal Groundwater Development	Development of a series of basal wells in the northern half of the Waihe`e aquifer, and Kahakuloa aquifer.
Eastward Basal Groundwater Development	Development of a series of basal wells in the Ha`ikū, Honopou and or Waikamoi aquifers.
Na Wai `Ehā Surface Water Treatment	Use of water from the Waihe`e ditch system. Na Wai `Eha, or the four great waters, including the `Īao, Waihe`e, Waikapū, and Waiehu Streams. The Waihe`e Ditch System was constructed by Hawaiian Commercial and Sugar Company and Wailuku Sugar in the early 1900s to supply water for sugarcane irrigation from these four streams. The system contains 12 miles of ditches and tunnels stretching from Waihe`e to Waikapū .
Desalinization of Brackish Groundwater	Several sites and configurations have been evaluated
Maximization of Water Conservation and Reclaimed Water Use	A certain amount of conservation is targeted in all final strategies. This option envisions maximal conservation through a major early investment as well as use of reclaimed water and possible construction of an additional reclaimed water line.
<b>UPCOUNTRY MAUI</b>	
<b>All strategies are assumed to include:</b> Conservation Watershed Protection Po`okela Well Olinda WTP Upgrade Kamole WTP Upgrade Phase 6 and 10 Booster Pump Upgrades Flume Rehabilitation Other Efficiency Measures	
<b>Strategy Options:</b>	
Incremental Basal Well Development	Various locations, elevations, and booster pump configurations are considered.
Expansion of Raw Water Storage Capacity	Construction of one or more additional large raw water storage reservoirs to supplement effective reliable yields from the Upcountry system.
“Drought Proof” Full Basal Backup	Construction of sufficient wells to provide service to Upcountry customers even during an extreme drought. This strategy is evaluated at different levels of uninterrupted reliability.

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Resource Strategy or Resource Option	Notes
Expanded Capacity at the Kamole Water Treatment Plant.	This strategy reviews the benefits of an increase of Kamole Water Treatment Plant capacity, particularly of drought-period capacity, in relation to system-operation costs.
Limited Growth with Extensive Conservation Measures	This strategy examined means and impacts of limiting demands on the Upcountry system. Conservation measures and redistribution of growth scenarios were considered. While redistribution of growth would be the purview of land use planning agencies, it was seen as potentially valuable information for land use decision makers.
<b>WEST MAUI</b>	
<b>All strategies are assumed to include:</b> Conservation Resource Protection Other Efficiency Measures	
<b>Strategy Options:</b>	
New Basal Wells	Drill new basal wells to supply additional water to DWS West Maui systems. Various sites have been identified.
Additional Use of Surface Water	Increase use of the Māhinahina Treatment Plant.
Renovation of Existing Unused Sources	Examine the feasibility of adapting and utilizing, or drilling into the same location as, some historical sources.
Desalinization	Desalinization of brackish water.
Increased Use of Reclaimed Water	Examine the feasibility of expanding reclaimed water use.
Improved Interconnection Between West Maui Systems	This would enable one end of the system to more readily and effectively back up the other, thereby making more effective use of existing sources.
<b>EAST MAUI</b>	
<b>All strategies are assumed to include:</b> Conservation & Other Efficiency Measures Resource Protection Ke`anae Backup Well Hāmoa Well 2 Wākiu Backup Well	
<b>Strategy Options:</b>	
New Basal Well(s)	
System Improvements	Improved connections within systems, water loss reduction.
Increased Use of Tunnel (Nāhiku)	

### Conservation and Energy Efficiency

In addition to the potential future sources discussed in the regional analysis section, several conservation and energy efficiency options exist to ensure a reliable and clean supply of water for all four regional systems.

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**Demand Side Management Programs:** Demand-side management (DSM) describes actions that DWS can take to influence how customers utilize County water. Examples of DSM programs include: incentives for installing efficient appliances and low-flow water fixtures and toilets, the implementation of landscaping ordinances that require drip irrigation and drought tolerant plants, and water-rate design and pricing policies that increase water rates as consumption increases.

**Supply-Side Leak Reduction:** Supply-side leak reduction involves continually inspecting transmission lines and distribution pipes for leaks and breaks. This practice reduces the loss of ground and surface water due to infrastructure deficiency.

**Stream and Watershed Restoration and Protection Measures:** Protecting and restoring watersheds and streams is a key element of ensuring a reliable source of fresh water for current and future generations. Options include requiring minimum streamflows, restoring stream channels, supporting watershed protection partnerships and programs, and acquiring Maui’s key watersheds.

### **CHALLENGES AND OPPORTUNITIES**

#### ***Comprehensive Water Resources Planning and System Control***

Water-resource planning is critical to ensure public health, economic development, and environmental protection. This involves continual assessment of the current and future adequacy of water supplies in a holistic way, including the establishment of appropriate principles and standards. The process looks ahead to what the subject area would be like, how much water would be needed, where such water would come from, and what the water quality should be. Equally important is determining the capital improvements that would be required to treat and deliver the needed water, and the best ways to pay for these improvements. With regard to system control, the County controls a relatively small percentage of the water on the island.

#### ***DWS Budget Constraints***

The DWS is currently facing a major financial deficit. The Department’s current budget is not able to cover costs for long overdue replacements and repairs for all water systems. Many systems need to be updated to ensure a reliable supply of water for users.

#### ***Stream Protection and Instream Flow Standards***

Section 174C-3, Hawai`i Revised Statutes (HRS), defines instream use as “beneficial uses of stream water for significant purposes which are located in the stream and which are achieved by leaving the water in the stream”. The CWRM’s mandate is to establish instream flow standards that will protect instream uses while allowing for reasonable and beneficial offstream use. Interim instream flow standards (IIFS) were adopted for both East and West Maui in 1988 (Sections 13-169-44 and 48, Hawai`i Administrative Rules). However, the IIFS are not based on scientific information; rather, they simply continue the “status quo” by setting the standard at the amount of water that was flowing in each stream on the date of adoption. CWRM is currently drafting an Instream Flow Program Implementation Plan which will, among other actions, develop a standardized IIFS methodology and set scientifically-based IIFS statewide. These standards will influence DWS’s long-range planning for surface-water resources, both instream and offstream.

#### ***Native Hawaiian Water Rights***

Water rights for native Hawaiians are protected by Section 174C-101, HRS. These water rights include current and future water use for Hawaiian Homelands, domestic water use for kuleana lands, and traditional and customary rights. The ahupua`a systems that exist should be maintained and enhanced.

### ***Energy Production and Efficiency Measures***

Since energy use is a substantial component of DWS costs, increasing energy efficiency is a key element of reducing long-term water service costs. Multiple energy production and efficiency options exist, including hydroelectric generation, wind power for water pumping, and system operation efficiency improvements.

### ***Wastewater Reuse***

Wastewater reuse involves the treatment and reuse of wastewater for agricultural, golf course, landscape, and other irrigation needs. Reuse of wastewater extends the life of used water and conserves freshwater sources. The feasibility of treating and utilizing wastewater depends on many factors; the location of the wastewater facility and the proposed service area are key considerations for wastewater reuse.

### ***Private Water Systems***

Private water systems present an alternative to public water systems when new developments are built beyond water service areas. However, water source development should implement, rather than undermine, County land use policies and directed growth strategies that seek to direct future growth to the most appropriate locations and communities. The permitting and use of private multi-user water systems are appropriate only when they implement County land use policies and directed growth strategies.

The DWS has concerns about the growing number of private wells on the island for several reasons:

- Each well is a potential conduit for contamination to the aquifer. Over the years, wear, damage, improper maintenance, or inadequate wellhead protection can lead to the potential for nondesirable substances to enter the aquifer through well bores, flawed or damaged casings, or abandoned wells that have not been properly sealed. There are already many wells on the island that can no longer be located. Each one of these represents a potential risk of such contamination to the aquifer. The more wells that are approved, the more this risk is multiplied.
- Private parties or their successors may lack long-term funds to ensure proper well maintenance, and may abandon wells without proper sealing. To avoid contamination and degradation of water quality, and to ensure long-term reliable water supply, wells must be properly operated, maintained, and sealed. Financial assurance is needed to ensure an uninterrupted operation (in case of bankruptcy or any default on financial obligation by the private operation).
- It is important that the impact of private water systems on surface and groundwater sources be carefully managed and monitored to ensure the long-term sustainability of the island's water resources. A majority of private wells in the State either do not report pumpage at all, or report infrequently. Though the individual impacts of such wells are generally minor, their cumulative impacts may not be. This makes it difficult for the agencies tasked with resource monitoring to accurately gauge aquifer status. Increasing the number of small private wells may exacerbate the problem.
- Some private systems are placed in such a way that they compete with DWS for resources that would otherwise have served the community at large. Because DWS is subject to more extensive public process, budgetary review, and environmental review than private developers, DWS can lose opportunities to develop intended wells as private developers install them. At times this creates opportunities for partnership. At other times, the

County loses opportunities to provide water that would meet the needs of the broader community.

### ***Agricultural Water Use***

The State Water Code identifies agriculture as a valid and protected use of water. Agriculture is important to Maui's economy, lifestyle, history, and quality of life. Large agricultural operations, namely sugarcane and pineapple, have dedicated water sources as a result of their establishment and development of these sources over a century ago. While large-scale agriculture has privately-owned water sources, diversified agricultural operations rely predominantly on DWS systems to supply water for irrigation. The majority of diversified agriculture is located Upcountry and utilizes the same County water supplied throughout the region for domestic purposes.

The State Water Code mandates balancing water uses (including domestic, commercial, Hawaiian water rights, instream flow, and agriculture) to obtain maximum beneficial use of State waters and best serve the public good. However, complex challenges for both large-scale and diversified agriculture currently exist regarding water supply in the future. These are mainly focused on the competing interests or conditions, including the current high demand for water from all types of users, the potential establishment of IIFS, and the growing concern over native Hawaiian water rights.

Since Upcountry farmers rely predominantly on County water, mandatory water-use restrictions implemented during severe drought conditions can have negative consequences for them. Additionally, since County water is treated for domestic use, farmers are paying high water rates for a use which does not necessarily require treatment. DWS, in conjunction with State and Federal agencies, is currently implementing a project (Upcountry Dual Water System) to supply Kula farmers with less expensive untreated surface water. While completion of this project will provide a more affordable source of water for crop irrigation, the use of untreated water gives rise to other potential future issues: competition for the water to treat and meet potable water demands, and the risk that some grocery stores may ban any produce irrigated with untreated water.

With the recent downsizing of Maui's sugar and pineapple industries along with uncertainty about the outcome of the CWRM's decision on IIFS, there are questions about the availability of a long-term source of water to support agriculture in Central Maui. Competition for unused diverted water is likely to arise, as demonstrated in the Waiāhole Water Case on Oahu, requiring tough decisions to ensure the equitable distribution of such water. Additionally, this uncertainty has the potential for negatively affecting future agriculture due to the requirement of many lending institutions to demonstrate long-term access to water to secure loans.

Other opportunities exist to meet Maui's water needs.

### ***Potential Opportunities***

- **Reclaimed Water Use:** While some agricultural operations utilize reclaimed water for irrigation, the potential exists to increase this usage where feasible. Utilizing reclaimed water conserves new water sources while extending the life of used water.
- **Desalination:** Desalination is the process of removing salt and excess minerals from sea water so that it is suitable for human consumption or irrigation. Desalination is becoming more cost effective for communities

where fresh water has become scarce. The desalination of large quantities of water can require large amounts of energy. In addition, it can be expensive to build the transmission infrastructure that may be required to transport the water from the desalination facility to consumers. There are a number of environmental constraints associated with desalination: the impact on marine life due to open ocean intakes; the impact on energy consumption; and the disposal of effluent wastewater generated through the desalination process. Many of these issues may be addressed as desalination technologies continue to improve.

### **GOAL, OBJECTIVES, POLICIES, AND ACTIONS**

#### **Goal:**

**6.3** Maui will have an environmentally sustainable, reliable, safe, and efficient water system.

#### **Objective:**

**6.3.1** More comprehensive approach to water resources planning to effectively protect, recharge, and manage water resources including watersheds, groundwater, streams, and aquifers.

#### **Policies:**

**6.3.1.a** Ensure that DWS actions reflect its public trust responsibilities toward water.

**6.3.1.b** Ensure the WUDP implements the State Water Code and MIP's goals, objectives, and policies.

**6.3.1.c** Regularly update the WUDP, to maintain compliance with the General Plan.

**6.3.1.d** Ensure that the County's CIP for water-source development is consistent with the WUDP and the MIP.

**6.3.1.e** Where desirable, retain and expand public ownership and management of watersheds and fresh-water systems.

**6.3.1.f** Encourage and improve data exchange and coordination among Federal, State, County, and private land use planning and water resource management agencies.

#### **Implementing Actions:**

**6.3.1-Action 1** Implement the WUDP.

**6.3.1-Action 2** Develop site selection studies for water storage and supply facilities for each community plan area.

**6.3.1-Action 3** Prepare and implement a plan to identify and prioritize infrastructure requirements needed to accommodate nonpotable water for irrigation.

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**6.3.1-Action 4** Work with the State to set standards for the amount of water withdrawn from aquifers and other groundwater sources to ensure the long-term health and sustainability of the resource.

**6.3.1-Action 5** Produce an annual evaluation of the state of available water resources on the island.

### **Objective:**

**6.3.2** Increase the efficiency and capacity of the water systems in striving to meet the needs and balance the island's water needs.

### **Policies:**

**6.3.2.a** Ensure the efficiency of all water system elements including well and stream intakes, water catchment, transmission lines, reservoirs, and all other system infrastructure.

**6.3.2.b** Encourage increased education about and use of private catchment systems where practicable for nonpotable uses.

**6.3.2.c** Maximize the efficient use of reclaimed wastewater to serve nonpotable needs.

**6.3.2.d** Work with appropriate State and County agencies to achieve a balance in resolving the needs of water users in keeping with the water allocation priorities of the MIP.

**6.3.2.e** Ensure water conservation through education, incentives, and regulations.

**6.3.2.f** Acquire and develop additional sources of potable water.

### **Implementing Actions:**

**6.3.2-Action 1.** Develop programs to increase the efficiency of all water system elements.

**6.3.2-Action 2.** Develop, adopt, and implement water source development siting standards that implement the MIP Directed Growth Plan and the WUDP, and protect water quality for existing and future consumers.

**6.3.2-Action 3.** Revise County regulations to require high-efficiency, low-flow plumbing fixtures in all new construction.

**6.3.2-Action 4.** Pursue development of additional potable water sources to keep pace with the County's needs.

**6.3.2-Action 5.** Identify and develop renewable energy systems to serve the DWS.

**6.3.2-Action 6.** Develop a water rate structure that encourages conservation and discourages the excessive use of water.

**6.3.2-Action 7.** Develop a comprehensive water conservation ordinance to include xeriscaping regulations to promote water conservation.



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**6.3.2-Action 8.** Update DWS reliability and drought standards, and continue to evaluate as needed in light of updated regulation and rainfall and flow data.

### **Objective:**

**6.3.3** Improve water quality and the monitoring of public and private water systems.

### **Policy:**

**6.3.3.a** Protect and maintain water delivery systems.

### **Implementing Actions:**

**6.3.3-Action 1** Ensure water quality and quantity report results are provided in a timely manner to consumers when water quality or quantity falls below standards.

**6.3.3-Action 2** Complete and implement DWS wellhead-protection program to protect the water quality of public and private wells.



*Hāna Highway is a major roadway infrastructure and gateway to central Maui.*

### TRANSPORTATION

*Streets and highways are currently the primary infrastructure supporting Maui's transportation system and play a major role in shaping settlement patterns. The quality of the roadway system affects various modes of travel including automobile, transit, bicycle, and pedestrian. The condition of Maui's roadway system also impacts the safety of all roadway users, the movement of goods and products, efficiency of emergency public services, and quality of life. This system experiences increasing demand associated with island growth and development. A key outcome, therefore, is to maintain, improve, and expand where necessary the existing roadway system, and expand multimodal transportation to improve traffic flow, safety, and efficiency.*

## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

Maui’s road network is comprised of both State and County roadways that provide connections between the island’s major urban centers and circulation within communities. Major highway systems on the island include Honoapi`ilani and Kūihelani Highways, which connect Central and West Maui; Mokulele and Pi`ilani Highways, which connect Central and South Maui; Hāna Highway, which connects Central and East Maui; and Haleakalā and Kula Highways, which connect Central and Upcountry Maui.

According to the State Department of Transportation (DOT), the average daily traffic volumes indicate that Maui’s most heavily-traveled roadways during the day are Honoapi`ilani Highway, Ka`ahumanu Avenue, and Hāna Highway.

### **Existing Plans and Programs**

The DOT has jurisdiction over State roadways while the County of Maui, Department of Public Works, Highways Division, has jurisdiction over County roadways. The primary program governing improvements to Maui’s roadway network is the Hawai`i Statewide Transportation Improvement Program (STIP). The STIP provides a multi-year listing of State and County projects and identifies those projects slated for Federal funding. It is a multimodal transportation improvement program that is developed utilizing existing transportation plans. The STIP delineates funding categories including the Federal and local share of funding required for each project.

Maui’s roadway network was assessed in the *Proposed Roadway Development Program*, Fehr & Peers and Kaku Associates, (2007). The purpose of this study was to provide a current and future (2030) capacity assessment of Maui’s roadway network pursuant to proposed land use and development trends. This study was used as the primary source of information for this Transportation Section. See Diagram 6-2 for a depiction of existing and conceptual transportation options.

**Table 6 - 4: Proposed Highway Improvements**

Up-Country - Kīhei Corridor	
Honoapi`ilani Realignment-aka Lahaina By-Pass	Wai`ale/Kūihelani Hwy Connector
Phase A Keawe St. to Lahainaluna Road	Lono Ave extension to Kūihelani Hwy
Phase B Lahainaluna Road to Launiupoko	`Imi Kālā /Pihana extension (bridge)
Phase C Keawe St. to Honokowai	`Imi Kālā /Wai`ale -Mill St, extension
Pali to Puamana Parkway-aka Honoapi`ilani Realignment	Paniolo Connector (Haleakalā Hwy - Baldwin Ave)
Mā`alaea to Ukumehame	
Keawe St. Extension	Kahekili Hwy widening
Mill Street Extension (Aholo St. to Keawe)	Maui Lani Parkway
Pā`ia By-Pass	Kuikahi Drive Extension
<b>Kīhei North-South Collector Road</b>	Kehalani Collector Road
<b>Kīhei Mauka By-Pass</b>	Kehalani Loop Road
Wai`ale Extension	
Kahului Airport	

### **CHALLENGES AND OPPORTUNITIES**

Although the implementation of proposed roadway improvements will certainly help Maui’s roadway network, traffic congestion will remain an important quality-of-life issue. The expansion of the roadway network should not be considered the only solution for addressing transportation and mobility on the island. The following issues present some essential factors in planning for an effective transportation and mobility system on Maui.

***Integration of Transportation and Land Use Planning***

Research by the National Transportation Research Board, the EPA, as well as numerous Professional and peer-reviewed academic studies shows the creation of more compact communities reduces dependence on automobile travel – i.e. on vehicle miles traveled (VMT). Research suggests that increasing residential density can reduce household VMT by about 10 percent, and perhaps by as much as 25 percent when combined with higher employment concentrations, public transit improvements, mixed uses, and other demand management measures.<sup>2</sup> Furthermore, more compact mixed-use developments can help produce reductions in CO2 emissions as well as energy consumption, both directly and indirectly. These reductions can mean improvements to air quality, healthier conditions for human beings and the surrounding natural environment.

Land use patterns have a significant effect on the costs of providing public infrastructure and services such as roads, water, solid waste collection, wastewater treatment, and school facilities. Numerous studies have demonstrated that the cost of providing public infrastructure and services tends to increase with low density and dispersed development, and can be reduced with higher density and compact development within or proximate to existing urban areas. A study by the Urban Land Institute in 1989, *The Costs of Alternative Development Patterns* by James Frank, demonstrated that the municipal capital costs per housing unit increased not only with lower density development, but also with the distance from urban employment and service centers. In Colorado, William Coyne found that “dispersed rural residential development costs county governments and schools \$1.65 in service expenditures for every dollar of tax revenue generated.”<sup>3</sup>

Integrating land use and transportation planning to create denser and more compact communities that are located closer to employment centers can have not only economic but also social and environmental benefits. Todd Litman of the Victoria Transport Policy Institute developed a summary of smart-growth benefits which are depicted in Table 6-5.<sup>4</sup>

**Table 6 - 5: Smart Growth Benefits**

<b>Economic</b>	<b>Social</b>	<b>Environmental</b>
Reduced development costs	Improved transit options and personal mobility	Greenspace and habitat preservation
Reduced public service costs	Improved housing options	Reduced air pollution
Reduced transportation costs	Community cohesion	Increased energy efficiency
More efficient transportation	Preserves unique cultural resources	Reduced ‘heat island’ effect
Supports industries that depend on ‘high quality’ environments (tourism, farming, etc.)	Increased physical health and exercise	

Many communities have been working on ways to create more livable and healthier communities by integrating land use and transportation planning and development. Compact smart-growth communities, the implementation of “complete streets” policies, and transit-oriented development projects can be found throughout the

<sup>2</sup> National Research Council of the National Academies (2009). *Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy use and CO2 Emissions*. (Transportation Research Board, Washington, D.C.).

<sup>3</sup> Coyne, William (December 2003). *The Fiscal Cost of Sprawl: How Sprawl Contributes to Local Governments’ Budget Woes*. (Environment Colorado Research & Policy Center, Denver).

<sup>4</sup> Litman, Todd (2002). *Evaluating Transportation Land Use Impacts* (Victoria Transport Policy Institute, Victoria).

***Expansion of the Multi-Modal Transportation Network***

United States.

Mobility issues on Maui can be addressed by expanding transportation alternatives, including public transit, paratransit, human services transportation, biking, and pedestrian movement. The State’s policy, as embodied in Act 54 (2009), favors complete streets – i.e., to reasonably accommodate convenient access and mobility for all users of the public highway, including pedestrians, bicyclists, transit users, motorists, and persons of all ages and abilities. A balanced multimodal transportation network provides mobility choices and contributes to an efficient network that meets varied needs of all uses, including those with mobility challenges. For environmental and sustainability reasons, a greater percentage of future transportation investment must shift away from the construction of additional roads and move towards the expansion of a public multimodal transportation network.

***Transportation Demand and System Management***

Transportation Demand Management (TDM) involves the implementation of plans or programs aimed at reducing the use of single-occupant vehicles. TDM strategies are primarily aimed at influencing the travel trends and options of weekday commuters. These strategies include supporting alternative travel modes and altering the time and amount of travel through programs and amenities such as guaranteed ride home programs, bicycle lockers, commuter benefits, telework, and alternative work schedules. Roadway and congestion pricing have also become increasingly common TDM and infrastructure financing strategies.

Transportation System Management (TSM) strategies increase the efficiency and effectiveness of existing and future roadway systems, without widening streets, through innovative technologies and effective prioritization of resource use. Strategies may include the use of intelligent transportation system (ITS-adaptive "Real-Time" Traffic Operations using: cameras and a centralized traffic management center to control traffic and incidents as they occur; changeable message signs along major roads to advise drivers of road problems). TSM strategies may also apply intersection modifications at signalized and non-signalized intersections, restriping travel lanes, one-way couplets, installing pavement markers, and relocating transit stops. Such modifications in traffic operations are designed to increase the operational efficiency, safety, and capacity of the existing roadway system without corridor-wide street widening.

***Funding Road Improvements***

Transportation networks are inherently expensive to construct and maintain. Maui’s roadways are primarily financed through Federal and County programs. In recent years, however, Federal funding has declined, resulting in increased pressure on the County to finance needed roadway network improvements. As Federal funding continues to wane, the County will need to explore alternative financing mechanisms to address transportation needs.

**GOAL, OBJECTIVES, POLICIES, AND ACTIONS**

**Goal:**

- 6.4** An interconnected, efficient, and well-maintained, multimodal transportation system.

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### **Objective:**

- 6.4.1** Provide for a more integrated island-wide transportation and land use planning program that reduces congestion and promotes more efficient (transit-friendly) land use patterns.

### **Policies:**

- 6.4.1.a** Plan for an integrated multi-modal transportation system comprised of public transit, bicycle, pedestrian, automobile, and other transportation modes.
- 6.4.1.b** Refocus transportation investment from the construction of additional roadways only for the automobile to the expansion of a multimodal transportation system.
- 6.4.1.c** Encourage the use of “complete streets” design methods.
- 6.4.1.d** Encourage employers to implement TDM strategies.

### **Implementing Actions:**

- 6.4.1-Action 1** Explore the benefits and costs of establishing a Metropolitan Planning Organization to serve Maui’s transportation needs.
- 6.4.1-Action 2** Develop and implement in a timely manner appropriate Transportation System Management(TSM) and Transportation Demand Management (TDM) programs in accordance with a Comprehensive Long Range Multimodal Plan.
- 6.4.1-Action 3** Study the feasibility of High Occupancy Vehicle (HOV) lanes within or adjacent to major arterials.
- 6.4.1-Action 4** Optimize traffic signal timing and coordination to reduce travel time and delay.
- 6.4.1-Action 5** Establish additional park-n-ride facilities in key locations.

### **Objective:**

- 6.4.2** Safe, interconnected transit, roadway, bicycle, equestrian, and pedestrian network.

### **Policies:**

- 6.4.2.a** Ensure transit-, roadway-, and pedestrian-facilities design and level-of-service standards respect the unique character of our communities.
- 6.4.2.b** Prioritize transportation improvements list to cost-effectively meet existing and future needs consistent with the MIP.
- 6.4.2.c** Require new development, where appropriate, to integrate sidewalks, pathways, bikeways, and transit infrastructure into new commercial and residential projects while enhancing community character.

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- 6.4.2.d** Identify and improve hazardous and substandard sections of roadways, drainage infrastructure, and bridges, provided that the historical integrity of the roads and bridges are protected.
- 6.4.2.e** Consider identification, acquisition where appropriate, and utilization of abandoned right-of-ways for bikeways, pedestrian pathways, and open-space networks.
- 6.4.2.f** Support the implementation of the *Central Maui Pedestrian & Bicycle Master Plan* (March 2012), when consistent with the MIP.

### **Implementing Actions:**

- 6.4.2-Action 1** Revise the subdivision ordinance to require developers, where appropriate, to integrate sidewalks, pathways, bikeways, and transit infrastructure into new commercial and residential projects, while enhancing community character.
- 6.4.2-Action 2** Implement the Upcountry Greenway Master Plan (2004), and other approved greenway plans, consistent with the MIP, and County and State transportation plans.
- 6.4.2-Action 3** Develop and adopt regulations to require developments to dedicate right-of-way consistent with State and County transportation plans prior to or as the phases of the developments become operational.
- 6.4.2-Action 4** Implement pedestrian and bikeway plans.

### **Objective:**

- 6.4.3** An island-wide, multimodal transportation system that respects and enhances the natural environment, scenic views, and each community's character.

### **Policies:**

- 6.4.3.a** Ensure that the roadway and transit alignments respect the natural environment and scenic views.
- 6.4.3.b** Ensure that roadways and transit systems in rural areas and small towns enhance community character.
- 6.4.3.c** Design all transit systems to respect visual corridors and Maui's character.

### **Implementing Actions:**

- 6.4.3-Action 1** Adopt and amend County regulations to incorporate design standards for roadways, transit, and pedestrian facilities that ensure protection of the natural environment and each community's sense of place.
- 6.4.3-Action 2** Develop, adopt, and regularly update the mapping of Scenic Corridor Protection standards that implement the recommendations of the Scenic Roadway Corridors Management Plan and Design Guidelines.

**6.4.3-Action 3** Urge the State to relocate Honoapiʻilani Highway mauka between the Pali and Puamana, and develop a network of parks and open space on the makai side of the highway, in accordance with the Pali to Puamana Master Plan.





*Maui Bus use has grown and continues to see support, Kahului.*

## TRANSIT

*Transit is the newest component of Maui's public infrastructure system. Public transit has increased in importance on Maui in the last 15 years as traffic congestion has stimulated the need for alternative modes of transportation. Public transit was initiated on Maui in 1992 with two fixed routes servicing Central Maui, operated by Maui Economic Opportunity, Inc. (MEO). The current public transit system, which began as the Maui Bus in July of 2006, includes fixed-route, paratransit, and commuter programs. Also, human services transportation, under the County of Maui Department of Transportation (MDOT), includes rural shuttles, dialysis transportation, and a variety of social services transportation programs. Transit services are now integrated to provide for the combined needs of the general population as well as the needs for individuals who are mobility challenged.*

Public transit continues to expand in response to the changing transportation needs of the community. MDOT has taken an adaptive management approach to establishing public transit and has initiated positive steps towards addressing roadway congestion and mobility issues on the island. MDOT transit ridership statistics indicate that ridership is steadily increasing; this trend is expected to continue. While ridership was approximately 33,000 passenger boardings during the month of July 2006, ridership has increased to 225,954 passenger boardings in the month of August 2011.

### **Existing Plans and Programs**

MDOT is currently operating the transit program on the basis of MDOT's operations taking into consideration the *County of Maui Short Range Transit Plan (2006-2010) (SRTP)*, prepared by Urbitran Associates, Inc.; the *Maui County Bus Stop Planning and Design Services*, prepared by the KFH Group; and Focus Maui Nui's goals and objectives. The SRTP contains planning, policy, and financial components that provide direction for implementing Maui's public transportation system. Federal policy, updated State Department of Transportation plans, and updated SRTP plans provide the basis for MDOT's transit policy throughout Maui.

### **Regional Analysis**

Long-range planning for Maui's transit needs requires an analysis of current and forecasted island population distribution, as well as identification of transit-dependent populations, employment centers, and major trip generators. Central, South, and West Maui will continue to demand more transit service based on their current and projected population and employment trends. Upcountry, although not a major employment center, possesses characteristics which make it an integral element of future island-wide transit planning. East Maui, being isolated and presenting unique transportation challenges, is currently being served by the human services component of the transportation system.

## **CHALLENGES AND OPPORTUNITIES**

### ***Accommodating Current and Future Transit Needs***

To accommodate Maui's needs, long-range transit planning must be integrated with land use decisions. The location of future transit operations is directly dependent on future development patterns. Major land use decisions must consider the potential implications for the mobility of residents, visitors, and individuals who are mobility challenged and plan for the beneficial integration of transit.

To encourage inter-modal transit, coordination must be achieved among bus service, rail, or other future transit modes, park-and-ride facilities, bike routes, and pedestrian paths. This should be accomplished while considering the special needs of each region on the island.

Since the visitor industry is a major contributor to Maui's roadway congestion, the industry must also be a significant player in the formulation of transportation solutions.

### ***Public Private Partnerships***

Many entities in the private sector benefit from the County transit services as alternative modes of transportation for customers and employees. The County should continue to partner with the private sector to support mass transit within the community and welcomes volunteers who will assist the MDOT in implementing infrastructure according to government standards. The private sector's involvement can vary from subsidizing commuter bus passes to the dedication of land for transit purposes. The funding of public transit programs and facilities continues to be an ongoing challenge. Reliable mechanisms for transit programs

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<b><i>Transit Supportive Roadway Infrastructure</i></b>	<p>such as dedicated funding sources should be obtained to ensure that transit remains a viable transportation option for an increasing number of residents and visitors throughout the island.</p> <p>Providing adequate transit supportive roadway infrastructure is vital to the efficient operation of a transit service. Bus pullouts, waiting benches/shelters, and signs are key roadway infrastructure items that are needed to support transit. While retroactively adding this infrastructure to existing roadways is important, ensuring that new roadways and subdivisions adequately accommodate transit is also a vital step.</p>
<b><i>Main Public Transit Facility</i></b>	<p>A key element of a successful public transit system is the presence of a main transit facility and connecting transit hubs. The County is currently utilizing the Queen Ka`ahumanu Shopping Center as a key transit hub. MDOT has entered into a license agreement to occupy its current premises at the Queen Ka`ahumanu Shopping Center, until the year 2020 and has implemented hub improvements. As Maui's ridership and system needs grow, the County should conduct a study to identify additional transit infrastructure needs.</p>
<b><i>Transportation Corridors</i></b>	<p>It is essential for Maui's future transportation system to identify multimodal corridors that include transit and other alternative modes of transportation (e.g., rail, bikes, etc.). The County should conduct a study to identify future locations for transit corridors and stations, as well as take action to protect and preserve lands necessary for these facilities for future County use.</p>

### **GOAL, OBJECTIVES, POLICIES, AND ACTIONS**

#### **Goal:**

- 6.5** An island-wide transit system that addresses the needs of residents and visitors and contributes to healthy and livable communities.

#### **Objective:**

- 6.5.1** An integrated transit system that better serves all mobility needs of Maui's residents and visitors.

#### **Policies:**

- 6.5.1.a** Maximize access to public transit in town centers, commercial districts, and employment centers.
- 6.5.1.b** Expand regional and inter-regional transit services, where appropriate, in heavily traveled corridors and within communities.
- 6.5.1.c** Increase the frequency of current service, add additional bus routes as demand requires, and transition to nonpolluting transit vehicles, as funding permits.
- 6.5.1.d** Provide adequate transit infrastructure (e.g., bus pullouts, waiting benches and shelters, signs) along existing and future transit right-of-ways.

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- 6.5.1.e** Require new development where appropriate, to provide right-of-ways (ROWs) to accommodate transit circulation and support facilities.
- 6.5.1.f** Identify, protect, and preserve, or acquire corridors for future inter-community transit use, including but not limited to, rail and also multimodal use corridors.
- 6.5.1.g** Establish transit corridors by planning for and securing right-of-way when appropriate for alternative modes of transportation (such as rail and water ferry service).
- 6.5.1.h** Pursue improvements and upgrades to the existing transit system consistent with updated MDOT planning studies/transit plans (within the framework of comprehensive island-wide multimodal transportation plans).
- 6.5.1.i** Increase inter-agency coordination between the Department of Planning, State Department of Transportation, County Department of Public Works, and other applicable agencies.

### **Implementing Actions:**

- 6.5.1-Action 1** Amend the County subdivision and development regulations to require, where appropriate, transit-supportive roadway infrastructure.
- 6.5.1-Action 2** Develop and adopt an ordinance to require developments, if appropriate, to provide private shuttle services connecting to public transit or appropriate impact fees for transportation improvements.
- 6.5.1-Action 3** Prepare a study to:
  - (1) Prioritize transit corridors and stations;
  - (2) Develop an implementation program to preserve sites and ROWs for necessary facilities; and
  - (3) Identify alternative funding approaches including public-private partnerships.
- 6.5.1-Action 4** Regularly conduct transit system needs-assessment surveys to ensure community satisfaction, and provide opportunities for transit-system users to make suggestions on ways to improve services.
- 6.5.1-Action 5** Work with rental car agencies to consider expansion of their agencies into high population areas such as West and South Maui.
- 6.5.1-Action 6** Designate, map, and preserve, or develop corridors to support mass-transit solutions.

### **Objective:**

- 6.5.2** Plan for a more diversified and stable funding base to support transportation goals.

### **Policies:**

- 6.5.2.a** Support alternative methods and sources of funding transportation improvements (including impact fees, higher taxes, fare adjustments, dedicated sources of funding, and assessments).

- 6.5.2.b** Collaborate with public-private entities or nonprofit organizations to reduce public transit operational expenses.
- 6.5.2.c** Coordinate with appropriate Federal, State, and County agencies to fund transportation projects in areas where growth is anticipated.

**Implementing Actions:**

- 6.5.2-Action 1** Conduct and implement technical studies to identify potential funding for ongoing maintenance and upgrades of transportation systems (transportation impact fees, community facilities districts, etc.).
- 6.5.2-Action 2** Establish alternative financing programs such as transportation impact fees, community facilities districts, transfer of development rights, or dedicated sources of funding.



*An example of active recreation in Eddie Tam Complex, Makawao.*

## PARKS

*As the island's population continues to grow, local actions to designate and protect parks and open space will play a key role in ensuring a high quality of life for Maui's residents. Therefore, it is important to plan for growth so these qualities are not lost. Maui's developed parks and system of open spaces include lands utilized for both active and passive recreation purposes. These developed parks provide athletic fields, tot lots, tennis courts, gymnasiums, and a variety of other facilities for daily use by island residents. The facilities are dispersed throughout the community at a scale that ranges from small one-acre mini-parks to large regional parks of 100 acres or more.*

Maui's system of open space resources includes natural areas, productive agricultural lands, gulches, wetlands, and waterways. These lands are often used for hiking, horseback riding, off-roading, mountain biking, fishing, hunting, camping, and other recreation uses. In addition to recreation, open lands serve the following important functions:

- Preserve important natural resources and critical habitats;
- Preserve lands for agriculture and forestry;
- Protect important views;
- Protect significant cultural and historic sites;
- Enhance the aesthetic quality of the built urban environment; and
- Contain urban sprawl.

To maintain a high degree of community livability, it is necessary to have a combination of adequate supply and distribution of open space resources.

### **Maui County Park System**

The County of Maui Department of Parks and Recreation is responsible for the development, operation, and maintenance of County park facilities. The State Department of Land and Natural Resources (DLNR) has jurisdiction over State Beach Parks, Natural Area Reserves, and other managed lands. The National Park Service manages Haleakalā National Park.

As of March 2007, the County's parks included a total of 770 acres of sub-regional parks (15- to 20-acres in size) and 334 acres of regional parks (40- to 150-acres in size). The *Public Facilities Assessment Update* (2007) finds that the island has a considerable deficit of park space in all of its community plan areas. This conclusion was based on a standard of 10 acres per 1,000 of *de facto* population for sub-regional parks and 15 acres per 1,000 of *de facto* population for regional parks. It should also be noted that these findings were based on County parks only and thus excluded State, private, and Federal park lands.

### **Existing Plans and Programs**

The Maui County Department of Parks and Recreation does not have a park and recreation facilities plan. This task has historically been done on an intermittent basis for a specific area when funding has been available. The *South Maui Parks and Open Space Master Plan* (October, 2003), the *Pali to Puamana Parkway Master Plan* (February, 2005) and the *Shoreline Access Inventory Update* (March, 2005) are examples of these types of studies. The Department typically conducts facility planning on the basis of its six-year capital program budget, which is updated on an annual basis.

An ongoing program of long-range park lands and facilities planning would help the Department serve the recreational needs of the island's rapidly growing population. A better understanding of the community's recreation goals and a set of criteria based on the community's desires will help identify adequate levels of staff and funding.

### **Level-of-Service (LOS) Standards**

The National Recreation and Parks Association (NRPA) published updated guidelines in 1996 entitled "Park, Recreation, Open Space, and Greenway Guidelines". These revised guidelines encourage communities to develop their own LOS standards that are based on local goals, priorities, and conditions. The NRPA suggests and provides approaches for inventorying existing park areas and facilities; and

assessing the adequacy of current standards through visitor surveys, resident questionnaires, and field observation of participation rates. Because of Maui's unique position as an ocean-oriented visitor destination, an individualized LOS study that recognizes the island's assets, conditions, and resources may result in standards that more accurately reflect the island's park land and facility needs.

### **Wailuku-Kahului Parks**

The Wailuku-Kahului Community Plan area contains more parks *per capita* than any other community plan area on the island. Since many of the community's parks provide region-wide facilities, they are used by residents of other communities. This area has approximately 186 acres of sub-regional park land and 377 acres of regional parks. Based on current *de facto* population, the area is already deficient in sub-regional park lands by approximately 477 acres. Future projections to 2030 indicate that this deficit will increase to 541 acres.

### **Kīhei-Mākena Parks**

The Kīhei-Mākena Community Plan area contains mostly beach parks. This area currently has 114 acres of sub-regional park land. Based on current *de facto* population, the area is already deficient in sub-regional park lands by approximately 336 acres. Future projections to 2030 indicate this deficit will increase to 605 acres.

### **West Maui Parks**

The West Maui Community Plan area contains many beach parks. The area currently has 125 acres of sub-regional parks which are primarily neighborhood parks. Based on current *de facto* population, the area is already deficient in sub-regional park lands by approximately 322 acres. Future projections to 2030 indicate this deficit will increase to 497 acres.

### **Makawao-Pukalani-Kula Parks**

The Makawao-Pukalani-Kula Community Plan area currently has 118 acres of sub-regional parks land. Based on current *de facto* population, the area is already deficient in sub-regional park lands by approximately 114 acres. Future projections to 2030 indicate that this deficit will increase to 191 acres. A major limitation with this area is its widely dispersed population centers. Consequently, an option that could be considered is locating some of the smaller parks within future designated residential areas and placing larger parks near the center of major residential areas such as Makawao and Pukalani.

### **Pā`ia-Ha`ikū Parks**

The Pā`ia-Ha`ikū Community Plan area has approximately 110 acres of sub-regional park land. Based on current *de facto* population, the area has a deficit of 13 acres in sub-regional park lands. Future projections to 2030 indicate that this deficit will increase to 30 acres.

### **Hāna Parks**

The Hāna Community Plan area has a well-developed park system; it experiences, by far, the smallest deficit of park space of any of Maui's community plan areas. The area will require an additional 7 acres of park space to support the *de facto* population by 2030.



### **Other Park Facilities**

The Public Facilities Assessment Update (2007) (PFAU) also identified the need for other park facilities such as tennis courts, sports courts, sports fields, gyms, and community centers. The PFAU concluded that every community plan area would need these park facilities to accommodate growth to 2030.

Along with infrastructure systems, the above mentioned park facilities are also important elements of building and supporting healthy communities. These facilities and the services they provide support social and economic activities and play a key role in our everyday lives.

## **CHALLENGES AND OPPORTUNITIES**

### ***Long-Term Planning and Adequate Facilities Maintenance***

Conducting long-range park land and facility planning will help to ensure that park land and facilities keep pace with population growth. The program must have the capacity to continually monitor the island's recreational needs, including persons with disabilities, and respond to changing circumstances through the timely acquisition of needed land and the development of required facilities.

A primary goal should be the preparation of a parks and recreation functional plan. Elements that should be addressed in the plan include the following: summary of existing conditions; parks and recreation level-of-service standards; Americans with Disabilities Act (ADA) compliance; demand and needs assessment; community vision, goals, objectives, policies, and actions; opportunities; long-term, island-wide master plan reflecting the vision; prioritization of land area and facility needs; potential funding sources; and implementation schedule.

To keep pace with population growth and the needs of different areas of the island, a proactive maintenance program should be employed and supported by adequate funding.

### ***Acquisitions of Suitable Park Sites***

The scarcity and cost of suitable park land necessitate that appropriate park sites be identified early in the planning process to allow sufficient time to acquire sites with favorable topography, access to infrastructure, and locations that could serve the dual purpose of meeting a community's recreational needs while serving as visual relief and open space between and within communities.

### ***Network of Parks and Recreational Areas***

The long-term functional plan should provide residents and visitors with opportunities to access and enjoy an interconnected network of greenways, trails, bikeways, and pedestrian-oriented streets. This network should link residential communities and visitor accommodations with existing and future park sites, the ocean, and different open-space resources.

### ***Shoreline Access and the Carrying Capacity of Beach Parks***

Being an ocean-oriented community with considerable population growth, Maui's existing beach parks are increasingly crowded. Therefore, access to the shoreline should be protected and enhanced. To maintain a high quality-of-life for island residents, the County will need to provide and maintain beach-access points and beach parks in each region of the island.

The *Pali to Puamana Parkway Master Plan* proposes the creation of an undeveloped 8-mile stretch of shoreline for recreation use through the realignment of Honoapi'ilani Highway. This will provide a significant opportunity for Maui to expand its inventory of shoreline lands. In addition, the *Shoreline Access Inventory Update – Final Report* (2005) identifies specific parcels the County could acquire to enhance beach access on Maui.

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### ***Availability and Access to Active and Passive Recreation***

In recent years, parks investment has generally been focused around active recreation parks. As the island urbanizes, it will be just as important to protect and create open spaces and passive recreation opportunities within urban areas and throughout the island.

### **GOAL, OBJECTIVES, POLICIES, AND ACTIONS**

#### **Goal:**

- 6.6** Maui will have a diverse range of active and passive recreational parks, wilderness areas, and other natural-resource areas linked, where feasible, by a network of greenways, bikeways, pathways, and roads that are accessible to all.

#### **Objective:**

- 6.6.1** More effective, long-range planning of parks and recreation programs able to meet community needs.

#### **Policies:**

- 6.6.1.a** Support, consistent with the MIP, the implementation of open-space and recreational plans, such as the *Pali to Puamana Parkway Master Plan* and the *Upcountry Greenways Master Plan*.
- 6.6.1.b** Utilize the ahupua`a approach by integrating mauka-to-makai natural landscapes into an island-wide parks and recreation functional plan.
- 6.6.1.c** Provide a balanced mix of passive and active parks, including neighborhood, community, and regional parks, in each community plan area.
- 6.6.1.d** Support the expansion of Haleakala National Park, where supported by affected communities.
- 6.6.1.e** Support lo`i and dryland taro restoration in County, State, and Federal parks.
- 6.6.1.f** Encourage private landowners to dedicate land to Federal, State, or County governments, or nonprofit land trusts, for parks and open-space protection consistent with the MIP.
- 6.6.1.g** Strengthen inter-agency coordination including State and County departments, such as resolving joint use of facilities and properties.
- 6.6.1.h** Work with the State to prepare and implement a master management plan for `Ahihi-Kīna`u and La Perouse-Keone`ō`io Bay to Kanaloa Point region.

#### **Implementing Actions:**

- 6.6.1-Action 1** Identify government ROWs to determine if they can be incorporated into an island-wide parks and recreation functional plan.

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- 6.6.1-Action 2** Identify community partners for the maintenance and ownership of community park facilities.
- 6.6.1-Action 3** Develop, adopt and regularly update an island-wide parks and recreation functional plan that incorporates facilities, programs, and a financial component.
- 6.6.1-Action 4** Institute regularly-held, inter-agency coordination meetings to facilitate the implementation of the functional plan.

### **Objective:**

- 6.6.2** Achieve parks and recreation opportunities to meet the diverse needs of our community.

### **Policies:**

- 6.6.2.a** Establish appropriate level-of-service standards at the neighborhood, community, and regional levels.
- 6.6.2.b** Identify and acquire parks and recreational facilities that address existing park inadequacies and complement and enhance neighborhoods, communities, and natural-land features.
- 6.6.2.c** Design park facilities to preserve and enhance natural site characteristics, maximize views, protect environmental and cultural sites, and minimize water demands.
- 6.6.2.d** Acquire lands along the shoreline, between coastal roadways and the ocean.
- 6.6.2.e** Encourage the development of regional parks, district parks, and greenways in a manner that helps to contain sprawl, provide separation between distinct communities, or offer open space within urban communities.
- 6.6.2.f** Require large master-planned communities that incorporate a mixture of park facilities pursuant to parks standards and functional plans.
- 6.6.2.g** Support appropriate areas for cultural parks (e.g., Kepaniwai) in each community plan area.
- 6.6.2.h** Incorporate community input to determine the appropriate location, design, and long-term stewardship of parks and recreation facilities.
- 6.6.2.i** Manage commercial activities at public parks to minimize impacts to residents.
- 6.6.2.j** Support public-private partnerships to implement the acquisition and development of parks when consistent with the General Plan.
- 6.6.2.k** Support a coordinated program to improve, operate, and maintain joint-use facilities and grounds.

### **Implementing Actions:**

- 6.6.2-Action 1** Develop and adopt LOS and design standards for parks and recreational facilities.
- 6.6.2-Action 2** Identify and acquire appropriate park sites in accordance with a parks and recreation functional plan.
- 6.6.2-Action 3** Implement parks and recreational plans, consistent with the MIP, including the North Shore Bikeway Master Plan; Upcountry Greenway Master Plan; South Maui Community Park and Open Space Master Plan; Pali to Puamana Parkway Master Plan; Shoreline Access and Inventory Update-Final Report; South Maui Heritage Corridor; and North Shore Corridor Report.
- 6.6.2-Action 4** Develop a regional park and fairground in Central Maui, and regional parks in South and West Maui.
- 6.6.2-Action 5** Amend County zoning and subdivision ordinances to require development to incorporate a mixture of park facilities into large master-planned communities.
- 6.6.2-Action 6** Develop additional historical and cultural parks.
- 6.6.2-Action 7** Establish community-based advisory boards where necessary to help prioritize the purchase of park and recreational lands and facilities.

### **Objective:**

- 6.6.3** An expanded network of greenways, trails, pathways, and bikeways.

### **Policies:**

- 6.6.3.a** Link existing and future park sites, natural areas, the shoreline, and residential areas with a network of bikeways, pedestrian paths, trails, and greenways.
- 6.6.3.b** Support the implementation of plans and programs that facilitate pedestrian mobility and access to active and passive recreation areas and sites.
- 6.6.3.c** Collaborate with the State and private land owners to ensure perpetual access and proper stewardship of traditional trails and access systems.
- 6.6.3.d** Facilitate the development of well-managed noncommercial campgrounds throughout the island.
- 6.6.3.e** Consider requiring commercial bike rental businesses to provide funding that supports a mauka-to-makai Haleakalā bikeway improvement program.
- 6.6.3.f** Ensure ADA compliance and seek opportunities to make all parks and recreational facilities accessible to people with disabilities.

### **Implementing Actions:**

- 6.6.3-Action 1** Amend development regulations to ensure the construction of adequate parking with pathways near shoreline access points.
- 6.6.3-Action 2** Amend the Maui County Code to provide better access and proper stewardship of traditional trails and access systems.
- 6.6.3-Action 3** Develop an educational program for private land owners and the general public to ensure proper stewardship of the islands' trail and access systems.
- 6.6.3-Action 4** Develop public campgrounds in suitable locations throughout the island.
- 6.6.3-Action 5** Create opportunities to utilize portions of public parks for community gardens.



*The renovated Kalana Pāku 'i Building, Wailuku.*

### **PUBLIC FACILITIES**

*Along with infrastructure systems, public facilities are important elements of building and supporting healthy communities. Services provided by these facilities play a key role in our everyday lives; by supporting essential social and economic activities. The following analysis examines public facilities from a regional perspective; it identifies the current setting and projected 2030 demand. Public facilities assessed include fire control, police, and government offices and parking. The Public Facilities Assessment Update (2007), prepared by R.M. Towill Corporation, provides the primary source of information for this section.*

### **Fire Control**

Maui's Fire control is administered by the Maui County Department of Fire and Public Safety (FPS). The mission of the FPS's is to "protect and preserve life, environment, and property." Adequate fire control coverage is determined by several factors such as the distance from a fire station, the value of property, and the population of an area. On Maui, nearly all commercial and residential districts are within a five road-mile coverage radius of a fire station. However, there are rural and agricultural areas outside of this coverage radius. Three fire stations exist in the Wailuku-Kahului community plan area, two in West Maui, two in South Maui, two in the Makawao-Pukalani-Kula community plan area, one in the Pā'ia-Ha'ikū community plan area, and one in the Hāna community plan area. As the island continues to grow, additional stations will be needed. FPS is currently planning to develop a new station in Ha'ikū. Fire stations in Waikapū, North Kihei, and West Maui will need to be constructed to accommodate future population growth in these areas.

### **Police**

Police services are administered by the Maui County Police Department (MPD). The mission of the MPD is to "serve the community in a manner that epitomizes those ideals woven into the fabric of the Constitution of the United States and the spirit of aloha. We will serve to enhance the quality of life in cooperation with all of those who share these beautiful islands in making this a better place to live."

A police force's effectiveness is a function of the number of police officers, the areas that they can cover, resources available to the police department, the speed at which they can respond to emergencies, and the frequency of calls distributed within an area. Maui County has a lower incident of crime per capita of de facto population compared to State averages.

Three police stations exist on the island; they are located in Wailuku, Lahaina, and Hāna. A number of sub-stations also exist around the island with none that can process and temporarily hold arrestees. MPD will need to expand and or replace its facilities as population increases. The exception is the Hāna station, which is projected to have adequate capacity to 2030. The Department is currently focusing its attentions on building a County-owned permanent station in Kihei.

### **Government Offices and Parking**

The Wailuku Civic Center District was established in 1905 when the Territorial Legislature designated Wailuku Town as the County's seat of government. The Civic Center encompasses State, Federal, and County-owned parcels and buildings. The Civic Center is a place of great importance and symbolism. It is a place where key decisions are made, people work, and numerous government services are provided.

The primary source of information for the following analysis is the *Wailuku Municipal Service Center Master Plan Report* (2004). Existing County offices include the Kalana O Maui building, County Courthouse, and the Kalana O Pāku'i building. Construction dates for these buildings range from 1907 for the County Courthouse to 1970 for the Kalana O Maui building. The construction of the Kalana O Maui building represents the last significant contribution of County-owned office space to service County employees. Maui's resident population and County government employment have both grown significantly since 1970. However, the supply of office space and parking has not kept pace with the growing demand.

As Maui's resident population and County government employees grow into 2030, office space and parking stalls will need to be added to accommodate this growth. Several options exist to address County

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government needs, including revitalization of the Civic Center District to provide additional municipal office space and parking.

### **GOAL, OBJECTIVES, POLICIES, AND ACTIONS**

#### **Goal:**

**6.7** Maui will have adequate public facilities that meet the diverse needs of residents.

#### **Objective:**

**6.7.1** More effective planning for public facilities to meet community needs.

#### **Policies:**

- 6.7.1.a** Ensure the development and update of island-wide public facilities functional plans that incorporate prioritized facilities, programs, and a financial component.
- 6.7.1.b** Establish appropriate level-of-service standards for public facilities provided by the County.
- 6.7.1.c** Pursue improvements and upgrades of County public facilities consistent with the public facilities functional plan.
- 6.7.1.d** Recognize Wailuku Town as Maui’s Civic Center and support the revitalization of the Civic Center District by consolidating government office spaces, enhancing landscape beautification, and providing adequate public parking.
- 6.7.1.e** Support, with community input, the relocation of the Maui Community Correctional Center from Wailuku to an appropriate location in Pu`unēnē.
- 6.7.1.f** Adequately plan and fund public safety facilities (fire, police, ambulance, civil defense) to meet community needs.
- 6.7.1.g** Increase joint facilities utilization and program coordination between State and County agencies such as baseyards, communication centers, recreational facilities, etc., where feasible.
- 6.7.1.h** Focus future expenditures for additional government office space, parking, and related facilities in Wailuku’s Civic Center District.
- 6.7.1.i** Encourage continuous and safe walkways for children within one mile of each school.
- 6.7.1.j** Encourage public-private partnerships to identify and resolve public facility plan shortcomings when consistent with the General Plan.
- 6.7.1.k** Incorporate community/area residents’ input to determine the appropriate location and design of public facilities.



**Implementing Action:**

**6.7.1-Action 1** Establish an archive center to preserve both digital and hardcopy documents that are important to Maui's planning process.

*If you are planning for a year, sow rice; if you are planning for a decade, plant trees; if you are planning for a lifetime, educate people.*

*~Chinese Proverb*



*Tao Intermediate School, Wailuku.*

## SCHOOLS AND LIBRARIES

*In this increasingly complex world and its emerging industries, educational institutions and libraries are critical elements in ensuring a healthy and prosperous community. A broad set of skills and aptitudes is required if our nation, our State, and our island are to remain globally competitive, with a diverse economy that will sustain our way of life. Research indicates that investments in school infrastructure correlate with significant increases in student learning. Our schools and libraries foster the development of Maui's children, promote life-long learning and responsible citizenship, shape future employment opportunities, and influence the island's growth and development. While public education is a State responsibility, Maui County encourages all educational institutions including the State to continually invest in our residents' future.*

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Our children have a right to an inheritance – capital investments made in our physical, social, and human resources – sufficient to ensure they will have a quality of life no less satisfying than the quality of life enjoyed by our generation. Our grandparents labored to open pathways of success for us; we can do no less for our keiki.

The Hawai`i school system is a statewide system that manages all public schools in the State, making it approximately the 10<sup>th</sup> largest school system in the nation. The County does not have any jurisdiction over the public school system; however, coordination between the State and County is necessary for planning future school locations and acquiring adequate land. The State’s public school system is managed by the Department of Education (DOE) with oversight provided by the Board of Education (BOE), Governor’s office, and the Hawai`i State Legislature.

The Hawai`i public school system includes elementary, intermediate, and high schools. Maui has a total of 24 public schools. Maui also has several charter and private schools. Table 6-6 provides a breakdown of the three school types, approximate student age by grade, and the number of schools on the island.

**Table 6 - 6: Maui’s Public Schools**

<b>School Type</b>	<b>DOE Grades</b>	<b>Student Age (Approx.)</b>	<b>Number on Maui <sup>5</sup></b>
Elementary School	K-5	5-10	15
Intermediate (middle) School	6-8	11-13	6
High School	9-12	14-17	5

For each school type, the BOE sets benchmarks for school size. Benchmark capacities are based on BOE policy, which calls for the design of schools as small communities of learners. Specific BOE enrollment design guidelines by school type are outlined in Table 6-7.

**Table 6 - 7: BOE Enrollment Design Guidelines**

<b>School Type</b>	<b>Grade Level Served</b>	<b>Building Design Capacity</b>
Elementary School	K-5	400 - 750 Students
Intermediate (middle) School	6-8	500 – 1,000 Students
High School	9-12	800 – 1,600 Students

### **Existing Plans and Programs**

Plans for the public school system are prepared in accordance with Chapter 226, (HRS). The *State Education Functional Plan*, adopted by the State Legislature in 1985, charts education directions intended to improve educational quality in Hawai`i. The State Education Plan serves as a technical reference document to support the functional plan. In addition, schools are organized around complexes that include a High School and the Elementary and Intermediate Schools that feed into the High School. Each school complex has its own facility master plan.

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<sup>5</sup> Hāna High/Elementary counted once for each school type.

### **Library Facilities**

Libraries are an important community resource for residents of all ages. The Hawai'i State Public Library System (HSPLS) is under the direct control of the BOE. Hawai'i's libraries are funded through and receive approximately 1 percent of the DOE's budget.

Library facilities were assessed on a measure of 0.6 gross square feet per capita and a ten road-mile service area radius. Six libraries exist on the island: Wailuku, Kahului, Makawao, Lahaina, Kīhei, and Hāna. HSPLS will need to expand and/or replace its facilities in all areas. The exception is Hāna, which is projected to have adequate capacity to 2030. The Pā'ia-Ha'ikū community plan region does not have a library of its own; given the current and projected population of this community, a new library would be warranted in this area by 2030.

### **CHALLENGES AND OPPORTUNITIES**

#### ***Meeting Capacity Deficits and Providing Smaller, Learning Centered Schools***

As the County grows and expands its urban growth areas to accommodate newly developing neighborhoods, existing schools will need to be expanded or new schools built to meet the increasing enrollment. This conclusion is based on the *County of Maui Public Facilities Assessment Update (2007)* and enrollment projections provided by the DOE (available through the 2014-2015 school year). Issues related to school capacity exist at Maui High School, 'Īao Intermediate School, Maui Waena Intermediate School, Waihe'e Elementary School, Lahaina Intermediate School, and Lahainaluna High School. Maui High School's capacity issue is being addressed through the proposed new high school in South Maui. Several schools exceed the BOE's enrollment design guidelines, and many schools rely on portable classrooms to meet capacity needs. New intermediate and elementary schools will be needed during the 2030 planning horizon in the Central and West Maui.

#### ***Coordinating Land Use and School Facility Planning***

As previously mentioned, the County does not have jurisdiction over the public school system. Therefore, cooperation with the State becomes increasingly important since the placement and design of facilities can help strengthen communities by providing a center for community activities that extend beyond the school day. Joint use of school facilities can result in a more efficient use of scarce public resources and provide neighborhood amenities; examples include shared use of playing fields, auditoriums that double as community theaters, and other community services incorporated into schools. However, the DOE's primary responsibility is to ensure that the State's K-12 educational facilities are available first and foremost for providing education and a safe environment for public school students.

### **GOAL, OBJECTIVES, POLICIES, AND ACTIONS**

#### **Goal:**

**6.8** Maui will have school and library facilities that meet residents' needs and goals.

## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

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### **Objective:**

- 6.8.1** Assist in providing appropriate school and library facilities in a timely manner and in strategic locations.

### **Policies:**

- 6.8.1.a** Work in partnership with all educational institutions to meet current and future needs including appropriate location, timing, and design of future facilities.
- 6.8.1.b** Allow for the expansion and intensification of uses at the UHMC including satellite campuses operating in remote areas.
- 6.8.1.c** Encourage the DOE to build and maintain smaller, community-oriented schools.
- 6.8.1.d** Encourage better cooperation by the State and County for use of State and County facilities.
- 6.8.1.e** Encourage the State to upgrade, modernize, and expand school facilities, including those in remote communities.
- 6.8.1.f** Work with the State to develop a master plan for the expansion of UHMC in accordance with the MIP.
- 6.8.1.g** Support partnerships (public/private/nonprofit) to build and staff new schools and improve existing facilities.
- 6.8.1.h** Work with the BOE HSPLS to provide centralized library services (including telecommunications) to all areas of Maui.
- 6.8.1.i** Work with the State to expedite planning and construction of Kīhei High School, including the integration of the high school with the Maui Research and Technology Park.
- 6.8.1.j** Work with the State to identify intermediate school sites in Central Maui and other areas where needed.

### **Objective:**

- 6.8.2** Provide a more expansive network of safe and convenient pedestrian-friendly streets, trails, pathways, and bikeways between neighborhoods and schools where appropriate.

### **Policies:**

- 6.8.2.a** Encourage the State to build new school facilities in appropriate locations that minimize time and distance for students to travel to and from school.
- 6.8.2.b** Encourage the State to implement the Safe Routes to School initiative with funding commitments to help the County plan and fund projects that ensure safe access routes to school.

### **Implementing Actions:**

- 6.8.2-Action 1** Conduct an inventory to determine safety obstacles along school access routes and work with the State to address safety concerns for students who are unable to utilize school bus transport.
- 6.8.2-Action 2** Work with the State to coordinate the siting and development of future school facilities, bikeways, pedestrian paths, and greenways to encourage mobility.
- 6.8.2-Action 3** Amend County zoning and subdivision regulations to require development within the vicinity of schools, libraries, community centers, and other public facilities to provide bike-and pedestrian-friendly infrastructure and traffic calming features.



*Maui Memorial Medical Center, Wailuku.*

## HEALTH CARE

*The Hawai`i Department of Health is the agency in charge of health care systems throughout all localities within the state. Hawai`i's current health care system and its overall health status are the legacies from the State's history as a kingdom, a republic, and a territory. The kingdom provided medical care to the population through the kauka (doctor) who were supported by the early ali`i (chiefs). With the establishment of the plantations beginning in 1835, came a highly paternalistic model that guaranteed access to medical care through a system of salaried or contract physicians and plantation-owned hospitals. Although some of the plantation hospitals eventually closed, others became private or County hospitals. The latter became the basis for what is today a system of hospitals on most of the neighbor islands that has been State-operated by the Department of Health.*

In 1967, an executive order established the State Comprehensive Health Planning Office. In 1974, through Chapter 323, Part III, HRS, the agency was formalized and renamed the State Health Planning and Development Agency (SHPDA). This legislation also established the Statewide Health Coordinating Council (SHCC) and the Subarea Health Planning Councils to provide a permanent vehicle for citizen input into the health planning process; this ensures the State's health services plans will be based on informed decision making.

### **Health Status**

Hawai'i's resident population enjoys a life expectancy that exceeds that of the mainland U.S. (78.8 years versus 76.1 for all races and both sexes). The resident population has the lowest age-adjusted overall death rate in the country, and is the fifth lowest in infant mortality. The State has been ranked fourth in the nation for overall health rankings.

### **Existing Plans and Programs**

The principal planning product of the SHPDA and its citizen advisory bodies is the State Health Services and Facilities Plan (HSFP). In 1996, the SHPDA and SHCC began a full-scale revision of the HSFP. The Plan was reformatted and redirected to become a strategic document that emphasized improvement of health status and the importance of access, quality, cost effectiveness, and equity as criteria for decision making. The HSFP is now more commonly known as the "Hawai'i Health Performance Plan."

In 2007, the Maui Health Initiative Task Force was established by Act 219 by the Session Laws of Hawai'i. The task force was charged with determining current and future health care needs; developing an integrated plan for health care; and proposing an appropriate role for facilities in Maui County. The task force produced its final report in four months including a set of priorities to provide a high quality of health care throughout Maui. The report's priorities are as follows: 1) Extend emergency care and medical transportation systems; 2) Expand and modernize facilities; 3) Add home and community-based services; 4) Boost reimbursements; 5) Recruit and maintain the workforce; 6) Enhance mental health services; 7) Improve access to dental care; 8) Upgrade obstetric care and establish a neonatal resuscitation team; 9) Promote healthy living and disease prevention; 10) Improve pharmacy services; 11) Update technology; and 12) Prepare for disasters.

The 2005-2025 Maui Bed Needs Study was the product of a collaborative work of the SHPDA; MMMC; Malulani Health Systems, Inc., Kaiser Permanente; and the County's Mayor's office. This study builds upon an understanding of patterns of hospitalization on Maui, in the State as a whole, and across the country; driving forces in healthcare; and the characteristics of Maui's population and its future projection.

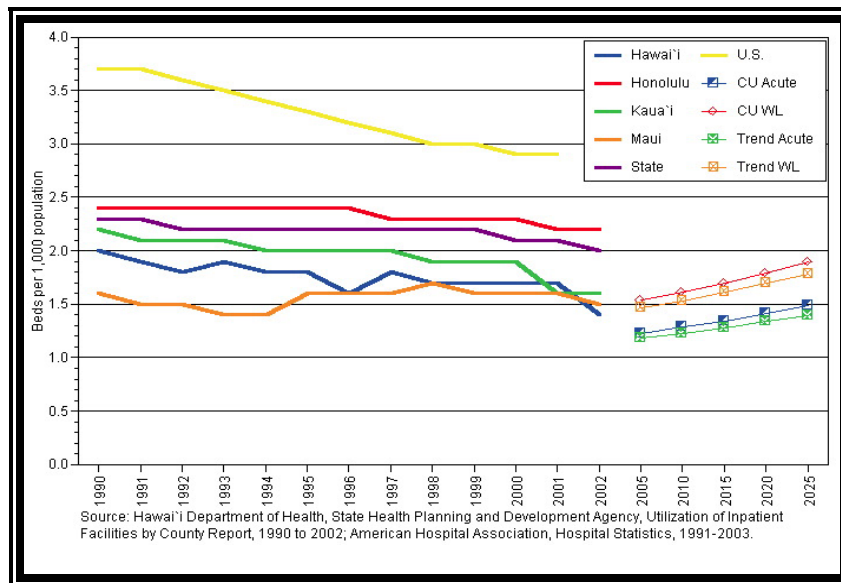
To estimate current and future needs, the study includes two sets of calculations that were performed on each bed projection model. The first set assumed that there would be no wait list patients in acute care beds. The second set assumed that the problem of wait list patients in acute care beds would not be resolved and that this patient population would continue to grow. A simplified version of the results is presented in Table 6-8.



**Table 6 - 8: Maui's Bed Needs, 2005-2025**

<b>Needs if 12% of Maui Residents Continue to be Hospitalized on Oahu</b>					
	2005	2010	2015	2020	2025
High Estimate to Meet Acute Care Needs Only	189	214	242	272	305
High Estimate to Meet Wait List Needs Only	48	55	65	73	85
<b>Total Beds Needed to Match High Estimates</b>	<b>237</b>	<b>269</b>	<b>307</b>	<b>345</b>	<b>390</b>
Beds to be Added Beyond Current 196 at MMMC					
To Meet High Estimate Acute Care Needs	-7	18	46	76	109
To Meet High Estimate Wait List Needs	48	55	65	73	85
<b>Total Beds to be Added to Meet High Estimates</b>	<b>41</b>	<b>73</b>	<b>111</b>	<b>149</b>	<b>194</b>
<b>OR</b>					
<b>Revised Needs if Maui Residents No Longer Go to Oahu for Hospitalization</b>					
Additional Beds Required	25	29	33	37	42
<b>Revised Total Beds Needed</b>	<b>262</b>	<b>298</b>	<b>340</b>	<b>382</b>	<b>432</b>
<b>Revised Total Additional Beds Needed</b>	<b>66</b>	<b>102</b>	<b>144</b>	<b>186</b>	<b>236</b>
<b>Note:</b> The High Estimate is the Current Use Model estimate assuming an occupancy rate of 75% plus 5%. Refer to Table 14 on page 55 for details.					

The Study showed that in 2002, Maui's licensed bed supply was 1.5 beds per 1,000 population. Bed projections, which include wait-list patients, start at 1.5 beds per 1,000 and reach 1.8 beds by 2025. Projections, which exclude wait-list patients, range from 1.3 beds per 1,000 in 2005 to 1.5 beds per 1,000 in 2025.



**Figure 6 - 1: Beds per 1,000 Population-Hawai'i Counties & U.S.**

**CHALLENGES AND OPPORTUNITIES**

**Aging Population**

Because Maui's population is aging and seniors are relocating from other areas of the country to retire in Hawai'i, there will be a need for additional services, including respite. Veterans predictably have a need for mental health services and many veterans do not seek help. Substance abuse produces a generation of people with mental incapacities in need of mental health care services; this need does exist on Maui.

On Maui, access to dental care is extremely limited for the elderly, the indigent, Native Hawaiians, and those with Medicaid. In addition, many of the island's

### ***Chronic Illness, Especially Among Native Hawaiians***

children lack adequate dental insurance, and the lack of fluoride in the island’s water has contributed to significant tooth decay among Maui’s children. The life expectancy of Native Hawaiians is significantly less than that of other populations. 18 percent of Native Hawaiians die before reaching age 45, 2.5 times higher than the death rate of other ethnic groups. Native Hawaiians experience higher death rates than the general population from cancer (50 percent higher), diabetes (119 percent higher), heart disease (86 percent higher), kidney-related complications (140 percent) and cerebrovascular disease (64 percent higher-brain dysfunctions related to disease of blood vessels supplying the brain).

### ***Disease Prevention and Integrated Health Care Delivery***

The challenges facing the island’s health care system are the reformation of the medical care delivery system and the design of a health system to reflect the unique circumstances facing health care on Maui. The basic premise upon which a redesigned system rests is that it is better to prevent a disease than to treat it. The best approach to improve the health status is to make an integrated delivery system available to all populations where they live, work, study, and engage in other life activities. This system should include primary care, health education, lifestyle, etc. Partnerships between health care providers, health care consumers, and the community becomes the desired operational strategy.

The need for a medical cure that dominated earlier health care thinking is growing less important than the need for total health care, including a focus on education and prevention.

There is a renewed emphasis throughout the country on educating citizens to make healthy lifestyle choices to reduce the prevalence of chronic disease. This shift carries an obligation to make full information available so patients can make informed lifestyle and health care choices.

### ***Emergency Services & Overall Health Care Infrastructure***

The need for improved emergency care and transport is most evident in West Maui where there are no emergency care facilities despite the presence of a significant number of residents and tourists. MMC’s Emergency Department has been targeted for upgrading and expansion; the intent is to provide additional capacity and enable better triage of patients in need of emergency room services. However, this facility (while centrally located) remains remote from other areas of the island.

According to the *Maui Bed Needs Study*, Maui needs additional acute-care beds and services. As demographic data show, Maui’s elderly population will grow significantly over the next 20 years. Long-term care beds will be needed near population centers to meet future demand. The need for long-term care beds is particularly acute in West Maui. Medical facilities need to be continuously modernized to keep up with technology. Modernization includes continuous updating of technology and systems, and replacing of outmoded facilities and infrastructure.

## **GOAL, OBJECTIVES, POLICIES, AND ACTIONS**

### **Goal:**

- 6.9** All of Maui residents will have the best possible health care to include healthy living, disease prevention, as well as acute and long-term care.

## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

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### **Objective:**

- 6.9.1** Greater autonomy to the Maui region in their efforts to improve medical care on the island.

### **Policies:**

- 6.9.1.a** Encourage the State to give greater autonomy to the Maui region in their efforts to improve medical care on the island.
- 6.9.1.b** Support innovative financial solutions, such as capital partnerships, joint ventures, and consolidations for MMMC and other health institutions.
- 6.9.1.c** Support MMMC as a major core medical center that provides a greater range of services.
- 6.9.1.d** Support the immediate development of a critical access hospital in West Maui.
- 6.9.1.e** Support the expansion of regional critical-access facilities, where allowed by Federal regulations.
- 6.9.1.f** Improve medical service to remote and outlying regions.
- 6.9.1.g** Support transportation services for dialysis patients and community dialysis programs.
- 6.9.1.h** Work with the State to determine the feasibility of appropriate medical facilities in South Maui and Hāna, including the possible reestablishment of a small community hospital in Hāna, the establishment of a hospital in South Maui, and assist the State in securing funding to meet Maui's health care needs.

### **Implementing Action:**

- 6.9.1-Action 1** Work with Federal and State legislators to enact legislation and secure funding to meet Maui's health care needs.

### **Objective:**

- 6.9.2** An expansion of long-term care facilities and long-term care alternatives to meet the needs of our aging population.

### **Policies:**

- 6.9.2.a** Support efforts to increase Maui's long-term care bed capacity to cover current and future needs, close to large population centers.
- 6.9.2.b** Recognize that facilities for low-income elders who need long-term care are a needed form of affordable and subsidized housing.
- 6.9.2.c** Evaluate the needs of the long-term disabled and provide planning support for their care, if there is a need for long-term care facilities.

## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

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- 6.9.2.d** Consider long-term care facilities as a major potential employment base and encourage the recruitment and training of potential employees.

### **Implementing Actions:**

- 6.9.2-Action 1** Work with the State to secure the construction of long-term care facilities (particularly in South and West Maui), expand and modernize Kula hospital without jeopardizing its status as a registered historic structure, and establish geriatric training programs.
- 6.9.2-Action 2** Monitor current and future long-term care bed needs and ensure that such needs are met consistently with the Maui Bed Needs Study.

### **Objective:**

- 6.9.3** More support to home-care and community-based programs so they become alternatives to traditional nursing homes.

### **Policies:**

- 6.9.3.a** Support the establishment of a program to assist the elderly and people with disabilities to remain in their homes or in a home-like setting.
- 6.9.3.b** Support the establishment of senior and adult-day-care centers and senior housing.
- 6.9.3.c** Continue to support existing senior centers (e.g. Kaunoa), and establish new senior centers that will provide day-care sites and programs for the disabled and elderly.
- 6.9.3.d** Support funding alternatives for community-based services that assist home-care efforts.
- 6.9.3.e** Encourage the State to adopt the recommendations contained within the Legislative Reference Bureau’s report entitled “Gimme a Break: Respite Care Services in Other States,” (December 2007) where appropriate, feasible, and consistent with the MIP.

### **Implementing Actions:**

- 6.9.3-Action 1** Gradually expand the “Aging-in-Place” education program for home builders and homeowners.
- 6.9.3-Action 2** Expand the responsibilities of the Department of Housing and Human Concerns to include providing support for the following community-based services:
- (1) The Hāna “Aging-in-Place Retrofit Project”;
  - (2) Transportation services for seniors and persons with disabilities; and
  - (3) Home-delivered meals programs, like Meals on Wheels, to underserved communities.
- 6.9.3-Action 3** Expand programs that utilize able-bodied seniors to voluntarily assist other seniors and disabled who are homebound.

## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

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### **Objective:**

**6.9.4** Improved preventative medicine and primary health care.

### **Policies:**

**6.9.4.a** Develop and utilize health-status benchmarks to measure prevention and primary health care service delivery.

**6.9.4.b** Support programs that provide family planning assistance.

### **Implementing Action:**

**6.9.4-Action 1** Offer culturally-sensitive programs to address healthy lifestyles, mental health, dental health, substance abuse, and chronic/life-threatening diseases.



*Kaheawa Wind Farm, Mā`alaea.*

## ENERGY

*Hawai`i's citizens pay the nation's highest energy costs. In 2005, Hawai`i relied on imported fossil fuels (petroleum and coal) for 94.5 percent of its primary energy needs, at a cost of \$4.62 billion, making Hawai`i the most oil-dependent state. Renewable energy development will be critical in helping Maui stabilize energy costs, avoid the negative economic effects of volatile oil prices, reduce overdependence imported on oil, and increase energy security by reducing imports.*

Less than 7 percent of Hawai'i's energy is provided by renewable sources (DBEDT, 2006). Oil was used to produce 80 percent of electricity sold by the State's utilities in 2005. The remaining electricity generation was supplied by coal (13.9 percent), municipal solid waste (2.6 percent), geothermal (2 percent), hydroelectricity (0.7 percent), bagasse or sugarcane waste (0.6 percent), wind (0.1 percent), and a very small amount from solar photovoltaic.<sup>6</sup> According to the U.S. Department of Energy, renewable energy sources include biomass, hydroelectric, geothermal, solar, wind, ocean thermal, and wave or tidal actions. Renewable energy can grow new local industries, provide jobs and income for the people of Maui County, and protect the environment.

### **Growth Trends**

Maui's electricity from renewable energy is provided by solar, wind, hydroelectric, and biomass.<sup>7</sup> The 30-megawatt Kaheawa Wind Power Project began producing power in June, 2006. A 21-megawatt expansion is underway; Sempra Energy announced plans to build the 21-megawatt Auwahi Wind Project at 'Ulupalakua Ranch. The Hawaiian Commercial & Sugar Company's (HC&S) facility in Pu'unēnē sells an average of 40 percent of its total electricity production to Maui Electric (MECO) and provides 6 percent of Maui's electrical power.

Hydropower is considered an intermittent energy resource because Maui's stream flows vary seasonally.<sup>8</sup> Several small-scale hydroelectric facilities operate on the island, providing approximately 6 megawatts of electricity.

Pumped-storage hydroelectric generation is a promising technology to allow for storage of renewable energy so that it can be used as needed. Saltwater-pumped storage is in use on the island of Okinawa, Japan, and MECO and the County are looking at this option.

The use of residential and commercial solar water heating and photovoltaic (PV) installations is widespread. Hawai'i is known to have more solar water heaters per capita than any other state. Grid-tied residential and commercial PV installations are considered to be competitive with conventional utility power in Hawai'i.

Geothermal energy has potential for future development in Maui and could contribute substantially to stabilizing electricity prices and to contribute to energy independence for the island. There are lands on Maui currently designated as a Geothermal Resource Area by the Board of Land and Natural Resources, a designation necessary for the potential development of geothermal resources for alternative energy production. Interest in geothermal resource development on Maui exists and may be developed to assist in reaching Maui County's goal for 70 percent clean, renewable energy resource by 2030.

## **CHALLENGES AND OPPORTUNITIES**

### ***Biomass Energy***

The economic feasibility of energy crops for biofuels depends largely on factors in the sugar, pineapple, and oil markets, as well as alternative uses for land and water. Only land zoned for agriculture is likely to be available for energy crops. Market forces appear to be working in favor of biofuel development on Maui. Potential synergies and trade-offs between dedicating land to biofuel crops, for automotive fuels, versus utility-scale power generation should be further examined. Potential areas identified for biomass energy crop production include former fallow

<sup>6</sup> State of Hawai'i DBEDT (January 2006). *Photovoltaic Electricity in Hawai'i*.

<sup>7</sup> State of Hawai'i DBEDT (December 2006). *A Catalog of Potential Sites for Renewable Energy in Hawai'i*.

<sup>8</sup> Id.

agricultural land in West Maui, and HC&S land in Central Maui.

MSW is not considered a purely renewable energy resource, since it includes non-renewable materials such as tires and plastics. MSW power generation may merit some consideration given scarce landfill space on the island.<sup>9</sup>

### ***Geothermal, Hydroelectric and Ocean Energy***

Geothermal, hydroelectric, ocean thermal and wave energy technologies are alternative energy sources being considered for Maui, along with additional wind, solar, and biofuel energy. Of these technologies, geothermal and hydroelectric are currently economically viable and thus, their development on Maui can be considered more likely in the near term. Ocean thermal and wave energy in particular are emerging technologies that may present economic opportunities for Maui from a research and development perspective; however, these technologies appear to have limited applications for near-term use for utility power generation.<sup>10</sup>

### ***Solar Energy***

Distributed solar energy projects such as solar water heating, PV lighting, building-integrated PV, and PV rooftop systems integrate easily with other land uses and developments. DBEDT lists Kahului Airport as a potential area for utility-scale solar development due to availability of open land, proximity to transmission lines, and lack of zoning conflicts.<sup>11</sup> However, the reflection from solar equipment and its potential to interfere with nearby airfield activities must be considered. The Kīhei area and the former Pu'unēnē airport site are also potential areas for utility-scale solar development.

Solar projects may be allowed in the County's Rural zoning district and in portions of the County's agricultural zoning district. Due to the need for significant land area for commercial-grade solar power facilities, utility-scale solar energy may be incompatible with active agricultural uses.<sup>12</sup>

### ***Wind***

Maui has significant potential for wind energy development. View impacts and physical access present challenges to wind energy development on Maui, since many viable sites lie on high ridges. Wind energy may encounter fewer land use and zoning barriers than other types of renewable energy development. Zoning ordinances allow for wind energy development in State and County agricultural districts. Barring conflicting land uses, wind energy is likely to be allowable in rural districts.<sup>13</sup>

### ***Increased Level of Service***

Increased water and wastewater treatment requires additional energy. The public should consider long-term energy requirements as part of a comprehensive analysis of the costs and benefits of improvements to services.

### ***Stable Energy Grid***

Maintaining a stable energy grid requires regulation and management of energy generation and distribution resources to enable diverse, distributed suppliers to generate energy in a way that optimizes available supplies while maintaining reliable electric service. Multiple factors are involved with maintaining a stable energy grid including improving energy generation, transmission and distribution infrastructure, providing more options for suppliers and end-users to regulate energy generation and consumption, and creating viable means for new energy suppliers to feed into the grid.

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<sup>9</sup> State of Hawai'i DBEDT (December 2006). *A Catalog of Potential Sites for Renewable Energy in Hawai'i*.

<sup>10</sup> Id.

<sup>11</sup> Id.

<sup>12</sup> State of Hawai'i DBEDT (January 2006). *Photovoltaic Electricity in Hawai'i*.

<sup>13</sup> State of Hawai'i DBEDT (December 2006). *A Catalog of Potential Sites for Renewable Energy in Hawai'i*.



**Opportunities** New energy markets can be developed to support suppliers of new, nonutility renewable energy provided a stable energy grid can be maintained. Options and standards for how energy is supplied and used by end-users and the suppliers of energy need to be developed to diversify the traditional and evolving energy sector.

Several studies from across the country suggest that renewable energy is a significant potential source of employment for Maui workers in a wide range of sectors, including agriculture, engineering, manufacturing, chemistry, information technology, communications, sales and marketing, and business services. The following is a brief summary of a few of these studies:

- A 2002 report funded by CALPIRG Charitable Trust suggests that building 5,900 megawatts of renewable-energy capacity could create the equivalent of 28,000 year-long construction jobs and 3,000 permanent operations and maintenance jobs.<sup>14</sup>
- A 2004 study (Renewable Energy Today) by economic consulting firm Black & Veatch found that adopting a renewable portfolio standard would cost the State of Pennsylvania \$1.23 billion more over twenty years than using conventional fuels, but would generate \$10.1 billion more in gross state output, \$2.8 billion more in earnings, and tens of thousands of additional jobs.
- A 2007 survey by Massachusetts Technology Collaborative found that renewable energy industries accounted for over 14,000 jobs in that state. Job growth in renewable energy was three times as fast as major industries such as financial services, defense contracting, software, communications, and healthcare.<sup>15</sup>
- A 2007 study by the University of New Hampshire (Alternative Energy Press) concluded that adopting a renewable energy portfolio of 20 percent would create thousands of jobs with wages far higher than the state average, generate over \$1 million in additional revenue, and provide opportunities to develop new local businesses.

### GOAL, OBJECTIVES, POLICIES, AND ACTIONS

#### Goal:

**6.10** Maui will meet its energy needs through local sources of clean, renewable energy, and through conservation.

#### Objective:

**6.10.1** Reduce fossil fuel consumption. Using the 2005 electricity consumption as a baseline, reduce by 15 percent in 2015; 20 percent by 2020; and 30 percent by 2030.

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<sup>14</sup> Heavner, Brad and Churchill, Susannah (June 2002). *Renewables Work: Job Growth from Renewable Energy Development in California*. (CALPIRG Charitable Trust, Sacramento).

<sup>15</sup> Howe, Peter J. (August 2007). *'Clean energy' industry shows fast job growth*. (Boston Globe, Boston).

### **Policies:**

- 6.10.1.a** Support energy efficient systems, processes, and methods in public and private operations, buildings, and facilities.
- 6.10.1.b** Support the Maui Solar Rooftop initiative.
- 6.10.1.c** Support Hawai'i Energy and other Public Utility Commission (PUC) approved energy efficiency programs.

### **Implementing Actions:**

#### **6.10.1-Action 1** Work with the Energy Management Program to:

- (1) Audit County facilities, operations, and equipment;
- (2) Develop programs and projects to achieve greater energy efficiency and reduction in fossil fuel use;
- (3) Develop and maintain data and reports on island energy consumption;
- (4) Phase out inefficient fossil-fueled vehicles; and
- (5) Assist homeowners and businesses in reducing fossil fuel consumption.

### **Objective:**

- 6.10.2** Increase the minimum percentage of electricity obtained from clean, renewable energy sources. By 2015, more than 15 percent of Maui's electricity will be produced from locally-produced, clean, renewable energy sources, 25 percent by 2020, and 40 percent by 2030.

### **Policies:**

- 6.10.2.a** Evaluate available renewable energy resource sites and applicable technologies.
- 6.10.2.b** Encourage the installation of renewable energy systems, where appropriate.
- 6.10.2.c** Support the establishment of new renewable energy facilities at appropriate locations provided that environmental, view plane, and cultural impacts are addressed.
- 6.10.2.d** Encourage all new County facilities completed after January 1, 2015, to produce at least 15 percent of their projected electricity needs with onsite renewable energy.

### **Objective:**

- 6.10.3** Increased use of clean, renewable energy.

### **Policies:**

- 6.10.3.a** Support efforts in the PUC to upgrade Maui's power grid to integrate renewable energy from multiple sources and wheeling of electricity.

## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

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- 6.10.3.b** Encourage the PUC to work with the County to implement and expedite community supported renewable energy projects.
- 6.10.3.c** Encourage efforts to produce more renewable energy using distributed generation.
- 6.10.3.d** Encourage import substitution by MECO and the broader community to become more self-sufficient in energy production.
- 6.10.3.e** Educate the public on the economic and environmental benefits from the increased use of renewable energy.
- 6.10.3.f** Encourage support from the Federal government, State, and the private sector for Maui's renewable energy objectives.
- 6.10.3.g** Encourage incentives to support the development and use of renewable energy.

### **Implementing Actions:**

- 6.10.3-Action 1** Install and maintain back-up power systems at County facilities for critical public health and safety purposes.
- 6.10.3-Action 2** Establish incentives or exemptions for renewable energy production facilities except for public utility companies.

### **Objective:**

- 6.10.4** More efficient distribution of power throughout the island while preserving island beauty.

### **Implementing Actions:**

- 6.10.4-Action 1** Avoid the use of power poles where possible for new construction.
- 6.10.4-Action 2** Underground existing power transmission and distribution systems wherever possible or feasible when upgrades or new systems are needed.
- 6.10.4-Action 3** Strongly encourage the State PUC to initiate a new Integrated Resource Plan process.



Historic Lahaina harbor (left) and Kahului airport (right).

### HARBORS AND AIRPORTS

*As a remote island state, Hawai`i is dependent on ocean transportation for supply of essential commodities. Hawai`i imports approximately 80 percent of its food and merchandise; nearly all of these imports, including food, clothing, building materials, cars, and fuel, enter the State through the commercial harbor system. Commercial harbors also provide the primary means of exporting local products such as sugar, molasses, pineapple, livestock, and diversified agricultural products. Maui's commercial harbor is vital to the island's economy because of the support it provides for Maui's major industries. Although the number of jobs provided by the harbor industry is also important to Maui's economy, the port system is most importantly the island's primary infrastructure, sustaining our modern lifestyle. Harbors can also be used as an economic development tool by strategically locating certain industry sectors within close proximity to harbors; and creating gathering areas for recreation and entertainment that benefit from the activity and atmosphere of a harbor area.*

## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

Maui has three harbor facilities: Kahului Commercial Harbor, Lahaina Harbor, and Mā`alaea Harbor. Kahului Commercial Harbor is Maui's primary harbor and is the focus of the remainder of the Commercial Harbors discussion.

### **Kahului Commercial Harbor**

Kahului Commercial Harbor serves as Maui's lifeline to the rest of the world. Most imported and exported goods travel through Kahului Harbor. All business activities on the island are either directly or indirectly dependent on operations at Kahului Harbor. The harbor is the third busiest harbor in the State in terms of traffic and the busiest of all neighbor island harbors with inbound vessel arrivals reaching 1,426 in 2006.<sup>16</sup>



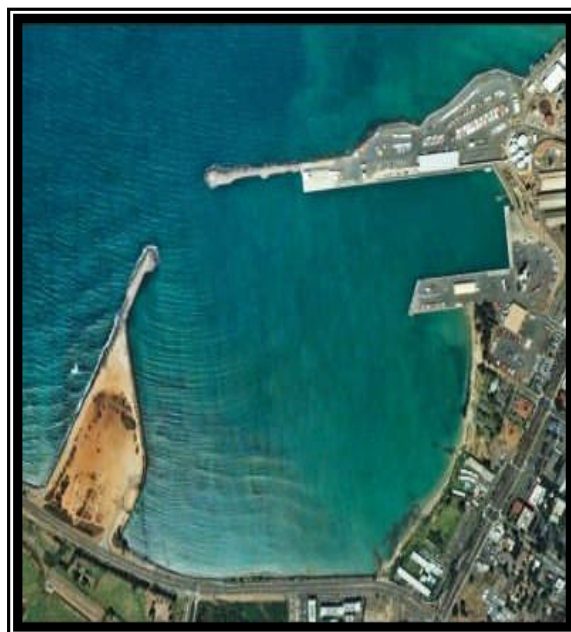
*Kahului Harbor.*

Primary harbor activities include overseas container cargo, inter-island cargo, and passenger cruise ships. Kahului Harbor provides vital industry support services to key economic sectors including retail, tourism, construction, and agriculture. Maintaining efficient and timely operations at Kahului Harbor is essential for supporting Maui's economy. In 2006, the State DOT Harbors Division developed the *Kahului Commercial Harbor 2025 Master Plan*. This Plan provides a general, long-range guide for commercial harbor development.

The Master Plan finds that Kahului Commercial Harbor's limited berths and maritime lands are inadequate to accommodate the projected volume of vessel dockings and cargo being shipped through its terminals. To address the shortfall, major facility improvement to 2025 include:

- New piers;
- Berthing improvements;
- Develop a cruise ship terminal at Pier 5; and
- The acquisition of lands adjacent to the harbor for future harbor development.

The overall goal of the above improvements is to ensure efficiency of harbor operations and safety of passengers disembarking and boarding ships.



*Aerial view of Kahului Harbor, Kahului.*

**Container Yard:** The open-yard, container storage locations at all container terminals designated by the carrier in the port.

**Berth:** The water area at the waterfront edge of a wharf, reserved for a vessel, including wharf accessories such as bollards.

<sup>16</sup> County of Maui (2006). *Maui County Data Book 2006*.

## CHALLENGES AND OPPORTUNITIES

### ***Need for Expanded Facilities***

Forecasted demand for port lands required by the year 2025 is considerably greater than the land currently available for harbor operations in Kahului. Expansion of the harbor's maritime lands is restricted by existing commercial and industrial operations surrounding the harbor. The Harbors Division is working with Alexander & Baldwin Properties, Inc. to identify possible expansion opportunities to resolve the shortage of cargo acreage. The growth of the cruise ship industry is constrained by limited berthing space. To support this form of tourism, additional harbor capacity will be required for both cruise ships and ferries at the Kahului and Lahaina harbors.

### ***Critical Need for Alternative Harbor***

Maui only has one commercial harbor that can accommodate large cargo vessels (unlike O`ahu, Hawai`i, and Kauai). In the event of a natural disaster, Maui would be left with no facility for ocean transport. The lack of an alternate harbor is a serious economic and safety issue that could have devastating consequences. Several studies have been conducted to assess the feasibility of developing contingency commercial harbor facilities on Maui; however, no potential locations have been identified. The primary function of the port system should be the movement of cargo. To enhance this system, it is important that land use planning for the area near harbors considers the allocation of sufficient land for industrial and high technology businesses; these businesses often benefit from close proximity to harbor infrastructure.

### ***Adequate Land Supply***

Harbor areas can also provide a great atmosphere for outdoor recreation and entertainment activities. Creating gathering areas for recreation and entertainment near harbor districts has proven to be a successful economic development tool for many port cities such as San Francisco and Seattle. The County should develop a master plan analyzing the potential for harbor front revitalization incorporating the potential for increased recreation and entertainment as one component of the plan.

## **Airports - Existing Setting**

Air transportation is critical to Maui's economy and way of life. Each day, thousands of Hawai'i residents travel through Maui's airports to conduct business, visit relatives, shop, and vacation. Maui's leading industry, tourism, and nearly all the other island's economic activities rely on an efficient, dependable, and affordable air transportation system.

Three airports exist on Maui: Kahului, Kapalua, and Hāna. Kahului Airport is the second busiest airport in the State with 6,514,814 passengers in 2007<sup>17</sup>. Kahului Airport is classified as a "Commercial Service-Primary Airport" by the Federal Aviation Administration; it services both transoceanic flights from the North American mainland and inter-island flights.

In addition to providing passenger service, Kahului Airport en-planes and de-planes thousands of tons of cargo and mail each year.

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<sup>17</sup> County of Maui (2008). *Maui County Data Book 2008*.

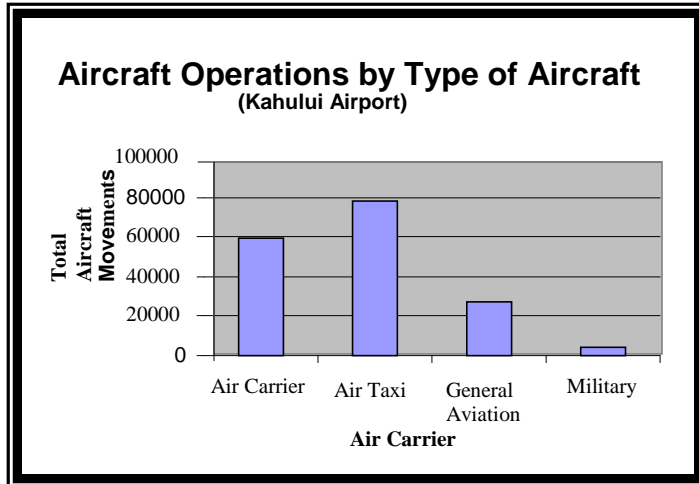


Figure 6 - 2: Aircraft Operations by Type of Aircraft (Kahului Airport).

The airport system is a vital element of Maui’s economy through direct employment created at airport facilities and affiliated businesses. *The Hawai`i Tourism Strategic Plan (2005–2015)* and final report of the Economic Momentum Commission recommend significant and immediate upgrades to Kahului Airport. The State Department of Transportation, Airports Division, is responsible for managing State airports. The Department, together with the Airlines Committee of Hawai`i, prepared an *Airport Modernization Plan* in March 2006. This Plan’s goals are two-fold:

- Create a world class airport transportation system that meets the needs of State residents and visitors today and into the future.
- Create efficiencies and effectiveness in operations and increase levels of satisfaction for State residents and visitors.

The Plan proposes short- and long-term projects at Kahului Airport designed to enhance existing facilities, as well as adequately accommodate current and projected demand.



Kahului Airport’s main runway.

**CHALLENGES AND OPPORTUNITIES**

***Airport Improvements***

Current Kahului Airport facilities can accommodate a limited number of wide-bodied aircraft; however, accommodating current and projected demand will require both modifications of existing gates and increasing the number of gates. Other long-term projects include lengthening of runways, increasing fuel storage capacity, expanding holding room capacity, increasing the number of on-site parking stalls, and constructing a new airport access road.

Prior efforts to expand Kahului Airport to an international airport status have been met with considerable public opposition. Project opponents have expressed concern over the introduction of alien species and the project’s growth inducing impacts. Future airport expansion will need to be done in a manner that is consistent with Maui’s land use, environmental, and economic development objectives.

Improvements to Kahului Airport can strengthen local business, enhance the quality of life, and strengthen the tourism industry when done in a manner that the community supports.

Airport facilities have become significant generators of employment at and around them. Different activities can prosper by being proximate to airport infrastructure, including business parks, industrial parks, warehousing and freight forwarding facilities, wholesale merchandising, information and telecommunication parks, hotel and entertainment centers, and mixed-use development. The County should develop a master plan to identify suitable land uses, urban design character, and supporting infrastructure for lands proximate to Kahului Airport. Such a plan would need to be sensitive to the visual character and rural ambiance of Maui.

### **GOAL, OBJECTIVES, POLICIES, AND ACTIONS**

#### **Goal:**

- 6.11** Maui will have harbors and airports that will efficiently, dependably, and safely facilitate the movement of passengers and cargo.

#### **Objective:**

- 6.11.1** Upgraded harbor facilities to handle larger volumes of freight and passengers and additional small boat harbors.

#### **Policies:**

- 6.11.1.a** Support the expansion and upgrade of Kahului Harbor through the following, provided that any expansion is respectful of cultural practices and existing recreational uses and supports improved water quality:
- (1) Accommodate increasing volumes of cargo;
  - (2) Provide deeper pier depths and greater fuel-receiving and storing capacities; and
  - (3) Ensure safe and efficient work areas, including separating passenger operations from fuel and cargo operations.
- 6.11.1.b** Work with public and private entities to provide adequate pier slips, utilities, repair facilities, and waste-disposal capabilities.
- 6.11.1.c** Encourage the State to safely separate passenger (cruise and ferry) operations from hazardous bulk fuels and heavy cargo transporting operations, while not decreasing harbor's capacity to safely support various recreational uses.
- 6.11.1.d** Encourage the State to develop cargo inspecting sites and facilities for efficient cargo and container processing and transportation and to prevent alien species entry.
- 6.11.1.e** Support a State and County task force to study the feasibility of a second commercial harbor on Maui.



## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

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### **Implementing Actions:**

**6.11.1-Action 1** Update/amend the Wailuku-Kahului Community Plan to accommodate planned harbor improvements and any compatible land uses considering sea level rise.

**6.11.1-Action 2** Study the feasibility of developing a Harbor Front District for Kahului Harbor that incorporates the planned harbor improvements and defines appropriate mixes of uses including entertainment and recreation where appropriate.

### **Objective:**

**6.11.2** Establish more economically thriving and environmentally sensitive small boat harbors accommodating resident and business activity, including fishing, recreation, and tour boats.

### **Policy:**

**6.11.2.a** Provide for needed shore-side facilities and capabilities to support small boat harbor users (e.g. repair facilities, parking, cold storage, and mass-transit connections).

### **Implementing Actions:**

**6.11.2-Action 1** Provide boat owners with adequate pier slips, utilities, repair facilities, waste-disposal capabilities, and yacht berthing/launch/recovery services.

**6.11.2-Action 2** Develop plans and funding mechanisms to stimulate shore-side improvements to small boat harbors.

**6.11.2-Action 3** Broaden cooperation with State, County, and private entities to regularly report progress on projects and implementing initiatives.

### **Objective:**

**6.11.3** Upgraded airport facilities and navigation aids to serve the needs of passengers, freight movements, and general aviation.

### **Policies:**

**6.11.3.a** Protect the island's airports from encroaching urbanization that may negatively impact the airport operations.

**6.11.3.b** Support State efforts to improve Kahului Airport operations to better serve passenger and cargo needs.

**6.11.3.c** Support State efforts to identify sites and plan to relocate and accommodate small and rotary wing aircraft.

**6.11.3.d** Encourage the State to improve airport safety including lighting, fuel transmission, fuel safety, etc.

## ***INFRASTRUCTURE AND PUBLIC FACILITIES***

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- 6.11.3.e** Consider expansion of rental car facilities in West and South Maui.
- 6.11.3.f** Consider expansion of mass transit (bus, fixed-rail, shuttle, and taxis, bicycle, and pedestrian facilities) to and from Kahului Airport and not limited to passenger movements (allowing for luggage and cargo).
- 6.11.3.g** Encourage the State to maintain airport capacity and to encourage more responsive air services to Hāna and Kapalua.

### **Implementing Actions:**

- 6.11.3-Action 1** Work with the State and Kahului Airport users to:
- (1) Safely accommodate more efficient airplanes;
  - (2) Increase infrastructure investments and improve operating procedures;
  - (3) Implement more efficient and reliable screening/inspecting of passengers, luggage, and cargo;
  - (4) Identify and construct airport sites and hangars for small and rotary wing aircraft;
  - (5) Accommodate mass transit, busses, shuttles, and taxis; and
  - (6) Beautify the airport grounds and access roads.
- 6.11.3-Action 2** Develop a plan to minimize safety hazards during the transport of aviation fuel from Kahului Harbor to Kahului Airport.
- 6.11.3-Action 3** Study the feasibility of developing an Airport District for Kahului Airport that intentionally agglomerates uses that support the airport such as a business hotel(s), gas stations, parcel delivery services and freight forwarding.
- 6.11.3-Action 4** Preserve land around the airport for future expansion.
- 6.11.3-Action 5** Develop a corridor study and sub-area plan for land uses around the airport and along the airport connector road.

# Water & Sewerage Service Areas Map

Island of Maui

Background Map  
For Informational Purposes Only

## Legend

-  Primary Road
-  Stream
-  Maui County Department of Water Supply Service Area
-  Wastewater Service Area
-  Public Utility Sewerline
-  Wastewater Treatment Plant



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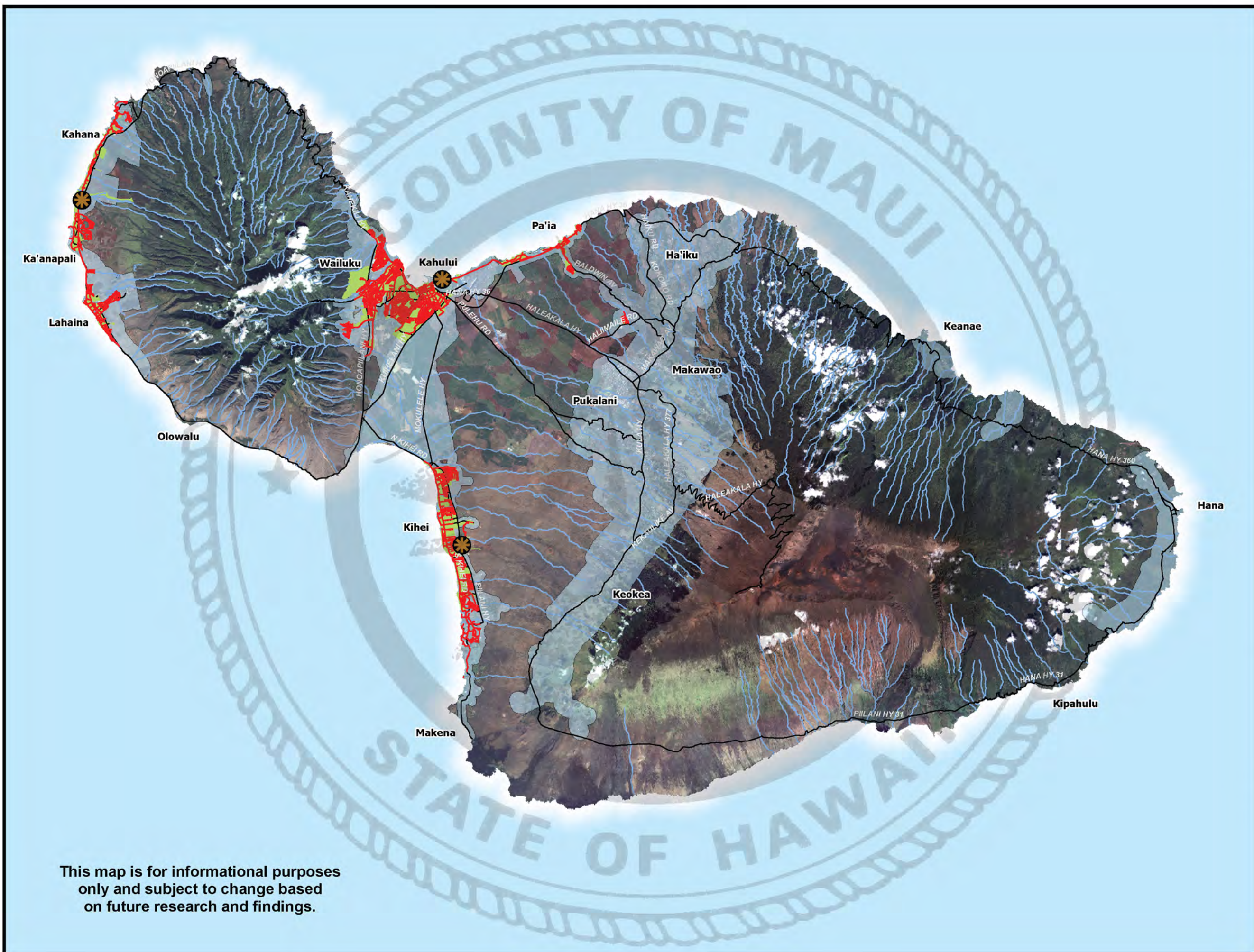
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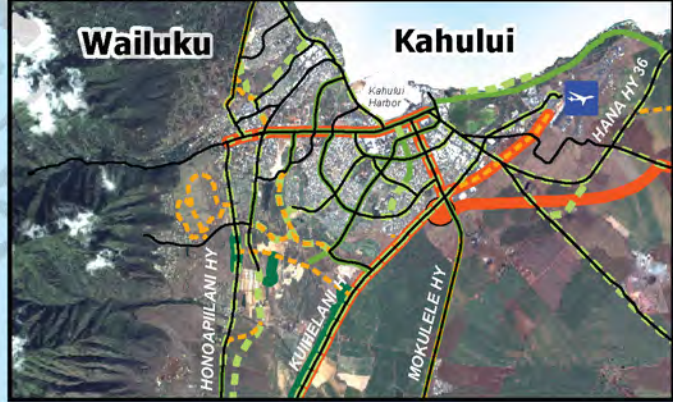
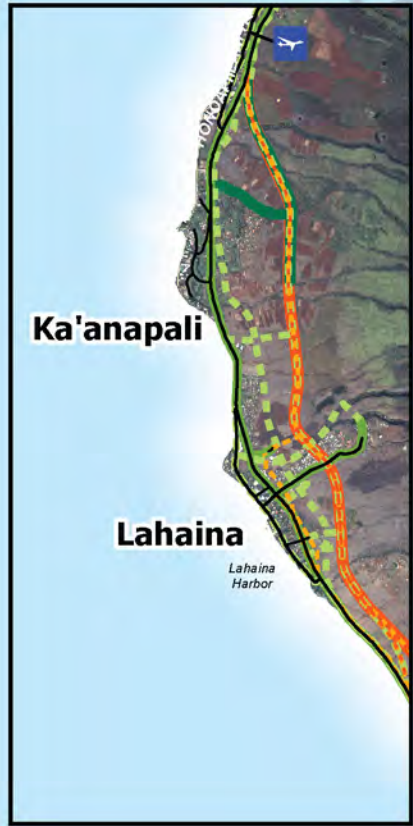
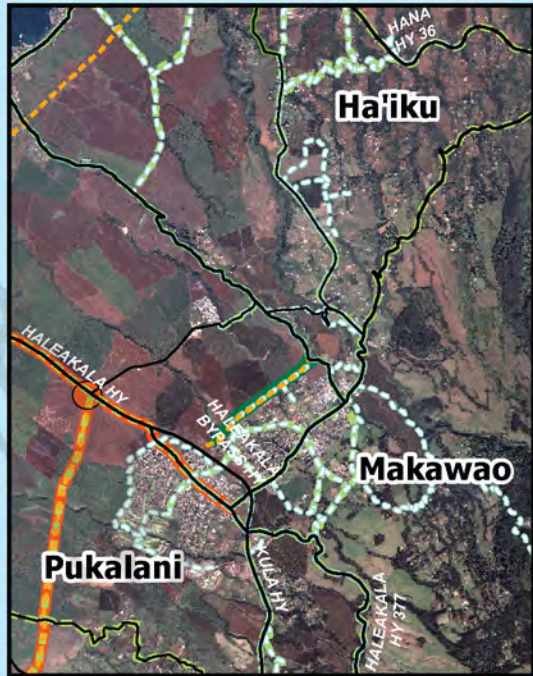
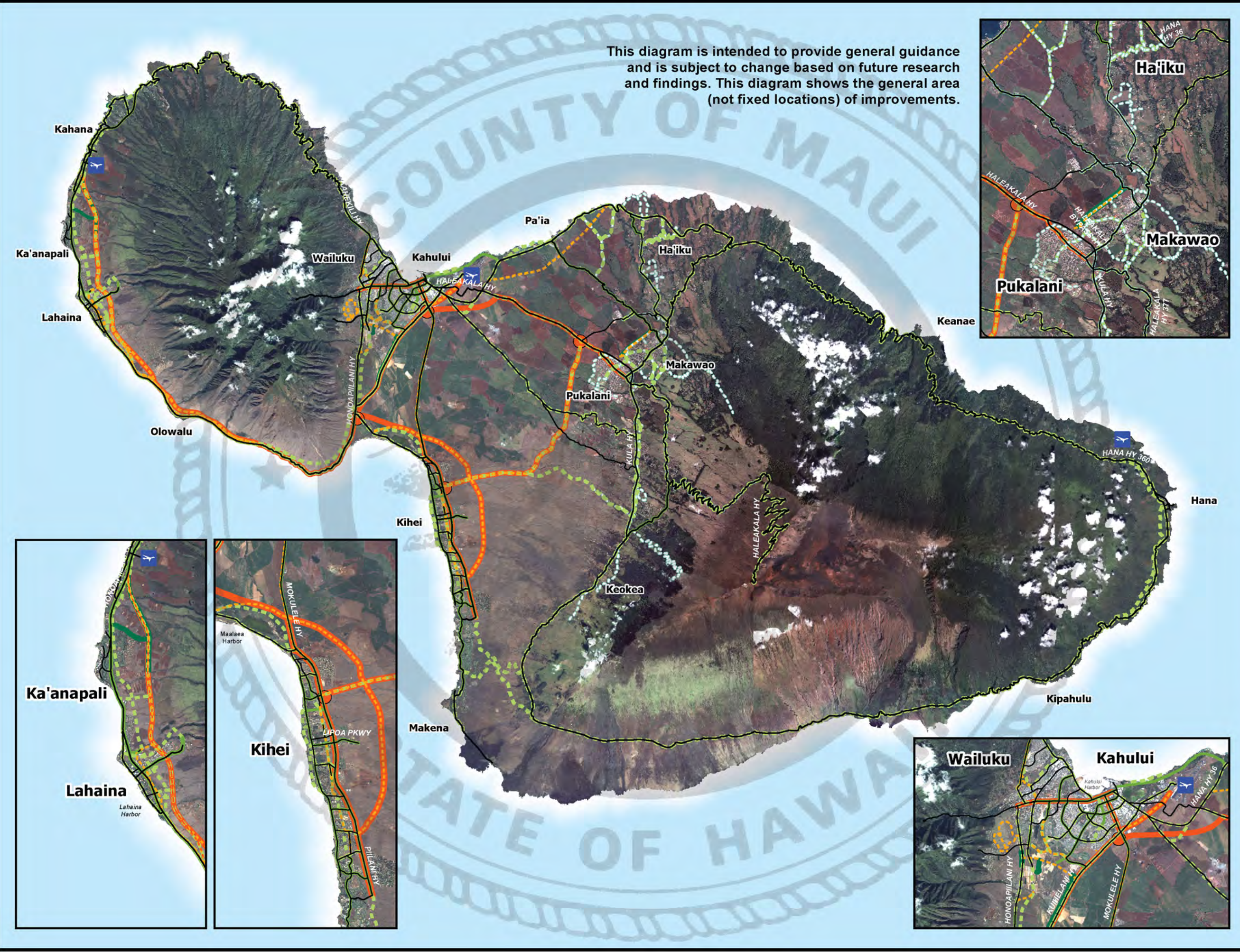
Map 6-1



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This diagram is intended to provide general guidance and is subject to change based on future research and findings. This diagram shows the general area (not fixed locations) of improvements.

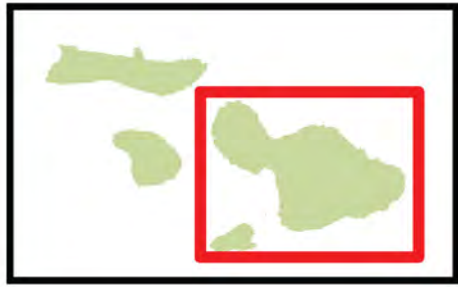


# Regional Transportation Network

## Island of Maui

### Legend

- Primary Road
- Secondary Road
- Bike Path
- ✈ Airport
- Proposed**
- Conceptual Transit Station
- Conceptual Transit Corridor
- - - Lahaina Bypass
- - - Road or Highway
- - - Bike Path
- - - Upcountry Greenways Plan
- Maui Island Plan Greenways



0 1 2 3 4 5 6 Miles

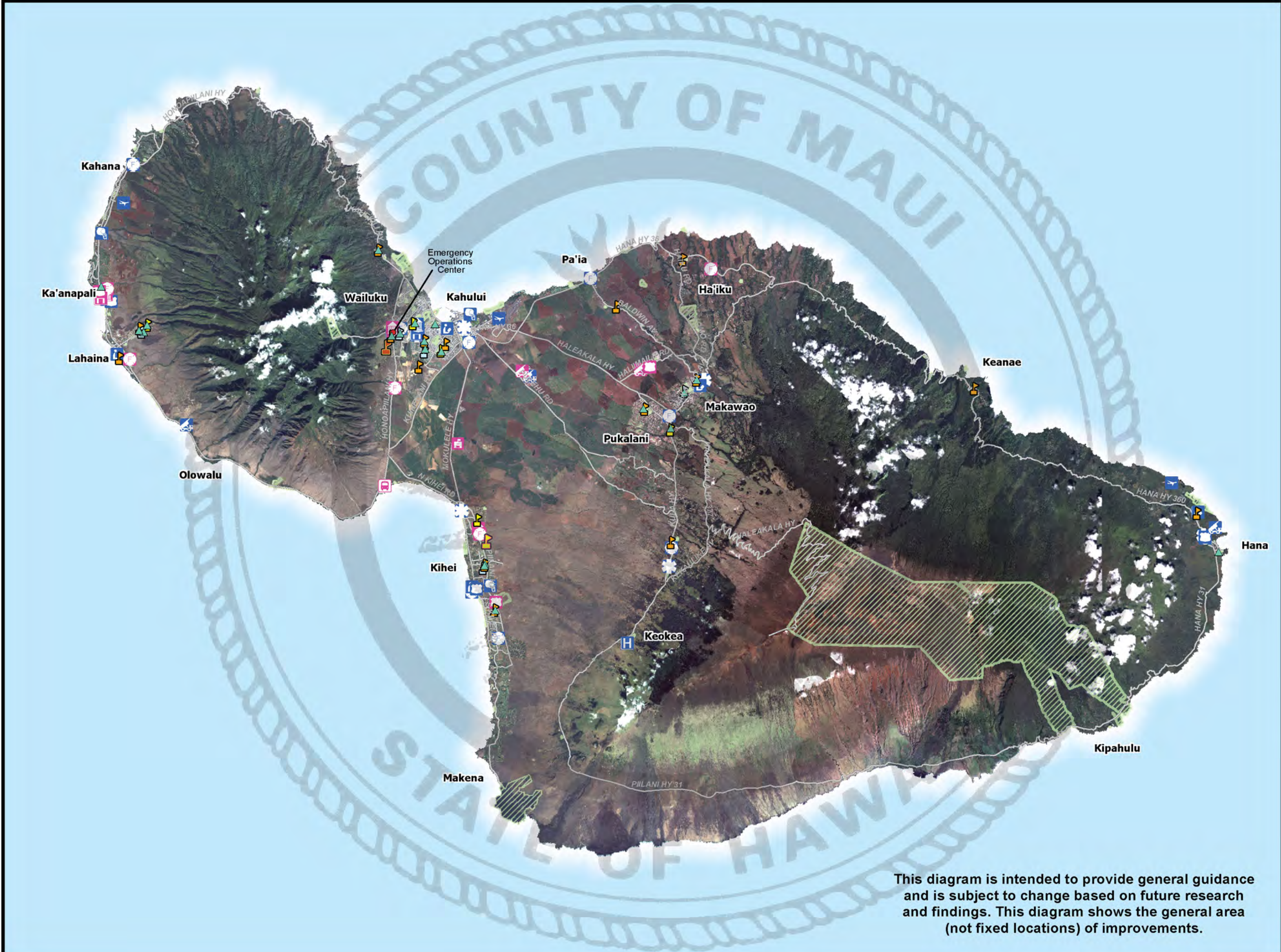
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### Diagram 6-1

# Public Facility/Infrastructure Improvements Island of Maui



## Legend

- Primary Road
- ▨ Parks & Public Access
- ▲ Emergency Shelter
- Existing Public Schools**
- 🏫 High School
- 🏫 Intermediate School
- 🏫 Elementary School
- Proposed Public Schools**
- 🏫 Elementary School
- 🏫 High School
- Public Facilities / Infrastructure**
- ✈️ Airport
- 🚑 Ambulance Station
- 🚒 Fire Station
- 🚓 Police Station
- 🏥 Hospital
- 🏢 Government Office
- ♻️ Solid Waste Facility
- 🌊 Waste Water Treatment Plant
- 🚇 Transit Center
- 📖 Public Library
- 🚔 Jail
- 🏠 PROPOSED



Miles  
0 1 2 3 4 5 6

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