Oahu Regional Transportation Plan 2030

Contents

OahuMPO

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WHAT IS THE ORTP?

The Policy Committee of the Oahu Metropolitan Planning Organization (OahuMPO) approved the Oahu Regional Transportation Plan (ORTP) 2030 in April 2006.

The ORTP 2030 is a blueprint that guides us in putting together pieces of the transportation puzzle to address the mobility issues and transportation needs of our community. It is a multifaceted plan that integrates planned growth patterns and reflects available financial resources over the next 25 years. It includes a vision and goals, identifies projects and provides an implementation program for mid- and long-range investment of the available transportation funds across Oahu in a fair and equitable manner.

The development of the plan helps decision-makers understand the options that are available for improving the transportation system and how they address our mobility needs. Any future transportation improvement for Oahu that receives federal transportation funds must be consistent with the ORTP in order to be eligible for these funds.

This regional planning document is required by a number of state and federal mandates and requirements which include the Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users ("SAFETEA-LU"). These requirements are mandated by the U.S. Department of Transportation as a means of verifying the eligibility of metropolitan areas for federal funds earmarked for surface transportation systems.

The ORTP is updated at least every five years to ensure that transportation decisions are based on current information and community priorities. As part of each update, future population and employment are projected and corresponding changes in travel patterns, revenue, and construction costs are forecast to validate and test past and new directions for transportation development on Oahu. The ORTP 2025 was adopted in April 2001. The current plan, adopted in April 2006, updates the ORTP to 2030.

LOOKING AT THE FUTURE OF OAHU

The Primary Urban Center (PUC) in Honolulu and the Secondary Urban Center in Kapolei have been designated by the City and County of Honolulu as the projected areas where growth in residential development and employment shall occur over the next 25 years. Additional growth is encouraged in Central Oahu to relieve pressure on the rest of the island.

Figure 1 graphically shows the amount of future growth in residential development and employment expected in each of the eight development plan areas of Oahu. Of the 240,000 new residents and 130,000 new jobs expected on Oahu by 2030, about 80 percent will be located in the PUC and in Ewa.

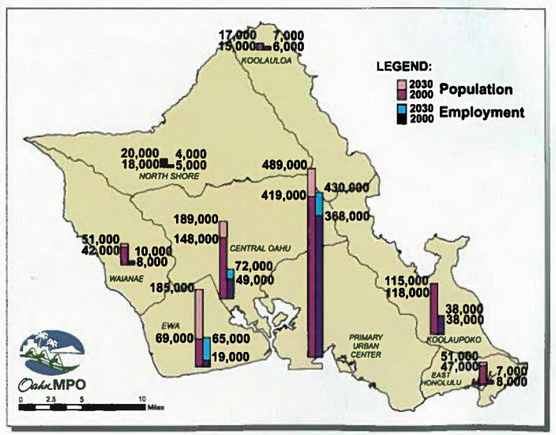


FIGURE 1: POPULATION AND EMPLOYMENT GROWTH BY DEVELOPMENT PLAN AREA

Transportation and New Growth

As we continue to grow, more people and more employment opportunities mean more and more traffic; more clogged roads and more delays getting to work, school, stores, and the beach. As an illustration of how congested the transportation system could become, a "Baseline 2030" analysis was conducted to estimate future traffic conditions if growth is allowed to occur but no new transportation facilities are built. Figure 2 shows significantly congested locations on Oahu during the morning peak hour in the Baseline 2030 analysis.

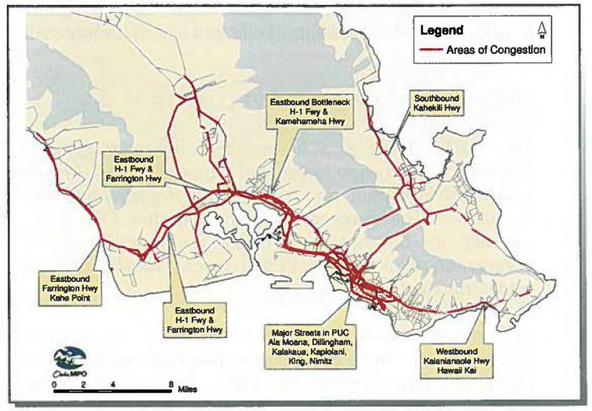


FIGURE 2: LOCATIONS OF SIGNIFICANT AM CONGESTION (BASELINE 2030)

The impact of the congested roadways corresponds to increases in travel time for all Oahu residents; some increases are huge, depending upon where they live and work. Figure 3 shows the travel time from each area on Oahu to downtown in the Year 2000. Figure 4 shows the projected travel time from each area on Oahu to downtown Honolulu for the Baseline 2030 if nothing is done. Travel times in excess of 80 minutes are projected from the western and northern portions of the island to downtown Honolulu during the AM peak period.

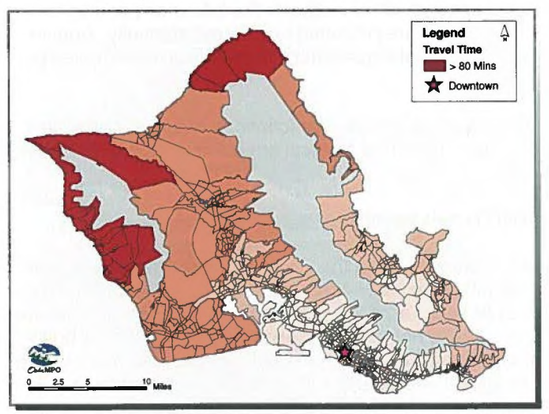


FIGURE 3: AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (YEAR 2000)

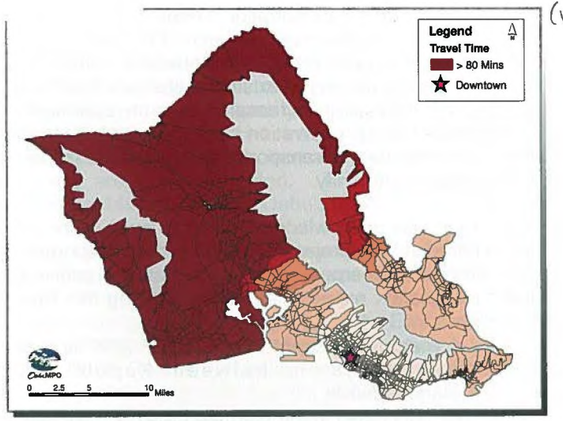


FIGURE 4: AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (BASELINE 2030)

Challenges Facing Oahu

To solve the transportation puzzle, we must address several challenges that Oahu will face over the next 25 years:

- We will have more people: more people who want to go to work, to school, to shop, and to play, resulting in about 30% more travel.
- Many of our major roadways are congested, especially those within the H-1 travel corridor between Manoa/Waikiki and Kapolei. As a result, residents on the Waianae Coast, in Ewa, and in Central Oahu are experiencing some of the worst morning commute travel times to downtown.
- Established communities want additional access for times of emergency as well as congestion relief.
- Many of our existing roadways need to be maintained, repaired, and rehabilitated.
- Our numerous transportation needs are constrained by our limited resources.

Our ultimate challenge is to decide how to allocate our resources to meet our many needs. There is only so much money available to fund transportation projects. How much money should be spent to reduce congestion on our roads, make our streets safer, provide more bikeways, create alternate accesses to communities, and maintain our roadways?

VISION FOR OAHU IN 2030

The vision for the ORTP 2030 is:

> *In 2030, Oahu is a place where transportation choices are available and the importance of the H-1 travel corridor is recognized.*

The first part of our vision focuses on increasing our mobility options. We recognize that we cannot afford to eliminate congestion. To improve mobility, the ORTP 2030 provides a number of strategies and programs to address

the island's future transportation needs. These include major capital improvement projects that add to the system's person-carrying and vehicular capacities, projects that expand on the existing systems and services to optimize their use, increased focus on operational, management and preservation strategies, and programs that help integrate the transportation system into the land uses of each community.

This vision also acknowledges the importance of the H-1 travel corridor. The projects included in the transportation plan propose numerous ways to address the additional traffic congestion expected to increase along this travel corridor:

- A major component of the ORTP 2030 is a rail transit system between Kapolei and Manoa/Waikiki.
- Also included in the plan are projects to increase the capacity of H-1 itself with new interchanges, additional High Occupancy Vehicle (HOV) lanes, freeway widening, and operational improvements at key locations. These major H-1 travel corridor projects are supplemented with two projects that provide alternatives to H-1: the intra-island commuter ferry from Ewa to downtown Honolulu and the Nimitz flyover HOV facility.
- The ORTP 2030 implements the island's bikeway plan, expands the bus system, includes several second access/emergency access roadways and projects to maximize the use of existing facilities, and other measures to reduce the need for auto travel.

GOALS

The ORTP 2030 will advance us toward the vision for addressing future growth and traffic on Oahu. To meet our vision, the island-wide transportation plan for Oahu is defined by three overarching goals.

Transportation Services System: *Develop and maintain Oahu's islandwide transportation system to ensure efficient, safe, convenient and economical movement of people and goods.*

The objectives guiding this goal include increasing capacity of the system, providing an efficient and convenient transit system, providing access to all important destinations, serving all intermodal terminals, ensuring that projects are distributed equitably, ensuring that safety and security is provided, integrating the entire system, supporting economic development and providing for system preservation.

Environment and Quality of Life: *Develop and maintain Oahu's transportation system in a manner that maintains environmental quality and community cohesiveness.*

The objectives associated with this goal are directed at developing a plan that satisfies noise, air and water quality standards; encourages energy conservation; preserves cultural integrity and natural resources; develops alternative transportation modes that are environmentally friendly, including pedestrian walkways and bicycle routes; optimizes use of transportation resources; minimizes disruption of neighborhoods; ensures compatibility with the physical and social character of existing development; incorporates landscaping and public safety; and plans for emergencies.

Land Use and Transportation Integration System Goal: *Develop and maintain Oahu's transportation system in a manner that integrates land uses and transportation*

The objectives that support this goal reinforce planned population distribution and land use development policies, encourage innovation, and encourage implementation of land use policies that support efficient use of transportation systems.

OVERVIEW OF ORTP 2030 PROJECTS

The ORTP 2030 is a financially-constrained plan that provides $6.07 billion for capital projects and $7.47 billion to operate, maintain, and preserve the highway and transit systems. The projects contained in the ORTP 2030 attempt to balance our need for mobility options, congestion relief, safety, second access, and bicycling and pedestrian facilities.

To improve mobility, a number of strategies and programs are proposed. These include new travel options such as rail transit and ferry systems that add to the system's person-carrying capacities; projects that expand upon the existing systems and services to optimize their use; increased focus on operational, management and preservation strategies; and programs that help integrate the transportation system into the land uses of each community.

With regard to congestion relief, the technical analysis and public input received during this effort highlighted the need to focus on the H-1 travel corridor and the Ewa and Central Oahu areas. Preliminary analysis indicated that island-wide congestion could be significantly addressed by focusing on the H-1 travel corridor. The need for transportation infrastructure in the Ewa area is already apparent and will increase in the future as population and employment are projected to grow substantially. Additional population and employment increases are also projected in Central Oahu.

The following provides descriptions of specific elements of the plan. Individual projects are listed on pages 15 through 19.

Rail Transit System

A key component of the ORTP 2030 is a rail transit system that will serve the H-1 travel corridor. It is important to note that building a rail system will not eliminate congestion. We will also not be able to eliminate congestion by building more highways, for we do not have the resources to keep up with the demand. The rail transit system will give priority to moving people rather than cars, will be a major factor in providing mobility options, and will work together with our land use policies in shaping our city.

The proposed rail transit system from Kapolei to Manoa/Waikiki will become the backbone of the transit system, connecting major employment and residential centers to each other and to downtown Honolulu. This project also includes associated feeder bus services for each station and access ramps and other freeway improvements to facilitate the flow of buses that supplement the rail system.

Transit System Expansion

While rail transit is the backbone of the transit system in the ORTP 2030, the existing bus system will continue to be an important element of public transportation. Many rail system passengers are expected to access the system using City buses traveling to and from their destination. Expansion of the bus system will be focused primarily in Ewa, with moderate increases in other parts of Oahu, including express bus service to rural areas. Purchasing and replacing new buses to support service increases are included in the plan.

An additional element of future transit service implements an intra-island express ferry service from Ewa to Honolulu Harbor.

Congestion Relief

The ORTP 2030 acknowledges that auto travel is, and will continue to be, a dominant travel mode and; subsequently, increases in roadway capacity will be required. This is especially true in the H-1 travel corridor and where congestion is forecast to increase significantly if new projects are not constructed. This plan provides an additional 140 lane-miles to Oahu's major roadways.

As part of the ORTP 2030, new and expanded roadway projects are proposed for the Ewa area, Central Oahu, and PUC, where the majority of the residential and employment growth is projected. For the Ewa area, these projects include expansion of several roadways like the North-South Road and Kapolei Parkway; new or modified freeway interchanges in Kapolei and Makakilo; and the widening of existing roadways such as Farrington Highway, Fort Barrette Road and Kunia Road. Examples of roadway projects in the Central Oahu area include expansion of Kamehameha Highway and H-1 between the Waiau and Waiawa Interchanges; and widening and improvements at the H-1 and H-2 Waiawa Interchange. Several capacity enhancement projects to various sections of Interstate Route H-1 from Pearl City to downtown Honolulu are also programmed.

Bicycle Facilities

One hallmark of a livable city is that its public spaces are actively used and the outdoors can be enjoyed. Honolulu is a great city for bicycles with its physical beauty, mild year-round climate, relatively flat coastal plain and compact form. Enhancing the appealing qualities of Oahu can be achieved in part by integrating bicycle facilities as a key component of the transportation system. The ORTP 2030 incorporates the Oahu elements of *Bike Plan Hawaii* and the "Priority One" projects identified in the *Honolulu Bicycle Master Plan*. This provides Honolulu with an integrated network of on-road bike lanes and off-road shared-use paths to link people with their favorite destinations.

Pedestrian Facilities

The majority of us walk to get to our cars, catch a bus, and run errands on our lunch breaks. Some of us walk for exercise as well as to get to work and to shop. In past plans, pedestrian facilities were combined with bicycle facilities. We recognize that the needs of pedestrians are, in many cases, different from those of bicyclists. To address this difference, the ORTP 2030 includes development of a pedestrian plan for Oahu as part of the Enhancement Projects.

Intelligent Transportation Systems

The ORTP 2030 contains an intelligent transportation systems (ITS) line item. ITS is a collection of technologies that enable multiple agencies to work together to manage the transportation network better. ITS can include services for highways, transit services, commercial vehicle operations, and emergency service providers. ITS technologies can be used for emergency response and incident management. They are effective in lessening the amount of time it takes to clear an accident on the freeway as well as providing travelers with information on traffic conditions and transit schedules.

TDM and TSM

Transportation Demand Management (TDM) and Transportation System Management (TSM) programs consist of measures that are designed to reduce the demand and increase the efficiency of the transportation system. The TDM and TSM programs for Oahu include facilities to enhance flow, such as HOV lanes on freeways, park-and-ride lots, bus-only lanes on city streets, and even separate HOV facilities. Also included are programs to help form and maintain carpools and vanpools as well as programs to give people incentives to rideshare.

Second Access Highways

While the coastal plains are relatively flat, Oahu's interior terrain is divided by two primary mountain ranges that can make access between communities difficult. Many of the established communities on the island have only one roadway into and out of the area. Providing a second means of access to these communities serves to increase the capacity to these areas and to provide needed emergency access. Four "second access" projects are included in the ORTP 2030 for Makakilo, Mililani Mauka, Wahiawa, and the Waianae Coast.

Operations, Maintenance and System Preservation

The ORTP 2030 recognizes the importance of the existing and future roadways and transit systems from the perspective of operations, maintenance and preservation. The plan includes the allocation of funding for these categories totaling $7.47 billion or approximately 55% of the plan cost. This funding covers both City and State facilities.

City operations and maintenance funding includes operating the public transit system (TheBus, paratransit, the proposed rail system, and the proposed commuter ferry system), transit vehicle replacement, and roadway system maintenance and operations. A total of approximately $5.62 billion is estimated for City operations and maintenance over the 25-year life of the plan, consisting of about $4.675 billion for transit operations and maintenance, $414 million for replacement of the existing bus fleet (identified as part of "Transit Capital: Non-Rail" in Figures 19 and 20), and $532 million for roadway system maintenance and operations.

Maintenance and operation of the State's existing and future highway operations and routine maintenance includes, but is not limited to, pavement repair, guardrail and shoulder improvements, lighting improvements, drainage improvements, sign upgrades and replacement, traffic signal upgrade and retrofit. About $850 million is allocated in the plan for State maintenance and operations.

The ORTP 2030 allocates $1.0 billion over the life of the plan to preserving the highway system through projects including, but not limited to, bridge replacement and seismic retrofit, pavement preventative maintenance, erosion control, viaduct improvements, and road resurfacing and rehabilitation projects.

Illustrative Projects

The ORTP 2030 planning process identified many potential projects that could prove beneficial as transportation improvements for the island of Oahu, but 2030 revenue projections could not support inclusion of these projects in the ORTP 2030 at this time. As part of the endorsement of the ORTP 2030, the OahuMPO Policy Committee identified a subset of those projects as "illustrative projects."

Illustrative projects are those projects that are considered high-priority for inclusion into the regional transportation plan should additional, firmly-established funding revenue sources become available. Illustrative projects are not considered to be a part of the officially endorsed regional transportation plan. Projects considered in the plan development and included on the ORTP 2030 illustrative projects list include the concept of a Pearl Harbor crossing (tunnel or bridge) and elevated reversible high occupancy toll ("HOT") lanes within the H-1 travel corridor.

HOW THE PROJECTS WORK TOGETHER

Between 2000 and 2030, we project that the number of trips people make will increase by just over 30%. This means about a third more people wanting to go to work, school, stores, beach and other places. Travel forecasting models were used to estimate how projects contained in the ORTP 2030 would collectively handle this demand. To help evaluate the quality of our future transportation system, comparisons were made between the ORTP 2030 and 1) Year 2000 conditions, and 2) Baseline 2030 conditions.

Comparing the ORTP 2030 to the Year 2000 conditions:

- Although we do not expect the percentage of people biking or walking to significantly change, transit ridership is projected to increase. As seen in Figures 5 and 7, the transit mode share is projected to increase from 5.7% to 8.9%, which translates into about 166,000 additional transit trips (170,000 with visitor transit trips as shown in Figure 15). Although the percentage of automobile trips is expected to decrease from 84.0% to 81.0%, there is still projected to be over 600,000 additional automobile trips.

- The added population growth and roadways in the ORTP 2030 will generate more travel during the day, resulting in a 22% increase in vehicle miles traveled (VMT) and 17% increase in vehicle hours traveled (VHT), as seen in Figures 12 and 13, respectively.

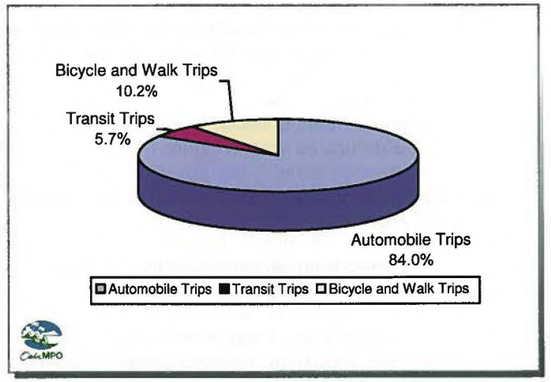


FIGURE 5: YEAR 2000 DAILY RESIDENT PERSON TRIPS

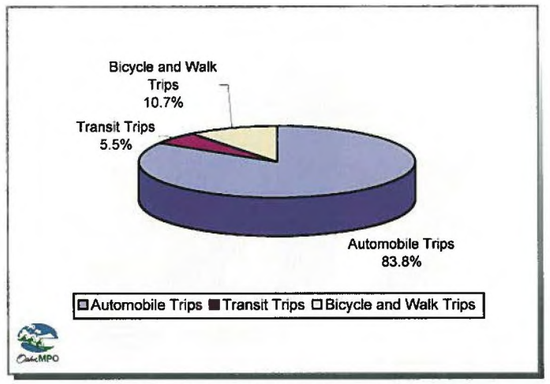


FIGURE 6: BASELINE YEAR 2030 DAILY RESIDENT PERSON TRIPS

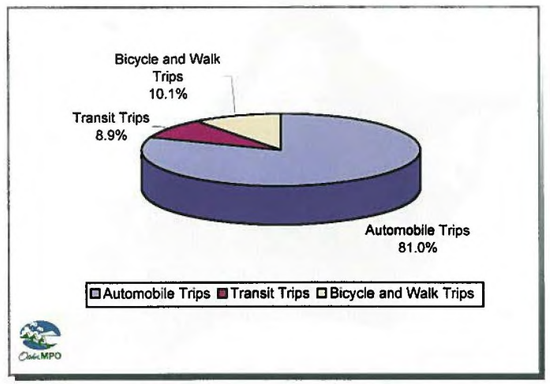


FIGURE 7: ORTP 2030 DAILY RESIDENT PERSON TRIPS

- The added transportation improvements in the ORTP 2030 are forecasted to reduce the average travel time per vehicle trip from 11.5 minutes to 10.4 minutes.

- Daily vehicle hours of delay decrease from 42,000 to 37,000 hours, as seen in Figure 14.

- Indicators for traffic congestion during the AM peak period are mixed.

  - From an islandwide perspective, auto drivers can expect more "bottlenecks."

  - Average travel times from various areas on Oahu to Downtown improve slightly between the Year 2000 and the ORTP 2030 when comparing Figure 3 with Figure 9, with the differences highlighted in Figure 10. Travel time is projected to decrease from 22.7 minutes to 21.0 minutes.

Comparing the ORTP 2030 to the Baseline 2030 conditions:

- The Baseline 2030 provides limited transit improvements such that transit mode share is reduced from Year 2000, as shown in Figures 6 and 7. Notably, resident transit trips are projected to increase to 8.9% under the ORTP 2030 (3.4% more than the baseline condition), with the percentage of automobile and bike/walk trips decreasing. The increase in transit mode share translates into 123,000 additional transit trips (126,000 with visitor transit trips, as shown in Figure 15).

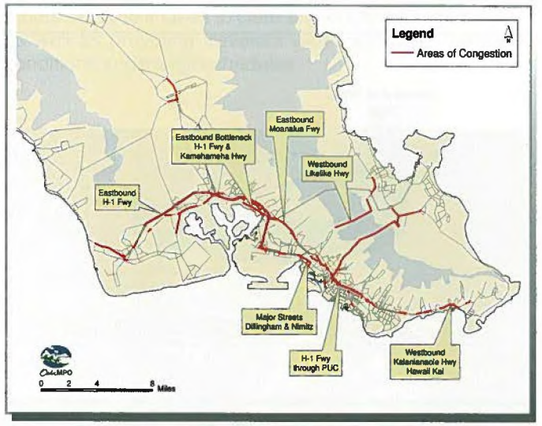


FIGURE 8: LOCATIONS OF SIGNIFICANT AM PEAK PERIOD CONGESTION (ORTP 2030)

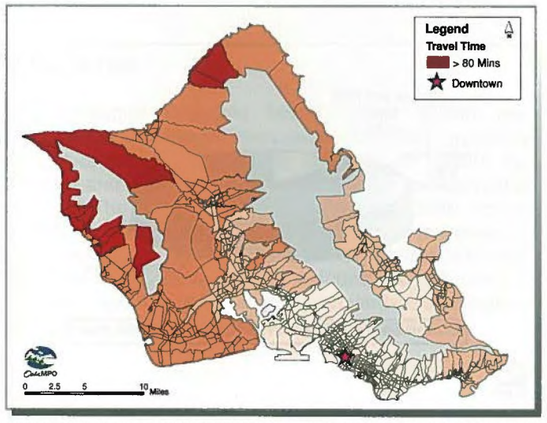


FIGURE 9: AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (ORTP 2030)

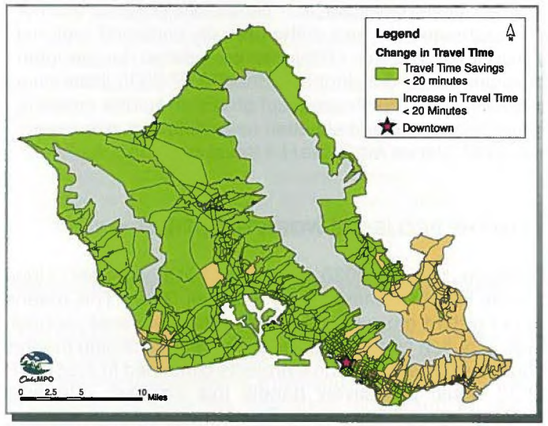


FIGURE 10: CHANGE IN AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (YEAR 2000 TO ORTP 2030)

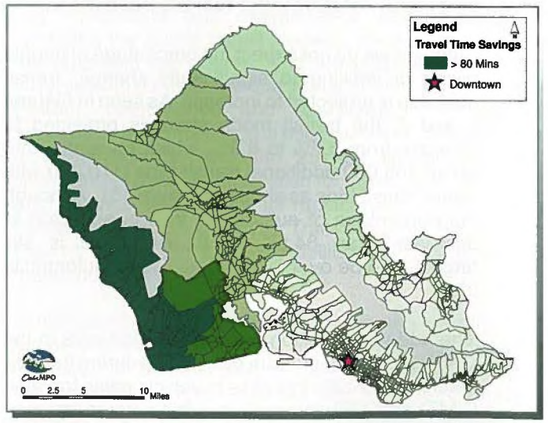


FIGURE 11: CHANGE IN AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (BASE LINE 2030 TO ORTP 2030)

- Figures 12, 13, and 14 illustrate that if no new transportation projects are built under Baseline 2030, we can expect congestion to significantly worsen. Improvements contained in the ORTP 2030 work together to reduce this congestion, with a resulting 6% decrease in VMT, 41% decrease in VHT, and 85% decrease in daily vehicle hours of delay.

- The transit mode share by residents is projected to increase to 8.9% (3.4% more than the baseline condition), with the percentage by automobile and bike/walk trips decreasing. The increase in transit mode share translates into 123,000 additional transit trips (126,000 with visitor transit trips).

- Indicators for traffic congestion during the AM peak period are positive, suggesting that the ORTP 2030 will alleviate the substantially increased delays and travel times projected in the Baseline 2030 along the H-1 travel corridor.

  - From an islandwide perspective, auto drivers can expect fewer "bottlenecks," as can be seen in comparing Figure 2 with Figure 8.

  - Average travel times from various areas on Oahu to Downtown decrease by 26.0 minutes, from 47.0 minutes to 21.0 minutes. As seen in Figure 11, Waianae Coast and Ewa residents realize the greatest travel time savings. However, it should be noted that there will still be pockets on the Waianae Coast and North Shore where travel times to downtown Honolulu are still expected to exceed 80 minutes during the AM peak period.

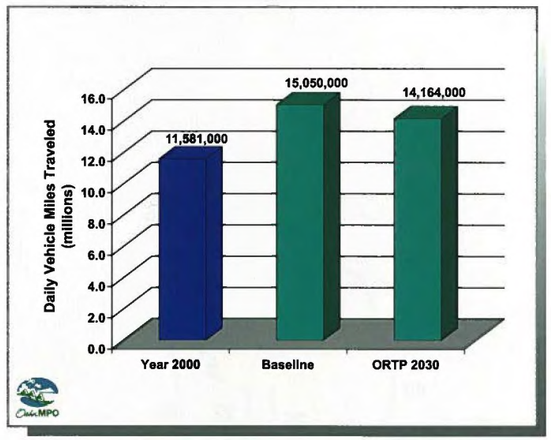


FIGURE 12: DAILY VEHICLE MILES OF TRAVEL

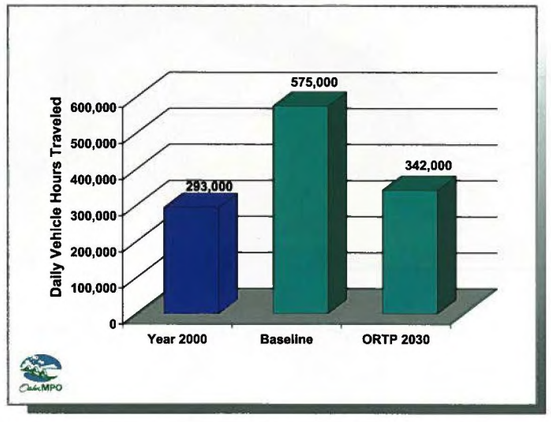


FIGURE 13: DAILY VEHICLE HOURS OF TRAVEL

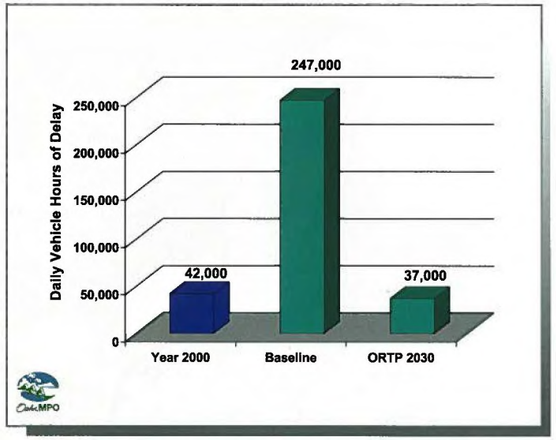


FIGURE 14: DAILY VEHICLE HOURS OF DELAY

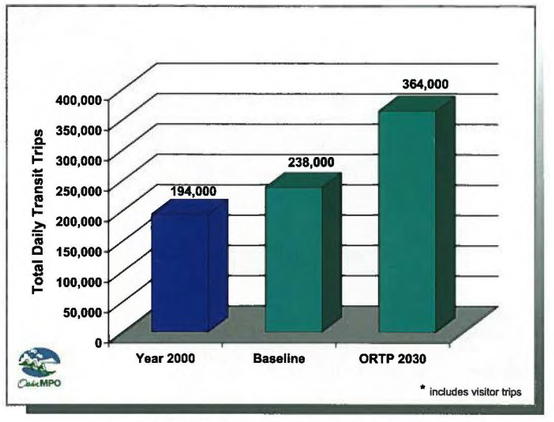
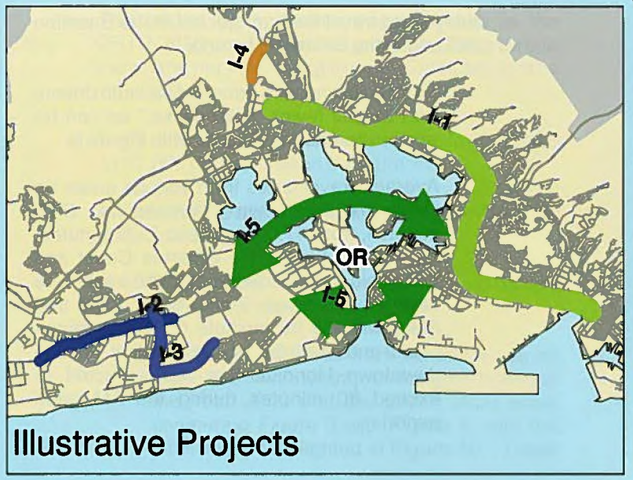


FIGURE 15: DAILY TRANSIT TRIPS

FIGURE 16: ORTP 2030 PROJECT LOCATION MAP

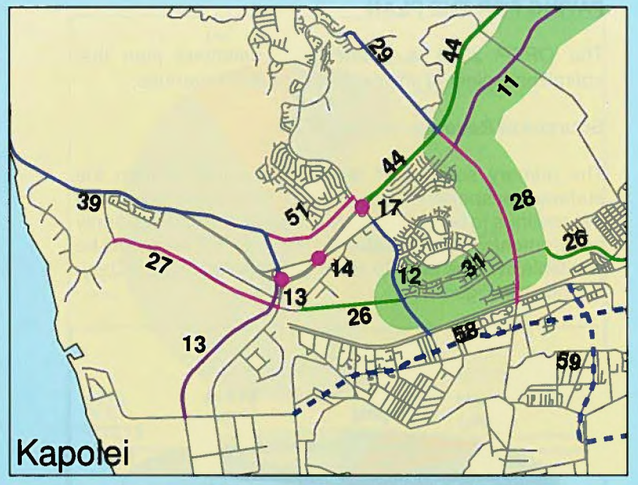


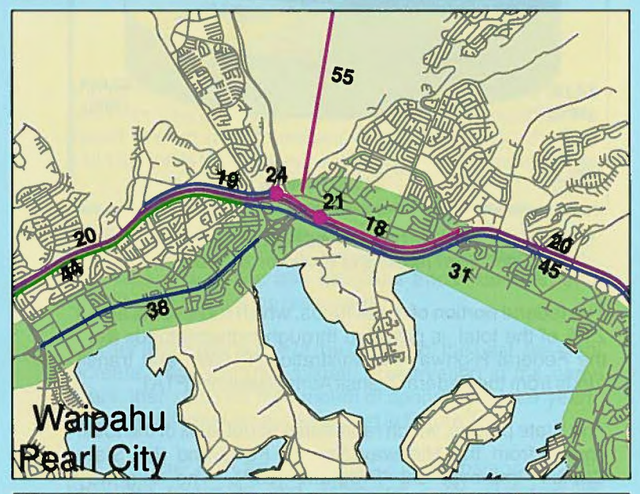
Legend

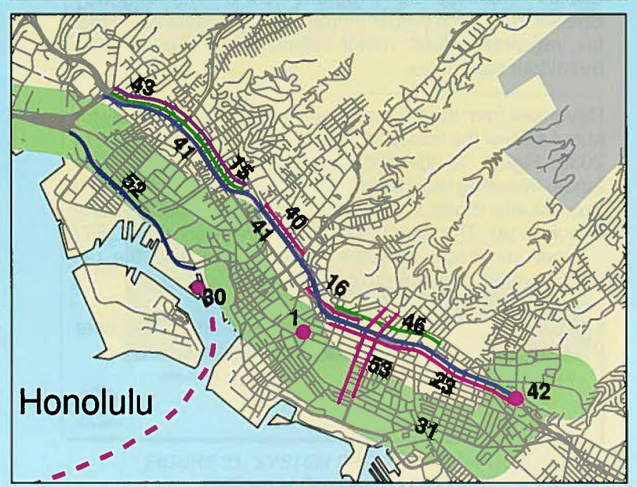
N

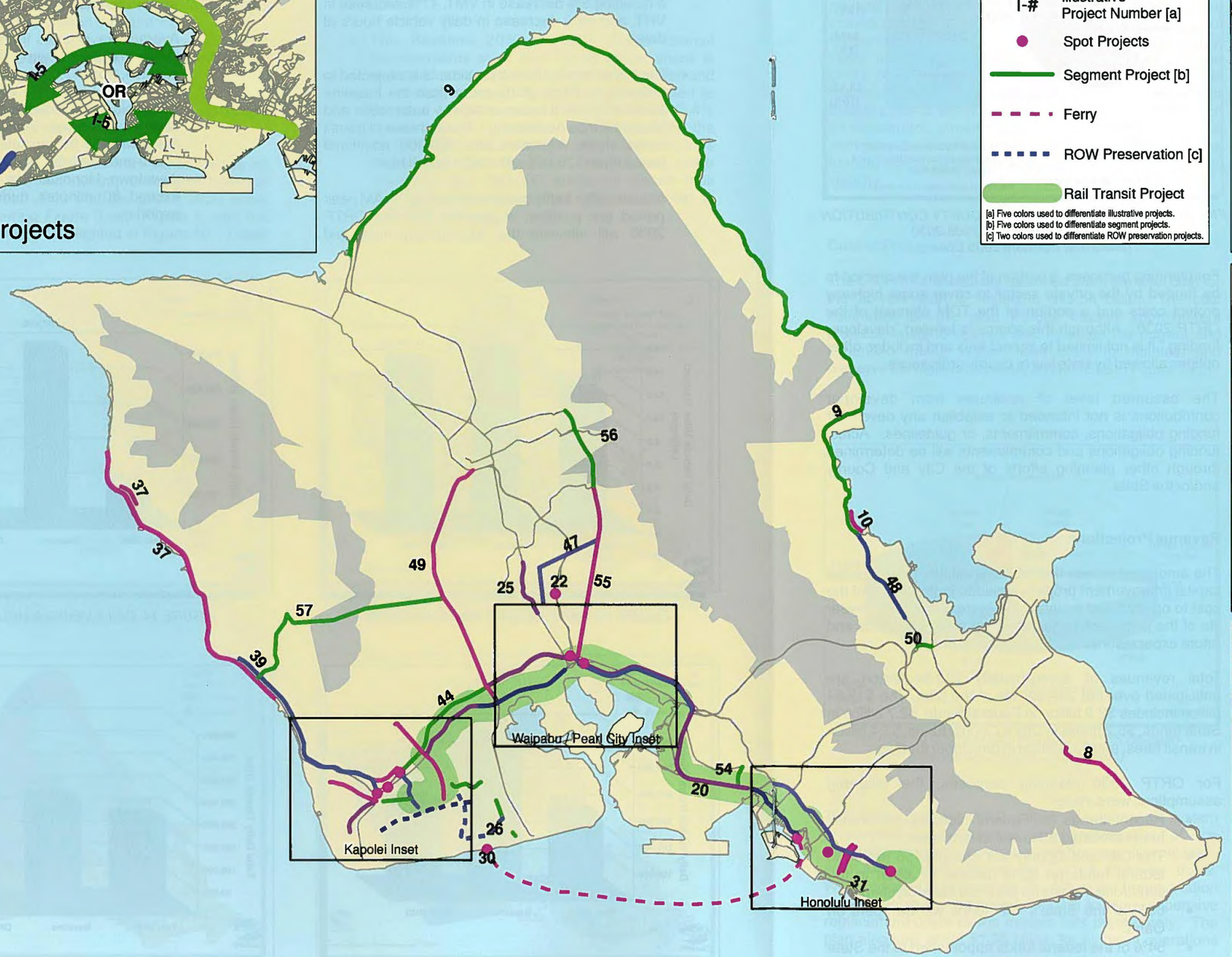
#	Project Number
I-#	Illustrative Project Number [a]
●	Spot Projects
———	Segment Project [b]
- - - -	Ferry
▪ ▪ ▪ ▪	ROW Preservation [c]
▬	Rail Transit Project

[a] Five colors used to differentiate illustrative projects.
[b] Five colors used to differentiate segment projects.
[c] Two colors used to differentiate ROW preservation projects.









OahuMPO

0 2.5 5 10 Miles

Disclaimer: The location of second-access projects will be determined by the implementing agency as part of the planning and design stages of the project implementation.
Note: Project I-5 will provide an alternative route through the Pearl Harbor Corridor. Options include a bridge or a tunnel.

PAYING FOR THE PLAN

The ORTP 2030 is a financially balanced plan that optimizes projected costs with anticipated revenues.

Sources of Revenue for the ORTP

The primary sources of revenues used to support the surface transportation system for Oahu have been, and will continue to be, the Federal, State, and City and County governments. We estimate that about $13.5 billion will be available over the next 25 years for transportation on Oahu as shown in Figure 17.

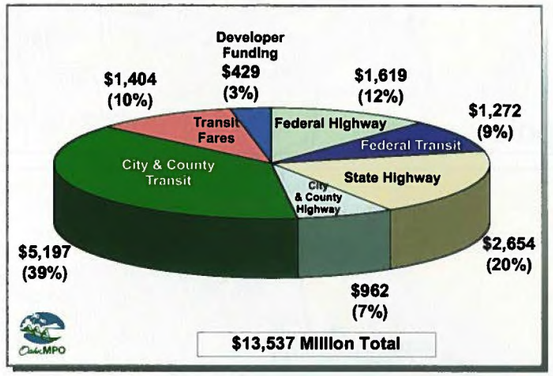


FIGURE 17: ESTIMATED TRANSPORTATION REVENUES: 2006-2030 (Millions of Constant 2005 Dollars)

The federal portion of these funds, which represents about 21% of the total, is provided through highway funds from the Federal Highway Administration (FHWA) and transit funds from the Federal Transit Administration (FTA).

The State portion, which represents about 20% of the total, comes from the Highway Special Fund and the State Capital Improvement Program (CIP). The Highway Special Fund receives its money from the State liquid fuel tax, registration fees, motor vehicle weight tax, and car rental/tour vehicle tax.

Revenues from the City and County of Honolulu will pay for about 46% of the transportation system costs from 2006 to 2030. Figure 18 identifies the various sources of City funds, including the General Fund as well as County fuel tax, County motor vehicle weight tax, and public utility franchise tax. The County's 0.5% general excise tax (GET) 15-year surcharge (beginning in 2007) to fund the rail transit system component of the Plan is assumed.

The City and County also collects transit fares that cover 27% to 33% of the cost to operate the bus system.

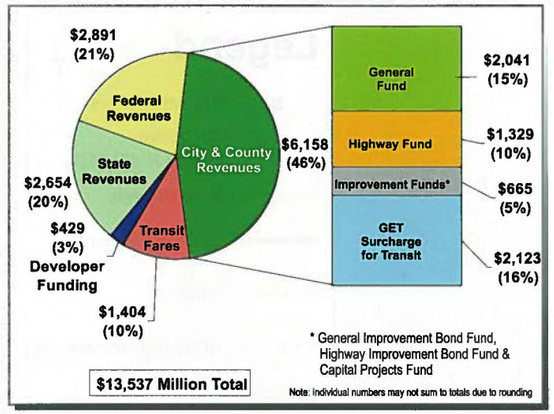


FIGURE 18: BREAKOUT OF CITY & COUNTY CONTRIBUTION TO TOTAL REVENUES: 2006-2030 (Millions of Constant 2005 Dollars)

For planning purposes, a portion of the plan is expected to be funded by the private sector to cover some highway project costs and a portion of the TDM element of the ORTP 2030. Although this source is labeled "developer funding," it is not limited to impact fees and includes other options allowed by state law or county ordinances.

The assumed level of revenues from developer contributions is not intended to establish any developer funding obligations, commitments, or guidelines. Actual funding obligations and commitments will be determined through other planning efforts of the City and County and/or the State.

Revenue Projections

The amount of money that will be available to pay for the capital improvement projects included in the plan and the cost to operate and maintain the system over the 25-year life of the plan were projected using historical trends and future expectations.

Total revenues of approximately $13.54 billion are anticipated over the 25-year life of the plan. The $13.54 billion includes $2.9 billion in Federal funds, $2.7 billion in State funds, $6.2 billion in City & County funds, $1.4 billion in transit fares, and $0.4 billion in developer funding.

For ORTP 2030 planning purposes, the following assumptions were made:

- Recent trends for Federal highway and transit funds allocated to Hawaii will continue.
- The City and County will obtain $456 million in federal funds (in 2005 dollars) to assist in the construction costs for the rapid transit system.
- 60% of the State's CIP funds will be spent on Oahu.
- 54% of the federal funds apportioned to the State will be spent on Oahu.

Revenue projections are used to estimate the level of transportation "supply" Oahu can reasonably afford and are based on the best available information. The primary purpose of these projections is to ensure the financial viability of the ORTP 2030 from a regional perspective. As projects move from the ORTP 2030 to the development of individual projects, funding assumptions (e.g., source of funds, level of funding, etc.) may be modified. Generally, these modifications should not substantially affect the ORTP 2030 financial plan. Revisions to the ORTP and its financial plan can be made during its regular five-year update cycle or when an action triggers the need for such an adjustment. Amendments to the ORTP 2030 financial plan may be made if major changes are made to the funding assumptions that would affect the plan's financial viability.

Cost of Plan

The ORTP is a financially balanced plan; the total cost for the 25-year plan is limited to $13.54 billion. The cost estimates for the plan include capital improvement projects, costs to operate and maintain the current and expanded transit system, and costs to maintain and preserve the highway system, as identified in Figure 19.

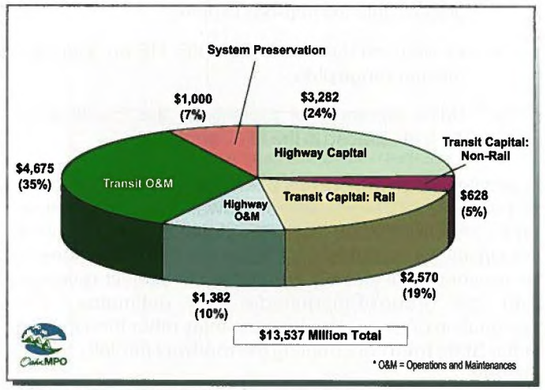


FIGURE 19: ESTIMATED PLAN COSTS:2006-2030 (Millions of Constant 2005 Dollars)

The plan provides $1.0 billion for highway system preservation. Maintenance and preservation of the transportation system is important because it provides a safe and efficient system for Oahu's roadway users. Without timely maintenance, the life of the transportation system would be shortened, leading to more expensive replacement costs as the system fails prematurely. The plan also sets aside $1.38 billion for highway operations

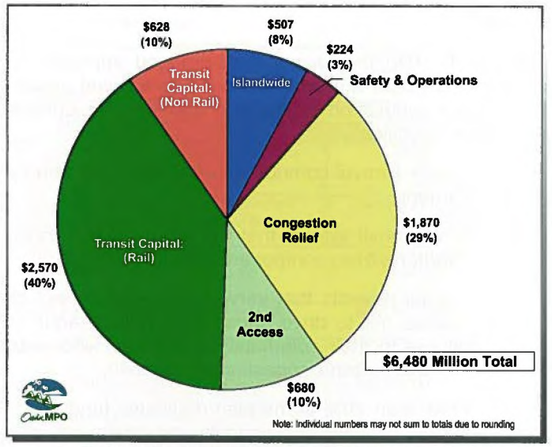


FIGURE 20: PROJECT CAPITAL COSTS BY TYPE (Millions of Constant 2005 Dollars)

and routine maintenance ($0.85 billion for State and $0.53 billion for City & County), and $4.68 billion to operate the transit system (bus, paratransit, ferry, and rail), of which $144 million is to operate and maintain the commuter ferry.

The ORTP 2030 includes more than $6.48 billion in capital costs, as seen in Figure 20: $3.28 billion for highway construction, $0.63 billion to implement a ferry system, purchase new buses and construct transit centers, and $2.57 billion to build the rail system.

In order to counter some of the neglect of the past, the plan increases spending for system preservation in the early years, then reduces the amount of spending in later years back to traditional levels, as shown in Figure 21.

The financial plan for the ORTP 2030 is balanced, with projected revenues and estimated costs matched at $13.54 billion over the 25-year period of the plan.

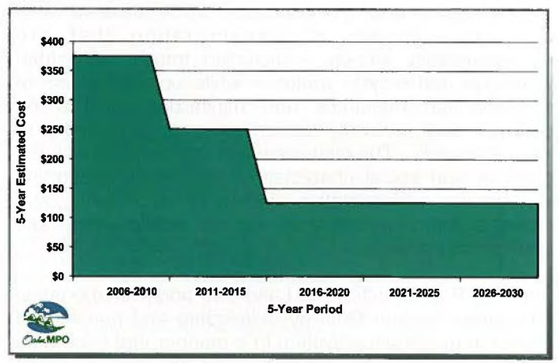


FIGURE 21: SYSTEM PRESERVATION COSTS (Millions of Constant 2005 Dollars)

SUMMARY

The ORTP 2030 provides a multi-pronged approach to achieve our vision and address our future travel needs. Forecasted congestion is reduced and mobility options increased. Specifically:

- The H-1 travel corridor is identified as our priority corridor.
- A rail transit system that will serve the H-1 travel corridor is a key component of the ORTP 2030.
- Capital projects that serve those who do not or choose not to drive, those who require another access to their community, and those who seek some relief from congestion are planned.
- More than 50% of the plan dedicates funding for system preservation projects and operations and maintenance projects.

Although the ORTP 2030 provides significant improvements over the Baseline 2030, we should still expect more bottlenecks in the future with some improvements in average overall travel time to downtown Honolulu during the morning peak period when compared to 2000.

The ORTP 2030 fulfills the Transportation Services System Goal through developing and maintaining Oahu's islandwide transportation system to ensure efficient, safe, convenient and economical movement of people and goods. The plan increases the capacity of the system, providing an efficient and convenient transit system serving many destinations across the island. The planned projects are distributed across Oahu, supporting economic development and providing funds to support system preservation.

The ORTP 2030 fulfills the Environment and Quality of Life Goal by developing and maintaining Oahu's transportation system in a manner that maintains environmental quality and community cohesiveness. The plan strives to achieve this goal by improving air quality and encouraging energy conservation through the reduction of VMT; and developing alternative modes of transportation that are environmentally friendly – including transit, pedestrian walkways and bicycle routes – while optimizing use of transportation resources and minimizing impacts on cultural and natural resources and disruption of neighborhoods. The plan considers compatibility with the physical and social character of existing development, incorporates transportation system enhancements, and includes improvements that address public safety and emergency planning.

The ORTP 2030 fulfills the Land Use and Transportation Integration System Goal by developing and maintaining Oahu's transportation system in a manner that integrates transportation with the City's land use policies. The plan reinforces planned population distribution and land use development policies, encourages innovation, andencourages implementation of land use policies that support efficient use of transportation systems.

ORTP 2030 PROJECT LIST

Each project in the ORTP 2030 is listed in Table 1 and shown on Figure 16. They are prioritized into a "Mid-Range Plan" to be implemented over the next 10 years; and a "Long-Range Plan" to be implemented over the final 15 years of the plan. Projects were placed within each time period based on anticipated funding and the following guidelines:

- Projects of different categories (e.g., islandwide, congestion relief, second access, transit) are placed in both the mid-range and long-range plans. An exception is the placement of all safety projects into the mid-range plan.
- Projects on the FYs 2004-2006 TIP are placed in the mid-range plan.
- Basic elements of projects in the Ewa/Kapolei area are placed in the mid-range plan.

In addition, each project has been given a City and County of Honolulu ("C") or State of Hawaii ("S") designation. While the ORTP 2030 identifies projects as falling under the jurisdiction of either the City or the State, it is done so for reasons of financially balancing the project revenues with the order-of-magnitude cost estimates. This designation does not preclude an entity other than the City or the State from constructing the roadway partially or in its entirety.

TABLE 1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE PLAN AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
			MID-RANGE PLAN (2006 TO 2015)	
ISLANDWIDE PROJECTS - 2006 to 2015				
1	C/S *	Alapai Transit Center & Joint Transportation Management Center	Construct a multi-use facility at Alapai Street to include a transit center, City-State transportation management center, and other operations.	$30.0
2	C/S *	Bike Plan Hawaii - Oahu	Implement Oahu elements of the State of Hawaii's *Bike Plan Hawaii*. (*Bike Plan Hawaii* includes only "Priority One" projects as identified in the *Honolulu Bicycle Master Plan.*)	$40.6 of $101.6 total in 1st 10 years
3	C/S *	Enhancement Projects	Implement enhancement projects, including, but not limited to, projects from the *Transportation Enhancement Program for Oahu*. Includes development of a pedestrian plan for Oahu.	$20.0 of $50.0 total in 1st 10 years
4	C/S *	Intelligent Transportation Systems (ITS)	Implement ITS projects including, but not limited to, those identified in the *Oahu Regional ITS Architecture*.	$60.0 of $150.0 total in 1st 10 years
5	S	Rockfall Protection, Various Locations	Install rockfall protection or mitigation measures along various state highways at various locations.	$22.5
6	C/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 (i.e., car sharing).	$62.9 of $152.9 total in 1st 10 years
7	S	Van Pool Program	Continue implementation and expansion of the State's Van Pool Program.	included as part of project # 6
SAFETY & OPERATIONAL IMPROVEMENT PROJECTS - 2006 to 2015				
8	S	Kalanianaole Highway, Safety & Operational improvements, Olomana Golf Course to Waimanalo Beach Park	Construct safety and operational improvements along Kalanianaole 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.	$19.7
9	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.	$115.9
10	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, installation of signs, flashers, and other warning devices. This project also includes replacement of Kaalaea Stream Bridge and Halamoa Stream Bridge with structures that meet current design standards.	$18.9
CONGESTION RELIEF PROJECTS - 2006 to 2015				
11	C	Farrington Highway, Widening, Golf Course Road to west of Fort Weaver Road	Widen Farrington Highway from 2 to 4 lanes, from Golf Course Road to just west of Fort Weaver Road.	$36.6
12	C	Fort Barrette Road, Widening, Farrington Highway to Franklin D. Roosevelt Avenue	Widen Fort Barrette Road from 2 to 4 lanes, from Farrington Highway to Franklin D Roosevelt Avenue.	$24.9
13	C	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 4-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.	$61.1
14	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.	$45.5
15	S	Interstate Route H-1, Widening, Middle Street to Vineyard Boulevard	Widen the Interstate Route H-1 by 1 lane, in the eastbound direction, from Middle Street to Vineyard Boulevard, as identified below: • From 2 to 3 lanes from Middle Street to Likelike Highway off-ramp • From 3 to 4 lanes from Likelike Highway off-ramp to Vineyard Boulevard This project also includes the widening of: • Gulick Avenue overpass to allow 5 lanes to pass under it • Kalihi Interchange overcrossings to allow 4 lanes to pass under it	$34.8
16	S	Interstate Route H-1, Operational Improvements, Lunalilo Street to Vineyard Boulevard	Modify the weaving movements on the Interstate Route H-1, in the westbound direction, between the Lunalilo Street on-ramp and the Vineyard Boulevard off-ramp.	$24.3
17	S	Interstate Route H-1, New On- & Off-Ramps, Makakilo Interchange	Construct a new eastbound off-ramp and a new westbound on-ramp to the Interstate Route H-1 at the Makakilo Interchange.	$9.9
18	S	Interstate Route H-1, Widening, Waiau Interchange to Waiawa Interchange	Widen Interstate Route H-1 in the westbound direction by 1 lane from the Waiau Interchange to the Waiawa Interchange.	$137.5

TABLE 1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE PLAN AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
19	S	Interstate Route H-1, Widening, Waiawa Interchange	Widen the Interstate Route H-1 by 1 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. • From 2 to 3 lanes in AM peak • From 4 to 5 lanes in PM peak	$6.9
20	S	Interstate Route H-1, Zipper Lane (PM), Keehi Interchange to Kunia Interchange	Construct a Zipper lane on the Interstate Route H-1, in the westbound direction, from Keehi Interchange to Kunia Interchange. This project would be in use during the PM peak.	$19.9
21	S	Interstate Route H-1, Widening, Waipahu Off-Ramp	Widen the Interstate Route H-1 Waipahu Street off-ramp from 1 to 2 lanes, in the westbound direction, at the Waiawa Interchange.	$11.7
22	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.	$20.7
23	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.	$13.7
24	S	Interstate Routes H-1 & 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).	$45.5
25	S	Kamehameha Highway, Widening, Lanikuhana Avenue to Ka Uka Boulevard	Widen Kamehameha Highway from a 3-lane to a 4-lane divided facility between Lanikuhana Avenue and Ka Uka Boulevard. This project includes shoulders for bicycles and disabled vehicles, bridge crossing replacement, bikeways, etc.	$78.9
26	C	Kapolei Parkway, Extension, Kamokila Boulevard to Papipi Road	Extend the existing 4-lane Kapolei Parkway by constructing the segments in each of the following areas: • Kamokila Boulevard to Fort Barrette Road • Ewa Village boundary to Renton Road • Geiger Road to Papipi Road	$78.9
27	C	Kapolei Parkway, Extension & Widening, Aliinui Drive to Kalaeloa Boulevard	Extend the existing 4-lane Kapolei Parkway, from Aliinui Drive to Hanua Street. This project includes widening of Kapolei Parkway from 4 to 6 lanes from Hanua Street to Kalaeloa Boulevard.	$46.9
28	S	North-South Road, Widening & Extension, Interstate Route H-1 to Franklin D Roosevelt Avenue	Widen and extend North-South Road as follows: • From 3 to 6 lanes from Kapolei Parkway to Interstate Route H-1 • Extend from Kapolei Parkway to Franklin D Roosevelt Avenue (6 lanes)	$35.3
SECOND ACCESS PROJECTS - 2006 to 2015				
29	C	Makakilo Drive, Second Access, Makakilo Drive to North-South Road/Interstate Route H-1 Interchange	Extend Makakilo Drive (vicinity Pueonani Street) south to the Interstate Route H-1 Freeway Interchange as 4-lane roadway, connecting Makakilo Drive to North-South Road.	$32.8
TRANSIT PROJECTS - 2006 to 2015				
30	C	Ferry, Intra-Island Express Commuter, in the vicinity of Ocean Pointe Marina to Honolulu Harbor	Implement intra-island passenger ferry in the vicinity of the Ocean Pointe Marina in Ewa and Honolulu Harbor.	$23.2
31	C	Rail Transit, Kapolei to Manoa/Waikiki	Plan, design, and construct a fixed rail transit system between Kapolei and Manoa/Waikiki. This project includes modifications to TheBus system to provide feeder services to rail stations and eliminate parallel express services. Note that the alignment, system technology, and location of transit stations will be determined pending the completion of the Alternative Analysis Draft Environmental Impact Statement (AA/DEIS).	$2,570.0
32	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: • Expansion to and within Ewa, Kapolei, and Central Oahu • Implementation of the Hub and Spoke bus system with transit centers and circuitous routes • Expansion through increase of Express service to the North Shore, Waianae, and Windward Oahu	$49.8 of $151.2 total in 1st 10 years
33	C	Transit Centers, Various Locations	Construct transit centers at various locations islandwide to support the Rail Transit and TheBus systems.	$30.7 in 1st 10 years
OPERATIONS, MAINTENANCE & SYSTEM PRESERVATION - 2006 TO 2015				
34	C	City Operations and Maintenance (O&M)	Maintain and operate the City's existing and future roadway, transit and paratransit operations and routine maintenance. Includes, but is not limited to, operation of the transit system (including bus, paratransit, rail, and ferry), replacement of existing fleet, resurfacing, guardrail and shoulder improvements, lighting improvements, drainage improvements, sign upgrades and replacement, etc.	$1,990.8 in 1st 10 years ($1,624 transit O&M, $139 bus fleet replacement, $228 roadway O&M)

TABLE 1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE PLAN AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
35	S	State Operations and Maintenance	Maintain and operate the State's existing and future highway operations and routine maintenance. Includes, but is not limited to, pavement repair, guardrail and shoulder improvements, lighting improvements, drainage improvements, sign upgrades and replacement, traffic signal upgrade and retrofit, etc.	$340.0 in 1st 10 years
36	S	System Preservation	Preserve the highway system through projects including, but not limited to, bridge replacement and seismic retrofit, pavement preventative maintenance, resurfacing and rehabilitation, etc.	$625.0 in 1st 10 years
COST SUBTOTALS: MID-RANGE PLAN (2006 TO 2015)				
Subtotals by Category				
Subtotal: Islandwide Projects				$236.0
Subtotal: Safety & Operational Improvement Projects				$154.5
Subtotal: Congestion Relief Projects				$733.0
Subtotal: Second Access Projects				$32.8
Subtotal: Transit Projects				$2,673.5
Subtotal: Operations, Maintenance, & System Preservation				$2,955.8
Total: All Categories				$6,785.5
Subtotals by Jurisdiction				
City & County of Honolulu Share of Project Costs *				$5,050.8
State of Hawaii Share of Project Costs *				$1,734.7
Total: All Shares				$6,785.5

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
LONG-RANGE PLAN (2016 TO 2030)				
ISLANDWIDE PROJECTS - 2016 to 2030				
2	C/S *	Bike Plan Hawaii - Oahu	See description in Mid-Range Plan	$61.0 in 2nd 15 years
3	C/S *	Enhancement Projects	See description in Mid-Range Plan	$30.0 in 2nd 15 years
4	C/S *	Intelligent Transportation Systems	See description in Mid-Range Plan	$90.0 in 2nd 15 years
6	C/S *	Transportation Demand Management Program	See description in Mid-Range Plan	$90.0 in 2nd 15 years
SAFETY & OPERATIONAL IMPROVEMENT PROJECTS - 2016 to 2030				
37	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.	$69.7
CONGESTION RELIEF PROJECTS - 2016 to 2030				
38	S	Farrington Highway, Widening, west of Fort Weaver Road to Waiawa Interchange	Widen Farrington Highway from Kunia to Waiawa by 1 lane in each direction, from west of Fort Weaver Road to Waiawa Interchange.	$87.1
39	S	Farrington Highway, Widening, Hakimo Road to Kalaeloa Boulevard	Widen Farrington Highway from 4 to 6 lanes, from Hakimo Road to Kalaeloa Boulevard, including intersection of Lualualei Naval Road.	$108.4
40	S	Interstate Route H-1, Widening, Lilina Street to Pali Highway	Widen the Interstate Route H-1 by 1 lane, from 3 to 4 lanes in the eastbound direction, from the Lilina Street on-ramp to Pali Highway off-ramp.	$3.4
41	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 from Middle Street to University Avenue. This project includes modification of auxiliary lanes at various exits and other operational changes to Interstate Route H-1. The identification of the precise improvements to be made will require a separate detailed corridor study.	$60.0
42	S	Interstate Route H-1, On- & Off-Ramp Modifications, University Avenue Interchange	Modify on- and off-ramps at the University Avenue Interchange on Interstate Route H-1. This project includes the construction of new ramps to allow all movements, safety improvements, including the closure of the eastbound on-ramp at University Avenue Interchange to Interstate Route H-1 and the construction of a new makai-bound off-ramp to University Avenue from Interstate Route H-1.	$24.0
43	S	Interstate Route H-1, Widening, Vineyard Boulevard to Middle Street	Widen the Interstate Route H-1 by 1 lane in the westbound direction, from Vineyard Boulevard to Middle Street.	$60.0
44	S	Interstate Route H-1, HOV Lanes, Waiawa Interchange to Makakilo Interchange	Construct 2 new lanes in the freeway median for HOV use, 1 in the westbound direction and 1 in the eastbound direction, on Interstate Route H-1, from the Waiawa Interchange to the Makakilo Interchange.	$52.5
45	S	Interstate Route H-1, Widening, Waiawa Interchange to Halawa Interchange	Widen the Interstate Route H-1 by 1 lane in the eastbound direction, from the Waiawa Interchange to the Halawa Interchange.	$251.3
46	S	Interstate Route H-1, Widening, Ward Avenue to Punahou Street	Widen the existing Interstate Route H-1 by 1 lane in the eastbound direction, from Ward Avenue to Punahou Street.	$24.3

TABLE 1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE PLAN AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
47	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 2 lanes to 4 lanes; and addition of new on- and off-ramps to and from Interstate Route H-2 at Pineapple Road Overpass.	$50.0
48	S	Kahekili Highway, Widening, Kamehameha Highway to Haiku Road	Widen Kahekili Highway from 2 to 4 lanes, from Kamehameha Highway to Haiku Road. This project also includes the following improvements: • Contraflow in existing right-of-way between Hui Iwa Street and Haiku Road • Intersection improvements at Hui Iwa Street and Kamehameha Highway	$30.0
49	S	Kunia Road, Widening and interchange improvement, Wilikina Drive to Farrington Highway	Widen Kunia Road as follows: • From 2 to 4 lanes, from Wilikina Drive to Anonui Street. • From 2 to 4 lanes, Anonui Street to Kupuna loop. • From 4 to 6 lanes, Kupuna Loop to Farrington Highway. • Add 1 lane eastbound loop on-ramp at Kunia Road & Interstate Route H-1.	$116.3
50	S	Likelike Highway, Widening, Kamehameha Highway to Kahekili Highway	Widen Likelike Highway from 4 to 6 lanes, from Kamehameha Highway to Kahekili Highway.	$14.6
51	C	Makakilo Mauka Frontage Road, New Roadway, Kaiaeloa Boulevard to Makakilo Drive	Construct a new 2-lane Makakilo Mauka Frontage Road, mauka of Interstate Route H-1, from Kaiaeloa Boulevard to Makakilo Drive.	$11.1
52	S	Nimitz Highway, High Occupancy Vehicle (HOV) Flyover, Keehi Interchange to Pacific Street	Construct a new 2-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.	$250.0
53	C	Piikoi-Pensacola Couplet Reversal	Reverse the direction of the existing one-way Piikoi Street and Pensacola Street couplet.	$4.2
54	C	Puuloa Road, Widening, Pukuloa Road to Nimitz Highway	Widen Puuloa Road, from Pukuloa Road to Nimitz Highway: • From 3 lanes (1 lane southbound and 2 lane northbound) to 5 lanes (2 lanes southbound and 3 lanes northbound), from Pukuloa Road to Kamehameha Highway.	$10.0
SECOND ACCESS PROJECTS - 2016 to 2030				
55	C	Central Mauka Road, Second Access, Mililani Mauka to Waiawa	Construct Central Mauka Road, a new 4-lane road from Mililani Mauka to Waiawa. Road connects Meheula Parkway to Kamehameha Highway in Pearl City; parallel to & mauka of Interstate Route H-2. The new 4-lane north-south road includes connections to Interstate Route H-2 interchanges.	$160.0
56	C	Wahiawa, Second Access, Whitmore Avenue to Meheula Parkway	Construct a new 2-lane second access road between Whitmore Village and Wahiawa, from Whitmore Avenue to California Avenue. Continue the new 2-lane second access road to Mililani Mauka, from California Avenue to Meheula Parkway.	$64.4
57	S	Waianae, Second Access, Farrington Highway to Kunia Road	Construct a new 2-lane second access road to Waianae from Farrington Highway in the vicinity of Maili, over the Waianae Mountain Range, to Kunia Road.	$423.0
TRANSIT PROJECTS - 2016 to 2030				
32	C	TheBus Service, Expansion, Islandwide	See description in Mid-Range Plan	$101.6 in 2nd 15 years
33	C	Transit Centers, Various Locations	See description in Mid-Range Plan	$9.0 in 2nd 15 years
OPERATIONS, MAINTENANCE & SYSTEM PRESERVATION - 2016 TO 2030				
34	C	City Operations and Maintenance (O&M)	See description in Mid-Range Plan	$3,630.1 in 2nd 15 years ($3,051 transit O&M, $275 bus fleet replacement, $304 roadway O&M)
35	S	State Operations and Maintenance	See description in Mid-Range Plan	$510 in 2nd 15 years
36	S	System Preservation	See description in Mid-Range Plan	$375 in 2nd 15 years
COST SUBTOTALS: LONG-RANGE PLAN (2016 TO 2030)				
Subtotals by Category				
Subtotal: Islandwide Projects				$271.0
Subtotal: Safety & Operational Improvement Projects				$89.7
Subtotal: Congestion Relief Projects				$1,137.2
Subtotal: Second Access Projects				$647.4
Subtotal: Transit Projects				$110.6
Subtotal: Operations, Maintenance, & System Preservation				$4,515.1
Total: All Project Categories				$6,751.0
Subtotals by Jurisdiction				
City & County of Honolulu Share of Project Costs *				$4,125.9
State of Hawaii Share of Project Costs *				$2,625.1
Total: All Shares				$6,751.0

TABLE 1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE PLAN AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
RIGHT-OF-WAY PRESERVATION				
CONGESTION RELIEF PROJECTS - ROW PRESERVATION				
58	C	Kalaeloa East-West Spine Road, New Roadway, Kalaeloa Boulevard to Geiger Road	Establish and preserve right-of-way (ROW) for Kalaeloa East-West Spine Road (new 4-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).	n/a
59	C	Keoneula Boulevard, Extension, Kapolei Parkway to Franklin D. Roosevelt Avenue	Establish and preserve right-of-way (ROW) for Keoneula Boulevard Extension (extension of Keoneula Boulevard from Kapolei Parkway to Franklin D. Roosevelt Avenue).	n/a
ORTP 2030 COST TOTALS: 2006-2030				
Subtotals by Category				
Subtotal: Islandwide Projects				$507.0
Subtotal: Safety & Operational Improvement Projects				$224.2
Subtotal: Congestion Relief Projects				$1,870.2
Subtotal: Second Access Projects				$680.2
Subtotal: Transit Projects				$2,784.1
Subtotal: Operations, Maintenance, & System Preservation				$7,470.9
Total: All Project Categories				$13,536.5
Subtotals by Jurisdiction				
City & County of Honolulu Share of Project Costs *				$9,176.7
State of Hawaii Share of Project Costs *				$4,359.8
Total: All Shares				$13,536.5

Notes:

* Costs for projects shared by City and State (C/S) allocated equally between the two jurisdictions. The designation is done for so for reasons of financially balancing the projected revenues with the order of magnitude cost estimates.

TABLE 2
ORTP 2030 ILLUSTRATIVE PROJECTS

Project No.	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
CONGESTION RELIEF PROJECTS			
I-1	H-1 Corridor, Reversible Highway, Waiawa interchange to Keehi Interchange	Construct a new, elevated, reversible two-lane highway from west of the Waiawa interchange to the Keehi interchange. The new facility could be used for high occupancy vehicles; and a toll could be charged.	$2,500
I-2	Kalaeloa East-West Spine Road, New Roadway, Kalaeloa Boulevard to Geiger Road	Construct a new 4-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.	$110
I-3	Keoneula Boulevard, Extension, Kapolei Parkway to Franklin D. Roosevelt Avenue	Extend Keoneula Boulevard from Kapolei Parkway to Franklin D. Roosevelt Avenue.	$85
I-4	Paiwa Street, Extension, Ka Uka Boulevard to Lumiauau Street	Extend Paiwa Street from north of Lumiauau Street, to the intersection of Kamehameha Highway and Ka Uka Boulevard.	$15
I-5	Pearl Harbor Corridor	Construct an alternative route through the Pearl Harbor corridor to provide direct connection between Honolulu and the Ewa Plain. A new tunnel beneath the mouth of Pearl Harbor and a series of bridges spanning Pearl Harbor are potential options for this route. This project could operate as a toll facility.	$7,000
Total (with Pearl Harbor Corridor as Tunnel)			$9,710

Additional copies of this document can be downloaded from www.OahuMPO.org/ortp.
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OahuMPO

Oahu Regional Transportation Plan 2030
Technical Report

OahuMPO

The Policy Committee of the Oahu Metropolitan Planning Organization approved the Oahu Regional Transportation Plan 2030 in April 2006.

OAHU REGIONAL TRANSPORTATION PLAN 2030

TECHNICAL REPORT

THE ORTP 2030 WAS APPROVED BY THE OAHU METROPOLITAN PLANNING ORGANIZATION POLICY COMMITTEE IN APRIL 2006

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GLOSSARY OF ACRONYMS
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3C	Comprehensive, Cooperative and Continuing
AA	Alternatives Analysis
ADA	Americans with Disabilities Act
AVO	Average Vehicle Occupancy
AVR	Average Vehicle Ridership
CAC	Citizens Advisory Committee
CCTV	Closed Caption Television
CDUA	Conservation District Use Application
CMP	Congestion Management Process
CMS	Congestion Management System
CSCS	Centralized Signal Control Systems
DBEDT	Department of Business, Economic Development and Tourism
DLNR	Department of Land and Natural Resources
DOT	Department of Transportation
DP	Development Plan
DPA	Development Plan Area
DPP	Department of Planning and Permitting
DTS	Department of Transportation Services
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration

FTA	Federal Transit Administration
FY	Fiscal Year
GET	General Excise Tax
HAR	Hawaii Administrative Rules
HBW	Home-Based Work
HDOT	Hawaii Department of Transportation
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
HPMS	Highway Performance Monitoring System
HRS	Hawaii Revised Statutes
HSTP	Hawaii Statewide Transportation Plan
HTF	Highway Trust Fund
ITS	Intelligent Transportation Systems
LOS	Level of Service
LOTMA	Leeward Oahu Transportation Management Association
LPA	Locally Preferred Alternative
LUC	State Land Use Commission
MOE	Measure of Effectiveness
OCCL	Office of Conservation and Coastal Lands
OahuMPO	Oahu Metropolitan Planning Organization
ORTP	Oahu Regional Transportation Plan
OTS	Oahu Transit Services, Inc.
PUC	Primary Urban Center
ROW	Right-of-Way
RTP	Regional Transportation Plan

RTSS	Regional Transit Security Strategy
SAFETEA-LU	Safe, Accountable, Flexible Transportation Equity Act – A Legacy for Users
SCP	Sustainable Community Plan
SHSP	Strategic Highway Safety Plan
SSEPP	System Security Emergency Preparedness Plan
STIP	Statewide Transportation Improvement Program
T6/EJ	Title VI and Environmental Justice
TAA	Transportation Analysis Area
TAC	Technical Advisory Committee
TAZ	Traffic Analysis Zone
TCC	Traffic Control Center
TDFM	Travel Demand Forecasting Model
TDM	Travel Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvement Program
TMC	Traffic Management Center
TOP 2025	Transportation for Oahu Plan 2025
TSM	Transportation System Management
UH	University of Hawaii
USDOT	United States Department of Transportation
V/C	Volume-to-Capacity Ratio
VHD	Vehicle Hours of Delay
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
VPH	Vehicles per Hour

1.0 INTRODUCTION

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 various requirements of the metropolitan transportation planning process for Oahu. These requirements are mandated by the U.S. Department of Transportation as the means of verifying the eligibility of metropolitan areas for Federal funds earmarked for surface transportation systems. They are currently 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 2030. It is an update of a plan that was first adopted in 1976 and has been updated four 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*, and in 2001 as *Transportation for Oahu Plan* (TOP) 2025.

1.1 STUDY PURPOSE

The ORTP 2030 is a blueprint that serves as a guide in the identification of the various elements of a long-range plan to address the mobility issues and transportation needs of the Honolulu community. It is a multi-faceted plan that represents a vision for a better transportation system and is integrated with the planned growth pattern for Oahu over the next 25 years. It includes goals and objectives, identifies projects and provides an implementation program for mid- and long-range investment of the available transportation funds across Oahu in a fair and equitable manner.

The development of the plan serves to assist decision-makers in understanding the options available for improving the transportation system and how different options work toward improving mobility. Once adopted, any future transportation improvements for Oahu that receive federal transportation funds must be consistent with the ORTP in order to be eligible for these funds.

To address the uncertainties of forecasting 25 years into the future, the ORTP is updated at least every five years. The update is based on current information and community priorities. As part of each update, socio-economic and land use assumptions are revisited and corresponding changes in travel patterns are forecast to validate or test past and new directions for transportation development on Oahu. Revenue and cost assumptions are also revisited. This regional planning document is required by a number of state and federal mandates and requirements, including SAFETEA-LU. These requirements are mandated by the U.S. Department of Transportation (USDOT) as a means of verifying the eligibility of metropolitan areas for federal funds earmarked for surface transportation systems.

The ORTP contains a financial element that identifies both current and potential future sources of revenue that may be available for the implementation of this plan. The financial element of the plan illustrates the relationship of these revenue projections with the estimates of costs associated

with the implementation and operation of each of the transportation plans and programs contained in the plan. It is a federal requirement that all elements of the ORTP have an identifiable source of revenue to offset the cost of implementation.

1.2 GOALS AND OBJECTIVES

A draft set of goals and objectives were developed based on a review of previous ORTP documents, the City and County of Honolulu's Development Plans (DPs) and Sustainable Community Plans (SCPs), and the State of Hawaii's Hawaii Statewide Transportation Plan (HSTP). The draft goals and objectives were modified in response to input from the public, primarily through the OahuMPO Citizen Advisory Committee (CAC), and Technical Advisory Committee (TAC). The finalized goals and objectives were endorsed by the OahuMPO Policy Committee and are found in Chapter 2 of this document in Table 2-1.

1.3 PLANNING PROCESS

The Regional Transportation Plan is developed in the context of the comprehensive, cooperative and continuing (3C) planning process established and carried out by the OahuMPO and its participating agencies. The OahuMPO is the officially designated regional agency that must ensure that the 3C process addresses all federal concerns regarding various transportation modes on Oahu while addressing the transportation needs of the state and county. The plan is organized to respond to travel needs over a 20+ year time horizon reflecting land use and socioeconomic and travel demand forecasts directed at Year 2030.

1.3.1 Participating Agencies

Although the OahuMPO, as the designated agency responsible for the preparation of the ORTP, functions as the lead agency, the development of the plan is a cooperative planning effort that includes the significant involvement of agencies from the State of Hawaii and the City and County of Honolulu. These agencies include:

State of Hawaii

- Department of Transportation (DOT)
- Department of Business, Economic Development & Tourism (DBEDT)

City and County of Honolulu

- Department of Transportation Services (DTS)
- Department of Planning and Permitting (DPP)

The Hawaii DOT is responsible for a number of major products related to the ORTP. These include the HSTP, within which the ORTP will be included, and the Statewide Transportation Improvement Program (STIP).

The DBEDT provides the statewide and countywide control totals for all socioeconomic and demographic forecasts used in the development of the ORTP.

DTS is responsible for the overall planning of local transportation facilities including public transit, highways, parking system, and any relevant transportation demand management activities. DTS administers the operation of the public transit system.

DPP is responsible for the development of the socioeconomic forecasts used for the development of travel demand forecasts for the ORTP on a detailed traffic analysis zone (TAZ) basis for Oahu.

1.3.2 Organizational Structure

Development of the ORTP is guided by an organizational structure that complies with the principles of the 3C process. It includes committees that establish policy, advise, and guide the development of major products prepared by the OahuMPO. They include:

- Policy Committee - The Policy Committee is responsible for adoption of the RTP and is composed of elected officials or their appointees. The committee composition includes five members from the City Council, three members from the State Senate, three members from the State House, the directors of the City and County and State departments of transportation.

- Technical Advisory Committee - The TAC consists of senior staff from City and County departments, including DTS and DPP; and State departments, including the State of Hawaii Department of Transportation (HDOT) and DBEDT. Staff representatives from Federal Highway Administration, the Federal Transit Administration, and the Federal Aviation Administration are non-voting members. Other ex-officio members include a faculty member from the University of Hawaii (UH) and the managing director of the Hawaii Transportation Association. The committee advises the Policy Committee and the Executive Director of the OahuMPO on technical matters.

- Citizen Advisory Committee - The members are appointed by the Policy Committee, with member organizations representing a broad range of interest groups. The role of the CAC is to provide public input and advise the Policy Committee and the OahuMPO Executive Director. The CAC assists the planning effort by identifying the concerns and issues regarding transportation needs, and by reviewing potential plans and programs.

1.3.3 Federal Requirements

SAFETEA-LU calls for transportation strategies in metropolitan regions to address a number of planning factors. SAFETEA-LU requires that the development of the plan must consider the following 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.

1.3.4 Transportation Improvement Program

The Oahu Transportation Improvement Program (TIP) is a short-term project implementation program. Projects in the Oahu TIP must be consistent with the ORTP. The TIP is updated at least every four years, with a scheduled annual review. Although both the ORTP and the TIP must include a financial plan to illustrate that the resources needed to fund the program can reasonably be expected to be available, the financial requirements are more stringent for the TIP.

1.3.5 Title VI & Environmental Justice

Title VI and environmental justice (EJ) are about faimess. Fairness means all groups enjoy the benefits without bearing a disproportionate share of the burden.

EJ is not a new concept or program. It has its roots in Title VI of the Civil Rights Act of 1964 and bars intentional discrimination as well as disparate impact discrimination (i.e., a neutral policy or practice that has a disparate impact on protected groups). Title VI 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."

In 1994, President Bill Clinton issued Executive Order 12898, directing all Federal agencies to implement environmental justice. The Environmental Justice Order further amplifies Title VI by providing 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.

The USDOT has identified EJ as an "undeniable mission of the agency" along with safety and mobility. USDOT stresses three principles of EJ:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.

- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.

- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

OahuMPO Policy Statement

"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

"The 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. The OahuMPO will not exclude anyone from participation in, deny the benefits of, or otherwise discriminate under any of its programs or activities."

Title VI & Environmental Justice Populations

The Title VI and EJ populations include both minority and low-income populations. For the purposes of the OahuMPO analyses, these populations are referred to as EJ block groups. The data are based on U.S. Census income, minority, and ethnicity data from the 2000 Census[1].

1.3.6 Relationship to Area Master Plans

The ORTP has been designed to identify and respond to transportation demands and potential deficiencies at the major travel corridor level. It includes plans and programs that address regional transportation issues and provide both specific and conceptual improvements that are developed on a regional scale. The ORTP is not intended to serve as a replacement for the circulation elements for Development Plan Areas (DPAs) or large project master plans. The circulation needs for these areas must be developed in a context that is consistent with the level of detail of each. Once transportation circulation patterns and improvements have been identified as part of Development Plans or master plans, the ORTP can include improvements developed as part of these plans. Any improvement projects affecting conservation designated lands would also need to comply with State Conservation Plan procedures.

[1] The analysis of the Census data and resulting designation of EJ block groups is detailed in the OahuMPO *Environmental Justice in the OahuMPO Planning Process: Defining Environmental Justice Populations* report, dated March 2004. This report is available on the OahuMPO website for download at www.OahuMPO.org.

1.4 SUMMARY OF THE ORTP 2030

1.4.1 Transportation System Challenges

To solve the transportation puzzle, several challenges that Oahu will face over the next 25 years must be addressed:

- There will be more people: more people who want to go to work, to school, to shop, to play – resulting in about 30% more travel.
- Many of Oahu's major roadways are congested, especially those within the H-1 travel corridor between Manoa/Waikiki and Kapolei. This results in Waianae Coast, Ewa, and Central Oahu residents experiencing some of the worse morning commute travel times.
- Established communities want additional access during emergencies as well as congestion relief.
- Many of Oahu's existing roadways need to be maintained, repaired, and rehabilitated.
- Finally, Oahu's numerous transportation needs are constrained by limited resources.

1.4.2 Overview of ORTP 2030

Like many areas throughout the country, Oahu does not have the resources to resolve all of its transportation challenges and must balance its needs with available funds. The ORTP 2030 does this by allocating $6.07 billion for capital projects and $7.47 billion to operate, maintain, and preserve the highway and transit systems. Projects contained in the ORTP 2030 work together to balance Oahu's need for mobility options, congestion relief, safety, second access, and bicycling and pedestrian facilities

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

With regard to congestion relief, the analysis and public input received during the development of the ORTP 2030 highlighted the need to focus on the Interstate Route H-1 travel corridor and the Ewa and Central Oahu areas. Preliminary analysis indicated that islandwide congestion could be significantly addressed by focusing on the H-1 travel corridor. The need for transportation infrastructure in the Ewa area is already apparent and will increase in the future as population and employment are projected to grow substantially. Major population and employment increases are also projected in Central Oahu.

The following provides descriptions of specific elements of the plan:

Rail Transit System

The ORTP 2030 envisions a rail transit system from Kapolei to Manoa/Waikiki as the backbone of the transit system, connecting major employment and residential centers along its alignment. The plan for this project also includes associated feeder bus services for each station and roadway improvements to facilitate the flow of buses that supplement the rail system. The City and County of Honolulu is presently investigating a rail option as part of its Honolulu High-Capacity Transit Corridor Project Alternatives Analysis.

Like many areas throughout the country, we will not be able to build our way out of our congestion problem. Although transit and new roadway projects can each reduce congestion, neither approach will eliminate congestion. Because of this, transportation efficiency and mobility options take on a greater importance in the ORTP 2030.

Giving priority to moving people instead of cars becomes more important as our ability to build more roadways is limited by our funding resources; as development reduces the available right-of-way (ROW) to expand existing roadways or build new roadways, especially in the Primary Urban Center (PUC); as our roadways and parking facilities within major destinations such as downtown and Waikiki strain to absorb the traffic; as more autos emit more pollutants into the air; and as fuel consumption become a greater public concern.

Providing mobility options is also a quality of life issue, not only for those who must depend upon transit as their sole source of transportation, but for those who would benefit from using a rail system. Rail transit will work together with land use policies to help shape Oahu.

Congestion Relief

The ORTP 2030 acknowledges that auto travel is, and will continue to be, a dominant travel mode and; subsequently, increases in roadway capacity will be required. This is especially true in the H-1 travel corridor and where congestion is forecast to increase significantly if new projects are not constructed. This plan provides and additional 140 lane-miles to Oahu's major roadways.

As part of the ORTP 2030, new and expanded roadway projects are proposed for the Ewa area, Central Oahu, and the PUC, where the majority of the residential and employment growth is projected. For the Ewa area, these projects include expansion of several roadways like the North-South Road and Kapolei Parkway; new or modified freeway interchanges in Kapolei and Makakilo; and the widening of existing roadways such as Farrington Highway, Fort Barrette Road and Kunia Road. Examples of roadway projects in the Central Oahu area include expansion of Kamehameha Highway and H-1 between the Waiau and Waiawa Interchanges; and widening and improvements at the H-1 and H-2 Waiawa Interchange. Several capacity enhancement projects to various sections of Interstate Route H-1 from Pearl City to downtown Honolulu are also programmed.

Bicycle Facilities

One hallmark of a livable city is that is public spaces are actively used and the outdoors can be enjoyed. Honolulu is a great city for bicycles with its physical beauty, mild year-round climate,

relatively flat coastal plain and compact form. Enhancing the appealing qualities of Oahu can be achieved in part by integrating bicycle facilities as a key component of the transportation system. The ORTP 2030 incorporates the Oahu elements of Bike Plan Hawaii and the "Priority One" projects identified in Honolulu Bicycle Master Plan. This provides Honolulu with an integrated network of on-road bikes and off-road shared-use paths to link people with their favorite destinations.

Pedestrian Facilities

The majority of us walk to get to our cars, catch a bus, and run errands on our lunch breaks. Some of us walk for exercise as well as to get to work and to shop. In past plans, pedestrian facilities were combined with bicycle facilities. We recognize that the needs of pedestrians are, in many cases, different from those of bicyclists. To address this difference, the ORTP 2030 includes development of a pedestrian plan for Oahu as part of the Enhancement Projects.

TDM and TSM

Transportation demand management (TDM) and transportation system management (TSM) programs consist of measures that are designed to reduce the demand and increase the efficiency of the transportation system. The TDM and TSM programs for Oahu include facilities to enhance flow such as high occupancy vehicle (HOV) lanes on freeways, park-and-ride lots, bus-only lanes on city streets, and even separate HOV facilities. Also included are programs to help form and maintain carpools and vanpools as well as programs to give people incentives to rideshare.

Second Access Highways

While the coastal plains are relatively flat, Oahu's interior terrain is divided by two primary mountain ranges that can make access between communities difficult. Many of the established communities on the island have only one roadway into and out of the area. Providing a second means of access to these communities serves to increase the capacity to these areas and to provide needed emergency access. Four "second access" projects are included in the ORTP 2030 for Makakilo, Mililani Mauka, Wahiawa, and the Waianae Coast.

Intelligent Transportation Systems

The ORTP 2030 contains an intelligent transportation systems (ITS) line item. ITS is a collection of technologies that enable multiple agencies to work together to manage the transportation network better. ITS can include services for highways, transit services, commercial vehicle operations, and emergency service providers. ITS technologies can be used for emergency response and incident management. They are effective in lessening the amount of time it takes to clear an accident on the freeway as well as providing travelers with information on traffic conditions and transit schedules.

Transit System Expansion

While the rail transit system is the backbone of the transit system in the ORTP 2030, the existing bus system will continue to be an important element of the public transit system. Many of the passengers on the rail system are expected to access the system using City buses traveling to and from their destination. Expansion of the bus system will be focused primarily in Ewa, with moderate increases in other parts of Oahu, including express bus service to rural areas. Also included are provisions for new equipment through continued purchase and replacement of new buses to support service increases. All new and expanded bus service will be compliant with Americans with Disabilities Act (ADA) requirements.

An additional element of the future transit service is the implementation of an intra-island express ferry service from Ewa to Honolulu Harbor.

Operations, Maintenance and System Preservation

The ORTP 2030 recognizes the importance of the existing and future roadways and transit systems from the perspective of operations, maintenance and preservation. The plan includes the allocation of funding for these categories totaling $7.47 billion or approximately 55% of the plan cost. This funding covers both City and State facilities.

City operations and maintenance funding includes operating the public transit system (TheBus, paratransit, the proposed rail system, and the proposed commuter ferry system), transit vehicle replacement, and roadway system maintenance and operations. A total of approximately $5.62 billion is estimated for City operations and maintenance over the 25-year life of the plan, consisting of about $4.675 billion for transit operations and maintenance, $414 million for replacement of the existing bus fleet, and $532 million for roadway system maintenance and operations.

Maintenance and operation of the State's existing and future highway operations and routine maintenance includes, but is not limited to, pavement repair, guardrail and shoulder improvements, lighting improvements, drainage improvements, sign upgrades and replacement, traffic signal upgrade and retrofit. About $850 million is allocated in the plan for State maintenance and operations.

The ORTP 2030 allocates $1.0 billion over the life of the plan to preserving the highway system through projects including, but not limited to, bridge replacement and seismic retrofit, pavement preventative maintenance, erosion control, viaduct improvements, and road resurfacing and rehabilitation projects.

Illustrative Projects

The ORTP 2030 planning process identified many potential projects that could prove beneficial as transportation improvements for the island of Oahu, but 2030 revenue projections could not support inclusion of these projects in the ORTP 2030 at this time. As part of the endorsement of the ORTP 2030, the OahuMPO Policy Committee identified a subset of those projects as "illustrative projects."

Illustrative projects are those projects that are considered high-priority for inclusion into the regional transportation plan should additional, firmly-established funding revenue sources become available. Illustrative projects are not considered to be a part of the officially endorsed regional transportation plan. Projects considered in the plan development and included on the ORTP 2030 illustrative projects list include the concept of a Pearl Harbor crossing (tunnel or bridge) and elevated reversible high occupancy toll ("HOT") lanes within the H-1 travel corridor.

2.0 VISION, GOALS, AND OBJECTIVES

2.1 VISION FOR OAHU IN 2030

The vision statement for the 2030 ORTP is:

> *In 2030, Oahu is a place where transportation choices are available and the importance of the H-1 travel corridor is recognized.*

The first part of the vision focuses on increasing mobility options. To improve mobility, the ORTP 2030 provides a number of strategies and programs to address the island's future transportation needs. These include major capital improvement projects that add to the system's person-carrying and vehicular capacities, projects that expand upon the existing systems and services to optimize their use, increased focus on operational, management and preservation strategies, and programs that help integrate the transportation system into the land uses of each community.

This vision also acknowledges the importance of travel along the H-1 travel corridor. The projects included in the transportation plan propose numerous ways to address the additional traffic congestion that is expected to increase along this travel corridor:

- A major component of the ORTP 2030 is a rail transit system that will serve the corridor between Kapolei and Manoa/Waikiki.

- Also included in the plan are projects to increase the capacity of H-1 itself with new interchanges, additional HOV lanes, freeway widening, and operational improvements at key locations. These major H-1 travel corridor projects are supplemented with two projects that provide alternatives to H-1: the intra-island commuter ferry from Ewa to downtown Honolulu and the Nimitz flyover HOV facility.

- The ORTP 2030 also includes implementation of the island's bikeway plan, expansion of the bus system, several second access/emergency access roadways, projects to maximize the use of existing facilities, and measures to reduce the need for auto travel.

The ORTP will advance toward the vision for addressing growth and traffic on Oahu for 2030.

2.2 GOALS

To meet this vision, the islandwide transportation plan for Oahu is defined by three overarching goals.

Transportation Services System: *Develop and maintain Oahu's islandwide transportation system to ensure efficient, safe, convenient and economical movement of people and goods.*

The objectives that guide the development of the plan with regard to this goal include increasing capacity of the system, providing an efficient and convenient transit system, providing access to all important destinations, serving all intermodal terminals, ensuring that projects are distributed

equitably, ensuring that safety and security is provided, integrating the entire system, supporting economic development and providing for system preservation.

Environment and Quality of Life: *Develop and maintain Oahu's transportation system in a manner that maintains environmental quality and community cohesiveness.*

The objectives associated with the environment and quality of life goal are directed at the development of a plan that satisfies noise, air and water quality standards, encourages energy conservation, preserves cultural integrity and natural resources, develops alternative modes of transportation that are friendly to the environment, including pedestrian walkways and bicycle routes, optimizes use of transportation resources, minimizes disruption of neighborhoods, ensures compatibility with the physical and social character of existing development, incorporates landscaping and public safety, and plans for emergencies.

Land Use and Transportation Integration System: *Develop and maintain Oahu's transportation system in a manner that integrates land uses and transportation.*

The objectives that support the land use and transportation integration system goal reinforce planned population distribution and land use development policies, encourage innovation, and encourage implementation of land use policies that support efficient use of transportation systems.

2.3 OBJECTIVES

Twenty-three objectives have been identified for the ORTP 2030 that support the goals described above. These goals and their supporting objectives are presented in Table 2-1.

TABLE 2-1
GOALS AND OBJECTIVES FOR THE OAHU REGIONAL TRANSPORTATION PLAN 2030

Transportation Services System Goal:

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

Objectives:

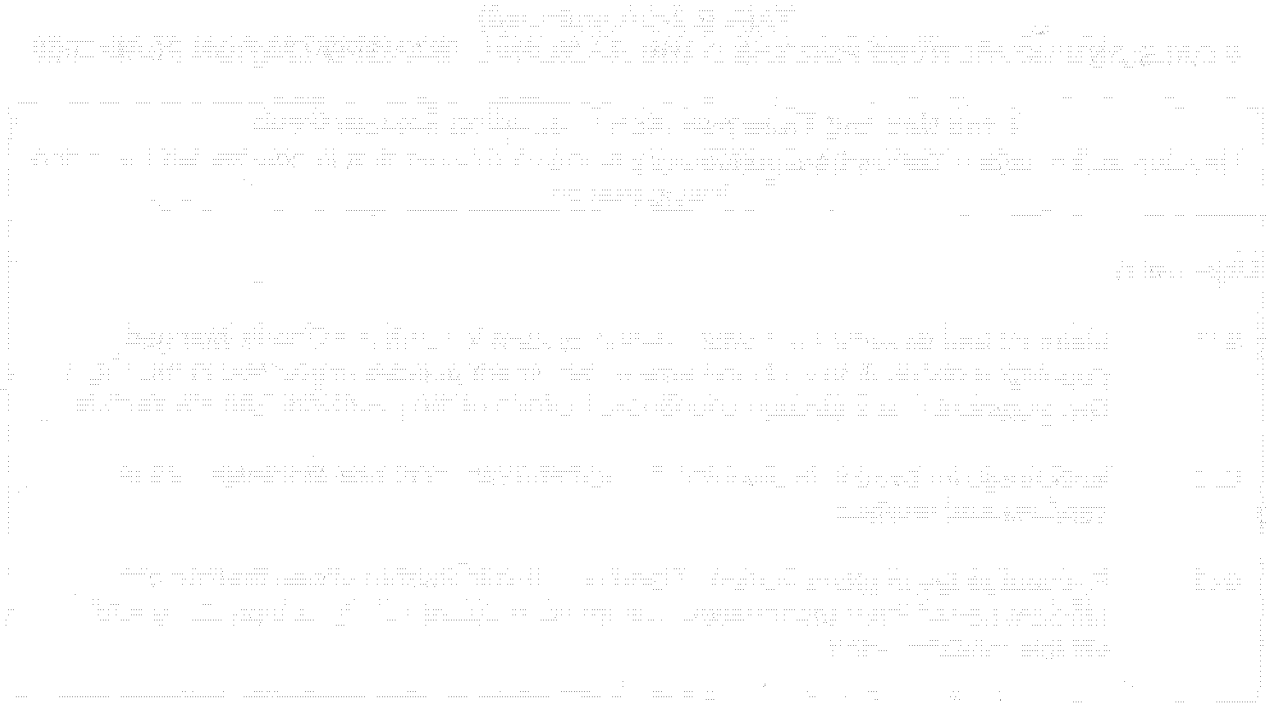
#1	Increase peak-period person-carrying capacities on Oahu's transportation network.
#2	Provide efficient, convenient and cost-effective transit service to Oahu citizens.
#3	Encourage the availability of adequate public and private services between Waikiki, the airport and other tourist destinations.
#4	Promote intermodal efficiency of harbor terminal facilities, airport terminal facilities and land transportation systems.
#5	Ensure that no person shall, on the grounds of race, color, gender, age, income, disability, or national origin, 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 local legislation.
#6	Ensure user and community safety and security in the physical design and operation of transportation facilities.
#7	Ensure that Oahu's transportation system is planned, designed, constructed and operated in an integrated and cost-effective manner.
#8	Enhance the performance and efficiency of Oahu's transportation system through the use of operation management strategies, such as ITS, TSM and TDM.
#9	Enhance the integration and connectivity of the regional transportation system.
#10	Promote planning, design and construction of transportation facilities and systems to support economic development and vitality.
#11	Provide major rehabilitation/renewal/modernization of facilities in sufficient magnitude to ensure continued effective operation.

TABLE 2-1 (continued)
GOALS AND OBJECTIVES FOR THE OAHU REGIONAL TRANSPORTATION PLAN 2030

Environment and Quality of Life System Goal: Develop and maintain Oahu's transportation system in a manner that maintains environmental quality and community cohesiveness.	
Objectives:	
#12	Develop and maintain Oahu's transportation system to meet or exceed noise, air and water quality standards set forth by federal, state and local agencies.
#13	Encourage energy conservation in transportation.
#14	Preserve Oahu's cultural integrity and sensitive natural resources, including beaches, scenic beauty, and sea and mountain vistas.
#15	Develop and maintain alternative transportation facilities, including bikeways, walkways and other environmentally friendly elements that can be safely integrated with other transport modes.
#16	Develop a travel demand management system for Oahu that optimizes use of transportation resources by encouraging programs to increase transit ridership, increase ridesharing on Oahu, reduce single occupancy vehicle travel, and reduce auto dependency.
#17	Minimize disruption of existing neighborhoods from construction of the transportation system.
#18	Ensure that transportation facility design and maintenance are compatible with the existing and planned physical and social character of new and existing developments.
#19	Maintain and upgrade existing facilities and design future transportation facilities in a manner that is aesthetically pleasing and incorporates landscaping, tree planting, and public safety.
#20	Develop transportation contingency plans for energy shortages, natural and man-made disasters and other emergencies that would impact the transportation system.

TABLE 2-1 (continued)
GOALS AND OBJECTIVES FOR THE OAHU REGIONAL TRANSPORTATION PLAN 2030

Land Use and Transportation Integration System Goal: Develop and maintain Oahu's transportation system in a manner that integrates land use and transportation.	
Objectives:	
#21	Maintain and develop the transportation system to reinforce Oahu's planned population distribution and land use development policies expressed in the City's Development Plans through coordinated efforts of the public and private sectors.
#22	Encourage innovation in planning, design and maintenance of transportation services and facilities.
#23	Encourage the implementation of land use development policies that support efficient use of the transportation system via reduced vehicular tripmaking and vehicle miles traveled.



3.0 REGIONAL SETTING

This chapter provides a description and evaluation of the existing and future baseline conditions affecting the transportation system on the island of Oahu. It begins with a discussion of policies regarding conservation designated lands, followed by discussions of socioeconomic conditions on the island, the existing transportation system, baseline improvement projects, and existing and projected Year 2030 travel statistics and operating conditions.

3.1 CONSERVATION DESIGNATED LANDS

The State of Hawaii's Department of Land and Natural Resources (DLNR) manages the lands designated in the "Conservation District," one of four land classifications by the State Land Use Commission (LUC).[1] 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. The DLNR Office of Conservation and Coastal Lands (OCCL) provides regulatory oversight in balancing the preservation of these lands with proposed development. It is the mission and goal of OCCL to protect and conserve Conservation District lands and beaches within the State of Hawaii for the benefit of present and future generations, pursuant to Article XI, Section 1, of the Hawaii State Constitution. These lands encompass our State's terrestrial and marine environments, with special emphasis on coastal areas and beaches.

Figure 3-1 identifies the Conservation District lands on the island of Oahu through the classification of the lands by subzone[2] while Table 3-1 tabulates the land area in each subzone.

As seen in the figure, 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. These subzones identify land uses that may be applied for in the Conservation District. Descriptions of these subzones are summarized below from more detailed information found in Section 13-5-11 of the Hawaii Administrative Rules (September 6, 1994).

1. 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.

2. Limited: Limits uses where natural conditions suggest constraints on human activities. Examples include lands susceptible to floods, soil erosion, tsunami, flooding, volcanic activity, or landslides; and lands that have a general slope of forty percent or more.

3. 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 growing and harvesting of commercial timber.

[1] The four State land classifications are urban, rural, agriculture, and conservation districts.
[2] All submerged lands around the island of Oahu are designated "Resource" subzone unless otherwise designated.

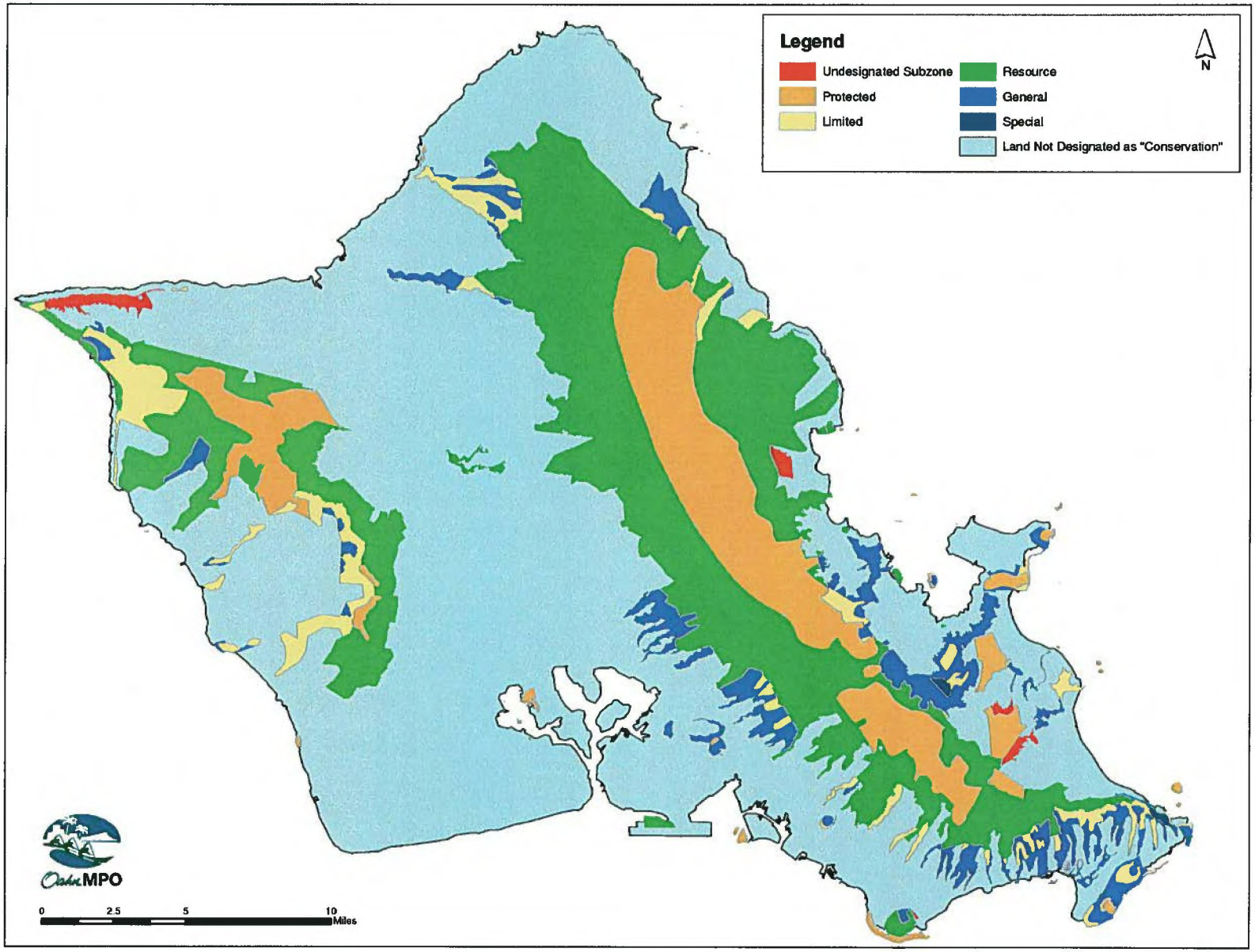


FIGURE 3-1: CONSERVATION DISTRICT LANDS ON OAHU

4. 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.

5. Special: Provides for areas possessing unique developmental qualities, which complement the natural resources of the area.

6. Undesignated: These are lands that have been transferred into the Conservation District by the LUC. A Rule Amendment to designate the land into a subzone is required.

TABLE 3-1
LAND AREA IN SUBZONES

Subzone	Square Meters	Acres	Percent of Oahu's Conservation Lands
Protective*	153,695,300	38,000	24%
Limited	53,342,100	13,200	8%
Resource	357,336,200	88,300	56%
General	71,773,700	17,700	11%
Special	1,148,400	300	Less than 1%
Undesignated	7,608,400	600	Less than 1%
Total	642,645,100	158,000	100%

**Does not include the 2,259,100 square meters (approximately 558 acres) of the conservation areas outside of the coastline – an example of which includes Hanauma Bay.*

Section 13-5-22 of the Hawaii Administrative Rules (HAR) 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. In the "public purpose use," allowable 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 (CDUA), are acquired in the relevant planning, environmental, and detailed design stages of project development.

3.2 SOCIOECONOMIC CONDITIONS

Socioeconomic and demographic characteristics play a significant role in determining 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.

The OahuMPO travel demand model subdivides Oahu into 762 TAZs and produces estimates of trip making based on key socioeconomic and land use characteristics by zone.

These characteristics include the following categories:

- Population (household and group quarters)
- Employment (retail, service, hotel[3], and other categories)
- Housing units
- Occupied households by size
- Visitor units

Travel demand forecasts were developed for the Year 2030 based on socioeconomic projections provided by the City and County of Honolulu DPP. The DPP forecasts in turn are based on statewide forecasts developed by the State of Hawaii Department of Business, Economic Development and Tourism. DBEDT is responsible for the development of employment and population forecasts for the State of Hawaii and for each of the counties.

3.2.1 Year 2000 Socioeconomic Data

Tables 3-2 and 3-3 tabulate population and employment statistics by transportation analysis area (TAA). Table 3-4 summarizes employment statistics by category, while Table 3-5 presents visitor unit estimates.

Examination of Year 2000 population figures reveals the total island population to be approximately 876,200 persons. The total number of housing units on Oahu in the Year 2000 amounted to about 316,000 units. Total employment on Oahu in the Year 2000 is estimated at about 499,300.

[3] Includes some eating and drinking establishments associated with hotel operations.

TABLE 3-2
POPULATION BY TAA FOR OAHU (YEAR 2000 AND FORECAST YEAR 2030)

Transportation Analysis Area (TAA)	Population		Population Change (Year 2000 to Year 2030)	
	Year 2000	Year 2030 Forecast	Difference	Percentage Difference
1. Ward-Chinatown	9,900	17,700	7,800	78.8%
2. Kakaako	7,500	33,800	26,300	350.7%
3. Punchbowl-Sheridan-Date	72,000	87,100	15,100	21.0%
4. Waikiki	19,700	24,000	4,300	21.8%
5. Kahala-Tantalus	74,100	78,000	3,900	5.3%
6. Pauoa-Kalihi	78,200	83,200	5,000	6.4%
7. Iwilei-Mapunapuna-Airport	15,200	19,700	4,500	29.6%
8. Hickam-Pearl Harbor	18,900	21,000	2,100	11.1%
9. Moanalua-Halawa	55,100	56,000	900	1.6%
10. Aiea-Pearl City	68,700	68,500	-200	-0.3%
11. Honouliuli-Ewa Beach	43,500	97,100	53,600	123.2%
12. Kapolei-Ko Olina-Kalaeloa	11,800	62,100	50,300	426.3%
13. Makakilo-Makaiwa	13,300	25,800	12,500	94.0%
14. Waipahu-Waikele-Kunia	52,100	61,300	9,200	17.7%
15. Waiawa-Koa Ridge	12,000	40,400	28,400	236.7%
16. Mililani-Melemanu-Kipapa	47,900	52,800	4,900	10.2%
17. Wahiawa-Whitmore-Schofield	36,200	35,100	-1,100	-3.0%
18. East Honolulu	46,700	51,100	4,400	9.4%
19. Kaneohe-Kahaluu-Kualoa	54,400	53,600	-800	-1.5%
20. Kailua-Mokapu-Waimanalo	63,600	61,800	-1,800	-2.8%
21. Koolauloa	14,500	16,700	2,200	15.2%
22 North Shore	18,400	20,000	1,600	8.7%
23. Waianae Coast	42,300	50,600	8,300	19.6%
Total	**876,200**	**1,117,300**	**241,100**	**27.5%**

Note: Individual TAA numbers may not sum to totals due to rounding.

TABLE 3-3
EMPLOYMENT BY TAA FOR OAHU (YEAR 2000 AND FORECAST YEAR 2030)

Transportation Analysis Area (TAA)	Employment		Employment Change (Year 2000 to Year 2030)	
	Year 2000	Year 2030 Forecast	Difference	Percentage Difference
1. Ward-Chinatown	55,700	61,200	5,500	9.9%
2. Kakaako	30,400	46,100	15,700	51.6%
3. Punchbowl-Sheridan-Date	47,000	60,500	13,500	28.7%
4. Waikiki	35,600	43,200	7,600	21.3%
5. Kahala-Tantalus	34,500	40,700	6,200	18.0%
6. Pauoa-Kalihi	19,100	23,900	4,800	25.1%
7. Iwilei-Mapunapuna-Airport	70,200	73,200	3,000	4.3%
8. Hickam-Pearl Harbor	25,000	25,900	900	3.6%
9. Moanalua-Halawa	29,800	31,000	1,200	4.0%
10. Aiea-Pearl City	21,200	24,100	2,900	13.7%
11. Honouliuli-Ewa Beach	7,700	15,400	7,700	100.0%
12. Kapolei-Ko Olina-Kalaeloa	9,800	42,900	33,100	337.8%
13. Makakilo-Makaiwa	1,300	7,100	5,800	446.2%
14. Waipahu-Waikele-Kunia	12,500	21,500	9,000	72.0%
15. Waiawa-Koa Ridge	2,900	12,400	9,500	327.6%
16. Mililani-Melemanu-Kipapa	10,900	15,300	4,400	40.4%
17. Wahiawa-Whitmore-Schofield	22,500	23,100	600	2.7%
18. East Honolulu	7,600	7,000	-600	-7.9%
19. Kaneohe-Kahaluu-Kualoa	12,600	13,100	500	4.0%
20. Kailua-Mokapu-Waimanalo	25,000	24,500	-500	-2.0%
21. Koolauloa	5,900	6,800	900	15.3%
22 North Shore	4,600	4,100	-500	-10.9%
23. Waianae Coast	7,600	9,700	2,100	27.6%
Total	**499,300**	**632,900**	**133,600**	**26.8%**

Note: Individual TAA numbers may not sum to totals due to rounding.

TABLE 3-4
EMPLOYMENT BY CATEGORY FOR OAHU (YEAR 2000 AND FORECAST YEAR 2030)

Employment Category	Year 2000	Forecast Year 2030	Difference	Percentage Difference
Armed Forces	40,400	40,400	0	0.0%
Public Administration	35,000	41,300	6,300	18.0%
Hotel	16,600	19,500	2,900	17.5%
Agriculture	4,700	5,400	700	14.9%
Transportation/Communications/Utilities	40,200	50,000	9,800	24.4%
Industrial	31,000	34,700	3,700	11.9%
Finance/Insurance/Real Estate	32,700	42,300	9,600	29.4%
Service	182,500	252,800	70,300	38.5%
Retail	93,100	119,100	26,000	27.9%
Construction	23,100	27,500	4,400	19.0%
Total Employment	**499,300**	**632,900**	**133,600**	**26.8%**

Note: Individual categories may not sum to totals dues to rounding

TABLE 3-5
VISITOR UNITS FOR OAHU (YEAR 2000 AND FORECAST YEAR 2030)

Category	Year 2000	Forecast Year 2030	Difference	Percentage Difference
Visitor Units	36,300	50,700	14,400	39.7%

The island of Oahu is a popular tourist destination and this is borne out by the number of hotel rooms on the island. There were an estimated 36,300 visitor units on Oahu in Year 2000, with over 85% of these located in Waikiki.

3.2.2 Year 2030 Socioeconomic Forecasts

The City and County of Honolulu's *General Plan* includes policies to promote continued development of the Primary Urban Center (PUC) and to encourage residential development and employment growth within the designated Secondary Urban Center in Kapolei, and the Ewa and Central Oahu urban-fringe areas to relieve pressures on the rest of the island. In the remaining rural areas of the island, the intent is to "keep the country country."

In light of these policies, Figure 3-2 graphically illustrates the amount of future growth in residential development and employment expected in each of the eight DPAs on Oahu.

According to State of Hawaii forecasts, islandwide population is projected to increase from about 876,000 residents in 2000 to 1,117,000 residents in 2030, an increase of 28% (about 1% per year). Islandwide employment is projected to increase from almost 500,000 jobs in 2000 to about 633,000 jobs in 2030, about 27%.

The highest levels of growth are projected for the PUC, Ewa, and Central Oahu DPAs. Of the 240,000 new residents and 133,000 new jobs expected on Oahu by 2030, about 80% will be located in the PUC and Ewa.

According to City and County of Honolulu forecasts, the PUC is projected to increase by about 70,000 residents, or 17%, between 2000 and 2030. Population in the Ewa DPA is projected to increase by 116,000 residents, more than double the number of Ewa residents in the Year 2000. The Central Oahu area is projected to experience an increase in population of about 28%.

The PUC is the employment center for the island, with about 75% of jobs currently located there. Future employment in the PUC is projected to increase by about 17%, or 62,000 jobs. Additionally, by 2030, jobs in the Ewa DPA are projected to increase by about 46,000, almost 250%.

Approximately 72% of the growth in employment between 2000 and 2030 is projected to be in the retail and service sectors (with service being almost 53%). In terms of growth rate, it can be seen in Table 3-4 that the service and finance/insurance/real estate sectors are projected to grow at the fastest rate.

Table 3-5 shows the projections for visitor units for the Year 2030. As indicated in the table, visitor units are projected to increase by approximately 40% islandwide, from about 36,000 in 2000 to 51,000 in 2030.

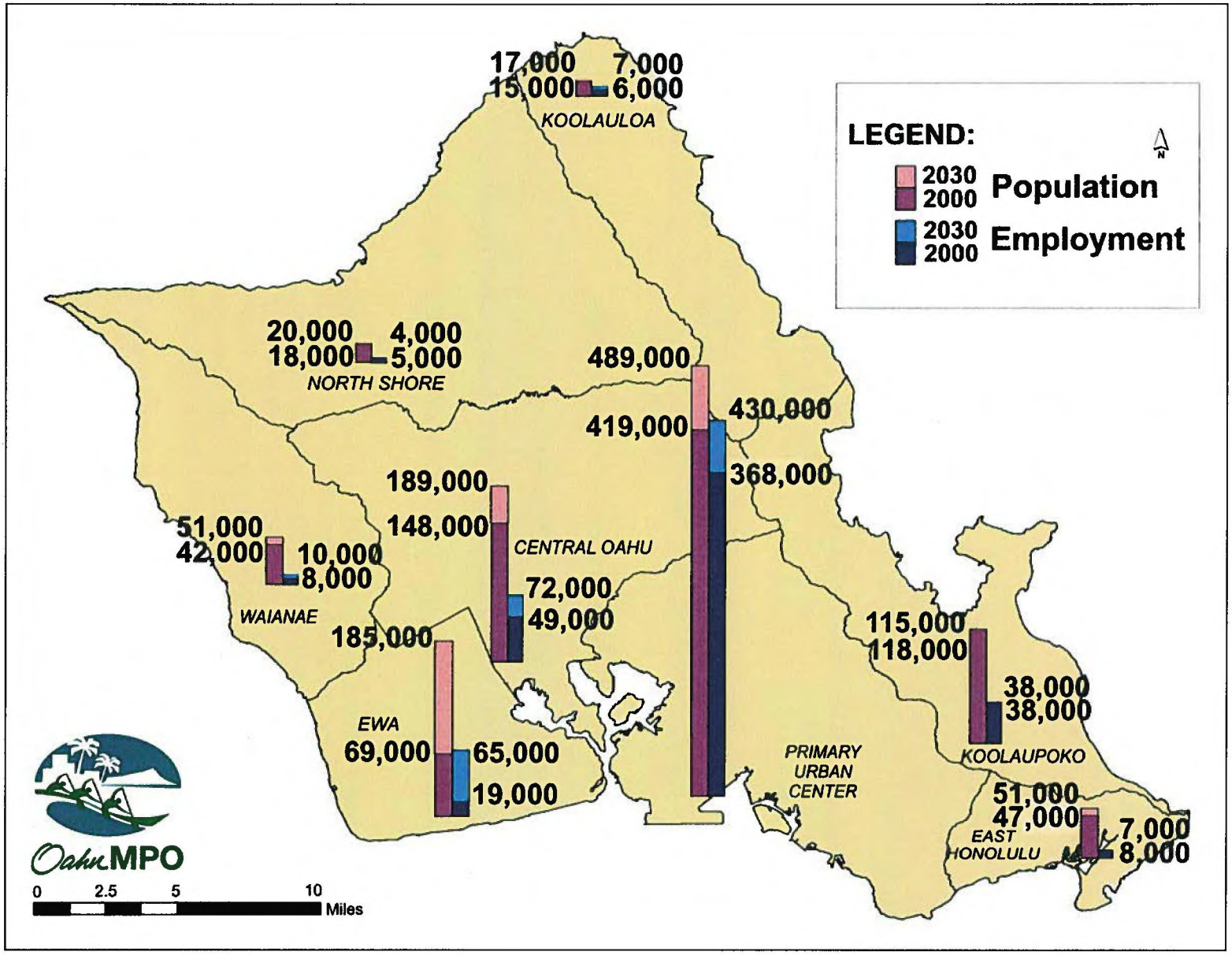


FIGURE 3-2: POPULATION AND EMPLOYMENT GROWTH BY DEVELOPMENT PLAN AREA

3.3 EXISTING TRANSPORTATION SYSTEM

3.3.1 Existing Street and Highway System

Freeways, highways, and streets are basic transportation network elements responsible for the movements of people and goods on Oahu. The transportation network is used by all types of vehicles, public and private transit services, bicycles, and pedestrians. The roadway system on Oahu is maintained by HDOT and the City and County of Honolulu DTS.

State Highway System

The State highway system includes all freeways and major highways connecting various parts of the island. The following description provides background information of State highways maintained by HDOT. The State highway system is illustrated in Figure 3-3.

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

Access to the interstate 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. There are 54.9 route miles on the State freeway system, which consists of 347.37 lane miles. The interstate facilities include:

- Interstate H-1 between Campbell Industrial Park and Waialae
- Interstate H-2 between Wahiawa and Waipahu
- Interstate H-3 between Halawa and Kaneohe Marine Corps Base Hawaii
- Moanalua Freeway connecting H-1 and Kamehameha Highway in Aiea with Middle Street

Highways. Highways 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. Unlike the interstate system, highways are not fully grade-separated roadways. Rather, highways are major surface streets and expressways. Local traffic 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. There are a total of 280.35 route miles of State highways consisting of 935.56 lane miles, including the freeway system. These facilities include the following:

- Pali Highway and Likelike Highway connect the PUC with Kaneohe and Kailua across the Koolau Mountains.
- Kalanianaole Highway serves travel between Kahala and Hawaii Kai continuing through Kailua to Castle Junction.

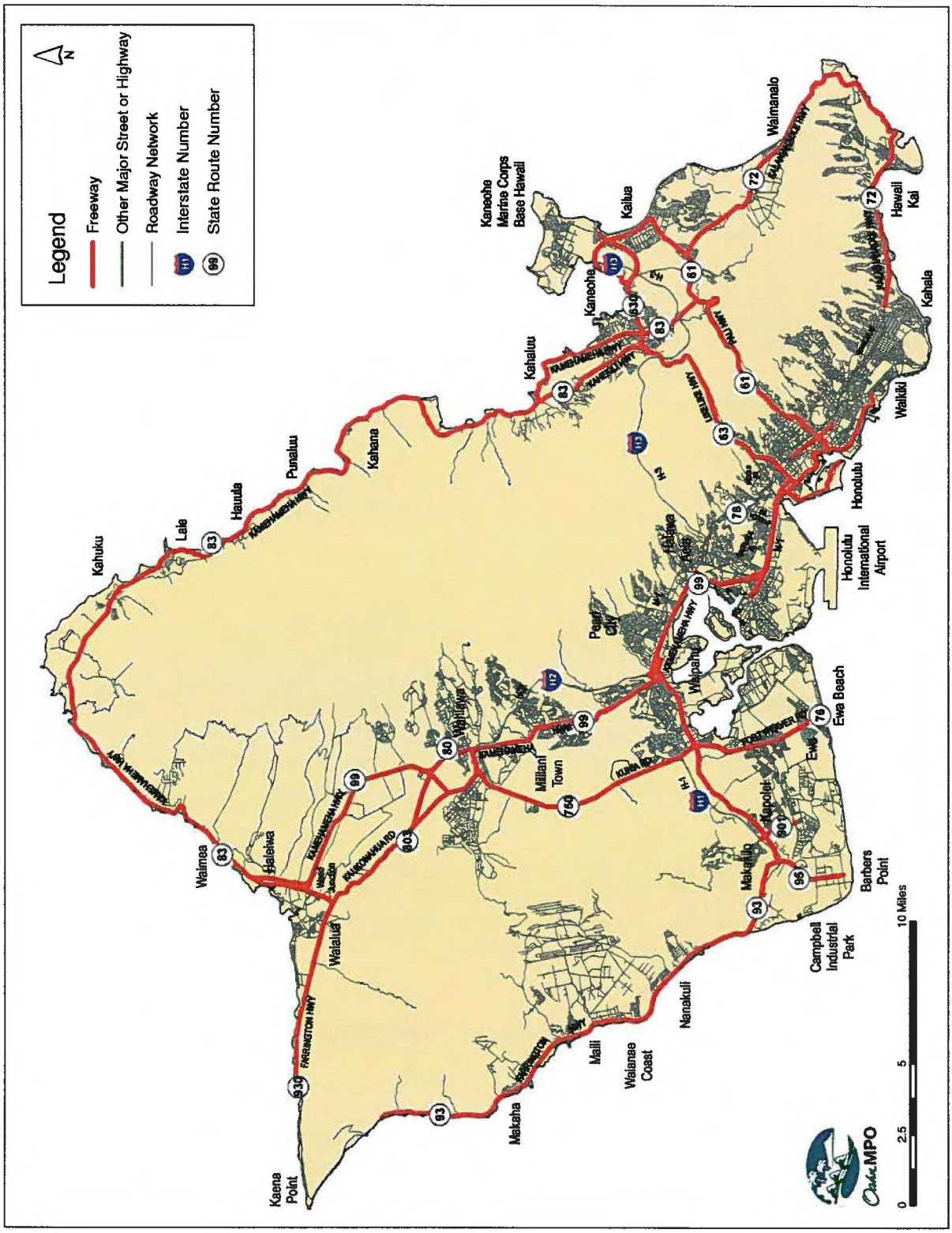


FIGURE 3-3: INTERSTATE AND STATE HIGHWAY SYSTEM

- Farrington Highway serves Waipahu and the Waianae Coast.

- Kamehameha Highway 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) connects Kamehameha Highway east of Weed Circle to Kamehameha Highway north of Haleiwa Beach Park.

City and County System

The City and County of Honolulu's street system consists of those arterial facilities that are not in the State system, plus local streets. Principal Ewa/Koko Head arteries located in the PUC are highlighted in Figure 3-4 and include the following:

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

The main mauka/makai roadways in the PUC are:

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

Portions of some of the roadways listed above are not always under the sole jurisdiction of the City and County. For example, McCully Street is listed as being under the sole jurisdiction of the City. However, a portion of McCully Street, Mauka of Beretania Street, is under the jurisdiction of the State Department of Transportation.

3.3.2 Transportation Demand Management and Transportation Systems Management

TDM is a general term referencing a variety of strategies to reduce highway travel demand. TSM has a basic objective of creating a more efficient use of transportation facilities by improving the operation and management of vehicles and roads. Examples of TDM/TSM measures specific to the island of Oahu include contraflow operations, special shoulder lanes, HOV lanes, and ITS; these measures are overseen either by HDOT or the City and County of Honolulu. The following sections discuss TDM/TSM measures that are currently in operation on the Oahu highway and street system.

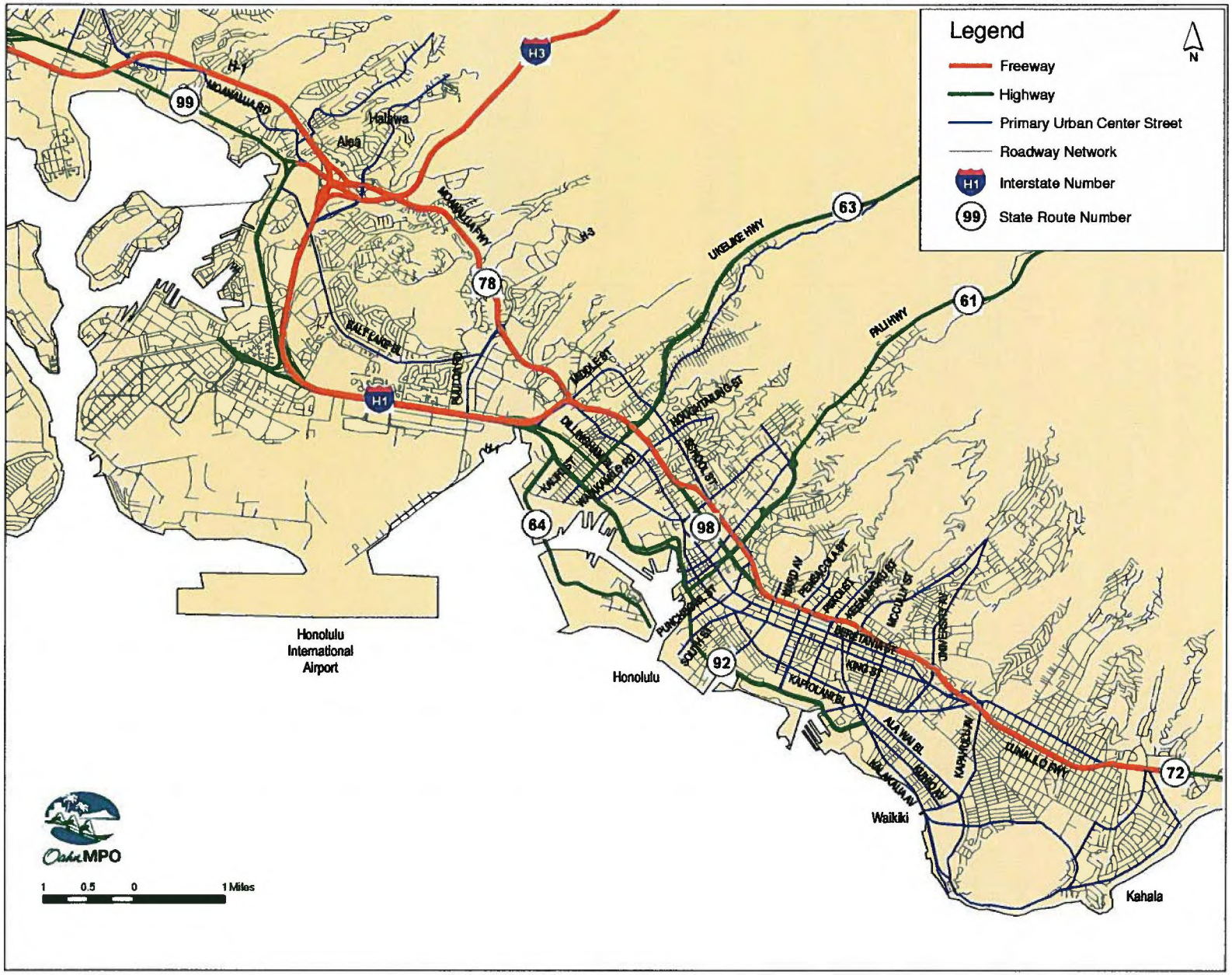


FIGURE 3-4: EXISTING STREET SYSTEM IN PRIMARY URBAN CENTER

Contraflow and HOV Operations

State Contraflow 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 directions are imbalanced, a lane can be removed from the off-peak direction of travel.

HDOT currently provides contraflow operations at four locations within the State highway system during specific peak periods. Contraflow facilities operated by the State are restricted to buses, vanpools, and vehicles with two or more occupants (except where noted). The reversible lanes on the State highway system all operate during the morning peak period only, although the precise hours of operation vary. State facilities currently operating with reversible contraflow lane operations include:

- H-1 Zipper Lane - The contraflow zipper lane provides a seventh Koko Head (eastbound) direction lane from Managers Drive in Waipahu to the Pearl Harbor Interchange during the morning peak period for HOV use only.

- H-1 Shoulder Express Lane - Provides an eastbound contraflow lane between the Pearl Harbor Interchange and the Keehi Interchange in the morning peak period for HOV use only.

- Nimitz Highway (Route 92) - During the morning peak period, there is an eastbound contraflow lane between the Keehi Interchange and Industrial Parkway for HOV use only.

- Kalanianaole Highway (Route 72) - During the morning peak period, there is a westbound contraflow lane between West Halemaumau Street and Ainakoa Avenue for HOV use only.

City and County Contraflow Operations. The City and County of Honolulu also operates contraflow operations along congested corridors during specific peak periods. Lanes are delineated to allow reversible operation and contraflow operates in the opposite direction. Unlike HDOT contraflow operations, the City and County facilities do not have occupancy restrictions. City and County locations with reversible lane operations include:

- Kapiolani Boulevard - One eastbound lane is reversed during the morning peak period to provide a fourth westbound travel lane from the H-1 Freeway near South King Street to Ewa of Ward Avenue.

- Ward Avenue - A mauka-direction lane is reversed to provide a third makai-direction travel lane between Lunalilo Street to makai of 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 operates during the morning peak period only in the eastbound direction.

- Waialae Avenue - During the afternoon peak period, one Ewa-bound lane is reversed to provide an additional Koko Head 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 northbound direction.

State High Occupancy Vehicle Operations. HOV lanes are freeway or surface street lanes that are designated for exclusive use by buses, carpools, 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 since the travel time is reduced on such exclusive ROW. As more people rideshare, the people-carrying capacity of the street system increases. With the exception of the H-1 Zipper Lane and Shoulder Express Lane (which requires three or more occupants from 5:30 to 7:00 a.m.), a vehicle must have two or more occupants in order to travel in the HOV lanes at the locations listed below:

- Interstate H-1 - Provides an eastbound HOV lane for nine miles between Waiawa Interchange and Keehi Interchange during the morning peak period. Provides a westbound HOV lane for eight miles between Keehi Interchange and the vicinity of Lehua Avenue during the afternoon peak period.

- Interstate H-2 - Provides northbound and southbound HOV lanes between Mililani Interchange and Waipio Interchange and between Waipio Interchange and Waiawa Interchange. These lanes operate in the morning peak period and the afternoon peak period.

- Moanalua Road (Route 78) - Provides an eastbound HOV lane between Halawa Interchange and Puuloa Road. This lane operates in the morning peak period and in the afternoon peak period.

- H-1 Zipper Lane and Shoulder Express Lane - Described above. These contraflow facilities are for HOV use only.

- Nimitz Highway (Route 92) - Described above. This contraflow facility is for HOV use only.

- Kalanianaole 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 Lane - Interstate H-1 has an eastbound shoulder lane between Kunia Interchange and Paiwa Interchange, between Waiawa Interchange and Waiau Interchange, and between Waiau Interchange and Halawa Interchange. This lane operates in the morning peak period and prohibits trucks and buses.

Intelligent Transportation Systems/Centralized Signal Control Systems

ITS uses new 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 range of different technologies applied to different elements of the transportation system, such as incident management, transit vehicle tracking, emergency services, etc.

A widely used application of ITS is in the area of 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 network by multiple 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 backbone of an ITS is communication and surveillance.

Existing System. 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.

The HDOT also operates a Traffic Management Center (TMC); the TMC provides live surveillance much like DTS's TCC. The difference lies within the facilities monitored by each center. The TMC monitors the State interstate and highway system.

The following describes the ITS infrastructure currently available on Oahu:

- 750 signalized intersections on Oahu.
- 400 signalized intersections controlled by the City's TCC.
- 196 CCTVs on Oahu: 135 controlled by the City's TCC and 61 controlled by the State's TMC.

Planned System. Long-term ITS initiatives, as indicated in *Oahu Regional ITS Plan: Intelligent Transportation Systems Architecture & Integration Strategy - An Element of the Oahu Regional Transportation Plan* (Parsons Brinckerhoff; April 2003), include expansion of the ITS infrastructure and the continued integration of other public agencies, both emergency and non-emergency. As the infrastructure is expanded and upgraded, system capabilities and interagency cooperation will be improved.

3.3.3 Existing Public Transit System

Public transportation 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, air and noise pollution, and energy consumption. Public transit also offers mobility options to the elderly, the physically and mobility challenged, and persons who do not have access to an automobile.

Transit Services

TheBus. Oahu Transit Services, Inc. (OTS) is a private management company formed solely to oversee and administer the daily operations of the City's bus system (TheBus) and TheHandi-Van system on the island of Oahu. OTS is under contract to the City and County of Honolulu. TheBus system provides mainly a fixed-route service but also provides public transit service for special events such as University of Hawaii football games. Since August 2000, TheBus route network has adopted a hub-and-spoke pattern with the intent of improving accessibility, increasing ridership, providing an enhanced level of service, and serving increasing number of trips to destinations other than the PUC.

The hub-and-spoke network is designed to provide better service within communities while connecting neighborhoods to major activity centers, both as destinations and as transfer points. Components of the hub-and-spoke system include community and urban trunk routes, community and urban circulators, and express services and transfer points between them. The following describes the components comprising the hub-and-spoke system:

- Community and Urban Trunk Routes - Trunk routes form spokes in the hub-and-spoke system and facilitate hub-to-hub connections. They are designed to provide direct multi-stop connections between activity hubs such as transit centers and the PUC and suburban areas of the island. Community trunk routes primarily service the neighborhoods outside of the PUC and offer circulation between other suburban neighborhoods; a headway range of 10 to 60 minutes are typical during the combined peak periods. Urban trunk routes provide service within the PUC along the Ewa/ Diamond Head arterials; combined peak period headway ranges of six to 40 minutes are typical.

- Community and Urban Circulators - Circulator routes also form spokes in the hub-and-spoke system and radiate from the hubs and provide local neighborhood service. Specifically, local access is provided to the transit system and short-range neighborhood circulation is promoted. The community circulator serves suburban neighborhoods without direct access to community trunk routes; the combined peak hour headway range of 20 to 60 minutes is typical. Urban circulators serve neighborhoods within the PUC not directly served by urban trunk routes; a combined peak hour headway range of 10 to 60 minutes is not uncommon.

- Express Services - Express bus services also form spokes of the hub-and-spoke system and direct non-stop hub-to-hub connections are facilitated by the express services. Typically, connections are made between outlying suburban neighborhoods and the activity hubs found within the PUC. Express bus services are typically in operation during the peak periods and offer headways ranging from three to 60 minutes.

- Limited Stop Routes – Limited stop services Routes A, B & C also form spokes within the hub-and-spoke system and direct hub-to-hub connections are facilitated by these routes. The routes generally provide limited stop service from the Waianae, Waipahu, and Kalihi areas into the activity and transit hubs found within the PUC and Waikiki. The limited stop routes operate throughout the day and offer headways of up to 30 minutes.

TheBus system provides 93 numbered buses serving urban, suburban, and rural areas throughout Oahu. TheBus has a fleet of 525 buses and approximately 4,200 bus stops on the

island. TheBus system carries approximately 68 million passengers traveling approximately 21.5 million miles per year.

TheHandi-Van. 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 ADA. TheHandi-Van is not a fixed-route service, although the areas serviced are similar to those serviced by TheBus. TheHandi-Van fleet consists of 106 vehicles that include different types of vans and provides service to over 13,000 eligible customers, performing over 630,000 trips annually. The days and hours of operation are the same as those of TheBus. Fares are $2 one-way and advance reservations are required. Costs for the TheHandi-Van operations are included in the City's operations and maintenance budget.

LOTMA Commuter Express. The Leeward Oahu Transportation Management Association (LOTMA) offers the LOTMA Commuter Express, a private commuter bus service. The LOTMA Commuter Express provides non-stop freeway express lane service between Central Oahu and Honolulu as an alternative to solo driving. The Commuter Express operates five days a week, traveling inbound to Honolulu during the morning peak period and outbound to Central Oahu during the evening peak period. This is a subscription-based service with financial support by local companies. Additionally, LOTMA offers carpooling and vanpooling programs, computerized ridematching assistance, and an emergency ride home program.

HDOT Vanpool Program. HDOT currently operates a vanpool program, Vanpool Hawaii, through an outside contractor, VPSI, Inc. A vanpool is a group of four to 15 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 November 2003, there were 119 vanpools in operation on Oahu. This program offers the option of a full size 15-passenger van at the cost of $55 per seat per month (Vanpool) or a seven-passenger minivan or Sport Utility Vehicle at the cost of $70 per seat per month (Cool Pool). All riders share the vehicle's fuel and parking costs, regardless of the vanpool option.

Transit Centers

Transit centers are points within TheBus' hub-and-spoke system; they offer locations for multimodal transfer and are intended to support the bus transit systems as well as alternate travel means. Currently on Oahu there are two existing transit centers with three in the plan, design, or construction phases:

Existing Transit Centers

- Waipahu Transit Center in Waipahu, located at Hikimoe Street near the Waipahu Library
- Kapolei Transit Center in Kapolei, located at Kamokila Boulevard near the Kapolei Post Office
- Middle Street Intermodal Transit Center, located on Middle Street between Kamehameha Highway and North King Street

Proposed Transit Centers

- Mililani Transit Center in Mililani, located on Meheula Parkway near the Town Center of Mililani
- Wahiawa Transit Center in Wahiawa, located on California Avenue near the Civic Center
- Waianae Transit Center in Waianae, located on Leihoku Street near the Waianae Mall

Park and Ride

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 transfers to other travel means are facilitated. Physical amenities generally include parking stalls, bike racks, and designated bus waiting areas. Typical users include commuters driving to the park and ride facility, parking their vehicle, and using either transit or a vanpool to complete the journey. Other users include "kiss and ride" riders who are dropped-off/picked-up at the park and ride lot. The four existing park and ride facilities on Oahu are listed below:

- Hawaii Kai Park & Ride in Hawaii Kai, located on Keahole Street near the Hawaii Kai Towne Center
- Mililani Park & Ride in Mililani Mauka, located on Ukuwai Street near the Mililani-Mauka District Park
- Wahiawa Park & Ride in Wahiawa, located in Leilehua Golf Course Road near the Wahiawa Armory
- Royal Kunia Park & Ride in Waipahu, located on Kupuna Loop near the Kunia Interchange

3.3.4 Existing and Planned Bikeway System

The bikeway system provides residents as well as tourists an inexpensive and convenient means of getting around Oahu for either recreation or commuting purposes. With the continued dependence on the automobile and increasing congestion found on the street system, the development and promotion of alternative travel means is important to the island of Oahu. There are three primary facility types that provide 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. Shared roadways may have signs designating the 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 to each.

- 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.

Existing Bikeway System

Figure 3-5 illustrates the locations of existing and planned bikeway facilities on the island. As of 2003, approximately 208 miles of bikeway facilities are available statewide; Oahu is home to 98.0 miles of these bikeways or 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 summarizes the bikeway facilities that are currently available on Oahu:

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

Planned Bikeway System

Plans to expand the bikeway system on Oahu are underway and are largely driven by *Bike Plan Hawaii* (2003) and *Honolulu Bicycle Master Plan* (Department of Transportation Services, City & County of Honolulu, April 1999). The following describes the bikeway expansion underway since publication of *Bike Plan Hawaii*:

- 18.8 miles of shared roadways
- 4.6 miles of bike lanes
- 14.3 miles of shared use paths

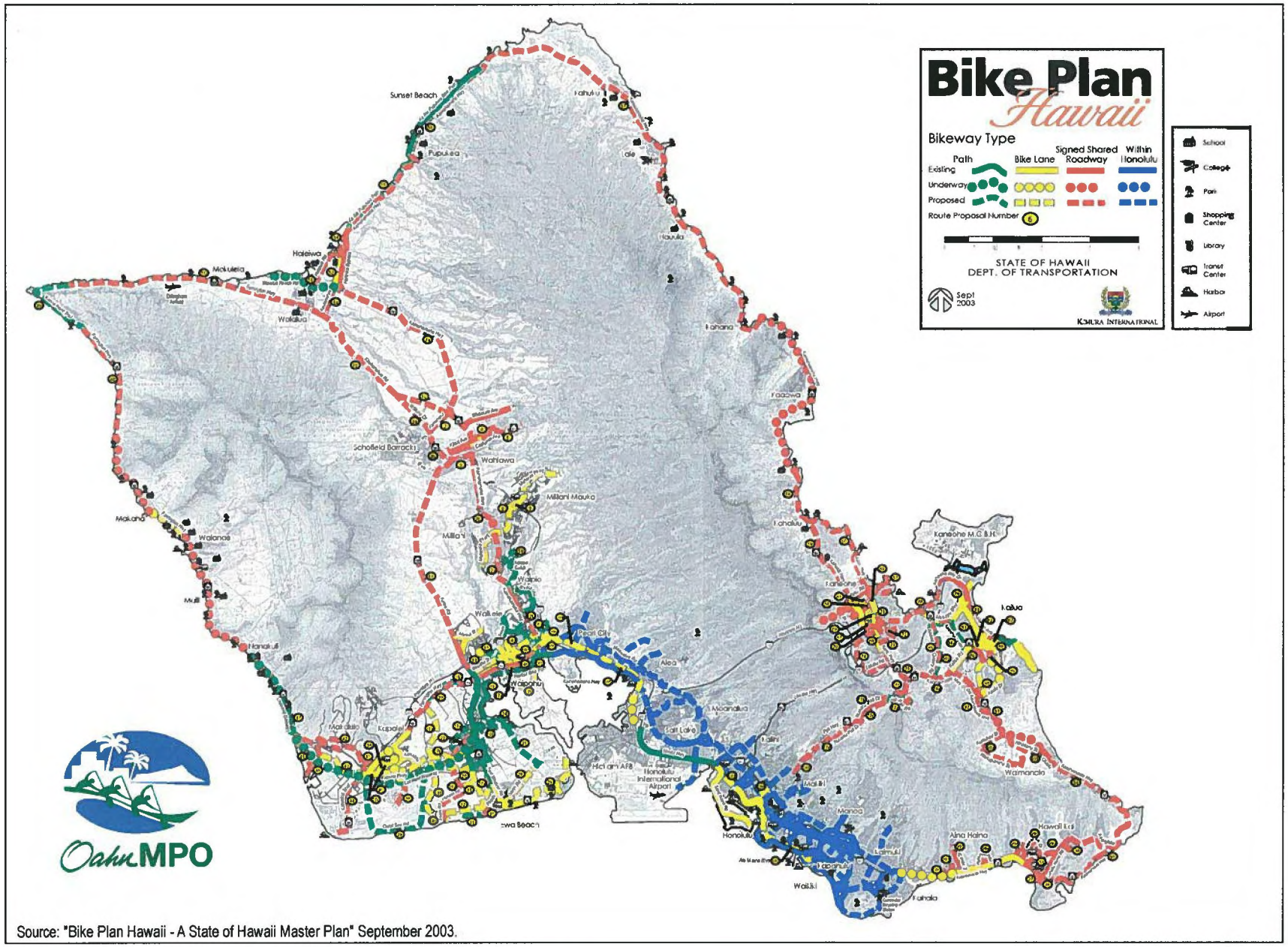
The following includes bikeway expansion projects as proposed in both *Bike Plan Hawaii* and *Honolulu Bicycle Master Plan*:

- 171.8 miles of shared roadways
- 49.7 miles of bike lanes
- 37.4 miles of shared use paths

These bikeway expansion projects could increase the bikeway facilities on Oahu to 394.6 total miles upon completion.

3.4 IDENTIFICATION OF BASELINE IMPROVEMENT PROJECTS

Transportation improvement projects that were identified as baseline improvements to be considered part of the 2030 baseline transportation conditions were added to the existing



Source: "Bike Plan Hawaii - A State of Hawaii Master Plan" September 2003.

FIGURE 3-5: BIKEWAY SYSTEM MAP

transportation network to serve as the starting point for development of the ORTP. Baseline projects are those assumed to have a high degree of certainty of being implemented by 2030 and were incorporated into the baseline 2030 travel demand model forecasts. The baseline transportation improvements were included in the final plan without being part of the project selection process.

It was important to ensure that the baseline improvement list was conservative, including only those projects for which there is a high degree of commitment and a high probability that the project will be implemented. The conservative baseline improvement provided maximum flexibility and credibility to the development of the ORTP.

3.4.1 Baseline Criteria

The following criteria were used for identification of baseline transportation improvement projects as part of the ORTP 2030 update:

- Project must be programmed for construction within the first two years (e.g., 2004 and/or 2005) of the fiscal years (FYs) 2004-2006 TIP, as amended.

  Projects programmed in the TIP for other phases (e.g., planning, design, ROW, etc.) or programmed for construction in the third year of the TIP were not considered for inclusion in the 2030 baseline. They were, however, considered as potential transportation improvement projects in subsequent stages of the ORTP 2030 update process.

- Project must be performance-enhancing (e.g., system expansion/capacity enhancing) at a regional scale.

  Projects in the TIP relating to safety and maintenance/operation of existing facilities (e.g., resurfacing, rehabilitation, bridge replacement, bus fleet replacement or maintenance, traffic control center operations, etc.) were not specifically included on the 2030 baseline improvement list since ongoing maintenance/operating costs were considered separately in the financial analysis for the ORTP 2030. Only those projects that are of appropriate scale for inclusion in the regional plan were included in the baseline list.

3.4.2 Baseline Network for ORTP 2030

As a result of the process described above, ten projects were determined to satisfy the criteria to qualify as baseline improvement projects for the ORTP 2030. These projects are listed in Table 3-6 and their model coding can be found in Appendix F. Also listed in the table are the total estimated costs of the projects listed in year 2005 dollars. The ten baseline projects listed in Table 3-6 were programmed for construction within the first two years of the FYs 2004-2006 TIP. Therefore it was not necessary to set aside a portion of the future revenue projections for years 2006 though 2030 funding the ORTP 2030 to fund the baseline projects.

TABLE 3-6
BASELINE PROJECT LIST

FYs 2004 - 2006 TIP Reference Number	Project Title	Project Description	Total Estimated Project Cost (Year 2005 $m)
S7	Fort Weaver Road Widening, Vicinity of Aawa Street to Geiger Road	Widen the roadway to six lanes. Improvements include turning lanes, traffic signal modifications, and additional highway lighting.	45.9
S8	Freeway Management System, Interstate H-1, H-2, and Moanalua Freeway	Construct a freeway management system, including intelligent transportation systems (ITS) technologies and interagency coordination to monitor and manage traffic operations.	16.8
S11	Interstate Route H-1, AM Contraflow Lane, Pearl Harbor Interchange to Keehi Interchange, AM Zipper Lane Extension	Extend the AM zipper lane from the vicinity of Radford Drive Overpass to Kalihi Stream.	11.0
S41	Kamehameha Highway Bikeway, Radford Drive to Arizona Memorial	Construct a bikeway, including drainage improvements, markings, signing, and Americans with Disabilities Act improvements.	2.5
S74	North/South Road, Kapolei Parkway to Vicinity of Interstate Route H-1	Construct a three-lane roadway from Kapolei Parkway to Interstate Route H-1.	122.0
C2	Computerized Traffic Control System	Upgrade and expand fiberoptic lines, CCTV cameras, data collection, and signal control in urban center and outlying areas for connectivity to the Traffic Control Center.	6.6
C18	Kamokila Boulevard Extension	Plan, design and construct an extension of Kamokila Boulevard from Franklin D. Roosevelt Avenue in Kapolei.	7.5
C7	Salt Lake Boulevard Widening, Phase 2B	Complete Salt Lake Boulevard Widening project, from Maluna Street to Ala Lilikoi Street.	1.5
C23	E-Transit Project	Implement constructed portion of the 5.6 mile Iwilei to Waikiki Bus Rapid Transit "E-Transit" segment. E-Transit includes: (1) purchase of 10 hybrid electric 60-foot buses (to replace 10 40-foot diesel buses); (2) construction of 20 boarding platforms, 5	27.8
C24	Dillingham Boulevard Transit Improvements	Construct 7 new bus pullouts on Dillingham Blvd. between Puuhale Road and North King Street, including ADA compliance, utility adjustments, driveway adjustments and landscaping. Project will enhance the transit service and improve traffic flow in the majo	4.3

3.5 EXISTING AND BASELINE OPERATING CONDITIONS AND TRAVEL STATISTICS

Operating conditions and travel statistics were evaluated for existing conditions and projected Year 2030 baseline conditions for the various quantitative measures of effectiveness established for the transportation service evaluation criteria.

Existing conditions were evaluated using data either collected (e.g., traffic count data) or estimated by the OahuMPO travel demand forecasting model (TDFM) (e.g., trip generation, mode choice, and systemwide statistics). Existing model statistics were developed for Year 2000 existing conditions.

Year 2030 baseline conditions were projected using the OahuMPO TDFM assuming the population and employment growth discussed in Section 3.2. This baseline forecast also assumes that no improvements would be made to the transportation system other than the baseline improvement projects identified in Section 3.4.

The OahuMPO travel demand forecasting model consists of networks that represent the roadway and transit system. The model produces estimates of vehicular travel on the simulated highway and person travel on the transit network through the typical four-stage modeling process of trip generation, trip distribution, mode choice, and trip assignment.

3.5.1 Service Effectiveness Analysis

Trip Production and Modal Choice

The Year 2000 OahuMPO model estimates that approximately 3,288,000 person trips are made on a daily basis on Oahu. As shown in Table 3-7, approximately 85% of the total daily person trips are estimated to be made by residents; of the total, 58% of the daily person trips are generated by the work commute or shopping/other trips. Visitor trips comprise the largest portion of non-resident trips at about 12% of the total.

Table 3-8 details the mode split estimates for the Year 2000 and Year 2030 baseline models. It can be seen from the table that an overall growth of approximately 886,000 daily person trips (approximately 32%) are projected to be made by residents over the 30-year period.

Of the estimated 3,675,000 total daily resident person trips in 2030, 84% are projected to be in private automobiles, 5% are projected to be made by transit, and the remaining 11% are projected to be made by bicycle/walking. The resident person trips by mode are projected to remain relatively proportional to each other over the 30-year plan time frame. Figures 3-6 and 3-7 present the modal data in pie chart form.

TABLE 3-7
EXISTING DAILY PERSON TRIPS (YEAR 2000)

Purpose of Trip	Daily Person Trips	%
Trips by Residents		
1. To and from work	906,000	27%
2. While at work	187,000	6%
3. To and from school/university	272,000	8%
4. To and from shopping/other	1,008,000	31%
5. Do not end at work or home	417,000	13%
Other Trips		
6. Trips by truck	44,000	1%
7. Ground access trips by air passengers	60,000	2%
8. Trips by visitors	394,000	12%
Total Daily Person Trips	**3,288,000**	**100%**

Source: Year 2000 OahuMPO travel demand forecasting model. Trips rounded to nearest thousand.

TABLE 3-8
MODE SPLIT ESTIMATES (YEAR 2000 AND BASELINE YEAR 2030)

Mode	Year 2000 Daily Resident Person Trips	Percentage	Baseline Year 2030 Daily Resident Person Trips	Percentage	Difference Between 2000 & 2030	Percentage Difference Between 2000 & 2030
Automobile Trips	2,344,000	84.0%	3,082,000	83.9%	738,000	31.5%
Transit Trips	160,000	5.7%	203,000	5.5%	43,000	26.9%
Bicycle and Walk Trips	285,000	10.2%	390,000	10.6%	105,000	36.8%
Total Daily Resident Person Trips	**2,789,000**	**100%**	**3,675,000**	**100%**	**886,000**	**31.8%**

Figure 3-6: Year 2000 Daily Resident Person Trips

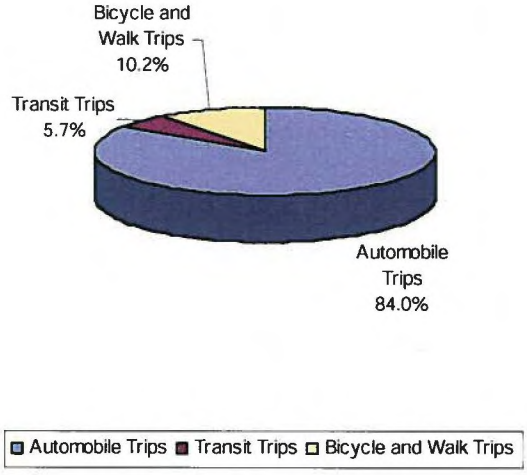
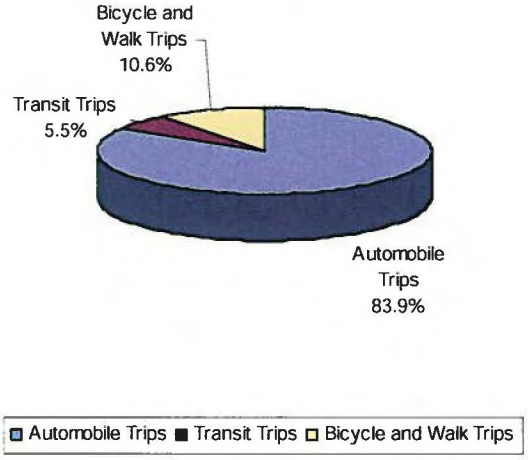


Figure 3-7: Baseline Year 2030 Daily Resident Person Trips



Transit Ridership

In general terms, transit ridership statistics reveal the effectiveness of improvements made to the transit system as a whole. The travel demand forecasting model provides estimates for both the peak (four-hour AM and PM) and off-peak (16-hour off-peak) periods amounting to a daily forecast of system ridership on Oahu.

Table 3-9 and Figure 3-8 provide a summary of ridership statistics for 2000 and 2030, including both the resident and tourist transit trips. Transit trips during the peak periods are projected to increase approximately 23% or 29,000 additional trips. Transit trips are projected to increase by 15,000 trips or almost 22% during the off-peak period. The overall net daily increase in system ridership is approximately 23% or 44,000 additional riders.

Average *Vehicle Occupancy and Ridership*

Average Vehicle Occupancy (AVO) is often used in travel demand forecasting as a measure of travel efficiency. In order to compute AVO, the total number of persons traveling in private vehicles is divided by the total number of private vehicle trips undertaken. The AVO produced by the Oahu travel demand model for Year 2000 was 1.15 rising to 1.16 for the Baseline Year 2030. This measure was computed for resident only home-based work (HBW) trips, typically when highway conditions are the most congested.

Average vehicle ridership (AVR) is another measure of travel efficiency that can be derived from the travel demand forecasts, and is often used in air quality analyses. The AVR is calculated by dividing the total person trips by total private vehicles and was again evaluated for the HBW trip purpose. AVR for the Year 2000 was calculated to be 1.36 and holding at 1.36 in the Year 2030 baseline conditions.

Vehicle Miles and Hours Traveled

Vehicle Miles Traveled (VMT) is another travel statistic measuring service effectiveness. The islandwide daily VMT is projected to increase by about 30% or 3.5 million between 2000 and 2030. Table 3-10 and Figure 3-9 show that the travel demand model forecasts VMT increases of approximately 1.6 million (32%) on the freeway system, 222,000 (15%) on expressways, 1.2 million (34%) on arterials, and 367,000 (30%) on collectors.

Vehicle Hours Traveled (VHT) is an indicator of how additional travel demand influences congestion in the system from a travel time standpoint. The travel demand model forecasts an increase in islandwide daily VHT of approximately 282,000 hours (96% overall) between 2000 and 2030. The model estimates that over three-quarters of the VHT occurs on the freeway and arterial systems, and the freeway and arterial systems are similarly projected to experience the greatest increases in VHT. Table 3-11 and Figure 3-10 present a breakdown of these results.

3.5.2 Congestion Analysis

Congestion is defined as the condition when demand for a facility exceeds a desired service capacity. Congestion can be measured through volume-to-capacity (V/C) ratio and level of service (LOS) and through travel delay.

TABLE 3-9
TRANSIT TRIPS FOR OAHU (YEAR 2000 AND BASELINE YEAR 2030)

Time Period	Year 2000	Baseline Year 2030	Difference	Percentage Difference
AM and PM Peak Periods	126,000	155,000	29,000	23.0%
Off-Peak Period	68,000	83,000	15,000	22.1%
Daily Total	**194,000**	**238,000**	**44,000**	**22.7%**

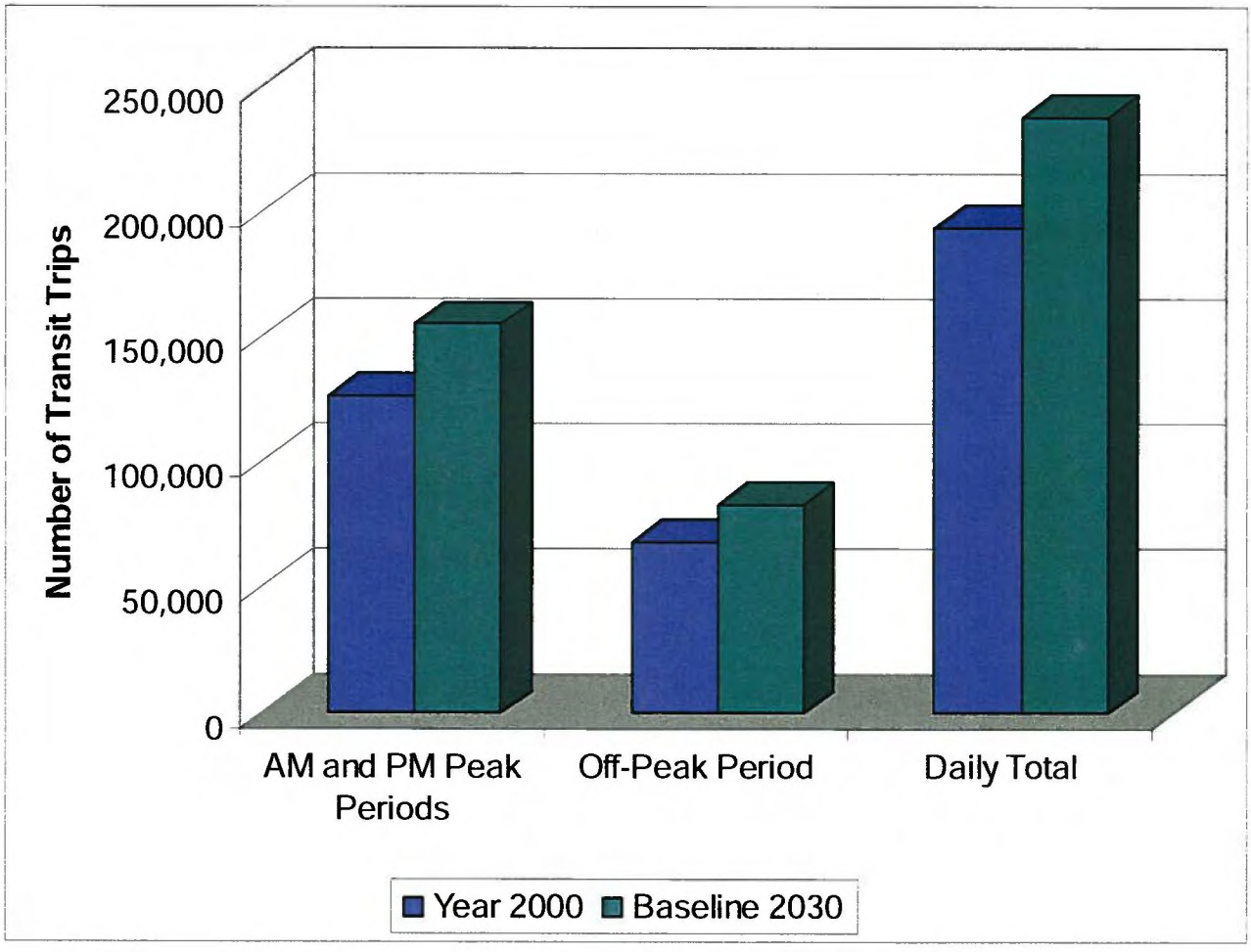


FIGURE 3-8: TRANSIT TRIPS ON OAHU

TABLE 3-10
CHANGES IN VMT ON CLASSIFIED SYSTEM (YEAR 2000 AND BASELINE YEAR 2030)

Facility Type	Daily VMT			
	Year 2000	Baseline 2030	Difference	Percentage Difference
Freeways	5,188,000	6,829,000	1,641,000	32%
Expressways	1,527,000	1,749,000	222,000	15%
Arterials	3,653,000	4,892,000	1,239,000	34%
Collectors	1,213,000	1,580,000	367,000	30%
Total	**11,581,000**	**15,050,000**	**3,469,000**	**30%**

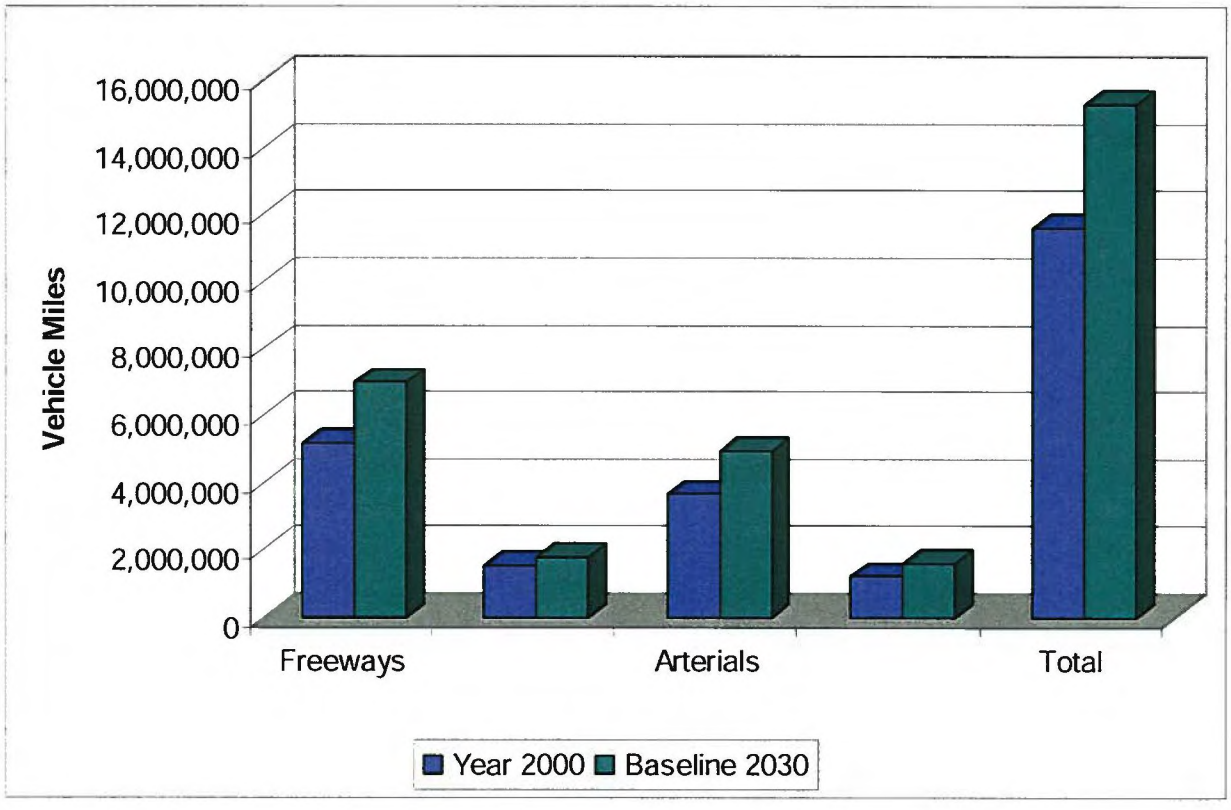


FIGURE 3-9: VEHICLE MILES TRAVELED

TABLE 3-11
CHANGES IN VHT ON CLASSIFIED SYSTEM (YEAR 2000 AND BASELINE 2030)

Facility Type	Daily VHT			
	Year 2000	Baseline 2030	Difference	Percentage Difference
Freeways	110,000	240,000	130,000	118%
Expressways	28,000	61,000	33,000	118%
Arterials	110,000	206,000	96,000	87%
Collectors	45,000	68,000	23,000	51%
Total	**293,000**	**575,000**	**282,000**	**96%**

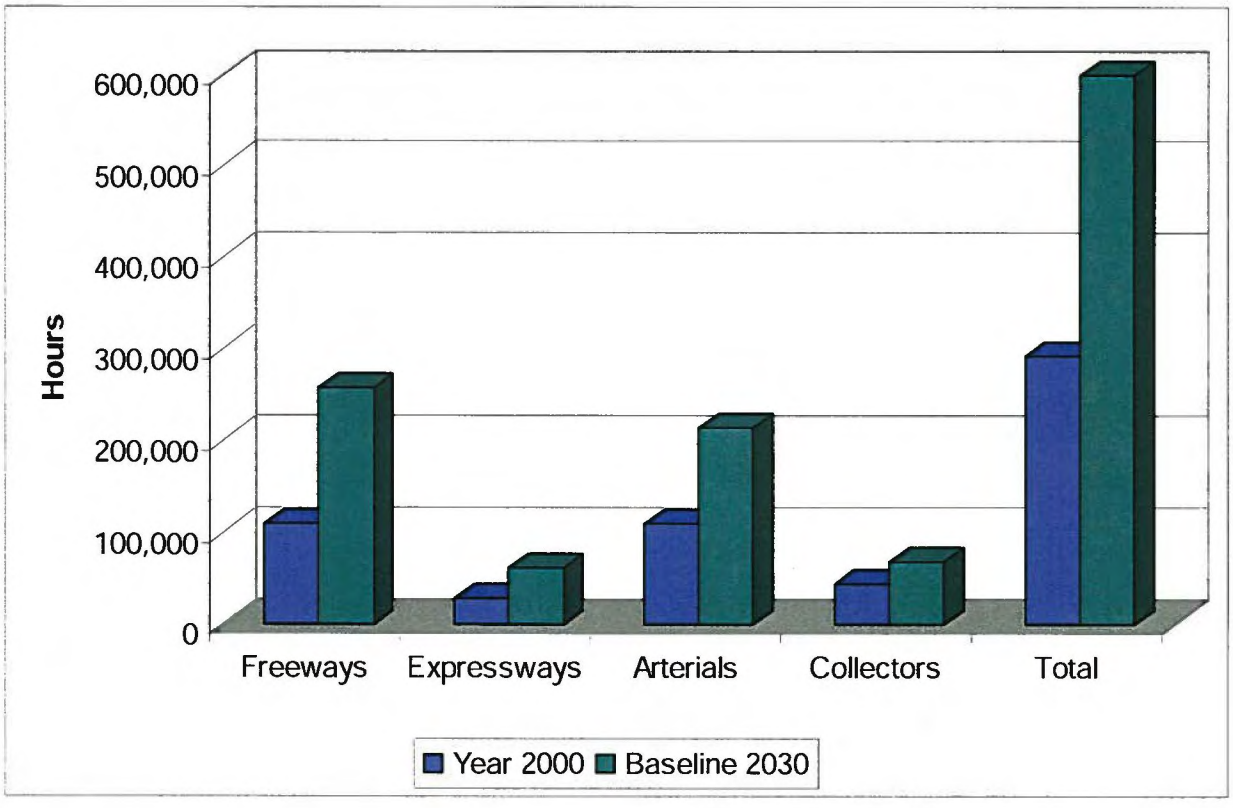


FIGURE 3-10: VEHICLE HOURS TRAVELED

Screenline Level of Service

LOS is a grading system used in transportation planning that assigns a grade to a roadway based on the V/C ratio; the grade scale is represented by the letters A through F, with LOS A representing the best conditions and LOS F representing the worst. LOS A through LOS D is generally considered an acceptable operating condition, while LOS E and LOS F are not. Descriptions of the six LOS grades are summarized in Table 3-12.

The V/C ratio represents the percent of a roadway's capacity that is being utilized. For example, a roadway with a V/C ratio of 0.85 indicates that the roadway is operating at 85% of its capacity. The key components of a roadway's V/C ratio are the volume of traffic traversing the roadway and the physical capacity of the roadway. Capacity is expressed in vehicles per hour and varies depending on the functional class, physical characteristics, and number of lanes of the facility in question. Factors affecting capacity include roadway widths, posted speed limits, gradient, degree of curvature, and area type (e.g., urban versus rural). In urban areas, capacity is heavily influenced by traffic signal spacing, green time allocation, and level of access control. The facility type and area type for each roadway link crossing the screenlines of interest were obtained from the Year 2000 baseline database of the OahuMPO model. The total capacity on each facility is computed by multiplying the capacity of a single travel lane by the number of travel lanes at the point the traffic count is measured. The resulting value represents the roadway's effective capacity.

V/C ratios and LOS were evaluated for traffic volumes on major facilities crossing 22 screenlines. These screenlines are identified in Figure 3-11. Screenlines are imaginary lines drawn across the road network at various locations around the island. The two conditions that represent the worst traffic scenarios are generally that of the AM inbound (toward the PUC) peak hour and the PM outbound (from the PUC) peak hour. Existing traffic volume data was provided by HDOT, primarily for Year 2002. Baseline 2030 conditions were assessed by extracting morning and afternoon peak period volumes from the TDFM 2030 baseline model run and then converting this data to peak hour volumes using a post processor. The volumes were then totaled for all of the individual facilities that cross each screenline, permitting an analysis of the total traffic volume that crosses the travel corridor covered by each screenline.

AM Peak Hour Level of Service. Table 3-13 summarizes the calculated V/C ratios and estimated LOS grades of each facility at each screenline for the AM peak direction. The analysis for 2030 indicates that two of the most congested screenlines are projected to be the Waikele Stream in Waipahu (Screenline 6) and the Ewa (Screenline 8). These screenlines increase to an average LOS F from B and A respectively under existing conditions with V/C ratios in excess of 1.00. Screenline 6 exhibits one of the largest projected increases in congestion in 2030, with the average V/C projected to increase from 0.67 to 1.29 in 2030. Screenline 8 in Ewa also shows a large projected increase in congestion from a V/C of 0.55 in Year 2002 to 1.23 in Year 2030. The change here is attributable to the large growth in employment and population forecast in the Ewa/Kapolei area.

Other screenlines worth noting for increases in LOS are Screenline 3 at East of Ward Avenue with a change from LOS B to LOS F (1.01), Screenline 7 at Kahe Point in the Waianae area with a change from LOS C to LOS F (1.16) and Screenlines 20 and 22 in Ainakoa and Kapolei, also showing LOS F in 2030. Figures 3-12 and 3-14 demonstrate the AM peak LOS values graphically.

TABLE 3-12
LEVEL OF SERVICE DEFINITIONS FOR ARTERIAL STREET SEGMENTS

Level of Service	Volume / Capacity Ratio	Definition
A	0.00 - 0.60	EXCELLENT. Completely freeflow conditions. Vehicle operation is virtually unaffected by presence of other vehicles. Minor disruptions are easily absorbed without causing significant delays.
B	0.61 - 0.70	VERY GOOD. Reasonably unimpeded flow, the presence of other vehicles begins to be noticeable. Disruptions are still easily absorbed, although local deterioration in LOS will be more obvious.
C	0.71 - 0.80	GOOD. The ability to maneuver and select an operating speed is clearly affected by the presence of other vehicles. Minor disruptions may be expected to cause serious local deterioration in service and queues may form behind any significant traffic disrupt
D	0.81 - 0.90	FAIR. Conditions border on unstable flow. Speed and ability to maneuver are severely restricted due to traffic congestion. Only the most minor disruptions can be absorbed without the formation of extensive queues and deterioration of service to LOS F.
E	0.91 - 1.00	POOR. Conditions become unstable. Represents operation at or near capacity. Any disruption, no matter how minor, will cause queues to form and service to deteriorate to LOS F.
F	> 1.00	FAILURE. Represents forced or breakdown flow. Operation within queues is unstable and characterized by short spurts of movement followed by stoppages.

Source: Adapted from *Highway Capacity Manual 2000* (Transportation Research Board, 2000).

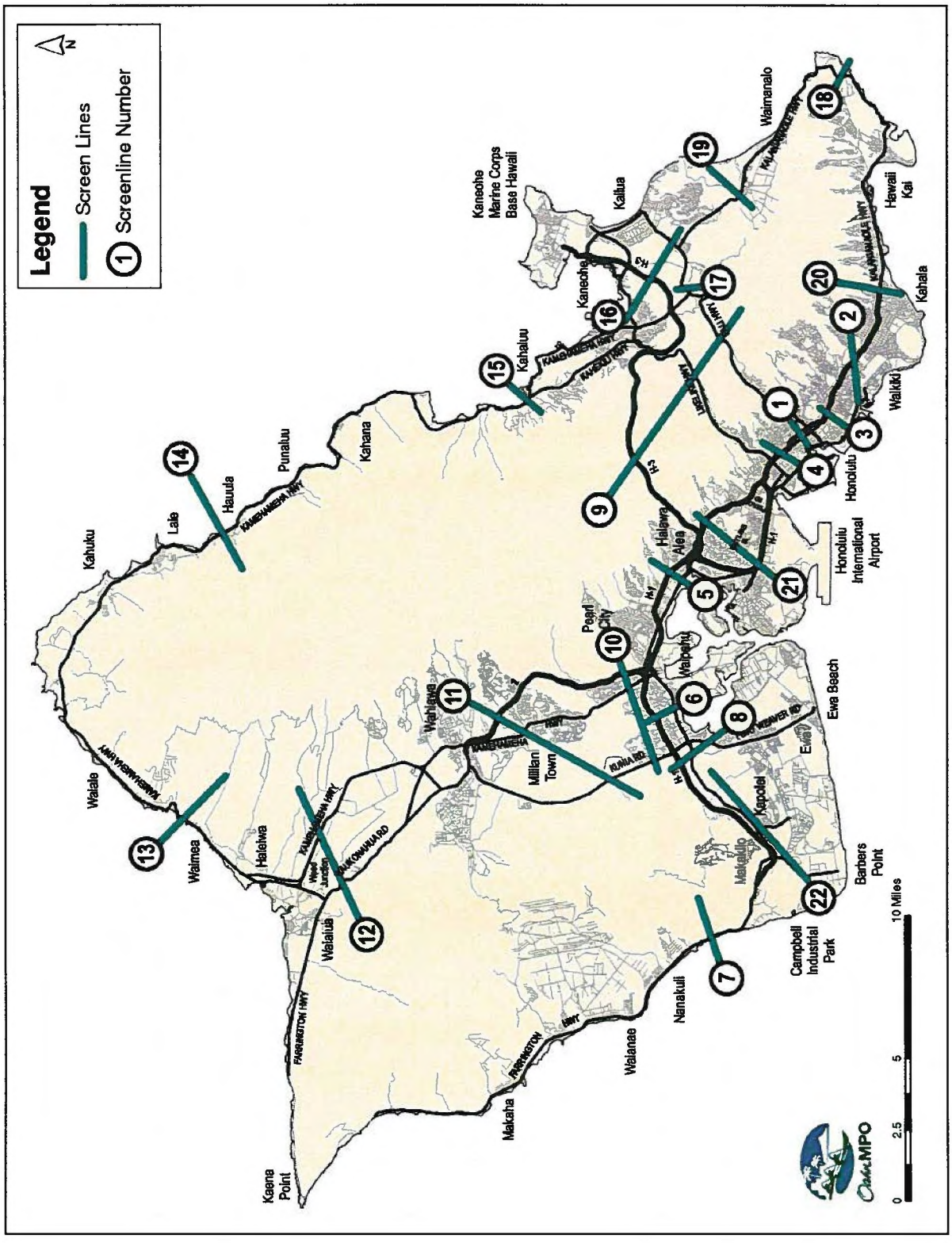


FIGURE 3-11: SCREENLINE LOCATIONS

TABLE 3-13
YEAR 2002 AND BASELINE YEAR 2030 SCREENLINE LEVEL OF SERVICE
AM PEAK HOUR INBOUND

SCREENLINE/FACILITY	YEAR 2002 EXISTING CONDITIONS				BASELINE YEAR 2030			
	Total Capacity (vph)	Total Volume (vph)	Volume/Capacity Ratio	Level of Service	Total Capacity (vph)	Total Forecast Volume (vph)	Volume/Capacity Ratio	Level of Service
1. NUUANU STREAM BRIDGE Eastbound	20,450	15,369	0.75	C	20,450	19,822	0.97	E
2. MANOA-PALOLO DRAINAGE CANAL/ ALA WAI CANAL Westbound	20,850	13,960	0.67	B	21,000	15,787	0.75	C
3. EAST OF WARD AVENUE Eastbound	17,250	11,749	0.68	B	17,900	18,116	1.01	F
4. KAPALAMA DRAINAGE CANAL Eastbound	15,900	15,881	1.00	E	15,650	17,862	1.14	F
5. KALAUAO Eastbound	18,350	18,323	1.00	E	18,350	21,773	1.19	F
6. WAIKELE STREAM Eastbound	11,850	7,933	0.67	B	11,850	15,265	1.29	F
7. KAHE POINT Southbound	2,500	1,809	0.72	C	2,500	2,909	1.16	F
8. EWA Eastbound	12,400	6,775	0.55	A	12,400	15,285	1.23	F
9. TRANS KOOLAU Westbound	11,800	7,793	0.66	B	11,000	9,787	0.89	D
10. WAIPIO Southbound	13,250	7,916	0.60	A	14,800	9,721	0.66	B
11. MILILANI Northbound	8,700	3,734	0.43	A	8,200	4,963	0.61	B
12. HALEIWA Southbound	2,650	994	0.38	A	2,650	1,447	0.55	A
13. WAIMEA BRIDGE Northbound	1,250	380	0.30	A	1,250	481	0.39	A
14. HAUULA (KAIPAPAU BRIDGE) Southbound	1,250	404	0.32	A	1,250	901	0.72	C
15. KAHALUU (KAMEHAMEHA HIGHWAY) Southbound	1,250	872	0.70	B	1,250	1,010	0.81	D
16. KANEOHE-KAILUA Westbound	8,500	3,901	0.46	A	8,500	3,781	0.44	A
17. MAUNAWILI Westbound	3,700	2,185	0.59	A	3,300	2,832	0.86	D
18. SANDY'S BEACH PARK Westbound	1,250	373	0.30	A	1,250	623	0.50	A
19. OLOMANA (WAIMANALO BRIDGE) Southbound	1,250	718	0.57	A	1,250	1,070	0.86	D
20. AINAKOA Westbound	7,400	4,649	0.63	B	5,800	6,537	1.13	F
21. SALT LAKE Eastbound	25,050	15,620	0.62	B	29,800	21,083	0.71	C
22. KAPOLEI Southbound [a]	4,600	2,472	0.54	A	4,750	5,013	1.06	F

Note: All screenlines are inbound to the PUC with the exception of screenlines 11, 13 & 22
[a] - Existing LOS does not include the North-South Road
Vph= Vehicles Per Hour

PM Peak Hour Level of Service. One of the most congested screenlines in 2030 during the PM peak hour is projected to be Ewa (Screenline 8) with an overall V/C ratio of 1.09 and an average LOS F. In 2002, the same screenline was at V/C 0.61 and an average LOS B. Kalauao in Pearl City (Screenline 5) and Kapalama Drainage Canal in Kalihi (Screenline 4) are also very congested locations, both with V/C ratios exceeding 1.00 and an average LOS F. Kalauao and Kapalama Drainage Canal were at LOS C and D respectively in Year 2002. Additional screenlines projected at LOS F under 2030 conditions are Kahe Point (Screenline 7) in the Waianae area and Ainakoa (Screenline 20). Kahe Point has limited access via one major facility (Farrington Highway) and as a result the screenline V/C ratio is 1.05 and an average LOS F, an increase from V/C 0.75 (LOS C) in 2002. Ainakoa suffers predominately due to geography, with Kalanianaole Highway the sole highway connecting the PUC to the Hawaii Kai area. Table 3-14 shows all the results of the PM peak hour outbound analysis. Figures 3-13 and 3-15 demonstrate the PM peak LOS values graphically.

TABLE 3-14
YEAR 2002 AND BASELINE YEAR 2030 SCREENLINE LEVEL OF SERVICE
PM PEAK HOUR OUTBOUND

SCREENLINE/FACILITY	YEAR 2002 EXISTING CONDITIONS				BASELINE YEAR 2030			
	Total Capacity (vph)	Total Volume (vph)	Volume/Capacity Ratio	Level of Service	Total Capacity (vph)	Total Forecast Volume (vph)	Volume/Capacity Ratio	Level of Service
1. NUUANU STREAM BRIDGE Westbound	19,800	14,846	0.75	C	19,800	17,328	0.88	D
2. MANOA-PALOLO DRAINAGE CANAL/ ALA WAI CANAL Eastbound	20,350	14,147	0.70	B	20,500	16,794	0.82	D
3. EAST OF WARD AVENUE Eastbound	20,450	14,683	0.72	C	21,300	19,550	0.92	E
4. KAPALAMA DRAINAGE CANAL Westbound	16,000	14,341	0.90	D	15,750	16,846	1.07	F
5. KALAUAO Westbound	18,350	13,525	0.74	C	18,350	18,503	1.01	F
6. WAIKELE STREAM Westbound	13,000	7,458	0.57	A	13,000	11,923	0.92	E
7. KAHE POINT Northbound	2,500	1,882	0.75	C	2,500	2,613	1.05	F
8. EWA Westbound	11,150	6,761	0.61	B	11,150	12,151	1.09	F
9. TRANS KOOLAU Eastbound	11,800	6,646	0.56	A	11,000	7,402	0.67	B
10. WAIPIO Northbound	13,250	7,326	0.55	A	13,650	8,887	0.65	B
11. MILILANI Southbound	8,700	4,250	0.49	A	8,200	5,184	0.63	B
12. HALEIWA Northbound	2,650	1,111	0.42	A	2,650	1,502	0.57	A
13. WAIMEA BRIDGE Southbound	1,250	633	0.51	A	1,250	779	0.62	B
14. HAUULA (KAIPAPAU BRIDGE) Northbound	1,250	604	0.48	A	1,250	750	0.60	A
15. KAHALUU (KAMEHAMEHA HIGHWAY) Northbound	1,250	854	0.68	B	1,250	906	0.73	C
16. KANEOHE-KAILUA Eastbound	8,500	3,583	0.42	A	8,500	3,720	0.44	A
17. MAUNAWILI Eastbound	3,700	2,373	0.64	B	3,300	2,496	0.76	C
18. SANDY'S BEACH PARK Eastbound	1,250	582	0.47	A	1,250	682	0.55	A
19. OLOMANA (WAIMANALO BRIDGE) Northbound	1,250	1,011	0.81	D	1,250	1,031	0.82	D
20. AINAKOA Eastbound	5,550	4,168	0.75	C	4,350	4,961	1.14	F
21. SALT LAKE Westbound	23,250	13,754	0.59	A	27,000	16,340	0.61	B
22. KAPOLEI Northbound [a]	4,600	2,140	0.47	A	5,900	4,374	0.74	C

Note: All screenlines are outbound from the PUC with the exception of screenlines 11, 13 & 22
[a] - Existing LOS does not include the North-South Road
Vph= Vehicles Per Hour

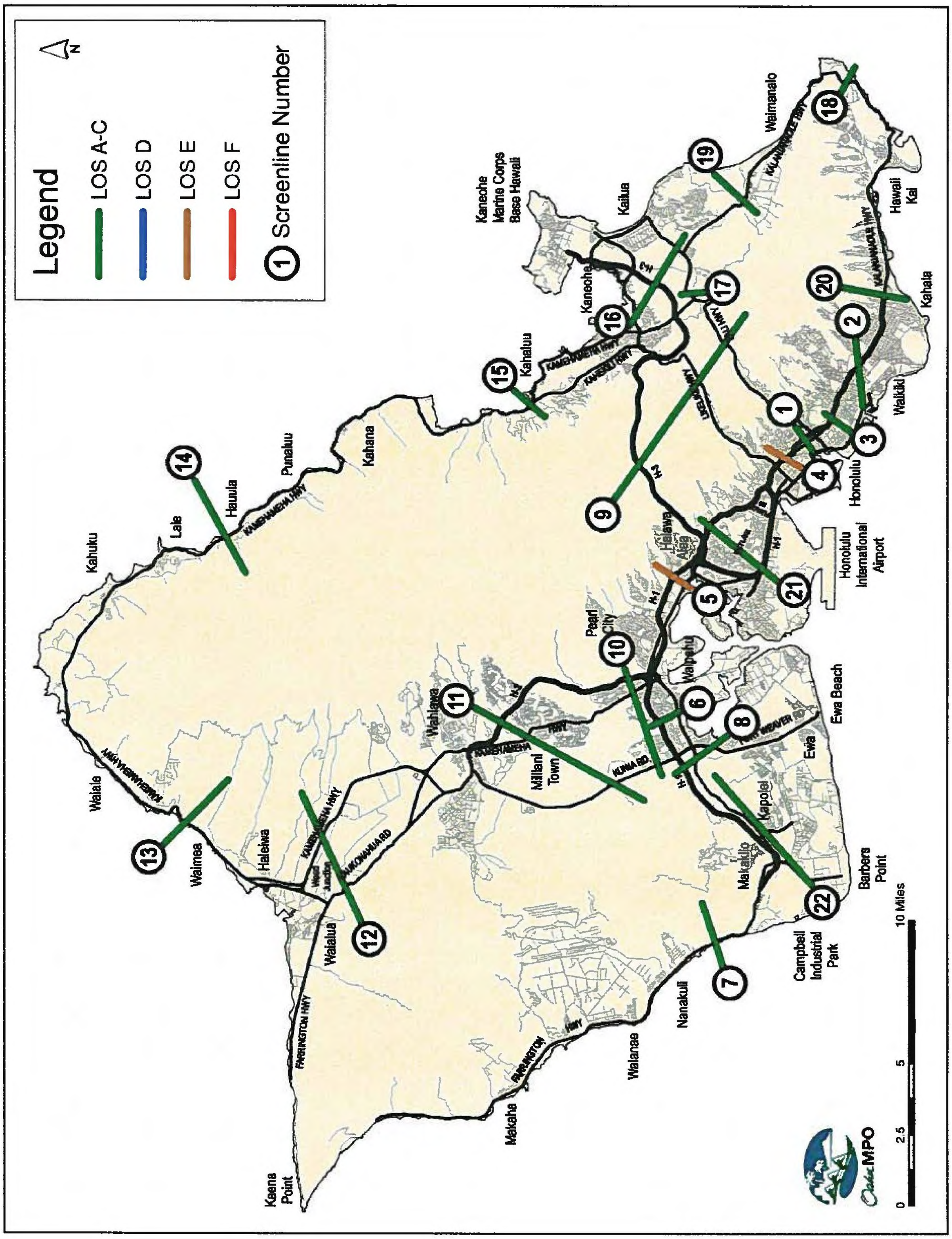


FIGURE 3-12: AM PEAK HOUR SCREENLINE LEVEL OF SERVICE INBOUND (EXISTING 2000)

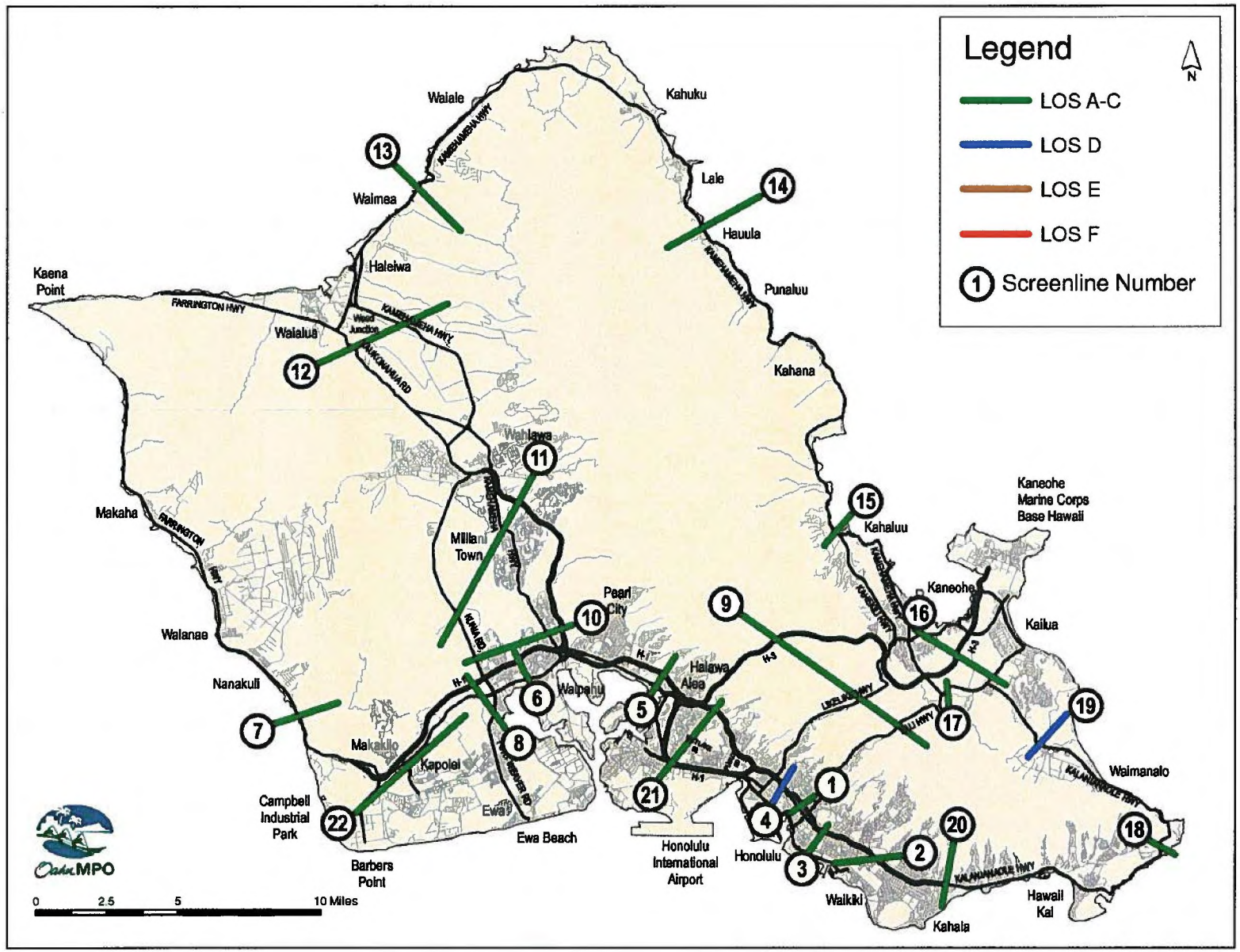


FIGURE 3-13: PM PEAK HOUR SCREENLINE LEVEL OF SERVICE OUTBOUND (EXISTING 2000)

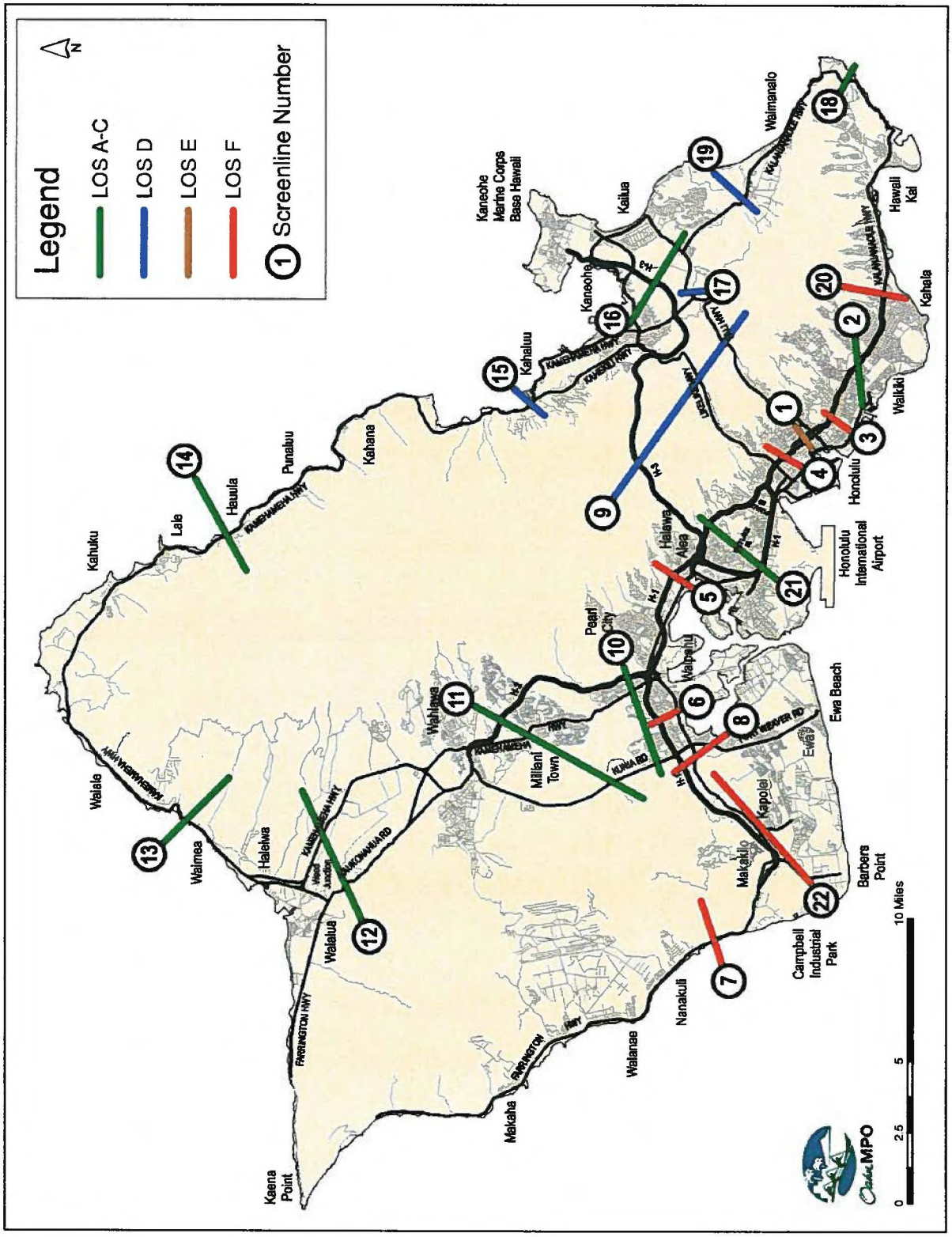


FIGURE 3-14: AM PEAK HOUR SCREENLINE LEVEL OF SERVICE INBOUND (BASELINE 2030)

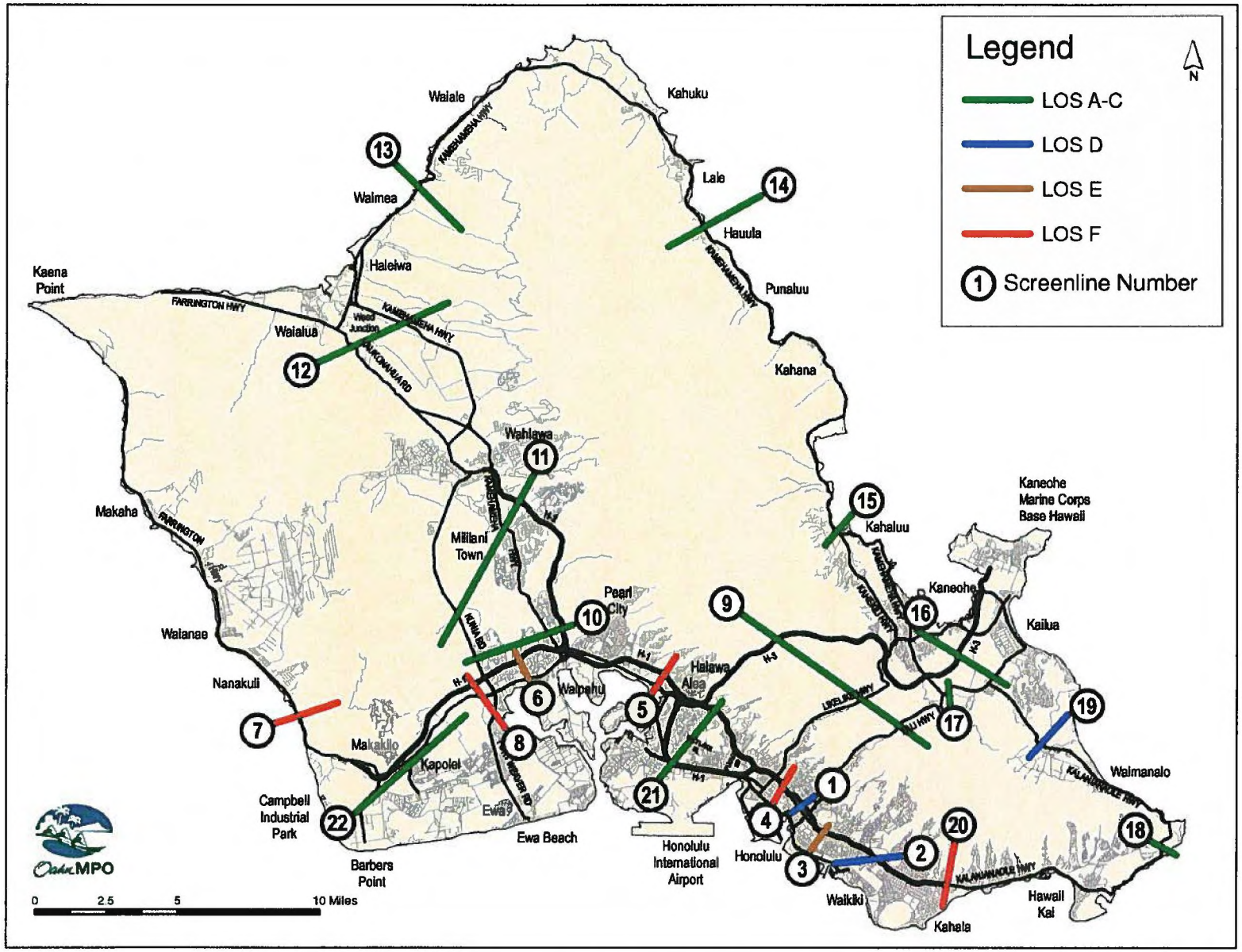


FIGURE 3-15 :PM PEAK HOUR SCREENLINE LEVEL OF SERVICE OUTBOUND (BASELINE 2030)

Vehicle Hours of Delay

Vehicle hours of delay (VHD) is defined as the difference between vehicles hours traveled under congested conditions and vehicle hours of travel that would otherwise be expected under free-flow conditions. These were calculated directly from the 2000 and 2030 model forecasts and are an indicator of congestion in the system. Table 3-15 and Figure 3-16 show that overall, there is a projected systemwide increase in daily delay of about 205,000 hours, amounting to a percentage change between 2000 and 2030 of almost 500%. Delay is projected to increase on all facility types in the model. The two largest increases occur on the freeways and arterials (103,000 hours and 61,000 hours respectively). The largest percentage change occurs on the expressways (1,500%). This delay is attributable to the projected changes in land use and socioeconomic data with relatively little being improved on the highways and transit system between 2000 and 2030 in the baseline scenario.

Locations of Significant Congestion

The V/C ratio at a particular location can be used to determine the level of congestion experienced. For the purpose of this study, locations operating at LOS E or F are defined as significantly congested. The TDFM was used to calculate estimated V/C ratio for every link in the model highway network. This data was used to identify projected locations of significant congestion during the AM peak period. The roadway facilities projected to experience significant congestion during the AM peak period under 2030 baseline conditions are illustrated in Figure 3-17. Key locations are listed below:

- Eastbound Farrington Highway (Kahe Point)
- Eastbound Interstate H-1 & Farrington Highway
- Eastbound bottleneck – Interstate H-1 & Kamehameha Highway in the Pearl City/Aeia area
- Major streets in the Primary Urban Center (Ala Moana, Dillingham, Kalakaua, King and Nimitz)
- Westbound Kalanianaole Highway (Hawaii Kai)
- Southbound Kahekili Highway

Travel Time

Travel time provides an indication as to how much time is required to complete a specific journey during a specific time period. For the purposes of the ORTP 2030, travel times were calculated during the two-hour AM peak period from all the traffic analysis zones across the island to downtown Honolulu by the travel demand model. Figures 3-18 and 3-19 depict travel time for the 2000 base year and for 2030 baseline conditions to downtown as estimated by the model. Figure 3-20 shows the projected net changes in travel time between the two years.

Figures 3-18 and 3-19 indicate that travel times from the Waianae Coast, Ewa/Kapolei, and Central Oahu to downtown Honolulu are projected to increase substantially by the year 2030 over

TABLE 3-15
CHANGES IN DELAY ON CLASSIFIED SYSTEM (YEAR 2000 AND BASELINE YEAR 2030)

Facility Type	Daily Delay			
	Year 2000	Baseline 2030	Difference	Percentage Difference
Freeways	23,000	126,000	103,000	448%
Expressways	2,000	32,000	30,000	1500%
Arterials	12,000	73,000	61,000	508%
Collectors	5,000	16,000	11,000	220%
Total	**42,000**	**247,000**	**205,000**	**488%**

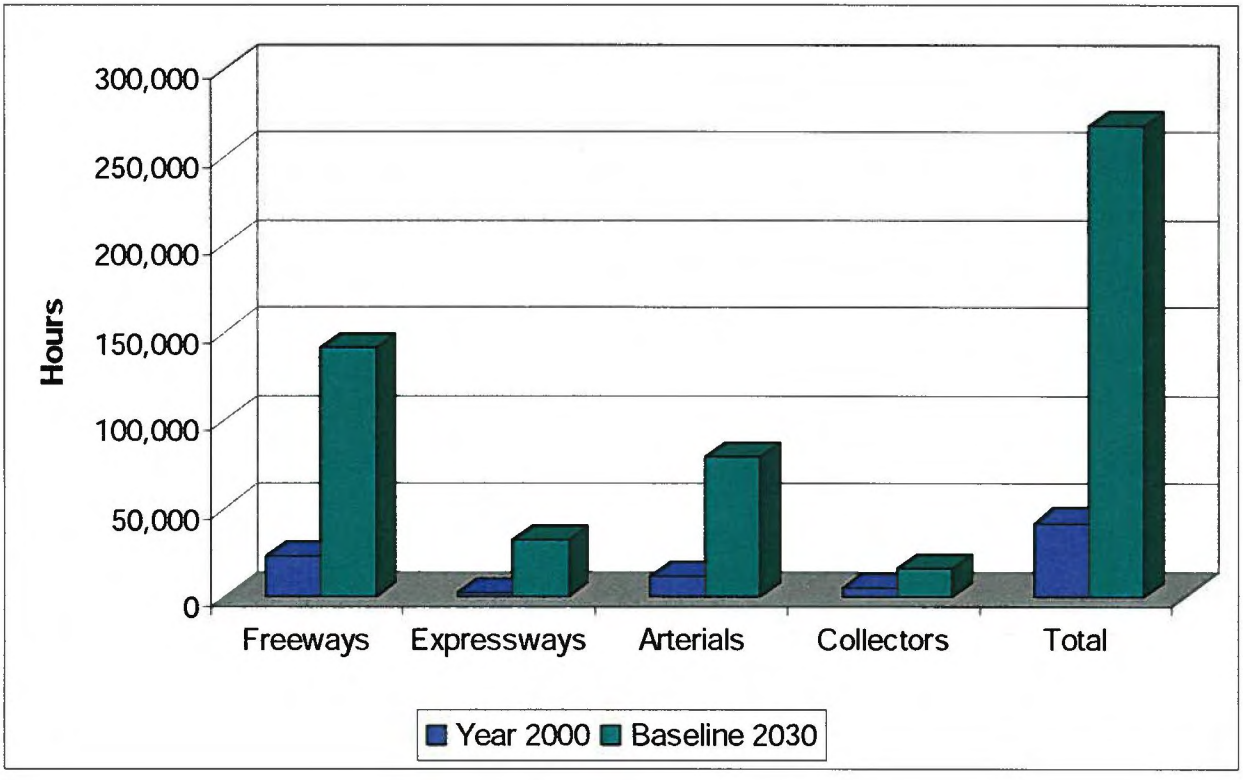


FIGURE 3-16: HOURS OF DELAY

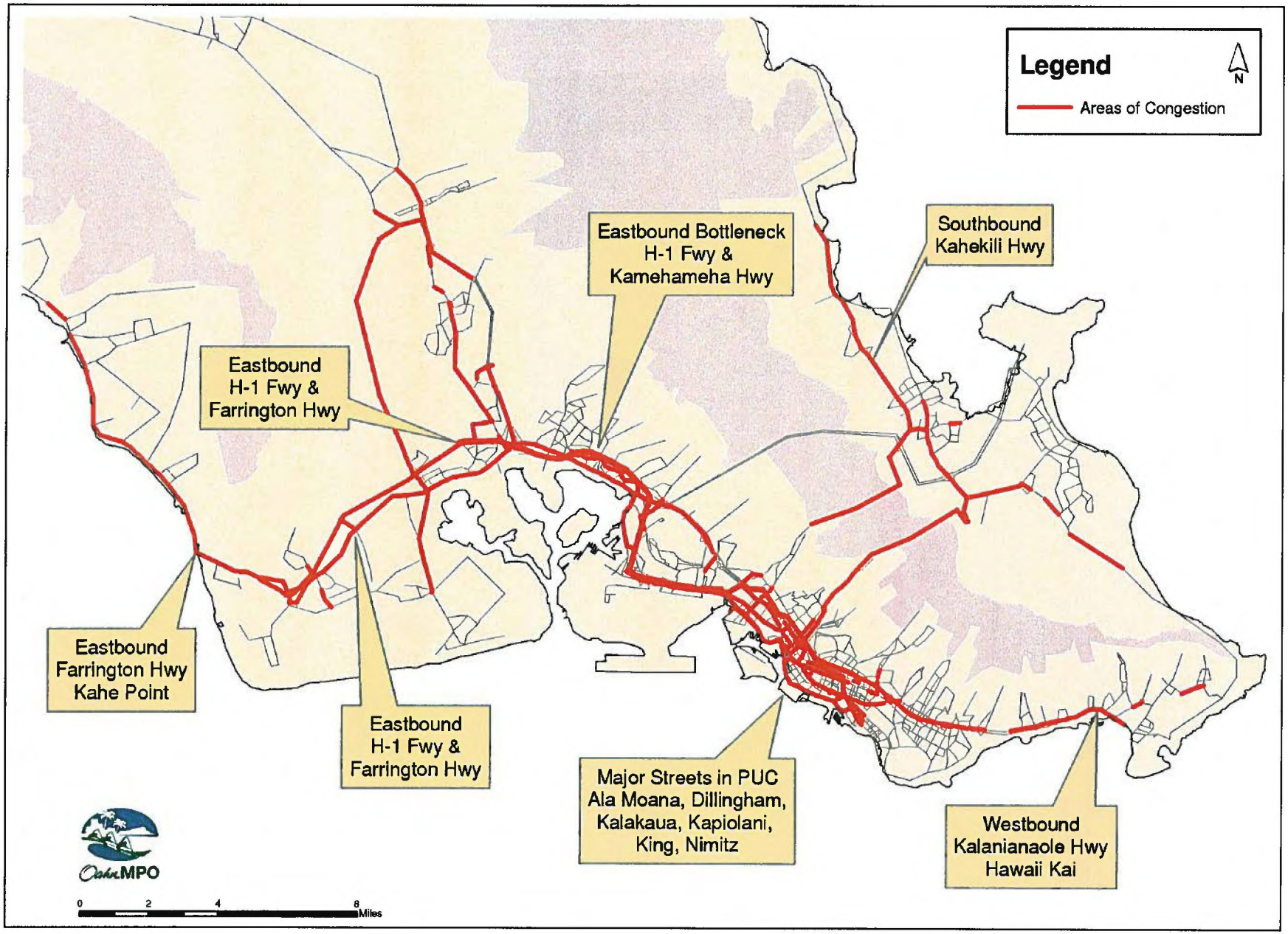


FIGURE 3-17: LOCATIONS OF SIGNIFICANT AM PEAK PERIOD CONGESTION (BASELINE 2030)

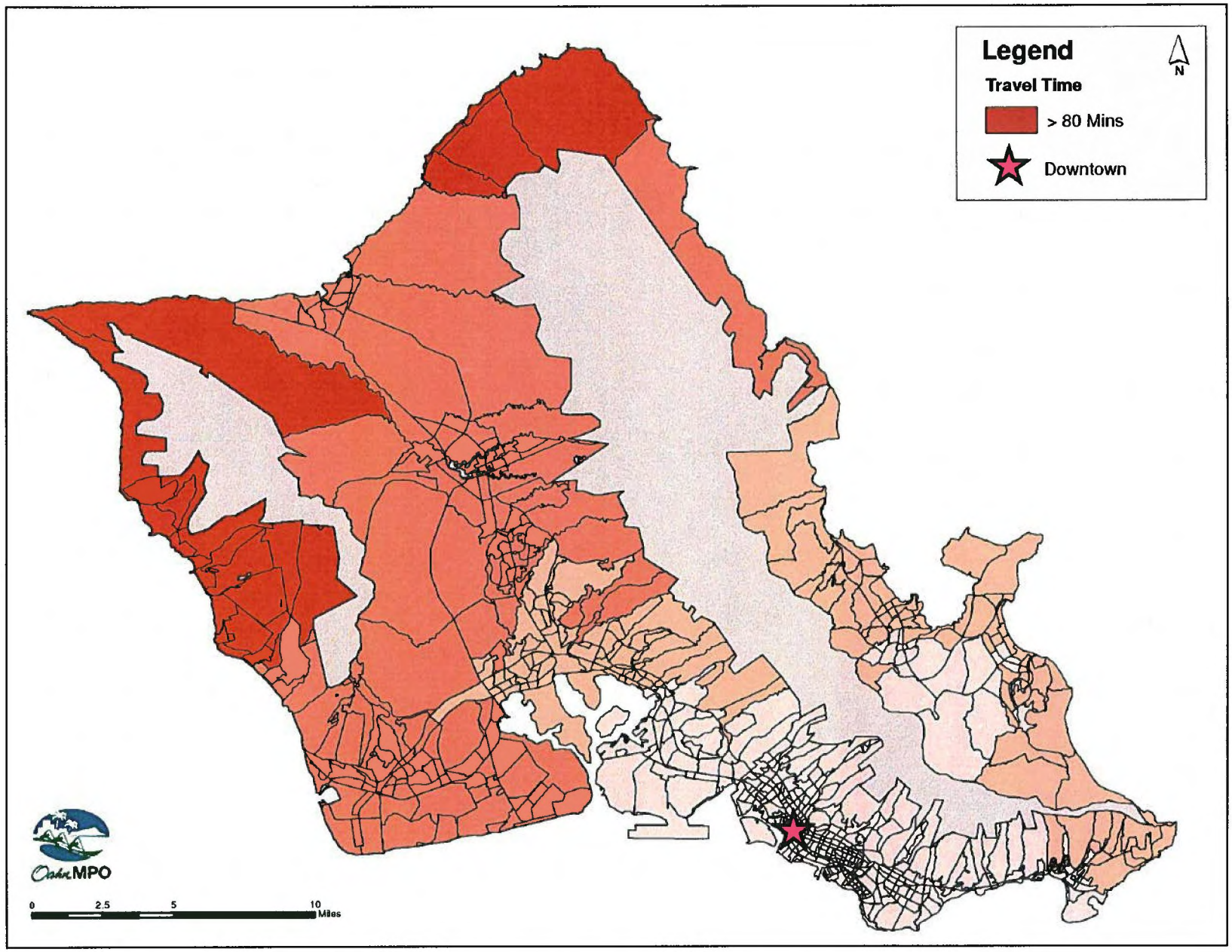


FIGURE 3-18: AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (EXISTING 2000)

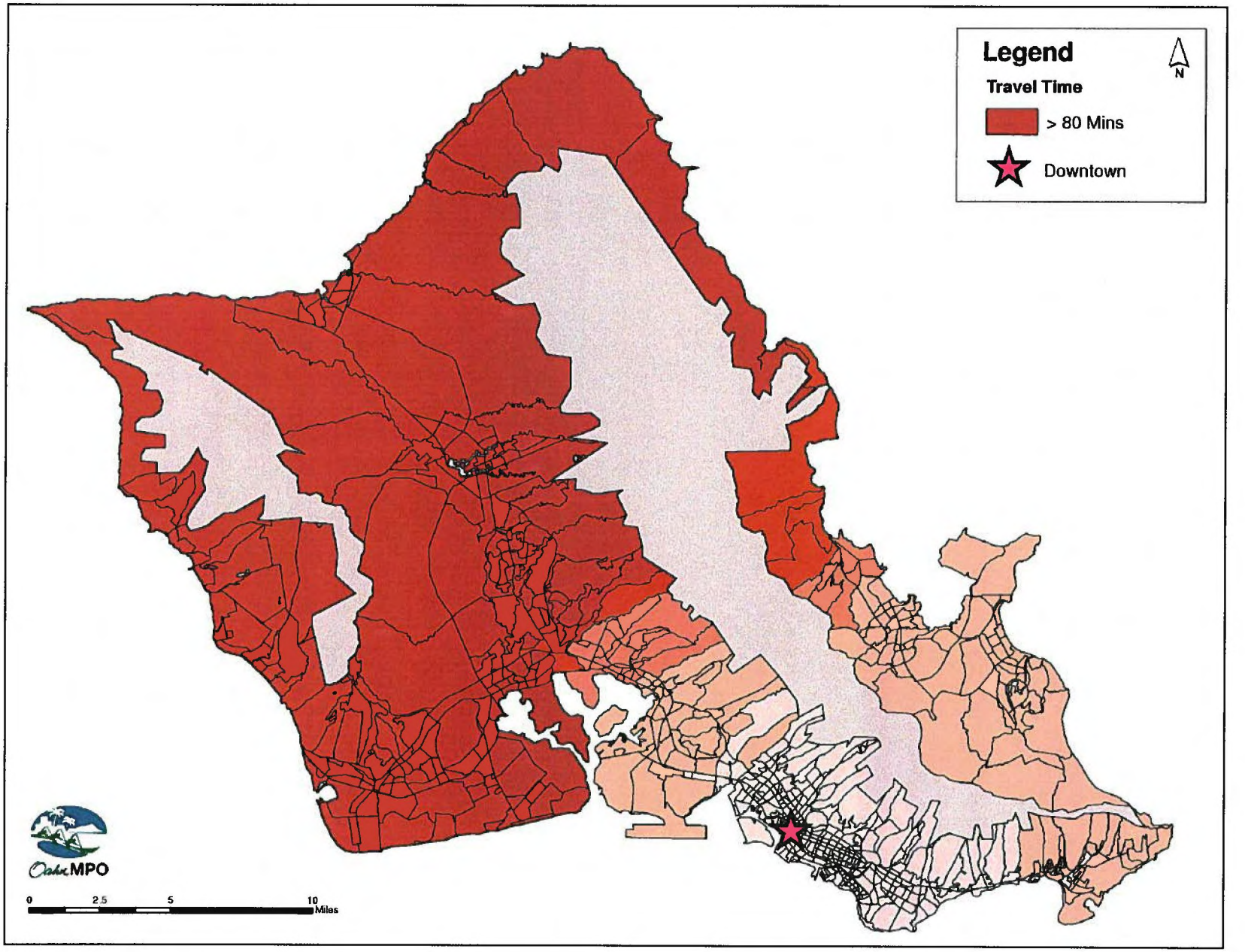


FIGURE 3-19: AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (BASELINE 2030)

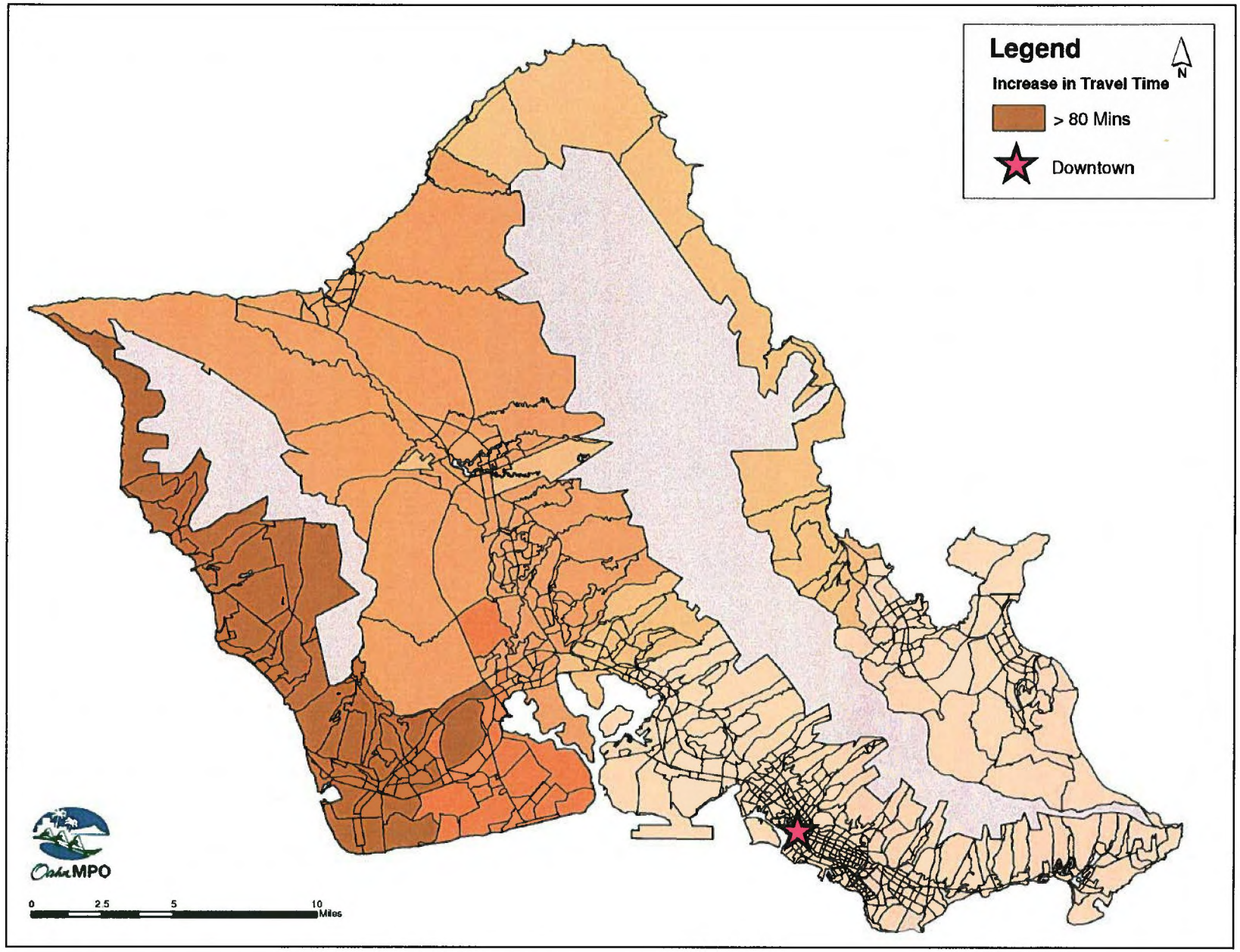


FIGURE 3-20: INCREASE IN AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (2000 to BASELINE 2030)

2000 base year conditions if nothing is done. Travel times in excess of 80 minutes are projected from Ewa, Central Oahu, and the Waianae Coast to downtown Honolulu during the morning peak period. This results from a substantial increase in volume levels projected by the travel demand model on H-1 in the Waiawa and Pearl City vicinity, causing a significant reduction in speed and increases in congestion and delay. The large volume increase is caused by the projected population growth in Ewa and Central Oahu.

4.0 PROJECT IDENTIFICATION, SCREENING, AND EVALUATION

The development of the ORTP 2030 involved a multi-step process that balanced public outreach and involvement with technical analysis.

4.1 COMMUNITY OUTREACH PROGRAM

The community outreach program (COP) was an integral part of the overall planning process used in the development of the ORTP 2030. The COP was developed in conjunction with a subcommittee of the CAC with the sole purpose of identifying public outreach techniques and options for the ORTP to ensure that the public involvement for the ORTP met the following three goals:

- **Goal #1:** Obtain public input to advise the decision-makers
- **Goal #2:** Foster public participation and involvement
- **Goal #3:** Maintain a reasonable budget

The public's input and participation were sought and incorporated at each stage of the study process – from development of the goals and objectives and assessment of existing conditions, to the forecasting of future conditions, identification of potential deficiencies, development and evaluation of alternative improvements and strategies, and refinement of the ORTP 2030.

The COP was accomplished through implementation of the following outreach techniques:

1. Telephone Survey – Separate surveys were held at two points during the planning process to determine general public support for transportation issues and projects.

2. Stakeholder Telephone Interviews – 30 interviews were conducted with organizations at the beginning of the project to determine transportation issues.

3. Regional Public Meetings – Four meetings were held to assist in the evaluation of alternative improvements, with a distributed questionnaire requesting comment and input on alternative groups, priorities, and how transportation dollars should be spent.

4. Islandwide Public Meeting – One meeting was held to present the draft ORTP 2030, with the specific purpose of gathering comments on the draft plan.

5. Website – A project website was developed that was attached to the OahuMPO website. The website was updated periodically throughout the project; comments on individual projects and the plan itself were provided through a "feedback form." Information about the ORTP 2030 process, milestones, and public meetings was also posted on the site.

6. Nontraditional Events – A table was set up at four selected locations with heavy pedestrian traffic in order to impart information and to solicit input from populations who have not traditionally participated in the planning process.

7. News Bureau – Press releases and direct calls to encourage coverage of the study were made to media outlets and editorial boards. Radio announcements and paid advertisements on ethnic radio stations were purchased to advertise public meetings. Radio and television interviews were set up with stations and the OahuMPO Executive Director.

8. Print Ads – Advertisements in major newspapers and several multilingual ethnic publications were purchased to announce regional and islandwide meetings.

In addition to the specific public outreach elements defined in the COP, other outreach efforts were made during the development of the ORTP 2030. These included the following:

1. Meetings with Interested Organizations and Groups – The OahuMPO Executive Director met with 25 organizations and groups to present and discuss the development of the draft plan.

2. CAC Meetings – Monthly meetings of the CAC often included progress reports on the status of the plan and periodic presentations of the ORTP milestones and issues where OahuMPO Policy Committee action was to be requested. These meetings were open to the public.

3. Direct Mail – In conjunction with meeting notices advertising the regional and islandwide meetings, direct mailouts were sent to a mailing list of over 400 individuals and organizations.

4.2 PREVIOUS REPORTS AND STUDIES

The technical portion of the plan development focused on the identification of potential projects for consideration, the development and evaluation of strategic concepts, the refinement of the concepts that yielded an "ideal" or financially unconstrained plan, and, finally, the development and evaluation of financially constrained draft and final plans.

Prior reports and studies used to complete this study effort in the preparation of the ORTP include documents from the following categories:

- Previous iterations of the ORTP
- Short-range improvement programs
- General, Development, and Sustainable Communities Plans
- Master plans
- Transit plans
- Bicycle plans
- ITS plans
- Sub-regional studies
- Travel demand documentation
- Environmental Justice planning documents

4.3 EVALUATION METHODOLOGY

Integral to the process was the application of a two-tiered evaluation methodology. The first tier of the evaluation was the initial screening analysis that was intended to ensure that projects considered for evaluation were regionally significant, addressed goals and objectives established for the ORTP 2030, and would not face severe physical or institutional obstacles in the implementation process considered to be fatal flaws.

The second tier of evaluation applied detailed performance measures to strategic plan concepts; each concept package consisted of combinations of improvement projects that passed the initial screening. This resulted in the comparison of concept packages with one another. Figure 4-1 illustrates the screening and evaluation process.

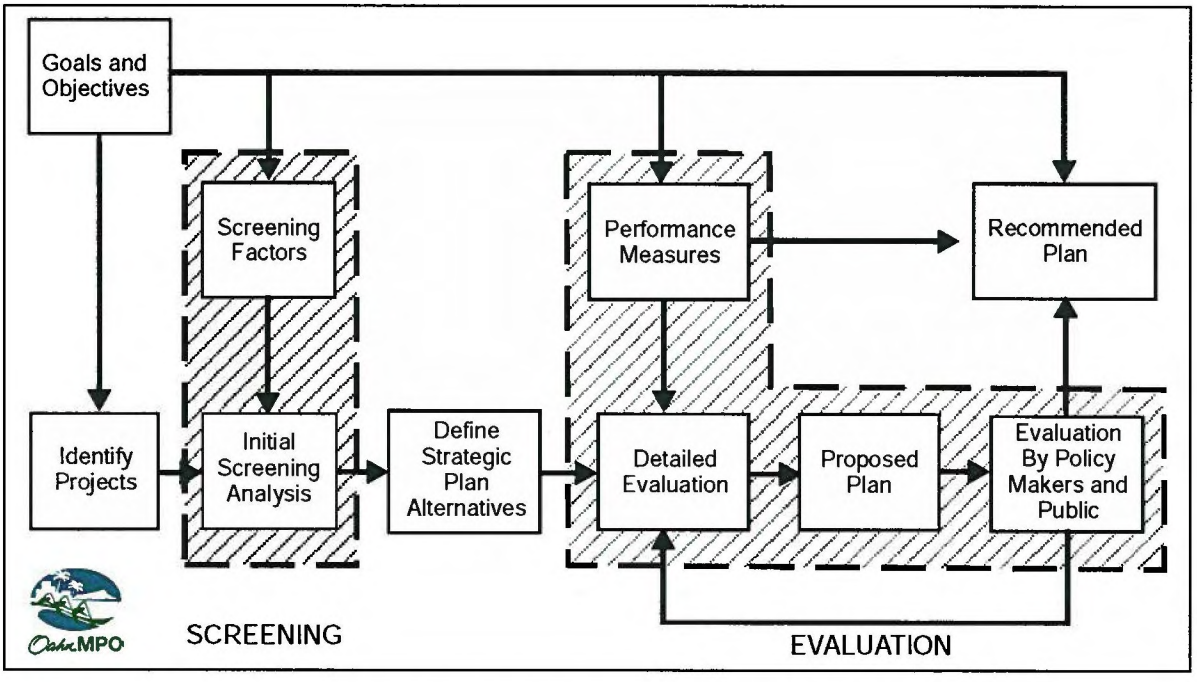


FIGURE 4-1: ORTP SCREENING AND EVALUATION PROCESS

4.4 POTENTIAL TRANSPORTATION IMPROVEMENTS

The identification of individual project proposals resulted from suggestions received from the general public, the OahuMPO CAC and Policy Committee, City and State agencies, through a "call for projects" and from prior planning documents. Organizations, agencies, and individuals from which project proposals were received include:

- General public (through "call for projects")
- Governor Linda Lingle's Task Force on Transportation, convened in 2003-2004
- Hawaii House of Representative bills from the 2005 Legislative Session
- Oahu TIP FYs 2004-2006

- OahuMPO CAC, including CAC recommendations to the
  - FYs 2002-2004 TIP
  - FYs 2004-2006 TIP
  - FYs 2006-2008 TIP
- OahuMPO Policy Committee
- OahuMPO TAC, including specific recommendations from the
  - HDOT
    - Harbors Division
    - Highways Division
  - City and County of Honolulu, DPP
  - City and County of Honolulu, DTS
- TOP 2025

These potential projects included highway and transit improvements that would enhance the capacity of the system, improvements to optimize use of existing facilities, improvements that increased efficiency of operation and safety, highway improvements that would provide a second access or serve as an emergency access, improvements to the bikeway system, and transportation demand management measures that would reduce travel demand.

There were over 700 projects that were identified and categorized into a number of different improvement types: bikeway, congestion relief, ferry, intelligent transportation systems, local, maintenance/system preservation, pedestrian, safety, second access, TDM/TSM, and transit.

4.5 INITIAL SCREENING

The first tier of evaluation required preliminary, qualitative screening at a regional system level. Each proposed transportation project was judged on its potential ability to address one or more of the ORTP 2030 objectives. In addition, a qualitative fatal flaw analysis was conducted to identify any monumental physical, environmental, cost, or institutional constraints. Proposed projects had to pass the initial screening in order to continue to the more detailed analysis found in the second tier of evaluation. As part of the initial screening, projects that were similar to, or duplicates of, other projects on the initial list were combined. The screening process and criteria used in this analysis are described in considerable detail in Appendix A.

4.6 PERFORMANCE MEASURES AND MEASURES OF EFFECTIVENESS

Transportation improvements passing the initial screening were carried into the second level of evaluation. Potential projects were grouped into one of four strategic plan concepts (packages of improvements). Performance measures were used to evaluate each of the concept packages.

The performance measures and their measures of effectiveness (MOE) were divided into four categories to facilitate the evaluation process. These categories correlate to the three goal areas established for the 2030 ORTP -- transportation services, environment/quality of life, and land use/transportation integration -- plus EJ criteria. MOEs that are able to differentiate between the potential improvement alternatives were selected.

Transportation services performance measures are designed to measure the relative effectiveness of various strategies used in meeting the transportation services goal to provide efficient, safe, convenient, and economical movement of people and goods. MOEs for the performance criteria include:

- Mode split
- Transit ridership
- Average vehicle occupancy
- Average vehicle ridership
- VMT
- VHT
- Average travel time (minutes per trip)
- Safety
- Screenline levels of service
- Congested lane miles
- Travel time savings for selected destinations
- VHD
- Annualized system costs
- Incremental cost per incremental transit trip
- Incremental cost per incremental vehicle mile reduced
- Incremental cost per incremental vehicle hour reduced

Environment/quality of life performance measures are designed to measure the relative effectiveness of various strategies in meeting the environment and quality of life goal to maintain environmental quality and community cohesiveness. With some exceptions, the criteria are largely qualitative measures and include:

- Land use sensitivity
- Resource conservation
- Air quality
- Energy conservation
- Quality of bicycle and pedestrian system

Land use/transportation integration performance measures are designed to measure the relative effectiveness of various strategies in meeting the land use and transportation integration goal. The criteria are qualitative and include:

- Population distribution/land use development policy
- Intermodal efficiency

EJ performance measures are designed to measure the relative effectiveness of the various strategies to ensure conformity with Title VI of the Civil Rights Act of 1964 and Environmental Justice requirements as mandated by SAFETEA-LU. These measures are both qualitative and quantitative in nature; there is some overlap with measures previously identified in other categories. Measures include:

- Mobility
- Accessibility
- Equity

- Safety
- Population policy

Further description of the MOEs used in the evaluation process is presented in Appendix B.

4.7 STRATEGIC PLAN CONCEPTS

Of the projects that passed the initial screening, 155 were grouped into at least one of four strategic plan concepts, each following a general theme. The four strategic plan concepts focused on those elements of the islandwide transportation system identified as significantly congested using four different approaches to the objective. The strategic plan concepts were intended as starting points for the evaluation of different approaches to resolving the transportation issues on Oahu and were not viewed as stand-alone preliminary draft plans. Improvements from the various packages were later combined through an iterative process as the draft ORTP 2030 was developed and refined.

A series of "core" improvements were included in each of the four concepts. The concepts underlying the four strategic plan packages were as follows:

- Core Improvements (included in each package) - Core improvements included improvements contained in the adopted FYs 2004-2006 TIP, plus ITS and TDM projects, *Bike Plan Hawaii* projects, and basic elements of the *Ewa Highway Master Plan* roadway system. Core transit improvements consisted of the 2030 baseline transit system (i.e., the existing bus system plus the planned hub-and-spoke bus system) and TheBus system capacity increases commensurate with population growth and expansion in developing areas.

- Concept 1: Islandwide - The Islandwide Concept included a variety of improvements throughout the island, such as second access projects, safety and emergency bypass projects, and highway and transit projects. Highway projects included major (capital intensive) projects such as widening and interchange improvements. Transit projects included the TheBus system expansion in rural areas and proposed intra-island commuter ferry routes.

- Concept 2: H-1 Corridor Emphasis - The objective of Concept 2 was to recognize and use the H-1 corridor as a resource to improve access within and between the major existing and future growth areas along the corridor by addressing the major bottlenecks and congested areas and improving traffic flow throughout the entire corridor. The concept included major projects such as widening and interchange modifications to Interstate Route H-1, and carpool and elevated high-occupancy toll (HOT) lanes. Also included were transit modifications to TheBus system with lower capital requirements.

- Concept 3: Pearl Harbor Emphasis - The emphasis of Concept 3 was on resolving the bottleneck around Pearl Harbor through the Aiea/Waiau/Pearl City/Waipahu areas. The primary feature of this package was a highway connection across Pearl Harbor, potentially consisting of a tunnel beneath the Pearl Harbor entrance connecting the Ewa area to H-1 in the vicinity of the Honolulu International Airport; or a series of bridges connecting Iroquois Point to West Loch, Ford Island, and the Aloha Stadium area.

- Concept 4: Rail Transit Emphasis - The primary feature of Concept 4 was construction of a rail transit line along with associated transit feeder services, park-and-ride lots, and access ramps and improvements. Two different alignment options were considered as part of evaluation of the package: Kapolei to UH Manoa, and Central Oahu to Waikiki.

Some project proposals were included in more than one concept. Conversely, some project proposals that passed the initial screening were not included in any of the concepts if, for example, the proposal was similar to or supplanted by another project that was included or if further evaluation determined that the proposal was not feasible.

4.8 EVALUATION OF CONCEPTS

Each concept was evaluated using the evaluation criteria and compared to the projected Year 2030 baseline conditions. The 2030 baseline includes the existing transportation system with the addition of the set of baseline improvements.

A comparison of the performance of each of the strategic plan concepts found that there are at least four different approaches to traffic congestion on Oahu and, in particular, between Leeward Oahu and Honolulu. One concept was not overwhelmingly better than another. In fact, in comparing travel times between the four concepts, each showed significant travel time savings to Downtown during the morning (AM) peak period. While changes in mode split, VHT, VMT, delay, and other performance measures varied between packages; each concept had its areas of strength and weakness. No single package was deemed to be more effective at reducing congestion and improving mobility on Oahu.

4.9 CONGESTION MANAGEMENT PROCESS

A concurrent technical analysis was conducted that involved the application of OahuMPO's existing Congestion Management Process (CMP). Where the second tier analysis of the strategic plan concepts assessed each of the four packages against a set of performance measures, the congestion management system (CMS) assessed each congestion relief project against a set of CMS performance measures. The CMS analysis provided additional insight on how an individual project performed. Of the 155 projects that passed the initial screening process and were grouped into one of the four strategic plan concepts, 84 were determined to be related to congestion relief and had firmly established revenue sources.

Each of the proposed congestion relief projects was modeled using the OahuMPO travel forecasting model. The model results were evaluated with the CMS set of performance measures and then compared with the results of the 2030 CMS baseline model run. Points were assigned to each project based on the point system illustrated in Tables 4-1 and 4-2.

TABLE 4-1
POINT SYSTEM FOR HIGHWAY PROJECTS

Performance Measure	Possible Points													
						Additional Vehicle Volume (increments of 500)								
	Increase	No Change	Decrease	New Roadway	On List of Congested Roadways	0	1-500	501-1000	1001-1500	1501-2000	2001-2500	2501-3000	3001-3500	3501-4000
Change in V/C Ratio	0	2	5	3		--	--	--	--	--	--	--	--	--
List of Congested Roadways	--	--	--	--	1	--	--	--	--	--	--	--	--	--
Transit Mode Share	3	1	0	--	--	--	--	--	--	--	--	--	--	--
Vehicle Volume	--	--	--	--	--	0	1	2	3	4	5	6	7	8
Vehicle Miles Traveled	0	1	2	--	--	--	--	--	--	--	--	--	--	--
Vehicle Hours Traveled	0	1	2	--	--	--	--	--	--	--	--	--	--	--
Vehicle Hours of Delay	0	1	2	--	--	--	--	--	--	--	--	--	--	--
Total Points Possible: 23 (or more based on increase in Vehicle Volume)														

As indicated in Table 4-1, highway projects were evaluated using the following performance measures:

- *Change in V/C Ratio* refers to the project's forecasted impact on the V/C ratio of the roadway facility on which the project is planned. New roadway projects receive points automatically.

- *List of Congested Roadways* refers to whether the project is on the list of congested roadways, as identified in the *CMS State of Congestion on Oahu* report.

- *Transit Mode Share* refers to the project's forecasted impact on the transit share of daily resident trips to work.

- *Vehicle Volume* refers to either the additional number of vehicles forecasted to use the upgraded *existing* facility or the number of vehicles forecasted to use the *new* roadway facility. Points are assigned based on a sliding scale as indicated in the table above.

- *Vehicle Miles Traveled* refers to the project's forecasted impact on the systemwide AM peak VMT.

- *Vehicle Hours Traveled* refers to the project's forecasted impact on the systemwide AM peak VHT.

- *Vehicle Hours of Delay* refers to the project's forecasted impact on the systemwide AM peak VHD.

Transit projects were evaluated using the following performance measures, as summarized in Table 4-2:

- *List of Congested Roadways* refers to whether the project is forecasted to decrease the AM peak vehicle volume on a facility that is on the list of congested roadways, as identified in the *CMS State of Congestion on Oahu* report.

- *Transit Mode Share* refers to the project's forecasted impact on the transit share of daily resident trips to work.

- *Transit Trips to Work* refers to the project's forecasted impact on the number of transit trips to work. Points are assigned based on a sliding scale as indicated in the table above.

- *Vehicle Miles Traveled* refers to the project's forecasted impact on the systemwide AM peak VMT.

- *Vehicle Hours Traveled* refers to the project's forecasted impact on the systemwide AM peak VHT.

- *Vehicle Hours of Delay* refers to the project's forecasted impact on the systemwide AM peak VHD.

Although the transit performance measures are similar to those for highway projects, the points received for individual highway projects should not be compared directly with points received for individual transit projects.

A ranked list of proposed congestion relief projects was achieved by sorting the highway and transit projects by the number of points received. The list of projects were reviewed by the TAC and provided to the Policy Committee. The list was used in determining the final list of projects as part of the evaluation of the technical merit of the proposed modifications to the draft ORTP 2030.

TABLE 4-2
POINT SYSTEM FOR TRANSIT PROJECTS

Performance Measure	Possible Points													
						Additional Resident Transit Trips to and from Work (increments of 5000)								
	Increase	No Change	Decrease	New Roadway	Decreases Vehicle Volume on a Facility on the List of Congested Roadways	0	1-5000	5001-10,000	10,001-15,000	15,001-20,000	20,001-25,000	25,001-30,000	30,001-35,000	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
Vehicle Miles Traveled	0	1	2	--	--	--	--	--	--	--	--	--	--	--
Vehicle Hours Traveled	0	1	2	--	--	--	--	--	--	--	--	--	--	--
Vehicle Hours of Delay	0	1	2	--	--	--	--	--	--	--	--	--	--	--
Total Points Possible: 18 (or more based on increase in Transit Trips)														

4.10 REVIEW OF RESULTS

A compilation of the results of the strategic plan concept analyses were formally organized in a brochure, a copy of which is included in Appendix G. The results were presented to the CAC, TAC, and Policy Committee, as well as at a series of regional meetings, at non-traditional public venues (e.g., informational tables set up at areas where there was high pedestrian traffic, targeted toward people who traditionally do not participate in the planning process). Public input was also solicited via a questionnaire that was included with the brochure, distributed at the regional meetings, and available online.

Public input received, combined with the technical analysis of the strategic plan concepts and the congestion management process, formed the basis for the selection of projects for inclusion in both unconstrained and constrained versions of the draft ORTP.

The technical analysis found, and the public confirmed, the need to focus on the H-1 travel corridor and the Ewa area. Besides acknowledging that congestion will grow in this corridor if nothing is done, the technical analysis indicated that islandwide congestion could be significantly addressed by focusing on the H-1 travel corridor through any of a number of capital intensive transportation projects. The need for transportation infrastructure in the Ewa area continues to grow and will increase in the future with forecasted population and employment growth.

4.11 UNCONSTRAINED ("IDEAL") PLAN

Using the technical results and the public input received, an "ideal" plan was developed. This plan represented a fiscally unconstrained set of projects intended to address each of the transportation issues and deficiencies identified in the 2030 baseline. The ideal plan was unconstrained in the sense that it assumed available funding to implement all of the projects contained within it.

Second access projects, safety and emergency bypass projects, and highway projects throughout the island were included in the ideal plan. It also included relatively major (capital-intensive) highway projects – such as new roadways, widening, new interchanges, interchange modifications, the Nimitz Highway flyover, and an elevated reversible HOT facility between the Waiawa Interchange and Keehi Interchange. Key transit projects of the ideal plan focused on construction of a grade-separated rail transit line between Kapolei through the PUC ending in Manoa, along with associated transit feeder services, six park-and-ride lots, and associated highway ramps and improvements, as well as TheBus system expansion in rural areas and the addition of a commuter ferry route from Ocean Pointe Marina to Honolulu Harbor.

The effectiveness of the draft "ideal" plan was assessed through application of the same performance measures used for the evaluation of strategic plan packages.

The performance of the ideal plan showed that congestion along several routes in the H-1 travel corridor could be reduced significantly from a LOS E or F designation. It also found that travel time to Downtown would be no more than 60 minutes from all but one area on Oahu (Kahuku) and that the Waianae Coast, Ewa, and Central Oahu areas would have travel time savings of at least 60 minutes in the AM peak period. In addition to alleviating delay, the performance results also suggested that VMT and VHT would be substantially reduced. All of these savings came at an estimated cost of almost $9 billion – $3 billion more than the available revenues for capital projects over the next 25 years.

4.12 CONSTRAINED PLAN

Potential revenues available to support improvements to the transportation system were forecast for the next 25 years and compared against the estimated costs of potential projects in the unconstrained or "ideal" plan. A draft constrained plan was then developed that was constrained by potentially available funding. The projects included in the draft constrained plan were based on an evaluation that addressed the effectiveness of congestion relief and non-congestion improvements, as well as consideration of environmental justice issues, public comments received, and whether large and capital-intensive projects had a firmly established revenue source. The effectiveness of the draft constrained plan was assessed through application of the performance measures developed and utilized previously for the evaluation of concept plan packages and the unconstrained plan.

The draft constrained plan assumed that complete funding would be available to implement all projects. The projects selected for inclusion in the constrained plan were designed to focus on the areas of the islandwide transportation system identified as significantly congested in the 2030 baseline analysis and to address other issues such as second access concerns.

A public review of the financially constrained draft ORTP 2030 was undertaken in early 2006. This included a home telephone survey to solicit views on various potential transportation

solutions; publication and presentation of the draft plan at an islandwide meeting; and review by the CAC, TAC, and the Policy Committee.

Over 800 public comments were received, documented, and presented to the Policy Committee in their deliberations on the draft plan. Potential changes to the plan resulting from these comments and results from the second home telephone survey were evaluated for technical viability. The CMS analysis contained in the CMP was also utilized in the technical assessment of individual projects. As a result, numerous modifications were made to the project list, including the addition of six projects and deletion of four projects from the draft constrained plan. The changes were done in a careful manner to ensure that the plan remained fiscally balanced.

Chapter 5.0 presents the projects included in the ORTP 2030; Chapter 6.0 describes the performance evaluation of the ORTP 2030; and Chapter 7.0 details the financial plan for the ORTP 2030.

5.0 ORTP 2030 PROJECTS

The vision for the ORTP 2030 is:

> *In 2030, Oahu is a place where transportation choices are available and the importance of the H-1 travel corridor is recognized.*

To improve mobility and to meet the three ORTP 2030 goals, the ORTP 2030 provides a number of strategies and programs to address the island's future transportation needs. These include major capital improvement projects that add to the system's person-carrying and vehicular capacities, projects that expand upon the existing systems and services to optimize their use, increased focus on operational, management and preservation strategies, and programs that help integrate the transportation system with the land uses of each community.

The potential revenues available to support improvements to the transportation system have been forecast and compared against the estimated costs of potential projects in the plan. The fiscally constrained plan represents a set of projects that aims to address the transportation issues and deficiencies identified in Chapter 3 in light of potentially available funding. The projects included in the fiscally constrained improvement package were based on an evaluation that addressed T6/EJ issues as well as consideration of the effectiveness of congestion relief and non-congestion improvements in addressing travel demand and congestion in the H-1 Corridor and in Ewa.

5.1 PROJECTS INCLUDED IN ORTP 2030

The ORTP 2030 provides approximately $6 billion for capital projects and $7.5 billion to operate, maintain, and preserve the highway and transit systems over the 25-year life of the plan. The capital projects contained in the ORTP 2030 attempt to balance the need for mobility options, congestion relief, safety, second access, highway, transit, and bicycling and pedestrian facilities:

H-1 Corridor

- A key component of the ORTP 2030 is a rail transit system that will serve the H-1 travel corridor between Kapolei and Manoa/Waikiki. The rail transit system will give priority to moving people rather than cars, provide mobility options, and work together with land use policies in shaping Oahu. The City and County of Honolulu is presently preparing an AA/DEIS study to further define and evaluate a proposed transit system.

- Another transit option proposed for the H-1 travel corridor is an intra-island ferry service between Ewa and Honolulu Harbor.

- Besides increasing mobility options along the H-1 travel corridor, the ORTP 2030 also acknowledges that auto travel is, and will continue to be, a dominant travel mode and increases in roadway capacity will be required. Examples of highway projects targeted for the H-1 corridor include widening of H-1 between Middle Street and Vineyard Boulevard and between Waiawa Interchange and Halawa Interchange, extension of

HOV lanes on H-1 from Waiawa to Makakilo, and constructing an elevated HOV facility on Nimitz Highway.

Ewa Projects

- Roadway projects are also planned for the Ewa area where the City's directed growth policies identify a second city. Examples of such projects include widening and extension of North/South Road and Kapolei Parkway, widening of Fort Barrette Road and Farrington Highway, and improvements at the Kapolei, Makakilo, and North/South Road H-1 interchanges.

- Four "second access" projects have been included in the ORTP 2030 (to Mililani Mauka, Makakilo, Wahiawa, and the Waianae Coast [via a new access road over the Waianae Mountain Range]).

Operations & Maintenance/System Preservation

- The plan also provides a commitment to operations and maintenance/system preservation. Maintenance and preservation of the transportation system is important to the provision of a safe, efficient system to Oahu. Similarly, devoting sufficient funds to operating the transportation system is critical to ensuring that the system performs in the manner intended.

Islandwide Projects

- The ORTP 2030 also includes implementation of the island's bikeway plan, expansion of the bus system, ITS and TSM programs to maximize the use of existing facilities, and TDM programs to reduce the need for automobile travel.

Illustrative Projects

- The ORTP 2030 planning process identified many potential projects that could prove beneficial as transportation improvements for the island of Oahu, but 2030 revenue projections could not support inclusion of these projects in the ORTP 2030 at this time. As part of the endorsement of the ORTP 2030, the OahuMPO Policy Committee identified a subset of those projects as "illustrative projects."

  Illustrative projects are those projects that are considered to be high-priority for inclusion into the regional transportation plan should additional, firmly-established funding revenue sources become available. Illustrative projects are not considered a part of the officially endorsed regional transportation plan. Projects considered in the plan development and included on the ORTP 2030 illustrative list include the concept of a Pearl Harbor crossing (tunnel or bridge) and elevated reversible HOT lanes within the H-1 travel corridor.

Table 5-1 lists the projects contained in the ORTP 2030 and Figure 5-1 illustrates their locations. Table 5-2 lists the illustrative projects while Figure 5-2 illustrates the locations of the illustrative projects.

TABLE 5-1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
			MID-RANGE PLAN (2006 TO 2015)	
ISLANDWIDE PROJECTS - 2006 to 2015				
1	C/S *	Alapai Transit Center & Joint Transportation Management Center	Construct a multi-use facility at Alapai Street to include a transit center, City-State transportation management center, and other operations.	$30.0
2	C/S *	Bike Plan Hawaii - Oahu	Implement Oahu elements of the State of Hawaii's *Bike Plan Hawaii*. (*Bike Plan Hawaii* includes only "Priority One" projects as identified in the *Honolulu Bicycle Master Plan.*)	$40.6 of $101.6 total in 1st 10 years
3	C/S *	Enhancement Projects	Implement enhancement projects, including, but not limited to, projects from the *Transportation Enhancement Program for Oahu*. Includes development of a pedestrian plan for Oahu.	$20.0 of $50.0 total in 1st 10 years
4	C/S *	Intelligent Transportation Systems (ITS)	Implement ITS projects including, but not limited to, those identified in the *Oahu Regional ITS Architecture.*	$60.0 of $150.0 total in 1st 10 years
5	S	Rockfall Protection, Various Locations	Install rockfall protection or mitigation measures along various state highways at various locations.	$22.5
6	C/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 (i.e., car sharing).	$62.9 of $152.9 total in 1st 10 years
7	S	Van Pool Program	Continue implementation and expansion of the State's Van Pool Program.	Included as part of project # 6
SAFETY & OPERATIONAL IMPROVEMENT PROJECTS - 2006 to 2015				
8	S	Kalanianaole Highway, Safety & Operational Improvements, Olomana Golf Course to Waimanalo Beach Park	Construct safety and operational improvements along Kalanianaole 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.	$19.7
9	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.	$115.9
10	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, 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.	$18.9
CONGESTION RELIEF PROJECTS - 2006 to 2015				
11	C	Farrington Highway, Widening, Golf Course Road to west of Fort Weaver Road	Widen Farrington Highway from 2 to 4 lanes, from Golf Course Road to just west of Fort Weaver Road.	$36.6
12	C	Fort Barrette Road, Widening, Farrington Highway to Franklin D. Roosevelt Avenue	Widen Fort Barrette Road from 2 to 4 lanes, from Farrington Highway to Franklin D Roosevelt Avenue.	$24.9
13	C	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 4-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.	$61.1
14	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.	$45.5
15	S	Interstate Route H-1, Widening, Middle Street to Vineyard Boulevard	Widen the Interstate Route H-1 by 1 lane, in the eastbound direction, from Middle Street to Vineyard Boulevard, as identified below: • From 2 to 3 lanes from Middle Street to Likelike Highway off-ramp • From 3 to 4 lanes from Likelike Highway off-ramp to Vineyard Boulevard This project also includes the widening of: • Gulick Avenue overpass to allow 5 lanes to pass under it • Kalihi Interchange overcrossings to allow 4 lanes to pass under it	$34.8

TABLE 5-1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
16	S	Interstate Route H-1, Operational Improvements, Lunalilo Street to Vineyard Boulevard	Modify the weaving movements on the Interstate Route H-1, in the westbound direction, between the Lunalilo Street on-ramp and the Vineyard Boulevard off-ramp.	$24.3
17	S	Interstate Route H-1, New On- & Off-Ramps, Makakilo Interchange	Construct a new eastbound off-ramp and a new westbound on-ramp to the Interstate Route H-1 at the Makakilo Interchange.	$9.9
18	S	Interstate Route H-1, Widening, Waiau Interchange to Waiawa Interchange	Widen Interstate Route H-1 in the westbound direction by 1 lane from the Waiau Interchange to the Waiawa Interchange.	$137.5
19	S	Interstate Route H-1, Widening, Waiawa Interchange	Widen the Interstate Route H-1 by 1 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. • From 2 to 3 lanes in AM peak • From 4 to 5 lanes in PM peak	$6.9
20	S	Interstate Route H-1, Zipper Lane (PM), Keehi Interchange to Kunia Interchange	Construct a Zipper lane on the Interstate Route H-1, in the westbound direction, from Keehi Interchange to Kunia Interchange. This project would be in use during the PM peak.	$19.9
21	S	Interstate Route H-1, Widening, Waipahu Off-Ramp	Widen the Interstate Route H-1 Waipahu Street off-ramp from 1 to 2 lanes, in the westbound direction, at the Waiawa Interchange.	$11.7
22	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.	$20.7
23	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.	$13.7
24	S	Interstate Routes H-1 & 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).	$45.5
25	S	Kamehameha Highway, Widening, Lanikuhana Avenue to Ka Uka Boulevard	Widen Kamehameha Highway from a 3-lane to a 4-lane divided facility between Lanikuhana Avenue and Ka Uka Boulevard. This project includes shoulders for bicycles and disabled vehicles, bridge crossing replacement, bikeways, etc.	$78.9
26	C	Kapolei Parkway, Extension, Kamokila Boulevard to Papipi Road	Extend the existing 4-lane Kapolei Parkway by constructing the segments in each of the following areas: • Kamokila Boulevard to Fort Barrette Road • Ewa Village boundary to Renton Road • Geiger Road to Papipi Road	$78.9
27	C	Kapolei Parkway, Extension & Widening, Aliinui Drive to Kalaeloa Boulevard	Extend the existing 4-lane Kapolei Parkway, from Aliinui Drive to Hanua Street. This project includes widening of Kapolei Parkway from 4 to 6 lanes from Hanua Street to Kalaeloa Boulevard.	$46.9
28	S	North-South Road, Widening & Extension, Interstate Route H-1 to Franklin D Roosevelt Avenue	Widen and extend North-South Road as follows: • From 3 to 6 lanes from Kapolei Parkway to Interstate Route H-1 • Extend from Kapolei Parkway to Franklin D Roosevelt Avenue (6 lanes)	$35.3
SECOND ACCESS PROJECTS - 2006 to 2015				
29	C	Makakilo Drive, Second Access, Makakilo Drive to North-South Road/Interstate Route H-1 Interchange	Extend Makakilo Drive (vicinity Pueonani Street) south to the Interstate Route H-1 Freeway Interchange as 4-lane roadway, connecting Makakilo Drive to North-South Road.	$32.8

TABLE 5-1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
TRANSIT PROJECTS - 2006 to 2015				
30	C	Ferry, Intra-Island Express Commuter, in the vicinity of Ocean Pointe Marina to Honolulu Harbor	Implement intra-island passenger ferry in the vicinity of the Ocean Pointe Marina in Ewa and Honolulu Harbor.	$23.2
31	C	Rail Transit, Kapolei to Manoa/Waikiki	Plan, design, and construct a fixed rail transit system between Kapolei and Manoa/Waikiki. This project includes modifications to TheBus system to provide feeder services to rail stations and eliminate parallel express services. Note that the alignment, system technology, and location of transit stations will be determined pending the completion of the Alternative Analysis Draft Environmental Impact Statement (AA/DEIS).	$2,570.0
32	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: • Expansion to and within Ewa, Kapolei, and Central Oahu • Implementation of the Hub and Spoke bus system with transit centers and circuitous routes • Expansion through increase of Express service to the North Shore, Waianae, and Windward Oahu	$49.6 of $151.2 total in 1st 10 years
33	C	Transit Centers, Various Locations	Construct transit centers at various locations islandwide to support the Rail Transit and TheBus systems.	$30.7 in 1st 10 years
OPERATIONS, MAINTENANCE & SYSTEM PRESERVATION - 2006 TO 2015				
34	C	City Operations and Maintenance (O&M)	Maintain and operate the City's existing and future roadway, transit and paratransit operations and routine maintenance. Includes, but is not limited to, operation of the transit system (including bus, paratransit, rail, and ferry), replacement of existing fleet, resurfacing, guardrail and shoulder improvements, lighting improvements, drainage improvements, sign upgrades and replacement, etc.	$1,990.8 in 1st 10 years ($1,624 transit O&M, $139 bus fleet replacement, $228 roadway O&M)
35	S	State Operations and Maintenance	Maintain and operate the State's existing and future highway operations and routine maintenance. Includes, but is not limited to, pavement repair, guardrail and shoulder improvements, lighting improvements, drainage improvements, sign upgrades and replacement, traffic signal upgrade and retrofit, etc.	$340 in 1st 10 years
36	S	System Preservation	Preserve the highway system through projects including, but not limited to, bridge replacement and seismic retrofit, pavement preventative maintenance, resurfacing and rehabilitation, etc.	$625 in 1st 10 years
COST SUBTOTALS: MID-RANGE PLAN (2006 TO 2015)				
Subtotals by Category				
Subtotal: Islandwide Projects				$236.0
Subtotal: Safety & Operational Improvement Projects				$154.5
Subtotal: Congestion Relief Projects				$733.0
Subtotal: Second Access Projects				$32.8
Subtotal: Transit Projects				$2,673.5
Subtotal: Operations, Maintenance, & System Preservation				$2,955.8
Total: All Categories				$6,785.5
Subtotals by Jurisdiction				
City & County of Honolulu Share of Project Costs *				$5,050.8
State of Hawaii Share of Project Costs *				$1,734.7
Total: All Shares				$6,785.5

TABLE 5-1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
LONG-RANGE PLAN (2016 TO 2030)				
ISLANDWIDE PROJECTS - 2016 to 2030				
2	C/S *	Bike Plan Hawaii - Oahu	See description in Mid-Range Plan	$61.0 in 2nd 15 years
3	C/S *	Enhancement Projects	See description in Mid-Range Plan	$30.0 in 2nd 15 years
4	C/S *	Intelligent Transportation Systems	See description in Mid-Range Plan	$90.0 in 2nd 15 years
6	C/S *	Transportation Demand Management Program	See description in Mid-Range Plan	$90.0 in 2nd 15 years
SAFETY & OPERATIONAL IMPROVEMENT PROJECTS - 2016 to 2030				
37	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.	$69.7
CONGESTION RELIEF PROJECTS - 2016 to 2030				
38	S	Farrington Highway, Widening, west of Fort Weaver Road to Waiawa Interchange	Widen Farrington Highway from Kunia to Waiawa by 1 lane in each direction, from west of Fort Weaver Road to Waiawa Interchange.	$67.1
39	S	Farrington Highway, Widening, Hakimo Road to Kalaeloa Boulevard	Widen Farrington Highway from 4 to 6 lanes, from Hakimo Road to Kalaeloa Boulevard, including intersection of Lualualei Naval Road.	$108.4
40	S	Interstate Route H-1, Widening, Liliha Street to Pali Highway	Widen the Interstate Route H-1 by 1 lane, from 3 to 4 lanes in the eastbound direction, from the Liliha Street on-ramp to Pali Highway off-ramp.	$3.4
41	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 from Middle Street to University Avenue. This project includes modification of auxiliary lanes at various exits and other operational changes to Interstate Route H-1. The identification of the precise improvements to be made will require a separate detailed corridor study.	$60.0
42	S	Interstate Route H-1, On- & Off-Ramp Modifications, University Avenue Interchange	Modify on- and off-ramps at the University Avenue Interchange on Interstate Route H-1. This project includes the construction of new ramps to allow all movements, safety improvements, including the closure of the eastbound on-ramp at University Avenue Interchange to Interstate Route H-1 and the construction of a new makai-bound off-ramp to University Avenue from Interstate Route H-1.	$24.0
43	S	Interstate Route H-1, Widening, Vineyard Boulevard to Middle Street	Widen the Interstate Route H-1 by 1 lane in the westbound direction, from Vineyard Boulevard to Middle Street.	$60.0
44	S	Interstate Route H-1, HOV Lanes, Waiawa Interchange to Makakilo Interchange	Construct 2 new lanes in the freeway median for HOV use, 1 in the westbound direction and 1 in the eastbound direction, on Interstate Route H-1, from the Waiawa Interchange to the Makakilo Interchange.	$52.5
45	S	Interstate Route H-1, Widening, Waiawa Interchange to Halawa Interchange	Widen the Interstate Route H-1 by 1 lane in the eastbound direction, from the Waiawa Interchange to the Halawa Interchange.	$251.3
46	S	Interstate Route H-1, Widening, Ward Avenue to Punahou Street	Widen the existing Interstate Route H-1 by 1 lane in the eastbound direction, from Ward Avenue to Punahou Street.	$24.3
47	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 2 lanes to 4 lanes; and addition of new on- and off-ramps to and from Interstate Route H-2 at Pineapple Road Overpass.	$50.0
48	S	Kahekili Highway, Widening, Kamehameha Highway to Haiku Road	Widen Kahekili Highway from 2 to 4 lanes, from Kamehameha Highway to Haiku Road. This project also includes the following improvements: • Contraflow in existing right-of-way between Hui Iwa Street and Haiku Road • Intersection improvements at Hui Iwa Street and Kamehameha Highway	$30.0
49	S	Kunia Road, Widening and Interchange Improvement, Wilikina Drive to Farrington Highway	Widen Kunia Road as follows: • From 2 to 4 lanes, from Wilikina Drive to Anonui Street. • From 2 to 4 lanes, Anonui Street to Kupuna loop. • From 4 to 6 lanes, Kupuna Loop to Farrington Highway. • Add 1 lane eastbound loop on-ramp at Kunia Road & Interstate Route H-1.	$116.3
50	S	Likelike Highway, Widening, Kamehameha Highway to Kahekili Highway	Widen Likelike Highway from 4 to 6 lanes, from Kamehameha Highway to Kahekili Highway.	$14.6

TABLE 5-1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
51	C	Makakilo Mauka Frontage Road, New Roadway, Kalaeloa Boulevard to Makakilo Drive	Construct a new 2-lane Makakilo Mauka Frontage Road, mauka of Interstate Route H-1, from Kalaeloa Boulevard to Makakilo Drive.	$11.1
52	S	Nimitz Highway, High Occupancy Vehicle (HOV) Flyover, Keehi Interchange to Pacific Street	Construct a new 2-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.	$250.0
53	C	Piikoi-Pensacola Couplet Reversal	Reverse the direction of the existing one-way Piikoi Street and Pensacola Street couplet.	$4.2
54	C	Puuloa Road, Widening, Pukuloa Road to Nimitz Highway	Widen Puuloa Road, from Pukuloa Road to Nimitz Highway: • From 3 lanes (1 lane southbound and 2 lane northbound) to 5 lanes (2 lanes southbound and 3 lanes northbound), from Pukuloa Road to Kamehameha Highway.	$10.0
SECOND ACCESS PROJECTS - 2016 to 2030				
55	C	Central Mauka Road, Second Access, Mililani Mauka to Waiawa	Construct Central Mauka Road, a new 4-lane road from Mililani Mauka to Waiawa. Road connects Meheula Parkway to Kamehameha Highway in Pearl City; parallel to & mauka of Interstate Route H-2. The new 4-lane north-south road includes connections to Interstate Route H-2 interchanges.	$160.0
56	C	Wahiawa, Second Access, Whitmore Avenue to Meheula Parkway	Construct a new 2-lane second access road between Whitmore Village and Wahiawa, from Whitmore Avenue to California Avenue. Continue the new 2-lane second access road to Mililani Mauka, from California Avenue to Meheula Parkway.	$64.4
57	S	Waianae, Second Access, Farrington Highway to Kunia Road	Construct a new 2-lane second access road to Waianae from Farrington Highway in the vicinity of Maili, over the Waianae Mountain Range, to Kunia Road.	$423.0
TRANSIT PROJECTS - 2016 to 2030				
32	C	TheBus Service, Expansion, Islandwide	See description in Mid-Range Plan	$101.6 in 2nd 15 years
33	C	Transit Centers, Various Locations	See description in Mid-Range Plan	$9.0 in 2nd 15 years
OPERATIONS, MAINTENANCE & SYSTEM PRESERVATION - 2016 TO 2030				
34	C	City Operations and Maintenance (O&M)	See description in Mid-Range Plan	$3,630.1 in 2nd 15 years ($3,051 transit O&M, $275 bus fleet replacement, $304 roadway O&M)
35	S	State Operations and Maintenance	See description in Mid-Range Plan	$510 in 2nd 15 years
36	S	System Preservation	See description in Mid-Range Plan	$375 in 2nd 15 years
COST SUBTOTALS: LONG-RANGE PLAN (2016 TO 2030)				
Subtotals by Category				
Subtotal: Islandwide Projects				$271.0
Subtotal: Safety & Operational Improvement Projects				$69.7
Subtotal: Congestion Relief Projects				$1,137.2
Subtotal: Second Access Projects				$647.4
Subtotal: Transit Projects				$110.6
Subtotal: Operations, Maintenance, & System Preservation				$4,515.1
Total: All Project Categories				$6,751.0
Subtotals by Jurisdiction				
City & County of Honolulu Share of Project Costs *				$4,125.9
State of Hawaii Share of Project Costs *				$2,625.1
Total: All Shares				$6,751.0

TABLE 5-1
OAHU REGIONAL TRANSPORTATION PLAN 2030
MID-RANGE AND LONG-RANGE PLAN PROJECT LIST

Project No.	City or State	Facility/Project Title	Project Description	Estimated Cost (Millions of Year 2005 $)
RIGHT-OF-WAY PRESERVATION				
CONGESTION RELIEF PROJECTS - ROW PRESERVATION				
58	C	Kalaeloa East-West Spine Road, New Roadway, Kalaeloa Boulevard to Geiger Road	Establish and preserve right-of-way (ROW) for Kalaeloa East-West Spine Road (new 4-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).	n/a
59	C	Keoneula Boulevard, Extension, Kapolei Parkway to Franklin D. Roosevelt Avenue	Establish and preserve right-of-way (ROW) for Keoneula Boulevard Extension (extension of Keoneula Boulevard from Kapolei Parkway to Franklin D. Roosevelt Avenue).	n/a
ORTP 2030 COST TOTALS: 2006-2030				
Subtotals by Category				
Subtotal: Islandwide Projects				$507.0
Subtotal: Safety & Operational Improvement Projects				$224.2
Subtotal: Congestion Relief Projects				$1,870.2
Subtotal: Second Access Projects				$680.2
Subtotal: Transit Projects				$2,784.1
Subtotal: Operations, Maintenance, & System Preservation				$7,470.9
Total: All Project Categories				$13,536.5
Subtotals by Jurisdiction				
City & County of Honolulu Share of Project Costs *				$9,176.7
State of Hawaii Share of Project Costs *				$4,359.8
Total: All Shares				$13,536.5

Notes:

* Costs for projects shared by City and State (C/S) allocated equally between the two jurisdictions. The designation is done for so for reasons of financially balancing the projected revenues with the order of magnitude cost estimates.

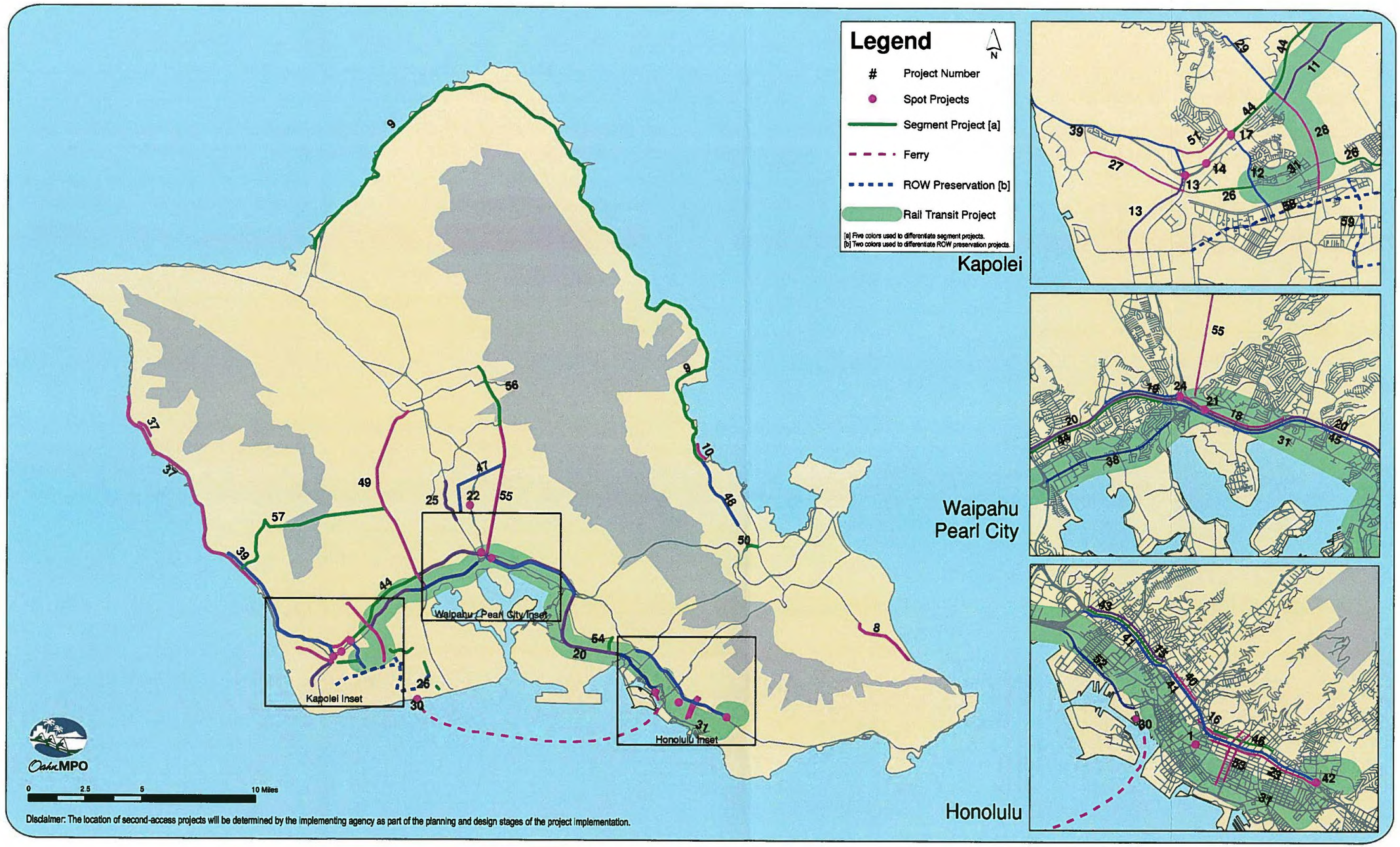


FIGURE 5-1: LOCATIONS OF ORTP 2030 PROJECTS

TABLE 5-2
ORTP 2030 ILLUSTRATIVE PROJECT LIST

Project No.	Facility/Project Title	Project Description	Estimated Capital Cost (Millions of Year 2005 $)
CONGESTION RELIEF PROJECTS			
I-1	H-1 Corridor, Reversible Highway, Waiawa Interchange to Keehi Interchange	Construct a new, elevated, reversible two-lane highway from west of the Waiawa Interchange to the Keehi Interchange. The new facility could be used for high occupancy vehicles; and a toll could be charged.	$2,500
I-2	Kalaeloa East-West Spine Road, New Roadway, Kalaeloa Boulevard to Geiger Road	Construct a new 4-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.	$110
I-3	Keoneula Boulevard, Extension, Kapolei Parkway to Franklin D. Roosevelt Avenue	Extend Keoneula Boulevard from Kapolei Parkway to Franklin D. Roosevelt Avenue.	$85
I-4	Paiwa Street, Extension, Ka Uka Boulevard to Lumiauau Street	Extend Paiwa Street from north of Lumiauau Street, to the intersection of Kamehameha Highway and Ka Uka Boulevard.	$15
I-5	Pearl Harbor Corridor	Construct an alternative route through the Pearl Harbor corridor to provide direct connection between Honolulu and the Ewa Plain. A new tunnel beneath the mouth of Pearl Harbor and a series of bridges spanning Pearl Harbor are potential options for this route. This project could operate as a toll facility.	$7,000
Total (with Pearl Harbor Corridor as Tunnel)			$9,710

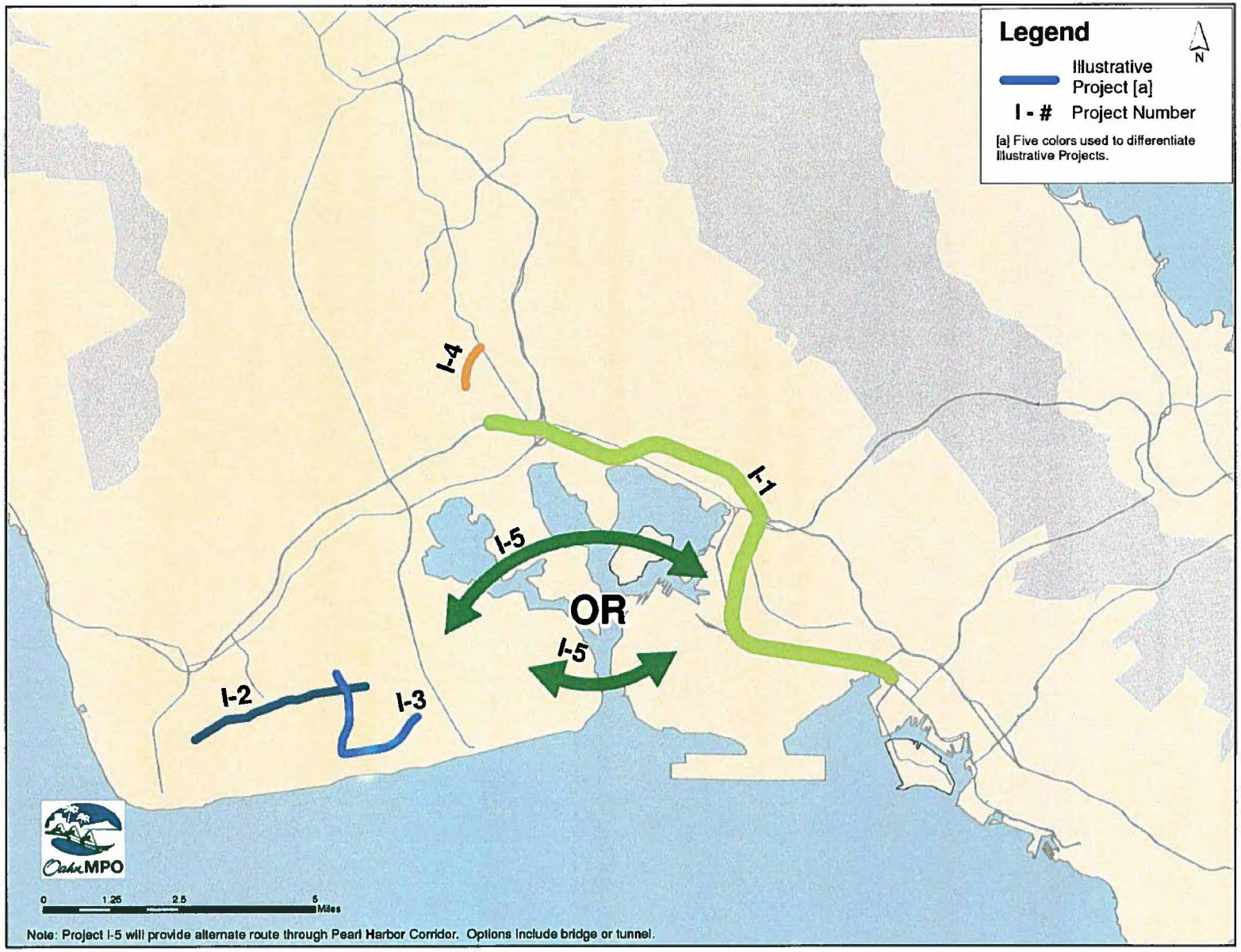


FIGURE 5-2: ORTP 2030 ILLUSTRATIVE PROJECTS

5.2 GEOGRAPHIC DISTRIBUTION OF PROJECTS

This section of the report discusses the geographic distribution of the ORTP 2030 projects on Oahu. The projects identified in this section reflect the vision statement and the goals/objectives established as part of the ORTP 2030 effort (defined in Chapter 2). The percentage of the plan that these projects represent and details the total costs of the group of projects are also provided.

The objectives associated with the transportation services system goal that these projects address include increasing capacity of the system, providing an efficient and convenient transit system, providing access to all important destinations, serving intermodal terminals, ensuring that safety and security is provided, and enhancing the integration and connectivity of the entire system.

The objectives associated with the environment and quality of life goal that these projects address include preserving cultural integrity and natural resources, optimizing use of transportation resources, minimizing disruption of neighborhoods, ensuring compatibility with the physical and social character of existing development, incorporating landscaping and public safety, and planning for emergencies.

The objectives that support the land use and transportation integration system goal reinforce planned population distribution and land use development policies, encourage innovation, and encourage implementation of land use policies that support efficient use of transportation systems.

5.2.1 H-1 Travel Corridor Projects

One of the most important aspects of the vision for the ORTP 2030 is the recognition of the importance of the H-1 travel corridor as a key link to improve access within and between the major existing and future growth areas along the corridor. This can be achieved by addressing major bottlenecks, congested areas, and improving traffic flow throughout the entire corridor. The projects in this category are aimed at achieving the three goals listed in Chapter 2 and include major projects such as widening, interchange modifications, flyovers, and carpool lanes. The results from the second telephone survey indicated that improving the H-1 travel corridor was a priority in terms of improving the island's overall transportation system.

There are a total of 17 projects along Interstate H-1 that combine for a sum of approximately $825 million (in 2005 dollars). 49% of all congestion relief projects and 44% of congestion relief dollars are focused on H-1 travel corridor improvements.

In addition to the aforementioned projects, there are another six projects in the vicinity of the H-1 travel corridor. These projects add up to a total of $2,951 million and include a ferry (project #30), the Intra-Island Express Commuter. This project involves the implementation of an intra island passenger ferry in the vicinity of the Ocean Pointe Marina in Ewa and Honolulu Harbor. The total cost to implement the project is $23.2 million. Also included is the rail transit project (project #31) between Kapolei and Manoa/Waikiki. This project involves the construction of a rail system with complimentary changes to the bus network. The estimated cost to implement this project is $2,570 million. Widening of Farrington Highway is also planned west of Fort

Weaver Road to Waiawa Interchange (Project #38) and from Golf Course Road to west of Fort Weaver Road (Project #11). These two projects total $103.7 million.

In addition to the above projects, there is a planned two-lane elevated and reversible HOV flyover (project #52) above Nimitz Highway from Keehi Interchange to Pacific Street at a cost of $250 million. The final H-1 Corridor project is that of the Piikoi-Pensacola couplet reversal (project #53) costing $4.2 million.

In summary, the total cost of the 23 H-1 Corridor projects is estimated at approximately $3,776 million.

5.2.2 Ewa Projects

One of the areas targeted for future development on the island is the Ewa area. There is a great need for existing and future improvements in the transportation infrastructure in this region. Ewa is projected to grow rapidly, with large increases in population and employment over the next 25 years. By City policy, the Ewa region is considered to be the second city on Oahu. There are a total of 16 projects in the Ewa development plan area amounting to $3,321 million.

The projects include the widening of Farrington Highway (projects #11, 38 and 39) at a cost of $212.1 million and a widening of Fort Barrette Road (project #12) at a cost of $24.9 million. Other projects include a new Kapolei interchanges on the Interstate H-1 (project #14), new on/off ramps at the Interstate H-1 Makakilo Interchange (project #17), the extension of Kapolei Parkway (projects #26 and #27), and the North-South Road widening (project #28). Second access projects in Ewa include the Makakilo Drive project (project #29), and transit projects include the rail transit from Kapolei to Manoa/Waikiki (project #31).

5.2.3 Central Oahu Projects

Another targeted growth area on the island is Central Oahu. Projects in the ORTP 2030 in the Central Oahu area include widening Kunia Road and improving the H-1/Kunia Road interchange (project #49) at a cost of $116.3 million, Kamehameha Highway widening between Lanikuhana Avenue and Ka Uka Boulevard (project #25) at $78.9 million, and the Central Mauka Road to provide a second access capability to the Mililani Mauka area (project #55) at $160 million.

5.3 PROJECT TYPES

5.3.1 Islandwide Projects

There are a total of seven projects in the islandwide project category over the life of the plan. The total costs of the islandwide projects are $507 million (approximately 4% of the plan). The islandwide projects are projects that do not specifically relate to one area or facility but are planned across the Island of Oahu. As such, this grouping contains many different projects that range from bikeways to vanpools to intelligent transportation system projects to safety projects.

One key project is the Enhancement Projects (project #3), which includes projects from, but not limited to, the *Transportation Enhancement Program for Oahu*. Contained within this program is the development of a pedestrian plan. The total allocated to implement the Enhancement Projects is $50 million.

Another key project included in the islandwide category is the Bike Plan Hawaii – Oahu (project #2) at a cost of $101.6 million. This includes implementation of the Oahu elements of the State of Hawaii's *Bike Plan Hawaii*. When feasible, it is the policy of the HDOT to build a bike facility whenever a state roadway is built or widened. Feasibility is dependent upon availability of funds, consistency with Bike Plan Hawaii, the project not being part of an emergency repair, and no other bike facility being in the immediate area. When such a bike facility is built, it is possible that the facility may be built on an adjacent roadway.

Also included in the islandwide category is the Travel Demand Management Program (project #6) at $152.9 million for such items as free real time 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 the vanpool program. The category also includes Intelligent Transportation Systems projects (project #4) including those identified in *Oahu Regional ITS Architecture*.

5.3.2 Safety and Operational Projects

This project category includes projects aimed primarily at improving the safety and operation of the transportation system. There are a total of four projects in this category amounting to a total cost of $224 million or approximately 2% of the plan. Key projects include safety and operational improvements such as left-turn lanes, guardrails, crosswalks and signage on Kamehameha Highway (project #9) and a realignment around Makaha Beach Park between Makau Street and Water Street on Farrington Highway (project #37). It should be noted that safety and operational improvements are also often part of capital improvements included in projects from other categories.

5.3.3 Congestion Relief Projects

This project category includes projects aimed at providing congestion relief in the transportation system. There are a total of 31 projects in this category amounting to a total cost of $1.87 billion or approximately 14% of the plan. This category includes most of the highway system improvements contained in the plan. Key projects include the construction of a PM peak zipper lane on Interstate H-1 westbound from Keehi Interchange to Kunia Interchange (project #20). This project is included at a cost of $19.9 million. Another significant project is that of widening and extending the North-South Road (project #28) at a cost of $35.3 million. Also included in this category is the widening of Interstate H-1 by one lane in the eastbound direction from Waiawa Interchange to Halawa Interchange (project #45).

5.3.4 Second Access Projects

The second access projects in the ORTP 2030 include the extension of Makakilo Drive (project #29) to the Interchange on the Interstate H-1. This project is included at a cost of $32.8 million.

Another key project is that of the Waianae second access project over the Waianae Mountain Range (project #57) at an estimated cost of approximately $423 million. Also included in this category is the Central Mauka Road second access project, a new four-lane road from Mililani Mauka to Waiawa (project #55). The total cost of all four second access projects included in the ORTP 2030 is $680 million or approximately 5% of the plan.

5.3.5 Transit Projects

Transit projects are an essential element of transportation plan in a metropolitan area. There are a total of four transit projects included in the ORTP 2030 at a cost of $2.78 billion or approximately 21% of the plan. This category includes the implementation of a rail transit system between Kapolei and Manoa/Waikiki (project #31) at a total cost of $2.57 billion. Also included is an intra island passenger ferry (project #30) from Ewa to Honolulu Harbor at an estimated cost of $23.2 million.

5.3.6 Operations, Maintenance and System Preservation

The ORTP 2030 recognizes the importance of the existing and future roadways and transit systems from the perspective of operations, maintenance and preservation. The plan includes the allocation of funding for these categories totaling $7.47 billion or approximately 55% of the plan cost. This funding covers both the City and State facilities (project #'s 34, 35 and 36).

City operations and maintenance funding (project #34) includes operating the public transit system (TheBus, paratransit, the proposed rail system, and the proposed commuter ferry system), transit vehicle replacement, and roadway system maintenance and operations. A total of approximately $5.62 billion is estimated for City operations and maintenance over the 25-year life of the plan, consisting of about $4.675 billion for transit operations and maintenance, $414 million for replacement of the existing bus fleet, and $532 million for roadway system maintenance and operations.

Maintenance and operation of the State's existing and future highway operations and routine maintenance (project #35) includes, but is not limited to, pavement repair, guardrail and shoulder improvements, lighting improvements, drainage improvements, sign upgrades and replacement, traffic signal upgrade and retrofit. About $850 million is allocated in the plan for State maintenance and operations.

The ORTP 2030 allocates $1.0 billion over the life of the plan to preserving the highway system through projects including, but not limited to, bridge replacement and seismic retrofit, pavement preventative maintenance, erosion control, viaduct improvements, and road resurfacing and rehabilitation projects (project #36).

5.3.7 Illustrative Projects

The illustrative category includes a HOT facility (project #I-1) as a major project. This would be an elevated reversible facility from west of the Waiawa Interchange to the Keehi Interchange and is estimated to cost approximately $2.5 billion.

Also included is the Pearl Harbor Corridor (project #I-5), which would construct an alternative route through Pearl Harbor to provide another connection between the Ewa Plain and Honolulu. A new tunnel beneath the mouth of Pearl Harbor and a series of bridges spanning Pearl Harbor are potential options for this route. This project is included in the illustrative category at an estimated cost of approximately $7 billion.

5.4 TIMING OF PROJECTS

The ORTP projects are divided into two time frames (1) the Mid-Range Plan (2006-2015) and (2) the Long-Range Plan (2016-2030). Projects that have been programmed for several years and are ready or nearing readiness for implementation were placed in the mid-range category, and those that were acknowledged to have characteristics that made them difficult to implement (for example, need for privately owned ROW, high capital costs, etc.) were placed in the long-range category. Other projects were placed into one of the two time frames based on the availability of funding over the 25-year period and the need for certain projects to occur before others in terms of complimentary solutions.

5.4.1 Mid-Range Plan (2006-2015)

There are a total of 36 projects included in the Mid-Range Plan at a cost of $6.786 billion or approximately 50% of the plan. Examples of these include:

- Ferry, Intra-Island Express (project #30)
- Interstate H-1 interchanges at Kapolei, Makakilo, and Palailai (projects 14, 17, and 13, respectively)
- Interstate H-1, Zipper Lane (PM) (project #20)
- Makakilo second access project (project #29)
- North-South Road (project #28)
- Rail Transit, Kapolei to Manoa/Waikiki (project #31)

5.4.2 Long-Range Plan (2016-2030)

There are a total of 30 projects included in the Long-Range Plan at a cost of $6.786 billion or approximately 50% of the plan.

5.4.3 Projects in Both Time Frames

Many of the islandwide projects (including Bike Plan Hawaii #2, enhancement projects #3, intelligent transportation systems #4, and transportation demand management #6) occur in the Mid-Range Plan and are continued in the Long-Range Plan. This is also true for TheBus system expansion (project #32) and transit centers (project #33). Additionally, City and State operations and maintenance funding (projects #34, 35 and 36) is allocated in both the Mid-Range and Long-Range Plans.

5.4.4 Right-of-Way Preservation

The ORTP 2030 provides for preservation of ROW for two projects:

- Kalaeloa East-West Spine Road and;
- Keoneula Boulevard Extension

This has been done in order to establish and preserve the ROW for both of these projects in future updates of the ORTP. These roadways are identified as the two primary roads in the Kalaeloa Master Plan, which was adopted on March 1, 2006. Although a financial feasibility analysis has been conducted, funding for the roads has not been firmly established. Construction of these roadways is also identified in the illustrative project list.

5.5 STATE AND CITY

This section of the report discusses the number of City & County of Honolulu and State of Hawaii projects separately, their total costs, and the projects that have the most support from the respective administrations. It should be noted that some of the projects are combined City and State projects.

While the ORTP 2030 identifies projects as falling under the jurisdiction of either the "City" or the "State", it is done so for reasons of financially balancing the projected revenues with the order-of-magnitude cost estimates. This designation does not preclude an entity other than the City or the State from constructing the roadway partially or in its entirety.

5.5.1 State of Hawaii Designated Projects

There are a total of 36 State designated projects contained in the ORTP 2030, plus another five projects that are designated as shared City/State projects. The total cost of the State projects (including 50% of the cost of the shared projects) is estimated at approximately $4.4 billion. A project's "State" designation does not preclude an entity other than the State of Hawaii from constructing the project partially or in its entirety.

5.5.2 City & County of Honolulu Designated Projects

There are a total of 16 City designated projects contained in the ORTP 2030, plus another five projects that are designated as shared City/State projects. The total cost of the City projects (including 50% of the cost of the shared projects) is estimated at approximately $9.2 billion. A project's "City" designation does not preclude an entity other than the City & County of Honolulu from constructing the project partially or in its entirety.

6.0 ORTP 2030 PERFORMANCE EVALUATION

The projects contained in the ORTP 2030 were evaluated using the evaluation criteria discussed in Chapter 4 and described in Appendix B: transportation service performance, environment/quality of life, land use/transportation integration, and environmental justice criteria. The data necessary to conduct the evaluation analysis for the quantitative transportation service and environmental justice performance measures was obtained from the OahuMPO TDFM. The OahuMPO model was used to forecast transportation conditions for the 2030 Baseline and for the plan to be evaluated for three different time periods: daily, morning peak period, and afternoon peak period. Detailed descriptions of the model coding for the projects in the plan can be found in Appendix F.

Evaluation statistics generated by the TDFM model run in support of the service effectiveness and congestion relief effectiveness performance measures and results of the EJ analysis are detailed in this chapter. Detailed results for the land use sensitivity and resource conservation analyses can be seen in Appendix D.

The analysis/performance evaluation of the ORTP 2030 was aimed at meeting the goals and objectives that were described in Chapter 2. The following sections discuss the performance of the ORTP 2030 through the evaluation of operating conditions and travel statistics with the plan and comparison with the existing conditions and 2030 Baseline conditions discussed earlier in Chapter 3.

6.1 ANALYSIS OF TRANSPORTATION SERVICE EFFECTIVENESS

The transportation service effectiveness goal centers on developing and maintaining Oahu's islandwide transportation system to ensure efficient, safe, convenient and economical movement of people and goods. In this section of the report, various performance indicators are examined and discussed to assess how well the plan fulfills this goal. Year 2000 existing, Baseline 2030, and the ORTP 2030 operating conditions are compared.

6.1.1 Trip Production and Modal Choice

The year 2000 OahuMPO model estimated that approximately 3,288,000 daily person trips occur on the Island of Oahu, the Year 2030 model forecasts that this will increase to 4,291,000 (an increase of 31%). Year 2000 statistics are discussed in Chapter 3 (see Table 3-7).

Table 6-1 presents a side-by-side comparison of the Year 2000 data with the forecast Year 2030 data. Year 2000 estimates show that 85% of the daily person trips are made by residents, while in Year 2030 this increases slightly to 86%. Overall there is an increase of 880,000 daily resident trips between 2000 and 2030. The distribution of trip type shown in Table 6-1 is generally constant between 2000 and 2030. Visitor trips, while increasing by 29% by the Year 2030, still comprise 12% of the total daily trips, the same as in 2000.

TABLE 6-1
DAILY PERSON TRIPS (YEAR 2000 AND YEAR 2030)

Purpose of Trip	Year 2000 Daily Person Trips	% of total trips	Year 2030 Daily Person Trips	% of total trips	% Increase in Trips (Year 2000 to Year 2030)
Trips by Residents					
1. To and from work	906,000	27%	1,163,000	27%	28%
2. While at work	187,000	6%	249,000	6%	33%
3. To and from school/university	272,000	8%	359,000	8%	32%
4. To and from shopping/other	1,008,000	31%	1,344,000	31%	33%
5. Do not end at work or home	417,000	13%	555,000	13%	33%
Other Trips					
6. Trips by truck	44,000	1%	53,000	1%	20%
7. Ground access trips by air passengers	60,000	2%	60,000	1%	0%
8. Trips by visitors	394,000	12%	508,000	12%	29%
Total Daily Person Trips	**3,288,000**	**100%**	**4,291,000**	**100%**	31%

TABLE 6-2
MODE SPLIT ESTIMATES (BASELINE 2030 AND ORTP 2030)

Mode	Year 2000 Daily Resident Person Trips	Percentage	Baseline Year 2030 Daily Resident Person Trips	Percentage	ORTP 2030 Daily Resident Person Trips	Percentage	Difference Between Baseline & ORTP 2030	% Difference Between Baseline & ORTP 2030
Automobile Trips	2,344,000	84.0%	3,080,000	83.8%	2,972,000	81.0%	-108,000	-3.5%
Transit Trips	160,000	5.7%	203,000	5.5%	326,000	8.9%	123,000	60.6%
Bicycle and Walk Trips	285,000	10.2%	392,000	10.7%	373,000	10.1%	-19,000	-4.8%
Total Daily Resident Person Trips	**2,789,000**	**100%**	**3,675,000**	**100%**	**3,671,000**	**100%**	**-4,000**	**-0.1%**

Figure 6-1: Baseline Year 2030 Daily Resident Person Trips

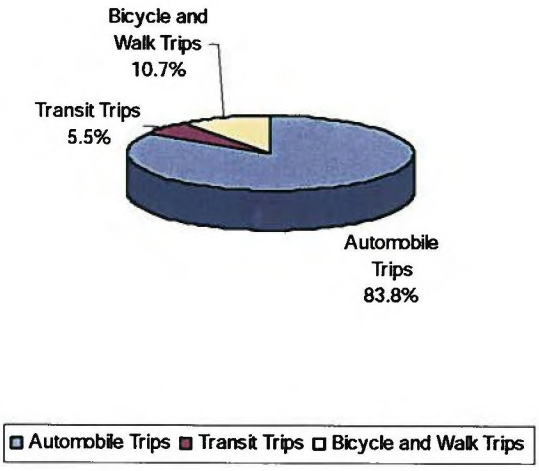


Figure 6-2: ORTP 2030 Daily Resident Person Trips

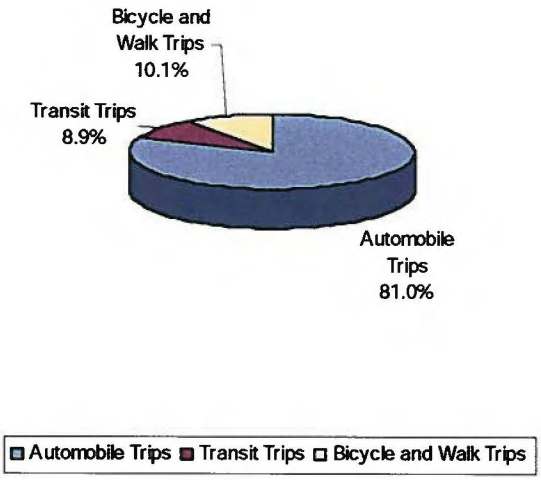


Table 6-2 details the mode split estimates for the Baseline 2030 and ORTP 2030 conditions. The data in the table shows that the mode choice estimates are very close overall in daily person trips but the largest difference between the baseline and the plan are that the automobile trips decrease by almost 4% while transit trips increase by close to 61%. The overall mode share of transit with the ORTP 2030 increases from approximately 6% to 9%, reflecting the improvements made to the transit system (including the rail transit and commuter ferry systems) while the automobile mode share decreases from approximately 84% to 81%. There is also a decrease projected in bike and walk trips.

Table 3-8 in Chapter 3 describes the mode shares for the Year 2000 and there is a 32% increase (880,000) in daily resident trips between Years 2000 and 2030. The baseline mode share is slightly different from the ORTP 2030, by 4,000 daily resident person trips.

6.1.2 Transit Ridership

Transit ridership statistics reveal the effectiveness of improvements made to the transit system as a whole. Table 6-3 illustrates the effectiveness of the ORTP 2030 with respect to the transit projects implemented through the plan.

Year 2000 versus ORTP 2030

Table 6-3 and Figure 6-3 provide a summary of ridership statistics for 2000 and ORTP 2030, including both resident and visitor trips. The statistics show that between Year 2000 and ORTP 2030 there will be an overall increase in transit ridership of 170,000 daily trips or approximately 88%. Transit trips in the peak period are projected to increase approximately 92% or 116,000 additional trips. Transit trips are projected to increase by 54,000 trips or almost 80% during the off peak.

Baseline 2030 versus ORTP 2030

Table 6-3 and Figure 6-3 also provide a summary of ridership statistics for baseline 2030 and ORTP 2030, including both resident and visitor trips. The statistics show that between the Baseline 2030 and ORTP 2030 there will be an overall increase in transit ridership of 126,000 daily trips or approximately 53%. Transit trips in the peak period are projected to increase approximately 56% or 87,000 additional trips. Transit trips are projected to increase by 39,000 trips or almost 47% during the off peak.

6.1.3 Average Vehicle Occupancy and Ridership

AVO is often defined as a measure of travel efficiency, and represents the number of people traveling by automobile, divided by the number of automobiles used. AVO is indicative of the number of single-occupant vehicles; so, a higher AVO represents automobiles with more than one occupant.

The AVO estimated by the Oahu travel demand model for Year 2000 was 1.15 rising to 1.16 for the Baseline 2030. Under the ORTP 2030 the AVO fell back to 1.15.

AVR is also a measure of efficiency. It represents all people traveling by any mode, divided by the number of automobiles used. The higher the AVR, the better an area is doing in terms of the transportation network's efficiency, energy consumption, and air pollution.

The AVR estimated by the Oahu travel demand model for Year 2000 was calculated at 1.36 and holding at 1.36 for the Baseline Year 2030. Under the ORTP 2030, the AVR rose to 1.52 indicating the effectiveness of ORTP 2030 improvements on increasing mode share for alternative modes.

TABLE 6-3
TRANSIT TRIPS* FOR OAHU (YEAR 2000, BASELINE 2030 AND ORTP 2030)

Time Period	Year 2000	ORTP 2030	Difference	Percentage Difference	Baseline Year 2030	ORTP 2030	Difference	Percentage Difference
AM and PM Peak Periods	126,000	242,000	116,000	92.1%	155,000	242,000	87,000	56.1%
Off-Peak Period	68,000	122,000	54,000	79.4%	83,000	122,000	39,000	47.0%
Daily Total	**194,000**	**364,000**	**170,000**	**87.6%**	**238,000**	**364,000**	**126,000**	**52.9%**

* Includes visitor trips

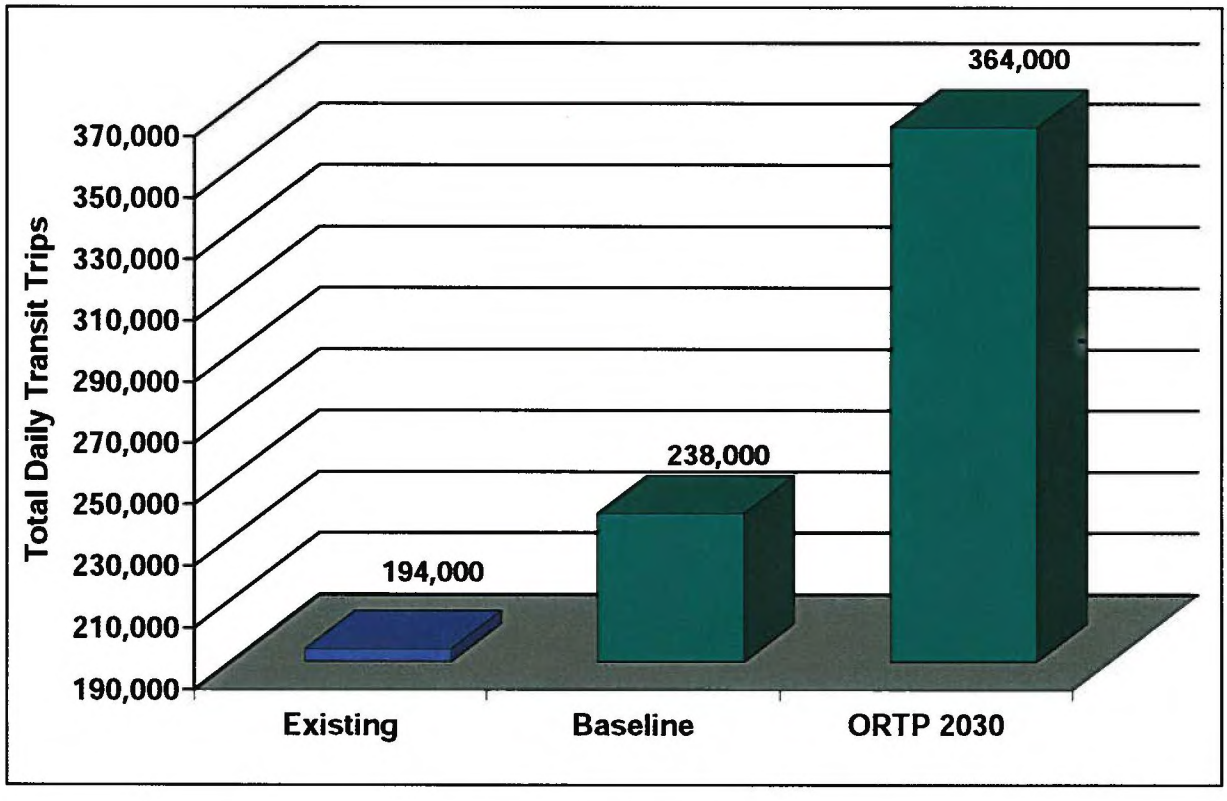


FIGURE 6-3: DAILY TRANSIT TRIPS*

6.1.4 Vehicle Miles and Hours Traveled

VMT is another service effectiveness indicator that can be used when comparing travel statistics. For example, the effectiveness of transportation projects can be assessed based on reduction in VMT. Table 6-4 and Figure 6-4 summarize the results for 2000, Baseline 2030 and ORTP 2030.

TABLE 6-4
CHANGES IN VMT ON CLASSIFIED SYSTEM
(YEAR 2000, BASELINE 2030 AND ORTP 2030)

Facility Type	Daily VMT				Daily VMT			
	Year 2000	ORTP 2030	Difference	Percentage Difference	Baseline 2030	ORTP 2030	Difference	Percentage Difference
Freeways	5,188,000	6,576,000	1,388,000	27%	6,829,000	6,576,000	-253,000	-4%
Expressways	1,527,000	1,729,000	202,000	13%	1,749,000	1,729,000	-20,000	-1%
Arterials	3,653,000	4,481,000	828,000	23%	4,892,000	4,481,000	-411,000	-8%
Collectors	1,213,000	1,378,000	165,000	14%	1,580,000	1,378,000	-202,000	-13%
Total	11,581,000	14,164,000	2,583,000	22%	15,050,000	14,164,000	-886,000	-6%

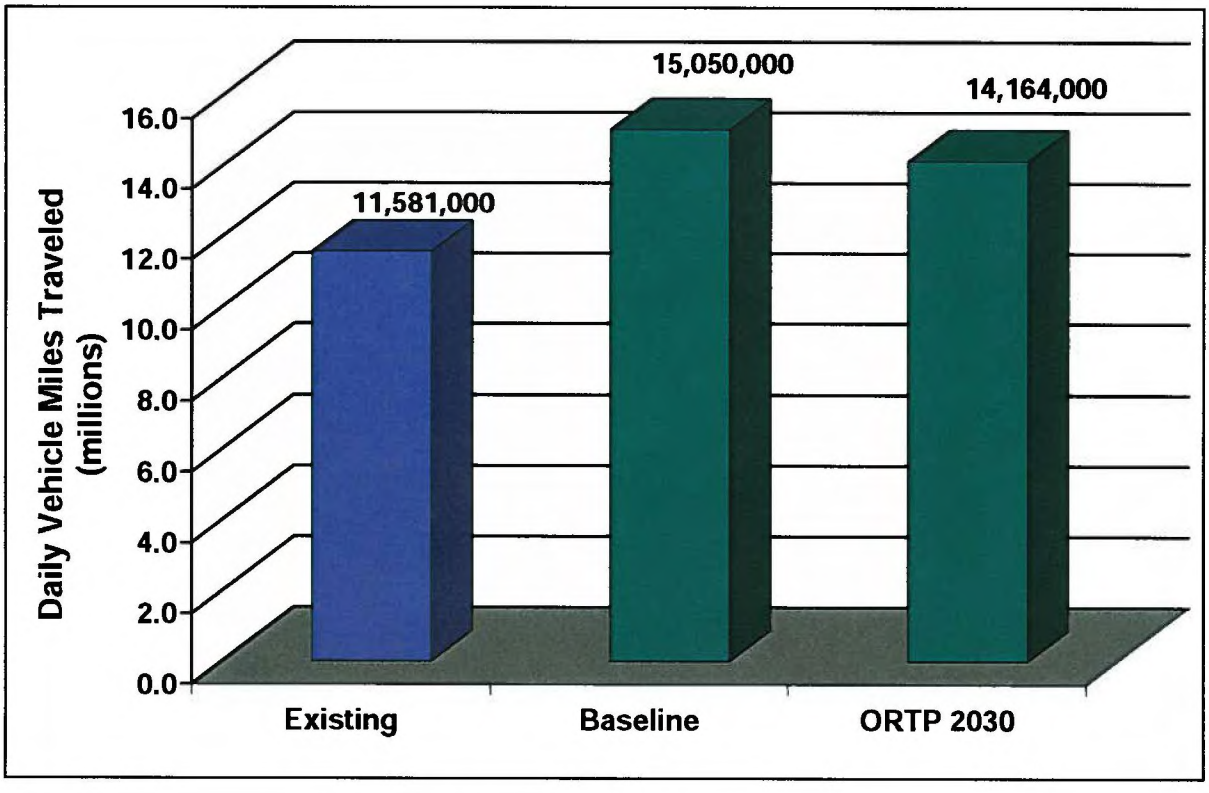


FIGURE 6-4: DAILY VEHICLE MILES TRAVELED

TABLE 6-5
CHANGES IN VHT ON CLASSIFIED SYSTEM
(YEAR 2000, BASELINE YEAR 2030 AND ORTP 2030)

Facility Type	Daily VHT				Daily VHT			
	Year 2000	ORTP 2030	Difference	Percentage Difference	Baseline 2030	ORTP 2030	Difference	Percentage Difference
Freeways	110,000	132,000	22,000	20%	240,000	132,000	-108,000	-45%
Expressways	28,000	32,000	4,000	14%	61,000	32,000	-29,000	-48%
Arterials	110,000	129,000	19,000	17%	206,000	129,000	-77,000	-37%
Collectors	45,000	49,000	4,000	9%	68,000	49,000	-19,000	-28%
Total	293,000	342,000	49,000	17%	575,000	342,000	-233,000	-41%

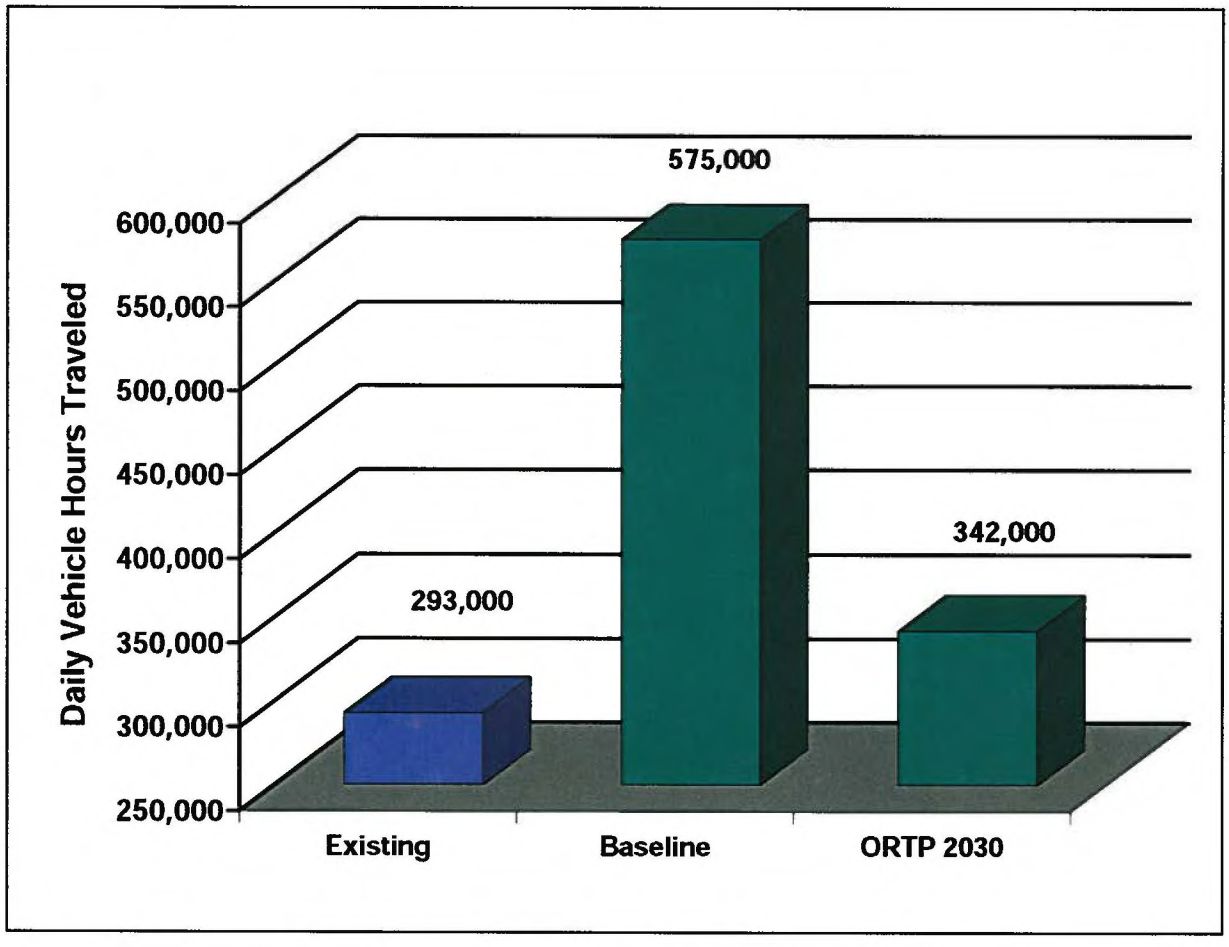


FIGURE 6-5: DAILY VEHICLE HOURS TRAVELED

As shown in the table and figure, VMT increases for the Baseline 2030 over the Year 2000 for all facility types. With the ORTP 2030, levels of VMT are projected to decline from the baseline highs, but do not fall sufficiently to obtain Year 2000 levels. Overall there is a 22% increase in VMT when compared to Year 2000 conditions (less than the 28% projected increase in Oahu

population), while there is an overall 6% decrease when compared to Baseline 2030 levels, demonstrating that the plan is effective in reducing VMT over forecast conditions in 2030.

VHT is an indicator of how travel demand influences congestion in the system from a travel time standpoint. Table 6-5 and Figure 6-5 present a breakdown of the results comparing Year 2000, Baseline 2030 and ORTP 2030. Overall the results indicate that there is a 17% (49,000 hours) increase in VHT over Year 2000 conditions but a decrease of 41% (342,000 hours) over Baseline 2030 conditions with the ORTP 2030. The large decrease over Baseline 2030 conditions indicates the effectiveness of the plan in reducing congestion. The largest percentage decreases on individual facilities occur on the expressways, followed by freeways.

6.1.5 Safety

Safety is a very important issue in the ORTP 2030 and one of the most important goals in highway planning is the reduction of accidents. In terms of addressing safety, the ORTP 2030 includes a number of safety projects aimed at improving conditions and hence accidents. Although there are four safety projects included in the plan specifically to address safety issues. It should be noted that safety and operational improvements are often part of improvement projects included in other categories. Types of safety improvements reflected in the ORTP 2030 include:

- Construction of turning lanes
- Sidewalks
- Wheelchair ramps
- Bike paths/lanes
- Traffic signal upgrades
- Guardrails
- Signage
- Installation of flashers
- Crosswalks
- Warning devices
- Rockfall protection

6.1.6 Screenline Level of Service

AM Peak Hour Level of Service

Table 6-6 summarizes the calculated V/C ratios and estimated LOS grades of each facility for the AM peak hour and Figure 6-6 presents the peak direction screenline LOS. The table shows V/C and LOS in both directions, while the figure indicates peak (inbound) direction. The analysis indicates the effectiveness of the ORTP 2030 in reducing the level of congestion over the Baseline 2030 conditions.

Under Baseline 2030 conditions, there are nine screenlines projected to operate at LOS E or F in the AM peak hour. With the ORTP 2030, this is projected to decrease to four locations: the westbound screenline east of Ward Avenue, the eastbound Kalauao screenline, the eastbound Ewa screenline, and the westbound Ainakoa screenline. The first three of these locations

improve from a projected LOS F to LOS E. The Ainakoa screenline remains at LOS F because there are no improvements in the plan for Kalanianaole Highway at this location.

Five locations are projected to improve from LOS E or F to LOS D or better: the eastbound screenline east of Ward Avenue, the eastbound Kapalama drainage canal screenline, the eastbound Waikele Stream screenline, the southbound Kahe Point screenline, and both directions at the Kapolei screenline.

PM Peak Hour Level of Service

Table 6-7 summarizes the calculated V/C ratios and estimated LOS grades of each facility for the PM peak hour and Figure 6-7 presents the peak direction screenline LOS. The table shows V/C and LOS in both directions, while the figure indicates peak (outbound) direction. The analysis indicates the effectiveness of the ORTP 2030 in reducing the level of congestion over the Baseline 2030 conditions.

Under Baseline 2030 conditions, there are seven screenlines that are projected to operate at LOS E or F in the PM peak hour. With the ORTP 2030, this is projected to decrease to two locations, the westbound screenline east of Ward Avenue and the eastbound Ainakoa screenline. The Ward Avenue screenline improves from a projected LOS F to LOS E. The Ainakoa screenline remains at LOS F because there are no improvements in the plan for Kalanianaole Highway at this location.

Five locations are projected to improve from LOS E or F to LOS D or better: the eastbound screenline east of Ward Avenue, the westbound Kapalama drainage canal screenline, the westbound Kalauao screenline, both directions at the Waikele Stream screenline, the northbound Kahe Point screenline, and the westbound Ewa screenline.

TABLE 6-6
ORTP 2030 LEVEL OF SERVICE ANALYSIS AT SCREENLINES
AM PEAK HOUR

SCREENLINE/FACILITY	BASELINE YEAR 2030				ORTP 2030			
	Total Capacity (vph)	Total Volume (vph)	Volume/Capacity Ratio	Level of Service	Total Capacity (vph)	Total Forecast Volume (vph)	Volume/Capacity Ratio	Level of Service
1. NUUANU STREAM BRIDGE								
Westbound	19,800	14,185	0.72	C	19,800	13,955	0.70	B
Eastbound	20,450	19,822	0.97	E	22,650	16,111	0.71	C
2. MANOA-PALOLO DRAINAGE CANAL/ ALA WAI CANAL								
Westbound	21,000	15,787	0.75	C	21,000	14,467	0.69	B
Eastbound	19,750	12,508	0.63	B	19,750	10,666	0.54	A
3. EAST OF WARD AVENUE								
Westbound	17,200	17,885	1.04	F	17,200	16,391	0.95	E
Eastbound	17,900	18,116	1.01	F	20,100	15,285	0.76	C
4. KAPALAMA DRAINAGE CANAL								
Westbound	14,900	12,236	0.82	D	17,950	12,585	0.70	B
Eastbound	15,650	17,862	1.14	F	20,750	16,623	0.80	C
5. KALAUAO								
Westbound	13,950	9,174	0.66	B	13,950	8,888	0.64	B
Eastbound	18,350	21,773	1.19	F	20,550	18,902	0.92	E
6. WAIKELE STREAM								
Westbound	13,000	9,831	0.76	C	16,350	9,207	0.56	A
Eastbound	11,850	15,265	1.29	F	15,200	13,110	0.86	D
7. KAHE POINT								
Northbound	2,500	1,259	0.50	A	3,750	1,298	0.35	A
Southbound	2,500	2,909	1.16	F	3,750	2,823	0.75	C
8. EWA								
Westbound	11,150	9,042	0.81	D	14,600	7,617	0.52	A
Eastbound	12,400	15,285	1.23	F	15,850	14,350	0.91	E
9. TRANS KOOLAU								
Westbound	11,000	9,787	0.89	D	11,000	9,120	0.83	D
Eastbound	11,000	3,247	0.30	A	11,000	2,846	0.26	A
10. WAIPIO								
Northbound	13,650	6,152	0.45	A	16,400	7,417	0.45	A
Southbound	14,800	9,721	0.66	B	16,400	9,988	0.61	B
11. MILILANI								
Northbound	8,200	4,963	0.61	B	9,100	4,327	0.48	A
Southbound	8,200	3,601	0.44	A	9,100	2,630	0.29	A
12. HALEIWA								
Northbound	2,650	716	0.27	A	2,650	532	0.20	A
Southbound	2,650	1,447	0.55	A	2,650	1,470	0.55	A
13. WAIMEA BRIDGE								
Northbound	1,250	481	0.39	A	1,250	326	0.26	A
Southbound	1,250	582	0.47	A	1,250	605	0.48	A
14. HAUULA (KAIPAPAU BRIDGE)								
Northbound	1,250	517	0.41	A	1,250	453	0.36	A
Southbound	1,250	901	0.72	C	1,250	629	0.50	A
15. KAHALUU (KAMEHAMEHA HIGHWAY)								
Northbound	1,250	1,010	0.81	D	1,250	823	0.66	B
Southbound	1,250	460	0.37	A	1,250	456	0.36	A
16. KANEOHE-KAILUA								
Westbound	8,500	3,781	0.44	A	8,500	3,739	0.44	A
Eastbound	8,500	2,796	0.33	A	8,500	2,727	0.32	A
17. MAUNAWILI								
Westbound	3,300	2,832	0.86	D	3,300	2,843	0.86	D
Eastbound	3,300	932	0.28	A	3,300	1,154	0.35	A
18. SANDY'S BEACH PARK								
Westbound	1,250	623	0.50	A	1,250	280	0.22	A
Eastbound	1,250	537	0.43	A	1,250	474	0.38	A
19. OLOMANA (WAIMANALO BRIDGE)								
Northbound	1,250	1,076	0.86	D	1,250	1,058	0.85	D
Southbound	1,250	1,070	0.86	D	1,250	800	0.64	B
20. AINAKOA								
Westbound	5,800	6,537	1.13	F	5,800	6,196	1.07	F
Eastbound	2,900	1,800	0.62	B	2,900	1,892	0.65	B
21. SALT LAKE								
Westbound	22,600	9,069	0.40	A	22,600	8,728	0.39	A
Eastbound	29,800	21,083	0.71	C	29,800	17,216	0.58	A
22. KAPOLEI								
Northbound	5,900	6,239	1.06	F	8,850	4,075	0.46	A
Southbound	4,750	5,013	1.06	F	8,850	4,276	0.48	A

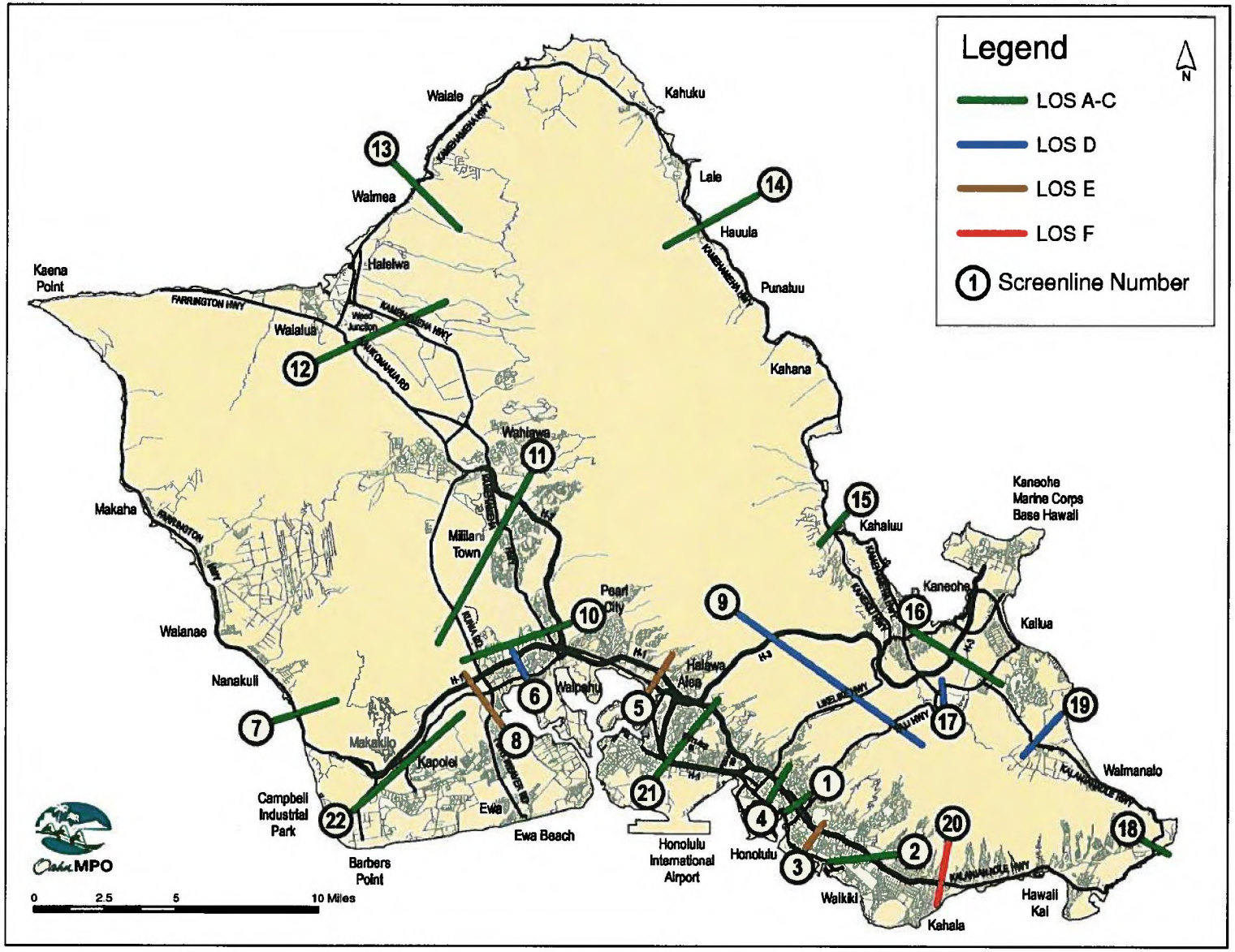


FIGURE 6-6: AM PEAK HOUR SCREENLINE LEVEL OF SERVICE INBOUND (ORTP 2030)

TABLE 6-7
ORTP 2030 LEVEL OF SERVICE ANALYSIS AT SCREENLINES
PM PEAK HOUR

SCREENLINE/FACILITY	BASELINE YEAR 2030				ORTP 2030			
	Total Capacity (vph)	Total Volume (vph)	Volume/Capacity Ratio	Level of Service	Total Capacity (vph)	Total Forecast Volume (vph)	Volume/Capacity Ratio	Level of Service
1. NUUANU STREAM BRIDGE								
Westbound	19,800	17,328	0.88	D	19,800	14,700	0.74	C
Eastbound	20,450	14,582	0.71	C	22,650	14,017	0.62	B
2. MANOA-PALOLO DRAINAGE CANAL/ ALA WAI CANAL								
Westbound	20,250	14,146	0.70	B	20,250	12,853	0.63	B
Eastbound	20,500	16,794	0.82	D	20,500	16,115	0.79	C
3. EAST OF WARD AVENUE								
Westbound	15,500	15,580	1.01	F	15,500	14,313	0.92	E
Eastbound	21,300	19,550	0.92	E	23,500	18,415	0.78	C
4. KAPALAMA DRAINAGE CANAL								
Westbound	15,750	16,846	1.07	F	20,850	16,172	0.78	C
Eastbound	15,650	13,178	0.84	D	17,850	13,292	0.74	C
5. KALAUAO								
Westbound	18,350	18,503	1.01	F	20,550	16,895	0.82	D
Eastbound	16,150	11,897	0.74	C	16,150	11,575	0.72	C
6. WAIKELE STREAM								
Westbound	13,000	11,923	0.92	E	18,550	11,262	0.61	B
Eastbound	11,850	10,852	0.92	E	13,000	10,530	0.81	D
7. KAHE POINT								
Northbound	2,500	2,613	1.05	F	3,750	2,591	0.69	B
Southbound	2,500	1,421	0.57	A	3,750	1,435	0.38	A
8. EWA								
Westbound	11,150	12,151	1.09	F	16,800	12,080	0.72	C
Eastbound	12,400	9,961	0.80	C	15,850	8,946	0.56	A
9. TRANS KOOLAU								
Westbound	11,000	3,788	0.34	A	11,000	3,766	0.34	A
Eastbound	11,000	7,402	0.67	B	11,000	7,247	0.66	B
10. WAIPIO								
Northbound	13,650	8,887	0.65	B	16,400	9,357	0.57	A
Southbound	14,800	6,963	0.47	A	16,400	7,945	0.48	A
11. MILILANI								
Northbound	8,200	4,422	0.54	A	9,100	3,665	0.40	A
Southbound	8,200	5,184	0.63	B	9,100	4,195	0.46	A
12. HALEIWA								
Northbound	2,650	1,502	0.57	A	2,650	1,476	0.56	A
Southbound	2,650	1,028	0.39	A	2,650	970	0.37	A
13. WAIMEA BRIDGE								
Northbound	1,250	799	0.64	B	1,250	797	0.64	B
Southbound	1,250	779	0.62	B	1,250	710	0.57	A
14. HAUULA (KAIPAPAU BRIDGE)								
Northbound	1,250	750	0.60	A	1,250	624	0.50	A
Southbound	1,250	619	0.50	A	1,250	586	0.47	A
15. KAHALUU (KAMEHAMEHA HIGHWAY)								
Northbound	1,250	740	0.59	A	1,250	729	0.58	A
Southbound	1,250	906	0.73	C	1,250	821	0.66	B
16. KANEOHE-KAILUA								
Westbound	8,500	3,152	0.37	A	8,500	3,170	0.37	A
Eastbound	8,500	3,720	0.44	A	8,500	3,764	0.44	A
17. MAUNAWILI								
Westbound	3,300	1,404	0.43	A	3,300	1,520	0.46	A
Eastbound	3,300	2,496	0.76	C	3,300	2,493	0.76	C
18. SANDY'S BEACH PARK								
Westbound	1,250	630	0.50	A	1,250	572	0.46	A
Eastbound	1,250	682	0.55	A	1,250	572	0.46	A
19. OLOMANA (WAIMANALO BRIDGE)								
Northbound	1,250	1,031	0.82	D	1,250	960	0.77	C
Southbound	1,250	1,070	0.86	D	1,250	1,028	0.82	D
20. AINAKOA								
Westbound	4,350	2,478	0.57	A	4,350	2,510	0.58	A
Eastbound	4,350	4,961	1.14	F	4,350	4,881	1.12	F
21. SALT LAKE								
Westbound	27,000	16,340	0.61	B	29,200	14,077	0.48	A
Eastbound	27,600	11,629	0.42	A	27,600	10,856	0.39	A
22. KAPOLEI								
Northbound	5,900	4,374	0.74	C	8,850	4,094	0.46	A
Southbound	4,750	4,234	0.89	D	8,850	3,418	0.39	A

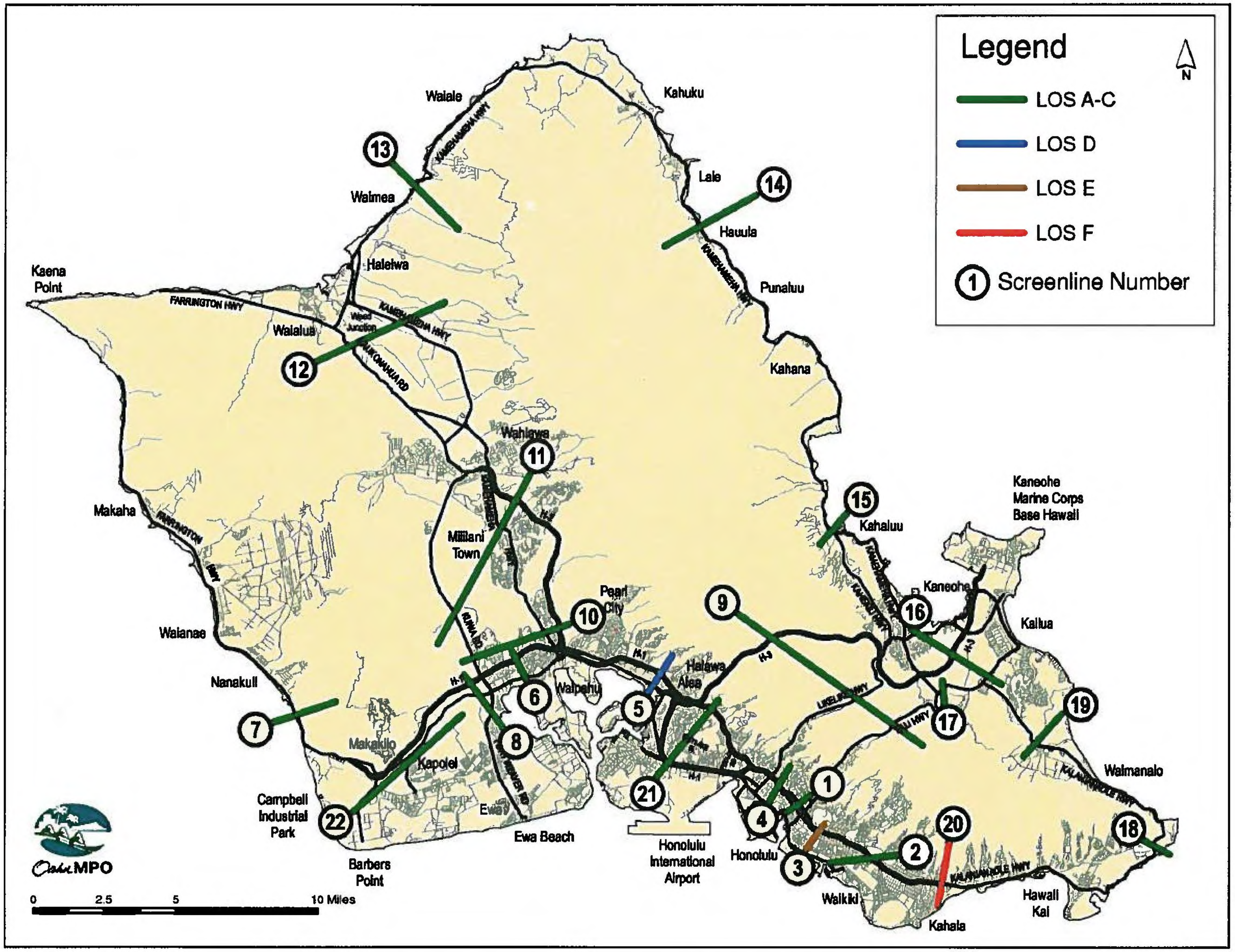


FIGURE 6-7: PM PEAK HOUR SCREENLINE LEVEL OF SERVICE OUTBOUND (ORTP 2030)

6.1.7 Vehicle Hours of Delay

VHD is defined as the difference between vehicles hours traveled under congested conditions and vehicle hours of travel that would otherwise be expected under free flow conditions. These values were calculated directly from the model forecasts and are a good indicator of the level of congestion in the system. Table 6-8 and Figure 6-8 show that overall, with the ORTP 2030, delay is projected to decrease dramatically over the Baseline 2030 conditions to a level that is comparable to with the Year 2000 levels of delay. Recognizing that delay will increase from existing conditions, the collective impact of the ORTP 2030 projects will result in a decrease on expressways (91%) followed by arterials at 89% compared to the Baseline 2030 condition. The large improvements in delay can be directly attributed to the transportation improvement projects in the ORTP 2030.

TABLE 6-8
CHANGES IN DELAY ON CLASSIFIED SYSTEM
(YEAR 2000, BASELINE 2030 AND ORTP 2030)

Facility Type	Daily Delay				Daily Delay			
	Year 2000	ORTP 2030	Difference	Percentage Difference	Baseline 2030	ORTP 2030	Difference	Percentage Difference
Freeways	23,000	22,000	(1,000)	-4%	126,000	22,000	-104,000	-83%
Expressways	2,000	3,000	1,000	50%	32,000	3,000	-29,000	-91%
Arterials	12,000	8,000	(4,000)	-33%	73,000	8,000	-65,000	-89%
Collectors	5,000	4,000	(1,000)	-20%	16,000	4,000	-12,000	-75%
Total	**42,000**	**37,000**	**(5,000)**	**-12%**	**247,000**	**37,000**	**-210,000**	**-85%**

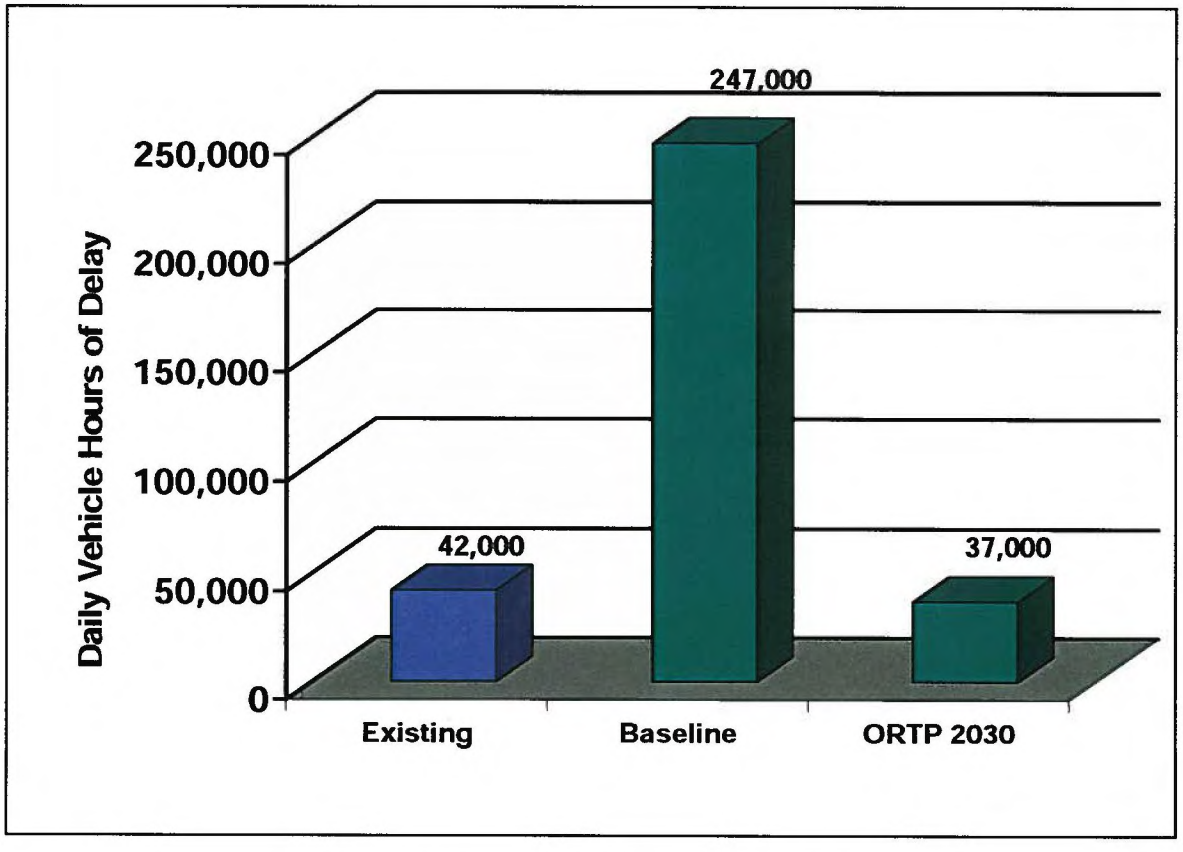


FIGURE 6-8 DAILY VEHICLE HOURS OF DELAY

6.1.8 Locations of Significant Congestion

The V/C ratio at a particular location can be used to determine the level of congestion experienced. For the purpose of this study, locations operating at LOS E or F are defined as significantly congested. The roadway facilities projected to experience significant congestion during the AM peak period under ORTP 2030 conditions are illustrated in Figure 6-9. When compared with the Baseline 2030 conditions shown in Figure 3-17, the data shown in this figure shows a significant improvement over the Baseline 2030 conditions, with congestion decreasing in Waianae, the PUC, and on Interstate H-1. A summary of the key remaining congested locations are highlighted in Figure 6-9.

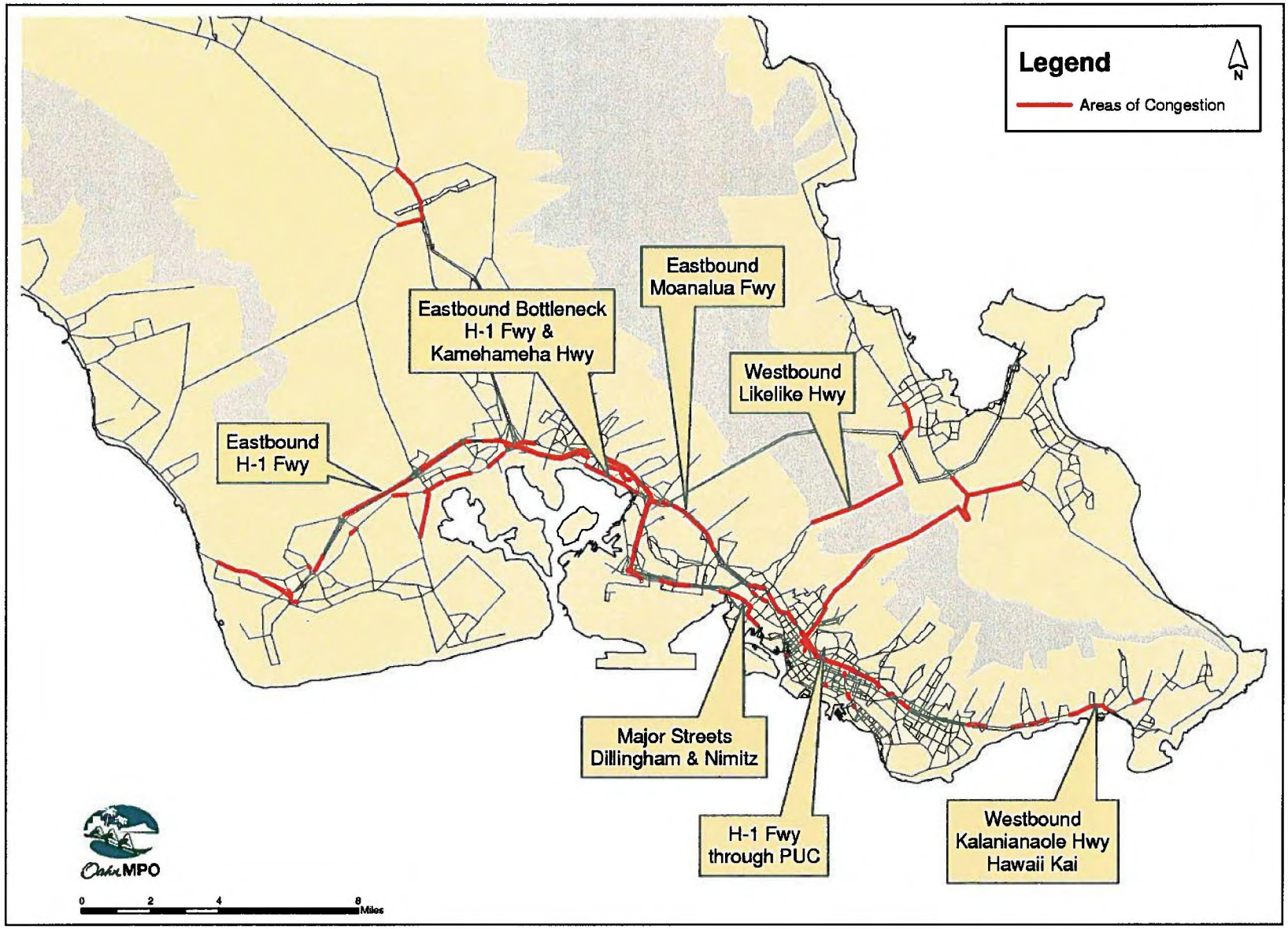


FIGURE 6-9: LOCATIONS OF SIGNIFICANT AM PEAK PERIOD CONGESTION (ORTP 2030)

6.1.9 Travel Time

Travel time provides an indication as to how much time is required to complete a specific journey during a specific time period. For the purposes of the ORTP 2030, travel times were calculated during the two-hour AM peak period from all the traffic analysis zones (TAZs) across the island to downtown Honolulu by the travel demand model. It should also be noted that the times represent an average travel time from all TAZs across the island to a single destination in Downtown.

The travel time results show that the average travel time to downtown with the ORTP 2030 is 21 minutes which represents savings of 26 minutes over the Baseline 2030 conditions and 1.7 minutes over the Year 2000.

The average travel time per vehicle trip shows that the ORTP 2030 achieves a value of 10.4 minutes compared to the Baseline 2030 of 16.8 minutes and 11.5 minutes in the Year 2000. This amounts to improvements of -6.4 minutes and -1.1 minutes over the Baseline 2030 and Year 2000 respectively.

Figure 6-10 depicts travel time for the ORTP 2030 to downtown as estimated by the model. Figure 6-11 shows the projected net changes in travel time between the Baseline 2030 and ORTP 2030. Figure 6-11 shows that the areas benefiting the most from the ORTP 2030 projects are Waianae, Ewa and Kapolei, which all experience significant travel time savings. It should be noted that, while travel time from Waianae and the North Shore has improved, some pockets within these areas will still experience travel times to downtown in excess of 80 minutes.

Figure 6-12 shows the travel time savings to downtown when comparing the ORTP 2030 with the Year 2000 (refer to Figure 3-18 for Year 2000 travel times to downtown). This figure indicates that in 2030, many areas on the island will experience marginally improved travel times over the existing conditions, while some areas (e.g. Kailua, Waimanalo and East Honolulu) will worsen slightly. It should also be noted that even with all the projects that are included in the ORTP 2030, travel time to downtown is not expected to decrease dramatically when compared with Year 2000 conditions.

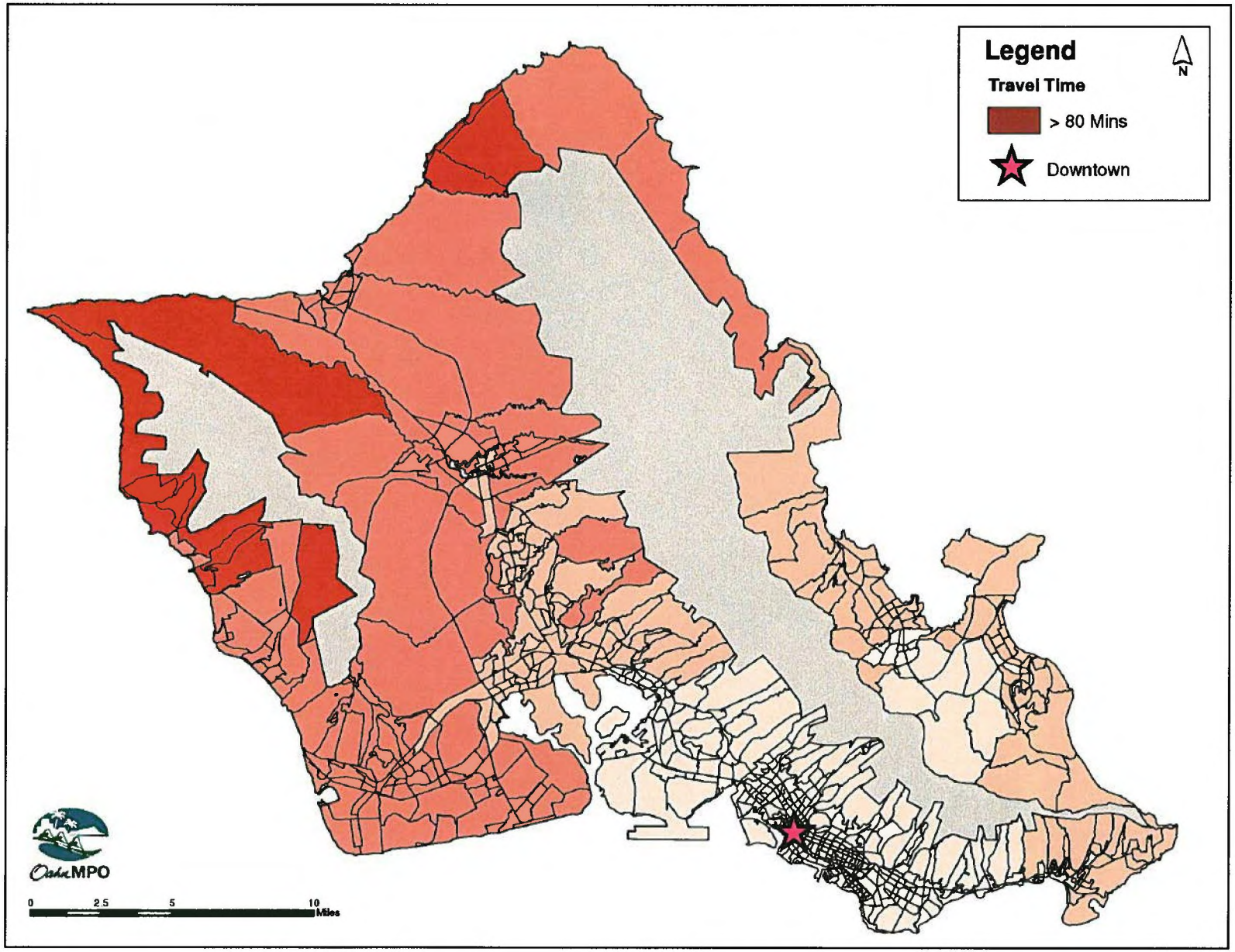


FIGURE 6-10: AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (ORTP 2030)

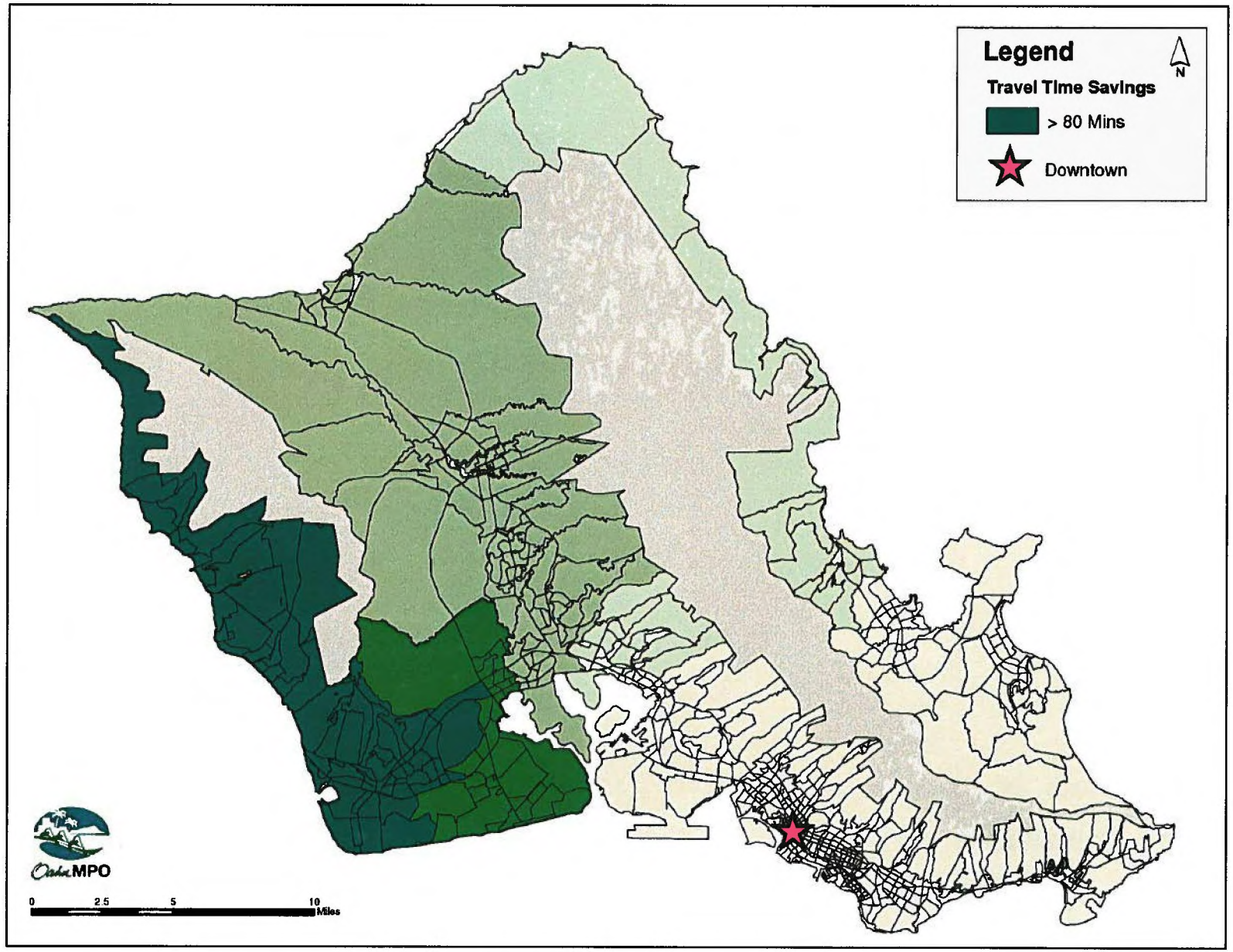


FIGURE 6-11: CHANGE IN AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (BASELINE 2030 TO ORTP 2030)

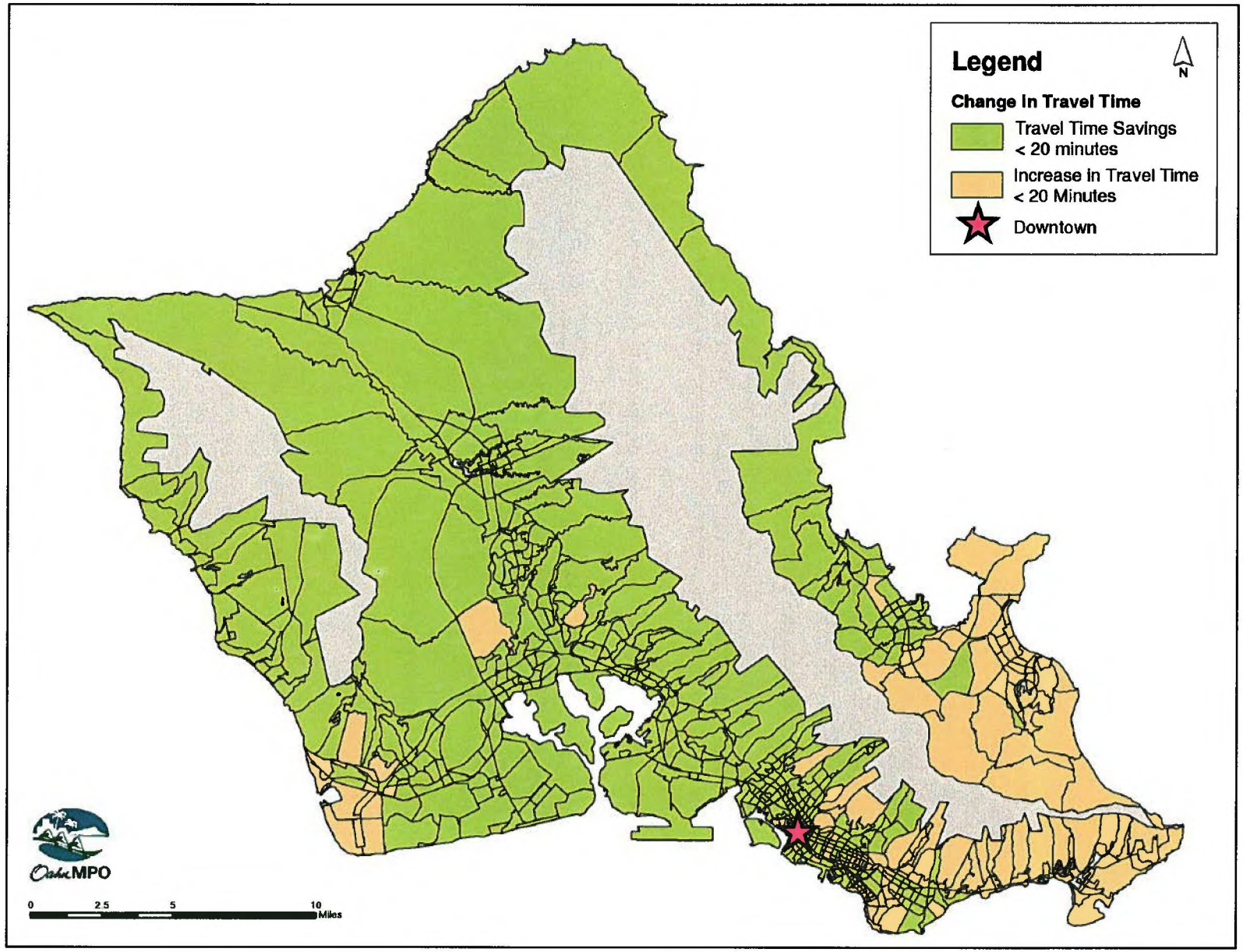


FIGURE 6-12: CHANGE IN AM PEAK PERIOD TRAVEL TIME TO DOWNTOWN (YEAR 2000 TO ORTP 2030)

6.1.10 Summary

The key findings of the transportation service performance measures are presented in Table 6-9.

Comparing the ORTP 2030 to the Year 2000 conditions:

- The added population growth and roadways in the ORTP 2030 will generate more travel during the day, resulting in an increase in VMT and VHT. However, the added transportation improvements in the ORTP 2030 are forecast to reduce the average travel time per vehicle trip from 11.5 minutes to 10.4 minutes. Daily vehicle hours of delay decreases from 42,000 hours to 37,000 hours.
- The transit mode share (by residents) is projected to increase from 5.7% to 8.9%, with the percent by automobile decreasing and bike/walk trips remaining about the same. The increase in transit mode share translates into 166,000 additional transit riders (170,000 additional transit riders with visitors).
- AVR is projected to increase from 1.36 to 1.52, indicating a greater use of transit.
- Indicators for traffic congestion during the morning and afternoon peak periods are mixed. From the statistics below and with an islandwide perspective, auto drivers can expect more "bottlenecks," slightly worse travel times to Kapolei and a little better travel time to Downtown.
    - The number of screenlines that are projected to operate at LOS E or F increases from two locations to six locations.
    - Average travel times from every TAZ on Oahu to Downtown decreases by 1.7 minutes, from 22.7 minutes to 21.0 minutes.
    - Average travel times from every TAZ on Oahu to Kapolei increases by half a minute, from 22.7 minutes to 23.2 minutes.

Comparing the ORTP 2030 to the Baseline 2030 conditions:

- The ORTP 2030 is forecast to have substantial improvements in service effectiveness with reductions in VMT, VHT, and average travel time per vehicle trip from projected Year 2030 Baseline conditions. The results indicate that the plan would reduce the number of miles and hours spent by people in automobiles to make trips.
- The transit mode share (by residents) is projected to increase to 8.9% (3.4% more than the baseline condition), with the percent by automobile and bike/walk trips decreasing. The increase in transit modes share translates into 123,000 additional transit riders (126,000 additional transit trips with visitors).
- Indicators for traffic congestion during the morning and afternoon peak periods are positive, suggesting that the ORTP 2030 will alleviate the substantially increased delays and travel times projected in the Baseline 2030 along the H-1 travel corridor. From the statistics below and with an islandwide perspective, auto drivers can expect less "bottlenecks" and improved travel times to Kapolei and Downtown.

- The number of screenlines that are projected to operate at LOS E or F in either the AM or PM peak hours decreases from 20 locations to six locations. This is a substantial reduction.
- The number of locations of significant congestion would be reduced.
- Average travel times from every TAZ on Oahu to Downtown decreases by 26.0 minutes, from 47.0 minutes to 21.0 minutes.
- Average travel times from every TAZ on Oahu to Kapolei decreases by 24.9 minutes, from 48.1 minutes to 23.2 minutes.

TABLE 6-9
SUMMARY OF EFFECTIVENESS OF TRANSPORTATION SERVICE PERFORMANCE MEASURES

Measures of Effectiveness	2000	Baseline 2030	ORTP 2030 Value	ORTP 2030 Change from 2000	ORTP 2030 Change from Baseline
Service Effectiveness:					
Mode Split (daily resident person trips)					
Auto	84.0%	83.8%	81.0%	-3.0%	-2.8%
Transit	5.7%	5.5%	8.9%	3.2%	3.4%
Bike & Walk	10.2%	10.7%	10.1%	-0.1%	-0.6%
Transit Trips (daily, with visitors)	194,000	238,000	364,000	170,000	126,000
Home-Work Average Vehicle Occupancy (AVO)	1.15	1.16	1.15	0.00	-0.01
Home-Work Average Vehicle Ridership (AVR)	1.36	1.36	1.52	0.16	0.16
Vehicle Miles Traveled (VMT) (daily)	11,581,000	15,050,000	14,164,000	2,583,000	-886,000
Vehicle Hours Traveled (VHT) (daily)	293,000	575,000	342,000	49,000	-233,000
Average Travel Time (minutes per vehicle trip)	11.5	16.8	10.4	-1.1	-6.4
Safety	n/a	n/a	Safety & Second access projects included in plan		
Congestion Relief Effectiveness:					
Screenline Levels of Service (total LOS E or F)	2	20	6	4	-14
Travel Time (avg min during AM peak period)					
Islandwide to Downtown	22.7	47.0	21.0	-1.7	-26.0
Islandwide to Kapolei	22.7	48.1	23.2	0.5	-24.9
Vehicle Hours of Delay (daily)	42,000	247,000	37,000	-5,000	-210,000

Overall, the ORTP 2030 fulfills the Transportation Services System Goal by developing and maintaining Oahu's islandwide transportation system ensuring efficient, safe, convenient and economical movement of people and goods. It is estimated that congestion in 2030 could be reduced to levels approximately consistent with today, with substantial increases in the public transit mode share.

6.2 ANALYSIS OF ENVIRONMENTAL AND QUALITY OF LIFE SYSTEM EFFECTIVENESS

The environmental and quality of life system effectiveness goal centers on developing and maintaining Oahu's transportation system in a manner that maintains environmental quality and community cohesiveness. In this section of the report, various performance indicators are examined and discussed to assess how well the plan fulfills this goal.

6.2.1 Land Use Sensitivity

The land use sensitivity criteria examine how the implementation of the ORTP 2030 may both adversely and positively impact communities and adjacent land uses. Examples of communities and sensitive land uses that may be adversely impacted include: culturally and historically significant locations, residential neighborhoods, institutions, medical facilities, and natural areas. On the other hand, proposed alternatives could provide convenient linkages to employment centers and recreational and cultural centers. This evaluation factor judges the compatibility between the ORTP 2030 and adjacent land uses in a qualitative manner. The land use sensitivity assessment also considers potential noise and/or visual impacts of transportation system alternatives on affected communities and adjacent land uses.

Table 6-10 summarizes the results of this analysis. Details of this analysis can be found in Appendix D.

6.2.2 Resource Conservation

This evaluation factor focuses on the degree to which a project potentially displaces or disrupts environmental resources of major significance. Environmental resources include natural resources such as vegetation and wild life, beaches, wetlands, and open spaces and manmade resources such as parks, historical sites, and cultural monuments. Additionally, details regarding the State Conservation Plan can be found in Chapter 3, and with respect to the proposed transportation improvements the implementing agency would be responsible for ensuring that the relevant permits (such as a CDUA) are required in the relevant planning, environmental, and detailed design stages of the project development.

Table 6-10 summarizes the results of this analysis. Details of this analysis can be found in Appendix D.

6.2.3 Air Quality

The objective of this evaluation factor is to assess the degree to which the ORTP 2030 has the potential to alter the production of airborne pollutants by vehicular sources. Three major components contributing to air pollution are carbon monoxide, nitrogen oxides, and volatile organic compounds. Emissions are related to VMT and to the cleanliness of the vehicle fleet. Although the vehicle fleet is expected to become cleaner over time as progressively more restrictive emission requirements are promulgated and enforced by the federal government, the amount of this change is speculative over a 25-year planning horizon and would not be materially different between various ORTP strategic plan alternatives. Therefore, the effect of ORTP 2030 on air quality was evaluated qualitatively based on review of the level of projected

VMT change. It should also be noted that Oahu has been designated a non-attainment area by the Environmental Protection Agency (EPA).

The results of the VMT and mode choice analysis show that with the ORTP 2030 there would be decreases in VMT that would in turn improve air quality over the Baseline 2030 condition (Table 6-4 and Figure 6-4). In addition, the mode choice results (Table 6-2 and Figures 6-1 and 6-2) show an increase in the number of transit trips while showing a decrease in the auto trips. Both of these factors will lead to improved air quality over the Baseline 2030 condition. Table 6-10 summarizes the results of this analysis. It should be noted that, when compared to Year 2000 conditions, although transit trips increase and auto trips decrease, a net increase in VMT is projected.

Energy Conservation

The objective of this evaluation factor is to assess the degree of energy efficiency of each proposed alternative. Energy efficiency can be measured in terms of the amount of energy consumption and the type of energy being consumed. Energy consumption is related to VMT and the fuel economy of the vehicle fleet. Although the vehicle fleet is expected to become more fuel-efficient over time as progressively more restrictive requirements are promulgated and enforced by the federal government, the amount of this change is speculative over a 25-year planning horizon and would not be materially different between various ORTP strategic plan alternatives. Therefore, the effect of ORTP 2030 on energy conservation was evaluated qualitatively based on review of the level of projected VMT change.

The results of the VMT analysis show that with the ORTP 2030 there would be decreases in VMT over the Baseline 2030 condition (Table 6-4 and Figure 6-4). This, coupled with higher transit trips with the ORTP 2030 in place, will lead to improved energy conservation over the Baseline 2030 condition. Table 6-10 summarizes the results of this analysis. It should be noted that when compared to Year 2000 conditions, both transit trips and VMT are forecast to increase.

6.2.4 Quality of Bicycle and Pedestrian System

The quality of bicycle and pedestrian facilities can be positively or negatively impacted by the projects in the ORTP 2030. This evaluation factor judges the potential to improve the quality of bikeway facilities based on the proposed locations of bikeway network expansion, a comparison of bikeway facilities as a percentage of arterial facilities, and the percentage increase of the proposed bicycle network over baseline facilities. This evaluation factor also judges the potential to improve the quality of the pedestrian system.

The ORTP 2030 includes many different types of projects ranging from transit improvements (rail, bus, and ferry) to highway widening and elevated structures to bikeway and pedestrian improvements. While some of the transit (rail) and highway projects may include pedestrian access improvements, the various highway widening projects may increase the crossing time for pedestrians. Elevated transportation improvements such as the Nimitz Highway HOV flyover may help to reduce pedestrian/vehicular and bike/vehicular conflicts. On the other hand, the islandwide enhancement projects incorporated in the ORTP 2030 includes the development of a pedestrian plan for Oahu. The ORTP also includes implementation of bikeway system

improvements consisting of the Oahu elements of *Bike Plan Hawaii*. Table 6-10 summarizes the results of this analysis.

6.2.5 Summary

The key findings of the environment/quality of life performance measures are presented in Table 6-10. Overall, the environmental and quality of life system effectiveness goal centers on developing and maintaining Oahu's transportation system in a manner that maintains environmental quality and community cohesiveness. The ORTP 2030 strives to achieve this goal by improving air quality and encouraging energy conservation relative to baseline conditions and developing alternative modes of transportation that are environmentally friendly including transit, pedestrian walkways and bicycle routes, while minimizing impacts on natural resources and disruption of neighborhoods.

TABLE 6-10
SUMMARY OF EFFECTIVENESS OF ENVIRONMENT AND QUALITY OF LIFE PERFORMANCE MEASURES

Measures of Effectiveness	ORTP 2030 Discussion
Land Use Sensitivity	ROW Impacts. Transit and highway improvements adjacent to sensitive land uses.
Resource Conservation	Ferry docking facilities may impact resources. Roadway improvements may impact agricultural/conservation lands. Potential noise and visual impacts of rail transit. PUC impacts.
Air Quality	Increased transit ridership. Less auto use.
Energy Conservation	Higher public transit ridership.
Quality of Bicycle & Pedestrian System	Includes Bike Plan Hawaii and Honolulu Bicycle Master Plan. Rail system and highway improvements may include pedestrian access improvements, but highway widenings increase pedestrian crossing time. Elevated roadways could reduce pedestrian/vehicular and bike/vehicular conflicts. Development of a pedestrian plan as part of the Transportation Enhancement Program for Oahu.

6.3 ANALYSIS OF LAND USE AND TRANSPORTATION INTEGRATION EFFECTIVENESS

The land use and transportation system goal centers on developing and maintaining Oahu's transportation system in a manner that integrates land uses and transportation. In this section of the report, various performance indicators are examined and discussed to assess how well the plan fulfills this goal.

The City and County of Honolulu's General Plan is a document that centers on articulating the goals of Oahu residents. It is a long range-planning document that aims to integrate land use and transportation policies. The ORTP 2030 is consistent with the goals and objectives of the General Plan.

6.3.1 Population and Land Use Development Policies

Population distribution and land use development policies as expressed in the City and County of Honolulu's development plans were incorporated in the ORTP 2030. This was achieved through the vision of the ORTP 2030 and the manner in which priority was placed on specific projects. The vision focuses on addressing the growth in population and employment as forecast for the year 2030. The ORTP 2030 addresses the full development of the PUC, the development within the second city (Ewa/Kapolei) and the management of growth. In order to achieve this, the plan includes highway improvements and transit expansion. Specific projects include the rail transit through the PUC and Ewa, the Ewa Master Plan roadway system, the Waiawa interchange improvements and H-1 Corridor improvements. The ORTP 2030 is intended to address the deficiencies based on the 2030 socioeconomic forecasts provided by the City's DPP. The results of this analysis can be found in Table 6-11.

6.3.2 Transportation System and Intermodal Efficiency

The ability to promote intermodal efficiency between the land transportation system and the harbor and airport terminal facilities was considered an essential element when developing the ORTP 2030. One of the aims of the plan was to help develop an integrated system by providing public transport for travel to and from work, improving the street network for commercial travel and travel in non urban areas. The addition of bikeways and improved pedestrian facilities for commuting and recreation was also considered an essential element.

The way in which the plan fulfills this objective was through the addition of specific projects. Improvement and expansion of TheBus system was undertaken, the addition of a ferry service and rail system also help address some of the aforementioned General Plan objectives. The plan also aims to implement the Bicycle Master Plan, a pedestrian plan, a TDM program, will support the development of a Strategic Highway Safety Plan, and will continue to support a Van Pool program while adding major highway system projects including HOT lanes. Overall, the ORTP 2030 aims to ensure that the intermodal connections between public transit, automobiles and the highway system, and air travel are maintained and improved.

The results of the analysis can be seen in Table 6-11.

TABLE 6-11
SUMMARY OF EFFECTIVENESS OF LAND USE AND TRANSPORTATION INTEGRATION PERFORMANCE MEASURES

Policy	ORTP 2030 Discussion
POPULATION DISTRIBUTION/LAND USE DEVELOPMENT POLICIES PERFORMANCE MEASURE	
General Plan for the City and County of Honolulu: Population/Land Use Distribution Policies	
Subject I. Population - Objective C. To establish a pattern of population distribution that will allow the people of Oahu to live and work in harmony • Policy 1. Facilitate the full development of the primary urban center • Policy 2. Encourage development within the secondary urban center at Kapolei and the Ewa and Central Oahu urban-fringe areas to relieve developmental pressures in remaining urban-fringe and rural areas and to meet housing needs not readily provided in the primary urban center. • Policy 3. Manage physical growth and development in the urban-fringe and rural areas so that: (a) an undesirable spreading of development is prevented; and (b) population densities are consistent with the character of development and environmental qualities desired for such areas. • Policy 4. Direct growth according to Policies 1, 2, and 3 above by providing land development capacity and needed infrastructure to seek a 2025 distribution of Oahu's resident population as specified. **Subject V. Transportation & Utilities - Objective D**. To maintain transportation and utility systems that will help Oahu continue to be a desirable place to live and visit. • Policy 2. Use the transportation and utility systems as means of guiding growth and the pattern of land use on Oahu. **Subject VII. Physical Development and Urban Design Objective B**. To develop Honolulu (Waialae-Kahala to Halawa), Aiea, and Pearl City as the Island's PUC. **Subject VII. Physical Development and Urban Design Objective C**. To develop a secondary urban center in Ewa with its nucleus in the Kapolei area.	Includes highway improvements and transit system expansion to improve access to and within developing areas (Ewa and Central Oahu) and to improve transportation system serving PUC. Examples: • Ewa Master Plan roadway system • TheBus expansion in developing areas • Rail transit through PUC and to Ewa • Waiawa interchange improvements • Major highway improvements in and parallel to H-1 corridor improving highway accessibility within PUC and to Ewa and Central Oahu (e.g., Nimitz HOV flyover) ORTP intended to address deficiencies identified through analysis of 2030 travel forecasts based on 2030 socioeconomic forecast/land use distribution provided by DPP.
General Plan for the City and County of Honolulu: Transportation System Policies **Subject V. Transportation & Utilities** - Objective A. To create a transportation system that will enable people and goods to move safely, efficiently, and at reasonable cost; serve all people including the poor, the elderly, and the physically handicapped; and offer a variety of attractive and convenient modes of travel.	
Policy 1. Develop and maintain an integrated ground-transportation system consisting of the following elements and their primary purposes: (a) public transportation-for travel to and from work, and travel within Central Honolulu; (b) roads and highways-for commercial traffic and travel in nonurban areas; (c) bikeways-for recreational activities and trips to work, schools, shopping centers, and community facilities; and (d) pedestrian walkways-for getting around Downtown and Waikiki, and for trips to schools, parks, and shopping centers.	• TheBus capacity increases • TheBus expansion in developing areas • TheBus expansion in rural areas • Commuter ferry system • Rail transit between Ewa and Primary Urban Center, with associated feeder-bus • Bicycle Master Plan/Bike Plan Hawaii • Major highway system improvements • Pedestrian plan development

TABLE 6-11
SUMMARY OF EFFECTIVENESS OF LAND USE AND TRANSPORTATION INTEGRATION PERFORMANCE MEASURES

Policy	ORTP 2030 Discussion
Policy 2. Provide transportation services to people living within the Ewa, Central Oahu, and Pearl City-Hawaii Kai corridors primarily through a mass transit system including exclusive right-of-way rapid transit and feeder-bus components as well as through the existing highway system with limited improvements as may be appropriate.	• Rail transit between Ewa and PUC, with associated feeder-bus • TheBus expansion in developing areas • Highway improvements
Policy 3. Provide transportation services outside the Ewa, Central Oahu, and Pearl City-Hawaii Kai corridors primarily through a system of express- and feeder-buses as well as through the highway system with limited to moderate improvements sufficient to meet the needs of the communities being served.	• TheBus capacity increases • TheBus expansion in rural areas • Highway system improvements
Policy 4. Improve transportation facilities and services in the Ewa corridor and in the trans-Koolau corridors to meet the needs of Ewa and Windward communities.	• Ewa Master Plan roadway system • Rail transit to Ewa • Major highway improvements in and parallel to H-1 corridor improving highway accessibility to Ewa • Limited improvements in the trans-Koolau corridors
Policy 5. Improve roads in existing communities to reduce congestion and eliminate unsafe conditions.	• Highway improvements throughout island • Rockfall protection program • 2nd access projects: e.g., Waianae 2nd Access, Mililani 2nd access (Central Mauka road), Wahiawa 2nd access • Kamehameha Hwy safety improvements
Policy 6. Consider both environmental impact as well as construction and operating costs as important factors in planning alternative nodes of transportation.	See environment/quality of life performance measure evaluation
Policy 7. Promote the use of public transportation as a means of moving people quickly and efficiently, of conserving energy, and of guiding urban development.	• TheBus capacity increases • TheBus expansion in developing areas • TheBus expansion in rural areas • Commuter ferry system • Rail transit between Ewa and PUC, with associated feeder-bus
Policy 8. Make available transportation services to people with limited mobility: the young, the elderly, the handicapped, and the poor.	• Transit vehicles are ADA compliant • Paratransit
Policy 9. Promote programs to reduce dependence on the use of automobiles.	• TDM program • Pedestrian plan • Van Pool program • Bicycle Master Plan/Bike Plan Hawaii • Commuter ferry system • Transit improvements including rail transit
Policy 10. Discourage the inefficient use of the private automobile, especially in congested corridors and during peak hours.	• Zipper lanes and HOV lanes in both peak periods.
INTERMODAL EFFICIENCY PERFORMANCE MEASURE	
Promote intermodal efficiency between the land transportation system and harbor facilities.	• Highway improvements in vicinity of harbor: Nimitz HOV flyover
Promote intermodal efficiency between the land transportation system and airport terminal facilities.	• Rail interface with airport • Highway improvements in vicinity of airport: e.g., H-1 westbound zipper lane in PM peak, Nimitz HOV flyover, Puuloa Road widening

6.3.3 Summary

The key findings of the land use and transportation effectiveness performance measures are presented in Table 6-11. Overall, the land use and transportation system goal centers on developing and maintaining Oahu's transportation system in a manner that integrates land uses and transportation.

The ORTP 2030 helps to fulfill the objectives that support the land use and transportation integration system goal through reinforcing planned population distribution and land use development policies, encouraging innovation, and encourage implementation of land use policies that support efficient use of transportation systems.

6.4 ANALYSIS OF ENVIRONMENTAL JUSTICE EFFECTIVENESS

Objective #5 of the Transportation Services System Goal of the ORTP 2030 addresses Title VI and environmental justice. It states, "Ensure that no person shall, on the grounds of race, color, gender, age, income, disability, or national origin, 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 local legislation."

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 Title VI and Environmental Justice of the ORTP 2030, OahuMPO-designated TAZs and census block groups were used as a basis for the evaluation.

The following five performance measures are used to evaluate the ORTP 2030 for compliance with T6/EJ principles:

- Equity: equitable distribution of transportation investments
- Safety: risk of accident or injury as measured by accidents
- Population Policy: correspondence of transportation plans to stated government policies regarding development and population growth
- Accessibility: ease of reaching opportunities using surface transportation
- Mobility: ease of movement of people, goods, and services

It should be noted that for the purpose of this evaluation, the analysis of the mobility and accessibility measures are by TAZ and by Census block group for equity, safety and population.

6.4.1 Mobility

Mobility is considered one of the core performance measures that form the foundation for the OahuMPO EJ monitoring methodology. Essentially, mobility can be defined as the ease of movement of people, goods, and services.

When measuring mobility the morning peak hour commute was selected for evaluation as it is considered an essential part of the daily routine. The mobility evaluation uses the average home-to-work travel time from both EJ and non-EJ designated areas to select employment centers.

The employment centers include the following locations:

- Airport/Pearl Harbor
- Downtown
- Iwilei
- Kaneohe
- Kaplolei/Ewa
- McCully
- Mililani
- Waikiki

The application of the mobility performance indicator involved determining the peak home-to-work travel time difference in tenths of minutes for the baseline 2030 and ORTP 2030 networks by automobile and transit. Table 6-12 presents the results of the mobility analysis showing the travel time to employment centers by transit and automobile and the also presents the travel time savings (for both EJ and Non-EJ TAZs). The analysis demonstrates that the EJ TAZs would benefit greatly from the ORTP 2030 projects in terms of travel time savings for the home-to-work journey. In comparison with the non-EJ TAZs, the average travel time savings for the EJ TAZs is projected to be over 30 minutes greater for trips via automobile and about eight minutes greater for trips via transit than for the non-EJ TAZs. Figures 6-13 to 6-20 also show the travel time savings to the eight individual employment centers.

TABLE 6-12
EJ MOBILITY - AVERAGE TRAVEL TIME SAVINGS TO EMPLOYMENT CENTERS (AM PEAK)

	ORTP 2030	
	EJ	Non-EJ
AUTO TRAVEL TIME SAVINGS TO EMPLOYMENT CENTERS (Minutes)	46.9	17.2
TRANSIT TRAVEL TIME SAVINGS TO EMPLOYMENT CENTERS (Minutes)	25.7	16.8
AVERAGE TRAVEL TIME SAVINGS BY AUTO OR TRANSIT (Minutes)	36.3	17.0

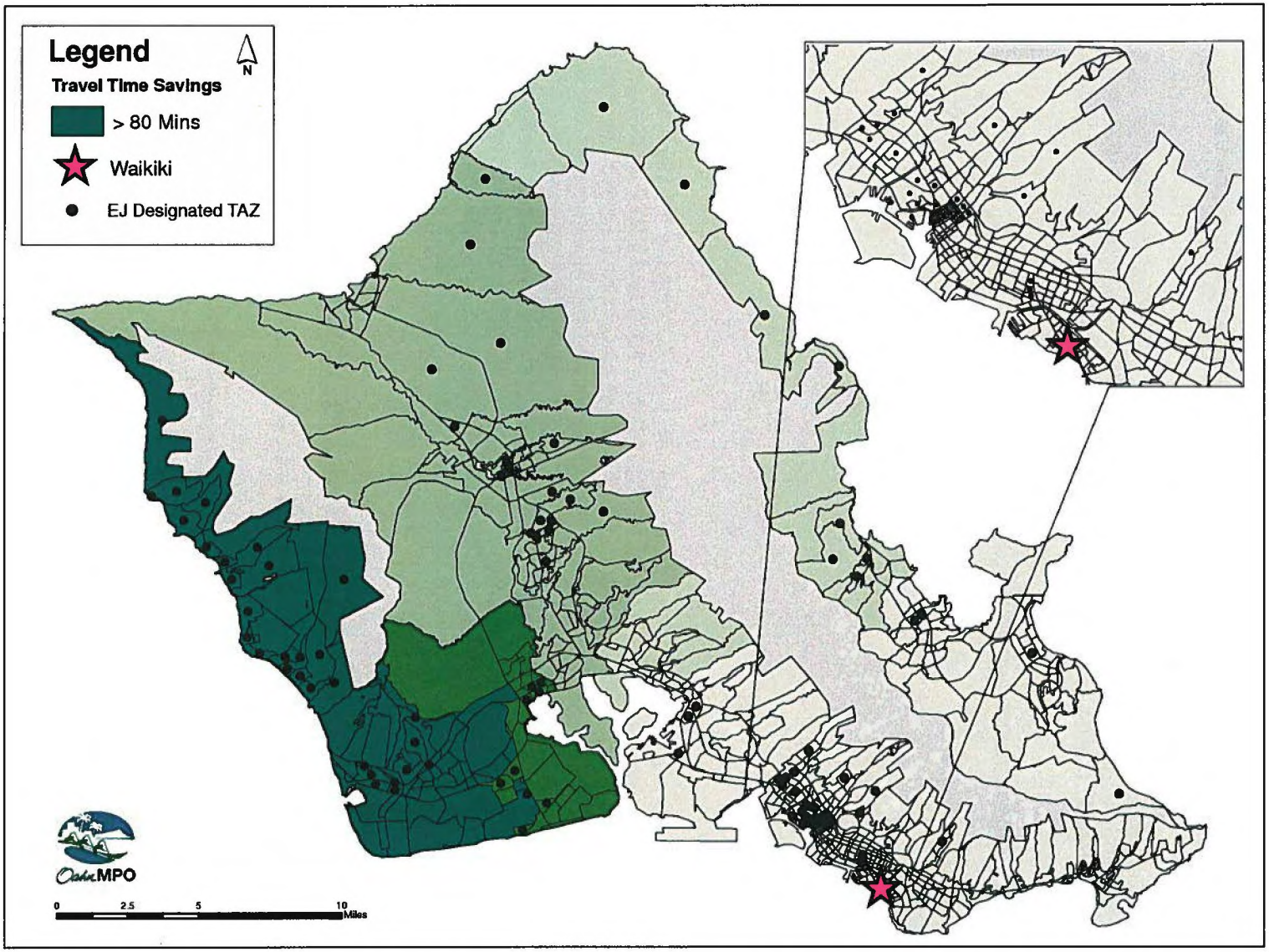


FIGURE 6-13: TRAVEL TIME SAVINGS TO WAIKIKI EMPLOYMENT CENTER (BASELINE 2030 TO ORTP 2030)

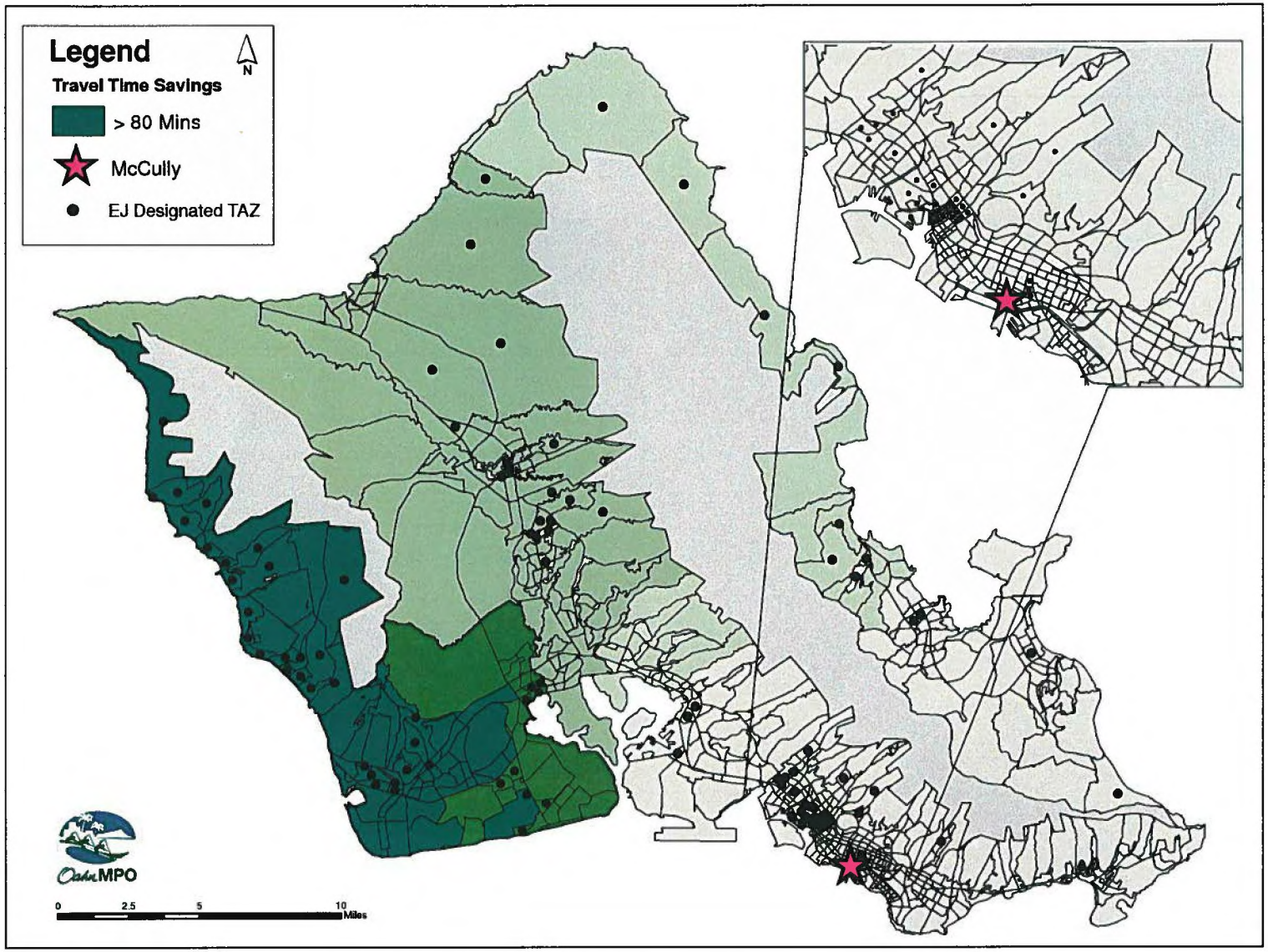


FIGURE 6-14: TRAVEL TIME SAVINGS TO McCULLY EMPLOYMENT CENTER (BASELINE 2030 TO ORTP 2030)

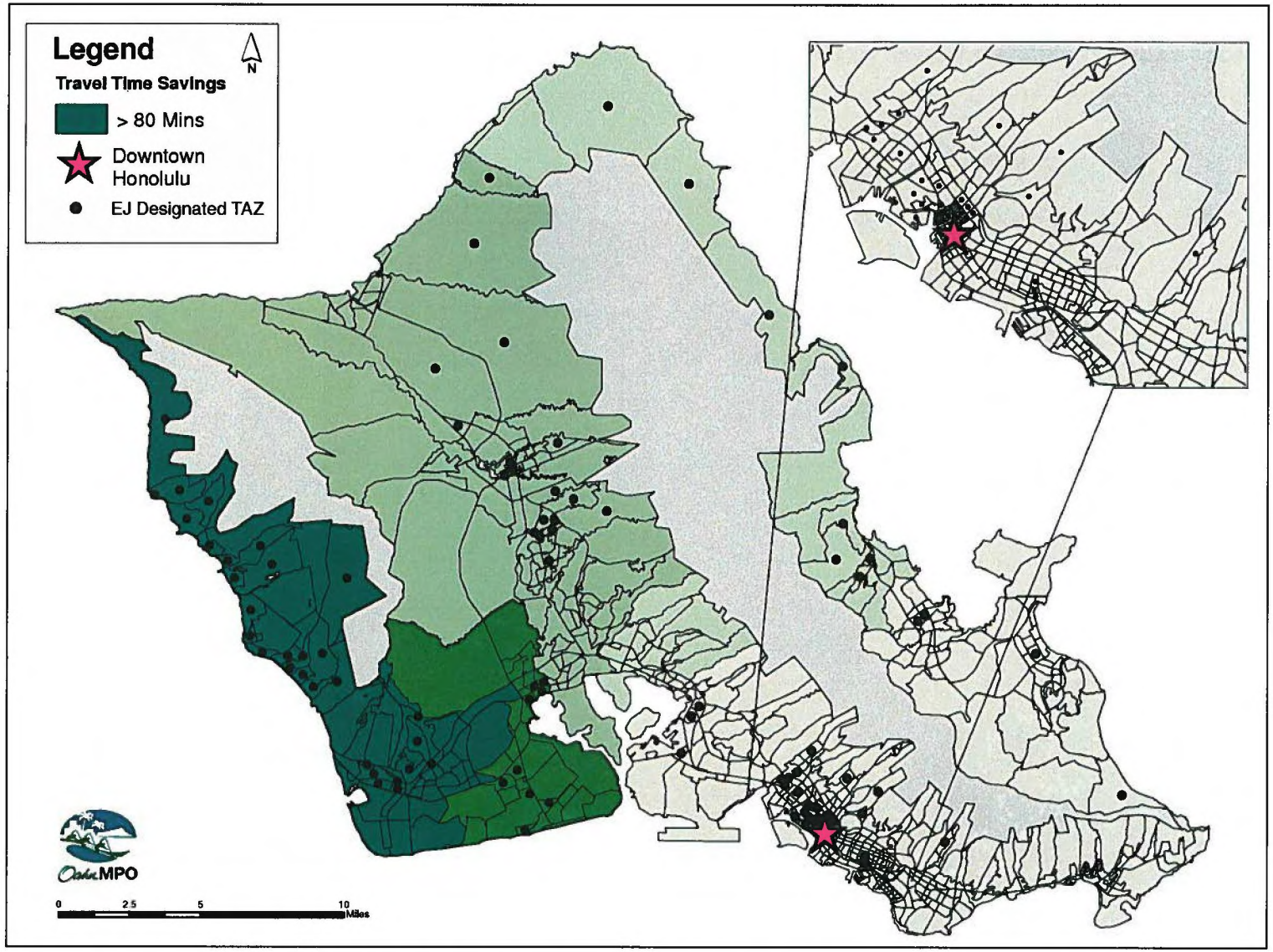


FIGURE 6-15: TRAVEL TIME SAVINGS TO DOWNTOWN HONOLULU EMPLOYMENT CENTER (BASELINE 2030 TO ORTP 2030)

FIGURE 6-16: TRAVEL TIME SAVINGS TO IWILEI EMPLOYMENT CENTER (BASELINE 2030 TO ORTP 2030)

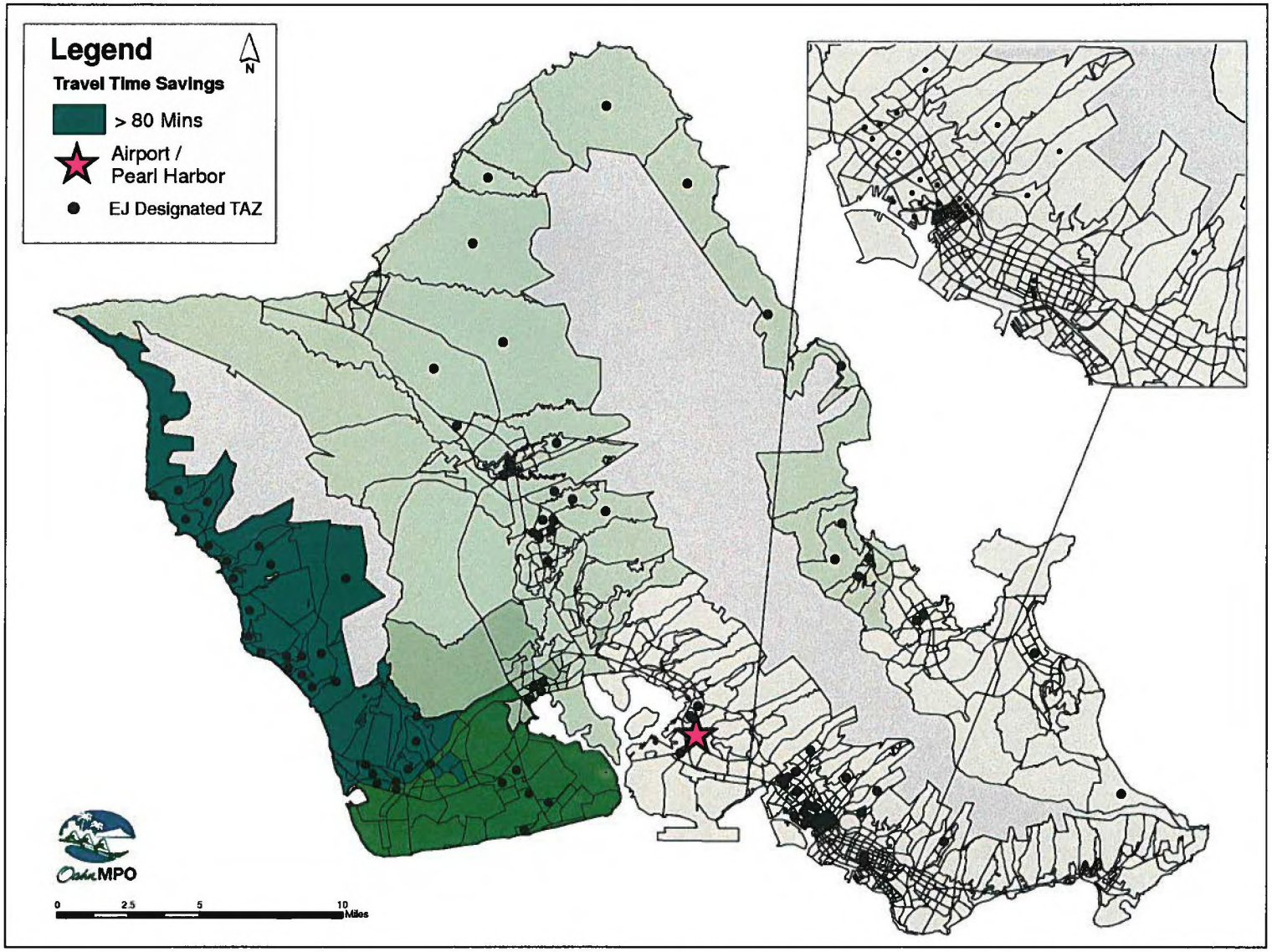


FIGURE 6-17: TRAVEL TIME SAVINGS TO AIRPORT/PEARL HARBOR EMPLOYMENT CENTER (BASELINE 2030 TO ORTP 2030)

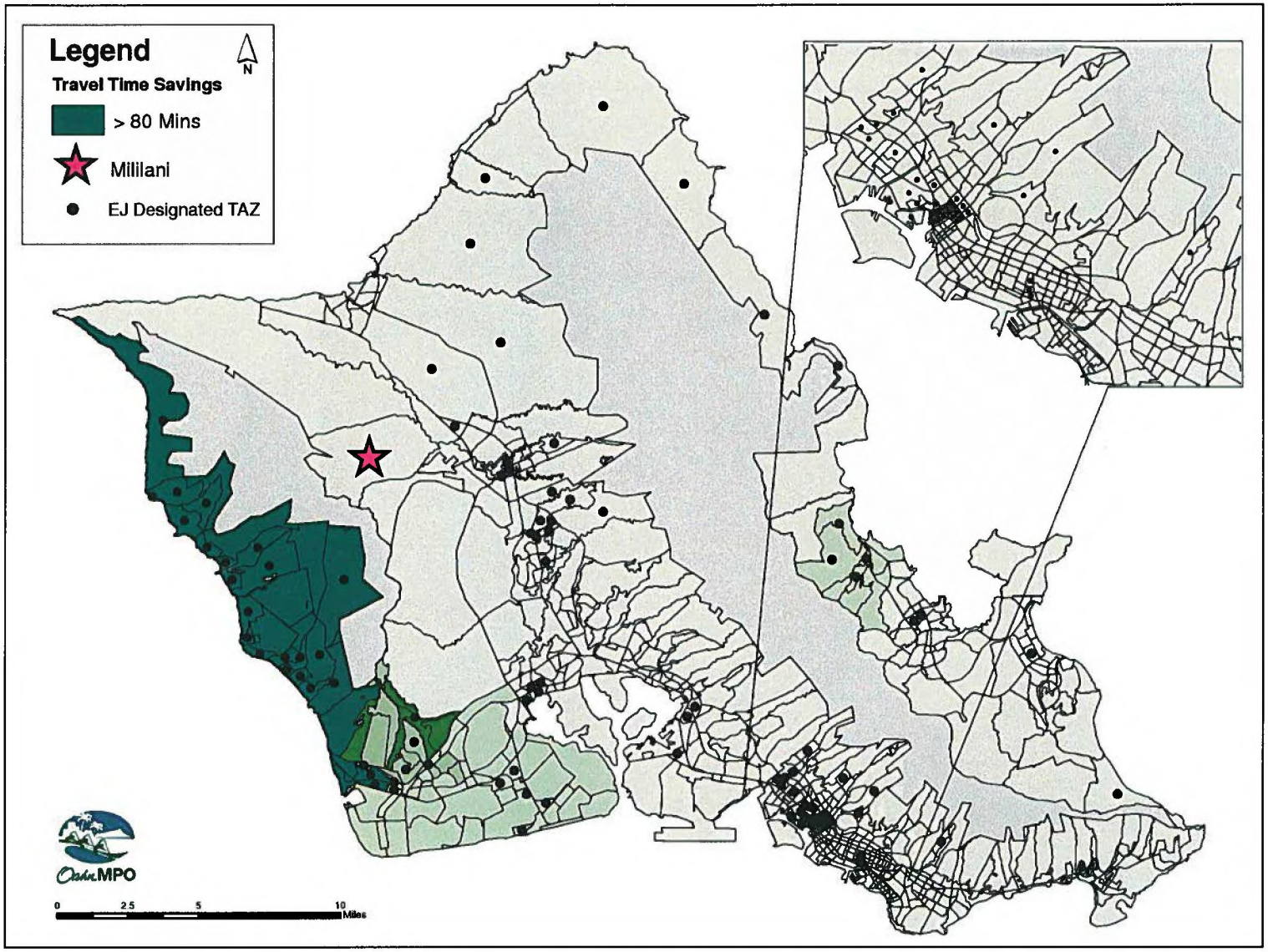


FIGURE 6-18: TRAVEL TIME SAVINGS TO MILILANI EMPLOYMENT CENTER (BASELINE 2030 TO ORTP 2030)

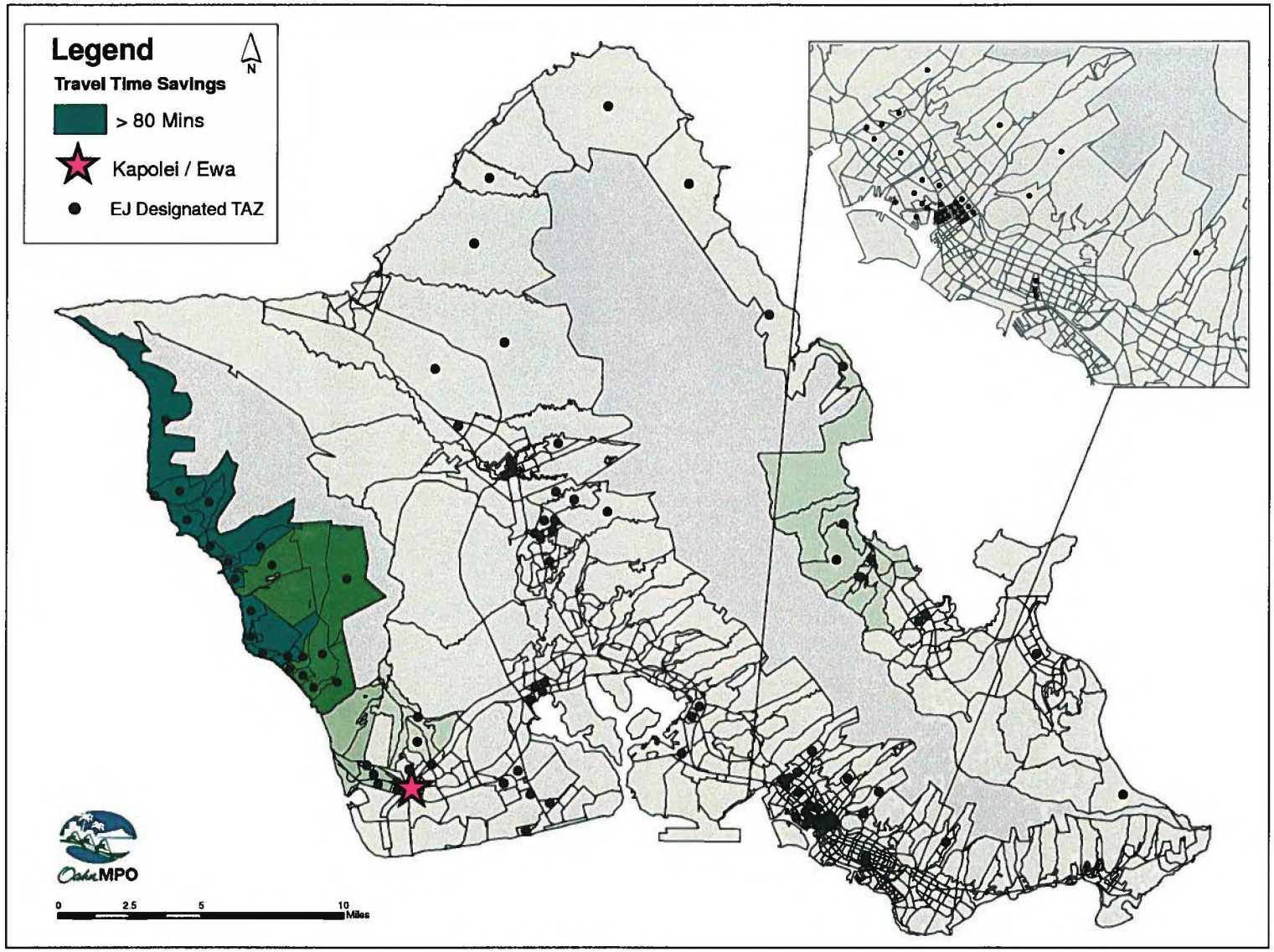


FIGURE 6-19: TRAVEL TIME SAVINGS TO KAPOLEI/EWA EMPLOYMENT CENTER (BASELINE 2030 TO ORTP 2030)

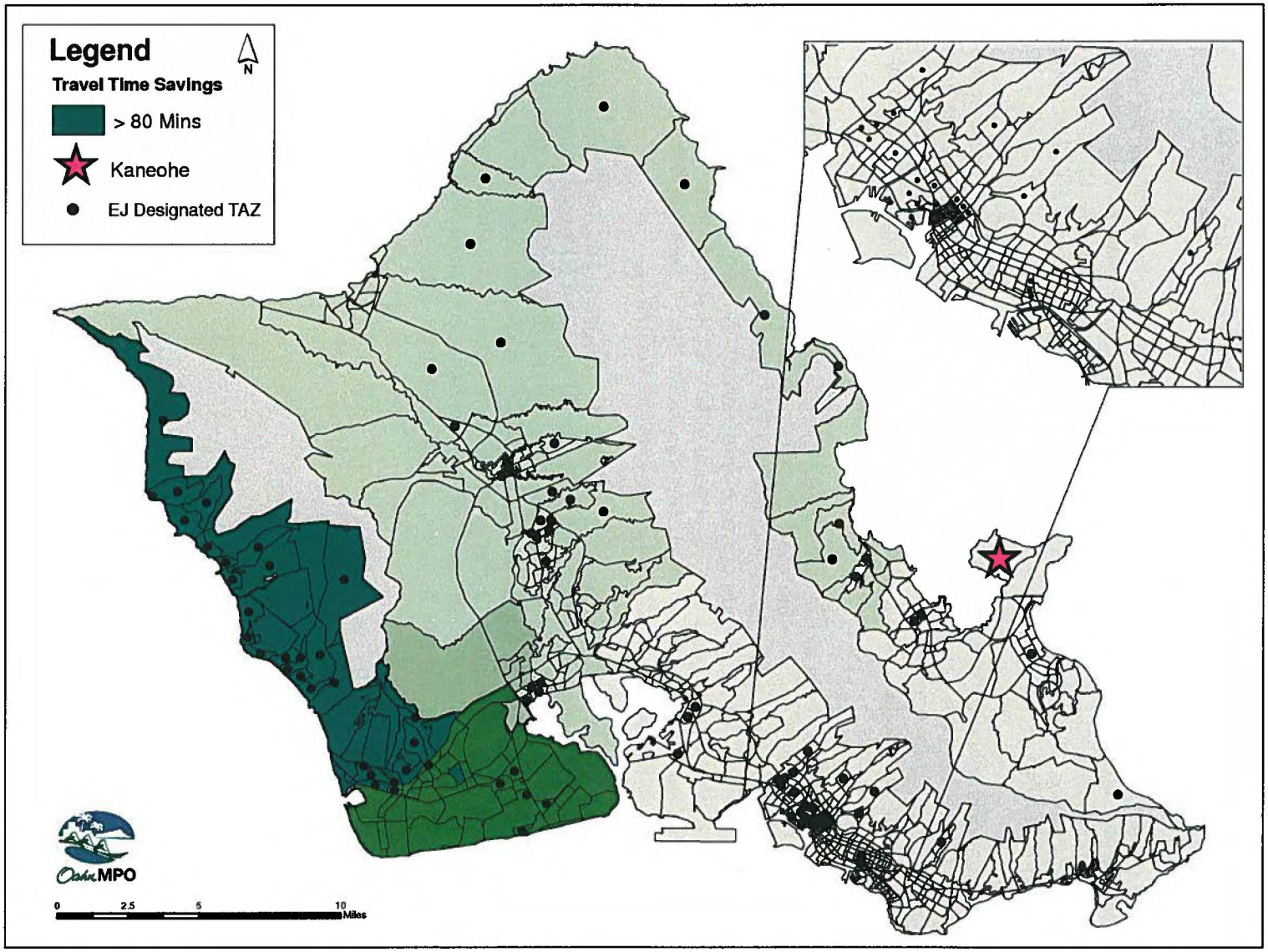


FIGURE 6-20: TRAVEL TIME SAVINGS TO KANEOHE EMPLOYMENT CENTER (BASELINE 2030 TO ORTP 2030)

6.4.2 Accessibility

Accessibility is another core performance measure that forms the foundation for the OahuMPO EJ monitoring methodology. Essentially, accessibility can be defined as the ease of reaching opportunities using surface (ground) transportation.

Accessibility is evaluated from the standpoint of travel time. While it is clear that a multitude of locations/destinations are available to people, some important destinations (e.g., shopping centers, employment centers, colleges, hospitals) may be more accessible to some areas compared to other areas. The aim of this evaluation is to assess whether EJ TAZs compare favorably to non-EJ TAZs.

Travel time thresholds were used to measure accessibility. The thresholds were used to calculate the number of people within a predetermined travel time to those travel destination opportunities represented by specific trip generator zones. These include select employment, college, regional shopping center, and hospital trip generators. A travel time threshold of 20 minutes was used for all trips.

Table 6-13 shows the accessibility to the selected trip generators for year 2030 both with and without the ORTP for both EJ and non-EJ travel analysis zones. The EJ to Non-EJ ratio in the table describes the ratio of % of EJ TAZs to % of Non-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 EJ TAZs or the Non EJ TAZs have over each other. If the ratio is less that 1 then the advantage lies with the Non EJ TAZs, if the number is greater than 1 then the advantage lies with the EJ TAZs. A value equal to 1 indicates parity between the TAZs.

The analysis demonstrates that 20-minute accessibility to hospitals and regional shopping centers would be very high and comparable for both the EJ and non-EJ populations with the ORTP. Relative to year 2030 baseline conditions, the ORTP 2030 projects would improve accessibility for both EJ and non-EJ populations to colleges and employment centers. The improved accessibility to colleges and to employment centers would be relatively greater for the EJ as opposed to non-EJ populations. Because of the excellent accessibility of EJ and non-EJ TAZs and populations to hospitals and regional shopping centers, there is little improvement when comparing Baseline 2030 to the ORTP 2030.

TABLE 6-13
EJ ACCESSIBILITY – TRAVEL TIME WITHIN 20 MINUTES OF DESTINATIONS

SCENARIOS		TO COLLEGES			TO HOSPITALS			TO REGIONAL SHOPPING CENTERS			TO EMPLOYMENT CENTERS		
		EJ	Non-EJ	EJ to Non-EJ Ratio	EJ	Non-EJ	EJ to Non-EJ Ratio	EJ	Non-EJ	EJ to Non-EJ Ratio	EJ	Non-EJ	EJ to Non-EJ Ratio
BASELINE 2030	Number of TAZs	50	453		111	650		105	647		64	478	
	% of All TAZs [a]	45.0%	69.6%	0.65	100.0%	99.8%	1.00	94.6%	99.4%	0.95	57.7%	73.4%	0.79
	Number of People	75,472	541,869		193,655	923,008		173,604	917,100		91,625	589,343	
	% of All People [a]	39.0%	58.7%	0.66	100.0%	99.9%	1.00	89.6%	99.3%	0.90	47.3%	63.8%	0.74
ORTP 2030	Number of TAZs	59	499		111	650		105	647		91	607	
	% of All TAZs [a]	53.2%	76.7%	0.69	100.0%	99.8%	1.00	94.6%	99.4%	0.95	82.0%	93.2%	0.88
	Number of People	90,002	631,546		193,655	923,008		173,604	917,100		147,108	873,427	
	% of All People [a[	46.5%	68.4%	0.68	100.0%	99.9%	1.00	89.6%	99.3%	0.90	76.0%	94.6%	0.80
CHANGES	Number of TAZs	18%	10%	7%	0%	0%	0%	0%	0%	0%	42%	27%	12%
	Number of People	19%	17%	2%	0%	0%	0%	0%	0%	0%	61%	48%	8%

Note:
[a] Islandwide, a total of 111 EJ zones and 193,655 EJ persons have been identified at year 2030, with 651 non-EJ zones and 923,638 non EJ persons

6.4.3 Equity

To assess the equity of funding allocations across the EJ and non-EJ neighborhoods, it was necessary to allocate the expenditures of the ORTP 2030 to different parts of the community. The projects that were analyzed totaled $13.5 billion.

Certain projects could not be mapped using the Geographic Information Systems (GIS) Analysis Tool. The following is a list of ORTP 2030 projects that were NOT analyzed:

- Project #2 Bike Plan Hawaii – Oahu
- Project #3 Enhancement Projects
- Project #4 ITS
- Project #5 Rockfall Protection, Various Locations
- Project #6 TDM Program
- Project #7 Van Pool Program
- Project #32 TheBus Service, Expansion, Islandwide
- Project #34 City Operations & Maintenance
- Project #35 State Operations & Maintenance
- Project #36 System Preservation

These projects total almost $7.1 billion. Project numbers 34 ($5,621 million), 35 ($810 million), and 36 ($1,000 million) are the three largest in monetary terms. The ten projects combined amount to just over one-half of the total ORTP project costs. Table 6-14 and Figure 6-21 show the results of equity analysis for both EJ and Non-EJ block groups. In the ORTP 2030, block groups that are designated as EJ, on the average, would receive about 20% more investment

dollars than non-EJ designated block groups. It should also be noted that while the EJ block groups are receiving less total dollars than Non-EJ block groups, the percent difference between the two (average per capita investment) is approximately 9%.

TABLE 6-14
EJ EQUITY ANALYSIS – DISTRIBUTION OF TOTAL ORTP 2030 DOLLARS

	ORTP 2030		
	EJ	Non-EJ	Total
Number of Block Groups	58	374	432
Average Investment by Block Group (Million)	$17	$14	$14
Total Cost of Projects (Million)	$983	$5,099	$6,082
% Project Investment	16%	84%	100%
Total Population	152,112	724,044	876,156
Average Per Capita Investment (Dollar)	$6,462	$7,042	$6,147

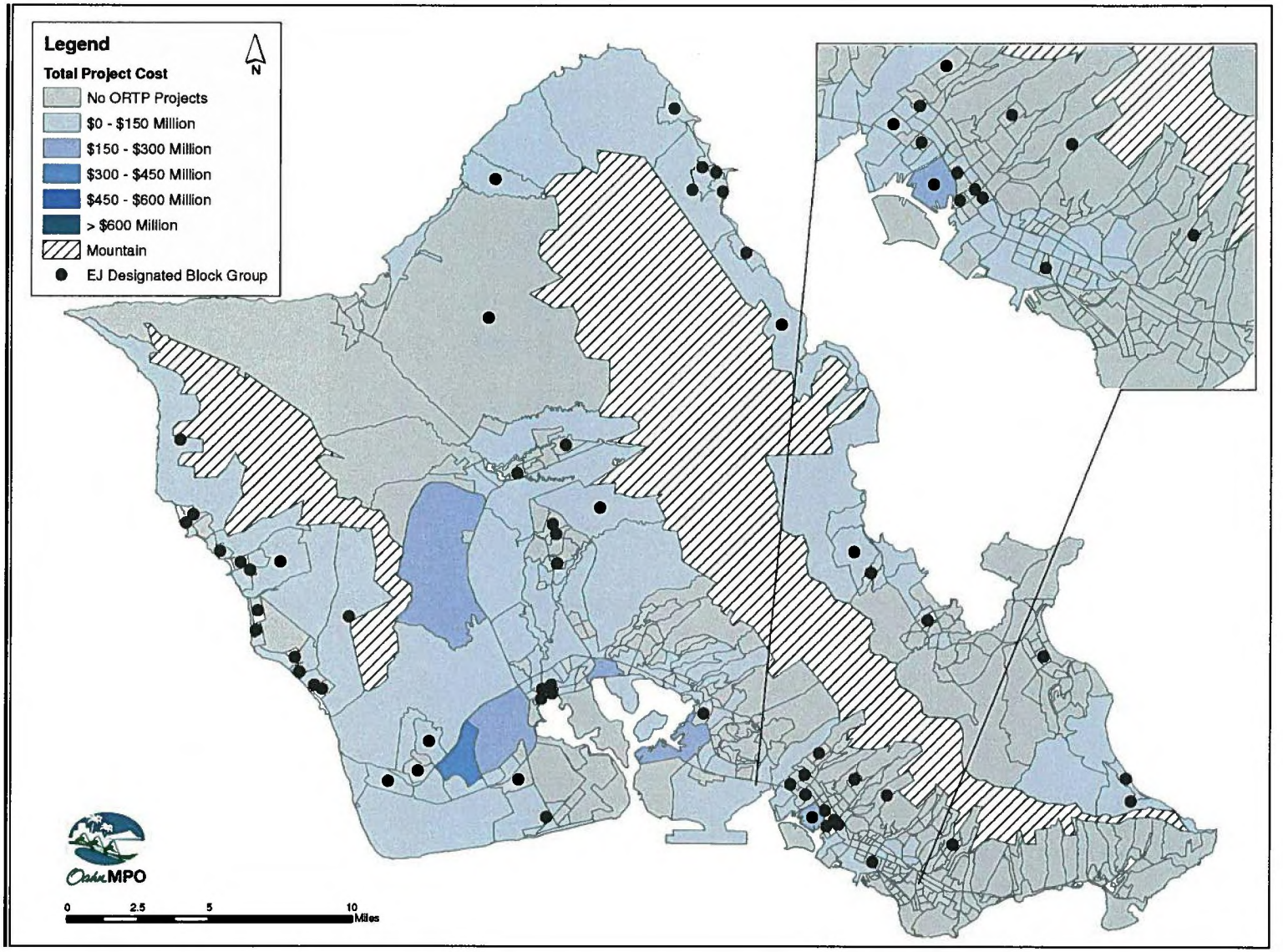


FIGURE 6-21: ANALYSIS OF EQUITY (ORTP 2030)

6.4.4 Safety

One of the most important goals in highway planning is to reduce the risk of accident and injury. Some safety projects address critical problems at one or a few discrete locations. Others address problems over the extent of the roadway network. The EJ question is whether improvements in the road system are distributed so that they might reasonably reduce the risk of crashes in the communities with the most risk, and those communities most removed from the policy decision process.

To determine the level of risk exposure over length of roadway, the frequency count of the behavior at risk (a crash) is divided by the number of miles traveled. This ratio is typically expressed in terms of millions of VMT. Using VMT and the number of crashes in a seven-year (1995-2001) period, a relative crash risk factor was developed. The specifics of the derivation of the risk factor are found in *Environmental Justice in the OahuMPO Planning Process.*

In addition to other factors, crash risk is determined based on the number of crashes within a certain time frame. This data is highly sensitive and, as such, is provided to the OahuMPO by HDOT in terms of number of crashes per block group. Identifying features, such as the intersections and/or cross streets, which would designate where within a block group the crash occurred, are not part of the data set. Because of this, the safety analysis is not able to determine if the projects programmed in the ORTP 2030 are actually projects that would address crashes at a specified location.

ORTP 2030 expenditures allocated to EJ and non-EJ neighborhoods are examined for their relationship to the crash risk per million VMT. Figure 6-22 illustrates the relative risk of accidents per million VMT across EJ and non-EJ neighborhoods and Table 6-15 compares the distribution of ORTP safety projects between EJ and non-EJ block groups. The results indicate that block groups designated as EJ have a higher percentage of ORTP 2030 safety projects either contained within them, or traversing through them, than those that are designated as non-EJ.

TABLE 6-15
EJ SAFETY ANALYSIS – DISTRIBUTION OF SAFETY PROJECTS

	ORTP 2030	
	EJ	Non-EJ
Percent of Total Block Groups with a Safety Project	41%	8%
Percent of Total Block Groups with a Safety Project AND a Crash Rate > 1.0 [a]	41%	7%
Percent of Total Block Groups with a Safety Project AND a Crash Rate > 5.0 [a]	9%	2%
Percent of Total Block Groups with a Safety Project AND a Crash Rate > 10.0 [a]	5%	1%
Percent of Total Block Groups with a Safety Project AND a Crash Rate > 15.0 [a]	0%	1%
Percent of Total Block Groups with a Safety Project AND a Crash Rate > 20.0 [a]	0%	1%

Note:
[a] Crash rate per million vehicle miles traveled

FIGURE 6-22: SAFETY PROJECTS AND CRASH RATE (ORTP 2030)

6.4.5 Population Policy

The community's public policy on this subject is embodied in the *Oahu General Plan* and related regional planning documents. The General Plan is the only fully approved plan for the entire island with growth goals for eight planning areas. The distinction between areas slated for slowed growth will be used to assess the appropriateness of major project funding based on the population distribution in the *Oahu General Plan*. Table 6-16 shows the distribution of the Oahu population by DPA and the percentage of ORTP 2030 dollars that are allocated in each of Oahu's eight planning areas. The population growth between Years 2000 and 2030 suggests that the transportation needs would be greatest in the high-growth areas, such as Ewa, Central Oahu and the PUC. Figure 6-23 shows the geographic distribution of population projected for the Year 2030.

The analysis shows that the allocation of ORTP 2030 dollars is generally consistent with population growth projections provided by the City & County of Honolulu for the year 2030 in that the most money will be allocated to areas that are expected to experience the largest growth in population. Additionally, the PUC, Ewa and Central Oahu DPAs receive 94.3% of ORTP 2030 dollars.

TABLE 6-16
EJ POPULATION POLICY ANALYSIS – DISTRIBUTION OF INVESTMENT FOR ORTP 2030

DPA No.	Development Plan Area	Population 2000	Population 2030	Population Growth Allocated	% of Total Dollars Allocated
					ORTP 2030
1	Primary Urban Center	47.9%	43.8%	28.9%	43.79%
2	Ewa	7.9%	16.6%	48.1%	23.08%
3	Central Oahu	16.9%	17.0%	17.3%	22.85%
4	East Honolulu	5.3%	4.6%	1.8%	0.31%
5	Koolaupoko	13.5%	10.3%	-1.1%	2.05%
6	Koolauloa	1.7%	1.5%	0.9%	1.26%
7	North Shore	2.1%	1.8%	0.7%	0.53%
8	Waianae	4.8%	4.5%	3.5%	6.14%
Subtotal	**PUC & Growth Areas** [a]	**72.6%**	**77.3%**	**94.3%**	89.71%

Note:
[a] PUC, Ewa and Central Oahu

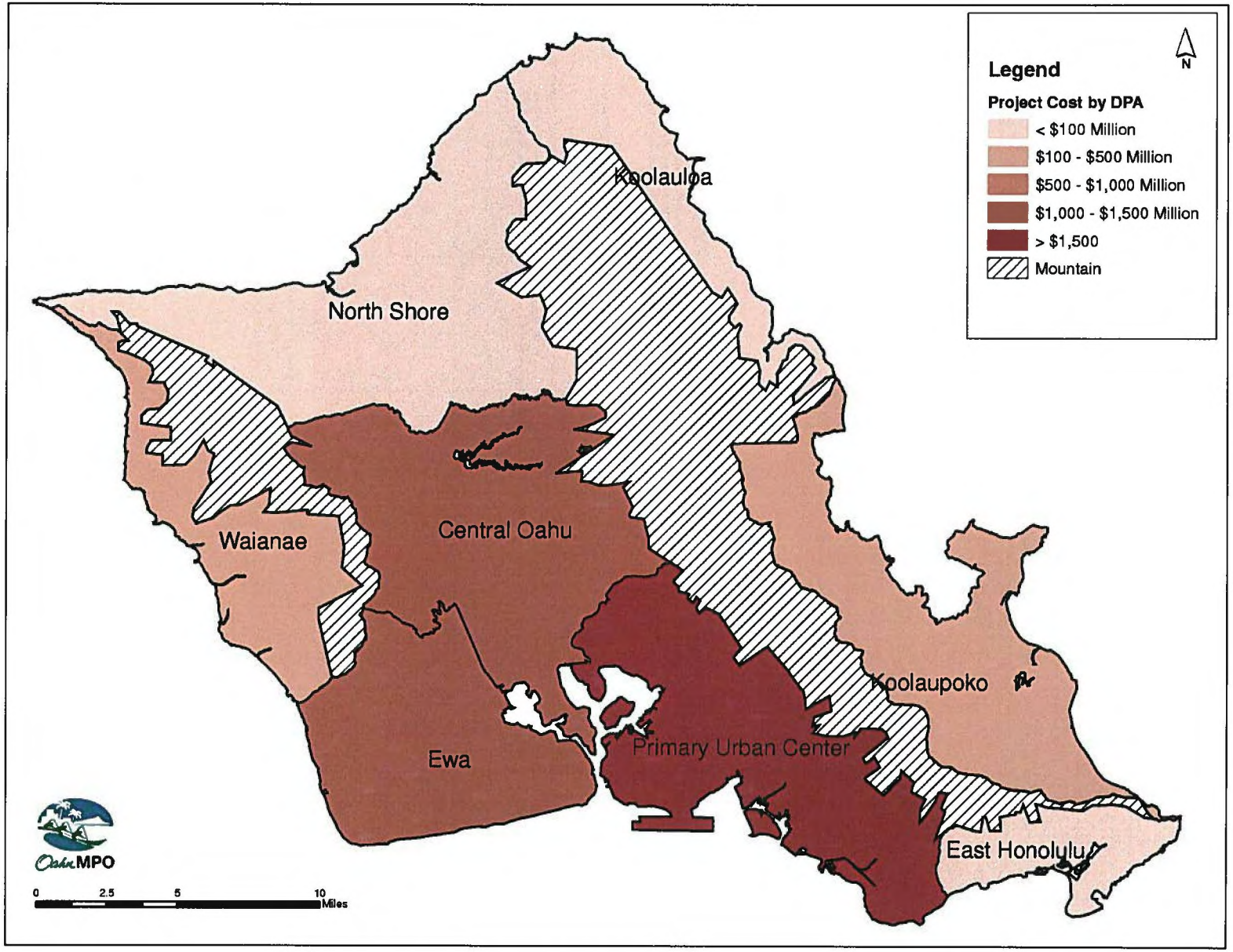


FIGURE 6-23: ANALYSIS OF POPULATION POLICY (ORTP 2030)

6.4.6 Summary

The analysis of the impacts of the ORTP 2030 indicates compliance with the principles of Title VI of the Civil Rights Act of 1964 and Executive Order 12898 pertaining to environmental justice, based on the quantitative performance measures of equity, safety, population policy, accessibility, and mobility, as follows:

- Equity: In the ORTP, block groups that are designated as EJ, on the average, would receive about 20% more ORTP 2030 investment expenditures than non-EJ designated block groups.

- Population Policy: The allocation of ORTP 2030 dollars is consistent with population growth projections provided by the City & County of Honolulu for the Year 2030 in that the most money will be allocated to areas that are expected to experience the largest growth in population.

- Safety: Block groups that are designated as EJ have a higher percentage of ORTP 2030 safety projects either contained within them, or traversing through them, than those that are designated as non-EJ.

- Accessibility: The analysis demonstrates that 20-minute accessibility to hospitals and regional shopping centers is very high and comparable for both the EJ and non-EJ TAZs. The ORTP 2030 plan also improves accessibility for EJ TAZs to colleges and employment centers.

- Mobility: EJ TAZs will benefit greatly in terms of travel time savings for the home-to-work journey. In comparison with the non-EJ TAZs, average travel time savings via automobile and via transit would be greater for EJ TAZs than for non-EJ TAZs.

Table 6-17 presents a summary of the findings.

TABLE 6-17
SUMMARY OF EFFECTIVENESS OF THE ENVIRONMENTAL JUSTICE PERFORMANCE MEASURES

Measures of Effectiveness	ORTP 2030	
	EJ Block Groups or TAZs	Non-EJ Block Groups or TAZs
Mobility		
Average Travel Time Savings to Employment Centers	36.3 minutes	17 minutes
Accessibility		
Accessibility Within 20 Minutes		
To Colleges	46.5%	68.4%
To Hospitals	100.0%	99.9%
To Shopping Centers	89.6%	99.3%
To Employment Centers	76.0%	94.6%
Equity		
Average Per Capita Investment	$6,462	$7,042
Safety		
% of Block Groups w/ Safety Project & Crash Rate > 5.0	9%	2%
Population Policy		
Population Growth vs. Investment in Growth Areas		
% of Population Growth	94.3%	
% of Dollars Allocated	89.7%	

6.5 KEY FINDINGS

The key findings of the performance analysis conducted for the ORTP 2030 is described in the following sections.

6.5.1 Transportation Service

Overall, the ORTP 2030 fulfills the Transportation Services System Goal by through developing and maintaining Oahu's islandwide transportation system ensuring efficient, safe, convenient and economical movement of people and goods. It is estimated that congestion in 2030 could be reduced to levels consistent with today, while increasing the public transit mode share.

6.5.2 Environment and Quality of Life

Overall, the environmental and quality of life system effectiveness goal centers on developing and maintaining Oahu's transportation system in a manner that maintains environmental quality and community cohesiveness. The projects incorporated in the ORTP 2030 help achieve this goal by satisfying noise, air and water quality standards, encouraging energy conservation, help preserve cultural integrity and natural resources, they develop alternative modes of transportation that are environment friendly including pedestrian walkways and bicycle routes, optimize use of transportation resources, and minimize the disruption of neighborhoods. The ORTP 2030 ensures compatibility with the physical and social character of existing development and plans for emergencies. It should be noted that while there are some adverse impacts, the positive improvements far outweigh them.

6.5.3 Land Use/Transportation Integration

The ORTP 2030 helps to fulfill the objectives that support the land use and transportation integration system goal reinforce planned population distribution and land use development policies, encourage innovation, and encourage implementation of land use policies that support efficient use of transportation systems.

6.5.4 Environmental Justice

The analysis of the impacts of the ORTP 2030 indicates compliance with the principles of Title VI of the Civil Rights Act of 1964 and Executive Order 12898 pertaining to environmental justice, based on the quantitative performance measures of equity, safety, population policy, accessibility, and mobility.

7.0 FINANCIAL ANALYSIS

In developing the ORTP 2030, the costs for each project, as well as the limited funds that could be used to pay for them, were considered. The ORTP 2030 is, therefore, a financially balanced plan that has optimized projected costs with anticipated revenues.

7.1 REVENUE PROJECTIONS AND ASSUMPTIONS

The primary sources of revenues used to support the surface transportation system for Oahu have been, and will continue to be, the Federal, State, and City and County governments. Revenue forecasts for the ORTP 2030 were developed based on data received from Federal, State of Hawaii, and City & County of Honolulu transportation officials. Table 7-1 summarizes historical revenues from 2000 to 2003.

An inflation rate of 2.7% per year was used in the financial assumptions. This rate was determined as follows:

- The annual average inflation rate in Honolulu for the 15-year period from 1989 to 2001 was 2.7%.
- It was also the forecast annual average inflation rate in Honolulu for the period from 2005 to 2008, per DBEDT's Quarterly Statistical and Economic Report, 2nd Quarter 2005.

Table 7-2 provides summary revenue projections by five-year increments between 2006 and 2030 for revenues from traditional Federal, State, and City and County sources. Detailed revenue forecasts by category used in the development of this summary are included in Appendix E. All revenue estimates are in constant year 2005 dollars. Assumptions used, as well as sources of information for the revenue forecast, are summarized in the following sections.

In addition to traditional Federal, State, and City and County sources, revenues from transit fares and from potential developer funding are also considered.

7.1.1 Federal Revenue Sources

Federal Highway Revenues

Federal highway revenues were estimated by extrapolating the funding trends in SAFETEA-LU. As is the case with all federal transportation revenues, the year-by-year allocation of funds in SAFETEA-LU are not indexed for inflation, that is, they are in current year or "year-of-expenditure" dollars. In SAFETEA-LU the major funding categories, Interstate Maintenance, National Highway System, Bridge Replacement and Rehabilitation, Surface Transportation Program, and Congestion Mitigation/Air Quality, grow at a rate of 1.61% per year.

TABLE 7-1
SUMMARY OF EXISTING REVENUES (FEDERAL, STATE & CITY)
(Thousands of dollars)

Revenue Source	Year 2000	Year 2001	Year 2002	Year 2003
Federal				
Highway Revenue (total to Hawaii)	$132,794	$141,670	$142,959	$124,376
Highway Revenue (Oahu share)	$22,219	$54,778	$54,944	$49,382
Transit Revenue	$26,478	$32,148	$47,219	$42,471
State				
O&M Revenue (statewide)	$111,052	$121,218	$132,467	$129,480
O&M Revenue (Oahu share)	$36,257	$34,297	$35,091	$40,760
Capital Improvement Program (statewide)	$88,040	$57,927	$79,025	$61,102
Capital Improvement Program (Oahu share)	$52,103	$9,578	$16,412	$24,305
City & County of Honolulu				
Highway O&M	$20,470	$18,542	$18,012	$17,215
Transit O&M	$67,136	$64,478	$76,862	$77,126
General Improvement Bond (to transportation)	$5	$368	$3,329	$985
Highway Improvement bond (to transportation)	$28,175	$39,703	$54,747	$63,694
Capital Projects Fund (to transportation)	$335	$539	$1,072	$4,210
TOTAL	**$585,064**	**$575,246**	**$662,139**	**$635,106**

Note: Amounts in year of expenditure dollars

Assuming an inflation rate of 2.7% per year results in Federal highway funds in these categories declining, however, in constant year 2005 dollars, by 1.06% per year. SAFETEA-LU includes four new funding categories: Recreational Trails, Safety, Rail-Highway Crossings, and Safe Routes to School. Recreational Trails grows at a rate of 6.76% per year in current year dollars. Safety grows at a rate of 1.95% per year in current year dollars. In SAFETEA-LU, Rail-Highway Crossings and Safe Routes to School remain at a constant level each year.

SAFETEA-LU also includes another funding category, designated as Equity Bonus. This Equity Bonus replaces the previous (TEA-21) Minimum Guarantee approach ($1,000,000 minimum, kept states as close as possible to an initial set of shares while raising states to a specified percentage of their share of contributions to the Highway Account of the Highway Trust Fund [HTF] with a modified approach that would only provide funding to States as necessary to bring them up to a specified percentage of their share of HTF contributions, subject to certain floors). The Equity Bonus provides that each State would be guaranteed a minimum percentage of its relative share of HTF contributions for each individual fiscal year: 90.5% in FY 2005-2006, 91.5% in FY 2007, and 92% in FY 2008-2009. As a Donee state (one that receives back more than it contributes to the HTF), the Equity Bonus for Hawaii is an amount that declines over time. Extrapolating this decline, the Equity Bonus amount for Hawaii (in current year dollars) goes from $18.416 million in 2006 to $3.925 million in 2030, a decline of about 6.2% per year. In constant year 2005 dollars, this decline occurs at a rate of 8.7% per year.

Including the major funding categories, plus the Equity Bonus, total Federal highway revenues to Hawaii are estimated to increase at an average annual rate of 1.06%, in current year dollars. In constant year 2005 dollars, assuming a 2.7% inflation rate, total Federal highway revenues to Hawaii over the 30 year period are estimated to decline at an average annual rate of 1.6%.

TABLE 7-2
REVENUE ESTIMATE SUMMARY - TRADITIONAL REVENUE SOURCES
ORTP 2030 – 2006 TO 2030
(Millions of Year 2005 dollars)

Revenue Sources	2006-2010 Increment	2011-2015 Increment	2016-2020 Increment	2021-2025 Increment	2026-2030 Increment	2006-2030 Total
OAHU'S FEDERAL REVENUES						
Highway Revenues						
System Preservation	$114	$77	$50	$46	$43	$331
System Improvement	$257	$272	$272	$252	$235	$1,288
Subtotal	$371	$349	$322	$298	$279	$1,619
Transit Revenues						
Section 5307	$135	$138	$133	$128	$123	$657
Section 5309 Fixed Guideway Modernization	$8	$8	$8	$8	$8	$41
Section 5309 New Starts (Discretionary)	$44	$202	$177	$33	$0	$456
Section 5309 Bus Capital (Discretionary)	$11	$28	$27	$26	$25	$118
Subtotal	$197	$376	$345	$195	$157	$1,272
Total: Federal	$569	$726	$667	$494	$436	$2,891
OAHU'S STATE REVENUES						
Highway Revenues						
Maintenance Funds for Operations & Routine Maintenance	$170	$170	$170	$170	$170	$850
Maintenance Funds for System Preservation	$179	$173	$75	$79	$82	$587
Subtotal: Oahu Share of State Maintenance	$349	$343	$245	$249	$252	$1,437
CIP Funds for System Preservation	$82	$0	$0	$0	$0	$82
CIP Funds for System Improvements	$75	$225	$293	$277	$265	$1,135
Subtotal: Oahu Share of State CIP	$157	$225	$293	$277	$265	$1,217
Total: State	$506	$568	$538	$526	$517	$2,654
CITY & COUNTY REVENUES						
Highway Revenues						
Highway O&M	$117	$111	$106	$101	$97	$532
Highway Capital	$85	$85	$86	$87	$88	$430
Subtotal	$202	$196	$191	$188	$185	$962
Transit Revenues						
Transit O&M	$460	$495	$564	$632	$687	$2,839
Transit Capital	$46	$46	$47	$47	$48	$235
GET Surcharge	$557	$706	$716	$144	$0	$2,123
Subtotal	$1,064	$1,247	$1,327	$824	$735	$5,197
Total: City & County	$1,266	$1,443	$1,518	$1,011	$920	$6,159
TOTAL REVENUE ESTIMATE	$2,340	$2,737	$2,723	$2,031	$1,873	$11,704

Note: See Appendix E for breakdown by revenue funding categories

The distribution of Federal highway funds to Oahu was increased over the forecast period. Throughout the period, 100% of Interstate Maintenance funds received by the State were assumed for Oahu, as were 61.56% of National Highway System funds. The portion of the High Priority Projects funds earmarked for Oahu projects is established in the SAFETEA-LU legislation. 41.31% of the funds in the remaining FHWA funding categories were assumed to be allocated to Oahu in the first five years of the forecast period (2006-2010). For the remaining 20 years of the forecast period, 53.81% of the funds in the remaining categories were assumed to be allocated to Oahu.

As shown in Table 7-2, a total of approximately $1.6 billion (in constant year 2005 dollars) is projected to be available in Federal highway revenues over the 25-year life of the plan.

Federal Transit Revenues

Federal transit formula funds were estimated by extrapolating the funding trends in SAFETEA-LU. As is the case with all federal transportation revenues, the year-by-year allocation of funds in SAFETEA-LU are not indexed for inflation, that is, they are in current year or "year-of-expenditure" dollars. In SAFETEA-LU, Section 5307 funds grow at a rate of 1.95% per year in current year dollars; Section 5309 Fixed Guideway Modernization Funds grow at a rate of 2.79% per year in current year dollars. Expressed in constant year 2005 dollars, Section 5307 funds decline at a rate of 0.7% per year, assuming a 2.7% inflation rate; Section 5309 Fixed Guideway Modernization Funds grow at a rate of 0.09% per year.

Section 5309 Bus Capital Funds are discretionary, that is, funds are not allocated to Honolulu on a formula basis. Honolulu has successfully competed for bus capital discretionary funds in the past, however, and it is reasonable to assume that it will be similarly successful in the future. Therefore, it was assumed that, beyond the authorization period of SAFETEA-LU, Section 5309 Bus Capital discretionary funds will be received at a level of approximately 20.5% of the Section 5307 formula funds received, consistent with the ratio of Section 5309 Bus Capital funds to Section 5307 funds authorized in SAFETEA-LU.

Section 5309 New Starts Funds are also discretionary. In recent years individual New Starts projects have seldom received more than $500 to $600 million dollars in Federal funds, spread over several years. For this plan, it was assumed that a New Starts transit project in Honolulu could successfully compete for and receive $600 million dollars in Section 5309 New Starts Funds. Since this $600 million would be received over time (it was assumed that $50 million per year would be received from 2010 through 2021), however, its value in constant year 2005 dollars would be less, approximately $455.5 million.

As shown in Table 7-2, a total of approximately $1.3 billion (in constant year 2005 dollars) is projected to be available in Federal transit revenues over the 25-year life of the plan.

7.1.2 State of Hawaii Revenue Sources

HDOT's Highways Division provides for roadway construction and maintenance with funding from the Highway Special Fund (248-8HRS). The Highway Special Fund's revenues are from various sources, including State Liquid Fuel Tax, Registration Fees, State Motor Vehicle Weight

Tax, and Car Rental/Tour Vehicle Tax. Revenues from the Highway Special Fund are used to fund operations and maintenance activities directly. Highway Special Fund revenues are also used to 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.

The various revenue sources that feed into the Highway Special Fund are assumed to continue to grow at historical rates. These historical rates are State Liquid Fuel Tax, 0.58% per year; Registration Fees, 1.00% per year; State Motor Vehicle Weight Tax, 1.74% per year; Car Rental/Tour Vehicle Tax, 3.18% per year; Time Certificates of Deposit, 3.05% per year; and Other Sources, 4.55% per year. In total, Highway Special Fund revenues are assumed to grow at a rate of 2.29% per year, in current dollars. Assuming a 2.7% inflation rate, however, results in a decline of 0.4% per year in constant year 2005 dollars.

The split of the State Highway Budget between operations and maintenance expenditures and capital expenditures varies. Historically, expenditures for operations and maintenance have averaged about 50% more than capital expenditures. More recently, in the current biennium, the share for operations and maintenance has increased to about twice that of capital expenditures. This reflects an increased emphasis on system preservation activities. The ORTP financial plan assumes that this increased emphasis on operations and maintenance will continue through the first 10 years of the plan, with a return in the last 15 years of the plan to a split more consistent with past history.

Oahu's share of the operations and maintenance portion of the State Highway Budget is anticipated to vary from about 45% in the first 10 years of the ORTP forecast period to about 40% in the last 15 years of the forecast period. Of the operations and maintenance expenditures on Oahu, $34 million per year is assumed to be used for operations and routine maintenance and the remainder is assumed to be used for system preservation.

Oahu's share of the capital portion of the State Highway Budget is anticipated to vary from 40% in the first five years of the forecast period to 61.2% in the final 20 years of the period.

As shown in Table 7-2, a total of approximately $2.7 billion (in constant year 2005 dollars) is projected to be available in State highway revenues over the 25-year life of the plan.

7.1.3 City and County of Honolulu Revenue Sources

City and County funding of surface transportation operations and maintenance comes from the General Fund and the Highway Fund. The City and County General Fund includes a variety of revenue sources, with the largest being property taxes. The City and County Highway Fund includes three major revenue sources: the County fuel tax, the County motor vehicle weight tax, and the public utility franchise tax. Portions of both the City and County General Fund and the City and County Highway Fund are transferred to the City and County Public Transportation Fund, which is used for transit operations and maintenance.

Revenues from the City and County General Fund and the City and County Highway Fund are also used to pay debt service on bonds. Capital projects are funded from the bond proceeds. Most surface transportation capital projects receive their local funding from the City and County Highway Improvement Bond Fund, but some projects also receive funding from the City and County General Improvement Bond Fund or the City and County Capital Projects Fund.

The various revenue sources that feed into the General Fund are assumed to continue to grow at historical rates. These historical rates are: Real Property Taxes, 3.6% per year; Motor Vehicle Registration Annual Fee, 2.0% per year; Transient Accommodation Tax (from State), 2.4% per year; Other Sources, 1.7% per year. In total, General Fund revenues are assumed to grow at a rate of 3.2% per year in current dollars. Assuming a 2.7% inflation rate, however, results in a growth of 0.5% per year in constant year 2005 dollars.

The various revenue sources that feed into the Highway Fund are assumed to continue to grow at historical rates. These historical rates are: Public Utility Franchise Tax, 1.7% growth per year; City & County Fuel Tax, a decline of 0.2% per year; County Motor Vehicle Weight Tax, 2.3% growth per year; Other Sources, 3.1% growth per year. In total, Highway Fund revenues are assumed to grow at a rate of 1.5% per year in current dollars. Assuming a 2.7% inflation rate, however, results in a 1.2% per year decline in constant year 2005 dollars.

An additional funding source is available for the implementation of a mass transit project on Oahu, a 0.5% general excise tax (GET) surcharge to be levied for 15 years beginning in 2007. The surcharge is expected to generate approximately $150 million beginning in 2007. From this amount must be deducted the cost of administering and collecting the tax, estimated to be 2.5% of the revenues collected. The remaining $146.25 million in 2007 would be available for project use. Based on historical trends, the tax is expected to increase at a rate of 3% per year, in current dollars. In constant year 2005 dollars, assuming a 2.7% inflation rate, the growth in the GET surcharge revenue is assumed to be about 0.3% per year.

As shown in Table 7-2, a total of approximately $6.2 billion (in constant year 2005 dollars) is projected to be available in City and County highway and transit revenues over the 25-year life of the plan, consisting of about $960 million in highway revenues and $5.2 billion in transit revenues. The latter figure includes an estimated $2.8 billion for transit operating costs and another $2.1 billion in funds accruing from the GET surcharge for mass transit.

7.1.4 Transit Farebox Recovery

Transit fares for the public transit system are not included in the revenue forecasts presented previously in Table 7-2. The City & County of Honolulu has a policy that transit fares shall be maintained and increased as necessary at a level that maintains a farebox recovery ratio of between 27% and 33%. For the purpose of the ORTP, it was therefore assumed that fares would generate approximately 30%, on average, of the projected future cost of operating the transit system, including ferry services, over the life of the plan. With this assumption, it is estimated that fares would generate about $1.4 billion over the 25-year period from 2006 to 2030.

7.1.5 Developer Funding

In addition to the traditional FHWA, FTA, state, and local contributions used to pay for future transportation projects, the ORTP 2030 has also identified another source: developer funding. Certain major highway capital projects located in growth areas that would serve or accommodate anticipated new future developments have the potential to be funded or partially funded by private and/or public developers.

Examples of developer funding include when the developer constructs (or partially constructs) a roadway or its components (e.g., on- or off-ramp, interchange, etc.), donates land, or is levied an impact fee on new development to pay for the construction or expansion of transportation improvements that are necessitated by and benefit the new development. Chapter 46-141 of the Hawaii Revised Statutes allows the counties of the State of Hawaii to enact ordinances to provide for impact fees.

The ORTP 2030 does not limit developer-funding options to the examples cited above. Other options allowed by state law or county ordinances are also included.

The ORTP 2030 assumed the following:

- Employer and developer funds would cover approximately $75 million of the TDM program.

- Developer funding is estimated to provide $354 million for some of the ORTP 2030 projects that support the construction of future development over the life of the plan (in constant Year 2005 dollars).

The estimated revenues from developer contributions have been generated for the ORTP 2030 for planning purposes only. The assumed level of revenues from developer contributions is not intended to establish any developer funding obligations, commitments, or guidelines. Actual funding obligations and commitments will be determined through other planning efforts of the City and County and/or State.

City ordinance requires a periodic review of the Ewa Highway Impact Fee Program which projected developer contributions for selected highway projects. These and other updates will be used to revise projected developer funding in future updates of the ORTP.

7.1.6 Revenue Summary

Total revenues of approximately $13.5 billion are thus anticipated over the 25-year life of the ORTP 2030. As indicated in Figure 7-1, the $13.5 billion includes $2.9 billion in Federal funds, $2.7 billion in State funds, $6.2 billion in City & County funds, $1.4 billion in transit fares, and $0.4 billion in developer funding. Table 7-3 presents a summary of all revenue assumptions.

The following assumptions were made about the actual amounts that would be available for Oahu to make these projections, for planning purposes:

- Recent trends for Federal highway and transit funds coming to Hawaii would continue.
- The City and County will obtain $456 million in federal funds (in 2005 dollars) to assist in the cost to construct the rapid transit system.
- Approximately $2.1 billion will be generated by the City & County's recently approved GET surcharge for mass transit.
- 60% of the State's CIP funds will be spent on Oahu.
- In the first five years of the plan (2006-2010), 41% of the federal highway funds controlled by the State would be spent on Oahu, increasing to 54% in the 2011-2030 period.

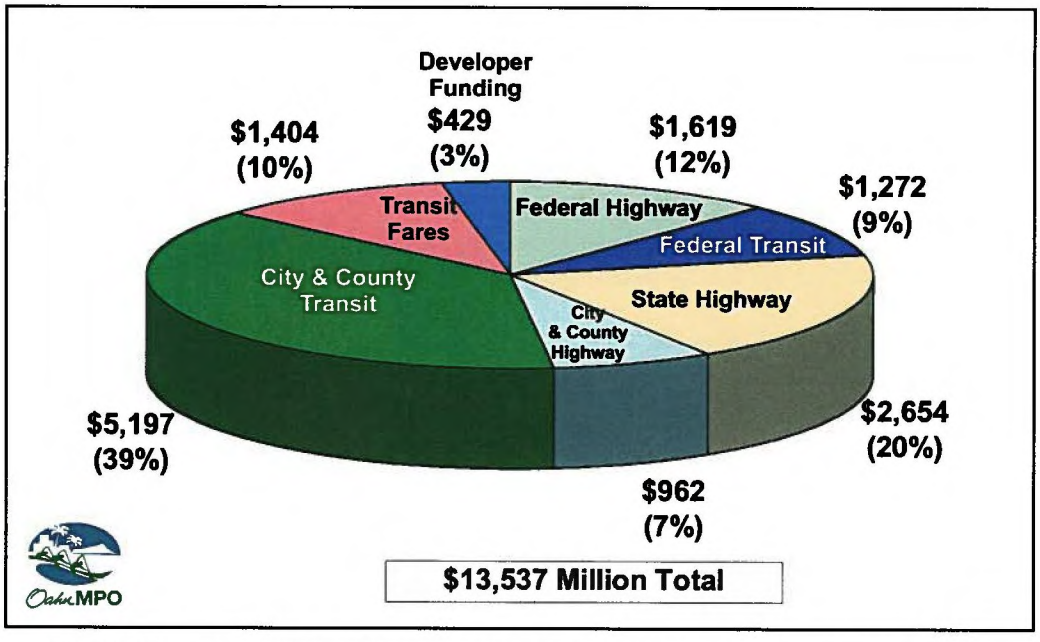


FIGURE 7-1: ESTIMATED TRANSPORTATION REVENUE: 2006 – 2030 (Millions of Constant 2005 Dollars)

Revenue projections are used to estimate the level of transportation "supply" Oahu can reasonably afford and are based on the best available information. The primary purpose for these projections is to ensure the financial viability of the ORTP 2030 from a regional perspective. As projects move from the ORTP 2030 to the development of individual projects, funding assumptions (e.g., source of funds, level of funding, etc.) may be modified. Generally, these modifications should not substantially affect the ORTP 2030 financial plan. Adjustments to the ORTP and its financial plan can be made during its regular five-year update cycle or when an action triggers the need for such an adjustment. Amendments to the ORTP financial plan can be made if major changes are made to the funding assumptions that would affect the plan's financial viability.

7.2 COST ESTIMATES

Cost estimates for the ORTP 2030 include costs to implement capital improvement projects, costs to operate and maintain the current and expanded transit system, and costs to maintain and preserve the highway system. Individual project cost estimates were prepared for each project in the ORTP 2030. Projected operating and capital costs for the public transit system were also estimated, including estimated costs to continue to operate the existing system between 2006 and 2020, costs to increase transit service levels as called for in the plan, and costs to build and operate the rail system.

Table 7-4 summarizes the projected revenues and costs for the ORTP 2030 over the 25-year life of the plan. Figure 7-2 illustrates the breakdown of overall costs by category, while Figure 7-3 illustrates a further breakdown of costs by type for the capital improvement projects.

TABLE 7-3
REVENUE ASSUMPTIONS SUMMARY TABLE

Funding Source	Funding Category	Revenues Available to Hawaii (Year 2005 dollars)	Oahu Share Assumption	Revenues Available to ORTP 2030 (Year 2005 dollars)
FHWA	Interstate Maintenance *	$192 million	100%	$192 million
	NHS *	$993 million	61.56%	$612 million
	High Priority Projects (Year 2006-2010)	$90 million	39.97%	$36 million
	All Other FHWA Funds (Year 2006-2010) *	$356 million	41.31%	$147 million
	All Other FHWA Funds (Year 2011-2030) *	$1,176 million	53.81%	$633 million
	* *Includes pro rata share of Equity Bonus*			
FTA	Section 5307	n/a	n/a	$657 million
	Section 5309 Fixed Guideway Modernization	n/a	n/a	$41 million
	Section 5309 Bus Capital	n/a	n/a	$118 million
	Section 5309 New Starts	n/a	n/a	$456 million
State of Hawaii	Highway Special Fund	$5,541 million	varies over time	$2,654 million
C&C of Honolulu	General Fund	n/a	n/a	$2,041 million
	Highway Fund	n/a	n/a	$1,329 million
	General Improvement Bond Fund	n/a	n/a	$25 million
	Highway Improvement Bond Fund	n/a	n/a	$626 million
	Capital Project Fund	n/a	n/a	$14 million
	General Excise Tax Surcharge for Transit	n/a	n/a	$2,123 million
Transit Fares		n/a	n/a	$1,403 million
Developer Funding		n/a	n/a	$359 million
Total				**$13,537 million**

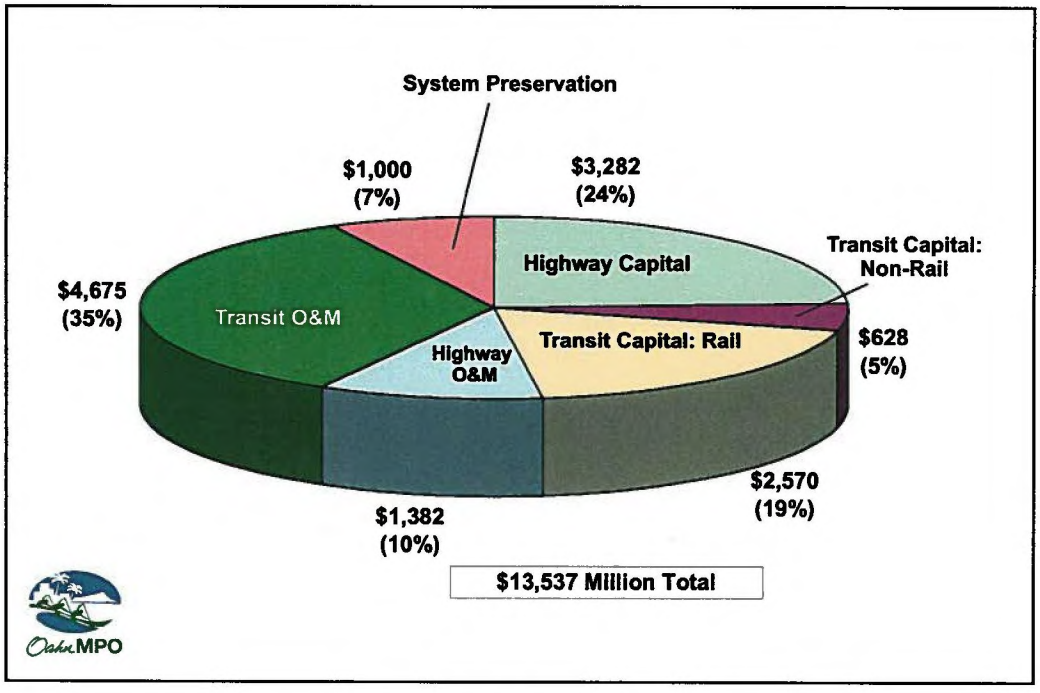


FIGURE 7-2: ESTIMATED PLAN COSTS: 2006 - 2030
(Millions of Constant 2005 Dollars)

Overall costs to implement the plan are estimated at approximately $13.5 billion in constant year 2005 dollars. This includes about $6.5 billion in capital costs: $3.3 for highway construction, $0.6 in non-rail transit capital costs (i.e. expansion of the bus system, including new and replacement buses, construction of transit centers, and the ferry system), and $2.6 billion to build the rail transit system.

The plan sets aside $1.4 billion for highway operations and routine maintenance ($850 million State and $532 million City & County), $4.675 billion to operate and maintain the transit system (bus, paratransit, ferry and rail), of which $144 million is to operate and maintain the commuter ferry.

7.2.1 Operations and Maintenance

The State portion of operation and maintenance funding is used for maintaining and repairing the pavement and shoulders, bridges and other structures, fencing and walls, drainage systems, traffic signs, guardrails, highway pavement markings, the highway lighting system, sidewalks and wheelchair ramps, landscaping and irrigation systems, cleaning the streets, restoration of State highways after slides, storm damages, accidents and other catastrophic events, and other similar items. For State highway operations and maintenance, $850 million is programmed over the 25-year life of the plan, about $34 million per year for each of the 25 years.

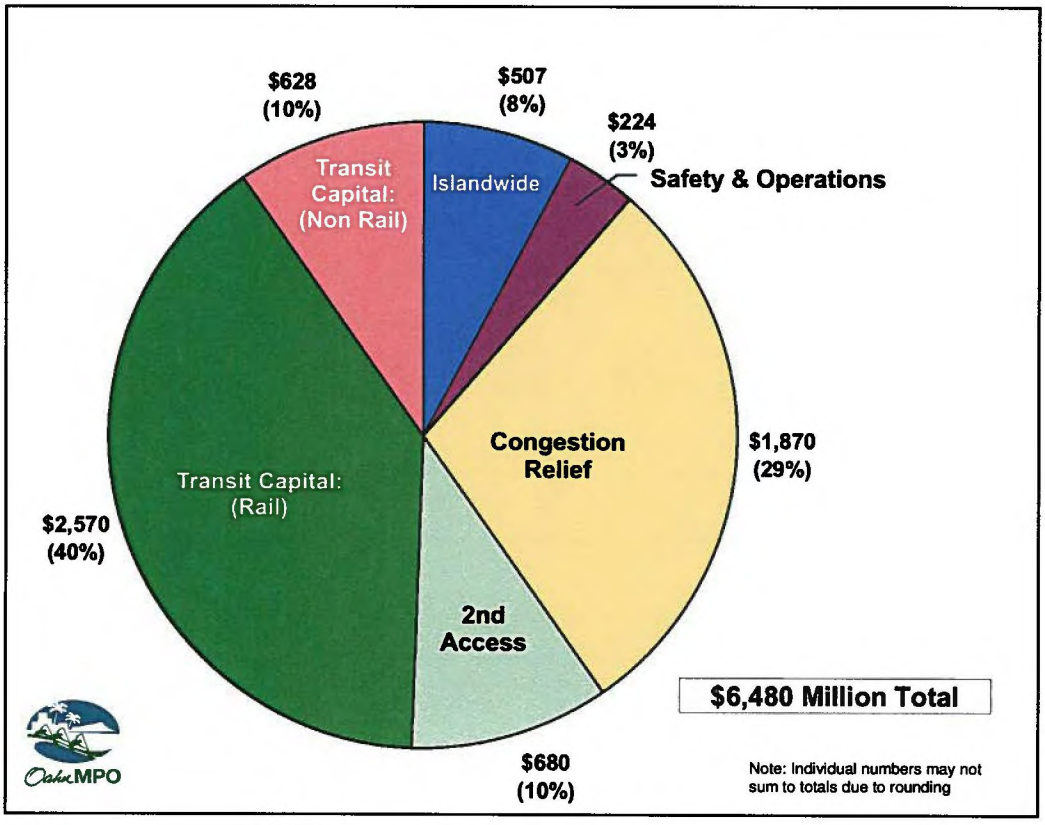


FIGURE 7-3: CAPITAL COSTS BY TYPE
(Millions of Constant 2005 Dollars)

For City roadway operation and maintenance, projects include, but are not limited to, the operation of the transit system (including bus, paratransit, rail, and ferry), replacement of the existing bus, paratransit, and ferry fleets, resurfacing, guardrail and shoulder improvements, lighting improvements, drainage improvements, and sign upgrades and replacements. To operate the transit system (including bus, paratransit, and rail), $4.5 billion is set aside, with $144 million to operate and maintain the commuter ferry. In addition, $532 million is programmed to maintain the roadway system, translating to about $21.3 million per year for each of the 25 years of the plan.

7.2.2 System Preservation

The ORTP 2030 also provides $1.0 billion for highway system preservation over the life of the plan. Examples of system preservation projects include bridge replacement, erosion control, viaduct improvements, and road resurfacing and rehabilitation projects.

In the past five to ten years, the funding for pavement resurfacing and rehabilitation was significantly reduced. During this period, HDOT changed its resurfacing cycle for its highways from an average of once every 10 years to once every 14 years. Studies have shown that after 10 years the pavement condition deteriorates at an accelerated rate. The overall condition of

TABLE 7-4
ESTIMATED REVENUE VERSUS COST – 2006 TO 2030

Category	Revenue Forecast							Estimated Costs		
	Traditional Revenue Sources				Other Sources					
	Federal	State	C&C	Subtotal	Transit Fares [a]	Developer Funding	Total	Estimated Cost		Revenue Less Cost
Capital										
Highway Capital	$1,288	$1,135	$430	$2,853	-	$429	$3,282	$3,282		$0
Transit Capital: Non-Rail	$384	-	$235	$619	-	-	$619	$628	[b]	-$9
Transit Capital: Rail	$456	-	$2,123	$2,579	-	-	$2,579	$2,570		$9
Capital Total	$2,128	$1,135	$2,788	$6,051	$0	$429	$6,480	$6,480		$0
O&M										
Highway O&M	-	$850	$532	$1,382	-	-	$1,382	$1,382		$0
Transit O&M	$432	-	$2,839	$3,271	$1,404	-	$4,675	$4,675	[c]	$0
O&M Total	$432	$850	$3,371	$4,653	$1,404	$0	$6,057	$6,057		$0
System Preservation	$331	$669	-	$1,000	-	-	$1,000	$1,000	[d]	$0
Total	$2,891	$2,654	$6,159	$11,704	$1,404	$429	$13,537	$13,537		$0

Notes:

a. Assumes 30% farebox recovery.

b. Non-rail transit capital: $414 million fleet replacement for existing fleet, $121 million for purchase of new buses for expansion, $30 million for replacement of new buses for expansion, $40 million for transit centers, and $23 million for ferry.

c. Transit O&M: $3,606 million for existing bus (including paratransit), $350 million for expanded bus (including paratransit), $575 million for rail, and $144 million for ferry.

d. Assumes $75 million/year for first 5 years, $50 million/year for next 5 years, $25 million/year for remaining 15 years.

the State highway system on Oahu has deteriorated because of the reduced funding and, as of April 2006, HDOT has not caught up with its resurfacing program.

The resulting deterioration of the State roadways on Oahu and the impacts of deferred maintenance are felt by roadway users driving over numerous potholes and experiencing a poorer ride quality. Now these roadways need to be brought back up to the quality expected by HDOT and roadway users. Because of the deferred maintenance over the past five to ten years, however, costs to rehabilitate and reconstruct the State highways have significantly increased[1].

The ORTP 2030 estimates that, for HDOT to catch up with its resurfacing program, $75 million per year for the first five years of the plan's implementation is necessary. This translates to a total of $375 million for the 2006-2010 period, as shown in Figure 7-4 (System Preservation Costs). The next five-year period, 2011-2015, it is anticipated that HDOT will continue to need to catch up with its resurfacing program, with $50 million set aside per year, a total of $250 million.

7.3 COSTS COMPARED TO REVENUES

As indicated in Table 7-4, the financial plan for the ORTP 2030 is balanced, with projected revenues and estimated costs matched at approximately $13.5 billion over the 25-year period of the plan.

[1] As the highway pavement deteriorates, the costs increase exponentially. The average cost of preventive maintenance is approximately $250,000 to $300,000[1] per lane mile, while the cost for rehabilitation and/or reconstructing the pavement is over $1 million per lane mile.

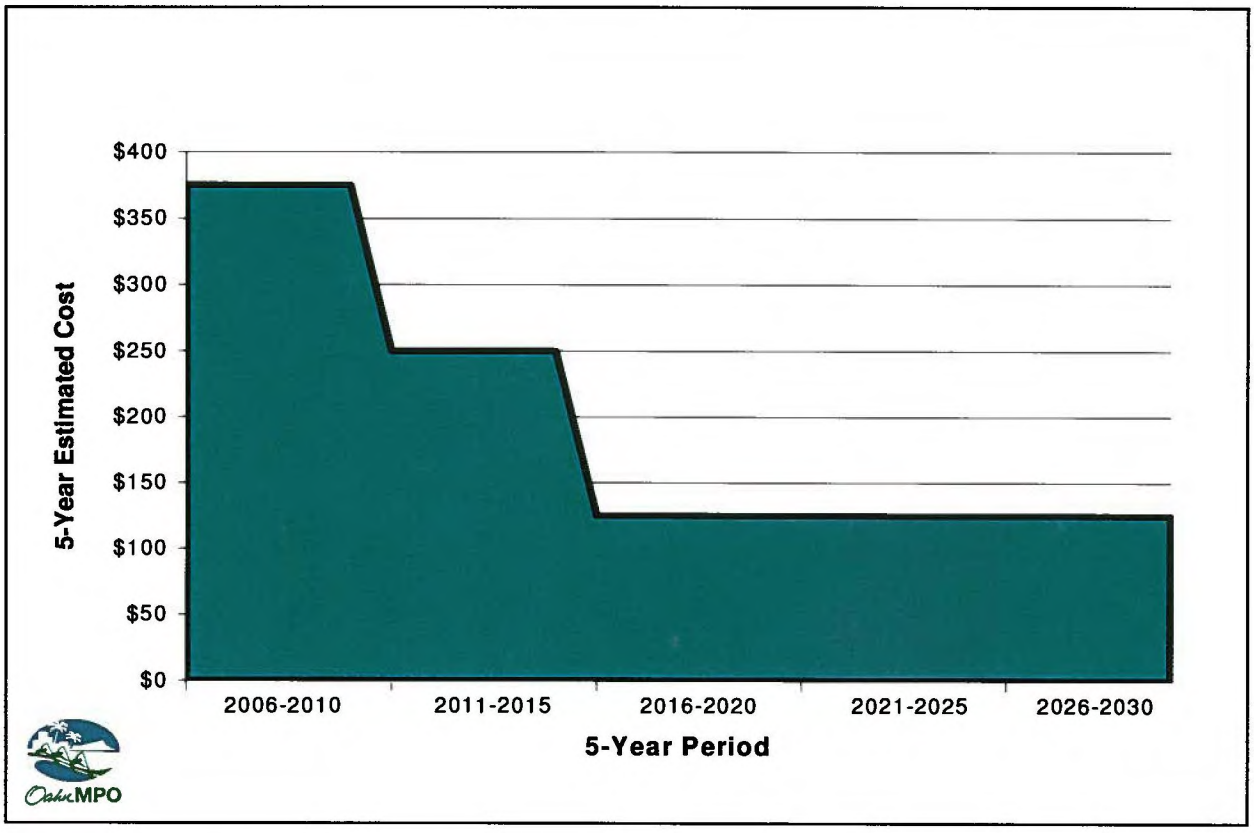


FIGURE 7-4: SYSTEM PRESERVATION COSTS (Millions of dollars)

8.0 IMPLEMENTATION AND CONCLUSIONS

The ORTP 2030 sets out a vision:

> *In 2030 Oahu is a place where transportation choices are available and the importance of the H-1 travel corridor is recognized.*

In order to achieve this vision, a comprehensive set of affordable transportation improvements have been compiled with the help of public input. The ORTP 2030 recognizes that there is a need to address the growth in population and employment over the next 25 years and aims to meet these through the setting of appropriate goals and objects while remaining consistent with City, State and Federal policies. The final chapter of this document discusses the plan implementation and conclusions drawn from in-depth analysis.

8.1 APPLICATIONS TO ORTP 2030 GOALS AND OBJECTIVES

The ORTP 2030 fulfills the Transportation Service System Goal through developing and maintaining Oahu's islandwide transportation system to ensure efficient, safe, convenient and economical movement of people and goods. The plan increases the capacity of the system, providing an efficient and convenient transit system serving many destinations across the island. The plan projects are distributed across Oahu, supporting economic development and providing funds to support system preservation.

The ORTP 2030 fulfills the Environment and Quality of Life Goal by developing and maintaining Oahu's transportation system in a manner that maintains environmental quality and community cohesiveness. The plan strives to achieve this goal by improving air quality and encouraging energy conservation, and developing alternative modes of transportation that are environmentally friendly, including transit, pedestrian walkways and bicycle routes, while optimizing use of transportation resources and minimizing impacts on cultural and natural resources and disruption of neighborhoods. The plan considers compatibility with the physical and social character of existing development, incorporates transportation system enhancements, and includes improvements that address public safety and emergency planning.

The ORTP 2030 fulfills the Land Use and Transportation Integration System Goal by developing and maintaining Oahu's transportation system in a manner that integrates transportation with the City's land use policies. The plan reinforces planned population distribution and land use development policies, encourages innovation, and encourages implementation of land use policies that support efficient use of transportation systems.

The ORTP 2030 addresses each of the 23 objectives defined in Chapter 2 through the planned transportation improvements, which lead to the fulfillment of the three aforementioned goals. These objectives are summarized in Tables 8-1, 8-2 and 8-3.

TABLE 8-1
SUMMARY OF TRANSPORTATION SERVICE SYSTEM GOAL OBJECTIVES

No.	Objective	ORTP 2030
Transportation Services System Goal: Develop and maintain Oahu's islandwide transportation system		
#1	Increase peak-period person-carrying capacities on Oahu's transportation network.	Met by increase in transit projects, alternative modes, HOV lanes and TDM element.
#2	Provide efficient, convenient and cost-effective transit service to Oahu citizens.	Upgraded bus network and rail transit added.
#3	Encourage the availability of adequate public and private services between Waikiki, the airport and other tourist destinations.	Additional transit services can be provided by public or private transportation providers. Services can be pursued through the TDM program and other programs.
#4	Promote intermodal efficiency of harbor terminal facilities, airport terminal facilities and land transportation systems.	Roadway networks improved and transit services added.
#5	Ensure that no person shall, on the grounds of race, color, gender, age, income, disability, or national origin, 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 local legislation.	Environmental justice analysis undertaken and satisfied. FHWA and FTA funds that support social service programs (e.g., Job Access and Reverse Commute Program, Elderly and Persons with Disabilities Program, New Freedom Program, Ways to Work Program, etc.) could be used to provide and assist persons who have been traditionally underserved by the transportation system. These programs will be developed and programmed through the TIP with input from transit providers, human service agencies, and the public. Development of a Human Services Transportation Plan will also improve transportation services for persons with disabilities, the aged, and individual with lower incomes.
#6	Ensure user and community safety and security in the physical design and operation of transportation facilities.	Safety improvements and second access projects included in plan; safety and security will also be considered further for individual projects as they are designed and implemented.
#7	Ensure that Oahu's transportation system is planned, designed, constructed and operated in an integrated and cost-effective manner.	Transportation system integration & cost-effectiveness considered in development of plan; will also be considered further for individual projects as they are designed and implemented.
#8	Enhance the performance and efficiency of Oahu's transportation system through the use of operation management strategies, such as ITS, TSM and TDM.	ITS, TDM and TSM elements included in the plan.
#9	Enhance the integration and connectivity of the regional transportation system.	Achieved through additional transit and highway improvements.
#10	Promote planning, design and construction of transportation facilities and systems to support economic development and vitality.	Highway and transit improvements to provide mobility options and congestion relief. Projects included that are consistent with City and State planning policies.
#11	Provide major rehabilitation/renewal/ modernization of facilities in sufficient magnitude to ensure continued effective operation.	System preservation and operations and maintenance included in plan.

TABLE 8-2
SUMMARY OF ENVIRONMENT AND QUALITY OF LIFE SYSTEM GOAL OBJECTIVES

No.	Objective	ORTP 2030
Environment and Quality of Life System Goal: Develop and maintain Oahu's transportation system in a manner that maintains environmental quality and community cohesiveness.		
#12	Develop and maintain Oahu's transportation system to meet or exceed noise, air and water quality standards set forth by federal, state and local agencies.	Plan addresses environmental standards by increasing transit ridership and decreasing VMT and delay compared to the Baseline 2030. Achievement of standards by individual projects will be addressed during project development.
#13	Encourage energy conservation in transportation.	Plan increases transit ridership while decreasing VMT and delay compared to the Baseline 2030.
#14	Preserve Oahu's cultural integrity and sensitive natural resources, including beaches, scenic beauty, and sea and mountain vistas.	Preserving resources was considered during development of plan. Will also be considered further for individual projects when they are designed and implemented.
#15	Develop and maintain alternative transportation facilities, including bikeways, walkways and other environmentally-friendly elements that can be safely integrated with other transport modes.	Plan includes bicycle projects, pedestrian plan, and transportation system enhancement projects.
#16	Develop a travel demand management system for Oahu that optimizes use of transportation resources by encouraging programs to increase transit ridership, increase ridesharing on Oahu, reduce single occupancy vehicle travel, and reduce auto dependency.	Plan includes additional HOV lanes and an extensive TDM program. It also includes improved bus system and rail transit. Ferry service added.
#17	Minimize disruption of existing neighborhoods from construction of the transportation system.	Minimizing disruption to existing neighborhoods was considered during development of plan. Will also be considered further for individual projects when they are designed and implemented.
#18	Ensure that transportation facility design and maintenance are compatible with the existing and planned physical and social character of new and existing developments.	Compatibility was considered during development of plan. Will also be considered further for individual projects when they are designed and implemented.
#19	Maintain and upgrade existing facilities and design future transportation facilities in a manner that is aesthetically pleasing and incorporates landscaping, tree planting, and public safety.	Aesthetics was considered during development of plan. Will also be considered further for individual projects when they are designed and implemented. Plan includes transportation system enhancement projects.
#20	Develop transportation contingency plans for energy shortages, natural and man-made disasters and other emergencies that would impact the transportation system.	Second access projects included in plan to Makakilo, Mililani Mauka, Wahiawa and Waianae Coast.

TABLE 8-3
SUMMARY OF LAND USE AND TRANSPORTATION INTEGRATION SYSTEM GOAL OBJECTIVES

No.	Objective	ORTP 2030
Land Use and Transportation Integration System Goal: Develop and maintain Oahu's transportation system in a manner that integrates land use and transportation.		
#21	Maintain and develop the transportation system to reinforce Oahu's planned population distribution and land use development policies expressed in the City's Development Plans through coordinated efforts of the public and private sectors.	Plan is consistent with City development policies; plan provides improvements in H-1 corridor and in growth areas to support City-directed growth in PUC, Ewa, and Central Oahu areas.
#22	Encourage innovation in planning, design and maintenance of transportation services and facilities.	Plan is fully integrated with highway, transit, bicycle, pedestrian, TDM, TSM and ITS elements.
#23	Encourage the implementation of land use development policies that support efficient use of the transportation system via reduced vehicular tripmaking and vehicle miles traveled.	Plan includes TDM projects and transit project to facilitate this objective.

8.2 SAFETEA-LU PLANNING FACTORS

SAFETEA-LU calls for transportation strategies in metropolitan regions to address a number of planning factors. The ORTP 2030 addresses the eight SAFETEA-LU planning factors that were defined in Chapter 1 of this document:

- The improvement in travel times and congestion relief support the economic vitality of the metropolitan area, allowing for competitiveness, productivity, and efficiency.

- The inclusion of safety projects and pedestrian/bike projects in the ORTP 2030 increase the safety of the transportation system for all users. Safety projects in the plan include safety and operational improvements such as left-turn lanes, guardrails, crosswalks, highway realignment, and rockfall protection. Safety and operational improvements are also often part of improvement projects included in other categories.

- The improved transportation system will afford greater support to homeland security and help safeguard the personal security of all motorized and non-motorized users. Reductions in delay compared to the Baseline 2030 (both reductions in congestion-related delay due to highway and transit improvements and reductions in incident delay due to ITS measures) and second access projects will support emergency response capability. Appropriate security measures will also be provided as part of the proposed rail transit system.

- Highway and transit improvements showing reductions in travel time, VMT, VHT and delay will increase the accessibility and mobility of people and freight.

- The ORTP 2030 was designed to support local development policies including continued development of the second city in the Ewa/Kapolei area. The proposed transportation

improvements including increased transit and alternative mode options offer less dependency on the automobile and in doing so promoted the enhancement of the environment, energy conservation and quality of life.

- The range of diverse projects included in the ORTP 2030 promotes the integration and connectivity of the transportation system, across and between modes, for people and freight.

- Efficient system management and operation is promoted by the ORTP 2030 through the carefully planned and complimentary transportation improvement projects.

- The ORTP 2030 promotes the continued preservation of the existing transportation system by allocating funds to system preservation throughout the 25-year time frame of the plan.

Table 8-4 describes how the ORTP 2030 addresses each of the eight SAFETEA-LU planning factors.

TABLE 8-4
SAFETEA-LU PLANNING FACTORS AND ORTP 2030

No.	SAFETEA-LU Planning Factor	ORTP 2030
#1	Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.	Achieved through a reduction in travel time, VMT, VHT and delay compared to the Baseline 2030 and increased transit ridership.
#2	Increase the safety of the transportation system for motorized and non-motorized users.	Safety, second access, pedestrian and bike projects included in the plan. Development of SHSP and Hawaii Services Transportation Plan.
#3	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 ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users. Development of SSEPP.
#4	Increase the accessibility and mobility of people and for freight.	Provision of additional mobility options, reductions in travel time, VMT, VHT and delay compared to the Baseline 2030, and increased transit ridership.
#5	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.	Local development policies directing growth to PUC and Ewa/Kapolei supported by improvements in plan. Environmental protection, energy conservation and quality of life addressed by increasing transit ridership and decreasing VMT and delay compared to the Baseline 2030; environmental effects and potential mitigation measures will also be considered for individual projects during project development.
#6	Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.	Achieved by a diverse range of highway and transit projects .
#7	Promote efficient system management and operation.	Plan integrates different modes and TDM measures; proposed projects are designed to be complimentary.
#8	Emphasize the preservation of the existing transportation system.	Funds allocated to system preservation and O&M over plan lifetime.

Many of the improvement projects contained in the ORTP 2030 may have impacts on the environment. These could include impacts on ROW, aesthetics and views, noise or vibration, biological resources, etc., associated with major improvements such as the proposed rail transit system, new roadways, freeway interchanges, highway widening projects, and the Nimitz HOV flyover project. In addition, there could be temporary impacts during construction of improvements such as emissions from construction equipment, noise, disruption of traffic flow, etc. The intent of the plan was to minimize the magnitude of potential impacts to the extent possible. The precise details of such impacts, and the steps that may be taken to mitigate the impacts, will be identified through environmental review for individual projects as part of the project development process.

8.3 TRANSPORTATION IMPROVEMENT PROGRAM

The Oahu TIP is a programming document that lists transportation projects that will be undertaken by the State of Hawaii and City & County of Honolulu and funded in part with federal money. Projects identified in the TIP are consistent with the ORTP. The TIP is the short-term four-year implementation program for federally assisted surface transportation projects. It describes and prioritizes federally assisted and regionally significant locally funded transportation programs and projects selected by the OahuMPO Policy Committee for implementation during the program period.

The TIP identifies funding amounts by source of funding, jurisdictional responsibility, type of project, and year of funding for these projects. The TIP is updated every three years. The TIP is adopted by the OahuMPO Policy Committee and sent to the Governor for approval. Upon approval, the TIP is incorporated as the Oahu element of the Statewide Transportation Improvement Program (STIP).

8.4 ON THE HORIZON

There are many projects and plans that are currently in the development stage. The following sections list these projects and provide further information concerning their purpose and progress.

8.4.1 Development of the Strategic Highway Safety Plan

HDOT, in conjunction with the Hawaii Department of Health and the Honolulu Police Department, is leading the effort to develop a Strategic Highway Safety Plan (SHSP) for Hawaii. An organizational structure has been developed that is comprised of an Executive Committee, Core Working Committee, Emphasis Area Committees (of which there are seven) and ad hoc Committees. The purpose of the organizational structure is to integrate resources and create a management process so safety partners can collaboratively direct activities in a coordinated way.

The Core Committee has been tasked with developing the SHSP and has identified the purpose of the Hawaii SHSP to reduce the number of motor vehicle fatalities and injuries. The proposed vision, mission statement, and goal of the plan are:

- Vision - Hawaii road users arrive safely at their destinations.

- Mission - Reduce the number of traffic-related deaths and injuries on Hawaii's roadways through the development and implementation of a strategic highway safety plan.

- Goal - Reduce the number of traffic-related deaths from an annual average of 140 in 2004, to 100 or fewer within five years, a rate of approximately 1.0 fatality per 100 million vehicle miles traveled.

The SHSP will tap representatives from various sectors and safety partners throughout the State – including highway and transit transportation, law enforcement, emergency responders, education, health care, and freight movement. These public and private entities will work together in the continued development of the SHSP to conduct road safety programs more effectively and efficiently.

The Hawaii SHSP is a multi-disciplinary effort, incorporating the 5E's: Engineering, Education, Enforcement, Emergency Services, and everybody else.

8.4.2 Development of the Honolulu High Capacity Transit Alternatives Analysis

The City & County of Honolulu's Department of Transportation Services has undertaken a multimodal alternatives analysis of major transit improvements for the Primary Urban Corridor.

The Honolulu High Capacity Transit Corridor Project is studying how to improve the ability of people to move in the highly congested east-west corridor between Kapolei and Manoa/Waikiki. Over sixty percent of Oahu's population currently lives within the area served by this corridor. This area is projected to continue to grow faster than the rest of Oahu.

A wide range of options for improving travel throughout the corridor are being evaluated against many criteria, including shortening travel times, project costs, environmental impacts, ease of implementation, support of the City and County of Honolulu's long-range land use plans, and community benefits.

The planning and project development process for the Honolulu High-Capacity Transit Corridor Project is based in part on requirements by the U.S. Department of Transportation, Federal Transit Administration (FTA), because FTA funds will be used for this project. The project is currently in the planning phase. The purpose of this phase is to select a "Locally Preferred Alternative" (LPA) and complete a draft environmental impact statement (EIS). After this phase is completed, the City will request approval from FTA to begin the preliminary engineering phase on the LPA.

In addition, in accordance with the federal requirements, the LPA selected from the Alternatives Analysis will be proposed for adoption as part of the ORTP, as a condition for proceeding into preliminary engineering.

8.4.3 Development of TheBus Safety Management Plan

The City DTS has begun work on development of its transit system safety program plan, called the "Safety Management Plan." The plan will formalize the existing policies and strategies of TheBus operator, Oahu Transit Services, to:

- identify all hazards in order to eliminate, minimize, or control them,
- identify all safety-related responsibilities,
- delegate responsibilities to the proper units within the organization, and
- provide the resources to carry out assigned responsibilities.

Ultimately, the Safety Management Plan will apply operating, technical, and management techniques and principles to the safety aspects of the system throughout its life cycle to reduce hazards to the lowest practical level through the most effective use of available resources.

8.4.4 System Security Emergency Preparedness Plan

In addition to the Safety Management Plan and the Alternatives Analysis study, the City DTS recently completed its "System Security Emergency Preparedness Plan (SSEPP)" for its transit operations. The plan was developed with funding from FTA and identifies security and emergency preparedness measures focusing on terrorist threats while also addressing all other hazard events for Oahu's public transit system.

The purpose of the SSEPP is to provide the framework for DTS to enhance its capabilities to provide effective security and safety measures for the protection of its transit system. Specific strategies and policies have not been disclosed to the public, nor are they expected to be disclosed to the public for security reasons. The rationale is to support homeland security in a way that the security of the transit system and its users will not be compromised.

The SSEPP is a component of DTS' Regional Transit Security Strategy (RTSS) that was developed in 2005 for the Department of Homeland Security's Transit Security Grant Program. The RTSS supports and integrates with the Implementation Strategy for State of Hawaii Homeland Security and the Honolulu Urban Area Homeland Security Strategy's goals and objectives to effectively protect, prevent, respond, and recovery from all security and safety threats and hazards.

8.4.5 Development of the Coordinated Public Transit-Human Services Transportation Plan

The development of a Coordinated Public Transit-Human Services Transportation Plan is underway. The ultimate plan will improve transportation services for persons with disabilities, the aged, and individuals with lower incomes. The purpose of the plan is to coordinate transportation resources provided through multiple Federal programs, to reduce the duplication of services between both public and private service providers, as well as employ the most cost-effective transportation possible.

Although an agency to coordinate the transportation services has not been identified to date, public agencies that provide these services have been asked to participate by HDOT, including

DTS and the Hawaii Department of Human Services. DTS has also initiated a consultant contract to identify the various public and private providers that accommodate these human service needs.

The solicitation for projects that are proposed in the Coordinated Public Transit-Human Services Transportation Plan will be done in cooperation with OahuMPO through the development of the TIP in the metropolitan planning process.

8.4.6 Conclusions

Many of Oahu's major roadways are already congested, especially those within the H-1 travel corridor between Manoa/Waikiki and Kapolei. The PUC in Honolulu and the Secondary Urban Center in Kapolei have been designated by the City as the projected areas where growth in residential development and employment are targeted over the next 25 years. Some growth is also encouraged in Central Oahu as a means of relieving pressures on the rest of the island. As the island continues to grow, more people and more employment opportunities mean more and more traffic: more clogged roads and more delays getting to work, school, stores, and the beach. In addition, many established communities on the island have only one roadway into and out of the area. Limited ROW, topographic and environmental constraints mean that there are no simple solutions to the issues. Furthermore, many of the existing roadways need to be maintained, repaired, and rehabilitated. Yet Oahu's numerous transportation needs are constrained by limited financial resources.

The ORTP 2030 is a guide to putting together pieces of the transportation puzzle to address the mobility issues and transportation needs of the island of Oahu. It is a multi-faceted plan that represents a vision for a better transportation system and is integrated with the planned growth pattern for Oahu over the next 25 years. It includes goals and objectives, identifies projects, and provides an implementation program for mid- and long-range investment of the available transportation funds across Oahu in a fair and equitable manner. The final ORTP 2030 provides approximately $6 billion for capital projects and $7.5 billion to operate, maintain, and preserve the highway and transit systems over the 25-year life of the plan. The capital projects contained in the ORTP 2030 attempt to balance the need for mobility options, congestion relief, safety, second access, highway, transit, and bicycling and pedestrian facilities:

- A key component of the ORTP 2030 is a rail transit system that will serve the H-1 travel corridor between Kapolei and Manoa/Waikiki. The rail transit system will give priority to moving people rather than cars, provide mobility options, and work together with land use policies in shaping Oahu.

- Also included in the plan are projects to increase the capacity of H-1 travel corridor with new interchanges, additional HOV lanes, freeway widening, and operational improvements at key locations. These major H-1 travel corridor projects also include: the intra-island commuter ferry from Ewa to downtown Honolulu and the Nimitz flyover HOV facility.

- Roadway projects are also planned for the Ewa area where the City's directed growth policies identify a second city.

- Four "second access" projects have been included in the ORTP 2030 to Mililani Mauka, Makakilo, Wahiawa, and the Waianae Coast that will increase the capacity to these areas and provide needed emergency access.

- The ORTP 2030 also includes implementation of the island's bikeway plan, expansion of the bus system, ITS and TSM programs to maximize the use of existing facilities, and TDM programs to reduce the need for automobile travel.

The ORTP 2030 will advance Oahu toward the vision of addressing traffic growth and increased mobility needs on Oahu for 2030 through provision of transportation choices and recognizing the importance of the H-1 travel corridor. The ORTP 2030 addresses the issues that are predicted for Oahu in the future. The need to provide a safe, efficient, well-planned transportation system that provides benefits for all is addressed and achieved within the constraints of our resources. The transportation improvement projects included in the plan cover a range of different modes, motorized and non-motorized, on both land and sea. These projects aim to address the future congestion that is forecast on corridors such as the H-1 travel corridor by improving the highway system and increasing mobility options in the form of a rail system, a commuter ferry system, expanded bus service, and bikeway and pedestrian improvements. The plan funds ongoing operations and maintenance and system preservation. The ORTP vision for 2030 is achieved within a comprehensive, balanced, and fiscally constrained transportation plan.

REFERENCES

BIKE PLANS

Bike Plan Hawaii, Highways Department, Department of Transportation, State of Hawaii, May 2003.

Honolulu Bicycle Master Plan, Department of Transportation Services, City & County of Honolulu, April 1999.

COMMUNITY/DEVELOPMENT/MASTER PLANS

Aiea Pearl City Livable Communities Plan, Wilson Okamoto & Associates, Inc., Kober/Hanssen/Mitchell Architects, Miyabara Associates, May 2004.

Central Oahu Sustainable Communities Plan, Department of Planning and Permitting, City and County of Honolulu, December 2002.

East Honolulu Sustainable Communities Plan, Department of Planning and Permitting, City and County of Honolulu, April 1999.

Ewa Development Plan, Department of Planning and Permitting, City and County of Honolulu, August 1997.

Ewa Highway Master Plan Year 2010 Highway Plan, Kaku Associates, Inc., August 2001.

General Plan for the City and County of Honolulu, Department of Planning and Permitting, City and County of Honolulu, Amended October 3, 2002.

Honolulu International Airport Master Plan-2010, Edward K. Noda and Associates, Inc., et al, August 1994.

Kalaeloa Redevelopment Plan-A Special Area Plan of the Ewa Development Plan, R.M. Towill Corporation, December 2000.

Koolaupoko Sustainable Communities Plan, Department of Planning and Permitting, City and County of Honolulu, August 2000.

Ko'olau Loa Sustainable Communities Plan, Department of Planning and Permitting, City and County of Honolulu, October 1999.

North Shore Sustainable Communities Plan, Department of Planning and Permitting, City and County of Honolulu, July 2000.

Oahu Commercial Harbors 2020 Master Plan, HDOT Harbors Division, May 1997.

Pearl Harbor Historic Trail Master Plan, City and County of Honolulu, May 2001.

Primary Urban Center Development Plan, Department of Planning and Permitting, City and County of Honolulu, June 2004.

Wahiawa Urban Design Plan, Wilson Okamoto & Associates, Inc., January 1998.

Waianae Sustainable Communities Plan, Department of Planning and Permitting, City and County of Honolulu, July 2000.

Waikiki Livable Communities Project Livability and Mobility Final Report, Wilson Okamoto Corporation, December 2003.

Waipahu Livable Communities Initiative, Wilson Okamoto & Associates, Inc. May 1998.

Waipahu Town Plan Report-A Special Area Plan of the Central Oahu Development Plan, Wilson Okamoto & Associates, Inc., December 1995.

TRAFFIC

Investigation of the Effects of Limited Ramp Closures along the H-1 Freeway, Volume 1: Project Description & West Bound Analysis, University of Hawaii at Manoa Department of Civil Engineering, HDOT Highways Division, USDOT, FHA, September 1999.

Investigation of the Effects of Limited Ramp Closures along the H-1 Freeway, Volume 2: East Bound H-1 Freeway Analyses and Recommendations, University of Hawaii at Manoa Department of Civil Engineering, HDOT Highways Division, USDOT, FHA, January 2003.

Investigation of the Effects of Limited Ramp Closures along the H-1 Freeway, Volume 3: West Bound Lunalilo Street On-Ramp Closure: Justification, Design and Analysis of Research Experiment, University of Hawaii at Manoa Department of Civil Engineering, HDOT Highways Division, USDOT, FHA, December 1999.

TRANSPORTATION

Evaluation of Potential Light Rail Transit (LRT) Corridors Primary Corridor Study Oahu, Hawaii, Parsons Brinckerhoff, November 1998.

Express Commuter Ferry Demonstration Project Final Report, Pacific Marine & Supply Co., Inc., OmniTrack Group, Inc., and Parsons Brinckerhoff Quade & Douglas, Inc., (no date given).

Final Environmental Assessment-Pearl City Bus Facility Pearl City, Oahu, Hawaii, SSFM Engineers, Inc., September 1998.

Freeway Management System Preliminary Engineering Report, Austin Tsutsumi Associates and HNTB, August 1999.

Intermodal Surface Transportation Efficiency Act of 1991, Public Law 102-240, December 18, 1991.

Middle Street Transit Center Final Environmental Assessment, City and County of Honolulu Department of Transportation Services, USDOT, FTA, February 2003.

Primary Corridor Transportation Project Final Environmental Impact Statement, U.S. Department of Transportation Federal Transit Administration, City and County of Honolulu Department of Transportation Services, July 2003.

APPENDIX A

INITIAL SCREENING CRITERIA

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INITIAL SCREENING CRITERIA

The first tier of evaluation of the various transportation projects required preliminary, qualitative screening at a regional system level. Each proposed transportation project was judged on its potential ability to address one or more of the ORTP objectives. A qualitative fatal flaw analysis was conducted to identify physical, environmental, cost, or institutional constraints that are considered fatal.

The list of projects thus developed has been screened based on the initial screening criteria. The initial screening criteria were applied with two modifications:

- A qualifying question was added regarding whether or not the project is performance-enhancing. Projects must be performance-enhancing (e.g., system expansion/capacity enhancing) on a regional scale. Projects relating to maintenance/system preservation/operation of existing facilities (e.g., resurfacing, rehabilitation, bridge replacement, bus fleet replacement or maintenance, traffic control center operations, etc.) will not be specifically included on the 2030 project list since ongoing maintenance/operating costs will be considered separately in the financial analysis for the ORTP update. The screening criteria already included a question regarding regional significance, but did not include a specific question regarding performance enhancement.

- It was determined while conducting the screening that the screening question regarding Environmental Justice and Title VI ("Are the project induced impacts proportional to the benefits accruing to all groups?") is not a nominating question so much as it is an evaluation question. There was insufficient information to conduct this evaluation at the screening phase. An Environmental Justice/Title VI analysis will be conducted of ORTP strategic plan alternatives during the evaluation process. This question was therefore eliminated from the initial screening process.

The three step screening process, consisting of a series of questions, is described below. Table A-1 provides further details relating to each individual step in the process.

- Step 1/Automatic Pass - The first step focuses on questions pertaining to the origin of the proposed project. If the project originated from any of the following sources, since it already received preliminary review, automatically passed the initial screening, and was forwarded to further evaluation:

    - Project listed on the TOP 2025.

    - Project listed on the illustrative project list in the TOP 2025.

    - Project identified by the Governor's Task Force on Transportation.

- Project on the *Oahu Transportation Improvement Program FY 2004-2006* (TIP) that was determined through the baseline project review to be performance-enhancing and regionally significant but was not identified as a baseline project since it did not have construction funding programmed in the first two years of the TIP.

- Step 2/Screening Criteria - The second step of the process is a set of nominating questions designed to reflect the goals and objectives of the ORTP 2030. These questions, which are listed on Table 1, were assessed qualitatively.

- Step 3/Fatal Flaw Criteria - The final step is a "fatal flaw" analysis. This was used to determine if a project has a negative aspect that is believed to outweigh its positive aspects. Such fatal flaws could be physical constraints, institutional constraints, high cost, and/or significant environmental concern.

  Physical constraints are tangible concepts that obstruct the implementation of an improvement alternative. The constraints can range from adverse environmental/ community impacts to limitations in the engineering or construction process.

  Environmental constraints include both natural and manmade barriers. The natural element includes potential impacts on natural resources such as wetlands, beaches, and wildlife refuges. The manmade element includes community impacts such as land use impacts, displacement, and right-of-way acquisition.

  Engineering or construction constraints are largely dictated by geotechnical or topographic issues. Examples include terrain, slope, soil quality, water tables, drainage, and limited availability of right-of-way.

  Unlike physical constraints, institutional constraints are less tangible in nature. Elements preventing the implementation of an improvement alternative can include government agency or public opposition, funding constraints, or public policy constraints. While the opportunity to overcome financial or policy constraints may exist, the potential lack of government agency or public support can obstruct the progression of the transportation improvements into the implementation stage; this can be considered a fatal flaw.

As part of the initial screening, projects that were similar to or duplicates of other projects on the initial list were combined. In addition, comments received by OMPO through the Call for Projects that are general policy statements rather than suggestions for particular projects were not forwarded for packaging into strategic plan alternatives.

TABLE A-1
INITIAL PROJECT SCREENING CRITERIA

Methodology	Screening Question
Step 1: Automatic Pass (Based on Source)	
Certain projects will pass the initial screening automatically depending on the source of the project. If **YES,** project passes initial screening and is considered for further analysis and evaluation. If **NO,** proceed to step 2.	Does the proposed project meet one of the following criteria? • included in the TOP 2025, • on the TOP 2025 list of illustrative projects, • advocated by the Governor's Transportation Committee, or • listed on the TIP and identified as a performance-enhancing regionally significant project but did not meet programming criteria as a baseline project?
Step 2: Screening Criteria	
The projects under consideration will be qualitatively screened using a series of questions designed to reflect the goals and objectives of the ORTP 2030. If **YES** to Criterion #1and #2 and one or more of Criteria #3-#15, project proceeds to step 3 for fatal flaw analysis. If **NO** to all of Criteria #3-#15 or to Criterion #2 or #3, project does not pass initial screening.	
1) Performance enhancement	Is the project performance-enhancing?
2) Regional significance	Is the scale of the project regionally significant?
3) Capacity enhancement	Would the project provide additional capacity at locations identified as deficient in the 2030 baseline?
4) Vehicle miles traveled (VMT)/vehicle hours traveled (VHT)	Would the project support reduction in vehicular miles traveled or travel times?
5) Airport and harbor access	Would the project improve surface access to the airport or harbor systems?
6) Improve freight operations or reduce costs	Would the project be expected to improve freight operations or reduce costs?
7) Economic vitality	Would the project support economic development and vitality?

TABLE A-1 (continued)
INITIAL PROJECT SCREENING CRITERIA

Methodology	Screening Question
8) Safety and security issues	Would the project address safety or security issues and concerns?
9) Intelligent transportation systems (ITS)	Are beneficial ITS improvements added as part of the project?
10) Transportation system management (TSM)/ transportation demand management (TDM)	Would the project promote system efficiency through effective TSM/TDM measures?
11) Non-automotive modes	Would the project include or accommodate non-automotive modes such as walking and cycling?
12) Transit patronage	Would the project encourage an increased transit mode split?
13) Secondary access	Would the project provide an alternative route to areas with few access routes?
14) Developed areas	Would the project support existing developed areas or future desired development patterns?
15) Individual projects	Does the project provide a benefit that cannot be obtained through a combination of other projects?
Step 3: Fatal Flaw Analysis	
If one or more of the following questions receives a **YES** then the project will be deemed to have a fatal flaw and will not be included for analysis in the strategic plan alternatives.	
1) Physical constraint	Are there overriding physical constraints associated with the project?
2) Institutional constraint	Are there overriding institutional constraints associated with the project?
3) Cost constraint	Are there overriding cost constraints to the project?
4) Environmental constraints	Would the project produce negative environmental impacts that outweigh its benefits?

APPENDIX B

PERFORMANCE MEASURES

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APPENDIX B
SYSTEM PERFORMANCE MEASURES

This appendix presents the detailed methods for analyzing transportation improvement alternatives under the four categories of evaluation criteria: transportation service performance criteria, environment/quality of life criteria, land use/transportation integration criteria, and environmental justice criteria. The performance measures and MOEs for the detailed evaluation process are listed in Table B-1.

The data necessary to conduct the evaluation analysis for the quantitative transportation service and environmental justice performance measures was obtained from the OMPO TDFM. The OMPO model was used to forecast transportation conditions for the 2030 baseline and for the plan to be evaluated for three different time periods: daily, morning peak period, and afternoon peak period.

TRANSPORTATION SERVICE PERFORMANCE MEASURES

The performance measures under this criteria are designed to measure the effectiveness of different improvement alternatives in providing an efficient, safe, convenient, and economical transportation system in support of the ORTP 2030 transportation services goal.

Three major factors have been identified under the transportation service performance category:

- Service effectiveness
- Congestion relief effectiveness
- Cost effectiveness

Each of these is described further below.

Service Effectiveness

This evaluation factor is designed to measure the overall effectiveness of the transportation plan alternative through application of the following quantitative MOEs:

- Mode Split – Mode split is the number of person trips made by single occupant vehicles, carpool vehicles, transit, bicycle, and walk, as estimated by the OMPO TDFM. This measure was evaluated on a daily basis for resident trips.
- Transit Ridership – Transit ridership statistics reveal the effectiveness of improvements made to the transit system. Projections of daily transit system ridership were obtained from the OMPO model.

TABLE B-1
PERFORMANCE MEASURES FOR
EVALUATION OF THE ORTP 2030

Transportation Service Performance Measures:

Service Effectiveness:

- Mode split
- Transit ridership
- Average vehicle occupancy
- Average vehicle ridership
- Vehicle miles traveled
- Vehicle hours traveled
- Average travel time (minutes per trip)
- Safety

Congestion Relief Effectiveness:

- Screenline levels of service
- Travel time savings for selected destinations
- Vehicle hours of delay

Cost Effectiveness:

- Annualized system costs
- Incremental cost per incremental transit trip
- Incremental cost per incremental vehicle mile reduced
- Incremental cost per incremental vehicle hour reduced

Environment/Quality of Life Performance Measures:

- Land use sensitivity
- Resource conservation
- Air quality
- Energy conservation
- Quality of bicycle and pedestrian system

Land Use/Transportation Integration Performance Measures:

- Population distribution/land use development policy
- Intermodal efficiency

Environmental Justice Criteria:

- Mobility
- Accessibility
- Equity
- Safety
- Population policy

- Average Vehicle Occupancy (AVO) – Average vehicle occupancy is a measure of travel efficiency obtained by dividing the number of persons traveling in private vehicles by the total number of private vehicle trips. This measure was evaluated for home-to-work peak period trips.

- Average Vehicle Ridership (AVR) – Average vehicle ridership is another measure of travel efficiency, commonly used in air quality analyses. AVR is obtained by dividing the total person trips by total private vehicle trips. This measure was evaluated for home-to-work peak period trips.

- Vehicle Miles Traveled (VMT) – Vehicle miles traveled will be calculated from the OMPO model. VMT was evaluated on a daily basis.

- Vehicle Hours Traveled (VHT) – Vehicle hours of travel will be calculated from the OMPO model. VHT was evaluated on a daily basis.

- Average Travel Time (minutes per trip) – Average travel time per vehicle trip was obtained by dividing the total daily vehicle hours of travel by the total daily vehicle trips.

- Safety – The OMPO Geographic Information System Analysis Tool (GISAT) contains accident and accident rate data from 1995 through 2001. The evaluation for the ORTP 2030 qualitatively assesses the extent to which ORTP alternatives including safety improvements address locations where the risk has already been determined to be greatest.

Many of these MOEs are interrelated. For example, by encouraging higher mode split percentages for alternatives modes, higher AVR and AVO would be achieved and VMT, VHT, and average travel time would be reduced.

Congestion Relief Effectiveness

This evaluation factor is designed to measure the overall effectiveness of the proposed alternatives in reducing or eliminating travel congestion. Congestion is defined as the condition when the demand for a facility exceeds a desired service capacity. Congestion can be measured by V/C ratio and LOS and by travel delay. Congestion relief would be quantified through application of the following MOEs:

- Screenline Level of Service – LOS was calculated for all major arterials crossing the screenline locations to identify locations with congested operations. The analysis was conducted for both morning peak hour and afternoon peak hour conditions in both directions across each screenline. Traffic volumes used in the screenline LOS calculations were derived by extracting traffic volumes from the OMPO model for the morning and afternoon peak periods traffic volumes and converting the peak period volumes to peak hour volumes using the post-processor.

  The screenline LOS performance measure was evaluated by tallying the number of occasions when the screenlines are projected to operate at LOS E or F during either the AM peak hour or the PM peak hour in either direction. Thus, any given screenline could

be counted as many as four times in the evaluation if it was projected to operate at LOS E or F in one or both directions during one or both peak hours.

- Travel Time Savings – Travel time savings (relative to the 2030 baseline condition) was calculated from the OMPO model for travel from various parts of the island to two destinations of interest: downtown Honolulu and Kapolei. This measure was evaluated for the morning peak period. The measure was also evaluated by calculating the change in travel time in minutes averaged across every model traffic analysis zone (TAZ) to downtown Honolulu and to Kapolei.

- Vehicle Hours of Delay – Vehicle hours of delay, defined as the difference between vehicle hours traveled under congested conditions and vehicle hours of travel that would otherwise be expected under free-flow conditions, was calculated from OMPO model forecast data. This measure was evaluated on a daily basis.

The objective of congestion relief is to improve system LOS by reducing the number of facilities operating at a poor LOS (e.g., LOS E or F) and reduced travel times.

Cost Effectiveness

The evaluation of cost effectiveness is designed to assess the cost consequences and relative economic efficiency of each transportation alternative. Comparison was made on the basis of total system cost for the improvements in each package and incremental unit costs. Total system cost includes two types of costs: capital and operating costs. Capital costs include but are not limited to cost to acquire right-of-way, facility construction, and purchase of support equipment. The cost calculations do not include any operating costs for either the highway or transit system, both of which have ongoing operational requirements.

Cost effectiveness was quantified through application of the following MOEs:

- Total Annualized System Capital Cost – The change in total annualized system cost for the improvements contained in each package (relative to the 2030 baseline) was estimated as follows: first, estimates for capital costs were developed for individual improvements contained in the plan. Where available, cost estimates were obtained from related agencies. For the rest of the proposed improvements, order-of-magnitude cost estimates were prepared as part of the evaluation process. Capital costs were amortized over the 30 years at an interest rate of 5%.

- Incremental Capital Cost per Incremental Transit Trip – Incremental cost per incremental transit person trip was derived by dividing the change in total system annualized cost (relative to the 2030 baseline) by the change in total annual transit ridership (relative to the 2030 baseline). Annual transit ridership was obtained by applying a multiplication factor of 350 to the daily transit ridership.[1]

- Incremental Capital Cost per Incremental Vehicle Mile Reduced – Incremental cost per incremental vehicle mile reduced was derived by dividing the change in total system

[1] An annualization factor of 350 was used rather than 365 since weekend and holiday travel tends to be lower than weekday travel. The factor of 350 was derived from data indicating that average weekend travel is approximately 85% to 90% of average weekday travel.

annualized cost (relative to the 2030 baseline) by the change in total annual VMT (relative to the 2030 baseline). Annual VMT was obtained by applying a multiplication factor of 350 to the daily VMT.[1]

- Incremental Capital Cost per Incremental Vehicle Hour Reduced – Incremental cost per incremental vehicle hour reduced was derived by dividing the change in total system annualized cost (relative to the 2030 baseline) by the change in total annual VHT (relative to the 2030 baseline). Annual VHT was obtained by applying a multiplication factor of 350 to the daily VHT.[1]

Note: This performance measure was used only in the analysis of Strategic Plan Concepts and to compare various plan scenarios.

Environment/Quality of Life Performance Measures

The performance measures identified for the environment/quality of life criteria were designed to measure the relative effectiveness of different improvement alternatives on maintaining environmental quality and community cohesiveness. Consideration of environmental and community impacts is integral to the planning process. Thus, this set of criteria was focused on identifying the positive and negative effects of the transportation system on the environment. The following factors were evaluated under the environment/quality of life evaluation criteria:

- Land use sensitivity
- Resource conservation
- Air quality
- Energy conservation
- Quality of bicycle and pedestrian system

The results of the environment/quality of life evaluation factors were evaluated in a community and environmental impacts matrix. Due to the long-range planning nature of the ORTP study, qualitative analysis was considered to be sufficient for assessment of the relative level of potential environmental impacts for the plan alternatives. In-depth quantification of environmental impacts will be part of the separate environmental review process for implementation of individual improvements.

Factors considered for each of the environment/quality of life criteria are as follows:

- Land Use Sensitivity – Implementation of ORTP 2030 projects can both adversely and positively impact communities and adjacent land uses. Examples of communities and sensitive land uses that may be adversely impacted include: culturally and historically significant locations, residential neighborhoods, institutions, medical facilities, and natural areas. On the other hand, ORTP 2030 projects could provide convenient linkages to employment centers and recreational and cultural centers. This evaluation factor judges the compatibility between ORTP 2030 projects and adjacent land uses in a qualitative manner. The land use sensitivity assessment considers potential noise

and/or visual impacts of transportation system alternatives on affected communities and adjacent land uses.

- Resource Conservation – This evaluation factor focuses on the degree to which the ORTP 2030 projects potentially displace or disrupt environmental resources of major significance. Environmental resources include natural resources such as vegetation and wild life, beaches, wetlands, and open spaces and manmade resources such as parks, historical sites, and cultural monuments. Resources of major significance in the ORTP 2030 were identified and located.

- Air Quality – The objective of this evaluation factor was to assess the degree to which the ORTP 2030 projects have the potential to alter the production of airborne pollutants by vehicular sources. Three major components contributing to air pollution are carbon monoxide, nitrogen oxides, and volatile organic compounds. Emissions are related to VMT and to the cleanliness of the vehicle fleet.

- Energy Conservation – The objective of this evaluation factor was to assess the degree of energy efficiency of each proposed alternative. Energy efficiency can be measured in terms of the amount of energy consumption and the type of energy being consumed. Energy consumption is related to VMT and the fuel economy of the vehicle fleet. Although the vehicle fleet is expected to become more fuel-efficient over time as progressively more restrictive requirements are promulgated and enforced by the federal government, the amount of this change is speculative over a 25-year planning horizon. Therefore, the effect of the ORTP 2030 on energy conservation was evaluated qualitatively based on review of the level of VMT change projected.

- Quality of Bicycle and Pedestrian System – The quality of bicycle and pedestrian facilities can be positively or negatively impacted by proposed project alternatives. This evaluation factor judges the potential to improve the quality of bikeway facilities based on the proposed locations of bikeway network expansion, a comparison of bikeway facilities as a percentage of arterial facilities, and the percentage increase of the proposed bicycle network over baseline facilities. This evaluation factor also judges the potential to improve the quality of the pedestrian system.

Land Use/Transportation Integration Performance Measures

The performance measures in support of the land use/transportation integration goal are qualitative in nature. The evaluation considers the degree to which the ORTP 2030 is compatible with regional planning goals and objectives. Each proposed ORTP project was evaluated for its compatibility with the following issues:

- Population Distribution/Land Use Development Policies – Population distribution and land use development policies as expressed in the City and County of Honolulu's General Plan.

- Intermodal Efficiency – Ability of the alternative to promote intermodal efficiency between the land transportation system and the harbor and airport terminal facilities.

Environmental Justice Performance Measures

The performance measures identified in this section are intended to measure the relative effectiveness of different improvement alternatives in meeting ORTP Objective 5 and to ensure compliance with T6/EJ requirements as stipulated by the SAFETEA-LU.

There are six performance measures that were used to evaluate the ORTP 2030 for compliance with the principles of environmental justice.

- Mobility – Ease of movement of people, goods, and services.
- Accessibility – Ease of reaching opportunities using surface transportation.
- Equity – Equitable distribution of transportation improvements.
- Safety – Risk of accident or injury as measured by accidents.
- Population Policy – Correspondence between transportation plans and stated government policies regarding population growth.
- Public Involvement – Degree to which targeted EJ populations participated in transportation decision-making.

While these performance measures are categorized under the environmental justice evaluation, they are not exclusive to this evaluation and the potential for overlap with the other evaluations exists. Data for these evaluations will originate from several sources such as the OMPO TDFM and the OMPO environmental justice geographic information system (GIS) database.

The application of these performance measures to the ORTP required the identification of Environmental Justice neighborhoods and population groups. Historically, these are groups that have had little to no access to or influence in the community decision-making process. The traditional descriptors applied to these populations groups are low-income and minority. The OMPO Policy Committee has formally adopted this definition of an environmental justice population. OMPO's EJ GIS database was used to identify the locations of environmental justice neighborhoods in terms of TDFM traffic analysis zones.

The question to be answered and the basic approach for each of the factors to be considered are as follows:

- Mobility – Will EJ TAZs experience comparable overall time savings in traveling from home to work in the morning compared to Non-EJ TAZs?

  The mobility threshold uses the average home-to-work travel time from EJ and non-EJ designated TAZs to select employment centers. The application of the mobility performance measure involved determining the peak home-to-work travel time difference in tenths of minutes for the baseline and ORTP 2030 networks by auto and by transit.

- Accessibility – Will EJ TAZs have comparable access to specific groups of trip generators as compared to Non-EJ TAZs?

Travel time thresholds were used to measure accessibility. Thresholds were used to calculate the number of people within a predetermined travel time to those travel destination opportunities represented by specific trip generator TAZs. These include select employment, college, regional shopping center, and hospital trip generators. A travel time threshold of 20 minutes was used for all trips.

- Safety – Are the safety improvements of the ORTP 2030 being implemented where the risk is greatest?

  The OMPO GISAT contains accident data from 1995 through 2001. This data has been used to determine accident rates and has already been accounted for in the GISAT. The evaluation for the ORTP 2030 assesses whether the safety improvements of the ORTP 2030 are being implemented in EJ TAZs where the risk has already been determined to be greatest.

- Equity - Will EJ Census block groups receive a share of the transportation investment dollars comparable to that provided to Non-EJ Census block groups?

  This evaluation assesses the allocation of funding to transportation projects primarily located in EJ versus Non-EJ neighborhoods. Each project was mapped in the GISAT. Project costs were allocated based on the length a project traverses across each Census block group.

- Population Policy - Is the ORTP 2030 consistent with the approved policy of the City and County of Honolulu for the allocation of future population growth on Oahu?

  This evaluation compared the location of transportation investments against the projected growth of the eight development plan areas.

APPENDIX C

ORTP 2030 TDFM EVALUATION RESULTS

TABLE C-1
AVO/AVR CALCULATIONS FOR THE FINAL PLAN YEAR 2030

Type	Mode	Person Trips	Daily HBW Person Trips	%	Conversion to AM 2 hr Person Trips	Conversion to AM 2 hr Vehicle Trips
Occupancy 1	Auto	1,267,332	354,523	28.0%	99,266	99,266
Occupancy 2	Auto	960,998	88,448	9.2%	26,092	13,046
Occupancy 3	Auto	743,319	21,285	2.9%	6,279	1,962
Transit walk premium	Transit	2,545	2,309	90.7%	764	
Transit walk local	Transit	184,500	65,509	35.5%	21,683	
Fixed Guideway	Transit	12,426	5,657	45.5%	1,872	
Park & Ride	Transit	100,219	46,426	46.3%	15,367	
Kiss & Ride	Transit	26,418	7,407	28.0%	2,452	
Aux walk	Walk	334,875	32,771	9.8%		
Aux Bike	Bike	38,413	7,559	19.7%		
Total		**3,671,045**	**631,894**	**17.2%**		
Subtotals	Auto	2,971,649	464,256	15.6%		
	Transit	326,108	127,308	39.0%		
	Walk/Bike	373,288	40,330	10.8%		
Total		**3,671,045**	**631,894**	**17.2%**		

MODE	AM TOD factor	Vehicle Occupancy
SOV	0.28	1
HOV2	0.295	2
HOV3+	0.295	3.2
TRANSIT	0.331	n/a

Final Plan Year 2030

AVO CALCULATION	AVR CALCULATION
1.15	1.52

NOTES:
AVO = Total person trips in private vehicles/total trips by private vehicles
AVR= Total person trips/total trips in private vehicles

TABLE C-2
AVERAGE TRAVEL TIME PER TRIP FOR THE FINAL PLAN YEAR 2030

Final Plan			MODE	AM TOD factor	Vehicle Occupancy		
							Conversion to Daily
Type	**Mode**	**Person Trips**	SOV	0.28	1.00		**Vehicle Trips**
Occupancy 1	Auto	1,267,332	HOV2	0.295	2		1,267,332
Occupancy 2	Auto	960,998	HOV3+	0.295	3.2		480,499
Occupancy 3	Auto	743,319	TRANSIT	0.331	n/a		232,287
Transit walk premium	Transit	2,545				**Sum**	**1,980,100**
Transit walk local	Transit	184,500					
Fixed Guideway	Transit	12,426					
Park & Ride	Transit	100,219					
Kiss & Ride	Transit	26,418					
Aux walk	Walk	334,875					
Aux Bike	Bike	38,413					
Total		**3,671,045**					
					Final Plan Daily VHT		
Subtotals	Auto	2,971,649			**342000**		
	Transit	326,108					
	Walk/Bike	373,288					
Total		**3,671,045**					
Average Travel time per trip (mins)		10.4					

APPENDIX D

LAND USE SENSITIVITY AND RESOURCE CONSERVATION

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APPENDIX D
ORTP 2030 PROJECT LIST WITH LAND USE SENSITIVITY AND RESOURCE CONSERVATION

Project #	DPA	Facility/Project Title	Project Description	Land Use Sensitivity	Resource Conservation
ISLANDWIDE PROJECTS					
1	Islandwide	Alapai Transit Center & Joint Transportation Management Center	Construct a multi-use facility at Alapai Street to include a transit center, City-State transportation management center, and other operations.	Promotes the development of a balanced transportation system, consistent with each of the Development Plans and Sustainable Communities Plans.	No currently known resource displacements.
2	Islandwide	Bike Plan Hawaii - Oahu	Implement Oahu elements of the State of Hawaii's Bike Plan Hawaii. (Bike Plan Hawaii includes only "Priority One" projects as identified in the Honolulu Bicycle Master Plan).	Consistent with goals of providing alternate modes of travel and supporting non-automotive travel, as seen in each Development Plan and Sustainable Communities Plan. Potential impacts to parking and access to residential and commercial development along selected bicycle corridors.	No currently known resource displacements.
3	Islandwide	Enhancement Projects	Implement enhancement projects, including, but not limited to, projects from the Transportation Enhancement Program for Oahu. Includes development of a pedestrian plan for Oahu.	Promotes the development of the "livable neighborhoods and walkable streets" concepts discussed in each Development Plan and Sustainable Communities Plan. The transportation experience for communities is enhanced within the vicinity of the enhancement project. Having an enjoyable place to live is mentioned and sought in the PUC Development Plan, as well as other DPs and SCPs.	Public resources will benefit from the enhancement and preservation goals of these projects. Historically significant sites may also benefit from these projects.
4	Islandwide	Intelligent Transportation Systems (ITS)	Implement ITS projects including, but not limited to, those identified in the Oahu Regional ITS Architecture.	Potential to increase accessibility and reduce travel times to various destinations such as residential, commercial, and medical facilities through the application of technology to the existing roadway (rather than through construction of new roads or widening). ITS is specifically mentioned in the PUC DP.	Installation of ITS equipment on existing roadways may impact sensitive roadside areas and view corridors.
5	Islandwide	Rockfall Protection, Various Locations	Install rockfall protection or mitigation measures along various state highways at various locations.	Rockfall mitigations may be located in areas sensitive to landslides/rockfall. Implementation of the rockfall protection projects may require major physical alterations to the sensitive areas.	Places of cultural, historical, or natural significance will be protected from the negative impacts of rockfalls.
6	Islandwide	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 (i.e., car sharing).	Consistent with transportation policies established in the Development Plans and Sustainable Communities Plans. Excessive single occupant vehicle usage and congestion degrades communities and sensitive land uses. Other TDM strategies include HOV facilities, park-and-ride facilities, and promotion of reduced private vehicle usage.	No currently known resource displacements.

APPENDIX D
ORTP 2030 PROJECT LIST WITH LAND USE SENSITIVITY AND RESOURCE CONSERVATION

Project #	DPA	Facility/Project Title	Project Description	Land Use Sensitivity	Resource Conservation
ISLANDWIDE PROJECTS (continued)					
7	Islandwide	Van Pool Program	Continue implementation and expansion of the State's Van Pool Program.	Promotes ridesharing and the reduction of single occupancy travel as discussed in the Development Plans and Sustainable Communities Plans.	No currently known resource displacements.
8	Koolaupoko	Kalanianaole Highway, Safety & Operational Improvements, Olomana Golf Course to Waimanalo Beach Park	Construct safety and operational improvements along Kalanianaole Highway between the Olomana Golf Course and Waimanalo Beach Park. Specific safety and operational improvements includes construction of turning lanes, sidewalks, wheelchair ramps, bike paths or bike lanes, traffic signal upgrades, utility relocation, and drainage improvements.	Consistent with the transportation system goals established in the Koolaupoko Sustainable Communities Plan. Improvements are beneficial to Waimanalo community: Turning lanes improve safety at the many cross streets. Pedestrian and bicycle improvements needed in this corridor and compatible with primarily residential nature of the community. Drainage improvements badly needed. Improvements will have ROW implications for residential and commercial developments between Olomana Golf Course and Bellows Air Base.	Potential wetlands in vicinity of Olomana Golf Course.
SAFETY & OPERATIONAL IMPROVEMENT PROJECTS					
9	Koolauloa, North Shore	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.	Consistent with the Koolauloa and North Shore Sustainable Communities Plans. Benefit to existing development and residential communities in Koolauloa and the North Shore. Improvements along Kamehameha Highway may require realignment due to shoreline erosion areas; potential for ROW implications to residential communities and agricultural and conservation designated areas.	Migratory turtle area at Laniakea Beach.
10	Koolaupoko	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, installation of signs, flashers, and other warning devices. This project also includes replacement of Kaalaea Stream Bridge and Halamoa Stream Bridge with structures that meet current design standards.	Consistent with the transportation system goals in the Koolaupoko Sustainable Communities Plan. Benefit to existing development and residential communities in Kahaluu.	No currently known resource displacements.
37	Waianae	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.	Consistent with the transportation system policy established in the Waianae Sustainable Communities Plan. Potential ROW impacts for commercial, industrial, recreational, and residential uses along Farrington Highway.	OR&L ROW located makai of Farrington Highway. Coastline impacts.

APPENDIX D
ORTP 2030 PROJECT LIST WITH LAND USE SENSITIVITY AND RESOURCE CONSERVATION

Project #	DPA	Facility/Project Title	Project Description	Land Use Sensitivity	Resource Conservation
CONGESTION RELIEF PROJECTS					
11	Ewa	Farrington Highway, Widening, Fort Barrette Road to west of Fort Weaver Road	Widen Farrington Highway from 2 to 4 lanes, from Fort Barrette Road to west of Fort Weaver Road.	Consistent with Ewa Development Plan. Will increase east-west mobility and improve access to planned development in Ewa Plain. Widening can occur within the existing ROW, if additional ROW is required, there are potential impacts to existing and planned residential communities along this corridor.	Potential endangered species in area. However, approved plan in place to relocate plants. Potential displacement of farm lands.
12	Ewa	Fort Barrette Road, Widening, Farrington Highway to Franklin D. Roosevelt Avenue	Widen Fort Barrette Road from 2 to 4 lanes, from Farrington Highway to Franklin D Roosevelt Avenue.	Consistent with Ewa Development Plan and will provide improved regional access and mauka-makai mobility. Widening can occur within the existing ROW. If additional ROW is required, potential impacts to existing and planned residential communities along this corridor.	No currently known resource displacements.
13	Ewa	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 4-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.	Consistent with Ewa Development Plan. Will increase mauka-makai mobility and improve access to the Campbell Industrial Park. Extension of Hanua Street may require additional ROW, impacting the industrial uses adjacent to the ROW.	No currently known resource displacements.
14	Ewa	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.	Consistent with Ewa Development Plan and will provide improved regional access for Kapolei and mauka areas of Interstate Route H-1. Depending on final location of the interchange, potential ROW impacts to the existing commercial uses located in the adjacent area.	No currently known resource displacements.
15	PUC	Interstate Route H-1, Widening, Middle Street to Vineyard Boulevard	Widen the Interstate Route H-1 by 1 lane, in the eastbound direction, from Middle Street to Vineyard Boulevard, as identified below: • From 2 to 3 lanes from Middle Street to Likelike Highway off-ramp • From 3 to 4 lanes from Likelike Highway off-ramp to Vineyard Boulevard This project also includes the widening of: • Gulick Avenue overpass to allow 5 lanes to pass under it • Kalihi Interchange overcrossings to allow 4 lanes to pass under it	Consistent with transportation system policies established in the PUC Development Plan. Will improve mauka-makai mobility and improve access between Kalihi/Palama and Kalihi Kai/ Kapalama. Potential ROW implications for Farrington High School and adjacent residential communities.	Potential intrusion into Farrington HS football field area could trigger 4f requirements.

APPENDIX D
ORTP 2030 PROJECT LIST WITH LAND USE SENSITIVITY AND RESOURCE CONSERVATION

Project #	DPA	Facility/Project Title	Project Description	Land Use Sensitivity	Resource Conservation
CONGESTION RELIEF PROJECTS (continued)					
16	PUC	Interstate Route H-1, Operational Improvements, Lunalilo Street to Vineyard Boulevard	Modify the weaving movements on the Interstate Route H-1, in the westbound direction, between the Lunalilo Street on-ramp and the Vineyard Boulevard off-ramp.	Beneficial in relieving operational issues on Interstate Route H-1. Potential safety issue impacts on surface streets in communities adjacent to the Punchbowl area, including Makiki and Kakaako.	No currently known resource displacements.
17	Ewa	Interstate Route H-1, New On- & Off-Ramps, Makakilo Interchange	Construct a new eastbound off-ramp and a new westbound on-ramp to the Interstate Route H-1 at the Makakilo Interchange.	Consistent with Ewa Development Plan and will provide improved regional access for Makakilo area and alternate access routes to UH West Oahu for Waianae traffic. Existing ROW appears adequate in accommodating new ramp construction.	No currently known resource displacements.
18	PUC	Interstate Route H-1, Widening, Waiau Interchange to Waiawa Interchange	Widen Interstate Route H-1 in the westbound direction by 1 lane from the Waiau Interchange to the Waiawa Interchange.	Consistent with the transportation policies in the Central Oahu Sustainable Communities Plan. Provides an additional lane into the Waiawa Interchange, potentially improving operations at the interchange. Widening can occur within the existing ROW; however ROW implications may arise in the Manana/Pearl City areas.	No currently known resource displacements.
19	Central Oahu	Interstate Route H-1, Widening, Waiawa Interchange	Widen the Interstate Route H-1 by 1 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. • From 2 to 3 lanes in AM peak • From 4 to 5 lanes in PM peak	Consistent with the transportation policies in the Central Oahu Sustainable Communities Plan. Provides an additional lane through the Waiawa Interchange, potentially improving operations at the interchange. Widening can occur within the existing ROW; however ROW implications may arise in the Waikele/Waipahu areas.	No currently known resource displacements.
20	PUC	Interstate Route H-1, Zipper Lane (PM), Keehi Interchange to Kunia Interchange	Construct a Zipper lane on the Interstate Route H-1, in the westbound direction, from Keehi Interchange to Kunia Interchange. This project would be in use during the PM peak.	Consistent with the PUC & Ewa Development Plans and the Central Oahu Sustainable Communities Plan. Improves westbound mobility, communities benefiting from this project may include Ewa, Kapolei, and Waianae.	No currently known resource displacements.
21	Central Oahu	Interstate Route H-1, Widening, Waipahu Off-Ramp	Widen the Interstate Route H-1 Waipahu Street off-ramp from 1 to 2 lanes, in the westbound direction, at the Waiawa Interchange.	Consistent with the Central Oahu Sustainable Communities Plan. Potential ROW implications to adjacent wetlands, additional ROW acquisition may not be necessary.	Potential displacement of wetlands.
22	Central Oahu	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.	Consistent with Central Oahu Sustainable Communities Plan. Additional ROW may not be necessary for the overpass widening and intersection improvements.	No currently known resource displacements.

APPENDIX D
ORTP 2030 PROJECT LIST WITH LAND USE SENSITIVITY AND RESOURCE CONSERVATION

Project #	DPA	Facility/Project Title	Project Description	Land Use Sensitivity	Resource Conservation
CONGESTION RELIEF PROJECTS (continued)					
23	PUC	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.	Consistent with the PUC Development Plan. Improved access to communities along this corridor, including: Kakaako, Pawaa, McCully, and Moiliili. These improvements include the potential closure of the Piikoi eastbound on-ramp. Closure of this ramp could have traffic impact implications to Lower Makiki, McCully, and Moiliili as traffic will reroute through these areas en route to alternative H-1 on-ramps from King Street and Kapiolani Boulevard. Some improvements could have ROW implications to adjacent development ,especially between Ward and Punahou and at the University Interchange.	Church of the Crossroads located makai of the University Interchange is on the Historic Register.
24	Central Oahu	Interstate Routes H-1 & 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).	Consistent with the Central Oahu Sustainable Communities Plan. Improvements likely within the existing ROW, additional ROW is not expected.	No currently known resource displacements.
25	Central Oahu	Kamehameha Highway, Widening, Lanikuhana Avenue to Ka Uka Boulevard	Widen Kamehameha Highway from a 3-lane to a 4-lane divided facility between Lanikuhana Avenue and Ka Uka Boulevard. This project includes shoulders for bicycles and disabled vehicles, bridge crossing replacement, bikeways, etc.	Consistent with the Central Oahu Sustainable Communities Plan. Improvement within the existing ROW in some locations, additional ROW may be necessary. Impacts to adjacent commercial, industrial, and residential areas can be expected.	No currently known resource displacements.
26	Ewa	Kapolei Parkway, Extension, Kamokila Boulevard to Papipi Road	Extend the existing 4-lane Kapolei Parkway by constructing the segments in each of the following areas: • Kamokila Boulevard to Fort Barrette Road • Ewa Village boundary to Renton Road • Geiger Road to Papipi Road	Consistent with Ewa Development Plan and will provide improved regional access for Ewa and Ewa Beach.	No currently known resource displacements.
27	Ewa	Kapolei Parkway, Extension and Widening, Aliinui Drive to Kalaeloa Boulevard	Extend the existing 4-lane Kapolei Parkway, from Aliinui Drive to Hanua Street. This project includes widening of Kapolei Parkway from 4 to 6 lanes from Hanua Street to Kalaeloa Boulevard.	Consistent with the Ewa Development Plan. Facilitates movement between Ko Olina and Kapolei areas. Extension can occur within the existing ROW, parts of the extension may have ROW impacts to adjacent industrial land uses.	No currently known resource displacements.
28	Ewa	North/South Road, Widening & Extension, Interstate Route H-1 to Franklin D Roosevelt Avenue	Widen and extend North-South Road as follows: • From 3 to 6 lanes from Kapolei Parkway to Interstate Route H-1 • Extend from Kapolei Parkway to Franklin D Roosevelt Avenue (6 lanes)	Consistent with the Ewa Development Plan. Facilitates and promotes travel between the mauka-makai communities. Project can be completed within the existing ROW.	No currently known resource displacements.

APPENDIX D
ORTP 2030 PROJECT LIST WITH LAND USE SENSITIVITY AND RESOURCE CONSERVATION

Project #	DPA	Facility/Project Title	Project Description	Land Use Sensitivity	Resource Conservation
CONGESTION RELIEF PROJECTS (continued)					
38	Central Oahu	Farrington Highway, Widening, west of Fort Weaver Road to Waiawa Interchange	Widen Farrington Highway from Kunia to Waiawa by 1 lane in each direction, from west of Fort Weaver Road to Waiawa Interchange.	Consistent with the Ewa Development Plan. Widening may require additional ROW in some locations, impacting commercial and residential uses along the corridor.	No currently known resource displacements.
39	Ewa, Waianae	Farrington Highway, Widening, Hakimo Road to Kalaeloa Boulevard	Widen Farrington Highway from 4 to 6 lanes, from Hakimo Road to Kalaeloa Boulevard, including intersection of Lualualei Naval Road.	Beneficial to communities along the Waianae Coast. Potential ROW impacts to adjacent commercial, industrial, recreational, or residential land uses.	OR&L ROW located makai of Farrington Highway. Coastline impacts.
40	PUC	Interstate Route H-1, Widening, Liliha Street to Pali Highway	Widen the Interstate Route H-1 by 1 lane, from 3 to 4 lanes in the eastbound direction, from the Liliha Street on-ramp to Pali Highway off-ramp.	Consistent with the PUC Development Plan. Widening may not likely occur within the existing ROW. Adjacent structures and land uses on the makai-side may be affected, including recreational and residential.	Foster Botanical Gardens, located makai of Interstate H-1.
41	PUC	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 from Middle Street to University Avenue. This project includes modification of auxiliary lanes at various exits and other operational changes to Interstate Route H-1. The identification of the precise improvements to be made will require a separate detailed corridor study.	Potentially beneficial to travelers to and from east Honolulu. Improvements for meeting the goals of this project will be identified through a separate detailed corridor study. ROW implications are possible along this corridor, depending on the identified improvement.	No currently known resource displacements.
42	PUC	Interstate Route H-1, On- & Off- Ramp Modifications, University Avenue Interchange	Modify on- and off-ramps at the University Avenue Interchange on Interstate Route H-1. This project includes the construction of new ramps to allow all movements, safety improvements, including the closure of the eastbound on-ramp at University Avenue Interchange to Interstate Route H-1 and the construction of a new makai-bound off-ramp to University Avenue from Interstate Route H-1.	Consistent with the PUC Development Plan. Project will improve accessibility to UH Manoa and surrounding communities. Additional ROW may be necessary to accommodate improvements to this interchange. Potential impacts to adjacent commercial, institutional, and residential land uses.	Church of the Crossroads located makai of the University Interchange is on the Historic Register.
43	PUC	Interstate Route H-1, Widening, Vineyard Boulevard to Middle Street	Widen the Interstate Route H-1 by 1 lane in the westbound direction, from Vineyard Boulevard to Middle Street.	Consistent with the PUC Development Plan. Project will facilitate Ewa-bound travel from the PUC. Potential to impact communities adjacent to this corridor. Additional ROW may be necessary to accommodate this project; potential impacts to adjacent institutions and residential land uses.	Potential intrusion into the Bishop Museum and Kalihi Library areas.
44	Ewa, Central Oahu	Interstate Route H-1, HOV Lanes, Waiawa Interchange to Makakilo Interchange	Construct 2 new lanes in the freeway median for HOV use, 1 in the westbound direction and 1 in the eastbound direction, on Interstate Route H-1, from the Waiawa Interchange to the Makakilo Interchange.	Consistent with Ewa Development Plan.	No currently known resource displacements.

APPENDIX D
ORTP 2030 PROJECT LIST WITH LAND USE SENSITIVITY AND RESOURCE CONSERVATION

Project #	DPA	Facility/Project Title	Project Description	Land Use Sensitivity	Resource Conservation
CONGESTION RELIEF PROJECTS (continued)					
45	PUC, Central Oahu	Interstate Route H-1, Widening, Waiawa Interchange to Halawa Interchange	Widen the Interstate Route H-1 by 1 lane in the eastbound direction, from the Waiawa Interchange to the Halawa Interchange.	Consistent with the PUC Development Plan. Facilitates accessibility from Ewa / Kapolei area. Potential ROW implications along the makai side of highway; impacts to residential and industrial areas through Waipahu, Pearl City, Waiau, and Aiea.	Potential wetlands in vicinity of Pearl City viaduct.
46	PUC	Interstate Route H-1, Widening, Ward Avenue to Punahou Street	Widen the existing Interstate Route H-1 by 1 lane in the eastbound direction, from Ward Avenue to Punahou Street.	Consistent with the PUC Development Plan. Facilitates east-west movement for the Kakaako and Makiki communities. The widening could have ROW implications to adjacent development between Ward and Punahou.	No currently known resource displacements.
47	Central Oahu	Interstate Route H-2, New Interchange, Kipapa Gulch	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 2 lanes to 4 lanes; and addition of new on- and off-ramps to and from Interstate Route H-2 at Pineapple Road Overpass.	Consistent with transportation goals established in the Central Oahu Sustainable Communities Plan. Additional access is provided for the Waipio community. Existing ROW appears sufficient to accommodate this project.	Impacts to agricultural and conservation lands.
48	Koolaupoko	Kahekili Highway, Widening, Kamehameha Highway to Haiku Road	Widen Kahekili Highway from 2 to 4 lanes, from Kamehameha Highway to Haiku Road. This project also includes the following improvements: • Contraflow in existing right-of-way between Hui Iwa Street and Haiku Road • Intersection improvements at Hui Iwa Street and Kamehameha Highway	Inconsistent with the Koolaupoko Sustainable Communities Plan. An iterative process is needed between land use planning and transportation planning, so that land use planners are aware of the impacts of not proceeding with this project. If policy of no transportation improvements to Koolaupoko remains, future versions of the ORTP will remove capacity enhancing projects from the area.	No currently known resource displacements.
49	Ewa, Central Oahu	Kunia Road, Widening, Wilikina Drive to Farrington Highway	Widen Kunia Road as follows: • From 2 to 4 lanes, from Wilikina Drive to Anonui Street. • From 2 to 4 lanes, Anonui Street to Kupuna loop. • From 4 to 6 lanes, Kupuna Loop to Farrington Highway. • Add 1 lane eastbound loop on-ramp at Kunia Road & Interstate Route H-1.	Consistent with the Central Oahu Sustainable Communities Plan. Improvements will facilitate mauka-makai movement along the Kunia Road corridor; communities benefiting from this project include Wahiawa, Kunia, Royal Kunia, and Waipahu. Additional ROW may be necessary, impacting agricultural and residential developments along Kunia Road.	Potential displacement of agricultural land

APPENDIX D
ORTP 2030 PROJECT LIST WITH LAND USE SENSITIVITY AND RESOURCE CONSERVATION

Project #	DPA	Facility/Project Title	Project Description	Land Use Sensitivity	Resource Conservation
CONGESTION RELIEF PROJECTS (continued)					
50	Koolaupoko	Likelike Highway, Widening, Kamehameha Highway to Kahekili Highway	Widen Likelike Highway from 4 to 6 lanes, from Kamehameha Highway to Kahekili Highway.	Inconsistent with the Koolaupoko Sustainable Communities Plan. An iterative process is needed between land use planning and transportation planning, so that land use planners are aware of the impacts of not proceeding with this project. If policy of no transportation improvements to Koolaupoko remains, future versions of the ORTP will remove capacity enhancing projects from the area.	No currently known resource displacements.
51	Ewa	Makakilo Mauka Frontage Road, New Roadway, Kalaeloa Boulevard to Makakilo Drive	Construct a new 2-lane Makakilo Mauka Frontage Road, mauka of Interstate Route H-1, from Kalaeloa Boulevard to Makakilo Drive.	Consistent with the Ewa Development Plan goal of developing additional linkages to improve circulation between communities on the mauka and makai sides of Interstate Route H-1 in the Kapolei / Makaiwa Hills area. Potential ROW impacts to mauka residential communities, depending on the roadway alignment.	No currently known resource displacements.
52	PUC	Nimitz Highway, HOV Flyover, Keehi Interchange to Pacific Street	Construct a new 2-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.	Consistent with transportation policies established in the PUC Development Plan. Beneficial in completing the HOV network from Leeward and Central to Downtown Honolulu. Potential impacts to the commercial and industrial uses along Nimitz Highway corridor.	Flyover may interfere with view corridors policies, including mauka-makai view corridors and line-of-sight opportunities to Pearl Harbor.
53	Koolaupoko	Piikoi-Pensacola Couplet Reversal	Reverse the direction of the existing one-way Piikoi Street and Pensacola Street couplet.	Consistent with the PUC Development Plan. Potential positive and negative impacts to adjacent communities in the Kakaako and Makiki areas, including the Ala Moana Center.	No currently known resource displacements.
54	PUC	Puuloa Road, Widening, Pukuloa Road to Nimitz Highway	Widen Puuloa Road, from Pukuloa Road to Nimitz Highway, as follows: • From 3 lanes (1 lane southbound and 2 lane northbound) to 5 lanes (2 lanes southbound and 3 lanes northbound), from Pukuloa Road to Kamehameha Highway.	Consistent with transportation policies established in the PUC Development Plan. Beneficial in enlarging roadway to appropriate size for level of industrial and commercial development in area. Potential ROW and access issues with selected properties adjacent to Puuloa Road.	No currently known resource displacements.
CONGESTION RELIEF PROJECTS - ROW PRESERVATION					
58	Ewa	Kalaeloa East-West Spine Road, New Roadway, Kalaeloa Boulevard to Geiger Road	Establish and preserve right-of-way (ROW) for Kalaeloa East-West Spine Road (see project description on illustrative project list).	Consistent with transportation goals established in the Ewa Development Plan. Beneficial in preserving right of way for future projects.	No currently known resource displacements.

APPENDIX D
ORTP 2030 PROJECT LIST WITH LAND USE SENSITIVITY AND RESOURCE CONSERVATION

Project #	DPA	Facility/Project Title	Project Description	Land Use Sensitivity	Resource Conservation
CONGESTION RELIEF PROJECTS - ROW PRESERVATION (continued)					
59	PUC	Keoneula Boulevard, Extension, Kapolei Parkway to Franklin D. Roosevelt Avenue	Establish and preserve right-of-way (ROW) for Keoneula Boulevard Extension (see project description on illustrative project list).	Consistent with transportation goals established in the Ewa Development Plan. Beneficial in preserving right of way for future projects.	No currently known resource displacements.
SECOND ACCESS PROJECTS					
29	Ewa	Makakilo Drive, Second Access, Makakilo Drive to North-South Road/Interstate Route H-1 Interchange	Extend Makakilo Drive (vicinity Pueonani Street) south to the Interstate Route H-1 Freeway Interchange as 4-lane roadway, connecting Makakilo Drive to North-South Road.	Consistent with Ewa Development Plan. Will provide additional mauka-makai mobility for communities including: Makakilo and Makaiwa Hills. Potential ROW impacts to existing industrial and open land including planned residential developments in the area.	Potential visual impacts of development enabled by roadway improvements.
55	Central Oahu	Central Mauka Road, Second Access, Mililani Mauka to Waiawa	Construct Central Mauka Road, a new 4-lane, 2.5-mile road from Mililani Mauka to Waiawa. Road connects Meheula Parkway to Kamehameha Highway in Pearl City; parallel to & mauka of Interstate Route H-2. The new 4-lane north-south road includes connections to Interstate Route H-2 interchanges.	Consistent with land use and infrastructure goals established in the Central Oahu Sustainable Communities plan. Facilitates additional mauka-makai access from Central Oahu communities . ROW impacts may entail acquisition and encroachment upon existing land uses, depending on the chosen roadway alignment.	Kipapa Gulch crossing.
56	Central Oahu	Wahiawa, Second Access, Whitmore Avenue to Meheula Parkway	Construct a new 2-lane second access road between Whitmore Village and Wahiawa, from Whitmore Avenue to California Avenue. Continue the new 2-lane second access road to Mililani Mauka, from California Avenue to Meheula Parkway.	Consistent with land use and infrastructure goals established in the Central Oahu Sustainable Communities plan. Facilitates additional mauka-makai access from Central Oahu communities . ROW impacts may entail acquisition and encroachment upon existing land uses, depending on the chosen roadway alignment.	Potential interference with military operations depending upon chosen roadway alignment.
57	Central Oahu	Waianae, Second Access, Farrington Highway to Kunia Road	Construct a new 2-lane second access road to Waianae from Farrington Highway in the vicinity of Maili, over the Waianae Mountain Range, to Kunia Road.	Consistent with "The Waianae Concept" established in the Waianae Sustainable Communities Plan. Potential ROW impacts to military installations and agricultural land; possible interference with military operations.	Conservation designated lands within the Waianae Range crossing and potential interference with designated military land.
TRANSIT PROJECTS					
30	PUC, Ewa	Ferry, Intra-Island Express Commuter, in the vicinity of Ocean Pointe Marina to Honolulu Harbor	Implement intra-island passenger ferry in the vicinity of the Ocean Pointe Marina in Ewa and Honolulu Harbor.	Consistent with transportation policies established in all Development Plans and Sustainable Communities Plans. Provides an alternative travel mode into the PUC. Communities benefiting from this project include the Waianae, Kapolei, Ewa, and Waipahu. Potential parking impacts in the vicinity of the Ewa terminal and adjacent residential communities.	Docking facilities may affect sensitive coastline areas.

APPENDIX D
ORTP 2030 PROJECT LIST WITH LAND USE SENSITIVITY AND RESOURCE CONSERVATION

Project #	DPA	Facility/Project Title	Project Description	Land Use Sensitivity	Resource Conservation
TRANSIT PROJECTS (continued)					
31	PUC, Ewa, Central Oahu, East Honolulu	Rail Transit, Kapolei to Manoa/Waikiki	Plan, design, and construct a fixed rail transit system between Kapolei and Manoa/Waikiki. This project includes modifications to TheBus system to provide feeder services to rail stations and eliminate parallel express services. Note that the alignment, system technology, and location of transit stations will be determined pending the completion of the Alternative Analysis Draft Environmental Impact Statement (AA/DEIS).	Consistent with transportation policies established in all Development Plans and Sustainable Communities Plans. Provides an alternative travel mode from Kapolei to Manoa/Waikiki. Project will benefit east-west travel for all communities along the H-1 travel corridor including: Waianae, Kapolei, Ewa, Waipahu, Pearl City, Aiea, Salt Lake, and the PUC. Potential parking impacts in the vicinity of local stations, including adjacent commercial, industrial and residential areas. ROW requirements to be determined pending a specific alignment, but impacts can be expected in densely developed communities along the alignment.	Quality of life type impacts can be expected, including but not limited to noise and visual impacts. Depending on the alignment and ROW requirements, historically sensitive places may be affected in the PUC.
32	Islandwide	TheBus Service, Expansion, Islandwide	Expand the bus service through increase of capacity of the existing system to accommodate population growth. Incorporation of ADA compliance. Expansion includes: • Expansion to and within Ewa, Kapolei, and Central Oahu • Implementation of the Hub and Spoke bus system with transit centers and circuitous routes • Expansion through increase of Express service to the North Shore, Waianae, and Windward Oahu	Provides alternative modes consistent with Development and Sustainable Communities Plans.	No currently known resource displacements.
33	Islandwide	Transit Centers, Various Locations	Construct transit centers at various locations islandwide to support the Rail Transit and TheBus systems.	Beneficial improvement to facilitate movement on the transit system and to link alternative transportation modes. Consistent with the Development and Sustainable Communities Plans.	No currently known resource displacements.

Notes

Development Plan Area (DPA) Names and Codes:

1 = Primary Urban Center	5 = Koolaupoko
2 = Ewa	6 = Koolauloa
3 = Central Oahu	7 = North Shore
4 = East Honolulu	8 = Waianae

APPENDIX E

TRANSPORTATION REVENUE FORECAST

APPENDIX E
TRANSPORTATION REVENUE FORECAST
(in thousands of year 2005 dollars)

	2006 - 2010	2011 - 2015	2016 - 2020	2021 - 2025	2026 - 2030	2006 - 2030
FEDERAL REVENUE SOURCES						
Highway Revenues - Statewide Estimates						
Interstate Maintenance (IM)	$39,268	$37,229	$35,294	$33,461	$31,722	$176,974
National Highway System (NHS)	$203,415	$192,848	$182,829	$173,331	$164,326	$916,749
Surface Transportation Program (STP)	$140,513	$133,213	$126,292	$119,731	$113,511	$633,260
Bridge Replacement & Rehabilitation (BR)	$96,561	$91,545	$86,789	$82,280	$78,006	$435,181
Congestion Mitigation/Air Quality (CMAQ)	$37,966	$36,111	$34,235	$32,456	$30,770	$171,537
Recreational Trails	$3,853	$4,670	$5,669	$6,882	$8,354	$29,427
Safety	$23,283	$22,445	$21,638	$20,859	$20,108	$108,334
Rail-Hwy Crossings	$4,854	$4,249	$3,719	$3,255	$2,849	$18,927
Safe Routes to School	$4,413	$3,863	$3,381	$2,959	$2,590	$17,206
High Priority Projects	$89,850	$0	$0	$0	$0	$89,850
Equity Bonus	$79,740	$56,512	$37,259	$22,855	$13,043	$209,409
Federal Revenue Total to Hawaii	$723,718	$582,684	$537,105	$498,069	$465,279	$2,806,854
Oahu's Share of Federal Highway Funding	**$371,246**	**$349,136**	**$321,760**	**$298,289**	**$278,544**	**$1,618,975**
Oahu Federal Funds for System Preservation	$114,086	$76,774	$50,182	$46,404	$43,185	$330,633
Oahu Federal Funds for System Improvement	$257,160	$272,362	$271,577	$251,885	$235,359	$1,288,343
Transit Revenues						
Section 5307	$135,380	$137,693	$132,769	$128,021	$123,443	$657,305
Section 5309 Fixed Guideway Modernization	$7,586	$8,370	$8,407	$8,444	$8,482	$41,289
Section 5309 New Starts (Discretionary)	$43,764	$202,155	$176,943	$32,647	$0	$455,509
Section 5309 Bus Capital (Discretionary)	$10,686	$28,227	$27,218	$26,244	$25,306	$117,680
Total	**$197,415**	**$376,446**	**$345,336**	**$195,356**	**$157,230**	**$1,271,783**
Section 5307 Funds for Preventive Maintenance	$89,052	$90,574	$87,335	$84,212	$81,200	$432,373
STATE REVENUE SOURCES						
Highway Special Fund (248-8HRS)						
State Liquid Fuel Tax	$425,212	$382,534	$344,609	$310,444	$279,667	$1,742,466
Registration Fee	$108,610	$99,698	$91,722	$84,383	$77,632	$462,044
State Motor Vehicle Weight Tax	$161,905	$153,882	$146,793	$140,030	$133,579	$736,190
Car Rental/ Tour Vehicle	$280,948	$285,715	$292,416	$299,274	$306,294	$1,464,647
Time Certificates of Deposit (interest inc.)	$82,713	$83,632	$85,083	$86,560	$88,062	$426,050
Other	$118,593	$128,530	$140,529	$153,647	$167,990	$709,289
Total Revenues - Statewide	$1,177,981	$1,133,991	$1,101,151	$1,074,339	$1,053,223	$5,540,686
SHARE OF STATE CAPITAL & O&M FOR OAHU						
Oahu's Share of State Maintenance	**$348,682**	**$343,226**	**$244,818**	**$248,596**	**$251,815**	**$1,437,136**
Oahu Maintenance Funds for Operations & Routine Maintenance	$170,000	$170,000	$170,000	$170,000	$170,000	$850,000
Oahu Maintenance Funds for System Preservation	$178,682	$173,226	$74,818	$78,596	$81,815	$587,136
Oahu's Share of State CIP	**$156,907**	**$224,805**	**$292,763**	**$277,437**	**$265,161**	**$1,217,074**
Oahu CIP Funds for System Preservation	$82,231					$82,231
Oahu CIP Funds for System Improvement	$74,676	$224,805	$292,763	$277,437	$265,161	$1,134,843

APPENDIX E
TRANSPORTATION REVENUE FORECAST
(in thousands of year 2005 dollars)

	2006 - 2010	2011 - 2015	2016 - 2020	2021 - 2025	2026 - 2030	2006 - 2030
CITY & COUNTY REVENUE SOURCES						
OPERATIONS & MAINTENANCE						
General Fund Revenue Sources						
Real Property Taxes	$2,548,067	$2,666,671	$2,790,796	$2,920,698	$3,056,647	$13,982,878
Motor Vehicle Registration Annual Fee	$79,937	$77,242	$74,638	$72,122	$69,691	$373,630
Transient Accommodation Tax (from State)	$198,517	$195,481	$192,493	$189,549	$186,651	$962,691
Other Sources (including transfers from other funds)	$802,820	$763,580	$726,259	$690,761	$656,999	$3,640,419
Total	$3,629,340	$3,702,975	$3,784,185	$3,873,131	$3,969,988	$18,959,618
General Fund Transportation Uses						
Streets, Highways & Traffic	$21,159	$21,588	$22,062	$22,580	$23,145	$110,535
Transit	$253,278	$302,419	$384,124	$462,911	$528,210	$1,930,942
Highway Fund Revenue Sources						
Public Utility Franchise Tax	$151,142	$144,155	$137,491	$131,135	$125,073	$688,997
City & County Fuel Tax	$292,069	$252,984	$219,129	$189,804	$164,404	$1,118,391
County Motor Vehicle Weight Tax	$199,214	$195,203	$191,274	$187,423	$183,650	$956,764
Other Sources	$59,705	$60,966	$62,254	$63,570	$64,913	$311,407
Total	$702,129	$653,308	$610,148	$571,933	$538,041	$3,075,559
Highway Fund Uses						
Streets, Highways & Traffic	$96,143	$89,457	$83,548	$78,315	$73,674	$421,136
Transit	$207,212	$192,804	$180,067	$168,789	$158,787	$907,659
Revenues for Highway O&M	$117,302	$111,046	$105,609	$100,895	$96,819	$531,671
Revenues for Transit O&M	$460,490	$495,223	$564,191	$631,700	$686,996	$2,838,600
CAPITAL						
General Improvement Bond Fund Expenditures	$225,355	$226,646	$228,626	$231,265	$234,541	$1,146,434
Streets, Highways & Traffic	$4,818	$4,846	$4,888	$4,944	$5,014	$24,510
Highway Improvement Bond Fund Expenditures	$129,903	$130,647	$131,788	$133,310	$135,198	$660,846
Streets, Highways & Traffic	$76,918	$77,359	$78,035	$78,935	$80,054	$391,301
Transit	$46,212	$46,477	$46,883	$47,424	$48,096	$235,093
Capital Projects Fund Expenditures	$8,374	$8,422	$8,496	$8,594	$8,716	$42,601
Streets and Highways	$2,789	$2,805	$2,830	$2,862	$2,903	$14,190
General Excise Tax Surcharge of 0.5 % for Transit	$557,080	$705,553	$715,918	$144,441	$0	$2,122,991
Capital Revenues for Streets, Highways & Traffic	$84,526	$85,010	$85,752	$86,742	$87,971	$430,001
Capital Revenues for Transit	$603,292	$752,030	$762,801	$191,865	$48,096	$2,358,085

APPENDIX F

TDFM CODING

Baseline Projects

- Fort Weaver Road, Widening, Aawa Drive to Geiger Road
  - Description: Widen Fort Weaver Road from Aawa Drive to Geiger Road by 1 lane in each direction.
  - Location: Aawa Drive to Geiger Road
  - Total number of lanes: 4 to 6
  - Direction of lanes: east-west
  - Edit links: 2111 – 2553 – 2168 – 2152

- Interstate Route H-1, AM Zipper Lane Extension, Radford Drive Overpass to Kalihi Stream Bridge
  - Description: Extend the AM eastbound Zipper Lane
  - Location: Pearl Harbor to Keehi Interchange
  - Total number of lanes: 1
  - Direction of lanes: east
  - Edit links: 2219 – 2218 – 2217 – 2216 – 2215 – 2214 – 2213 – 2212 – 2826

- Kamokila Boulevard, Extension, Kamokila Boulevard to Franklin D. Roosevelt Avenue
  - Description: Extend Kamokila Boulevard by two lanes in each direction from Kamokila Boulevard to Franklin D. Roosevelt Avenue
  - Location: Kapolei
  - Total number of lanes: 4
  - Direction of lanes: north-south
  - Edit links: 2536 – 2179

- North-South Road, New Interchange and Roadway, Interstate Route H-1 to Kapolei Parkway
  - Description: Construct diamond interchange for Interstate Route H-1. Add new three lane roadway (two northbound lanes and one southbound lane) between Interstate Route H-1 and Kapolei Parkway
  - Location: Kapolei
  - Total number of lanes: 3
  - Direction of lanes: north-south
  - Add new nodes: 3885, 3886, 3887, 3888, 3889, 3890, 3891, 3892
  - New links: 3885 – 3892 – 3886 – 3887 – 3888 – 3889; 2164 – 3889 – 3891; 3890 – 3888 - 2163

- Salt Lake Boulevard, Widening, Maluna Street to Ala Lilikoi Street
  - Description: Widen Salt Lake Boulevard from one lane to three lanes per direction from Maluna Street to Ala Lilikoi Street
  - Location: Salt Lake
  - Total number of lanes: 4
  - Direction of lanes: east-west
  - Edit links: 1904 – 3813 – 3662 – 2560 – 1906 – 2813

Islandwide Projects

- Bike Plan Hawaii – Oahu (Project 2)
  - Description: Implement Oahu elements of the State of Hawaii's *Bike Plan Hawaii*. (*Bike Plan Hawaii* includes only "Priority One" projects as identified in the *Honolulu Bicycle Master Plan*).
  - Location: Islandwide
  - This project was not coded.
- Enhancement Projects (Project 3)
  - Description: Implement enhancement projects, including, but not limited to, projects from the *Transportation Enhancement Program for Oahu*.
  - Location: Islandwide
  - This project was not coded.

- Intelligent Transportation Systems (Project 4)
  - Description: Implement ITS projects including, but not limited to, those identified in the *Oahu Regional ITS Architecture*.
  - Coding: Capacity increase of 5% applied to freeways, expressways, and arterials in the CBD core and urban areas in ACAPA.HNL
  - Location: Islandwide
  -

- Rockfall Protection, Various Locations (Project 5)
  - Description: Install rockfall protection or mitigation measures along various state highways at various locations.
  - Location: Islandwide
  - This project was not coded.

- Transportation Demand Management Program (Project 6)
  - Description: 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; and
    6. Emerging and innovative strategies (i.e., car sharing)
  - Location: Islandwide
  - Time of day calculations modified to simulate a 5% reduction in peak hour trips via TDM in DFTTXXXX.SET.

- Van Pool Program (Project 7)
  - Description: Continue implementation and expansion of the State's Van Pool Program.
  - Location: Islandwide
  - This project was not coded.

Safety & Operational Improvement Projects

- Farrington Highway, Safety Improvements, Makua Valley Road to Aliinui Drive (Project 37)
  - Description: 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.
  - Location: Waianae Coast
  - Total number of lanes: no change
  - Direction of lanes: north-south
  - This project was not coded.
- Kalanianaole Highway, Safety & Operational Improvements, Olomana Golf Course to Waimanalo Beach Park (Project 8)
  - Description: Construct safety and operational improvements along Kalanianaole Highway between the Olomana Golf Course and Waimanalo Beach Park. Specific safety and operational improvements includes construction of turning lanes, sidewalks, wheelchair ramps, bike paths or bike lanes, traffic signal upgrades, utility relocation, and drainage improvements.
  - Location: Waimanalo
  - This project was not coded.

- Kamehameha Highway, Safety Improvements, Haleiwa to Kahaluu (Project 9)
  - Description: 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.
  - Location: Haleiwa to Kahaluu
  - This project was not coded.

- Kamehameha Highway, Safety & Operational Improvements, Kaalaea Stream to Hygienic Store (Project 10)
  - Description: 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.
  - Location: Kahaluu
  - This project was not coded.

Congestion Relief Projects

- Farrington Highway, Widening, Golf Course Road to west of Fort Weaver Road (Project 11)
  - Description: Widen Farrington Highway from 2 to 4 lanes, from Golf Course Road to west of Fort Weaver Road.
  - Location: Kapolei to Ewa
  - Total number of lanes: 4
  - Direction of lanes: east-west
  - Edit links: 3887 – 2161 – 2173 – 2109

- Farrington Highway, Widening, west of Fort Weaver Road to Waiawa Interchange (Project 38)
  - Description: Widen Farrington Highway from Kunia to Waiawa by 1 lane in each direction, from west of Fort Weaver Road to Waiawa Interchange.
  - Location: Kunia to Waiawa
  - Total number of lanes: 5 to 7
  - Direction of lanes: east-west
  - Edit links: 2109 – 2473 (5 lanes); 2473 – 2492 – 3509 – 2400 – 3784 - 2100 – 2098 (6 lanes); 2098 – 3692 – 3506 – 2096 (7 lanes); 2096 – 2094 – 2091 – 2086 – 2774 – 2079 (6 lanes)

- Farrington Highway, Widening, Hakimo Road to Kalaeloa Boulevard (Project 41)
  - Description: Widen Farrington Highway from 4 to 6 lanes, from Hakimo Road to Kalaeloa Boulevard, including intersection of Lualualei Naval Road.
  - Location: Lualualei to Kapolei
  - Total number of lanes: 6
  - Direction of lanes: north-south
  - Edit links: 2203 – 3620 – 3776 – 3619 – 2201 – 3609 – 3775 – 2529 – 2531 – 3605 – 2493 – 2207 – 2753 – 2534 – 3774 – 3600 – 2182 – 2123

- Fort Barrette Road, Widening, Farrington Highway to Franklin D Roosevelt Avenue (Project 12)
  - Description: Widen Fort Barrette Road from 2 to 4 lanes, from Farrington Highway to Franklin D Roosevelt Avenue. This project includes right- and left-turning lanes, sidewalks, bikeways, highway lighting, drainage, traffic signals, and landscaping.
  - Location: Kalaeloa Community Development District
  - Total number of lanes: 4
  - Direction of lanes: north-south
  - Edit links: 2114 – 2170 (no change, existing two lanes in each direction); 2170 – 2807 – 2113 (widen from one to two lanes in each direction)

- Hanua Street, Extension, Farrington Highway to Malakole Street; Interstate Route H-1, New On & Off Ramps, Palailai Interchange (Project 13)
  - Description:
    - Hanua Street: Extend Hanua Street from Malakole Street to Farrington Highway. This new 4-lane roadway will provide access to Kalaeloa Harbor.
    - Interstate Route H-1 Palailai Interchange: Construct new on & off ramps at Interstate Route H-1 Palailai Interchange to Hanua Street extension.
  - Location: Kapolei
  - Total number of lanes: Hanua Street – 4 lanes; 1 to 2 lanes per ramp
  - Direction of lanes: Hanua Street – north - south; Ramps – east - west
  - Add nodes: 4022, 4023, 4024
  - Add links: 3591 – 4024 – 4023 – 4022 – 2123 (Hanua Street extension); 2122 – 2127, 2123 – 2183 (1 lane ramp)
  - Add Centroid links: 586 – 4022 and 579 – 4023
  - Edit links: 2181 – 2123; 2121 – 2180 (2 lane ramp)
  - Delete link: 2122 – 2121

- Interstate Route H-1, New Interchange, Kapolei Interchange (Project 14)
  - Description: Construct new Interstate Route H-1 Kapolei Interchange for Kapolei between the Palailai Interchange and Makakilo Interchange.
  - Location: Kapolei
  - Total number of lanes: 1 lane per ramp; overpass 3 lanes
  - Direction of lanes: Ramps – east-west; overpass – north-south
  - Add node: 4027, 4028, 4029, 4030, 4031, 4032, 4033
  - Delete link: 2123 – 2539
  - Add links: 4027 – 4029 – 4030 – 4028; 4031 – 4029; 4030 – 4032; 4033 – 4030

- Interstate Route H-1, Widening, Middle Street to Vineyard Boulevard (Project 15)
  - Description: Widen the Interstate Route H-1 by 1 lane, in the eastbound direction, from Middle Street to Vineyard Boulevard, as identified below:
    - From 2 to 3 lanes from Middle Street to Likelike Highway off-ramp
    - From 3 to 4 lanes from Likelike Highway off-ramp to Vineyard Boulevard

    This project also includes the widening of:
    - Gulick Avenue overpass to allow 5 lanes to pass under it
    - Kalihi Interchange overcrossings to allow 4 lanes to pass under it
  - Location: Keehi to Liliha
  - Total number of lanes: 3 lanes to Moanalua merge/ 4 lanes to Vineyard Boulevard
  - Direction of lanes: east
  - Edit links: 1775 – 1661 (3 lanes); 1661 – 1657 – 1654 – 1645 – 1629 – 3687 – 3686 (4 lanes)

- Interstate Route H-1, Widening, Liliha Street to Pali Highway (Project 40)
  - Description: Widen the Interstate Route H-1 by 1 lane, from 3 to 4 lanes in the eastbound direction, from the Liliha Street on-ramp to Pali Highway off-ramp.
  - Location: Liliha
  - Total number of lanes: 4
  - Direction of lanes: east
  - Edit link: 1618 – 1614

- Interstate Route H-1, Operational Improvements, Lunalilo Street to Vineyard Boulevard (Project 16)
  - Description: Modify the weaving movements on the Interstate Route H-1, in the westbound direction, between the Lunalilo Street on-ramp and the Vineyard Boulevard off-ramp.
  - Location: Makiki to Kalihi
  - Direction of lanes: west
  - This project was not coded.

- Interstate Route H-1, New On- & Off-Ramps, Makakilo Interchange (Project 17)
  - Description: Construct a new eastbound off-ramp and a new westbound on-ramp to the Interstate Route H-1 at the Makakilo Interchange.
  - Location: Makakilo
  - Total number of lanes: 1 lane per ramp
  - Direction of lanes: east-west
  - Add nodes: 4194, 4195
  - Add links: 4194 – 2115 and 2118 – 4195
  - Add turn penalties to: 4194 – 2115 – 2760 and 2117 – 2118 – 4195

- Interstate Route H-1, On- & Off-Ramp Modifications, Various Locations (Project 41)
  - Description: Modify and/or close various on- and off- ramps on the Interstate Route H-1 from Middle Street to University Avenue. This project includes modification of auxiliary lanes at various exits and other operational changes to Interstate Route H-1. The identification of the precise improvements to be made will require a separate detailed corridor study.
  - Coding: Added 5% capacity to freeways in all core area types in ACAPA.HNL.
  - Location: Kalihi to Moiliili

- Interstate Route H-1, Widening, Vineyard Boulevard to Middle Street (Project 43)
  - Description: Widen the existing Interstate Route H-1 by 1 lane in the westbound direction, from Vineyard Boulevard to Middle Street.
  - Location: Kalihi
  - Total number of lanes: 4
  - Direction of lanes: west
  - Edit links: 1630 – 1640 – 1646 – 1655 – 1656

- Interstate Route H-1, On- & Off-Ramp Modifications, University Avenue Interchange (Project 42)
    - Description: Modify on- and off-ramps at the University Avenue Interchange on Interstate Route H-1. This project includes the construction of new ramps to allow all movements, safety improvements, including the closure of the eastbound on-ramp at University Avenue Interchange to Interstate Route H-1 and the construction of a new makai-bound off-ramp to University Avenue from Interstate Route H-1.
    - Location: Moiliili
    - Total number of lanes: 1
    - Direction of lanes: east-west
    - Delete node: 2843
    - Add links: 1054 - 1058
    - Delete links: 1058 – 2843 – 1055; 1054 –1057
    - Modify links: Changed direction of: 1059 – 1061 to 1061 – 1059; 1053 – 1059 to 1059 – 1053
    - Add turn penalties to: 1054 – 1058 – 1062 and 1061 – 1059 – 1053

- Interstate Route H-1, Widening, Waiawa Interchange (Project 19)
    - Description: Widen the Interstate Route H-1 by 1 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.
        - From 2 to 3 lanes in AM peak
        - From 4 to 5 lanes in PM peak
    - Location: Waipahu to Waikele
    - Total number of lanes: AM – 3 lanes, Mid/PM – 5 lanes
    - Direction of lanes: west
    - Edit links: 2077 – 2084 – 2156 – 2158

- Interstate Route H-1, HOV Lanes, Waiawa Interchange to Makakilo Interchange (Project 44)
    - Description: Construct 2 HOV lanes, 1 in the westbound direction and 1 in the eastbound direction, on the Interstate Route H-1, from the Waiawa Interchange to the Makakilo Interchange.
    - Location: Makakilo to Waiawa
    - Total number of lanes: 2
    - Direction of lanes: east-west
    - Add nodes: 4113, 4114, 4115, 4116, 4117, 4118, 4119, 4120, 4121, 4122, 4123, 4124, 4125, 4126, 4127, 4128, 4129, 4130, 4131, 4132, 4133, 4134, 4135.
    - Add links: 4130 – 4114 – 4116 – 4118 – 4120 – 4122 - 4124 – 4126 – 4128; 4127 – 4125 – 4123 – 4121 – 4119 – 4117 – 4115 – 4113; 4113 – 4129; 4117 – 4131; 4132 – 4118; 4122 – 4135; and 4128 – 4134;

- Interstate Route H-1, Widening, Waiawa Interchange to Halawa Interchange (Project 45)
  - Description: Widen the Interstate Route H-1 by 1 lane in the eastbound direction, from the Waiawa Interchange to the Halawa Interchange.
  - Location: Waiawa to Halawa
  - Total number of lanes: AM/PM – 5 lanes, Mid – 6 lanes
  - Direction of lanes: east
  - Edit links: 2070 – 2069 – 3412 – 3438 – 2135 – 2829 – 3681 – 2134 – 3413 – 3415 – 2026.
  - Edit link: 3412 – 3438. Changed coding from two-way highway to one-way highway

- Interstate Route H-1, Zipper Lane (PM), Keehi Interchange to Kunia Interchange (Project 20)
  - Description: Construct a Zipper lane on the Interstate Route H-1, in the westbound direction, from Keehi Interchange to Kunia Interchange. This project would be in use during the PM peak.
  - Location: Kalihi to Kunia
  - Total number of lanes: PM - 1
  - Direction of lanes: west
  - Add nodes: 4152, 4153, 4154, 4155, 4156, 4157, 4158, 4159, 4160, 4161, 4162, 4163, 4164, 4165, 4166, 4167, 4168, 4169, 4170, 4171, 4172, 4173, 4174.
  - Add link: 1773 – 4152 – 4153 – 4154 – 4155 – 4156 – 4157 – 4158 – 4159 – 4160 – 4161 – 4162 – 4163 – 4164 – 4165 – 4166 – 4167 – 4168 – 4169 – 4170 – 4171 – 4172 – 4173 – 4174
  - Modify links (reduced by 1 lane in PM): 4175 – 2104 – 2108 – 4135 – 4135 – 2241 – 2159– 2155 – 2240 – 4134 – 2085 – 2078 – 2070 – 2069 – 3412 – 3438 – 2135 –2829 – 3681 – 2134 – 3413 – 3415 – 2026 – 2143 – 2027 – 2030 – 2398 – 1894 – 1882 – 1878 – 3711 – 1874 – 1864 – 1865 – 3716 – 2826.

- Interstate Route H-1, Widening, Waipahu Off-Ramp (Project 21)
  - Description: Widen the Interstate Route H-1 Waipahu Street off-ramp from 1 to 2 lanes, in the westbound direction, at the Waiawa Interchange.
  - Location: Waipahu
  - Total number of lanes: 2
  - Direction of lanes: west
  - Edit link: 2068 – 2071

- Interstate Route H-1, Operational Improvements, Ward Avenue On-Ramp to University Avenue Interchange (Project 23)
  - Description: 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.
  - This project is an operational improvement and is not able to be modeled.
  - Location: Makiki to Moiliili
  - This project was not coded.

- Interstate Route H-1, Widening, Waiau Interchange to Waiawa Interchange (Project 18)
    - Description: Widen Interstate Route H-1 in the westbound direction by 1 lane from Waiau Interchange to Waiawa Interchange.
    - Location: Pearl City to Waipahu
    - Total number of lanes: AM – 4, Mid – 6, PM – 5
    - Direction of lanes: west
    - Edit links: 2827 – 2133 – 3437 – 3411 – 2068 – 2073

- Interstate Routes H-1 & H-2, Operational Improvements, Waiawa Interchange (Project 24)
    - Description: Modify the Interstate Routes H-1 and H-2 Waiawa Interchange, to improve merging characteristics through operational improvements (e.g., additional transition lanes).
    - Location: Waiawa
    - This project was not coded.

- Interstate Route H-1, Widening, Ward Avenue to Punahou Street (Project 46)
    - Description: Widen the existing Interstate Route H-1 by 1 lane in the eastbound direction, from Ward Avenue to Punahou Street.
    - Location: Makiki
    - Total number of lanes: 4
    - Direction of lanes: east
    - Edit links: 1324 – 1077 – 1075

- Interstate Route H-2, New Interchange, Pineapple Road Overpass (Project 47)
    - Description: 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 2 lanes to 4 lanes; and addition of new on- and off-ramps to and from Interstate Route H-2 at Pineapple Road Overpass.
    - Location: Kipapa Gulch.
    - Total number of lanes: 1 lanes per ramp; Pineapple Road Overpass – 4 lanes (2 lanes in each direction)
    - Direction of lanes: Ramps - north-south; Pineapple Road – east-west
    - Add nodes: 4140, 4141, 4142, 4143, 4144, 4145, 4146, 4147, 4148
    - Add links: 3521 – 4140 – 4141 – 4142 – 4143 – 4148
    - Add ramps: 4147 – 4143; 4143 – 4146; 4144 – 4142; 4142 – 4145.
    - Add Centroid link: 472 – 4141
    - Delete Centroid link: 472 – 3521
    - Add turn penalties to: 4147– 4143 – 4146 and 4144 – 4142 – 4145.

- Interstate Route H-2, Widening, Waipio Interchange (Project 22)
  - Description: 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.
  - Location: Waipio
  - Total number of lanes: Ramps – 2; Bridge – 4
  - Direction of lanes: Ramps – north-south; Bridge – east-west
  - Edit Links: 2249 – 2247; 2247 – 2245; 2246 – 2248 and 2248 – 2250

- Kahekili Highway, Widening, Kamehameha Highway to Haiku Road (Project 48)
  - Description: Widen Kahekili Highway from 2 to 4 lanes, from Kamehameha Highway to Haiku Road. This project also includes the following improvements:
    - Contraflow in existing right-of-way between Hui Iwa Street and Haiku Road
    - Intersection improvements at Hui Iwa Street and Kamehameha Highway
  - Location: Kahaluu to Haiku
  - Total number of lanes: 4
  - Direction of lanes: north-south
  - Edit links: 2586 – 2942 – 2378 (w/contraflow) and 2378 - 2376 – 2938 – 2377
- Kamehameha Highway, Widening, Lanikuhana Avenue to Ka Uka Boulevard (Project 25)
  - Description: Widen Kamehameha Highway from a 3-lane to a 4-lane divided facility between Lanikuhana Avenue and Ka Uka Boulevard. This project includes shoulders for bicycles and disabled vehicles, bridge crossing replacement, bikeways, etc.
  - Location: Mililani to Waipio
  - Total number of lanes: 4
  - Direction of lanes: north-south
  - Edit links: 2251 – 2489 – 2089

- Kapolei Parkway, Extension, Kamokila Boulevard to Papipi Road (Project 26)
  - Description: Extend the existing 4-lane Kapolei Parkway by constructing the segments in each of the following areas:
    - Kamokila Boulevard to Fort Barrette Road
    - Ewa Village boundary to Renton Road
    - Geiger Road to Papipi Road
  - Location: Kapolei to Ewa Beach
  - Total number of lanes: 4
  - Direction of lanes: east-west
  - Add links: 1220 – 3885 – 3598, 2807 – 2536, 2112 – 4579 – 4578 - 2549
  - New centroid links: 565 – 4578, 567 – 4579, 566 – 4579
  - Delete centroid links: 567 – 2112, 566 – 2112

- Kapolei Parkway, Extension, Aliinui Drive to Kalaeloa Boulevard (Project 27)
  - Description: Extend the existing 4-lane Kapolei Parkway, from Aliinui Drive to Kalaeloa Boulevard.
  - Location: Ko Olina (Resort) to Kapolei
  - Total number of lanes: 6
  - Direction of lanes: east-west
  - Add node: 4022
  - Add link: 2127 – 4022 – 2538

- Kunia Road, Widening and Interchange Improvement, Wilikina Drive to Farrington Highway (Project 49)
  - Description: Widen and improve Kunia Road as follows:
    - Widen from 2 to 4 lanes, from Wilikina Drive to Kupuna Loop.
    - Widen from 4 to 6 lanes, Kupuna Loop to Farrington Highway.
    - Add 1 eastbound loop on-ramp at Kunia Road and Interstate Route H-1
  - Location: Schofield Barracks Military Reservation to Kunia
  - Total number of lanes: 4 lanes from Wilikina Drive to Kupuna Loop; 6 lanes from Kupuna Loop to Farrington Highway.
  - Direction of lanes: north-south
  - Edit Links: 2257 – 2258 – 3772 – 3565 – 2259 – 3566 – 2147 – 2832 – 3569 – 2571 (4 lanes); 2571 – 2151 – 2106 – 3801 – 2103 – 3513 – 2102 – 2472 – 2491 (6 lanes)
  - Add node: 4580
  - Add link: 3801 – 4580 – 2108 (EB loop ramp)

- Likelike Highway, Widening, Kamehameha Highway to Kahekili Highway (Project 50)
  - Description: Widen Likelike Highway from 4 to 6 lanes, from Kamehameha Highway to Kahekili Highway.
  - Location: Kaneohe
  - Total number of lanes: 6
  - Direction of lanes: east-west
  - Edit links: 2411 – 2383 – 2384

- Makakilo Mauka Frontage Road, New Roadway, Kalaeloa Boulevard to Makakilo Drive (Project 51)
  - Description: Construct a new 2-lane Makakilo Mauka Frontage Road, mauka of Interstate Route H-1, from Kalaeloa Boulevard to Makakilo Drive.
  - Location: Makakilo
  - Total number of lanes: 2
  - Direction of lanes: north-south
  - Add node: 4026
  - Add links: 2182 – 4027 - 4026

- Nimitz Highway, HOV Flyover, Keehi Interchange to Pacific Street (Project 52)
  - Description: Construct a new 2-lane elevated and reversible HOV flyover above Nimitz Highway, from the Keehi Interchange to Pacific Street. This project includes the removal of the existing east-bound contraflow lane in the AM peak and restoration of all turning movements on the at-grade portion of Nimitz Highway.
  - Location: Kalihi
  - Total number of lanes: 2
  - Direction of lanes: AM/MD – east; PM – west
  - HOV Flyover
    - Add nodes: 4180, 4181, 4182, 4183, 4184, 4185, 4186, 4187, 4188, 4189, 4190, 4191, and 4192.
    - Add eastbound links: 1765 – 4180 – 4181 - 4182 – 4183 – 4184– 4185 – 4186 – 2859
    - Add westbound links: 2858 – 4187 – 4188 – 4189 – 4190 – 4191 – 4192 – 4193 - 1765.
  - Remove east-bound contraflow
    - Delete links: 1765 – 3893 – 3894 – 3895 – 3896 – 3897 – 3898 – 1725
    - Add one lane to: 1725 – 3376 – 1732 – 3816 – 1735 – 1755 – 1758 – 1783 – 1784 – 1765

- North/South Road, Widening and Extension, Interstate Route H-1 to Franklin D Roosevelt Avenue (Project 28)
  - Description: Widen and extend North-South Road as follows:
    - From 3 to 6 lanes from Kapolei Parkway to Interstate Route H-1
    - Extend from Kapolei Parkway to Franklin D Roosevelt Avenue (6 lanes)
  - Location: Kapolei
  - Total number of lanes: 6
  - Direction of lanes: north-south
  - Edit links: 3889 – 3888 – 3887 – 3886 – 3892 – 3885
  - Add node: 4139
  - Add link: 3885 – 4139

- Piikoi-Pensacola Couplet Reversal (Project 53)
  - Description: Reverse the direction of the existing one-way Piikoi Street and Pensacola Street couplet.
  - Location: Makiki to Kakaako
  - Total number of lanes: no change
  - Pensacola Street (Wilder Avenue to Waimanu Street)
    - Direction of lanes: reversed to northbound
    - Delete links: 1307 – 3344 – 1309 – 1320 – 1321 – 2496 – 1357 – 3267 – 1298 – 3268 – 1356 – 3269 – 1409
    - Add links: 1409 – 3269 – 1356 – 3268 – 1298 – 3267 – 1357 – 2496 – 1321 – 1320 – 1309 – 3344 – 1307
  - Piikoi Street (Kapiolani Boulevard to Wilder Avenue)
    - Direction of lanes: reversed to southbound
    - Delete links: 1359 – 3252 – 1297 – 3255 – 1358 – 2495 – 1317 – 1318 – 1319 – 1308 – 3345 – 1306
    - Add links: 1306 – 3345 – 1308 – 1319 – 1318 – 1317 – 2495 – 1358 – 3255 – 1297 – 3252 – 1359

- Puuloa Road, Widening, Pukoloa Street to Nimitz Highway (Project 54)
  - Description: Widen Puuloa Road, from Pukoloa Street to Nimitz Highway, as follows:
    - From 3 lanes (1 lane southbound and 2 lane northbound) to 5 lanes (2 lanes southbound and 3 lanes northbound), from Pukoloa Street to Kamehameha Highway.
    - From 4 lanes (2 lanes each direction) to 6 lanes (3 lanes each direction) from Kamehameha Highway to Nimitz Highway.
  - Location: Mapunapuna
  - Total number of lanes: total 5 lanes (2 lanes southbound and 3 lanes northbound) between Pukoloa Street and Kamehameha Highway; total 6 lanes (3 lanes each) between Kamehameha Highway to Nimitz Highway
  - Direction: north-south
  - Edit links: 1690 – 2728 – 3800 (from 3 to 5 lanes); 1852– 1853 (from 4 to 6 lanes)

Second Access Projects

- Central Mauka Road, Second Access, Mililani Mauka to Waiawa (Project 55)
  - Description: Construct Central Mauka Road, a new 4-lane, 2.5-mile road from Mililani Mauka to Waiawa. Road connects Meheula Parkway to Kamehameha Highway in Pearl City; parallel to & mauka of Interstate Route H-2. The new 4-lane north-south road includes connections to Interstate Route H-2 interchanges.
  - Location: Central Oahu
  - Total number of lanes: 4
  - Direction of lanes: north-south
  - Add node: 4000, 4001, 4002, 4003, 4004, 4136
  - Add centroid links: 493 – 4001; 473 – 4002; 480 – 4003; 475 – 4004
  - Add link: 3833 – 4001 – 4002 – 4000 – 4003 – 3498; 2248 – 4004 – 4000 (Ka Uka Boulevard extension)
  - Delete centroid links: 473 – 3521; 480 – 2072; 475 – 2248
  - Add centroid Link: 493 – 4001

- Makakilo Drive, Second Access, Makakilo Drive to North-South Road/Interstate Route H-1 (Project 29)
  - Description: Extend the 4-lane Makakilo Drive (vicinity Pueonani Street) south to the Interstate Route H-1 Freeway Interchange, connecting Makakilo Drive to North-South Road.
  - Location: Makakilo
  - Total Number of lanes: 4
  - Direction of lanes: north-south
  - Add link: 2541 – 3889

- Wahiawa, Second Access, Whitmore Avenue to Meheula Parkway (Project 56)
  - Description: Construct a new 2-lane second access road between Whitmore Village and Wahiawa, from Whitmore Avenue to California Avenue. Continue the new 2-lane second access road to Mililani Mauka, from California Avenue to Meheula Parkway.
  - Location: Wahiawa
  - Direction of lanes: north-south
  - Add node: 4136
  - Add links: 3833 – 4136 – 2265 – 2556; 511 – 4136
  - Delete Centroid link: 511 – 2255

- Waianae, Second Access, Farrington Highway to Kunia Road (Project 57)
  - Description: Construct a new 2-lane second access road to Waianae from Farrington Highway in the vicinity of Maili, over the Waianae Range, to Kunia Road. Roadway will go around the Lualualei Naval Base.
  - Location: Waianae
  - Total number of lanes: 2
  - Direction of lanes: east-west
  - Add links: 3630 – 2147
  - Distance set to 13.5 miles to simulate crossing rugged terrain

Transit Projects

- Ferry, Intra-Island Express Commuter, in the vicinity of Ocean Pointe Marina to Honolulu Harbor (Project 30)
    - Description: Implement intra-island passenger ferry in vicinity of the Ocean Pointe Marina in Ewa and Honolulu Harbor
    - Location: Ewa to Downtown
    - Add nodes: 4016, 4017, 4018, 4019
    - Add ferry link: 4019 – 4016 – 4017 – 4018

- Rail Transit, Kapolei to Manoa/Waikiki (Project 31)
    - Description: Plan, design, and construct a fixed rail transit system between Kapolei and Manoa/Waikiki. This project includes modifications to TheBus system to provide feeder services to rail stations and eliminate parallel express services. Note that the alignment, system technology, and location of transit stations will be determined pending the completion of the Alternative Analysis Draft Environmental Impact Statement (AA/DEIS).
    - Location: Kapolei to Manoa/Waikiki
    - Additional Parameters assumed for the LRT coding:
        - Service Frequency: 5-minute headways (peak periods) and 10-minutes headways (off-peak periods).
        - Operating Speeds: Average speeds, including station stops and acceleration/ deceleration, of 30 mph from Kapolei/Central to downtown and 20 mph from Downtown to Manoa (at the University of Hawaii). The LRT vehicles would have a maximum speed of 50 mph.
        - Fare: $2 one way fare.

- TheBus Service, Expansion, Islandwide (Project 32)
    - Description: Expand the bus service to and within the Ewa, Kapolei, and Central Oahu developing areas.
        - Locations: Ewa, Kapolei, & Central Oahu
        - Re-routed existing Country Express for service through Kapolei town
        - Extended existing local route to serve Kapolei
    - Description: Expand the bus service through implementation of a "Hub-and-Spoke" bus system with transit centers and circuitous routes.
        - Location: Systemwide
    - Description: Expand the bus service through increase of capacity of the existing system to accommodate population growth.
        - Location: Systemwide
        - Service headways increased to accommodate growth.
    - Description: Expand the bus service through increase of Express bus service to the North Shore, Waianae, and Windward Oahu.
        - Location: Kailua, Kaneohe, North Shore, Waianae
        - Add new bus lines: Honolulu to Kaneohe Express (Rte IA), Honolulu to Kailua Express (Rte IB) in files TLTTXXBX. FNL& TLTTXXTR. FNL
        - Expand route: Route D expanded into Haleiwa via Kaukonahua Road in files TLTTXXBX. FNL & TLTTXXTR. FNL

Transit Center Projects

- Transit Centers, Various Locations (Project 33)
    - Description: Construct transit centers at various locations islandwide to support the Rail Transit and TheBus Systems.
    - Location: Various Islandwide
    - This project was not coded.

APPENDIX G

STRATEGIC PLAN CONCEPTS BROCHURE

2030 OAHU REGIONAL TRANSPORTATION PLAN
STRATEGIC PLAN CONCEPTS

PLANNING in Motion
2030 O'ahu Regional Transportation Plan

INTRODUCTION

The Oahu Regional Transportation Plan (ORTP) is the official guide for the development of the major land transportation facilities and programs to be implemented on Oahu. It is a long-term vision document that outlines transportation goals, objectives, and policies for Oahu. The plan identifies short-range and long-range strategies and actions that are designed to promote the development of an integrated intermodal transportation system that facilitates the safe, efficient, and economic movement of people and goods.

Every five years, the Oahu Metropolitan Planning Organization (OMPO) revises the ORTP. The last updated plan was adopted by OMPO in April 2001, and development of the next ORTP is underway.

The 2030 ORTP study is now at the point of evaluating potential solutions to address identified needs. This brochure summarizes the problem areas and possible solutions identified to this point.

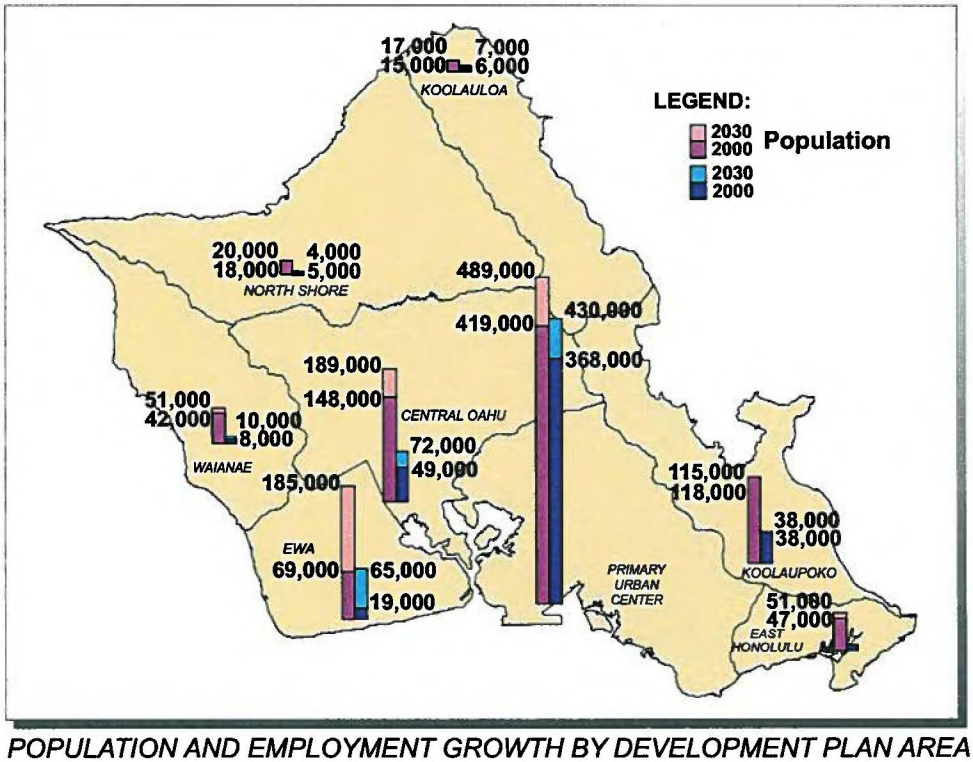
This brochure contains a questionnaire requesting your input regarding the ideas presented herein to help shape the development of the draft ORTP.

OAHU POPULATION AND EMPLOYMENT GROWTH

The City and County of Honolulu's *General Plan* includes policies to promote development of the Honolulu Primary Urban Center (PUC), to encourage development within the secondary urban center at Kapolei and the Ewa and Central Oahu urban-fringe areas, and, in the remaining rural areas of the island, to "keep the country country."

Based on State of Hawaii forecasts, islandwide population is projected to increase from about 876,000 residents in 2000 to 1,117,000 residents in 2030, an increase of 28% (about 1% per year). Islandwide employment is projected to increase from about 500,000 jobs in 2000 to 633,000 jobs in 2030, about 27%.

The highest levels of growth are projected for the PUC, Ewa, and Central Oahu Development Plan Areas (DPAs). According to City and County of Honolulu forecasts, the PUC is projected to increase by about 70,000 residents, or 17%, between 2000 and 2030.



POPULATION AND EMPLOYMENT GROWTH BY DEVELOPMENT PLAN AREA

Population in the Ewa DPA is projected to increase by 116,000 residents, more than double the number of Ewa residents in the Year 2000. The Central Oahu area is projected to experience an increase in population of about 28%.

The PUC is the employment center for the island, with about 75% of jobs currently located there. Waikiki, part of the PUC, is the key tourist area on the island, with over 85% of all visitor units and related jobs. Future employment in the PUC is projected to increase by about 17%, or 62,000 jobs. Additionally, by 2030, jobs in the Ewa DPA are projected to increase by about 46,000, almost 250%.

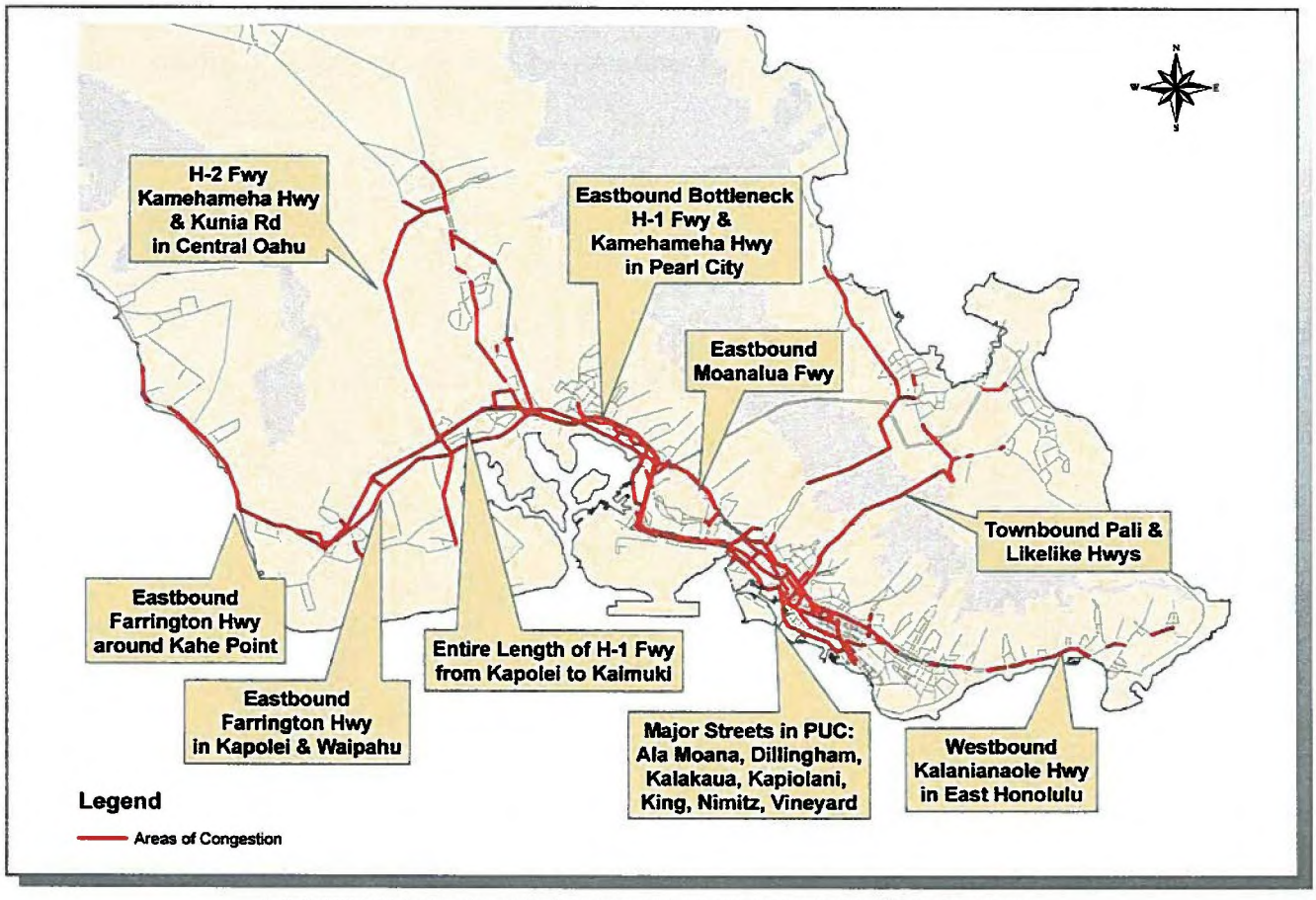
TRAVEL DEMAND GROWTH AND PROBLEM AREAS

Future conditions were forecast for the Year 2030 assuming the population and employment growth discussed above. This forecast also assumed that no improvements would be made to the transportation system other than baseline improvement projects that are already funded for implementation within the next few years. The purpose of this baseline analysis is to evaluate potential future transportation system problems. This process is a first step to the identification of solutions for possible inclusion in the 2030 ORTP.

The combination of substantial increases in residential population in Ewa and Central Oahu while the PUC remains the primary employment location leads to a high projected increase in travel demand between Ewa and the PUC.

Most of these trips are projected to be made in private automobiles (about 86% of commute trips to and from work would be via auto, 8% by transit [e.g., TheBus], and 6% by bicycling or walking).

As a result of the projected growth patterns and continued reliance on auto trips, many of the key highways on Oahu are projected to experience significant congestion during the AM peak period under Year 2030 baseline conditions.

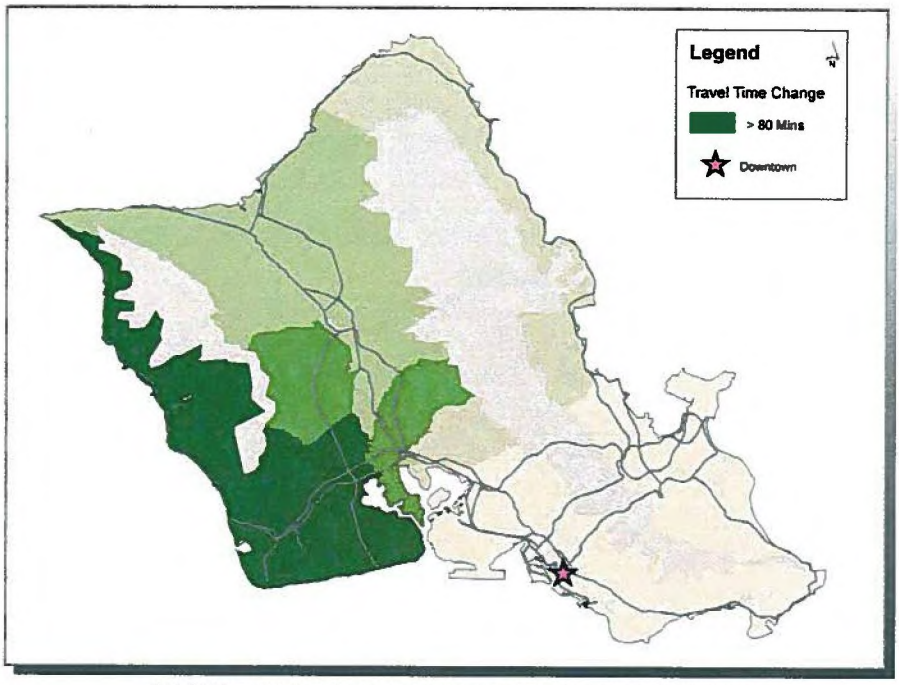


LOCATIONS OF SIGNIFICANT AM CONGESTION (YEAR 2030)

The amount of time it takes to drive from the Waianae Coast, Ewa/Kapolei, and Central Oahu to downtown Honolulu is projected to increase significantly by the Year 2030.

This increase is caused by large increases in traffic volumes projected on H-1 in the Waiawa and Pearl City area, causing a significant reduction in speed and increases in congestion and delay. The large volume increase is caused by the projected population growth in the Ewa and Central Oahu areas.

In addition to congestion, other important transportation system issues include safety and a lack of alternative access to portions of the island.



CHANGE IN AM PEAK TRAVEL TIME TO DOWNTOWN HONOLULU: 2000 TO 2030

POTENTIAL PROJECTS

Potential transportation improvement projects have been identified from a variety of sources for possible inclusion in the 2030 ORTP. These sources include the general public (in response to a "Call for Projects"), the OMPO Citizen Advisory and Policy Committees, City and State agencies, and prior planning documents. Each project was classified into categories of improvement types: transit, ferry, highway/congestion relief, safety, and secondary/emergency access projects.

STRATEGIC PLAN CONCEPTS

The projects were grouped into four strategic plan concepts, each following a general theme. The four strategic plan concepts are described on the following pages.

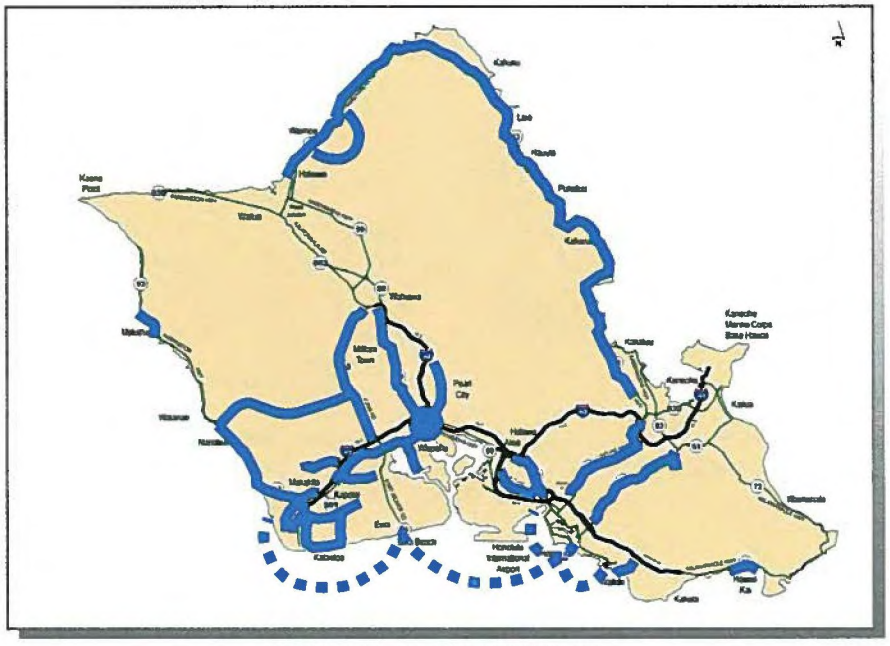
The 2030 ORTP will include projects addressing both islandwide/regional and subregional needs. The intention behind the strategic plan concepts at this stage of the ORTP is to test alternative approaches to resolving the major regional problems related to travel within and between the Primary Urban Center and developing areas. The concepts focus on those portions of the islandwide transportation system identified as significantly congested in the 2030 baseline analysis. The strategic plan concepts also address issues such as second access concerns.

Regardless of theme, each concept shared common projects: *Bike Plan Hawaii* projects, intelligent transportation system projects, transportation demand management measures, TheBus hub-and-spoke system, and TheBus system capacity increases in proportion to population growth and expansion in developing areas.

The strategic plan concepts are intended as starting points for evaluation of effectiveness of different approaches to resolving the major transportation problems facing the island. They should not be viewed as stand-alone plans. Improvements from the various concepts will be combined and/or eliminated through an iterative process as the draft 2030 ORTP is developed and refined.

CONCEPT 1: ISLANDWIDE

The Islandwide Concept includes a variety of improvements, such as second and emergency access projects, safety projects, and highway and transit projects throughout the island. Highway projects include major projects such as widening and interchange improvements. Transit projects include the TheBus system expansion in rural areas and proposed intra-island ferry routes.



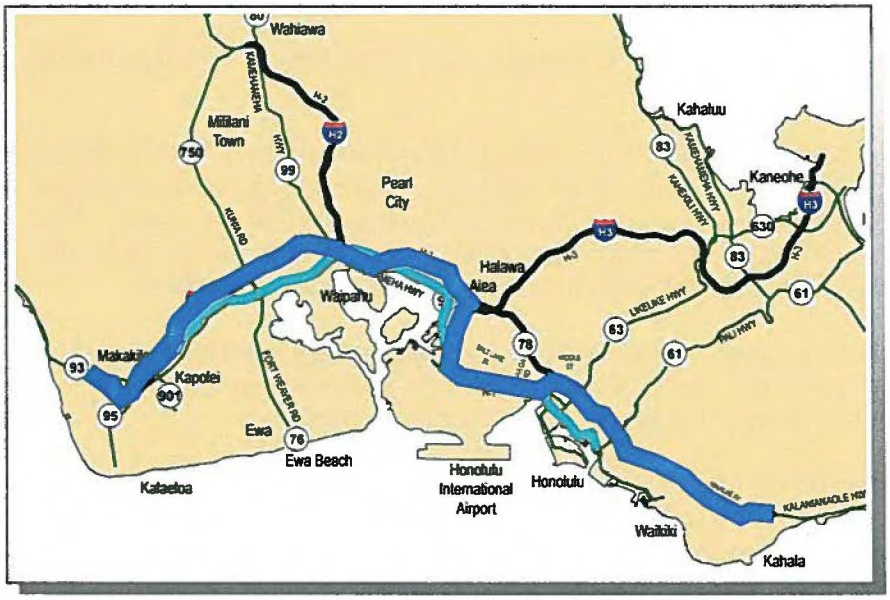
CONCEPT 1: ISLANDWIDE

Sample Projects:

- Central Mauka Road
- Farrington Hwy Improvements
- H-1 to Waikiki Access
- H-1/H-2 Waiawa Interchange Improvements
- Intra-Island Commuter Ferry
- Kamehameha Hwy Safety Projects
- Kunia Road Widening
- Mililani Second Access
- Pali/Likelike Improvements
- Waianae Second Access
- Waimea Bay Second Access

CONCEPT 2: H-1 CORRIDOR EMPHASIS

The objective of Concept 2 is to recognize and use the H-1 corridor as a resource to improve access within and between the major existing and future growth areas along the corridor by addressing major bottlenecks and congested areas and improving traffic flow throughout the entire corridor. The concept includes major projects such as widening, interchange modifications, flyovers, and carpool and high-occupancy toll (HOT) lanes. Also included are transit projects with lower capital requirements.



CONCEPT 2: H-1 CORRIDOR EMPHASIS

Sample Projects:

- Dillingham Elevated Roadway
- Farrington Hwy Widening
- H-1 Elevated High-Occupancy Toll Lanes
- Interchange & Ramp Modifications along length of H-1
- Kamehameha Hwy Widening
- Nimitz Flyover

CONCEPT 3: PEARL HARBOR EMPHASIS

The emphasis of Concept 3 is on resolving the bottleneck around Pearl Harbor through the Aiea/ Waiau/Pearl City/Waipahu areas. The primary feature of this concept is a highway connection across Pearl Harbor, potentially consisting of a tunnel connecting the Ewa area to H-1 in the vicinity of the airport or a series of bridges connecting Iroquois Point to West Loch, Ford Island, and the Aloha Stadium area.

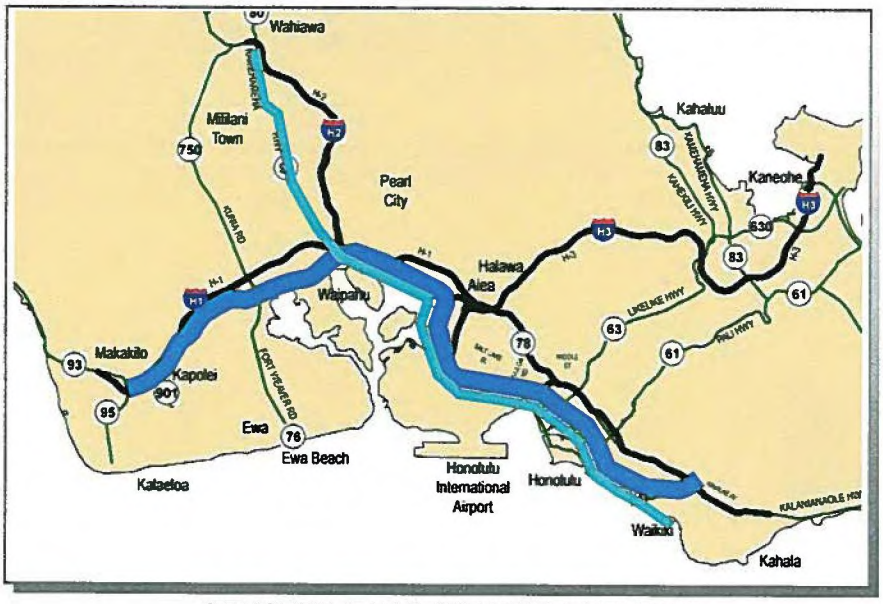
CONCEPT 3: PEARL HARBOR EMPHASIS

Crossings Evaluated:

- Bridge crossing from Iroquois Point to Waipio Peninsula to Ford Island to Kamehameha Hwy
- Tunnel beneath Pearl Harbor Entrance

CONCEPT 4: RAIL TRANSIT EMPHASIS

The primary feature of Concept 4 is construction of a rail transit line along with associated transit feeder services and access ramps and improvements. Alignment options are being considered as part of the evaluation of the concept.



CONCEPT 4: RAIL TRANSIT EMPHASIS

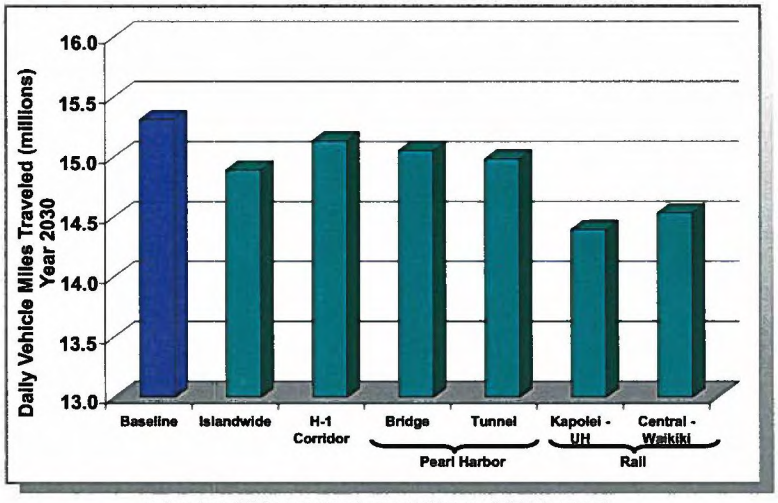
Alignments Evaluated:

- Rail Transit Line between Central Oahu to Waikiki
- Rail Transit Line between Kapolei & UH Manoa
- Transit Feeders

SUMMARY OF EVALUATION

The four strategic plan concepts were evaluated using a series of performance measures:

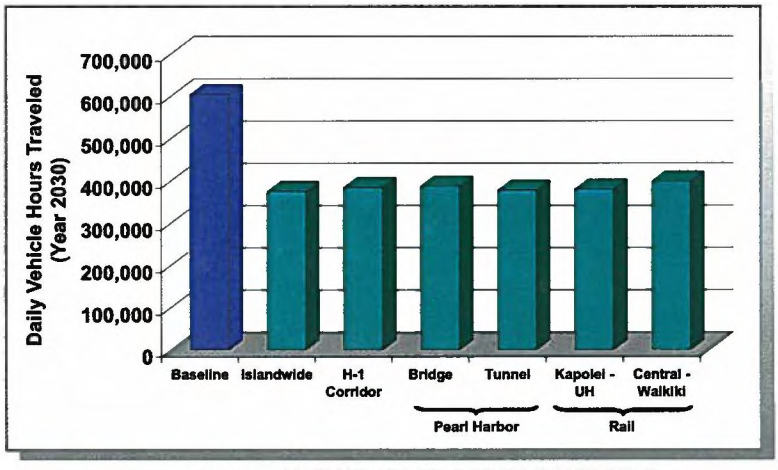
- Transportation service including service effectiveness (mode split, transit ridership, vehicle occupancy, vehicle miles traveled), congestion relief effectiveness (level of service, congested lane miles, travel time), cost effectiveness (annualized cost, marginal cost per transit trip, marginal cost per vehicle mile reduced), and system preservation.
- Environment/quality of life including land use sensitivity, resource conservation, air quality, energy conservation, and bicycle/pedestrian system.
- Land use/transportation integration including population distribution/land use policy, and intermodal efficiency.



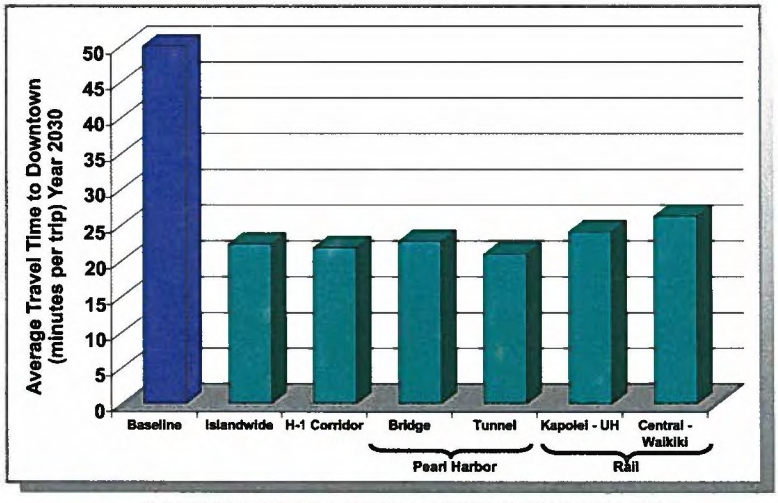
DAILY VEHICLE MILES TRAVELED (YEAR 2030)

The performance evaluation focuses on the effectiveness of each strategic plan concept in resolving the regional transportation problems facing the island. Each of the strategic plan concepts would reduce vehicle miles traveled, vehicle hours traveled, delay, and average travel time per vehicle trip, although to varying degrees.

Key findings of the performance analysis are summarized in the adjacent bar charts. Note that each chart illustrates the respective performance measure for each concept as compared to 2030 baseline if no other transportation improvements were implemented.



DAILY VEHICLE HOURS TRAVELED (YEAR 2030)



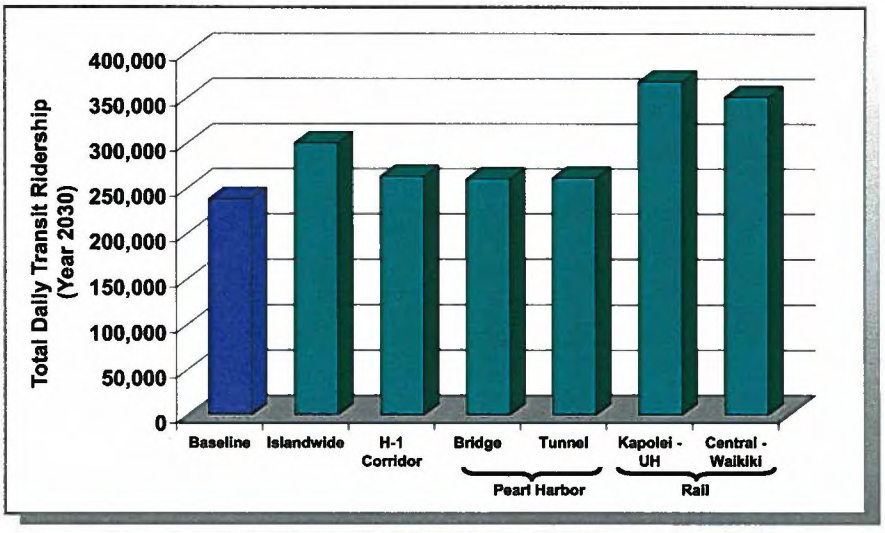
AVERAGE TRAVEL TIME TO DOWNTOWN (YEAR 2030)

Additional findings include the following:

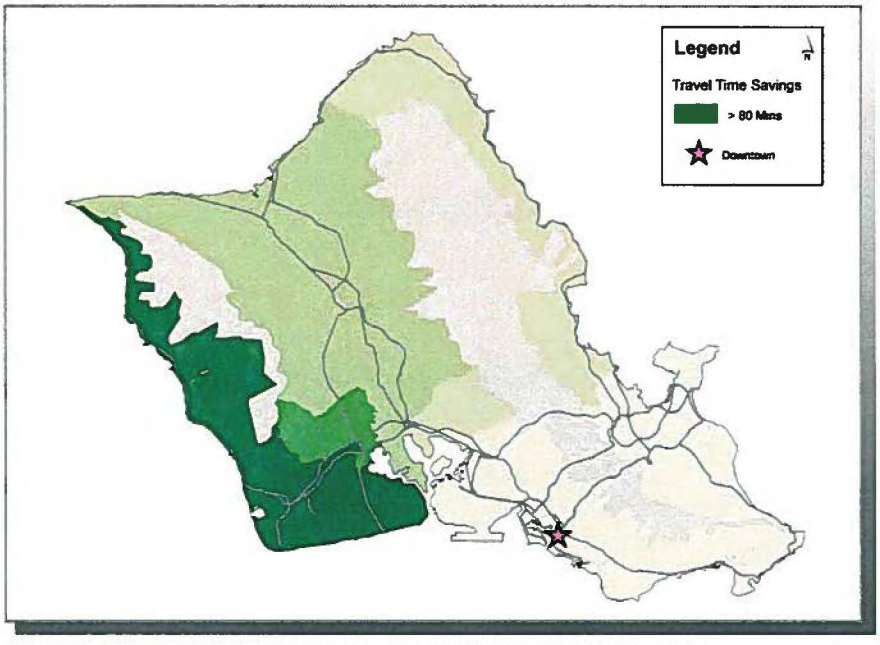
- The concepts that emphasize highway network improvements (Concepts 2 and 3) result in very little change in mode split or automobile occupancy and only a minor increase in transit ridership. The rail transit concepts (Concept 4) achieve the greatest increases in transit ridership and transit mode share.

- Each concept is projected to result in a similar level of improvement in travel times. Each of the concepts would alleviate the substantially increased delays and travel times projected in the Year 2030 between Ewa and Central Oahu and the primary urban center.

- Each of the concepts includes moderate to major improvements (e.g., ferries and highway improvements spread throughout the island in Concept 1, elevated high-occupancy toll lanes and viaducts in Concept 2, Pearl Harbor tunnel or bridges in Concept 3, and rail transit in Concept 4) that may have environmental impacts associated with implementation.



DAILY TRANSIT RIDERSHIP (YEAR 2030)



TRAVEL TIME IMPROVEMENT TO DOWNTOWN WITH CONCEPTS 1, 2, 3 AND 4A (YEAR 2030)

FUNDING

The strategic plan concepts serve as a starting point to test the level of transportation system improvement that may be required to address projected demands on the island. The high level of improvement projects contained in the concepts, however, would cost substantially more than the level of transportation funding historically available to Oahu. It is unlikely that Federal funding will be available to cover all of the increased costs.

This means that alternative forms of funding would need to be obtained if major projects contained in the concepts are to be included in the 2030 ORTP and ultimately implemented. Alternative means that could be explored could include:

- Tolls to fund projects such as a Pearl Harbor bridge or Pearl Harbor tunnel.
- Charging solo drivers variable tolls to use high-occupancy toll (HOT) express lanes.
- Combination of Federal funding and local taxes such as the General Excise Tax (GET) increase recently passed by the City and County for funding rail transit.
- Public/private partnerships to fund improvement projects in developing areas.

The final 2030 ORTP will include a financial analysis and must demonstrate a balance between projected costs and anticipated revenues. The plan will consider both costs to construct proposed improvements as well as costs to operate and maintain the transportation system. Improvement projects from the various concepts will be combined and/or eliminated through an iterative process as the 2030 ORTP is developed and refined.

For more information regarding the ORTP or to download the questionnaire from the web, please visit the OMPO website at www.OahuMPO.org/ortp or contact OMPO at:

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