

ORTP 2035 Technical Report Oahu Regional Transportation Plan 2035



Prepared for the
Oahu Metropolitan Planning Organization

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In Association with
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Oahu Metropolitan Planning Organization
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Appendix A: Travel Time Range Maps

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Acronyms Used in this Document

3C	Comprehensive, cooperative, and continuing planning process
ADA	Americans with Disabilities Act
ARRA	American Recovery and Reinvestment Act of 2009
AVO	Average Vehicle Occupancy
CAC	Citizen Advisory Committee
CBD	Central Business District
CCTV	Closed-Circuit Television
CFR	Code of Federal Regulations
CIP	Capital Improvements Program
City	City and County of Honolulu
CMP	Congestion Management Process
CMS	Congestion Management System
CSCS	Centralized Signal Control Systems
DBEDT	State Department of Business, Economic Development & Tourism
DDC	City Department of Design and Construction
DEM	City Department of Emergency Management
DHHL	State Department of Hawaiian Homelands
DLNR	State Department of Land and Natural Resources
DPP	City Department of Planning and Permitting
DTS	City Department of Transportation Services
EJ	Environmental Justice
FAA	U.S. Federal Aviation Administration
FEMA	U.S. Federal Emergency Management Agency
FFY	Federal Fiscal Year
FHWA	U.S. Federal Highway Administration
FTA	U.S. Federal Transit Administration
FY	State Fiscal Year
GET	Hawaii General Excise and Use Tax
GHG	Greenhouse Gas
HBW	Home-based Work Trips
HCDA	State Hawaii Community Development Authority

HDOT	State Department of Transportation
HHCA	Hawaiian Homes Commission Act
HHCTCP	Honolulu High-Capacity Transit Corridor Project
HOV	High-Occupancy Vehicle
HSF	Highway Special Fund
HSTP	Hawaii Statewide Transportation Plan
HTF	Federal Highway Trust Fund
HUD	U.S. Department of Housing and Urban Development
ITS	Intelligent Transportation Systems
LOS	Level-of-Service
LUC	State Land Use Commission
MARAD	U.S. Maritime Administration Department
NBs	Neighborhood Boards
NPS	U.S. National Park Service
NOAA	U.S. National Oceanic and Atmospheric Administration
OahuMPO	Oahu Metropolitan Planning Organization
OCCL	DLNR Office of Conservation and Coastal Lands
OHA	Office of Hawaiian Affairs
OPP	The OahuMPO Public Participation Plan
OR&L	Oahu Railway and Land Company
ORTP	Oahu Regional Transportation Plan
OTS	Oahu Transit Services, Inc.
PUC	Primary Urban Center
ROW	Right-of-Way
RTP	Regional Transportation Plan
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SCD	State Department of Civil Defense
SOEST	School of Ocean and Earth Science and Technology at the University of Hawaii at Manoa
SOV	Single-Occupancy Vehicle
State	State of Hawaii
STIP	Statewide Transportation Improvement Program

T6	Title VI of the Civil Rights Act of 1964
TAA	Transportation Analysis Area
TAC	Technical Advisory Committee
TAZ	Traffic Analysis Zone
TCC	City Traffic Control Center
TDM	Travel Demand Management
TIP	Transportation Improvement Program
TMC	State Traffic Management Center
TSM	Transportation System Management
UH Manoa	University of Hawaii at Manoa
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
VHD	Vehicle Hours of Delay
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
YOE	Year of Expenditure

As the designated metropolitan planning organization for the two urbanized areas on the Island of Oahu, Honolulu and Kailua-Kaneohe, and having designated the entire island as its planning area, the Oahu Metropolitan Planning Organization (OahuMPO) is responsible for carrying out the comprehensive, cooperative, and continuing (3C) planning process for Oahu. These requirements are mandated by the U.S. Department of Transportation (USDOT) as the means of verifying the eligibility of metropolitan areas for Federal surface transportation funds. They are promulgated to State, regional, and local agencies through the current Federal surface transportation legislation, enacted in 2005 – the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

This document describes the elements of the Oahu Regional Transportation Plan (ORTP) for 2035. It is an update of a plan that was first adopted in 1976 and has been updated five times since: in 1984 as *Hali 2000*, in 1991 as the Oahu Regional Transportation Plan (*Hali 2005*), in 1995 as *2020 Oahu Regional Transportation Plan*, in 2001 as *Transportation for Oahu Plan (TOP) 2025*, and in 2006 as the *Oahu Regional Transportation Plan (ORTP) 2030*.

1.1 Plan Purpose

The ORTP 2035 serves as a guide for identifying the various long-range mobility issues and transportation needs of the broader Oahu community. ORTP 2035 is integrated with the assumed growth and development for the island, and presents a vision for an improved transportation system to achieve the needs and preferences of the population. The Plan lists goals and objectives, identifies projects that serve to help accomplish them, and presents an implementation program for mid- and long-range use of the available transportation funds across Oahu.

Decision-makers will use the ORTP 2035 as one resource to understand the available options for improving the current transportation system and how those options address the Plan's goals and objectives. As a result of adoption of the Plan by the OahuMPO Policy Committee, any future transportation improvements for Oahu must be consistent with the ORTP to receive Federal transportation funds.

The ORTP 2035 is based on forecasts provided by the State Department of Business, Economic Development and Tourism (DBEDT) and the City's Department of Planning and Permitting (DPP) that extend 25 years into the future. The Plan is updated at least every five years to address the inherent uncertainties resulting from such long-range forecasts. Each revision is based on current information and takes community priorities into consideration. A number of factors are reevaluated, including socioeconomic conditions, such as population growth and economic development, as well as land use, revenue, and cost assumptions. Travel patterns are updated to reflect existing travel demands and help identify new opportunities for transportation development on the island to meet anticipated needs.

The financial element of the ORTP discusses current and potential future sources of revenue that may be available to help realize the elements of the Plan. The revenue projections are discussed in relation to the estimates of costs associated with the implementation and operation of each transportation project and program contained in the ORTP. Federal requirements mandate that all elements of the ORTP have an identified, firmly established source of revenue to offset the cost of its implementation.

1.2 Planning Process

The OahuMPO is the officially designated agency that must ensure that the 3C process addresses all Federal concerns regarding various transportation modes on Oahu while focusing on the transportation needs of both the State and City. The Plan is organized to respond to the travel needs resulting from projected land use and socioeconomic conditions anticipated by the year 2035.

1.2.1 Federal Planning Factors

SAFETEA-LU requires that the development of long-range transportation plans consider the following eight planning factors:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users;
- Increase the accessibility and mobility of people and freight;
- Protect and enhance the environment, promote energy conservation and improve quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system.

1.2.2 Title VI and Environmental Justice

Title VI of the Civil Rights Act of 1964 states, “No person in the United States shall, on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.”

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, issued in 1994, provides that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

OahuMPO Policy Statement for Title VI and Environmental Justice

The following OahuMPO Policy Statement for Title VI and Environmental Justice (T6/EJ) was approved by the Policy Committee on July 19, 2001:

“It is the policy of the Oahu Metropolitan Planning Organization to adhere to the following Federal regulations:

- The Civil Rights Act of 1964
- Environmental Justice (Executive Order 12898)
- Civil Rights Restoration Act of 1987
- Age Discrimination Act of 1975

“OahuMPO will fully comply with the above statutes and their implementing regulations and will not discriminate on the basis of race, color, gender, national origin, age, or low-income. OahuMPO will not exclude anyone from participation in, deny the benefits of, or otherwise discriminate under any of its programs or activities.”

In 2001, the OahuMPO published a report, *Environmental Justice in the OahuMPO Planning Process*. The report documented how OahuMPO evaluated the effectiveness of the planning process in meeting Title VI and Environmental Justice requirements. The report went on to discuss how OahuMPO implemented a process to analyze the distribution of benefits and disproportionate impacts of planned activities. In 2004, OahuMPO updated the report in which it reevaluated the environmental justice-designated block groups based on the release of the 2000 U.S. Census income data and geography, using a revised methodology based on the settlement patterns of Federally-defined minority groups.

1.2.3 Transportation Improvement Program

The Oahu Transportation Improvement Program (TIP) is the adopted list of public transit, highway, bicycle, and pedestrian projects that will receive Federal transportation funds in the near future. The TIP needs to be financially constrained; that is, there must be a reasonable expectation that projects that are identified will have the necessary Federal, State, City, and local funding.

The following types of projects are included in the TIP:

- Surface transportation projects that are proposed to be funded with Federal funds,¹
- Regionally-significant projects that require action by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA), regardless of whether or not they are funded with Federal funds, and
- Regionally-significant projects that are proposed to be funded with non-Federal funds or with Federal funds other than those administered by the FHWA or the FTA, such as congressional earmarks. These projects are included in the TIP for informational purposes.

1.2.4 *Hawaii Statewide Transportation Plan*

The *Hawaii Statewide Transportation Plan* (HSTP) is a policy document that establishes the planning framework to be used in developing the State's transportation system and, therefore, plays a key role in the development of the ORTP. The HSTP was coordinated and prepared in cooperation with the OahuMPO, its participating agencies, and the modal divisions of the State Department of Transportation (HDOT). Transportation system users, stakeholders, providers, and the general public also participated and provided input. The goals and objectives identified in the HSTP are consistent with those in the ORTP 2035 and "provide the keys to the development of an integrated, multi-modal transportation system for the safe, efficient, and effective movement of people and goods throughout Hawaii".

1.2.5 *Relationship to Area Master Plans*

The ORTP is developed with strong consideration of the City's Development and Sustainable Communities Plans that, along with its General Plan, guide population and land use growth toward a 20-year horizon. Areas anticipated to see a rise in population, employment, or both are, as a consequence, reasonably anticipated to experience an increase in travel demand. Likewise, the same can be said for areas anticipated to experience more intensive land use activities.

¹ Under 23 U.S.C. and 49 U.S.C. Chapter 53 (including transportation enhancements, Federal Lands Highway Program projects, safety projects included in the State's Strategic Highway Safety Plan, trails projects, pedestrian walkways, and bicycle facilities).

1.3 Role of Public Involvement and Outreach in Developing the ORTP 2035

1.3.1 Statutory Requirement

Under SAFETEA-LU, metropolitan planning organizations are required to develop a participation plan that documents a process for providing interested parties with reasonable opportunities to be involved in the planning process.

1.3.2 Fulfillment of Statutory Requirement

The OahuMPO Participation Plan (OPP), approved by the Policy Committee on December 15, 2006, has been developed to assist members of the public and affected organizations, as well as government agencies, understand:

- The OahuMPO's planning process for Oahu's major surface transportation efforts, and
- How to participate effectively in that process.

The OPP was developed to ensure compliance with SAFETEA-LU legislation, and in accordance with this legislation, the procedures outlined in the OPP are to be reviewed periodically and updated as necessary to ensure a fully open and inclusive public participation process.

Citizen Advisory Committee

The Citizen Advisory Committee (CAC) advises the Policy Committee and the OahuMPO Executive Director with input from its members on transportation planning issues. At present, the CAC consists of representatives from about 45 community associations, Neighborhood Boards (NBs), professional associations, businesses, private transportation providers, a transportation management association, developers, and other interested parties.

A working group of the CAC was established to provide early input and assist with the ORTP 2035 *Public Outreach Plan*. The group monitored progress on the plan, served as a sounding board for outreach techniques, and received reports on outcomes from outreach activities.

Other Public Involvement and Outreach Initiatives

Planning processes for the ORTP 2035 were also informed by citizens, stakeholders, Federal, State, and City agencies, commercial users, and civic and business groups. Consistent with *The OahuMPO Participation Plan*, the ORTP 2035 *Public Outreach Plan* objectives included:

- Conducting public participation and outreach employing best practices to serve all users of the transportation system more effectively, including citizens who are traditionally underserved and under-represented, such as minority, low-income, elderly, and disabled populations.

- Providing interested communities, groups, and individuals with pertinent information in a timely manner.
- Employing effective means of obtaining feedback from interested communities, groups, and individuals, and providing feedback to stakeholders regarding how comments would be used throughout the transportation planning process.

Outreach tools were designed to reach each of the stakeholder groups. Table 1-1 below lists the planned outreach tools that were used to involve each group.

Table 1-1 ORTP 2035 Stakeholder Outreach Tools

Stakeholder Groups	Planned Outreach Tools
Citizens-at-large Under-served populations Government agencies	Telephone surveys Focus groups Stakeholder interviews Public meetings Electronic communications*
Commercial users Large land owners and building developers Business organizations Community and civic groups Colleges and universities	Telephone surveys Stakeholder interviews Public meetings Electronic communications*

* Electronic communications includes the use of email and the OahuMPO website, as well as a range of social networking portals, including both Facebook and Twitter.

Stakeholder Interviews

The first round of stakeholder interviews was conducted face-to-face and over the telephone with 20 respondents. The question-and-answer sessions were roughly 30 minutes long, with the objective of assessing initial issues and gathering information to create a list of potential needs for planned improvements and scenarios. The target audiences of this outreach effort were comprised of members of the industry and commercial sectors, public policy decision makers, and community and environmental group leaders.

The second round of stakeholder interviews included the same 20 respondents from the first round, plus an additional 20. This time, the 30-minute sessions were comprised of 40 detailed, one-on-one questions that were designed to outline proposed alternatives and refine the list of potential transportation projects.

Focus Groups

The first round of focus group discussions involved small groups, generally made up of eight-to-ten people, and were conducted by the project team as face-to-face discussions to help identify planning issues and augment the information gathered through the stakeholder interviews. The target audiences of this effort were T6/EJ community members and emergency first responders (including the City's police, fire, and emergency medical departments) and emergency managers (including the

Federal Emergency Management Agency (FEMA), State Civil Defense (SCD), and City Department of Emergency Management (DEM).

The second round of focus group discussions were conducted for the T6/EJ community. These were held to hone the list of initial planning issues and concerns identified in the first round, ask questions about them, and refine the list of potential scenarios and transportation projects.

Telephone Surveys

Two telephone surveys were conducted. The first was aimed at reaching citizens-at-large through detailed, one-on-one question-and-answer sessions that lasted roughly 18 minutes each. The survey utilized an islandwide, random, and statistically-valid sample size of 600 Oahu residents. If the person who answered the call was uncomfortable speaking English, they were transferred to an interviewer able to speak to them in the language most comfortable for them. The objective of this exercise was to continue to build upon the information gathered through the first rounds of stakeholder interviews and focus groups concerning perceived transportation issues and potential transportation solutions.

The second telephone survey was aimed at validating citizen preferences concerning proposed alternatives and prioritization of transportation improvements through detailed, one-on-one question-and-answer sessions conducted by a public outreach consultant, again lasting about 18 minutes each. The survey included 600 islandwide random households, plus 400 targeted underserved T6/EJ populations. Language preferences were handled in the same manner as for the first telephone survey.

Regional Public Meetings

Three regional meetings were held in August 2010 to talk neighbor-to-neighbor with the general public and solicit feedback. The objectives of these meetings included presenting information about the potential alternatives and associated transportation projects and programs, listening to concerns and issues, answering questions about the planning process, and gathering comments on citizen preferences concerning potential transportation improvements. These meetings were held in areas experiencing major transportation challenges, and were widely advertised through a variety of media.

One islandwide public meeting was held in February 2011, with the prime objective of informing Oahu residents about the Plan and to solicit their comments. This meeting served as a venue to distribute the *Draft ORTP 2035*, provide information about its contents, as well as demonstrate how previous public input was incorporated into the plan.

1.4 Roles of Participating Agencies in Developing the ORTP 2035

1.4.1 Participating Agencies

The development of the ORTP 2035 is a cooperative effort, with substantial involvement of the OahuMPO's participating agencies from the State and City, including:

State of Hawaii

- Department of Transportation (HDOT): Responsible for implementation of numerous major projects related to the ORTP, including those in the Statewide Transportation Improvements Plan (STIP) of which the TIP represents the Oahu component. HDOT is responsible for Federal-aid and Interstate freeways on Oahu.
- Department of Business, Economic Development and Tourism (DBEDT): Provides State- and County-wide control totals for all socioeconomic and demographic forecasts used in development of the ORTP.

City and County of Honolulu

- Department of Transportation Services (DTS): Responsible for planning of local transportation facilities including City roadways, parking systems, transportation demand management activities, and public transit, of which it also administers operation. DTS is chartered by ordinance to coordinate with the City's departments for implementing roadway improvements including the Department of Facility Management (DFM) and Department of Design and Construction (DDC).
- Department of Planning and Permitting (DPP): Responsible for the allocation of the socioeconomic forecasts provided by DBEDT across designated traffic analysis zones (TAZs) throughout the island. These forecasts were used in the development of travel demand forecasts for the ORTP.

1.4.2 Other Agencies Consulted During the Development of the ORTP 2035

Federal

- Department of Housing and Urban Development (HUD): Responsible for developing and executing policies on housing and metropolitan areas.
- Environmental Protection Agency (EPA): Studies environmental issues, educates people about the environment, and develops and enforces regulations for environmental laws written by Congress with the mission of protecting human health and the environment.

- Federal Aviation Administration (FAA): Part of the U.S. Department of Transportation, its mission is to provide a safe and efficient aerospace system.
- Federal Emergency Management Agency (FEMA): Part of the U.S. Department of Homeland Security, its mission is to support the country's citizens and first responders to ensure that the Nation works together to build, sustain, and improve its capability to prepare for, protect against, respond to, recover from, and mitigate all hazards.
- Federal Highway Administration (FHWA): Carries out the Federal highway programs in partnership with the State and local agencies to meet the country's transportation needs.
- Federal Transit Administration (FTA): As authorized by SAFETEA-LU, FTA provides stewardship of combined formula and discretionary programs to support a variety of locally-planned, constructed, and operated public transportation systems throughout the country.
- Fish and Wildlife Service (USFWS): Manages the 150 million-acre National Wildlife Refuge System and operates National Fish Hatcheries, its mission is to work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.
- Maritime Administration (MARAD): The agency within the U.S. Department of Transportation that deals with waterborne transportation and works in many areas involving ships and shipping, shipbuilding, port operations, vessel operations, national security, environment, and safety.
- National Oceanographic and Atmospheric Administration (NOAA): Provides a range of services and products, from daily weather forecasts, severe storm warnings, and climate monitoring to fisheries management, coastal restoration, and maritime commerce activities.
- National Park Service (NPS): Responsible for taking care of the country's National Parks System, comprised of 394 areas covering 84 million acres and including national parks, monuments, battlefields, military parks, historical parks and sites, lakeshores, seashores, recreation areas, scenic rivers and trails, and the White House.

State of Hawaii

- Department of Civil Defense (SCD): Leads the State in prevention, protection, and rapid assistance during disasters with a full range of resources and effective partnerships. Provides input regarding safety and evacuation routes for Oahu.
- Department of Hawaiian Homelands (DHHL): Mission is to manage the Hawaiian Home Lands trust effectively and to develop and deliver lands to native Hawaiians. DHHL will partner with others towards developing self-

sufficient and healthy communities. Provides input regarding Hawaiian Home Lands and communities.

- Department of Health (DOH): Mission is to protect and improve the health and environment for all people in Hawaii. Responsible for a variety of issues, from contagious diseases to environmental health to substance abuse. Provides input regarding environmental health issues, including air quality and climate change.
- DOH – Elderly Affairs Division: Contains the Executive Office on Aging, the designated lead agency in the coordination of a statewide system of aging and caregiver support services in the State, as authorized by Federal and State laws. This is the focal point for all matters relating to older adults' needs and the coordination and development of caregiver support services within the State. Provides input regarding the transportation concerns and issues facing seniors on Oahu.
- Department of Land and Natural Resources (DLNR): Responsible for land management and dedicated to preserving Hawaii's natural and historical resources for the benefit of future generations. Provides statewide maps of culturally- and environmentally-sensitive areas.
- Hawaii Community Development Authority (HCDA): The authority supplements renewal methods by promoting and coordinating public and private sector development for the communities of Kakaako and Kalaeloa. Provides input on development plans.

City and County of Honolulu

- Department of Design and Construction (DDC): In consultation with the appropriate client agencies and stakeholders, aims to manage effectively and efficiently authorized improvements to the City's public buildings, streets, roads, bridges and walkways, wastewater facilities, parks and recreational facilities, transportation systems, and drainage and flood improvements; and to provide technical assistance when needed.
- Department of Emergency Management (DEM): Assists in planning, raising awareness, and preparing emergency management programs and response and evacuation activities for the City.
- Department of Facility Maintenance (DFM): Administers maintenance programs for multiple City facilities, including roads, traffic signs and markings, streetlights, and streams; also provides training support, property and parking garage management, and security and interdepartmental mail services for various City properties and agencies.

1.4.3 Other Statewide Planning Activities Considered in the ORTP 2035 Update

Along with previous iterations of the ORTP and associated technical reports and studies, the following State, regional, and local transportation plans and reports were reviewed and considered in the drafting of the ORTP 2035:

- *2050 Sustainability Plan*: Identifies goals for Hawaii's sustainable long-range future, strategic actions to achieve the goals, indicators that measure sustainability, intermediate steps for the year 2020, and public accountability for the State's progress.
- *Environmental Justice in the OahuMPO Planning Process Report*: As discussed previously in Section 1.2.2.
- *Ewa Roadway Connectivity Study* (2009): DPP commissioned this study to investigate ways to improve roadway connectivity throughout the Ewa plain. This study serves as the basic roadway, bikeway, and pedestrian facilities planning guide for future development in the Ewa region.
- *Ewa Highway Master Plan* (2004): Analyzed the developing Ewa area and determined transportation infrastructure needs.
- *FFYs 2008-2011 and FY 2011-2014 Transportation Improvement Program* (TIP), as revised: Documents short-term (i.e., four-year plus two illustrative years) funded transportation improvements for the island of Oahu.
- *Honolulu High-Capacity Transit Corridor Project Final Environmental Impact Statement/Section 4(f) Evaluation* (2010): Final NEPA environmental process document for the island's proposed fixed guideway system.
- *Oahu Development and Sustainable Communities Plans*: As discussed later in Section 3.1.2.
- *Oahu Regional Intelligent Transportation Systems (ITS) Architecture* (2003): Provides a framework to foster ITS integration and improve inter-agency communication with regard to the island's ITS infrastructure.
- *Strategic Highway Safety Plan 2007-2012*: Aims to reduce the number and severity of traffic-related injuries and deaths on Hawaii's roadways.

1.4.4 Concurrent Planning Activities

During the course of preparing the ORTP 2035 the following planning activities were being undertaken concurrently by the HDOT and DTS. Every effort was made to ensure coordination across the plans and use of consistent datasets, including:

- *Hawaii Statewide Transportation Plan*: As discussed previously in Section 1.2.4.
- *Hawaii Long-Range Land Transportation Plan*: This HDOT-led plan is currently underway. This plan addresses the long-range transportation needs

for the islands of Maui/Molokai/Lanai, Kauai, and Hawaii. Both the ORTP 2035 and the Long-Range Land Transportation Plan are based on the same growth assumptions.

- *Statewide Pedestrian Master Plan*: Currently being developed by HDOT to help increase pedestrian safety and mobility, support a multimodal transportation system, and provide guidance on the best use of resources to implement pedestrian initiatives.
- *Complete Streets Task Force*: Act 54, 2009 Session Laws of Hawaii, required that HDOT and County transportation agencies adopt a Complete Streets policy. The task force was established by HDOT to determine applicable state- and county-wide standards and guidelines to provide consistency for all highway users, propose changes standards and guidelines as appropriate, and make recommendations for restructuring procedures, rewriting design manuals, and creating new measures to track success. Complete Streets are defined as “Transportation facilities that are planned, designed, operated, and maintained to provide safe access and mobility for all users, including bicyclists, pedestrians, transit riders, and motorists, and that are appropriate to the function and context of the facility.”
- *Short-Range Transit Plan*: This document currently under development by the City and County of Honolulu specifies the operating and capital program for the island’s public transit system.
- *Public Transit Facility Master Plan (2009)*: Examines existing facilities, assesses their ability to meet the existing and expanding needs associated with the operation of the transit system; identifies and recommends actions that should be taken to maximize the efficiency and effectiveness of the facilities. The master plan provides a “road map” for the various capital projects identified in the study.
- *Coordinated Public Transit - Human Services Transportation Plan (2009)*: Required by SAFETEA-LU and focusing on elderly, disabled, and socially and economically disadvantaged transportation clients, the plan serves to maximize the collective coverage of these programs by minimizing the duplication of public and private services, filling missing service gaps, and providing a collaborative and coordinated effort amongst representatives of the public, private, and non-profit human services transportation providers.
- *Transit-Oriented Development Program (Ongoing)*: This DPP-administered program plans for the anticipated growth and change around the transit stations to be constructed as part of the planned fixed guideway system. Transit and transit-oriented development (TOD) can positively affect the way island residents commute and live. The goal of each community-based TOD plan is to identify such opportunities and lay the foundation for each area's success.
- *Hawaii Clean Energy Initiative (Ongoing)*: Aims to reduce Hawaii's dependence on oil by setting goals and a roadmap to achieve 70 percent

clean energy by 2030 with 30 percent from efficiency measures and 40 percent coming from locally-generated renewable resources.

- *Hawaii Catastrophic Hurricane Operations Plan* (2009): Joint plan signed by the SCD and FEMA that outlines the foundation for the response and recovery from category four hurricanes that directly impact Oahu.
- *Strategies for Energy Efficiencies in Transportation* (2008): In response to Act 254, 2007 Session Laws of Hawaii, the Hawaii Energy Policy Forum at the University of Hawaii at Manoa (UH Manoa) conducted a study on energy-efficient transportation strategies to reduce the demand for fuel in Hawaii's transportation sector and, in doing so, reduce Hawaii's dependence on imported fossil fuel.

1.5 Plan for the Island of Oahu

1.5.1 Geographic Overview

While the coastal areas of Oahu are relatively flat, the island's interior consists of the Koolau and Waianae mountain ranges that effectively divide the island. Much of the development lies along the southern portion of the island, generally comprising the Interstate H-1 travel corridor. Only two of the island's eight geographic regions – Ewa and the Primary Urban Center (PUC) – are slated for development in the future; the remaining areas are guided by Sustainable Communities plans and little to no growth is anticipated. The ORTP 2035 identifies transportation projects that will both support and manage the island's future development.

1.5.2 Overview of ORTP 2035

The ORTP 2035 is a financially-constrained plan that provides roughly \$23.8 billion for capital projects and projects that help to operate, maintain, and preserve the island's transportation systems. The projects contained in the ORTP 2035 attempt to balance budget realities with the need for system preservation, transportation options and accessibility, congestion mitigation, safety, alternative access routes, and facilities for bicyclists and pedestrians within a Complete Streets context.

The Plan provides a number of projects, strategies, and programs to address the island's future transportation needs and improve mobility. These include increased focus on operational, management, and preservation strategies; programs that help integrate the transportation system into the land uses of each community; major capital improvement projects that add to the system's person-carrying and vehicular capacities; and projects that expand upon the existing systems and services to optimize their use. The following sections discuss specific elements of the ORTP 2035.

Operations, Maintenance, and System Preservation

A priority of the ORTP 2035 is to support the operations, maintenance, and preservation of the existing transportation system. While new facilities and programs are important to address increased travel demand, maintaining existing facilities is critical to avoid degradation of the system. This is typically more cost-effective than building new facilities because it leverages previous investments made to the system.

Congestion Mitigation

Travel by personal vehicle will continue to be an important travel mode in the future, which means that roadway capacity will need to be increased. The H-1 travel corridor in particular would benefit from additional capacity, as congestion is forecast to increase significantly if nothing is done. With the rapid development of the Ewa/Kapolei side of the island, the congestion mitigation projects will enable the transportation network to handle the population and employment expansion slated for the area in the future.

Transit Options

The Honolulu High-Capacity Transit Corridor Project (HHCTCP) is a key component of the ORTP 2035. This elevated, fixed guideway system will serve the Interstate H-1 travel corridor and provide a reliable alternative to personal vehicle use, substantially improving mobility for those who use it. While the fixed guideway system is not anticipated to eliminate congestion, projections indicate that congestion would be worse in the future if it is not built. The guideway will connect the major employment and residential areas of Kapolei and Ewa to Downtown Honolulu and the Ala Moana Shopping Center. Part of this project would also involve redirecting some bus services to act as feeder bus routes serving the fixed guideway stations and reduce redundancy in transit routes.

TheBus and TheHandi-Van are Oahu's existing forms of public transportation; TheBus serves the population island-wide, with TheHandi-Van providing service for qualified persons with disabilities who are unable to use TheBus. TheBus is an award-winning service, and enhancing it to continue to provide excellent public transportation service for the island is a strong consideration in the ORTP 2035.

Bicycle and Pedestrian Facilities

An important feature of the ORTP 2035 is providing more transportation choices and increasing accessibility to those choices. A top priority in fulfilling this goal is expanding and enhancing Oahu's existing network of bicycle facilities so that it functions as a key, integrated component of the overall transportation system on the island. The ORTP 2035 considered and incorporated the Oahu elements of the State's *Bike Plan Hawaii* (2003), as well as projects included in the City's draft *Oahu Bike Plan*.

TDM and TSM

Transportation Demand Management (TDM) and Transportation Systems Management (TSM) allow for more efficient use of existing facilities. A main component of the ORTP 2035 in this area is the development of an afternoon contraflow lane that would operate in the Ewa direction from Radford Drive to the Waialeale Interchange, which would allow for higher capacity in the peak direction of flow.

One important TDM project is the Vanpool Hawaii program. This program offers travelers the option of a full size 15-passenger van (Vanpool) or a seven-passenger minivan or sport utility vehicle (Cool Pool). All riders share the costs of their vehicle's fuel and parking expenses. The Vanpool Hawaii program is subsidized through grants from FHWA and FTA with local-matching funds from the State.

Intelligent Transportation Systems

The ORTP 2035 attempts to build on the benefits realized by existing Intelligent Transportation Systems (ITS) around the island. The Plan includes two projects that would develop, install, and manage closed-circuit television cameras and associated systems; one would be part of the State's Traffic Management Center (TMC) and the other would be installed and integrated with the City's Traffic Control Center (TCC).

1.6 Decision Making

The ORTP is developed using an organizational structure in line with the principles of the 3C process that includes committees that establish policy, advise, and guide the development of major projects prepared by the OahuMPO. The OahuMPO is comprised of three standing committees and a full-time Executive Director and support staff, as discussed in more detail below.

- Citizen Advisory Committee (CAC),
- Technical Advisory Committee (TAC),
- Policy Committee, and
- OahuMPO Executive Director and Staff.

1.6.1 Citizen Advisory Committee

The CAC is a volunteer group that consists of members appointed by the Policy Committee and contains various member organizations representing an array of interests, including community organizations, professional associations, Neighborhood Boards (NBs), and the private sector. The CAC provides direct input to the Policy Committee and the OahuMPO Executive Director. The CAC also assists in developing public involvement programs to reach the general public and solicit its input.

1.6.2 *Technical Advisory Committee*

The TAC consists of senior staff from City departments, including DTS and DPP; and State departments, including HDOT and DBEDT. There are also staff representatives from FHWA, FTA, and FAA that participate as non-voting members. Ex-officio members include a faculty member from the University of Hawaii (UH) with transportation or urban planning expertise, and the managing director of the Hawaii Transportation Association. The TAC provides technical input to OahuMPO's planning process and advises the Policy Committee and the OahuMPO Executive Director on technical matters.

1.6.3 *Policy Committee*

The Policy Committee is the policy board created and designated to carry out the metropolitan transportation planning process. It is composed of elected officials or their appointees. There are five members from the City Council, three from the State Senate including the chair of the Senate's transportation committee, three from the State House of Representatives including the chair of the House's transportation committee, and the directors of HDOT and DTS. The Policy Committee determines the direction of the OahuMPO's effort and considers and approves transportation planning issues as articulated in 23 CFR 450 Subpart C.

1.6.4 *OahuMPO Executive Director and Staff*

The daily operations of the OahuMPO are overseen by an Executive Director, who reports to the Policy Committee, and six staff members who coordinate and manage the various projects and programs that are required under Federal and State statute and City ordinance.

1.7 ORTP 2035 Documents

The information provided in this document is based on detailed information contained in the following technical reports that were prepared for the ORTP 2035.

- Public Participation and Outreach Plan
- Vision Statement Report
- Goals and Objectives Report
- Performance Measures Report
- Existing Land Use Conditions Report
- Existing Transportation Inventory Report
- Existing Multi-Modal Conditions Performance Report
- Revenue Sources Report
- Revenue Projections Report

- Socio-Economic Data Reasonableness Report
- Baseline Project Definition and Characteristics Report
- Baseline Auto and Transit Travel Demand Forecasts Report
- Baseline Scenario Performance Analysis Report
- Baseline Problems and Issues Technical Memoranda
- Potential Transportation Improvements Project Matrix
- Project Cost Estimates Report
- Alternative Scenarios Analysis Report
- Congestion Management Process Report
- Preferred Plan Scenario Performance Analysis Report

2.1 Vision for Oahu in 2035

The Vision Statement, approved by the Policy Committee on May 28, 2009, provides the general direction and planning context for the ORTP 2035.

In 2035, Oahu will be a place where we will have efficient, well-maintained, safe, secure, convenient, appropriate, and economical choices in getting from place to place. Our transportation system will move us and the goods we use in a manner that supports the island's high quality of life, natural beauty, economic vitality, and land use policies by supporting appropriate density development and avoiding urban sprawl. This system will promote energy conservation and economic sustainability as well as the protection of our ports of entry, preparation for emergency situations and changes in global climate patterns.

2.2 Goals and Objectives

To help achieve the Vision, the ORTP 2035 is defined by five overarching goals that address the following topical areas:

- Transportation facilities
- Transportation operations and services
- Natural environment
- Human environment and quality of life
- Land use and transportation integration

To support the goals, 25 objectives were identified for the ORTP 2035. Section 2.2.1 below provides a listing of the five goals and 25 objectives that have been endorsed by the TAC and adopted by the OahuMPO Policy Committee for use in the development of the ORTP 2035.

2.2.1 Adopted Goals and Objectives

Transportation Facilities

Goal

Provide an inclusive, multi-modal transport system whose connectedness provides efficient means for users desiring to move about this island by bicycle, freight carrier, pedestrian facility, road, transit service, and intermodal connectors.

Objectives

1. Develop, operate, and maintain alternative transportation facilities, including bikeways, walkways, and other accessible and environmentally-friendly elements.
2. Enhance the integration and connectivity of the regional transportation system.
3. Provide efficient, convenient, and cost-effective transit service to Oahu's citizens.
4. Promote the intermodal connectivity and efficiency of harbor terminal facilities, airport terminal facilities, and land transportation systems.
5. Provide rehabilitation, renewal, and modernization of facilities in sufficient magnitude to ensure system preservation and continued, effective operation.

Transportation Operations and Services

Goal

Develop, operate, and maintain Oahu's islandwide transportation system to ensure the efficient, dependable, safe, secure, convenient, and economical movement of people and goods.

Objectives

1. Promote planning, design, operation, maintenance, and construction of transportation facilities and systems to support economic development and vitality.
2. Optimize transportation resources through TDM strategies, including telecommuting solutions, to encouraging transit ridership and ridesharing, while reducing single-occupancy vehicle travel and auto dependency.
3. Encourage public-private partnerships in providing transportation services.
4. Monitor and enhance the performance and efficiency of Oahu's transportation system through the use of operation management strategies, such as ITS, TSM, TDM, and the OahuMPO Congestion Management Process (CMP).
5. Ensure that Oahu's transportation system is planned, designed, constructed, maintained, and operated in an integrated and cost-effective manner.
6. Ensure user and community safety, and practical systems for the disabled by incorporating the priorities, programs, physical design and operation of transportation facilities, and other improvements, consistent with the *Hawaii Strategic Highway Safety Plan* and *Americans with Disabilities Act Accessibility Guidelines*.
7. Increase the peak-period, person-carrying capacities of Oahu's transportation network.

8. Reduce security risks associated with terrorism and other criminal acts, natural and man-made disasters, and other emergencies that would impact the transportation system.

Natural Environment

Goal

Develop, operate, and maintain Oahu's transportation system in a manner that sustains environmental quality.

Objectives

1. Develop, operate, and maintain Oahu's transportation system to meet or exceed noise, air, and water quality standards set by Federal, State, and City agencies.
2. Maximize energy conservation in transportation and reduce greenhouse gas (GHG) emissions.
3. Maintain and upgrade existing facilities, and locate and design future transportation facilities in a manner that protects them from significant damage or disruption due to climate change.
4. Preserve and enhance Oahu's cultural integrity, including archaeological and historic sites, and sensitive natural resources, including beaches, scenic beauty, and sea and mountain vistas.

Human Environment and Quality of Life

Goal

Develop, operate, and maintain Oahu's transportation system in a manner that supports community-wide values related to health, safety, and civil rights.

Objectives

1. Address and minimize the impacts of energy shortages, natural or man-made disasters, and other emergencies to the transportation system.
2. Encourage the development of sustainable and renewable energy sources for transportation.
3. Ensure that no person shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination in transportation services as provided for under current Federal, State, and City legislation.
4. Maintain and upgrade existing facilities and design future transportation facilities in a manner that complies with local urban design policies and regulations.
5. Encourage innovation in planning, design, construction, operation, and maintenance of transportation services and facilities.

6. Minimize disruption to existing neighborhoods from construction and maintenance of the transportation system.

Land Use and Transportation Integration

Goal

Develop, operate, and maintain Oahu's transportation system in a manner that integrates effective land use and transportation with established sources of funding in a fair and equitable manner.

Objectives

1. Develop, operate, and maintain the transportation system to support Oahu's planned population distribution and land use development policies expressed in the City's General, Development, and Sustainable Communities Plans, and other adopted plans through coordinated efforts of both public and private sectors.
2. Support land use development policies, such as Transit-Oriented Development, that capitalize on the efficient use of the transportation system and reduce vehicular trip-making and vehicle miles traveled.

2.2.2 Differences from ORTP 2030

The ORTP 2030 only listed goals for three focus areas, as opposed to the goals presented for five focus areas in the ORTP 2035. The focus area of "Transportation Facilities" was added, while the previous focus area of "Environment and Quality of Life System" was split into two areas of "Natural Environment" and "Human Environment and Quality of Life" in order to address more fully their unique aspects. Also, it is worth mentioning that the previous "Transportation Services System" focus area was revised to "Transportation Operations and Services" to recognize the demands on transportation systems due to operations needs.

23 objectives were identified in the ORTP 2030 under the three goal focus areas, while for the ORTP 2035 25 objectives are identified under the five goal focus areas. These objectives generally expanded upon those presented in the ORTP 2030, while also identifying more specific measures and areas of scrutiny.

2.3 Performance Measures

Performance measures are an essential part of the planning process. 31 measures have been used to help determine how well candidate projects and programs proposed for inclusion in the ORTP 2035 address the plan's adopted goals and objectives. The performance measures were presented to the Technical Advisory Committee (TAC) of the OahuMPO on April 15, 2009, for discussion and endorsed at its meeting on May 21, 2009, for use during the ORTP 2035 update process.

A number of the measures included in Section 2.3.1 below have been used in the development of previous versions of the ORTP. Building on these existing

measures, additional performance measures have been added to address new long-range transportation planning requirements in SAFETEA-LU as well as issues of energy efficiency and climate change.

2.3.1 Adopted Goals and Measures

Table 2-1 lists the adopted performance measures for the ORTP 2035 and provides a brief description for each.

Table 2-1 ORTP 2035 Performance Measures

Performance Measure	Description
Transportation Facilities	
Bicycle and Pedestrian Facilities	Compares the level of investment in new or improved non-motorized transportation elements as well as potential impacts to existing bicycle and pedestrian facilities, and assesses how the scenario affects continuity of and accessibility to the bicycle/pedestrian network.
Intermodal Freight Connections	Assesses the quality of connections between freight modes (highway, air and seaports) based on quality (suitable routes, design standards, conflicts, etc) and redundancy of connections.
Modal Conflicts	Assesses the candidate improvements' affect(s) on the potential for modal conflicts by assessing the negative effect(s) on other travel modes.
Mode Share	Measures the share (as a percentage) of person-trips carried by travel modes (e.g., single-occupant vehicle, high-occupant vehicle, transit, bicycle, pedestrian) based on travel demand model output.
Regional Transportation Linkages	Assesses whether the candidate improvements provide connections between regional transportation facilities or services.
Improved Accessibility to the Transportation System for Persons with Disabilities	Assesses the level of investment in the proposed project or program that supports the <i>Americans with Disabilities Act Accessibility Guidelines</i> .
Transportation Operations and Services	
Economic Vitality	Assesses the contribution of candidate improvements to the economic development and vitality of the region in terms of both job creation and reducing the costs associated with congestion.
Average Vehicle Occupancy	Measures the average number of occupants per automobile based on travel demand model output, excluding buses and commercial vehicles.
Condition and/or Life Span of Transportation Infrastructure	Assesses whether the candidate improvements upgrade the condition and/or life span of transportation infrastructure and the degree to which strategies balance resources for construction, rehabilitation, and maintenance.
Highway and Arterial Level-of-Service (LOS)	Measures (in lane-miles) and maps LOS for all major highway and arterial segments based on travel demand model Volume/Capacity ratios.

Performance Measure	Description
Historical Accident Risks	Assesses whether candidate improvements address existing high-accident locations and maps those locations based on compiled accident data for available modes.
Homeland Security, Personal Security, and All-Hazards Preparedness	Assesses whether candidate strategies are consistent with and support Homeland Security initiatives, personal security concerns, and all-hazards preparedness.
Operations Management Strategies	Assesses whether the candidate improvements effectively employ ITS, TSM, and/or TDM techniques.
Screenline Person-Trips	Measures the person-trips (all modes) crossing study area screenlines based on travel demand model output.
Total Annual System Costs	Estimates annualized transportation costs (capital, operating, and maintenance) over a predetermined span of time based on available cost information.
Transit Ridership	Measures number of transit patrons based on travel demand model output.
Travel Demand	Assesses the degree to which candidate improvements employ or support TDM techniques to reduce travel demand based on the potential to reduce vehicle trips.
Travel Times [Selected Origin-Destination (OD) Pairs]: Auto	Measures and maps the average peak period travel time between key destinations based on travel demand model output.
Freight	Measures and maps the average peak period travel time between key freight destinations based on travel demand model output.
Public Transit	Measures and maps the average peak period travel time between key destinations on transit based on travel demand model output.
Vehicle Hours of Delay (VHD)	Measures the total hours of delay (daily and peak period) experienced by all vehicles on the network based on travel demand model output. Delay is the difference between predicted travel times and travel time under free-flow (uncongested) conditions.
Vehicle Hours of Travel (VHT)	Measures the total duration of trips by motorized vehicles (automobiles, buses, trucks) based on travel demand model output.
Vehicle Miles of Travel (VMT)	Measures the total length of trips by motorized vehicles (automobiles, buses, trucks) based on travel demand model output.
Natural Environment	
Natural Resource/Environment Effects	Assesses potential disruption or other impacts to natural areas such as animal habitats, open spaces, beaches, archeological sites, and forested areas/vegetation based on the mapped location of sensitive areas and potential footprint changes associated with proposed projects.

Performance Measure	Description
Reliance on Renewable and Sustainable Energy Sources	Assesses the degree to which candidate actions promote the use of renewable and sustainable energy sources for transportation (over non-renewable sources).
Susceptibility to Climate Change	Evaluates the effects of global climate change, including rising sea level, on transportation infrastructure.
Human Environment and Quality of Life	
Disruption during Construction	Assesses potential disruption to neighborhoods (access, mobility, noise, dust, etc.) during construction of candidate improvements based on degree of travel disruption, availability of suitable alternate routes, and proximity to sensitive neighborhoods.
Energy Consumption	Assesses whether candidate actions reduce energy consumption based on VMT, presumed fuel efficiency assumptions, and mix of fuel/power sources.
Air Quality	The State of Hawaii is in attainment for air quality. Assesses the level of GHG emissions as the result of proposed projects based on VMT, presumed fuel efficiency assumptions, and mix of fuel/power sources.
Title VI/Environmental Justice (T6/EJ) : - Accessibility - Equity - Mobility - Public Involvement and Outreach	Compares share of people within T6/EJ and non-T6/EJ Traffic Analysis Zones (TAZs) who are within a 20-minute trip of selected work, shopping, education, and healthcare destinations based on travel demand model output.
	Compares transportation funding allocations for T6/EJ and non-T6/EJ areas needs based on available cost information.
	Compares travel times for work trips from T6/EJ and non-T6/EJ TAZs based on travel demand model output.
	Assesses concerns and issues of T6/EJ populations regarding transportation system performance and plan project selection based on feedback from focus groups, telephone surveys, and other public outreach initiatives. Assesses the degree to which outreach was done to T6/EJ populations.
Land Use and Transportation Integration	
Land Use Plans	Assesses whether the candidate improvements serve planned growth areas based on forecast population and employment growth.
Built Environment Effects	Assesses potential displacements of people and/or activities and structures to developed areas.
Compact, Mixed-Use Growth	Assesses the degree to which candidate actions would encourage land development that supports more efficient use of transportation services as a result of concentrated growth patterns, mix of uses, and/or development around public transportation facilities.

2.3.2 Differences from ORTP 2030

While many of the measures above were used in developing previous versions of the ORTP, this is the first version of the document that has specifically listed them and how they will be applied to various potential improvement projects and programs. Also, as stated in Section 2.3, additional performance measures were added to address new, long-range transportation planning requirements of SAFETEA-LU. These performance measures are directed especially at the “Human Environment and Quality of Life” focus area, and serve to ensure T6/EJ populations are appropriately considered and there are no disproportionate adverse effects on these communities. Performance measures relating to the natural environment include additional measures related to renewable and sustainable energy sources, and climate change.

3.1 Existing Conditions

3.1.1 Existing Transportation System

Roadways ranging from Interstate freeways to local streets form Oahu's basic transportation network, which facilitates the movements of its people and goods. The transportation network is used by all vehicle types and modes including cars, trucks, public and private transit services, bicycles, and pedestrians. The roadway system on Oahu is maintained by HDOT and DFM.

Existing State Roadway System

The State highway system includes all freeways, principal arterials, and some minor arterials connecting various parts of the island. The following description provides background information on State roadways maintained by HDOT. The State roadway system is illustrated in Figure 3-1 below.

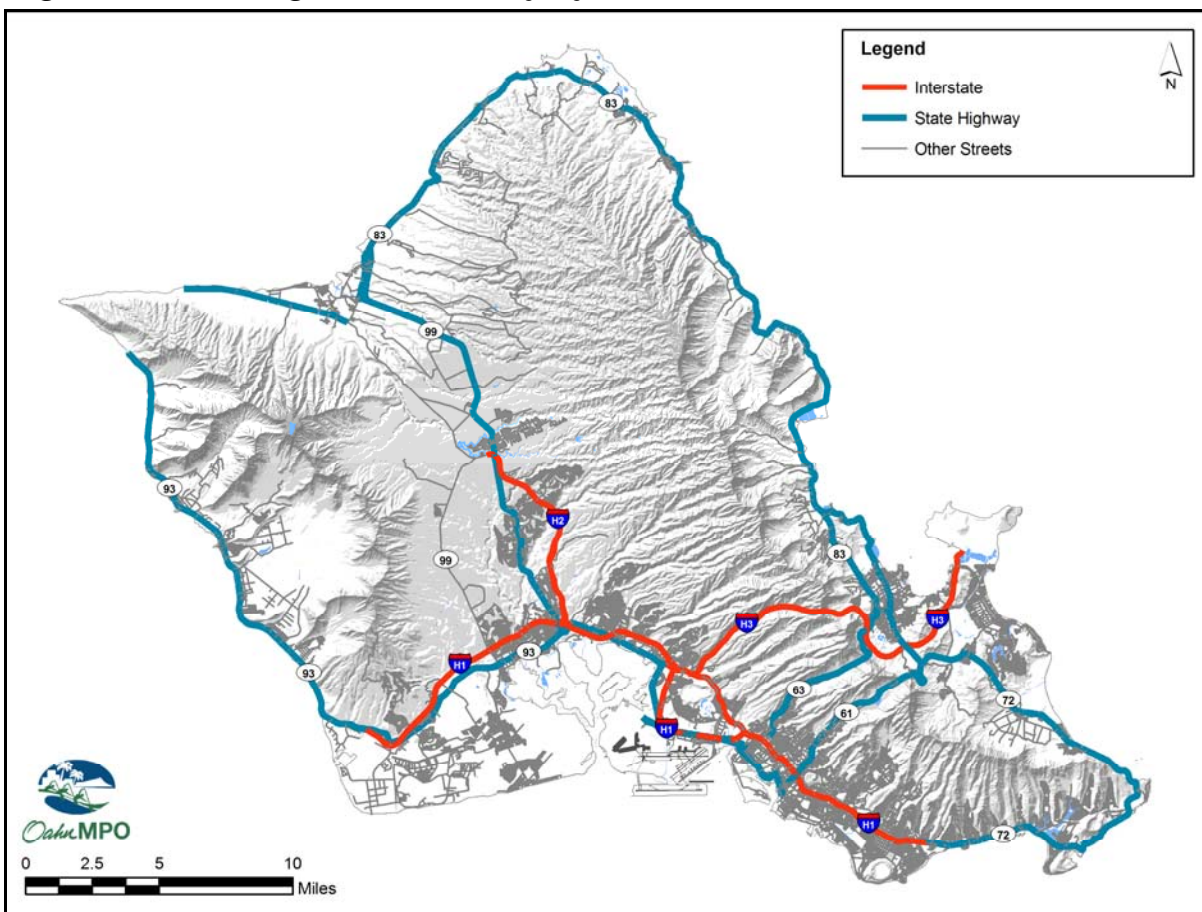
Interstate Freeways

The Interstate freeways on Oahu are dedicated transportation facilities. They are fully grade-separated, access-controlled routes with the sole purpose of facilitating the through movement of people and goods to different parts of the island.

Access to the freeway system is restricted to dedicated ramps, which serve to minimize disruptions to the flow of traffic; this, in turn, allows for higher operational speeds and improved capacity when compared to surface streets. The freeway system has 54.9 route miles (or 347.37 lane miles). The Interstate facilities include:

- Interstate H-1 between Kapolei and Kahala
- Interstate H-2 between Wahiawa and Interstate H-1
- Interstate H-3 between Halawa and Kaneohe Marine Corps Base Hawaii
- Moanalua Freeway (H-201) connecting Interstate H-1 and Kamehameha Highway in Aiea with the merge back into Interstate H-1 at Middle Street

Figure 3-1: Existing State Roadway System



Other Principal Arterials

Principal arterials other than freeways serve a purpose similar to that of the Interstate system, i.e., facilitating the movement of goods and people to different parts of the island. Vehicles can access these facilities without the use of dedicated ramps; in turn, capacities and operational speeds are not as high when compared to the Interstate system. The State highway system has 280.35 route miles (or 935.56 lane miles) of principal arterials. These include, but are not limited to, the following:

- Pali Highway (Route 61) and Likelike Highway (Route 63) connect the Primary Urban Center (PUC) with Kaneohe and Kailua across the Koolau Mountains.
- Kalanianaʻole Highway (Route 72) serves travel between Kahala and Hawaii Kai continuing around the west end of Oahu through Waimanalo and Kailua to Castle Junction.
- Kamehameha Highway (Portions of Routes 80, 83 and 99) runs from Middle Street through Central Oahu and encircles the North Shore of the island and the Windward Coast through Kaneohe to Castle Junction.

- Haleiwa Bypass, also known as the Joseph P. Leong Highway (Route 83), connects Kamehameha Highway east of Weed Circle to Kamehameha Highway north of Haleiwa Beach Park.

Existing City and County Roadway System

The City's roadway system consists of those facilities that are not in the State system and includes minor arterials, collector streets, and local streets.

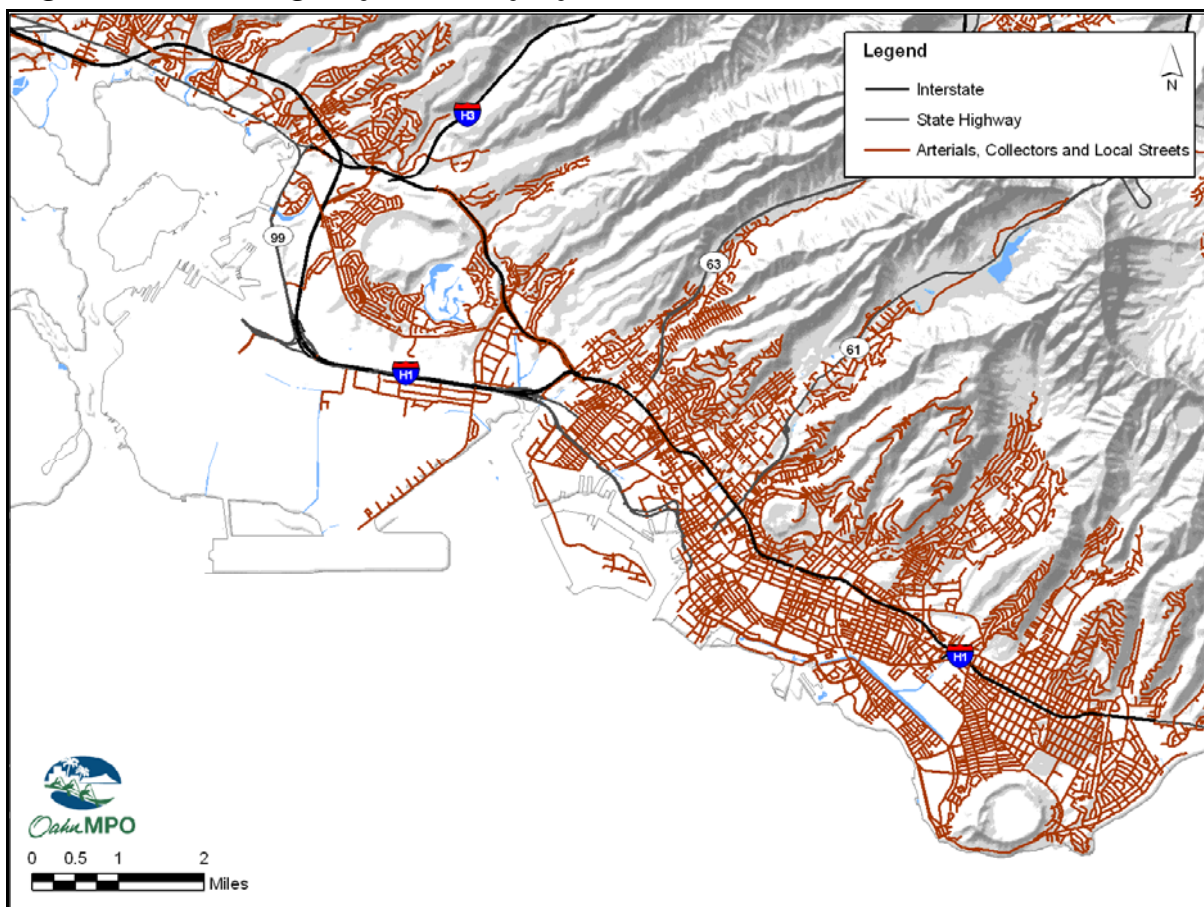
Principal Ewa/Koko Head roadways located in the PUC are highlighted in Figure 3-2 and include the following:

- | | |
|------------------------|-----------------------|
| • Ala Wai Boulevard | • King Street |
| • Beretania Street | • Kuhio Avenue |
| • Dillingham Boulevard | • Moanalua Road |
| • Kalakaua Avenue | • Salt Lake Boulevard |
| • Kapiolani Boulevard | • School Street |

The main mauka/makai roadways in the PUC are shown in Figure 3-2 and include the following:

- | | |
|-----------------------|---------------------|
| • Houghtailing Street | • Piikoi Street |
| • Kalihi Street | • Punchbowl Street |
| • Kapahulu Avenue | • Puuloa Road |
| • Keeaumoku Street | • South Street |
| • McCully Street | • University Avenue |
| • Middle Street | • Waiakamilo Road |
| • Pensacola Street | • Ward Avenue |

Figure 3-2: Existing City Roadway System for Urban Honolulu



Portions of some of the roadways that fall under the City's roadway system are not always under the sole jurisdiction of the City. For example, while Farrington Highway is owned and operated by the City for the section between Kapolei Golf Course Access Road to Fort Weaver Road, the remainder is a State-managed facility.

Existing TDM and TSM

TDM is a general term referring to a variety of strategies to reduce highway travel demand. One way of reducing vehicular demand is shifting trips to modes other than the single-occupant auto. As such, TDM measures can include encouraging the use of public transportation and carpooling as ways to reduce overall vehicular demand. Programs or projects that encourage a shift of trips to walk and/or bicycle modes also can reduce overall vehicular demand.

One important TDM project is the Vanpool Hawaii program. HDOT currently operates the Vanpool Hawaii program through an outside contractor, VPSI, Inc. A vanpool is a group of seven to fifteen commuters sharing one vehicle during the commute to and from work. The vanpools operate five days-a-week and designated drivers may keep the vehicles over the weekend. As of December 2007, there were 198 vanpools in operation on Oahu. This program offers the option of a full size

15-passenger van at the cost of \$65 per-seat per-month (Vanpool) or a seven-passenger minivan or sport utility vehicle at the cost of \$80 per-seat per-month (Cool Pool). All riders share the costs of their vehicle's fuel and parking expenses. The Vanpool Hawaii program is subsidized through grants from FHWA and FTA with local-matching funds from the State.

TSM has the basic objective of creating more efficient use of transportation facilities by improving the operation and management of vehicles and roads. The following sections discuss TSM measures that are currently in operation on the Oahu roadway system.

Contraflow and HOV Operations

Contraflow lanes are a TSM strategy wherein a lane that typically provides vehicular travel in one direction is reversed during certain times of the day. Contraflow lanes are used to provide additional capacity in the peak direction of travel during peak periods. When the traffic flows in the peak versus off-peak direction are imbalanced, a lane can be removed from the off-peak direction of travel and used, instead, to increase peak-direction capacity.

HOV lanes are Interstate freeway or highway lanes that are designated for exclusive use by buses, carpools, motorcycles and vanpools. By creating an exclusive right-of-way (ROW), travel time savings can be realized and HOV facilities serve as incentives for people to carpool, vanpool, or ride public transit. As more people rideshare, the overall people-carrying capacity of the street system increases.

State Contraflow Operations

HDOT currently provides contraflow operations at three locations within the State highway system during specific peak periods, although the precise hours of operation vary. Contraflow facilities operated by the State are restricted to buses, vanpools, motorcycles, and vehicles with the required number of occupants, and include:

- Interstate H-1 Zipper Lane. The contraflow zipper lane provides a seventh Koko Head (eastbound) direction lane from Managers Drive in Waipahu to the Keehi Interchange during the morning peak period for HOV use only. Vehicles are required to have three or more occupants.
- Nimitz Highway (Route 92). During the morning peak period, there is a Koko Head-direction contraflow lane between the Keehi Interchange and Pacific Street for HOV use only. Vehicles are required to have three or more occupants.
- Kalanianaʻole Highway (Route 72). During the morning peak period, there is an Ewa (westbound) direction contraflow lane between West Halemaumau Street and Ainakoa Avenue for HOV use only. Vehicles are required to have two or more occupants. Residents living mauka of the highway may receive a permit from HDOT (which must be displayed) to allow them to be single occupant vehicles.

City and County Contraflow Operations

The City also delineates lanes to allow reversible operation along congested corridors during specific peak periods. Unlike HDOT contraflow operations, the City facilities do not have occupancy restrictions. City locations with reversible lane operations include the following.

- Kapiolani Boulevard. One Koko Head-bound travel lane is reversed during the morning peak period to provide a fourth Ewa-bound travel lane from the Interstate H-1 Freeway near the intersection of Kapiolani Boulevard and South King Street to Ward Avenue. One Ewa-bound lane is reversed during the afternoon peak period to provide a fourth Koko Head-bound travel lane from Ward Avenue to the Interstate H-1 Freeway near South King Street.
- Ward Avenue. A mauka-direction lane is reversed to provide a third makai-direction travel lane between Lunalilo Street and South King Street (in front of the Neal Blaisdell Center) during the morning peak period.
- Atkinson Drive. A contraflow lane from Kona Street to Kapiolani Boulevard operates during the morning peak period only in the mauka direction.
- Waialae Avenue. During the afternoon peak period, one Ewa-bound (westbound) lane is reversed to provide an additional Koko Head-direction travel lane from Kapahulu Avenue to 8th Avenue (the lane ends between 7th and 8th Avenues).
- Kalakaua Avenue. An afternoon peak period contraflow lane operates from Ala Wai Boulevard to Kapiolani Boulevard in the mauka direction.

State High Occupancy Vehicle Operations

With the exception of the Interstate H-1 Zipper Lane, Interstate H-1 Shoulder Express Lane, and the Nimitz Highway Contraflow Lane which require three or more occupants from 5:30 to 8:30 a.m. except Saturdays, Sundays, and holidays, a vehicle must have two or more occupants in order to travel in the State-managed HOV lanes at the following locations.

- Interstate H-1. Provides an eastbound HOV lane for nine miles between Waiawa Interchange and Keehi Interchange during the morning peak period. Provides a Ewa-bound HOV lane for eight miles between Keehi Interchange and the vicinity of Lehua Avenue during the afternoon peak period.
- Interstate H-2. Provides mauka and makai HOV lanes between Mililani Interchange and Waiawa Interchange that operate in both the morning afternoon peak periods.
- Moanalua Freeway (Route 78). Provides a Koko Head-bound HOV lane between Halawa Interchange and Puuloa Road that operates in both the morning and afternoon peak periods.
- Interstate H-1 Zipper Lane. Described above; this contraflow facility is for HOV use only.

- Interstate H-1 Shoulder Express Lane. Provides an additional Koko Head-bound lane between the Pearl Harbor Interchange and the Keehi Interchange in the morning peak period for HOV use only; see below for details.
- Nimitz Highway (Route 92). Described above; this contraflow facility is for HOV use only.
- Kalanianaʻole Highway (Route 72). Described above; this contraflow facility is for HOV use only.

Special Shoulder Lanes

In addition to the contraflow lanes and the HOV facilities described above, the shoulder along a portion of Interstate H-1 is used to provide an additional travel lane.

- Interstate H-1 Shoulder Express Lanes. Interstate H-1 has Koko Head-bound shoulder lanes between the Kunia Interchange on-ramp and the Paiwa Interchange off-ramp, between the Waiawa Interchange on-ramp from Kamehameha Highway and the Waiau Interchange off-ramp, and between the Waiau Interchange on-ramp and Kaamilo Street overpass. These lanes, which prohibit trucks and buses, operate in the morning peak period. They end at each interchange's off-ramp and start up again at the next interchange on-ramp.

ITS/Centralized Traffic Signal Control Systems

ITS uses emerging technologies to improve the way transportation is managed and operated, with the goal of improving efficiency and safety. The Federal government has been involved with ITS since 1991 in order to promote the implementation of a technically-integrated and jurisdictionally-coordinated transportation system across the nation. ITS encompasses a variety of technologies applied to different elements of the transportation system, ranging from incident management and transit vehicle location tracking to traffic signal priority for emergency services.

A widely-used application of ITS is centralized signal control systems (CSCS). CSCS are a group of technologies and communication protocols that allow management of an entire transportation network through a centralized system by one or more agencies. By tailoring traffic controls to operating conditions, the efficiency of a roadway can be improved through networking signalized intersections, traffic surveillance, and centralized traffic signal control. The core components of these systems are communications and surveillance.

Existing Systems

Currently, DTS operates a centralized signal control center, referred to as the Traffic Control Center (TCC). The TCC offers signal coordination and preemption through live, video surveillance provided by a closed-circuit television (CCTV) system. Live surveillance is available along most major arterial corridors.

HDOT also operates a Traffic Management Center (TMC); the TMC provides live surveillance much like the TCC operated by DTS. The difference lies within the

facilities monitored by each center, as the State TMC monitors the State's Interstate and highway system, including the Interstate H-3 tunnel.

The ITS infrastructure currently available on Oahu includes the following:

- 784 signalized intersections on Oahu:
 - 400 controlled by the City's TCC.
- 202 CCTVs on Oahu:
 - 141 controlled by the City's TCC, and
 - 61 controlled by the State's TMC.

Existing Public Transit System

Transit plays an important role in Oahu's transportation system. Such services provide an alternative to automobile travel and, by extension, benefit the island by aiding in the reduction of roadway congestion, highway travel demand, air and noise pollution, and energy consumption. Transit also offers mobility options to youth and the elderly, the physically- and mobility-challenged, and persons who do not have access to a car. Transit service in Honolulu consists of a fixed-route bus transit service – known as TheBus – paratransit service – known as TheHandi-Van – and vanpools.

Transit Services

TheBus

Oahu Transit Services, Inc. (OTS) is a private management company contracted by the City solely to oversee and administer the daily operations of the City's bus system (TheBus) and paratransit system (TheHandi-Van). TheBus system currently consists of 100 fixed routes that serve approximately 3,800 bus stops. Bus route categories include Rapid Bus, Urban Trunk, Urban Feeder, Suburban Trunk, Community Circulators, Community Access, and Peak Express, the characteristics of which are summarized below.

- Rapid Bus. This category includes CityExpress! and CountryExpress! routes that provide limited-stop service in both directions between the Waianae Coast, Ewa, Central Oahu, Downtown, Ala Moana Center, UH Manoa, and Waikiki from the early morning through the late evening on weekdays. CityExpress! Routes A and B provide service every fifteen minutes, and CountryExpress! Routes C and E typically provide thirty-minute service.
- Urban Trunk. The routes in this category provide frequent, direct service connecting neighborhoods within the Primary Urban Center (PUC) along major Ewa- and Koko Head-direction corridors. Urban Trunk routes typically provide service every fifteen minutes or less.
- Urban Feeder. These routes connect the mauka/makai neighborhoods within the urban center, and typically provide service every thirty minutes or less. Serving the hills and valleys of Honolulu, they connect residential areas to the

Urban Trunk and Rapid Bus routes, while also providing service to major destinations such as Downtown, the UH Manoa campus, and Waikiki.

- Suburban Trunk. The routes in this category provide service through late evenings and connect outlying communities to the urban center. They stop at all local bus stops, and service is provided every day typically every thirty minutes.
- Community Circulators. These routes provide local transit access within their communities, as well as timed connections with other Community Circulator and Suburban Trunk routes at neighborhood hubs or transit centers. Routes with higher demand provide thirty-minute service, while routes with lower demand provide service every sixty minutes. Some routes offer intermittent or peak-only service.
- Community Access. This category contains routes that operate on a regular schedule using TheHandi-Van vehicles. Curb-to-curb service is provided to registered customers of TheHandi-Van who give 24-hour advance notice of a request and are located within one-quarter mile of the service route. TheHandi-Van service can be used to connect to transit hubs. These routes operate on demand and schedules allow for possible route deviation. Also, the City, in partnership with Hawaii Helping the Hungry Have Hope (H-5), and several other agencies, has established a shuttle service that complements the City's regular circulator route 415 by providing mid-day and evening service between the Kalaeloa homeless shelter and the Kapolei Transit Center. This service facilitates access to job opportunities in the Kalaeloa area and throughout Oahu for shelter residents and other low-income Oahu residents. The City has provided funds to Goodwill Industries of Hawaii to lease and operate vans from Vanpool Hawaii and another vendor. These vans are being used to provide trips for Goodwill's clients who would otherwise use TheHandi-Van.
- Peak Express. This category contains routes that serve predominantly home-to-work trips by connecting neighborhoods to employment centers. Service is provided in the peak direction during peak hours.

Most bus routes operate seven days-a-week, including holidays. Passenger amenities include approximately 980 passenger shelters and 2,400 benches, while TheBus system fleet consists of 531 buses. TheBus system carries approximately 73 million passengers each year. Fares for TheBus are \$2.50 one-way, and include a transfer that is valid for one use within two hours of paying cash fare. Costs for TheBus operations are included in the City's operations and maintenance budget.

The Handi-Van

As noted above, TheHandi-Van is a curb-to-curb, demand-based transportation solution provided by OTS for those persons eligible for paratransit service under the guidelines established by the Americans with Disabilities Act (ADA). TheHandi-Van is not a fixed-route service, although the areas serviced are similar to those serviced by TheBus, and passengers are picked up and dropped off at driveways and

entrances to both public and private facilities. TheHandi-Van fleet consists of 166 vehicles that include different types of vans and has an annual ridership of 850,000. The days and hours of operation are the same as those of TheBus, and fares are \$2 one-way and 24-hour, advance reservations are required. Costs for the TheHandi-Van operations are included in the City's operations and maintenance budget.

Transit Centers

Transit centers are points within TheBus' hub-and-spoke system, offering locations for multimodal transfers and intended to support the bus transit systems as well as alternate travel means. Currently on Oahu there are seven existing transit centers, the locations of which are listed below.

- Alapai Transit Center in Honolulu, located on South King Street at Alapai Street.
- Middle Street Transit Center in Honolulu, located on Middle Street at Kamehameha Highway.
- Hawaii Kai Transit Center in Hawaii Kai, located on Keahole Street near Hawaii Kai Towne Center.
- Kapolei Transit Center in Kapolei, located at Kamokila Boulevard near the Kapolei Post Office.
- Mililani Transit Center in Mililani, located on Meheula Parkway near the Town Center of Mililani.
- Waianae Transit Center in Waianae, located on Leihoku Street near the Waianae Mall.
- Waipahu Transit Center in Waipahu, located at Hikimoe Street near the Waipahu Library.

Park-and-Ride Facilities

Park-and-ride lots are designed as an alternative for people wishing to travel the majority of their commute by public transit. To a lesser extent, park-and-ride lots also serve as focal points within TheBus' hub-and-spoke system. They are similar in function to transit centers, in that they facilitate transfers to other travel means. Physical amenities generally include parking stalls, bike racks, and designated bus waiting areas. Typical users include those commuters that drive to the park-and-ride facility, park their vehicle, and use either transit or join a vanpool to complete their journey. Other users include "kiss and ride" riders who are dropped-off/picked-up at the park-and-ride lot. The five existing park-and-ride facilities on Oahu are listed below.

- Haleiwa Park-and-Ride in Haleiwa, located at the Waialua Community Association Facility.
- Hawaii Kai Park-and-Ride in Hawaii Kai, located on Keahole Street near the Hawaii Kai Towne Center.

- Mililani Park-and-Ride in Mililani Mauka, located on Ukuwai Street near the Mililani-Mauka District Park.
- Royal Kunia Park-and-Ride in Waipahu, located on Kupuna Loop near the Kunia Interchange.
- Wahiawa Park-and-Ride in Wahiawa, located in Leilehua Golf Course Road near the Wahiawa Armory.

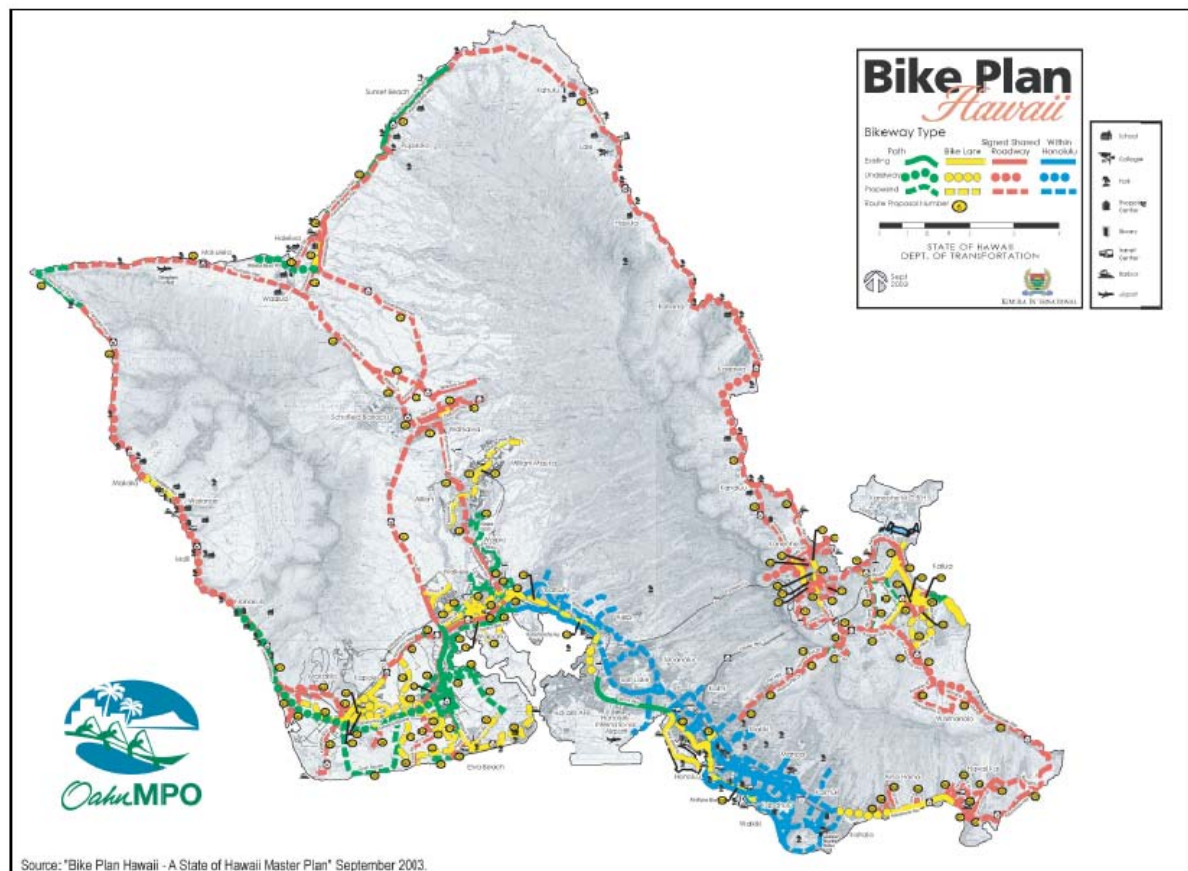
Existing Bikeway System

Bicycling provides residents and visitors alike with an inexpensive and convenient means of getting around Oahu for recreation, commuting, and/or utilitarian purposes. With the continued dependence on the automobile and increasing congestion found on the street system, the development and promotion of this alternative travel means is important to the island. There are three primary facility types that comprise the bikeway infrastructure on the island. The three facility types fall into the following categories as defined by the *Bike Plan Hawaii, A State of Hawaii Master Plan* (2003).

- Shared Roadway. A shared roadway refers to any street or highway that is open to both bicycle and motor vehicle travel. All roadways on Oahu are shared roadways, except for the interstates and roadways where bicycles are specifically prohibited. Shared roadways may have signs designating their status as a preferred bike route.
- Bike Lane. A bike lane refers to a section of the roadway that has been designated by striping, signing, and/or pavement markings for the preferential or exclusive use by bicyclists. It delineates the ROW assigned to bicyclists and motorists in part to provide for more predictable movements by each type of user.
- Shared-Use Path. Shared-use path refers to a pathway that is physically separated from motorized vehicular traffic by an open space or a barrier, and is either within the highway ROW or has an independent ROW. Shared-use paths may also be used by other non-motorized vehicle users.

In addition to referencing the *Bike Plan Hawaii, A State of Hawaii Master Plan* (2003 – currently being updated), the information in this section was also drawn from the *Honolulu Bicycle Master Plan* (April 1999) that was developed by the City and is currently being updated as the *Oahu Bike Plan* with a public review draft released in July of 2009. Figure 3-3 illustrates the locations of existing and planned bikeway facilities on the island.

Figure 3-3: Bikeway System Map – Existing and Planned



As of 2003, Oahu had 98 miles of bikeway facilities, or approximately 47% of the statewide bikeway system. Although the current system is geared toward the recreational user, connections to activity centers are provided for commuter use. The following bikeway facilities are currently available on Oahu.

- 30.1 miles of signed shared roadways
- 33.6 miles of bike lanes
- 34.3 miles of shared-use paths

Existing Pedestrian System

The pedestrian system provides residents and visitors with access to local shopping, business, residential, recreational, and educational opportunities. It also provides access to public transit services, which in turn expands travel opportunities for residents and visitors. More than one-third of Oahu residents do not have access to a car at any given time; these people are dependent on the pedestrian network to give them access to basic services and/or transportation options.

The quality and extent of Honolulu's pedestrian system varies depending on location. In certain areas, such as Waikiki, Chinatown, and Downtown, the City has invested heavily in creating a continuous and accessible pedestrian system while in

other neighborhoods the condition of pedestrian facilities is poor or incomplete. For example, pedestrian linkages are not fully developed in the Kapolei area because of the less dense land uses and the unfinished highway network. In most other areas, pedestrian facilities exist but are sometimes narrow or not continuous.

HDOT is in the process of developing a *Statewide Pedestrian Master Plan*, and will involve public and stakeholder groups in this effort. The plan will document the policies, existing conditions for pedestrians, and education, enforcement, and engineering measures that may prove useful in improving conditions for pedestrians in Hawaii.² It will also provide guidance on the optimal use of resources to incorporate the various measures.

Existing Freight System

Freight mobility is important to Oahu, with ocean and air transportation importing the majority of food, building materials, manufactured goods, and energy products. Freight travel patterns on Oahu are focused around the two commercial harbors on the island, Honolulu Harbor and Kalaeloa Barbers Point Harbor, and Honolulu International Airport, with goods radiating to outlying areas on the connecting highways. The primary routes used for moving freight include Nimitz Highway, Interstate H-1, and Ala Moana Boulevard, but these roadways are also used by transit and the general public. As such, freight movers experience the same delays as individuals in automobiles and on transit. Oahu does not have dedicated freight routes.

3.1.2 Existing Land Use Conditions

The following is a description and evaluation of the existing land use conditions on Oahu, which affect the transportation system. Included is a discussion of land use constraints, including conservation areas and environmentally-protected areas.

State Land Use Districts

The overall framework of land use management was established by Chapter 205, Hawaii Revised Statutes (as amended), originally adopted by the State Legislature in 1961. All lands in the State are classified into one of the following four Land Use Districts.

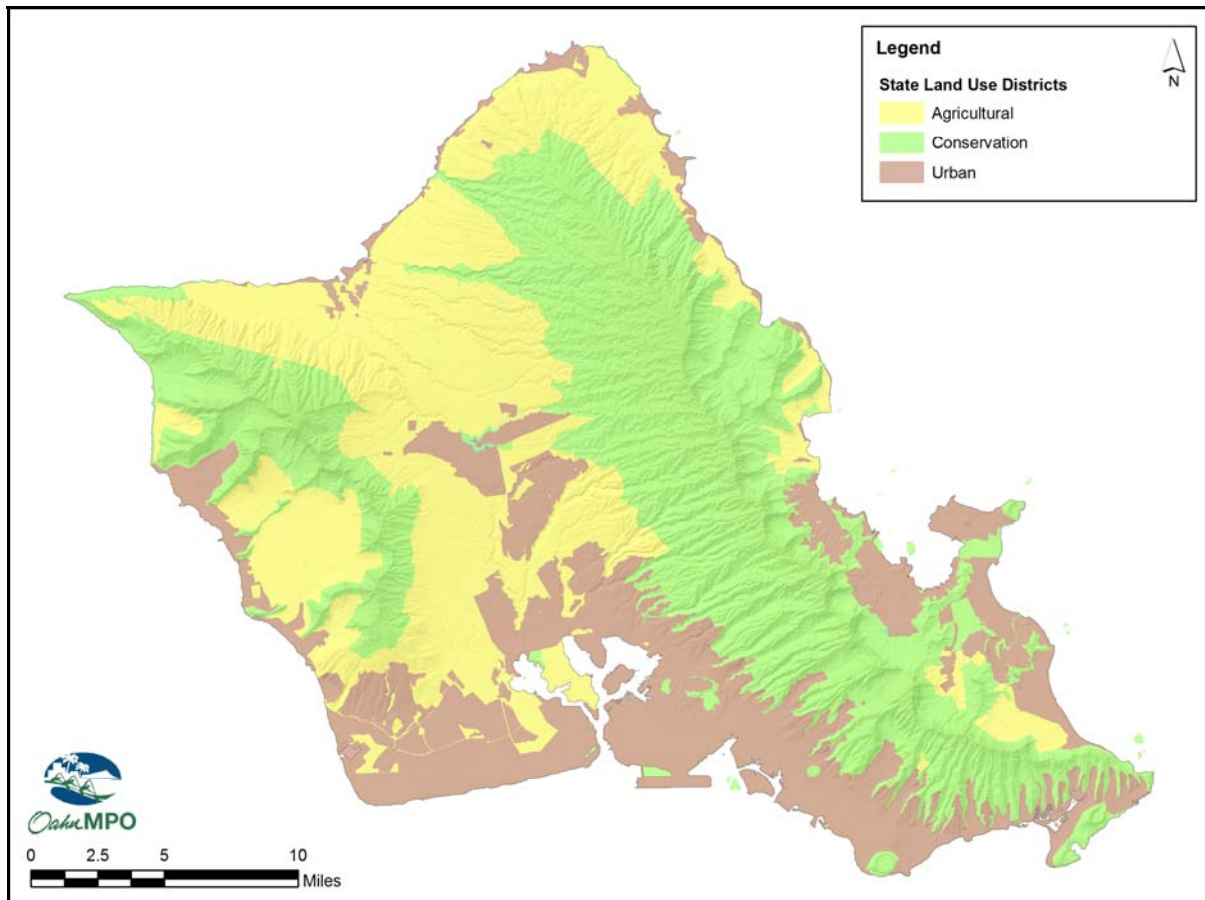
- Urban. This district generally includes lands with concentrations of people, structures, and services that are “city-like,” as well as vacant areas for future development. In general, lot sizes and uses permitted in Urban District areas are established by the City through ordinances or rules. On Oahu, approximately 160 square miles are within the Urban District.
- Rural. There are no lands within this district found on Oahu.

² Department of Transportation’s report to Legislature of the State of Hawaii on Act 232 Session Laws of Hawaii 2008 (2008).

- **Agricultural.** This district is comprised of lands for growing crops, aquaculture, raising livestock, wind energy facilities, timber cultivation, agriculture-support activities (such as employee housing), and land with significant potential for agriculture uses. These lands are divided into agricultural categories, based on productivity, and the intent is to preserve the most valuable agricultural lands for the most productive agricultural use. Golf courses and golf-related activities may also be included in the Agricultural District in some cases, if the land is not in the highest productivity categories. Agricultural District lands total approximately 190 square miles on Oahu.
- **Conservation.** This district includes lands that are in existing forest and water reserve zones, and areas necessary for protecting watersheds and water sources, scenic and historic areas, parks, wilderness, open space, recreational areas, habitats of endemic plants, fish, and wildlife, and all submerged lands beyond the shoreline. The Conservation District also includes lands subject to flooding and soil erosion. Conservation District lands cover approximately 40 percent of the total land area of Oahu.

Oahu has three districts: Agricultural, Conservation, and Urban, the boundaries of which are established by the Commission. Figure 3-4 illustrates the locations of the State Land Use Districts.

Figure 3-4: State Land Use Districts of Oahu



Conservation Designated Lands

Conservation Districts are administered by the State Board of Land and Natural Resources, and uses are governed by rules set by the State Department of Land and Natural Resources (DNLR), with regulatory oversight provided by its Office of Conservation and Coastal Lands (OCCL). About two million acres of land in the State have been designated as conservation and are contained within the Conservation District. Ownership of these lands is held by both public and private entities. It is the mission and goal of OCCL to protect and conserve Conservation District lands and beaches within the State for the benefit of present and future generations, pursuant to Article XI, Section 1, of the Hawaii State Constitution. These lands encompass the State's terrestrial and marine environments, with special emphasis on coastal areas and beaches.

Lands that have been identified in the Conservation District are classified into one of five subzones, the most restrictive of which is the "protective" subzone. There is also a classification of "Undesignated", but these are simply lands that have been transferred into the Conservation District by the State Land Use Commission (LUC) pending a rule amendment to designate the land into one of the five subzones. These subzones identify land uses that may be applied for in the Conservation District, and are discussed below.

- Protective. To protect valuable resources in designated areas such as restricted watersheds, marine, plant, and wildlife sanctuaries; significant historic, archaeological, geological, and volcanological features and sites; and other designated unique areas.
- Limited. To limit uses where natural conditions suggest constraints on human activities. Examples include lands susceptible to floods, soil erosion, tsunamis, flooding, volcanic activity, or landslides; and lands that have a general slope of forty percent or more.
- Resource. To develop, with proper management, areas to ensure sustained use of the natural resource for those areas. These include providing for future parkland and outdoor recreation uses (e.g., hunting, hiking, and camping), as well as the growing and harvesting of commercial timber.
- General. To designate open space where specific conservation uses may not be defined, but where urban use would be premature. This subzone includes lands with topography, soils, climate, or other related environmental factors that may not be normally adaptable or presently needed for urban, rural, or agricultural use; and encompasses lands suitable for farming, nurseries, etc.
- Special. This designation is applied in special cases specifically to allow a unique land use on a specific site.

Table 3-1 below tabulates the land area in each subzone, and Figure 3-5 illustrates the Conservation District lands on the island.

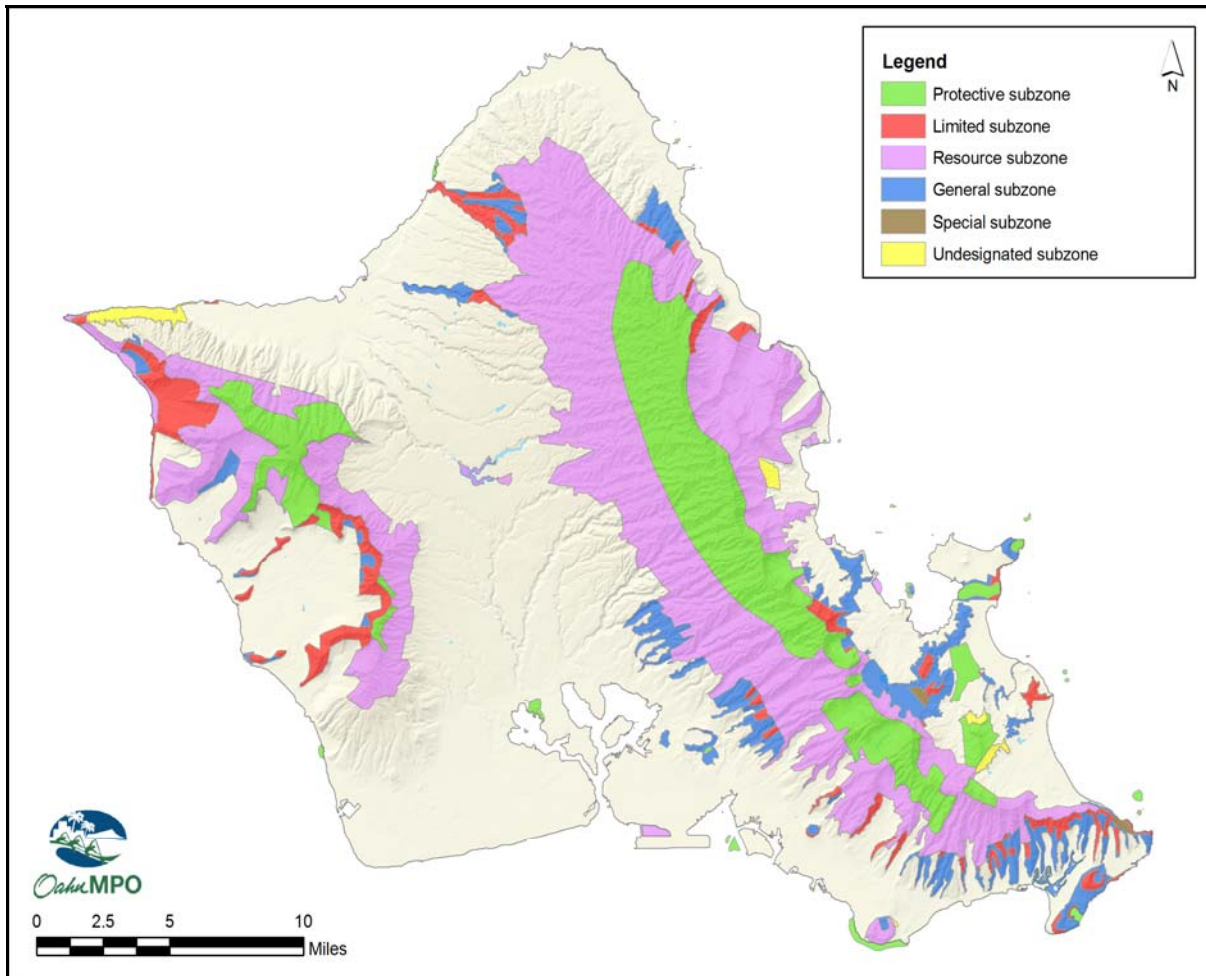
Table 3-1: Land Area in Subzones

Subzone*	Square Meters	Acres	Percent of Oahu's Conservation Lands
Protective	151,435,000	37,400	24%
Limited	53,341,600	13,200	8%
Resource	357,333,500	88,300	56%
General	71,773,200	17,700	11%
Special	1,148,400	300	Less than 1%
Undesignated	7,496,400	1,900	1%
Total	642,528,100	158,800	100%

Data Source: Office of Planning, 2000.

*Does not include the 2,259,100 square meters (approximately 558 acres) of the conservation areas outside of the coastline, such as Hanauma Bay.

Figure 3-5: Conservation District Subzones



Section 13-5-22 of the Hawaii Administrative Rules provides direction regarding proposed uses in the protective subzone. These include data collection, fishponds, agricultural and single family residences, landscaping, public purpose uses, sanctuaries, signs, and replacement of existing structures. Allowable “public purpose uses,” include transportation systems “undertaken by the State of Hawaii or

the counties to fulfill a mandated governmental function.” The implementing agency would therefore be responsible for ensuring that the relevant permits, such as a Conservation District Use Application, are acquired in the relevant planning, environmental, and detailed design stages of project development.

Development Plan Areas

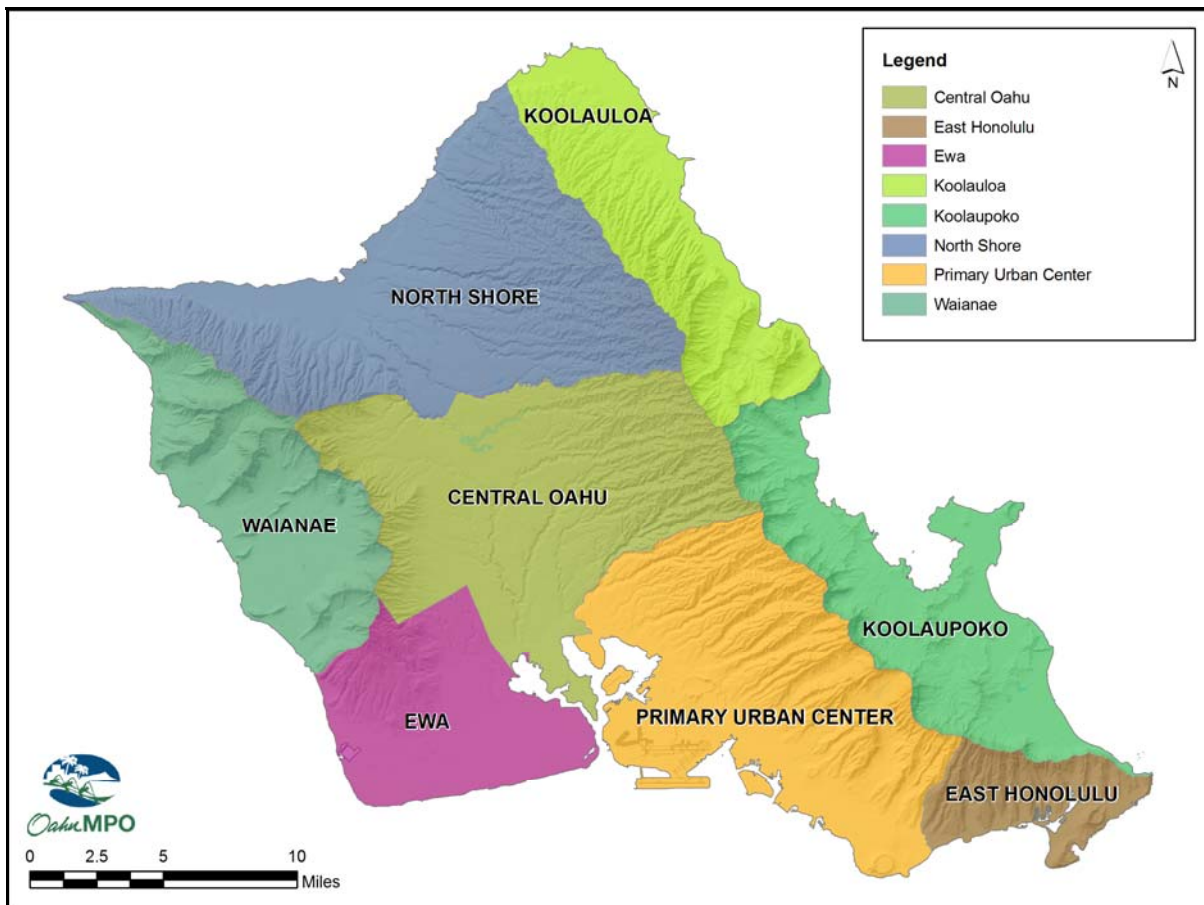
Oahu is divided into eight geographic regions, as delineated by the *City and County of Honolulu General Plan* (as amended, 2002). Each area has a Development or Sustainable Communities Plan that is administered by the Department of Planning and Permitting (DPP) after being adopted by City Council ordinance. The “Sustainable Communities Plans” more accurately describe their policy intent for the area, while the “Development Plans” support the intended future development of those areas. Together with the General Plan, the Development and Sustainable Communities Plans guide population and land use growth over time spans of 20 years or more. The eight plan areas, shown in Figure 3-6, are discussed below.

- Central Oahu. The Sustainable Communities Plan’s vision includes the protection of agricultural and preservation areas, revitalization of Waipahu and Wahiawa, and continued development of master planned communities.
- East Honolulu. The Sustainable Communities Plan supports containment of urban development, protection of agricultural areas, limitations on population and commercial growth, protection and preservation of significant scenic views and natural areas, expansion of public access to mountain and shoreline areas, and changes to the housing supply to accommodate evolving demographics.
- Ewa. The Development Plan’s vision includes protecting prime agricultural lands and natural, historical, and cultural resources; supporting a secondary urban center at Kapolei; establishing a regional open space network; promoting master-planned communities; and providing adequate infrastructure to meet current and future needs.
- Koolaupoko. The Sustainable Communities Plan seeks to preserve the natural, scenic, cultural, historical and agricultural resources of the area; to protect the residential environment of its neighborhoods; and adaptation of the traditional Hawaiian land division system, known as an *ahupuaa*, that considers sections of the island from the mountains to the sea as a basis for land use and natural resources management.
- Koolauloa. The Sustainable Communities Plan’s vision is to preserve the area’s rustic qualities and “old Hawaii” character. Measures for accomplishing this include geographic boundaries and policies that define how community needs should be balanced with the protection and enhancement of the area’s natural, scenic, and cultural qualities.
- North Shore. The Sustainable Communities Plan aims for retention of the region’s scenic open spaces, coastal resources, and elements of the community’s cultural and plantation history, and includes policies that support

diversified agriculture and commercial activity in the towns of Haleiwa and Waialua, while retaining their historic character.

- Primary Urban Center. The Development Plan seeks to enhance lifestyle choices for residents, provide business and economic development opportunities for present and future enterprises, and enhance the attractiveness of Honolulu and its neighborhoods for residents and visitors of the most populated area on the island.
- Waianae. The Sustainable Communities Plan's vision seeks to preserve the region's country character by preserving agricultural land and open space, supporting small town values, and maintaining a land use pattern that reflects the use of the traditional Hawaiian *ahupuaa* as a tool for physical and resource planning.

Figure 3-6: Plan Areas



Hawaiian Home Lands

The Hawaiian Homes Commission Act (HHCA), enacted by the U.S. Congress in 1921, mandated that the Federal government set aside approximately 200,000 acres as a land trust for homesteading by native Hawaiians. The HHCA, with amendments, remains in effect today. To carry out the HHCA, the State Department of Hawaiian Home Lands (DHHL) provides benefits to native Hawaiians in the form

of 99-year homestead leases for one dollar per year. In 1990, the Legislature authorized DHHL to extend leases for an aggregate term not to exceed 199 years. Homestead leases are for residential, agricultural, or pastoral purposes. Aquacultural leases are also authorized, but none have been awarded.

Government-owned Lands

Government-owned lands include those owned by the City, State, and Federal government, plus those owned by DHHL. Of the government-owned lands, the State holds about 49 percent, the Federal government 39 percent, and the City 12 percent. The State-owned lands are predominantly parks and reserves, and many of the City's lands also are parks. Just over half of the Federally-owned land is used by the military.

3.1.3 Socioeconomic Conditions

Socioeconomic and demographic characteristics influence the travel patterns found on the island of Oahu. The demand for travel is directly related to the density and geographic distribution of population and land use.

Population

Table 3-2 lists population statistics by transportation analysis area (TAA) in 2007, when the total island population was estimated to be approximately 905,500 persons. Figure 3-7 displays population density by TAA.

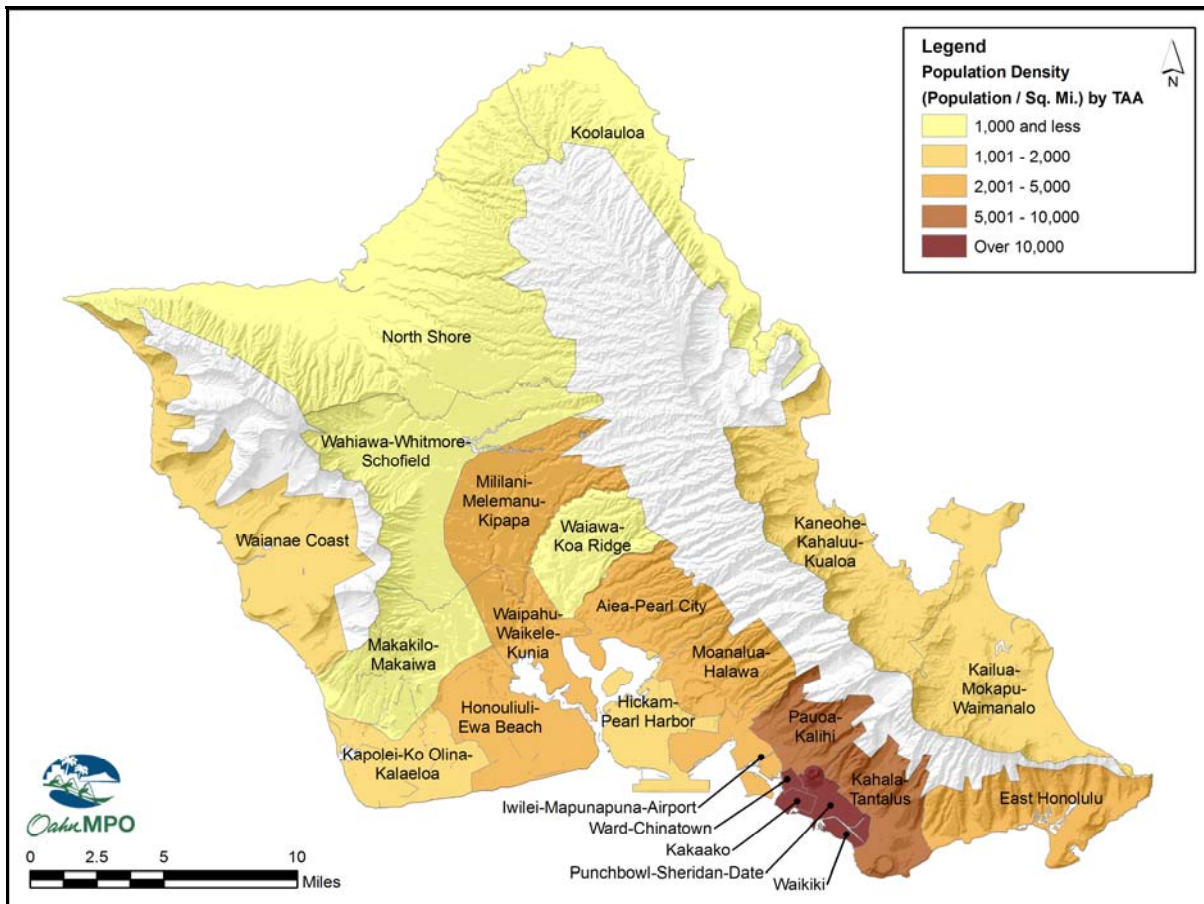
Table 3-2: Existing Population by TAA for Oahu

TAA	Year 2007 Population	Percent of Total
1. Ward-Chinatown	10,600	1.2%
2. Kakaako	10,400	1.1%
3. Punchbowl-Sheridan-Date	72,800	8.0%
4. Waikiki	19,500	2.2%
5. Kahala-Tantalus	73,300	8.1%
6. Pauoa-Kalihi	77,200	8.5%
7. Iwilei-Mapunapuna-Airport	16,300	1.8%
8. Hickam-Pearl Harbor	18,500	2.0%
9. Moanalua-Halawa	54,000	6.0%
10. Aiea-Pearl City	67,300	7.4%
11. Honouliuli-Ewa Beach	53,600	5.9%
12. Kapolei-Ko Olina-Kalaheo	18,300	2.0%
13. Makakilo-Makaiwa	15,600	1.7%
14. Waipahu-Waialeale-Kunia	56,100	6.2%
15. Waiawa-Koa Ridge	11,900	1.3%
16. Mililani-Melemanu-Kipapa	53,400	5.9%
17. Wahiawa-Whitmore-Schofield	35,700	3.9%
18. East Honolulu	48,800	5.4%

TAA	Year 2007 Population	Percent of Total
19. Kaneohe-Kahaluu-Kualoa	53,600	5.9%
20. Kailua-Mokapu-Waimanalo	62,500	6.9%
21. Koolauloa	14,400	1.6%
22. North Shore	18,000	2.0%
23. Waianae Coast	43,700	4.8%
Total	905,500	100%

Data source: DPP, 2009.

Figure 3-7: Population Density by TAA



Employment

Total employment on Oahu in 2007 was estimated at about 556,800 jobs. Table 3-3 shows employment statistics by TAA, and Table 3-4 identifies employment statistics by category for 2007.

Table 3-3: Existing Employment by TAA for Oahu

TAA	Year 2007 Employment	Percent of Total
1. Ward-Chinatown	57,300	10.3%
2. Kakaako	33,300	6.0%
3. Punchbowl-Sheridan-Date	52,600	9.4%
4. Waikiki	46,100	8.3%
5. Kahala-Tantalus	38,500	6.9%
6. Pauoa-Kalihi	22,500	4.0%
7. Iwilei-Mapunapuna-Airport	76,900	13.8%
8. Hickam-Pearl Harbor	26,800	4.8%
9. Moanalua-Halawa	16,500	3.0%
10. Aiea-Pearl City	24,300	4.4%
11. Honouliuli-Ewa Beach	14,000	2.5%
12. Kapolei-Ko Olina-Kalaehoa	22,500	4.0%
13. Makakilo-Makaiwa	2,100	0.4%
14. Waipahu-Waialae-Kunia	17,500	3.1%
15. Waiawa-Koa Ridge	6,200	1.1%
16. Mililani-Melemanu-Kipapa	19,300	3.5%
17. Wahiawa-Whitmore-Schofield	19,500	3.5%
18. East Honolulu	7,000	1.3%
19. Kaneohe-Kahaluu-Kualoa	12,600	2.3%
20. Kailua-Mokapu-Waimanalo	25,000	4.5%
21. Koolauloa	5,800	1.0%
22. North Shore	4,000	0.7%
23. Waianae Coast	6,500	1.2%
Total	556,800	100.0%

Data source: DPP, 2009.

Table 3-4: Existing Employment by Category for Oahu

Employment Category	Year 2007	Percent of Total
Military	44,200	7.9%
Government	37,400	6.7%
Hotel	16,500	3.0%
Agriculture	2,500	0.5%
Transportation/Communications/Utilities	42,500	7.6%
Industrial	30,400	5.5%
Finance/Insurance/Real Estate	28,900	5.2%
Service	224,000	40.2%
Retail	99,500	17.9%
Construction	30,900	5.5%
Total Employment	556,800	100%

Data source: DPP, 2009.

Visitor Industry

The island of Oahu is a popular visitor destination. There were an estimated 33,800 visitor units on Oahu in 2007, with over 85 percent of these located in Waikiki. Visitor units include hotel rooms and housing units held for use by visitors. The visitor industry generates a quarter of Hawaii's tax revenue and approximately twenty percent of all economic activity. Tourism also generates additional demands on the transportation system through use of transit services, rental cars, and other commercial transportation systems available on the island.

Military

U.S. military presence in Hawaii contributes towards ensuring that peace and stability are maintained throughout the Asia Pacific region. With expenditures totaling \$8.2 billion in 2007, defense expenditures remain the second major source of revenue to Hawaii's economy, next to tourism.

3.2 2035 Future Conditions

The forecasted socioeconomic data for 2035 were determined to be consistent with both the *General Plan* and the various Development and Sustainable Communities Plans for Oahu. Therefore, based on review of the socioeconomic data sets and land use plans, it is reasonable and appropriate to use the 2007/2035 socioeconomic data for future travel demand analyses prescribed as part of the long-range transportation planning for Oahu.

3.2.1 Households and Population

The 2007 population figures determined that the total island population was approximately 905,500 persons, which is projected to grow to 1,113,600 by 2035. The total number of households in 2007 was 311,000 and is expected to grow to 405,900 by 2035; a difference of 30.5 percent.

Population is expected to increase in all but four TAAs. However, these four TAAs, which show a slight decrease in population, all have an increase in number of households, which means that the household size may be decreasing because of demographic changes over time. Overall, the average household size on Oahu is predicted to decrease.

Population and households are directly tied to the number of trips made from each area and as these two variables increase, so do the number of trips. However, a slight decrease in household size for a certain area means fewer trips per household for that area. Also, as household size shrinks and the population grows older and drives less, there will be a higher demand for transit services in these areas. Table 3-5 shows the population by TAA for Oahu for 2007 and 2035, and Table 3-6 shows the households by TAA for 2007 and 2035.

Table 3-5: Population by TAA for Oahu (2007 and 2035)

TAA	Population		Population Change (Year 2007 to Year 2035)	
	Year 2007	Year 2035	Difference	Percent Difference
1. Ward-Chinatown	10,600	19,400	8,800	83%
2. Kakaako	10,400	37,300	26,900	260%
3. Punchbowl-Sheridan-Date	72,800	84,700	11,800	16%
4. Waikiki	19,500	21,800	2,300	12%
5. Kahala-Tantalus	73,300	76,100	2,800	4%
6. Pauoa-Kalihi	77,200	84,200	7,000	9%
7. Iwilei-Mapunapuna-Airport	16,300	19,800	3,500	21%
8. Hickam-Pearl Harbor	18,500	18,600	100	1%
9. Moanalua-Halawa	54,000	54,400	400	1%
10. Aiea-Pearl City	67,300	68,000	700	1%
11. Honouliuli-Ewa Beach	53,600	102,200	48,600	91%
12. Kapolei-Ko Olina-Kalaeloa	18,300	51,300	33,000	180%
13. Makakilo-Makaiwa	15,600	29,900	14,300	91%
14. Waipahu-Waikele-Kunia	56,100	60,900	4,800	9%
15. Waiawa-Koa Ridge	11,900	46,700	34,800	291%
16. Mililani-Melemanu-Kipapa	53,400	52,600	-800	-1%
17. Wahiawa-Whitmore-Schofield	35,700	34,500	-1,100	-3%
18. East Honolulu	48,800	49,300	600	1%
19. Kaneohe-Kahaluu-Kualoa	53,600	52,300	-1,200	-2%
20. Kailua-Mokapu-Waimanalo	62,500	61,800	-700	-1%
21. Koolauloa	14,400	16,200	1,800	12%
22. North Shore	18,000	20,400	2,400	13%
23. Waianae Coast	43,700	51,100	7,400	17%
Total	905,500	1,113,500	208,200	23%

Note: TAA numbers may not precisely correspond to DPP 2009 values due to rounding.
Data source: DPP, 2009.

Table 3-6: Households by TAA for Oahu (2007 and 2035)

TAA	Households		Households Change (Year 2007 to Year 2035)	
	Year 2007	Year 2035	Difference	Percent Difference
1. Ward-Chinatown	5,500	10,600	5,100	93%
2. Kakaako	5,700	21,900	16,200	284%
3. Punchbowl-Sheridan-Date	38,300	46,100	7,800	20%
4. Waikiki	11,500	13,100	1,600	14%
5. Kahala-Tantalus	26,800	28,700	1,900	7%
6. Pauoa-Kalihi	23,500	26,900	3,400	14%
7. Iwilei-Mapunapuna-Airport	4,800	5,900	1,100	23%
8. Hickam-Pearl Harbor	5,500	5,700	200	4%
9. Moanalua-Halawa	17,600	18,300	700	4%

TAA	Households		Households Change (Year 2007 to Year 2035)	
	Year 2007	Year 2035	Difference	Percent Difference
10. Aiea-Pearl City	22,100	23,300	1,200	5%
11. Honouliuli-Ewa Beach	15,600	31,600	16,000	103%
12. Kapolei-Ko Olina-Kalaeloa	5,400	16,100	10,700	198%
13. Makakilo-Makaiwa	4,800	9,400	4,600	96%
14. Waipahu-Waikele-Kunia	15,200	17,900	2,700	18%
15. Waiawa-Koa Ridge	4,000	15,900	11,900	298%
16. Mililani-Melemanu-Kipapa	18,200	19,300	1,100	6%
17. Wahiawa-Whitmore-Schofield	10,500	10,800	300	3%
18. East Honolulu	17,500	18,900	1,400	8%
19. Kaneohe-Kahaluu-Kualoa	17,300	18,100	800	5%
20. Kailua-Mokapu-Waimanalo	18,700	19,700	1,000	5%
21. Koolauloa	3,700	4,400	700	19%
22. North Shore	6,200	7,600	1,400	23%
23. Waianae Coast	12,400	15,600	3,200	26%
Total	310,800	405,800	95,000	31%

Note: TAA numbers may not precisely correspond to DPP 2009 values due to rounding.

Data source: DPP, 2009.

The Kakaako TAA's population and households are expected to triple by the year 2035, consistent with the *Primary Urban Center Development Plan*, which shows that this area already has the infrastructure and regulations in place to build higher-density, residential and mixed-use development. The Kapolei-Ko Olina-Kalaeloa and Waiawa-Koa Ridge TAAs are expected to more than double in population and households between 2007 and 2035, consistent with the policy set forth in the *General Plan* to encourage development within the secondary urban center of Kapolei and the Ewa and Central Oahu urban-fringe areas.

3.2.2 Employment

In 2007, 71 percent of the island's jobs were located in the PUC, comprised of TAAs 1 through 10. In 2035, almost all TAAs are expected to experience an increase in jobs, though the PUC is still expected to have the majority of all jobs on the island, at 64 percent. From 2007 to 2035, the number of jobs in the PUC is anticipated to rise by 52,100, which could result in increased work-related trips on Oahu's most congested roadways to and within the PUC. The number of jobs in Honouliuli-Ewa Beach, Kapolei-Ko Olina-Kalaeloa, Makakilo-Makaiwa, and Waiawa-Koa Ridge are forecast to more than double to 71,100, but these areas would only consist of 17 percent of all jobs in 2035. This growth in jobs in these areas may take a large number of work trips away from the PUC (and Oahu's most congested roadways) and/or may re-orient travel patterns somewhat between the PUC and these outlying areas. Increases in the number of jobs in these areas will place higher demand on Interstate H-1, the southern portion of Interstate H-2 and other major roadways such as Farrington Highway and Kamehameha Highway. Table 3-7 lists the employment

by TAA for 2007 and 2035, and Table 3-8 lists the employment by category for Oahu for 2007 and 2035.

Table 3-7: Employment by TAA for Oahu (2007 and 2035)

TAA	Employment		Employment Change (Year 2007 to Year 2035)	
	Year 2007	Year 2035	Difference	Percent Difference
1. Ward-Chinatown	57,300	64,200	6,900	12%
2. Kakaako	33,300	43,100	9,800	29%
3. Punchbowl-Sheridan-Date	52,600	61,600	9,000	17%
4. Waikiki	46,100	48,100	2,000	4%
5. Kahala-Tantalus	38,500	43,500	5,000	13%
6. Pauoa-Kalihi	22,500	29,200	6,700	30%
7. Iwilei-Mapunapuna-Airport	76,900	81,700	4,800	6%
8. Hickam-Pearl Harbor	26,800	27,700	900	3%
9. Moanalua-Halawa	16,500	17,700	1,200	7%
10. Aiea-Pearl City	24,300	30,100	5,800	24%
11. Honouliuli-Ewa Beach	14,000	40,300	26,200	187%
12. Kapolei-Ko Olina-Kalaeloa	22,500	55,200	32,600	145%
13. Makakilo-Makaiwa	2,100	5,700	3,600	171%
14. Waipahu-Waikele-Kunia	17,500	23,000	5,500	31%
15. Waiawa-Koa Ridge	6,200	14,900	8,700	141%
16. Mililani-Melemanu-Kipapa	19,300	22,700	3,400	18%
17. Wahiawa-Whitmore-Schofield	19,500	21,800	2,300	12%
18. East Honolulu	7,000	6,600	-400	-6%
19. Kaneohe-Kahaluu-Kualoa	12,600	12,700	100	1%
20. Kailua-Mokapu-Waimanalo	25,000	25,800	800	3%
21. Koolauloa	5,800	7,100	1,300	22%
22. North Shore	4,000	3,900	-100	-2%
23. Waianae Coast	6,500	6,800	300	4%
Total	556,800	693,400	136,400	24%

Note: TAA numbers may not precisely correspond to DPP 2009 values due to rounding.
Data source: DPP, 2009.

Table 3-8: Employment by Category for Oahu (2007 and 2035)

Employment Category	Year 2007	Year 2035	Difference	Percent Difference
Military	44,300	46,700	2,400	5%
Government	37,400	42,500	5,100	14%
Hotel	16,500	18,800	2,300	14%
Agriculture	2,500	2,800	200	9%
Transportation/Communications/Utilities	42,500	49,800	7,300	17%
Industrial	30,400	34,600	4,200	14%

Employment Category	Year 2007	Year 2035	Difference	Percent Difference
Finance/Insurance/Real Estate	28,900	35,900	6,900	24%
Service	224,100	306,100	82,100	37%
Retail	99,500	120,500	21,000	21%
Construction	30,900	35,700	4,900	16%
Total Employment	557,000	693,400	136,400	24%

Note: TAA numbers may not precisely correspond to DPP 2009 values due to rounding.
Data source: DPP, 2009.

3.2.3 Visitor Industry

The total visitor units are anticipated to increase to 39,600 by 2035, with Waikiki comprising only 70 percent of the share at that time. The City's policy, as stated in the *General Plan*, is not to intensify development in Waikiki and instead direct growth to resort areas such as Ko Olina and Turtle Bay. Table 3-9 presents visitor unit estimates and forecasts.

Table 3-9: Visitor Units for Oahu by TAA (2007, 2035)

TAA	Year 2007	Year 2035	Difference	Percent Difference
1.Ward-Chinatown	100	100	0	0%
2.Kakaako	0	300	300	0%
3.Punchbowl-Sheridan-Date	1,400	1,400	0	0%
4.Waikiki	28,800	27,800	-1,000	-3%
5.Kahala-Tantalus	300	200	-100	-33%
6.Pauoa-Kalihi	0	0	0	0%
7.Iwilei-Mapunapuna-Airport	700	1,000	300	43%
8.Hickam-Pearl Harbor	0	0	0	0%
9.Moanalua-Halawa	0	0	0	0%
10.Aiea-Pearl City	100	100	0	0%
11. Honouliuli-Ewa Beach	0	1,000	1,000	0%
12.Kapolei-Ko Olina-Kalaeloa	800	5,500	4,700	588%
13.Makakilo-Makaiwa	0	0	0	0%
14.Waipahu-Waikele-Kunia	0	0	0	0%
15.Waiawa-Koa Ridge	0	0	0	0%
16.Mililani-Melemanu-Kipapa	0	0	0	0%
17.Wahiawa-Whitmore-Schofield	200	200	0	0%
18.East Honolulu	400	400	0	0%
19.Kaneohe-Kahaluu-Kualoa	0	0	0	0%
20.Kailua-Mokapu-Waimanalo	100	0	-100	-100%
21.Koolauloa	600	1,400	800	133%
22 North Shore	0	0	0	0%
23.Waianae Coast	200	200	0	0%
Total	33,700	39,600	5,900	18%

Note: TAA numbers may not precisely correspond to DPP 2009 values due to rounding.
Data source: DPP, 2009.

3.3 2035 Baseline Transportation System

The analysis of Baseline improvement projects provides a foundation against which to evaluate potential improvements for the ORTP 2035 scenarios.

3.3.1 Baseline Criteria

To be considered as a Baseline improvement for the ORTP 2035, a project had to meet the following conditions:

- Project is performance enhancing at a regional scale; AND
- Project is currently being constructed; OR
- Project is programmed for construction within the first two years of the FFYs 2008-2011 Transportation Improvement Program (TIP), as revised.

3.3.2 Baseline Network for ORTP 2035

The Baseline projects for the ORTP 2035 are shown in Table 3-10. Review of the two previous TIPs was included to capture those Baseline projects that are currently under construction or were recently constructed (after 2007), and/or those Baseline projects which no longer appear in the current TIP because their funds were previously obligated. Projects constructed during or prior to 2007 would be considered part of the existing system and are not included on the Baseline project list.

In addition to the capital projects listed in the table, ongoing operations, maintenance, and preservation work (of regional significance) is also generally considered to be part of the 2035 Baseline scenario. For example, the bus network supporting the HHCTCP is considered to be part of the 2035 Baseline scenario.

Table 3-10: 2035 Baseline Projects for ORTP 2035

Project No.	ORTP 2030 Project No.	City or State	Facility/ Project Title	Project Description	Estimated Cost per Current TIP (Millions\$)
Projects from FFYs 2008-2011 TIP (Revision #13, July 2009)					
Highway Projects					
1	4	State	Freeway Management System, Interstate H-1, H-2, and Moanalua Freeway, Phase 1B	Manage and guide the Intelligent Transportation System (ITS) program. The project includes software development, equipment procurement assistance, acceptance testing, performance monitoring, and strategic planning. The project consists of installation of closed-circuit television (CCTV) cameras, vehicle detectors, cabinets, and communication equipment. Minor interior modifications of the H-3 Control Center will be done to accommodate system improvements. Phase 1 involves the development of the CCTV system.	\$55.0
2	20	State	Interstate Route H-1, PM Zipper Lane, Westbound	Develop a PM zipper lane alternative from Radford Drive to the Waialeale Interchange.	\$165.0
3	N/A	State	Kalanianaʻole Highway (Route 72) Improvements, Vicinity of Hawaii Kai Drive to Keahole Street (Add Lane)	Add an additional town-bound lane from Hawaii Kai Drive to Keahole Street. Includes utility relocation, asphalt concrete pavement, sidewalk, highway lighting, landscaping, irrigation, guardrail, signing and pavement markings.	\$4.7
4	4	City	Computerized Traffic Control System	This is an American Recovery and Reinvestment Act of 2009 (ARRA) backup project. Should ARRA funds become available, the funds will be used for the project in the Kapolei, Makakilo, and/or Kailua areas. Upgrade and expand fiber optic lines, CCTV cameras, data collection, and signal control in urban and rural areas for connectivity to the Traffic Control Center. Project locations vary.	\$17.9***

Project No.	ORTP 2030 Project No.	City or State	Facility/ Project Title	Project Description	Estimated Cost per Current TIP (Millions\$)
5	N/A	City	Kalaeloa Boulevard (Route 95), Widening and Reconstruction, Phase 1, Oahu Railway and Land Company (OR&L) Right-of-Way to Lauwiliwili Street	This is an ARRA funded project. Improve and widen Kalaeloa Boulevard, between the old OR&L right-of-way and Lauwiliwili Street, to a six-lane divided roadway, meeting the City and County of Honolulu standards for dedication. Kalaeloa Boulevard is a major regional arterial roadway that serves as an access between the H-1 Freeway and the major industrial areas on Oahu. Stimulus funding will allow the project to move forward in a timely manner to better address the regional traffic and safety issues of the area.	\$7.0
Transit Projects					
6	31	City	Honolulu High Capacity Transit Corridor Project [Airport Alternative will be included]	This is an ARRA-funded project. Plan, design, construct, inspect, relocate, and acquire land and equipment for a fixed guideway system between East Kapolei and Ala Moana Center.	\$4420.9***
7	30	City	Intra-Island Ferry****	Continue ferry demonstration project operations and plan, design, and construct facilities for a ferry operation which will serve as an extension of the bus service and provide West Oahu residents with another transportation option to downtown Honolulu. The project will include, but not be limited to, parking lots, passenger terminals, and improved docking facilities.	\$7.5
Bicycle Projects					
8	2	State	Kalaniana'ole Highway (Route 72), Bicycle Improvements, Waimanalo Beach Park to Makapuu	Improve bike route on Kalaniana'ole Highway, from Huli Street to Makapuu Beach Park.	\$2.8

Project No.	ORTP 2030 Project No.	City or State	Facility/ Project Title	Project Description	Estimated Cost per Current TIP (Millions\$)
Projects from FFYs 2006-2008 TIP not included above (i.e., recently built/currently under construction)					
Highway Projects					
9	14	State	Interstate Route H-1, Addition and Modification of Freeway Access, Makakilo IC to Palailai IC (Kapolei IC Complex) [soon to be or currently under construction]	Improve/modify freeway access to Interstate Route H-1 between Makakilo IC and Palailai IC (Kapolei Interchange Complex). (Phase 1)	N/A
10	N/A	State	Interstate Route H-1, Kinau Off-Ramp Improvements, Near The Queen's Medical Center [soon to be or currently under construction]	The project will construct a right-turn lane from the Kinau Off-Ramp to provide a direct access to Lusitana Street. The design includes the addition of an 11foot-wide, 200 foot-long deceleration lane.	N/A
11	N/A	State	North/South Road, Vicinity of Kapolei Parkway to Interstate Route H-1 [under construction]	Construct North/South Road from Kapolei Parkway to vicinity of the H-1 Freeway. Improvements include a multi-lane highway and an interchange at the H-1 Freeway. (Phases 1B and 1C)	N/A
12	N/A	City	Kamokila Boulevard Extension [construction is complete]	Construct an approximately 200-foot extension of Kamokila Boulevard from the old OR&L right-of-way to Franklin D. Roosevelt Avenue.	N/A
13	26	City	Kapolei Parkway [construction is substantially complete]	Design and construct Kapolei Parkway in two phases between Renton Road and the City/State property line at the western boundary of Ewa Villages (0.7 mile).	N/A

Project No.	ORTP 2030 Project No.	City or State	Facility/ Project Title	Project Description	Estimated Cost per Current TIP (Millions\$)
Projects from FFY s 2004-2006 TIP not included above (i.e., recently built/currently under construction)					
Highway Projects					
14	N/A	State	Fort Weaver Road Widening, Vicinity of Aawa Street to Geiger Road [under construction]	Widen the roadway to six lanes. Improvements include turning lanes, traffic signal modifications, and additional highway lighting.	N/A
Bicycle Projects					
15	2	State	Kamehameha Highway Bikeway, Radford Drive to Arizona Memorial [construction is complete]	Construct a bikeway, including drainage improvements, markings, signing, and Americans with Disabilities Act improvements.	N/A

**ORTP 2030 Project No. is provided for information only. TIP project(s) listed above may comprise only selected portion(s) or phase(s) of a multi-phase ORTP 2030 project or program.

***Amount is for FFYs 2008-2013 only.

****Operation of the intra-island ferry was terminated on June 30, 2009, and cannot be "guaranteed" to be in place in 2035.

N/A = Not Applicable (i.e., project not listed in current TIP).

3.3.3 Modifications to 2035 Baseline System

The 2035 Baseline network presented above consists of the 2007 existing-conditions network plus the 15 additional projects in Table 3-10. Additional roadway network links were added to the Baseline network in the Kapolei area to capture the travel impacts associated with future large planned developments, including Hoopili, UH West Oahu, and DHHL East Kapolei. These added links, which are not in themselves considered to be "regional" improvements, are necessary to allow the trips generated by these developments to connect to other proposed transportation projects which are regional in nature, including the HHCTCP. The developments referenced above all occur in one traffic analysis zone (TAZ), and the anticipated impacts of these developments can only be captured by providing additional street network connections to facilitate travel across TAZs so that the developments' impacts on the transportation system can be reasonably accounted for. The small additions made to the street network were necessary to distribute anticipated roadway and transit volumes in this high-growth area more accurately.

3.4 Existing and 2035 Baseline Transportation System Performance

This section discusses the existing (Year 2007) and future 2035 Baseline travel patterns and conditions on Oahu, and establishes a Baseline performance from

which to measure growth and/or changes for future year alternative network analyses.

3.4.1 Travel Patterns

Screenline Person Trips

Figure 3-8 illustrates the locations of the screenlines that were used to analyze person trips for 2007 and Baseline 2035 conditions. Person trips are provided by screenline and broken out by the following modes of travel:

- Single-occupancy vehicles (SOV),
- High-occupancy vehicles with two or more persons (HOV 2+), and
- Transit.

The screenline estimates will be used to compare the growth at these locations for the future year forecasts.

Figure 3-8: Screenline Locations

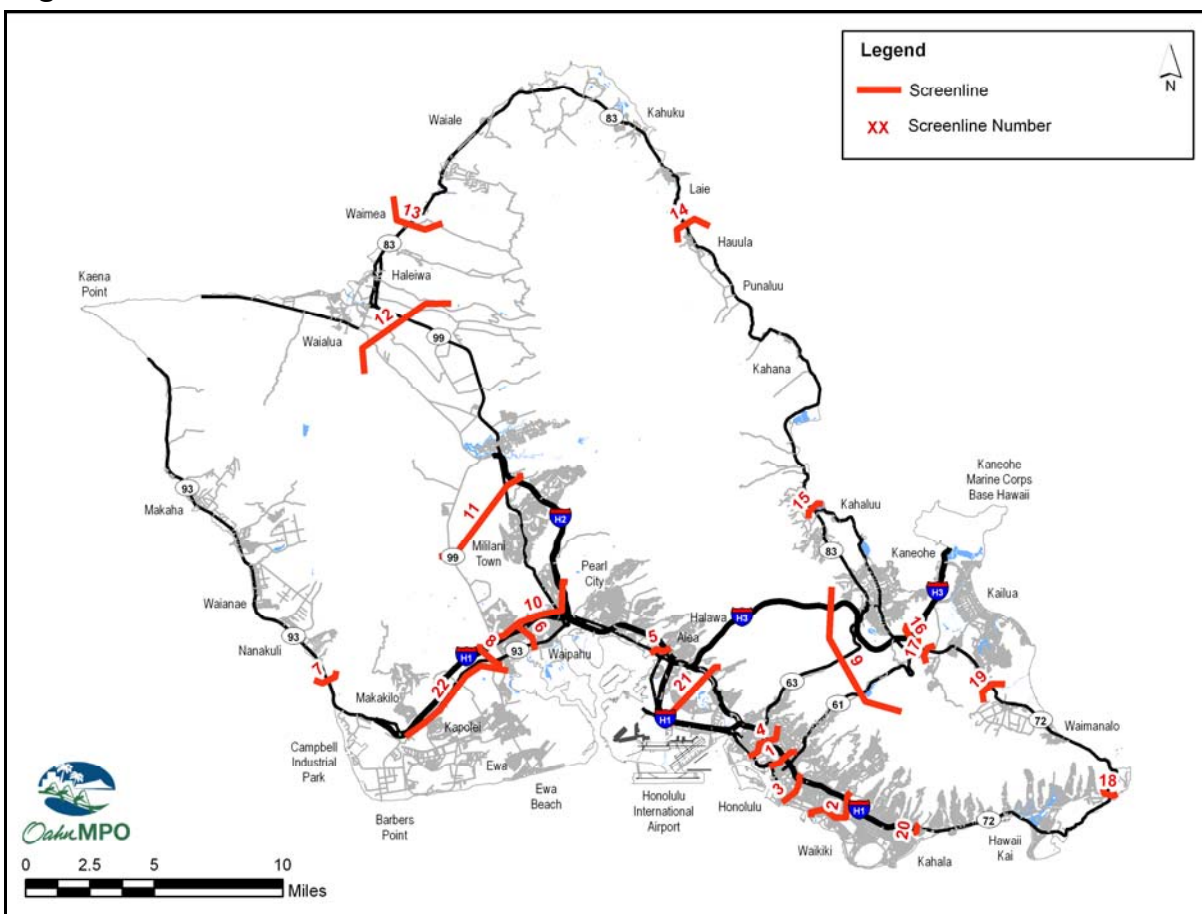


Table 3-11 shows daily person trips estimated by the travel demand forecasting model for the year 2007.

Table 3-11: Daily Screenline Person Trips (Year 2007)

Screenline	SOV	HOV 2+	Transit	Total
1. Nuuanu Stream Bridge	221,600	171,700	45,700	439,000
2. Manoa Palolo/Ala Wai Canal	244,600	167,700	44,000	456,300
3. East of Ward Ave	234,100	169,600	46,600	450,300
4. Kapalama Drainage Canal	220,000	175,700	47,400	443,100
5. Kalauao	305,000	243,500	36,900	585,400
6. Waikele	126,500	108,300	18,900	253,700
7. Kahe Point	28,000	35,300	8,900	72,200
8. Ewa	111,600	57,600	14,700	183,900
9. Trans Koolau	81,800	72,000	12,100	165,900
10. Waipahu	115,200	122,200	11,500	248,900
11. Wahiawa/Mililani	61,600	60,200	6,600	128,400
12. Haleiwa	14,900	16,100	1,800	32,800
13. Waimea	7,700	7,800	800	16,300
14. Hauula	9,300	8,400	1,700	19,400
15. Kahaluu	12,800	11,600	2,000	26,400
16. Kailua/Kaneohe	41,100	37,900	6,300	85,300
17. Maunawili	28,500	26,700	5,700	60,900
18. Sandy Beach Park	3,400	2,700	1,000	7,100
19. Waimanalo	10,200	10,600	1,200	22,000
20. Kahala	58,700	53,300	7,600	119,600
21. Salt Lake	202,000	173,800	35,900	411,700
22. Kalaeloa/Kapolei	95,100	102,000	21,100	218,200

The number of total person trips islandwide is expected to grow by 26 percent on Oahu between 2007 and 2035. As with existing conditions, Screenline 5 (Kalauao), near Aiea, which captures person trips traveling between Downtown Honolulu and Pearl City, Waipahu, Central Oahu, and the rapidly growing areas of Ewa and Kapolei is estimated to have the maximum number of daily person trips in 2035, while Screenline 18 (Sandy Beach Park), near Hawaii Kai, has the minimum number of daily person trips out of the 22 screenlines.

In comparison to existing conditions, screenlines in the Ewa-Kapolei area are expected to have the highest rate of travel increase. This is likely due to the dramatic increase in population and employment in this area coupled with new roadway facilities or improvements programmed for it. Accordingly, Screenline 22 (Kalaeloa/Kapolei) is projected to increase the most, with Screenline 8 (Ewa) also expected to grow considerably. Their rates of growth are substantially higher than the islandwide average of 26 percent.

Conversely, travel in the H-1 corridor between Pearl City and Kalihi is projected to experience growth rates considerably lower than the islandwide average. This is likely due to the disproportionate growth in population and employment in the Ewa-Kapolei area that results in a higher concentration of trips staying within the area, as opposed to traveling to Downtown. This is reflected in the results for Screenline 5 (Kalauao) which, even though it is still the highest traveled screenline in the system, only grows by 5 percent between 2007 and 2035. Other screenlines in this corridor

also have relatively low growth rates, which reflect the relatively low population growth expected in these areas between 2007 and 2035. Table 3-12 illustrates the 2035 Baseline screenline person trips.

Table 3-12: Daily Screenline Person Trips (2035 Baseline)

Screenline	SOV	HOV 2+	Transit	Total	Difference from 2007	Percent Difference from 2007
1. Nuuanu Stream Bridge	253,900	183,000	75,000	511,900	72,900	17%
2. Manoa Palolo/Ala Wai Canal	266,100	175,000	58,300	499,400	43,100	9%
3. East of Ward Ave	269,800	190,900	68,800	529,500	79,200	18%
4. Kapalama Drainage Canal	250,900	183,300	126,900	561,100	118,000	27%
5. Kalauao	309,400	244,200	58,500	612,100	26,700	5%
6. Waikele	131,800	121,100	34,600	287,500	33,800	13%
7. Kahe Point	35,600	46,900	11,000	93,500	21,300	30%
8. Ewa	109,000	100,000	32,300	241,300	57,400	31%
9. Trans Koolau	88,900	75,900	13,500	178,300	12,400	7%
10. Waipahu	150,000	151,700	21,000	322,700	73,800	30%
11. Wahiawa/Mililani	69,100	67,100	9,500	145,700	17,300	13%
12. Haleiwa	17,700	18,700	3,000	39,400	6,600	20%
13. Waimea	10,000	10,100	1,400	21,500	5,200	32%
14. Hauula	12,900	9,300	2,400	24,600	5,200	27%
15. Kahaluu	16,600	13,100	2,800	32,500	6,100	23%
16. Kailua/Kaneohe	42,800	39,700	7,100	89,600	4,300	5%
17. Maunawili	30,000	28,000	6,400	64,400	3,500	6%
18. Sandy Beach Park	3,700	3,000	1,100	7,800	700	10%
19. Waimanalo	11,100	11,600	1,400	24,100	2,100	10%
20. Kahala	62,100	56,600	8,500	127,200	7,600	6%
21. Salt Lake	200,200	171,600	59,500	431,300	19,600	5%
22. Kalaeloa/Kapolei	175,000	171,800	54,900	401,700	183,500	84%

Mode Share

Transit trips are forecasted to increase by more than 49 percent by 2035, the largest increase in percentage terms of any mode, followed by walking at 36 percent and bicycling at 33 percent. The projected high rate of increase in transit trips is likely due to the implementation of fixed guideway transit between Kapolei and Ala Moana Center, the presence of which will provide improved transit accessibility in 2035 over existing conditions. Table 3-13 below illustrates the mode split estimates.

Table 3-13: Mode Split Estimates (Year 2007 and 2035 Baseline)

Mode	Year 2007 Daily Person Trips	Percent	Baseline Year 2035 Daily Person Trips	Percent	Difference	Percent Difference
SOV	1,209,400	38.0%	1,492,700	36.9%	283,300	23.4%
HOV	1,470,900	46.2%	1,842,400	45.6%	371,500	25.3%
Transit	164,800	5.2%	245,900	6.1%	81,100	49.2%
Bicycle	34,500	1.1%	46,000	1.1%	11,500	33.3%
Pedestrian	305,800	9.6%	416,100	10.3%	110,300	36.1%
Total	3,185,400	100.0%	4,043,100	100.0%	857,700	26.9%

Average Vehicle Occupancy and Ridership

Average vehicle occupancy (AVO) is often used in travel demand forecasting as a measure of travel efficiency.

Based on output from the 2035 Baseline travel demand forecasting model, the average occupancy for vehicles on Oahu (excluding buses and commercial vehicles) is forecasted at 1.90 persons per vehicle. This AVO is across all trip purposes and constitutes a negligible increase from 1.89 in year 2007. For home-based-work (HBW) trips, the AVO is calculated to be 1.35, a small increase compared to the estimated AVO in 2007 of 1.34.

Vehicle Miles of Travel

Table 3-14 summarizes the total islandwide daily VMT by motorized vehicles (automobiles, buses, and commercial vehicles), as estimated by the travel demand forecasting model for year 2007 and 2035 Baseline conditions. An overall increase of approximately 2.1 million (16 percent) daily VMT is forecasted between 2007 and 2035.

The fact that VMT grows at a slower rate than total trips on the island (26 percent), indicates that the average length of trips in 2035 will be less than 2007, and that more trips will be made by transit. The former is likely due to a higher proportion of overall trips staying within the Ewa-Kapolei areas, and a lower proportion traveling between Ewa-Kapolei and Downtown. The latter is likely due to the implementation of fixed guideway transit between Kapolei and Ala Moana Center, as mentioned above.

The breakdown of VMT by facility type in 2035 is anticipated to be similar to that in 2007, with a slight reduction in the percentage of travel occurring on expressways and ramps, and increases on arterials and collectors. These latter facilities are likely expected to experience a slightly higher share of VMT growth than the overall average because these are the typical facility types that the additional trips in the Ewa-Kapolei area would use for travel.

Table 3-14: Daily Vehicle Miles Traveled (Year 2007 and 2035 Baseline)

Facility Type	Daily VMT				VMT Change (Year 2007 to Year 2035)	
	Year 2007	Percent	Year 2035	Percent	Difference	Percent Difference
Freeways	5,263,200	40.0%	5,959,300	39.2%	696,100	13.2%
Expressways	1,555,000	11.8%	1,707,700	11.2%	152,700	9.8%
Ramps	704,800	5.4%	791,300	5.2%	86,500	12.3%
Arterials	4,112,000	31.3%	4,963,300	32.6%	851,300	20.7%
Collectors	1,507,600	11.5%	1,787,300	11.8%	279,700	18.6%
Total	13,142,600	100.0%	15,208,900	100.0%	2,066,300	15.7%

Note: VMT by facility type may not sum to totals due to rounding.

Vehicle Hours of Travel

Table 3-15 lists the total duration of islandwide daily trips by motorized vehicles as estimated by the 2007 and 2035 Baseline travel demand forecasting models. The travel demand forecasting model estimates an overall increase in daily VHT of approximately 80,200 hours (21 percent) between 2007 and 2035. The largest percentage growth in VHT from 2007 to 2035 is forecasted for the arterials, at 23 percent.

Table 3-15: Daily Vehicle Hours Traveled (Year 2007 and 2035 Baseline)

Facility Type	Daily VHT				VHT Change (Year 2007 to Year 2035)	
	Year 2007	Percent	Year 2035	Percent	Difference	Percent Difference
Freeways	109,500	28.6%	128,600	27.8%	19,100	17.4%
Expressways	33,000	8.6%	39,900	8.6%	6,900	20.9%
Ramps	33,900	8.8%	40,500	8.7%	6,600	19.5%
Arterials	144,300	37.7%	178,000	38.4%	33,700	23.4%
Collectors	62,500	16.3%	76,400	16.5%	13,900	22.2%
Total	383,200	100.0%	463,400	100.0%	80,200	20.9%

Note: VHT by facility type may not sum to totals due to rounding.

Vehicle Hours of Delay

The VHD is projected to increase by 27,900 hours (31 percent) for the average weekday, as shown in Table 3-16. Daily VHD growth significantly outpaces population and overall travel growth. The reason daily delay can increase at a rate disproportionate to growth in population and overall travel is that when roadways are operating at or near capacity, even an incremental increase in volume can significantly affect congestion levels and associated delay. The majority of the increased delay is likely happening in the shoulders of the peak periods as opposed to the peak of the peaks because in the peak of the peak congestion levels currently exceed capacity and are oversaturated on many of Oahu's major roadways, so there is not as much opportunity for additional delay.

Table 3-16: Daily Vehicle Hours of Delay (Year 2007 and 2035 Baseline)

Facility Type	Daily VHD				VHD Change (Year 2007 to Year 2035)	
	Year 2007	Percent	Year 2035	Percent	Difference	Percent Difference
Freeways	25,400	27.9%	33,400	28.1%	8,000	31.5%
Expressways	7,200	7.9%	11,600	9.8%	4,400	61.1%
Ramps	17,000	18.7%	21,300	17.9%	4,300	25.3%
Arterials	27,400	30.1%	35,100	29.5%	7,700	28.1%
Collectors	13,900	15.3%	17,400	14.6%	3,500	25.2%
Total	90,900	100.0%	118,800	100.0%	27,900	30.7%

Note: VHD by facility type may not sum to totals due to rounding.

3.4.2 Transit

The goal related to transportation facilities is *to provide an inclusive, multi-modal transport system whose connectedness provides efficient means for users desiring to move about the island by bicycle, freight carrier, pedestrian facility, road, transit service, and intermodal connectors.*

System Characteristics

Changes to the transit system on Oahu assumed for the 2035 Baseline travel demand forecasting model include the construction of the HHCTCP (Airport Alignment Alternative), which is a fixed guideway system between East Kapolei and Ala Moana Center. Also, *TheBus* transit route system would be restructured to integrate with the fixed guideway system.

System Performance

The total number of daily transit boardings as estimated by the 2035 Baseline travel demand forecasting model is 388,700, an increase of 69 percent from 230,200 estimated for existing year 2007. As indicated previously, total transit linked trips (transit trips from an origin to a destination, including transfers) are projected to increase by 49 percent. The reason boardings are increasing at a higher rate than overall linked trips is that an increase in the number of average transfers per transit trip is also expected, many of which are anticipated to occur between bus and fixed guideway transit. The increase in transit trips is the largest increase in percentage terms of any mode. This is likely due in large part to the presence of the fixed guideway line in 2035, which provides improved transit speed and reliability over existing conditions.

3.4.3 Roadways

System Characteristics

The 2035 Baseline travel demand forecasting model network includes numerous recently-constructed and planned highway improvement projects, as indicated

previously in Table 3-10. These projects would affect operations management strategies on the island, and include construction of a westbound zipper lane on H-1 from Radford Drive to the Waialeale interchange for the afternoon peak period, which is an integral element of the islandwide transportation system management (TSM) network on Oahu.

System Performance

Highway and Arterial Level-of-Service (LOS)

Level-of-Service (LOS) is a measure that characterizes the operating conditions perceived by a driver or user of a roadway. Although LOS is a qualitative measure, it is based on quantitative indicators. LOS, as presented in this report, is based on volume-to-capacity ratios as reported from the travel demand forecasting model. Six LOS designations, from A to F, are defined in the Transportation Research Board's *2000 Highway Capacity Manual*. LOS A represents ideal, congestion free operating conditions; LOS B through D represent intermediate operating conditions; LOS E denotes congested conditions at the point of maximum service rate, and is considered "at capacity"; and LOS F designates extremely congested breakdown conditions, and reflects overcapacity conditions.

Table 3-17 provides LOS summaries for all major roadways in lane-miles, for the AM two-hour peak period under 2007 and Baseline 2035 conditions. Approximately 73 percent of all roadway lane-miles islandwide are estimated to operate at LOS A in the 2035 Baseline as opposed to 77 percent in the year 2007; 12 percent are projected to operate under congested conditions at LOS E or F compared to 10 percent in 2007. More than 25 percent of freeways, expressways, and ramps are estimated to operate under congested conditions in 2035, compared to 23 percent in 2007. This higher level of congestion reflects the fact that freeways, expressways, and ramps serve a proportionately higher level of commute trips than arterials and collectors, which show congested conditions between roughly five and six percent, respectively.

Table 3-17: AM Two-Hour Peak Period Arterial LOS – Lane Miles (Year 2007 and 2035 Baseline)

Facility Type	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Total Lane Miles
Freeways							
2007	213	17	22	28	33	33	346
2035	202	24	25	23	33	41	348
Expressways							
2007	65	6	9	9	18	22	129
2035	64	6	8	9	19	23	129
Ramps							
2007	60	6	5	6	6	20	103
2035	56	5	4	7	6	25	103
Arterials							
2007	619	42	27	27	19	30	764

Facility Type	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Total Lane Miles
2035	595	56	35	34	28	34	782
Collectors							
2007	561	24	13	7	7	10	622
2035	559	35	14	12	13	15	648
Total							
2007	1,518	95	76	77	83	115	1,964
2035	1,476	126	86	85	99	138	2,010
Percentage							
2007	77.3%	4.8%	3.9%	3.9%	4.2%	5.9%	100.0%
2035	73.4%	6.3%	4.3%	4.2%	4.9%	6.9%	100.0%

Figure 3-9 and Figure 3-10 graphically map LOS for 2007 and 2035 Baseline for all the modeled highway segments throughout the island for the AM two-hour peak period. The majority of congested conditions can be seen in the Interstate H-1 corridor between Ewa and Downtown Honolulu. Other highly congested facilities of note include Farrington Highway accessing Waianae, Kamehameha Highway between Mililani Town and the Honolulu International Airport, Pali Highway, and a small section of Fort Weaver Road in Ewa.

Figure 3-9: 2007 AM Two-Hour Peak Period LOS – Islandwide

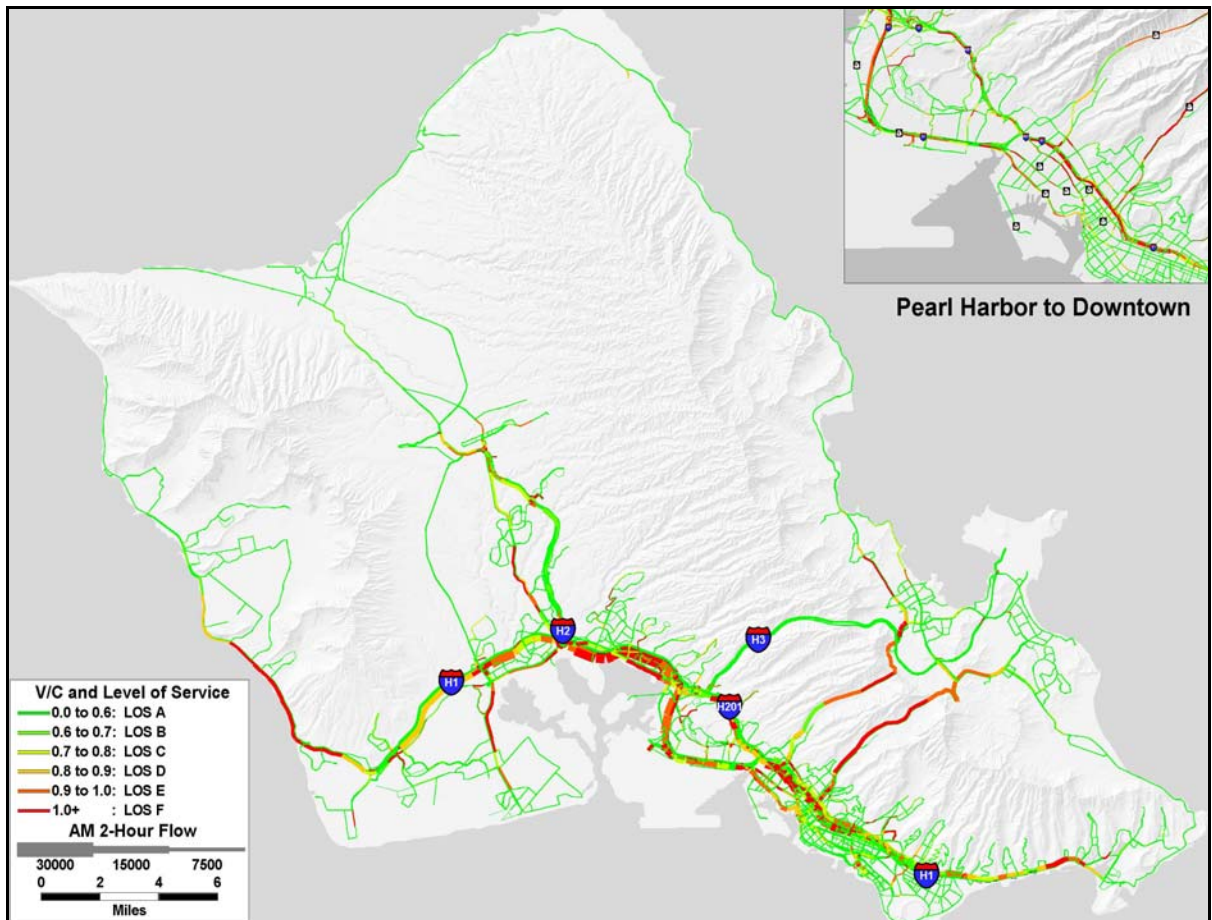
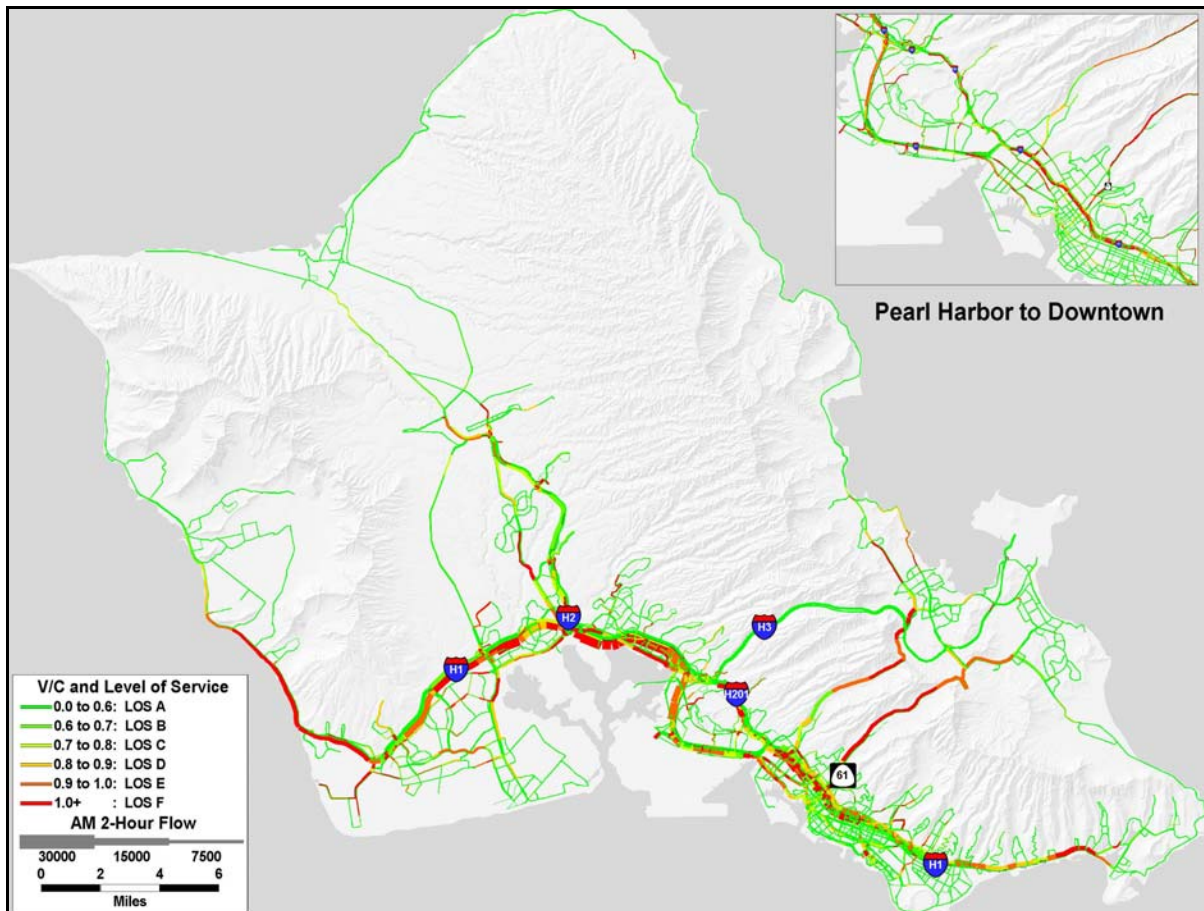


Figure 3-10: 2035 Baseline AM Two-Hour Peak Period LOS – Islandwide



Auto Travel Times to Selected Destinations

Travel times from each TAZ on Oahu to key destinations across the island were calculated for the AM peak hour using the dynamic traffic assignment model in the OahuMPO travel demand forecasting model and are discussed below. The maps depicting these travel time ranges are displayed in Appendix A.

Downtown Honolulu

Travel times from the Waianae Coast to Downtown Honolulu for year 2007 are estimated to range from 60 to 120 minutes, and are expected to increase to a range from 60 to 160 minutes for the 2035 Baseline. Travel times for most zones in Kapolei, Ewa, and Central Oahu are forecasted to improve from over 60 minutes in the year 2007 to between 45 and 60 minutes in 2035. This may be due to the local roadway improvements programmed for the Ewa area, including widening Fort Weaver Road, constructing the Kualakai Parkway, and the Interstate H-1 widening projects. Travel times in the Waipahu area are also forecasted to improve from 2007 to 2035. The planned fixed guideway system is also expected to slightly reduce the amount of future traffic on roadways between Ewa and Downtown, resulting in some improvement in overall speeds and travel times on those facilities

(e.g., Interstate H-1). There is very little change in travel times projected from areas Koko Head of the Interstate H-1/Interstate H-2 merge to Downtown.

Kapolei

Travel times are projected to increase to 30 to 120 minutes from the Waianae Coast to Kapolei during the AM peak period for the 2035 Baseline, up from roughly 20 to 60 minutes for year 2007. This large increase in travel times is the result of high levels of congestion forecasted for Farrington Highway along the southern half of the coast. From Downtown Honolulu to Kapolei, travel times remain close to those of year 2007 and range from 20 to 30 minutes, increasing progressively in the direction of Koko Head.

Waikiki

Travel time patterns for trips to Waikiki from the Waianae Coast increase from 60 to 120 minutes for year 2007 to 120 to 160 minutes in the 2035 Baseline. Travel times for Kapolei and Central Oahu improve from 60 to 120 minutes in 2007 to between 45 and 60 minutes in 2035. Travel times for Waipahu also improve from 45 to 60 minutes in 2007 to 30 to 45 minutes in 2035. Travel times from the Koolauloa and North Shore areas range from 60 to 120 minutes and travel times from Downtown Honolulu peak at 15 minutes.

Mililani

Mililani, located centrally on Oahu, is accessible within 45 minutes from most areas on the island and within 30 minutes from Downtown Honolulu. The Waianae Coast, is still an exception with travel times ranging between 45 and 120 minutes for 2007 and increasing to over 120 minutes in the 2035 Baseline. The Koolauloa and Hawaii Kai areas have travel times estimated to be between 45 and 60 minutes.

Honolulu International Airport

Travel times ranging from 60 to 120 minutes are estimated from the Waianae Coast, Wahiawa, and Waialua to the airport for year 2007. The travel times increase to 60 to 160 minutes from the Waianae Coast and decrease slightly for Wahiawa and Waialua in the 2035 Baseline. Travel times improve from 60 to 120 minutes in the Ewa and West Kapolei area for 2007 to 30 to 60 minutes in 2035. From Downtown Honolulu, estimated travel times to the Airport range from 10 to 20 minutes.

Accident Risks

The 2035 Baseline travel demand forecasting model network includes some highway improvement projects which may address the issue of safety directly or indirectly by measures such as improved lighting and signing, as well as general widening and improved channelization. These include the following:

- Fort Weaver Road Widening, vicinity of Aawa Drive to Geiger Road. Widen the roadway to six lanes, and other improvements include turning lanes, traffic signal modifications, and additional highway lighting. The intersection

of Fort Weaver Road with Renton Road, midway between Aawa Drive and Geiger Road, is a high accident location with 14 vehicle crashes recorded on the Department of Transportation's High-Accident Location Data at this location between 2004 and 2006. The improvements will likely increase the safety at this location.

- Kalaeloa Boulevard (Route 95), Widening and Reconstruction, Phase 1, OR&L Right-of-Way to Lauwiliwili Street. Improve and widen Kalaeloa Boulevard between the old OR&L ROW and Lauwiliwili Street to a six-lane divided roadway, meeting the City and County of Honolulu's standards for dedication. Kalaeloa Boulevard is a major regional arterial roadway that serves as an access between the H-1 Freeway and Campbell Industrial Park. Stimulus funding will allow the project to move forward in a timely manner to address the regional traffic and safety issues of the area.

Intermodal Freight Connections

The planned highway improvements assumed in the Baseline 2035 scenario are anticipated to benefit freight mobility on Oahu. For example, improvement and modification of the freeway access to Interstate Route H-1 between Makakilo Interchange and Palailai Interchange (Kapolei Interchange Complex) will provide improved freight mobility to and from Kalaeloa Barbers Point Harbor and Campbell Industrial Park.

Freight Travel Times for Selected Origin-Destination Pairs

Oahu does not have dedicated freight routes, therefore, peak period travel times between key freight destinations are anticipated to be similar to those estimated for automobile travel, as discussed above. For example, freight travel times from various parts of Oahu to Honolulu Harbor are anticipated to be similar to those for automobile travel to Downtown Honolulu. In addition, estimated automobile travel times to Waikiki and Honolulu International Airport are expected to be similar for freight.

3.4.4 *Bicycle and Pedestrian Facilities*

Improvements to the bicycle and pedestrian facility network were not modeled in the 2035 Baseline travel demand forecasting network. However, projects that were considered and that would provide additional mobility for these modes include the following:

- Kalaniana'ole Highway, Bicycle Improvements, Waimanalo Beach Park to Makapuu. Improve the bike route on Kalaniana'ole Highway, from Huli Street to Makapuu Beach Park.
- Kamehameha Highway Bikeway, Radford Drive to Arizona Memorial. Construct a bikeway, including drainage improvements, markings, signing, and ADA accommodation improvements.

In addition, the City is in the process of completing the updated *Oahu Bike Plan*, a bicycle master plan for the island as previously mentioned. Currently in draft form, the plan establishes a vision, goals, and objectives that will help to institutionalize bicycle planning within Oahu's transportation and land use planning processes. The plan also discusses programs and policies that pertain to bicycle planning and identifies specific bicycle facility projects that are needed to create the overall bicycle network. In 2006, voters approved City Charter Amendment #8, to make Oahu more pedestrian- and bicycle-friendly. In response, the Revised Charter of Honolulu was updated and bikeways are now included under the powers, duties, and functions for the Director of DTS, with an additional section that clarifies the City's priority of making Honolulu pedestrian and bicycle friendly.

As also discussed earlier, the HDOT is in the process of developing a *Statewide Pedestrian Master Plan*. The plan will document the policies; existing conditions for pedestrians; and education, enforcement, and engineering measures that can prove useful in improving the conditions for pedestrians in Hawaii.

The local transportation and planning agencies realize the importance of improving the conditions for both walking and bicycling on Oahu by all residents and visitors. Encouraging bicycling as a viable means of transportation, and improving bicycle facilities to make them safer, more accessible, and more readily-usable by a greater proportion of the population, could have a multitude of positive benefits. A reduction in automobile trips could lead to decreased congestion on roadways, improved public health and air quality, and reduced GHG emissions. Also, as stated above, the Revised Charter of Honolulu now clearly states the City's priority of making the City pedestrian and bicycle friendly in response to the majority of voters' desires. Increased bicycling could also help the State attain its goal of reducing its fossil fuel consumption by 70 percent by 2030. These local agencies also realize the difficulties faced when trying to increase and/or expand bicycle facilities on Oahu, including narrow lanes and shoulders on existing roadways and physical restrictions due to topography. Particularly in the urbanized areas of Oahu, many existing roadways are not sufficiently wide to establish separate bicycle facilities without a reduction in automobile lane capacity. Such facilities do not typically provide sufficient buffer space from roadway traffic even for the experienced cyclist to feel safe or comfortable using the facility. Also of consideration is that – due to a lack of established bicycle facilities in most parts of the island – many motorists are not used to sharing roadways with bicyclists, which can lead to vehicle-bicycle conflicts.

3.4.5 *Natural Environment*

Susceptibility to Climate Change

The science supporting climate change is advancing in its capability of predicting impacts of a wide range of factors on humans and the built and natural environments. The fact that Oahu is an island makes it susceptible to many of these impacts, but the more significant among them are expected to be from sea-level rise, flooding, and increased storm severity, including tidal surges, and their impacts to transportation infrastructure. Therefore, it is anticipated that transportation facilities

that are located within close proximity to coastal zones and other areas prone to flooding could be at risk. These include the two commercial harbors on the island, Honolulu Harbor and Kalaheo Barbers Point Harbor, Honolulu International Airport, and various roadways, but particularly Farrington Highway, Kalanianaʻole Highway, Kamehameha Highway, and Nimitz Highway.

Climate change-related impacts are already impacting some of the Pacific island nations. Certain areas of Oahu, including Mapunapuna near Honolulu International Airport, in the Hobron area of Waikiki, at Campbell Industrial Park, and on Kamehameha Highway along the North Shore are routinely subjected to flooding at high tide, periods of heavy rains, or the effects of high surf. These impacts may be expected to be seen more widely along both the shoreline as well as in some of the interior parts of Oahu as sea levels rise, storm intensity increases, and extended periods of drought take place.

While the current consensus is that it is essential to reduce GHG emissions, the majority of climate scientists forecast that it will take years for some of the effects of the changes already underway to be felt. The Federal government has taken a leading role in extending planning horizons beyond the traditional 20 year-cycle, and is working to provide guidance to coastal communities, especially, to develop adaptation strategies appropriate for the climate-related phenomena they will eventually face.

Air Quality

For the first time in its history, the ORTP for 2035 investigated the impacts of greenhouse gases due to mobile-source emissions. The methodology used to forecast GHG emissions and energy consumption for the ORTP 2035 project is based in part on the GreenSTEP model that was developed by the Oregon Department of Transportation for analysis and comparison of greenhouse gas emissions resulting from land-use and transport strategies. The model estimates daily and annual tons of carbon dioxide emissions based on motor vehicle use and fuel efficiency, while accounting for vehicle miles of travel by speed and facility type, and data regarding fuel efficiency. Included in the model were the following assumptions:

- For 2007, passenger cars were assumed to get 21.6 miles per gallon while trucks, SUVs, and vans were assumed to get 17.2 miles per gallon.
- For 2035, an increase in vehicle fleet fuel efficiency of 40 percent for all vehicles, including light trucks, was assumed. This assumption is based on the requirement in the *Energy Independence and Security Act of 2007* that all manufactured vehicles must meet a fuel efficiency target of 35 miles per gallon by 2020.

The State of Hawaii is currently in attainment for air quality. The 2007 existing year resulted in a daily total of 580,000 gallons of fuel consumed and 7,000 tons of carbon dioxide emissions from over 13.1 million vehicle miles traveled on the

roadways modeled for Oahu, which included freeways, expressways, arterials, ramps, and collectors.

The 2035 Baseline resulted in a daily total of 422,000 gallons of fuel consumed and 5,000 tons of carbon dioxide emissions from over 15.2 million vehicle miles traveled on the roadways modeled for Oahu. This represents a 27 percent decrease in fuel consumption and a 29 percent decrease in carbon dioxide emissions from the 2007 existing year conditions, despite a 16 percent increase in vehicle miles traveled. These results are directly related to the assumed increase in fuel efficiency between 2007 and 2035, which will offset increases in vehicle miles of travel over the same time period.

3.4.6 Title VI/Environmental Justice

The analysis presented in the ORTP 2035 for T6/EJ groups is based on data from the 2000 United States Census. These data designate which block groups are defined as T6/EJ, as well as providing population information for those block groups.

Four sub-measures are associated with T6/EJ: accessibility, equity, mobility, and public involvement and outreach. A baseline conditions summary is not applicable to the sub-measures of equity or public involvement and outreach as these measures do not require a baseline performance analysis. Results of the equity and public outreach measures are covered in Section 7.1.6. The sub-measures of accessibility and mobility are addressed below.

Accessibility

Accessibility can be defined as the ease of reaching opportunities using surface (ground) transportation. Travel time thresholds were used to measure accessibility. A travel time threshold of 20 minutes was used for all trips to calculate the number of people within that predetermined travel time to those travel destination opportunities represented by specific trip generator zones, including selected employment, college, regional shopping center, and hospital trip generators.

The analysis demonstrated that, for peak-period auto trips, 20-minute accessibility to hospitals and regional shopping centers is very high and comparable for both the T6/EJ and non-T6/EJ populations, similar to existing conditions. In contrast, non-T6/EJ populations have better accessibility to colleges and employment centers than T6/EJ populations. Similar patterns can be seen for off-peak auto trips and transit trips during both peak and off-peak periods.

Mobility

Mobility can be defined as the ease of movement of people, goods, and services. The mobility evaluation calculated the average travel time from both T6/EJ and non-T6/EJ designated areas to selected employment centers during the AM peak period.

The analysis demonstrated that the difference in average auto travel time to employment centers between T6/EJ TAZs and non-T6/EJ TAZs is forecasted to

increase from 15 minutes in 2007 to 19 minutes for 2035 Baseline conditions. Similarly, the difference in average transit travel times to employment centers would increase from 21 minutes in 2007 to 26 minutes in 2035.

4.1 Sources of Revenue for Transportation on Oahu

Surface transportation on Oahu requires both operating and capital expenditures. Funding sources include Federal grants and appropriations from both the State and City. Transit operations are partially self-supported by transit operating revenues, primarily fares. In addition, developer funding may be used to help support specific improvement projects on a case-by-case basis.

4.1.1 Uncertainties Given Current Economic Conditions

The revenue forecasts and their underlying assumptions used in developing the ORTP 2035 were approved by the Policy Committee on October 21, 2009. During its deliberations, there were several key uncertainties that were acknowledged, including:

- The SAFETEA-LU authorization expired on September 30, 2009, and Federal funding was and continues to be provided by means of Continuing Resolutions. It was unclear when Congress would act on a new authorization and, as of the approval of the ORTP 2035 by the Policy Committee in April 2011, no authorization has been passed.
- The Federal Highway Trust Fund (HTF) is facing bankruptcy. For a number of reasons, including the lack of an increase in the motor fuel tax as well as Congress' diversion of HTF monies to other purposes, its current balance is insufficient to sustain the nation's highway and transit needs.
- The significant economic downturn that began in 2007 has had, and continues to have considerable impact on revenue streams that fund transportation infrastructure by both the State and City. While it is anticipated that this reduction in funding will not be permanent, it was unclear how long the recession would last and made reliance upon historic trends difficult.
- The American Recovery and Reinvestment Act of 2009 (ARRA) was a stimulus bill enacted by Congress to counter some of the effects of the recession. Within the bill, approximately \$48 billion was earmarked for transportation-related projects nationally. Of that amount, approximately \$46 million was made available for transportation-related expenditures on Oahu during FFYs 2009-2010. Whether further ARRA-type stimulus funding will be provided by Congress in the future is not clear.

As a result, the revenue forecasts that underlie the ORTP 2035 are conservative, as is demonstrated and discussed in the following sections.

4.1.2 Federal Revenue Sources

Federal motor fuel taxes provide the majority of revenue for the HTF, and those revenues are allocated to surface transportation uses by Congress. Authorization for Federal-aid surface transportation programs has been extended by Congress through the SAFETEA-LU authorization that expired on September 30, 2009. Funding by means of Continuing Resolutions since its expiration has remained at FFY 2009 levels. Federal highway revenues are allocated to HDOT under a variety of FHWA programs.

Future Federal highway revenues for the ORTP 2035 were estimated by comparing the growth rate of Federal highway funds spent on Oahu over the past several years with the forecasted growth rates used by a sample of other Metropolitan Planning Organizations (MPOs) in their recently completed long-range transportation plans. Based on the past experience in Hawaii and the estimates used by other MPOs described previously, it is assumed that future Federal highway revenues for the ORTP 2035 Project will grow at an average rate of two percent per year through FFY 2035.

The distribution of Federal highway funds to Oahu was assumed to remain constant over the forecast period. The forecasted future share to Oahu of each revenue source was based on the share of that revenue source that was spent on Oahu during SAFETEA-LU. The assumed percentage shares to Oahu of each revenue source are shown in Table 4-1. For example, 100 percent of Hawaii's Interstate Maintenance funds were spent on Oahu during SAFETEA-LU, so it is assumed that 100 percent of Hawaii's future Interstate Maintenance funds will also be spend on Oahu through FFY 2035.

Table 4-1: Forecast of FHWA Funds for Hawaii and Oahu (FFYs 2011-2035)

	Hawaii*	Percent to Oahu	Oahu*
Interstate Maintenance	\$325,812	100%	\$325,812
National Highway System	\$1,606,032	56%	\$899,378
Bridge Replacement & Rehabilitation	\$994,098	63%	\$626,282
Surface Transportation Program	\$1,118,531	42%	\$469,783
Congestion Mitigation & Air Quality	\$303,218	82%	\$248,639
Recreational Trails	\$28,426	0%	\$0
Safe Routes To Schools	\$33,324	46%	\$15,329
Highway Safety Improvement Program	\$222,573	46%	\$102,384
Equity Bonus/Minimum Guarantee	\$100,506	24%	\$24,121
High Priority Projects/Demonstration Projects	\$728,000	46%	\$334,880
Totals	\$5,460,521	56%	\$3,046,608

*Thousands of YOE dollars.

Oahu receives FTA revenues. As the transit operator, the City is the designated recipient of formula apportionments, and can also receive discretionary Federal allocations from certain programs for specific projects. HDOT also receives Federal transit revenues, primarily for use in non-urbanized and rural areas of the Neighbor Islands, and is also an eligible recipient of certain discretionary allocations for

specific projects. These discretionary funds can be transferred to a project on Oahu at HDOT's discretion.

It is estimated that FTA Section 5307 Urbanized Area formula funds and Section 5309 Fixed Guideway Modernization funds for Oahu will grow by approximately 1.8 percent per year during FFYs 2011 – 2035. It is also assumed that the City and County will receive discretionary Federal allocations from the FTA Section 5309 "New Starts" and FTA Section 5309 Bus Capital programs for specific projects.

4.1.3 State of Hawaii Revenue Sources

HDOT's Highways Division provides for roadway maintenance and construction with funding from the Highway Special Fund (HSF). HSF revenues are generated by the following sources:

- Liquid Fuel Taxes
- Registration Fees
- Motor Vehicle Weight Taxes
- Car Rental/Tour Vehicle Taxes
- Time Certificates of Deposit
- Other sources

Revenues from the HSF are used directly to fund operations and maintenance activities, as well as pay debt service on bonds issued for capital improvements. Bond proceeds are used to fund highway capital expenditures, budgeted through the State's Capital Improvement Program (CIP), as enacted by the Hawaii Legislature. HSF revenues may also be used to match Federal highway funds.

No State funds are currently used for bus transit operations or capital projects on Oahu. However, State funds are used as the local match for the Vanpool Hawaii program.

4.1.4 City and County of Honolulu Revenue Sources

Local funding of surface transportation operations and maintenance comes from the City's General Fund and the Highway Fund. The General Fund includes the following revenue sources:

- Real Property Taxes
- Motor Vehicle Registration Annual Fees
- State Transient Accommodations Taxes

The City's Highway Fund includes the following revenue sources:

- Public Utilities Franchise Taxes
- City and County Fuel Taxes
- County Motor Vehicle Weight Taxes

Portions of both the City's General Fund and its Highway Fund are transferred to the City's Public Transportation Fund, which funds transit operations and maintenance.

Revenues from the General Fund and Highway Fund are also used to pay debt service on bonds; capital projects are funded using bond proceeds.

In 2005, the Hawaii State Legislature authorized counties to enact a surcharge of one-half percent on the Hawaii General Excise and Use Tax (GET). The GET surcharge was enacted by the City to provide the primary local funding source for the HHCTCP. The lifetime of the GET surcharge runs from FY 2007 through FY 2022. GET surcharge revenues are expected to generate approximately \$3.5 billion in capital funds for the HHCTCP. Local bond funds will also be available to support transit capital improvement projects and are estimated to total \$571 million between FY 2011 and FY 2035.

Transit Fare Revenues

Transit passenger fare revenues are a primary source of revenue for transit operations and maintenance. It is estimated that approximately \$3 billion in transit passenger fare revenues will be collected by the City and County of Honolulu during the 25-year life of the ORTP 2035.

4.2 Long-Range Revenue Forecast – State of Hawaii Department of Transportation

As part of its HSF multi-year forecasting effort, HDOT developed forecasted annual growth rates through FY 2015 for each of the HSF revenue sources. For purposes of consistency with statewide transportation planning efforts currently underway, it is assumed that these future growth rates will be used for the 25-year period of the ORTP 2035. Historically, debt service payments from the HSF for bonds issued have increased at about 1.45 percent per year, and it is assumed that this growth rate will remain constant during the years covered by the ORTP 2035.

Based on these assumptions, it is estimated that HSF revenues will total approximately \$5.0 billion over the FY 2011-2035 period. Subtracting out an estimated \$1.5 billion in future debt service payments, remaining HSF revenues available for statewide highway operations and maintenance are approximately \$3.6 billion during FYs 2011-2035. Consistent with past trends, it is estimated that approximately 33 percent of these funds, or \$1.18 billion, will be available for use on Oahu.

The amount of Statewide Capital Improvement Program (CIP) funding for the State highway system has been extremely variable over the past several years. In addition, the percentage of CIP funds spent on Oahu during this period has varied between 16.5 and 69 percent per year, with an average of 50 percent. It is assumed that the Statewide CIP funds will grow at a nominal rate of one percent per year for the ORTP 2035 period and that approximately 50 percent of the CIP will be spent on Oahu. Therefore, it is estimated that the CIP funds available for Oahu during FYs 2011-2035 will be approximately \$654 million.

4.3 Long-Range Revenue Forecast – City and County of Honolulu

For the ORTP 2035 period, it is assumed that the City's General Fund and Highway Fund revenue sources will continue to grow at their historical rates. This translates to the estimate of the General Fund generating approximately \$48.9 billion in revenues for the FYs 2011-2035 period. For this same period, it is estimated that the Highway Fund will generate approximately \$12.7 billion in revenues.

Each year, portions of the General and Highway Fund revenues are spent on operations and maintenance activities for streets, highways, traffic management, and transit. Assuming that the historical percentage trend of these expenditures continues into the future, it is estimated that approximately \$2.8 billion of those funds would be spent on streets, highways, and traffic operations and maintenance during FYs 2011-2035. In addition, it is estimated that approximately \$6.0 billion of those funds would be transferred to the Public Transportation Fund for transit operations and maintenance expenditures during FYs 2011-2035.

Most highway capital projects receive their local funding from the City and County Highway Improvement Bond Fund; some projects also receive funding from the City and County General Improvement Bond Fund or the City and County Capital Projects Fund. Extrapolating from past trends, it is estimated that approximately \$1.1 billion in bond funds will be available during FYs 2011-2035 for streets, highways, and traffic capital improvement projects.

4.4 Revenue Summary

This section provides estimates of likely available future revenues for ORTP 2035 projects and programs during FYs 2011-2035. Historical funding available for regional transportation projects and programs from Federal, State, City and County, and private sources was presented in the *Revenue Sources Report for the ORTP 2035*, prepared in November 2009. As discussed at the opening of this chapter, it is recognized that the recent worldwide economic crisis and the future reauthorization of Federal surface transportation program funding creates significant uncertainty in forecasting future revenues for the ORTP 2035. It is also unclear whether the Federal tax sources that feed into the Highway Transportation Fund will be able to support future expenditure levels. Forecasted revenues for the ORTP 2035 must be

those that are considered “firmly established,” and the estimated future growth trends should be based on past experience.

The following revenue estimates for the ORTP 2035 were based on data received from Federal, State, and City transportation officials. Table 4-2 provides summary revenue projections for ORTP 2035 revenues from traditional Federal, State, and City tax-based revenue sources, in addition to potential revenues from transit farebox recovery and from anticipated developer funding of selected improvement projects. It is estimated that approximately \$26.1 billion in revenues will be available for ORTP 2035 projects and programs; all amounts are expressed in year of expenditure (YOE) dollars.

Table 4-2: ORTP 2035 Revenue Summary (FYs 2011-2035)

Source	Estimated Revenue*
Federal Highway Administration	\$3,000
Federal Transit Administration	\$3,200
State capital funding	\$700
State operating and maintenance	\$1,200
City and County capital funding	\$4,900
City and County operating and maintenance	\$8,800
Transit passenger fares	\$3,000
Developer and private funding	\$1,300
Total	\$26,100

*Millions of YOE dollars.

4.5 Amount Assumed from Private-Sector Contributions

Potential future amounts of other types of revenues, such as developer and private funding, will be identified on a project-by-project basis. Since the fall of 2009, an additional \$700 million in revenue from developer and private funding has been identified by the City, for a total of \$1.3 billion for funding transportation projects in the ORTP 2035. These revenues include contributions for improvements from the Hawaii Community Development Authority and Department of Hawaiian Homelands and also reflect the analyses undertaken for the City’s *Draft Ewa Impact Fees for Traffic and Roadway Improvement Update Study*.

5.1 Planning Process Overview

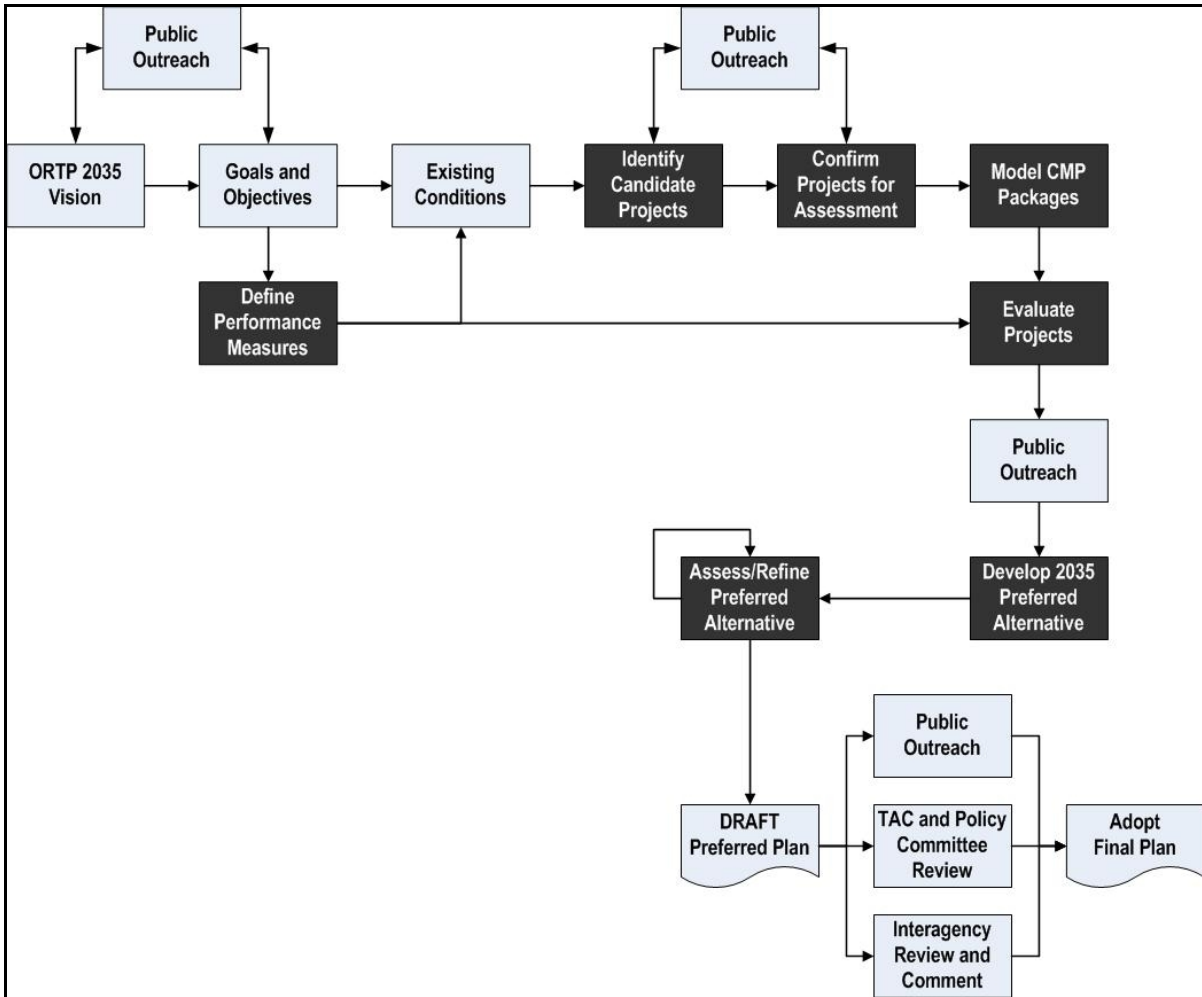
An evaluation approach was used to gauge how different transportation improvement projects might operate in terms of transportation performance, effects on land use and development patterns, and impacts to the natural and human environments. Results from this assessment of alternative improvements informed stakeholder and public outreach efforts.

The primary steps involved in the evaluation process were:

- Identification of candidate transportation improvement projects and strategies, and related public outreach activities to facilitate this process.
- Grouping of congestion mitigation projects into logical packages for evaluation.
- Technical analyses of the improvement strategies, including travel demand modeling of the congestion mitigation packages.
- Evaluation of congestion mitigation performance measures to assess the congestion mitigation improvement packages.
- Development of a preferred plan comprising elements of the initial candidate improvement projects. The assessment of the initial improvement projects, technical analysis of the congestion mitigation improvements, and feedback garnered from the public outreach process formed the basis for selecting components of the preferred plan alternative.
- The preferred plan alternative was then assessed based on the identified performance measures and refined to finalize selection of the elements of the ORTP 2035.

The evaluation process was designed to incorporate public and stakeholder input in identifying potential strategies and providing feedback on evaluation results to inform the selection of recommended plan elements. The process is depicted in Figure 5-1.

Figure 5-1: ORTP 2035 Update Project Process



5.2 Project Selection Process

5.2.1 ORTP 2030

The ORTP is a living document in the sense that the OahuMPO is required to update the plan every five years, and each version builds upon the previous one. Some projects from the earlier plan may be removed, revised in scope, or reprioritized based on new information, but the ORTP 2030 provided much of the basis of the ORTP 2035.

5.2.2 Other Plans and Studies

The ORTP is meant to support the long-term goals of the island, including economic, business, and community development. Various other plans and studies, as discussed in Section 1.4.3 were considered and used in the development of the ORTP 2035.

- *Oahu Bike Plan*
 - City and County Bike Projects (2011-2020)
 - City and County Bike Projects (2021-2035)
- *Human Services Transportation Coordination Program*
- *Strategic Highway Safety Plan*
 - Highway Safety Improvement Program (2011-2020)
 - Highway Safety Improvement Program (2021-2035)
 - Shoreline Protection Program (2011-2020)
 - Shoreline Protection Program (2021-2035)
- *Ewa Roadway Connectivity Study*
 - East-West Road
 - Kamokila Boulevard
 - Fort Barrette Road
- *FFYs 2011-2014 TIP*
 - Salt Lake Boulevard Widening Project
 - Human Services Transportation Coordination Program (2021-2035)

5.2.3 Baseline Analysis

The Baseline analysis was used to establish the Baseline performance against which to measure growth and/or changes for future-year alternative network analyses. Projects that resulted in the greatest benefit for conditions when compared to the 2035 Baseline were more favored than those that resulted in lesser or no benefit. Additionally, the Baseline analysis helped identify where the greatest current and future needs are or are likely to be, allowing the focus of new projects to be on areas that demonstrate the greater needs. Results of the Baseline analysis are documented in the *Baseline Forecast Analysis Technical Memorandum – ORTP 2035 Project*, December 2009. Problems and issues identified through the Baseline analysis are documented in the *Baseline Problems and Issues Technical Memorandum – ORTP 2035 Project*, January 2010.

5.2.4 Public Outreach

Stakeholder Interviews and Focus Groups

Overall the key priority regarding transportation identified by stakeholders and the emergency responders such as police, firefighters, and paramedics was congestion mitigation. Uniformed responders specifically mentioned their ability to navigate through congested corridors is aggravated by the conversion of roadway shoulders to travel lanes. Road maintenance and safety/security were also ranked very high by 50 percent or more of stakeholders. A review of the stakeholder comments indicate that “safety” concerns are typically considered to be related to accidents,

bike and pedestrian issues, and evacuation in an emergency. Several comments also mentioned mass transit as a means of alleviating congestion.

The T6/EJ service providers maintain that improving mass transit is the key priority for their clients. These improvements include extended hours of operation, more frequent service, better bus stops, and express service. The emergency response managers spoke from a system wide perspective and said disaster infrastructure, such as alternative evacuation routes, is the key priority.

Both focus groups and stakeholders alike agreed that the highest priority transportation corridor is the “Ewa to Downtown” corridor. Both the emergency response managers and responders also specified access to and from the Waianae Coast as a priority issue, as there is only one route for these communities in case of an evacuation or disaster crisis.

When assessing new transportation projects “Widen Middle Street Merge/H-1” was the highest recommendation by both the stakeholders and emergency response service providers. The T6/EJ providers agreed that providing alternate routes to isolated communities were the highest priority; the emergency response managers specifically listed providing the Waianae Coast with a secondary access route. The T6/EJ service providers also mentioned improving pedestrian facilities.

When it comes to alleviating congestion Downtown, many ideas were brought up to manage traffic flow more efficiently. These included traffic signal synchronization, telecommuting, providing real-time traffic information (e.g., variable message signage), contra-flow lanes, and encouraging alternative transportation mode choices, such as bus, carpool or bike. Stakeholders would not support the removal of on-street parking as a way of alleviating congestion.

None of the eleven proposals to fund transportation were supported by the stakeholders interviewed, what is described here are the “least unpopular” alternatives. The least objectionable funding sources identified were charging developer fees to fund needed transportation improvements and imposing a commercial vehicle tax. Tolling was mentioned by some emergency response managers, but the comments seemed to indicate they were speaking personally, and not from their agency viewpoint. T6/EJ service providers did not address funding alternatives directly, but recommended that the OahuMPO focus on a few key initiatives. Again, they recommended improving transit and pedestrian facilities to relieve traffic congestion, rather than spreading limited funds across too many projects to have an impact.

Overall, stakeholder interviewees and the focus group participants showed a high degree of interest in and familiarity with transportation issues. There appears to be general agreement that “congestion mitigation” is the number one transportation issue on Oahu. Clearly, improvements in the H-1 corridor are recognized as needed by a wide cross section of respondents. However, the proposed remedy for general congestion mitigation seems to be split between advocates for mass transit or road widening and building alternative access.

Telephone and Web-based Surveys

As discussed in Section 1.3.2, two telephone surveys were conducted, and their results are summarized below.

Oahu residents' priorities clearly reflect usage of the H-1 freeway as the primary east-west transportation corridor linking Oahu's key residential and job centers. Residents' top priority in transportation projects – *improving the H-1 corridor between Leeward and Downtown* – was supported by 56 percent. The *Waianae Second Access Road* emerged as a second priority due to strong support in West Oahu, which includes Waianae.

Similarly, the top priority in transportation corridors is the *Leeward to Downtown corridor*, representing the main commuting route between the most populous residential zone, Leeward Oahu and the key job center, Urban Honolulu. Residents chose the Leeward-Downtown corridor by a 3-to-1 margin over the next highest priority, the Central Oahu-to-Downtown corridor.

Easing traffic congestion is generally seen as the top transportation challenge. When asked to rate the importance of six transportation challenges facing Oahu, 55 percent of residents gave top ratings to "*traffic congestion on existing roadways*," followed by "*unsafe driver behavior*," rated highly by 47 percent of residents. Other challenges mentioned include the lack of alternative routes, the high cost of parking, and dangerous roadways – but these challenges ranked well behind congestion.

Easing traffic congestion is particularly important to residents in West Oahu and Windward Oahu, where residents have long commutes to the urban area. The second highest-rated issue, "*unsafe or inappropriate driver behavior*," ranked highest only in Central Oahu.

While traffic congestion is a key issue in transportation, road maintenance emerged as the most effective transportation solution for residents. Of six solutions rated for perceived effectiveness, "*better maintenance of existing roads*" garnered high ratings from 57 percent, far more than any other solution tested. The next highest ranked solution, which was well under 50 percent of residents, was "*improving pedestrian facilities*," followed by "*widening or extending existing roads...*," and "*Improvements to... TheBus system*."

As a solution, "*better road maintenance*" topped the list in all Oahu regions but especially so in West Oahu, Central Oahu and Downtown Honolulu. This is consistent with the fact that most residents use their vehicles for daily commuting, with 80 percent of Oahu workers and students driving themselves to work or school versus only nine percent taking TheBus.

Data on satisfaction reinforce the finding that road maintenance is an immediate concern. Asked to rate their satisfaction with the road system, residents indicated low satisfaction, overall, with over half rating in the bottom half of a 10-point scale. In none of the individual areas were the roads rated higher than 5.7 of 10, on average (6.0 or below is considered low by Hawaii standards).

When asked why they gave low ratings, 87 percent of the most dissatisfied residents polled commented about road conditions, citing “*pot holes, uneven surfaces, poor repair and maintenance.*” Some even mentioned that the public agencies’ attempts at “quick fix repairs” for road surfaces seemed to make the problems worse, not better.

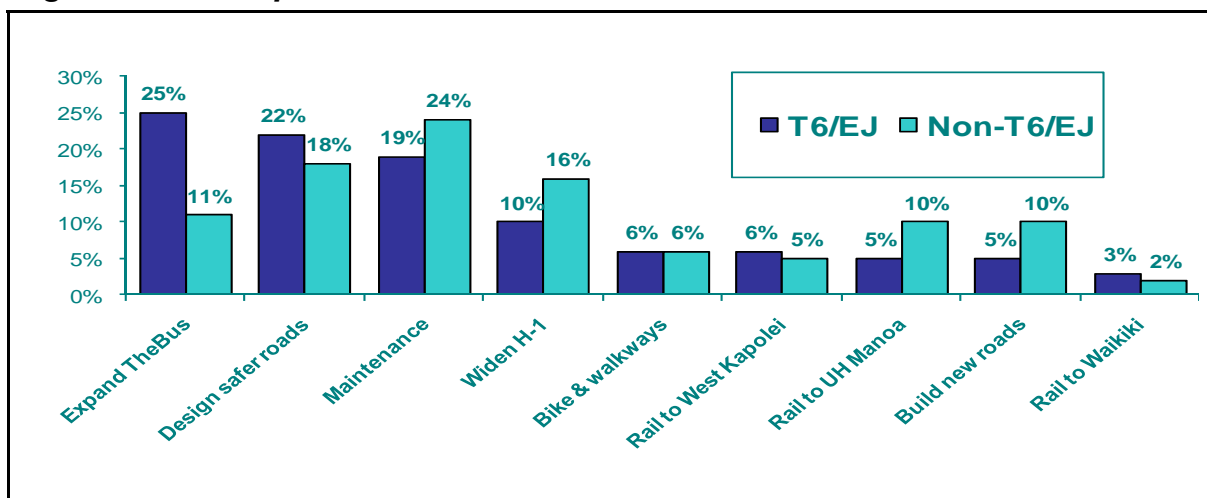
Finally, the survey tested 11 proposed options for funding transportation. Consistent with prior research, none of these options received substantial support from residents though “*charging fees to developers*” and imposing a “*commercial vehicle tax*” were relatively less opposed, with both proposals supported by about 1 in 5 residents.

Residents were overwhelmingly opposed to tax increases and new fees on driving. Three-quarters or more indicated opposition to “*raising the excise tax, charging a vehicle-miles-traveled tax, raising the gasoline tax,*” and, especially, “*charging a fee for driving into Downtown.*” Ninety percent were opposed to “*raising County property taxes*” as a means of funding transportation.

Lower-income (<\$35,000 income) residents overwhelmingly opposed “*raising the tax on gasoline*” and “*charging a toll on HOV lanes.*”

The second telephone survey was given to 1,000 Oahu residents and included a subset of 400 persons from T6/EJ areas. Respondents were asked to rate nine transportation priorities, including roadway expansion projects, rail/transit expansion projects, and operations and maintenance projects. According to the survey, 31 percent of the T6/EJ sample used TheBus for commuting, compared to only eight percent of the overall Oahu sample. Their resultant priorities reflect this difference in mode use, as shown in Figure 5-2.

Figure 5-2: Transportation Priorities – T6/EJ and Non-T6/EJ Residents



However, it should be noted that among the T6/EJ population using vehicles as their primary of transportation, increasing road maintenance and road design rank higher than TheBus expansion. Overall, the top four priorities of both samples were the same, albeit in different order.

Regional Meetings

Three regional public meetings were held on Oahu on August 14, 17, and 19, 2010. Information was conveyed through a combination of display boards, handouts, one-on-one conversations with staff and a PowerPoint presentation. Although meeting attendance was light, 228 online surveys were completed and twelve paper copies of the evaluation form were received, resulting in data analysis of 240 respondents.

Overall, the safety, operations and maintenance, and multi-modal projects received far more support than the road-oriented congestion mitigation projects. There were only two road congestion mitigation projects receiving more than 100 “important” and “very important” rankings:

- Widen Interstate Route H-1 from Vineyard Boulevard to Middle Street, and
- Widen Interstate Route H-1 from Ward Avenue to Punahou Street

Meanwhile, extending the Honolulu rail transit line, improving TheBus service and facilities, providing bike and pedestrian facilities, and maintaining the existing roads and bridges consistently received between 150 and 200 positive rankings.

Islandwide Meeting

An islandwide public meeting was held on Oahu on February 24, 2011, to present the draft ORTP 2035 for public comment. This meeting was conducted at the Neal Blaisdell Center in downtown Honolulu. Approximately 60 people attended, including 23 members of OahuMPO’s Citizen Advisory Committee and three members of the OahuMPO’s Technical Advisory or Policy Committees. The meeting featured a combination of open house and presentation formats. Information was conveyed through individual conversations at display boards as well as a PowerPoint presentation followed by questions and answers. Although written comments were received that evening, the 45-day ORTP public review period remained open through March 28, 2011.

As shown in Table 5-1, meeting participants were almost identically split between “Well” and “Somewhat” in their evaluation of how well the plan addressed stated goals of ORTP 2035.

Table 5-1: Islandwide Meeting Public Rating of ORTP 2035 Goal Satisfaction

Goal	Very Well	Well	Somewhat	Not at all
Improves traffic flow	1	2	4	
Serves a planned growth area and supports local sustainability plans	1	5	1	
Supports community values		5	2	
Improves regional transportation connections	2	2	3	
Sustains environmental quality		1	3	1
Provides balanced transportation system		3	3	
Provides accessibility and mobility for all	2	2	3	

All of the performance measures were deemed very important with the exception of “significantly reduces travel time to Downtown”, which was considered somewhat important. (See Table 5-2)

Table 5-2: Islandwide Meeting Public Rating of ORTP 2035 Performance Measures

Plan Results	Very Important	Somewhat Important	Not at all Important
Improves mobility by reducing travel times to employment centers for auto and transit users	5	2	
Improves accessibility to hospitals and regional shopping centers for all	4	3	
Reduces vehicle hours of delay and vehicle hours traveled	6	1	
Significantly reduces travel time to downtown	2	5	
Provides better accessibility and mobility for low and moderate income residents	7		
Increases transit ridership	7		
Reduces congestion in peak hours	6	1	
Reduces congestion on H-1 and major highways	6	1	
Total	43	13	

An additional 37 comments were received from individuals and nine from agencies during the public review period. The vast majority of the comments from individuals were general in nature and hard to categorize. However, two projects did receive a disproportionate amount of comments relative to the rest. Approximately 33 percent of the comments from individuals concerned Project 62, Kahekili Highway, Widening, Kamehameha Highway to Haiku Road; opinions expressed were nearly evenly split concerning project support (six for and five against). Project 23, Keoneula Boulevard, Extension, Kapolei Parkway to Franklin D. Roosevelt Avenue, also received a large number of comments (five), all of them opposing the project based on its proposed alignment. Most agency comments were requests for coordination on particular projects of interest.

5.2.5 Congestion Management Process

The purpose of the Congestion Management Process (CMP) for the OahuMPO is to identify congested surface transportation facilities, evaluate projects proposed to mitigate congestion, and prioritize these projects using quantifiable performance measures to assist decision-makers in selecting projects for the ORTP 2035 and TIP. In short, the CMP identifies the congested transportation facilities, evaluates projects proposed to reduce traffic congestion, and prioritizes these projects based on how well the project performs.

This analysis, which helps the OahuMPO meet federal Congestion Management Process reporting requirements as stated in SAFETEA-LU, builds on the Congestion Management System (CMS) process and procedures adopted by the OahuMPO and found in the OahuMPO’s *CMS Performance Monitoring and Evaluation Plan* (December 2005).

Consistent with that process, the CMP covered the whole island, including all segments and corridors that experience congestion. All freeways, expressways, arterials, and collectors as defined by the regional functional classification system were evaluated and reflected in facilities contained within the OahuMPO travel demand model.

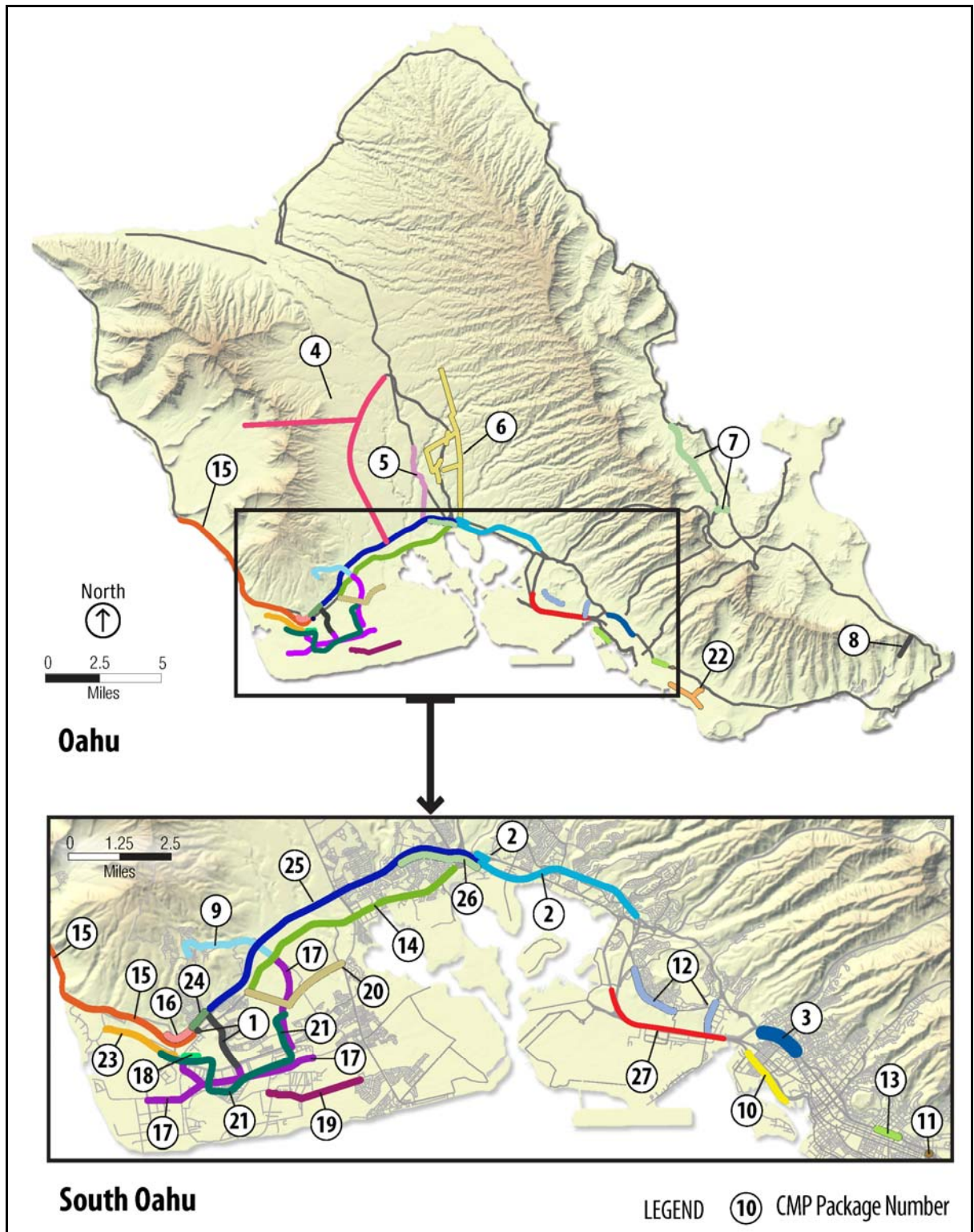
Twenty-seven CMP project packages were analyzed, using the OahuMPO travel demand model to generate scores for each package. The selection of projects for the 2010 CMP analysis differed slightly than what was done for the 2005 CMS process. In the previous case, individual regionally-significant roadway capacity projects that were identified through the ORTP 2030 plan development process were selected for consideration in the CMS analysis process. Each of these projects would be coded into the OahuMPO travel demand model individually and the model would be run to produce outputs that could be used for the CMS analysis.

For the 2010 CMP analysis, project packages (one or more individual road capacity projects) were defined to be run through the OahuMPO travel demand model. Project packages were developed to explore in more detail whether there were synergies among logical groupings of projects that were in close proximity to each other. It was felt that the analysis of the packages could highlight which projects were the most effective at reducing congestion within a subarea or corridor, and also that the analysis might highlight unforeseen deficiencies in the transportation network that modeling individual projects might miss. It was felt that the outcome of the CMP analysis might benefit future corridor or subarea planning studies, or performance monitoring programs based on the results of the analysis. It was also determined that while the effect of individual projects on the performance of the regional transportation system may be too small to be captured with the regional model, grouping logical packages together may result in a noticeable effect. Table 5-3 lists the 27 CMP project packages shown in Figure 5-3.

Table 5-3: CMP Highway Project Packages

CMP Package No.	ORTP Projects
1	Fort Barrette Road Widening Kapolei Interchange Complex Phase I
2	Interstate Route H-1 Eastbound Waiawa to Halawa Widening Interstate Route H-1 Westbound Waiawa to Waiawa Interchange Widening Interstate Route H-1 Westbound Waipahu Street Off-Ramp Widening
3	Interstate Route H-1 Middle Street to Vineyard Widening Interstate Route H-1 Westbound Vineyard to Middle Street Widening
4	Kunia Road Widening Near Interstate Route H-1 and from Royal Kunia to Wahiawa Waianae Second Access Road
5	Kamehameha Highway Lanikuhana to Ka Uka Boulevard Widening Paiwa Street Extension
6	Central Mauka Road, Mililani/Waiawa Area Central Mauka Road, Wahiawa Area Interstate Route H-2 Pineapple Road Interchange Interstate Route H-2 Waipio Interchange Widening
7	Kahekili Widening Likelike Highway Widening
8	Makapuu Tunnel
9	Makakilo Drive Extension
10	Nimitz Flyover
11	Interstate Route H-1 University Interchange Improvements
12	Puuloa Road Widening Salt Lake Boulevard Widening
13	Interstate Route H-1 Eastbound Ward Avenue to Punahou Street Widening
14	Farrington Highway Ewa Area Widening Farrington Highway Waipahu Area Widening
15	Farrington Highway Waianae Area Widening
16	Extend Hanua Street, Malakole Street to Farrington Highway and Construct New On- and Off-Ramps for Interstate Route H-1 from Palailai Interchange to Hanua Street Extension
17	Fort Barrette Road Extension Kalaeloa East-West Spine Road Kamokila Boulevard Extension Kualakai Parkway Widening
18	Kapolei Parkway Extension, Kamokila Boulevard to Fort Barrette Road
19	Keoneula Boulevard Extension
20	Extend East-West Road, Farrington Highway to Old Fort Weaver Road
21	Fixed Guideway West Kapolei to East Kapolei Extension
22	Fixed Guideway Ala Moana Center to UH Manoa and Waikiki Extension
23	Kapolei Parkway Extension, Aliinui Drive to Kalaeloa Boulevard
24	Makakilo Frontage Road
25	Interstate Route H-1 Median HOV between Waiawa and Makakilo Interchange Interstate Route H-1 Westbound Waiawa to Paiwa Widening
26	PM Zipper Lane Extension, Waiawa Interchange to Kunia Interchange
27	PM Zipper Lane Extension, Keehi Interchange to Radford Drive

Figure 5-3: ORTP 2035 CMP Project Packages



For the CMP analysis, six performance measures were used. These measures were:

- Volume-to-Capacity Ratio (V/C)
- Vehicle Volume
- Work-Related Transit Mode Share
- VMT
- VHT
- VHD

The following discussion summarizes the results of the CMP performance analysis.

Highway Related Projects

Table 5-4 shows the project rankings and corresponding descriptions for each of the 40 highway-related projects. Three projects tied for the top ranking: Kamehameha Highway widening between Lanikuhana Avenue and Ka Uka Boulevard, the extension of Kapolei Parkway between Kamokila Boulevard and Fort Barrette Road, and the extension of Kapolei Parkway between Aliinui Drive and Kalaeloa Boulevard. These three projects ranked the highest generally because when compared to the Baseline, they showed a significant improvement in congestion mitigation as measured by a reduction in their volume-to-capacity ratio, while carrying more traffic. The scoring system for the projects is contained in Appendix B.

Table 5-4: CMP Highway Project Package Rankings and Descriptions

CMP Package No.	ORTP Highway Project Description	2010 CMP Ranking
18	Extend the existing six-lane Kapolei Parkway between Kamokila Boulevard and Fort Barrette Road.	1
23	Extend Kapolei Parkway from Aliinui Drive to Kalaeloa Boulevard.	1
5	Widen Kamehameha Highway from a three-lane to a four-lane divided facility between Lanikuhana Avenue and Ka Uka Boulevard.	1
6	Construct Central Mauka Road, a new four-lane road from Mililani Mauka to Waiawa.	4
2	Widen the Interstate Route H-1 by one lane in the eastbound direction, from the Waiawa Interchange to the Halawa Interchange.	5
4	Widen Kunia Road from Wilikina Drive to Farrington Highway.	5
7	Widen Kahekili Highway from two to four lanes, from Kamehameha Highway to Haiku Road.	5
25	Construct two new lanes in the freeway median for HOV use, one in the westbound direction and one in the eastbound direction, on Interstate Route H-1, from the Waiawa Interchange to the Makakilo Interchange.	5
3	Widen H-1 by one lane from Ola Lane to Vineyard Blvd.	5
4	Construct a Waianae Second Access Road from Lualualei Homestead Road to Kunia Road	10
6	Construct a new full-service freeway interchange on Interstate Route H-2, between Meheula Parkway and Ka Uka Boulevard.	10
17	Construct a new four-lane east-west spine road within Kalaeloa by realigning and connecting portions of the existing Saratoga Avenue from Kalaeloa Boulevard in the west and to Geiger Road in the east.	10

CMP Package No.	ORTP Highway Project Description	2010 CMP Ranking
15	Widen Farrington Highway from four to six lanes, from Hakimo Road to Kalaeloa Boulevard, including intersection of Lualualei Naval Road.	10
14	Widen Farrington Highway from two to four lanes, from Golf Course Road to just west of Fort Weaver Road.	14
6	Widen both on- and off-ramps on Interstate Route H-2, at the Waipio Interchange.	14
7	Widen Likelike Highway from Kamehameha Highway to Kahekili Highway.	14
14	Widen Farrington Highway from Kunia to Waiawa by one lane in each direction, from west of Fort Weaver Road to Waiawa Interchange.	14
1	Construct new Interstate Route H-1 Kapolei Interchange for Kapolei between the Palailai Interchange and Makakilo Interchange.	14
12	Widen Salt Lake Boulevard from two to six lanes, between Maluna Street and Ala Lilikoi Street.	14
12	Widen Puuloa Road, from Pukuloa Road to Nimitz Highway.	14
16	Extend Hanua Street from Malakole Street to Farrington Highway. Construct new on- and off-ramps at Interstate Route H-1 Palailai Interchange to Hanua Street extension.	21
17	Widen and extend Kualakai Parkway as follows: • From three to six lanes from Kapolei Parkway to Interstate Route H-1 • Extend from Kapolei Parkway to Franklin D Roosevelt Avenue (six lanes).	21
6	Construct a new two-lane second access road between Whitmore Village and Wahiawa, from Whitmore Avenue to California Avenue. Continue the new two-lane second access road to Mililani Mauka, from California Avenue to Meheula Parkway.	21
17	Extend Kamokila Boulevard as a four-lane roadway between Roosevelt and Saratoga.	21
17	Extend Fort Barrette Road as a four-lane roadway between Roosevelt and Saratoga.	21
5	Extend Paiwa Street from north of Lumiauwau Street, to the intersection of Kamehameha Highway and Ka Uka Boulevard.	21
25	Widen the Interstate Route H-1 by one lane, in the westbound direction, through the Waiawa Interchange. This project will begin in the vicinity of the Waiawa Interchange and end at the Paiwa Interchange.	21
9	Extend Makakilo Drive (vicinity of Pueonani Street) south to the Interstate Route H-1 Freeway Interchange as four-lane roadway, connecting Makakilo Drive to Kualakai Parkway.	21
1	Widen Fort Barrette Road from two to four lanes, from Farrington Highway to Barbers Point Gate.	21
13	H-1 widening from Ward Avenue to Punahou Street.	21
20	Widen East-West Road from two to four lanes, from Farrington Highway to Old Fort Weaver Road.	21
2	Widen Interstate Route H-1 in the westbound direction by one lane from the Waiau Interchange to the Waiawa Interchange.	32
2	Widen the Interstate Route H-1 Waipahu Street off-ramp from one-to-two lanes, in the westbound direction, at the Waiawa Interchange.	32

CMP Package No.	ORTP Highway Project Description	2010 CMP Ranking
10	Construct a new two-lane elevated and reversible HOV flyover above Nimitz Highway, from the Keehi Interchange to Pacific Street. This project includes the removal of the existing eastbound contraflow lane in the AM peak and restoration of all turning movements on the at-grade portion of Nimitz highway.	32
3	Widen H-1 by one lane from Vineyard Boulevard to Middle Street.	32
8	Construct a secondary access road (tunnel) from the vicinity of Lunalilo Home Road to the vicinity of Kalanianaʻole Highway north of Sea Life Park.	36
24	Construct a new two-lane Makakilo Mauka Frontage Road, mauka of Interstate Route H-1, from Kalaeloa Boulevard to Makakilo Drive.	36
19	Extend Keoneula Boulevard from Kapolei Parkway to Franklin D. Roosevelt Avenue.	38
26	Extend PM contra flow lane westbound from Waiawa Interchange to Kunia Interchange.	38
11	Modify H-1 on-and-off ramps at University Interchange.	38
27	Extend PM contra flow lane westbound from Keehi Interchange to Radford Drive.	41

Change in V/C Ratio

All highway widening projects in each of the CMP packages showed a reduction in the V/C ratio. Changes in V/C ratios could not be measured for new roadways but they received points for providing additional capacity.

Vehicle Volume

The Kapolei Parkway extension from Aliinui Drive to Kalaeloa Boulevard project received the most points in this regard for having the largest change in the AM two-hour peak period volume from the 2035 Baseline. The Kapolei Parkway extension from Kamokila Boulevard to Fort Barrette Road and the addition of the Interstate Route H-1 median HOV from Waiawa to Makakilo Interchange projects tied for second in this performance measure.

Work-Related Transit Mode Share

Most highway-related CMP packages received a point for no change in work-related transit mode share compared to the Baseline. The CMP Project Package #2 had a decrease in work-related transit mode share and thus received no points for this metric. The projects in this package included the H-1 eastbound widening from Waiawa Interchange to Halawa Interchange, the Interstate Route H-1 westbound widening from Waiau Interchange to Waiawa Interchange, and the Interstate Route H-1 westbound widening of the Waipahu Street off-ramp. These three H-1 corridor-related projects attracted more auto-related traffic and drew trips away from the transit mode.

Vehicle Miles Traveled

Most highway-related CMP packages had a decrease or no change in daily VMT compared to the Baseline. The three packages that received an increase and thus no points were CMP Project #2 package (Interstate Route H-1 eastbound widening from Waiawa Interchange to Halawa Interchange, Interstate Route H-1 westbound widening between Waiau Interchange and Waiawa Interchange, and the Interstate Route H-1 westbound Waipahu Street off-ramp), CMP Project #25 package (Interstate Route H-1 HOV Median between Waiawa Interchange and Makakilo Interchange, Interstate Route H-1 westbound widening between Waiawa Interchange and Paiwa Interchange), and CMP Project #14 package (Farrington Highway widening between Golf Course Road and Fort Weaver Road, Farrington Highway widening between Fort Weaver Road and Waiawa Interchange).

Vehicle Hours of Delay

All highway-related CMP packages received either a decrease or no change in AM two-hour peak period VHD compared to the Baseline. The top three CMP packages that received the largest improvement in VHD were CMP Project #15 package (Farrington Highway widening from Hakimo Road to Kalaeloa Boulevard), CMP Project #4 package (Waianae Second Access Road, and Kunia Road Widening from Wilikina Drive to Farrington Highway), and CMP Project #6 package (Interstate Route H-2 Waipio Interchange widening, Interstate Route H-2 Pineapple Road Interchange, Central Mauka Road, and Wahiawa Second Access Road).

Vehicle Hours Traveled

All highway-related CMP packages received either a decrease or no change in AM two-hour peak period VHT compared to the Baseline. The top three CMP packages with the biggest improvement in VHT were the same as the top three packages for the VHD metric.

Transit Related Projects

Table 5-5 shows the project rankings and corresponding descriptions for the two transit projects. For the metrics that were used to rank the two transit projects, the West Kapolei to East Kapolei (Waianae-end) rail extension scored higher than the Ala Moana to UH Manoa and Waikiki (Diamond Head-end) rail extensions. However, it is important to mention that the Diamond Head-end rail extension had 20 percent more rail boardings compared to the Baseline while the Waianae-end rail extension had only 6.5 percent more rail boardings compared to the Baseline.

Table 5-5: CMP Transit Project Package Rankings and Descriptions

CMP Package No.	ORTP Transit Project Description	2010 CMP Ranking
21	Extend Rail from West Kapolei to East Kapolei. The western terminus begins on the Waianae-side of the new Hanua Street extension on Kapolei Parkway, continues alongside Kapolei Parkway turning makai near Wakea Street toward Saratoga Avenue, then heading Koko Head along Saratoga Avenue, turning mauka near Kualakai Parkway, and connecting with the Honolulu Rail Transit alignment's first station (East Kapolei).	1
22	Extend Rail from Ala Moana Center (at Kona Street) to UH Manoa (at Lower Campus Road: this extension continues along Kona Street to the Convention Center to Kapiolani Boulevard, turning mauka on University Avenue toward UH Manoa's Lower Campus Road) and Waikiki (between Liliuokalani and Ohua Avenues: this extension continues along Kona Street toward the Convention Center turning at Kalakaua Avenue and continuing on Kuhio Avenue where it ends between Liliuokalani and Ohua Avenues).	2

Work-Related Mode Share

Both transit projects had increases in work-related transit mode share. Overall work-related transit mode share increased from 12.2 to 12.5 percent.

Vehicle Miles Traveled

Both transit projects had decreases in daily VMT over the 2035 Baseline. The Waianae-end rail extension had a decrease of 27,100 miles in VMT over the Baseline, while the Diamond Head-end rail extension had a 32,600 mile decrease in VMT over the Baseline.

Vehicle Hours of Delay

The Waianae-end rail extension had a decrease of 360 hours of delay in the AM two-hour peak period VHD over the 2035 Baseline. The Diamond Head-end rail extension had a decrease of 290 hours of delay, but this was within the threshold of "no change" (the "no change" threshold was $-350 < \text{VHD} < 350$). It is important to note that the Waianae-end rail extension project barely met the threshold for a change in VHD.

Vehicle Hours Traveled

Both transit projects had decreases in AM two-hour peak period VHT over the 2035 Baseline. The Waianae-end rail extension had a decrease of 580 hours in VHT over the Baseline, while the Diamond Head-end rail extension had a 490 hour decrease in VHT over the Baseline.

5.2.6 Final Project Package

The projects proposed for the ORTP 2035 were ranked according to the outcomes of the CMP analysis and feedback gained from the public outreach activities. The

recommended projects and programs were presented to the OahuMPO TAC for consideration. Based on feedback from the TAC, the project package represented in Chapter 6 was approved for final analysis. The results of the combined performance of the projects and programs in the ORTP 2035 are reflected in Chapter 7.

6.1 Projects Included in ORTP 2035

The ORTP 2035 contains a total of 69 projects and programs worth a total of roughly \$23.8 billion meant to sustain, improve, and expand Oahu's transportation system with support for all the various users and modes. This fiscally-constrained plan was developed in coordination and consultation with various Federal, State, and County agencies, stakeholders, and residents from across the island. The ORTP 2035 is intended to integrate Oahu's transportation system with the various land uses around the island, while supporting anticipated growth and development. The projects and programs included in the Plan were selected based on their effectiveness and efficiency in addressing the various needs of the transportation system with regard to all user groups.

Figure 6-1 illustrates, where possible, the projects included in the ORTP 2035. Some projects are islandwide or programmatic in nature, and therefore cannot be singularly located. Table 6-1 presents the ORTP 2035 Project List in its entirety; the project numbers used in the table correspond to those in the Figure 6-1. For a detailed assessment of how the projects and programs in ORTP 2035 satisfy the five goals and 25 adopted objectives, please see Section 8.1.

Figure 6-1: ORTP 2035 Project Map

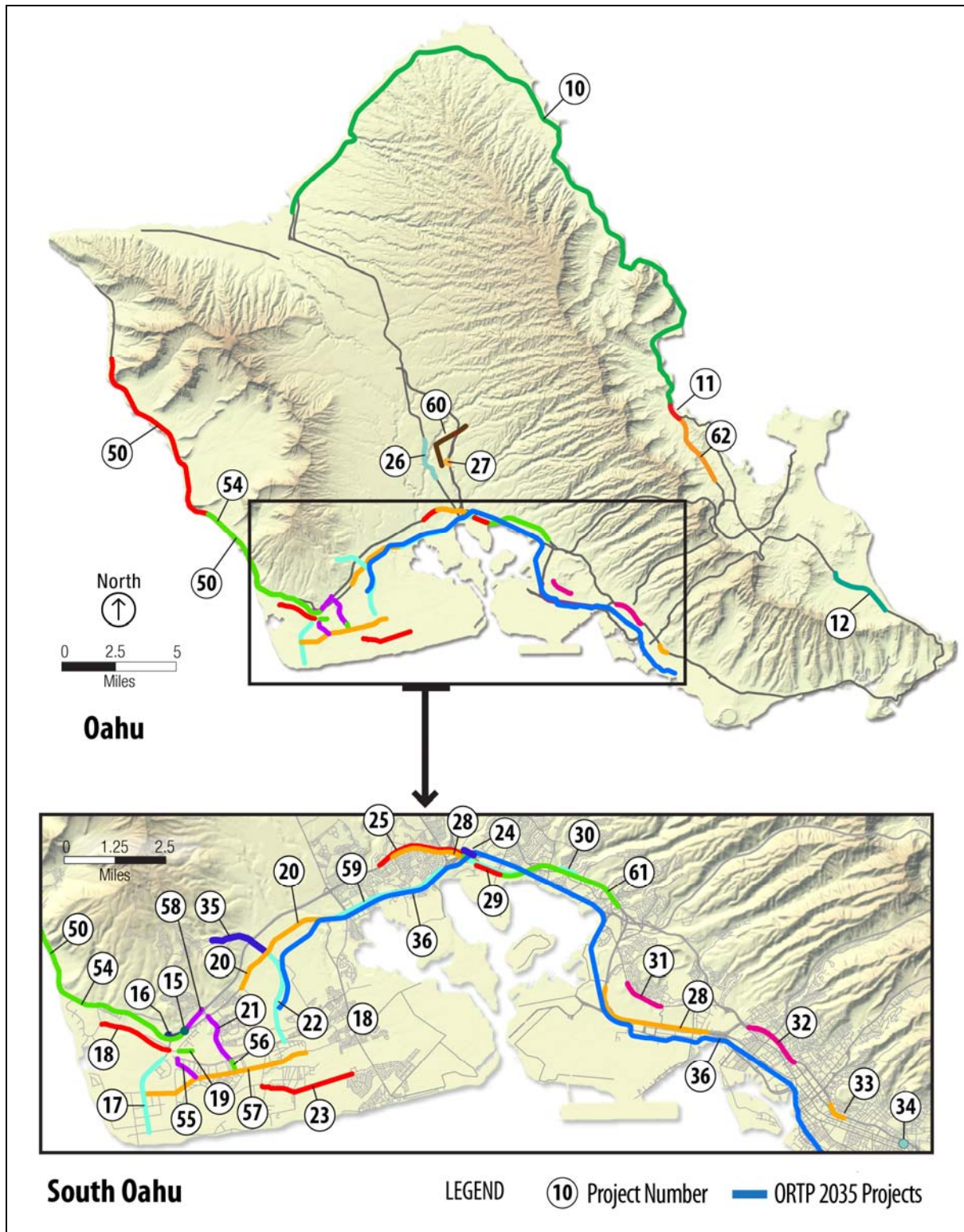


Table 6-1: ORTP 2035 Project List

Project No.	City/ State	Facility/Project Title	Project Description	In City or State Bicycle Plans*	Estimated Cost in \$M (\$YOE)
ISLANDWIDE PROJECTS – 2011 TO 2020					
1	S	<i>Bike Plan Hawaii - Oahu</i>	Implement Oahu elements of the State of Hawaii's <i>Bike Plan Hawaii</i> (2003).	✓	\$40.0
2	C/S	Enhancement Projects	Implement enhancement projects, including, but not limited to, projects from the Transportation Enhancement Program for Oahu.	✓	\$8.7
3	C	Human Services Transportation Coordination Program	Provide a range of transportation services targeted to disadvantaged populations under the Human Services Transportation Coordination Program.		\$16.5
4	C/S	Intelligent Transportation Systems (ITS)	Implement ITS projects including, but not limited to, those identified in the Oahu Regional ITS Architecture.		\$50.8
5	C	Joint Traffic Management Center	Construct a transportation management center behind the Alapai Transit Center that will combine transportation management with City, State, and emergency response agencies.		\$68.9
6	C	<i>Oahu Bike Plan</i>	Implement City and County bike projects.	✓	\$22.5
7	S	Transportation Demand Management (TDM) Program	Develop an aggressive TDM program that could include, but is not limited to: 1. Free real-time online carpool matching, 2. Outreach promotion and marketing of alternative transportation, 3. Emergency ride home program, 4. Major special events, 5. Employer based commuter programs, 6. Emerging and innovative strategies (e.g., car sharing).		\$10.0
8	S	Vanpool Program	Continue implementation and expansion of the State's Vanpool Hawaii program.		\$26.1
SAFETY AND OPERATIONAL IMPROVEMENT PROJECTS – 2011 TO 2020					
9	S	Highway Safety Improvement Program	Comprehensive program to fund safety improvements to reduce collisions and damage to property. Strategies may include installation of left turn lanes, roadway widening, traffic signal modifications, installation of rumble strips and crash attenuators, installation of guardrails and bridge railings and others.	✓	\$27.4
10	S	Kamehameha Highway, Safety Improvements, Haleiwa to Kahaluu	Construct safety improvements along Kamehameha Highway, from Haleiwa to Kahaluu. Safety improvements include turn lanes, guardrails, signage, crosswalks, etc. to improve safety. Widening of Kamehameha Highway will only be in areas where needed for storage/turn lanes safety improvements.		\$49.5
11	S	Kamehameha Highway, Safety & Operational Improvements, Kaalaea Stream to Hygienic Store	Construct safety and operational improvements along Kamehameha Highway, between Kaalaea Stream and Hygienic Store. Safety and operational improvements include passing and turning lanes, modification of signals, and installation of signs, flashers, and other warning devices. This project also includes replacement of Kaalaea Stream Bridge and Haiamoa Stream Bridge with structures that meet current design standards.	✓	\$17.0

Project No.	City/ State	Facility/Project Title	Project Description	In City or State Bicycle Plans*	Estimated Cost in \$M (\$YOE)
12	S	Kalanianaʻole Highway, Safety & Operational Improvements, Olomana Golf Course to Waimanalo Beach Park	Construct safety and operational improvements along Kalanianaʻole Highway between the Olomana Golf Course and Waimanalo Beach Park. Specific safety and operational improvements include construction of turning lanes, sidewalks, wheelchair ramps, bike paths or bike lanes, traffic signal upgrades, utility relocation, and drainage improvements.	✓	\$41.0
13	S	Rockfall Protection, Various Locations	Install rockfall protection or mitigation measures along various state highways at various locations.		\$50.0
14	S	Shoreline Protection Program	Protect shoreline along Kamehameha Highway and other locations.		\$20.0
CONGESTION MITIGATION PROJECTS – 2011 TO 2020					
15	S	Interstate Route H-1, New Interchange, Kapolei Interchange	Construct new Interstate Route H-1 Kapolei Interchange for Kapolei between the Palailai Interchange and Makakilo Interchange. Project to be constructed in multiple phases.		\$47.7
16	S	Hanua Street Extension, Farrington Highway to Malakole Street; Interstate Route H-1, New On- & Off-Ramps, Palailai Interchange	Hanua Street: • Extend Hanua Street from Malakole Street to Farrington Highway. This new four-lane roadway will provide access to Kalaeloa Harbor. Interstate Route H-1, Palailai Interchange: • Construct new on- and off-ramps at Interstate Route H-1 Palailai Interchange to Hanua Street extension.		\$120.0
17	C	Kalaeloa Boulevard, Reconstruction and Widening; Lauwiliwili Street to Olai Street	Improve and reconstruct Kalaeloa Boulevard between Lauwiliwili Street and Olai Street.		\$30.0
18	C	Kapolei Parkway, Extension & Widening, Aliinui Drive to Kalaeloa Boulevard	Extend the existing four-lane Kapolei Parkway, from Aliinui Drive to Hanua Street. This project includes widening of Kapolei Parkway from four to six lanes from Hanua Street to Kalaeloa Boulevard.		\$44.1
19	C	Kapolei Parkway, Extension, Kamokila Boulevard to Kamaaha Avenue	Complete the extension of the existing four-lane Kapolei Parkway.	✓	\$13.3
20	C	Farrington Highway, Widening, Golf Course Road to west of Fort Weaver Road	Widen Farrington Highway from two to four lanes, from Golf Course Road to just west of Fort Weaver Road.	✓	\$33.0
21	S	Fort Barrette Road, Widening, Farrington Highway to Barber's Point Gate	Widen Fort Barrette Road from two to four lanes from Farrington Highway to Barber's Point Gate.	✓	\$23.5
22	S	Kualaka'i Parkway, Widening & Extension, Interstate Route H-1 to Franklin D. Roosevelt Avenue	Widen and extend Kualaka'i Parkway as follows: • From three to six lanes from Kapolei Parkway to Interstate Route H-1, • Extend from Kapolei Parkway to Franklin D. Roosevelt Avenue (six lanes).	✓	\$200.0
23	S	Keoneula Boulevard, Extension, Kapolei Parkway to Franklin D. Roosevelt Avenue	Extend Keoneula Boulevard from Kapolei Parkway to Franklin D. Roosevelt Avenue.		\$209.5
24	S	Interstate Route H-1, Widening, Waipahu Off-Ramp	Widen the Interstate Route H-1 Waipahu Street off-ramp from one to two lanes, in the westbound direction, at the Waiawa Interchange.		\$28.8

Project No.	City/ State	Facility/Project Title	Project Description	In City or State Bicycle Plans*	Estimated Cost in \$M (\$YOE)
25	S	Interstate Route H-1, Widening, Waiawa Interchange	Widen the Interstate Route H-1 by one lane in each direction through the Waiawa Interchange. This project will begin in the vicinity of the Waiawa Interchange and end at the Paiwa Interchange.		\$16.2
26	S	Kamehameha Highway, Widening, Lanikuhana Avenue to Ka Uka Boulevard	Widen Kamehameha Highway from a three-lane to a four-lane divided facility between Lanikuhana Avenue and Ka Uka Boulevard. This project includes shoulders for bicycles and disabled vehicles, bridge crossing replacement, bikeways, etc.		\$130.0
27	S	Interstate Route H-2, Widening, Waipio Interchange	Widen both on- and off-ramps on Interstate Route H-2, at the Waipio Interchange. This project includes the widening of the Ka Uka Boulevard overpass and intersection improvements to facilitate movement to and from the on- and off-ramps.		\$30.6
28	S	Interstate Route H-1, Contra Flow Lane extension (PM), Waiawa Interchange to Kunia Interchange and Keehi Interchange to Radford Drive	This project would construct an extension of the PM contra-flow lane on the Interstate Route H-1, in the westbound direction, on the west end from Waiawa Interchange to Kunia Interchange and on the east end from the Keehi Interchange to Radford Drive.		\$165.0
29	S	Interstate Route H-1, Pearl City and Waimalu Viaduct Improvements, Phase 2	Replace, repair, and/or strengthen the Pearl City and Waimalu Viaduct concrete deck and other structural components, including guardrails. Project will be implemented in five phases.		\$100.0
30	S	Interstate Route H-1, Waiau Interchange to Halawa Interchange, Widening, Eastbound	Widen the H-1 Freeway to six lanes from the Waiau Interchange to the Halawa Interchange in the eastbound direction, and restore the current freeway lane width and shoulder standards. Project may be phased due to high cost.		\$100.0
31	C	Salt Lake Boulevard Widening Project	Widen Salt Lake Boulevard from two to six lanes, between Maluna Street and Ala Lilikoi Street.	✓	\$66.0
32	S	Interstate Route H-1, Widening, Ola Lane to Vineyard Boulevard	Widen the Interstate Route H-1 by one lane, in the eastbound direction, from Ola Lane to Vineyard Boulevard as identified below: <ul style="list-style-type: none"> • From two to three lanes from Ola Lane/Middle Street to Likelike Highway off-ramp, • From three to four lanes from Likelike Highway off-ramp to Vineyard Boulevard. This project also includes the widening of: <ul style="list-style-type: none"> • Gulick Avenue overpass to allow five lanes to pass under it, • Kalihi Interchange overcrossings to allow four lanes to pass under it. 		\$104.0
33	S	Interstate Route H-1, Operational Improvements, Lunalilo Street Off-Ramp and On-Ramp (Between Lunalilo Street on-ramp and Vineyard Boulevard off-ramp)	Improve operation and capacity on the westbound H-1 Freeway by modifying weaving movements between the Lunalilo Street on-ramp and Vineyard Boulevard off-ramp.		\$6.0

Project No.	City/ State	Facility/Project Title	Project Description	In City or State Bicycle Plans*	Estimated Cost in \$M (\$YOE)
34	S	Interstate Route H-1, Operational Improvements, Ward Avenue On-Ramp to University Avenue Interchange	Improve traffic flow on the Interstate Route H-1, in the eastbound direction, from the Ward Avenue on-ramp to the University Avenue Interchange through operational improvements.		\$65.0
SECOND ACCESS PROJECTS – 2011 TO 2020					
35	C	Makakilo Drive, Second Access, Makakilo Drive to Kualaka'i Parkway / Interstate Route H-1 Interchange	Extend Makakilo Drive (vicinity Pueonani Street) south to the Interstate Route H-1 Freeway Interchange as four-lane roadway, connecting Makakilo Drive to Kualaka'i Parkway.	✓	\$69.1
TRANSIT PROJECTS – 2011 TO 2020					
36	C	Honolulu High-Capacity Transit Corridor Project	Plan, design, and construct a fixed guideway system between East Kapolei and Ala Moana Center. This project includes intermodal connections with TheBus system to provide feeder services to fixed guideway stations.		\$5,532.5
37	C	TheBus Service, Expansion, Islandwide	Expand the bus service through increase of capacity of the existing system to accommodate population growth. Expanded service will be ADA-compliant. This includes: <ul style="list-style-type: none"> • Expansion of Services to and within Ewa, Kapolei, Central, and Windward Oahu, • Expansion through increase of Express service to the North Shore, Waianae, and Windward Oahu, • Restructure of service in urban Honolulu. 		\$10.0
38	C	Transit Centers, Various Locations	Construct transit centers at various locations islandwide to support transit operations.		\$70.0
OPERATIONS, MAINTENANCE & SYSTEM PRESERVATION – 2011 TO 2020					
39	C	City Operations and Maintenance (O&M): Roadways	Maintain and operate the City's existing and future roadway. Includes, but is not limited to, resurfacing, guardrail and shoulder improvements, lighting improvements, drainage improvements, signal and sign upgrades and replacement, etc.		\$537.1
40	C	City Operations and Maintenance (O&M): Transit	Maintain and operate the City's existing and future transit, and paratransit operations and routine maintenance. Includes, but is not limited to, operation of the transit system (including bus, rail, and paratransit), plan, design and construct a third bus operating facility, etc.		\$2,900.1
41	S	State Operations and Maintenance	Maintain and operate the State's existing and future highway operations and routine maintenance. Special Maintenance Program (SMP) Projects include, but are not limited to, pavement repair, preventative maintenance, resurfacing and rehabilitation, etc.		\$380.00
42	S	System Preservation	Preserve the highway system through projects including, but not limited to, bridge replacement and seismic retrofit, guardrail and shoulder improvements, lighting improvements, drainage improvements, sign upgrades and replacement, traffic signal upgrade and retrofit, etc.		\$150.7
COST SUBTOTALS: MID-RANGE PLAN (2011 TO 2020)				CATEGORIES	SUBTOTALS
				Islandwide Projects	\$243.5
				Safety and Operational Improvement Projects	\$204.9
				Congestion mitigation Projects	\$1,532.7
				Second Access Projects	\$69.1
				Transit Projects	\$5,612.5

Project No.	City/ State	Facility/Project Title	Project Description	In City or State Bicycle Plans*	Estimated Cost in \$M (\$YOE)
Operations, Maintenance & System Preservation					\$3,967.9
All Categories					\$11,630.6
SUBTOTALS BY JURISDICTION					
City & County of Honolulu Share of Project Costs					\$9,422.6
State of Hawaii Share of Project Costs					\$2,208.0
Total: All Shares					\$11,630.6
ISLANDWIDE PROJECTS – 2021 TO 2035					
43	S	Bike Plan Hawaii - Oahu	Implement Oahu elements of the State of Hawaii's Bike Plan Hawaii.	✓	\$100.0
44	S	Enhancement Projects	Implement enhancement projects, including, but not limited to, projects from the Transportation Enhancement Program for Oahu.	✓	\$50.0
45	C	Human Services Transportation Coordination Program	Provide a range of transportation services targeted to disadvantaged populations under the Human Services Transportation Coordination Program.		\$33.2
46	C/S	Intelligent Transportation Systems (ITS)	Implement ITS projects including, but not limited to, those identified in the Oahu Regional ITS Architecture.		\$138.0
47	C	Oahu Bike Plan	Implement City and County bike projects	✓	\$37.5
48	S	Transportation Demand Management (TDM) Program	Develop an aggressive TDM program that could include, but is not limited to: 1. Free real-time online carpool matching, 2. Outreach promotion and marketing of alternative transportation, 3. Emergency ride home program, 4. Major special events, 5. Employer based commuter programs, 6. Emerging and innovative strategies (e.g., car sharing).		\$20.0
49	S	Vanpool Program	Continue implementation and expansion of the State's Vanpool Hawaii Program.		\$88.1
SAFETY AND OPERATIONAL IMPROVEMENT PROJECTS – 2021 TO 2035					
50	S	Farrington Highway, Safety Improvements, Makua Valley Road to Aliinui Drive	Construct safety improvements on Farrington Highway along the Waianae Coast, from Makua Valley Road (Kaena Point) to Aliinui Drive (Kahe Point). This project includes realignment around Makaha Beach Park, between Makau Street and Water Street.		\$209.0
51	S	Highway Safety Improvement Program	Comprehensive program to fund safety improvements to reduce collisions and damage to property. Strategies may include installation of left turn lanes, roadway widenings, traffic signal modifications, installation of rumble strips and crash attenuators, installation of guardrails and bridge railings and others.		\$21.2
52	S	Rockfall Protection, Various Locations	Install rockfall protection or mitigation measures along various state highways at various locations.		\$75.0
53	S	Shoreline protection program	Kamehameha Highway and other locations.		\$30.0
CONGESTION MITIGATION PROJECTS – 2021 TO 2035					
54	S	Farrington Highway, Widening, Hakimo Road to Kalaeloa Boulevard	Widen Farrington Highway from four to six lanes, from Hakimo Road to Kalaeloa Boulevard, including the intersection of Lualualei Naval Road.	✓	\$233.1
55	C	Kamokila Boulevard	Extend as four-lane roadway between Franklin D. Roosevelt Avenue and Saratoga Street.	✓	\$24.2
56	C	Fort Barrette Road	Extend as four-lane roadway between Franklin D. Roosevelt Avenue and Saratoga Street.	✓	\$10.7

Project No.	City/ State	Facility/Project Title	Project Description	In City or State Bicycle Plans*	Estimated Cost in \$M (\$YOE)
57	C	Kalaeloa East-West Spine Road, New Roadway, Kalaeloa Boulevard to Geiger Road	Construct a new four-lane east-west spine road within Kalaeloa by realigning and connecting portions of the existing Saratoga Avenue from Kalaeloa Boulevard in the west and to Geiger Road in the east.		\$271.1
58	S	Makakilo Mauka Frontage Road, New Roadway, Kalaeloa Boulevard to Makakilo Drive	Construct a new two-lane Makakilo Mauka Frontage Road, mauka of Interstate Route H-1, from Kalaeloa Boulevard to Makakilo Drive.		\$18.2
59	S	Farrington Highway, Widening, west of Fort Weaver Road to Waiawa Interchange	Widen Farrington Highway from Kunia to Waiawa by one lane in each direction, from west of Fort Weaver Road to Waiawa Interchange.	✓	\$130.8
60	S	Interstate Route H-2, New Interchange, Pineapple Road Overpass	Construct a new full-service freeway interchange on Interstate Route H-2, between Meheula Parkway and Ka Uka Boulevard, to accommodate future developments in Central Oahu. This project includes the widening of the existing Pineapple Road Overpass from two to four lanes, and the addition of new on- and off-ramps to and from Interstate Route H-2 at Pineapple Road Overpass.		\$102.5
61	S	Interstate Route H-1, Widening, Waiawa Interchange to Halawa Interchange	Widen the Interstate Route H-1 by one lane in the eastbound direction, from the Waiawa Interchange to the Halawa Interchange.		\$540.3
62	S	Kahekili Highway, Widening, Kamehameha Highway to Haiku Road	Widen Kahekili Highway from two to four lanes, from Kamehameha Highway to Haiku Road. This project also includes the following improvements: <ul style="list-style-type: none"> • Contraflow in existing right-of-way between Hui Iwa Street and Haiku Road, • Intersection improvements at Hui Iwa Street and Kamehameha Highway. 	✓	\$75.0
TRANSIT PROJECTS – 2021 TO 2035					
63	C	City Rail Rehabilitation and Fleet Expansion	Provide for rehabilitation of track and expansion of rail fleet.		\$203.0
64	C	TheBus Service, Expansion, Islandwide	Expand the bus service through increase of capacity of the existing system to accommodate population growth. Expanded service will be ADA-compliant. This includes: <ul style="list-style-type: none"> • Expansion of Services to and within Ewa, Kapolei, Central, and Windward Oahu, • Expansion through increase of Express service to the North Shore, Waianae, and Windward Oahu, • Restructure of service in urban Honolulu. 		\$848.0
65	C	Transit Centers, Various Locations	Construct transit centers at various locations islandwide to support transit operations.		\$9.0
OPERATIONS, MAINTENANCE & SYSTEM PRESERVATION – 2021 TO 2035					
66	C	City Operations and Maintenance: Roadways	Maintain and operate the City's existing and future roadway. Includes, but is not limited to, resurfacing, guardrail and shoulder improvements, lighting improvements, drainage improvements, signal and sign upgrades and replacement, etc.		\$800.3
67	C	City Operations and Maintenance: Transit	Maintain and operate the City's existing and future transit, and paratransit operations and routine maintenance. Includes, but is not limited to, operation of the transit system (including bus, rail, paratransit, and ferry), replacement of existing fleet, plan, design and construct a third bus operating facility, etc.		\$6,872.1

Project No.	City/ State	Facility/Project Title	Project Description	In City or State Bicycle Plans*	Estimated Cost in \$M (\$YOE)
68	S	State Operations and Maintenance	Maintain and operate the State's existing and future highway operations and routine maintenance. Special Maintenance Program (SMP) Projects include, but is not limited to, pavement repair, preventative maintenance, resurfacing and rehabilitation, etc.		\$704.4
69	S	System Preservation	Preserve the highway system through projects including, but not limited to, bridge replacement and seismic retrofit, guardrail and shoulder improvements, lighting improvements, drainage improvements, sign upgrades and replacement, traffic signal upgrade and retrofit, etc.		\$517.7
COST SUBTOTALS: LONG-RANGE PLAN (2020 TO 2035)				CATEGORIES	SUBTOTALS
				Islandwide Projects	\$466.8
				Safety and Operational Improvement Projects	\$335.2
				Congestion mitigation Projects	\$1,405.9
				Transit Projects	\$1,060.0
				Operations, Maintenance & System Preservation	\$8,894.5
				All Categories	\$12,162.4
SUBTOTALS BY JURISDICTION					
				City & County of Honolulu Share of Project Costs	\$9,113.6
				State of Hawaii Share of Project Costs	\$3,048.8
				Total: All Shares	\$12,162.4
ORTP 2035 COST TOTALS: 2011 TO 2035				CATEGORIES	SUBTOTALS
				Islandwide Projects	\$710.3
				Safety and Operational Improvement Projects	\$540.1
				Congestion mitigation Projects	\$2,938.6
				Second Access Projects	\$69.1
				Transit Projects	\$6,672.5
				Operations, Maintenance & System Preservation	\$12,862.4
				All Categories	\$23,793.0
SUBTOTALS BY JURISDICTION					
				City & County of Honolulu Share of Project Costs	\$18,536.2
				State of Hawaii Share of Project Costs	\$5,256.8
				Total: All Shares	\$23,793.0
NOTE: Illustrative projects listed below are not included in the financially constrained plan due to funding limitations. If additional funding becomes available, they may be considered for amendment to the plan.					
ILLUSTRATIVE PROJECTS					
70	S	Interstate Route H-1, On- & Off-Ramp Modifications, Various Locations	Modify and/or close various on- and off- ramps on the Interstate Route H-1.		\$108.0
71	S	Kunia Road, Widening and Interchange Improvement, Wilikina Drive to Farrington Highway	Widen Kunia Road as follows: • From two to four lanes, from Wilikina Drive to Anonui Street, • From two to four lanes, from Anonui Street to Kupuna Loop, • From four to six lanes, from Kupuna Loop to Farrington Highway. •Also, add one-lane eastbound loop on-ramp at Kunia Road & Interstate Route H-1.	✓	\$348.9
72	S	Interstate Route H-1, Widening, Waiiau Interchange to Waiawa Interchange	Widen Interstate Route H-1 in the westbound direction by one lane from the Waiiau Interchange to the Waiawa Interchange.		\$338.9

Project No.	City/ State	Facility/Project Title	Project Description	In City or State Bicycle Plans*	Estimated Cost in \$M (\$YOE)
73	S	Interstate Routes H-1 and H-2, Operational Improvements, Waiawa Interchange	Modify the Interstate Routes H-1 and H-2 Waiawa Interchange, to improve merging characteristics through operational improvements (e.g., additional transition lanes).		\$112.1
74	S	Interstate Route H-1, Widening, Vineyard Boulevard to Middle Street	Widen the Interstate Route H-1 by one lane in the westbound direction, from Vineyard Boulevard to Middle Street.		\$200.0
75	S	Nimitz Highway, High Occupancy Vehicle (HOV) Flyover, Keehi Interchange to Pacific Street	Construct a new two-lane elevated and reversible HOV flyover above Nimitz Highway, from the Keehi Interchange to Pacific Street. This project includes the removal of the existing eastbound contraflow lane in the AM peak and restoration of all turning movements on the at-grade portion of Nimitz highway.		\$537.5
76	S	Interstate Route H-1, Widening, Ward Avenue to Punahou Street	Widen the existing Interstate Route H-1 by one lane in the eastbound direction, from Ward Avenue to Punahou Street.		\$100.0
77	S	Waianae, Second Access, Farrington Highway to Kunia Road	Construct a new two-lane second access road to Waianae from Farrington Highway in the vicinity of Maili, over the Waianae Mountain Range, to Kunia Road. Requires Kunia Road, Widening and Interchange Improvement, Wilikina Drive to Farrington Highway (#71) to ensure benefit; priority for new administration.	✓	\$1,269.0
78	C	Fixed Guideway, West Kapolei to East Kapolei	Plan, design, and construct a fixed guideway system between West Kapolei to East Kapolei.		\$2,031.6
79	C	Fixed Guideway, Ala Moana to UH Manoa and Waikiki	Plan, design, and construct a fixed guideway system between Ala Moana and UH Manoa and Waikiki.		\$1,828.4
80	C	Fixed Guideway, Pearl City to Mililani	Plan, design, and construct a fixed guideway system between Pearl City and Mililani.		\$1,268.4
81	C	East-West Road	Construct as four-lane roadway between Farrington Highway and Fort Weaver Road.		\$57.3

*Projects that are included in or consistent with the City's or State's bicycle plans.

6.1.1 Islandwide Projects

The 15 islandwide projects contained in the ORTP 2035 serve to support and improve multi-modal transportation system operations. Unlike the location-specific projects in the Plan, these projects and programs aim to improve system connectivity and travel choices throughout Oahu. The total cost of the islandwide projects in the plan is just over \$710 million.

These projects would include the implementation of Oahu elements of *Bike Plan Hawaii* and projects included in the *Oahu Bike Plan*. It is the existing policy of HDOT that when a new roadway is built or an existing roadway widened a bicycle facility shall be built (and may be built on an adjacent facility), when feasible. Feasibility takes into account funding for the facility, the facility's proximity to existing bicycle facilities in the area, its consistency with the *Bike Plan Hawaii*, and if the roadway project involved is part of an emergency repair.

Many of the islandwide projects are supportive of the State's Complete Streets policy, established by Act 54, 2009 Session Laws of Hawaii. Oahu's complete streets policy serves as an important guide and process for transportation system designs by improving safety through the provision of adequate sidewalks, bike lanes, and crosswalks among other roadway improvements such as sufficient turning radii for large freight trucks. Under the Complete Streets law, a statewide task force reviewed existing State and County highway design standards and guidelines and proposed changes to procedures and design manuals to accommodate all users of the road, no matter age, ability, or mode of transportation. The task force submitted its recommendations to the Hawaii Legislature and both the State and City (as well as the Neighbor Island counties) to determine how best to implement them. The ORTP 2035 supports this concept by including improvements as well as roadway designs that reflect Complete Streets concepts.

In 2006, voters approved Charter Amendment #8 to make Oahu more pedestrian- and bicycle-friendly. The Revised Charter of Honolulu now specifically mentions bikeways under the powers, duties and functions for the Director of the DTS, and a new section (Section 6-17) has been added that explicitly states the priority of making the City pedestrian and bicycle friendly.

The continued operation of the TDM project – the Vanpool Hawaii Program – would assist in providing increased choices for commuters to move out of traffic congestion. The Enhancement Projects and implementation of ITS projects would improve the experience of users of Oahu's transportation system, through better and more coordinated facilities. Improved coordination between agencies would be achieved through the Human Services Transportation Coordination Program and construction of the Joint Traffic Management Center.

6.1.2 *Safety and Operational Improvement Projects*

The ORTP 2035 includes three comprehensive projects aimed at improving the safety and operation of the island's transportation system. The projects in this category include the Highway Safety Improvement Program that aims to reduce accidents and property damage, a Rockfall Protection Program that seeks to install rockfall protection and/or mitigation measures where needed, and the Shoreline Protection Program that would protect the shoreline in areas of coastal roadways.

There are also four projects that focus on particular roadways. Farrington Highway, Kalaniana'ole Highway, and Kamehameha Highway are all slated for safety and operational improvements. These include the installation of passing and turn lanes, guardrails, improved or additional signage, potential roadway realignment and/or widening in areas where necessary, and replacement of some bridges to achieve current design standards.

The total cost of the Safety and Operational Improvement projects in the Plan is approximately \$540 million.

6.1.3 Congestion Mitigation Projects

There are 29 congestion mitigation projects in the ORTP 2035. These projects consist largely of efforts aimed at reducing congestion on the most heavily-utilized highways and roadways, including the H-1, and Farrington and Kamehameha Highways.

The total cost of the congestion mitigation projects in the plan is roughly \$2.94 billion, just over 12 percent of the total Plan cost.

6.1.4 Second Access Projects

There is one second access project in the ORTP 2035 that would extend Makakilo Drive south to the H-1 freeway interchange to connect Makakilo Drive to Kualakai Parkway. This project is anticipated to cost \$69.1 million.

6.1.5 Transit Projects

There are six transit projects listed in the ORTP 2035. The HHCTCP (project #36) remains a key project for providing additional transit system access and, in the future, the rehabilitation of the rail system and expansion of its fleet (project #63) would be necessary for the transit system's continued operation.

Other projects consist of a continued effort toward expanding and supporting the existing bus transit system. Expansion of TheBus service would increase transit capacity, and the construction of transit centers in various locations around the island would increase transit accessibility. Some bus routes would likely be reevaluated to serve more complementary roles to the HHCTCP. These projects have the potential to improve overall transit system speeds, coverage, performance, reliability, and function.

The total cost of the transit projects in the plan is approximately \$6.67 billion, or 28 percent of the total ORTP 2035 cost.

6.1.6 Operations, Maintenance and System Preservation Projects

The ORTP 2035 recognizes the importance of maintaining and operating Oahu's existing multi-modal transportation system. The four operations, maintenance, and system preservation projects included in the ORTP 2035 focus on maximizing the life, use, and efficiency of existing and future transportation system facilities.

The total cost of the operations, maintenance, and system preservation projects in the ORTP 2035 is \$12.86 billion, or about 54% of the total ORTP 2035 cost.

6.2 Illustrative Projects

Illustrative projects are those that have been identified by the OahuMPO as potential future projects. At present, they do not have an established funding source for their

development that the project sponsor can use. It is possible that the project sponsor may obtain guaranteed aid in the future. The ORTP 2035 Illustrative Project List is listed below.

- Interstate Route H-1 On- and Off-Ramp Modifications: Various Locations;
- Kunia Road Widening and Interchange Improvement: Wilikina Drive to Farrington Highway;
- Interstate Route H-1 Widening: Waiau Interchange to Waiawa Interchange;
- Interstate Routes H-1 and H-2 Operational Improvements: Waiawa Interchange;
- Interstate Route H-1 Widening: Vineyard Boulevard to Middle Street;
- Nimitz Highway HOV Flyover: Keehi Interchange to Pacific Street;
- Interstate Route H-1 Widening: Ward Avenue to Punahou Street;
- Waianae Second Access: Farrington Highway to Kunia Road;
- Fixed Guideway: West Kapolei to East Kapolei;
- Fixed Guideway: Ala Moana to UH Manoa and Waikiki; and
- Fixed Guideway: Pearl City to Mililani.

The projects contained in the ORTP 2035 were evaluated using the performance measures discussed in Chapter 2. These measures reflect how well the ORTP 2035 meets the five overarching goals related to the following topical areas:

- Transportation facilities
- Transportation operations and services
- Natural environment
- Human environment and quality of life
- Land use and transportation integration

The data necessary to conduct the evaluation analyses for the quantitative transportation service and environmental justice performance measures were obtained from the OahuMPO travel demand forecasting model. The OahuMPO model was used to forecast transportation conditions for the 2035 Baseline and for the ORTP 2035, for daily and morning peak periods.

Travel statistics generated by the model support the evaluation of the service effectiveness and congestion mitigation performance measures, as well as analysis of the environmental justice effects, which are documented in this chapter.

The analysis and performance evaluation of the ORTP 2035 was aimed at meeting the goals and objectives that were described in Chapter 2. The following sections discuss the performance of the ORTP 2035 through the evaluation of operating conditions and travel statistics and comparison with the 2035 Baseline conditions discussed earlier in Chapter 3.

7.1 2035 Baseline and ORTP 2035 Transportation System Performance

The transportation service effectiveness goals center on developing and maintaining Oahu's islandwide transportation system to provide an inclusive, multi-modal transport system whose connectedness provides efficient means for users desiring to move about the island by bicycle, freight carrier, pedestrian facility, roadway, transit service, and intermodal connectors; and to do this in a manner which will ensure the efficient, dependable, safe, secure, convenient, and economical movement of people and goods.

This section discusses the ORTP 2035 travel patterns and expected transportation system performance on Oahu for all modes of travel, and compares them to the 2035 Baseline conditions.

7.1.1 Travel Patterns

Screenline Person Trips

Table 7-1 shows the daily person trips estimated for the ORTP 2035 and the total percent change from the 2035 Baseline.

Table 7-1: Daily Screenline Person Trips (ORTP 2035)

Screenline	SOV	HOV 2+	Transit	Total	Difference from 2035 Baseline	Percent Difference
1. Nuuanu Stream Bridge	254,000	179,400	73,200	506,600	-5,300	-1%
2. Manoa Palolo/Ala Wai Canal	266,200	173,300	57,700	497,200	-2,200	0%
3. East of Ward Ave	268,900	187,400	67,600	523,900	-5,600	-1%
4. Kapalama Drainage Canal	251,800	180,100	123,200	555,100	-6,000	-1%
5. Kalauao	318,100	241,900	56,900	616,900	4,800	1%
6. Waikele	136,600	121,500	33,500	291,600	4,100	1%
7. Kahe Point	39,800	45,300	11,200	96,300	2,800	3%
8. Ewa	117,600	105,800	31,400	254,800	13,500	6%
9. Trans Koolau	88,500	75,200	13,400	177,100	-1,200	-1%
10. Waipahu	155,900	155,300	21,500	332,700	10,000	3%
11. Wahiawa/Mililani	69,200	66,700	9,500	145,400	-300	0%
12. Haleiwa	17,500	18,300	2,900	38,700	-700	-2%
13. Waimea	9,900	9,800	1,400	21,100	-400	-2%
14. Hauula	12,900	9,300	2,300	24,500	-100	0%
15. Kahaluu	17,000	13,300	2,900	33,200	700	2%
16. Kailua/Kaneohe	42,900	39,700	6,800	89,400	-200	0%
17. Maunawili	30,000	28,000	6,200	64,200	-200	0%
18. Sandy Beach Park	3,700	3,000	1,100	7,800	0	0%
19. Waimanalo	11,100	11,600	1,400	24,100	0	0%
20. Kahala	61,900	56,400	8,600	126,900	-300	0%
21. Salt Lake	203,800	170,200	57,700	431,700	400	0%
22. Kalaeloa/Kapolei	166,100	158,700	50,200	375,000	-26,700	-7%

As in the 2035 Baseline, Screenline 5 (Kalauao), near Aiea, which captures person trips traveling between Downtown Honolulu and Pearl City, Waipahu, Central Oahu, Ewa and Kapolei, is estimated to have the maximum number of daily person trips for the ORTP 2035. Screenline 18 (Sandy Beach Park), near Hawaii Kai, has the least number of daily person trips out of the 22 screenlines.

In comparison to the 2035 Baseline, the Kalauao, Kahe Point, Ewa, Waipahu, and Waikele screenlines would experience an increase in SOV person trips as the H-1 and Farrington Highway widening projects would improve throughput in these areas. The Kalaeloa/Kapolei screenline (22) illustrated the greatest change between the ORTP 2035 and 2035 Baseline alternatives. Here, the 2035 Baseline had 26,700 more daily person trips than the ORTP 2035, as well as 9,000 more SOV trips, 13,000 more HOV2+ trips, and 14,800 more transit trips than the ORTP 2035. The new facilities added in the ORTP 2035 allowed traffic to take alternate routes, some

of which did not cross the screenline. Hence, trips crossing this screenline were lower, even though trips in the greater vicinity remained the same.

Mode Share

Table 7-2 details the mode split as estimated by the 2035 Baseline and ORTP 2035 travel demand forecasting models. SOV and HOV person trips are projected to increase very slightly as a result of the widening projects and new roadways in the ORTP 2035, while person trips for other modes are forecasted to decrease slightly in the ORTP 2035.

Table 7-2: Mode Split Estimates (2035 Baseline and ORTP 2035)

Mode	2035 Baseline Daily Person Trips	Percent	ORTP 2035 Daily Person Trips	Percent	Difference	Percent Difference
SOV	1,492,700	36.9%	1,499,200	37.1%	6,500	0.4%
HOV	1,842,400	45.6%	1,845,400	45.6%	3,000	0.2%
Transit	245,900	6.1%	245,500	6.1%	-400	-0.2%
Bicycle	46,000	1.1%	45,500	1.1%	-500	-1.1%
Pedestrian	416,100	10.3%	408,500	10.1%	-7,600	-1.8%
Total	4,043,100	100.0%	4,044,100	100.0%	1,000	0.0%

Note: Mode split may not sum to totals due to rounding.

Average Vehicle Occupancy

Based on output from the ORTP 2035 alternative travel demand modeling results, the average occupancy for motorized vehicles on Oahu (excluding buses and commercial vehicles) is forecasted at 1.90 persons per vehicle. This AVO is across all trip purposes and remains similar to the 2035 Baseline.

Vehicle Miles of Travel

Table 7-3 summarizes the total islandwide daily VMT by motorized vehicles (automobiles, buses, and commercial vehicles), as estimated by the travel demand forecasting model for the 2035 Baseline and ORTP 2035. There was a slight overall increase of approximately 147,100 (one percent) daily VMT forecasted between the 2035 Baseline and the ORTP 2035. Most of the increase occurred on expressways as portions of Farrington Highway and Kamehameha Highway were widened, which provided more capacity and relieved congestion in those areas.

Table 7-3: Daily Vehicle Miles Traveled (2035 Baseline and ORTP 2035)

Facility Type	Daily VMT				VMT Change (2035 Baseline to ORTP 2035)	
	2035 Baseline	Percent	ORTP 2035	Percent	Difference	Percent Difference
Freeways	5,959,300	39.2%	5,975,300	38.9%	16,000	0.3%
Expressways	1,707,700	11.2%	1,780,100	11.6%	72,400	4.2%
Ramps	791,300	5.2%	804,000	5.2%	12,700	1.6%
Arterials	4,963,300	32.6%	5,015,000	32.7%	51,700	1.0%
Collectors	1,787,300	11.8%	1,781,600	11.6%	-5,700	-0.3%
Total	15,208,900	100.0%	15,356,000	100.0%	147,100	1.0%

Note: VMT by facility type may not sum to totals due to rounding.

Vehicles Hours of Travel

Table 7-4 lists the total duration of islandwide daily trips by motorized vehicles as estimated by the 2035 Baseline and ORTP 2035 travel demand forecasting models. The travel demand forecasting model estimates an overall decrease in daily VHT of approximately 15,500 hours (-3.3 percent) between the 2035 Baseline and ORTP 2035. There is a small percentage decrease across all facility types with expressways having the largest percentage decrease at -6.5 percent. This overall decrease in hours of travel indicates that even though slightly more miles are being driven (i.e., higher VMT) in the ORTP 2035, the reduction in congestion on the roadways being traveled results in increased average speeds and faster travel times.

Table 7-4: Daily Vehicle Hours Traveled (2035 Baseline and ORTP 2035)

Facility Type	VHT				VHT Change (2035 Baseline to ORTP 2035)	
	2035 Baseline	Percent	ORTP 2035	Percent	Difference	Percent Difference
Freeways	128,600	27.8%	125,900	28.1%	-2,700	-2.1%
Expressways	39,900	8.6%	37,300	8.3%	-2,600	-6.5%
Ramps	40,500	8.7%	39,500	8.8%	-1,000	-2.5%
Arterials	178,000	38.4%	171,200	38.2%	-6,800	-3.8%
Collectors	76,400	16.5%	74,000	16.5%	-2,400	-3.1%
Total	463,400	100.0%	447,900	100.0%	-15,500	-3.3%

Note: VHT by facility type may not sum to totals due to rounding.

Vehicle Hours of Delay

Table 7-5 shows the daily estimated islandwide total hours of delay experienced by all vehicles as indicated by the 2035 Baseline and ORTP 2035 travel demand forecasting models. The VHD is projected to decrease by about 18,700 hours (16 percent) daily from the 2035 Baseline to the ORTP 2035. The largest forecasted decreases in daily delay are expected on expressways (34 percent), arterials (23 percent), and collectors (13 percent). VHD is often considered to be a direct indicator of overall levels of congestion. The sizable reduction in VHD for the ORTP

2035 in comparison to the Baseline indicates that it is expected to have a significant effect on reducing congestion. This is in spite of the projection that more travel (i.e., higher VMT) will occur with the ORTP 2035.

Table 7-5: Daily Vehicle Hours of Delay (2035 Baseline and ORTP 2035)

Facility Type	VHD				VHD Change (2035 Baseline to ORTP 2035)	
	2035 Baseline	Percent	ORTP 2035	Percent	Difference	Percent Difference
Freeways	33,400	28.1%	30,400	30.4%	-3000	-9.0%
Expressways	11,600	9.8%	7,700	7.7%	-3900	-33.6%
Ramps	21,300	17.9%	20,000	20.0%	-1300	-6.1%
Arterials	35,100	29.5%	26,900	26.9%	-8200	-23.4%
Collectors	17,400	14.6%	15,100	15.1%	-2300	-13.2%
Total	118,800	100.0%	100,100	100.0%	-18,700	-15.7%

Note: VHD by facility type may not sum to totals due to rounding.

7.1.2 Transit

This section discusses the ORTP 2035 transit system characteristics and system performance, and compares them to the 2035 Baseline conditions.

System Characteristics

The 2035 Baseline transit system included the construction of the HHCTCP fixed guideway system. Additionally, it includes a continued effort toward expanding and supporting the existing bus transit system by funding increased service levels and constructing transit centers and park-and-ride lots in various locations around the island to increase transit accessibility. As stated earlier, some of TheBus' transit routes would be restructured to integrate with and serve a more complementary role to the fixed-guideway system.

System Performance

Implementation of the HHCTCP will help to increase transit usage on Oahu significantly. As discussed in Chapter 3, daily transit boardings are anticipated to increase by almost 70 percent between 2007 conditions and the 2035 Baseline scenario. The ORTP 2035 shows a very slight decrease in daily transit boardings when compared to the Baseline. The total number of daily transit boardings, as estimated by the ORTP 2035, is 388,100, which though similar to, is slightly less than, the 388,700 boardings estimated for the 2035 Baseline. The total number of daily rail boardings is forecasted at 99,900 for the ORTP 2035, while 100,800 is forecasted for the 2035 Baseline.

7.1.3 Roadways

System Characteristics

The ORTP 2035 travel demand forecasting model included numerous projects and programs aimed at improving the performance of the roadway system. The roadway projects included in the ORTP 2035 are primarily aimed at preserving the existing infrastructure, congestion mitigation, and safety and operational improvements. Also included in the ORTP 2035 is the implementation of the TDM Program and ITS projects that would serve to improve the performance of the roadway system, either by encouraging travelers to share a ride or to provide traveler information that would give drivers the option of finding an alternative to using the more seriously congested roadways.

The congestion mitigation projects consist largely of efforts aimed at easing congestion on the most heavily-utilized highways and roadways, including the Interstate Route H-1, Farrington Highway, and Kamehameha Highway. There are also multiple new interchanges slated to be constructed along the Interstate Routes H-1 and H-2, as well as various widening projects to address some of the more congested portions of those routes.

The safety and operational improvements projects focus mainly on improving the safety and operations on key roadways, including Farrington Highway, Kalanianaʻole Highway, and Kamehameha Highway.

There is also a roadway improvement intended to provide a second access to the Makakilo area by extending Makakilo Drive south to the H-1 freeway interchange to connect Makakilo Drive to Kualakai Parkway.

As has been discussed above, the ongoing need to invest sufficiently in the preservation of the existing roadway network is paramount. Not only is it a Federal requirement, it ensures a safer, more enjoyable travel experience for all residents and visitors. More than half of the funding under the ORTP 2035 is dedicated to ensuring that both State and City roadways are well-maintained.

System Performance

Highway and Arterial Level of Service (LOS)

Table 7-6 provides LOS summaries for all major roadways in lane-miles by LOS category for the AM two-hour peak period (6:00 a.m. to 8:00 a.m.) for the 2035 Baseline and ORTP 2035, respectively. Approximately 75 percent of all roadway lane-miles islandwide are estimated to operate at LOS A during the AM two-hour peak period in the ORTP 2035 as opposed to just over 73 percent in the 2035 Baseline. Under the ORTP 2035, roughly ten percent are projected to operate under congested conditions (i.e., LOS E or F), as compared to 12 percent in the 2035 Baseline. Approximately 24 percent of freeways, expressways, and ramps are estimated to operate under congested conditions in the ORTP 2035, as compared to 25 percent in the 2035 Baseline alternative. For both alternatives, this is a

significantly higher percentage than arterials and collectors, which have just over four percent operating under congested conditions in the ORTP 2035 and approximately six percent in the Baseline. This reflects the fact that freeways, expressways, and ramps serve a proportionately higher level of commute trips.

Table 7-6: AM Two-Hour Peak Period Arterial LOS – Lane Miles (2035 Baseline and ORTP 2035)

Facility Type	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Total Lane Miles
Freeways							
2035 Baseline	202	24	25	23	33	41	348
ORTP 2035	221	31	15	27	31	39	364
Expressways							
2035 Baseline	64	6	8	9	19	23	129
ORTP 2035	62	9	10	12	30	17	140
Ramps							
2035 Baseline	56	5	4	7	6	25	103
ORTP 2035	58	4	8	7	6	24	107
Arterials							
2035 Baseline	595	56	35	34	28	34	782
ORTP 2035	645	63	36	34	25	26	829
Collectors							
2035 Baseline	559	35	14	12	13	15	648
ORTP 2035	609	33	17	10	7	12	688
Total							
2035 Baseline	1,476	126	86	85	99	138	2,010
ORTP 2035	1,595	140	86	90	99	118	2,128
Percentage							
2035 Baseline	73.4%	6.3%	4.3%	4.2%	4.9%	6.9%	100.0%
ORTP 2035	75.0%	6.6%	4.0%	4.2%	4.7%	5.5%	100.0%

Figure 7-1 and Figure 7-2 graphically map LOS for both the 2035 Baseline and ORTP 2035 for all the modeled highway segments throughout the island for the AM two-hour peak period. The majority of congested conditions can be seen in the Interstate H-1 corridor between Ewa and Downtown Honolulu. Other highly congested facilities of note include Farrington Highway accessing Waianae, Kamehameha Highway between Mililani Town and the Honolulu International Airport, Pali Highway, and a small section of Fort Weaver Road in Ewa.

Figure 7-1: 2035 Baseline AM Two-Hour Peak Period LOS – Islandwide

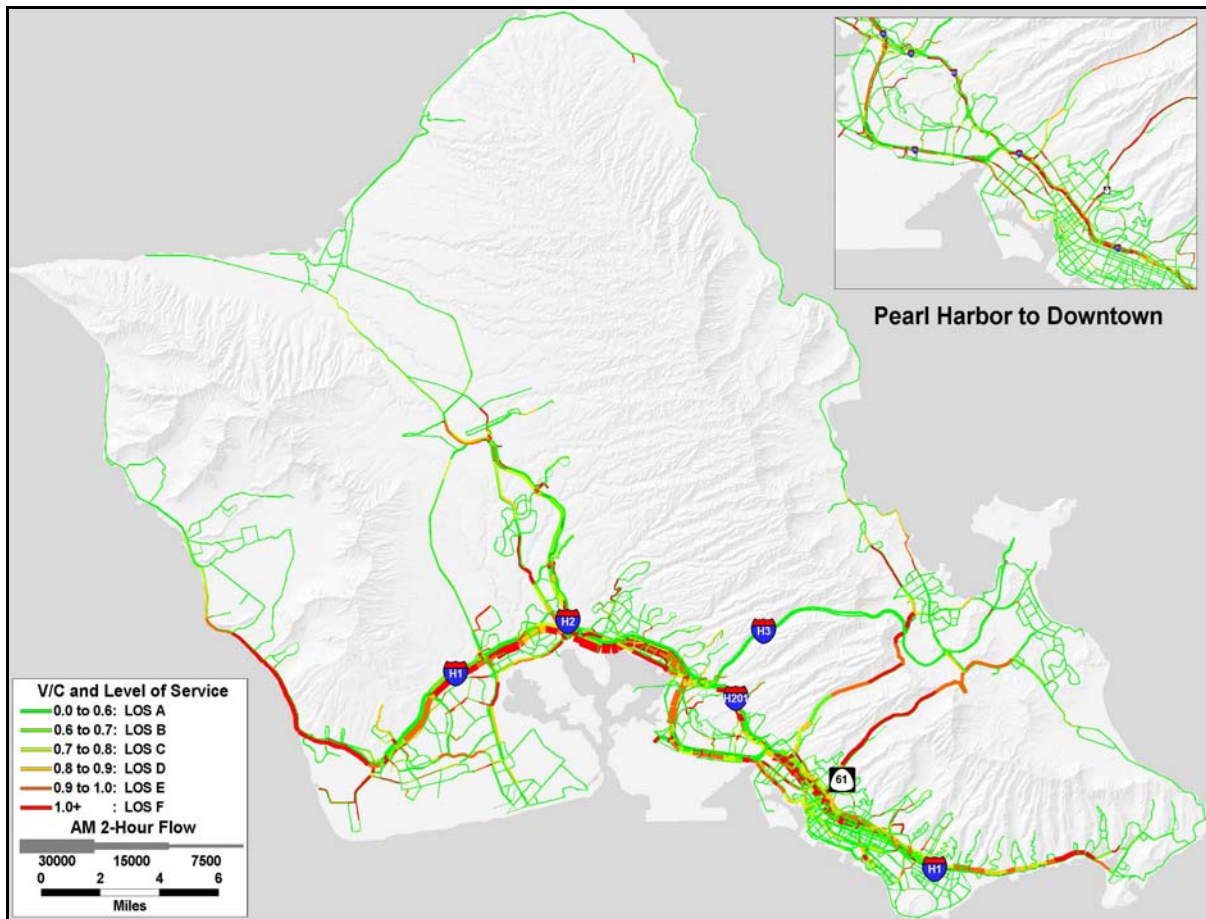
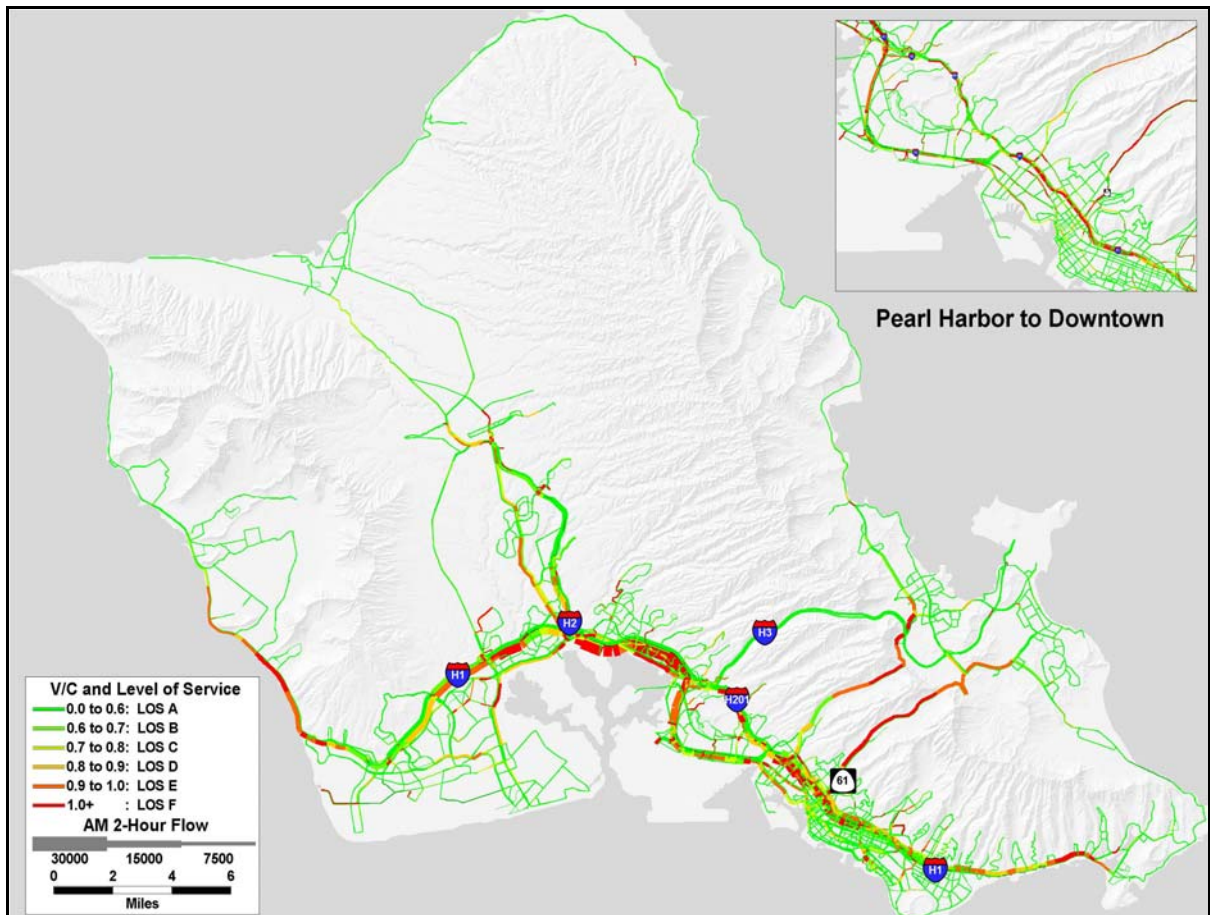


Figure 7-2: ORTP 2035 AM Two-Hour Peak Period LOS – Islandwide



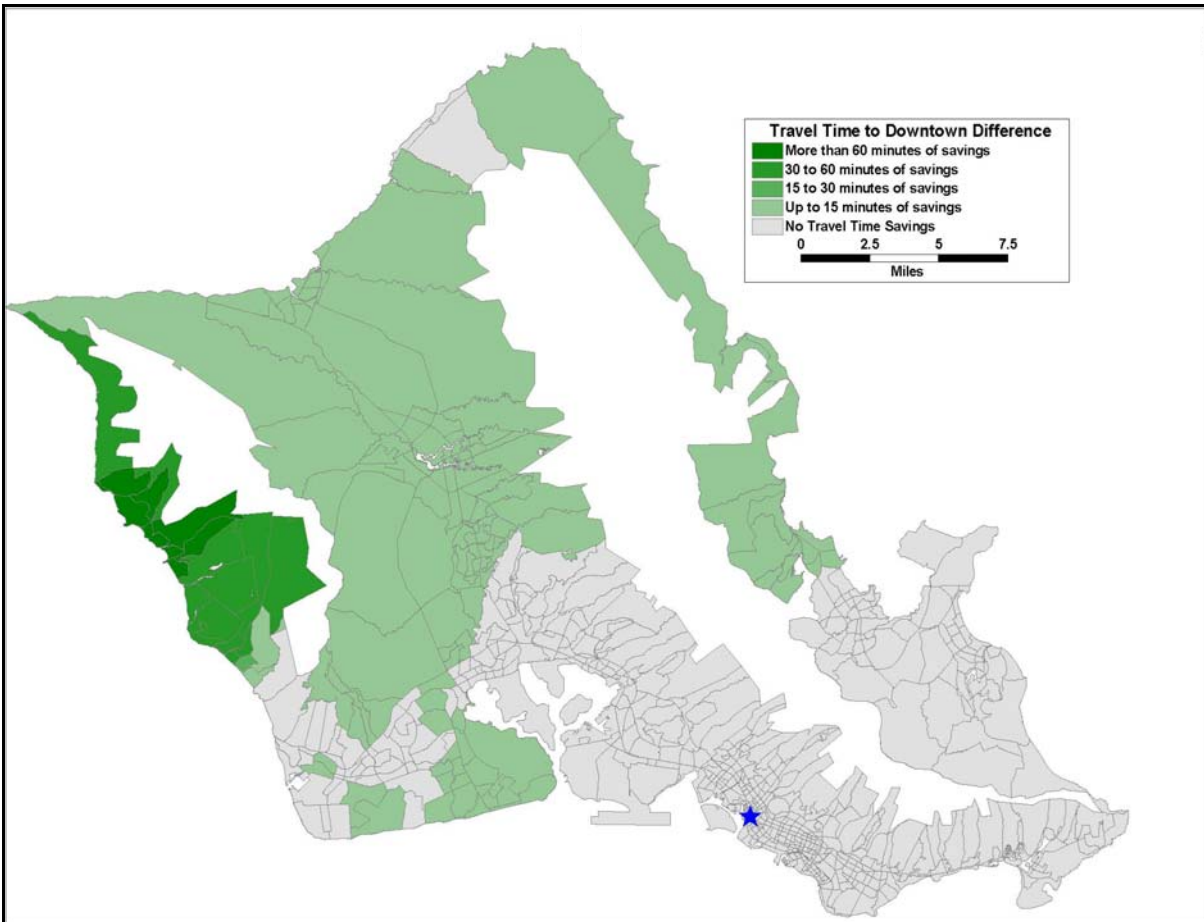
Auto Travel Times to Selected Destinations

Travel times from each TAZ on Oahu to key destinations across the island were calculated for the AM peak hour using the dynamic traffic assignment model in the OahuMPO travel demand forecasting model and are discussed below. The maps depicting these travel time ranges are displayed in the Appendix A.

Downtown Honolulu

Travel times improved from 60 to 160 minutes estimated for the 2035 Baseline to 45 to 120 for the ORTP 2035 from the Waianae Coast to Downtown Honolulu. Travel times for zones in Central Oahu are also forecasted to improve between the 2035 Baseline and the ORTP 2035. There is very little change in travel times projected from areas Koko Head of the H-1/H-2 merge to Downtown. Figure 7-3 shows the difference in auto travel times to Downtown Honolulu between the 2035 Baseline and ORTP 2035.

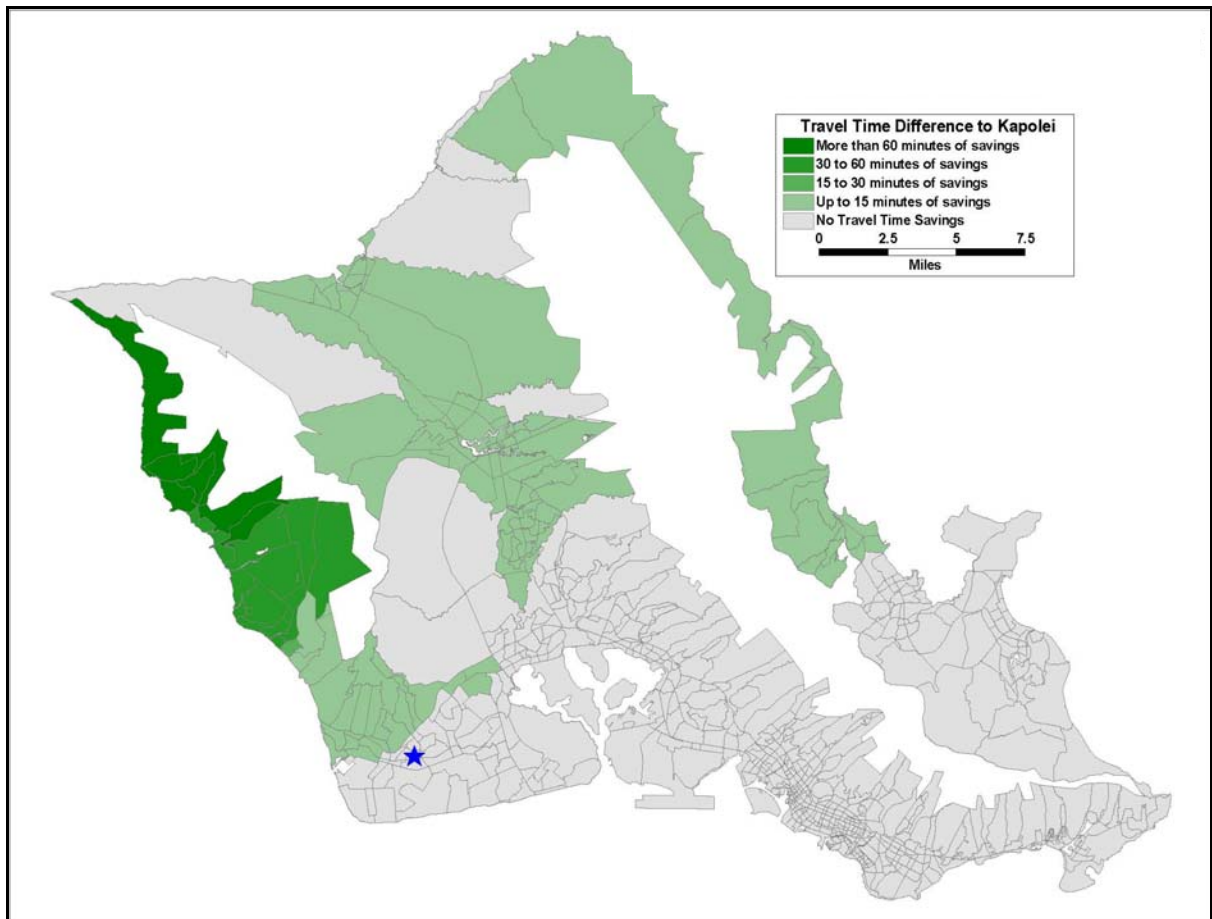
Figure 7-3: Travel Time Difference to Downtown Honolulu – 2035 Baseline and ORTP 2035



Kapolei

Travel times are projected to improve significantly along the Waianae Coast to Kapolei during the AM peak for the 2035 ORTP 2035, from roughly 30 to 120 minutes in the Baseline to 20 to 60 minutes. From Downtown Honolulu to Kapolei, travel times remain close to those of the Baseline and range from 20 to 30 minutes, increasing progressively in the direction of Koko Head. Figure 7-4 shows the difference in auto travel times to Kapolei between the 2035 Baseline and ORTP 2035.

Figure 7-4: Travel Time Difference to Kapolei – 2035 Baseline and ORTP 2035



Waikiki

Travel time patterns for trips to Waikiki from Waianae Coast improve from 120 to 180 minutes for the 2035 Baseline to 60 to 120 minutes in the 2035 ORTP 2035. Travel times for some areas in Kapolei and Central Oahu improve slightly but remain similar to the Baseline. Travel times from all other areas to Waikiki remain similar to those of the Baseline.

Mililani

Mililani, located centrally on Oahu, is accessible within 30 minutes from most areas on the island. The Waianae Coast was the exception, with travel times between 120 and 160 minutes for the 2035 Baseline; it remains the exception, but with improved travel times of 45 to 120 minutes for the ORTP 2035.

Honolulu International Airport

Travel times ranged from 60 to 160 minutes in the 2035 Baseline from the Waianae Coast and improved to 60 to 120 minutes in the ORTP 2035. Some areas in Kapolei and Central Oahu also saw improved travel times in the ORTP 2035 over the Baseline. From the Downtown Honolulu, Kakaako, and Waikiki areas, estimated

travel times to the Airport remain similar to the Baseline with travel times approaching 30 minutes.

Accident Risks

There are three programs aimed at improving safety along the island's roadways: the Highway Safety Improvement Program, Shoreline Protection Program, and Rockfall Protection Program. Also included are four projects along three highways that would include realignment, widening, improved lighting and signage, and other safety improvement measures. These projects are as follows:

- Kamehameha Highway Safety Improvements, Haleiwa to Kahaluu. Construct safety improvements along Kamehameha Highway, from Haleiwa to Kahaluu. Safety improvements include turn lanes, guardrails, signage, crosswalks, etc. to improve safety. Widening of Kamehameha Highway will only be in areas where needed for storage/turn lanes safety improvements.
- Kamehameha Highway, Safety and Operational Improvements, Kaalaea Stream to Hygienic Store. Construct safety and operational improvements along Kamehameha Highway, between Kaalaea Stream and Hygienic Store. Safety and operational improvements include passing and turning lanes, modification of signals, and installation of signs, flashers, and other warning devices. This project also includes replacement of Kaalaea Stream Bridge and Haiahoa Stream Bridge with structures that meet current design standards.
- Kalaniana'ole Highway, Safety and Operational Improvements, Olomana Golf Course to Waimanalo Beach Park. Construct safety and operational improvements along Kalaniana'ole Highway between the Olomana Golf Course and Waimanalo Beach Park. Specific safety and operational improvements include construction of turning lanes, sidewalks, wheelchair ramps, bike paths or bike lanes, traffic signal upgrades, utility relocation, and drainage improvements.
- Farrington Highway, Safety Improvements, Makua Valley Road to Aliinui Drive. Construct safety improvements on Farrington Highway along the Waianae Coast, from Makua Valley Road at Kaena Point to Aliinui Drive at Kahe Point. This project includes realignment around Makaha Beach Park, between Makau Street and Water Street.

Intermodal Freight Connections

The planned highway improvements in the ORTP 2035 are anticipated to benefit freight mobility on Oahu. For example, improvement and modification of the freeway access to Interstate Route H-1 between Makakilo Interchange and Palailai Interchange (Kapolei Interchange Complex) will improve the ability of freight to move to and from Kalaeloa Barbers Point Harbor and Campbell Industrial Park. Congestion mitigation projects in the ORTP 2035 are likewise anticipated to benefit freight mobility by improving the flow of traffic, specifically by reducing VHD and VHT.

Freight Travel Times for Selected Origin-Destination Pairs

As stated earlier, Oahu does not have dedicated freight routes, therefore, peak period travel times between key freight destinations are anticipated to be similar to those estimated for automobile travel, as discussed above. For example, freight travel times from various parts of Oahu to Honolulu Harbor are anticipated to be similar to those for automobile travel to Downtown Honolulu. In addition, estimated automobile travel times to Waikiki and Honolulu International Airport are expected to be similar for freight.

7.1.4 *Bicycle and Pedestrian Facilities*

As discussed above, the adoption of the State's Complete Streets Policy along with voter support for change to the City's Charter concerning the priority of pedestrian and bicycle facilities are major milestones guiding future development of all roadway infrastructure on Oahu.

The ORTP 2035 includes projects that would improve the conditions of bicycle and pedestrian facilities on the island for users of all experience and comfort levels. These include the implementation of Oahu elements of the State's *Bike Plan Hawaii* and the City's *Oahu Bike Plan*. Also to be considered is HDOT's existing policy that when a new roadway is built or an existing roadway widened a bicycle facility shall be built, when feasible. Lastly, assumed in the islandwide projects is the development and future implementation of the *Statewide Pedestrian Master Plan*. These commitments illustrate that the level of awareness regarding such projects is heightened in the ORTP 2035 as compared to existing conditions and the Baseline scenario.

7.1.5 *Natural Environment*

Susceptibility to Climate Change

As stated in Section 3.4.5, the fact that Oahu is an island makes it susceptible to many of the anticipated impacts of climate change. The most significant among them are expected to be from sea-level rise, flooding, and increased storm severity, including tidal surges, and their impacts to transportation infrastructure. Therefore, it is anticipated that transportation facilities that are located within close proximity to coastal zones and other areas prone to flooding could be at risk. These include the two commercial harbors on the island, Honolulu Harbor and Kalaeloa Barbers Point Harbor, the Hickham Air Force Base/Honolulu International Airport complex, and various roadways, but particularly Farrington Highway, Kalanianaʻole Highway, Kamehameha Highway, and Nimitz Highway.

The ORTP 2035 includes the Shoreline Protection Program, and various other Safety and Operational Improvements projects that would assist in addressing some of these anticipated impacts. Also, the ORTP 2035 states that future transportation facilities should be designed and located in such a manner as to protect them from significant damage or disruption due to climate change.

In cooperation with FHWA, the OahuMPO is undertaking a project to test a model for assessing the vulnerability of transportation infrastructure to various climate change scenarios. It is anticipated that the results of that study will provide both guidance that will inform future planning initiatives and probably result in policies and projects to adapt both existing and prospective transportation infrastructure to meet these climate challenges.

Air Quality

The State of Hawaii is currently in attainment for air quality. The 2035 Baseline resulted in a daily total of 422,000 gallons of fuel consumed and 5,000 tons of carbon dioxide emissions from over 15.2 million vehicle miles traveled on the roadways modeled for Oahu.

The ORTP 2035 resulted in a daily total of 420,000 gallons of fuel consumed and 5,000 tons of carbon dioxide emissions from over 15.4 million vehicle miles traveled on the roadways modeled for Oahu. This represents a decrease of almost half of one percent in fuel consumption over the 2035 Baseline scenario, while vehicle miles traveled would increase by just over one percent compared to the Baseline.

7.1.6 Title VI/Environmental Justice

This discussion of the 2035 Baseline in comparison to the ORTP 2035 assesses the sub-measures of accessibility, equity, and mobility, and also discusses related public outreach activities.

Accessibility

Accessibility can be defined as the ease of reaching opportunities using surface (ground) transportation. Travel time thresholds were used to measure accessibility. A travel time threshold of 20 minutes was used for all trips to calculate the number of people within that predetermined travel time to those travel destination opportunities represented by specific trip generator zones, including selected employment, college, regional shopping center, and hospital trip generators.

Table 7-7 below shows the accessibility to the selected trip generators for both T6/EJ and non-T6/EJ TAZs for the 2035 Baseline and the ORTP 2035. The table describes the ratio of percent of T6/EJ TAZs to percent of non-T6/EJ TAZs that are within 20 minutes travel time of the destinations. The magnitude of this ratio describes the degree of advantage that either the T6/EJ TAZs or the non-T6/EJ TAZs have over each other. If the ratio is less than one then the advantage lies with the non-T6/EJ TAZs, while if the number is greater than one then the advantage lies with the T6/EJ TAZs. A value equal to one indicates parity between the TAZs.

The analysis demonstrated that, for AM peak period auto trips, 20-minute accessibility to hospitals and regional shopping centers is very high and comparable for both the T6/EJ and non-T6/EJ populations, with results generally improved (i.e., more T6/EJ and non-T6/EJ TAZs within 20 minutes of destinations) compared with 2035 Baseline conditions. Non-T6/EJ populations continue to have better

accessibility to colleges and employment centers than T6/EJ populations under the ORTP 2035. Similar patterns can be seen for transit trips during the AM peak period.

Table 7-7: T6/EJ TAZs within 20 minutes of Selected Destinations (AM Peak Period)

Measure	To Colleges			To Hospitals			To Regional Shopping Centers			To Employment Centers		
	T6/EJ	Non-T6/EJ	Ratio	T6/EJ	Non-T6/EJ	Ratio	T6/EJ	Non-T6/EJ	Ratio	T6/EJ	Non-T6/EJ	Ratio
Auto Trips												
Number of TAZs												
2035 Baseline	61	521	N/A	103	645	N/A	102	638	N/A	75	584	N/A
ORTP 2035	69	552	N/A	105	646	N/A	102	639	N/A	83	601	N/A
Percent of All TAZs												
2035 Baseline	56.0%	79.5%	0.70	94.5%	98.5%	0.96	93.6%	97.4%	0.96	68.8%	89.2%	0.77
ORTP 2035	63.3%	84.3%	0.75	96.3%	98.6%	0.98	93.6%	97.6%	0.96	76.1%	91.8%	0.83
Number of People												
2035 Baseline	90,519	681,329	N/A	191,496	900,713	N/A	181,122	895,437	N/A	123,170	809,905	N/A
ORTP 2035	110,387	726,035	N/A	195,874	900,260	N/A	181,122	898,855	N/A	141,603	852,165	N/A
Percent of All People												
2035 Baseline	45.2%	74.6%	0.61	95.6%	98.6%	0.97	90.4%	98.0%	0.92	61.5%	88.7%	0.69
ORTP 2035	55.1%	79.5%	0.69	97.8%	98.6%	0.99	90.4%	98.4%	0.92	70.7%	93.3%	0.76
Transit Trips												
Number of TAZs												
2035 Baseline	61	505	N/A	89	567	N/A	90	586	N/A	65	494	N/A
ORTP 2035	64	522	N/A	89	577	N/A	92	588	N/A	74	511	N/A
Percent of All TAZs												
2035 Baseline	56.0%	77.1%	0.73	81.7%	86.6%	0.94	82.6%	89.5%	0.92	59.6%	75.4%	0.79
ORTP 2035	58.7%	79.7%	0.74	81.7%	88.1%	0.93	84.4%	89.8%	0.94	67.9%	78.0%	0.87
Number of People												
2035 Baseline	94,017	632,247	N/A	155,598	791,986	N/A	153,578	787,435	N/A	95,731	662,343	N/A
ORTP 2035	101,921	672,942	N/A	158,082	812,981	N/A	156,425	794,252	N/A	122,676	713,261	N/A
Percent of All People												
2035 Baseline	46.9%	69.2%	0.68	77.7%	86.7%	0.90	76.7%	86.2%	0.89	47.8%	72.5%	0.66
ORTP 2035	50.9%	73.7%	0.69	78.9%	89.0%	0.89	78.1%	87.0%	0.90	61.2%	78.1%	0.78

Equity

Equity can be defined as the equitable distribution of transportation investments. To assess the equity of funding allocations across the T6/EJ and non-T6/EJ neighborhoods, it was necessary to allocate the expenditures of the ORTP 2035 to different parts of the community. The projects listed below, due to their islandwide and/or programmatic nature could not be specifically located and therefore, were not included in the equity analysis.

- Projects #1 and 43: *Bike Plan Hawaii* – Oahu
- Projects #2 and 44: Enhancement Projects
- Projects #3 and 45: Human Services Transportation Coordination Program
- Projects #4 and 46: Intelligent Transportation Systems (ITS)
- Project #5: Joint Traffic Management Center
- Projects #6 and 47: *Oahu Bike Plan*
- Projects #7 and 48: Transportation Demand Management (TDM) Program
- Projects #8 and 49: Vanpool Hawaii Program
- Projects #9 and 51: Highway Safety Improvement Program
- Projects #13 and 52: Rockfall Protection, Various Locations
- Projects #14 and 53: Shoreline Protection Program
- Projects #37 and 64: TheBus Service, Expansion, Islandwide
- Projects #38 and 65: Transit Centers, Various Locations
- Projects #39 and 66: City Operations and Maintenance (O&M): Roadways
- Projects #40 67: City Operations and Maintenance (O&M): Transit
- Projects #41 and 68: State Operations and Maintenance
- Projects #42 and 69: System Preservation
- Project #63: City Rail Rehabilitation and Fleet Expansion

These projects together comprise just under \$20.5 billion of the almost \$23.8 billion total of the ORTP 2035. Table 7-8 below shows the results of the equity analysis for both T6/EJ and non-T6/EJ census block groups for those location-specific projects that could be analyzed.

Table 7-8: T6/EJ Equity Analysis – Distribution of Total ORTP 2035 Dollars

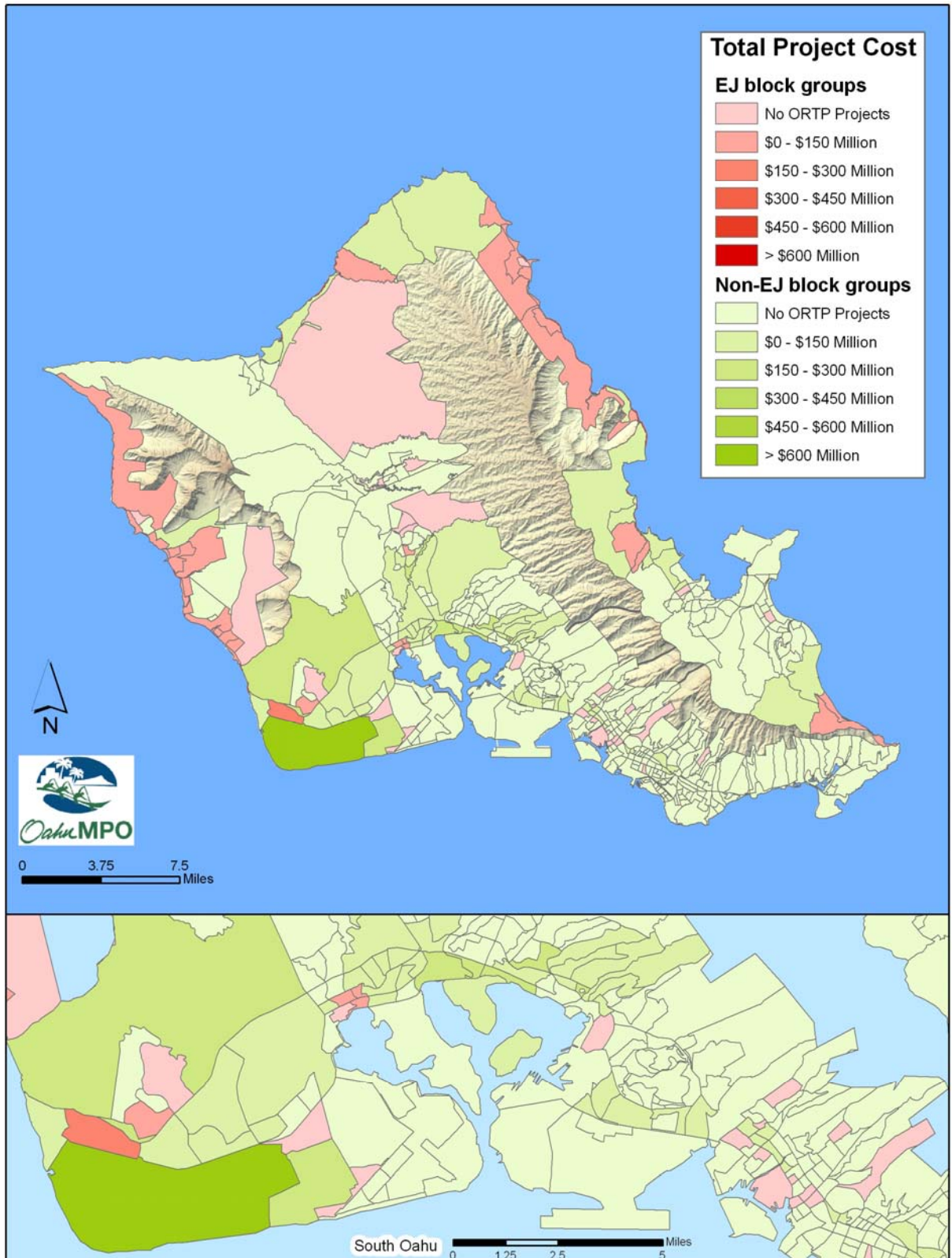
	ORTP 2035		
	T6/EJ	Non-T6/EJ	Total
Number of Block Groups	58	374	432
Average Investment by Block Group (\$Million)	\$10	\$7	\$8
Total Cost of Projects (\$Million)*	\$577	\$2,664	\$3,241
Percent Project Investment	18%	82%	100%
Total Population	152,112	724,044	876,156
Average Per Capita Investment (\$Million)	\$3,790	\$3,680	\$3,699

*In year of expenditure dollars.

Note: Population and block group information contained in this table is based on data from the 2000 United States Census.

Census block groups designated as T6/EJ would, on average, receive about 40 percent more investment dollars than non-T6/EJ designated block groups in the ORTP 2035. It should be noted that while T6/EJ block groups would receive fewer total dollars than non-T6/EJ block groups, the average per capita investment would be similar. Figure 7-5 below illustrates these findings.

Figure 7-5: Analysis of Equity in ORTP 2035 Based on Total Project Cost



Mobility

Mobility can be defined as the ease of movement of people, goods, and services. The mobility evaluation calculates the average travel time from both T6/EJ and non-T6/EJ designated areas to selected employment centers during the AM peak period.

As shown in Table 7-9 below, the analysis demonstrates that the difference in average auto travel time to employment centers between T6/EJ TAZs and non-T6/EJ TAZs is anticipated to decrease from 19 minutes to 11 minutes with implementation of the ORTP 2035 compared to the 2035 Baseline. Similarly, the difference in average transit travel times between T6/EJ TAZs and non-T6/EJ TAZs to employment centers would decrease from 26 minutes to 18 minutes.

Table 7-9: T6/EJ Mobility – Average Travel Time to Employment Centers (AM Peak Period)

Mode	2035 Baseline		ORTP 2035	
	T6/EJ	Non-T6/EJ	T6/EJ	Non-T6/EJ
Auto (minutes)	48	29	38	27
Transit (minutes)	76	50	64	46
Average by Auto or Transit (minutes)	62	40	51	37

Public Outreach

The public outreach efforts of the ORTP 2035 were introduced in Section 1.3.2, and incorporated many “best practices” for outreach to T6/EJ populations in order to learn of their transportation needs and concerns. The results of the public outreach efforts were then presented in Section 5.2.4. In summary, the T6/EJ population is much more dependent on transit for their transportation, and their priorities are focused on this mode. By investing 28 percent of the available funds in transit projects, \$6.7 billion in total, the ORTP 2035 will help to address their needs and concerns.

Analysis of Environmental Justice Effects

The purpose of analyzing the effectiveness of environmental justice is to ensure that minority and low-income communities enjoy the benefits of transportation planning and funding without bearing a disproportionate share of the burdens that can accompany it. To streamline the analytical process of evaluating the effectiveness of T6/EJ for the ORTP 2035, the OahuMPO-designated TAZs and census block groups were used as components of the evaluation.

In terms of accessibility, the ratios of percent of T6/EJ TAZs to percent of non-T6/EJ TAZs that are within 20 minutes travel time of the destinations increased in all but four instances. In the two instances regarding travel to regional shopping centers by automobile, the ratios remained the same for both TAZs and people. In the two instances regarding travel to hospitals, the ratios for both TAZs and people slightly decreased from the 2035 Baseline for the ORTP 2035. As stated earlier, the magnitude of this ratio describes the degree of advantage that either the T6/EJ TAZs

or the non-T6/EJ TAZs have over each other. If the ratio is less than one then the advantage lies with the non-T6/EJ TAZs, while if the number is greater than one then the advantage lies with the T6/EJ TAZs. The general increase in the ratios of the ORTP 2035 illustrate improved accessibility for T6/EJ communities.

Regarding equity, block groups designated as T6/EJ would, on average, receive about 40 percent more investment dollars than non-T6/EJ designated block groups and the average per capita investment would be similar between T6/EJ and non-T6/EJ block groups. It can be concluded that the ORTP 2035 is equitable with regard to these groups.

For mobility, the difference in average travel time to employment centers between T6/EJ TAZs and non-T6/EJ TAZs is anticipated to decrease for both auto and transit modes, illustrating an increase in mobility for T6/EJ TAZs.

The public involvement efforts for the ORTP 2035 ensured the inclusion of T6/EJ residents of the island. The subsequent large investment in public transit contained in the ORTP 2035 reflects the consideration their input was given.

7.1.7 Land Use and Transportation Integration Analysis

The ORTP 2035 was drafted in full consideration of the planned population distribution and land use policies expressed in the City's General, Development, and Sustainable Communities Plans, as well as other adopted plans through coordinated efforts of both public and private sectors. The ORTP 2035 directs a fair amount of focus on supporting the Interstate H-1 corridor. This freeway is the most heavily-used travel route between the Ewa/Kapolei area, where the island's future growth is directed, and Downtown Honolulu. The ORTP 2035 capitalizes on the existing transportation system while focusing transportation development to those areas slated to experience development in order to address the anticipated needs of the island's residents, businesses, and visitors into the year 2035.

7.2 Strategies to Improve Performance – Operational Management Strategies

Operational management strategies in the ORTP 2035 include a variety of applications aimed at improving the efficiency of the overall transportation system by either facilitating more vehicular through-put or reducing vehicular demand in comparison to the Baseline.

The Enhancement Projects and implementation of ITS projects would improve the efficiency of Oahu's transportation system through better and more coordinated facilities. Improved coordination between agencies would be achieved through the construction of the Joint Traffic Management Center that will combine transportation management with City, State, and emergency response agencies.

The proposed TDM program could include, but is not limited to, the following:

- Telecommuting,
- Flexible work hours,
- Free real-time online carpool matching,
- Outreach promotion and marketing of alternative transportation,
- Emergency ride home program,
- Major special events,
- Employer based commuter programs,
- Emerging and innovative strategies (e.g., car sharing), and
- Continued implementation and expansion of the State's Vanpool Hawaii Program.

8.1 ORTP 2035 Applications to Goals and Objectives

The following paragraphs discuss how the ORTP 2035 addresses the five established overarching goals. For a detailed assessment of how the projects and programs in the ORTP 2035 satisfy the 25 adopted objectives, please see Table 8-1 on the following pages.

The ORTP 2035 project list includes various projects and programs meant to develop and establish a multi-modal transportation system with connections that provide Oahu's residents expanded options for using the system. These projects include the implementation of Oahu elements of the State's *Bike Plan Hawaii*, and the *Oahu Bike Plan*, as well as pedestrian improvements that would be categorized under "Enhancement Projects." Also, the construction of the HHCTCP would provide another option for those wishing to use public transportation, and would have the potential to improve the efficiency and coverage of Oahu's public transportation system.

The four categories of operations, maintenance, safety, and system preservation projects included in the ORTP 2035 account for over half of the total anticipated cost of the ORTP 2035. This illustrates the awareness of the need to care for the island's transportation system to ensure it is able provide a reliable, efficient, and convenient means of moving people and goods. It should be noted that according to Federal regulation 23 CFR 1.27, it is a requirement that facilities constructed with the use of Federal funds must be properly maintained, and it is the responsibility of the State and City to ensure that they are kept in good, safe operating condition.

The ORTP 2035 recognizes the importance of sustaining Oahu's environmental quality through various projects and programs, each of which would be required to perform their own environmental review processes as project design progresses. The HHCTCP has the potential to provide a means of transport that requires less energy per-person than travel by automobile. Also, the ORTP 2035 would result in a some small reduction in congestion in the corridors where congestion mitigation projects are implemented, which would lead to lower emissions from cars operating at slow speeds in stop-and-go traffic.

The ORTP 2035 was developed in consultation with Federal, State, and City agencies along with public input received from various individuals, multiple stakeholders, and disadvantaged populations from around the island.

The Plan was developed in full recognition of the existing land use policies expressed in the City's General, Development, and Sustainable Communities Plans, as well as other adopted plans, and therefore supports developing, operating, and maintaining Oahu's transportation system in a manner that integrates effective land use and transportation with established sources of funding in a fair and equitable manner.

Table 8-1: Summary of ORTP 2035 in Relation to Plan Objectives

Objective	ORTP 2035
Transportation Facilities Goal: Provide an inclusive, multi-modal transport system whose connectedness provides efficient means for users desiring to move about this island by bicycle, freight carrier, pedestrian facility, road, transit service, and intermodal connectors.	
Develop, operate, and maintain alternative transportation facilities, including bikeways, walkways, and other accessible pedestrian, bicycle, and environmentally-friendly elements.	<p>The total level of investment in the ORTP 2035 exclusively for bicycle facilities would be \$200 million. This represents a substantial increase over the level of investment assumed for the Baseline, which is \$3 million. Also to be acknowledged is the State's existing Complete Streets statute that requires when a new roadway is built or an existing roadway widened, when feasible, a bicycle and pedestrian facilities shall be built.</p> <p>Included in the islandwide projects of ORTP 2035 is the development and future implementation of the <i>Statewide Pedestrian Master Plan</i>.</p>
Enhance the integration and connectivity of the regional transportation system.	Oahu does not have dedicated freight routes, so freight traffic experiences the same delays and congestion as general automobile traffic. The planned improvements in the ORTP 2035 would benefit freight mobility on the island, especially those focused on the Interstate routes and major highways, and those that improve access to port facilities (e.g., Honolulu Harbor and Kalaeloa Barbers Point Harbor) and Honolulu International Airport.
Provide efficient, convenient, and cost-effective transit service to Oahu's citizens.	<p>The Baseline scenario forecasted roughly 4.043 million daily person trips, of which 245,900 (6.1 percent) were taken using transit. The ORTP 2035 resulted in 4.044 million daily person trips, an increase of 1,000 over the Baseline, of which 245,500 were taken using transit. Despite the decrease in person trips using transit, because of the overall increase in daily person trips the percent share of the mode split remains constant between the two.</p> <p>The HHCTCP fixed guideway project (\$5,532.5 million; about 23 percent of the ORTP 2035) would provide an additional transportation choice for travelers using the most congested corridor on the island, the H-1 corridor between Kapolei and Downtown. The fixed guideway service would be coordinated with TheBus' routes for maximum coverage and efficiency. Expansion of TheBus and construction of new transit centers would improve access to and enhancement of transit services, and would get a total of \$937 million, or almost four percent of the ORTP 2035 funding.</p> <p>The Human Services Transportation Coordination Program would provide various transportation services specifically aimed at disadvantaged populations, with a total investment of \$49.7 million. All of these improvements would be ADA-compliant and would increase the overall efficiency, service, and benefit of the public transportation system on the island.</p>
Promote the intermodal efficiency of harbor terminal facilities, airport terminal facilities, and land transportation systems.	Included in the ORTP 2035 are multiple improvements to the Interstate routes through additional lane capacity and operational improvements, as well as the construction of new and modification of existing interchanges to improve operability and traffic flow. The Interstates also provide important connections to local highways that connect directly to key harbor and airport terminal facilities, for instance, Kalaeloa Boulevard and Nimitz Highway.

Objective	ORTP 2035
Provide rehabilitation, renewal, and modernization of facilities in sufficient magnitude to ensure system preservation and continued, effective operation.	The ORTP 2035 would invest a total of \$12,862.4 million in operations, maintenance, and system preservation projects, or 54 percent of its total. This level of investment illustrates a commitment to maintaining and maximizing the benefit of existing facilities.
Transportation Operations and Services Goal: Develop, operate, and maintain Oahu's islandwide transportation system to ensure the efficient, dependable, safe, secure, convenient, and economical movement of people and goods.	
Promote planning, design, operation, maintenance, and construction of transportation facilities and systems to support economic development and vitality.	<p>Twenty-nine of the 69 projects included in the ORTP 2035 are congestion-mitigation projects, many of which are aimed at improving operations along the Interstate routes and major highways (e.g., Farrington Highway, Kamehameha Highway). These routes carry the vast majority of traffic to, from, and through Oahu's major employment centers.</p> <p>Overall, the ORTP 2035 will improve mobility as it is expected to reduce islandwide congestion, measured as VHD, by nearly 16 percent and VHT by 3.5 percent, while accommodating a slight increase (1 percent) in vehicular travel (measured as VMT) over the Baseline. Additionally, automobile travel times to-and-from major activity centers are expected to improve dramatically in comparison to the Baseline, which supports economic vitality. As an example, morning peak period travel times to Downtown improve by up to 15 minutes for trips traveling from Central Oahu, Ewa, Kaneohe, and the North Shore. Travel times from the Waianae Coast range from 45 to 120 minutes under the ORTP 2035, which is an improvement of 30 to 80 minutes over the Baseline.</p> <p>Additionally, The ORTP 2035 shows positive benefits in reducing congestion during the AM peak hours. This is particularly true on roadways in the rapidly growing Ewa/Kapolei area, along the Waianae Coast, and in the critical H-1/H-2 merge area.</p>
Optimize transportation resources through TDM strategies, including telecommuting solutions, to encouraging transit ridership and ridesharing, while reducing single-occupancy vehicle travel and auto dependency.	The ORTP 2035 includes a total of \$30 million to develop and implement a TDM Program, and \$114.2 million to continue operation of the State's Vanpool Hawaii Program. These investments in TDM balance the investment in highway congestion mitigation projects and would result in maintaining a relatively high AVO (1.90) between the ORTP 2035 and the Baseline.
Encourage public-private partnerships in providing transportation services.	Additional transportation services are provided by public and private transportation providers, the TDM Program, Human Services Transportation Coordination Program, and others.
Monitor and enhance the performance and efficiency of Oahu's transportation system through the use of operation management strategies, such as ITS, TSM, TDM, and the OahuMPO CMP.	Included in the ORTP 2035 are the implementation of ITS projects islandwide (\$188.8 million total), the TDM Program (\$30 million total), and the construction of the Joint Traffic Management Center (\$68.9 million) that would combine transportation management with City and State, and their respective emergency response agencies. The implementation of all these measures would provide a significant improvement over Baseline management strategies.

Objective	ORTP 2035
Ensure that Oahu's transportation system is planned, designed, constructed, maintained, and operated in an integrated and cost-effective manner.	The integration and cost-effectiveness of the projects and programs included in the ORTP 2035 were key factors in how the Plan was developed. This will continue to be a key consideration for each individual project and program as designed and implemented.
Ensure user and community safety, and practical systems for the disabled by incorporating the priorities, programs, physical design and operation of transportation facilities, and other improvements, consistent with the <i>Hawaii Strategic Highway Safety Plan</i> and <i>Americans with Disabilities Act Accessibility Guidelines</i> .	All ORTP 2035 projects would be built with both safety and ADA guidelines in mind. Further details on project design will be defined in the project design stage of project development. TheBus and TheHandi-Van services and pedestrian facilities would benefit the disabled population. All expansion of transit service would be ADA-compliant.
Increase the peak-period, person-carrying capacities of Oahu's transportation network.	The ORTP 2035 contains multiple projects and programs that would increase Oahu's peak-period, person-carrying capacity: ITS measures, TDM Program, expansion of the Vanpool Hawaii Program, congestion mitigation projects, and the construction of the HHCTCP would all contribute to an overall increase in mobility throughout the island.
Reduce security risks associated with terrorism and other criminal acts, natural and man-made disasters, and other emergencies that would impact the transportation system.	<p>The ORTP 2035 includes the Highway Safety Improvement Program that would attempt to reduce automobile accidents, which have been known to cause major delays. Also included are the Shoreline and Rockfall Protection Programs. The Makakilo Drive Second Access Project would provide an alternate route, and would likely assist any necessary evacuations of the area.</p> <p>As individual projects and programs are designed and implemented, their consistency with and support for Homeland Security initiatives, personal security concerns, and all-hazards preparedness would be assessed.</p>
<u>Natural Environment Goal:</u> Develop, operate, and maintain Oahu's transportation system in a manner that sustains environmental quality.	
Develop, operate, and maintain Oahu's transportation system to meet or exceed noise, air, and water quality standards set by Federal, State, and City agencies.	The individual projects and programs included in the ORTP 2035 will be designed to address all relevant noise, air, and water quality regulations set by Federal, State, and City agencies. In meeting these requirements, it may be feasible that some projects and programs can help to exceed standards set forth in these regulations.

Objective	ORTP 2035
Maximize energy conservation in transportation and reduce greenhouse gas emissions.	<p>The HHCTCP has the ability to transport large volumes of people with lower energy usage compared to automobile travel. Also, through congestion mitigation projects, the ORTP 2035 would assist in reducing GHG emissions due to cars idling.</p> <p>The VHD is projected to decrease by nearly 16 percent daily from the 2035 Baseline to the Plan. VHD is often considered to be a direct indicator of overall levels of congestion. The sizable reduction in VHD for the Plan in comparison to the Baseline indicates that the Plan is expected to have a significant effect on reducing congestion. This is in spite of the projection that more travel (i.e., higher VMT) would occur with the ORTP 2035.</p> <p>The ORTP 2035 results in a daily total of 5,000 tons of carbon dioxide emissions from over 15.4 million vehicle miles traveled on the roadways modeled for Oahu, while the Baseline results in the same carbon dioxide emissions, but from 15.2 million vehicle miles traveled. The Plan holds carbon dioxide emissions steady compared to the Baseline, but accommodates an increase of just over one percent in vehicle miles traveled.</p>
Maintain and upgrade existing facilities and locate and design future transportation facilities in a manner that protects them from significant damage or disruption due to climate change.	The ORTP 2035 includes the Shoreline Protection Program, to protect the shoreline along portions of coastal highways. Future transportation facilities would be designed and located in such a manner as to protect them from significant damage or disruption due to climate change. The climate stressors anticipated to impact Oahu's transportation infrastructure include sea-level rise, flooding, and increased storm intensity.
Preserve and enhance Oahu's cultural integrity, including archaeological and historic sites, and sensitive natural resources, including beaches, scenic beauty, and sea and mountain vistas.	As the designs of individual projects and programs included in the ORTP 2035 are furthered, their potential impacts on cultural resources, including archaeological, cultural, and historic sites, and sensitive natural resources, including beaches, scenic beauty, and sea and mountain vistas would be considered and mitigation measures would be prepared as appropriate and necessary.
Human Environment and Quality of Life Goal: Develop, operate, and maintain Oahu's transportation system in a manner that supports community-wide values related to health, safety, and civil rights.	
Address and minimize the impacts of energy shortages, natural or man-made disasters, and other emergencies to the transportation system.	<p>The ORTP 2035 is consistent with the policy directions found in the State's <i>Strategic Highway Safety Plan</i>. The ORTP 2035 helps to further the plan's objectives by implementing projects and programs to help reduce automobile accidents, which can cause major delays. Also included are both the Shoreline and Rockfall Protection Programs. The Makakilo Drive Second Access Project would provide an alternate route, and would likely assist any necessary evacuations of the area.</p> <p>As individual projects and programs are designed and implemented, every effort would be made to capitalize upon their potential to minimize the impacts of energy shortages, natural or man-made disasters, and other emergencies.</p>

Objective	ORTP 2035
Encourage the development of sustainable and renewable energy sources for transportation.	<p>VMT for the ORTP 2035 would be one percent higher than for the 2035 Baseline (increase of 147,100 miles), but VHT would decrease by just over three percent (reduction of 15,500 hours) and VHD would decrease by almost 16 percent (18,700 hours less).</p> <p>During the development of the ORTP 2035, every effort was made to ensure coordination with many plans and studies, including the Hawaii Clean Energy Initiative. The Initiative aims to reduce Hawaii's dependence on oil by setting goals and a roadmap to achieve 70 percent clean energy by 2030 with 30 percent from efficiency measures and 40 percent coming from locally-generated renewable resources. A working group of the Initiative, the Transportation Working Group, is dedicated to establishing a sustainable alternative-fuel strategy to help reduce Hawaii's dependence on imported oil.</p>
Ensure that no person shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination in transportation services as provided for under current Federal, State, and City legislation.	In the development of the ORTP 2035, the concerns and issues of T6/EJ populations regarding transportation system performance, and plan project selection were assessed based on feedback from focus groups, telephone surveys, and other public outreach initiatives. T6/EJ populations and service providers were included throughout the planning process and the results of these consultations included in the Plan.
Maintain and upgrade existing facilities and design future transportation facilities in a manner that complies with local urban design policies and regulations.	Maintenance and system preservation are major components of the ORTP 2035, and local urban design policies and regulations would be acknowledged in the final design of individual projects.
Encourage innovation in planning, design, construction, operation, and maintenance of transportation services and facilities.	Innovation in all aspects of individual projects and programs in the ORTP 2035 will be encouraged. An example of such innovation is the adoption of the State's Complete Streets Policy that requires HDOT and the counties to establish policies to accommodate all users of the roads, no matter age, ability, or mode of transportation. A "complete street", as defined by the OahuMPO Citizen Advisory Committee, "is safe, comfortable, and convenient for travel by automobile, foot, bicycle, and transit regardless of age or ability." It is important to recognize that "complete streets" is also a process for ensuring that all modes' needs are accommodated. It is, therefore, important to view the entire roadway network wherein roadway designs and amenities may vary depending on the intended operation of the facility.
Minimize disruption to existing neighborhoods from construction and maintenance of the transportation system.	As the individual projects and programs in the ORTP 2035 are further developed, their potential disruption to neighborhoods (access, mobility, noise, dust, etc.) during construction based on degree of travel disruption, availability of suitable alternate routes, and proximity to sensitive neighborhoods would be evaluated and mitigated as necessary.

Objective	ORTP 2035
Land Use and Transportation Integration Goal: Develop, operate, and maintain Oahu's transportation system in a manner that integrates effective land use and transportation with established sources of funding in a fair and equitable manner.	
Develop, operate, and maintain the transportation system to support Oahu's planned population distribution and land use development policies expressed in the City's <i>General, Development, Sustainable Communities Plans</i> , and other adopted plans through coordinated efforts of both public and private sectors.	The ORTP 2035 would support developing, operating, and maintaining Oahu's transportation system to support planned population distribution and land use policies expressed in the City's General, Development, and Sustainable Communities Plans, as well as other adopted plans through coordinated efforts of both public and private sectors, as it was developed in full consideration of these planning efforts.
Support land use development policies, such as Transit-Oriented Development, that capitalize on the efficient use of the transportation system and reduce vehicular trip-making and vehicle miles traveled.	The City's Department of Planning and Permitting has established a transit-oriented development function to direct planning around future HHCTCP rail stations. As the design and implementation of individual projects and programs included in the ORTP 2035 are furthered, they would be evaluated with consideration of their support for land use development policies and their potential to further such concentrated, mixed-use development.

8.2 ORTP 2035 in Relation to SAFETEA-LU Planning Factors

As introduced in Section 1.2.1, SAFETEA-LU requires that the development of long-range transportation plans consider each of eight planning factors. Table 8-2 below lists the SAFETEA-LU planning factors and the measures within the ORTP 2035 that address them.

Table 8-2: Summary of ORTP 2035 in Relation to SAFETEA-LU Planning Factors

SAFETEA-LU Planning Factor	ORTP 2035
Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.	A significant number of projects included in the ORTP 2035 are congestion mitigation projects, many of which are aimed at improving operations along Interstate routes and major highways (e.g., Farrington Highway, Kamehameha Highway, etc.). These routes carry the vast majority of traffic to, from, and through Oahu's major population and employment centers. Also, under the ORTP 2035, VHT would decrease by over three percent (15,500 hours less), and VHD would decrease by almost 16 percent (18,700 hours less) compared to the 2035 Baseline.
Increase the safety of the transportation system for motorized and non-motorized users.	The ORTP 2035 includes the Highway Safety Improvement Program, as well as Oahu elements of <i>Bike Plan Hawaii</i> , implementation of the <i>Oahu Bike Plan</i> , and the development and future implementation of the <i>Statewide Pedestrian Master Plan</i> . These efforts would all assist in improving the safety of the transportation system for all users. The Makakilo Drive Second Access Project would provide an alternate route in the case of an emergency evacuation of the area.

SAFETEA-LU Planning Factor	ORTP 2035
Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users.	The ORTP 2035 contains various safety and operational improvements projects and programs. These would contribute to the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users.
Increase the accessibility and mobility of people and freight.	The ORTP 2035 contains the HHCTCP, a key component of Oahu's future transportation system. Under the ORTP 2035, VMT would increase by one percent (147,100 miles more) compared to the 2035 Baseline. However, as stated above, VHT and VHD would decrease compared to the 2035 Baseline improving the mobility of people and freight as a result.
Protect and enhance the environment, promote energy conservation and improve quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.	The ORTP 2035 was developed to support the planning policies in place for individual planning areas, as well as the overarching planning goals of the island. The decreased VHT and VHD projected for the ORTP 2035 would lead to an improvement in quality of life for the island's residents. As the individual projects and programs in the ORTP 2035 are furthered, their potential impacts on environmental resources would be considered and mitigation measures would be implemented as necessary.
Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.	Included in the ORTP 2035 are multiple improvements to the Interstate routes, through additional lane capacity and operational improvements, and also the construction of new and modification of existing interchanges to improve operability and traffic flow. The Interstates provide the main connections to key harbor and airport terminal facilities.
Promote efficient system management and operation.	The projects and programs in the ORTP 2035 are complementary to each other when possible, and efficient system management and operation are promoted through ITS measures and the TDM Program.
Emphasize the preservation of the existing transportation system.	Over half of the funding projected for the ORTP 2035 would be directed to operations, maintenance, safety, and system preservation projects.

8.3 Financial Assessment

The ORTP 2035 achieves a balance of transportation projects that help meet the mobility and accessibility needs of travelers on Oahu. The Plan does this while remaining within the short- and-long term revenue sources that are firmly established to the year 2035.

8.3.1 Project Investments and Costs

The investment priorities in the ORTP 2035 reflect the stated goal of making Oahu's transportation system more sustainable through investments in existing and new highway infrastructure as well as mass transit.

As shown in Table 8-3, of the \$23.8 billion forecast for transportation investments in ORTP 2035 (69 projects), over \$13 billion, or 56 percent of the total, is allocated to projects or programs related to system preservation, safety, operations, and maintenance. Another 28 percent of the total is allocated to transit projects and

12 percent is set aside for congestion mitigation projects, many of which are located along the H-1 corridor.

To facilitate the development of the Ewa/Kapolei area and the continued growth of the Primary Urban Center, many of the congestion mitigation projects in the mid-term plan (2011-2020) are located in and around those areas or along the H-1 corridor. In addition, a significant portion of the money allocated for transit capital projects is associated with the HHCTCP and TheBus and TheHandi-Van service expansion to and within Ewa, Kapolei, and Windward Oahu. All of these improvements are anticipated to work together to relieve the most congested corridors in Oahu.

Seventy-three percent of the expenditures in the long-term plan (2021-2035) are associated with operations, maintenance, and system preservation projects, and 77 percent of the funds in this category are designated for transit operations. Additional transit expansion projects include TheBus express service to the North Shore, Waianae Coast, and Windward Oahu.

Table 8-3: ORTP 2035 Expenditures

Project (by Category)	Dollars	Percent of Dollars*	Number of Projects
Mid-Term Plan (2011-2020)			
Islandwide	\$243.5	2.1%	8
Safety and Operational Improvements	\$204.9	1.8%	6
Congestion Mitigation	\$1,532.7	13.2%	20
Second Access	\$69.1	0.6%	1
Transit	\$5,612.5	48.3%	3
Operations, Maintenance, and System Preservation	\$3,967.9	34.1%	4
Mid-Term Plan Total	\$11,630.6	100.0%	42
Long-Term Plan (2021-2035)			
Islandwide	\$466.8	3.8%	7
Safety and Operational Improvements	\$335.2	2.8%	4
Congestion Mitigation	\$1,405.9	11.6%	9
Second Access	\$0.0	0%	0
Transit	\$1,060.0	8.7%	3
Operations, Maintenance, and System Preservation	\$8,894.5	73.1%	4
Long-Term Plan Total	\$12,162.4	100.0%	27
ORTP 2035 (2011-2035)			
Islandwide	\$710.3	3.0%	15
Safety and Operational Improvements	\$540.1	2.3%	10
Congestion Mitigation	\$2,938.6	12.4%	29
Second Access	\$69.1	0.3%	1
Transit	\$6,672.5	28.0%	6
Operations, Maintenance, and System Preservation	\$12,862.4	54.1%	8
ORTP 2035 Total	\$23,793.0	100.0%	69

*May not total to 100% due to rounding.

8.3.2 Financial Constraint

According to CFR 450.322, the long-range plan must demonstrate the consistency of proposed transportation investments with already available and firmly established sources of future revenue. In other words, the ORTP must be fiscally (or financially) constrained. The financial plan of the ORTP 2035 includes sufficient forecasted revenues of firmly established funding sources that can reasonably be expected to be available for projects and programs over the period of the Plan.

As shown in Table 8-4, the total sum of projects and programs included in the ORTP 2035 total (\$23.8 billion in YOE dollars), fall well within the forecasted \$26.1 billion in total revenues forecasted for the life of the Plan. Total capital funding (from Federal, State, City, and developer and private sources) for highway and transit uses amounts to about \$13.3 billion, and the total costs for these capital projects are \$10.9 billion, which leaves a surplus of over \$2.4 billion. Total operations, maintenance and system preservation for highway and transit uses (all funding sources) are estimated to be about \$12.9 billion, and the total operations, maintenance and system preservation revenues are \$12.9 billion, thus there is a balance in revenues and Plan obligations.

Developer and private fees are estimated to be over \$1.3 billion, an increase of about \$700 million over the estimate presented to the Policy Committee in the fall of 2009. The additional revenues include funding for transportation improvements from the Hawaii Community Development Authority and Department of Hawaiian Homelands and also analyses undertaken for the City's *Draft Ewa Impact Fees for Traffic and Roadway Improvement Update Study*.

Table 8-4: FFY 2011-2035 Revenue Forecast

Category	Capital Projects	Operations, Maintenance, and System Preservation Projects	Total
Federal	\$5,092	\$1,180	\$6,272
State	\$657	\$1,176	\$1,834
City & County	\$6,200	\$7,563	\$13,763
Transit Fares	\$0	\$2,943	\$2,943
Developer & Private	\$1,322	\$0	\$1,322
Total Revenue	\$13,271	\$12,862	\$26,133
Estimated Cost	\$10,931	\$12,862	\$23,793
Revenue Less Cost	\$2,340	\$0	\$2,340

*Millions of YOE dollars.

8.3.3 Future Plan Refinements

As projects move from the ORTP 2035 to implementation, funding assumptions (e.g., sources and amounts of revenues) may be modified. Revisions to the ORTP 2035 can be made during its five-year funding cycle or when an action triggers the need for an adjustment. Amendments to the ORTP 2035 financial plan would be required if major changes are made to the funding assumptions that would affect its financial viability.

9.1 Addressing Future Challenges

Working with a planning horizon that is over 20 years into the future means that there are inherent uncertainties and potential impediments that may challenge the assumptions underlying the ORTP 2035. The largest area of concern revolves around the funding that may or may not be available for the implementation of the projects and programs contained in the ORTP 2035.

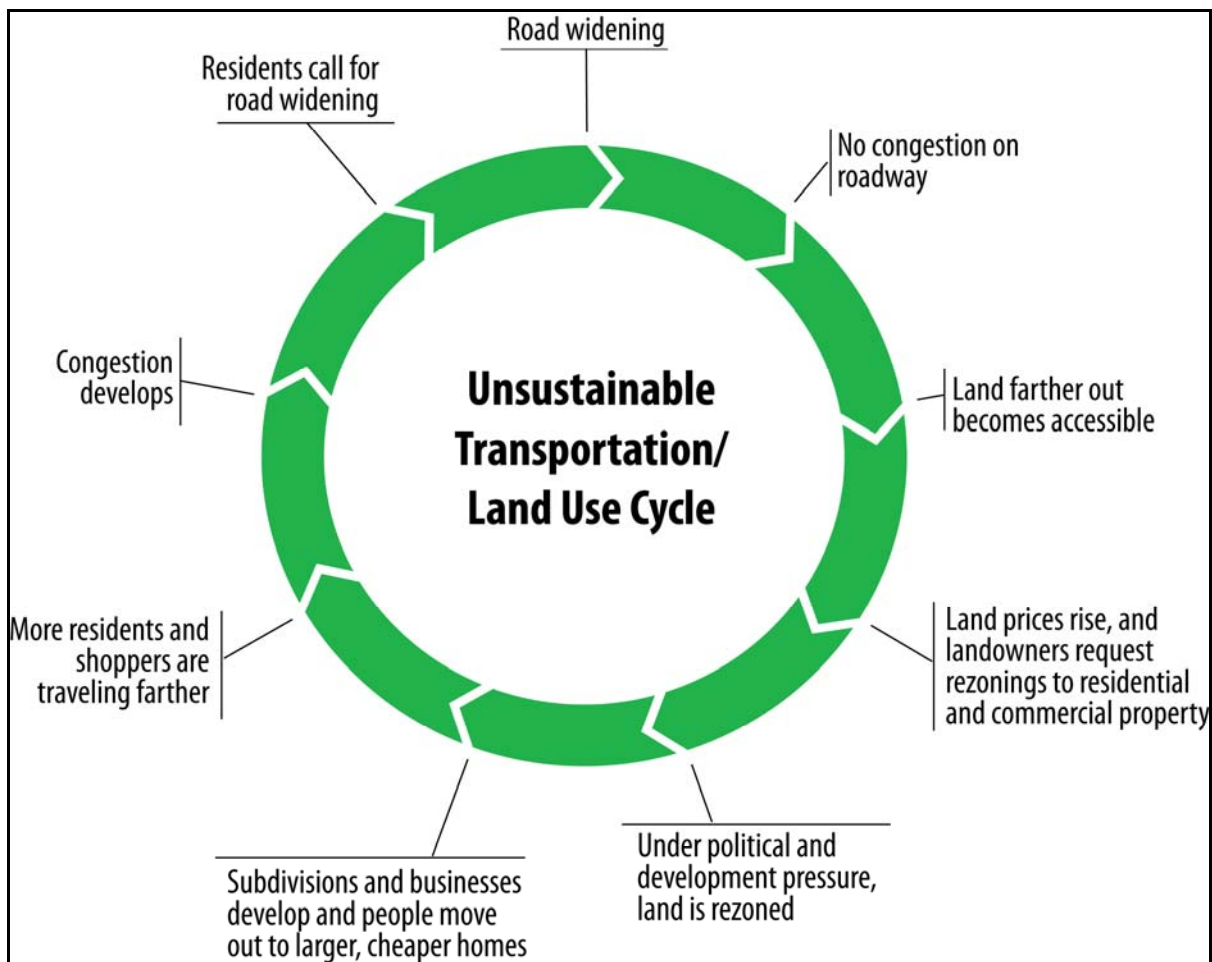
Federal funding for transportation has been in a state of flux for several years, and the Congress' inability to agree on a multi-year transportation funding bill is crippling the ability of transportation agencies nationwide to plan for long-term investments. As discussed in Section 4.1.1, multiple issues have already surfaced and it is likely that those issues will evolve over the coming years, while the potential for new, as of yet unidentified issues to surface is a very real one. The most significant of these issues include:

- The application of historic trends regarding funding to the ORTP 2035 was made more difficult due to the economic turndown in 2007.
- Whether further ARRA-type stimulus funding will be provided by Congress in the future is not clear.
- The SAFETEA-LU authorization expired in 2009 and, as of the approval of the ORTP 2035 by the Policy Committee in April 2011, no new authorization has been passed.
- The near-bankruptcy of the Federal Highway Trust Fund remains as an unresolved concern.

The results of the 2010 election resulted in further uncertainties and concerns. The clashing of political ideologies has made cross-party collaboration much less cooperative.

Clearly with its emphasis on livability and sustainability, the Federal government is signaling new transportation priorities to the Nation's state and local transportation agencies. There are many reasons for these changes, chief among them is the realization that the transportation system we have been investing in for the last 50 years, with its focus on highways and roads, is very expensive to maintain, much less expand. As shown in Figure 9-1, the Unsustainable Transportation and Land Use Cycle, more roads beget more development which begets the need for more roads, etc.

Figure 9-1: Unsustainable Transportation/Land Use Cycle



After 50+years of repeating this cycle, transportation professionals have concluded that we cannot build our way out of congestion. There is also growing recognition of the health consequences of relying on automobiles powered with internal combustion engines, which both pollute the air and facilitate a sedentary lifestyle. Finally, there is the simple fact that many people are not well served by this system. On Oahu, low and moderate income residents rely heavily on the local transit system. The combination of all these facts has resulted in the transportation priorities reflected in the ORTP 2035.

The projects and programs included in ORTP 2035 reflect the desire to make Oahu's transportation system more sustainable. The overwhelming share of the expenditures – 88 percent – goes to support maintenance and operations, system preservation, transit expansion, high technology projects such as ITS, and bicycle and pedestrian improvements.

The initial capital costs associated with developing a more sustainable transportation system may make it appear to be more expensive than not. Yet, over the long term, increasing transportation choices and access to the transportation system reduces

the overall costs of moving people, goods, and services, enhancing economic competitiveness.

Transportation investments that support community livability can also have multiple co-benefits. Compact, connected communities encourage regular walking, bicycling, and transit use, providing exercise while reducing the need for auto travel; they also make trips shorter for those who choose to drive. The State of Hawaii's Complete Streets statute and the City Charter Amendment #8 will help guide investments towards making local communities more pedestrian- and bicycle- friendly.

Measures that lead to a more sustainable lifestyle are comprised of strategies that reduce congestion, increase access to public transportation, improve air quality, and enhance the coordination between land use and transportation decisions. Many of these measures are not under OahuMPO's control, thus requiring a concerted and coordinated effort over time by several key players. The OahuMPO is actively working with DPP and DTS on the City level, HDOT and DBEDT at the State level, and USDOT, EPA, and HUD on the Federal level, as well as with other public and private agencies identified in the first chapter of this document. In order to institutionalize sustainability goals, these partnerships must continue, and additional stakeholders, such as large employers and the military, should be brought into the conversation.

Fostering livability in transportation projects and programs will result in improved quality of life, create a more efficient, more accessible transportation network, and serve the mobility needs of communities, families, and businesses for years to come.

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Appendix A

Travel Time Range Maps

This appendix contains the following travel time range maps:

Figure A-1: 2007 AM Peak Period Auto Travel Times to Downtown Honolulu

Figure A-2: 2007 AM Peak Period Auto Travel Times to Kapolei

Figure A-3: 2007 AM Peak Period Auto Travel Times to Waikiki

Figure A-4: 2007 AM Peak Period Auto Travel Times to Mililani

Figure A-5: 2007 AM Peak Period Auto Travel Times to Honolulu International Airport

Figure A-6: 2035 Baseline AM Peak Period Auto Travel Times to Downtown Honolulu

Figure A-7: 2035 Baseline AM Peak Period Auto Travel Times to Kapolei

Figure A-8: 2035 Baseline AM Peak Period Auto Travel Times to Waikiki

Figure A-9: 2035 Baseline AM Peak Period Auto Travel Times to Mililani

Figure A-10: 2035 Baseline AM Peak Period Auto Travel Times to Honolulu International Airport

Figure A-11: ORTP 2035AM Peak Period Auto Travel Times to Downtown Honolulu

Figure A-12: ORTP 2035 AM Peak Period Auto Travel Times to Kapolei

Figure A-13: ORTP 2035 AM Peak Period Auto Travel Times to Waikiki

Figure A-14: ORTP 2035 AM Peak Period Auto Travel Times to Mililani

Figure A-15: ORTP 2035 AM Peak Period Auto Travel Times to Honolulu International Airport

Figure A-1: 2007 AM Peak Period Auto Travel Times to Downtown Honolulu

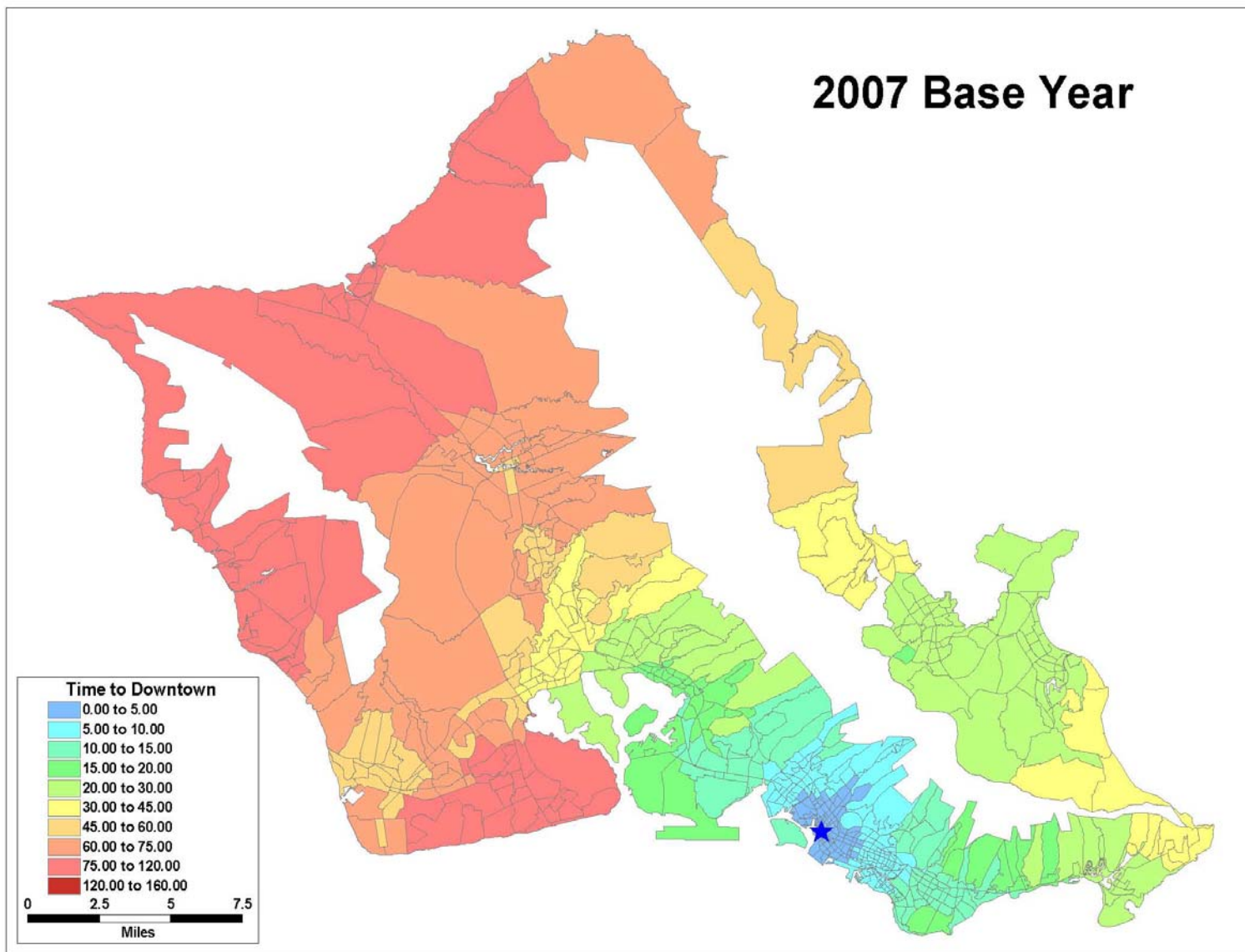


Figure A-2: 2007 AM Peak Period Auto Travel Times to Kapolei

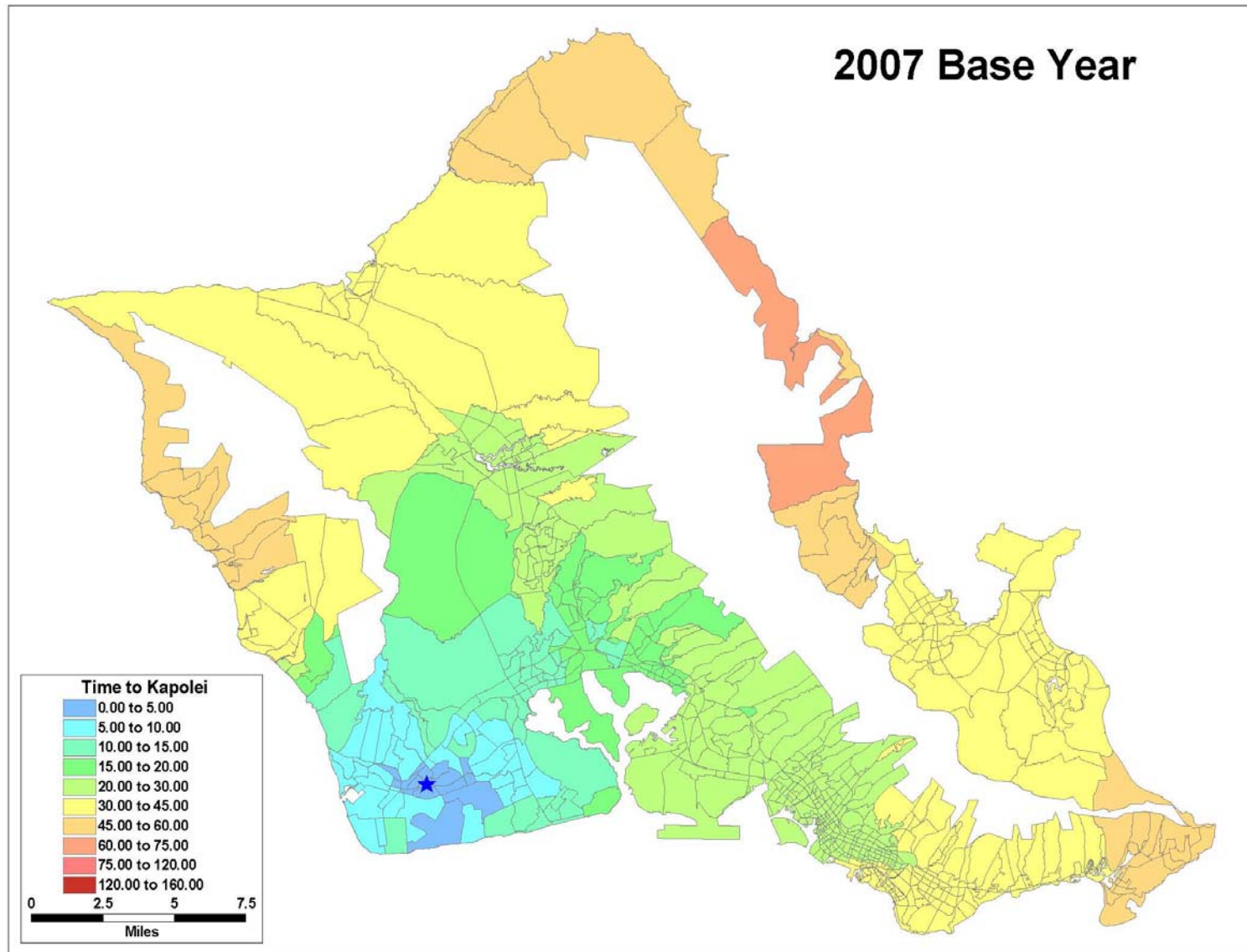


Figure A-3: 2007 AM Peak Period Auto Travel Times to Waikiki

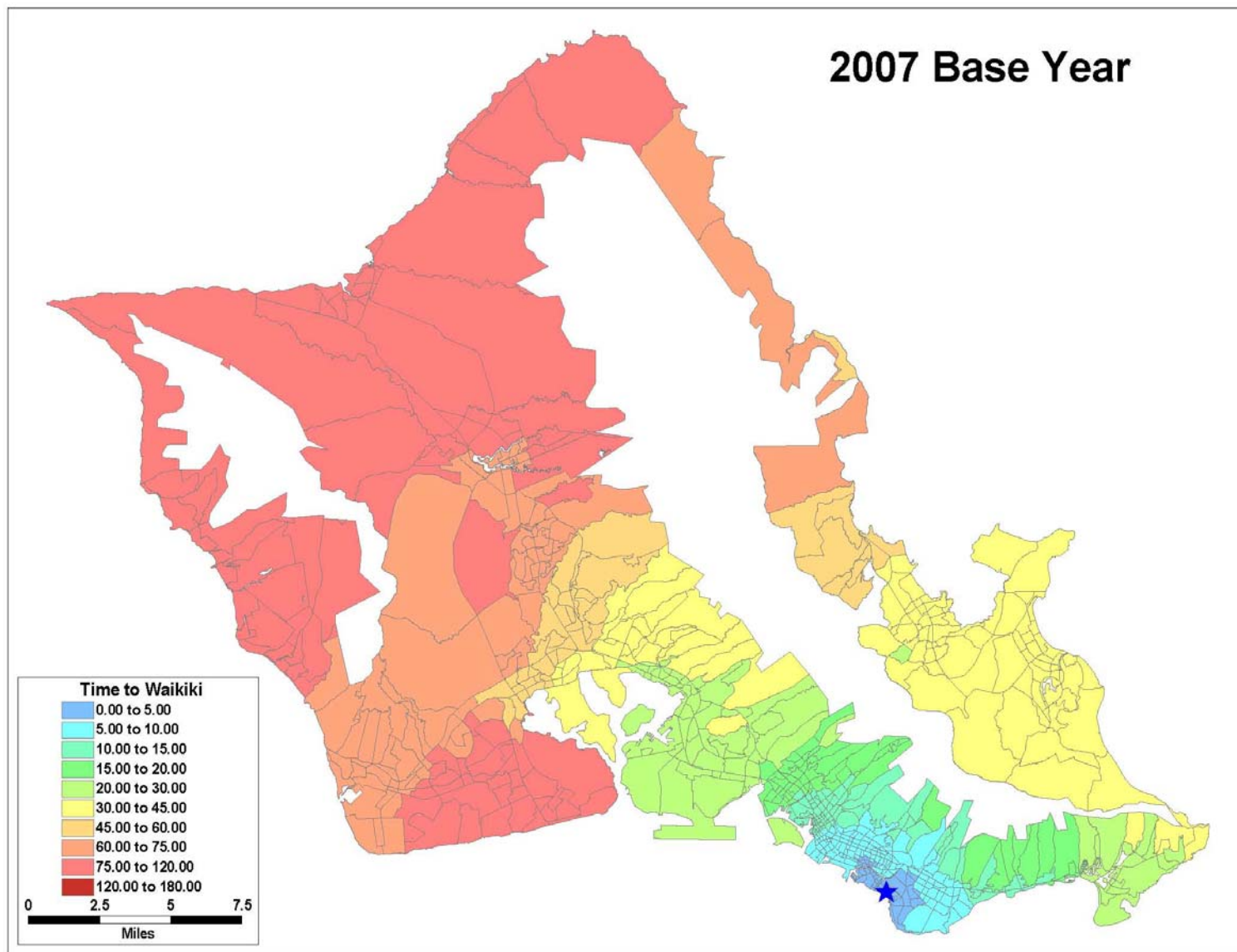


Figure A-4: 2007 AM Peak Period Auto Travel Times to Mililani

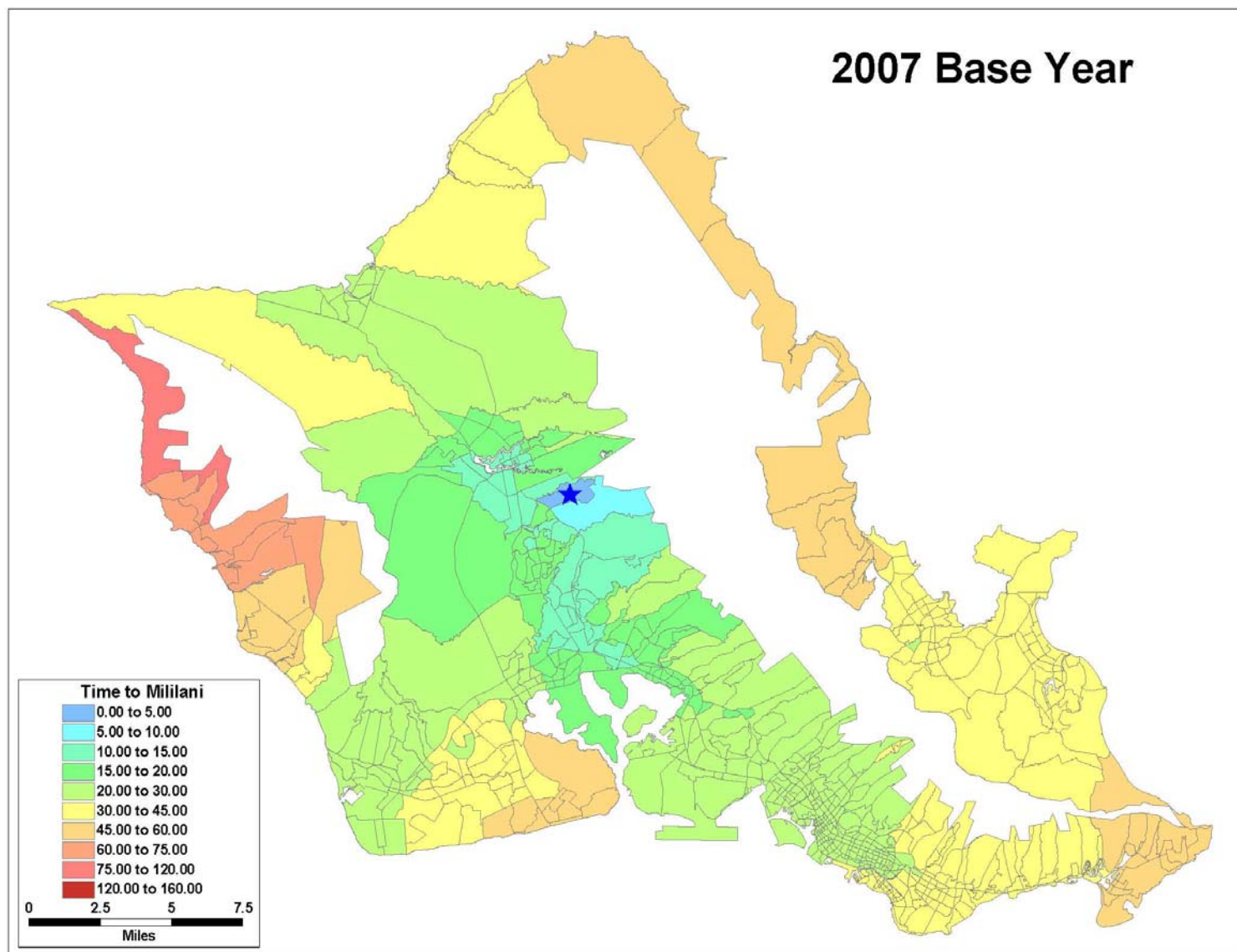


Figure A-5: 2007 AM Peak Period Auto Travel Times to Honolulu International Airport

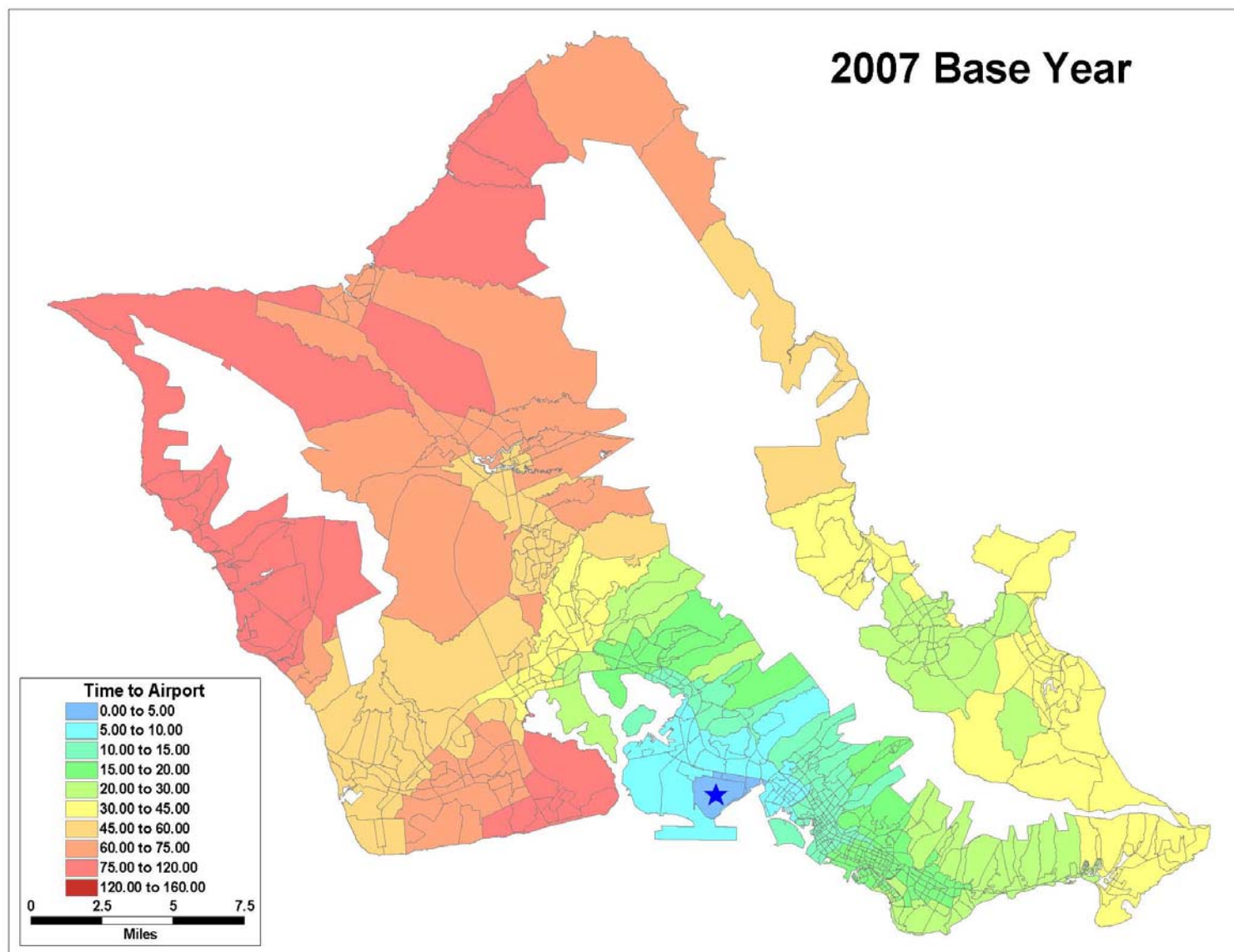


Figure A-6: 2035 Baseline AM Peak Period Auto Travel Times to Downtown Honolulu

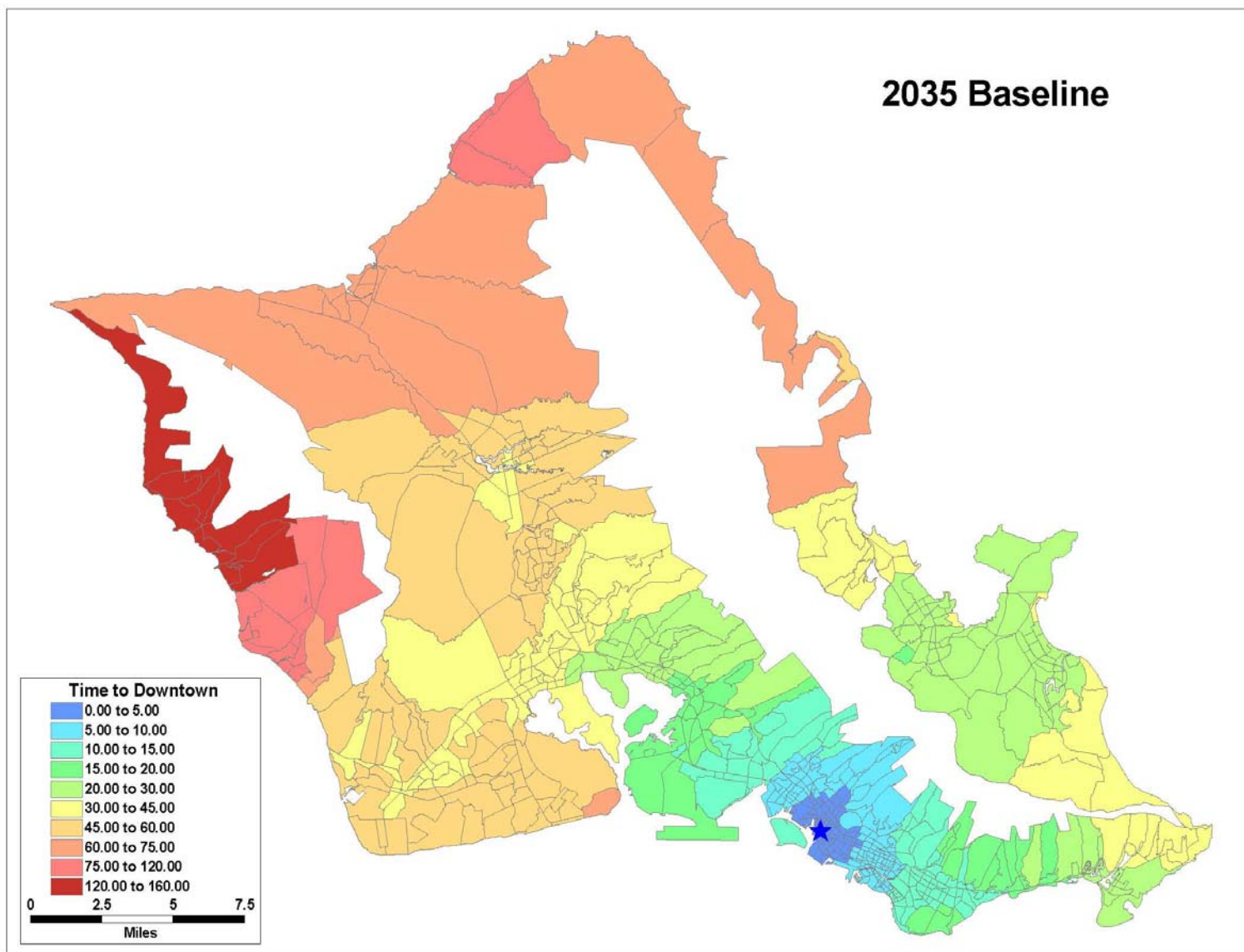


Figure A-7: 2035 Baseline AM Peak Period Auto Travel Times to Kapolei

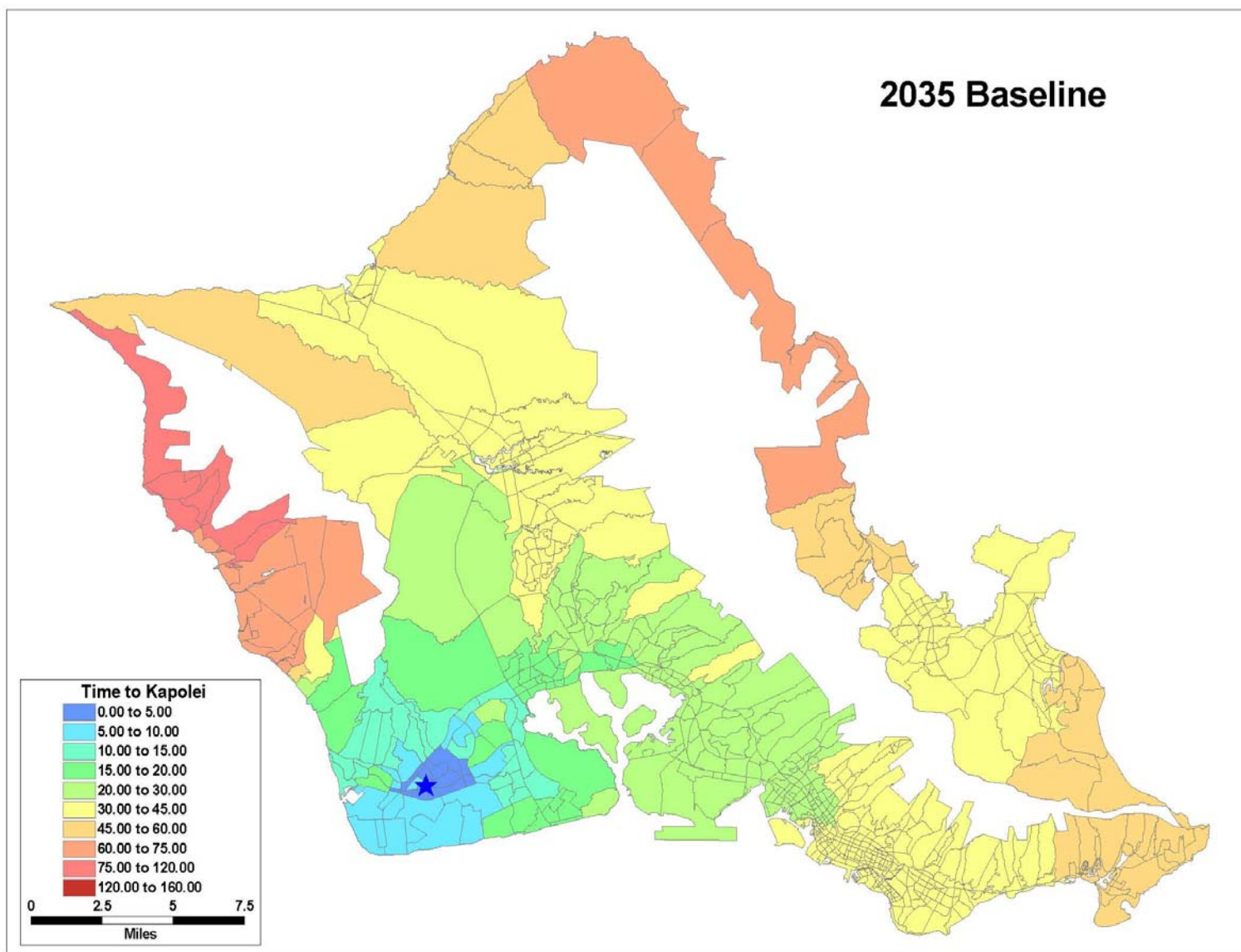


Figure A-8: 2035 Baseline AM Peak Period Auto Travel Times to Waikiki

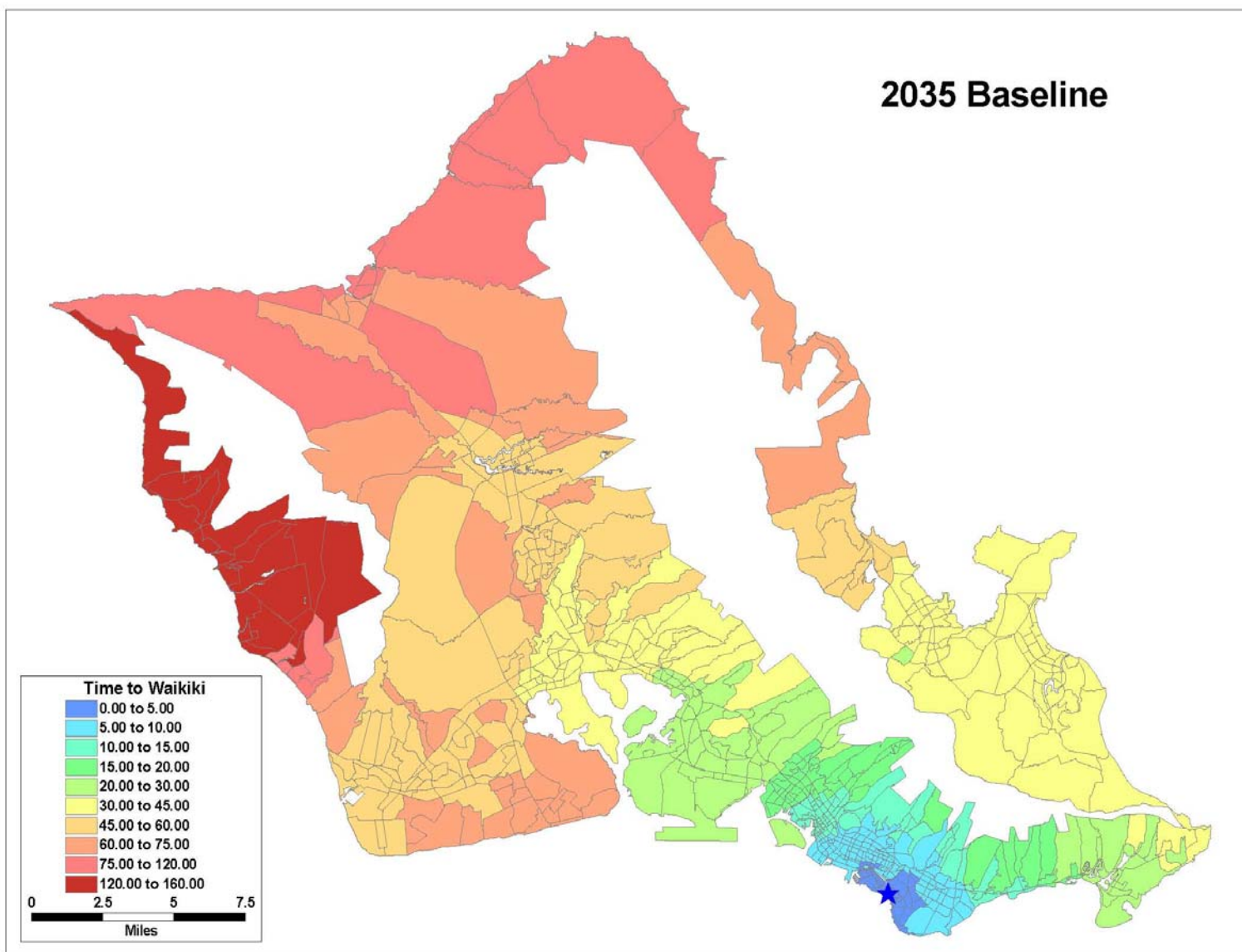


Figure A-9: 2035 Baseline AM Peak Period Auto Travel Times to Mililani

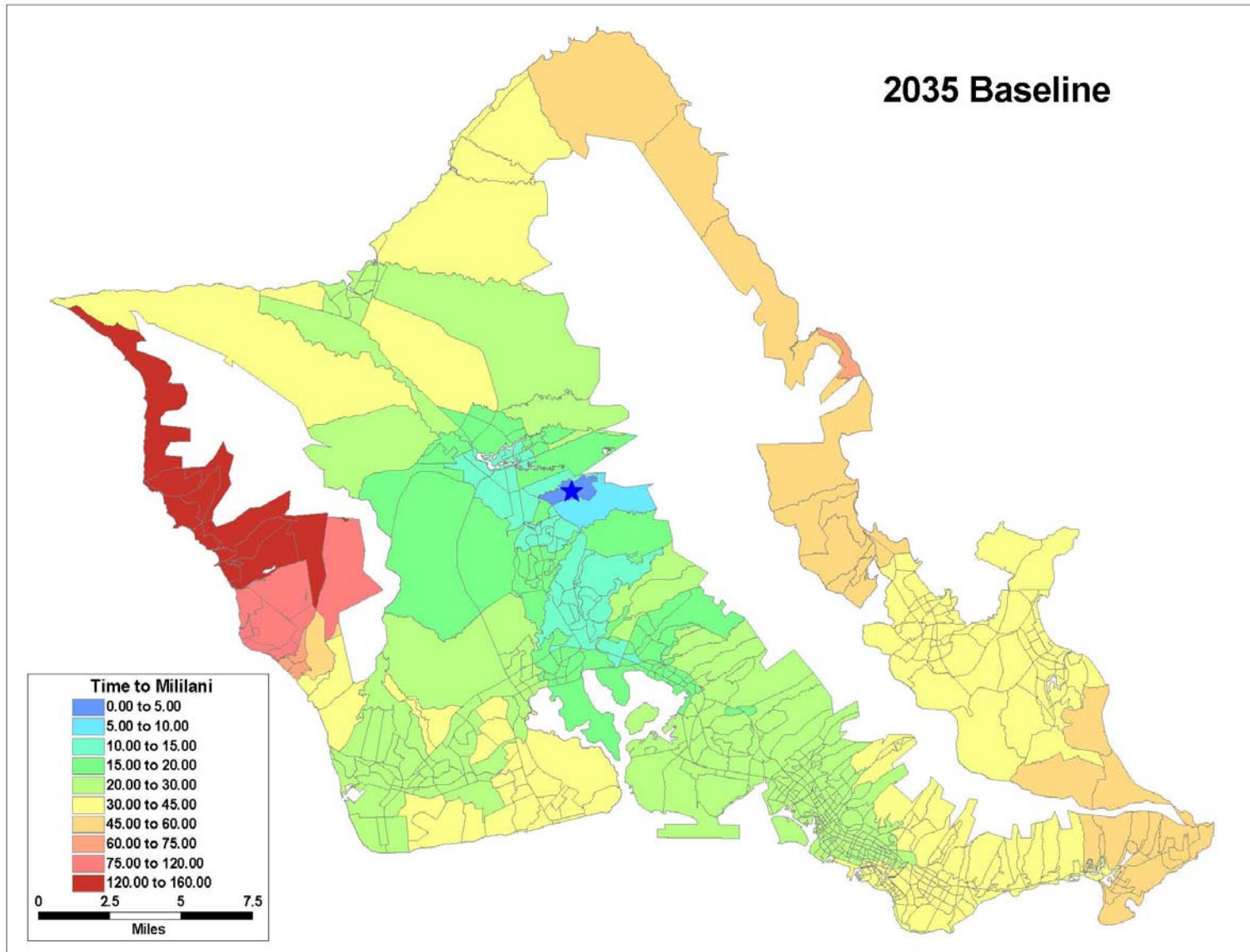


Figure A-10: 2035 Baseline AM Peak Period Auto Travel Times to Honolulu International Airport

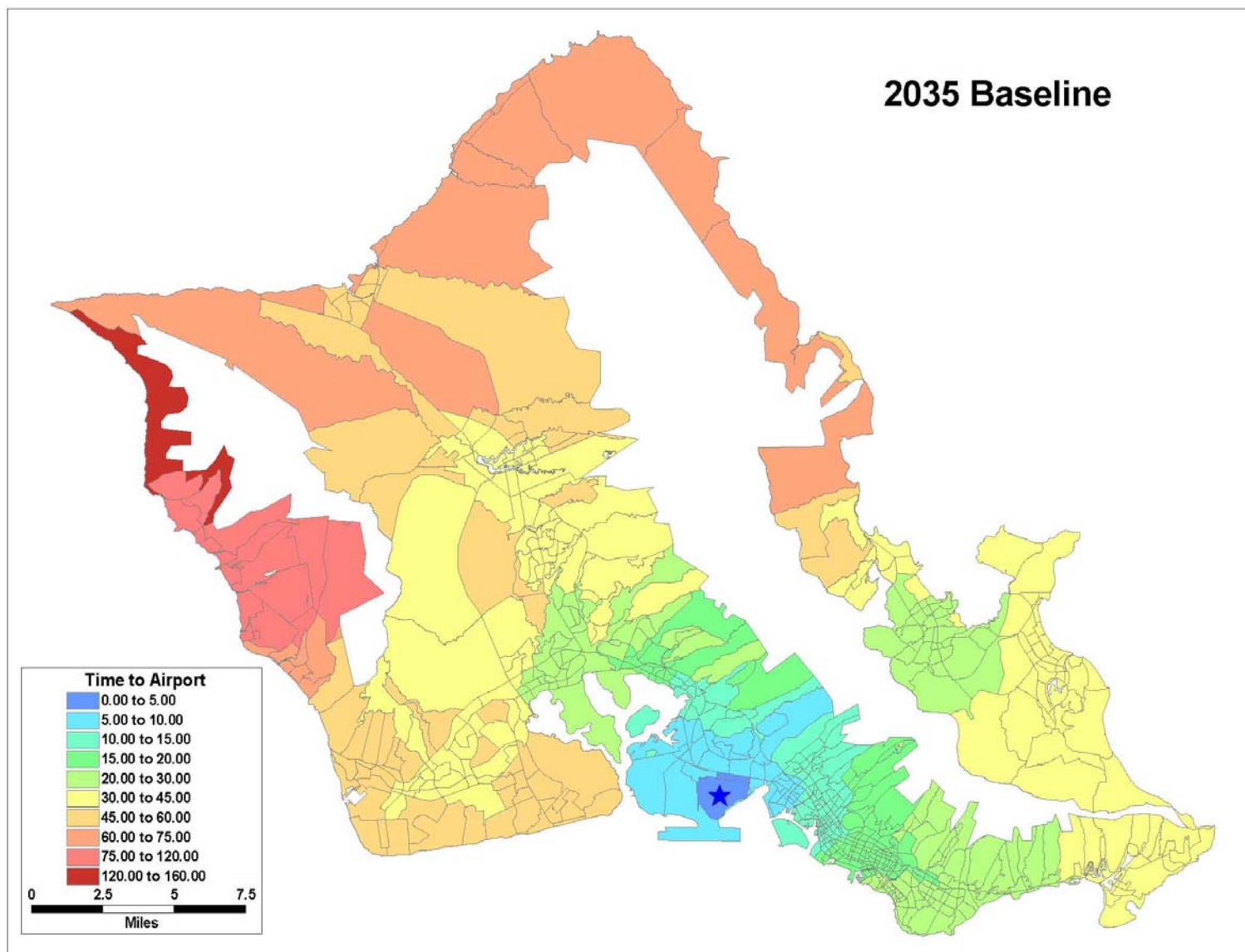


Figure A-11: ORTP 2035AM Peak Period Auto Travel Times to Downtown Honolulu

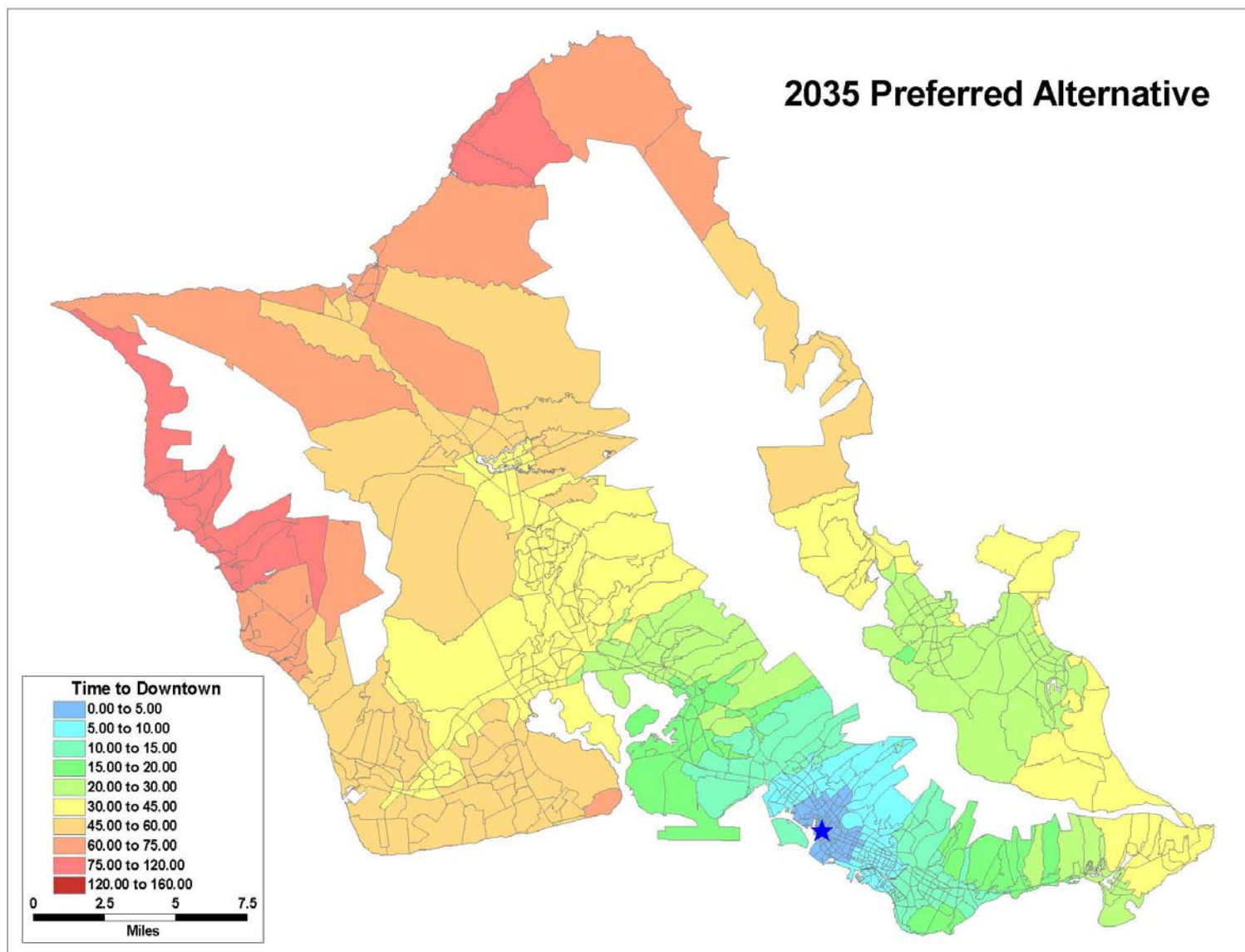


Figure A-12: ORTP 2035 AM Peak Period Auto Travel Times to Kapolei

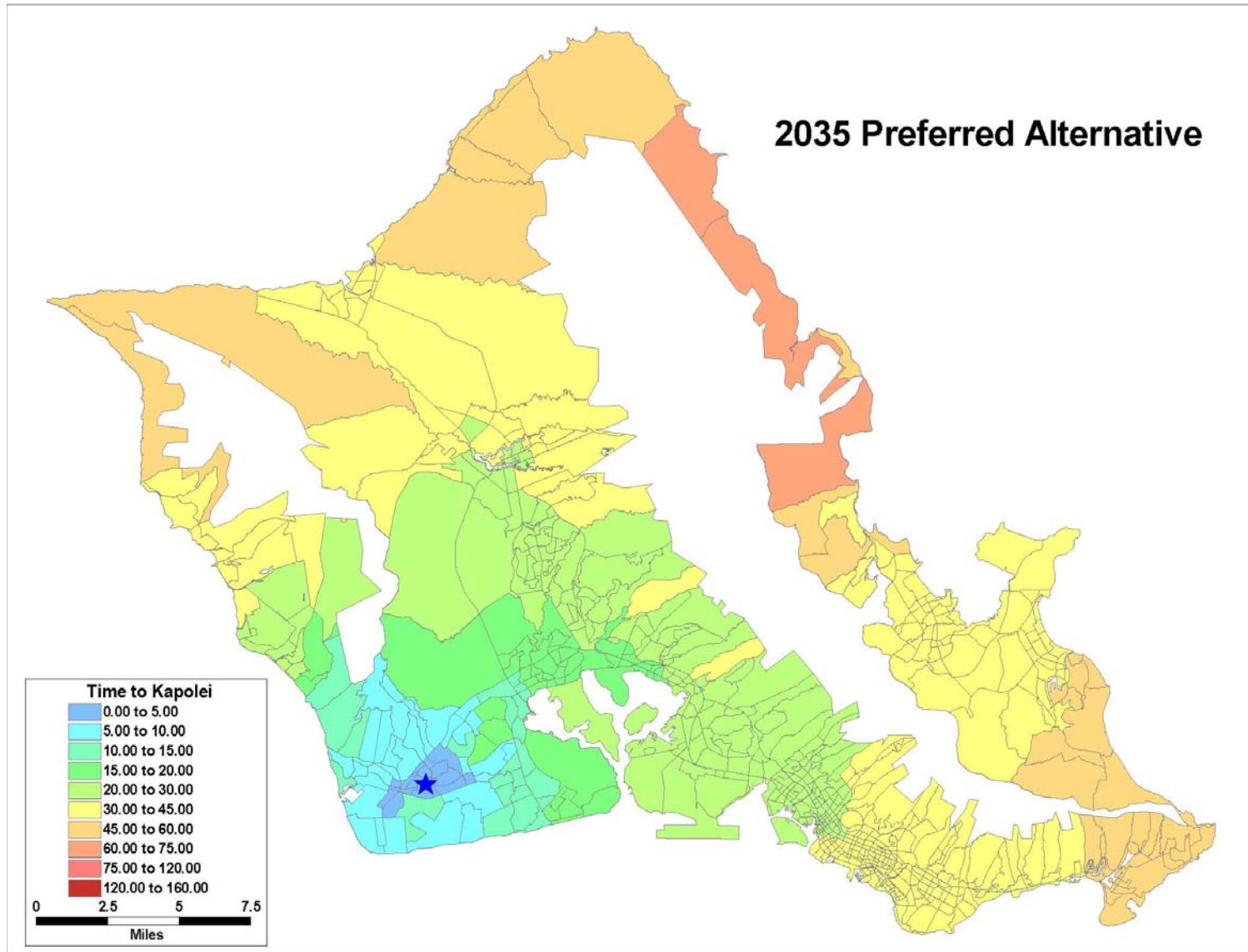


Figure A-13: ORTP 2035 AM Peak Period Auto Travel Times to Waikiki

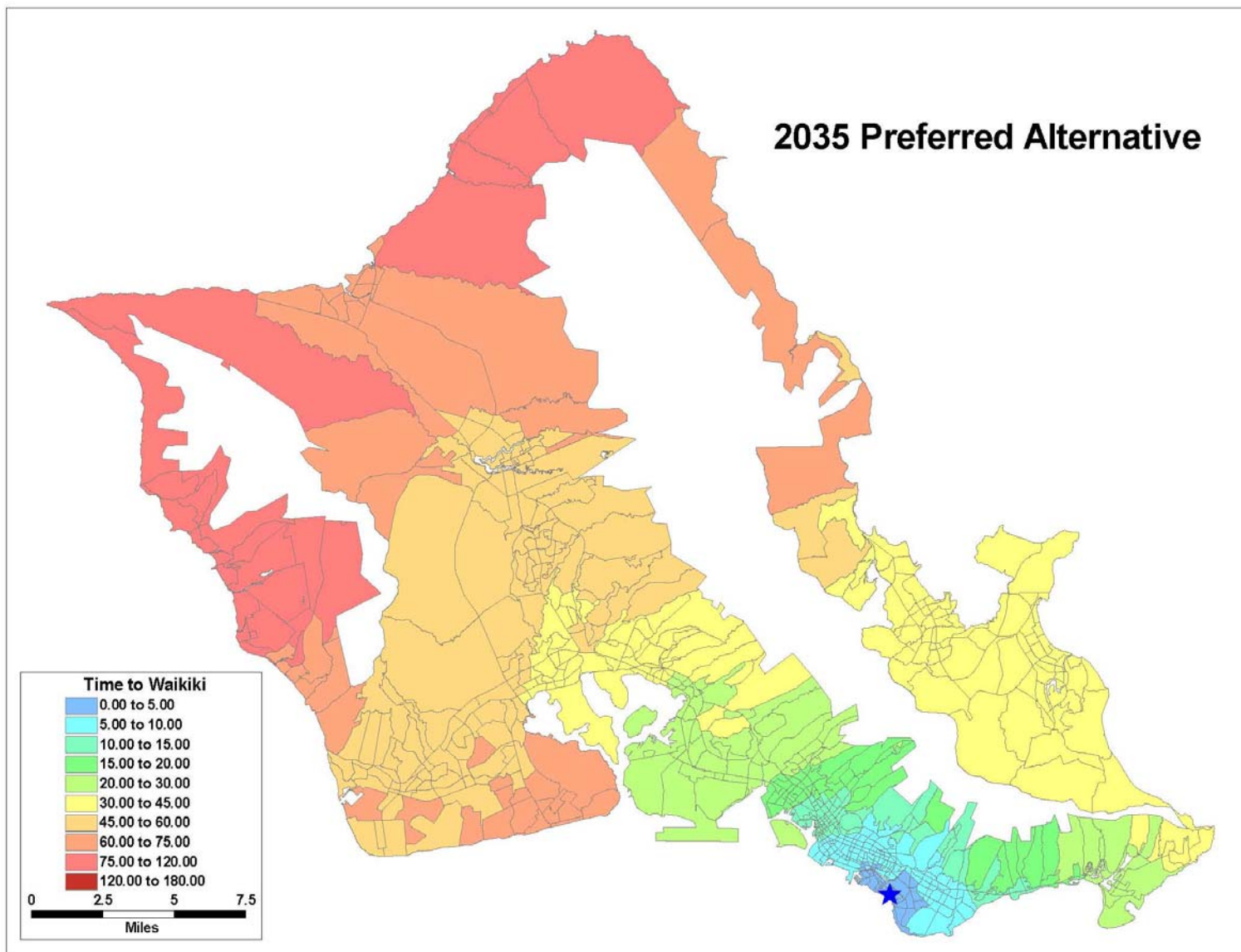


Figure A-14: ORTP 2035 AM Peak Period Auto Travel Times to Mililani

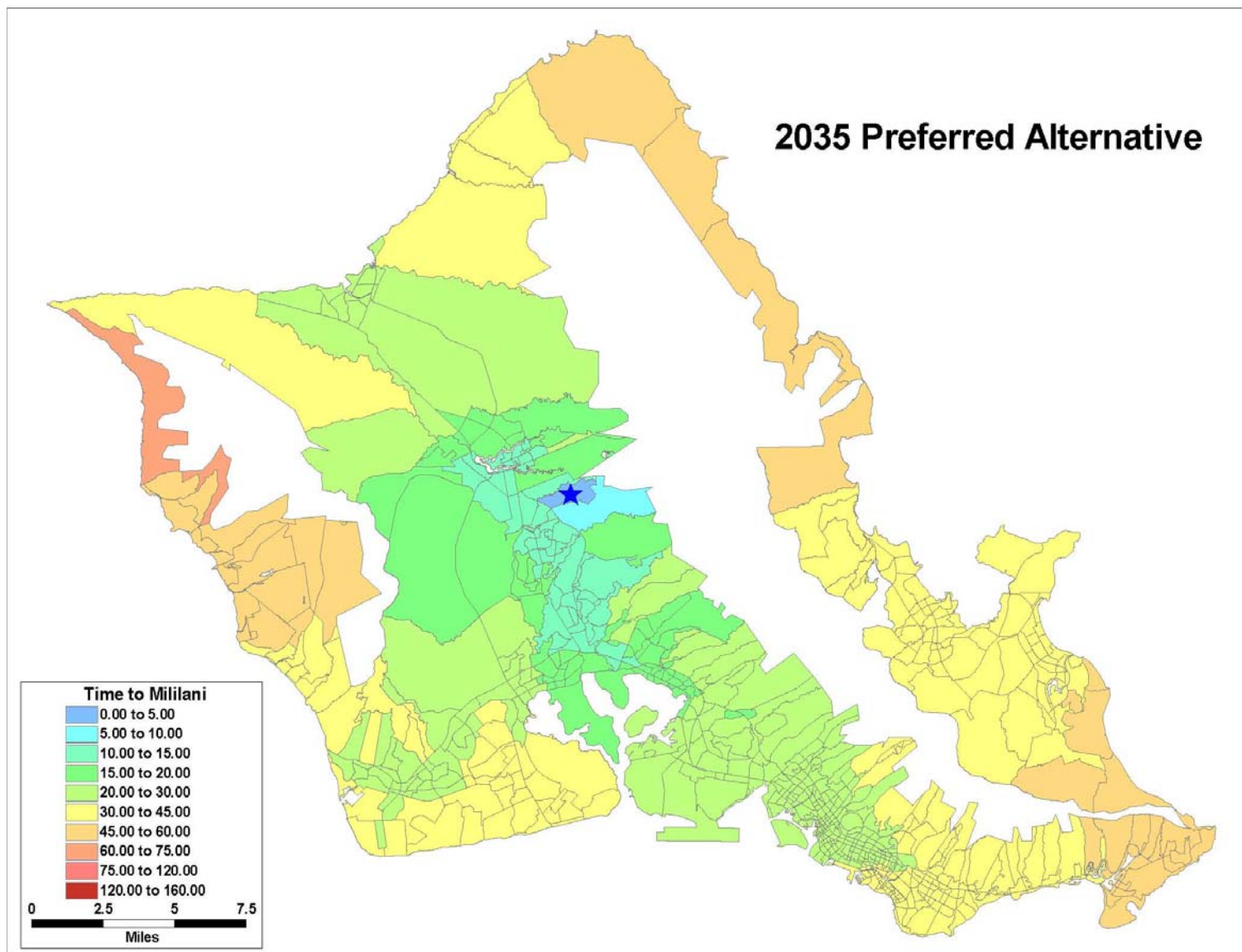
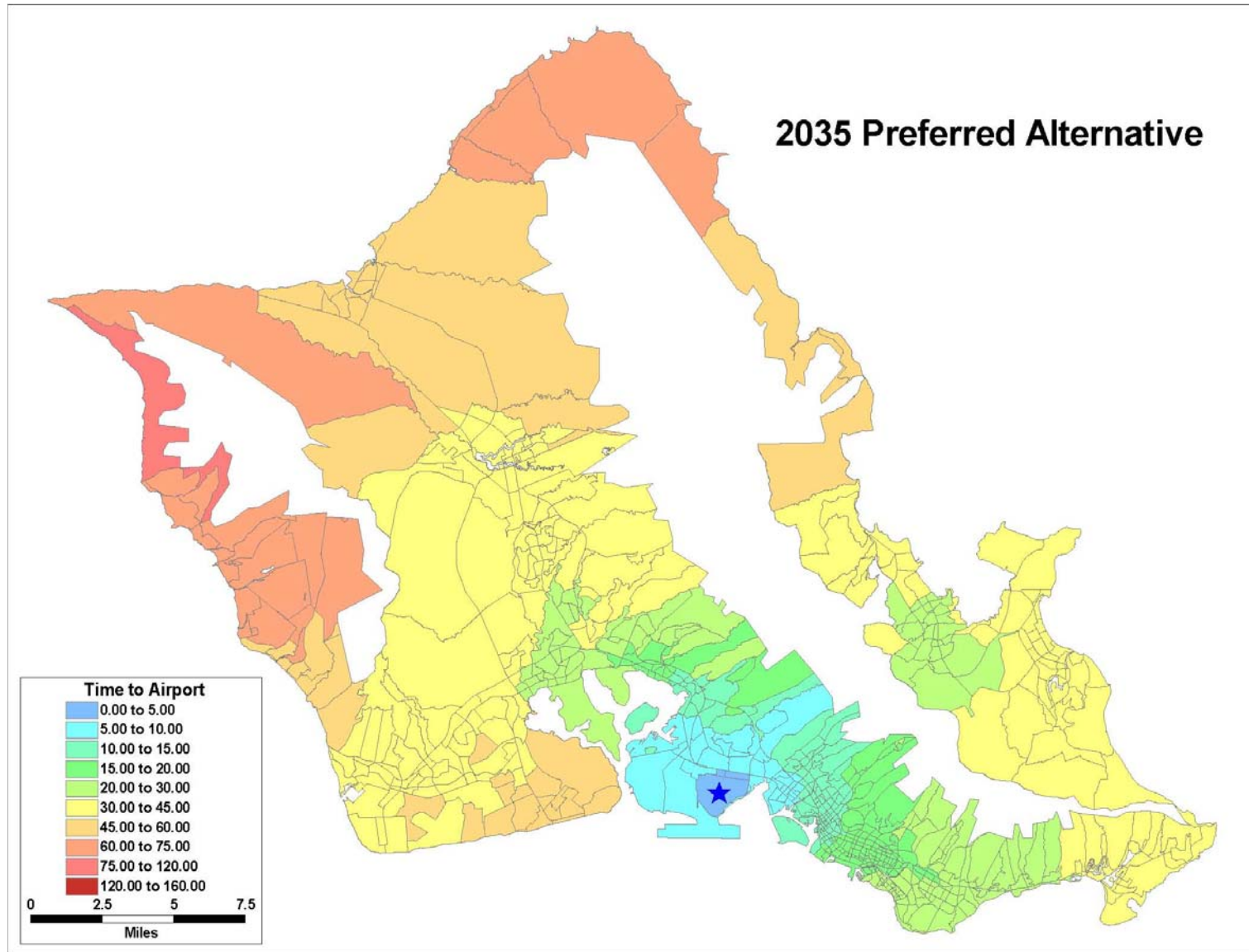


Figure A-15: ORTP 2035 AM Peak Period Auto Travel Times to Honolulu International Airport



About the OahuMPO Congestion Management Process

The purpose of the Congestion Management Process (CMP) for the Oahu Metropolitan Planning Organization (OahuMPO) is to identify congested surface transportation facilities, evaluate projects proposed to mitigate congestion, and prioritize these projects using quantifiable performance measures to assist decision-makers in selecting projects for the ORTP 2035 and Transportation Improvement Program (TIP).

The CMP for the ORTP 2035 builds upon previous work by the OahuMPO, particularly the technical analysis protocol developed for use for project evaluation as part of the ORTP 2030. This process follows the procedures found in the OahuMPO's *CMS Performance Monitoring and Evaluation Plan, December 2005*.

Consistent with the previous process, the CMP covers the island of Oahu, including all segments and corridors that experience congestion. Included are freeways, expressways, arterials, and collectors as defined by the regional functional classification system and reflected in facilities contained within the OahuMPO travel demand forecasting model.

Selection of CMP Project Packages

The selection of projects for the 2010 CMP analysis differed slightly than what was done for the 2005 Congestion Management System (CMS) process. In the previous case, individual regionally significant roadway capacity projects that were identified through the ORTP 2030 plan development process were identified for consideration in the CMS analysis process. Each of these projects would be coded into the OahuMPO travel demand model individually and the model would be run to produce outputs that could be used for the CMS analysis.

For the 2010 CMP analysis, project packages (one or more individual road capacity projects) were defined to be run through the OahuMPO travel demand model. Project packages were developed to explore in more detail whether there were synergies among logical groupings of projects that were in close proximity to each other. It was felt that the analysis of the packages could highlight which projects were the most effective at reducing congestion within a subarea or corridor. Or, that the analysis might highlight unforeseen deficiencies in the transportation network, that modeling individual projects might miss. It was felt that the outcome of the CMP analysis might benefit future corridor or subarea planning studies, or performance monitoring programs based on the results of the analysis. It was also determined that while the effect of individual projects on the performance of the regional transportation system may be too small to be captured with the regional model, but grouping logical packages together may result in a noticeable effect.

Defining Congestion

For purposes of this report, and consistent with the process previously used by the OahuMPO for the ORTP 2030, the primary means of identifying congestion is the link-based volume-to-capacity ratio (V/C ratio).³ The V/C ratio is the calculation of the demand flow rate divided by the capacity for a roadway facility. The OahuMPO 2035 Baseline travel demand forecasting model will be used to provide a starting point from which to calculate the link-based V/C ratio. A roadway facility will be defined as congested if the V/C ratio in during the A.M. peak period is greater than 0.90, which equates to LOS E or F.

Performance Measures

The CMP uses performance measures documented in the *CMS Performance Monitoring and Evaluation Plan*. Performance scores for all of the measures are generated by the OahuMPO travel demand forecast model. The included in the analyses are the following:

- Change in V/C Ratio
- Vehicle Volume
- Transit Mode Share
- Vehicle Miles Traveled (VMT)
- Vehicle Hours of Delay (VHD)
- Vehicle Hours Traveled (VHT)

The methodology for calculating these measures is described below.

Change in V/C Ratio

As mentioned above, the V/C ratio is used to calculate congestion for both 2035 Baseline conditions and for comparing CMP project packages with the Baseline. The measure is presented for the two-hour morning (AM) peak period.

Vehicle Volume

Vehicle volume is the number of vehicles that use a given roadway over a specified period of time. Vehicle volumes are presented in concert with V/C ratio to provide a comparison of project effectiveness. For example, does the project (or projects) in a CMP project package reduce congestion (reduced V/C ratio), while carrying more traffic (higher vehicle volumes)? A comparison to the Baseline alternative is also provided.

³ A complete definition of congestion can be found in the OahuMPO *CMS Performance Monitoring and Evaluation Plan*, December 2005.

Mode Share

This performance measure provides a comparison of the daily 2035 multi-modal mode share by 11 trip purposes, produced by the OahuMPO travel demand forecast model for each CMP project package. A comparison of the percentage change with the Baseline alternative is also provided.

Vehicle Miles Traveled

Vehicle-miles traveled (VMT) is a unit that measures travel distance made by a vehicle, such as an automobile, van, pickup truck, commercial vehicle, or motorcycle. Each mile traveled is counted as one vehicle mile regardless of the number of persons in the vehicle. The measure reflects total year 2035 forecasted islandwide VMT produced by the CMP project package for the two-hour AM peak period. Total VMT is presented by facility and Area Type and compared to the 2035 Baseline alternative (percent change).

Vehicle Hours of Delay

Vehicle-hours of delay (VHD) is defined as the difference between vehicle-hours traveled under congested conditions and vehicle hours of travel that would otherwise be expected under free flow (uncongested) conditions. VHD is calculated using travel times and travel speeds. The measure reflects total year 2035 forecasted islandwide VHD produced by the CMP project package for the two-hour AM peak period. Total VHD will be presented by facility and Area Type and compared to the 2035 Baseline alternative (percent change).

Vehicle Hours Traveled

Vehicle-hours traveled (VHT) is a measurement of the total hours traveled by all vehicles. It is calculated by multiplying the number of vehicles times the travel time of those vehicles on a network or specific links within that network. VHT is an indicator of how additional travel demand influences congestion in the system from a travel time standpoint. The measure reflects total year 2035 forecasted islandwide VHT produced by the CMP project package for the two-hour AM peak period. Total VHT is presented by facility and Area Type and compared to the 2035 Baseline alternative (percent change).

Transit Boardings

Transit boardings are a new measure that has been added to this analysis. This measure tests the impacts of congestion relief projects on transit usage, in the form of transit boardings. This measure provides a summary of 2035 transit boardings by time period and by mode. Time periods include peak and off-peak travel. Transit modes include local, limited, and express bus; guideway (Honolulu Rail Transit); and ferry. A comparison to the Baseline alternative (percent change) is also provided.

Table B-1 CMP Point System for Highway Projects

	Possible Points													
						Additional Vehicle Volume								
Performance Measure	Increase	No Change	Decrease	New Road	On List of Congested Roads	0	1-500	501-1,000	1,001-1,500	1,501-2,000	2,001-2,500	2,501-3,000	3,000-3,500	3,501-4,000
Change in V/C Ratio	0	2	5	3										
List of Congested Roadways					1									
Transit Mode Share	3	1	0											
Vehicle Volume Increase						0	1	2	3	4	5	6	7	8
VMT	0	1	2											
VHT	0	1	2											
VHD	0	1	2											
Total	Points Possible: 23 (or more based on increase in Vehicle Volume)													

Table B-2 CMP Point System for Transit Projects

	Possible Points													
						Additional Vehicle Volume								
Performance Measure	Increase	No Change	Decrease	New Road	On List of Congested Roads	0	1-5,000	5,001-10,000	10,001-15,000	15,001-20,000	20,001-25,000	25,001-30,000	30,000-35,000	35,001-40,000
List of Congested Roadways					1									
Transit Mode Share	3	1	0											
Transit Trips to Work						0	1	2	3	4	5	6	7	8
VMT	0	1	2											
VHT	0	1	2											
VHD	0	1	2											
Total	Points Possible: 18 (or more based on increase in Transit Trips)													

Table B-3 CMP Point System for TDM/TSM Projects

Performance Measure	Possible Points				
	Increase	No Change	Decrease	New Road	On List of Congested Roads
Change in V/C Ratio	0	2	5	3	
List of Congested Roadways					1
Transit Mode Share	3	1	0		
Vehicle Volume Increase	3	1	0		
VMT	0	1	2		
VHT	0	1	2		
VHD	0	1	2		
Total	Points Possible: 18				

Table B-4 ORTP 2035 CMP Scoring and Ranking Results

ORTP 2035 Project No.	CMP Package No.	Facility/Project Title	Points	Change in V/C Ratio	Vehicle Volume	List of Congested Roadways	VHT	VHD	VMT	Transit Mode Share	Transit Person Trips
Highway Projects											
19	18	Kapolei Parkway, Extension, Kamokila Boulevard to Kamaaha Avenue	18	3	8	0	2	2	2	1	N/A
18	23	Kapolei Parkway, Extension & Widening, Aliinui Drive to Kalaeloa Boulevard	18	3	9	0	2	2	1	1	N/A
26	5	Kamehameha Highway, Widening, Lanikuhana Avenue to Ka Uka Boulevard	18	5	7	1	1	2	1	1	N/A
N/A	6	Central Mauka Road, Mililani/Waiawa Area, from Meheula Parkway to Kamehameha Highway	16	3	6	0	2	2	2	1	N/A
61	2	Interstate Route H-1, Widening, Waiawa Interchange to Halawa Interchange	15	5	6	1	1	2	0	0	N/A
71	4	Kunia Road, Widening and Interchange Improvement, Wilikina Drive to Farrington Highway	15	5	2	1	2	2	2	1	N/A
62	7	Kahekili Highway, Widening, Kamehameha Highway to Haiku Road	15	5	3	1	2	2	1	1	N/A
N/A ⁴	25	Interstate Route H-1 Median High-Occupancy Vehicle (HOV) between Waiawa and Makakilo Interchanges	15	3	8	0	1	2	0	1	N/A
32	3	Interstate Route H-1, Widening, Ola Lane to Vineyard Boulevard	15	5	5	1	1	1	1	1	N/A
77	4	Waianae Second Access, Farrington Highway to Kunia Road	14	3	4	0	2	2	2	1	N/A
60	6	Interstate Route H-2, New Interchange, Pineapple Road Overpass	14	3	4	0	2	2	2	1	N/A
57	17	Kalaeloa East-West Spine Road, New Roadway, Kalaeloa Boulevard to Geiger Road	14	3	4	0	2	2	2	1	N/A

⁴ Project was evaluated as part of the CMP process, but was not included in ORTP 2035.

ORTP 2035 Project No.	CMP Package No.	Facility/Project Title	Points	Change in V/C Ratio	Vehicle Volume	List of Congested Roadways	VHT	VHD	VMT	Transit Mode Share	Transit Person Trips
54	15	Farrington Highway, Widening, Hakimo Road to Kalaeloa Boulevard	14	5	2	1	2	2	1	1	N/A
20	14	Farrington Highway, Widening, Golf Course Road to west of Fort Weaver Road	13	5	3	1	1	2	0	1	N/A
27	6	Interstate Route H-2, Widening, Waipio Interchange	13	5	0	1	2	2	2	1	N/A
N/A	7	Likelike Highway Widening, from Kamehameha Highway to Kahekili Highway	13	5	1	1	2	2	1	1	N/A
59	14	Farrington Highway, Widening, west of Fort Weaver Road to Waiawa Interchange	13	5	3	1	1	2	0	1	N/A
15	1	Interstate Route H-1, New Interchange, Kapolei Interchange	13	3	5	1	1	1	1	1	N/A
31	12	Salt Lake Boulevard Widening Project	13	5	3	1	1	1	1	1	N/A
N/A	12	Puuloa Road Widening, from Pukuloa Road to Nimitz Highway	13	5	3	1	1	1	1	1	N/A
16	16	Hanua Street Extension, Farrington Highway to Malakole Street; Interstate Route H-1, New On- & Off-Ramps, Palailai Interchange	12	3	3	0	2	2	1	1	N/A
22	17	Kualakai Parkway, Widening & Extension, Interstate Route H-1 to Franklin D. Roosevelt Avenue	12	3	2	0	2	2	2	1	N/A
N/A	6	Wahiawa Second Access Road, from Whitmore Village to California Avenue and from California Avenue to Meheula Parkway	12	3	2	0	2	2	2	1	N/A
55	17	Kamokila Boulevard, from Franklin D. Roosevelt Avenue to Saratoga Street	12	3	2	0	2	2	2	1	N/A
56	17	Fort Barrette Road, from Franklin D. Roosevelt Avenue to Saratoga Street	12	3	2	0	2	2	2	1	N/A
N/A	5	Paiwa Street Extension, from Ka Uka Boulevard to Lumiauu Street	12	3	4	0	1	2	1	1	N/A
25	25	Interstate Route H-1 Widening, Waiawa to Paiwa	12	5	2	1	1	2	0	1	N/A

ORTP 2035 Project No.	CMP Package No.	Facility/Project Title	Points	Change in V/C Ratio	Vehicle Volume	List of Congested Roadways	VHT	VHD	VMT	Transit Mode Share	Transit Person Trips
35	9	Makakilo Drive, Second Access, Makakilo Drive to Kualaka'i Parkway / Interstate Route H-1 Interchange	12	3	5	0	1	1	1	1	N/A
21	1	Fort Barrette Road, Widening, Farrington Highway to Barber's Point Gate	12	5	2	1	1	1	1	1	N/A
76	13	Interstate Route H-1, Widening, Ward Avenue to Punahou Street	12	5	2	1	1	1	1	1	N/A
N/A	20	East-West Road Widening Project, from Farrington Highway to Old Fort Weaver Road	12	3	4	1	1	1	1	1	N/A
72	2	Interstate Route H-1 Widening, from Waiau to Waiawa Interchanges	11	5	2	1	1	2	0	0	N/A
24	2	Interstate Route H-1, Widening, Waipahu Off-Ramp	11	5	2	1	1	2	0	0	N/A
75	10	Nimitz Highway High-Occupancy Vehicle (HOV) Flyover, Keehi Interchange to Pacific Street	11	5	2	0	1	1	1	1	N/A
74	3	Interstate Route H-1, Widening, Vineyard Boulevard to Middle Street	11	5	1	1	1	1	1	1	N/A
N/A	8	Makapuu Tunnel Second Access, from Lunalilo Home Road to Kalaniana'ole Highway north of Sea Life Park	10	3	2	0	1	1	2	1	N/A
58	24	Makakilo Mauka Frontage Road, New Roadway, Kalaeloa Boulevard to Makakilo Drive	10	3	3	0	1	1	1	1	N/A
23	19	Keoneula Boulevard, Extension, Kapolei Parkway to Franklin D. Roosevelt Avenue	9	3	2	0	1	1	1	1	N/A
28	26	Interstate Route H-1, Contra Flow Lane extension (PM), Waiawa Interchange to Kunia Interchange	9	2	0	1	2	2	1	1	N/A
34	11	Interstate Route H-1, Operational Improvements, Ward Avenue On-Ramp to University Avenue Interchange	9	5	0	0	1	1	1	1	N/A
28	27	Interstate Route H-1, Contra Flow Lane extension (PM), Keehi Interchange to Radford Drive	8	2	0	1	2	1	1	1	N/A

ORTP 2035 Project No.	CMP Package No.	Facility/Project Title	Points	Change in V/C Ratio	Vehicle Volume	List of Congested Roadways	VHT	VHD	VMT	Transit Mode Share	Transit Person Trips
Transit Projects											
78	21	Fixed Guideway, West Kapolei to East Kapolei	10			1	2	2	1	3	1
79	22	Fixed Guideway, Ala Moana to UH Manoa and Waikiki	10			1	2	2	1	3	1
TDM/TSM Projects											
7	N/A	Transportation Demand Management (TDM) Program (2011-2020)	15	5	0	1	2	2	2	3	N/A
3	N/A	Human Services Transportation Coordination Program (2011-2020)	15	5	0	1	2	2	2	3	N/A
48	N/A	Transportation Demand Management (TDM) Program (2021-2035)	15	5	0	1	2	2	2	3	N/A
45	N/A	Human Services Transportation Coordination Program (2021-2035)	15	5	0	1	2	2	2	3	N/A
8	N/A	Vanpool Program (2011-2020)	13	5	0	1	2	2	2	1	N/A
49	N/A	Vanpool Program (2021-2035)	13	5	0	1	2	2	2	1	N/A
5	N/A	Joint Traffic Management Center	7	2	0	1	1	1	1	1	N/A
4	N/A	Intelligent Transportation Systems (ITS) (2011-2020)	6	0	0	1	2	2	0	1	N/A
46	N/A	Intelligent Transportation Systems (ITS) (2021-2035)	6	0	0	1	2	2	0	1	N/A